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IP Forwarding Table MIB

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Abstract

This document 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 related to the forwarding of Internet Protocol (IP) packets in an IP version-independent manner. This document obsoletes RFC 2096.

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1. Introduction

This document defines a portion of the Management Information Base (MIB) for use in managing objects related to the forwarding of Internet Protocol (IP) packets in an IP version-independent manner.

It should be noted that the MIB definition described herein does not support multiple instances based on the same address family type. However, it does support an instance of the MIB per address family.

2. Conventions Used In This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

3. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

4. Overview

The MIB consists of one current table and two current global objects.

1. The object inetCidrRouteNumber indicates the number of current routes. This is primarily to avoid having to read the table in order to determine this number.

2. The object inetCidrRouteDiscards counts the number of valid routes that were discarded from inetCidrRouteTable for any reason. This object replaces the ipRoutingDiscards and ipv6DiscardedRoutes objects.

3. The inetCidrRouteTable provides the ability to display IP version-independent multipath CIDR routes.

4.1. Relationship to Other MIBs

This MIB definition contains several deprecated and obsolete tables and objects. The following subsections describe the relationship between these objects and other MIB modules.

4.1.1. RFC 1213

The ipRouteTable object was originally defined in RFC 1213 [RFC1213]. It was updated by ipForwardTable in RFC 1354 [RFC1354].

4.1.2. RFC 1354

The ipForwardTable object replaced the ipRouteTable object from RFC 1213. It was in turn obsoleted by the ipCidrRouteTable defined in RFC 2096 [RFC2096].

In addition, RFC 1354 introduced ipForwardNumber. This object reflects the number of entries found in ipForwardTable. It was obsoleted by ipCidrRouteNumber, defined in RFC 2096.

4.1.3. RFC 2096

In RFC 2096, the ipCidrRouteTable and ipCidrRouteNumber were introduced. The ipCidrRouteTable object supports multipath IP routes having the same network number but differing network masks. The number of entries in that table is reflected in ipCidrRouteNumber. These objects are deprecated by the definitions contained in this MIB definition.

4.1.4. RFC 2011 and 2465

RFC 2011 [RFC2011] contains the ipRoutingDiscards object, which counts the number of valid routes that have been removed from the ipCidrRouteTable object. The corresponding ipv6DiscardedRoutes object is defined in RFC 2465 [RFC2465]. These objects are deprecated in favor of the version-independent object inetCidrRouteDiscards defined in this MIB.

5. Definitions

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

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE,
    IpAddress, Integer32, Gauge32,
    Counter32                          FROM SNMPv2-SMI
    RowStatus                          FROM SNMPv2-TC
```

```
       MODULE-COMPLIANCE, OBJECT-GROUP    FROM SNMPv2-CONF
       InterfaceIndexOrZero               FROM IF-MIB
       ip                                 FROM IP-MIB
       IANAipRouteProtocol                FROM IANA-RTPROTO-MIB
       InetAddress, InetAddressType,
       InetAddressPrefixLength,
       InetAutonomousSystemNumber         FROM INET-ADDRESS-MIB;

   ipForward MODULE-IDENTITY
       LAST-UPDATED "200602010000Z"
       ORGANIZATION
              "IETF IPv6 Working Group
               http://www.ietf.org/html.charters/ipv6-charter.html"
       CONTACT-INFO
              "Editor:
               Brian Haberman
               Johns Hopkins University - Applied Physics Laboratory
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               11100 Johns Hopkins Road
               Laurel MD,  20723-6099  USA

               Phone: +1-443-778-1319
               Email: brian@innovationslab.net

               Send comments to <ipv6@ietf.org>"
       DESCRIPTION
              "The MIB module for the management of CIDR multipath IP
               Routes.

               Copyright (C) The Internet Society (2006).  This version
               of this MIB module is a part of RFC 4292; see the RFC
               itself for full legal notices."

       REVISION      "200602010000Z"
       DESCRIPTION
              "IPv4/v6 version-independent revision.  Minimal changes
               were made to the original RFC 2096 MIB to allow easy
               upgrade of existing IPv4 implementations to the
               version-independent MIB.  These changes include:

               Adding inetCidrRouteDiscards as a replacement for the
               deprecated ipRoutingDiscards and ipv6DiscardedRoutes
               objects.

               Adding a new conformance statement to support the
               implementation of the IP Forwarding MIB in a
               read-only mode.
```

```
                The inetCidrRouteTable replaces the IPv4-specific
                ipCidrRouteTable, its related objects, and related
                conformance statements.

                Published as RFC 4292."

        REVISION      "199609190000Z"
        DESCRIPTION
                "Revised to support CIDR routes.
                 Published as RFC 2096."

        REVISION      "199207022156Z"
        DESCRIPTION
                "Initial version, published as RFC 1354."
        ::= { ip 24 }

    inetCidrRouteNumber OBJECT-TYPE
        SYNTAX     Gauge32
        MAX-ACCESS read-only
        STATUS     current
        DESCRIPTION
                "The number of current inetCidrRouteTable entries that
                 are not invalid."
    ::= { ipForward 6 }

    inetCidrRouteDiscards OBJECT-TYPE
        SYNTAX     Counter32
        MAX-ACCESS read-only
        STATUS     current
        DESCRIPTION
                "The number of valid route entries discarded from the
                 inetCidrRouteTable.  Discarded route entries do not
                 appear in the inetCidrRouteTable.  One possible reason
                 for discarding an entry would be to free-up buffer space
                 for other route table entries."
        ::= { ipForward 8 }

    --  Inet CIDR Route Table

    --  The Inet CIDR Route Table deprecates and replaces the
    --  ipCidrRoute Table currently in the IP Forwarding Table MIB.
    --  It adds IP protocol independence.

    inetCidrRouteTable OBJECT-TYPE
        SYNTAX     SEQUENCE OF InetCidrRouteEntry
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
```

```
            "This entity's IP Routing table."
        REFERENCE
               "RFC 1213 Section 6.6, The IP Group"
        ::= { ipForward 7 }

    inetCidrRouteEntry OBJECT-TYPE
        SYNTAX     InetCidrRouteEntry
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
               "A particular route to a particular destination, under a
                particular policy (as reflected in the
                inetCidrRoutePolicy object).

