

IPv6 MIB Revision Design Team
INTERNET-DRAFT
Expires: June 2004

Shawn A. Routhier, Editor
Wind River
December 2003

Management Information Base
for the Internet Protocol (IP)
draft-ietf-ipv6-rfc2011-update-05.txt

Status of this Document

This document is an Internet-Draft and is in full conformance with all provisions of [Section 10 of RFC2026](#).

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/lid-abstracts.txt>

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>.

This document is a product of the IPv6 MIB Revision Design Team. Comments should be addressed to the authors, or the mailing list at ipng@sunroof.eng.sun.com.

Copyright Notice

Copyright (C) The Internet Society (2003). All Rights Reserved.

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.

INTERNET-DRAFT

Expires: June 2004

December 2003

Table of Contents

1.	The Internet-Standard Management Framework.	2
2.	Revision History.	2
3.	Overview.	12
3.1.	Multi-Stack Implementations.	12
3.2.	Discussion of Tables and Groups.	12
3.2.1.	General Objects	12
3.2.2.	Interface Tables.	13
3.2.3.	IP Statistics Tables.	13
3.2.4.	Internet Address Prefix Table	16
3.2.5.	Internet Address Table.	16
3.2.6.	Internet Address Translation Table.	16
3.2.7.	IPv6 Scope Zone Index	16
3.2.8.	Default Router Table.	17
3.2.9.	Router Advertisement Table.	17
3.2.10.	ICMP Statistics Tables	17
3.2.11.	Conformance and Compliance	17
3.2.12.	Deprecated Objects	18
4.	Updating Implementations.	18
4.1.	Updating an implementation of the IPv4-only IP-MIB.	18
4.2.	Updating an implementation of the IPv6-MIB	19
5.	Definitions	21
6.	Acknowledgments	117
7.	References.	117
7.1.	Normative.	118
7.2.	Informative.	118
8.	Security Considerations	119
9.	Editor's Contact Information.	121
10.	Authors.	121
11.	Acknowledgments.	122
12.	Full Copyright Statement	122
13.	RFC Editor Notes	123

[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 compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [1], STD

Routhier, Editor

[Section 1](#). [Page 2]

INTERNET-DRAFT

Expires: June 2004

December 2003

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-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 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.

Routhier, Editor

[Section 2](#). [Page 4]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

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.

Routhier, Editor

[Section 2](#). [Page 5]

INTERNET-DRAFT

Expires: June 2004

December 2003

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.

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

Routhier, Editor

[Section 2](#). [Page 6]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 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.

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

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

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

May 2002

Removed `ipv6InterfaceEffectiveMtu` and `ipv6InterfaceIdentifierLength`.

Added text to `ipAddressPrefixTable` to describe its utility.

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

Added `ipv4IfAdminStatus` and `ipv6InterfaceAdminStatus`.

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

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

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

Created textual conventions for the following `IpAddressOrigin`, `IpAddressStatus` and `IpAddressPrefixOrigin`.

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

`ipForwarding` & `ipDefaultTTL` - should be persistent

`ipv6Forwarding`, `ipv4AdminStatus` & `ipv6InterfaceAdminStatus` - SHOULD be persistent

`ipv6InterfaceIdentifier` - modified from RW to Read-only

`ipNetToMediaPhysAddress` & `ipNetToMediaType` - should not be persistent

`inetNetToMediaPhysAddress` & `inetNetToMediaType` - SHOULD NOT be persistent

Added text to specify that `ifIndex` objects (`ipv4IfIndex`, `ipv6InterfaceIfIndex`, `ipIfStatsIfIndex`, `ipAddressPrefixIfIndex`, `ipAddressIfIndex` and `ipv6ScopeIdIfIndex`) use the same indexes as `ifIndex`.

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

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

Added ipIfStatsRefreshRate

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

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

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

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

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

Added the ipAddressLastChanged object.

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

Modified the IP statistics table.

ipIfStatsHCInUcastPkts became ipIfStatsHCInReceives

removed ipIfStatsInTooBigErrors and include those packets in ipIfStatsOutFragFails

added ipIfStatsInForwDatagrams to count packets that we attempt to

forward

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

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

Routhier, Editor

[Section 2](#). [Page 10]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

added `ipIfStatsOutFragReqs` 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](#)

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:

Routhier, Editor

[Section 2](#). [Page 11]

INTERNET-DRAFT

Expires: June 2004

December 2003

[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 community string or context name, with the Entity MIB providing a method for listing the supported contexts.

[3.2.](#) Discussion of Tables and Groups

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

While some of the objects are meant to be included in all entities some of the objects are only conditionally mandatory. The unconditionally mandatory objects are mostly counters for IP and ICMP statistics. The

Routhier, Editor

[Section 3.2.](#) [Page 12]

INTERNET-DRAFT

Expires: June 2004

December 2003

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.

from
interface

V
|

from
upper
layers

V
|

Routhier, Editor

[Section 3.2.3](#). [Page 14]

INTERNET-DRAFT

Expires: June 2004

December 2003

+ InReceives (1)
|
|
+--> InHdrErrors (5)

+ OutRequests
|
|
+--> OutNoRoutes



|
v
to
upper
layers

|
v
to
interface

(1) The HC counters and octet counters are also found at these points but have been left out for clarity.

(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.

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

[3.2.4.](#) Internet Address Prefix Table

This table provides information about the prefixes that this entity is using including their lifetimes. This table provides a convenient place to which other tables that make use of prefixes, such as the ipAddressTable, may point. By including this table the MIB can supply the prefix information for all addresses yet minimize the amount of

duplication required in storing and accessing this data. This

arrangement also makes the relationship between addresses that have the same prefix clear.

This table is required for IPv6 entities.

[3.2.5.](#) Internet Address Table

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

This table is required for all IP entities.

