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J. Parker, Ed.
Axiowave Networks

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Management Information Base for Intermediate System to Intermediate System (IS-IS)

Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. Specifically, this document describes a MIB for the Intermediate System to Intermediate System (IS-IS) Routing protocol when it is used to construct routing tables for IP networks.

Table of Contents

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 [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].

2. Overview

This document describes a management information base for the Intermediate System to Intermediate System (IS-IS) Routing protocol, as described in ISO 10589 [ISO10589], when it is used to construct routing tables for IP networks, as described in RFC 1195 [RFC1195]. The objects are mainly derived from the Guidelines for Definition of Managed Objects (GDMO) definitions in ISO 10589 and from the GDMO definitions in ISO 10733 [ISO10733]. There are also additional objects for managing the IP-specific functionality of Integrated IS-IS operation.

This MIB imports definitions from SNMPv2-TC [RFC2579], SNMPv2-SMI [RFC2578], SNMPv2-CONF [RFC2580], SNMP-FRAMEWORK-MIB [RFC3411], DIFFSERV-MIB [RFC3289], IF-MIB [RFC2863], and INET-ADDRESS-MIB [RFC4001]. See the imports section of the MIB for the specific items imported.

This MIB defines some objects to manage Mesh Groups, described in [RFC2973], and a three-way handshake for point-to-point adjacencies, described in [RFC3373].

The IS-IS MIB defines the following objects:

System-Wide Attributes

- isisSystem

  This table contains information specific to a single instance of the IS-IS protocol running on a router.

- isisManAreaAddr

  This table includes area addresses that are manually configured, which are used to control the associations formed between Level 1 Intermediate Systems.

- isisAreaAddr

  This table includes area addresses reported in relevant L1 LSPs.

- isisSummAddr

  This table holds summary addresses configured for each Level 2 instance of the IS-IS protocol running on a router.

- isisRedistributeAddr

  This table provides criteria to decide whether a route should be leaked from L2 to L1 when Domain Wide Prefix leaking is enabled.

- isisRouter

  This table holds the hostname and router ID for Intermediate Systems in the network.

- isisSysLevel

  This table contains information specific to a domain (Level 2) or an area (Level 1) of the IS-IS protocol.

- isisNextCircIndex

  This scalar is used to provide a unique circuit index.

Circuit-specific Attributes

- isisCirc

  This table contains information specific to a point-to-point or a broadcast interface in the system.

- isisCircLevel

  This table contains information specific to Level 1 or Level 2 of an interface.

Counters

- isisSystemCounter

  Counters in the System table, such as number of times we have wrapped a sequence counter on one of our Link State PDUs.

- isisCircuitCounter

  Counters of events particular to a circuit, such as PDUs with an illegal value of the System ID field length.

- isisPacketCounter

  Counts of IS-IS Protocol PDUs broken down into packet type.

Attributes associated with an Adjacency

- isisISAdj

  This table contains information about adjacencies to routers maintained by the protocol. Entries in this table cannot be created by management action: they are established through the Hello protocol.

- isisISAdjAreaAddr

  This table contains the set of Area Addresses of neighboring Intermediate Systems, as reported in IIH PDUs.

- isisISAdjIPAddr

  This table contains the set of IP Addresses of neighboring Intermediate Systems, as reported in received IIH PDUs.

- isisISAdjProtSupp

  This table contains the set of protocols supported by neighboring Intermediate Systems, as reported in received IIH PDUs.

Attributes Associated with Addresses

- isisRA

  The Reachable Address Table.

  This table contains information about an address prefix manually configured on the system or learned through another protocol.

- isisIPRA

  The IP Reachable Address Table.

  This table contains information about an IP reachable address manually configured on this system or learned from another protocol.

Attributes Associated with Link State PDU Table

- isisLSPSummaryTable

  The Link State PDU Summary Table.

  This table contains information contained in the headers of Link State PDUs stored by the system.

- isisLSPTLVTable

  The Link State PDU TLV Table.

  This table holds the sequence of TLVs that make up an LSP fragment.

Attributes Associated with a Notification

- isisNotification

  This table defines attributes that will be included when reporting IS-IS notifications.

3. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL", when they appear in this document, are to be interpreted as described in BCP 14, RFC 2119 [RFC2119].