                Dynamically created rows will survive an agent reboot.

                Implementers need to be aware that if the total number
                of elements (octets or sub-identifiers) in
                inetCidrRouteDest, inetCidrRoutePolicy, and
                inetCidrRouteNextHop exceeds 111, then OIDs of column
                instances in this table will have more than 128 sub-
                identifiers and cannot be accessed using SNMPv1,
                SNMPv2c, or SNMPv3."
        INDEX {
            inetCidrRouteDestType,
            inetCidrRouteDest,
            inetCidrRoutePfxLen,
            inetCidrRoutePolicy,
            inetCidrRouteNextHopType,
            inetCidrRouteNextHop
            }
        ::= { inetCidrRouteTable 1 }

    InetCidrRouteEntry ::= SEQUENCE {
            inetCidrRouteDestType     InetAddressType,
            inetCidrRouteDest         InetAddress,
            inetCidrRoutePfxLen       InetAddressPrefixLength,
            inetCidrRoutePolicy       OBJECT IDENTIFIER,
            inetCidrRouteNextHopType  InetAddressType,
            inetCidrRouteNextHop      InetAddress,
            inetCidrRouteIfIndex      InterfaceIndexOrZero,
            inetCidrRouteType         INTEGER,
            inetCidrRouteProto        IANAipRouteProtocol,
            inetCidrRouteAge          Gauge32,
            inetCidrRouteNextHopAS    InetAutonomousSystemNumber,
            inetCidrRouteMetric1      Integer32,
            inetCidrRouteMetric2      Integer32,
            inetCidrRouteMetric3      Integer32,
```

```
            inetCidrRouteMetric4      Integer32,
            inetCidrRouteMetric5      Integer32,
            inetCidrRouteStatus       RowStatus
        }

    inetCidrRouteDestType OBJECT-TYPE
        SYNTAX     InetAddressType
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
               "The type of the inetCidrRouteDest address, as defined
                in the InetAddress MIB.

                Only those address types that may appear in an actual
                routing table are allowed as values of this object."
        REFERENCE "RFC 4001"
        ::= { inetCidrRouteEntry 1 }

    inetCidrRouteDest OBJECT-TYPE
        SYNTAX     InetAddress
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
               "The destination IP address of this route.

                The type of this address is determined by the value of
                the inetCidrRouteDestType object.

                The values for the index objects inetCidrRouteDest and
                inetCidrRoutePfxLen must be consistent.  When the value
                of inetCidrRouteDest (excluding the zone index, if one
                is present) is x, then the bitwise logical-AND
                of x with the value of the mask formed from the
                corresponding index object inetCidrRoutePfxLen MUST be
                equal to x.  If not, then the index pair is not
                consistent and an inconsistentName error must be
                returned on SET or CREATE requests."

        ::= { inetCidrRouteEntry 2 }

    inetCidrRoutePfxLen OBJECT-TYPE
        SYNTAX     InetAddressPrefixLength
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
               "Indicates the number of leading one bits that form the
                mask to be logical-ANDed with the destination address
                before being compared to the value in the
```

```
                inetCidrRouteDest field.

                The values for the index objects inetCidrRouteDest and
                inetCidrRoutePfxLen must be consistent.  When the value
                of inetCidrRouteDest (excluding the zone index, if one
                is present) is x, then the bitwise logical-AND
                of x with the value of the mask formed from the
                corresponding index object inetCidrRoutePfxLen MUST be
                equal to x.  If not, then the index pair is not
                consistent and an inconsistentName error must be
                returned on SET or CREATE requests."

        ::= { inetCidrRouteEntry 3 }

    inetCidrRoutePolicy OBJECT-TYPE
        SYNTAX     OBJECT IDENTIFIER
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
               "This object is an opaque object without any defined
                semantics.  Its purpose is to serve as an additional
                index that may delineate between multiple entries to
                the same destination.  The value { 0 0 } shall be used
                as the default value for this object."
        ::= { inetCidrRouteEntry 4 }

    inetCidrRouteNextHopType OBJECT-TYPE
        SYNTAX     InetAddressType
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
               "The type of the inetCidrRouteNextHop address, as
                defined in the InetAddress MIB.

                Value should be set to unknown(0) for non-remote
                routes.

                Only those address types that may appear in an actual
                routing table are allowed as values of this object."
        REFERENCE "RFC 4001"
        ::= { inetCidrRouteEntry 5 }

    inetCidrRouteNextHop OBJECT-TYPE
        SYNTAX     InetAddress
        MAX-ACCESS not-accessible
        STATUS     current
        DESCRIPTION
               "On remote routes, the address of the next system en
```

```
                route.  For non-remote routes, a zero length string.

                The type of this address is determined by the value of
                the inetCidrRouteNextHopType object."
        ::= { inetCidrRouteEntry 6 }

    inetCidrRouteIfIndex OBJECT-TYPE
        SYNTAX     InterfaceIndexOrZero
        MAX-ACCESS read-create
        STATUS     current
        DESCRIPTION
               "The ifIndex value that identifies the local interface
                through which the next hop of this route should be
                reached.  A value of 0 is valid and represents the
                scenario where no interface is specified."
        ::= { inetCidrRouteEntry 7 }

    inetCidrRouteType OBJECT-TYPE
        SYNTAX     INTEGER {
                    other    (1), -- not specified by this MIB
                    reject   (2), -- route that discards traffic and
                                  --   returns ICMP notification
                    local    (3), -- local interface
                    remote   (4), -- remote destination
                    blackhole(5)  -- route that discards traffic
                                  --   silently
                   }
        MAX-ACCESS read-create
        STATUS     current
        DESCRIPTION
               "The type of route.  Note that local(3) refers to a
                route for which the next hop is the final destination;
                remote(4) refers to a route for which the next hop is
                not the final destination.