[3.2.6.](#) Internet Address Translation Table

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

[3.2.7.](#) IPv6 Scope Zone Index

This table specifies the zone index to interface mapping. By examining the table a manager can determine which groups of interfaces are within a particular zone for a given scope.

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

This table is required for IPv6 entities.

[3.2.8.](#) Default Router Table

This table lists the default routers known to this entity. This table is intended to be a simple list to display the information end nodes may

have been configured with or acquired through a simple system such as IPv6 router advertisements. Managers attempting to view more complicated routing information should examine the routing specific tables from other MIBs.

This table is required for all entities.

Routhier, Editor

[Section 3.2.8.](#) [Page 17]

INTERNET-DRAFT

Expires: June 2004

December 2003

[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, 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 pervious iterations. They are included as part of the historical record.

Routhier, Editor

[Section 3.2.12.](#) [Page 18]

INTERNET-DRAFT

Expires: June 2004

December 2003

[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 `inetIcmpMsgTable` respectively.

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

The third change is the addition of several new objects to the replacement for a previously existing table such as `inetNetToMedia`.

The fourth change is the addition of completely new tables such as `ipIfStatsTable` and `ipDefaultRouterTable`. The first is based on the previous statistics groups while the second is completely new to this MIB.

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

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

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

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

In addition to the ipSystemStatsTable the MIB includes the ipIfStatsTable. This table counts the same items as the system table but does 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

Routhier, Editor

[Section 4.1](#). [Page 19]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 inetNetToMediaTable. 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 `ip6Forwarding` and `ip6DefaultHopLimit`.

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

The `ipv6IfStatsTable` most closely resembles the `ipIfStatsTable` with an additional index for the address 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.

Routhier, Editor

[Section 4.2.](#) [Page 20]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

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

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

5. Definitions

IP-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE,
Integer32, Counter32, IPAddress,
mib-2, Unsigned32, Counter64,
zeroDotZero FROM SNMPv2-SMI
PhysAddress, TruthValue,
TimeStamp, RowPointer,
TEXTUAL-CONVENTION, TestAndIncr,

Routhier, Editor

[Section 5.](#) [Page 21]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 "200312280000Z"

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 (2003). This version of this MIB module is part of RFC xxxx; see the RFC itself for full legal notices."

REVISION "200312280000Z"

DESCRIPTION

"Update and clarify the IP version neutral revision as well as add IPv6 objects for ND, default routers and router advertisements."

REVISION "200107130000Z"

DESCRIPTION

"IP version neutral revision."

REVISION "199411010000Z"

DESCRIPTION

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

REVISION "199103310000Z"

DESCRIPTION

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

::= { mib-2 48}

--

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

--

IpAddressOrigin ::= TEXTUAL-CONVENTION

Routhier, Editor

[Section 5](#). [Page 22]

STATUS current

DESCRIPTION

"The origin of the address.

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

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

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

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

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

SYNTAX INTEGER {

other(1),
manual(2),
wellknown(3),
dhcp(4),
linklayer(5),
random(6)

}

IpAddressStatus ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

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

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

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

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

INTERNET-DRAFT

Expires: June 2004

December 2003

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

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

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

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

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

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

IpAddressPrefixOrigin ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"The origin of this prefix.

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

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

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

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

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

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

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

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

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

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

DESCRIPTION

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

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

::= { ip 1 }

Routhier, Editor

[Section 5](#). [Page 25]

INTERNET-DRAFT

Expires: June 2004

December 2003

ipDefaultTTL OBJECT-TYPE

SYNTAX INTEGER (1..255)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

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

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

::= { ip 2 }

ipReasmTimeout OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum number of seconds which received fragments are held while they are awaiting reassembly at this entity."

::= { ip 13 }

--

-- the IPv6 general group

-- Some objects that affect all of IPv6
--

ip6Forwarding 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."

Routhier, Editor

[Section 5](#). [Page 26]

INTERNET-DRAFT

Expires: June 2004

December 2003

::= { ip 25 }

ip6DefaultHopLimit OBJECT-TYPE

SYNTAX INTEGER (0..255)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The default value inserted into the Hop Limit field of the IPv6 header of datagrams originated at this entity, whenever a Hop Limit value is not supplied by the transport layer protocol.

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

REFERENCE "[RFC2461 Section 6.3.2](#)"

::= { ip 26 }

--

-- IPv4 Interface Table

--

ipv4IfTableLastChange 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 ipv4InterfaceAdminStatus 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

Routhier, Editor

[Section 5.](#) [Page 27]

INTERNET-DRAFT

Expires: June 2004

December 2003

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,

ipv4InterfaceAdminStatus 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 }

ipv4InterfaceAdminStatus 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
--

ipv6IfTableLastChange 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 ipv6InterfaceTable was added or deleted or when
 an ipv6InterfaceReasmMaxSize, ipv6InterfaceIdentifier,
 ipv6InterfacePhysicalAddress, ipv6InterfaceAdminStatus,
 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   Ipv6AddressIfIdentifier,
```

```
    ipv6InterfacePhysicalAddress PhysAddress,
```

```
    ipv6InterfaceAdminStatus  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  
    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      Ipv6AddressIfIdentifier
```

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

INTERNET-DRAFT

Expires: June 2004

December 2003

STATUS current

DESCRIPTION

"The Interface Identifier for this interface that is (at least) unique on the link this interface is attached to. The Interface Identifier is combined with an address prefix to form an interface address.

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

::= { ipv6InterfaceEntry 3 }

ipv6InterfacePhysicalAddress OBJECT-TYPE

SYNTAX PhysAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

::= { ipv6InterfaceEntry 4 }

ipv6InterfaceAdminStatus OBJECT-TYPE

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

}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

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

When this object is written the entity SHOULD save the

change to non-volatile storage and restore the object from non-volatile storage upon re-initialization of the system."
 ::= { ipv6InterfaceEntry 5 }

ipv6InterfaceReachableTime OBJECT-TYPE

Routhier, Editor

[Section 5](#). [Page 31]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 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)."

This object is constrained by ip6Forwarding and is ignored if ip6Forwarding 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 ip6Forwarding 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.

