

IPv6 MIB Revision Design Team
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Wind River
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Management Information Base
for the Internet Protocol (IP)
draft-ietf-ipv6-rfc2011-update-10.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. This memo obsoletes RFCs 2011, 2465 and 2466.

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[1. The Internet-Standard Management Framework](#)

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to [section 7](#) of RFC [3410](#) [[9](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is

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compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[1](#)], STD 58, [RFC 2579](#) [[2](#)] and STD 58, [RFC 2580](#) [[3](#)].

[2. Revision History](#)

One of the primary purposes of this revision of the IP MIB is to create a single set of objects to describe and manage IP modules in an IP version independent manner. Where RFCs 2465 and 2466 created a set of objects independent from [RFC2011](#) this document merges those three documents into a single unified set of objects. The ipSystemStatsTable and ipIfStatsTable tables are examples of updating objects to be independent of IP version. Both of these tables contain counters to reflect IP traffic statistics that originated in much earlier MIBs and both include an IP address type in order to separate the information

based on IP version.

Another purpose of this document is to increase the manageability of a node running IPv6 by adding new objects. Some of these tables, such as `ipDefaultRouterTable`, may be useful on both IPv4 and IPv6 nodes while others, such as `ipv6RouterAdvertTable`, are specific to a single protocol.

```
-- RFC Editor
-- The remainder of this section (up to the section header "Overview")
-- is to be removed before publication.
--
```

Changes from [draft-ietf-ipv6-rfc2011-update-09.txt](#)

May 2004

Renamed `icmpNeutralMsg` to `icmpMsgStats` and `icmpNeutralTable` et al to `icmpStats` et al.

Corrected the OID of `icmpMsgStatsTable` to 30 from 28.

Changes from [draft-ietf-ipv6-rfc2011-update-08.txt](#)

April 2004

Renamed `ipv4IfTableLastChange` and `ipv6IfTableLastChange` to `ipv4InterfaceTableLastChange` and `ipv6InterfaceTableLastChange` for consistency with other names.

Renamed `inetNetToMedia` to `ipNetToPhysical` in order to avoid conflicts with either the INET TC module or the previous versions of the `NetToMedia` table.

Renamed inetIcmp to icmpNeutral in order to avoid conflicts with either the INET TC module or the previous versions of the icmp objects.

Renamed icmpGroup2 to icmpNeutralGroup to bring it in line with the previous change.

Changes from [draft-ietf-ipv6-rfc2011-update-07.txt](#)

April 2004

Modified ipv4InterfaceAdminStatus and ipv6InterfaceAdminStatus to be ipv4InterfaceEnableStatus and ipv6InterfaceEnableStatus

Removed ipv6InterfacePhysicalAddress and skipped over it's OID

Corrected the descriptions for ipIfStatsHCOutMcastOctets and ipSystemStatsHCOutMcastOctets to be for octets transmitted rather than for octets received.

Modified the OIDs for inetIcmpTable and inetIcmpMsgTable to skip OIDs {icmp 27} and {icmp 28}

Changed ipNetToMediaGroup to inetNetToMediaGroup

Modifications per IESG review comments:

Removed mention of invalid prefixes from ipIfStatsInAddrErrors.

Removed mention of "unique on link" from ipv6InterfaceIdentifier.

Removed the "wellknown(3)" enum from the IpAddressOriginTC, but didn't modify other values.

Changes from [draft-ietf-ipv6-rfc2011-update-06.txt](#)

February 2004

Removed the (0..128) constraint on ipAddressPrefixLength as a better constraint, (0..2040) the maximum number of bits, has been added to the TC.

Removed the comment characters on the syntax restriction for the ipAddressRowStatus instance in the compliance statement.

Changes from [draft-ietf-ipv6-rfc2011-update-05.txt](#)

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January 2004

Minor typographical updates.

Removed ipIfStatsOutNoRoutes and updated ipSystemStatsOutNoRoutes to remove the description of ipIfStatsOutNoRoutes.

Added a size constraint on ipv6InterfacePhysicalAddress, inetNetToMediaPhysAddress and ipNetToMediaPhysAddress.

Added a value constraint on ipAddressPrefixLength

Added text to explain why ipNetToMediaIfIndex and ipNetToMediaNetAddress have a max access value of read-create rather than not-accessible.

Modified several objects to use a syntax of Integer32 instead of INTEGER: ipDefaultTTL and ip6DefaultHopLimit.

Added the suffix 'TC' to IpAddressPrefixOriginTC, IpAddressOriginTC, ipAddressStatusTC, and ipv6InterfaceIdentifierTC to separate them from the objects of the similar name.

Modified 'Multi-Stack Implementations' to remove the mention of communities and to add the Context table.

Updated the revision stamps in the MIB.

Added a units clause to ipReasmTimeout.

Modified ip6Forwarding and ip6DefaultHopLimit to be ipv6IpForwarding and ipv6IpDefaultHopLimit.

Added text to all of the objects with syntax InetAddress specifying which object determines the type of their addresses.

Added text to the description of the stats tables and to the compliance statements of the HC groups to reinforce that the 32 bit counters are the low order 32 bits of the 64 bit counters and that the 32 bit counters are required even if the 64 bit counters are included.

Added text suggesting that the spinlocks be the first varbind for their objects in a PDU.

Specified that if ipAddressStorageType is permanent, no other objects in the row are required to be able to be modified.

Added text to `ipAddressTable` to describe the philosophy behind objects being read-only or read-create.

Added a reference clause to `inetNetToMediaTable`.

Added `inetNetToMediaRowStatus` and a `defval` to `inetNetToMediaType`.

Added some text to `ipv6RouterAdvertMinInterval` to try and clear up its minimum value.

Added test to `ipv6RouterAdvertRowStatus` describing when a row can go active.

Added text to `ipMIBCompliance2` to make it clear that the required address sizes match the required address types.

Made `MIN-ACCESS` for `ipAddressSpinLock` be not-accessible.

Tagged the syntax for `ipAddressRowStatus` as `'active(1)'` the compliance statement.

Added description of zero to `ipv6InterfaceIdentifier` and `ipAddressPrefixLength`.

Added a informative references for the address architecture document in the scope zone table.

Modified `ipv6RouterAdvertCurHopLimit` to refer to www.iana.org.

Added IPR statement.

Added `ipAddressTable` to the security section.

Added OutFragOks to the case diagram and a note describing the intended relationship between the various fragment counters.

Changes from [draft-ietf-ipv6-rfc2011-update-04.txt](#)

December 2003

Corrected descriptive text for inetIcmpOutMsgs. It was referring to messages received, it now refers to messages sent.

Modified several objects to use InetVersion instead of InetAddressType. These objects were using the address type to specify a version and can now make use of the more specific TC. Changed ipSystemStatsAFType to ipSystemStatsIPVersion, changed ipIfStatsAFType to ipIfStatsIPVersion, changed inetIcmpAFType to

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inetIcmpIPVersion and inetIcmpMsgAFType to inetIcmpMsgIPVersion.

Modified the ipAddressTable to allow entries to be created or modified. This entailed the addition of ipAddressSpinLock, ipAddressRowStatus and ipAddressStorageType objects. Also ipAddressIfIndex, ipAddressType and ipAddressStatus were made read-create.

In the case diagram moved the incrementing of InHdrErrors to occur before the incrementing of InMcastPkts and InBcastPkts.

Moved the broadcast counters into separate groups to allow them to be tagged as required only for systems including IPv4.

Added note 5 to the case diagram describing the desired outcome when counting short packets (header errors vs truncated packets).

Added text to note 2 of the case diagram to specify which discard counter may be incremented.

Clarified text about summing interface levels statistics into system level statistics.

Added ipv6InterfaceForwarding and made the object mandatory. Also included text suggesting that a simple system that doesn't allow forwarding to be enabled on a per-interface basis could set these objects to "forward" and rely on ip6Forwarding to enable or disable forwarding for the system.

Modified the size restrictions on ipv6InterfaceReasmMaxSize to be (1500..65535).

Added ipv4InterfaceRetransmitTime and made it mandatory for IPv4 entities.

Made ipDefaultRouterIfIndex part of the index for ipDefaultRouterTable.

Changed ipv6ScopeZoneIndexSubnetLocal to ipv6ScopeZoneIndex3.

Modified the size restrictions on ipv6RouterAdvertDefaultLifetime to be (0 | 4..9000).

Added HC counters for InForwDatagrams, InDelivers, OutRequests and OutForwDatagrams.

Modified the text for OutForwDatagrams to allow for forwarding of locally generated packets. Also added a note to the Case diagram

mentioning that the forwarding counters may be incremented even if the packets are generated by or destined for the local host.

Added references for the router selection draft and the update to 2096.

Removed the size constraint on indexes of type InetAddress.

Changed ipDefaultRouterAFType to ipDefaultRouterAddressType

Changes from [draft-ietf-ipv6-rfc2011-update-03.txt](#)

September 2003

Deprecated the ipRoutingDiscards object and add some text to describe why and that the new version specific object can be found in the IP-FORWARD-MIB.

Modified the syntax for ipIfStatsIfIndex to be InterfaceIndex instead of InterfaceIndexOrZero as we no longer need the capability of using zero within the index. (The MIB originally used a zero index to specify the system level statistics.)

Added a description clause to the ipAddressGroup object.

Added the ipLastChangeGroup to ipMIBCompliance2 with a description of optional.

Changed [draft-ietf-ipngwg-addr-arch-v3-11.txt](#) to [RFC3513](#).

Changes from [draft-ietf-ipv6-rfc2011-update-02.txt](#)

June 2003

Removed the ipv4 and ipv6 only requirements on the

ipSystemStatsAFType and ipIfStatsAFType objects. Instead added a pseudo compliance statement requiring only global ipv4 and ipv6 types for those two objects as well as inetIcmpAFType and inetIcmpMsgAFType.