                Routes that do not result in traffic forwarding or
                rejection should not be displayed, even if the
                implementation keeps them stored internally.

                reject(2) refers to a route that, if matched, discards
                the message as unreachable and returns a notification
                (e.g., ICMP error) to the message sender.  This is used
                in some protocols as a means of correctly aggregating
                routes.

                blackhole(5) refers to a route that, if matched,
                discards the message silently."
        ::= { inetCidrRouteEntry 8 }
```

```
   inetCidrRouteProto OBJECT-TYPE
       SYNTAX     IANAipRouteProtocol
       MAX-ACCESS read-only
       STATUS     current
       DESCRIPTION
              "The routing mechanism via which this route was learned.
               Inclusion of values for gateway routing protocols is
               not intended to imply that hosts should support those
               protocols."
       ::= { inetCidrRouteEntry 9 }

   inetCidrRouteAge OBJECT-TYPE
       SYNTAX     Gauge32
       MAX-ACCESS read-only
       STATUS     current
       DESCRIPTION
              "The number of seconds since this route was last updated
               or otherwise determined to be correct.  Note that no
               semantics of 'too old' can be implied, except through
               knowledge of the routing protocol by which the route
               was learned."
       ::= { inetCidrRouteEntry 10 }

   inetCidrRouteNextHopAS OBJECT-TYPE
       SYNTAX     InetAutonomousSystemNumber
       MAX-ACCESS read-create
       STATUS     current
       DESCRIPTION
              "The Autonomous System Number of the Next Hop.  The
               semantics of this object are determined by the routing-
               protocol specified in the route's inetCidrRouteProto
               value.  When this object is unknown or not relevant, its
               value should be set to zero."
       DEFVAL { 0 }
       ::= { inetCidrRouteEntry 11 }

   inetCidrRouteMetric1 OBJECT-TYPE
       SYNTAX     Integer32
       MAX-ACCESS read-create
       STATUS     current
       DESCRIPTION
              "The primary routing metric for this route.  The
               semantics of this metric are determined by the routing-
               protocol specified in the route's inetCidrRouteProto
               value.  If this metric is not used, its value should be
               set to -1."
       DEFVAL { -1 }
```

```
        ::= { inetCidrRouteEntry 12 }

    inetCidrRouteMetric2 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     current
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's inetCidrRouteProto
                value.  If this metric is not used, its value should be
                set to -1."
        DEFVAL { -1 }
        ::= { inetCidrRouteEntry 13 }

    inetCidrRouteMetric3 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     current
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's inetCidrRouteProto
                value.  If this metric is not used, its value should be
                set to -1."
        DEFVAL { -1 }
        ::= { inetCidrRouteEntry 14 }

    inetCidrRouteMetric4 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     current
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's inetCidrRouteProto
                value.  If this metric is not used, its value should be
                set to -1."
        DEFVAL { -1 }
        ::= { inetCidrRouteEntry 15 }

    inetCidrRouteMetric5 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     current
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
```

```
                protocol specified in the route's inetCidrRouteProto
                value.  If this metric is not used, its value should be
                set to -1."
        DEFVAL { -1 }
        ::= { inetCidrRouteEntry 16 }

    inetCidrRouteStatus OBJECT-TYPE
        SYNTAX     RowStatus
        MAX-ACCESS read-create
        STATUS     current
        DESCRIPTION
               "The row status variable, used according to row
                installation and removal conventions.

                A row entry cannot be modified when the status is
                marked as active(1)."
        ::= { inetCidrRouteEntry 17 }

    --  Conformance information

    ipForwardConformance
         OBJECT IDENTIFIER ::= { ipForward 5 }

    ipForwardGroups
         OBJECT IDENTIFIER ::= { ipForwardConformance 1 }

    ipForwardCompliances
         OBJECT IDENTIFIER ::= { ipForwardConformance 2 }

    --  Compliance statements

    ipForwardFullCompliance MODULE-COMPLIANCE
        STATUS     current
        DESCRIPTION
               "When this MIB is implemented for read-create, the
                implementation can claim full compliance.

                There are a number of INDEX objects that cannot be
                represented in the form of OBJECT clauses in SMIv2,
                but for which there are compliance requirements,
                expressed in OBJECT clause form in this description:

                -- OBJECT      inetCidrRouteDestType
                -- SYNTAX      InetAddressType (ipv4(1), ipv6(2),
                --                              ipv4z(3), ipv6z(4))
                -- DESCRIPTION
                --     This MIB requires support for global and
                --     non-global ipv4 and ipv6 addresses.
```

```
                --
                -- OBJECT      inetCidrRouteDest
                -- SYNTAX      InetAddress (SIZE (4 | 8 | 16 | 20))
                -- DESCRIPTION
                --     This MIB requires support for global and
                --     non-global IPv4 and IPv6 addresses.
                --
                -- OBJECT      inetCidrRouteNextHopType
                -- SYNTAX      InetAddressType (unknown(0), ipv4(1),
                --                              ipv6(2), ipv4z(3)
                --                              ipv6z(4))
                -- DESCRIPTION
                --     This MIB requires support for global and
                --     non-global ipv4 and ipv6 addresses.
                --
                -- OBJECT      inetCidrRouteNextHop
                -- SYNTAX      InetAddress (SIZE (0 | 4 | 8 | 16 | 20))
                -- DESCRIPTION
                --     This MIB requires support for global and
                --     non-global IPv4 and IPv6 addresses.
                "

      MODULE -- this module
      MANDATORY-GROUPS { inetForwardCidrRouteGroup }

      OBJECT        inetCidrRouteStatus
      SYNTAX        RowStatus { active(1), notInService (2) }
      WRITE-SYNTAX  RowStatus { active(1), notInService (2),
                                createAndGo(4), destroy(6) }
      DESCRIPTION  "Support for createAndWait is not required."