```
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 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,

```

Routhier, Editor

[Section 5.](#) [Page 33]

INTERNET-DRAFT

Expires: June 2004

December 2003

```

    ipSystemStatsInAddrErrors    Counter32,
    ipSystemStatsInUnknownProtos Counter32,
    ipSystemStatsInTruncatedPkts Counter32,
    ipSystemStatsInForwDatagrams Counter32,
    ipSystemStatsHCInForwDatagrams Counter64,
    ipSystemStatsReasmReqds      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 }

```

Routhier, Editor

[Section 5.](#) [Page 34]

INTERNET-DRAFT

Expires: June 2004

December 2003

```

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

```

```

ipSystemStatsInReceives OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The total number of input IP datagrams received, including
        those received in error.

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

```

```
        ipSystemStatsDiscontinuityTime."  
 ::= { ipSystemStatsEntry 3 }
```

ipSystemStatsHCInReceives OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

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

```
 ::= { ipSystemStatsEntry 4 }
```

ipSystemStatsInOctets OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

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

```
 ::= { ipSystemStatsEntry 5 }
```

ipSystemStatsHCInOctets OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

values.

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

::= { ipSystemStatsEntry 6 }

ipSystemStatsInHdrErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

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

::= { ipSystemStatsEntry 7 }

ipSystemStatsInNoRoutes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

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

::= { ipSystemStatsEntry 8 }

ipSystemStatsInAddrErrors OBJECT-TYPE

SYNTAX Counter32

STATUS current

DESCRIPTION

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

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

::= { ipSystemStatsEntry 9 }

ipSystemStatsInUnknownProtos OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

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

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

::= { ipSystemStatsEntry 10 }

ipSystemStatsInTruncatedPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"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

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

Routhier, Editor

[Section 5.](#) [Page 38]

INTERNET-DRAFT

Expires: June 2004

December 2003

"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

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

Routhier, Editor

[Section 5](#). [Page 40]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 local generated IP datagrams discarded because

Routhier, Editor

[Section 5](#). [Page 41]

INTERNET-DRAFT

Expires: June 2004

December 2003

no route could be found to transmit them to their destination.

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

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

::= { ipSystemStatsEntry 22 }

ipSystemStatsOutForwDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of datagrams 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
ipSystemStatsDiscontinuityTime."

```
::= { ipSystemStatsEntry 23 }
```

ipSystemStatsHCOutForwDatagrams OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of datagrams 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.

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 }`

INTERNET-DRAFT

Expires: June 2004

December 2003

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

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
```

Routhier, Editor

[Section 5](#). [Page 46]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
"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
```

```
"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

Routhier, Editor

[Section 5](#). [Page 47]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 received in IP multicast

datagrams. This object counts the same octets as ipSystemStatsOutMcastOctets but allows for larger values.

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

::= { ipSystemStatsEntry 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

Routhier, Editor

[Section 5](#). [Page 49]

INTERNET-DRAFT

Expires: June 2004

December 2003

"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,  
    ipIfStatsOutNoRoutes       Counter32,  
    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

INTERNET-DRAFT

Expires: June 2004

December 2003

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

Routhier, Editor

[Section 5](#). [Page 53]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

"The number of input IP datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (e.g., ::0) and unsupported

addresses (e.g., addresses with unallocated prefixes). For entities which are not IP routers and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

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

::= { ipIfStatsEntry 9 }

ipIfStatsInUnknownProtos OBJECT-TYPE
SYNTAX Counter32

Routhier, Editor

[Section 5](#). [Page 54]

INTERNET-DRAFT

Expires: June 2004

December 2003

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.

Routhier, Editor

[Section 5](#). [Page 55]

INTERNET-DRAFT

Expires: June 2004

December 2003

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.
```

Routhier, Editor

[Section 5](#). [Page 56]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
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.

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 }

ipIfStatsOutNoRoutes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

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

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

::= { ipIfStatsEntry 22 }

ipIfStatsOutForwDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of datagrams 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

INTERNET-DRAFT

Expires: June 2004

December 2003

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 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 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 packets that are being forwarded and exceed the outgoing link MTU.

Routhier, Editor

[Section 5](#). [Page 61]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

SYNTAX Counter64
MAX-ACCESS read-only
STATUS current

Routhier, Editor

[Section 5](#). [Page 62]

INTERNET-DRAFT

Expires: June 2004

December 2003

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.

Routhier, Editor

[Section 5](#). [Page 63]

INTERNET-DRAFT

Expires: June 2004

December 2003

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.

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

Routhier, Editor

[Section 5](#). [Page 65]

INTERNET-DRAFT

Expires: June 2004

December 2003

MAX-ACCESS read-only

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

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

::= { ipIfStatsEntry 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-DRAFT

Expires: June 2004

December 2003

--

-- 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

"inet prefix entry"

INDEX { ipAddressPrefixIfIndex, ipAddressPrefixType,
 ipAddressPrefixPrefix, ipAddressPrefixLength }

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

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

Routhier, Editor

[Section 5.](#) [Page 68]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
    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. This object is the standard length for objects of the type specified in ipAddressPrefixType (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 than 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."

::= { ipAddressPrefixEntry 4 }

Routhier, Editor

[Section 5](#). [Page 69]

INTERNET-DRAFT

Expires: June 2004

December 2003

ipAddressPrefixOrigin OBJECT-TYPE

SYNTAX IPAddressPrefixOrigin

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. 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,

Routhier, Editor

[Section 5](#). [Page 70]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

Routhier, Editor

[Section 5](#). [Page 71]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
ipAddressSpinLock. "  
::= { 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](#).

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 InetAddressEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An address mapping for a particular interface."

INDEX { ipAddressAddrType, ipAddressAddr }

::= { ipAddressTable 1 }

IpAddressEntry ::= SEQUENCE {

ipAddressAddrType InetAddressType,

ipAddressAddr InetAddress,

ipAddressIfIndex InterfaceIndex,

ipAddressType INTEGER,

ipAddressPrefix RowPointer,

ipAddressOrigin IpAddressOrigin,

ipAddressStatus IpAddressStatus,

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.
```

```
        Implementors need to be aware that if the size of  
        ipAddressAddr exceeds 116 octets than 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
```