Added a pseudo compliance statement requiring only global ipv4 and ipv6 types for ipAddressPrefixType.

Added a pseudo compliance statement requiring only global and non global ipv4 and ipv6 types for ipAddressAddrType, inetNetToMediaNetAddressType and ipDefaultRouterAFType

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In response to a question about the size constraint on the various InetAddress objects (0..36). I have decided to leave this as is for now. The actually size will be one of 4, 8, 16 or 20 depending on the type in use and the syntax could be reduced to cover those sizes. However using such a small limit might require a new mib if a new address type is added to the InetAddress MIB that uses a larger size. 36 seems to be a reasonable compromise for allowing possible growth but avoiding problems with index length limitations.

May 2003

Restored ipRoutingDiscards to a current object from the deprecated group per discussions with previous MIB authors. The argument to move it to deprecated relied on the fact that it really belongs with the routing group rather than the main IP group. However as it already exists in the IP group and any router must contain the IP group it is not reasonable to remove it and create a new object in the routing area simply to adjust where the object is rooted in the MIB tree. This object was placed in a new group "ipRoutingGroup" and the group was made mandatory in order to mimic the previous MIB.

Changed the text to use "address type" or "address types" instead of "address family" or "address families" in order to avoid any confusion with the term as used by IANA in the assignment of address family numbers.

Added some text to the description of ipAddressTable to remind users that link-local addresses must use the "ipv6z" type.

Changes from [draft-ietf-ipv6-rfc2011-update-01.txt](#)

February 2003

Added ipLastChangeGroup which makes the lastChange objects a SHOULD for agents that have the proper values available.

Added normative references for IMPORTed mibs.

January 2003

Editorial cleanup.

Renamed the ipv4If entries to ipv4Interface in order to be similar to the ipv6Interface entries.

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Updated the SNMP boilerplate.

Updated the references to remove many SNMP specific entries and

split the remainder into normative and informative.

Updated the security considerations section.

Decided not to add the netmask or BcastAddr information from the deprecated ipAddrTable into the new mib as there was no major support for them.

Removed IPv6 conformance and compliance OIDs as they are no longer in use.

Renamed ipv6Forwarding and ipv6DefaultHopLimit to ip6Forwarding and ip6DefaultHopLimit and moved them from the IPv6 branch to the IP branch, thus removing the last objects in the IPv6 branch.

Added ipv6RouterAdvertSpinLock and ipv6RouterAdvertRowStatus

Added ipv4IfTableLastChange, ipv6IfTableLastChange and ipIfStatsTableLastChange.

Renumbered pretty much everything at the IP branch level in order to rationalize things and fit in the new objects.

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

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, ipSystemStatsHC0ctetGroup, ipSystemStatsHCPacketGroup, ipIfStatsGroup, ipIfStatsHC0ctetGroup, 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 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 wait 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.

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.

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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

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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.

November 2001

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

[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](#)

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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

[3.1.](#) Multi-Stack Implementations

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

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[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 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 group of objects is required when implementing their respective protocols.

[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 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 types. Typically the only two types of interest are IPv4 and IPv6; however the table can support other types 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 type 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 type (IPv4 and IPv6) and the interface within that address type 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.

Several objects of note are `ipSystemStatsDiscontinuityTime`, `ipIfStatsDiscontinuityTime`, `ipSystemsStatsRefreshRate` and `ipIfStatsRefreshRate`. These objects provide information about the row in the table more than about the system itself.

The discontinuity objects allow a management entity to determine if a discontinuity event which would invalidate the management entity's

understanding of the counters has occurred. The system being re-initialized or the interface being cycled are possible examples of a discontinuity event.

The refresh objects allow 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.

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from
interface

```
V
|
+ InReceives (1)
|
+--> InHdrErrors (5)
|
+-->+ InMcastPkts (1)
|   V
+--<--+
|
+-->+ InBcastPkts (1)
|   V
+--<--+
|
+--> InTruncatedPkts (5)
|
+--> InAddrErrors
|
+--> InDiscards (2)
```

from
upper
layers

```
V
|
+ OutRequests
|
+--> OutNoRoutes
|
|
|
|
|
|
|
|
|
|
|
```


(2) The discard counters may increment at any time in the processing path. Packets discarded to the left of InNoRoutes cause the InDiscards counter to increment while those discarded to the right are counted in the OutDiscards counters.

(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 fragments may not be counted in this object.

(5) InTruncatedPkts should only be incremented if the frame contained a valid header but was otherwise shorter than required. Frames that are too short to contain a valid header should be counted as InHdrErrors.

(6) The forwarding objects may be incremented even for packets that were originated locally or are destined for the local host if their addresses are such that the local host would need to forward the packet to pass it to the correct interface.

(7) When fragmenting a packet an entity should increment the OutFragFails counter rather than the OutDiscards counter in order to preserve the equation $\text{FragOks} + \text{FragFails} == \text{FragRqds}$.

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.

[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 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.

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[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 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 counters 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 type (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 all 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,

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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 types. The general counters for IP and ICMP are examples of this. They have been moved to the `ipSystemStatsTable` and `icmpMsgStatsTable` 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 `ipNetToPhysical`.

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

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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 so on a per interface basis. It is optional and may be ignored. If you decide to implement it you may wish to arrange to collect the data on a per-interface basis and then sum those counters in order to provide the aggregate system level statistics. However if you choose to provide the system level statistics by summing the interface level counters no interface level statistics can be lost - if an interface is removed the statistics associated with it must be retained.

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, ipv4InterfaceTable. As above the SNMP routines will need to be updated to handle the new indexing.

The ipNetToMediaTable has been moved to the ipNetToPhysicalTable. 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, ipv4InterfaceTable 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.

Two of the general objects, `ipv6Forwarding` and `ipv6DefaultHopLimit`, have been renamed and given new object identifiers within the `ip` branch but are otherwise unchanged. The new names are `ipv6IpForwarding` and `ipv6IpDefaultHopLimit`.

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

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`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 type 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. Again, as with the IPv4 discussion, this strategy only works if the interfaces can not be removed or if the statistics for removed interfaces are somehow retained.

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 [16]. The ipv6NetToMediaTable has been converted to the ipNetToPhysicalTable. 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,
zeroDotZero                                FROM SNMPv2-SMI
PhysAddress, TruthValue,
TimeStamp, RowPointer,
TEXTUAL-CONVENTION, TestAndIncr,
RowStatus, StorageType                     FROM SNMPv2-TC
MODULE-COMPLIANCE, OBJECT-GROUP            FROM SNMPv2-CONF
InetAddress, InetAddressType,
InetAddressPrefixLength,
InetVersion, InetZoneIndex                 FROM INET-ADDRESS-MIB
InterfaceIndex                             FROM IF-MIB;
```

ipMIB MODULE-IDENTITY

```
LAST-UPDATED "200404260000Z"
ORGANIZATION "IETF IPv6 MIB Revision Team"
CONTACT-INFO
    "Editor:
     Shawn A. Routhier
     Wind River
     500 Wind River Way
     Alameda, CA
     USA

     Phone: +1 510 749 2095
     EMail: <shawn.routhier@windriver.com>"
```

DESCRIPTION

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

Copyright (C) The Internet Society (2004). This version of this MIB module is part of RFC xxxx; see the RFC itself for full legal notices."

```
-- RFC Editor
-- Please update this reference as the RFC number is assigned.
--
```

```
REVISION      "200404260000Z"
```

DESCRIPTION

"The IP version neutral revision with added IPv6 objects for ND, default routers and router advertisements. As well as being the successor to [RFC2011](#) this MIB is also the successor to [RFC2465](#) and [RFC 2466](#). Published as RFC xxxx."

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-- RFC Editor
-- Please update this reference as the RFC number is assigned.
--

REVISION "199411010000Z"

DESCRIPTION

"A separate MIB module (IP-MIB) for IP and ICMP management objects. Published as [RFC 2011](#)."

REVISION "199103310000Z"

DESCRIPTION

"The initial revision of this MIB module was part of MIB-II, which was published as [RFC 1213](#)."

::= { mib-2 48}

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

IpAddressOriginTC ::= 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.

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),
    dhcp(4),
    linklayer(5),
    random(6)
}
```

IpAddressStatusTC ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The status of an address. Most of the states correspond to

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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 isn't a valid address and it shouldn't 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)."

