

Internet Engineering Task Force
INTERNET-DRAFT
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PIM-WG
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Protocol Independent Multicast MIB

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects used for managing the Protocol Independent Multicast (PIM) protocol.

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[1](#). Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects used for managing the Protocol Independent Multicast (PIM) protocol [[18,19](#)].

[2](#). The SNMP Network Management Framework

The SNMP Management Framework presently consists of five major components:

- * An overall architecture, described in [RFC 2571](#) [[1](#)].
- * Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and described in STD 16, [RFC 1155](#) [[2](#)], STD 16, [RFC 1212](#) [[3](#)] and [RFC 1215](#) [[4](#)]. The second version, called SMIV2, is described in STD 58, [RFC 2578](#) [[5](#)], STD 58, [RFC 2579](#) [[6](#)] and STD 58, [RFC 2580](#) [[7](#)].
- * Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, [RFC 1157](#) [[8](#)]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called

SNMPv2c and described in [RFC 1901](#) [9] and [RFC 1906](#) [10]. The third version of the message protocol is called SNMPv3 and described in [RFC 1906](#) [10], [RFC 2572](#) [11] and [RFC 2574](#) [12].

- * Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, [RFC 1157](#) [8]. A second set of protocol operations and associated PDU formats is described in [RFC 1905](#) [13].
- * A set of fundamental applications described in [RFC 2573](#) [14] and the view-based access control mechanism described in [RFC 2575](#) [15].

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

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

[3.](#) Overview

This MIB module contains one scalar and eight tables. Some of the objects in these tables are deprecated. This MIB contains deprecated objects since they are necessary for managing PIMv1 routers, but PIMv1 itself is obsoleted by PIM v2 [[18](#),[19](#)].

The tables contained in this MIB are:

- (1) The PIM Interface Table contains one row for each of the router's PIM interfaces.
- (2) The PIM Neighbor Table contains one row for each of the router's PIM neighbors.

- (3) The PIM IP Multicast Route Table contains one row for each multicast routing entry whose incoming interface is running PIM.
- (4) The PIM Next Hop Table which contains one row for each outgoing interface list entry in the multicast routing table whose interface is running PIM, and whose state is pruned.
- (5) The (deprecated) PIM RP Table contains the PIM (version 1) information for IP multicast groups which is common to all RPs of a group.
- (6) The PIM RP-Set Table contains the PIM (version 2) information for sets of candidate Rendezvous Points (RPs) for IP multicast group addresses with particular address prefixes.
- (7) The PIM Candidate-RP Table contains the IP multicast groups for which the local router is to advertise itself as a Candidate-RP. If this table is empty, then the local router advertises itself as a Candidate-RP for all groups.
- (8) The PIM Component Table contains one row for each of the PIM domains to which the router is connected.

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[4.](#) Definitions

PIM-MIB DEFINITIONS ::= BEGIN

IMPORTS

```
MODULE-IDENTITY, OBJECT-TYPE, experimental,
NOTIFICATION-TYPE,
Integer32, IpAddress, TimeTicks    FROM SNMPv2-SMI
RowStatus, TruthValue              FROM SNMPv2-TC
MODULE-COMPLIANCE, OBJECT-GROUP,
NOTIFICATION-GROUP                 FROM SNMPv2-CONF
ipMRouteGroup, ipMRouteSource,
ipMRouteSourceMask, ipMRouteNextHopGroup,
ipMRouteNextHopSource, ipMRouteNextHopSourceMask,
ipMRouteNextHopIfIndex,
ipMRouteNextHopAddress              FROM IPMROUTE-STD-MIB
InterfaceIndex                     FROM IF-MIB;
```

pimMIB MODULE-IDENTITY

```
LAST-UPDATED "200206040000Z" -- June 4, 2002
ORGANIZATION "IETF PIM Working Group."
```

CONTACT-INFO

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DESCRIPTION

"The MIB module for management of PIM routers."

REVISION "200206040000Z" -- June 4, 2002

DESCRIPTION

"Revised June 4, 2002."

::= { experimental 61 }

pimMIBObjects OBJECT IDENTIFIER ::= { pimMIB 1 }

pimTraps OBJECT IDENTIFIER ::= { pimMIBObjects 0 }

pim OBJECT IDENTIFIER ::= { pimMIBObjects 1 }

pimJoinPruneInterval OBJECT-TYPE

SYNTAX Integer32

UNITS "seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default interval at which periodic PIM-SM Join/Prune
messages are to be sent."

DEFVAL { 60 }

::= { pim 1 }

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-- The PIM Interface Table

pimInterfaceTable OBJECT-TYPE

SYNTAX SEQUENCE OF PimInterfaceEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table listing the router's PIM interfaces.
IGMP and PIM are enabled on all interfaces listed in this
table."