INTERNET-DRAFT

Expires: June 2004

December 2003

address belongs. May be { 0 0 } if there is no such row."
DEFVAL { zeroDotZero }
::= { ipAddressEntry 5 }

ipAddressOrigin OBJECT-TYPE
SYNTAX IpAddressOrigin
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The origin of the address."
::= { ipAddressEntry 6 }

ipAddressStatus OBJECT-TYPE
SYNTAX IpAddressStatus
MAX-ACCESS read-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
"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

Routhier, Editor

[Section 5](#). [Page 74]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
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."

```
DEFVAL { volatile }
```

```
 ::= { ipAddressEntry 11 }
```

```
--
-- the Internet Address Translation table
--
```

inetNetToMediaTable OBJECT-TYPE

```
SYNTAX      SEQUENCE OF InetNetToMediaEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
```

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

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

While many protocols may be used to populate this table, ARP [10] and Neighbor Discovery [4] are the most likely

Routhier, Editor

[Section 5.](#) [Page 75]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
        options."  
 ::= { ip 35 }
```

```
inetNetToMediaEntry OBJECT-TYPE
```

```
SYNTAX      InetNetToMediaEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

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

```
INDEX       { inetNetToMediaIfIndex,  
              inetNetToMediaNetAddressType,  
              inetNetToMediaNetAddress }
```

```
 ::= { inetNetToMediaTable 1 }
```

```
InetNetToMediaEntry ::= SEQUENCE {
```

```
    inetNetToMediaIfIndex      InterfaceIndex,  
    inetNetToMediaNetAddressType InetAddressType,  
    inetNetToMediaNetAddress    InetAddress,  
    inetNetToMediaPhysAddress   PhysAddress,  
    inetNetToMediaLastUpdated   TimeStamp,  
    inetNetToMediaType          INTEGER,  
    inetNetToMediaState         INTEGER
```

```
}
```

```
inetNetToMediaIfIndex OBJECT-TYPE
```

```
SYNTAX      InterfaceIndex
```

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

```
STATUS      current
```

DESCRIPTION

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

::= { inetNetToMediaEntry 1 }

inetNetToMediaNetAddressType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The type of inetNetToMediaNetAddress."

::= { inetNetToMediaEntry 2 }

inetNetToMediaNetAddress OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS not-accessible

STATUS current

Routhier, Editor

[Section 5.](#) [Page 76]

INTERNET-DRAFT

Expires: June 2004

December 2003

DESCRIPTION

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

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

::= { inetNetToMediaEntry 3 }

inetNetToMediaPhysAddress OBJECT-TYPE

SYNTAX PhysAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The media-dependent `physical' address.

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

::= { inetNetToMediaEntry 4 }

inetNetToMediaLastUpdated OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

::= { inetNetToMediaEntry 5 }

inetNetToMediaType OBJECT-TYPE

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

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The type of mapping.

Setting this object to the value invalid(2) has the effect

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

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

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

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

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

```
::= { inetNetToMediaEntry 6 }
```

```
inetNetToMediaState OBJECT-TYPE
```

```
SYNTAX      INTEGER {
                reachable(1), -- confirmed reachability
                stale(2),     -- unconfirmed reachability
                delay(3),     -- waiting for reachability
                                -- confirmation before entering
                                -- the probe state
                probe(4),     -- actively probing
                invalid(5),   -- an invalidated mapping
                unknown(6),   -- state can not be determined
                                -- for some reason.
                incomplete(7) -- address resolution is being performed.
            }
MAX-ACCESS  read-only
STATUS      current
```

Routhier, Editor

[Section 5](#). [Page 78]

INTERNET-DRAFT

Expires: June 2004

December 2003

DESCRIPTION

"The Neighbor Unreachability Detection [4] state for the interface when the address mapping in this entry is used. If Neighbor Unreachability Detection is not in use (e.g. for IPv4), this object is always unknown(6)."

REFERENCE "[RFC2461](#)"

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

```

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

ipv6ScopeZoneIndexTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ipv6ScopeZoneIndexEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The table used to describe IPv6 unicast and multicast scope
         zones."
    ::= { ip 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,
    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."
 ::= { 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

Routhier, Editor

[Section 5.](#) [Page 81]

INTERNET-DRAFT

Expires: June 2004

December 2003

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  
}
```

Routhier, Editor

[Section 5](#). [Page 82]

INTERNET-DRAFT

Expires: June 2004

December 2003

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.

Implementors need to be aware that if the size of ipDefaultRouterAddress exceeds 115 octets than 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

"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 implementor of the MIB as to whether a router with a lifetime of zero is removed from the list.

For IPv6 this value should be extracted from the router

Routhier, Editor

[Section 5](#). [Page 83]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 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

Routhier, Editor

[Section 5](#). [Page 84]

INTERNET-DRAFT

Expires: June 2004

December 2003

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. "

::= { 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

Routhier, Editor

[Section 5.](#) [Page 85]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

 The default is $0.33 \times \text{ipv6RouterAdvertMaxInterval}$."
REFERENCE "[RFC2461 Section 6.2.1](#)"
::= { ipv6RouterAdvertEntry 4 }

ipv6RouterAdvertManagedFlag OBJECT-TYPE
SYNTAX TruthValue

MAX-ACCESS read-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 }

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 'Assigned Numbers' RFC that was in effect at the time of implementation."

