

IPv6 MIB Revision Design Team
INTERNET-DRAFT
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Wind River
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Management Information Base
for the Internet Protocol (IP)
draft-ietf-ipv6-rfc2011-update-01.txt

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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 implementations of the Internet Protocol (IP) in an IP version independent manner.

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[1.](#) The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in [RFC 2571](#) [8].
- o 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](#) [9], STD 16, [RFC 1212](#) [10] and [RFC 1215](#) [11]. The second version, called SMIV2, is described in STD 58, [RFC 2578](#) [12], STD 58, [RFC 2579](#) [13] and STD 58, [RFC 2580](#) [14].

- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, [RFC 1157](#) [15]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in [RFC 1901](#) [16] and [RFC 1906](#) [17]. The third version of the message protocol is called SNMPv3 and described in [RFC 1906](#) [17], [RFC 2572](#) [18] and [RFC 2574](#) [19].
- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, [RFC 1157](#) [15]. A second set of protocol operations and associated PDU formats is described in [RFC 1905](#) [20].
- o A set of fundamental applications described in [RFC 2573](#) [21] and the view-based access control mechanism described in [RFC 2575](#) [22].

A more detailed introduction to the current SNMP Management Framework can be found in [RFC 2570](#) [23].

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.

[2](#). Revision History

This section will either be removed or considerably reduced when the

draft is submitted for approval as a RFC.

Changes from [draft-ops-rfc2011-update-02.txt](#):

October 2002

Renumbered objects in groups that had objects removed from one draft to another. As per SMI rules no objects that have been published in an RFC have been renumbered. The affected areas are: ipv6InterfaceTable, ipIfStatsTable, inetIcmpTable and inetIcmpMsgTable

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Split the ipIfStatsTable into two tables under a common OID. The two tables are ipSystemStatsTable which contains system-wide statistics and ipIfStatsTable which contains interface-specific statistics. The same counters are available from both tables.

The compliance and conformance section was rebuilt. ipGroup2 was renamed to ipv4GeneralGroup and ipReasmTimeout was added to it. The following groups were created: ipv4IfGroup, ipv6Ifgroup, ipSystemStatsGroup, ipSystemStatsHCOctetGroup, ipSystemStatsHCPacketGroup, ipIfStatsGroup, ipIfStatsHCOctetGroup, ipIfStatsHCPacketGroup, ipAddressPrefixGroup, ipAddressGroup, ipNetToMediaGroup, ipDefaultRouterGroup, ipv6RouterAdvertGroup and icmpGroup2. The compliance section allows a compliant agent to provide read-only access to all of the nominally read-write objects.

Many minor changes to deal with errors found from mib compilers.

Changed the indexing from inetNetToMediaEntry to use a local copy of the ifIndex.

Import InetZoneIndex for use as a scope index. Previously this was the ScopeIdentifier TC defined within this document. Also change the naming convention for scopes to use index instead of identifier.

Close several issues without changes:

Should we include an object or objects to express the capability of

an implementation with respect to items like extension headers for IPv6. I have decided to not include such objects. I believe that we should for some deployment experience to see if such objects would be useful and to determine their proper granularity.

Are there other items that could be added to the ipv{4 6}IfTables such as (for v4) directed broadcast, proxy arp, header compression, broadcast address and arp cache timeout. As I receive only one request for such objects I have not added them.

Is there a better SMI data type for the lifetime objects in the ipAddressPrefixTable, ipDefaultRouterTable and ipv6RouterAdvertTable. I don't think there is a better SMI data type. We could generate some TCs for them (there are several classes of lifetime) but I don't think that would be useful.

There was a note in the v6 interface table suggesting that some of the objects could be removed. I think we have now removed all of those objects and don't intend to remove more without comments.

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Should the ipv6ScopeZoneIndexTable include associated objects to provide a scope description similar to ipMRouteScopeNameString ([rfc2932](#))?

My current decision is to NOT add such an object or set of objects. Should the ipv6AddressIfIdentifier be dropped? I think this provides some utility in specifying the how addresses are formed (at least some of them). There is also the further question of moving the Ipv6AddressIfIdentifier TC somewhere else. I don't think it is completely an EUI and therefore it should have a TC somewhere other than the IF-MIB and here seems reasonable.

Any other objects from ipv6IfTable that we need? I don't think so.

Are there other possible sources for ipAddressPrefixOrigin? No additions were suggested and no action was taken.

Changes from [draft-ops-rfc2011-update-00.txt](#):

May 2002

Removed ipv6InterfaceEffectiveMtu and
ipv6InterfaceIdentifierLength.

Added text to ipAddressPrefixTable to describe its utility.

Added text to ipAddressTable to state that multicast addresses are
described in their own table(s).

Added ipv4IfAdminStatus and ipv6InterfaceAdminStatus.

Added text to ipAddressPrefixOrigin to describe that an address
becomes well known by assignment from IANA or the address
registries or by specification in a standards track RFC.

Added text to ipAddressOrigin to clarify the manual vs random
difference.

Added text to inetNetToMediaType to clarify the difference between
static and local.

Created textual conventions for the following IPAddressOrigin,
IpAddressStatus and IPAddressPrefixOrigin.

Added persistence information to all read-write and read-create
objects:

ipForwarding & ipDefaultTTL - should be persistent

ipv6Forwarding, ipv4AdminStatus & ipv6InterfaceAdminStatus - SHOULD
be persistent

ipv6InterfaceIdentifier - modified from RW to Read-only

ipNetToMediaPhysAddress & ipNetToMediaType - should not be
persistent

inetNetToMediaPhysAddress & inetNetToMediaType - SHOULD NOT be
persistent

Added text to specify that ifIndex objects (ipv4IfIndex,
ipv6InterfaceIfIndex, ipIfStatsIfIndex, ipAddressPrefixIfIndex,

ipAddressIfIndex and ipv6ScopeIdIfIndex) use the same indexes as ifIndex.

Removed ifIndex and code from the descriptions of inetIcmpMsg{In Out}Pkts.

Updated the text for the objects in the ipIfStatsTable. The new text allows them to be either system wide or interface specific. It also clarifies which interface should be used for some objects. Finally descriptions were added to some newer objects.

Added ipIfStatsRefreshRate

Modified the author information. The main author list has been moved to a section within the document and replaced on the front page with the editor's name. The MIB contact information has been modified.

Added text mentioning that ARP ([RFC826](#)) and ND ([RFC2461](#)) are the two most likely ways of populating the Net to Media table.

Added a reference clause to inetIcmpMsgType pointing to the IANA pages for ICMP and ICMPv6 parameters.

Added text mentioning that ipIfStatsInTooBigErrors is only valid for IPv6 but that it should be instantiated for IPv4 as well.

Added text to the ipAddressPrefixTable and it's objects mentioning that it isn't tuned for IPv4 and defaults to use for IPv4 addresses.

Added the ipAddressLastChanged object.

Added reference clauses to ipv6DefaultHopLimit and several objects in the ipAddressPrefix table. I don't think that any other objects that don't already have some text have something to reference.

Modified the IP statistics table.

ipIfStatsHCInUcastPkts became ipIfStatsHCInReceives

removed ipIfStatsInTooBigErrors and include those packets in ipIfStatsOutFragFails

added ipIfStatsInForwDatagrams to count packets that we attempt to forward

clarified the text in ipIfStatsOutForwDatagrams to make it clear that "success" was related to the forwarding step and not the transmission step

added ipIfStatsOutTransmits and ipIfStatsHCOutTransmits as counters of the packets sent to the lower layers and pointed the OutOctet counters to them

added ipIfStatsOutNoRoutes to count the number of locally generated datagrams that couldn't be transmitted as no route was found

added ipIfStatsOutFragReqds to count the number of datagrams that require fragmentation

Added text and a Case diagram describing the statistics table.

Added the ipAddressCreated object.

Removed ipIfStatsHCOutUcastPkts as HCOutTransmits replaces it.

Also re-arranged the statsTable sequence to try and group the objects more rationally.

Added reachable and retransmit times to the ipv6InterfaceTable

Added Default router list.

Added router advertisement configuration table.

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Modified the ICMP message table to remove some indexes. The table no longer tracks counters with per-interface or per-ICMP code granularity.

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[12](#) Jul 2001

Changed to IPNG working group work item.

Removed mention of SIIT, since it's just for transition

Added lots of counters to ipIfStats table, and ipIfStatsDiscontinuityTime

Changed ipAddressIfIndex and ScopeIdentifier to refer to IF-MIB instead of [RFC 2863](#) or [RFC 2233](#)

Removed text about agents supporting a subset of values from ipv6Forwarding; this belongs in an AGENT-CAPABILITIES.

Un-deprecated ipReasmTimeout. XXX Do we need ipv6ReasmTimeout too? I think not; [RFC2460](#) seems to say that it's a constant 60 seconds.

Changes from first draft posted to v6mib mailing list:

[23](#) Feb 2001

Added ipv4InterfaceTable

Added ipv6InterfaceTable

Added ipAddressPrefixTable and slightly reworked ipAddressTable (nee inetAddressTable).

Deprecated ipMIBCompliance. Still need to finish updated ones.

Added copyright and table of contents.

[7](#) Feb 2001

Renamed inetIfStats to ipIfStats

Added ipv6ScopeTable

Added ScopeIdentifier TC, which should be in INET-ADDRESS-MIB.

Added SIZE to inetAddrAddr and inetNetToMediaAddress

Wrote some boilerplate for multi-interface-or-system-wide counter tables.

3. Overview

Add overview of the entire MIB, briefly describe each table and some of the interrelationships.

3.1. Multi-Stack Implementations

This MIB does not provide native support for implementations of multiple stacks sharing the same address family. One option for supporting such designs is to assign each stack within an address family to a separate context. These contexts could then be selected based upon the community string or context name, with the Entity MIB providing a method for listing the supported contexts.

3.2. Discussion of Tables and Groups This MIB is composed of a small number of discrete objects and a series of tables meant to form the base for managing IPv4 and IPv6 entities.

While some of the objects are meant to be included in all entities some of the objects are only conditionally mandatory. The unconditionally mandatory objects are mostly counters for the IP and ICMP statistics. The conditionally mandatory objects fall into one of several groups: objects for use in higher bandwidth situations, objects for use with IPv4, objects for use with IPv6 and objects for use on IPv6 routers. In short it is not expected that every entity will implement all of the objects within this MIB. The reader should consult the conformance and compliance section to determine which objects are appropriate for a given entity.

3.2.1. General Objects In both IPv4 and IPv6 there are only a small number of "knobs" for controlling the general IP stack. Most controls will be in a more specific setting, such as for controlling a router or TCP engine.

This MIB defines a total of three general knobs only two of which are used for both IPv4 and IPv6.

Objects are included for both protocols to enable or disable forwarding and to set limits on the lifetime of a packet (ttl or hop count).

The third knob, the timeout period for reassembling fragments, is only defined for IPv4 as IPv6 specifies this value directly.

Each of group of objects is required when implementing their respective

protocols.

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[3.2.2.](#) Interface Tables This MIB includes a pair of tables to convey information about the IPv4 and IPv6 protocols that is interface specific.

Special note should be taken of the administrative status objects. These are defined to allow each protocol to selectively enable or disable interfaces. These objects can be used in conjunction with the ifAdminStatus object to manipulate the interfaces as necessary. With these three objects an interface may be enabled or disabled completely as well as connected connected to the IPv4 stack, the IPv6 stack or both stacks. Setting ifAdminStatus to "down" should not affect the protocol specific status objects.

Each interface table is required when implementing their respective protocols.

[3.2.3.](#) IP Statistics Tables The IP statistics tables (ipSystemStatsTable and ipIfStatsTable) contain objects to count the number of datagrams and octets that a given entity has processed. Unlike the previous attempt this document uses a single table for multiple address families. Typically the only two families of interest are IPv4 and IPv6 however the table can support other families if necessary.

The first table, ipSystemStatsTable, conveys system wide information. (That is, the various counters are for all interfaces and not a specific set of interfaces.) Its index is formed from a single sub-id that represents the address family for which the statistics were counted.

The second table, ipIfStatsTable, conveys interface specific information. Its index is formed from two sub-ids. The first represents the address family (IPv4 and IPv6) and the interface within that address family is represented by the second sub-id.

The two tables have a similar set of objects which are intended to count the same things except for the difference in granularity. The object ID "ipSystemStatsEntry.2" is reserved in order to align the object ids of the counters in the first table with their counterparts in the second

table.

Two objects of note are *IfStatsDiscontinuityTime and *IfStatsRefreshRate. These objects provide information about the row in the table more than about the system itself.

The discontinuity object allows a management entity to determine if a discontinuity event which would invalidate the management entities understanding of the counters has occurred. The system being re-

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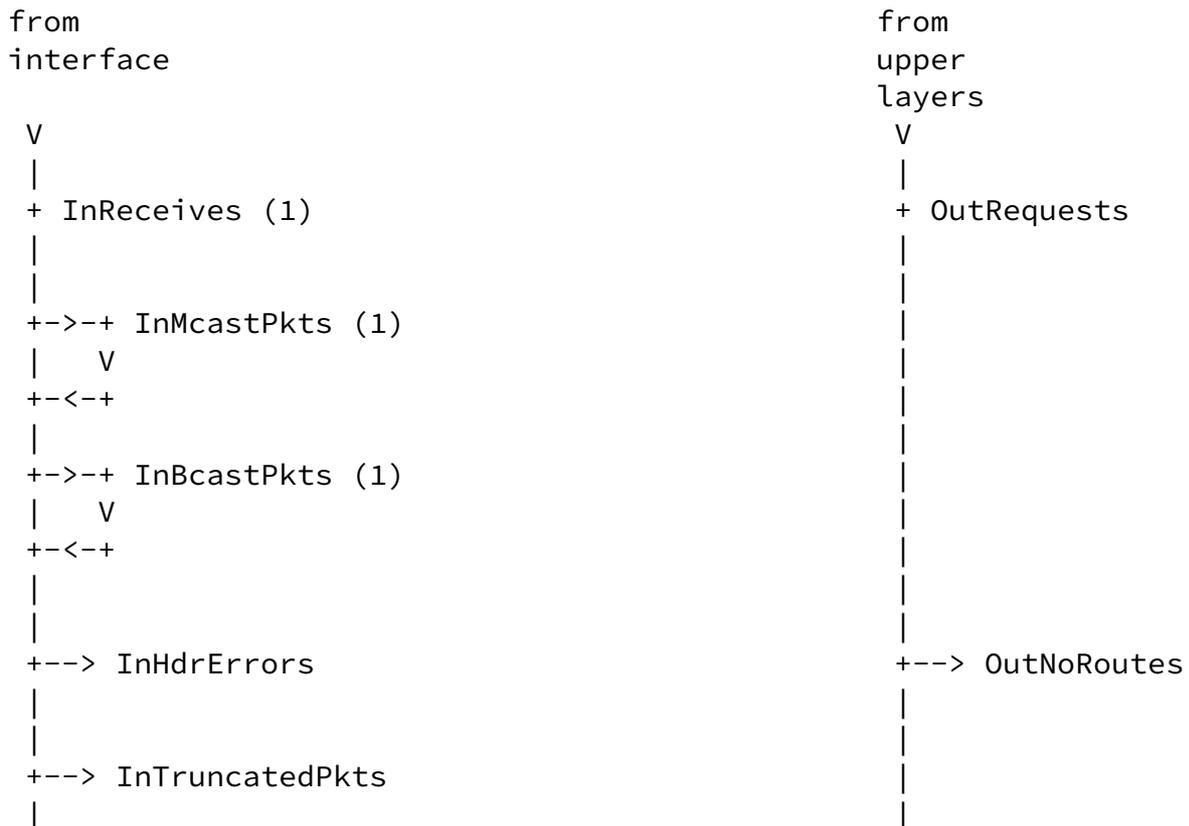
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initialized or the interface being cycled are possible examples of a discontinuity event.