      ::= { ipForwardCompliances 3 }

   ipForwardReadOnlyCompliance MODULE-COMPLIANCE
      STATUS     current
      DESCRIPTION
              "When this MIB is implemented without support for read-
               create (i.e., in read-only mode), the implementation can
               claim read-only compliance."
      MODULE -- this module
      MANDATORY-GROUPS { inetForwardCidrRouteGroup }

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

      OBJECT      inetCidrRouteType
```

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

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

      OBJECT      inetCidrRouteMetric1
      MIN-ACCESS  read-only
      DESCRIPTION
         "Write access is not required."

      OBJECT      inetCidrRouteMetric2
      MIN-ACCESS  read-only
      DESCRIPTION
         "Write access is not required."

      OBJECT      inetCidrRouteMetric3
      MIN-ACCESS  read-only
      DESCRIPTION
         "Write access is not required."

      OBJECT      inetCidrRouteMetric4
      MIN-ACCESS  read-only
      DESCRIPTION
         "Write access is not required."

      OBJECT      inetCidrRouteMetric5
      MIN-ACCESS  read-only
      DESCRIPTION
         "Write access is not required."

      OBJECT      inetCidrRouteStatus
      SYNTAX      RowStatus { active(1) }
      MIN-ACCESS  read-only
      DESCRIPTION
         "Write access is not required."

      ::= { ipForwardCompliances 4 }

   -- units of conformance

   inetForwardCidrRouteGroup OBJECT-GROUP
       OBJECTS { inetCidrRouteDiscards,
                 inetCidrRouteIfIndex, inetCidrRouteType,
                 inetCidrRouteProto, inetCidrRouteAge,
```

```
                inetCidrRouteNextHopAS, inetCidrRouteMetric1,
                inetCidrRouteMetric2, inetCidrRouteMetric3,
                inetCidrRouteMetric4, inetCidrRouteMetric5,
                inetCidrRouteStatus, inetCidrRouteNumber
            }
        STATUS     current
        DESCRIPTION
               "The IP version-independent CIDR Route Table."
        ::= { ipForwardGroups 4 }

    --  Deprecated Objects

    ipCidrRouteNumber OBJECT-TYPE
        SYNTAX     Gauge32
        MAX-ACCESS read-only
        STATUS     deprecated
        DESCRIPTION
               "The number of current ipCidrRouteTable entries that are
                not invalid.  This object is deprecated in favor of
                inetCidrRouteNumber and the inetCidrRouteTable."
        ::= { ipForward 3 }

    --  IP CIDR Route Table

    --  The IP CIDR Route Table obsoletes and replaces the ipRoute
    --  Table current in MIB-I and MIB-II and the IP Forwarding Table.
    --  It adds knowledge of the autonomous system of the next hop,
    --  multiple next hops, policy routing, and Classless
    --  Inter-Domain Routing.

    ipCidrRouteTable OBJECT-TYPE
        SYNTAX     SEQUENCE OF IpCidrRouteEntry
        MAX-ACCESS not-accessible
        STATUS     deprecated
        DESCRIPTION
               "This entity's IP Routing table.  This table has been
                deprecated in favor of the IP version neutral
                inetCidrRouteTable."
        REFERENCE
               "RFC 1213 Section 6.6, The IP Group"
        ::= { ipForward 4 }

    ipCidrRouteEntry OBJECT-TYPE
        SYNTAX     IpCidrRouteEntry
        MAX-ACCESS not-accessible
        STATUS     deprecated
        DESCRIPTION
               "A particular route to a particular destination, under a
```

```
                particular policy."
        INDEX {
            ipCidrRouteDest,
            ipCidrRouteMask,
            ipCidrRouteTos,
            ipCidrRouteNextHop
            }
           ::= { ipCidrRouteTable 1 }

    IpCidrRouteEntry ::= SEQUENCE {
            ipCidrRouteDest       IpAddress,
            ipCidrRouteMask       IpAddress,
            ipCidrRouteTos        Integer32,
            ipCidrRouteNextHop    IpAddress,
            ipCidrRouteIfIndex    Integer32,
            ipCidrRouteType       INTEGER,
            ipCidrRouteProto      INTEGER,
            ipCidrRouteAge        Integer32,
            ipCidrRouteInfo       OBJECT IDENTIFIER,
            ipCidrRouteNextHopAS  Integer32,
            ipCidrRouteMetric1    Integer32,
            ipCidrRouteMetric2    Integer32,
            ipCidrRouteMetric3    Integer32,
            ipCidrRouteMetric4    Integer32,
            ipCidrRouteMetric5    Integer32,
            ipCidrRouteStatus     RowStatus
        }

    ipCidrRouteDest OBJECT-TYPE
        SYNTAX     IpAddress
        MAX-ACCESS read-only
        STATUS     deprecated
        DESCRIPTION
               "The destination IP address of this route.

                This object may not take a Multicast (Class D) address
                value.

                Any assignment (implicit or otherwise) of an instance
                of this object to a value x must be rejected if the
                bitwise logical-AND of x with the value of the
                corresponding instance of the ipCidrRouteMask object is
                not equal to x."
        ::= { ipCidrRouteEntry 1 }

    ipCidrRouteMask OBJECT-TYPE
        SYNTAX     IpAddress
        MAX-ACCESS read-only
```

```
        STATUS     deprecated
        DESCRIPTION
               "Indicate the mask to be logical-ANDed with the
                destination address before being compared to the value
                in the ipCidrRouteDest field.  For those systems that
                do not support arbitrary subnet masks, an agent
                constructs the value of the ipCidrRouteMask by
                reference to the IP Address Class.

                Any assignment (implicit or otherwise) of an instance
                of this object to a value x must be rejected if the
                bitwise logical-AND of x with the value of the
                corresponding instance of the ipCidrRouteDest object is
                not equal to ipCidrRouteDest."
        ::= { ipCidrRouteEntry 2 }

    -- The following convention is included for specification
    -- of TOS Field contents.  At this time, the Host Requirements
    -- and the Router Requirements documents disagree on the width
    -- of the TOS field.  This mapping describes the Router
    -- Requirements mapping, and leaves room to widen the TOS field
    -- without impact to fielded systems.

    ipCidrRouteTos OBJECT-TYPE
        SYNTAX     Integer32 (0..2147483647)
        MAX-ACCESS read-only
        STATUS     deprecated
        DESCRIPTION
               "The policy specifier is the IP TOS Field.  The encoding
                of IP TOS is as specified by the following convention.
                Zero indicates the default path if no more specific
                policy applies.

                +-----+-----+-----+-----+-----+-----+-----+-----+
                |                 |                       |     |
                |   PRECEDENCE    |    TYPE OF SERVICE    |  0  |
                |                 |                       |     |
                +-----+-----+-----+-----+-----+-----+-----+-----+

                             IP TOS                IP TOS
                   Field     Policy      Field     Policy
                   Contents    Code      Contents    Code
                   0 0 0 0  ==>   0      0 0 0 1  ==>   2
                   0 0 1 0  ==>   4      0 0 1 1  ==>   6
                   0 1 0 0  ==>   8      0 1 0 1  ==>  10