4. Definition of IS-IS MIB

```
ISIS-MIB DEFINITIONS ::= BEGIN
     IMPORTS
        TEXTUAL-CONVENTION, RowStatus, TruthValue, TimeStamp
                FROM SNMPv2-TC                -- RFC2579
        MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
            Unsigned32, Counter32, mib-2
                FROM SNMPv2-SMI               -- RFC2578
        MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
                FROM SNMPv2-CONF              -- RFC2580
        SnmpAdminString
                FROM SNMP-FRAMEWORK-MIB       -- RFC2571
        IndexInteger, IndexIntegerNextFree
                FROM DIFFSERV-MIB             -- RFC3289
        InterfaceIndex
                FROM IF-MIB                   -- RFC2863
        InetAddressType, InetAddress, InetAddressPrefixLength
                FROM INET-ADDRESS-MIB;        -- RFC3291

    isisMIB MODULE-IDENTITY
        LAST-UPDATED "200604040000Z" -- April 4, 2006, midnight
        ORGANIZATION "IETF IS-IS for IP Internets Working Group"
        CONTACT-INFO
            "IS-IS for IP Internets working Group
             http://www.ietf.org/html.charters/isis-charter.html
             isis-wg@ietf.org

             Jeff Parker
             Department of Computer Science
             Middlebury College,
             Middlebury, Vermont 05753
             jeffp at middlbury dot edu"

        DESCRIPTION
             "This document describes a management information base for
             the IS-IS Routing protocol, as described in ISO 10589,
             when it is used to construct routing tables for IP
             networks, as described in RFC 1195.

             This document is based on a 1994 IETF document by Chris
             Gunner.  This version has been modified to include
             current syntax, to exclude portions of the protocol that
             are not relevant to IP, and to add management support for
             current practice.
```

```
            Copyright (C) The Internet Society (2006).  This version
            of this MIB module is part of RFC 4444; see the RFC
            itself for full legal notices."

        REVISION "200604040000Z" -- April 4, 2006, midnight

        DESCRIPTION
            "Initial version, published as RFC 4444."
    ::= { mib-2 138 }

-- Top-level structure of the MIB

isisNotifications       OBJECT IDENTIFIER ::= { isisMIB 0 }
isisObjects             OBJECT IDENTIFIER ::= { isisMIB 1 }
isisConformance         OBJECT IDENTIFIER ::= { isisMIB 2 }

-- OBJECT IDENTIFIER definitions

-- System wide attributes.
isisSystem OBJECT IDENTIFIER ::= { isisObjects 1 }

-- Attributes associated with the domain or with the area.
isisSysLevel OBJECT IDENTIFIER ::= { isisObjects 2 }

-- Attributes associated with one Circuit
isisCirc OBJECT IDENTIFIER ::= { isisObjects 3 }

-- Attributes associated with area or domain relevant within a Circuit.
isisCircLevelValues OBJECT IDENTIFIER ::= { isisObjects 4 }

-- System and circuit counters.
isisCounters OBJECT IDENTIFIER ::= { isisObjects 5 }

-- Attributes associated with an adjacent Protocol Peer.
isisISAdj OBJECT IDENTIFIER ::= { isisObjects 6 }

-- Attributes associated with a configured address.
isisReachAddr OBJECT IDENTIFIER ::= { isisObjects 7 }

-- Attributes associated with IP routes learned by
-- configuration or through another protocol.
isisIPReachAddr OBJECT IDENTIFIER ::= { isisObjects 8 }

-- The collection of Link State PDUs known to the Intermediate System
isisLSPDataBase OBJECT IDENTIFIER ::= { isisObjects 9 }

-- Objects included in Notifications.
isisNotification OBJECT IDENTIFIER ::= { isisObjects 10 }
```

```
-- Type definitions

    IsisOSINSAddress ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "OSI Network Service Address, e.g., NSAP, SNPA, or Network
             Entity Title"
        SYNTAX OCTET STRING (SIZE(0..20))

    IsisSystemID ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "The ID for an Intermediate System.  This should
             be unique within a network, and is included
             in all PDUs originated by an Intermediate System.
             The protocol does not place any meanings upon
             the bits, other than using ordering to break
             ties in electing a Designated IS on a LAN."
        REFERENCE "{ISIS.aoi systemId (119)}"
        SYNTAX OCTET STRING (SIZE(6))

    IsisLinkStatePDUID ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "The 8-byte Link State PDU (LSP) ID,
             consisting of the 6-byte SystemID of the
             originating IS; a one-byte PseudoNode ID,
             which is 0 unless the LSP represents the
             topology of a LAN; and a one-byte LSP
             fragment number that is issued in sequence,
             starting with 0.  Non-zero PseudoNode IDs
             need to be unique to the IS but need not
             match the IfIndex."
        REFERENCE "{See section 9.8 of ISO 10589}"
        SYNTAX OCTET STRING (SIZE(8))

    IsisAdminState ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "Type used in enabling and disabling a row."
        SYNTAX INTEGER
            {
                on(1),
                off(2)
            }

    IsisLSPBuffSize ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
```

```
        STATUS current
        DESCRIPTION
            "Integer sub-range for maximum LSP size."
        SYNTAX Unsigned32 (512..16000)

    IsisLevelState ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "States of the IS-IS protocol."
        SYNTAX INTEGER
            {
                off (1),
                on (2),
                waiting (3),
                overloaded(4)
            }

    IsisSupportedProtocol ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "Types of network protocol supported by Integrated IS-IS.
             The values for ISO8473 and IP are those registered for
             these protocols in ISO TR9577."
        REFERENCE "{See section 5.3.1 of RFC 1195}"
        SYNTAX INTEGER
            {
                iso8473(129),
                ipV6(142),
                ip(204)
            }

    IsisDefaultMetric ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
        STATUS current
        DESCRIPTION
            "Integer sub-range for default metric for single hop.
             ISO 10589 provides for 4 types of metric.  Only the
             'default' metric is used in practice."
        REFERENCE "{See section 7.2.2 of ISO 10589}"
        SYNTAX Unsigned32 (0..63)

    IsisWideMetric ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
        STATUS current
        DESCRIPTION
            "Wide metric for IS Neighbors.  ISO 10589 provides a
             6-bit metric.  Traffic Engineering extensions provide
             24-bit metrics."
```

```
        REFERENCE "{See section 3 of RFC 3784}"
        SYNTAX Unsigned32 (0..16777215)

    IsisFullMetric ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
        STATUS current
        DESCRIPTION
            "Full metric for IP Routes.  Traffic Engineering extensions
             provide 32-bit metrics."
        REFERENCE "{See section 4 of RFC 3784}"
        SYNTAX Unsigned32

    IsisMetricType ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "Is this an Internal or External Metric?"
        REFERENCE "{See section 7.2.2 of ISO 10589}"
        SYNTAX INTEGER
            {
                internal(1),
                external(2)
            }

    IsisMetricStyle ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "Do we use RFC 1195 style metrics or wide metrics?"
        REFERENCE "{See section 5 of RFC 3787}"
        SYNTAX INTEGER
            {
                narrow(1),
                wide(2),
                both(3)
            }

    IsisISLevel ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "Identifies a level."
        REFERENCE "{See definitions 3.6.1 and 3.6.11 of ISO 10589}"
        SYNTAX INTEGER
            {
                area(1),        -- L1
                domain(2)       -- L2
            }

    IsisLevel ::= TEXTUAL-CONVENTION
        STATUS current
```

```
        DESCRIPTION
            "Identifies one or more levels."
        REFERENCE "{See definitions 3.6.1 and 3.6.11 of ISO 10589}"
        SYNTAX INTEGER
            {
                level1(1),
                level2(2),
                level1and2(3)
            }

    IsisPDUHeader ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "A block to contain the header from a PDU."
        SYNTAX OCTET STRING (SIZE(0..64))

    IsisCircuitID ::= TEXTUAL-CONVENTION
        STATUS current
        DESCRIPTION
            "ID for a circuit."
        REFERENCE "{See section 7.2.7 of ISO 10589}"
        SYNTAX OCTET STRING (SIZE(0|7))

    IsisISPriority ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
        STATUS current
        DESCRIPTION
            "Integer sub-range for IS-IS priority."
        REFERENCE "{See section 9.5 of ISO 10589}"
        SYNTAX Unsigned32 (0..127)

    IsisUnsigned16TC ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
        STATUS current
        DESCRIPTION
            "An Unsigned32 further restricted to 16 bits.  Note that
             the ASN.1 BER encoding may still require 24 bits for
             some values."
        SYNTAX Unsigned32 (0..65535)

    IsisUnsigned8TC ::= TEXTUAL-CONVENTION
        DISPLAY-HINT "d"
        STATUS current
        DESCRIPTION
            "An Unsigned32 further restricted to 8 bits.  Note that
             the ASN.1 BER encoding may still require 16 bits for
             some values."
        SYNTAX Unsigned32 (0..255)
```

```
-- Behavior Definitions

-- ResettingTimer behavior definition
--

-- "This behavior applies to objects that specify the interval
-- between events in the operation of the protocol state machine.
-- If the value of such an object is set to a new value while
-- the protocol state machine is in operation, the implementation
-- shall take the necessary steps to ensure that for any time
-- interval that was in progress when the value of the
-- corresponding object was changed, the next expiration of that
-- interval takes place the specified time after the original
-- start of that interval, or immediately, whichever is later.
-- The precision with which this time shall be implemented shall
-- be the same as that associated with the basic operation of
-- the timer object."

-- ReplaceOnlyWhileDisabled behavior definition
-- "This behavior applies to objects that may not be modified
-- while the corresponding table row's variable of type
-- IsisAdminState is in state on."

-- ManualOrAutomatic behavior definition
-- "This behavior applies to objects that are read-write
-- if the object was created manually.  Objects that were
-- created automatically that have this behavior are
-- read-only.

    isisSysObject  OBJECT IDENTIFIER ::= { isisSystem 1 }

    isisSysVersion OBJECT-TYPE
        SYNTAX INTEGER
            {
                unknown(0),
                one(1)