The refresh object allows a management entity to determine a proper polling interval for the rest of the objects.

The following Case diagram represents the general ordering of the packet counters. In order to avoid extra clutter the prefixes "ipSystemStats" and "ipIfStats" have been removed from each of the counter names.



path.

(3) Local packets on the input side are counted on the interface associated with their destination address, which may not be the interface on which they were received. This requirement is caused by the possibility of losing the original interface during processing, especially re-assembly.

(4) Some re-assembly algorithms may lose track of the number of fragments during processing and so some some fragments may not be counted in this object.

The objects in both tables are spread amongst several conformance groups based on the bandwidth required to wrap the counters within an hour. The base system group is mandatory for all entities. The other system groups are optional depending on bandwidth. The interface specific-groups are optional.

[3.2.4.](#) Internet Address Prefix Table This table provides information about the prefixes that this entity is using including their lifetimes. This table provides a convenient place to which other tables that make use of prefixes, such as the `ipAddressTable`, may point. By including

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this table the MIB can supply the prefix information for all addresses yet minimize the amount of duplication required in storing and accessing this data. This arrangement also makes the relationship between addresses that have the same prefix clear.

This table is required for IPv6 entities.

[3.2.5.](#) Internet Address Table This table lists the IP addresses (both IPv4 and IPv6) used by this entity. It also includes some basic information about how and when the address was formed and last updated. This table allows a manager to determine who a given entity thinks it is.

This table is required for all IP entities.

[3.2.6.](#) Internet Address Translation Table This table provides a mapping

between IP layer addresses and physical addresses as would be formed by either ARP for IPv4 or the neighbor discovery protocol for IPv6.

[3.2.7.](#) IPv6 Scope Zone Index This table specifies the zone index to interface mapping. By examining the table a manager can determine which groups of interfaces are within a particular zone for a given scope.

The zone index information is only valid within a given entity, the indexes used on one entity may not be comparable to those used on a different entity.

This table is required for IPv6 entities.

[3.2.8.](#) Default Router Table This table lists the default routers known to this entity. This table is intended to be a simple list to display the information end nodes may have been configured with or acquired through a simple system such as IPv6 router advertisements. Managers attempting to view more complicated routing information should examine the routing specific tables from other MIBs.

This table is required for all entities.

[3.2.9.](#) Router Advertisement Table This table contains the non-routing information that an IPv6 router would use in constructing a router advertisement message. It does not contain information about the prefixes or other routing specific information that the router might advertise. The router should acquire such information from either the

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routing tables or from some routing table specific MIB.

This table is only required for IPv6 router entities.

[3.2.10.](#) ICMP Statistics Tables There are two sets of statistics for ICMP. The first contains a simple set of counter to track the number of ICMP messages and errors processed by this entity.

The second supplies more detail about the ICMP messages processed by this entity. Its index is formed from two sub-ids. The first

represents the address family (IPv4 and IPv6) and the particular message type being counted is represented by the second sub-id.

Both of these tables are required for all entities.

[3.2.11](#). Conformance and Compliance This MIB contains several sets of objects. Some of these sets are useful on only types of entities while others are only useful on a limited subset of entities. The conformance section attempts to group the objects into sets that may be discussed as units and the compliance section then details which of these units are required in various circumstances.

The circumstances used in the compliance section are implementing IPv4, IPv6 or IPv6 router functions and having bandwidth less than 20MB, between 20MB and 650MB or greater than 650MB.

[3.2.12](#). Deprecated Objects This MIB also includes a set of deprecated objects from previous iterations. They are included as part of the historical record.

[4](#). Updating Implementations There are several general classes of change that are required.

The first and most major change is that most of the previous objects have different object ids and additional indexes to support the possibility of different address families. The general counters for IP and ICMP are examples of this. They have been moved to the ipSystemStatsTable and inetIcmpMsgTable respectively.

The second change is the extension of all address objects to allow for both IPv4 and IPv6 addresses and the addition of an address type object to specify what address type is in use.

The third change is the addition of several new objects to the

replacement for a previously existing table such as inetNetToMedia.

The fourth change is the addition of completely new tables such as ipIfStatsTable and ipDefaultRouterTable. The first is based on the

previous statistics groups while the second is completely new to this MIB.

[4.1.](#) Updating an implementation of the IPv4-only IP-MIB

The somewhat more specific changes that are required for IPv4 follow. Note well: this is not meant to be an exhaustive list and the reader should examine the MIB for full details.

Several of the general objects (ipForwarding, ipDefaultTTL, ipReasmTimeout) remain unchanged.

Most of the rest of the general objects were counters and have been moved into the ipSystemStatsTable. The basic instrumentation should remain the same though the object definitions should be checked for any clarifications. If they aren't already in a structure putting the counter variables in one would be useful. Several new objects have been added to count additional items, instrumentation code must be added for these objects. Finally the SNMP routines must be updated to handle the new indexing.

In addition to the ipSystemStatsTable the MIB includes the ipIfStatsTable. This table counts the same items as the system table but does it on a per interface basis. It is optional and may be ignored. If you decide to implement it you may wish to use the previous instrumentation and arrange for the system statistics table to aggregate the new interface level statistics.

The ipAddrTable has, loosely, been converted to the ipAddressTable. While the general idea remains the same the ipAddressTable is sufficiently different that writing new code may be easier than updating old code. The primary difference is the addition of several new objects. In addition the ipAdEntReasmMaxSize has been moved to another table, ipv4IfTable. As above the SNMP routines will need to be updated to handle the new indexing.

The ipNetToMediaTable has been moved to the inetToMediaTable. These tables are fairly similar and updating the old code may be straightforward. As above the SNMP routines will need to be updated to handle the new indexing.

Two new tables, ipv4IfTable and ipDefaultRouterTable, are required as

well as several new ICMP counters.

Finally there are several tables that are required for IPv6 but are optional for IPv4 that you may elect to implement.

[4.2.](#) Updating an implementation of the IPv6-MIB

The somewhat more specific changes that are required for IPv6 follow. Note well: this is not meant to be an exhaustive list and the reader should examine the MIB for full details.

Several of the general objects (ipv6Forwarding, ipv6DefaultHopLimit) remain unchanged.

While there is an ipv6InterfaceTable that contains some of the pieces from the ipv6IfTable the two are somewhat different in concept. The ipv6IfTable was meant to replicate the ifTable while the ipv6InterfaceTable is meant to be an addition to the ifTable. As such items that were duplicated between the ifTable and ipv6IfTable have been removed and some new objects added.

The ipv6IfStatsTable most closely resembles the ipIfStatsTable with an additional index for the address family and most of the instrumentation should be re-usable. Some new objects have been added to the ipIfStatsTable. As above the SNMP routines will need to be updated to handle the new indexing. Finally the ipIfStatsTable is optional and may be ignored.

The ipSystemStatsTable is effectively new, but it may be able to make use of most of the instrumentation from the old ipv6IfStatsTable. As with the IPv4 discussion one implementation strategy would be to count the statistics for the ipIfStatsTable and aggregate them when queried for this table.

The ipv6AddrPrefixTable is now the ipAddressPrefixTable. The new table contains an extra object and the additional index required for IPv4 compatibility. As above the SNMP routines will need to be updated to handle the new indexing.

The ipAddressTable is loosely based on the ipv6AddrTable but has changed considerably with the addition of several new objects and the removal of one of its indexes.

The IPv6 routing information (ipv6RouteNumber, ipv6DiscardedRoutes and ipv6RouteTable) has been removed from this MIB. The replacements or updates for this information is in the update to the IP Forwarding Table

MIB.

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The ipv6NetToMediaTable has been converted to the inetNetToMediaTable. The new table contains an extra object and the additional index required for IPv4 compatibility. As above the SNMP routines will need to be updated to handle the new indexing.

The ICMP tables have been substantially changed. The previous tables required counting on a per-message and per-interface basis. The new tables only require counting on a per-message per-protocol basis and include an aggregate of all messages on a per-protocol basis.

In addition to the above several new tables have been added. Both the ipv6ScopeZoneIndexTable and ipDefaultRouterTable are required on all IPv6 entities. The ipv6RouterAdvertTable is only required on IPv6 routers.

[5.](#) Definitions

```
IP-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE,  
    Integer32, Counter32, IpAddress,  
    mib-2, Unsigned32, Counter64      FROM SNMPv2-SMI  
    PhysAddress, TruthValue,  
    TimeStamp, RowPointer,  
    TEXTUAL-CONVENTION              FROM SNMPv2-TC  
    MODULE-COMPLIANCE, OBJECT-GROUP FROM SNMPv2-CONF  
    InetAddress, InetAddressType,  
    InetAddressPrefixLength,  
    InetZoneIndex                   FROM INET-ADDRESS-MIB  
    InterfaceIndex,  
    InterfaceIndexOrZero, ifIndex   FROM IF-MIB;
```

```
ipMIB MODULE-IDENTITY
```

```
    LAST-UPDATED "200107130000Z"  
    ORGANIZATION "IETF IPv6 MIB Revision Team"  
    CONTACT-INFO  
        "Editor:
```

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DESCRIPTION

"The MIB module for managing IP and ICMP implementations, but excluding their management of IP routes."

REVISION "200207010000Z"

DESCRIPTION

"Update and clarify the IP version neutral revision adding the ND objects."

REVISION "200107130000Z"

DESCRIPTION

"IP version neutral revision, published as RFC XXXX."

REVISION "9411010000Z"

DESCRIPTION

"Published separately as [RFC 2011](#)."

REVISION "9103310000Z"

DESCRIPTION

"The initial revision of this MIB module was part of MIB-II."

::= { mib-2 48}

--

-- The textual conventions we define and use in this MIB.

--

IpAddressOrigin ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The origin of the address.

manual(2) indicates that the address was manually configured to a specified address, e.g. by user configuration.

wellknown(3) indicates an address constructed from a well-known value, e.g. an IANA-assigned anycast address.

dhcp(4) indicates an address that was assigned to this system by a DHCP server.

linklayer(5) indicates an address created by IPv6 stateless auto-configuration.

random(6) indicates an address chosen by the system at random, e.g. an IPv4 address within 169.254/16, or an [RFC 3041](#) privacy address."

```
SYNTAX      INTEGER {
    other(1),
    manual(2),
    wellknown(3),
    dhcp(4),
    linklayer(5),
```

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```
    random(6)
}
```

IpAddressStatus ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The status of an address. Most of the states correspond to states from the IPv6 Stateless Address Autoconfiguration protocol [[5](#)]

The preferred(1) state indicates that this is a valid address that can appear as the destination or source address of a packet.

The deprecated(2) state indicates that this is a valid but deprecated address that should no longer be used as a source address in new communications, but packets addressed to such an address are processed as expected.

The invalid(3) state indicates that this is not valid address which should not appear as the destination or source address of a packet.

The inaccessible(4) state indicates that the address is not accessible because the interface to which this address is assigned is not operational.

The unknown(5) state indicates that the status can not be determined for some reason.

The tentative(6) state indicates the uniqueness of the address on the link is being verified. Addresses in this state should not be used for general communication and should only be used to determine the uniqueness of the address.

The duplicate(7) state indicates the address has been determined to be non-unique on the link and so must not be used.

In the absence of other information, an IPv4 address is always preferred(1)."

```
SYNTAX      INTEGER {
    preferred(1),
    deprecated(2),
    invalid(3),
    inaccessible(4),
    unknown(5),
```

```
    tentative(6),
    duplicate(7)
}
```

IpAddressPrefixOrigin ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The origin of this prefix.

manual(2) indicates a prefix that was manually configured.

wellknown(3) indicates a well-known prefix, e.g. 169.254/16 for IPv4 auto-configuration or fe80::/10 for IPv6 link-local addresses. Well known prefixes may be assigned by IANA or the address registries or by specification in a standards track RFC.

dhcp(4) indicates a prefix that was assigned by a DHCP

server.

routeradv(5) indicates a prefix learned from a router advertisement.

Note: while IpAddressOrigin and IpAddressPrefixOrigin are similar they are not identical. The first defines how an address was created while the second defines how a prefix was found."

```
SYNTAX      INTEGER {
    other(1),
    manual(2),
    wellknown(3),
    dhcp(4),
    routeradv(5)
}
```

```
Ipv6AddressIfIdentifier ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "2x:"
    STATUS      current
    DESCRIPTION
        "This data type is used to model IPv6 address
        interface identifiers. This is a binary string
        of up to 8 octets in network byte-order."
    SYNTAX      OCTET STRING (SIZE (0..8))
```

```
--
-- the IP general group
-- some objects that affect all of IPv4
```

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--

```
ip          OBJECT IDENTIFIER ::= { mib-2 4 }
```

```
ipForwarding OBJECT-TYPE
    SYNTAX      INTEGER {
        forwarding(1),    -- acting as a router
        notForwarding(2) -- NOT acting as a router
    }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
```

"The indication of whether this entity is acting as an IPv4 router in respect to the forwarding of datagrams received by, but not addressed to, this entity. IPv4 routers forward datagrams. IPv4 hosts do not (except those source-routed via the host).

When this object is written the entity should save the change to non-volatile storage and restore the object from non-volatile storage upon re-initialization of the system. Note: a stronger requirement is not used because this object was previously defined."

::= { ip 1 }

ipDefaultTTL OBJECT-TYPE

SYNTAX INTEGER (1..255)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default value inserted into the Time-To-Live field of the IPv4 header of datagrams originated at this entity, whenever a TTL value is not supplied by the transport layer protocol.

When this object is written the entity should save the change to non-volatile storage and restore the object from non-volatile storage upon re-initialization of the system. Note: a stronger requirement is not used because this object was previously defined."

::= { ip 2 }

ipReasmTimeout OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum number of seconds which received fragments are

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held while they are awaiting reassembly at this entity."

::= { ip 13 }

--

-- the IPv6 general group

```

-- Some objects that affect all of IPv6
--

ipv6MIB OBJECT IDENTIFIER ::= { mib-2 55 }

ipv6MIBObjects OBJECT IDENTIFIER ::= { ipv6MIB 1 }

ipv6Forwarding OBJECT-TYPE
    SYNTAX      INTEGER {
                    forwarding(1),    -- acting as a router
                    notForwarding(2) -- NOT acting as a router
                }
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The indication of whether this entity is acting as an IPv6
        router in respect to the forwarding of datagrams received
        by, but not addressed to, this entity. IPv6 routers forward
        datagrams. IPv6 hosts do not (except those source-routed
        via the host).

        When this object is written the entity SHOULD save the
        change to non-volatile storage and restore the object from
        non-volatile storage upon re-initialization of the system."
    ::= { ipv6MIBObjects 1 }

ipv6DefaultHopLimit OBJECT-TYPE
    SYNTAX      INTEGER (0..255)
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The default value inserted into the Hop Limit field of the
        IPv6 header of datagrams originated at this entity, whenever
        a Hop Limit value is not supplied by the transport layer
        protocol.