REFERENCE "[RFC 2462](#)"

```
SYNTAX    INTEGER {  
    preferred(1),  
    deprecated(2),  
    invalid(3),  
    inaccessible(4),  
    unknown(5),  
    tentative(6),  
    duplicate(7)  
}
```

IpAddressPrefixOriginTC ::= TEXTUAL-CONVENTION

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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 IpAddressOriginTC and IpAddressPrefixOriginTC 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)
}
```

```
Ipv6AddressIfIdentifierTC ::= 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
--
```

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

```
ipForwarding OBJECT-TYPE
    SYNTAX      INTEGER {
```

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```
        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 Integer32 (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
    UNITS "seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The maximum number of seconds which received fragments are
         held while they are awaiting reassembly at this entity."
    ::= { ip 13 }
```

```
--
-- the IPv6 general group
```

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```
-- Some objects that affect all of IPv6
--
```

```
ipv6IpForwarding 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 on any interface 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."
    ::= { ip 25 }
```

```
ipv6IpDefaultHopLimit OBJECT-TYPE
    SYNTAX      Integer32 (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"
    ::= { ip 26 }
```

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

```
ipv4InterfaceTableLastChange OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of sysUpTime on the most recent occasion at which
```

a row in the ipv4InterfaceTable was added or deleted or when an ipv4InterfaceReasmMaxSize or an ipv4InterfaceEnableStatus object was modified.

If new objects are added to the ipv6InterfaceTable that require the ipv6InterfaceTableLastChange to be updated when they are modified they must specify that requirement in their description clause."

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

```
ipv4InterfaceTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ipv4InterfaceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The table containing per-interface IPv4-specific
        information."
    ::= { ip 28 }
```

```
ipv4InterfaceEntry OBJECT-TYPE
    SYNTAX      Ipv4InterfaceEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry containing IPv4-specific information for a specific
        interface."
    INDEX { ipv4InterfaceIfIndex }
    ::= { ipv4InterfaceTable 1 }
```

```
Ipv4InterfaceEntry ::= SEQUENCE {
    ipv4InterfaceIfIndex      InterfaceIndex,
    ipv4InterfaceReasmMaxSize Integer32,
    ipv4InterfaceEnableStatus INTEGER,
    ipv4InterfaceRetransmitTime Unsigned32
}
```

```
ipv4InterfaceIfIndex 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."
    ::= { ipv4InterfaceEntry 1 }
```

```
ipv4InterfaceReasmMaxSize 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."
 ::= { ipv4InterfaceEntry 2 }
```

ipv4InterfaceEnableStatus 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."
 ::= { ipv4InterfaceEntry 3 }
```

ipv4InterfaceRetransmitTime OBJECT-TYPE

```
SYNTAX      Unsigned32
UNITS "milliseconds"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The time between retransmissions of ARP requests to a
    neighbor when resolving the address or when probing the
    reachability of a neighbor."
REFERENCE "RFC1122"
DEFVAL { 1000 }
 ::= { ipv4InterfaceEntry 4 }
```

```
--
-- v6 interface table
--
```

ipv6InterfaceTableLastChange OBJECT-TYPE

SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION

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"The value of sysUpTime on the most recent occasion at which a row in the ipv6InterfaceTable was added or deleted or when an ipv6InterfaceReasmMaxSize, ipv6InterfaceIdentifier, ipv6InterfaceEnableStatus, ipv6InterfaceReachableTime, ipv6InterfaceRetransmitTime or ipv6InterfaceForwarding object was modified.

If new objects are added to the ipv6InterfaceTable that require the ipv6InterfaceTableLastChange to be updated when they are modified they must specify that requirement in their description clause."

::= { ip 29 }

ipv6InterfaceTable OBJECT-TYPE

SYNTAX SEQUENCE OF Ipv6InterfaceEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

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

::= { ip 30 }

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   Ipv6AddressIfIdentifierTC,  
    ipv6InterfaceEnableStatus INTEGER,  
    ipv6InterfaceReachableTime Unsigned32,  
    ipv6InterfaceRetransmitTime Unsigned32,  
    ipv6InterfaceForwarding   INTEGER  
}
```

```
ipv6InterfaceIfIndex OBJECT-TYPE
```

```
SYNTAX      InterfaceIndex
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The index value which uniquely identifies the interface to
```

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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 (1500..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 Ipv6AddressIfIdentifierTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The Interface Identifier for this interface. 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.

A zero length identifier may be used where appropriate. One possible example is a loopback interface."

::= { ipv6InterfaceEntry 3 }

-- This object ID is reserved as it was used in earlier drafts of
-- the MIB module. In theory OIDs are not assigned until the specification
-- is released as an RFC, however as some companies may have shipped
-- code based on earlier versions of the MIB it seems best to reserve
-- this OID. This OID had been ipv6InterfacePhysicalAddress
-- ::= { ipv6InterfaceEntry 4}

ipv6InterfaceEnableStatus 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 messages to a neighbor when resolving the address or when probing the reachability of a neighbor."

REFERENCE "[RFC2461, Section 6.3.2](#)"

::= { ipv6InterfaceEntry 7 }

ipv6InterfaceForwarding 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 on this interface with 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).

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This object is constrained by ipv6IpForwarding and is ignored if ipv6IpForwarding is set to notForwarding. Those systems that do not provide per-interface control of the forwarding function should set this object to forwarding for all interfaces and allow the ipv6IpForwarding object to control the forwarding capability.

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 8 }
```

```
--
```

```
-- 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 type.  
-- 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.
```

```
--
```

```
-- Note well: Both of these tables contain some items that are represented  
-- by two objects, representing the value in either 32 or 64 bits. For  
-- those objects the 32 bit value MUST be the low order 32 bits of the  
-- 64 bit value. Also note that the 32 bit counters must be when the  
-- 64 bit counters are included.
```

```
ipTrafficStats OBJECT IDENTIFIER ::= { ip 31 }
```

ipSystemStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpSystemStatsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The table containing system wide, IP version 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

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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 IP version."

INDEX { ipSystemStatsIPVersion }

::= { ipSystemStatsTable 1 }

IpSystemStatsEntry ::= SEQUENCE {

ipSystemStatsIPVersion	InetVersion,
ipSystemStatsInReceives	Counter32,
ipSystemStatsHCInReceives	Counter64,
ipSystemStatsInOctets	Counter32,
ipSystemStatsHCInOctets	Counter64,
ipSystemStatsInHdrErrors	Counter32,
ipSystemStatsInNoRoutes	Counter32,
ipSystemStatsInAddrErrors	Counter32,
ipSystemStatsInUnknownProtos	Counter32,
ipSystemStatsInTruncatedPkts	Counter32,
ipSystemStatsInForwDatagrams	Counter32,
ipSystemStatsHCInForwDatagrams	Counter64,
ipSystemStatsReasmReqs	Counter32,

ipSystemStatsReasmOKs	Counter32,
ipSystemStatsReasmFails	Counter32,
ipSystemStatsInDiscards	Counter32,
ipSystemStatsInDelivers	Counter32,
ipSystemStatsHCInDelivers	Counter64,
ipSystemStatsOutRequests	Counter32,
ipSystemStatsHCOutRequests	Counter64,
ipSystemStatsOutNoRoutes	Counter32,
ipSystemStatsOutForwDatagrams	Counter32,
ipSystemStatsHCOutForwDatagrams	Counter64,
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

}

ipSystemStatsIPVersion OBJECT-TYPE
 SYNTAX InetVersion
 MAX-ACCESS not-accessible

```
STATUS      current
DESCRIPTION
    "The IP version of this row."
 ::= { 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.

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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 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 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.

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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

"The number of input IP datagrams discarded because the 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 }
```

ipSystemStatsHCInForwDatagrams OBJECT-TYPE

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SYNTAX Counter64

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. This object counts the same packets as ipSystemStatsInForwDatagrams 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 13 }
```

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 14 }
```

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 15 }

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 16 }

ipSystemStatsInDiscards 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.

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 }

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

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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 18 }

ipSystemStatsHCInDelivers OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of datagrams successfully delivered to IP user-protocols (including ICMP). This object counts the same packets as ipSystemStatsInDelivers 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 19 }

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 20 }

ipSystemStatsHCOutRequests OBJECT-TYPE

SYNTAX Counter64

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. This object counts the same packets as ipSystemStatsHCOutRequests 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 21 }

ipSystemStatsOutNoRoutes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of locally generated 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 ipSystemStatsDiscontinuityTime."

::= { ipSystemStatsEntry 22 }

ipSystemStatsOutForwDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of datagrams for which this entity was not their final IP destination 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

times as indicated by the value of
ipSystemStatsDiscontinuityTime."
 ::= { ipSystemStatsEntry 23 }

ipSystemStatsHCOutForwDatagrams OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of datagrams for which this entity was not their final IP destination and for which it was successful in finding a path to their final destination. This object counts the same packets as ipSystemStatsOutForwDatagrams 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 24 }

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 25 }

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.

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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 26 }
```

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 27 }
```

ipSystemStatsOutFragFails 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 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 28 }

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 29 }

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 30 }

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 31 }

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 32 }

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 33 }

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 34 }

ipSystemStatsHCInMcastPkts OBJECT-TYPE

SYNTAX Counter64

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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 35 }

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 36 }

ipSystemStatsHCInMcastOctets 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 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 37 }

ipSystemStatsOutMcastPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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"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 38 }

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 39 }

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 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 40 }

ipSystemStatsHCOutMcastOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets transmitted 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 41 }

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 42 }

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 ipSystemStatsDiscontinuityTime."

::= { ipSystemStatsEntry 43 }

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 44 }

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 45 }

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 46 }

ipSystemStatsRefreshRate 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."

::= { ipSystemStatsEntry 47 }

ipIfStatsTableLastChange OBJECT-TYPE

SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"The value of sysUpTime on the most recent occasion at which a row in the ipIfStatsTable was added or deleted.

If new objects are added to the ipIfStatsTable that require the ipIfStatsTableLastChange to be updated when they are modified they must specify that requirement in their description clause."

::= { ipTrafficStats 2 }

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 3 }

ipIfStatsEntry OBJECT-TYPE

SYNTAX IpIfStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"An interface statistics entry containing objects for a particular interface and version of IP."