::= { pim 2 }

```

pimInterfaceEntry OBJECT-TYPE
    SYNTAX      PimInterfaceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry (conceptual row) in the pimInterfaceTable."
    INDEX       { pimInterfaceIfIndex }
    ::= { pimInterfaceTable 1 }

```

```

PimInterfaceEntry ::= SEQUENCE {
    pimInterfaceIfIndex      InterfaceIndex,
    pimInterfaceAddress      IpAddress,
    pimInterfaceNetMask      IpAddress,
    pimInterfaceMode         INTEGER,
    pimInterfaceDR           IpAddress,
    pimInterfaceHelloInterval Integer32,
    pimInterfaceStatus       RowStatus,
    pimInterfaceJoinPruneInterval Integer32,
    pimInterfaceCBSRPreference Integer32,
    pimInterfaceTrigHelloInterval Integer32,
    pimInterfaceHelloHoldtime Integer32,
    pimInterfaceLanPruneDelay BITS,
    pimInterfacePropagationDelay Integer32,
    pimInterfaceOverrideInterval Integer32,
    pimInterfaceGenerationID  BITS,
    pimInterfaceJoinPruneHoldtime Integer32,
    pimInterfaceGraftRetryInterval Integer32,
    pimInterfaceMaxGraftRetries Integer32,
    pimInterfaceSRTTLThreshold Integer32,
    pimInterfaceLanDelayEnabled TruthValue,
    pimInterfaceSRCapable     TruthValue,
    pimInterfaceDRPriority    Integer32
}

```

```

pimInterfaceIfIndex OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The ifIndex value of this PIM interface."
    ::= { pimInterfaceEntry 1 }

```

```

pimInterfaceAddress OBJECT-TYPE
    SYNTAX      IpAddress
    MAX-ACCESS  read-only

```

STATUS current
DESCRIPTION
 "The IP address of the PIM interface."
::= { pimInterfaceEntry 2 }

pimInterfaceNetMask OBJECT-TYPE

SYNTAX IPAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The network mask for the IP address of the PIM interface."
::= { pimInterfaceEntry 3 }

pimInterfaceMode OBJECT-TYPE

SYNTAX INTEGER { dense(1), sparse(2), sparseDense(3) }
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The configured mode of this PIM interface. A value of
 sparseDense is only valid for PIMv1."
DEFVAL { dense }
::= { pimInterfaceEntry 4 }

pimInterfaceDR OBJECT-TYPE

SYNTAX IPAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The Designated Router on this PIM interface."
::= { pimInterfaceEntry 5 }

pimInterfaceHelloInterval OBJECT-TYPE

SYNTAX Integer32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The frequency at which PIM Hello messages are transmitted
 on this interface."
DEFVAL { 30 }
::= { pimInterfaceEntry 6 }

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pimInterfaceStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The status of this entry. Creating the entry enables PIM on the interface; destroying the entry disables PIM on the interface."

::= { pimInterfaceEntry 7 }

pimInterfaceJoinPruneInterval OBJECT-TYPE

SYNTAX Integer32

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The frequency at which PIM Join/Prune messages are transmitted on this PIM interface. The default value of this object is the pimJoinPruneInterval."

::= { pimInterfaceEntry 8 }

pimInterfaceCBSRPreference OBJECT-TYPE

SYNTAX Integer32 (-1..255)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The preference value for the local interface as a candidate bootstrap router. The value of -1 is used to indicate that the local interface is not a candidate BSR interface."

DEFVAL { 0 }

::= { pimInterfaceEntry 9 }

pimInterfaceTrigHelloInterval OBJECT-TYPE

SYNTAX Integer32

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION "The maximum time before a triggered PIM Hello message is transmitted on this interface."

DEFVAL { 5 }

::= { pimInterfaceEntry 10 }

pimInterfaceHelloHoldtime OBJECT-TYPE

SYNTAX Integer32 (0..65535)

UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The value set in the Holdtime field of Hello messages
transmitted on this interface. This should be 3.5
times the value of pimInterfaceHelloInterval."
DEFVAL { 105 }
::= { pimInterfaceEntry 11 }

pimInterfaceLanPruneDelay OBJECT-TYPE

SYNTAX BITS { off (0), on (1) }
MAX-ACCESS read-create
STATUS current
DESCRIPTION "Turns the LAN Prune Delay Option off and on on this
interface."
DEFVAL { off }
::= { pimInterfaceEntry 12 }

pimInterfacePropagationDelay OBJECT-TYPE

SYNTAX Integer32 (0..32767)
UNITS "milliseconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The value inserted into the LAN Prune Delay field of a
LAN Prune Delay option on this interface."
DEFVAL { 500 }
::= { pimInterfaceEntry 13 }

pimInterfaceOverrideInterval OBJECT-TYPE

SYNTAX Integer32 (0..65535)
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The value inserted into the Override Interval field of
a LAN Prune Delay option on this interface."
DEFVAL { 2500 }
::= { pimInterfaceEntry 14 }

pimInterfaceGenerationID OBJECT-TYPE

SYNTAX BITS { off (0), on (1) }
MAX-ACCESS read-create
STATUS current
DESCRIPTION "Turns the Generation ID Option off and on on this
interface."
DEFVAL { off }

```
::= { pimInterfaceEntry 15 }
```

```
pimInterfaceJoinPruneHoldtime OBJECT-TYPE
```

```
SYNTAX Integer32 (0..65535)
```

```
UNITS "seconds"
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION "The value inserted into the Holdtime field of a Join/  
Prune message sent on this interface. The value should  
be 3.5 times pimInterfaceJoinPruneInterval."
```

```
DEFVAL { 210 }
```

```
::= { pimInterfaceEntry 16 }
```