        When this object is written the entity SHOULD save the
        change to non-volatile storage and restore the object from
        non-volatile storage upon re-initialization of the system."
    REFERENCE  "RFC2461 Section 6.3.2"
    ::= { ipv6MIBObjects 2 }

--

```

```
-- IPv4 Interface Table
--
```

```
ipv4IfTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ipv4IfEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The table containing per-interface IPv4-specific
        information."
    ::= { ip 25 }
```

```
ipv4IfEntry OBJECT-TYPE
    SYNTAX      Ipv4IfEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry containing IPv4-specific information for a specific
        interface."
    INDEX { ipv4IfIndex }
    ::= { ipv4IfTable 1 }
```

```
Ipv4IfEntry ::= SEQUENCE {
    ipv4IfIndex      InterfaceIndex,
    ipv4IfReasmMaxSize Integer32,
    ipv4IfAdminStatus INTEGER
}
```

```
ipv4IfIndex OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The index value which 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."
    ::= { ipv4IfEntry 1 }
```

```
ipv4IfReasmMaxSize OBJECT-TYPE
    SYNTAX      Integer32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The size of the largest IPv4 datagram which this entity can
        re-assemble from incoming IPv4 fragmented datagrams received
        on this interface."
    ::= { ipv4IfEntry 2 }
```

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ipv4IfAdminStatus OBJECT-TYPE

```
SYNTAX      INTEGER {
                up(1),
                down(2)
            }
```

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The indication of whether IPv4 is enabled (up) or disabled (down) on this interface. This object does not affect the state of the interface itself, only its connection to an IPv4 stack. The IF-MIB should be used to control the state of the interface.

When this object is written the entity SHOULD save the change to non-volatile storage and restore the object from non-volatile storage upon re-initialization of the system."

::= { ipv4IfEntry 3 }

--

-- v6 interface table

--

ipv6InterfaceTable OBJECT-TYPE

SYNTAX SEQUENCE OF Ipv6InterfaceEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The table containing per-interface IPv6-specific information."

::= { ip 31 }

ipv6InterfaceEntry OBJECT-TYPE

SYNTAX Ipv6InterfaceEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry containing IPv6-specific information for a given interface."

INDEX { ipv6InterfaceIfIndex }

::= { ipv6InterfaceTable 1 }

Ipv6InterfaceEntry ::= SEQUENCE {
 ipv6InterfaceIfIndex InterfaceIndex,
 ipv6InterfaceReasmMaxSize Unsigned32,
 ipv6InterfaceIdentifier Ipv6AddressIfIdentifier,

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 ipv6InterfacePhysicalAddress PhysAddress,
 ipv6InterfaceAdminStatus INTEGER,
 ipv6InterfaceReachableTime Unsigned32,
 ipv6InterfaceRetransmitTime Unsigned32
}

ipv6InterfaceIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"The index value which 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."

::= { ipv6InterfaceEntry 1 }

ipv6InterfaceReasmMaxSize OBJECT-TYPE

SYNTAX Unsigned32 (0..65535)
UNITS "octets"
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The size of the largest IPv6 datagram which this entity can re-assemble from incoming IPv6 fragmented datagrams received on this interface."

::= { ipv6InterfaceEntry 2 }

ipv6InterfaceIdentifier OBJECT-TYPE

SYNTAX Ipv6AddressIfIdentifier
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The Interface Identifier for this interface that is (at least) unique on the link this interface is attached to. The

Interface Identifier is combined with an address prefix to form an interface address.

By default, the Interface Identifier is auto-configured according to the rules of the link type this interface is attached to.

```
::= { ipv6InterfaceEntry 3 }
```

ipv6InterfacePhysicalAddress OBJECT-TYPE

```
SYNTAX      PhysAddress
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
```

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"The interface's physical address. For example, for an IPv6 interface attached to an 802.x link, this object normally contains a MAC address. Note that in some cases this address may differ from the address of the interface's protocol sub-layer. The interface's media-specific MIB must define the bit and byte ordering and the format of the value of this object. For interfaces which do not have such an address (e.g., a serial line), this object should contain an octet string of zero length.

```
::= { ipv6InterfaceEntry 4 }
```

ipv6InterfaceAdminStatus OBJECT-TYPE

```
SYNTAX      INTEGER {
                up(1),
                down(2)
            }
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
```

"The indication of whether IPv6 is enabled (up) or disabled (down) on this interface. This object does not affect the state of the interface itself, only its connection to an IPv6 stack. The IF-MIB should be used to control the state of the interface.

When this object is written the entity SHOULD save the change to non-volatile storage and restore the object from non-volatile storage upon re-initialization of the system."

```
::= { ipv6InterfaceEntry 5 }
```

```
ipv6InterfaceReachableTime OBJECT-TYPE
```

```
SYNTAX      Unsigned32
```

```
UNITS "milliseconds"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The time a neighbor is considered reachable after receiving  
    a reachability confirmation."
```

```
REFERENCE "RFC2461, Section 6.3.2"
```

```
::= { ipv6InterfaceEntry 6 }
```

```
ipv6InterfaceRetransmitTime OBJECT-TYPE
```

```
SYNTAX      Unsigned32
```

```
UNITS "milliseconds"
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The time between retransmissions of Neighbor Solicitation
```

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```
    messages to a neighbor when resolving the address or when  
    probing the reachability of a neighbor."
```

```
REFERENCE "RFC2461, Section 6.3.2"
```

```
::= { ipv6InterfaceEntry 7 }
```

```
--
```

```
-- Per-Interface or System-Wide IP statistics.
```

```
--
```

```
-- The following two tables, ipSystemStatsTable and ipIfStatsTable  
-- are intended to provide the same counters at different granularities.  
-- The ipSystemStatsTable provides system wide counters aggregating  
-- the traffic counters for all interfaces for a given address family.  
-- The ipIfStatsTable provides the same counters but for specific  
-- interfaces rather than as an aggregate.  
--
```

```
-- Note well: If a system provides both system-wide and interface-specific  
-- values the system-wide value may not be equal to the sum of the  
-- interface-specific values across all interfaces due to e.g. dynamic  
-- interface creation/deletion.
```

ipTrafficStats OBJECT IDENTIFIER ::= { ip 26 }

ipSystemStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpSystemStatsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The table containing system wide, address family specific traffic statistics. This table and the ipIfStatsTable contain similar objects whose difference is in their granularity. Where this table contains system wide traffic statistics the ipIfStatsTable contains the same statistics but counted on a per-interface basis."

::= { ipTrafficStats 1 }

ipSystemStatsEntry OBJECT-TYPE

SYNTAX IpSystemStatsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A statistics entry containing system-wide objects for a particular address family."

INDEX { ipSystemStatsAftype }

::= { ipSystemStatsTable 1 }

IpSystemStatsEntry ::= SEQUENCE {

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ipSystemStatsAftype	InetAddressType,
ipSystemStatsInReceives	Counter32,
ipSystemStatsHCInReceives	Counter64,
ipSystemStatsInOctets	Counter32,
ipSystemStatsHCInOctets	Counter64,
ipSystemStatsInHdrErrors	Counter32,
ipSystemStatsInNoRoutes	Counter32,
ipSystemStatsInAddrErrors	Counter32,
ipSystemStatsInUnknownProtos	Counter32,
ipSystemStatsInTruncatedPkts	Counter32,
ipSystemStatsInForwDatagrams	Counter32,
ipSystemStatsReasmReqds	Counter32,
ipSystemStatsReasmOKs	Counter32,
ipSystemStatsReasmFails	Counter32,

```

    ipSystemStatsInDiscards      Counter32,
    ipSystemStatsInDelivers      Counter32,
    ipSystemStatsOutRequests     Counter32,
    ipSystemStatsOutNoRoutes     Counter32,
    ipSystemStatsOutForwDatagrams Counter32,
    ipSystemStatsOutDiscards     Counter32,
    ipSystemStatsOutFragReqds    Counter32,
    ipSystemStatsOutFragOKs     Counter32,
    ipSystemStatsOutFragFails    Counter32,
    ipSystemStatsOutFragCreates  Counter32,
    ipSystemStatsOutTransmits    Counter32,
    ipSystemStatsHCOutTransmits  Counter64,
    ipSystemStatsOutOctets       Counter32,
    ipSystemStatsHCOutOctets     Counter64,
    ipSystemStatsInMcastPkts     Counter32,
    ipSystemStatsHCInMcastPkts  Counter64,
    ipSystemStatsInMcastOctets   Counter32,
    ipSystemStatsHCInMcastOctets Counter64,
    ipSystemStatsOutMcastPkts    Counter32,
    ipSystemStatsHCOutMcastPkts  Counter64,
    ipSystemStatsOutMcastOctets  Counter32,
    ipSystemStatsHCOutMcastOctets Counter64,
    ipSystemStatsInBcastPkts     Counter32,
    ipSystemStatsHCInBcastPkts  Counter64,
    ipSystemStatsOutBcastPkts    Counter32,
    ipSystemStatsHCOutBcastPkts  Counter64,
    ipSystemStatsDiscontinuityTime TimeStamp,
    ipSystemStatsRefreshRate     Unsigned32
}

```

```

ipSystemStatsAFType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  not-accessible
    STATUS      current

```

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DESCRIPTION

```

    "The address family for this row. May only be IPv4 or IPv6."
    ::= { ipSystemStatsEntry 1 }

```

```

-- This object ID is reserved to allow the IDs for this table's objects
-- to align with the objects in the ipIfStatsTable.
-- ::= { ipSystemStatsEntry 2 }

```

ipSystemStatsInReceives OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of input IP datagrams received, including those received in error.

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

::= { ipSystemStatsEntry 3 }

ipSystemStatsHCInReceives OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of input IP datagrams received, including those received in error. This object counts the same datagrams as ipSystemStatsInReceives but allows for larger values.

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

::= { ipSystemStatsEntry 4 }

ipSystemStatsInOctets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets received in input IP datagrams, including those received in error. Octets from datagrams counted in ipSystemStatsInReceives MUST be counted here.

Discontinuities in the value of this counter can occur at

re-initialization of the management system, and at other times as indicated by the value of ipSystemStatsDiscontinuityTime."
 ::= { ipSystemStatsEntry 5 }

ipSystemStatsHCInOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets received in input IP datagrams, including those received in error. This object counts the same octets as ipSystemStatsInOctets but allows for larger values.

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

::= { ipSystemStatsEntry 6 }

ipSystemStatsInHdrErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of input IP datagrams discarded due to errors in their IP headers, including version number mismatch, other format errors, hop count exceeded, errors discovered in processing their IP options, etc.

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

::= { ipSystemStatsEntry 7 }

ipSystemStatsInNoRoutes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of input IP datagrams discarded because no route could be found to transmit them to their destination.

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

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```
        ipSystemStatsDiscontinuityTime."  
 ::= { ipSystemStatsEntry 8 }
```

```
ipSystemStatsInAddrErrors OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"The number of input IP datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (e.g., ::0) and unsupported addresses (e.g., addresses with unallocated prefixes). For entities which are not IP routers and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

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

```
 ::= { ipSystemStatsEntry 9 }
```

```
ipSystemStatsInUnknownProtos OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"The number of locally-addressed IP datagrams received successfully but discarded because of an unknown or unsupported protocol.

When tracking interface statistics the counter of the interface to which these datagrams were addressed is incremented. This interface might not be the same as the input interface for some of the datagrams.

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

```
 ::= { ipSystemStatsEntry 10 }
```

ipSystemStatsInTruncatedPkts OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

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"The number of input IP datagrams discarded because datagram frame didn't carry enough data.

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

::= { ipSystemStatsEntry 11 }

ipSystemStatsInForwDatagrams OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of input datagrams for which this entity was not their final IP destination and for which this entity attempted to find a route to forward them to that final destination. In entities which do not act as IP routers, this counter will include only those datagrams which were Source-Routed via this entity, and the Source-Route processing was successful.

When tracking interface statistics the counter of the incoming interface is incremented for each datagram.

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

::= { ipSystemStatsEntry 12 }

ipSystemStatsReasmReqds OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of IP fragments received which needed to be reassembled at this interface.

When tracking interface statistics the counter of the interface to which these fragments were addressed is incremented. This interface might not be the same as the input interface for some of the fragments.

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

::= { ipSystemStatsEntry 13 }

ipSystemStatsReasmOKs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP datagrams successfully reassembled.

When tracking interface statistics the counter of the interface to which these datagrams were addressed is incremented. This interface might not be the same as the input interface for some of the datagrams.

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

::= { ipSystemStatsEntry 14 }

ipSystemStatsReasmFails OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of failures detected by the IP re-assembly algorithm (for whatever reason: timed out, errors, etc.). Note that this is not necessarily a count of discarded IP fragments since some algorithms (notably the algorithm in

[RFC 815](#)) can lose track of the number of fragments by combining them as they are received.

When tracking interface statistics the counter of the interface to which these fragments were addressed is incremented. This interface might not be the same as the input interface for some of the fragments.

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

```
::= { ipSystemStatsEntry 15 }
```

ipSystemStatsInDiscards OBJECT-TYPE

```
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
```

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"The number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (e.g., for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting re-assembly.

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

```
::= { ipSystemStatsEntry 16 }
```

ipSystemStatsInDelivers OBJECT-TYPE

```
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
```

"The total number of datagrams successfully delivered to IP user-protocols (including ICMP).

When tracking interface statistics the counter of the interface to which these datagrams were addressed is

incremented. This interface might not be the same as the input interface for some of the datagrams.

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

::= { ipSystemStatsEntry 17 }

ipSystemStatsOutRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of IP datagrams which local IP user-protocols (including ICMP) supplied to IP in requests for transmission. Note that this counter does not include any datagrams counted in ipSystemStatsOutForwDatagrams.

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

::= { ipSystemStatsEntry 18 }

ipSystemStatsOutNoRoutes OBJECT-TYPE

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SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of local generated IP datagrams discarded because no route could be found to transmit them to their destination.

As no route can be found for these datagrams the interface specific instances are not meaningful for this object.

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

```
::= { ipSystemStatsEntry 19 }
```

```
ipSystemStatsOutForwDatagrams OBJECT-TYPE
```

```
SYNTAX Counter32
```

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

```
STATUS current
```

```
DESCRIPTION
```

"The number of datagrams which this entity received and for which it was successful in finding a path to their final destination. In entities which do not act as IP routers, this counter will include only those datagrams which were Source-Routed via this entity, and the Source-Route processing was successful.

When tracking interface statistics the counter of the outgoing interface is incremented for a successfully forwarded datagram.

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

```
::= { ipSystemStatsEntry 20 }
```

```
ipSystemStatsOutDiscards OBJECT-TYPE
```

```
SYNTAX Counter32
```

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

```
STATUS current
```

```
DESCRIPTION
```

"The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (e.g., for lack of buffer space). Note that this counter would include

datagrams counted in ipSystemStatsOutForwDatagrams if any such datagrams met this (discretionary) discard criterion.

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

