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**IP 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 objects used for managing multicast function, independent of the specific multicast protocol(s) in use. This document obsoletes [RFC 2932](#).

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## **1. Introduction**

This MIB describes objects used for managing IP multicast function, including IP multicast routing. These objects are independent of the specific multicast routing protocol in use. Managed objects specific to particular multicast protocols are defined elsewhere.

## **2. History**

This document obsoletes [[RFC2932](#)]. The MIB module defined by this document is a re-working of the MIB module from [[RFC2932](#)], with changes that include the following.

- o This MIB module includes support for IPv6 addressing and the IPv6 scoped address architecture. [[RFC2932](#)] supported only IPv4.
- o This MIB module allows several multicast protocols to perform routing on a single interface, where [[RFC2932](#)] assumed each interface supported at most one multicast routing protocol. Multicast routing protocols are now per-route, see `ipMcastRouteProtocol`.
- o This MIB module includes objects that are not specific to multicast routing. It allows management of multicast function on systems that do not perform routing, whereas [[RFC2932](#)] was restricted to multicast routing.
- o This MIB module includes a table of Source-Specific Multicast (SSM) address ranges to which SSM semantics [[RFC3569](#)] should be applied.
- o This MIB module includes a table of local applications that are receiving multicast data.
- o This MIB module includes a table of multicast scope zones.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

## **3. 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 \[RFC3410\]](#).

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, ([[RFC2578](#)], [[RFC2579](#)] and [[RFC2580](#)]).

#### **4. Overview**

This MIB module contains two scalars and eight tables. The tables are:

1. The IP Multicast Interface Table, which contains multicast information specific to interfaces.
2. The IP Multicast SSM Range Table, which contains one row per range of multicast group addresses to which Source-Specific Multicast semantics [[RFC3569](#)] should be applied.
3. The IP Multicast Route Table, which contains multicast routing information for IP datagrams sent by particular sources to the IP multicast groups known to a system.
4. The IP Multicast Routing Next Hop Table, which contains information about next-hops for the routing of IP multicast datagrams. Each entry is one of a list of next-hops on outgoing interfaces for particular sources sending to a particular multicast group address.
5. The IP Multicast Scope Boundary Table, which contains the boundaries configured for multicast scopes [[RFC2365](#)].
6. The IP Multicast Scope Name Table, which contains human-readable names for multicast scopes.
7. The IP Multicast Local Listener Table, which contains identifiers for local applications that are receiving multicast data.
8. The IP Multicast Zone Table, which contains an entry for each scope zone known to a system, and maps each zone to the multicast address range that is the corresponding scope.

This MIB module uses textual conventions defined in the IF-MIB [[RFC2863](#)], the INET-ADDRESS-MIB [[RFC4001](#)] and the IANA-RTPROTO-MIB.

#### **5. IMPORTed MIB Modules and REFERENCE Clauses**

The MIB modules defined in this document IMPORTs definitions normatively from the following MIB modules, beyond [[RFC2578](#)],



[[RFC2579](#)], and [[RFC2580](#)]: HCNM-TC [[RFC2856](#)], IF-MIB [[RFC2863](#)], IANA-RTPROTO-MIB, SNMP-FRAMEWORK-MIB [[RFC3411](#)], INET-ADDRESS-MIB [[RFC4001](#)] and LANGTAG-TC-MIB [RFCzzzz].

-- Note to RFC Editor.: replace zzzz with LangTag MIB RFC number & remove this note

This MIB module also includes REFERENCE clauses that make normative references to Administratively Scoped IP Multicast [[RFC2365](#)], Unicast-Prefix-based IPv6 Multicast Addresses [[RFC3306](#)], Source-Specific Multicast, [[RFC3569](#)], IPv6 Scoped Address Architecture, [[RFC4007](#)], and IPv6 Addressing Architecture, [[RFC4291](#)].

Finally, this MIB module makes informative references to several RFCs in text of DESCRIPTION clauses, including sysApplMIB [[RFC2287](#)], IP-MIB [[RFC4293](#)], PIM-SMv2 Protocol Specification [[RFC4601](#)], and Tags for Identifying Languages, [[RFC4646](#)].

## 6. Definitions

IPMCAST-MIB DEFINITIONS ::= BEGIN

### IMPORTS

```
MODULE-IDENTITY, OBJECT-TYPE,
mib-2, Unsigned32, Counter64,
Gauge32, TimeTicks                FROM SNMPv2-SMI        -- [RFC2578]
RowStatus, TruthValue,
StorageType, TimeStamp            FROM SNMPv2-TC        -- [RFC2579]
MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF        -- [RFC2580]
CounterBasedGauge64              FROM HCNM-TC            -- [RFC2856]
InterfaceIndexOrZero,
InterfaceIndex                    FROM IF-MIB             -- [RFC2863]
IANAipRouteProtocol,
IANAipMRouteProtocol             FROM IANA-RTPROTO-MIB
SnmpAdminString                  FROM SNMP-FRAMEWORK-MIB -- [RFC3411]
InetAddress, InetAddressType,
InetAddressPrefixLength,
InetAddressIndex, InetVersion     FROM INET-ADDRESS-MIB -- [RFC4001]
LangTag                          FROM LANGTAG-TC-MIB;    -- [RFCzzzz]
-- RFC Ed.: replace zzzz with LangTag MIB RFC number & remove this note
```

### ipMcastMIB MODULE-IDENTITY

```
LAST-UPDATED "200707300000Z" -- 30 July 2007
ORGANIZATION "IETF MBONE Deployment (MBONED) Working Group"
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#### DESCRIPTION

"The MIB module for management of IP Multicast, including multicast routing, data forwarding, and data reception.

Copyright (C) The IETF Trust (2007). This version of this MIB module is part of RFC yyyy; see the RFC itself for full legal notices."

-- RFC Ed.: replace yyyy with actual RFC number & remove this note

REVISION "200707300000Z" -- 30 July 2007

DESCRIPTION "Initial version, published as RFC yyyy.

This MIB module obsoletes IPMROUTE-STD-MIB defined by [[RFC2932](#)]. Changes include the following.

- o This MIB module includes support for IPv6 addressing and the IPv6 scoped address architecture. [[RFC2932](#)] supported only IPv4.
- o This MIB module allows several multicast protocols to perform routing on a single interface, where [[RFC2932](#)] assumed each interface supported at most one multicast routing protocol. Multicast routing protocols are now per-route, see ipMcastRouteProtocol.
- o This MIB module includes objects that are not



specific to multicast routing. It allows management of multicast function on systems that do not perform routing, whereas [[RFC2932](#)] was restricted to multicast routing.

- o This MIB module includes a table of Source-Specific Multicast (SSM) address ranges to which SSM semantics [[RFC3569](#)] should be applied.
- o This MIB module includes a table of local applications that are receiving multicast data.
- o This MIB module includes a table of multicast scope zones."

-- RFC Ed.: replace yyyy with actual RFC number & remove this note

::= { mib-2 XXX }

-- RFC Ed.: replace XXX with IANA-assigned number & remove this note

--

-- Top-level structure of the MIB

--

ipMcast OBJECT IDENTIFIER ::= { ipMcastMIB 1 }

ipMcastEnabled OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The enabled status of IP Multicast function on this system.

The storage type of this object is determined by ipMcastDeviceConfigStorageType."

::= { ipMcast 1 }

ipMcastRouteEntryCount OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of rows in the ipMcastRouteTable. This can be used to check for multicast routing activity, and to monitor the multicast routing table size."

::= { ipMcast 2 }

ipMcastDeviceConfigStorageType OBJECT-TYPE

SYNTAX StorageType



MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The storage type used for the global IP multicast configuration of this device, comprised of the objects listed below. If this storage type takes the value 'permanent', write-access to the listed objects need not be allowed.

The objects described by this storage type are:

ipMcastEnabled."

DEFVAL { nonVolatile }

::= { ipMcast 11 }

--

-- The Multicast Interface Table

--

ipMcastInterfaceTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpMcastInterfaceEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table used to manage the multicast protocol active on an interface."

::= { ipMcast 3 }

ipMcastInterfaceEntry OBJECT-TYPE

SYNTAX IpMcastInterfaceEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) containing the multicast protocol information for a particular interface.

Per-interface multicast forwarding statistics are also available in ipIfStatsTable."

REFERENCE "[RFC 4293](#) ipIfStatsTable"

INDEX { ipMcastInterfaceIPVersion,  
ipMcastInterfaceIfIndex }

::= { ipMcastInterfaceTable 1 }

IpMcastInterfaceEntry ::= SEQUENCE {

ipMcastInterfaceIPVersion	InetVersion,
ipMcastInterfaceIfIndex	InterfaceIndex,
ipMcastInterfaceTtl	Unsigned32,
ipMcastInterfaceRateLimit	Unsigned32,
ipMcastInterfaceStorageType	StorageType



```
}
```

```
ipMcastInterfaceIPVersion OBJECT-TYPE
```

```
    SYNTAX      InetVersion
```

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

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The IP version of this row."
```

```
    ::= { ipMcastInterfaceEntry 1 }
```

```
ipMcastInterfaceIfIndex OBJECT-TYPE
```

```
    SYNTAX      InterfaceIndex
```

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

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The index value that uniquely identifies the interface to  
        which this entry is applicable.  The interface identified by  
        a particular value of this index is the same interface as  
        identified by the same value of the IF-MIB's ifIndex."
```