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```
pimInterfaceGraftRetryInterval OBJECT-TYPE
```

```
SYNTAX Integer32
```

```
UNITS "seconds"
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION "The interval a PIM router waits for a Graft Ack before  
resending a Graft on this interface."
```

```
DEFVAL { 3 }
```

```
::= { pimInterfaceEntry 17 }
```

```
pimInterfaceMaxGraftRetries OBJECT-TYPE
```

```
SYNTAX Integer32
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION "The maximum number of times this router will resend a  
Graft on this interface."
```

```
DEFVAL { 2 }
```

```
::= { pimInterfaceEntry 18 }
```

```
pimInterfaceSRTTLThreshold OBJECT-TYPE
```

```
SYNTAX Integer32
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION "The Time To Live in a PIM-DM State Refresh message at  
which it is not forwarded on this interface."
```

```
DEFVAL { 0 }
```

```
::= { pimInterfaceEntry 19 }
```

```
pimInterfaceLanDelayEnabled OBJECT-TYPE
```

```
SYNTAX TruthValue
```

```
MAX-ACCESS read-only
```

```
STATUS current
```

```
DESCRIPTION "Evaluates to TRUE if all routers on this interface are  
              using the LAN Prune Delay Option."
```

```
::= { pimInterfaceEntry 20 }
```

```
pimInterfaceSRCapable OBJECT-TYPE
```

```
SYNTAX TruthValue
```

```
MAX-ACCESS read-only
```

```
STATUS current
```

```
DESCRIPTION "Evaluates to TRUE if all routers on this interface are  
              using the State Refresh Capable Option."
```

```
::= { pimInterfaceEntry 21 }
```

```
pimInterfaceDRPriority OBJECT-TYPE
```

```
SYNTAX Integer32
```

```
MAX-ACCESS read-create
```

```
STATUS current
```

```
DESCRIPTION "The Designater Router Priority inserted into the DR  
              priority option on this interface."
```

```
DEFVAL { 1 }
```

```
::= { pimInterfaceEntry 22 }
```

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-- The PIM Neighbor Table

```
pimNeighborTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF PimNeighborEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
    "The (conceptual) table listing the router's PIM neighbors."
```

```
::= { pim 3 }
```

```
pimNeighborEntry OBJECT-TYPE
```

```
SYNTAX PimNeighborEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
    "An entry (conceptual row) in the pimNeighborTable."
```

```
INDEX { pimNeighborAddress }
```

::= { pimNeighborTable 1 }

```
PimNeighborEntry ::= SEQUENCE {  
    pimNeighborAddress      IPAddress,  
    pimNeighborIfIndex      InterfaceIndex,  
    pimNeighborUpTime       TimeTicks,  
    pimNeighborExpiryTime   TimeTicks,  
    pimNeighborMode         INTEGER,  
    pimNeighborLanPruneDelay Integer32,  
    pimNeighborOverrideInterval Integer32,  
    pimNeighborTBit         BITS,  
    pimNeighborSRCapable     TruthValue,  
    pimNeighborDRPresent     TruthValue  
}
```

pimNeighborAddress OBJECT-TYPE

SYNTAX IPAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IP address of the PIM neighbor for which this entry
contains information."

::= { pimNeighborEntry 1 }

pimNeighborIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of ifIndex for the interface used to reach this
PIM neighbor."

::= { pimNeighborEntry 2 }

pimNeighborUpTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The time since this PIM neighbor (last) became a neighbor
of the local router."

::= { pimNeighborEntry 3 }

```

pimNeighborExpiryTime OBJECT-TYPE
    SYNTAX      TimeTicks
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The minimum time remaining before this PIM neighbor will be
        aged out."
    ::= { pimNeighborEntry 4 }

pimNeighborMode OBJECT-TYPE
    SYNTAX      INTEGER { dense(1), sparse(2) }
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The active PIM mode of this neighbor.  This object is
        deprecated for PIMv2 routers since all neighbors on the
        interface must be either dense or sparse as determined by
        the protocol running on the interface."
    ::= { pimNeighborEntry 5 }

pimNeighborLANPruneDelay OBJECT-TYPE
    SYNTAX Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION "The value of LAN Prune Delay field of the LAN Prune
        Delay Option received from this neighbor.  A value of
        0 indicates that no LAN Prune Delay Option was
        received from this neighbor."
    ::= { pimNeighborEntry 6 }