            }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The version number of the IS-IS protocol that
             is implemented."
        REFERENCE "{ISIS.aoi version (1)}"
        DEFVAL { one }
    ::= { isisSysObject 1 }

    isisSysLevelType OBJECT-TYPE
        SYNTAX IsisLevel
```

```
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "At which levels is the Intermediate System
             running? This object may not be modified when
             the isisSysAdminState variable is in state 'on'
             for this Intermediate System.

             Configured values MUST survive an agent reboot."
        REFERENCE "{ISIS.aoi iSType (2)}"
        DEFVAL { level1and2 }
    ::= { isisSysObject 2 }

    isisSysID OBJECT-TYPE
        SYNTAX IsisSystemID
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "The ID for this Intermediate System.
             This value is appended to each of the
             area addresses to form the Network Entity Titles.
             The derivation of a value for this object is
             implementation specific.  Some implementations may
             automatically assign values and not permit an
             SNMP write, while others may require the value
             to be set manually.

             Configured values MUST survive an agent reboot."
        REFERENCE "{ISIS.aoi systemId (119)}"
    ::= { isisSysObject 3 }

    isisSysMaxPathSplits OBJECT-TYPE
        SYNTAX Unsigned32 (1..32)
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Maximum number of paths with equal routing metric value
             which it is permitted to split between.  This object
             may not be modified when the isisSysAdminState variable
             is in state 'on' for this Intermediate System.

             Configured values MUST survive an agent reboot."
        REFERENCE "{ISIS.aoi maximumPathSplits (3)}"
        DEFVAL { 2 }
    ::= { isisSysObject 4 }

    isisSysMaxLSPGenInt OBJECT-TYPE
        SYNTAX Unsigned32 (1..65235)
```

```
        UNITS "seconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Maximum interval, in seconds, between generated LSPs
             by this Intermediate System.  This object follows
             the ResettingTimer behavior.  The value must be
             greater than any value configured for
             isisSysLevelMinLSPGenInt, and should be at least 300
             seconds less than isisSysMaxAge.

             Configured values MUST survive an agent reboot."
        REFERENCE "{ISIS.aoi maximumLSPGenerationInterval (6)}"
        DEFVAL { 900 }
    ::= { isisSysObject 5 }

    isisSysPollESHelloRate OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (1..65535)
        UNITS "seconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "The value, in seconds, to be used for the suggested ES
             configuration timer in ISH PDUs when soliciting the ES
             configuration.

             Configured values MUST survive an agent reboot."
        REFERENCE "{ISIS.aoi pollESHelloRate (13)}"
        DEFVAL { 50 }
    ::= { isisSysObject 6 }

    isisSysWaitTime OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (1..65535)
        UNITS "seconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Number of seconds to delay in state 'waiting' before
             entering the state 'on'.  This object follows the
             ResettingTimer behavior.

             Configured values MUST survive an agent reboot."
        REFERENCE "{ISIS.aoi waitingTime (15)}"
        DEFVAL { 60 }
    ::= { isisSysObject 7 }

    isisSysAdminState OBJECT-TYPE
        SYNTAX IsisAdminState
```

```
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "The administrative state of this Intermediate
             System.  Setting this object to the value 'on'
             when its current value is 'off' enables
             the Intermediate System.

             Configured values MUST survive an agent reboot."
        DEFVAL { off }
    ::= { isisSysObject 8 }

    isisSysL2toL1Leaking OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "If true, allow the router to leak L2 routes into L1.

             Configured values MUST survive an agent reboot."
        DEFVAL { false }
    ::= { isisSysObject 9 }

    isisSysMaxAge OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (350..65535)
        UNITS "seconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Value to place in RemainingLifeTime field of
             the LSPs we generate.
             This should be at least 300 seconds greater than
             isisSysMaxLSPGenInt.

             Configured values MUST survive an agent reboot."
        DEFVAL { 1200 }
    ::= { isisSysObject 10 }

    isisSysReceiveLSPBufferSize OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (1492..16000)
        UNITS "bytes"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Size of the largest buffer we are designed or
             configured to store.  This should be at least
             as big as the maximum isisSysLevelOrigLSPBuffSize
             supported by the system.
```

```
            If resources allow, we will store and flood LSPs
            larger than isisSysReceiveLSPBufferSize, as this
            can help avoid problems in networks with different
            values for isisSysLevelOrigLSPBuffSize.

            Configured values MUST survive an agent reboot."
        DEFVAL { 1492 }
    ::= { isisSysObject 11 }

    isisSysProtSupported OBJECT-TYPE
        SYNTAX BITS {
                    iso8473 (0),
                    ipv4 (1),
                    ipv6 (2)
                  }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This attribute contains the set of protocols
            supported by this Intermediate System."
    ::= { isisSysObject 12 }

    isisSysNotificationEnable OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "If this object is set to true(1), then it enables
            the emission of IS-IS Notifications.  If it is
            set to false(2), these notifications are not sent.

            Configured values MUST survive an agent reboot."
        DEFVAL { true }
    ::= { isisSysObject 13 }

-- The Level 1 Manual Area Address Table

    isisManAreaAddrTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisManAreaAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The set of manual area addresses configured on this
            Intermediate System.

            At least one row in which the value of
            isisManAreaAddrExistState is active must be present.
            The maximum number of rows in this table for
```

```
            which the object isisManAreaAddrExistState has the
            value active is 3.

            An attempt to create more than 3 rows of
            isisManAreaAddrEntry with state 'active' in one
            instance of the IS-IS protocol should
            return inconsistentValue."
        REFERENCE "{ISIS.aoi manualAreaAddresses (10)}"
    ::= { isisSystem 2 }

    isisManAreaAddrEntry OBJECT-TYPE
        SYNTAX IsisManAreaAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry contains one area address manually configured
             on this system.

             Dynamically created rows MUST survive an agent reboot."
        INDEX { isisManAreaAddr }
    ::= { isisManAreaAddrTable 1 }

    IsisManAreaAddrEntry ::=
        SEQUENCE {
            isisManAreaAddr
                IsisOSINSAddress,
            isisManAreaAddrExistState
                RowStatus
            }

    isisManAreaAddr OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "A manually configured area address for this system.

             Note: An index for the entry {1, {49.0001} active} in
             this table would be the ordered pair
             (1, (0x03 0x49 0x00 0x01)), as the length of an octet
             string is part of the OID."
    ::= { isisManAreaAddrEntry 1 }

    isisManAreaAddrExistState OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
```

```
            "The state of the isisManAreaAddrEntry.  If the
             isisSysAdminState for this Intermediate System is 'on' and
             an attempt is made to set this object to the value
             'destroy' or 'notInService' when this is the only
             isisManAreaAddrEntry in state 'active' for this
             Intermediate System should return inconsistentValue.

             A row entry cannot be modified when the value of this
             object is 'active'."
    ::= { isisManAreaAddrEntry 2 }

-- The Level 1 Area Address Table

-- The Level 1 Area Address Table contains the
-- union of the sets of relevant area addresses configured
-- or learned from Level 1 LSPs received by this Intermediate System.

    isisAreaAddrTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisAreaAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The union of the sets of area addresses reported in all
             Level 1 LSPs with fragment number zero generated by this
             Intermediate System, or received from other Intermediate
             Systems that are reachable via Level 1 routing."
        REFERENCE "{ISIS.aoi areaAddresses (18)}"
    ::= { isisSystem 3 }

    isisAreaAddrEntry OBJECT-TYPE
        SYNTAX IsisAreaAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry contains one area address reported in a
             Level 1 LSP generated or received by this Intermediate
             System.

             Dynamically learned rows do not survive an agent reboot."
        INDEX { isisAreaAddr }
    ::= { isisAreaAddrTable 1 }

    IsisAreaAddrEntry ::=
        SEQUENCE {
            isisAreaAddr
                IsisOSINSAddress
            }
```

```
    isisAreaAddr OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "An area address reported in a Level 1 LSP."
    ::= { isisAreaAddrEntry 1 }

-- The Summary Address Table

-- The Summary Address Table contains the set of summary
-- addresses manually configured for the Intermediate System.
--
-- This is used to control leaking L1 routes into L2.

    isisSummAddrTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisSummAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The set of IP summary addresses to use in forming
             summary TLVs originated by this Intermediate System.

             An administrator may use a summary address to combine
             and modify IP Reachability announcements.  If the
             Intermediate system can reach any subset of the summary
             address, the summary address MUST be announced instead,
             at the configured metric."
    ::= { isisSystem 4 }

    isisSummAddrEntry OBJECT-TYPE
        SYNTAX IsisSummAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry contains one IP summary address.

             Dynamically created rows MUST survive an agent reboot.

             Implementers need to be aware that if the total number
             of elements (octets or sub-identifiers) in
             isisSummAddress and isisSummAddrPrefixLen is too great,