```
    ::= { ipMcastInterfaceEntry 2 }
```

```
ipMcastInterfaceTtl OBJECT-TYPE
```

```
    SYNTAX      Unsigned32 (0..256)
```

```
    MAX-ACCESS  read-write
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The datagram TTL threshold for the interface.  Any IP  
        multicast datagrams with a TTL (IPv4) or Hop Limit (IPv6)  
        less than this threshold will not be forwarded out the  
        interface.  The default value of 0 means all multicast  
        packets are forwarded out the interface.  A value of 256  
        means that no multicast packets are forwarded out the  
        interface."
```

```
    DEFVAL      { 0 }
```

```
    ::= { ipMcastInterfaceEntry 3 }
```

```
ipMcastInterfaceRateLimit OBJECT-TYPE
```

```
    SYNTAX      Unsigned32
```

```
    MAX-ACCESS  read-write
```

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The rate-limit, in kilobits per second, of forwarded  
        multicast traffic on the interface.  A rate-limit of 0  
        indicates that no rate limiting is done."
```

```
    DEFVAL      { 0 }
```

```
    ::= { ipMcastInterfaceEntry 4 }
```

```
ipMcastInterfaceStorageType OBJECT-TYPE
```





```
SYNTAX      StorageType
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
    "The storage type for this row.  Rows having the value
    'permanent' need not allow write-access to any columnar
    objects in the row."
DEFVAL { nonVolatile }
::= { ipMcastInterfaceEntry 5 }
```

```
--
```

```
-- The SSM Range Table
```

```
--
```

```
ipMcastSsmRangeTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF IpMcastSsmRangeEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This table is used to create and manage the range(s) of
    group addresses to which SSM semantics should be applied."
REFERENCE "RFC 3569"
::= { ipMcast 4 }
```

```
ipMcastSsmRangeEntry OBJECT-TYPE
```

```
SYNTAX      IpMcastSsmRangeEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "An entry (conceptual row) containing a range of group
    addresses to which SSM semantics should be applied."
REFERENCE "RFC 3569"
INDEX       { ipMcastSsmRangeAddressType,
              ipMcastSsmRangeAddress,
              ipMcastSsmRangePrefixLength }
::= { ipMcastSsmRangeTable 1 }
```

```
IpMcastSsmRangeEntry ::= SEQUENCE {
    ipMcastSsmRangeAddressType  InetAddressType,
    ipMcastSsmRangeAddress      InetAddress,
    ipMcastSsmRangePrefixLength InetAddressPrefixLength,
    ipMcastSsmRangeRowStatus     RowStatus,
    ipMcastSsmRangeStorageType   StorageType
}
```

```
ipMcastSsmRangeAddressType OBJECT-TYPE
```

```
SYNTAX      InetAddressType
MAX-ACCESS  not-accessible
```



STATUS current

DESCRIPTION

"The address type of the multicast group prefix."

::= { ipMcastSsmRangeEntry 1 }

ipMcastSsmRangeAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The multicast group address which, when combined with ipMcastSsmRangePrefixLength, gives the group prefix for this SSM range. The InetAddressType is given by ipMcastSsmRangeAddressType.

This address object is only significant up to ipMcastSsmRangePrefixLength bits. The remainder of the address bits are zero. This is especially important for this index field, which is part of the index of this entry. Any non-zero bits would signify an entirely different entry.

For IPv6 SSM address ranges, only ranges prefixed by FF3x::/16 are permitted, where 'x' is a valid IPv6 [RFC 4291](#) multicast address scope. The syntax of the address range is given by [RFC 3306](#) sections [4](#) and [7](#).

For addresses of type ipv4z or ipv6z, the appended zone index is significant even though it lies beyond the prefix length. The use of these address types indicate that this SSM range entry applies only within the given zone. Zone index zero is not valid in this table.

If non-global scope SSM range entries are present, then consistent ipMcastBoundaryTable entries are required on routers at the zone boundary."

REFERENCE "[RFC 2365](#), [RFC 4291 section 2.7](#), [RFC 3306](#) sections [4](#), [6](#) and [7](#)"

::= { ipMcastSsmRangeEntry 2 }

ipMcastSsmRangePrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The length in bits of the mask which, when combined with ipMcastSsmRangeAddress, gives the group prefix for this SSM range.



The InetAddressType is given by ipMcastSsmRangeAddressType. For values 'ipv4' and 'ipv4z', this object must be in the range 4..32. For values 'ipv6' and 'ipv6z', this object must be in the range 8..128."

REFERENCE "[RFC 2365](#), [RFC 4291 section 2.7](#), [RFC 3306](#) sections [4](#), [6](#) and [7](#)"

::= { ipMcastSsmRangeEntry 3 }

ipMcastSsmRangeRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The status of this row, by which rows in this table can be created and destroyed.

This status object can be set to active(1) without setting any other columnar objects in this entry.

All writeable objects in this entry can be modified when the status of this entry is active(1)."

::= { ipMcastSsmRangeEntry 4 }

ipMcastSsmRangeStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type for this row. Rows having the value 'permanent' need not allow write-access to any columnar objects in the row."

DEFVAL { nonVolatile }

::= { ipMcastSsmRangeEntry 5 }

--

-- The IP Multicast Routing Table

--

ipMcastRouteTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpMcastRouteEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table containing multicast routing information for IP datagrams sent by particular sources to the IP multicast groups known to this router."

::= { ipMcast 5 }



## ipMcastRouteEntry OBJECT-TYPE

SYNTAX IpMcastRouteEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"An entry (conceptual row) containing the multicast routing information for IP datagrams from a particular source and addressed to a particular IP multicast group address."

INDEX { ipMcastRouteGroupAddressType,  
ipMcastRouteGroup,  
ipMcastRouteGroupPrefixLength,  
ipMcastRouteSourceAddressType,  
ipMcastRouteSource,  
ipMcastRouteSourcePrefixLength }

::= { ipMcastRouteTable 1 }

## IpMcastRouteEntry ::= SEQUENCE {

ipMcastRouteGroupAddressType	InetAddressType,
ipMcastRouteGroup	InetAddress,
ipMcastRouteGroupPrefixLength	InetAddressPrefixLength,
ipMcastRouteSourceAddressType	InetAddressType,
ipMcastRouteSource	InetAddress,
ipMcastRouteSourcePrefixLength	InetAddressPrefixLength,
ipMcastRouteUpstreamNeighborType	InetAddressType,
ipMcastRouteUpstreamNeighbor	InetAddress,
ipMcastRouteInIfIndex	InterfaceIndexOrZero,
ipMcastRouteTimeStamp	TimeStamp,
ipMcastRouteExpiryTime	TimeTicks,
ipMcastRouteProtocol	IANAipMRouteProtocol,
ipMcastRouteRtProtocol	IANAipRouteProtocol,
ipMcastRouteRtAddressType	InetAddressType,
ipMcastRouteRtAddress	InetAddress,
ipMcastRouteRtPrefixLength	InetAddressPrefixLength,
ipMcastRouteRtType	INTEGER,
ipMcastRouteOctets	Counter64,
ipMcastRoutePkts	Counter64,
ipMcastRouteTtlDropOctets	Counter64,
ipMcastRouteTtlDropPackets	Counter64,
ipMcastRouteDifferentInIfOctets	Counter64,
ipMcastRouteDifferentInIfPackets	Counter64,
ipMcastRouteBps	CounterBasedGauge64

}

## ipMcastRouteGroupAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION





"A value indicating the address family of the address contained in ipMcastRouteGroup. Legal values correspond to the subset of address families for which multicast forwarding is supported."

::= { ipMcastRouteEntry 1 }

ipMcastRouteGroup OBJECT-TYPE

SYNTAX        InetAddress  
MAX-ACCESS not-accessible  
STATUS        current  
DESCRIPTION

"The IP multicast group address which, when combined with the corresponding value specified in ipMcastRouteGroupPrefixLength, identifies the groups for which this entry contains multicast routing information.

This address object is only significant up to ipMcastRouteGroupPrefixLength bits. The remainder of the address bits are zero. This is especially important for this index field, which is part of the index of this entry. Any non-zero bits would signify an entirely different entry.

For addresses of type ipv4z or ipv6z, the appended zone index is significant even though it lies beyond the prefix length. The use of these address types indicate that this forwarding state applies only within the given zone. Zone index zero is not valid in this table."

::= { ipMcastRouteEntry 2 }

ipMcastRouteGroupPrefixLength OBJECT-TYPE

SYNTAX        InetAddressPrefixLength  
MAX-ACCESS not-accessible  
STATUS        current  
DESCRIPTION

"The length in bits of the mask which, when combined with the corresponding value of ipMcastRouteGroup, identifies the groups for which this entry contains multicast routing information.

The InetAddressType is given by ipMcastRouteGroupAddressType. For values 'ipv4' and 'ipv4z', this object must be in the range 4..32. For values 'ipv6' and 'ipv6z', this object must be in the range 8..128."

::= { ipMcastRouteEntry 3 }

ipMcastRouteSourceAddressType OBJECT-TYPE



SYNTAX        InetAddressType  
MAX-ACCESS not-accessible  
STATUS        current  
DESCRIPTION  
    "A value indicating the address family of the address  
    contained in ipMcastRouteSource. The value MUST be the same  
    as the value of ipMcastRouteGroupType."  
 ::= { ipMcastRouteEntry 4 }

ipMcastRouteSource OBJECT-TYPE

SYNTAX        InetAddress  
MAX-ACCESS not-accessible  
STATUS        current  
DESCRIPTION  
    "The network address which, when combined with the  
    corresponding value of ipMcastRouteSourcePrefixLength,  
    identifies the sources for which this entry contains  
    multicast routing information.  
  