pimNeighborOverrideInterval OBJECT-TYPE
    SYNTAX Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION "The value of Override Interval field of the LAN Prune
        Delay Option received from this neighbor.  A value of
        0 indicates that no LAN Prune Delay Option was
        received from this neighbor."
    ::= { pimNeighborEntry 7 }

```

pimNeighborTBit OBJECT-TYPE

SYNTAX BITS

MAX-ACCESS read-only

STATUS current

DESCRIPTION "The value of the T bit field of the LAN Prune
Delay Option received from this neighbor. The T bit
specifies the ability of the neighbor to disable
join suppression."

::= { pimNeighborEntry 8 }

pimNeighborSRCapable OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION "Evaluates to TRUE if this neighbor is using the State
Refresh Capable Option."

::= { pimNeighborEntry 9 }

pimNeighborDRPresent OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION "Evaluates to TRUE if this neighbor is using the
Designated Router Option."

::= { pimNeighborEntry 10 }

--

-- The PIM IP Multicast Route Table

--

pimIpMRouteTable OBJECT-TYPE

SYNTAX SEQUENCE OF PimIpMRouteEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table listing PIM-specific information on
a subset of the rows of the ipMRouteTable defined in the IP
Multicast MIB."

::= { pim 4 }

pimIpMRouteEntry OBJECT-TYPE

SYNTAX PimIpMRouteEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the pimIpMRouteTable. There
is one entry per entry in the ipMRouteTable whose incoming
interface is running PIM."

INDEX { ipMRouteGroup, ipMRouteSource, ipMRouteSourceMask }

::= { pimIpMRouteTable 1 }

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```
PimIpMRouteEntry ::= SEQUENCE {
    pimIpMRouteUpstreamAssertTimer    TimeTicks,
    pimIpMRouteAssertMetric            Integer32,
    pimIpMRouteAssertMetricPref        Integer32,
    pimIpMRouteAssertRPTBit            TruthValue,
    pimIpMRouteFlags                    BITS,
    pimIpMRouteRPFNeighbor              IPAddress,
    pimIpMRouteSourceTimer              TimeTicks,
    pimIpMRouteOriginatorSRTTL          Integer32
}
```

pimIpMRouteUpstreamAssertTimer OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The time remaining before the router changes its upstream neighbor back to its RPF neighbor. This timer is called the Assert timer in the PIM Sparse and Dense mode specification. A value of 0 indicates that no Assert has changed the upstream neighbor away from the RPF neighbor."

::= { pimIpMRouteEntry 1 }

pimIpMRouteAssertMetric OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The metric advertised by the assert winner on the upstream interface, or 0 if no such assert is in received."

::= { pimIpMRouteEntry 2 }

pimIpMRouteAssertMetricPref OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The preference advertised by the assert winner on the upstream interface, or 0 if no such assert is in effect."

::= { pimIpMRouteEntry 3 }

pimIpMRouteAssertRPTBit OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of the RPT-bit advertised by the assert winner on the upstream interface, or false if no such assert is in effect."

::= { pimIpMRouteEntry 4 }

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pimIpMRouteFlags OBJECT-TYPE

SYNTAX BITS {
 rpt(0),
 spt(1)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object describes PIM-specific flags related to a multicast state entry. See the PIM Sparse Mode specification for the meaning of the RPT and SPT bits."

::= { pimIpMRouteEntry 5 }

pimIpMRouterRPFNeighbor OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION "The IP Address of the current RPF neighbor. If there is an upstream Assert Winner, it will be the RPF neighbor. Otherwise, the RPF neighbor will be the next hop indicated by unicast routing."

::= { pimIpMRouteEntry 6 }

pimIpMRouteSourceTimer OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION "The time before this router ceases originating State Refresh messages for this route."

::= { pimIpMRouteEntry 7 }

pimIpMRouteOriginatorSRTTL OBJECT-TYPE


```

SYNTAX Integer32
MAX_ACCESS read-only
STATUS current
DESCRIPTION "The TTL used in State Refresh messages originated by
              this router for this route."
 ::= { pimIpMRouteEntry 8 }

```

```

--
-- The PIM Next Hop Table
--

```

```

pimIpMRouteNextHopTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PimIpMRouteNextHopEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
        "The (conceptual) table listing PIM-specific information on
         a subset of the rows of the ipMRouteNextHopTable defined in
         the IP Multicast MIB."
    ::= { pim 7 }

```

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```

pimIpMRouteNextHopEntry OBJECT-TYPE
    SYNTAX      PimIpMRouteNextHopEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
        "An entry (conceptual row) in the pimIpMRouteNextHopTable.
         There is one entry per entry in the ipMRouteNextHopTable
         whose interface is running PIM and whose
         ipMRouteNextHopState is pruned(1)."
    INDEX       { ipMRouteNextHopGroup, ipMRouteNextHopSource,
                  ipMRouteNextHopSourceMask, ipMRouteNextHopIfIndex,
                  ipMRouteNextHopAddress }
    ::= { pimIpMRouteNextHopTable 1 }

```