             then OIDs of column instances in this table will have
             more than 128 subidentifiers and cannot be accessed
             using SNMPv1, SNMPv2c, or SNMPv3."
        INDEX { isisSummAddressType,
                isisSummAddress,
                isisSummAddrPrefixLen }
```

```
    ::= { isisSummAddrTable 1 }

    IsisSummAddrEntry ::=
        SEQUENCE {
            isisSummAddressType
                InetAddressType,
            isisSummAddress
                InetAddress,
            isisSummAddrPrefixLen
                InetAddressPrefixLength,
            isisSummAddrExistState
                RowStatus,
            isisSummAddrMetric
                IsisDefaultMetric,
            isisSummAddrFullMetric
                IsisFullMetric
        }

    isisSummAddressType OBJECT-TYPE
        SYNTAX InetAddressType
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The Type of IP address for this summary address."
    ::= { isisSummAddrEntry 1 }

    isisSummAddress OBJECT-TYPE
        SYNTAX InetAddress
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The IP Address value for this summary address.
             The address must not contain any set host bits
             (bits set after the address prefix determined by
             isisSummAddrPrefixLen).

             The type of this address is determined by the value of
             the isisSummAddressType object."
    ::= { isisSummAddrEntry 2 }

    isisSummAddrPrefixLen OBJECT-TYPE
        SYNTAX InetAddressPrefixLength
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The Length of the IP NetMask for this summary address.

             The values for the index objects isisSummAddress and
```

```
            isisSummAddrPrefixLen must be consistent.  When the value
            of isisSummAddress (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 isisSummAddrPrefixLen 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."
    ::= { isisSummAddrEntry 3 }

    isisSummAddrExistState OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The existence state of this summary address.  Support
             for 'createAndWait' and 'notInService' is not required.

             A row entry cannot be modified when the value of this
             object is 'active'."
    ::= { isisSummAddrEntry 4 }

    isisSummAddrMetric OBJECT-TYPE
        SYNTAX IsisDefaultMetric
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The metric value to announce this summary
             address within LSPs generated by this system."
        DEFVAL { 20 }
    ::= { isisSummAddrEntry 5 }

    isisSummAddrFullMetric OBJECT-TYPE
        SYNTAX IsisFullMetric
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The wide metric value to announce this summary
             address within LSPs generated by this system."
        DEFVAL { 20 }
    ::= { isisSummAddrEntry 6 }

-- The Redistribution table defines addresses that should be
-- leaked from L2 to L1 if isisSysL2toL1Leaking is enabled.

    isisRedistributeAddrTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisRedistributeAddrEntry
        MAX-ACCESS not-accessible
```

```
        STATUS current
        DESCRIPTION
            "This table provides criteria to decide if a route should
             be leaked from L2 to L1 when Domain Wide Prefix leaking is
             enabled.

             Addresses that match the summary mask in the table MUST
             be announced at L1 by routers when isisSysL2toL1Leaking
             is enabled.  Routes that fall into the ranges specified
             are announced as is, without being summarized.  Routes
             that do not match a summary mask are not announced."
    ::= { isisSystem 5 }

    isisRedistributeAddrEntry OBJECT-TYPE
        SYNTAX IsisRedistributeAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry contains one configured IP summary
             address to manage leaking L2 addresses into L1.

             Dynamically created rows MUST survive an agent reboot.

             Implementers need to be aware that if the total number
             of elements (octets or sub-identifiers) in
             isisRedistributeAddrAddress and
             isisRedistributeAddrPrefixLen is too great, then OIDs
             of column instances in this table will have more than
             128 subidentifiers and cannot be accessed using SNMPv1,
             SNMPv2c, or SNMPv3."
        INDEX { isisRedistributeAddrType,
                isisRedistributeAddrAddress,
                isisRedistributeAddrPrefixLen }
    ::= { isisRedistributeAddrTable 1 }

    IsisRedistributeAddrEntry ::=
        SEQUENCE {
            isisRedistributeAddrType
                InetAddressType,
            isisRedistributeAddrAddress
                InetAddress,
            isisRedistributeAddrPrefixLen
                InetAddressPrefixLength,
            isisRedistributeAddrExistState
                RowStatus
        }

    isisRedistributeAddrType OBJECT-TYPE
```

```
        SYNTAX InetAddressType
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The Type of IP address for this summary address."
    ::= { isisRedistributeAddrEntry 1 }

    isisRedistributeAddrAddress OBJECT-TYPE
        SYNTAX InetAddress
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The IP Address value for this summary address.
             The type of this address is determined by the
             value of the isisRedistributeAddrType object.
             The address must not contain any set host bits -
             bits set after the address prefix determined by
             isisRedistributeAddrPrefixLen."

    ::= { isisRedistributeAddrEntry 2 }

    isisRedistributeAddrPrefixLen OBJECT-TYPE
        SYNTAX InetAddressPrefixLength
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The Length of the IP NetMask for this summary address.

             The values for the index objects
             isisRedistributeAddrAddress and
             isisRedistributeAddrPrefixLen must be consistent.
             When the value of isisRedistributeAddrAddress
             (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
             isisRedistributeAddrPrefixLen 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."

    ::= { isisRedistributeAddrEntry 3 }

    isisRedistributeAddrExistState OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The existence state of this summary address.  Support
```

```
            for createAndWait and notInService is not required.

            A row entry cannot be modified when the value of this
            object is 'active'."
    ::= { isisRedistributeAddrEntry 4 }

-- The Router Table keeps track of hostnames and router IDs
-- associated with Intermediate Systems in the area and domain.

    isisRouterTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisRouterEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The set of hostnames and router ID."
    ::= { isisSystem 6 }

    isisRouterEntry OBJECT-TYPE
        SYNTAX IsisRouterEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry tracks information about one Intermediate
             System at one level.

             Dynamically learned rows do not survive an agent reboot."
        INDEX { isisRouterSysID,
                isisRouterLevel }
    ::= { isisRouterTable 1 }

    IsisRouterEntry ::=
        SEQUENCE {
            isisRouterSysID
                IsisSystemID,
            isisRouterLevel
                IsisISLevel,
            isisRouterHostName
                SnmpAdminString,
            isisRouterID
                Unsigned32
        }

    isisRouterSysID OBJECT-TYPE
        SYNTAX IsisSystemID
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The System ID of the Intermediate System."
```

```
    ::= { isisRouterEntry 1 }

    isisRouterLevel OBJECT-TYPE
        SYNTAX IsisISLevel
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The level at which the information about this
             Intermediate System was received."
    ::= { isisRouterEntry 2 }

    isisRouterHostName OBJECT-TYPE
        SYNTAX SnmpAdminString
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The hostname listed in the LSP, or a zero-length
             string if none."
    ::= { isisRouterEntry 3 }

    isisRouterID OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The Router ID found in the LSP, or zero if none."
    ::= { isisRouterEntry 4 }

-- The System Level Table
-- This table captures level-specific information about the system

    isisSysLevelTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisSysLevelEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Level specific information about the System."
    ::= { isisSysLevel 1 }

    isisSysLevelEntry OBJECT-TYPE
        SYNTAX IsisSysLevelEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each row describes variables configured for Area or Domain.

             Configured values MUST survive an agent reboot."
        INDEX { isisSysLevelIndex }
```

```
    ::= { isisSysLevelTable 1 }

    IsisSysLevelEntry ::=
        SEQUENCE {
            isisSysLevelIndex
                IsisISLevel,
            isisSysLevelOrigLSPBuffSize
                IsisLSPBuffSize,
            isisSysLevelMinLSPGenInt
                IsisUnsigned16TC,
            isisSysLevelState
                IsisLevelState,
            isisSysLevelSetOverload
                TruthValue,
            isisSysLevelSetOverloadUntil
                Unsigned32,
            isisSysLevelMetricStyle
                IsisMetricStyle,
            isisSysLevelSPFConsiders
                IsisMetricStyle,
            isisSysLevelTEEnabled
                TruthValue
        }

    isisSysLevelIndex OBJECT-TYPE
        SYNTAX IsisISLevel
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The level that this entry describes."
    ::= { isisSysLevelEntry 1 }

    isisSysLevelOrigLSPBuffSize OBJECT-TYPE
        SYNTAX IsisLSPBuffSize
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "The maximum size of LSPs and SNPs originated by
             this Intermediate System at this level.  This
             object may not be modified when the isisSysAdminState
             variable is in state 'on' for this Intermediate System."
        REFERENCE "{ISIS.aoi originatingL1LSPBufferSize (9)}"
        DEFVAL { 1492 }
    ::= { isisSysLevelEntry 2 }

    isisSysLevelMinLSPGenInt OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (1..65535)
        UNITS "seconds"
```

```
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Minimum interval, in seconds, between successive
             generation of LSPs with the same LSPID at this level
             by this Intermediate System."
        REFERENCE "{ISIS.aoi minimumLSPGenerationInterval (11)}"
        DEFVAL { 30 }
    ::= { isisSysLevelEntry 3 }

    isisSysLevelState OBJECT-TYPE
        SYNTAX IsisLevelState
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The state of the database at this level.