```
::= { ipSystemStatsEntry 21 }
```

ipSystemStatsOutFragReqds OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP datagrams that would require fragmentation in order to be transmitted.

When tracking interface statistics the counter of the outgoing interface is incremented for a successfully fragmented datagram.

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

::= { ipSystemStatsEntry 22 }

ipSystemStatsOutFragOKs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP datagrams that have been successfully fragmented.

When tracking interface statistics the counter of the outgoing interface is incremented for a successfully fragmented datagram.

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

::= { ipSystemStatsEntry 23 }

ipSystemStatsOutFragFails OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

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STATUS current

DESCRIPTION

"The number of IP datagrams that have been discarded because they needed to be fragmented but could not be. This includes IPv4 packets that have the DF bit set and IPv6 packets that are being forwarded and exceed the outgoing link MTU.

When tracking interface statistics the counter of the outgoing interface is incremented for an unsuccessfully fragmented datagram.

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

::= { ipSystemStatsEntry 24 }

ipSystemStatsOutFragCreates OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of output datagram fragments that have been generated as a result of IP fragmentation.

When tracking interface statistics the counter of the outgoing interface is incremented for a successfully fragmented datagram.

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

::= { ipSystemStatsEntry 25 }

ipSystemStatsOutTransmits OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of IP datagrams that this entity supplied to the lower layers for transmission. This includes datagrams generated local and those forwarded by this entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other

times as indicated by the value of
ipSystemStatsDiscontinuityTime."
 ::= { ipSystemStatsEntry 26 }

ipSystemStatsHCOutTransmits OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of IP datagrams that this entity supplied to the lower layers for transmission. This object counts the same datagrams as ipSystemStatsOutTransmits but allows for larger values.

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

::= { ipSystemStatsEntry 27 }

ipSystemStatsOutOctets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets in IP datagrams delivered to the lower layers for transmission. Octets from datagrams counted in ipSystemStatsOutTransmits MUST be counted here.

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

::= { ipSystemStatsEntry 28 }

ipSystemStatsHCOutOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets in IP datagrams delivered to the lower layers for transmission. This objects counts the same octets as ipSystemStatsOutOctets but allows for larger values.

Discontinuities in the value of this counter can occur at

re-initialization of the management system, and at other times as indicated by the value of

```
        ipSystemStatsDiscontinuityTime."  
 ::= { ipSystemStatsEntry 29 }
```

ipSystemStatsInMcastPkts OBJECT-TYPE

```
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current  
DESCRIPTION
```

"The number of IP multicast datagrams received.

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

```
        ipSystemStatsDiscontinuityTime."  
 ::= { ipSystemStatsEntry 30 }
```

ipSystemStatsHCInMcastPkts OBJECT-TYPE

```
SYNTAX      Counter64  
MAX-ACCESS  read-only  
STATUS      current  
DESCRIPTION
```

"The number of IP multicast datagrams received. This object counts the same datagrams as ipSystemStatsInMcastPkts but allows for larger values.

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

```
        ipSystemStatsDiscontinuityTime."  
 ::= { ipSystemStatsEntry 31 }
```

ipSystemStatsInMcastOctets OBJECT-TYPE

```
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current  
DESCRIPTION
```

"The total number of octets received in IP multicast datagrams. Octets from datagrams counted in ipSystemStatsOutMcastPkts MUST be counted here.

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

::= { ipSystemStatsEntry 32 }

ipSystemStatsHCInMcastOctets OBJECT-TYPE
SYNTAX Counter64

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MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets received in IP multicast datagrams. This object counts the same octets as ipSystemStatsInMcastOctets but allows for larger values.

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

::= { ipSystemStatsEntry 33 }

ipSystemStatsOutMcastPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP multicast datagrams transmitted.

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

::= { ipSystemStatsEntry 34 }

ipSystemStatsHCOutMcastPkts OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP multicast datagrams transmitted. This

object counts the same datagrams as
ipSystemStatsOutMcastPkts but allows for larger values.

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

::= { ipSystemStatsEntry 35 }

ipSystemStatsOutMcastOctets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets transmitted in IP multicast
datagrams. Octets from datagrams counted in

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ipSystemStatsInMcastPkts MUST be counted here.

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

::= { ipSystemStatsEntry 36 }

ipSystemStatsHCOutMcastOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets received in IP multicast
datagrams. This object counts the same octets as
ipSystemStatsOutMcastOctets but allows for larger values.

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

::= { ipSystemStatsEntry 37 }

ipSystemStatsInBcastPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of IP broadcast datagrams received.

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

::= { ipSystemStatsEntry 38 }

ipSystemStatsHCInBcastPkts OBJECT-TYPE

SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of IP broadcast datagrams received. This object counts the same datagrams as ipSystemStatsInBcastPkts but allows for larger values.

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

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ipSystemStatsDiscontinuityTime."
::= { ipSystemStatsEntry 39 }

ipSystemStatsOutBcastPkts OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of IP broadcast datagrams transmitted.

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

::= { ipSystemStatsEntry 40 }

ipSystemStatsHCOutBcastPkts OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of IP broadcast datagrams transmitted. This object counts the same datagrams as ipSystemStatsOutBcastPkts but allows for larger values.

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

::= { ipSystemStatsEntry 41 }

ipSystemStatsDiscontinuityTime OBJECT-TYPE

SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The value of sysUpTime on the most recent occasion at which any one or more of this entry's counters suffered a discontinuity.

If no such discontinuities have occurred since the last re-initialization of the local management subsystem, then this object contains a zero value."

::= { ipSystemStatsEntry 42 }

ipSystemStatsRefreshRate OBJECT-TYPE

SYNTAX Unsigned32
UNITS "milli-seconds"

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MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The minimum reasonable polling interval for this entry. This object provides an indication of the minimum amount of time required to update the counters in this entry."

::= { ipSystemStatsEntry 43 }

ipIfStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpIfStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"The table containing per-interface traffic statistics. This table and the ipSystemStatsTable contain similar objects whose difference is in their granularity. Where this table contains per-interface statistics the ipSystemStatsTable contains the same statistics but counted on a system wide basis."

::= { ipTrafficStats 2 }

ipIfStatsEntry OBJECT-TYPE
SYNTAX IpIfStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"An interface statistics entry containing objects for a particular interface and address family."

INDEX { ipIfStatsAftype, ipIfStatsIfIndex }

::= { ipIfStatsTable 1 }

IpIfStatsEntry ::= SEQUENCE {
 ipIfStatsAftype InetAddressType,
 ipIfStatsIfIndex InterfaceIndexOrZero,
 ipIfStatsInReceives Counter32,
 ipIfStatsHCInReceives Counter64,
 ipIfStatsInOctets Counter32,
 ipIfStatsHCInOctets Counter64,
 ipIfStatsInHdrErrors Counter32,
 ipIfStatsInNoRoutes Counter32,
 ipIfStatsInAddrErrors Counter32,
 ipIfStatsInUnknownProtos Counter32,
 ipIfStatsInTruncatedPkts Counter32,
 ipIfStatsInForwDatagrams Counter32,
 ipIfStatsReasmReqds Counter32,
 ipIfStatsReasmOKs Counter32,

ipIfStatsReasmFails Counter32,
ipIfStatsInDiscards Counter32,
ipIfStatsInDelivers Counter32,
ipIfStatsOutRequests Counter32,

```

    ipIfStatsOutNoRoutes      Counter32,
    ipIfStatsOutForwDatagrams Counter32,
    ipIfStatsOutDiscards     Counter32,
    ipIfStatsOutFragReqds    Counter32,
    ipIfStatsOutFragOKs     Counter32,
    ipIfStatsOutFragFails   Counter32,
    ipIfStatsOutFragCreates  Counter32,
    ipIfStatsOutTransmits    Counter32,
    ipIfStatsHCOutTransmits  Counter64,
    ipIfStatsOutOctets       Counter32,
    ipIfStatsHCOutOctets     Counter64,
    ipIfStatsInMcastPkts    Counter32,
    ipIfStatsHCInMcastPkts  Counter64,
    ipIfStatsInMcastOctets  Counter32,
    ipIfStatsHCInMcastOctets Counter64,
    ipIfStatsOutMcastPkts   Counter32,
    ipIfStatsHCOutMcastPkts Counter64,
    ipIfStatsOutMcastOctets Counter32,
    ipIfStatsHCOutMcastOctets Counter64,
    ipIfStatsInBcastPkts    Counter32,
    ipIfStatsHCInBcastPkts  Counter64,
    ipIfStatsOutBcastPkts   Counter32,
    ipIfStatsHCOutBcastPkts Counter64,
    ipIfStatsDiscontinuityTime TimeStamp,
    ipIfStatsRefreshRate    Unsigned32
}

```

ipIfStatsAFType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The address family for this row. May only be IPv4 or IPv6."

::= { ipIfStatsEntry 1 }

ipIfStatsIfIndex OBJECT-TYPE

SYNTAX InterfaceIndexOrZero

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The index value which 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."

```
::= { ipIfStatsEntry 2 }
```

ipIfStatsInReceives OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of input IP datagrams received, including those received in error.

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

```
::= { ipIfStatsEntry 3 }
```

ipIfStatsHCInReceives OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of input IP datagrams received, including those received in error. This object counts the same datagrams as ipIfStatsInReceives but allows for larger values.

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

```
::= { ipIfStatsEntry 4 }
```

ipIfStatsInOctets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets received in input IP datagrams, including those received in error. Octets from datagrams counted in ipIfStatsInReceives MUST be counted here.

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

```
::= { ipIfStatsEntry 5 }
```

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SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets received in input IP datagrams, including those received in error. This object counts the same octets as ipIfStatsInOctets but allows for larger values.

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

::= { ipIfStatsEntry 6 }

ipIfStatsInHdrErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of input IP datagrams discarded due to errors in their IP headers, including version number mismatch, other format errors, hop count exceeded, errors discovered in processing their IP options, etc.

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

::= { ipIfStatsEntry 7 }

ipIfStatsInNoRoutes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of input IP datagrams discarded because no route could be found to transmit them to their destination.

Discontinuities in the value of this counter can occur at

re-initialization of the management system, and at other times as indicated by the value of ipIfStatsDiscontinuityTime."
 ::= { ipIfStatsEntry 8 }

ipIfStatsInAddrErrors OBJECT-TYPE
 SYNTAX Counter32
 MAX-ACCESS read-only

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STATUS current
 DESCRIPTION

"The number of input IP datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (e.g., ::0) and unsupported addresses (e.g., addresses with unallocated prefixes). For entities which are not IP routers and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

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

::= { ipIfStatsEntry 9 }

ipIfStatsInUnknownProtos OBJECT-TYPE
 SYNTAX Counter32
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION

"The number of locally-addressed IP datagrams received successfully but discarded because of an unknown or unsupported protocol.

When tracking interface statistics the counter of the interface to which these datagrams were addressed is incremented. This interface might not be the same as the input interface for some of the datagrams.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other

```
        times as indicated by the value of
        ipIfStatsDiscontinuityTime."
 ::= { ipIfStatsEntry 10 }
```

ipIfStatsInTruncatedPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of input IP datagrams discarded because datagram frame didn't carry enough data.

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

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```
        ipIfStatsDiscontinuityTime."
 ::= { ipIfStatsEntry 11 }
```

ipIfStatsInForwDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of input datagrams for which this entity was not their final IP destination and for which this entity attempted to find a route to forward them to that final destination. In entities which do not act as IP routers, this counter will include only those datagrams which were Source-Routed via this entity, and the Source-Route processing was successful.

When tracking interface statistics the counter of the incoming interface is incremented for each datagram.

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

```
        ipIfStatsDiscontinuityTime."
 ::= { ipIfStatsEntry 12 }
```

ipIfStatsReasmReqds OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of IP fragments received which needed to be reassembled at this interface.

When tracking interface statistics the counter of the interface to which these fragments were addressed is incremented. This interface might not be the same as the input interface for some of the fragments.

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

::= { ipIfStatsEntry 13 }

ipIfStatsReasmOKs OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current

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DESCRIPTION

"The number of IP datagrams successfully reassembled.

When tracking interface statistics the counter of the interface to which these datagrams were addressed is incremented. This interface might not be the same as the input interface for some of the datagrams.

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

::= { ipIfStatsEntry 14 }

ipIfStatsReasmFails OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The number of failures detected by the IP re-assembly algorithm (for whatever reason: timed out, errors, etc.). Note that this is not necessarily a count of discarded IP fragments since some algorithms (notably the algorithm in [RFC 815](#)) can lose track of the number of fragments by combining them as they are received.

When tracking interface statistics the counter of the interface to which these fragments were addressed is incremented. This interface might not be the same as the input interface for some of the fragments.

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

```
::= { ipIfStatsEntry 15 }
```

ipIfStatsInDiscards OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (e.g., for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting re-assembly.

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

```
::= { ipIfStatsEntry 16 }
```

ipIfStatsInDelivers OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of datagrams successfully delivered to IP

user-protocols (including ICMP).

When tracking interface statistics the counter of the interface to which these datagrams were addressed is incremented. This interface might not be the same as the input interface for some of the datagrams.

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

```
::= { ipIfStatsEntry 17 }
```

ipIfStatsOutRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of IP datagrams which local IP user-protocols (including ICMP) supplied to IP in requests for transmission. Note that this counter does not include any datagrams counted in ipIfStatsOutForwDatagrams.

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

```
::= { ipIfStatsEntry 18 }
```

ipIfStatsOutNoRoutes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of local generated IP datagrams discarded because no route could be found to transmit them to their

destination.

As no route can be found for these datagrams the interface specific instances are not meaningful for this object.

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

::= { ipIfStatsEntry 19 }

ipIfStatsOutForwDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of datagrams which this entity received and for which it was successful in finding a path to their final destination. In entities which do not act as IP routers, this counter will include only those datagrams which were Source-Routed via this entity, and the Source-Route processing was successful.

When tracking interface statistics the counter of the outgoing interface is incremented for a successfully forwarded datagram.

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

::= { ipIfStatsEntry 20 }

ipIfStatsOutDiscards OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (e.g., for lack of buffer space). Note that this counter would include datagrams counted in ipIfStatsOutForwDatagrams if any such datagrams met this (discretionary) discard criterion.

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

```
        ipIfStatsDiscontinuityTime."  
 ::= { ipIfStatsEntry 21 }
```

```
ipIfStatsOutFragReqds OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The number of IP datagrams that would require fragmentation  
in order to be transmitted.
```

```
When tracking interface statistics the counter of the  
outgoing interface is incremented for a successfully  
fragmented datagram.
```

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

```
 ::= { ipIfStatsEntry 22 }
```

```
ipIfStatsOutFragOKs OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The number of IP datagrams that have been successfully  
fragmented.
```

```
When tracking interface statistics the counter of the  
outgoing interface is incremented for a successfully  
fragmented datagram.
```

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

```
 ::= { ipIfStatsEntry 23 }
```

```
ipIfStatsOutFragFails OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The number of IP datagrams that have been discarded because  
they needed to be fragmented but could not be. This  
includes IPv4 packets that have the DF bit set and IPv6  
packets that are being forwarded and exceed the outgoing
```

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link MTU.

When tracking interface statistics the counter of the outgoing interface is incremented for an unsuccessfully fragmented datagram.

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

::= { ipIfStatsEntry 24 }

ipIfStatsOutFragCreates OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of output datagram fragments that have been generated as a result of IP fragmentation.

When tracking interface statistics the counter of the outgoing interface is incremented for a successfully fragmented datagram.

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

::= { ipIfStatsEntry 25 }

ipIfStatsOutTransmits OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of IP datagrams that this entity supplied to the lower layers for transmission. This includes datagrams generated local and those forwarded by this entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other

times as indicated by the value of
ipIfStatsDiscontinuityTime."
 ::= { ipIfStatsEntry 26 }

ipIfStatsHCOutTransmits OBJECT-TYPE
SYNTAX Counter64

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MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The total number of IP datagrams that this entity supplied to the lower layers for transmission. This object counts the same datagrams as ipIfStatsOutTransmits but allows for larger values.