```

PimIpMRouteNextHopEntry ::= SEQUENCE {
    pimIpMRouteNextHopPruneReason    INTEGER,
    pimIpMRouteNextHopAssertWinner   IpAddress,
    pimIpMRouteNextHopAssertTimer    TimeTicks,
    pimIpMRouteNextHopAssertMetric   Integer32,
    pimIpMRouteNextHopAssertMetricPref Integer32,
    pimIpMRouteNextHopJoinPruneTimer TimeTicks
}

```

pimIpMRouteNextHopPruneReason OBJECT-TYPE

SYNTAX INTEGER {
 other (1),
 prune (2),
 assert (3)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object indicates why the downstream interface was
pruned, whether in response to a PIM prune message or due to
PIM Assert processing."

::= { pimIpMRouteNextHopEntry 2 }

pimIpMRouteNextHopAssertWinner OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION "The IP Address of the Assert Winner."

::= { pimIpMRouteNextHopEntry 3 }

pimIpMRouteNextHopAssertTimer OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION "The time remaining before the PIM router leaves the
current Assert state. A value of 0 indicates that the
router is in the No Info state."

::= { pimIpMRouteNextHopEntry 4 }

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pimIpMRouteNextHopAssertMetric OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION "The metric advertised by the Assert Winner."

::= { pimIpMRouteNextHopEntry 5 }

pimIpMRouteNextHopAssertMetricPref OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION "The metric preference advertised by the Assert Winner."

::= { pimIpMRouteNextHopEntry 6 }

```

pimIpMRouteNextHopJoinPruneTimer OBJECT-TYPE
    SYNTAX TimeTicks
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION "The time remaining before the PIM router reverts to
                  default operation on this interface. PIM-SM will
                  cease forwarding, PIM-DM will resume forwarding."
    ::= { pimIpMRouteNextHopEntry 7 }

-- The PIM RP Table

pimRPTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PimRPEntry
    MAX-ACCESS not-accessible
    STATUS      deprecated
    DESCRIPTION
        "The (conceptual) table listing PIM version 1 information
        for the Rendezvous Points (RPs) for IP multicast groups.
        This table is deprecated since its function is replaced by
        the pimRPSetTable for PIM version 2."
    ::= { pim 5 }

pimRPEntry OBJECT-TYPE
    SYNTAX      PimRPEntry
    MAX-ACCESS not-accessible
    STATUS      deprecated
    DESCRIPTION
        "An entry (conceptual row) in the pimRPTable. There is one
        entry per RP address for each IP multicast group."
    INDEX      { pimRPGroupAddress, pimRPAddress }
    ::= { pimRPTable 1 }

```

```

PimRPEntry ::= SEQUENCE {
    pimRPGroupAddress  IpAddress,
    pimRPAddress       IpAddress,
    pimRPState         INTEGER,
    pimRPStateTimer    TimeTicks,

```

```

        pimRPLastChange      TimeTicks,
        pimRPRowStatus       RowStatus
    }

```

pimRPGroupAddress OBJECT-TYPE

```

    SYNTAX      IpAddress
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
        "The IP multicast group address for which this entry
        contains information about an RP."
    ::= { pimRPEntry 1 }

```

pimRPAddress OBJECT-TYPE

```

    SYNTAX      IpAddress
    MAX-ACCESS  not-accessible
    STATUS      deprecated
    DESCRIPTION
        "The unicast address of the RP."
    ::= { pimRPEntry 2 }

```

pimRPState OBJECT-TYPE

```

    SYNTAX      INTEGER { up(1), down(2) }
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The state of the RP."
    ::= { pimRPEntry 3 }

```

pimRPStateTimer OBJECT-TYPE

```

    SYNTAX      TimeTicks
    MAX-ACCESS  read-only
    STATUS      deprecated
    DESCRIPTION
        "The minimum time remaining before the next state change.
        When pimRPState is up, this is the minimum time which must
        expire until it can be declared down. When pimRPState is
        down, this is the time until it will be declared up (in
        order to retry)."
    ::= { pimRPEntry 4 }

```

pimRPLastChange OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The value of sysUpTime at the time when the corresponding instance of pimRPState last changed its value."

::= { pimRPEntry 5 }

pimRPRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS deprecated

DESCRIPTION

"The status of this row, by which new entries may be created, or old entries deleted from this table."

::= { pimRPEntry 6 }

-- The PIM RP-Set Table

pimRPSetTable OBJECT-TYPE

SYNTAX SEQUENCE OF PimRPSetEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table listing PIM information for candidate Rendezvous Points (RPs) for IP multicast groups. When the local router is the BSR, this information is obtained from received Candidate-RP-Advertisements. When the local router is not the BSR, this information is obtained from received RP-Set messages."

::= { pim 6 }

pimRPSetEntry OBJECT-TYPE

SYNTAX PimRPSetEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the pimRPSetTable."

INDEX { pimRPSetComponent, pimRPSetGroupAddress,
pimRPSetGroupMask, pimRPSetAddress }

::= { pimRPSetTable 1 }

PimRPSetEntry ::= SEQUENCE {

pimRPSetGroupAddress IpAddress,
pimRPSetGroupMask IpAddress,
pimRPSetAddress IpAddress,