             The value 'off' indicates that IS-IS is not active at
             this level.
             The value 'on' indicates that IS-IS is active at this
             level and is not overloaded.
             The value 'waiting' indicates a database that is low on
             an essential resource, such as memory.
             The administrator may force the state to 'overloaded'
             by setting the object isisSysLevelSetOverload.
             If the state is 'waiting' or 'overloaded', we
             originate LSPs with the overload bit set."
        REFERENCE "{ISIS.aoi l1State (17)}"
    ::= { isisSysLevelEntry 4 }

    isisSysLevelSetOverload OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Administratively set the overload bit for the level.
             The overload bit MUST continue to be set if the
             implementation runs out of memory, independent of
             this variable.  It may also be set manually independent
             of this variable, using the isisSysLevelSetOverloadUntil
             object."
        DEFVAL { false }
    ::= { isisSysLevelEntry 5 }

    isisSysLevelSetOverloadUntil OBJECT-TYPE
        SYNTAX Unsigned32
        UNITS "Seconds until clearing manually set Overload Bit"
        MAX-ACCESS read-write
        STATUS current
```

```
        DESCRIPTION
            "If this object is non-zero, the overload bit is set at
             this level when the isisSysAdminState variable goes to
             state 'on' for this Intermediate System.  The overload bit
             remains set for isisSysLevelSetOverloadUntil seconds.
             When isisSysLevelSetOverloadUntil seconds have elapsed,
             the overload flag remains set if the implementation has
             run out of memory, or if it is set manually using the
             isisSysLevelSetOverload object.

             If isisSysLevelSetOverload is false, the system clears
             the overload bit when isisSysLevelSetOverloadUntil seconds
             have elapsed, if the system has not run out of memory."
    ::= { isisSysLevelEntry 6 }

    isisSysLevelMetricStyle OBJECT-TYPE
        SYNTAX IsisMetricStyle
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Which style of metric do we generate in our LSPs
             at this level?"
        DEFVAL { narrow }
    ::= { isisSysLevelEntry 7 }

    isisSysLevelSPFConsiders OBJECT-TYPE
        SYNTAX IsisMetricStyle
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Which style of metric do we consider in our
             SPF computation at this level?"
        DEFVAL { narrow }
    ::= { isisSysLevelEntry 8 }

    isisSysLevelTEEnabled OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Do we do Traffic Engineering at this level?"
        DEFVAL { false }
    ::= { isisSysLevelEntry 9 }

-- Static to provide next CircIndex

    isisNextCircIndex OBJECT-TYPE
        SYNTAX IndexIntegerNextFree
```

```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "This object is used to assist a management
             application in creating new rows in the
             isisCircTable.  If it is possible to create
             a new instance of isisCircEntry, then this
             object will contain a non-zero value that
             is not in use as the index of any row in the
             isisCircTable.  The network manager reads the
             value of this object and then (if the
             value read is non-zero) attempts to create
             the corresponding instance of isisCircEntry.
             If the set request fails with the code
             'inconsistentValue', then the process must be
             repeated;  if the set request succeeds, then
             the agent will change the value of this object
             according to an implementation-specific
             algorithm."
    ::= { isisCirc  1 }

-- The Circuit Table
-- Each broadcast or point-to-point interface on the system
-- corresponds to one entry in the Circuit table.  However, there
-- may be multiple X.25 DA circuit entries in the Circuit table
-- for a given X.25 interface.

    isisCircTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisCircEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The table of circuits used by this
             Intermediate System."
    ::= { isisCirc 2 }

    isisCircEntry OBJECT-TYPE
        SYNTAX IsisCircEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "An isisCircEntry exists for each circuit configured
             for Integrated IS-IS on this system.

             Dynamically created rows MUST survive an agent reboot."
        INDEX { isisCircIndex }
    ::= { isisCircTable 1 }
```

```
    IsisCircEntry ::=
        SEQUENCE {
            isisCircIndex
                IndexInteger,
            isisCircIfIndex
                InterfaceIndex,
            isisCircAdminState
                IsisAdminState,
            isisCircExistState
                RowStatus,
            isisCircType
                INTEGER,
            isisCircExtDomain
                TruthValue,
            isisCircLevelType
                IsisLevel,
            isisCircPassiveCircuit
                TruthValue,
            isisCircMeshGroupEnabled
                INTEGER,
            isisCircMeshGroup
                Unsigned32,
            isisCircSmallHellos
                TruthValue,
            isisCircLastUpTime
                TimeStamp,
            isisCirc3WayEnabled
                TruthValue,
            isisCircExtendedCircID
                Unsigned32
        }

    isisCircIndex OBJECT-TYPE
        SYNTAX IndexInteger
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "An index used to uniquely identify this circuit.
             When creating a row in this table, the
             isisNextCircIndex object should be retrieved,
             and its value should be specified as the value
             of this index using a SET operation.  A retrieved
             value of zero(0) indicates that no rows can be
             created at this time."
    ::= { isisCircEntry 1 }

    isisCircIfIndex OBJECT-TYPE
        SYNTAX InterfaceIndex
```

```
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The value of ifIndex for the interface to which this
             circuit corresponds.  This object cannot be modified
             after creation."
    ::= { isisCircEntry 2 }

    isisCircAdminState OBJECT-TYPE
        SYNTAX IsisAdminState
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The administrative state of the circuit."
        DEFVAL { off }
    ::= { isisCircEntry 3 }

    isisCircExistState OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The existence state of this circuit.  Setting the state
             to 'notInService' halts the generation and processing of
             IS-IS protocol PDUs on this circuit.  Setting the state
             to destroy will also erase any configuration associated
             with the circuit.  Support for 'createAndWait' and
             'notInService' is not required.

             A row entry cannot be modified when the value of this
             object is 'active'."
    ::= { isisCircEntry 4 }

    isisCircType OBJECT-TYPE
        SYNTAX INTEGER
            {
                broadcast(1),
                ptToPt(2),
                staticIn(3),
                staticOut(4),
                dA(5)
            }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The type of the circuit.  This object follows the
             ReplaceOnlyWhileDisabled behavior.  The type specified
             must be compatible with the type of the interface defined
```

```
            by the value of isisCircIfIndex."
        REFERENCE "{ISIS.aoi type (33)}"
    ::= { isisCircEntry 5 }

    isisCircExtDomain OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "If true, suppress normal transmission of and
             interpretation of Intra-domain IS-IS PDUs on this
             circuit."
        REFERENCE "{ISIS.aoi externalDomain (46)}"
        DEFVAL { false }
    ::= { isisCircEntry 6 }

    isisCircLevelType OBJECT-TYPE
        SYNTAX IsisLevel
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Indicates which type of packets will be sent and
             accepted on this circuit.  The values set will be
             saved, but the values used will be modified by
             the settings of isisSysLevelType.  Thus, if the
             isisSysTpe is level2 and the isisCircLevelType
             for a circuit is level1, the circuit will not send
             or receive IS-IS packets.  This object follows the
             ReplaceOnlyWhileDisabled behavior."
        DEFVAL { level1and2 }
    ::= { isisCircEntry 7 }

    isisCircPassiveCircuit OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Should we include this interface in LSPs, even if
             it is not running the IS-IS Protocol?"
        DEFVAL { false }
    ::= { isisCircEntry 8 }

    isisCircMeshGroupEnabled OBJECT-TYPE
        SYNTAX INTEGER
            {
                inactive(1),
                blocked(2),
                set(3)
```

```
            }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Is this port a member of a mesh group, or is it
             blocked?  Circuits in the same mesh group act as a
             virtual multiaccess network.  LSPs seen on one circuit
             in a mesh group will not be flooded to another circuit
             in the same mesh group."
        REFERENCE "{ RFC 2973 }"
        DEFVAL { inactive }
    ::= { isisCircEntry 9 }

    isisCircMeshGroup OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Circuits in the same mesh group act as a virtual
             multiaccess network.  LSPs seen on one circuit in
             a mesh group will not be flooded to another circuit
             in the same mesh group.  If isisCircMeshGroupEnabled
             is inactive or blocked, this value is ignored."
        REFERENCE "{ RFC 2973 }"
    ::= { isisCircEntry 10 }

    isisCircSmallHellos OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Can we send unpadded hellos on LAN circuits?  False
             means the LAN Hellos must be padded.
             Implementations should allow the administrator to read
             this value.  An implementation need not be able to
             support unpadded hellos to be conformant."
         DEFVAL { false }
    ::= { isisCircEntry 11 }

    isisCircLastUpTime OBJECT-TYPE
        SYNTAX TimeStamp
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "How long the circuit has been enabled, measured in
             hundredths of seconds since the last re-initialization
             of the network management subsystem; 0 if the
             circuit has never been 'on'."
```

```
    ::= { isisCircEntry 12 }

    isisCirc3WayEnabled OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Is this circuit enabled to run 3Way handshake?"
        DEFVAL { true }
    ::= { isisCircEntry 13 }