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

::= { ipIfStatsEntry 27 }

ipIfStatsOutOctets OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The total number of octets in IP datagrams delivered to the lower layers for transmission. Octets from datagrams counted in ipIfStatsOutTransmits MUST be counted here.

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

::= { ipIfStatsEntry 28 }

ipIfStatsHCOutOctets OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The total number of octets in IP datagrams delivered to the

lower layers for transmission. This objects counts the same octets as ipIfStatsOutOctets but allows for larger values.

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

::= { ipIfStatsEntry 29 }

ipIfStatsInMcastPkts OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current

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DESCRIPTION

"The number of IP multicast datagrams received.

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

::= { ipIfStatsEntry 30 }

ipIfStatsHCInMcastPkts OBJECT-TYPE

SYNTAX Counter64
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The number of IP multicast datagrams received. This object counts the same datagrams as ipIfStatsInMcastPkts but allows for larger values.

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

::= { ipIfStatsEntry 31 }

ipIfStatsInMcastOctets OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The total number of octets received in IP multicast datagrams. Octets from datagrams counted in ipIfStatsOutMcastPkts MUST be counted here.

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

::= { ipIfStatsEntry 32 }

ipIfStatsHCInMcastOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets received in IP multicast datagrams. This object counts the same octets as ipIfStatsInMcastOctets but allows for larger values.

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

::= { ipIfStatsEntry 33 }

ipIfStatsOutMcastPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP multicast datagrams transmitted.

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

::= { ipIfStatsEntry 34 }

ipIfStatsHCOutMcastPkts OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of IP multicast datagrams transmitted. This object counts the same datagrams as ipIfStatsOutMcastPkts but allows for larger values.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ipIfStatsDiscontinuityTime."
::= { ipIfStatsEntry 35 }

ipIfStatsOutMcastOctets OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of octets transmitted in IP multicast datagrams. Octets from datagrams counted in ipIfStatsInMcastPkts MUST be counted here.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ipIfStatsDiscontinuityTime."
::= { ipIfStatsEntry 36 }

ipIfStatsHCOutMcastOctets OBJECT-TYPE
SYNTAX Counter64
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of octets received in IP multicast datagrams. This object counts the same octets as ipIfStatsOutMcastOctets but allows for larger values.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ipIfStatsDiscontinuityTime."
::= { ipIfStatsEntry 37 }

ipIfStatsInBcastPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP broadcast datagrams received.

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

::= { ipIfStatsEntry 38 }

ipIfStatsHCInBcastPkts OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP broadcast datagrams received. This object counts the same datagrams as ipIfStatsInBcastPkts but allows for larger values.

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

::= { ipIfStatsEntry 39 }

ipIfStatsOutBcastPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP broadcast datagrams transmitted.

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

::= { ipIfStatsEntry 40 }

ipIfStatsHCOutBcastPkts OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of IP broadcast datagrams transmitted. This object counts the same datagrams as ipIfStatsOutBcastPkts but allows for larger values.

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

::= { ipIfStatsEntry 41 }

ipIfStatsDiscontinuityTime OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime on the most recent occasion at which any one or more of this entry's counters suffered a discontinuity.

If no such discontinuities have occurred since the last re-initialization of the local management subsystem, then this object contains a zero value."

::= { ipIfStatsEntry 42 }

ipIfStatsRefreshRate OBJECT-TYPE

SYNTAX Unsigned32

UNITS "milli-seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The minimum reasonable polling interval for this entry.

This object provides an indication of the minimum amount of time required to update the counters in this entry."

::= { ipIfStatsEntry 43 }

```
--  
-- Internet Address Prefix table  
--
```

```
ipAddressPrefixTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF IPAddressPrefixEntry
```

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

```
STATUS current
```

```
DESCRIPTION
```

```
"The inet prefix table.
```

This table allows the user to determine the source of an IP address or set of IP addresses and allows other tables to share the information via pointer rather than by copying.

For example when the node configures both a unicast and anycast address for a prefix the ipAddressPrefix objects for those addresses will point to a single row in this table.

This table primarily provides support for IPv6 prefixes and several of the objects are less meaningful for IPv4. The table continues to allow IPv4 addresses to allow future flexibility. In order to promote a common configuration this document includes suggestions for default values for IPv4 prefixes. Each of these values may be overridden if an object is meaningful to the node."

```
::= { ip 27 }
```

```
ipAddressPrefixEntry OBJECT-TYPE
```

```
SYNTAX IPAddressPrefixEntry
```

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

```
STATUS current
```

```
DESCRIPTION
```

```
"inet prefix entry"
```

```
INDEX { ipAddressPrefixIfIndex, ipAddressPrefixType,  
        ipAddressPrefixPrefix, ipAddressPrefixLength }
```

```
::= { ipAddressPrefixTable 1 }
```

```
IpAddressPrefixEntry ::= SEQUENCE {
```

ipAddressPrefixIfIndex	InterfaceIndex,
ipAddressPrefixType	InetAddressType,
ipAddressPrefixPrefix	InetAddress,
ipAddressPrefixLength	InetAddressPrefixLength,
ipAddressPrefixOrigin	IpAddressPrefixOrigin,
ipAddressPrefixOnLinkFlag	TruthValue,
ipAddressPrefixAutonomousFlag	TruthValue,
ipAddressPrefixAdvPreferredLifetime	Unsigned32,
ipAddressPrefixAdvValidLifetime	Unsigned32

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}

ipAddressPrefixIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The index value which uniquely identifies the interface on which this prefix is configured. 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."

::= { ipAddressPrefixEntry 1 }

ipAddressPrefixType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The address type of ipAddressPrefix. Only IPv4 and IPv6 addresses are expected."

::= { ipAddressPrefixEntry 2 }

ipAddressPrefixPrefix OBJECT-TYPE

SYNTAX InetAddress (SIZE(0..36))

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The address prefix. Bits after ipAddressPrefixLength must be zero."

::= { ipAddressPrefixEntry 3 }

ipAddressPrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The prefix length associated with this prefix."

::= { ipAddressPrefixEntry 4 }

ipAddressPrefixOrigin OBJECT-TYPE

SYNTAX IpAddressPrefixOrigin

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The origin of this prefix."

::= { ipAddressPrefixEntry 5 }

ipAddressPrefixOnLinkFlag OBJECT-TYPE

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SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object has the value 'true(1)', if this prefix can be used for on-link determination and the value 'false(2)' otherwise.

The default for IPv4 prefixes is 'true(1)'."

REFERENCE "For IPv6 [RFC2461](#), especially sections [2](#) and [4.6.2](#) and [RFC2462](#)"

::= { ipAddressPrefixEntry 6 }

ipAddressPrefixAutonomousFlag OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Autonomous address configuration flag. When true(1), indicates that this prefix can be used for autonomous address configuration (i.e. can be used to form a local interface address). If false(2), it is not used to auto-configure a local interface address.

The default for IPv4 prefixes is 'false(2)'."

REFERENCE "For IPv6 [RFC2461](#), especially sections [2](#) and [4.6.2](#) and [RFC2462](#)"

::= { ipAddressPrefixEntry 7 }

ipAddressPrefixAdvPreferredLifetime OBJECT-TYPE

SYNTAX Unsigned32

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The length of time in seconds that this prefix will remain preferred, i.e. time until deprecation. A value of 4,294,967,295 represents infinity.

The address generated from a deprecated prefix should no longer be used as a source address in new communications, but packets received on such an interface are processed as expected.

The default for IPv4 prefixes is 4,294,967,295 (infinity)."
REFERENCE "For IPv6 [RFC2461](#), especially sections [2](#) and [4.6.2](#) and [RFC2462](#)"
::= { ipAddressPrefixEntry 8 }

ipAddressPrefixAdvValidLifetime OBJECT-TYPE
SYNTAX Unsigned32

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UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The length of time, in seconds, that this prefix will remain valid, i.e. time until invalidation. A value of 4,294,967,295 represents infinity.

The address generated from an invalidated prefix should not appear as the destination or source address of a packet.

The default for IPv4 prefixes is 4,294,967,295 (infinity)."
REFERENCE "For IPv6 [RFC2461](#), especially sections [2](#) and [4.6.2](#) and [RFC2462](#)"
::= { ipAddressPrefixEntry 9 }

--

-- Internet Address Table

--

ipAddressTable OBJECT-TYPE
SYNTAX SEQUENCE OF IpAddressEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"inet addr table

This table contains addressing information relevant to the entity's interfaces.

This table does not contain multicast address information. Tables for such information should be contained in multicast specific MIBs such as [RFC3019](#)."

::= { ip 28 }

```
ipAddressEntry OBJECT-TYPE
    SYNTAX      IpAddressEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "inet addr entry"
    INDEX { ipAddressAddrType, ipAddressAddr }
    ::= { ipAddressTable 1 }
```

```
IpAddressEntry ::= SEQUENCE {
    ipAddressAddrType      InetAddressType,
```

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```
    ipAddressAddr      InetAddress,
    ipAddressIfIndex   InterfaceIndex,
    ipAddressType      INTEGER,
    ipAddressPrefix    RowPointer,
    ipAddressOrigin    IpAddressOrigin,
    ipAddressStatus    IpAddressStatus,
    ipAddressCreated   TimeStamp,
    ipAddressLastChanged TimeStamp
}
```

```
ipAddressAddrType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The address type of ipAddressAddr."
    ::= { ipAddressEntry 1 }
```

```
ipAddressAddr OBJECT-TYPE
    SYNTAX      InetAddress (SIZE(0..36))
    MAX-ACCESS  not-accessible
    STATUS      current
```

DESCRIPTION

"The IP address to which this entry's addressing information pertains."

::= { ipAddressEntry 2 }

ipAddressIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The index value which 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."

::= { ipAddressEntry 3 }

ipAddressType OBJECT-TYPE

SYNTAX INTEGER {
 unicast(1),
 anycast(2),
 broadcast(3)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The type of address. broadcast(3) is not a valid value for

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IPv6 addresses [[draft-ietf-ipngwg-addr-arch-v3-05.txt](#)]. "
::= { ipAddressEntry 4 }

ipAddressPrefix OBJECT-TYPE

SYNTAX RowPointer

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A pointer to the row in the prefix table to which this address belongs. May be { 0 0 } if there is no such row."

::= { ipAddressEntry 5 }

ipAddressOrigin OBJECT-TYPE

SYNTAX IpAddressOrigin

MAX-ACCESS read-only

STATUS current
DESCRIPTION
"The origin of the address."
 ::= { ipAddressEntry 6 }

ipAddressStatus OBJECT-TYPE
SYNTAX IPAddressStatus
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The status of the address, describing if the address can be used for communication.

In the absence of other information, an IPv4 address is always preferred(1)."
 ::= { ipAddressEntry 7 }

ipAddressCreated OBJECT-TYPE
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The value of sysUpTime at the time this entry was created. If this entry was created prior to the last re-initialization of the local network management subsystem, then this object contains a zero value."
 ::= { ipAddressEntry 8 }

ipAddressLastChanged OBJECT-TYPE
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The value of sysUpTime at the time this entry was last updated. If this entry was updated prior to the last re-initialization of the local network management subsystem, then this object contains a zero value."
 ::= { ipAddressEntry 9 }

--
-- the Internet Address Translation table
--

inetNetToMediaTable OBJECT-TYPE

SYNTAX SEQUENCE OF InetNetToMediaEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IP Address Translation table used for mapping from IP addresses to physical addresses.

The Address Translation tables contain the IP address to 'physical' address equivalences. Some interfaces do not use translation tables for determining address equivalences (e.g., DDN-X.25 has an algorithmic method); if all interfaces are of this type, then the Address Translation table is empty, i.e., has zero entries.

While many protocols may be used to populate this table, ARP [1] and Neighbor Discovery [4] are the most likely options."

::= { ip 29 }

inetNetToMediaEntry OBJECT-TYPE

SYNTAX InetNetToMediaEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Each entry contains one IP address to `physical' address equivalence."

INDEX { inetNetToMediaIfIndex,
inetNetToMediaNetAddressType,
inetNetToMediaNetAddress }

::= { inetNetToMediaTable 1 }

InetNetToMediaEntry ::= SEQUENCE {

inetNetToMediaIfIndex,	InterfaceIndex,
inetNetToMediaNetAddressType	InetAddressType,
inetNetToMediaNetAddress	InetAddress,
inetNetToMediaPhysAddress	PhysAddress,

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inetNetToMediaLastUpdated TimeStamp,

```

        inetNetToMediaType          INTEGER,
        inetNetToMediaState        INTEGER
    }

```

inetNetToMediaIfIndex, OBJECT-TYPE

```

SYNTAX      InterfaceIndex
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

```

"The index value which 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."

```
 ::= { inetNetToMediaEntry 1 }
```

inetNetToMediaNetAddressType OBJECT-TYPE

```

SYNTAX      InetAddressType
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

```

"The type of inetNetToMediaNetAddress."

```
 ::= { inetNetToMediaEntry 2 }
```

inetNetToMediaNetAddress OBJECT-TYPE

```

SYNTAX      InetAddress (SIZE(0..36))
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION

```

"The IP Address corresponding to the media-dependent `physical' address."

```
 ::= { inetNetToMediaEntry 3 }
```

inetNetToMediaPhysAddress OBJECT-TYPE

```

SYNTAX      PhysAddress
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION

```

"The media-dependent `physical' address.

As the entries in this table are typically not persistent when this object is written the entity SHOULD NOT save the change to non-volatile storage."

```
 ::= { inetNetToMediaEntry 4 }
```

inetNetToMediaLastUpdated OBJECT-TYPE

```

SYNTAX      TimeStamp
MAX-ACCESS  read-only

```

STATUS current

DESCRIPTION

"The value of sysUpTime at the time this entry was last updated. If this entry was updated prior to the last re-initialization of the local network management subsystem, then this object contains a zero value."

::= { inetNetToMediaEntry 5 }

inetNetToMediaType OBJECT-TYPE

SYNTAX INTEGER {
 other(1), -- none of the following
 invalid(2), -- an invalidated mapping
 dynamic(3),
 static(4),
 local(5) -- local interface
}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The type of mapping.

Setting this object to the value invalid(2) has the effect of invalidating the corresponding entry in the inetNetToMediaTable. That is, it effectively dis-associates the interface identified with said entry from the mapping identified with said entry. It is an implementation-specific matter as to whether the agent removes an invalidated entry from the table. Accordingly, management stations must be prepared to receive tabular information from agents that corresponds to entries not currently in use. Proper interpretation of such entries requires examination of the relevant inetNetToMediaType object.

The 'dynamic(3)' type indicates that the IP address to physical addresses mapping has been dynamically resolved using e.g. IPv4 ARP or the IPv6 Neighbor Discovery protocol.

The 'static(4)' type indicates that the mapping has been statically configured. Both of these refer to entries that provide mappings for other entities addresses.

The 'local(5)' type indicates that the mapping is provided for an entity's own interface address.

As the entries in this table are typically not persistent when this object is written the entity SHOULD NOT save the

```
change to non-volatile storage."
 ::= { inetNetToMediaEntry 6 }
```

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```
inetNetToMediaState OBJECT-TYPE
    SYNTAX      INTEGER {
        reachable(1), -- confirmed reachability
        stale(2),    -- unconfirmed reachability
        delay(3),    -- waiting for reachability
                    -- confirmation before entering
                    -- the probe state
        probe(4),    -- actively probing
        invalid(5),  -- an invalidated mapping
        unknown(6),  -- state can not be determined
                    -- for some reason.
        incomplete(7) -- address resolution is being performed.
    }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The Neighbor Unreachability Detection [4] state for the
        interface when the address mapping in this entry is used.
        If Neighbor Unreachability Detection is not in use (e.g. for
        IPv4), this object is always unknown(6)."
```

REFERENCE "[RFC2461](#)"

```
 ::= { inetNetToMediaEntry 7 }
```

```
--
-- The IPv6 Scope Zone Index Table.
--
```

```
ipv6ScopeZoneIndexTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ipv6ScopeZoneIndexEntry
    MAX-ACCESS  not-accessible
    STATUS      current
```

DESCRIPTION

"The table used to describe IPv6 unicast and multicast scope zones."