                   0 1 1 0  ==>  12      0 1 1 1  ==>  14
                   1 0 0 0  ==>  16      1 0 0 1  ==>  18
                   1 0 1 0  ==>  20      1 0 1 1  ==>  22
```

```
                1 1 0 0  ==>  24      1 1 0 1  ==>  26
                1 1 1 0  ==>  28      1 1 1 1  ==>  30"
        ::= { ipCidrRouteEntry 3 }

    ipCidrRouteNextHop OBJECT-TYPE
        SYNTAX     IpAddress
        MAX-ACCESS read-only
        STATUS     deprecated
        DESCRIPTION
               "On remote routes, the address of the next system en
                route; Otherwise, 0.0.0.0."
        ::= { ipCidrRouteEntry 4 }

    ipCidrRouteIfIndex OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
               "The ifIndex value that identifies the local interface
                through which the next hop of this route should be
                reached."
        DEFVAL { 0 }
        ::= { ipCidrRouteEntry 5 }

    ipCidrRouteType OBJECT-TYPE
        SYNTAX     INTEGER {
                    other    (1), -- not specified by this MIB
                    reject   (2), -- route that discards traffic
                    local    (3), -- local interface
                    remote   (4)  -- remote destination
                  }
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
               "The type of route.  Note that local(3) refers to a
                route for which the next hop is the final destination;
                remote(4) refers to a route for which the next hop is
                not the final destination.

                Routes that do not result in traffic forwarding or
                rejection should not be displayed, even if the
                implementation keeps them stored internally.

                reject (2) refers to a route that, if matched,
                discards the message as unreachable.  This is used in
                some protocols as a means of correctly aggregating
                routes."
        ::= { ipCidrRouteEntry 6 }
```

```
   ipCidrRouteProto OBJECT-TYPE
       SYNTAX     INTEGER {
                   other     (1),  -- not specified
                   local     (2),  -- local interface
                   netmgmt   (3),  -- static route
                   icmp      (4),  -- result of ICMP Redirect

                           -- the following are all dynamic
                           -- routing protocols
                   egp         (5),  -- Exterior Gateway Protocol
                   ggp         (6),  -- Gateway-Gateway Protocol
                   hello       (7),  -- FuzzBall HelloSpeak
                   rip         (8),  -- Berkeley RIP or RIP-II
                   isIs        (9),  -- Dual IS-IS
                   esIs        (10), -- ISO 9542
                   ciscoIgrp   (11), -- Cisco IGRP
                   bbnSpfIgp   (12), -- BBN SPF IGP
                   ospf        (13), -- Open Shortest Path First
                   bgp         (14), -- Border Gateway Protocol
                   idpr        (15), -- InterDomain Policy Routing
                   ciscoEigrp (16)  -- Cisco EIGRP
                 }
       MAX-ACCESS read-only
       STATUS     deprecated
       DESCRIPTION
              "The routing mechanism via which this route was learned.
               Inclusion of values for gateway routing protocols is
               not intended to imply that hosts should support those
               protocols."
       ::= { ipCidrRouteEntry 7 }

   ipCidrRouteAge OBJECT-TYPE
       SYNTAX     Integer32
       MAX-ACCESS read-only
       STATUS     deprecated
       DESCRIPTION
              "The number of seconds since this route was last updated
               or otherwise determined to be correct.  Note that no
               semantics of 'too old' can be implied, except through
               knowledge of the routing protocol by which the route
               was learned."
       DEFVAL  { 0 }
       ::= { ipCidrRouteEntry 8 }

   ipCidrRouteInfo OBJECT-TYPE
       SYNTAX     OBJECT IDENTIFIER
       MAX-ACCESS read-create
```

```
        STATUS     deprecated
        DESCRIPTION
               "A reference to MIB definitions specific to the
                particular routing protocol that is responsible for
                this route, as determined by the value specified in the
                route's ipCidrRouteProto value.  If this information is
                not present, its value should be set to the OBJECT
                IDENTIFIER { 0 0 }, which is a syntactically valid
                object identifier, and any implementation conforming to
                ASN.1 and the Basic Encoding Rules must be able to
                generate and recognize this value."
        ::= { ipCidrRouteEntry 9 }

    ipCidrRouteNextHopAS OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
               "The Autonomous System Number of the Next Hop.  The
                semantics of this object are determined by the routing-
                protocol specified in the route's ipCidrRouteProto
                value.  When this object is unknown or not relevant, its
                value should be set to zero."
        DEFVAL { 0 }
        ::= { ipCidrRouteEntry 10 }

    ipCidrRouteMetric1 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
               "The primary routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's ipCidrRouteProto
                value.  If this metric is not used, its value should be
                set to -1."
        DEFVAL { -1 }
        ::= { ipCidrRouteEntry 11 }

    ipCidrRouteMetric2 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's ipCidrRouteProto
                value.  If this metric is not used, its value should be
```

```
                set to -1."
        DEFVAL { -1 }
        ::= { ipCidrRouteEntry 12 }

    ipCidrRouteMetric3 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's ipCidrRouteProto
                value.  If this metric is not used, its value should be
                set to -1."
        DEFVAL { -1 }
        ::= { ipCidrRouteEntry 13 }

    ipCidrRouteMetric4 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's ipCidrRouteProto
                value.  If this metric is not used, its value should be
                set to -1."
        DEFVAL { -1 }
        ::= { ipCidrRouteEntry 14 }

    ipCidrRouteMetric5 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's ipCidrRouteProto
                value.  If this metric is not used, its value should be
                set to -1."
        DEFVAL { -1 }
        ::= { ipCidrRouteEntry 15 }

    ipCidrRouteStatus OBJECT-TYPE
        SYNTAX     RowStatus
        MAX-ACCESS read-create
        STATUS     deprecated
        DESCRIPTION
```

```
            "The row status variable, used according to row
             installation and removal conventions."
        ::= { ipCidrRouteEntry 16 }

    -- compliance statements

    ipForwardCompliance MODULE-COMPLIANCE
        STATUS     deprecated
        DESCRIPTION
               "The compliance statement for SNMPv2 entities that
                implement the ipForward MIB.

                This compliance statement has been deprecated and
                replaced with ipForwardFullCompliance and
                ipForwardReadOnlyCompliance."

       MODULE  -- this module
       MANDATORY-GROUPS { ipForwardCidrRouteGroup }