    isisCircExtendedCircID OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The value to be used as the extended circuit ID in
             3Way handshake.  This value is only used if
             isisCirc3WayEnabled is true, and it must be unique
             across all circuits on this IS."
    ::= { isisCircEntry 14 }

-- The Circuit Level Table
-- This table captures level-specific information about a circuit

    isisCircLevelTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisCircLevelEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Level specific information about circuits used by IS-IS."
    ::= { isisCircLevelValues 1 }

    isisCircLevelEntry OBJECT-TYPE
        SYNTAX IsisCircLevelEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "An isisCircLevelEntry exists for each level on
             each circuit configured for Integrated IS-IS on
             this system.

             Configured values MUST survive an agent reboot."
        INDEX { isisCircIndex,
                isisCircLevelIndex }
    ::= { isisCircLevelTable 1 }

    IsisCircLevelEntry ::=
```

```
        SEQUENCE {
            isisCircLevelIndex
                IsisISLevel,
            isisCircLevelMetric
                IsisDefaultMetric,
            isisCircLevelWideMetric
                IsisWideMetric,
            isisCircLevelISPriority
                IsisISPriority,
            isisCircLevelIDOctet
                Unsigned32,
            isisCircLevelID
                IsisCircuitID,
            isisCircLevelDesIS
                IsisCircuitID,
            isisCircLevelHelloMultiplier
                Unsigned32,
            isisCircLevelHelloTimer
                Unsigned32,
            isisCircLevelDRHelloTimer
                Unsigned32,
            isisCircLevelLSPThrottle
                IsisUnsigned16TC,
            isisCircLevelMinLSPRetransInt
                Unsigned32,
            isisCircLevelCSNPInterval
                Unsigned32,
            isisCircLevelPartSNPInterval
                Unsigned32
        }

    isisCircLevelIndex OBJECT-TYPE
        SYNTAX IsisISLevel
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The level that this entry describes."
    ::= { isisCircLevelEntry 1 }

    isisCircLevelMetric OBJECT-TYPE
        SYNTAX IsisDefaultMetric
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "The metric value of this circuit for this level."
        REFERENCE "{ISIS.aoi l1DefaultMetric (35)}"
        DEFVAL { 10 }
    ::= { isisCircLevelEntry 2 }
```

```
    isisCircLevelWideMetric OBJECT-TYPE
        SYNTAX IsisWideMetric
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "The wide metric value of this circuit for this level."
        DEFVAL { 10 }
    ::= { isisCircLevelEntry 3 }

    isisCircLevelISPriority OBJECT-TYPE
        SYNTAX IsisISPriority
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "The priority for becoming the LAN-Designated
             Intermediate System at this level."
        REFERENCE "{ISIS.aoi l2IntermediateSystemPriority (73)}"
        DEFVAL { 64 }
    ::= { isisCircLevelEntry 4 }

    isisCircLevelIDOctet OBJECT-TYPE
        SYNTAX Unsigned32(0..255)
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "A one-byte identifier for the circuit selected by the
             Intermediate System.

             On point-to-point circuits, the value is used as the Local
             Circuit ID in point-to-point IIH PDUs transmitted on this
             circuit.  In this case, values of isisCircLevelIDOctet do
             not need to be unique.

             For broadcast circuits, the value is used to generate the
             LAN ID that will be used if this Intermediate System is
             elected as the Designated IS on this circuit.  The value
             is required to differ on LANs where the Intermediate System
             is the Designated Intermediate System."
    ::= { isisCircLevelEntry 5 }

    isisCircLevelID OBJECT-TYPE
        SYNTAX IsisCircuitID
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "On a point-to-point circuit with a fully initialized
             adjacency to a peer IS, the value of this object is
             the circuit ID negotiated during adjacency initialization.
```

```
            On a point to point circuit without such an adjacency,
            the value is the concatenation of the local system ID
            and the one-byte isisCircLevelIDOctet for this circuit,
            i.e., the value that would be proposed for the circuit ID.
            On other circuit types, the value returned is the zero-
            length OCTET STRING."
        REFERENCE "{ISIS.aoi ptPtCircuitID (51)}"
    ::= { isisCircLevelEntry 6 }

    isisCircLevelDesIS OBJECT-TYPE
        SYNTAX IsisCircuitID
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The ID of the LAN-Designated Intermediate System
             on this circuit at this level.  If, for any reason,
             this system is not partaking in the relevant
             Designated Intermediate System election process,
             then the value returned is the zero-length OCTET STRING."
        REFERENCE "{ISIS.aoi l2DesignatedIntermediateSystem (75)}"
    ::= { isisCircLevelEntry 7 }

    isisCircLevelHelloMultiplier OBJECT-TYPE
        SYNTAX Unsigned32 (2..100)
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "This value is multiplied by the corresponding HelloTimer,
             and the result in seconds (rounded up) is used as the
             holding time in transmitted hellos, to be used by
             receivers of hello packets from this IS."
        REFERENCE "{ISIS.aoi iSISHelloTimer (45)}"
        DEFVAL { 10 }
    ::= { isisCircLevelEntry 8 }

    isisCircLevelHelloTimer OBJECT-TYPE
        SYNTAX Unsigned32 (10..600000)
        UNITS "milliseconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Maximum period, in milliseconds, between IIH PDUs
             on multiaccess networks at this level for LANs.
             The value at L1 is used as the period between
             Hellos on L1L2 point-to-point circuits.  Setting
             this value at level 2 on an L1L2 point-to-point
             circuit will result in an error of InconsistentValue.
```

```
            This object follows the ResettingTimer behavior."
        REFERENCE "{ISIS.aoi iSISHelloTimer (45)}"
        DEFVAL { 3000 }
    ::= { isisCircLevelEntry 9 }

    isisCircLevelDRHelloTimer OBJECT-TYPE
        SYNTAX Unsigned32 (10..120000)
        UNITS "milliseconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Period, in milliseconds, between Hello PDUs on
             multiaccess networks when this IS is the Designated
             Intermediate System.  This object follows the
             ResettingTimer behavior."
        REFERENCE "{ISIS.aoi iSISHelloTimer (45)}"
        DEFVAL { 1000 }
    ::= { isisCircLevelEntry 10 }

    isisCircLevelLSPThrottle OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (1..65535)
        UNITS "milliseconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Minimal interval of time, in milliseconds, between
             transmissions of LSPs on an interface at this level."
        REFERENCE
            "{ISIS.aoi minimumBroadcastLSPTransmissionInterval (5)}"
        DEFVAL { 30 }
    ::= { isisCircLevelEntry 11 }

    isisCircLevelMinLSPRetransInt OBJECT-TYPE
        SYNTAX Unsigned32 (1..300)
        UNITS "seconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Minimum interval, in seconds, between re-transmission of
             an LSP at this level.  This object follows the
             ResettingTimer behavior.

             Note that isisCircLevelLSPThrottle controls
             how fast we send back-to-back LSPs.  This variable
             controls how fast we re-send the same LSP."
        REFERENCE "{ISIS.aoi minimumLSPTransmissionInterval (5)}"
        DEFVAL { 5 }
    ::= { isisCircLevelEntry 12 }
```

```
    isisCircLevelCSNPInterval OBJECT-TYPE
        SYNTAX Unsigned32 (1..600)
        UNITS "seconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Interval of time, in seconds, between periodic
             transmission of a complete set of CSNPs on
             multiaccess networks if this router is the
             designated router at this level.
             This object follows the ResettingTimer behavior."
        REFERENCE "{ISIS.aoi completeSNPInterval (8)}"
        DEFVAL { 10 }
    ::= { isisCircLevelEntry 13 }

    isisCircLevelPartSNPInterval OBJECT-TYPE
        SYNTAX Unsigned32 (1..120)
        UNITS "seconds"
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
            "Minimum interval, in seconds, between sending Partial
             Sequence Number PDUs at this level.  This object
             follows the ResettingTimer behavior."
        REFERENCE "{ISIS.aoi partialSNPInterval (14)}"
        DEFVAL { 2 }
    ::= { isisCircLevelEntry 14 }

-- isisSystemCounterTable keeps track of system-wide events.

    isisSystemCounterTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisSystemCounterEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "System-wide counters for this Intermediate System."
    ::= { isisCounters 1 }

    isisSystemCounterEntry OBJECT-TYPE
        SYNTAX IsisSystemCounterEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "System-wide IS-IS counters."
        INDEX { isisSysStatLevel }
    ::= { isisSystemCounterTable 1 }

    IsisSystemCounterEntry ::=
```

```
        SEQUENCE {
            isisSysStatLevel
                IsisISLevel,
            isisSysStatCorrLSPs
                Counter32,
            isisSysStatAuthTypeFails
                Counter32,
            isisSysStatAuthFails
                Counter32,
            isisSysStatLSPDbaseOloads
                Counter32,
            isisSysStatManAddrDropFromAreas
                Counter32,
            isisSysStatAttmptToExMaxSeqNums
                Counter32,
            isisSysStatSeqNumSkips
                Counter32,
            isisSysStatOwnLSPPurges
                Counter32,
            isisSysStatIDFieldLenMismatches
                Counter32,
            isisSysStatPartChanges
                Counter32,
            isisSysStatSPFRuns
                Counter32,
            isisSysStatLSPErrors
                Counter32
        }

    isisSysStatLevel OBJECT-TYPE
        SYNTAX IsisISLevel
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The level that this entry describes."
    ::= { isisSystemCounterEntry 1 }

    isisSysStatCorrLSPs OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of corrupted in-memory frames"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of corrupted in-memory LSPs detected.

             LSPs received from the wire with a bad checksum
             are silently dropped and are not counted.
```

```
            LSPs received from the wire with parse errors
            are counted by isisSysStatLSPErrors."
        REFERENCE "{ISIS.aoi corruptedLSPsDetected (19)}"
    ::= { isisSystemCounterEntry 2 }