    This address object is only significant up to  
    ipMcastRouteGroupPrefixLength bits. The remainder of the  
    address bits are zero. This is especially important for  
    this index field, which is part of the index of this entry.  
    Any non-zero bits would signify an entirely different  
    entry.  
  
    For addresses of type ipv4z or ipv6z, the appended zone  
    index is significant even though it lies beyond the prefix  
    length. The use of these address types indicate that this  
    source address applies only within the given zone. Zone  
    index zero is not valid in this table."  
 ::= { ipMcastRouteEntry 5 }

ipMcastRouteSourcePrefixLength OBJECT-TYPE

SYNTAX        InetAddressPrefixLength  
MAX-ACCESS not-accessible  
STATUS        current  
DESCRIPTION  
    "The length in bits of the mask which, when combined with  
    the corresponding value of ipMcastRouteSource, identifies  
    the sources for which this entry contains multicast routing  
    information.  
  
    The InetAddressType is given by  
    ipMcastRouteSourceAddressType. For values 'ipv4' and  
    'ipv4z', this object must be in the range 4..32. For values  
    'ipv6' and 'ipv6z', this object must be in the range  
    8..128."



::= { ipMcastRouteEntry 6 }

ipMcastRouteUpstreamNeighborType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A value indicating the address family of the address contained in ipMcastRouteUpstreamNeighbor.

An address type of unknown(0) indicates that the upstream neighbor is unknown, for example in BIDIR-PIM."

REFERENCE "I-D.ietf-pim-bidir"

::= { ipMcastRouteEntry 7 }

ipMcastRouteUpstreamNeighbor OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The address of the upstream neighbor (for example, RPF neighbor) from which IP datagrams from these sources to this multicast address are received."

::= { ipMcastRouteEntry 8 }

ipMcastRouteInIfIndex OBJECT-TYPE

SYNTAX InterfaceIndexOrZero

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of ifIndex for the interface on which IP datagrams sent by these sources to this multicast address are received. A value of 0 indicates that datagrams are not subject to an incoming interface check, but may be accepted on multiple interfaces (for example, in BIDIR-PIM)."

REFERENCE "I-D.ietf-pim-bidir"

::= { ipMcastRouteEntry 9 }

ipMcastRouteTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at which the multicast routing information represented by this entry was learned by the router.

If this information was present at the most recent re-



initialization of the local management subsystem, then this object contains a zero value."  
 ::= { ipMcastRouteEntry 10 }

ipMcastRouteExpiryTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The minimum amount of time remaining before this entry will be aged out. The value 0 indicates that the entry is not subject to aging. If ipMcastRouteNextHopState is pruned(1), this object represents the remaining time until the prune expires. If this timer expires, state reverts to forwarding(2). Otherwise, this object represents the time until this entry is removed from the table."

::= { ipMcastRouteEntry 11 }

ipMcastRouteProtocol OBJECT-TYPE

SYNTAX IANAipMRouteProtocol

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The multicast routing protocol via which this multicast forwarding entry was learned."

::= { ipMcastRouteEntry 12 }

ipMcastRouterRtProtocol OBJECT-TYPE

SYNTAX IANAipRouteProtocol

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The routing mechanism via which the route used to find the upstream or parent interface for this multicast forwarding entry was learned."

::= { ipMcastRouteEntry 13 }

ipMcastRouterRtAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A value indicating the address family of the address contained in ipMcastRouterRtAddress."

::= { ipMcastRouteEntry 14 }

ipMcastRouterRtAddress OBJECT-TYPE

SYNTAX InetAddress





MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The address portion of the route used to find the upstream or parent interface for this multicast forwarding entry.

This address object is only significant up to ipMcastRouteGroupPrefixLength bits. The remainder of the address bits are zero.

For addresses of type ipv4z or ipv6z, the appended zone index is significant even though it lies beyond the prefix length. The use of these address types indicate that this forwarding state applies only within the given zone. Zone index zero is not valid in this table."

::= { ipMcastRouteEntry 15 }

ipMcastRouteRtPrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The length in bits of the mask associated with the route used to find the upstream or parent interface for this multicast forwarding entry.

The InetAddressType is given by ipMcastRouteRtAddressType. For values 'ipv4' and 'ipv4z', this object must be in the range 4..32. For values 'ipv6' and 'ipv6z', this object must be in the range 8..128."

::= { ipMcastRouteEntry 16 }

ipMcastRouteRtType OBJECT-TYPE

SYNTAX INTEGER {  
    unicast (1), -- Unicast route used in multicast RIB  
    multicast (2) -- Multicast route  
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The reason the given route was placed in the (logical) multicast Routing Information Base (RIB). A value of unicast means that the route would normally be placed only in the unicast RIB, but was placed in the multicast RIB (instead or in addition) due to local configuration, such as when running PIM over RIP. A value of multicast means that the route was explicitly added to the multicast RIB by the routing protocol, such as DVMRP or Multiprotocol BGP."



```
::= { ipMcastRouteEntry 17 }
```

ipMcastRouteOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets contained in IP datagrams which were received from these sources and addressed to this multicast group address, and which were forwarded by this router.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system. Discontinuities can also occur as a result of routes being removed and replaced, which can be detected by observing the value of ipMcastRouteTimeStamp."

```
::= { ipMcastRouteEntry 18 }
```

ipMcastRoutePkts OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of packets routed using this multicast route entry.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system. Discontinuities can also occur as a result of routes being removed and replaced, which can be detected by observing the value of ipMcastRouteTimeStamp."

```
::= { ipMcastRouteEntry 19 }
```

ipMcastRouteTtlDropOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets contained in IP datagrams which this router has received from these sources and addressed to this multicast group address, which were dropped because the TTL (IPv4) or Hop Limit (IPv6) was decremented to zero, or to a value less than ipMcastInterfaceTtl for all next hops.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system. Discontinuities can also occur as a result of routes being removed and replaced, which can be detected by observing



the value of ipMcastRouteTimeStamp."  
 ::= { ipMcastRouteEntry 20 }

ipMcastRouteTtlDropPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of packets which this router has received from these sources and addressed to this multicast group address, which were dropped because the TTL (IPv4) or Hop Limit (IPv6) was decremented to zero, or to a value less than ipMcastInterfaceTtl for all next hops.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system. Discontinuities can also occur as a result of routes being removed and replaced, which can be detected by observing the value of ipMcastRouteTimeStamp."

::= { ipMcastRouteEntry 21 }

ipMcastRouteDifferentInIfOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets contained in IP datagrams which this router has received from these sources and addressed to this multicast group address, which were dropped because they were received on an unexpected interface.

For RPF checking protocols (such as PIM-SM), these packets arrived on interfaces other than ipMcastRouteInIfIndex, and were dropped because of this failed RPF check. (RPF paths are 'Reverse Path Forwarding' path; the unicast routes to the expected origin of multicast data flows).

Other protocols may drop packets on an incoming interface check for different reasons (for example, BIDIR-PIM performs a DF check on receipt of packets). All packets dropped as a result of an incoming interface check are counted here.

If this counter increases rapidly, this indicates a problem. A significant quantity of multicast data is arriving at this router on unexpected interfaces, and is not being forwarded.

For guidance, if the rate of increase of this counter exceeds 1% of the rate of increase of ipMcastRouteOctets,



then there are multicast routing problems that require investigation.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system. Discontinuities can also occur as a result of routes being removed and replaced, which can be detected by observing the value of ipMcastRouteTimeStamp."

REFERENCE "[RFC 4601](#) and I-D.ietf-pim-bidir"

::= { ipMcastRouteEntry 22 }

#### ipMcastRouteDifferentInIfPackets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

#### DESCRIPTION

"The number of packets which this router has received from these sources and addressed to this multicast group address, which were dropped because they were received on an unexpected interface.

For RPF checking protocols (such as PIM-SM), these packets arrived on interfaces other than ipMcastRouteInIfIndex, and were dropped because of this failed RPF check. (RPF paths are 'Reverse Path Forwarding' path; the unicast routes to the expected origin of multicast data flows).

Other protocols may drop packets on an incoming interface check for different reasons (for example, BIDIR-PIM performs a DF check on receipt of packets). All packets dropped as a result of an incoming interface check are counted here.

If this counter increases rapidly, this indicates a problem. A significant quantity of multicast data is arriving at this router on unexpected interfaces, and is not being forwarded.

For guidance, if the rate of increase of this counter exceeds 1% of the rate of increase of ipMcastRoutePkts, then there are multicast routing problems that require investigation.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system. Discontinuities can also occur as a result of routes being removed and replaced, which can be detected by observing the value of ipMcastRouteTimeStamp."

REFERENCE "[RFC 4601](#) and I-D.ietf-pim-bidir"

::= { ipMcastRouteEntry 23 }





**ipMcastRouteBps OBJECT-TYPE**

SYNTAX CounterBasedGauge64

UNITS "bits per second"

MAX-ACCESS read-only

STATUS current

**DESCRIPTION**

"Bits per second forwarded by this router using this multicast routing entry.