       ::= { ipForwardCompliances 1 }

    -- units of conformance

    ipForwardCidrRouteGroup OBJECT-GROUP
        OBJECTS { ipCidrRouteNumber,
                  ipCidrRouteDest, ipCidrRouteMask, ipCidrRouteTos,
                  ipCidrRouteNextHop, ipCidrRouteIfIndex,
                  ipCidrRouteType, ipCidrRouteProto, ipCidrRouteAge,
                  ipCidrRouteInfo,ipCidrRouteNextHopAS,
                  ipCidrRouteMetric1, ipCidrRouteMetric2,
                  ipCidrRouteMetric3, ipCidrRouteMetric4,
                  ipCidrRouteMetric5, ipCidrRouteStatus
            }
        STATUS     deprecated
        DESCRIPTION
               "The CIDR Route Table.

                This group has been deprecated and replaced with
                inetForwardCidrRouteGroup."
        ::= { ipForwardGroups 3 }

    -- Obsoleted Definitions - Objects

    ipForwardNumber OBJECT-TYPE
        SYNTAX     Gauge32
        MAX-ACCESS read-only
        STATUS     obsolete
        DESCRIPTION
```

```
            "The number of current ipForwardTable entries that are
             not invalid."
        ::= { ipForward 1 }

    --  IP Forwarding Table

    --  The IP Forwarding Table obsoletes and replaces the ipRoute
    --  Table current in MIB-I and MIB-II.  It adds knowledge of
    --  the autonomous system of the next hop, multiple next hop
    --  support, and policy routing support.

    ipForwardTable OBJECT-TYPE
        SYNTAX     SEQUENCE OF IpForwardEntry
        MAX-ACCESS not-accessible
        STATUS     obsolete
        DESCRIPTION
               "This entity's IP Routing table."
        REFERENCE
               "RFC 1213 Section 6.6, The IP Group"
        ::= { ipForward 2 }

    ipForwardEntry OBJECT-TYPE
        SYNTAX     IpForwardEntry
        MAX-ACCESS not-accessible
        STATUS     obsolete
        DESCRIPTION
               "A particular route to a particular destination, under a
                particular policy."
        INDEX {
            ipForwardDest,
            ipForwardProto,
            ipForwardPolicy,
            ipForwardNextHop
            }
        ::= { ipForwardTable 1 }

    IpForwardEntry ::= SEQUENCE {
            ipForwardDest       IpAddress,
            ipForwardMask       IpAddress,
            ipForwardPolicy     Integer32,
            ipForwardNextHop    IpAddress,
            ipForwardIfIndex    Integer32,
            ipForwardType       INTEGER,
            ipForwardProto      INTEGER,
            ipForwardAge        Integer32,
            ipForwardInfo       OBJECT IDENTIFIER,
            ipForwardNextHopAS  Integer32,
            ipForwardMetric1    Integer32,
```

```
            ipForwardMetric2    Integer32,
            ipForwardMetric3    Integer32,
            ipForwardMetric4    Integer32,
            ipForwardMetric5    Integer32
        }

    ipForwardDest OBJECT-TYPE
        SYNTAX     IpAddress
        MAX-ACCESS read-only
        STATUS     obsolete
        DESCRIPTION
               "The destination IP address of this route.  An entry
                with a value of 0.0.0.0 is considered a default route.

                This object may not take a Multicast (Class D) address
                value.

                Any assignment (implicit or otherwise) of an instance
                of this object to a value x must be rejected if the
                bitwise logical-AND of x with the value of the
                corresponding instance of the ipForwardMask object is
                not equal to x."
        ::= { ipForwardEntry 1 }

    ipForwardMask OBJECT-TYPE
        SYNTAX     IpAddress
        MAX-ACCESS read-create
        STATUS     obsolete
        DESCRIPTION
               "Indicate the mask to be logical-ANDed with the
                destination address before being compared to the value
                in the ipForwardDest field.  For those systems that do
                not support arbitrary subnet masks, an agent constructs
                the value of the ipForwardMask by reference to the IP
                Address Class.

                Any assignment (implicit or otherwise) of an instance
                of this object to a value x must be rejected if the
                bitwise logical-AND of x with the value of the
                corresponding instance of the ipForwardDest object is
                not equal to ipForwardDest."
        DEFVAL { '00000000'H }      -- 0.0.0.0
        ::= { ipForwardEntry 2 }

    -- The following convention is included for specification
    -- of TOS Field contents.  At this time, the Host Requirements
    -- and the Router Requirements documents disagree on the width
    -- of the TOS field.  This mapping describes the Router
```

```
   -- Requirements mapping, and leaves room to widen the TOS field
   -- without impact to fielded systems.

   ipForwardPolicy OBJECT-TYPE
       SYNTAX     Integer32 (0..2147483647)
       MAX-ACCESS read-only
       STATUS     obsolete
       DESCRIPTION
              "The general set of conditions that would cause
               the selection of one multipath route (set of
               next hops for a given destination) is referred
               to as 'policy'.

               Unless the mechanism indicated by ipForwardProto
               specifies otherwise, the policy specifier is
               the IP TOS Field.  The encoding of IP TOS is as
               specified by the following convention.  Zero
               indicates the default path if no more specific
               policy applies.

               +-----+-----+-----+-----+-----+-----+-----+-----+
               |                 |                       |     |
               |   PRECEDENCE    |    TYPE OF SERVICE    |  0  |
               |                 |                       |     |
               +-----+-----+-----+-----+-----+-----+-----+-----+


                           IP TOS                  IP TOS
                  Field    Policy      Field      Policy
                  Contents   Code      Contents     Code
                  0 0 0 0  ==>   0     0 0 0 1  ==>   2
                  0 0 1 0  ==>   4     0 0 1 1  ==>   6
                  0 1 0 0  ==>   8     0 1 0 1  ==>  10
                  0 1 1 0  ==>  12     0 1 1 1  ==>  14
                  1 0 0 0  ==>  16     1 0 0 1  ==>  18
                  1 0 1 0  ==>  20     1 0 1 1  ==>  22
                  1 1 0 0  ==>  24     1 1 0 1  ==>  26
                  1 1 1 0  ==>  28     1 1 1 1  ==>  30

               Protocols defining 'policy' otherwise must either
               define a set of values that are valid for
               this object or must implement an integer-instanced
               policy table for which this object's
               value acts as an index."
       ::= { ipForwardEntry 3 }

   ipForwardNextHop OBJECT-TYPE
```

```
        SYNTAX     IpAddress
        MAX-ACCESS read-only
        STATUS     obsolete
        DESCRIPTION
               "On remote routes, the address of the next system en
                route; otherwise, 0.0.0.0."
        ::= { ipForwardEntry 4 }

    ipForwardIfIndex OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     obsolete
        DESCRIPTION
               "The ifIndex value that identifies the local interface
                through which the next hop of this route should be
                reached."
        DEFVAL { 0 }
        ::= { ipForwardEntry 5 }