    isisSysStatAuthTypeFails OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of frames with authentication type mismatches"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of authentication type mismatches recognized
             by this Intermediate System."
    ::= { isisSystemCounterEntry 3 }

    isisSysStatAuthFails OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of frames with authentication key failures"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of authentication key failures recognized
             by this Intermediate System."
    ::= { isisSystemCounterEntry 4 }

    isisSysStatLSPDbaseOloads OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of times the LSP database has become
             overloaded."
        REFERENCE "{ISIS.aoi lSPL1DatabaseOverloads (20)}"
    ::= { isisSystemCounterEntry 5 }

    isisSysStatManAddrDropFromAreas OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of times a manual address has been dropped from
             the area."
        REFERENCE "{ISIS.aoi manualAddressesDroppedFromArea (21)}"
    ::= { isisSystemCounterEntry 6 }

    isisSysStatAttmptToExMaxSeqNums OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
```

```
        STATUS current
        DESCRIPTION
            "Number of times the IS has attempted to exceed the
             maximum sequence number."
        REFERENCE
            "{ISIS.aoi attemptsToExceedmaximumSequenceNumber (22)}"
    ::= { isisSystemCounterEntry 7 }

    isisSysStatSeqNumSkips OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of times a sequence number skip has occurred."
        REFERENCE "{ISIS.aoi sequenceNumberSkips (23)}"
    ::= { isisSystemCounterEntry 8 }

    isisSysStatOwnLSPPurges OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of times a zero-aged copy of the system's own LSP
             is received from some other node."
        REFERENCE "{ISIS.aoi ownLSPPurges (24)}"
    ::= { isisSystemCounterEntry 9 }

    isisSysStatIDFieldLenMismatches OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of frames with ID length mismatches"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of times a PDU is received with a different value
             for ID field length from that of the receiving system."
        REFERENCE "{ISIS.aoi iDFieldLengthMismatches (25)}"
    ::= { isisSystemCounterEntry 10 }

    isisSysStatPartChanges OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Partition changes."
    ::= { isisSystemCounterEntry 11 }

    isisSysStatSPFRuns OBJECT-TYPE
        SYNTAX Counter32
```

```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of times we ran SPF at this level."
    ::= { isisSystemCounterEntry 12 }

    isisSysStatLSPErrors OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of frames with errors that we have received"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Number of LSPs with errors we have received."
    ::= { isisSystemCounterEntry 13 }

-- isisCircuitCounterTable keeps track of events
-- specific to a circuit and a level

    isisCircuitCounterTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisCircuitCounterEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Circuit specific counters for this
             Intermediate System."
    ::= { isisCounters 2 }

    isisCircuitCounterEntry OBJECT-TYPE
        SYNTAX IsisCircuitCounterEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "An isisCircuitCounterEntry exists for each circuit
             used by Integrated IS-IS on this system."
        INDEX { isisCircIndex,
                isisCircuitType }
    ::= { isisCircuitCounterTable 1 }

    IsisCircuitCounterEntry ::= SEQUENCE {
          isisCircuitType
              INTEGER,
          isisCircAdjChanges
              Counter32,
          isisCircNumAdj
              Unsigned32,
          isisCircInitFails
              Counter32,
          isisCircRejAdjs
```

```
            Counter32,
        isisCircIDFieldLenMismatches
            Counter32,
        isisCircMaxAreaAddrMismatches
            Counter32,
        isisCircAuthTypeFails
            Counter32,
        isisCircAuthFails
            Counter32,
        isisCircLANDesISChanges
            Counter32
    }

isisCircuitType OBJECT-TYPE
    SYNTAX INTEGER
        {
            lanlevel1(1),
            lanlevel2(2),
            p2pcircuit(3)
        }
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "What type of circuit saw these counts?

         The point-to-point Hello PDU includes
         both L1 and L2, and ISs form a single
         adjacency on point-to-point links.
         Thus, we combine counts on
         point-to-point links into one group."
::= { isisCircuitCounterEntry 1 }

isisCircAdjChanges OBJECT-TYPE
    SYNTAX Counter32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of times an adjacency state change has
         occurred on this circuit."
    REFERENCE "{ISIS.aoi changesInAdjacencyState (40)}"
::= { isisCircuitCounterEntry 2 }

isisCircNumAdj OBJECT-TYPE
    SYNTAX Unsigned32
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The number of adjacencies on this circuit."
```

```
        REFERENCE "{ISIS.aoi changesInAdjacencyState (40)}"
    ::= { isisCircuitCounterEntry 3 }

    isisCircInitFails OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of times initialization of this circuit has
             failed.  This counts events such as PPP NCP failures.
             Failures to form an adjacency are counted by
             isisCircRejAdjs."
    ::= { isisCircuitCounterEntry 4 }

    isisCircRejAdjs OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of times an adjacency has been rejected on
             this circuit."
        REFERENCE "{ISIS.aoi rejectedAdjacencies (42)}"
    ::= { isisCircuitCounterEntry 5 }

    isisCircIDFieldLenMismatches OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of frames with ID field length mismatch"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of times an IS-IS control PDU with an ID
             field length different from that for this system has been
             received."
        REFERENCE "{ISIS.aoi iDFieldLengthMismatches (25)}"
    ::= { isisCircuitCounterEntry 6 }

    isisCircMaxAreaAddrMismatches OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of times an IS-IS control PDU with a
             max area address field different from that for this
             system has been received."
        REFERENCE "{ISIS.aoi iDFieldLengthMismatches (25)}"
    ::= { isisCircuitCounterEntry 7 }

    isisCircAuthTypeFails OBJECT-TYPE
```

```
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of times an IS-IS control PDU with
             an auth type field different from that for this
             system has been received."
    ::= { isisCircuitCounterEntry 8 }

    isisCircAuthFails OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of times an IS-IS control PDU with
             the correct auth type has failed to pass authentication
             validation."
    ::= { isisCircuitCounterEntry 9 }

    isisCircLANDesISChanges OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of times the Designated IS has changed
             on this circuit at this level.  If the circuit is
             point to point, this count is zero."
    ::= { isisCircuitCounterEntry 10 }

-- isisPacketCounterTable keeps track of the number of IS-IS
-- control packets sent and received at each level

    isisPacketCounterTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisPacketCounterEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Information about IS-IS protocol traffic at one level,
             on one circuit, in one direction."
    ::= { isisCounters 3 }

    isisPacketCounterEntry OBJECT-TYPE
        SYNTAX IsisPacketCounterEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Information about IS-IS protocol traffic at one level,
             on one circuit, in one direction."
```

```
        INDEX { isisCircIndex,
                isisPacketCountLevel,
                isisPacketCountDirection }
    ::= { isisPacketCounterTable 1 }

    IsisPacketCounterEntry ::=
        SEQUENCE {
            isisPacketCountLevel
                IsisISLevel,
            isisPacketCountDirection
                INTEGER,
            isisPacketCountIIHello
                Counter32,
            isisPacketCountISHello
                Counter32,
            isisPacketCountESHello
                Counter32,
            isisPacketCountLSP
                Counter32,
            isisPacketCountCSNP
                Counter32,
            isisPacketCountPSNP
                Counter32,
            isisPacketCountUnknown
                Counter32
    }

    isisPacketCountLevel OBJECT-TYPE
        SYNTAX IsisISLevel
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The level at which these PDU counts have been collected."
    ::= { isisPacketCounterEntry 1 }

    isisPacketCountDirection OBJECT-TYPE
        SYNTAX INTEGER
            {
                sending(1),
                receiving(2)
            }
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Were we sending or receiving these PDUs?"
    ::= { isisPacketCounterEntry 2 }

    isisPacketCountIIHello OBJECT-TYPE
```

```
        SYNTAX Counter32
        UNITS "Number of IS-IS Hellos frames seen in this direction
               at this level"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of IS-IS Hello PDUs seen in this
             direction at this level.

             Point-to-Point IIH PDUs are counted at
             the lowest enabled level: at L1 on L1 or L1L2 circuits,
             and at L2 otherwise."
        REFERENCE "{ISIS.aoi iSISControlPDUsSent (43)}"
    ::= { isisPacketCounterEntry 3 }

    isisPacketCountISHello OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of ES-IS frames seen in this direction at
             this level."
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of ES-IS Hello PDUs seen in this
             direction.  ISH PDUs are counted at the
             lowest enabled level: at L1 on L1 or L1L2
             circuits, and at L2 otherwise."
    ::= { isisPacketCounterEntry 4 }

    isisPacketCountESHello OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of ES Hello frames seen in this direction at
             this level"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of ES Hello PDUs seen in this
             direction.  ESH PDUs are counted at the
             lowest enabled level: at L1 on L1 or L1L2
             circuits, and at L2 otherwise."
    ::= { isisPacketCounterEntry 5 }

    isisPacketCountLSP OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of IS-IS LSP frames seen in this direction at
             this level"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
```

```
            "The number of IS-IS LSPs seen in this
             direction at this level."
        REFERENCE "{ISIS.aoi iSISControlPDUsSent (43)}"
    ::= { isisPacketCounterEntry 6 }