REFERENCE "[RFC2461 Section 6.2.1](#)"

```
::= { ipv6RouterAdvertEntry 10 }
```

ipv6RouterAdvertDefaultLifetime OBJECT-TYPE

```
SYNTAX      Unsigned32 (0|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.

INTERNET-DRAFT

Expires: June 2004

December 2003

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.

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

--

inetIcmpTable OBJECT-TYPE

SYNTAX SEQUENCE OF InetIcmpEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The table of generic system-wide ICMP counters."

```
::= { icmp 27 }
```

```
inetIcmpEntry OBJECT-TYPE  
    SYNTAX      InetIcmpEntry  
    MAX-ACCESS  not-accessible  
    STATUS      current  
    DESCRIPTION  
        "A conceptual row in the inetIcmpTable."
```

Routhier, Editor

[Section 5.](#) [Page 89]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
INDEX      { inetIcmpIPVersion }  
 ::= { inetIcmpTable 1 }
```

```
InetIcmpEntry ::= SEQUENCE {  
    inetIcmpIPVersion  InetVersion,  
    inetIcmpInMsgs     Counter32,  
    inetIcmpInErrors   Counter32,  
    inetIcmpOutMsgs    Counter32,  
    inetIcmpOutErrors  Counter32  
}
```

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

```
inetIcmpInMsgs OBJECT-TYPE  
    SYNTAX      Counter32  
    MAX-ACCESS  read-only  
    STATUS      current  
    DESCRIPTION  
        "The total number of ICMP messages which the entity received.  
        Note that this counter includes all those counted by  
        inetIcmpInErrors."  
 ::= { inetIcmpEntry 2 }
```

```
inetIcmpInErrors OBJECT-TYPE  
    SYNTAX      Counter32  
    MAX-ACCESS  read-only  
    STATUS      current
```

DESCRIPTION

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

::= { inetIcmpEntry 3 }

inetIcmpOutMsgs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

::= { inetIcmpEntry 4 }

Routhier, Editor

[Section 5](#). [Page 90]

INTERNET-DRAFT

Expires: June 2004

December 2003

inetIcmpOutErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

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

::= { inetIcmpEntry 5 }

--

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

--

inetIcmpMsgTable OBJECT-TYPE

SYNTAX SEQUENCE OF InetIcmpMsgEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

```
inetIcmpMsgEntry OBJECT-TYPE
    SYNTAX      InetIcmpMsgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
        "A conceptual row in the inetIcmpMsgTable.
```

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

```
INDEX { inetIcmpMsgIPVersion, inetIcmpMsgType }
 ::= { inetIcmpMsgTable 1 }
```

```
InetIcmpMsgEntry ::= SEQUENCE {
    inetIcmpMsgIPVersion  InetVersion,
    inetIcmpMsgType       Integer32,
    inetIcmpMsgInPkts     Counter32,
    inetIcmpMsgOutPkts    Counter32
}
```

Routhier, Editor

[Section 5.](#) [Page 91]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

```
        "The IP version of the statistics."
```

```
 ::= { inetIcmpMsgEntry 1 }
```

```
inetIcmpMsgType OBJECT-TYPE
    SYNTAX      Integer32 (0..255)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
        "The ICMP type field of the message type being counted by
        this row.
```

```
        Note that ICMP message types are scoped by the address type
        in use."
```

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



```

                http://www.iana.org/assignments/icmpv6-parameters"
 ::= { inetIcmpMsgEntry 2 }

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

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

--
-- conformance information
--

ipMIBConformance OBJECT IDENTIFIER ::= { ipMIB 2 }

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

```

Routhier, Editor

[Section 5](#). [Page 92]

INTERNET-DRAFT

Expires: June 2004

December 2003

```

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

```
MODULE -- this module
```

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

```
GROUP ipSystemStatsHCOctetGroup
DESCRIPTION
```

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

```
GROUP ipSystemStatsHCPacketGroup
DESCRIPTION
```

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

```
GROUP ipIfStatsGroup
DESCRIPTION
```

```
"This group is optional for all systems."
```

```
GROUP ipIfStatsHCOctetGroup
DESCRIPTION
```

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

```
GROUP ipIfStatsHCPacketGroup
DESCRIPTION
```

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

```
GROUP ipv4GeneralGroup
DESCRIPTION
```

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

INTERNET-DRAFT

Expires: June 2004

December 2003

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."

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."

GROUP ipv6GeneralGroup2

DESCRIPTION

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

GROUP ipv6IfGroup

DESCRIPTION

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

GROUP ipAddressPrefixGroup

DESCRIPTION

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

GROUP ipv6ScopeGroup

DESCRIPTION

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

GROUP ipv6RouterAdvertGroup

DESCRIPTION

"This group is mandatory for all IPv6 routers."

GROUP ipLastChangeGroup
DESCRIPTION
 "This group is optional for all agents."

OBJECT ip6Forwarding

Routhier, Editor

[Section 5.](#) [Page 95]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

OBJECT ip6DefaultHopLimit
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipv4InterfaceAdminStatus
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipv6InterfaceAdminStatus
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipv6InterfaceForwarding
 MIN-ACCESS read-only
DESCRIPTION
 "An agent is not required to provide write access to this
 object"

OBJECT ipAddressSpinLock
 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 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

Routhier, Editor

[Section 5](#). [Page 96]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

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 inetNetToMediaPhysAddress

MIN-ACCESS read-only

DESCRIPTION

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

to this object"

OBJECT inetNetToMediaType
MIN-ACCESS read-only

DESCRIPTION

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

OBJECT 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 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"

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, ipv4InterfaceAdminStatus,
            ipv4InterfaceRetransmitTime }
    STATUS current
    DESCRIPTION
        "The group of IPv4-specific objects for basic management of
        IPv4 interfaces."
    ::= { ipMIBGroups 4 }

ipv6GeneralGroup2 OBJECT-GROUP
    OBJECTS { ip6Forwarding, ip6DefaultHopLimit }
    STATUS current
    DESCRIPTION
        "The IPv6 group of objects providing for basic management of
        IPv6 entities."
    ::= { ipMIBGroups 5 }

ipv6IfGroup OBJECT-GROUP
    OBJECTS { ipv6InterfaceReasmMaxSize, ipv6InterfaceIdentifier,
            ipv6InterfacePhysicalAddress, ipv6InterfaceAdminStatus,
            ipv6InterfaceReachableTime, ipv6InterfaceRetransmitTime,
            ipv6InterfaceForwarding }