INDEX { ipIfStatsIPVersion, ipIfStatsIfIndex }

::= { ipIfStatsTable 1 }

```

IpIfStatsEntry ::= SEQUENCE {
    ipIfStatsIPVersion          InetVersion,
    ipIfStatsIfIndex            InterfaceIndex,
    ipIfStatsInReceives         Counter32,
    ipIfStatsHCInReceives      Counter64,
    ipIfStatsInOctets           Counter32,
    ipIfStatsHCInOctets        Counter64,
    ipIfStatsInHdrErrors        Counter32,
    ipIfStatsInNoRoutes        Counter32,
    ipIfStatsInAddrErrors       Counter32,
    ipIfStatsInUnknownProtos    Counter32,
    ipIfStatsInTruncatedPkts    Counter32,
    ipIfStatsInForwDatagrams    Counter32,
    ipIfStatsHCInForwDatagrams Counter64,
    ipIfStatsReasmReqds         Counter32,
    ipIfStatsReasmOKs           Counter32,
    ipIfStatsReasmFails         Counter32,
    ipIfStatsInDiscards         Counter32,
    ipIfStatsInDelivers         Counter32,

```

```

    ipIfStatsHCInDelivers       Counter64,
    ipIfStatsOutRequests        Counter32,
    ipIfStatsHCOutRequests      Counter64,
    ipIfStatsOutForwDatagrams    Counter32,
    ipIfStatsHCOutForwDatagrams Counter64,
    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
}

```

```

ipIfStatsIPVersion OBJECT-TYPE
    SYNTAX      InetVersion
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The IP version of this row."
    ::= { ipIfStatsEntry 1 }

```

```

ipIfStatsIfIndex 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."
    ::= { 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 }

ipIfStatsHCInOctets 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 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
STATUS      current
DESCRIPTION
```

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"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). 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 the 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 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 }

ipIfStatsHCInForwDatagrams OBJECT-TYPE

SYNTAX Counter64

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. This object counts the same packets as ipIfInForwDatagrams 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."

::= { ipIfStatsEntry 13 }

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 14 }
```

ipIfStatsReasmOKs 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 ipIfStatsDiscontinuityTime."

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

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 16 }
```

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.

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 }
```

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 18 }

ipIfStatsHCInDelivers OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of datagrams successfully delivered to IP user-protocols (including ICMP). This object counts the same packets as ipIfStatsInDelivers 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 ipSystemStatsDiscontinuityTime."

::= { ipIfStatsEntry 19 }

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 20 }
```

```
ipIfStatsHCOutRequests OBJECT-TYPE
```

```
SYNTAX      Counter64
```

```
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. This object counts the same packets as  
    ipIfStatsHCOutRequests 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."
```

```
 ::= { ipIfStatsEntry 21 }
```

```
-- This object ID is reserved to allow the IDs for this table's objects  
-- to align with the objects in the ipSystemStatsTable.  
-- ::= {ipIfStatsEntry 22}
```

```
ipIfStatsOutForwDatagrams OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The number of datagrams for which this entity was not their
```

```
    final IP destination 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 23 }
```

ipIfStatsHCOutForwDatagrams OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of datagrams for which this entity was not their final IP destination and for which it was successful in finding a path to their final destination. This object counts the same packets as ipIfStatsOutForwDatagrams 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."

```
::= { ipIfStatsEntry 24 }
```

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

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times as indicated by the value of
ipIfStatsDiscontinuityTime."
 ::= { ipIfStatsEntry 25 }

ipIfStatsOutFragReqs 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 26 }

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 27 }

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

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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
ipIfStatsDiscontinuityTime."

::= { ipIfStatsEntry 28 }

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 29 }

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 30 }

ipIfStatsHCOutTransmits OBJECT-TYPE

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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 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 31 }

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 32 }

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 33 }

ipIfStatsInMcastPkts 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 ipIfStatsDiscontinuityTime."

::= { ipIfStatsEntry 34 }

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 35 }

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 36 }

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 37 }

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 38 }

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 39 }

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 40 }

ipIfStatsHCOutMcastOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of octets transmitted 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 41 }

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 42 }

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 43 }

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 44 }

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 45 }

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 46 }

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 47 }
```

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

ipAddressPrefixTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpAddressPrefixEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"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.

All prefixes used by this entity should be included in this table independent of how the entity learned the prefix. (This table isn't limited to prefixes learned from router advertisements.) "

```
::= { ip 32 }
```

ipAddressPrefixEntry OBJECT-TYPE

SYNTAX IpAddressPrefixEntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "An entry in the ipAddressPrefixTable."
 INDEX { ipAddressPrefixIfIndex, ipAddressPrefixType,
 ipAddressPrefixPrefix, ipAddressPrefixLength }
 ::= { ipAddressPrefixTable 1 }

IpAddressPrefixEntry ::= SEQUENCE {
 ipAddressPrefixIfIndex InterfaceIndex,
 ipAddressPrefixType InetAddressType,
 ipAddressPrefixPrefix InetAddress,
 ipAddressPrefixLength InetAddressPrefixLength,
 ipAddressPrefixOrigin IpAddressPrefixOriginTC,
 ipAddressPrefixOnLinkFlag TruthValue,

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 ipAddressPrefixAutonomousFlag TruthValue,
 ipAddressPrefixAdvPreferredLifetime Unsigned32,
 ipAddressPrefixAdvValidLifetime Unsigned32
 }

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."
 ::= { ipAddressPrefixEntry 2 }

ipAddressPrefixPrefix OBJECT-TYPE

SYNTAX InetAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"The address prefix. The address type of this object is specified in ipAddressPrefixType. The length of this object is the standard length for objects of that type (4 or 16 bytes). Any bits after ipAddressPrefixLength must be zero.

Implementors need to be aware that if the size of ipAddressPrefixPrefix exceeds 114 octets then OIDS of instances of columns in this row will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c or SNMPv3."

::= { ipAddressPrefixEntry 3 }

ipAddressPrefixLength OBJECT-TYPE

SYNTAX InetAddressPrefixLength
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"The prefix length associated with this prefix.

The value 0 has no special meaning for this object. It simply refers to address ':::/0'."

::= { ipAddressPrefixEntry 4 }

ipAddressPrefixOrigin OBJECT-TYPE

SYNTAX IpAddressPrefixOriginTC
MAX-ACCESS read-only

STATUS current
DESCRIPTION
"The origin of this prefix."
 ::= { ipAddressPrefixEntry 5 }

ipAddressPrefixOnLinkFlag OBJECT-TYPE

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 remaining length of time in seconds that this prefix will continue to be preferred, i.e. time until deprecation.

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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

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The remaining length of time, in seconds, that this prefix will continue to be 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
--

ipAddressSpinLock OBJECT-TYPE

SYNTAX TestAndIncr

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"An advisory lock used to allow cooperating SNMP managers to coordinate their use of the set operation in creating or modifying rows within this table.

In order to use this lock to coordinate the use of set operations managers should first retrieve ipvAddressTableSpinLock. They should then determine the appropriate row to create or modify. Finally they should issue the appropriate set command including the retrieved

value of ipAddressSpinLock. If another manager has altered the table in the meantime, then the value of ipAddressSpinLock will have changed and the creation will fail as it will be specifying an incorrect value for ipAddressSpinLock. It is suggested, but not required, that the ipAddressSpinLock be the first var bind for each set of objects representing a 'row' in a PDU. "

::= { ip 33 }

ipAddressTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpAddressEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"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](#).

While this table is writable the user will note that several objects, such as ipAddressOrigin, are not. The intention in allowing a user to write to this table is to allow them to add or remove any entry that isn't permanent. The user should be allowed to modify objects and entries when that would not cause inconsistencies within the table. Allowing write access to objects such as ipAddressOrigin could allow a user to insert an entry and then label it incorrectly.

Note well: When including IPv6 link-local addresses in this table the entry must use an InetAddressType of 'ipv6z' in order to differentiate between the possible interfaces.

```
"  
 ::= { ip 34 }
```

```
ipAddressEntry OBJECT-TYPE  
    SYNTAX      IPAddressEntry  
    MAX-ACCESS  not-accessible  
    STATUS      current  
    DESCRIPTION  
        "An address mapping for a particular interface."  
    INDEX { ipAddressAddrType, ipAddressAddr }  
    ::= { ipAddressTable 1 }
```

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

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ipAddressAddr	InetAddress,
ipAddressIfIndex	InterfaceIndex,
ipAddressType	INTEGER,
ipAddressPrefix	RowPointer,
ipAddressOrigin	IpAddressOriginTC,
ipAddressStatus	IpAddressStatusTC,
ipAddressCreated	TimeStamp,

```
    ipAddressLastChanged    TimeStamp,  
    ipAddressRowStatus      RowStatus,  
    ipAddressStorageType    StorageType  
}
```

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

```
ipAddressAddr OBJECT-TYPE  
    SYNTAX      InetAddress  
    MAX-ACCESS  not-accessible  
    STATUS      current  
    DESCRIPTION  
        "The IP address to which this entry's addressing information  
        pertains. The address type of this object is specified in  
        ipAddressAddrType.  
  
        Implementors need to be aware that if the size of  
        ipAddressAddr exceeds 116 octets then OIDS of instances of  
        columns in this row will have more than 128 sub-identifiers  
        and cannot be accessed using SNMPv1, SNMPv2c or SNMPv3."  
    ::= { ipAddressEntry 2 }
```

```
ipAddressIfIndex OBJECT-TYPE  
    SYNTAX      InterfaceIndex  
    MAX-ACCESS  read-create  
    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-create
    STATUS current
    DESCRIPTION
        "The type of address. broadcast(3) is not a valid value for
        IPv6 addresses (RFC3513). "
```

```
    DEFVAL { unicast }
    ::= { 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."
DEFVAL { zeroDotZero }
::= { ipAddressEntry 5 }
```

ipAddressOrigin OBJECT-TYPE

```
SYNTAX IpAddressOriginTC
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The origin of the address."
::= { ipAddressEntry 6 }
```

ipAddressStatus OBJECT-TYPE