This value is a sample; it is the number of bits forwarded during the last whole 1 second sampling period. The value during the current 1 second sampling period is not made available until the period is completed.

The quantity being sampled is the same as that measured by ipMcastRouteOctets. The units and the sampling method are different."

::= { ipMcastRouteEntry 24 }

--

-- The IP Multicast Routing Next Hop Table

--

**ipMcastRouteNextHopTable OBJECT-TYPE**

SYNTAX SEQUENCE OF IpMcastRouteNextHopEntry

MAX-ACCESS not-accessible

STATUS current

**DESCRIPTION**

"The (conceptual) table containing information on the next-hops on outgoing interfaces for routing IP multicast datagrams. Each entry is one of a list of next-hops on outgoing interfaces for particular sources sending to a particular multicast group address."

::= { ipMcast 6 }

**ipMcastRouteNextHopEntry OBJECT-TYPE**

SYNTAX IpMcastRouteNextHopEntry

MAX-ACCESS not-accessible

STATUS current

**DESCRIPTION**

"An entry (conceptual row) in the list of next-hops on outgoing interfaces to which IP multicast datagrams from particular sources to an IP multicast group address are routed."

INDEX { ipMcastRouteNextHopGroupAddressType,  
ipMcastRouteNextHopGroup,  
ipMcastRouteNextHopGroupPrefixLength,  
ipMcastRouteNextHopSourceAddressType,  
ipMcastRouteNextHopSource,



```

        ipMcastRouteNextHopSourcePrefixLength,
        ipMcastRouteNextHopIfIndex,
        ipMcastRouteNextHopAddressType,
        ipMcastRouteNextHopAddress }
 ::= { ipMcastRouteNextHopTable 1 }

```

```

IpMcastRouteNextHopEntry ::= SEQUENCE {
    ipMcastRouteNextHopGroupAddressType      InetAddressType,
    ipMcastRouteNextHopGroup                 InetAddress,
    ipMcastRouteNextHopGroupPrefixLength     InetAddressPrefixLength,
    ipMcastRouteNextHopSourceAddressType     InetAddressType,
    ipMcastRouteNextHopSource                InetAddress,
    ipMcastRouteNextHopSourcePrefixLength    InetAddressPrefixLength,
    ipMcastRouteNextHopIfIndex               InterfaceIndex,
    ipMcastRouteNextHopAddressType           InetAddressType,
    ipMcastRouteNextHopAddress               InetAddress,
    ipMcastRouteNextHopState                 INTEGER,
    ipMcastRouteNextHopTimeStamp             TimeStamp,
    ipMcastRouteNextHopExpiryTime            TimeTicks,
    ipMcastRouteNextHopClosestMemberHops     Unsigned32,
    ipMcastRouteNextHopProtocol              IANAipMRouteProtocol,
    ipMcastRouteNextHopOctets                Counter64,
    ipMcastRouteNextHopPkts                  Counter64
}

```

ipMcastRouteNextHopGroupAddressType OBJECT-TYPE

SYNTAX       InetAddressType

MAX-ACCESS not-accessible

STATUS       current

DESCRIPTION

"A value indicating the address family of the address contained in ipMcastRouteNextHopGroup. Legal values correspond to the subset of address families for which multicast forwarding is supported."

```
 ::= { ipMcastRouteNextHopEntry 1 }
```

ipMcastRouteNextHopGroup OBJECT-TYPE

SYNTAX       InetAddress

MAX-ACCESS not-accessible

STATUS       current

DESCRIPTION

"The IP multicast group address which, when combined with the corresponding value specified in ipMcastRouteNextHopGroupPrefixLength, identifies the groups for which this entry contains multicast forwarding information.

This address object is only significant up to



ipMcastRouteNextHopGroupPrefixLength bits. The remainder of the address bits are zero. This is especially important for this index field, which is part of the index of this entry. Any non-zero bits would signify an entirely different entry.

For addresses of type ipv4z or ipv6z, the appended zone index is significant even though it lies beyond the prefix length. The use of these address types indicate that this forwarding state applies only within the given zone. Zone index zero is not valid in this table."

::= { ipMcastRouteNextHopEntry 2 }

ipMcastRouteNextHopGroupPrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The length in bits of the mask which, when combined with the corresponding value of ipMcastRouteGroup, identifies the groups for which this entry contains multicast routing information.

The InetAddressType is given by ipMcastRouteNextHopGroupAddressType. For values 'ipv4' and 'ipv4z', this object must be in the range 4..32. For values 'ipv6' and 'ipv6z', this object must be in the range 8..128."

::= { ipMcastRouteNextHopEntry 3 }

ipMcastRouteNextHopSourceAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A value indicating the address family of the address contained in ipMcastRouteNextHopSource. The value MUST be the same as the value of ipMcastRouteNextHopGroupType."

::= { ipMcastRouteNextHopEntry 4 }

ipMcastRouteNextHopSource OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The network address which, when combined with the corresponding value of the mask specified in ipMcastRouteNextHopSourcePrefixLength, identifies the



sources for which this entry specifies a next-hop on an outgoing interface.

This address object is only significant up to ipMcastRouteNextHopSourcePrefixLength bits. The remainder of the address bits are zero. This is especially important for this index field, which is part of the index of this entry. Any non-zero bits would signify an entirely different entry.

For addresses of type ipv4z or ipv6z, the appended zone index is significant even though it lies beyond the prefix length. The use of these address types indicate that this source address applies only within the given zone. Zone index zero is not valid in this table."

::= { ipMcastRouteNextHopEntry 5 }

#### ipMcastRouteNextHopSourcePrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS not-accessible

STATUS current

##### DESCRIPTION

"The length in bits of the mask which, when combined with the corresponding value specified in ipMcastRouteNextHopSource, identifies the sources for which this entry specifies a next-hop on an outgoing interface.

The InetAddressType is given by ipMcastRouteNextHopSourceAddressType. For values 'ipv4' and 'ipv4z', this object must be in the range 4..32. For values 'ipv6' and 'ipv6z', this object must be in the range 8..128."

::= { ipMcastRouteNextHopEntry 6 }

#### ipMcastRouteNextHopIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS not-accessible

STATUS current

##### DESCRIPTION

"The ifIndex value of the interface for the outgoing interface for this next-hop."

::= { ipMcastRouteNextHopEntry 7 }

#### ipMcastRouteNextHopAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

##### DESCRIPTION





"A value indicating the address family of the address contained in ipMcastRouteNextHopAddress."

::= { ipMcastRouteNextHopEntry 8 }

ipMcastRouteNextHopAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The address of the next-hop specific to this entry. For most interfaces, this is identical to ipMcastRouteNextHopGroup. NBMA interfaces, however, may have multiple next-hop addresses out a single outgoing interface."

::= { ipMcastRouteNextHopEntry 9 }

ipMcastRouteNextHopState OBJECT-TYPE

SYNTAX INTEGER { pruned(1), forwarding(2) }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"An indication of whether the outgoing interface and next-hop represented by this entry is currently being used to forward IP datagrams. The value 'forwarding' indicates it is currently being used; the value 'pruned' indicates it is not."

::= { ipMcastRouteNextHopEntry 10 }

ipMcastRouteNextHopTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at which the multicast routing information represented by this entry was learned by the router.

If this information was present at the most recent re-initialization of the local management subsystem, then this object contains a zero value."

::= { ipMcastRouteNextHopEntry 11 }

ipMcastRouteNextHopExpiryTime OBJECT-TYPE

SYNTAX TimeTicks

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The minimum amount of time remaining before this entry will



be aged out. If ipMcastRouteNextHopState is pruned(1), the remaining time until the prune expires and the state reverts to forwarding(2). Otherwise, the remaining time until this entry is removed from the table. The time remaining may be copied from ipMcastRouteExpiryTime if the protocol in use for this entry does not specify next-hop timers. The value 0 indicates that the entry is not subject to aging."

::= { ipMcastRouteNextHopEntry 12 }

#### ipMcastRouteNextHopClosestMemberHops OBJECT-TYPE

SYNTAX Unsigned32 (0..256)

MAX-ACCESS read-only

STATUS current

##### DESCRIPTION

"The minimum number of hops between this router and any member of this IP multicast group reached via this next-hop on this outgoing interface. Any IP multicast datagrams for the group which have a TTL (IPv4) or Hop Count (IPv6) less than this number of hops will not be forwarded to this next-hop.

A value of 0 means all multicast datagrams are forwarded out the interface. A value of 256 means that no multicast datagrams are forwarded out the interface.

This is an optimization applied by multicast routing protocols that explicitly track hop counts to downstream listeners. Multicast protocols that are not aware of hop counts to downstream listeners set this object to 0."

::= { ipMcastRouteNextHopEntry 13 }

#### ipMcastRouteNextHopProtocol OBJECT-TYPE

SYNTAX IANAipMRouteProtocol

MAX-ACCESS read-only

STATUS current

##### DESCRIPTION

"The routing mechanism via which this next-hop was learned."

::= { ipMcastRouteNextHopEntry 14 }

#### ipMcastRouteNextHopOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

##### DESCRIPTION

"The number of octets of multicast packets that have been forwarded using this route.

Discontinuities in this monotonically increasing value



occur at re-initialization of the management system.  
Discontinuities can also occur as a result of routes being  
removed and replaced, which can be detected by observing  
the value of ipMcastRouteNextHopTimeStamp."