```

    pimRPSetHoldTime      Integer32,
    pimRPSetExpiryTime    TimeTicks,
    pimRPSetComponent      Integer32
}

```

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pimRPSetGroupAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IP multicast group address which, when combined with
pimRPSetGroupMask, gives the group prefix for which this
entry contains information about the Candidate-RP."

::= { pimRPSetEntry 1 }

pimRPSetGroupMask OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The multicast group address mask which, when combined with
pimRPSetGroupAddress, gives the group prefix for which this
entry contains information about the Candidate-RP."

::= { pimRPSetEntry 2 }

pimRPSetAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IP address of the Candidate-RP."

::= { pimRPSetEntry 3 }

pimRPSetHoldTime OBJECT-TYPE

SYNTAX Integer32 (0..255)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The holdtime of a Candidate-RP. If the local router is not
the BSR, this value is 0."

::= { pimRPSetEntry 4 }

pimRPSetExpiryTime OBJECT-TYPE

```

SYNTAX      TimeTicks
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The minimum time remaining before the Candidate-RP will be
    declared down.  If the local router is not the BSR, this
    value is 0."
 ::= { pimRPSetEntry 5 }

```

```

pimRPSetComponent OBJECT-TYPE
    SYNTAX      Integer32 (1..255)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " A number uniquely identifying the component.  Each
        protocol instance connected to a separate domain should have
        a different index value."
    ::= { pimRPSetEntry 6 }

```

```

--
-- Note: { pim 8 } through { pim 10 } were used in older versions
-- of this MIB.  Since some earlier versions of this MIB have been
-- widely-deployed, these values must not be used in the future,
-- as long the MIB is rooted under { experimental 61 }.
--

```

-- The PIM Candidate-RP Table

```

pimCandidateRPTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PimCandidateRPEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The (conceptual) table listing the IP multicast groups for
        which the local router is to advertise itself as a
        Candidate-RP when the value of pimComponentCRPHoldTime is
        non-zero.  If this table is empty, then the local router
        will advertise itself as a Candidate-RP for all groups
        (providing the value of pimComponentCRPHoldTime is non-

```

```
        zero)."  
 ::= { pim 11 }
```

pimCandidateRPEntry OBJECT-TYPE

SYNTAX PimCandidateRPEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the pimCandidateRPTable."

INDEX { pimCandidateRPGroupAddress,
 pimCandidateRPGroupMask }

::= { pimCandidateRPTable 1 }

PimCandidateRPEntry ::= SEQUENCE {

pimCandidateRPGroupAddress IpAddress,

pimCandidateRPGroupMask IpAddress,

pimCandidateRPAddress IpAddress,

pimCandidateRPRowStatus RowStatus

}

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pimCandidateRPGroupAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IP multicast group address which, when combined with
pimCandidateRPGroupMask, identifies a group prefix for which
the local router will advertise itself as a Candidate-RP."

::= { pimCandidateRPEntry 1 }

pimCandidateRPGroupMask OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The multicast group address mask which, when combined with
pimCandidateRPGroupMask, identifies a group prefix for which
the local router will advertise itself as a Candidate-RP."

::= { pimCandidateRPEntry 2 }

pimCandidateRPAddress OBJECT-TYPE

SYNTAX IPAddress
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The (unicast) address of the interface which will be
 advertised as a Candidate-RP."
::= { pimCandidateRPEnt 3 }

pimCandidateRPEnt OBJECT-TYPE

SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The status of this row, by which new entries may be
 created, or old entries deleted from this table."
::= { pimCandidateRPEnt 4 }

-- The PIM Component Table

pimComponentTable OBJECT-TYPE

SYNTAX SEQUENCE OF PimComponentEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The (conceptual) table containing objects specific to a PIM
 domain. One row exists for each domain to which the router
 is connected. A PIM-SM domain is defined as an area of the
 network over which Bootstrap messages are forwarded.
 Typically, a PIM-SM router will be a member of exactly one

domain. This table also supports, however, routers which may form a border between two PIM-SM domains and do not forward Bootstrap messages between them."

::= { pim 12 }

pimComponentEntry OBJECT-TYPE

SYNTAX PimComponentEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) in the pimComponentTable."

INDEX { pimComponentIndex }

::= { pimComponentTable 1 }

PimComponentEntry ::= SEQUENCE {

pimComponentIndex Integer32,

pimComponentBSRAddress IpAddress,

pimComponentBSRExpiryTime TimeTicks,

pimComponentCRPHoldTime Integer32,

pimComponentStatus RowStatus

}

pimComponentIndex OBJECT-TYPE

SYNTAX Integer32 (1..255)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A number uniquely identifying the component. Each protocol instance connected to a separate domain should have a different index value. Routers that only support membership in a single PIM-SM domain should use a pimComponentIndex value of 1."

::= { pimComponentEntry 1 }

pimComponentBSRAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

STATUS current
DESCRIPTION
 "The IP address of the bootstrap router (BSR) for the local
 PIM region."
::= { pimComponentEntry 2 }

pimComponentBSRExpiryTime OBJECT-TYPE
SYNTAX TimeTicks
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The minimum time remaining before the bootstrap router in
 the local domain will be declared down. For candidate BSRs,
 this is the time until the component sends an RP-Set
 message. For other routers, this is the time until it may
 accept an RP-Set message from a lower candidate BSR."
::= { pimComponentEntry 3 }

pimComponentCRPHoldTime OBJECT-TYPE
SYNTAX Integer32 (0..255)
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The holdtime of the component when it is a candidate RP in
 the local domain. The value of 0 is used to indicate that
 the local system is not a Candidate-RP."
DEFVAL { 0 }
::= { pimComponentEntry 4 }

pimComponentStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The status of this entry. Creating the entry creates
 another protocol instance; destroying the entry disables a
 protocol instance."
::= { pimComponentEntry 5 }

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-- PIM State Refresh Objects

pimSourceLifetime OBJECT-TYPE

SYNTAX Integer32

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION "The maximum time this router will continue to
originate State Refresh messages in the absence of
traffic from the source itself."

DEFVAL { 210 }

::= { pim 13 }

pimStateRefreshInterval OBJECT-TYPE

SYNTAX Integer32 (1..255)

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION "The interval between successive State Refresh
messages originated by this router."

DEFVAL { 60 }

::= { pim 14 }

pimStateRefreshLimitInterval OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-create

STATUS current

DESCRIPTION "This router will not forward successive State Refresh
messages received at less than this interval."

DEFVAL { 0 }

::= { pim 15 }

pimStateRefreshTimeToLive OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-create

STATUS current

DESCRIPTION "The TTL to be used by this router's originated State
Refresh messages if the data packet's TTL is not
recorded."

DEFVAL { 16 }

::= { pim 16 }

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-- PIM Traps

pimNeighborLoss NOTIFICATION-TYPE

OBJECTS {

pimNeighborIfIndex

}

STATUS current

DESCRIPTION

"A pimNeighborLoss trap signifies the loss of an adjacency with a neighbor. This trap should be generated when the neighbor timer expires, and the router has no other neighbors on the same interface with a lower IP address than itself."

::= { pimTraps 1 }

-- conformance information

pimMIBConformance OBJECT IDENTIFIER ::= { pimMIB 2 }

pimMIBCompliances OBJECT IDENTIFIER ::= { pimMIBConformance 1 }

pimMIBGroups OBJECT IDENTIFIER ::= { pimMIBConformance 2 }

-- compliance statements

pimV1MIBCompliance MODULE-COMPLIANCE

STATUS deprecated

DESCRIPTION

"The compliance statement for routers running PIMv1 and implementing the PIM MIB."

MODULE -- this module

MANDATORY-GROUPS { pimV1MIBGroup }

::= { pimMIBCompliances 1 }

pimSparseV2MIBCompliance MODULE-COMPLIANCE