    ipForwardType OBJECT-TYPE
        SYNTAX     INTEGER {
                    other    (1), -- not specified by this MIB
                    invalid  (2), -- logically deleted
                    local    (3), -- local interface
                    remote   (4)  -- remote destination
                   }
        MAX-ACCESS read-create
        STATUS     obsolete
        DESCRIPTION
               "The type of route.  Note that local(3) refers to a
                route for which the next hop is the final destination;
                remote(4) refers to a route for which the next hop is
                not the final destination.

                Setting this object to the value invalid(2) has the
                effect of invalidating the corresponding entry in the
                ipForwardTable object.  That is, it effectively
                disassociates the destination identified with said
                entry from the route 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 ipForwardType object."
        DEFVAL { invalid }
        ::= { ipForwardEntry 6 }
```

```
   ipForwardProto OBJECT-TYPE
       SYNTAX     INTEGER {
                   other     (1),  -- not specified
                   local     (2),  -- local interface
                   netmgmt   (3),  -- static route
                   icmp      (4),  -- result of ICMP Redirect

                           -- the following are all dynamic
                           -- routing protocols
                   egp       (5),  -- Exterior Gateway Protocol
                   ggp       (6),  -- Gateway-Gateway Protocol
                   hello     (7),  -- FuzzBall HelloSpeak
                   rip       (8),  -- Berkeley RIP or RIP-II
                   is-is     (9),  -- Dual IS-IS
                   es-is     (10), -- ISO 9542
                   ciscoIgrp (11), -- Cisco IGRP
                   bbnSpfIgp (12), -- BBN SPF IGP
                   ospf      (13), -- Open Shortest Path First
                   bgp       (14), -- Border Gateway Protocol
                   idpr      (15)  -- InterDomain Policy Routing
                  }
       MAX-ACCESS read-only
       STATUS     obsolete
       DESCRIPTION
              "The routing mechanism via which this route was learned.
               Inclusion of values for gateway routing protocols is
               not intended to imply that hosts should support those
               protocols."
       ::= { ipForwardEntry 7 }

   ipForwardAge OBJECT-TYPE
       SYNTAX     Integer32
       MAX-ACCESS read-only
       STATUS     obsolete
       DESCRIPTION
              "The number of seconds since this route was last updated
               or otherwise determined to be correct.  Note that no
               semantics of 'too old' can be implied except through
               knowledge of the routing protocol by which the route
               was learned."
       DEFVAL  { 0 }
       ::= { ipForwardEntry 8 }

   ipForwardInfo OBJECT-TYPE
       SYNTAX     OBJECT IDENTIFIER
       MAX-ACCESS read-create
       STATUS     obsolete
```

```
        DESCRIPTION
               "A reference to MIB definitions specific to the
                particular routing protocol that is responsible for
                this route, as determined by the value specified in the
                route's ipForwardProto value.  If this information is
                not present, its value should be set to the OBJECT
                IDENTIFIER { 0 0 }, which is a syntactically valid
                object identifier, and any implementation conforming to
                ASN.1 and the Basic Encoding Rules must be able to
                generate and recognize this value."
        ::= { ipForwardEntry 9 }

    ipForwardNextHopAS OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     obsolete
        DESCRIPTION
               "The Autonomous System Number of the Next Hop.  When
                this is unknown or not relevant to the protocol
                indicated by ipForwardProto, zero."
        DEFVAL { 0 }
        ::= { ipForwardEntry 10 }

    ipForwardMetric1 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     obsolete
        DESCRIPTION
               "The primary routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's ipForwardProto value.
                If this metric is not used, its value should be set to
                -1."
        DEFVAL { -1 }
        ::= { ipForwardEntry 11 }

    ipForwardMetric2 OBJECT-TYPE
        SYNTAX     Integer32
        MAX-ACCESS read-create
        STATUS     obsolete
        DESCRIPTION
               "An alternate routing metric for this route.  The
                semantics of this metric are determined by the routing-
                protocol specified in the route's ipForwardProto value.
                If this metric is not used, its value should be set to
                -1."
        DEFVAL { -1 }
        ::= { ipForwardEntry 12 }
```

```
   ipForwardMetric3 OBJECT-TYPE
       SYNTAX     Integer32
       MAX-ACCESS read-create
       STATUS     obsolete
       DESCRIPTION
              "An alternate routing metric for this route.  The
               semantics of this metric are determined by the routing-
               protocol specified in the route's ipForwardProto value.
               If this metric is not used, its value should be set to
               -1."
       DEFVAL { -1 }
       ::= { ipForwardEntry 13 }

   ipForwardMetric4 OBJECT-TYPE
       SYNTAX     Integer32
       MAX-ACCESS read-create
       STATUS     obsolete
       DESCRIPTION
              "An alternate routing metric for this route.  The
               semantics of this metric are determined by the routing-
               protocol specified in the route's ipForwardProto value.
               If this metric is not used, its value should be set to
               -1."
       DEFVAL { -1 }
       ::= { ipForwardEntry 14 }

   ipForwardMetric5 OBJECT-TYPE
       SYNTAX     Integer32
       MAX-ACCESS read-create
       STATUS     obsolete
       DESCRIPTION
              "An alternate routing metric for this route.  The
               semantics of this metric are determined by the routing-
               protocol specified in the route's ipForwardProto value.
               If this metric is not used, its value should be set to
               -1."
       DEFVAL { -1 }
       ::= { ipForwardEntry 15 }

   -- Obsoleted Definitions - Groups
   -- compliance statements

   ipForwardOldCompliance MODULE-COMPLIANCE
       STATUS     obsolete
       DESCRIPTION
              "The compliance statement for SNMP entities that
               implement the ipForward MIB."
```

```
      MODULE  -- this module
      MANDATORY-GROUPS { ipForwardMultiPathGroup }

      ::= { ipForwardCompliances 2 }

   ipForwardMultiPathGroup OBJECT-GROUP
       OBJECTS { ipForwardNumber,
                 ipForwardDest, ipForwardMask, ipForwardPolicy,
                 ipForwardNextHop, ipForwardIfIndex, ipForwardType,
                 ipForwardProto, ipForwardAge, ipForwardInfo,
                 ipForwardNextHopAS,
                 ipForwardMetric1, ipForwardMetric2, ipForwardMetric3,
                 ipForwardMetric4, ipForwardMetric5
             }
       STATUS     obsolete
       DESCRIPTION
              "IP Multipath Route Table."
       ::= { ipForwardGroups 2 }

   END
```