::= { ipMcastRouteNextHopEntry 15 }

ipMcastRouteNextHopPkts OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of packets which have been forwarded using this  
route.

Discontinuities in this monotonically increasing value  
occur at re-initialization of the management system.  
Discontinuities can also occur as a result of routes being  
removed and replaced, which can be detected by observing  
the value of ipMcastRouteNextHopTimeStamp."

::= { ipMcastRouteNextHopEntry 16 }

--

-- The IP Multicast Scope Boundary Table

--

ipMcastBoundaryTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpMcastBoundaryEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table listing the system's multicast scope  
zone boundaries."

REFERENCE "[RFC 4007 section 5](#)"

::= { ipMcast 7 }

ipMcastBoundaryEntry OBJECT-TYPE

SYNTAX IpMcastBoundaryEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) describing one of this device's  
multicast scope zone boundaries."

REFERENCE "[RFC 2365 section 5](#), [RFC 4007 section 5](#)"

INDEX { ipMcastBoundaryIfIndex,  
ipMcastBoundaryAddressType,  
ipMcastBoundaryAddress,  
ipMcastBoundaryAddressPrefixLength }

::= { ipMcastBoundaryTable 1 }



```
IpMcastBoundaryEntry ::= SEQUENCE {  
    ipMcastBoundaryIfIndex      InterfaceIndex,  
    ipMcastBoundaryAddressType  InetAddressType,  
    ipMcastBoundaryAddress      InetAddress,  
    ipMcastBoundaryAddressPrefixLength  InetAddressPrefixLength,  
    ipMcastBoundaryTimeStamp    TimeStamp,  
    ipMcastBoundaryDroppedMcastOctets  Counter64,  
    ipMcastBoundaryDroppedMcastPkts   Counter64,  
    ipMcastBoundaryStatus        RowStatus,  
    ipMcastBoundaryStorageType      StorageType  
}
```

ipMcastBoundaryIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IfIndex value for the interface to which this boundary applies. Packets with a destination address in the associated address/mask range will not be forwarded over this interface.

For IPv4, zone boundaries cut through links. Therefore this is an external interface. This may be either a physical or virtual interface (tunnel, encapsulation, and so forth.)

For IPv6, zone boundaries cut through nodes. Therefore this is a virtual interface within the node. This is not an external interface, either real or virtual. Packets crossing this interface neither arrive at nor leave the node, but only move between zones within the node."

REFERENCE "[RFC 2365 section 5](#), [RFC 4007 section 5](#)"

::= { ipMcastBoundaryEntry 1 }

ipMcastBoundaryAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A value indicating the address family of the address contained in ipMcastBoundaryAddress. Legal values correspond to the subset of address families for which multicast forwarding is supported."

::= { ipMcastBoundaryEntry 2 }

ipMcastBoundaryAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible





STATUS current

DESCRIPTION

"The group address which, when combined with the corresponding value of ipMcastBoundaryAddressPrefixLength, identifies the group range for which the scoped boundary exists. Scoped IPv4 multicast address ranges must be prefixed by 239.0.0.0/8. Scoped IPv6 multicast address ranges are FF0x::/16, where x is a valid [RFC 4291](#) multicast scope.

An IPv6 address prefixed by FF1x::/16 is a non-permanently-assigned address. An IPv6 address prefixed by FF3x::/16 is a unicast-prefix-based multicast addresses. A zone boundary for FF0x::/16 implies an identical boundary for these other prefixes. No separate FF1x::/16 or FF3x::/16 entries exist in this table.

This address object is only significant up to ipMcastBoundaryAddressPrefixLength bits. The remainder of the address bits are zero. This is especially important for this index field, which is part of the index of this entry. Any non-zero bits would signify an entirely different entry."

::= { ipMcastBoundaryEntry 3 }

ipMcastBoundaryAddressPrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The length in bits of the mask which when, combined with the corresponding value of ipMcastBoundaryAddress, identifies the group range for which the scoped boundary exists.

The InetAddressType is given by ipMcastBoundaryAddressType. For values 'ipv4' and 'ipv4z', this object must be in the range 4..32. For values 'ipv6' and 'ipv6z', this object must be set to 16."

::= { ipMcastBoundaryEntry 4 }

ipMcastBoundaryTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at which the multicast boundary information represented by this entry was learned by the



router.

If this information was present at the most recent re-initialization of the local management subsystem, then this object contains a zero value."

::= { ipMcastBoundaryEntry 5 }

ipMcastBoundaryDroppedMcastOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of octets of multicast packets that have been dropped as a result of this zone boundary configuration.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system. Discontinuities can also occur as a result of boundary configuration being removed and replaced, which can be detected by observing the value of ipMcastBoundaryTimeStamp."

::= { ipMcastBoundaryEntry 6 }

ipMcastBoundaryDroppedMcastPkts OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of multicast packets that have been dropped as a result of this zone boundary configuration.

Discontinuities in this monotonically increasing value occur at re-initialization of the management system. Discontinuities can also occur as a result of boundary configuration being removed and replaced, which can be detected by observing the value of ipMcastBoundaryTimeStamp."

::= { ipMcastBoundaryEntry 7 }

ipMcastBoundaryStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The status of this row, by which rows in this table can be created and destroyed.

This status object can be set to active(1) without setting



any other columnar objects in this entry.

All writeable objects in this entry can be modified when the status of this entry is active(1)."

::= { ipMcastBoundaryEntry 8 }

ipMcastBoundaryStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type for this row. Rows having the value 'permanent' need not allow write-access to any columnar objects in the row."

DEFVAL { nonVolatile }

::= { ipMcastBoundaryEntry 9 }

--

-- The IP Multicast Scope Name Table

--

ipMcastScopeNameTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpMcastScopeNameEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table listing multicast scope names."

REFERENCE "[RFC 4007 section 4](#)"

::= { ipMcast 8 }

ipMcastScopeNameEntry OBJECT-TYPE

SYNTAX IpMcastScopeNameEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) that names a multicast address scope."

REFERENCE "[RFC 4007 section 4](#)"

INDEX { ipMcastScopeNameAddressType,  
ipMcastScopeNameAddress,  
ipMcastScopeNameAddressPrefixLength,  
ipMcastScopeNameLanguage }

::= { ipMcastScopeNameTable 1 }

IpMcastScopeNameEntry ::= SEQUENCE {

ipMcastScopeNameAddressType InetAddressType,

ipMcastScopeNameAddress InetAddress,

ipMcastScopeNameAddressPrefixLength InetAddressPrefixLength,



```
    ipMcastScopeNameLanguage      LangTag,
    ipMcastScopeNameString        SnmpAdminString,
    ipMcastScopeNameDefault       TruthValue,
    ipMcastScopeNameStatus        RowStatus,
    ipMcastScopeNameStorageType   StorageType
}
```

ipMcastScopeNameAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A value indicating the address family of the address contained in ipMcastScopeNameAddress. Legal values correspond to the subset of address families for which multicast forwarding is supported."

::= { ipMcastScopeNameEntry 1 }

ipMcastScopeNameAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The group address which, when combined with the corresponding value of ipMcastScopeNameAddressPrefixLength, identifies the group range associated with the multicast scope. Scoped IPv4 multicast address ranges must be prefixed by 239.0.0.0/8. Scoped IPv6 multicast address ranges are FF0x::/16, where x is a valid [RFC 4291](#) multicast scope.

An IPv6 address prefixed by FF1x::/16 is a non-permanently-assigned address. An IPv6 address prefixed by FF3x::/16 is a unicast-prefix-based multicast addresses. A scope FF0x::/16 implies an identical scope name for these other prefixes. No separate FF1x::/16 or FF3x::/16 entries exist in this table.

This address object is only significant up to ipMcastScopeNameAddressPrefixLength bits. The remainder of the address bits are zero. This is especially important for this index field, which is part of the index of this entry. Any non-zero bits would signify an entirely different entry."

::= { ipMcastScopeNameEntry 2 }

ipMcastScopeNameAddressPrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength





MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The length in bits of the mask which, when combined with the corresponding value of ipMcastScopeNameAddress, identifies the group range associated with the multicast scope.

The InetAddressType is given by ipMcastScopeNameAddressType. For values 'ipv4' and 'ipv4z', this object must be in the range 4..32. For values 'ipv6' and 'ipv6z', this object must be set to 16."

::= { ipMcastScopeNameEntry 3 }

ipMcastScopeNameLanguage OBJECT-TYPE

SYNTAX LangTag

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Language tag associated with the scope name."

REFERENCE "[RFC 4646](#)"

::= { ipMcastScopeNameEntry 4 }

ipMcastScopeNameString OBJECT-TYPE

SYNTAX SnmpAdminString

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The textual name associated with the multicast scope. The value of this object should be suitable for displaying to end-users, such as when allocating a multicast address in this scope.

When no name is specified, the default value of this object for IPv4 should be the string 239.x.x.x/y with x and y replaced with decimal values to describe the address and mask length associated with the scope.

When no name is specified, the default value of this object for IPv6 should be the string FF0x::/16, with x replaced by the hexadecimal value for the [RFC 4291](#) multicast scope.

An IPv6 address prefixed by FF1x::/16 is a non-permanently-assigned address. An IPv6 address prefixed by FF3x::/16 is a unicast-prefix-based multicast addresses. A scope FF0x::/16 implies an identical scope name for these other prefixes. No separate FF1x::/16 or FF3x::/16 entries exist in this table."