```
SYNTAX IpAddressStatusTC
MAX-ACCESS read-create
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)."
DEFVAL { preferred }
```

::= { ipAddressEntry 7 }

ipAddressCreated OBJECT-TYPE

SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION

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"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 }

ipAddressRowStatus OBJECT-TYPE

SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION

"The status of this conceptual row.

The RowStatus TC requires that this DESCRIPTION clause states under which circumstances other objects in this row can be modified. The value of this object has no effect on whether other objects in this conceptual row can be

modified.

A conceptual row can not be made active until the
ipAddressIfIndex has been set to a valid index. "
::= { ipAddressEntry 10 }

ipAddressStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type for this conceptual row. If this object
has a value of 'permanent' then no other objects are
required to be able to be modified."

DEFVAL { volatile }

::= { ipAddressEntry 11 }

--

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-- the Internet Address Translation table

--

ipNetToPhysicalTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpNetToPhysicalEntry

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 [10] and Neighbor Discovery [4] are the most likely options."

REFERENCE "[RFC0826](#) and [RFC2461](#)"
 ::= { ip 35 }

ipNetToPhysicalEntry OBJECT-TYPE
SYNTAX IpNetToPhysicalEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "Each entry contains one IP address to `physical' address
 equivalence."
INDEX { ipNetToPhysicalIfIndex,
 ipNetToPhysicalNetAddressType,
 ipNetToPhysicalNetAddress }
 ::= { ipNetToPhysicalTable 1 }

IpNetToPhysicalEntry ::= SEQUENCE {
 ipNetToPhysicalIfIndex InterfaceIndex,
 ipNetToPhysicalNetAddressType InetAddressType,
 ipNetToPhysicalNetAddress InetAddress,
 ipNetToPhysicalPhysAddress PhysAddress,
 ipNetToPhysicalLastUpdated TimeStamp,
 ipNetToPhysicalType INTEGER,
 ipNetToPhysicalState INTEGER,
 ipNetToPhysicalRowStatus RowStatus
 }

ipNetToPhysicalIfIndex OBJECT-TYPE

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."
 ::= { ipNetToPhysicalEntry 1 }

ipNetToPhysicalNetAddressType OBJECT-TYPE
SYNTAX InetAddressType
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The type of ipNetToPhysicalNetAddress."
 ::= { ipNetToPhysicalEntry 2 }

ipNetToPhysicalNetAddress OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The IP Address corresponding to the media-dependent `physical' address. The address type of this object is specified in ipNetToPhysicalAddressType.

 Implementors need to be aware that if the size of ipNetToPhysicalNetAddress exceeds 115 octets then OIDS of instances of columns in this row will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c or SNMPv3."
 ::= { ipNetToPhysicalEntry 3 }

ipNetToPhysicalPhysAddress OBJECT-TYPE
SYNTAX PhysAddress (SIZE(0..65535))
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."
 ::= { ipNetToPhysicalEntry 4 }

ipNetToPhysicalLastUpdated OBJECT-TYPE
SYNTAX TimeStamp

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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."

::= { ipNetToPhysicalEntry 5 }

ipNetToPhysicalType 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 ipNetToPhysicalTable. 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 ipNetToPhysicalType 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."
DEFVAL { static }
 ::= { ipNetToPhysicalEntry 6 }
```

ipNetToPhysicalState 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](#)"

```
::= { ipNetToPhysicalEntry 7 }
```

ipNetToPhysicalRowStatus OBJECT-TYPE

```
SYNTAX      RowStatus
MAX-ACCESS read-create
STATUS      current
DESCRIPTION
```

"The status of this conceptual row.

The RowStatus TC requires that this DESCRIPTION clause states under which circumstances other objects in this row can be modified. The value of this object has no effect on whether other objects in this conceptual row can be modified.

A conceptual row can not be made active until the ipNetToPhysicalPhysAddress object has been set.

Note that if the ipNetToPhysicalType is set to 'invalid' the managed node may delete the entry independent of the state of this object."

```

 ::= { ipNetToPhysicalEntry 8 }

--
-- 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.

        For those objects that have names rather than numbers the
        names were chosen to coincide with the names used in the
        IPv6 address architecture document, [17]. "
    REFERENCE  "Section 2.7 of draft-ietf-ipv6-addr-arch-v4-00.txt"
-- RFC Editor
-- If the address architecture document precedes this document as an RFC
-- please update this reference to use the proper RFC number.
    ::= { ip 36 }

ipv6ScopeZoneIndexEntry OBJECT-TYPE
    SYNTAX      Ipv6ScopeZoneIndexEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry contains the list of scope identifiers on a given
        interface."
    INDEX { ipv6ScopeZoneIndexIfIndex }
    ::= { ipv6ScopeZoneIndexTable 1 }

Ipv6ScopeZoneIndexEntry ::= SEQUENCE {
    ipv6ScopeZoneIndexIfIndex      InterfaceIndex,
    ipv6ScopeZoneIndexLinkLocal    InetZoneIndex,
    ipv6ScopeZoneIndex3            InetZoneIndex,
    ipv6ScopeZoneIndexAdminLocal   InetZoneIndex,
    ipv6ScopeZoneIndexSiteLocal    InetZoneIndex,
    ipv6ScopeZoneIndex6            InetZoneIndex,
    ipv6ScopeZoneIndex7            InetZoneIndex,
    ipv6ScopeZoneIndexOrganizationLocal InetZoneIndex,
    ipv6ScopeZoneIndex9            InetZoneIndex,

```

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```
        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 }

ipv6ScopeZoneIndex3 OBJECT-TYPE

SYNTAX InetZoneIndex

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The zone index for the subnet-local scope on this interface."

::= { 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."

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::= { 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
        "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
        "The table used to describe the default routers known to this
        entity."
    ::= { ip 37 }

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 { ipDefaultRouterAddressType, ipDefaultRouterAddress,
           ipDefaultRouterIfIndex}
    ::= { ipDefaultRouterTable 1 }

IpDefaultRouterEntry ::= SEQUENCE {

```

```
    ipDefaultRouterAddressType  InetAddressType,
    ipDefaultRouterAddress      InetAddress,
    ipDefaultRouterIfIndex      InterfaceIndex,
    ipDefaultRouterLifetime      Unsigned32,
    ipDefaultRouterPreference    INTEGER
}
```

ipDefaultRouterAddressType OBJECT-TYPE

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

ipDefaultRouterAddress OBJECT-TYPE

```
SYNTAX      InetAddress
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "The IP address of the default router represented by this
    row. The address type of this object is specified in
    ipDefaultRouterAddressType.
```

Implementers need to be aware that if the size of ipDefaultRouterAddress exceeds 115 octets then OIDS of instances of columns in this row will have more than 128 sub-identifiers and cannot be accessed using SNMPv1, SNMPv2c or SNMPv3."

```
 ::= { ipDefaultRouterEntry 2 }
```

ipDefaultRouterIfIndex OBJECT-TYPE

```
SYNTAX      InterfaceIndex
MAX-ACCESS  not-accessible
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

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"The remaining length of time, in seconds, that this router will continue to be 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 implementer 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 {
reserved (-2),
low (-1),
medium (0),
high (1)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"An indication of preference given to this router as a default router as described in [[8](#)]. 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](#)"

```
-- RFC Editor
-- Please update this reference as the RFC number is assigned.
--
```

```
::= { ipDefaultRouterEntry 5 }
```

```
--
-- Configuration information for constructing router advertisements
--
```

```
ipv6RouterAdvertSpinLock OBJECT-TYPE
```

```
    SYNTAX      TestAndIncr
```

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

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "An advisory lock used to allow cooperating SNMP managers to
```

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coordinate their use of the set operation in creating or modifying rows within this table.

In order to use this lock to coordinate the use of set operations managers should first retrieve `ipv6RouterAdvertSpinLock`. They should then determine the appropriate row to create or modify. Finally they should issue the appropriate set command including the retrieved value of `ipv6RouterAdvertSpinLock`. If another manager has altered the table in the meantime, then the value of `ipv6RouterAdvertSpinLock` will have changed and the creation will fail as it will be specifying an incorrect value for `ipv6RouterAdvertSpinLock`. It is suggested, but not required, that the `ipv6RouterAdvertSpinLock` be the first var bind for each set of objects representing a 'row' in a PDU.

"

::= { ip 38 }

ipv6RouterAdvertTable OBJECT-TYPE

SYNTAX SEQUENCE OF Ipv6RouterAdvertEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

::= { ip 39 }

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,  
    ipv6RouterAdvertRowStatus        RowStatus  
}
```

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

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STATUS current

DESCRIPTION

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

The default is $0.33 * \text{ipv6RouterAdvertMaxInterval}$, however in the case of a low value for `ipv6RouterAdvertMaxInterval` the minimum value for this object is restricted to 3."

REFERENCE "[RFC2461 Section 6.2.1](#)"

::= { ipv6RouterAdvertEntry 4 }

ipv6RouterAdvertManagedFlag OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

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

MAX-ACCESS read-create

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-create
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 }

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ipv6RouterAdvertReachableTime OBJECT-TYPE
SYNTAX Unsigned32 (0..3600000)
UNITS "milliseconds"
MAX-ACCESS read-create
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-create
STATUS current
DESCRIPTION
 "The value to be placed in the retransmit timer field in
 router advertisements sent from this interface.

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

REFERENCE "[RFC2461 Section 6.2.1](#)"

DEFVAL { 0 }

::= { ipv6RouterAdvertEntry 9 }

ipv6RouterAdvertCurHopLimit OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

MAX-ACCESS read-create

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 IANA web pages (www.iana.org) at the time of implementation."

REFERENCE "[RFC2461 Section 6.2.1](#)"

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::= { ipv6RouterAdvertEntry 10 }

ipv6RouterAdvertDefaultLifetime OBJECT-TYPE

SYNTAX Unsigned32 (0|4..9000)

UNITS "seconds"

MAX-ACCESS read-create

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 $3 * \text{ipv6RouterAdvertMaxInterval}$."

REFERENCE "[RFC2461 Section 6.2.1](#)"

::= { ipv6RouterAdvertEntry 11 }

ipv6RouterAdvertRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The status of this conceptual row.

As all objects in this conceptual row have default values a row can be created and made active by setting this object appropriately.