```

```

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

```

```

ipLastChangeGroup OBJECT-GROUP

```

```

OBJECTS    { ipv4IfTableLastChange, ipv6IfTableLastChange,
              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,
              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,
                 ipIfStatsInHdrErrors,    ipIfStatsInNoRoutes,
                 ipIfStatsInAddrErrors,    ipIfStatsInUnknownProtos,
                 ipIfStatsInTruncatedPkts, ipIfStatsInForwDatagrams,
                 ipIfStatsReasmReqds,      ipIfStatsReasmOKs,
                 ipIfStatsReasmFails,     ipIfStatsInDiscards,
                 ipIfStatsInDelivers,     ipIfStatsOutRequests,
                 ipIfStatsOutNoRoutes,     ipIfStatsOutForwDatagrams,
                 ipIfStatsOutDiscards,     ipIfStatsOutFragReqds,
                 ipIfStatsOutFragOKs,     ipIfStatsOutFragFails,
                 ipIfStatsOutFragCreates, ipIfStatsOutTransmits,
                 ipIfStatsOutOctets,       ipIfStatsInMcastPkts,
                 ipIfStatsInMcastOctets,  ipIfStatsOutMcastPkts,
                 ipIfStatsOutMcastOctets, 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 }
```

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

Routhier, Editor

[Section 5.](#) [Page 102]

INTERNET-DRAFT

Expires: June 2004

December 2003

"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 }

ipNetToMediaGroup OBJECT-GROUP
OBJECTS { inetNetToMediaPhysAddress, inetNetToMediaLastUpdated,
inetNetToMediaType, inetNetToMediaState }
STATUS current
DESCRIPTION

"The group of objects for providing information about the mappings of network address to physical address known to this node."
 ::= { ipMIBGroups 20 }

ipv6ScopeGroup OBJECT-GROUP
OBJECTS { ipv6ScopeZoneIndexLinkLocal, ipv6ScopeZoneIndex3,
ipv6ScopeZoneIndexAdminLocal,
ipv6ScopeZoneIndexSiteLocal,
ipv6ScopeZoneIndex6, ipv6ScopeZoneIndex7,
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,
```

Routhier, Editor

[Section 5.](#) [Page 103]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
        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 }
```

```
icmpGroup2 OBJECT-GROUP
OBJECTS    { inetIcmpInMsgs,          inetIcmpInErrors, inetIcmpOutMsgs,
            inetIcmpOutErrors, inetIcmpMsgInPkts, inetIcmpMsgOutPkts }
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."

::= { ip 3 }

ipInHdrErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { ip 4 }

ipInAddrErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

Routhier, Editor

[Section 5.](#) [Page 104]

INTERNET-DRAFT

Expires: June 2004

December 2003

DESCRIPTION

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

::= { ip 5 }

ipForwDatagrams OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { ip 6 }

ipInUnknownProtos OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { ip 7 }

ipInDiscards OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { ip 8 }

ipInDelivers OBJECT-TYPE

Routhier, Editor

[Section 5.](#) [Page 105]

INTERNET-DRAFT

Expires: June 2004

December 2003

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The total number of input datagrams successfully delivered to IPv4 user-protocols (including ICMP)."

::= { ip 9 }

ipOutRequests OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { ip 10 }

ipOutDiscards OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { ip 11 }

ipOutNoRoutes OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { ip 12 }

ipReasmReqds OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated
DESCRIPTION
"The number of IPv4 fragments received which needed to be reassembled at this entity."
 ::= { ip 14 }

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

ipReasmFails OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The number of failures detected by the IPv4 re-assembly algorithm (for whatever reason: timed out, errors, etc). Note that this is not necessarily a count of discarded IPv4 fragments since some algorithms (notably the algorithm in [RFC 815](#)) can lose track of the number of fragments by combining them as they are received."
 ::= { ip 16 }

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

ipFragFails OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
"The number of IPv4 datagrams that have been discarded because they needed to be fragmented at this entity but could not be, e.g., because their Don't Fragment flag was set."
 ::= { ip 18 }

ipFragCreates OBJECT-TYPE

INTERNET-DRAFT

Expires: June 2004

December 2003

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

```
ipRoutingDiscards OBJECT-TYPE
```

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

Routhier, Editor

[Section 5](#). [Page 108]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
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

Routhier, Editor

[Section 5.](#) [Page 109]

INTERNET-DRAFT

Expires: June 2004

December 2003

address is used, the value will be 1. This value applies to both the subnet and network broadcasts addresses used by the entity on this (logical) interface."

```
 ::= { ipAddrEntry 4 }
```

ipAdEntReasmMaxSize OBJECT-TYPE

SYNTAX INTEGER (0..65535)

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The size of the largest IPv4 datagram which this entity can re-assemble from incoming IPv4 fragmented datagrams received on this interface."