```

STATUS    current
DESCRIPTION
    "The compliance statement for routers running PIM Sparse
    Mode and implementing the PIM MIB."
MODULE    -- this module
MANDATORY-GROUPS { pimV2MIBGroup }

GROUP      pimV2CandidateRPMIBGroup
DESCRIPTION
    "This group is mandatory if the router is capable of being a
    Candidate RP."

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

::= { pimMIBCompliances 2 }

```

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```

pimDenseV2MIBCompliance MODULE-COMPLIANCE
    STATUS    current
    DESCRIPTION
        "The compliance statement for routers running PIM Dense Mode
        and implementing the PIM MIB."
    MODULE    -- this module

        MANDATORY-GROUPS { pimDenseV2MIBGroup }

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

    ::= { pimMIBCompliances 3 }

-- units of conformance

pimNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS { pimNeighborLoss }
    STATUS    current
    DESCRIPTION
        "A collection of notifications for signaling important PIM
        events."
    ::= { pimMIBGroups 1 }

```

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pimV2MIBGroup OBJECT-GROUP

```
OBJECTS { pimJoinPruneInterval, pimInterfaceIfIndex,
  pimInterfaceAddress, pimInterfaceNetMask,
  pimInterfaceMode, pimInterfaceDR,
  pimInterfaceHelloInterval, pimInterfaceStatus,
  pimInterfaceJoinPruneInterval,
  pimInterfaceCBSRPreference, pimInterfaceTrigHelloInterval,
  pimInterfaceHelloHoldtime, pimInterfaceLanPruneDelay,
  pimInterfacePropagationDelay,
  pimInterfaceOverrideInterval, pimInterfaceGenerationID,
  pimInterfaceJoinPruneHoldtime,
  pimInterfaceLanDelayEnabled, pimInterfaceDRPriority,
  pimNeighborAddress, pimNeighborInterfaceIfIndex,
  pimNeighborUpTime, pimNeighborExpiryTime,
  pimNeighborLANPruneDelay, pimNeighborOverrideInterval,
  pimNeighborTBit, pimNeighborDRPresent,
  pimIpMRouteUpstreamAssertTimer, pimIpMRouteAssertMetric,
```

```

        pimIpMRouteIpRouteAssertMetricPref,
        pimIpMRouteAssertRPTBit, pimIpMRouteFlags,
        pimIpMRouteRPFNeighbor, pimIpMRouteNextHopPruneReason,
        pimRPSetGroupAddress, pimRPSetGroupMask, pimRPSetAddress,
        pimRPSetHoldTime, pimRPSetExpiryTime, pimRPSetComponent,
        pimComponentBSRAddress, pimComponentBSRExpiryTime,
        pimComponentCRPHoldTime, pimComponentStatus
    }
    STATUS    current
    DESCRIPTION
        "A collection of objects to support management of PIM Sparse
        Mode (version 2) routers."
    ::= { pimMIBGroups 2 }