The RowStatus TC requires that this DESCRIPTION clause states under which circumstances other objects in this row can be modified. The value of this object has no effect on whether other objects in this conceptual row can be modified."

::= { ipv6RouterAdvertEntry 12 }

--

-- ICMP section

--

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

--

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

```
-- These object IDs are reserved as they were used in earlier drafts of
-- the MIB module. In theory OIDs are not assigned until the specification
-- is released as an RFC, however as some companies may have shipped
-- code based on earlier versions of the MIB it seems best to reserve
-- these OIDs.
-- ::= { icmp 27 }
-- ::= { icmp 28 }
```

```
icmpStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF IcmpStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The table of generic system-wide ICMP counters."
    ::= { icmp 29 }
```

```
icmpStatsEntry OBJECT-TYPE
    SYNTAX      IcmpStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A conceptual row in the icmpStatsTable."
    INDEX      { icmpStatsIPVersion }
    ::= { icmpStatsTable 1 }
```

```
IcmpStatsEntry ::= SEQUENCE {
    icmpStatsIPVersion  InetVersion,
    icmpStatsInMsgs     Counter32,
    icmpStatsInErrors   Counter32,
    icmpStatsOutMsgs    Counter32,
    icmpStatsOutErrors  Counter32
}
```

```
icmpStatsIPVersion OBJECT-TYPE
    SYNTAX      InetVersion
    MAX-ACCESS  not-accessible
    STATUS      current
```

DESCRIPTION

"The IP version of the statistics."

::= { icmpStatsEntry 1 }

icmpStatsInMsgs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

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STATUS current

DESCRIPTION

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

::= { icmpStatsEntry 2 }

icmpStatsInErrors 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.)."

::= { icmpStatsEntry 3 }

icmpStatsOutMsgs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of ICMP messages which the entity attempted
to send. Note that this counter includes all those counted
by icmpStatsOutErrors."

::= { icmpStatsEntry 4 }

icmpStatsOutErrors 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."
 ::= { icmpStatsEntry 5 }
```

```
--
-- per-version, per-message type ICMP counters
--
```

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```
icmpMsgStatsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF IcmpMsgStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The table of system-wide per-version, per-message type ICMP
        counters."
    ::= { icmp 30 }
```

```
icmpMsgStatsEntry OBJECT-TYPE
    SYNTAX      IcmpMsgStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A conceptual row in the icmpMsgStatsTable.
```

The system should track each ICMP type value, even if that ICMP type is not supported by the system."
INDEX { icmpMsgStatsIPVersion, icmpMsgStatsType }
 ::= { icmpMsgStatsTable 1 }

```
IcmpMsgStatsEntry ::= SEQUENCE {  
    icmpMsgStatsIPVersion  InetVersion,  
    icmpMsgStatsType       Integer32,  
    icmpMsgStatsInPkts     Counter32,  
    icmpMsgStatsOutPkts    Counter32  
}
```

```
icmpMsgStatsIPVersion OBJECT-TYPE  
    SYNTAX      InetVersion  
    MAX-ACCESS  not-accessible  
    STATUS      current  
    DESCRIPTION  
        "The IP version of the statistics."  
    ::= { icmpMsgStatsEntry 1 }
```

```
icmpMsgStatsType 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 type in use."

```
REFERENCE "http://www.iana.org/assignments/icmp-parameters and  
> http://www.iana.org/assignments/icmpv6-parameters"
```

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```
 ::= { icmpMsgStatsEntry 2 }
```

```
icmpMsgStatsInPkts OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The number of input packets for this AF and type."
    ::= { icmpMsgStatsEntry 3 }
```

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

```
--
-- conformance information
--
```

```
ipMIBConformance OBJECT IDENTIFIER ::= { ipMIB 2 }
```

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

```
-- compliance statements
```

```
ipMIBCompliance2 MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
```

```
        "The compliance statement for systems which implement IP -
either
        IPv4 or IPv6.
```

```
in
        There are a number of INDEX objects that cannot be represented
the form of OBJECT clauses in SMIV2, but for which we have the
following compliance requirements, expressed in OBJECT clause
form
in this description clause:
```

```
-- OBJECT      ipSystemStatsIPVersion
-- SYNTAX      InetVersion {ipv4(1), ipv6(2)}
```

```
-- DESCRIPTION
--      This MIB requires support for only IPv4 and IPv6
versions.
--
-- OBJECT      ipIfStatsIPVersion
-- SYNTAX      InetVersion {ipv4(1), ipv6(2)}
```

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```
-- DESCRIPTION
--      This MIB requires support for only IPv4 and IPv6
versions.
--
-- OBJECT      icmpStatsIPVersion
-- SYNTAX      InetVersion {ipv4(1), ipv6(2)}
```

```
-- DESCRIPTION
--      This MIB requires support for only IPv4 and IPv6
versions.
--
-- OBJECT      icmpMsgStatsIPVersion
-- SYNTAX      InetVersion {ipv4(1), ipv6(2)}
```

```
-- DESCRIPTION
--      This MIB requires support for only IPv4 and IPv6
versions.
--
-- OBJECT      ipAddressPrefixType
-- SYNTAX      InetAddressType {ipv4(1), ipv6(2)}
```

```
-- DESCRIPTION
--      This MIB requires support for only global IPv4 and IPv6
--      address types.
```

```
-- OBJECT      ipAddressPrefixPrefix
-- SYNTAX      InetAddress (Size(4 | 16))
-- DESCRIPTION
--      This MIB requires support for only global IPv4 and IPv6
--      address and so the size can be either 4 or 16 bytes.
```

```
-- OBJECT      ipAddressAddrType
-- SYNTAX      InetAddressType {ipv4(1), ipv6(2),
--                               ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This MIB requires support for only global and non-global
```

```
--      IPv4 and IPv6 address types.
--
-- OBJECT          ipAddressAddr
-- SYNTAX          InetAddress (Size(4 | 8 | 16 | 20))
-- DESCRIPTION
--      This MIB requires support for only global and non-global
--      IPv4 and IPv6 address and so the size can be 4, 8 16 or
--      20 bytes.
--
-- OBJECT          ipNetToPhysicalNetAddressType
-- SYNTAX          InetAddressType {ipv4(1), ipv6(2),
--                                ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This MIB requires support for only global and non-global
--      IPv4 and IPv6 address types.
--
-- OBJECT          ipNetToPhysicalNetAddress
-- SYNTAX          InetAddress (Size(4 | 8 | 16 | 20))
```

```
-- DESCRIPTION
--      This MIB requires support for only global and non-global
--      IPv4 and IPv6 address and so the size can be 4, 8 16 or
--      20 bytes.
--
-- OBJECT          ipDefaultRouterAddressType
-- SYNTAX          InetAddressType {ipv4(1), ipv6(2),
--                                ipv4z(3), ipv6z(4)}
-- DESCRIPTION
--      This MIB requires support for only global and non-global
--      IPv4 and IPv6 address types.
--
-- OBJECT          ipDefaultRouterAddress
-- SYNTAX          InetAddress (Size(4 | 8 | 16 | 20))
-- DESCRIPTION
--      This MIB requires support for only global and non-global
--      IPv4 and IPv6 address and so the size can be 4, 8 16 or
--      20 bytes.
```

"

MODULE -- this module

```
MANDATORY-GROUPS { ipSystemStatsGroup, ipAddressGroup,  
                    ipNetToPhysicalGroup, ipDefaultRouterGroup,  
                    icmpStatsGroup }
```

GROUP ipSystemStatsHCOctetGroup

DESCRIPTION

"This group is mandatory for systems that have an aggregate bandwidth greater than 20MB. Including this group does not allow an entity to neglect the 32 bit versions of these objects."

GROUP ipSystemStatsHCPacketGroup

DESCRIPTION

"This group is mandatory for systems that have an aggregate bandwidth greater than 650MB. Including this group does not allow an entity to neglect the 32 bit versions of these objects."

GROUP ipIfStatsGroup

DESCRIPTION

"This group is optional for all systems."

GROUP ipIfStatsHCOctetGroup

DESCRIPTION

"This group is mandatory for systems that include the

ipIfStatsGroup and include links with bandwidths greater than 20MB. Including this group does not allow an entity to neglect the 32 bit versions of these objects."

GROUP ipIfStatsHCPacketGroup

DESCRIPTION

"This group is mandatory for systems that include the ipIfStatsGroup and include links with bandwidths greater than 650MB. Including this group does not allow an entity to neglect the 32 bit versions of these objects."

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 ipv4SystemStatsGroup

DESCRIPTION

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

GROUP ipv4SystemStatsHCPacketGroup

DESCRIPTION

"This group is mandatory for all systems supporting IPv4 and that have an aggregate bandwidth greater than 650MB. Including this group does not allow an entity to neglect the 32 bit versions of these objects."

GROUP ipv4IfStatsGroup

DESCRIPTION

"This group is mandatory for all systems supporting IPv4 and including the ipIfStatsGroup."

GROUP ipv4IfStatsHCPacketGroup

DESCRIPTION

"This group is mandatory for all systems supporting IPv4 and including the ipIfStatsHCPacketGroup. Including this group does not allow an entity to neglect the 32 bit versions of these objects."

GROUP ipv6GeneralGroup2

DESCRIPTION

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

GROUP ipv6IfGroup

DESCRIPTION

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"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."

GROUP ipLastChangeGroup

DESCRIPTION

"This group is optional for all agents."

OBJECT ipv6IpForwarding

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipv6IpDefaultHopLimit

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipv4InterfaceEnableStatus

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipv6InterfaceEnableStatus

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipv6InterfaceForwarding

MIN-ACCESS read-only

DESCRIPTION

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

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OBJECT ipAddressSpinLock

MIN-ACCESS not-accessible

DESCRIPTION

"An agent is not required to provide write access to this object. However if an agent provides write access to any of the other objects in the ipAddressGroup it SHOULD provide write access to this object as well."

OBJECT ipAddressIfIndex

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipAddressType

MIN-ACCESS read-only

DESCRIPTION

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

to this object."

OBJECT ipAddressStatus

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipAddressRowStatus

SYNTAX RowStatus { active(1) }

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipAddressStorageType

MIN-ACCESS read-only

DESCRIPTION

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

If an agent allows this object to be written or created it is not required to allow this object to be set to readOnly, permanent or nonVolatile."

OBJECT ipNetToPhysicalPhysAddress

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipNetToPhysicalType

MIN-ACCESS read-only

DESCRIPTION

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

to this object."

OBJECT ipv6RouterAdvertSpinLock

MIN-ACCESS read-only

DESCRIPTION

"An agent is not required to provide write access to this object. However if an agent provides write access to any of the other objects in the ipv6RouterAdvertGroup it SHOULD provide write access to this object as well."

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."

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

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object."

OBJECT ipv6RouterAdvertReachableTime

MIN-ACCESS read-only

DESCRIPTION

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

OBJECT ipv6RouterAdvertRowStatus

MIN-ACCESS read-only

DESCRIPTION

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

::= { 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 { ipv4InterfaceReasmMaxSize, ipv4InterfaceEnableStatus,
ipv4InterfaceRetransmitTime }

STATUS current

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DESCRIPTION

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

::= { ipMIBGroups 4 }

ipv6GeneralGroup2 OBJECT-GROUP

OBJECTS { ipv6IpForwarding, ipv6IpDefaultHopLimit }

STATUS current

DESCRIPTION

"The IPv6 group of objects providing for basic management of IPv6 entities."

::= { ipMIBGroups 5 }

ipv6IfGroup OBJECT-GROUP

OBJECTS { ipv6InterfaceReasmMaxSize, ipv6InterfaceIdentifier,
ipv6InterfaceEnableStatus, ipv6InterfaceReachableTime,
ipv6InterfaceRetransmitTime, ipv6InterfaceForwarding }

STATUS current

DESCRIPTION