REFERENCE "[RFC 2365](#), [RFC 3306 section 4](#), [RFC 4291 section 2.7](#)"

::= { ipMcastScopeNameEntry 5 }

ipMcastScopeNameDefault OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"If true, indicates a preference that the name in the following language should be used by applications if no name is available in a desired language."

DEFVAL { false }

::= { ipMcastScopeNameEntry 6 }

ipMcastScopeNameStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The status of this row, by which rows in this table can be created and destroyed. Before the row can be activated, the object ipMcastScopeNameString must be set to a valid value. All writeable objects in this entry can be modified when the status is active(1)."

::= { ipMcastScopeNameEntry 7 }

ipMcastScopeNameStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type for this row. Rows having the value 'permanent' need not allow write-access to any columnar objects in the row."

DEFVAL { nonVolatile }

::= { ipMcastScopeNameEntry 8 }

--

-- The Multicast Listeners Table

--

ipMcastLocalListenerTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpMcastLocalListenerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table listing local applications or services that have joined multicast groups as listeners."



Entries exist for all addresses in the multicast range for all applications and services as they are classified on this device."

::= { ipMcast 9 }

ipMcastLocalListenerEntry OBJECT-TYPE

SYNTAX IpMcastLocalListenerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry (conceptual row) identifying a local application or service that has joined a multicast group as a listener."

INDEX { ipMcastLocalListenerGroupAddressType,  
ipMcastLocalListenerGroupAddress,  
ipMcastLocalListenerSourceAddressType,  
ipMcastLocalListenerSourceAddress,  
ipMcastLocalListenerSourcePrefixLength,  
ipMcastLocalListenerIfIndex,  
ipMcastLocalListenerRunIndex }

::= { ipMcastLocalListenerTable 1 }

IpMcastLocalListenerEntry ::= SEQUENCE {

ipMcastLocalListenerGroupAddressType InetAddressType,

ipMcastLocalListenerGroupAddress InetAddress,

ipMcastLocalListenerSourceAddressType InetAddressType,

ipMcastLocalListenerSourceAddress InetAddress,

ipMcastLocalListenerSourcePrefixLength InetAddressPrefixLength,

ipMcastLocalListenerIfIndex InterfaceIndex,

ipMcastLocalListenerRunIndex Unsigned32

}

ipMcastLocalListenerGroupAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A value indicating the address family of the address contained in ipMcastLocalListenerGroupAddress. Legal values correspond to the subset of address families for which multicast is supported."

::= { ipMcastLocalListenerEntry 1 }

ipMcastLocalListenerGroupAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IP multicast group for which this entry specifies



locally joined applications or services."  
 ::= { ipMcastLocalListenerEntry 2 }

ipMcastLocalListenerSourceAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A value indicating the address family of the address contained in ipMcastLocalListenerSource. The value MUST be the same as the value of ipMcastLocalListenerGroupAddressType."

::= { ipMcastLocalListenerEntry 3 }

ipMcastLocalListenerSourceAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The network address which, when combined with the corresponding value of the mask specified in ipMcastLocalListenerSourcePrefixLength, identifies the sources for which this entry specifies a local listener.

This address object is only significant up to ipMcastLocalListenerSourcePrefixLength bits. The remainder of the address bits are zero. This is especially important for this index field, which is part of the index of this entry. Any non-zero bits would signify an entirely different entry.

For addresses of type ipv4z or ipv6z, the appended zone index is significant even though it lies beyond the prefix length. The use of these address types indicate that this listener address applies only within the given zone. Zone index zero is not valid in this table."

::= { ipMcastLocalListenerEntry 4 }

ipMcastLocalListenerSourcePrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The length in bits of the mask which, when combined with the corresponding value specified in ipMcastLocalListenerSource, identifies the sources for which this entry specifies a local listener. A mask length of zero corresponds to all sources within the group.





The InetAddressType is given by ipMcastLocalListenerSourceAddressType. For values 'ipv4' and 'ipv4z', this object must be in the range 4..32. For values 'ipv6' and 'ipv6z', this object must be in the range 8..128."

::= { ipMcastLocalListenerEntry 5 }

ipMcastLocalListenerIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IfIndex value of the interface for which this entry specifies a local listener."

::= { ipMcastLocalListenerEntry 6 }

ipMcastLocalListenerRunIndex OBJECT-TYPE

SYNTAX Unsigned32 (0..2147483647)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A unique value corresponding to a piece of software running on this router or host system. Where possible, this should be the system's native, unique identification number.

This identifier is platform-specific. It may correspond to a process ID or application instance number.

A value of zero indicates that the application instance(s) cannot be identified. A value of zero indicates that one or more unidentified applications have joined the specified multicast groups (for the specified sources) as listeners."

REFERENCE "[RFC 2287](#) sysApplRunIndex"

::= { ipMcastLocalListenerEntry 7 }

--

-- The Multicast Zone Table

--

ipMcastZoneTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpMcastZoneEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The (conceptual) table listing scope zones on this device."

REFERENCE "[RFC 4007 section 5](#)"

::= { ipMcast 10 }



## ipMcastZoneEntry OBJECT-TYPE

SYNTAX IpMcastZoneEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"An entry (conceptual row) describing a scope zone on this device."

REFERENCE [RFC 4007 section 5](#)

INDEX { ipMcastZoneIndex }

::= { ipMcastZoneTable 1 }

IpMcastZoneEntry ::= SEQUENCE {

ipMcastZoneIndex InetZoneIndex,

ipMcastZoneScopeDefaultZoneIndex InetZoneIndex,

ipMcastZoneScopeAddressType InetAddressType,

ipMcastZoneScopeAddress InetAddress,

ipMcastZoneScopeAddressPrefixLength InetAddressPrefixLength

}

## ipMcastZoneIndex OBJECT-TYPE

SYNTAX InetZoneIndex (1..4294967295)

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This zone index uniquely identifies a zone on a device."

Each zone is for a given scope. Scope-level information in this table is for the unique scope that corresponds to this zone.

Zero is a special value used to request the default zone for a given scope. Zero is not a valid value for this object.

To test whether ipMcastZoneIndex is the default zone for this scope, test whether ipMcastZoneIndex is equal to ipMcastZoneScopeDefaultZoneIndex."

::= { ipMcastZoneEntry 1 }

## ipMcastZoneScopeDefaultZoneIndex OBJECT-TYPE

SYNTAX InetZoneIndex (1..4294967295)

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The default zone index for this scope. This is the zone that this device will use if the default (zero) zone is requested for this scope."

Zero is not a valid value for this object."



::= { ipMcastZoneEntry 2 }

ipMcastZoneScopeAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The IP address type for which this scope zone exists."

::= { ipMcastZoneEntry 3 }

ipMcastZoneScopeAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The multicast group address which, when combined with ipMcastZoneScopeAddressPrefixLength, gives the multicast address range for this scope. The InetAddressType is given by ipMcastZoneScopeAddressType.

Scoped IPv4 multicast address ranges are prefixed by 239.0.0.0/8. Scoped IPv6 multicast address ranges are FF0x::/16, where x is a valid [RFC 4291](#) multicast scope.

An IPv6 address prefixed by FF1x::/16 is a non-permanently-assigned address. An IPv6 address prefixed by FF3x::/16 is a unicast-prefix-based multicast addresses. A scope FF0x::/16 implies an identical scope for these other prefixes. No separate FF1x::/16 or FF3x::/16 entries exist in this table.

This address object is only significant up to ipMcastZoneScopeAddressPrefixLength bits. The remainder of the address bits are zero."

REFERENCE "[RFC 2365](#), [RFC 3306 section 4](#), [RFC 4291 section 2.7](#)"

::= { ipMcastZoneEntry 4 }

ipMcastZoneScopeAddressPrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The length in bits of the mask which, when combined with ipMcastZoneScopeAddress, gives the multicast address prefix for this scope.