```
 ::= { ipAddrEntry 5 }
```

-- the deprecated IPv4 Address Translation table

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

ipNetToMediaTable OBJECT-TYPE

SYNTAX SEQUENCE OF IpNetToMediaEntry

MAX-ACCESS not-accessible
STATUS deprecated
DESCRIPTION
 "The IPv4 Address Translation table used for mapping from
 IPv4 addresses to physical addresses."
 ::= { ip 22 }

ipNetToMediaEntry OBJECT-TYPE
SYNTAX IpNetToMediaEntry
MAX-ACCESS not-accessible
STATUS deprecated
DESCRIPTION
 "Each entry contains one IpAddress to `physical' address
 equivalence."
INDEX { ipNetToMediaIfIndex,
 ipNetToMediaNetAddress }
 ::= { ipNetToMediaTable 1 }

IpNetToMediaEntry ::= SEQUENCE {

Routhier, Editor

[Section 5.](#) [Page 110]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
    ipNetToMediaIfIndex        INTEGER,  
    ipNetToMediaPhysAddress    PhysAddress,  
    ipNetToMediaNetAddress    IpAddress,  
    ipNetToMediaType          INTEGER  
}
```

ipNetToMediaIfIndex OBJECT-TYPE
SYNTAX INTEGER (1..2147483647)
MAX-ACCESS read-create
STATUS deprecated
DESCRIPTION
 "The interface on which this entry's equivalence is
 effective. The interface identified by a particular value
 of this index is the same interface as identified by the
 same value of the IF-MIB's ifIndex."
 ::= { ipNetToMediaEntry 1 }

ipNetToMediaPhysAddress OBJECT-TYPE
SYNTAX PhysAddress
MAX-ACCESS read-create
STATUS deprecated
DESCRIPTION

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

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

::= { ipNetToMediaEntry 2 }

ipNetToMediaNetAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-create

STATUS deprecated

DESCRIPTION

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

::= { ipNetToMediaEntry 3 }

ipNetToMediaType OBJECT-TYPE

SYNTAX INTEGER {

other(1), -- none of the following

invalid(2), -- an invalidated mapping

dynamic(3),

static(4)

}

Routhier, Editor

[Section 5.](#) [Page 111]

INTERNET-DRAFT

Expires: June 2004

December 2003

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."
```

```
::= { icmp 1 }
```

```
icmpInErrors OBJECT-TYPE
```

```
SYNTAX Counter32
```

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

```
STATUS deprecated
```

```
DESCRIPTION
```

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

```
::= { icmp 2 }
```

Routhier, Editor

[Section 5](#). [Page 112]

INTERNET-DRAFT

Expires: June 2004

December 2003

```
icmpInDestUnreachs OBJECT-TYPE
```

```
SYNTAX Counter32
```

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

```
STATUS deprecated
```

```
DESCRIPTION
```

```
"The number of ICMP Destination Unreachable messages  
received."
```

```
::= { icmp 3 }
```


icmpInTimeExcds OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS deprecated
DESCRIPTION
 "The number of ICMP Time Exceeded messages received."
 ::= { icmp 4 }

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

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

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

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

icmpInEchoReps OBJECT-TYPE

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

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

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

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

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

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

::= { icmp 14 }

icmpOutErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { icmp 15 }

icmpOutDestUnreachs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Destination Unreachable messages sent."

::= { icmp 16 }

icmpOutTimeExcds OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Time Exceeded messages sent."

::= { icmp 17 }

icmpOutParmProbs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Parameter Problem messages sent."

::= { icmp 18 }

icmpOutSrcQuenchs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Source Quench messages sent."

::= { icmp 19 }

INTERNET-DRAFT

Expires: June 2004

December 2003

icmpOutRedirects OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Redirect messages sent. For a host, this object will always be zero, since hosts do not send redirects."

::= { icmp 20 }

icmpOutEchos OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { icmp 21 }

icmpOutEchoReps OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

"The number of ICMP Echo Reply messages sent."

::= { icmp 22 }

icmpOutTimestamps OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

::= { icmp 23 }

icmpOutTimestampReps OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS deprecated

DESCRIPTION

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

```
icmpOutAddrMasks OBJECT-TYPE
```

```
    SYNTAX      Counter32
```

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

```
    STATUS      deprecated
```

```
    DESCRIPTION
```

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

Routhier, Editor

[Section 5.](#) [Page 116]

INTERNET-DRAFT

Expires: June 2004

December 2003

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

```
icmpOutAddrMaskReps OBJECT-TYPE
```

```
    SYNTAX      Counter32
```

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

```
    STATUS      deprecated
```

```
    DESCRIPTION
```

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

```
 ::= { icmp 26 }
```

```
-- deprecated conformance information
```

```
-- deprecated compliance statements
```

```
ipMIBCompliance MODULE-COMPLIANCE
```

```
    STATUS      deprecated
```

```
    DESCRIPTION
```

```
        "The compliance statement for systems which implement only
        IPv4. For version-independence, this compliance statement
        is deprecated in favor of ipMIBCompliance2."
```

```
    MODULE -- this module
```

```
        MANDATORY-GROUPS { ipGroup,
                             icmpGroup }
```

```
 ::= { ipMIBCompliances 1 }
```

```
-- deprecated units of conformance
```

```
ipGroup OBJECT-GROUP
```

```
    OBJECTS { ipForwarding,          ipDefaultTTL,      ipInReceives,
              ipInHdrErrors,        ipInAddrErrors,   ipForwDatagrams,
              ipInUnknownProtos,    ipInDiscards,     ipInDelivers,
              ipOutRequests,         ipOutDiscards,    ipOutNoRoutes,
              ipReasmTimeout,        ipReasmReqds,     ipReasmOKs,
```