```
        "The group of IPv6-specific objects for basic management of
        IPv6 interfaces."
 ::= { ipMIBGroups 6 }
```

ipLastChangeGroup OBJECT-GROUP

```
OBJECTS { ipv4InterfaceTableLastChange, ipv6InterfaceTableLastChange,
          ipIfStatsTableLastChange }
```

```
STATUS current
```

DESCRIPTION

```
"The last change objects associated with this MIB. These
objects are optional for all agents. They SHOULD be
implemented on agents where it is possible to determine the
proper values. Where it is not possible to determine the
proper values, for example when the tables are split amongst
several sub-agents using AgentX, the agent MUST NOT
implement these objects to return an incorrect or static
value."
```

```
::= { ipMIBGroups 7 }
```

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,
ipSystemStatsDiscontinuityTime,
          ipSystemStatsRefreshRate }
STATUS current
```

DESCRIPTION

"IP system wide statistics."
 ::= { ipMIBGroups 8 }

ipv4SystemStatsGroup OBJECT-GROUP

OBJECTS { ipSystemStatsInBcastPkts, ipSystemStatsOutBcastPkts }
STATUS current
DESCRIPTION
 "IPv4 only System wide statistics."
 ::= { ipMIBGroups 9 }

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 10 }

ipSystemStatsHCPacketGroup OBJECT-GROUP

OBJECTS { ipSystemStatsHCInReceives,
 ipSystemStatsHCInForwDatagrams,
 ipSystemStatsHCInDelivers, ipSystemStatsHCOutRequests,
 ipSystemStatsHCOutForwDatagrams,
 ipSystemStatsHCOutTransmits,
 ipSystemStatsHCInMcastPkts, ipSystemStatsHCOutMcastPkts
}
STATUS current
DESCRIPTION
 "IP system wide statistics for systems that may overflow the
 standard packet counters within 1 hour."
 ::= { ipMIBGroups 11 }

ipv4SystemStatsHCPacketGroup OBJECT-GROUP

OBJECTS { ipSystemStatsHCInBcastPkts, ipSystemStatsHCOutBcastPkts }
STATUS current
DESCRIPTION
 "IPv4 only system wide statistics for systems that may
 overflow the standard packet counters within 1 hour."
 ::= { ipMIBGroups 12 }

ipIfStatsGroup OBJECT-GROUP

OBJECTS { ipIfStatsInReceives, ipIfStatsInOctets,

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```

        ipIfStatsInHdrErrors,          ipIfStatsInNoRoutes,
        ipIfStatsInAddrErrors,        ipIfStatsInUnknownProtos,
        ipIfStatsInTruncatedPkts,     ipIfStatsInForwDatagrams,
        ipIfStatsReasmReqds,          ipIfStatsReasmOKs,
        ipIfStatsReasmFails,          ipIfStatsInDiscards,
        ipIfStatsInDelivers,          ipIfStatsOutRequests,
        ipIfStatsOutForwDatagrams,    ipIfStatsOutDiscards,
        ipIfStatsOutFragReqds,        ipIfStatsOutFragOKs,
        ipIfStatsOutFragFails,        ipIfStatsOutFragCreates,
        ipIfStatsOutTransmits,        ipIfStatsOutOctets,
        ipIfStatsInMcastPkts,         ipIfStatsInMcastOctets,
        ipIfStatsOutMcastPkts,        ipIfStatsOutMcastOctets,
        ipIfStatsDiscontinuityTime,  ipIfStatsRefreshRate }
STATUS      current
DESCRIPTION
    "IP per-interface statistics."
 ::= { ipMIBGroups 13 }

ipv4IfStatsGroup OBJECT-GROUP
OBJECTS     { ipIfStatsInBcastPkts, ipIfStatsOutBcastPkts }
STATUS      current
DESCRIPTION
    "IPv4 only per-interface statistics."
 ::= { ipMIBGroups 14 }

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 15 }

ipIfStatsHCPacketGroup OBJECT-GROUP
```

OBJECTS { ipIfStatsHCInReceives, ipIfStatsHCInForwDatagrams,
ipIfStatsHCInDelivers, ipIfStatsHCOutRequests,
ipIfStatsHCOutForwDatagrams, ipIfStatsHCOutTransmits,
ipIfStatsHCInMcastPkts, ipIfStatsHCOutMcastPkts }

STATUS current

DESCRIPTION

"IP per-interfaces statistics for systems that include
interfaces that may overflow the standard packet counters
within 1 hour."

::= { ipMIBGroups 16 }

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ipv4IfStatsHCPacketGroup OBJECT-GROUP

OBJECTS { ipIfStatsHCInBcastPkts, ipIfStatsHCOutBcastPkts }

STATUS current

DESCRIPTION

"IPv4 only per-interface statistics for systems that include
interfaces that may overflow the standard packet counters
within 1 hour."

::= { ipMIBGroups 17 }

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 18 }

ipAddressGroup OBJECT-GROUP

OBJECTS { ipAddressSpinLock, ipAddressIfIndex,
ipAddressType, ipAddressPrefix,
ipAddressOrigin, ipAddressStatus,

```
        ipAddressCreated,    ipAddressLastChanged,
        ipAddressRowStatus,  ipAddressStorageType }
STATUS      current
DESCRIPTION
    "The group of objects for providing information about the
    addresses relevant to this entity's interfaces."
 ::= { ipMIBGroups 19 }
```

```
ipNetToPhysicalGroup OBJECT-GROUP
OBJECTS      { ipNetToPhysicalPhysAddress, ipNetToPhysicalLastUpdated,
               ipNetToPhysicalType,        ipNetToPhysicalState,
               ipNetToPhysicalRowStatus }
STATUS      current
DESCRIPTION
    "The group of objects for providing information about the
    mappings of network address to physical address known to
    this node."
 ::= { ipMIBGroups 20 }
```