```

pimDenseV2MIBGroup OBJECT-GROUP

```

    OBJECTS { pimInterfaceIfIndex, pimInterfaceAddress,
        pimInterfaceNetMask, pimInterfaceHelloInterval,
        pimInterfaceStatus, pimInterfaceTrigHelloInterval,
        pimInterfaceHelloHoldtime, pimInterfaceLanPruneDelay,
        pimInterfacePropagationDelay, pimInterfaceOverrideInterval,
        pimInterfaceGenerationID, pimInterfaceJoinPruneHoldtime,
        pimInterfaceGraftRetryInterval,
        pimInterfaceMaxGraftRetries, pimInterfaceSRTTLThreshold,
        pimInterfaceLanDelayEnabled, pimInterfaceSRCapable,
        pimNeighborIfIndex, pimNeighborUpTime,
        pimNeighborExpiryTime, pimNeighborLANPruneDelay,
        pimNeighborOverrideInterval, pimNeighborSRCapable,
        pimIpMRouteSourceTimer, pimIpMRouteOriginatorSRTTL,
        pimSourceLifetime, pimStateRefreshInterval,
        pimStateRefreshLimitInterval, pimStateRefreshTimeToLive
    }
    STATUS    current
    DESCRIPTION
        "A collection of objects to support management of PIM Dense
        Mode (version 2) routers."
    ::= { pimMIBGroups 5 }

```

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pimV2CandidateRPMIBGroup OBJECT-GROUP

```

    OBJECTS { pimCandidateRPAddress,
        pimCandidateRPRowStatus
    }
    STATUS    current
    DESCRIPTION
        "A collection of objects to support configuration of which
        groups a router is to advertise itself as a Candidate-RP."

```



```
::= { pimMIBGroups 3 }
```

```
pimV1MIBGroup OBJECT-GROUP
```

```
OBJECTS { pimJoinPruneInterval, pimNeighborIfIndex,  
           pimNeighborUpTime, pimNeighborExpiryTime,  
           pimNeighborMode,  
           pimInterfaceAddress, pimInterfaceNetMask,  
           pimInterfaceJoinPruneInterval, pimInterfaceStatus,  
           pimInterfaceMode, pimInterfaceDR,  
           pimInterfaceHelloInterval,  
           pimRPState, pimRPStateTimer,  
           pimRPLastChange, pimRPRowStatus  
}
```

```
STATUS deprecated
```

```
DESCRIPTION
```

```
"A collection of objects to support management of PIM  
(version 1) routers."
```

```
::= { pimMIBGroups 4 }
```

```
pimNextHopGroup OBJECT-GROUP
```

```
OBJECTS { pimIpMRouteNextHopPruneReason,  
           pimIpMRouteNextHopAssertWinner,  
           pimIpMRouteNextHopAssertTimer,  
           pimIpMRouteNextHopAssertMetric,  
           pimIpMRouteNextHopAssertMetricPref,  
           pimIpMRouteNextHopJoinPruneTimer  
}
```

```
STATUS current
```

```
DESCRIPTION
```

```
"A collection of optional objects to provide per-next hop  
information for diagnostic purposes. Supporting this group  
may add a large number of instances to a tree walk, but the  
information in this group can be extremely useful in  
tracking down multicast connectivity problems."
```

```
::= { pimMIBGroups 6 }
```

```
pimAssertGroup OBJECT-GROUP
```

```

OBJECTS { pimIpMRouteAssertMetric, pimIpMRouteAssertMetricPref,
           pimIpMRouteAssertRPTBit, pimIpMRouteRPFNeighbor}
STATUS   current
DESCRIPTION
    "A collection of optional objects to provide extra
    information about the assert election process. There is no
    protocol reason to keep such information, but some
    implementations may already keep this information and make
    it available. These objects can also be very useful in
    debugging connectivity or duplicate packet problems,
    especially if the assert winner does not support the PIM and
    IP Multicast MIBs."
 ::= { pimMIBGroups 7 }

```

END

5. Security Considerations

This MIB contains readable objects whose values provide information related to multicast routing, including information on the network topology. There are also a number of objects that have a MAX-ACCESS clause of read-write and/or read-create, which allow an administrator to configure PIM in the router.

While unauthorized access to the readable objects is relatively innocuous, unauthorized access to the write-able objects could cause a denial of service. Hence, the support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

SNMPv1 by itself is such an insecure environment. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and SET (change/create/delete) the objects in this MIB.

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model [RFC 2274](#) [12] and the View-based Access Control Model [RFC 2275](#) [15] is recommended.

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

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6. Acknowledgements

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7. Authors' Addresses

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