```

        ipReasmFails,          ipFragOKs,          ipFragFails,
        ipFragCreates,        ipAdEntAddr,       ipAdEntIfIndex,
        ipAdEntNetMask,       ipAdEntBcastAddr,
ipAdEntReasmMaxSize,
        ipNetToMediaIfIndex,  ipNetToMediaPhysAddress,
        ipNetToMediaNetAddress, ipNetToMediaType, ipRoutingDiscards
}

```

STATUS deprecated

DESCRIPTION

"The ip group of objects providing for basic management of IP entities, exclusive of the management of IP routes."

::= { ipMIBGroups 1 }

icmpGroup OBJECT-GROUP

```

OBJECTS { icmpInMsgs,          icmpInErrors,
          icmpInDestUnreachs,  icmpInTimeExcds,
          icmpInParmProbs,     icmpInSrcQuenchs,
          icmpInRedirects,     icmpInEchos,

```

Routhier, Editor

[Section 5](#). [Page 117]

INTERNET-DRAFT

Expires: June 2004

December 2003

```

          icmpInEchoReps,      icmpInTimestamps,
          icmpInTimestampReps,  icmpInAddrMasks,
          icmpInAddrMaskReps,  icmpOutMsgs,
          icmpOutErrors,       icmpOutDestUnreachs,
          icmpOutTimeExcds,    icmpOutParmProbs,
          icmpOutSrcQuenchs,   icmpOutRedirects,
          icmpOutEchos,        icmpOutEchoReps,
          icmpOutTimestamps,   icmpOutTimestampReps,
          icmpOutAddrMasks,    icmpOutAddrMaskReps }

```

STATUS deprecated

DESCRIPTION

"The icmp group of objects providing ICMP statistics."

::= { ipMIBGroups 2 }

END

[6](#). Acknowledgments

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

[7](#). References

[7.1.](#) Normative

- [1] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, [RFC 2578](#), April 1999.
- [2] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, [RFC 2579](#), April 1999.
- [3] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Conformance Statements for SMIv2", STD 58, [RFC 2580](#), April 1999.
- [4] Narten, T., E. Nordmark and W. Simpson, "Neighbor Discovery for IP Version 6 (IPv6)", [RFC 2461](#), December 1998.
- [5] Thomson, S., T. Narten, "IPv6 Stateless Address Autoconfiguration", [RFC 2462](#), December 1998.
- [6] McCloghrie, K., F. Kastenholz, "The Interfaces Group MIB", [RFC 2863](#), June 2000.

Routhier, Editor

[Section 7.1.](#) [Page 118]

INTERNET-DRAFT

Expires: June 2004

December 2003

- [7] Daniele, M., B. Haberman, S. Routhier, J. Schoenwaelder, "[draft-ietf-ops-rfc3291bis-02.txt](#)", RFC XXXX Month Year.
 - RFC Editor
 - Please update this reference as the RFC number is assigned
 -
- [8] Draves, R. and R. Hinden, "[draft-ietf-ipv6-router-selection-02.txt](#)", June 2002.
 - RFC Editor
 - Please update this reference as the RFC number is assigned
 -

[7.2.](#) Informative

- [9] Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction and

Applicability Statements for Internet-Standard Management Framework", [RFC 3410](#), December 2002.

- [10] D. Plummer, "An Ethernet Address Resolution Protocol", [RFC0826](#), November 1982.
- [11] Rose, M. and K. McCloghrie, "Management Information Base for Network Management of TCP/IP-based internets", [RFC 1213](#), March 1991.
- [12] K. McCloghrie, "SNMPv2 Management Information Base for the Internet Protocol using SMIV2", [RFC 2011](#), November 1996.
- [13] Haskin, D. and S. Onishi, "Management Information Base for IP Version 6: Textual Conventions and General Group", [RFC 2465](#), December 1998.
- [14] Haskin, D. and S. Onishi, "Management Information Base for IP Version 6: ICMPv6 Group", [RFC 2466](#), December 1998.
- [15] Narten, T. and R. Draves, "Privacy Extensions for Stateless Address Autoconfiguration in IPv6", [RFC 3041](#), January 2001.
- [16] Haberman, B. and M. Wasserman, "[draft-ietf-ipv6-rfc2096-update-05.txt](#)", August 2003
 - RFC Editor
 - Please update this reference as the RFC number is assigned.
 -

Routhier, Editor

[Section 7.2.](#) [Page 119]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 ip6Forwarding - 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 open an 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 ip6DefaultHopLimit - 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.

ipv4InterfaceAdminStatus and ipv6InterfaceAdminStatus - 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.

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.

inetNetToMediaPhysAddress and inetNetToMediaType - 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. 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.

9. Editor's Contact Information

Shawn A. Routhier
Wind River
[500](#) Wind River Way
Alameda, CA 94501
USA

Email: shawn.routhier@windriver.com

10. Authors

This document was written by the IPv6 MIB revision design team:

Bill Fenner, AT&T Labs -- Research
Email: fenner@research.att.com

Brian Haberman
Email: brian@innovationslab.com

Shawn A. Routhier, Wind River
Email: shawn.routhier@windriver.com

Dave Thaler, Microsoft
Email: dthaler@windows.microsoft.com

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

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

[RFC2465](#) and [RFC2466](#):
Dimitry Haskin, Bay Networks

Steve Onishi, Bay Networks

11. Acknowledgments

Reviews and other contributions were made by:

INTERNET-DRAFT

Expires: June 2004

December 2003

Dario Acornero, Cisco Systems

Mike MacFaden, Riverstone

Keith McCloghrie, Cisco Systems

Juergen Schoenwalder, TU Braunschweig

Margaret Wasserman, Wind River

[12](#). Full Copyright Statement

Copyright (C) The Internet Society (2003). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

[13.](#) 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

Routhier, Editor

[Section 13.](#) [Page 123]

INTERNET-DRAFT

Expires: June 2004

December 2003

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 (replacing xxxx).

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

In the references section (8.1) the references to 3291Bis, 2096Bis and the router selection RFC must be replaced with proper RFCs as those numbers are assigned.