```
ipv6ScopeGroup OBJECT-GROUP
OBJECTS      { ipv6ScopeZoneIndexLinkLocal,    ipv6ScopeZoneIndex3,
               ipv6ScopeZoneIndexAdminLocal,
ipV6ScopeZoneIndexSiteLocal,
               ipv6ScopeZoneIndex6,            ipv6ScopeZoneIndex7,
```

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```
        ipv6ScopeZoneIndexOrganizationLocal, ipv6ScopeZoneIndex9,
        ipv6ScopeZoneIndexA,                 ipv6ScopeZoneIndexB,
        ipv6ScopeZoneIndexC,                 ipv6ScopeZoneIndexD }
STATUS      current
DESCRIPTION
    "The group of objects for managing IPv6 scope zones."
 ::= { ipMIBGroups 21 }
```

```
ipDefaultRouterGroup OBJECT-GROUP
OBJECTS      { ipDefaultRouterLifetime, ipDefaultRouterPreference }
STATUS      current
DESCRIPTION
```

```

        "The group of objects for providing information about default
        routers known to this node."
 ::= { ipMIBGroups 22 }

ipv6RouterAdvertGroup OBJECT-GROUP
    OBJECTS { ipv6RouterAdvertSpinLock,          ipv6RouterAdvertSendAdverts,
              ipv6RouterAdvertMaxInterval,      ipv6RouterAdvertMinInterval,
              ipv6RouterAdvertManagedFlag,
ipv6RouterAdvertOtherConfigFlag,
              ipv6RouterAdvertLinkMTU,
ipv6RouterAdvertReachableTime,
              ipv6RouterAdvertRetransmitTime,
ipv6RouterAdvertCurHopLimit,
              ipv6RouterAdvertDefaultLifetime, ipv6RouterAdvertRowStatus
    }
    STATUS      current
    DESCRIPTION
        "The group of objects for controlling information advertised
        by IPv6 routers."
 ::= { ipMIBGroups 23 }

icmpStatsGroup OBJECT-GROUP
    OBJECTS { icmpStatsInMsgs,          icmpStatsInErrors,
              icmpStatsOutMsgs,        icmpStatsOutErrors,
              icmpMsgStatsInPkts,     icmpMsgStatsOutPkts }
    STATUS      current
    DESCRIPTION
        "The group of objects providing ICMP statistics."
 ::= { ipMIBGroups 24 }

--
-- 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsInReceives. "

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsInHdrErrors."

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsInAddrErrors."

::= { ip 5 }

ipForwDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of input datagrams for which this entity was not

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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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsInForwDatagrams. "

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsInUnknownProtos. "

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsInDiscards. "

::= { ip 8 }

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

"The total number of input datagrams successfully delivered

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to IPv4 user-protocols (including ICMP).

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsIndelivers. "

::= { 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 datagrams counted in ipForwDatagrams.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsOutRequests. "

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsOutDiscards. "

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsOutNoRoutes. "

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsReasmReqds. "

::= { ip 14 }

ipReasmOKs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of IPv4 datagrams successfully re-assembled.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsReasmOKs. "

::= { ip 15 }

ipReasmFails OBJECT-TYPE

SYNTAX Counter32

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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsReasmFails. "

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::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsOutFragOKs. "

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by ipSystemStatsOutFragFails. "

::= { 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.

This object has been deprecated as a new IP version neutral
table has been added. It is loosely replaced by
ipSystemStatsOutFragCreates. "

::= { ip 19 }

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

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"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
space for other routing entries.

This object was defined in pre-IPv6 versions of the IP MIB.
It was implicitly IPv4 only but the original specifications
did not indicate this protocol restriction. In order to
clarify the specifications this object has been deprecated
and a similar, but more thoroughly clarified, object has
been added to the IP-FORWARD-MIB."

::= { 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.

This table has been deprecated as a new IP version neutral table has been added. It is loosely replaced by the ipAddressTable although several objects that weren't deemed useful weren't carried forward while another (ipAdEntReasmMaxSize) was moved to the ipv4InterfaceTable.
"

::= { 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

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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);
-- 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.

This table has been deprecated as a new IP version neutral table has been added. It is loosely replaced by the ipNetToPhysicalTable. "

::= { 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,

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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.

This object predates the rule limiting index objects to a
max access value of 'not-accessible' and so continue to use
a value of 'read-create'."

::= { ipNetToMediaEntry 1 }

ipNetToMediaPhysAddress OBJECT-TYPE

SYNTAX PhysAddress (SIZE(0..65535))

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.

This object predates the rule limiting index objects to a max access value of 'not-accessible' and so continue to use a value of 'read-create'."

```
::= { ipNetToMediaEntry 3 }
```

ipNetToMediaType OBJECT-TYPE

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```
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 }
```

```
-- 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.
```

```
This object has been deprecated as a new IP version neutral  
table has been added. It is loosely replaced by  
icmpStatsInMsgs. "
```

```
::= { 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.).

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by icmpStatsInErrors. "

::= { icmp 2 }

icmpInDestUnreachs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Destination Unreachable messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 3 }

icmpInTimeExcds OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Time Exceeded messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 4 }

icmpInParmProbs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Parameter Problem messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in

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the icmpMsgStatsTable."
 ::= { icmp 5 }

icmpInSrcQuenchs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Source Quench messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 6 }

icmpInRedirects OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Redirect messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 7 }

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

"The number of ICMP Echo (request) messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 8 }

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

"The number of ICMP Echo Reply messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in

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the icmpMsgStatsTable."
::= { icmp 9 }

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

"The number of ICMP Timestamp (request) messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 10 }

icmpInTimestampReps OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Timestamp Reply messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 11 }

icmpInAddrMasks OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Address Mask Request messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 12 }

icmpInAddrMaskReps OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Address Mask Reply messages received.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in

```
        the icmpMsgStatsTable."  
 ::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by icmpStatsOutMsgs."

```
 ::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by icmpStatsOutErrors."

```
 ::= { icmp 15 }
```

icmpOutDestUnreachs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Destination Unreachable messages sent.

This object has been deprecated as a new IP version neutral

table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."
 ::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 17 }

icmpOutParmProbs OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of ICMP Parameter Problem messages sent.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 18 }

icmpOutSrcQuenchs OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of ICMP Source Quench messages sent.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { 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.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 20 }

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icmpOutEchos OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Echo (request) messages sent.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 21 }

icmpOutEchoReps OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated
DESCRIPTION
"The number of ICMP Echo Reply messages sent.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 22 }

icmpOutTimestamps OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of ICMP Timestamp (request) messages sent.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 23 }

icmpOutTimestampReps OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION

"The number of ICMP Timestamp Reply messages sent.

This object has been deprecated as a new IP version neutral table has been added. It is loosely replaced by a column in the icmpMsgStatsTable."

::= { icmp 24 }

icmpOutAddrMasks OBJECT-TYPE

```
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      deprecated
DESCRIPTION
    "The number of ICMP Address Mask Request messages sent.
```

```
    This object has been deprecated as a new IP version neutral
    table has been added.  It is loosely replaced by a column in
    the icmpMsgStatsTable."
```

```
::= { icmp 25 }
```

```
icmpOutAddrMaskReps OBJECT-TYPE
```

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

```
    "The number of ICMP Address Mask Reply messages sent.
```

```
    This object has been deprecated as a new IP version neutral
    table has been added.  It is loosely replaced by a column in
    the icmpMsgStatsTable."
```

```
::= { 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,

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```
        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.

As part of the version independence this group has been deprecated. "

::= { 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.

As part of the version independence this group has been

```
        deprecated. "  
 ::= { ipMIBGroups 2 }
```

END

6. Previous Work

This document contains objects modified from [RFC 1213](#) [11], [RFC 2011](#) [12], [RFC 2465](#) [13], and [RFC 2466](#) [14].

7. References

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--

8. Security Considerations

There are a number of management objects defined in this MIB module with 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. These are the tables and objects and their sensitivity/vulnerability:

ipForwarding and ipv6IpForwarding - these objects allow a manager

to enable or disable the routing functions on the entity. By disabling the routing functions an attacker would possibly be able to deny service to users. By enabling the routing functions an attacker could open a conduit into an area. This might result in the area providing transit for packets it shouldn't or allow the attacker access to the area bypassing security safeguards.

`ipDefaultTTL` and `ipv6IpDefaultHopLimit` - these objects allow a manager to determine the diameter of the valid area for a packet. By decreasing the value of these objects an attacker could cause packets to be discarded before reaching their destinations.

`ipv4InterfaceEnableStatus` and `ipv6InterfaceEnableStatus` - these objects allow a manager to enable or disable IPv4 and IPv6 on a specific interface. By enabling a protocol on an interface an attacker might be able to create an unsecured path into a node (or through it if routing is also enabled). By disabling a protocol on an interface an attacker might be able to force packets to be routed through some other interface or deny access to some or all of the network via that protocol.

`ipAddressTable` - the objects in this table specify the addresses in use on this node. By modifying this information an attacker can cause a node to either ignore messages destined to it or accept (at least at the IP layer) messages it would otherwise ignore. The use of filtering or security associations may reduce the potential damage in the latter case.

`ipv6RouterAdvertTable` - the objects in this table specify the information that a router should propagate in its routing advertisement messages. By modifying this information an attacker can interfere with the auto-configuration of all hosts on the link. Most modifications to this table will result in a denial of service to some or all hosts on the link. However two objects,

ipv6RouterAdvertManagedFlag and ipv6RouterAdvertOtherConfigFlag, indicate if a host should acquire configuration information from some other source. By enabling these an attacker might be able to cause a host to retrieve its configuration information from a compromised source.

ipNetToPhysicalPhysAddress and ipNetToPhysicalType - these objects specify information used to translate a network (IP) address into a media dependent address. By modifying these objects an attacker could disable communication with a node or divert messages from one node to another. However the attacker may be able to carry out a similar attack by simply responding to the ARP or ND requests made by the target node.

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

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These are the tables and objects and their sensitivity/vulnerability:

Essentially all of the objects in this MIB could be considered sensitive as they report on the status of the IP modules within a system. However the ipSystemStatsTable, ipIfStatsTable and ipAddressTable are likely to be of most interest to an attacker. The statistics tables supply information about the quantity and type of traffic this node is processing and, especially for transit providers, may be considered sensitive. The address table provides a convenient list of all address in use by this node. Each address in isolation is unremarkable however the total list would allow an attacker to correlate otherwise unrelated traffic. For example an attacker might be able to correlate the a [RFC 3041](#) [15] private address with known public addresses thus circumventing the intentions of [RFC 3041](#).

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

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [9], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

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

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[14.](#) RFC Editor Notes

-- RFC Editor

-- This section to be removed as well.

This section contains notes to the RFC Editor and should be removed

as the document is converted into an RFC.

Most of the revision history section is to be removed. The sections to be removed include all of the specific changes to various iterations of the drafts and is indicated with a removal tag.

In the module identity section of the MIB (beginning of [section 5](#)) the RFC number of this document must be added in the description field and the first revision field (replacing xxxx).

In the reference section of object ipv6ScopeZoneIndexTable the reference needs to be updated to refer to the correct document if the address architecture document precedes this document as an RFC.

In the references section of object ipDefaultRouterPreference the reference needs to be updated to refer to the correct document.

In the references section (7) the references to 3291Bis, 2096Bis and the router selection RFC must be replaced with proper RFCs as those numbers are assigned.

In the references section (7) the reference to 3513BIS should be replaced with a proper RFC if the address architecture document precedes this one as an RFC.