6. 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:

1. The inetCidrRouteTable contains routing and forwarding information that is critical to the operation of the network node (especially routers). Allowing unauthenticated write access to this table can compromise the validity of the forwarding information.

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 and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:

1. The inetCidrRouteTable contains routing and forwarding information that can be used to compromise a network.

Specifically, this table can be used to construct a map of the network in preparation for a denial-of-service attack on the network infrastructure.

2. The inetCidrRouteProto object identifies the routing protocols in use within a network. This information can be used to determine how a denial-of-service attack should be launched.

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 [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

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

7. Changes from RFC 2096

This document obsoletes RFC 2096 in the following ways:

1. Replaces ipCidrRouteTable with inetCidrRouteTable. This applies to corresponding objects and conformance statements.

2. Utilizes the InetAddress TC to support IP version-independent implementations of the forwarding MIB. This gives common forwarding MIB support for IPv4 and IPv6.

3. Creates a read-only conformance statement to support implementations that only wish to retrieve data.

4. Creates the inetCidrRouteDiscards object to replace the deprecated ipRoutingDiscards and ipv6DiscardedRoutes objects.

The inetCidrRouteTable retains the logical structure of the ipCidrRouteTable in order to allow the easy upgrade of existing IPv4 implementations to the version-independent MIB.

8. Normative References

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