The InetAddressType is given by ipMcastZoneScopeAddressType. For values 'ipv4' and 'ipv4z', this object must be in the



```
        range 4..32.  For values 'ipv6' and 'ipv6z', this object
        must be set to 16."
 ::= { ipMcastZoneEntry 5 }

--
-- Conformance information
--

ipMcastMIBConformance
    OBJECT IDENTIFIER ::= { ipMcastMIB 2 }
ipMcastMIBCompliances
    OBJECT IDENTIFIER ::= { ipMcastMIBConformance 1 }
ipMcastMIBGroups    OBJECT IDENTIFIER ::= { ipMcastMIBConformance 2 }

--
-- Compliance statements
--

ipMcastMIBComplianceHost MODULE-COMPLIANCE
    STATUS    current
    DESCRIPTION
        "The compliance statement for hosts supporting IPMCAST-MIB.

        Support for either InetAddressType ipv4 or ipv6 is
        mandatory; support for both InetAddressTypes ipv4 and ipv6
        is optional.  Support for types ipv4z and ipv6z is
        optional.

        -- OBJECT      ipMcastLocalListenerGroupAddressType
        -- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
        --              ipv4z(3), ipv6z(4)}
        -- DESCRIPTION
        --      This compliance requires support for ipv4 or ipv6.
        --
        -- OBJECT      ipMcastLocalListenerGroupAddress
        -- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
        -- DESCRIPTION
        --      This compliance requires support for ipv4 or ipv6.
        --
        -- OBJECT      ipMcastLocalListenerSourceAddressType
        -- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
        --              ipv4z(3), ipv6z(4)}
        -- DESCRIPTION
        --      This compliance requires support for ipv4 or ipv6.
        --
        -- OBJECT      ipMcastLocalListenerSourceAddress
        -- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
        -- DESCRIPTION
```





```
--      This compliance requires support for ipv4 or ipv6."

MODULE  -- this module
MANDATORY-GROUPS { ipMcastMIBLocalListenerGroup,
                    ipMcastMIBBasicGroup }

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

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

GROUP       ipMcastMIBSsmGroup
DESCRIPTION
    "This group is optional."

GROUP       ipMcastMIBRouteGroup
DESCRIPTION
    "This group is optional."

GROUP       ipMcastMIBRouteDiagnosticsGroup
DESCRIPTION
    "This group is optional."

GROUP       ipMcastMIBBoundaryIfGroup
DESCRIPTION
    "This group is optional."

GROUP       ipMcastMIBScopeNameGroup
DESCRIPTION
    "This group is optional."

 ::= { ipMcastMIBCompliances 1 }

ipMcastMIBComplianceRouter MODULE-COMPLIANCE
STATUS      current
DESCRIPTION
    "The compliance statement for routers supporting
    IPMCAST-MIB.

    Support for either InetAddressType ipv4 or ipv6 is
    mandatory; support for both InetAddressTypes ipv4 and ipv6
    is optional.  Support for types ipv4z and ipv6z is
    optional."
```



```
-- OBJECT      ipMcastSsmRangeAddressType
-- SYNTAX      InetAddressType {ipv4(1), ipv6(2), ipv4z(3),
--                               ipv6z(4)}
-- DESCRIPTION
--      This compliance requires support for ipv4 or ipv6.
--
-- OBJECT      ipMcastSsmRangeAddress
-- SYNTAX      InetAddress (SIZE (4|8|16|20))
-- DESCRIPTION
--      This compliance requires support for ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteGroupAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteGroup
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteSourceAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteSource
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteNextHopGroupAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteNextHopGroup
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--      This compliance requires support for unknown and
```



```
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteNextHopSourceAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteNextHopSource
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteNextHopAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteNextHopAddress
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 or ipv6."

MODULE -- this module
MANDATORY-GROUPS { ipMcastMIBRouteProtoGroup,
                    ipMcastMIBBasicGroup,
                    ipMcastMIBSsmGroup,
                    ipMcastMIBRouteGroup }

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

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

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



OBJECT ipMcastInterfaceRateLimit

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT ipMcastInterfaceStorageType

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT ipMcastRouteUpstreamNeighborType

SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2),  
ipv4z(3), ipv6z(4) }

MIN-ACCESS read-only

DESCRIPTION

"This compliance requires support for unknown and either ipv4  
or ipv6."

OBJECT ipMcastRouteUpstreamNeighbor

SYNTAX InetAddress (SIZE (0|4|8|16|20))

MIN-ACCESS read-only

DESCRIPTION

"This compliance requires support for unknown and either ipv4  
or ipv6."

OBJECT ipMcastRouteRtAddressType

SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2),  
ipv4z(3), ipv6z(4) }

MIN-ACCESS read-only

DESCRIPTION

"This compliance requires support for unknown and either ipv4  
or ipv6."

OBJECT ipMcastRouteRtAddress

SYNTAX InetAddress (SIZE (0|4|8|16|20))

MIN-ACCESS read-only

DESCRIPTION

"This compliance requires support for unknown and either ipv4  
or ipv6."

OBJECT ipMcastSsmRangeRowStatus

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT ipMcastSsmRangeStorageType

MIN-ACCESS read-only

DESCRIPTION





"Write access is not required."

GROUP            ipMcastMIBRouteDiagnosticsGroup

DESCRIPTION

"This group is not mandatory, but SHOULD be supported where hardware permits."

GROUP            ipMcastMIBPktsOutGroup

DESCRIPTION

"This group is optional."

GROUP            ipMcastMIBHopCountGroup

DESCRIPTION

"This group is optional."

GROUP            ipMcastMIBRouteOctetsGroup

DESCRIPTION

"This group is optional."

GROUP            ipMcastMIBRouteBpsGroup

DESCRIPTION

"This group is optional."

GROUP            ipMcastMIBLocalListenerGroup

DESCRIPTION

"This group is optional."

GROUP            ipMcastMIBBoundaryIfGroup

DESCRIPTION

"This group is optional."

GROUP            ipMcastMIBScopeNameGroup

DESCRIPTION

"This group is optional."

::= { ipMcastMIBCompliances 2 }

ipMcastMIBComplianceBorderRouter MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for routers on scope boundaries supporting IPMCAST-MIB.

Support for either InetAddressType ipv4z or ipv6z is mandatory; support for both InetAddressTypes ipv4z and ipv6z is optional.

-- OBJECT        ipMcastSsmRangeAddressType



```
-- SYNTAX      InetAddressType {ipv4(1), ipv6(2), ipv4z(3),
--                               ipv6z(4)}
-- DESCRIPTION
--     This compliance requires support for ipv4 or ipv6.
--
-- OBJECT      ipMcastSsmRangeAddress
-- SYNTAX      InetAddress (SIZE (4|8|16|20))
-- DESCRIPTION
--     This compliance requires support for ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteGroupAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--     This compliance requires support for unknown and
--     either ipv4 or ipv6.
--
-- OBJECT      ipMcastRouteGroup
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--     This compliance requires support for unknown and
--     either ipv4 and ipv4z or ipv6 and ipv6z.
--
-- OBJECT      ipMcastRouteSourceAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--     This compliance requires support for unknown and
--     either ipv4 and ipv4z or ipv6 and ipv6z.
--
-- OBJECT      ipMcastRouteSource
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--     This compliance requires support for unknown and
--     either ipv4 and ipv4z or ipv6 and ipv6z.
--
-- OBJECT      ipMcastRouteNextHopGroupAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--     This compliance requires support for unknown and
--     either ipv4 and ipv4z or ipv6 and ipv6z.
--
-- OBJECT      ipMcastRouteNextHopGroup
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--     This compliance requires support for unknown and
--     either ipv4 and ipv4z or ipv6 and ipv6z.
```



```
--
-- OBJECT      ipMcastRouteNextHopSourceAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 and ipv4z or ipv6 and ipv6z.
--
-- OBJECT      ipMcastRouteNextHopSource
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 and ipv4z or ipv6 and ipv6z.
--
-- OBJECT      ipMcastRouteNextHopAddressType
-- SYNTAX      InetAddressType {unknown(0), ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 and ipv4z or ipv6 and ipv6z.
--
-- OBJECT      ipMcastRouteNextHopAddress
-- SYNTAX      InetAddress (SIZE (0|4|8|16|20))
-- DESCRIPTION
--      This compliance requires support for unknown and
--      either ipv4 and ipv4z or ipv6 and ipv6z.
--
-- OBJECT      ipMcastBoundaryAddressType
-- SYNTAX      InetAddressType {ipv4(1), ipv6(2)}
-- DESCRIPTION
--      This compliance requires support for ipv4 or ipv6.
--
-- OBJECT      ipMcastBoundaryAddress
-- SYNTAX      InetAddress (SIZE (4|16))
-- DESCRIPTION
--      This compliance requires support for ipv4 or ipv6.
--
-- OBJECT      ipMcastScopeNameAddressType
-- SYNTAX      InetAddressType {ipv4(1), ipv6(2)}
-- DESCRIPTION
--      This compliance requires support for ipv4 or ipv6.
--
-- OBJECT      ipMcastScopeNameAddress
-- SYNTAX      InetAddress (SIZE (4|16))
-- DESCRIPTION
--      This compliance requires support for ipv4 or ipv6."
```

```
MODULE -- this module
```



```
MANDATORY-GROUPS { ipMcastMIBRouteProtoGroup,
                    ipMcastMIBBasicGroup,
                    ipMcastMIBSsmGroup,
                    ipMcastMIBRouteGroup,
                    ipMcastMIBBoundaryIfGroup,
                    ipMcastMIBScopeNameGroup }
```

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

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

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

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

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

```
OBJECT      ipMcastRouteUpstreamNeighborType
SYNTAX      InetAddressType { unknown(0), ipv4(1), ipv6(2),
                             ipv4z(3), ipv6z(4) }
MIN-ACCESS  read-only
DESCRIPTION
```

```
    "This compliance requires support for unknown and either ipv4
    and ipv4z, or ipv6 and ipv6z."
```

```
OBJECT      ipMcastRouteUpstreamNeighbor
SYNTAX      InetAddress (SIZE (0|4|8|16|20))
MIN-ACCESS  read-only
DESCRIPTION
```

```
    "This compliance requires support for unknown and either ipv4
    and ipv4z, or ipv6 and ipv6z."
```

```
OBJECT      ipMcastRouteRtAddressType
```





```
SYNTAX      InetAddressType { unknown(0), ipv4(1), ipv6(2),
                               ipv4z(3), ipv6z(4) }

MIN-ACCESS  read-only

DESCRIPTION
    "This compliance requires support for unknown and either ipv4
    and ipv4z, or ipv6 and ipv6z."
```

```
OBJECT      ipMcastRouterRtAddress
SYNTAX      InetAddress (SIZE (0|4|8|16|20))
MIN-ACCESS  read-only
DESCRIPTION
    "This compliance requires support for unknown and either ipv4
    and ipv4z, or ipv6 and ipv6z."
```

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

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

GROUP	ipMcastMIBRouteDiagnosticsGroup
DESCRIPTION	"This group is not mandatory, but SHOULD be supported where hardware permits."

GROUP	ipMcastMIBPktsOutGroup
DESCRIPTION	"This group is optional."