::= { ip 30 }

ipv6ScopeZoneIndexEntry OBJECT-TYPE

SYNTAX Ipv6ScopeZoneIndexEntry

MAX-ACCESS not-accessible

STATUS current

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DESCRIPTION

"Each entry contains the list of scope identifiers on a given interface."

INDEX { ipv6ScopeZoneIndexIfIndex }

::= { ipv6ScopeZoneIndexTable 1 }

Ipv6ScopeZoneIndexEntry ::= SEQUENCE {

ipv6ScopeZoneIndexIfIndex	InterfaceIndex,
ipv6ScopeZoneIndexLinkLocal	InetZoneIndex,
ipv6ScopeZoneIndexSubnetLocal	InetZoneIndex,
ipv6ScopeZoneIndexAdminLocal	InetZoneIndex,
ipv6ScopeZoneIndexSiteLocal	InetZoneIndex,
ipv6ScopeZoneIndex6	InetZoneIndex,
ipv6ScopeZoneIndex7	InetZoneIndex,
ipv6ScopeZoneIndexOrganizationLocal	InetZoneIndex,
ipv6ScopeZoneIndex9	InetZoneIndex,
ipv6ScopeZoneIndexA	InetZoneIndex,
ipv6ScopeZoneIndexB	InetZoneIndex,
ipv6ScopeZoneIndexC	InetZoneIndex,
ipv6ScopeZoneIndexD	InetZoneIndex

}

ipv6ScopeZoneIndexIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The index value which uniquely identifies the interface to which these scopes belong. 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."

::= { ipv6ScopeZoneIndexEntry 1 }

ipv6ScopeZoneIndexLinkLocal OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The zone index for the link-local scope on this interface."
 ::= { ipv6ScopeZoneIndexEntry 2 }

ipv6ScopeZoneIndexSubnetLocal OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The zone index for the subnet-local scope on this
interface."

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::= { ipv6ScopeZoneIndexEntry 3 }

ipv6ScopeZoneIndexAdminLocal OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The zone index for the admin-local scope on this interface."
 ::= { ipv6ScopeZoneIndexEntry 4 }

ipv6ScopeZoneIndexSiteLocal OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The zone index for the site-local scope on this interface."
 ::= { ipv6ScopeZoneIndexEntry 5 }

ipv6ScopeZoneIndex6 OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The zone index for scope 6 on this interface."
 ::= { ipv6ScopeZoneIndexEntry 6 }

ipv6ScopeZoneIndex7 OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The zone index for scope 7 on this interface."
 ::= { ipv6ScopeZoneIndexEntry 7 }

ipv6ScopeZoneIndexOrganizationLocal OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The zone index for the organization-local scope on this
 interface."
 ::= { ipv6ScopeZoneIndexEntry 8 }

ipv6ScopeZoneIndex9 OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION

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 "The zone index for scope 9 on this interface."
 ::= { ipv6ScopeZoneIndexEntry 9 }

ipv6ScopeZoneIndexA OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The zone index for scope A on this interface."
 ::= { ipv6ScopeZoneIndexEntry 10 }

ipv6ScopeZoneIndexB OBJECT-TYPE
SYNTAX InetZoneIndex
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The zone index for scope B on this interface."
 ::= { ipv6ScopeZoneIndexEntry 11 }

```
ipv6ScopeZoneIndexC OBJECT-TYPE
    SYNTAX      InetZoneIndex
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The zone index for scope C on this interface."
    ::= { ipv6ScopeZoneIndexEntry 12 }
```

```
ipv6ScopeZoneIndexD OBJECT-TYPE
    SYNTAX      InetZoneIndex
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The zone index for scope D on this interface."
    ::= { ipv6ScopeZoneIndexEntry 13 }
```

```
--
-- The Default Router Table
-- This table simply lists the default routers, for more information
-- about routing tables see the routing MIBs
--
```

```
ipDefaultRouterTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF IpDefaultRouterEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

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```
        "The table used to describe the default routers known to this
        entity."
    ::= { ip 32 }
```

```
ipDefaultRouterEntry OBJECT-TYPE
    SYNTAX      IpDefaultRouterEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry contains information about a default router known
        to this entity."
```

```
INDEX {ipDefaultRouterAftype, ipDefaultRouterAddress}
 ::= { ipDefaultRouterTable 1 }
```

```
IpDefaultRouterEntry ::= SEQUENCE {
    ipDefaultRouterAftype      InetAddressType,
    ipDefaultRouterAddress     InetAddress,
    ipDefaultRouterIfIndex     InterfaceIndex,
    ipDefaultRouterLifetime    Unsigned32,
    ipDefaultRouterPreference  INTEGER
}
```

```
ipDefaultRouterAftype OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The address family for this row."
    ::= { ipDefaultRouterEntry 1 }
```

```
ipDefaultRouterAddress OBJECT-TYPE
    SYNTAX      InetAddress (SIZE(0..36))
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The IP address of the default router represented by this
        row."
    ::= { ipDefaultRouterEntry 2 }
```

```
ipDefaultRouterIfIndex OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The index value which uniquely identifies the interface by
        which the router can be reached. 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."
```

```
 ::= { ipDefaultRouterEntry 3 }
```

```
ipDefaultRouterLifetime OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
```

UNITS "seconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The length of time, in seconds, that this router will remain useful as a default router. A value of zero indicates that it is no longer useful as a default router. It is left to the implementor of the MIB as to whether a router with a lifetime of zero is removed from the list.

For IPv6 this value should be extracted from the router advertisement messages. "
REFERENCE "For IPv6 [RFC2462](#) sections [4.2](#) and [6.3.4](#)"
::= { ipDefaultRouterEntry 4 }

ipDefaultRouterPreference OBJECT-TYPE

SYNTAX INTEGER {
medium (0),
high (1),
reserved (2),
low (3)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"An indication of preference given to this router as a default router. Treating the value as a 2 bit signed integer allows for simple arithmetic comparisons.

For IPv4 routers or IPv6 routers that are not using the updated router advertisement format this object is set to medium (0)."

REFERENCE "[draft-ietf-ipv6-router-selection-02.txt](#), [section 2.1](#)"

::= { ipDefaultRouterEntry 5 }

--

-- Configuration information for constructing router advertisements

--

ipv6RouterAdvertTable OBJECT-TYPE

SYNTAX SEQUENCE OF Ipv6RouterAdvertEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The table containing information used to construct router advertisements."

::= { ip 33 }

ipv6RouterAdvertEntry OBJECT-TYPE

SYNTAX Ipv6RouterAdvertEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry containing information used to construct router advertisements."

Information in this table is persistent and when this object is written the entity SHOULD save the change to non-volatile storage."

INDEX { ipv6RouterAdvertIfIndex }

::= { ipv6RouterAdvertTable 1 }

Ipv6RouterAdvertEntry ::= SEQUENCE {

ipv6RouterAdvertIfIndex	InterfaceIndex,
ipv6RouterAdvertSendAdverts	TruthValue,
ipv6RouterAdvertMaxInterval	Unsigned32,
ipv6RouterAdvertMinInterval	Unsigned32,
ipv6RouterAdvertManagedFlag	TruthValue,
ipv6RouterAdvertOtherConfigFlag	TruthValue,
ipv6RouterAdvertLinkMTU	Unsigned32,
ipv6RouterAdvertReachableTime	Unsigned32,
ipv6RouterAdvertRetransmitTime	Unsigned32,
ipv6RouterAdvertCurHopLimit	Unsigned32,
ipv6RouterAdvertDefaultLifetime	Unsigned32

}

ipv6RouterAdvertIfIndex OBJECT-TYPE

SYNTAX InterfaceIndex

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The index value which uniquely identifies the interface on which router advertisements constructed with this information will be transmitted. 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."

::= { ipv6RouterAdvertEntry 1 }

ipv6RouterAdvertSendAdverts OBJECT-TYPE

SYNTAX TruthValue

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STATUS current

DESCRIPTION

"A flag indicating whether or not the router sends periodic router advertisements and responds to router solicitations on this interface."

REFERENCE "[RFC2461 Section 6.2.1](#)"

DEFVAL { false }

::= { ipv6RouterAdvertEntry 2 }

ipv6RouterAdvertMaxInterval OBJECT-TYPE

SYNTAX Unsigned32 (4..1800)

UNITS "seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The maximum time allowed between sending unsolicited router advertisements from this interface."

REFERENCE "[RFC2461 Section 6.2.1](#)"

DEFVAL { 600 }

::= { ipv6RouterAdvertEntry 3 }

ipv6RouterAdvertMinInterval OBJECT-TYPE

SYNTAX Unsigned32 (3..1350)

UNITS "seconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The minimum time allowed between sending unsolicited router advertisements from this interface."

The default is $0.33 \times \text{ipv6RouterAdvertMaxInterval}$."

REFERENCE "[RFC2461 Section 6.2.1](#)"

::= { ipv6RouterAdvertEntry 4 }

ipv6RouterAdvertManagedFlag OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The true/false value to be placed into the 'managed address

configuration' flag field in router advertisements sent from this interface."

REFERENCE "[RFC2461 Section 6.2.1](#)"

DEFVAL { false }

::= { ipv6RouterAdvertEntry 5 }

ipv6RouterAdvertOtherConfigFlag OBJECT-TYPE

SYNTAX TruthValue

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MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The true/false value to be placed into the 'other stateful configuration' flag field in router advertisements sent from this interface."

REFERENCE "[RFC2461 Section 6.2.1](#)"

DEFVAL { false }

::= { ipv6RouterAdvertEntry 6 }

ipv6RouterAdvertLinkMTU OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The value to be placed in MTU options sent by the router on this interface.

A value of zero indicates that no MTU options are sent."

REFERENCE "[RFC2461 Section 6.2.1](#)"

DEFVAL { 0 }

::= { ipv6RouterAdvertEntry 7 }

ipv6RouterAdvertReachableTime OBJECT-TYPE

SYNTAX Unsigned32 (0..3600000)

UNITS "milliseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The value to be placed in the reachable time field in router advertisement messages sent from this interface.

A value of zero in the router advertisement indicates that

the advertisement isn't specifying a value for reachable time."

REFERENCE "[RFC2461 Section 6.2.1](#)"

DEFVAL { 0 }

::= { ipv6RouterAdvertEntry 8 }

ipv6RouterAdvertRetransmitTime OBJECT-TYPE

SYNTAX Unsigned32

UNITS "milliseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The value to be placed in the retransmit timer field in router advertisements sent from this interface.

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A value of zero in the router advertisement indicates that the advertisement isn't specifying a value for retransmit time."

REFERENCE "[RFC2461 Section 6.2.1](#)"

DEFVAL { 0 }

::= { ipv6RouterAdvertEntry 9 }

ipv6RouterAdvertCurHopLimit OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default value to be placed in the current hop limit field in router advertisements sent from this interface. The value should be set to the current diameter of the Internet.

A value of zero in the router advertisement indicates that the advertisement isn't specifying a value for curHopLimit.

The default should be set to the value specified in the 'Assigned Numbers' RFC that was in effect at the time of implementation."

REFERENCE "[RFC2461 Section 6.2.1](#)"

::= { ipv6RouterAdvertEntry 10 }

```
ipv6RouterAdvertDefaultLifetime OBJECT-TYPE
    SYNTAX      Unsigned32 (0..65535)
    UNITS "seconds"
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "The value to be placed in the router lifetime field of
         router advertisements sent from this interface. This value
         MUST be either 0 or between ipv6RouterAdvertMaxInterval and
         9000 seconds.

         A value of zero indicates that the router is not to be used
         as a default router.

         The default is 3 * ipv6RouterAdvertMaxInterval."
    REFERENCE  "RFC2461 Section 6.2.1"
    ::= { ipv6RouterAdvertEntry 11 }
```

```
--
-- ICMP section
```

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```
--
icmp      OBJECT IDENTIFIER ::= { mib-2 5 }
```

```
--
-- ICMP non-message-specific counters
--
```

```
inetIcmpTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF InetIcmpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The table of generic system-wide ICMP counters."
    ::= { icmp 27 }
```

```
inetIcmpEntry OBJECT-TYPE
    SYNTAX      InetIcmpEntry
    MAX-ACCESS  not-accessible
```

```
STATUS      current
DESCRIPTION
    "A conceptual row in the inetIcmpTable."
INDEX      { inetIcmpAFType }
 ::= { inetIcmpTable 1 }
```

```
InetIcmpEntry ::= SEQUENCE {
    inetIcmpAFType      InetAddressType,
    inetIcmpInMsgs      Counter32,
    inetIcmpInErrors    Counter32,
    inetIcmpOutMsgs     Counter32,
    inetIcmpOutErrors   Counter32
}
```

```
inetIcmpAFType OBJECT-TYPE
SYNTAX      InetAddressType
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "The IP address family of the statistics."
 ::= { inetIcmpEntry 1 }
```

```
inetIcmpInMsgs OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The total number of ICMP messages which the entity received.
     Note that this counter includes all those counted by
```

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```
    inetIcmpInErrors."
 ::= { inetIcmpEntry 2 }
```

```
inetIcmpInErrors OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of ICMP messages which the entity received but
     determined as having ICMP-specific errors (bad ICMP
     checksums, bad length, etc.)."
 ::= { inetIcmpEntry 3 }
```

inetIcmpOutMsgs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The total number of ICMP messages which the entity received.
Note that this counter includes all those counted by
inetIcmpOutErrors."
 ::= { inetIcmpEntry 4 }

inetIcmpOutErrors OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of ICMP messages which this entity did not send
due to problems discovered within ICMP such as a lack of
buffers. This value should not include errors discovered
outside the ICMP layer such as the inability of IP to route
the resultant datagram. In some implementations there may
be no types of error which contribute to this counter's
value."
 ::= { inetIcmpEntry 5 }

--
-- per-AF, per-message type ICMP counters
--

inetIcmpMsgTable OBJECT-TYPE
SYNTAX SEQUENCE OF InetIcmpMsgEntry
MAX-ACCESS not-accessible
STATUS current

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DESCRIPTION
"The table of system-wide per-message type ICMP counters."
 ::= { icmp 28 }

inetIcmpMsgEntry OBJECT-TYPE

SYNTAX InetIcmpMsgEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

 "A conceptual row in the inetIcmpMsgTable.

 The system should track each ICMP type value, even if that
 ICMP type is not supported by the system."

INDEX { inetIcmpMsgAftype, inetIcmpMsgType }
 ::= { inetIcmpMsgTable 1 }

InetIcmpMsgEntry ::= SEQUENCE {
 inetIcmpMsgAftype InetAddressType,
 inetIcmpMsgType Integer32,
 inetIcmpMsgInPkts Counter32,
 inetIcmpMsgOutPkts Counter32
}

inetIcmpMsgAftype OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The IP address family of the statistics."
 ::= { inetIcmpMsgEntry 1 }

inetIcmpMsgType OBJECT-TYPE
SYNTAX Integer32 (0..255)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The ICMP type field of the message type being counted by
 this row.

 Note that ICMP message types are scoped by the address
 family in use."
REFERENCE "http://www.iana.org/assignments/icmp-parameters and
 <http://www.iana.org/assignments/icmpv6-parameters>"
 ::= { inetIcmpMsgEntry 2 }

inetIcmpMsgInPkts OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only

```

STATUS      current
DESCRIPTION
    "The number of input packets for this AF and type."
 ::= { inetIcmpMsgEntry 3 }

inetIcmpMsgOutPkts OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of output packets for this AF and type."
 ::= { inetIcmpMsgEntry 4 }

--
-- conformance information
--

ipMIBConformance OBJECT IDENTIFIER ::= { ipMIB 2 }

ipMIBCompliances OBJECT IDENTIFIER ::= { ipMIBConformance 1 }
ipMIBGroups      OBJECT IDENTIFIER ::= { ipMIBConformance 2 }

ipv6Conformance OBJECT IDENTIFIER ::= { ipv6MIB 3 }

ipv6Compliances OBJECT IDENTIFIER ::= { ipv6Conformance 1 }
ipv6Groups      OBJECT IDENTIFIER ::= { ipv6Conformance 2 }

-- compliance statements
ipMIBCompliance2 MODULE-COMPLIANCE
STATUS      current
DESCRIPTION
    "The compliance statement for systems which implement IP -
    either IPv4 or IPv6."
MODULE -- this module

MANDATORY-GROUPS { ipSystemStatsGroup, ipAddressGroup,
                  ipNetToMediaGroup, ipDefaultRouterGroup,
                  icmpGroup2 }

GROUP ipSystemStatsHCOctetGroup
DESCRIPTION
    "This group is mandatory for systems that have an aggregate
    bandwidth greater than 20MB."

GROUP ipSystemStatsHCPacketGroup
DESCRIPTION

```

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"This group is mandatory for systems that have an aggregate bandwidth greater than 650MB."

GROUP ipIfStatsGroup

DESCRIPTION

"This group is optional for all systems."

GROUP ipIfStatsHC0ctetGroup

DESCRIPTION

"This group is mandatory for systems that include the ipIfStatsGroup and include links with bandwidths greater than 20MB."

GROUP ipIfStatsHCPacketGroup

DESCRIPTION

"This group is mandatory for systems that include the ipIfStatsGroup and include links with bandwidths greater than 650MB."

GROUP ipv4GeneralGroup

DESCRIPTION

"This group is mandatory for all systems supporting IPv4."

GROUP ipv4IfGroup

DESCRIPTION

"This group is mandatory for all systems supporting IPv4."

GROUP ipv6GeneralGroup2

DESCRIPTION

"This group is mandatory for all systems supporting IPv6."

GROUP ipv6IfGroup

DESCRIPTION

"This group is mandatory for all systems supporting IPv6."

GROUP ipAddressPrefixGroup

DESCRIPTION

"This group is mandatory for all systems supporting IPv6."

GROUP ipv6ScopeGroup

DESCRIPTION

"This group is mandatory for all systems supporting IPv6."

GROUP ipv6RouterAdvertGroup

DESCRIPTION

"This group is mandatory for all IPv6 routers."

OBJECT ipv6Forwarding

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MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write access to this object"

OBJECT ipv6DefaultHopLimit

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write access to this object"

OBJECT ipv4IfAdminStatus

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write access to this object"

OBJECT ipv6InterfaceAdminStatus

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write access to this object"

OBJECT inetNetToMediaPhysAddress

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write or create access to this object"

OBJECT inetNetToMediaType

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write or create access to this object"

OBJECT ipv6RouterAdvertSendAdverts
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipv6RouterAdvertMaxInterval
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

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OBJECT ipv6RouterAdvertMinInterval
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipv6RouterAdvertManagedFlag
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipv6RouterAdvertOtherConfigFlag
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipv6RouterAdvertLinkMTU
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipv6RouterAdvertReachableTime
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

object"

OBJECT ipv6RouterAdvertRetransmitTime

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write access to this object"

OBJECT ipv6RouterAdvertCurHopLimit

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write access to this object"

OBJECT ipv6RouterAdvertDefaultLifetime

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write access to this object"

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::= { ipMIBCompliances 2 }

-- units of conformance

ipv4GeneralGroup OBJECT-GROUP

OBJECTS { ipForwarding, ipDefaultTTL, ipReasmTimeout }

STATUS current

DESCRIPTION

"The group of IPv4-specific objects for basic management of IPv4 entities."

::= { ipMIBGroups 3 }

ipv4IfGroup OBJECT-GROUP

OBJECTS { ipv4IfReasmMaxSize, ipv4IfAdminStatus }

STATUS current

DESCRIPTION

"The group of IPv4-specific objects for basic management of IPv4 interfaces."

::= { ipMIBGroups 4 }

ipv6GeneralGroup2 OBJECT-GROUP

```
OBJECTS { ipv6Forwarding, ipv6DefaultHopLimit }
STATUS   current
DESCRIPTION
    "The IPv6 group of objects providing for basic management of
    IPv6 entities."
 ::= { ipMIBGroups 5 }
```

```
ipv6IfGroup OBJECT-GROUP
OBJECTS     { ipv6InterfaceReasmMaxSize,    ipv6InterfaceIdentifier,
              ipv6InterfacePhysicalAddress, ipv6InterfaceAdminStatus,
              ipv6InterfaceReachableTime,  ipv6IntefaceRetransmitTime }
STATUS      current
DESCRIPTION
    "The group of IPv6-specific objects for basic management of
    IPv6 interfaces."
 ::= { ipMIBGroups 6 }
```

```
ipSystemStatsGroup OBJECT-GROUP
OBJECTS     { ipSystemStatsInReceives,      ipSystemStatsInOctets,
              ipSystemStatsInHdrErrors,    ipSystemStatsInNoRoutes,
              ipSystemStatsInAddrErrors,   ipSystemStatsInUnknownProtos,
              ipSystemStatsInTruncatedPkts, ipSystemStatsInForwDatagrams,
              ipSystemStatsReasmReqds,     ipSystemStatsReasmOKs,
              ipSystemStatsReasmFails,     ipSystemStatsInDiscards,
              ipSystemStatsInDelivers,     ipSystemStatsOutRequests,
              ipSystemStatsOutNoRoutes,    ipSystemStatsOutForwDatagrams,
              ipSystemStatsOutDiscards,    ipSystemStatsOutFragReqds,
```

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```
              ipSystemStatsOutFragOKs,    ipSystemStatsOutFragFails,
              ipSystemStatsOutFragCreates, ipSystemStatsOutTransmits,
              ipSystemStatsOutOctets,      ipSystemStatsInMcastPkts,
              ipSystemStatsInMcastOctets,  ipSystemStatsOutMcastPkts,
              ipSystemStatsOutMcastOctets, ipSystemStatsInBcastPkts,
              ipSystemStatsOutBcastPkts,   ipSystemStatsDiscontinuityTime,
              ipSystemStatsRefreshRate }
STATUS      current
DESCRIPTION
    "IP system wide statistics."
 ::= { ipMIBGroups 7 }
```

```
ipSystemStatsHCOctetGroup OBJECT-GROUP
OBJECTS     { ipSystemStatsHCInOctets,      ipSystemStatsHCOutOctets,
```

```
        ipSystemStatsHCInMcastOctets, ipSystemStatsHCOutMcastOctets }
STATUS      current
DESCRIPTION
    "IP system wide statistics for systems that may overflow the
    standard octet counters within 1 hour."
 ::= { ipMIBGroups 8 }
```

```
ipSystemStatsHCPacketGroup OBJECT-GROUP
OBJECTS     { ipSystemStatsHCInReceives, ipSystemStatsHCOutTransmits,
              ipSystemStatsHCInMcastPkts, ipSystemStatsHCOutMcastPkts,
              ipSystemStatsHCInBcastPkts, ipSystemStatsHCOutBcastPkts }
STATUS      current
DESCRIPTION
    "IP system wide statistics for systems that may overflow the
    standard packet counters within 1 hour."
 ::= { ipMIBGroups 9 }
```

```
ipIfStatsGroup OBJECT-GROUP
OBJECTS     { ipIfStatsInReceives,      ipIfStatsInOctets,
              ipIfStatsInHdrErrors,    ipIfStatsInNoRoutes,
              ipIfStatsInAddrErrors,   ipIfStatsInUnknownProtos,
              ipIfStatsInTruncatedPkts, ipIfStatsInForwDatagrams,
              ipIfStatsReasmReqds,     ipIfStatsReasmOKs,
              ipIfStatsReasmFails,    ipIfStatsInDiscards,
              ipIfStatsInDelivers,     ipIfStatsOutRequests,
              ipIfStatsOutNoRoutes,    ipIfStatsOutForwDatagrams,
              ipIfStatsOutDiscards,    ipIfStatsOutFragReqds,
              ipIfStatsOutFragOKs,     ipIfStatsOutFragFails,
              ipIfStatsOutFragCreates, ipIfStatsOutTransmits,
              ipIfStatsOutOctets,      ipIfStatsInMcastPkts,
              ipIfStatsInMcastOctets,  ipIfStatsOutMcastPkts,
              ipIfStatsOutMcastOctets, ipIfStatsInBcastPkts,
              ipIfStatsOutBcastPkts,   ipIfStatsDiscontinuityTime,
              ipIfStatsRefreshRate }
 ::= { ipMIBGroups 10 }
```

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```
STATUS      current
DESCRIPTION
    "IP per-interface statistics."
 ::= { ipMIBGroups 10 }
```

```
ipIfStatsHCOctetGroup OBJECT-GROUP
OBJECTS     { ipIfStatsHCInOctets,      ipIfStatsHCOutOctets,
```

```

        ipIfStatsHCInMcastOctets, ipIfStatsHCOutMcastOctets }
STATUS      current
DESCRIPTION
    "IP per-interfaces statistics for systems that include
    interfaces that may overflow the may overflow the standard
    octet counters within 1 hour."
 ::= { ipMIBGroups 11 }

ipIfStatsHCPacketGroup OBJECT-GROUP
OBJECTS     { ipIfStatsHCInReceives, ipIfStatsHCOutTransmits,
              ipIfStatsHCInMcastPkts, ipIfStatsHCOutMcastPkts,
              ipIfStatsHCInBcastPkts, ipIfStatsHCOutBcastPkts }
STATUS      current
DESCRIPTION
    "IP per-interfaces statistics for systems that includes
    interfaces that may overflow the standard packet counters
    within 1 hour."
 ::= { ipMIBGroups 12 }

ipAddressPrefixGroup OBJECT-GROUP
OBJECTS     { ipAddressPrefixOrigin,
              ipAddressPrefixOnLinkFlag,
              ipAddressPrefixAutonomousFlag,
              ipAddressPrefixAdvPreferredLifetime,
              ipAddressPrefixAdvValidLifetime }
STATUS      current
DESCRIPTION
    "The group of objects for providing information about address
    prefixes used by this node."
 ::= { ipMIBGroups 13 }

ipAddressGroup OBJECT-GROUP
OBJECTS     { ipAddressIfIndex, ipAddressType,
              ipAddressPrefix, ipAddressOrigin,
              ipAddressStatus, ipAddressCreated,
              ipAddressLastChanged }
STATUS      current
DESCRIPTION
    ""
 ::= { ipMIBGroups 14 }

```

ipNetToMediaGroup OBJECT-GROUP

OBJECTS { inetNetToMediaPhysAddress, inetNetToMediaLastUpdated,
inetNetToMediaType, inetNetToMediaState }

STATUS current

DESCRIPTION

"The group of objects for providing information about the mappings of network address to physical address known to this node."

::= { ipMIBGroups 15 }

ipv6ScopeGroup OBJECT-GROUP

OBJECTS { ipv6ScopeZoneIndexLinkLocal, ipv6ScopeZoneIndexSubnetLocal,
ipv6ScopeZoneIndexAdminLocal, ipv6ScopeZoneIndexSiteLocal,
ipv6ScopeZoneIndex6, ipv6ScopeZoneIndex7,
ipv6ScopeZoneIndexOrganizationLocal, ipv6ScopeZoneIndex9,
ipv6ScopeZoneIndexA, ipv6ScopeZoneIndexB,
ipv6ScopeZoneIndexC, ipv6ScopeZoneIndexD }

STATUS current

DESCRIPTION

"The group of objects for managing IPv6 scope zones."

::= { ipMIBGroups 16 }

ipDefaultRouterGroup OBJECT-GROUP

OBJECTS { ipDefaultRouterIfIndex, ipDefaultRouterLifetime,
ipDefaultRouterPreference }

STATUS current

DESCRIPTION

"The group of objects for providing information about default routers known to this node."

::= { ipMIBGroups 17 }

ipv6RouterAdvertGroup OBJECT-GROUP

OBJECTS { ipv6RouterAdvertSendAdverts, ipv6RouterAdvertMaxInterval,
ipv6RouterAdvertMinInterval, ipv6RouterAdvertManagedFlag,
ipv6RouterAdvertOtherConfigFlag, ipv6RouterAdvertLinkMTU,
ipv6RouterAdvertReachableTime, ipv6RouterAdvertRetransmitTime,
ipv6RouterAdvertCurHopLimit, ipv6RouterAdvertDefaultLifetime}

STATUS current

DESCRIPTION

"The group of objects for controlling information advertised by IPv6 routers."

::= { ipMIBGroups 18 }

icmpGroup2 OBJECT-GROUP

OBJECTS {inetIcmpInMsgs, inetIcmpInErrors, inetIcmpOutMsgs,
inetIcmpOutErrors, inetIcmpMsgInPkts, inetIcmpMsgOutPkts }

STATUS current

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DESCRIPTION

"The group of objects providing ICMP statistics."
 ::= { ipMIBGroups 19 }

--
-- Deprecated objects
--

ipInReceives OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The total number of input datagrams received from
 interfaces, including those received in error."
 ::= { ip 3 }

ipInHdrErrors OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of input datagrams discarded due to errors in
 their IPv4 headers, including bad checksums, version number
 mismatch, other format errors, time-to-live exceeded, errors
 discovered in processing their IPv4 options, etc."
 ::= { ip 4 }

ipInAddrErrors OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of input datagrams discarded because the IPv4
 address in their IPv4 header's destination field was not a
 valid address to be received at this entity. This count
 includes invalid addresses (e.g., 0.0.0.0) and addresses of
 unsupported Classes (e.g., Class E). For entities which are
 not IPv4 routers and therefore do not forward datagrams,
 this counter includes datagrams discarded because the
 destination address was not a local address."
 ::= { ip 5 }

ipForwDatagrams OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

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"The number of input datagrams for which this entity was not their final IPv4 destination, as a result of which an attempt was made to find a route to forward them to that final destination. In entities which do not act as IPv4 routers, this counter will include only those packets which were Source-Routed via this entity, and the Source-Route option processing was successful."

::= { ip 6 }

ipInUnknownProtos OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol."

::= { ip 7 }

ipInDiscards OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of input IPv4 datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (e.g., for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting re-assembly."