```
GROUP          ipMcastMIBHopCountGroup
DESCRIPTION
    "This group is optional."
```

GROUP	ipMcastMIBRouteOctetsGroup
DESCRIPTION	"This group is optional."

GROUP	ipMcastMIBRouteBpsGroup
DESCRIPTION	"This group is optional."

GROUP	ipMcastMIBLocalListenerGroup
DESCRIPTION	"This group is optional."



OBJECT       ipMcastZoneScopeAddressType  
SYNTAX       InetAddressType { ipv4(1), ipv6(2) }  
MIN-ACCESS   read-only  
DESCRIPTION  
    "This compliance requires support for ipv4 or ipv6."

OBJECT       ipMcastZoneScopeAddress  
SYNTAX       InetAddress (SIZE (4|16))  
MIN-ACCESS   read-only  
DESCRIPTION  
    "This compliance requires support for ipv4 or ipv6."

::= { ipMcastMIBCompliances 3 }

--

-- Units of conformance

--

ipMcastMIBBasicGroup OBJECT-GROUP

OBJECTS { ipMcastEnabled,  
          ipMcastRouteEntryCount,  
          ipMcastDeviceConfigStorageType  
          }

STATUS   current

DESCRIPTION

    "A collection of objects to support basic management of IP  
    Multicast protocols."

::= { ipMcastMIBGroups 1 }

ipMcastMIBSsmGroup OBJECT-GROUP

OBJECTS { ipMcastSsmRangeRowStatus,  
          ipMcastSsmRangeStorageType }

STATUS   current

DESCRIPTION

    "A collection of objects to support management of Source-  
    Specific Multicast routing."

::= { ipMcastMIBGroups 2 }

ipMcastMIBRouteGroup OBJECT-GROUP

OBJECTS { ipMcastInterfaceTtl,  
          ipMcastInterfaceRateLimit,  
          ipMcastInterfaceStorageType,  
          ipMcastRouteUpstreamNeighborType,  
          ipMcastRouteUpstreamNeighbor,  
          ipMcastRouteInIfIndex,  
          ipMcastRouteTimeStamp,  
          ipMcastRouteExpiryTime,  
          ipMcastRouteNextHopState,  
          ipMcastRouteNextHopTimeStamp,



```
        ipMcastRouteNextHopExpiryTime
    }
    STATUS current
    DESCRIPTION
        "A collection of objects to support basic management of IP
        Multicast routing."
    ::= { ipMcastMIBGroups 3 }

ipMcastMIBRouteDiagnosticsGroup OBJECT-GROUP
    OBJECTS { ipMcastRoutePkts,
        ipMcastRouteTtlDropPackets,
        ipMcastRouteDifferentInIfPackets
    }
    STATUS current
    DESCRIPTION
        "A collection of routing diagnostic packet counters."
    ::= { ipMcastMIBGroups 4 }

ipMcastMIBPktsOutGroup OBJECT-GROUP
    OBJECTS { ipMcastRouteNextHopTimeStamp,
        ipMcastRouteNextHopPkts }
    STATUS current
    DESCRIPTION
        "A collection of objects to support management of packet
        counters for each outgoing interface entry of a route."
    ::= { ipMcastMIBGroups 5 }

ipMcastMIBHopCountGroup OBJECT-GROUP
    OBJECTS { ipMcastRouteNextHopClosestMemberHops }
    STATUS current
    DESCRIPTION
        "A collection of objects to support management of the use of
        hop counts in IP Multicast routing."
    ::= { ipMcastMIBGroups 6 }

ipMcastMIBRouteOctetsGroup OBJECT-GROUP
    OBJECTS { ipMcastRouteTimeStamp,
        ipMcastRouteOctets,
        ipMcastRouteTtlDropOctets,
        ipMcastRouteDifferentInIfOctets,
        ipMcastRouteNextHopTimeStamp,
        ipMcastRouteNextHopOctets }
    STATUS current
    DESCRIPTION
        "A collection of objects to support management of octet
        counters for each forwarding entry."
    ::= { ipMcastMIBGroups 7 }
```



**ipMcastMIBRouteBpsGroup OBJECT-GROUP**

OBJECTS { ipMcastRouteBps }

STATUS current

DESCRIPTION

"A collection of objects to support sampling of data rate  
in bits per second for each forwarding entry."

::= { ipMcastMIBGroups 8 }

**ipMcastMIBRouteProtoGroup OBJECT-GROUP**OBJECTS { ipMcastRouteProtocol, ipMcastRouteRtProtocol,  
ipMcastRouteRtAddressType, ipMcastRouteRtAddress,  
ipMcastRouteRtPrefixLength, ipMcastRouteRtType,  
ipMcastRouteNextHopProtocol }

STATUS current

DESCRIPTION

"A collection of objects providing information on the  
relationship between multicast routing information and the  
IP Forwarding Table."

::= { ipMcastMIBGroups 9 }

**ipMcastMIBLocalListenerGroup OBJECT-GROUP**

OBJECTS { ipMcastLocalListenerRunIndex }

STATUS current

DESCRIPTION

"A collection of objects to support management of local  
listeners on hosts or routers."

::= { ipMcastMIBGroups 10 }

**ipMcastMIBBoundaryIfGroup OBJECT-GROUP**OBJECTS { ipMcastBoundaryTimeStamp,  
ipMcastBoundaryDroppedMcastOctets,  
ipMcastBoundaryDroppedMcastPkts,  
ipMcastBoundaryStatus,  
ipMcastBoundaryStorageType,  
ipMcastZoneScopeDefaultZoneIndex,  
ipMcastZoneScopeAddressType,  
ipMcastZoneScopeAddress,  
ipMcastZoneScopeAddressPrefixLength  
}

STATUS current

DESCRIPTION

"A collection of objects to support management of multicast  
scope zone boundaries."

::= { ipMcastMIBGroups 11 }

**ipMcastMIBScopeNameGroup OBJECT-GROUP**OBJECTS { ipMcastScopeNameString, ipMcastScopeNameDefault,  
ipMcastScopeNameStatus, ipMcastScopeNameStorageType }





STATUS current

DESCRIPTION

"A collection of objects to support management of multicast address scope names."

::= { ipMcastMIBGroups 12 }

END

## **7. Security Considerations**

### **7.1 SNMPv3**

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secured (for example by using IPSec), there is still no control over whom on the secure network is allowed to access (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).

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 access (read/change/create/delete) them.

### **7.2 Writeable objects**

There are a number of management objects defined in this MIB module with a MAX-ACCESS clause of read-write and/or read-create. This section discusses and lists these elements.

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.

In this MIB module, possible effects that can be induced by SET operations on writeable objects include:

- o Modifications to multicast routing behavior that prevent or disrupt services provided by the network, including (but not limited to) multicast data traffic delivery.



- o Modifications to multicast routing behavior that allow interception or subversion of information that is carried by the network. For example, attacks can be envisaged that would pass nominated multicast data streams through a nominated location, without the sources or listeners becoming aware of this subversion.

The following are the read-write and read-create objects defined in this MIB module.

ipMcastEnabled  
ipMcastDeviceConfigStorageType  
ipMcastInterfaceTtl  
ipMcastInterfaceRateLimit  
ipMcastInterfaceStorageType  
ipMcastSsmRangeRowStatus  
ipMcastSsmRangeStorageType  
ipMcastBoundaryStatus  
ipMcastBoundaryStorageType  
ipMcastScopeNameTable  
ipMcastScopeNameString  
ipMcastScopeNameDefault  
ipMcastScopeNameStatus  
ipMcastScopeNameStorageType

### **7.3 Readable objects**

As well as the writeable objects discussed above, there are a number of readable objects (i.e., objects with a MAX-ACCESS other than not-accessible) that 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.

In this MIB module, possible effects that can be induced by GET and/or NOTIFY operations include:

- o Determination of the topology, disposition, and composition of the network. This information may be commercially sensitive, and may also be used in preparation for attacks, including any of the attacks described above.
- o Determination of whether multicast data is flowing in the network, or has flowed recently, as well as the locations of senders and recipients. An attacker can apply 'traffic analysis' to this data. In some cases, the information revealed by traffic analyses can be as damaging as full knowledge of the data being



transported.

## 8. IANA Considerations

The MIB module in this document uses the following IANA-assigned OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

Descriptor	OBJECT IDENTIFIER value
-----	-----
ipMcastMIB	{ mib-2 XXX }

Editor's Note (to be removed prior to publication): the IANA is requested to assign a value for "XXX" under the 'mib-2' subtree and to record the assignment in the SMI Numbers registry. When the assignment has been made, the RFC Editor is asked to replace "XXX" (here and in the MIB module) with the assigned value and to remove this note.

## 9. Acknowledgements

This MIB module is based on the original work in [[RFC2932](#)] by K. McCloghrie, D. Farinacci and D. Thaler.

Suggested IPv6 multicast MIBs by R. Sivaramu and R. Raghunarayan have been used for comparison while editing this MIB module.

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