::= { ip 8 }

ipInDelivers OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The total number of input datagrams successfully delivered to IPv4 user-protocols (including ICMP)."
 ::= { ip 9 }

ipOutRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The total number of IPv4 datagrams which local IPv4 user protocols (including ICMP) supplied to IPv4 in requests for transmission. Note that this counter does not include any

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datagrams counted in ipForwDatagrams."
 ::= { ip 10 }

ipOutDiscards OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of output IPv4 datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (e.g., for lack of buffer space). Note that this counter would include datagrams counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion."

::= { ip 11 }

ipOutNoRoutes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of IPv4 datagrams discarded because no route could be found to transmit them to their destination. Note that this counter includes any packets counted in ipForwDatagrams which meet this 'no-route' criterion. Note that this includes any datagrams which a host cannot route because all of its default routers are down."

::= { ip 12 }

ipReasmReqds OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of IPv4 fragments received which needed to be
 reassembled at this entity."
 ::= { ip 14 }

ipReasmOKs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of IPv4 datagrams successfully re-assembled."
 ::= { ip 15 }

ipReasmFails OBJECT-TYPE
SYNTAX Counter32

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MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of failures detected by the IPv4 re-assembly
 algorithm (for whatever reason: timed out, errors, etc).
 Note that this is not necessarily a count of discarded IPv4
 fragments since some algorithms (notably the algorithm in
 [RFC 815](#)) can lose track of the number of fragments by
 combining them as they are received."
 ::= { ip 16 }

ipFragOKs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of IPv4 datagrams that have been successfully
 fragmented at this entity."
 ::= { ip 17 }

ipFragFails OBJECT-TYPE
SYNTAX Counter32

MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of IPv4 datagrams that have been discarded
 because they needed to be fragmented at this entity but
 could not be, e.g., because their Don't Fragment flag was
 set."
 ::= { ip 18 }

ipFragCreates OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of IPv4 datagram fragments that have been
 generated as a result of fragmentation at this entity."
 ::= { ip 19 }

ipRoutingDiscards OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of routing entries which were chosen to be
 discarded even though they are valid. One possible reason
 for discarding such an entry could be to free-up buffer

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 space for other routing entries."
 ::= { ip 23 }

-- the deprecated IPv4 address table

ipAddrTable OBJECT-TYPE
SYNTAX SEQUENCE OF IpAddrEntry
MAX-ACCESS not-accessible
STATUS deprecated
DESCRIPTION
 "The table of addressing information relevant to this
 entity's IPv4 addresses."
 ::= { ip 20 }

ipAddrEntry OBJECT-TYPE

SYNTAX IpAddrEntry
MAX-ACCESS not-accessible
STATUS deprecated
DESCRIPTION
 "The addressing information for one of this entity's IPv4
 addresses."
INDEX { ipAdEntAddr }
 ::= { ipAddrTable 1 }

IpAddrEntry ::= SEQUENCE {
 ipAdEntAddr IpAddress,
 ipAdEntIfIndex INTEGER,
 ipAdEntNetMask IpAddress,
 ipAdEntBcastAddr INTEGER,
 ipAdEntReasmMaxSize INTEGER
}

ipAdEntAddr OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The IPv4 address to which this entry's addressing
 information pertains."
 ::= { ipAddrEntry 1 }

ipAdEntIfIndex OBJECT-TYPE
SYNTAX INTEGER (1..2147483647)
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The index value which 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."
 ::= { ipAddrEntry 2 }

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

STATUS deprecated
DESCRIPTION
"The subnet mask associated with the IPv4 address of this entry. The value of the mask is an IPv4 address with all the network bits set to 1 and all the hosts bits set to 0."
 ::= { ipAddrEntry 3 }

ipAdEntBcastAddr OBJECT-TYPE
SYNTAX INTEGER (0..1)
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The value of the least-significant bit in the IPv4 broadcast address used for sending datagrams on the (logical) interface associated with the IPv4 address of this entry. For example, when the Internet standard all-ones broadcast address is used, the value will be 1. This value applies to both the subnet and network broadcasts addresses used by the entity on this (logical) interface."
 ::= { ipAddrEntry 4 }

ipAdEntReasmMaxSize OBJECT-TYPE
SYNTAX INTEGER (0..65535)
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The size of the largest IPv4 datagram which this entity can re-assemble from incoming IPv4 fragmented datagrams received on this interface."
 ::= { ipAddrEntry 5 }

-- the deprecated IPv4 Address Translation table

-- The Address Translation tables contain the IpAddress to
-- "physical" address equivalences. Some interfaces do not
-- use translation tables for determining address
-- equivalences (e.g., DDN-X.25 has an algorithmic method);

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-- if all interfaces are of this type, then the Address

-- Translation table is empty, i.e., has zero entries.

ipNetToMediaTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpNetToMediaEntry

MAX-ACCESS not-accessible

STATUS deprecated

DESCRIPTION

"The IPv4 Address Translation table used for mapping from
IPv4 addresses to physical addresses."

::= { ip 22 }

ipNetToMediaEntry OBJECT-TYPE

SYNTAX IpNetToMediaEntry

MAX-ACCESS not-accessible

STATUS deprecated

DESCRIPTION

"Each entry contains one IpAddress to `physical' address
equivalence."

INDEX { ipNetToMediaIfIndex,
ipNetToMediaNetAddress }

::= { ipNetToMediaTable 1 }

IpNetToMediaEntry ::= SEQUENCE {

ipNetToMediaIfIndex INTEGER,

ipNetToMediaPhysAddress PhysAddress,

ipNetToMediaNetAddress IpAddress,

ipNetToMediaType INTEGER

}

ipNetToMediaIfIndex OBJECT-TYPE

SYNTAX INTEGER (1..2147483647)

MAX-ACCESS read-create

STATUS deprecated

DESCRIPTION

"The interface on which this entry's equivalence is
effective. 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."

::= { ipNetToMediaEntry 1 }

ipNetToMediaPhysAddress OBJECT-TYPE

SYNTAX PhysAddress

MAX-ACCESS read-create

STATUS deprecated

DESCRIPTION

"The media-dependent `physical' address. This object should
return 0 when this entry is in the 'incomplete' state."

As the entries in this table are typically not persistent when this object is written the entity should not save the change to non-volatile storage. Note: a stronger requirement is not used because this object was previously defined."

::= { ipNetToMediaEntry 2 }

ipNetToMediaNetAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-create

STATUS deprecated

DESCRIPTION

"The IpAddress corresponding to the media-dependent `physical' address."

::= { ipNetToMediaEntry 3 }

ipNetToMediaType OBJECT-TYPE

SYNTAX INTEGER {

other(1), -- none of the following
invalid(2), -- an invalidated mapping
dynamic(3),
static(4)

}

MAX-ACCESS read-create

STATUS deprecated

DESCRIPTION

"The type of mapping.

Setting this object to the value invalid(2) has the effect of invalidating the corresponding entry in the ipNetToMediaTable. That is, it effectively dis-associates the interface identified with said entry from the mapping identified with said entry. It is an implementation-specific matter as to whether the agent removes an invalidated entry from the table. Accordingly, management stations must be prepared to receive tabular information from agents that corresponds to entries not currently in use. Proper interpretation of such entries requires examination of the relevant ipNetToMediaType object.

As the entries in this table are typically not persistent when this object is written the entity should not save the change to non-volatile storage. Note: a stronger requirement is not used because this object was previously defined."

::= { ipNetToMediaEntry 4 }

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-- the deprecated ICMP group

icmpInMsgs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The total number of ICMP messages which the entity received.
Note that this counter includes all those counted by
icmpInErrors."

::= { icmp 1 }

icmpInErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP messages which the entity received but
determined as having ICMP-specific errors (bad ICMP
checksums, bad length, etc.)."

::= { icmp 2 }

icmpInDestUnreachs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Destination Unreachable messages
received."

::= { icmp 3 }

icmpInTimeExcds OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Time Exceeded messages received."

::= { icmp 4 }

icmpInParmProbs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Parameter Problem messages received."
 ::= { icmp 5 }

icmpInSrcQuenchs OBJECT-TYPE

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SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Source Quench messages received."
 ::= { icmp 6 }

icmpInRedirects OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Redirect messages received."
 ::= { icmp 7 }

icmpInEchos OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Echo (request) messages received."
 ::= { icmp 8 }

icmpInEchoReps OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Echo Reply messages received."
 ::= { icmp 9 }

icmpInTimestamps OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Timestamp (request) messages received."
 ::= { icmp 10 }

icmpInTimestampReps OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Timestamp Reply messages received."
 ::= { icmp 11 }

icmpInAddrMasks OBJECT-TYPE

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SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Address Mask Request messages received."
 ::= { icmp 12 }

icmpInAddrMaskReps OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Address Mask Reply messages received."
 ::= { icmp 13 }

icmpOutMsgs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The total number of ICMP messages which this entity
 attempted to send. Note that this counter includes all
 those counted by icmpOutErrors."
 ::= { icmp 14 }

icmpOutErrors OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of ICMP messages which this entity did not send due to problems discovered within ICMP such as a lack of buffers. This value should not include errors discovered outside the ICMP layer such as the inability of IP to route the resultant datagram. In some implementations there may be no types of error which contribute to this counter's value."

::= { icmp 15 }

icmpOutDestUnreachs OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of ICMP Destination Unreachable messages sent."

::= { icmp 16 }

icmpOutTimeExcds OBJECT-TYPE

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SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of ICMP Time Exceeded messages sent."

::= { icmp 17 }

icmpOutParmProbs OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of ICMP Parameter Problem messages sent."

::= { icmp 18 }

icmpOutSrcQuenchs OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only

STATUS deprecated
DESCRIPTION
"The number of ICMP Source Quench messages sent."
 ::= { icmp 19 }

icmpOutRedirects OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The number of ICMP Redirect messages sent. For a host, this
 object will always be zero, since hosts do not send
 redirects."
 ::= { icmp 20 }

icmpOutEchos OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The number of ICMP Echo (request) messages sent."
 ::= { icmp 21 }

icmpOutEchoReps OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The number of ICMP Echo Reply messages sent."
 ::= { icmp 22 }

icmpOutTimestamps OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The number of ICMP Timestamp (request) messages sent."
 ::= { icmp 23 }

icmpOutTimestampReps OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only

```

STATUS      deprecated
DESCRIPTION
    "The number of ICMP Timestamp Reply messages sent."
 ::= { icmp 24 }

icmpOutAddrMasks OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      deprecated
DESCRIPTION
    "The number of ICMP Address Mask Request messages sent."
 ::= { icmp 25 }

icmpOutAddrMaskReps OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      deprecated
DESCRIPTION
    "The number of ICMP Address Mask Reply messages sent."
 ::= { icmp 26 }

-- deprecated conformance information
-- deprecated compliance statements

ipMIBCompliance MODULE-COMPLIANCE
STATUS      deprecated
DESCRIPTION
    "The compliance statement for systems which implement only
    IPv4.  For version-independence, this compliance statement
    is deprecated in favor of ipMIBCompliance2."
MODULE -- this module
    MANDATORY-GROUPS { ipGroup,
                       icmpGroup }
 ::= { ipMIBCompliances 1 }

-- deprecated units of conformance

```

```

ipGroup OBJECT-GROUP
OBJECTS   { ipForwarding,          ipDefaultTTL,      ipInReceives,
            ipInHdrErrors,        ipInAddrErrors,   ipForwDatagrams,
            ipInUnknownProtos,    ipInDiscards,     ipInDelivers,

```

```

        ipOutRequests,          ipOutDiscards,    ipOutNoRoutes,
        ipReasmTimeout,        ipReasmReqds,    ipReasmOKs,
        ipReasmFails,         ipFragOKs,       ipFragFails,
        ipFragCreates,        ipAdEntAddr,     ipAdEntIfIndex,
        ipAdEntNetMask,       ipAdEntBcastAddr, ipAdEntReasmMaxSize,
        ipNetToMediaIfIndex,  ipNetToMediaPhysAddress,
        ipNetToMediaNetAddress, ipNetToMediaType, ipRoutingDiscards }
STATUS      deprecated
DESCRIPTION
    "The ip group of objects providing for basic management of IP
    entities, exclusive of the management of IP routes."
 ::= { ipMIBGroups 1 }

icmpGroup OBJECT-GROUP
OBJECTS     { icmpInMsgs,          icmpInErrors,
              icmpInDestUnreaches, icmpInTimeExcds,
              icmpInParmProbs,    icmpInSrcQuenchs,
              icmpInRedirects,    icmpInEchos,
              icmpInEchoReps,     icmpInTimestamps,
              icmpInTimestampReps, icmpInAddrMasks,
              icmpInAddrMaskReps, icmpOutMsgs,
              icmpOutErrors,      icmpOutDestUnreaches,
              icmpOutTimeExcds,   icmpOutParmProbs,
              icmpOutSrcQuenchs,  icmpOutRedirects,
              icmpOutEchos,       icmpOutEchoReps,
              icmpOutTimestamps,  icmpOutTimestampReps,
              icmpOutAddrMasks,   icmpOutAddrMaskReps }
STATUS      deprecated
DESCRIPTION
    "The icmp group of objects providing ICMP statistics."
 ::= { ipMIBGroups 2 }

END

```

6. Open Issues / To Do

The MIB has been passed through a MIB checker (smilint and smicng) but will need another pass to ensure no errors crept in during editing.

Should we add lastChange and/or Number objects to some or all tables. This is the last major open issue. The request was made and there was some discussion about it with several comments against adding such objects. I have currently chosen to not add any such objects but to see

if I can get some more responses. We have a range of options and I'd like to hear which ones might be useful with less intrusion. The range of options include: 1) Don't add any objects 2) Add a single object indicating if anything within the MIB has changed 3) Add objects for the number of interfaces associated with either protocol. As several of the tables are based on the indexes this would provide an indication that those tables may have changed. 4) do (2) and (3) 4) Add number and timestamp objects to particular tables.

I don't think the default router, router advertisement, net to media or systemStats tables are particularly amenable to these objects.

The prefix and address tables could use the objects though I think adding a row will be a lot less frequent than modifying part of the table.

The ipv*IfTables, ipIfStatsTable and scope table are most likely to have rows added or removed rather than unexpected changes to the data. All of these are based on the if so including a count of the number of interfaces associated with each protocol would supply an indication that a row was added.

Should either the netmask or BcastAddr information from the deprecated ipAddrTable be placed somewhere in the new mib? One potential place would be in the ipAddressTable.

Add normative and informative lists.

7. Acknowledgments

This document contains objects modified from [RFC 1213](#) [2], [RFC 2011](#) [3], [RFC 2465](#) [6], and [RFC 2466](#) [7].

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[9.](#) Security Considerations

There are a number of management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. Such 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.

There are a number of managed objects in this MIB that may contain sensitive information. These are:

-- not yet evaluated

It is thus important to control even GET access to these objects and possibly to even encrypt the values of these object when sending them over the network via SNMP. Not all versions of SNMP provide features for such a secure environment.

SNMPv1 by itself is not a secure 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 GET/SET (read/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 2574](#) [19] and the View-based Access Control Model [RFC 2575](#) [22] is recommended.

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

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This document updates parts of the MIBs from several other documents. [RFC2011](#) is the previous update to the IP MIB. [RFC2465](#) and [RFC2466](#) are the first versions specifying IPv6 addresses and information.

[RFC2011](#):
Keith McCloghrie, Cisco Systems (Editor)

[RFC2465](#) and [RFC2466](#):
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