    isisPacketCountCSNP OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of IS-IS CSNP frames seen in this direction at
             this level"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of IS-IS CSNPs seen in this
             direction at this level."
        REFERENCE "{ISIS.aoi iSISControlPDUsSent (43)}"
    ::= { isisPacketCounterEntry 7 }

    isisPacketCountPSNP OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of IS-IS PSNP frames seen in this direction at
             this level"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of IS-IS PSNPs seen in this
             direction at this level."
        REFERENCE "{ISIS.aoi iSISControlPDUsSent (43)}"
    ::= { isisPacketCounterEntry 8 }

    isisPacketCountUnknown OBJECT-TYPE
        SYNTAX Counter32
        UNITS "Number of unknown IS-IS frames seen at this level"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The number of unknown IS-IS PDUs seen
             at this level."
        REFERENCE "{ISIS.aoi iSISControlPDUsSent (43)}"
    ::= { isisPacketCounterEntry 9 }

-- The IS Adjacency Table
--
-- Each adjacency to an IS corresponds to one entry in this
-- table.

    isisISAdjTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisISAdjEntry
        MAX-ACCESS not-accessible
```

```
        STATUS current
        DESCRIPTION
            "The table of adjacencies to Intermediate Systems."
    ::= { isisISAdj 1 }

    isisISAdjEntry OBJECT-TYPE
        SYNTAX IsisISAdjEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry corresponds to one adjacency to an
             Intermediate System on this system.

             Dynamically learned rows do not survive an agent reboot."
        INDEX { isisCircIndex,
                isisISAdjIndex }
    ::= { isisISAdjTable 1 }

    IsisISAdjEntry ::=
        SEQUENCE {
            isisISAdjIndex
                Unsigned32,
            isisISAdjState
                INTEGER,
            isisISAdj3WayState
                INTEGER,
            isisISAdjNeighSNPAAddress
                IsisOSINSAddress,
            isisISAdjNeighSysType
                INTEGER,
            isisISAdjNeighSysID
                IsisSystemID,
            isisISAdjNbrExtendedCircID
                Unsigned32,
            isisISAdjUsage
                IsisLevel,
            isisISAdjHoldTimer
                IsisUnsigned16TC,
            isisISAdjNeighPriority
                IsisISPriority,
            isisISAdjLastUpTime
                TimeStamp
      }

    isisISAdjIndex OBJECT-TYPE
        SYNTAX Unsigned32(1..4294967295)
        MAX-ACCESS not-accessible
        STATUS current
```

```
        DESCRIPTION
            "A unique value identifying the IS adjacency from all
             other such adjacencies on this circuit.  This value is
             automatically assigned by the system when the adjacency
             is created."
    ::= { isisISAdjEntry 1 }

    isisISAdjState OBJECT-TYPE
        SYNTAX INTEGER
            {
                 down (1),
                 initializing (2),
                 up (3),
                 failed(4)
            }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The state of the adjacency."
        REFERENCE "{ISIS.aoi adjacencyState (78)}"
    ::= { isisISAdjEntry 2 }

    isisISAdj3WayState OBJECT-TYPE
        SYNTAX INTEGER
            {
                 up (0),
                 initializing (1),
                 down (2),
                 failed (3)
            }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The 3Way state of the adjacency.  These are picked
             to match the historical on-the-wire representation
             of the 3Way state and are not intended to match
             isisISAdjState."
        REFERENCE "{ RFC 3373 }"
    ::= { isisISAdjEntry 3 }

    isisISAdjNeighSNPAAddress OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The SNPA address of the neighboring system."
        REFERENCE "{ISIS.aoi neighbourSNPAAddress (79)}"
    ::= { isisISAdjEntry 4 }
```

```
    isisISAdjNeighSysType OBJECT-TYPE
        SYNTAX INTEGER
            {
                l1IntermediateSystem(1),
                l2IntermediateSystem(2),
                l1L2IntermediateSystem(3),
                unknown(4)
            }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The type of the neighboring system."
        REFERENCE "{ISIS.aoi neighbourSystemType (80)}"
    ::= { isisISAdjEntry 5 }

    isisISAdjNeighSysID OBJECT-TYPE
        SYNTAX IsisSystemID
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The system ID of the neighboring Intermediate
             System."
        REFERENCE "{ISIS.aoi neighbourSystemIds (83)}"
    ::= { isisISAdjEntry 6 }

    isisISAdjNbrExtendedCircID OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The 4-byte Extended Circuit ID learned from the
             Neighbor during 3-way handshake, or 0."
    ::= { isisISAdjEntry 7 }

    isisISAdjUsage OBJECT-TYPE
        SYNTAX IsisLevel
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "How is the adjacency used?  On a point-to-point link,
             this might be level1and2, but on a LAN, the usage will
             be level1 on the adjacency between peers at L1,
             and level2 for the adjacency between peers at L2."
        REFERENCE "{ISIS.aoi adjacencyUsage (82)}"
    ::= { isisISAdjEntry 8 }

    isisISAdjHoldTimer OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (1..65535)
```

```
        UNITS "seconds"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The holding time, in seconds, for this adjacency.
             This value is based on received IIH PDUs and
             the elapsed time since receipt."
        REFERENCE "{ISIS.aoi holdingTimer (85)}"
    ::= { isisISAdjEntry 9 }

    isisISAdjNeighPriority OBJECT-TYPE
        SYNTAX IsisISPriority
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Priority of the neighboring Intermediate System for
             becoming the Designated Intermediate System."
        REFERENCE "{ISIS.aoi lANPriority (86)}"
    ::= { isisISAdjEntry 10 }

    isisISAdjLastUpTime OBJECT-TYPE
        SYNTAX TimeStamp
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "When the adjacency most recently entered the state 'up',
             measured in hundredths of a second since the last
             re-initialization of the network management subsystem.
             Holds 0 if the adjacency has never been in state 'up'."
    ::= { isisISAdjEntry 11 }

-- The IS Adjacency Area Address Table

-- The IS Adjacency Area Address Table contains the set of
-- Area Addresses of neighboring
-- Intermediate Systems as reported in IIH PDUs.

    isisISAdjAreaAddrTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisISAdjAreaAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table contains the set of Area Addresses of
             neighboring Intermediate Systems as reported in received
             IIH PDUs."
        REFERENCE "{ISIS.aoi areaAddressesOfNeighbour (84)}"
    ::= { isisISAdj 2 }
```

```
    isisISAdjAreaAddrEntry OBJECT-TYPE
        SYNTAX IsisISAdjAreaAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry contains one Area Address reported by a
             neighboring Intermediate System in its IIH PDUs.

             Dynamically learned rows do not survive an agent reboot."
        INDEX { isisCircIndex,
                isisISAdjIndex,
                isisISAdjAreaAddrIndex }
    ::= { isisISAdjAreaAddrTable 1 }

    IsisISAdjAreaAddrEntry ::=
        SEQUENCE {
            isisISAdjAreaAddrIndex
                Unsigned32,
            isisISAdjAreaAddress
                IsisOSINSAddress
            }

    isisISAdjAreaAddrIndex OBJECT-TYPE
        SYNTAX Unsigned32(1..4294967295)
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "An index for the areas associated with one neighbor.
             This provides a simple way to walk the table."
    ::= { isisISAdjAreaAddrEntry 1 }

    isisISAdjAreaAddress OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "One Area Address as reported in IIH PDUs received from
             the neighbor."
    ::= { isisISAdjAreaAddrEntry 2 }

-- The IS Adjacency IP Address Table

-- The IS Adjacency IP Address Table contains the
-- set of IP Addresses of neighboring Intermediate Systems
-- as reported in received IIH PDUs.

    isisISAdjIPAddrTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisISAdjIPAddrEntry
```

```
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table contains the set of IP Addresses of
             neighboring Intermediate Systems as reported in received
             IIH PDUs."
    ::= { isisISAdj 3 }

    isisISAdjIPAddrEntry OBJECT-TYPE
        SYNTAX IsisISAdjIPAddrEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry contains one IP Address reported by a
             neighboring Intermediate System in its IIH PDUs.

             Dynamically learned rows do not survive an agent reboot."
        INDEX { isisCircIndex,
                isisISAdjIndex,
                isisISAdjIPAddrIndex
                }
    ::= { isisISAdjIPAddrTable 1 }

    IsisISAdjIPAddrEntry ::=
        SEQUENCE {
            isisISAdjIPAddrIndex
                Unsigned32,
            isisISAdjIPAddrType
                 InetAddressType,
            isisISAdjIPAddrAddress
                InetAddress
        }

    isisISAdjIPAddrIndex OBJECT-TYPE
        SYNTAX Unsigned32(1..4294967295)
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "An index to this table that identifies the IP addresses
             to which this entry belongs."
    ::= { isisISAdjIPAddrEntry 1 }

    isisISAdjIPAddrType OBJECT-TYPE
        SYNTAX InetAddressType
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The type of one IP Address as reported in IIH PDUs
```

```
            received from the neighbor."
    ::= { isisISAdjIPAddrEntry 2 }

    isisISAdjIPAddrAddress OBJECT-TYPE
        SYNTAX InetAddress
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "One IP Address as reported in IIH PDUs received from the
             neighbor.

             The type of this address is determined by the value of
             the isisISAdjIPAddrType object."
    ::= { isisISAdjIPAddrEntry 3 }

-- The IS Adjacency Protocol Supported Table
--
-- The IS Adjacency Protocol Supported Table contains the set of
-- protocols supported by neighboring
-- Intermediate Systems as reported in received IIH PDUs.

    isisISAdjProtSuppTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisISAdjProtSuppEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table contains the set of protocols supported by
             neighboring Intermediate Systems as reported in received
             IIH PDUs."
    ::= { isisISAdj 4 }

    isisISAdjProtSuppEntry OBJECT-TYPE
        SYNTAX IsisISAdjProtSuppEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry contains one protocol supported by a
             neighboring Intermediate System as reported in its IIH
             PDUs.

             Dynamically learned rows do not survive an agent reboot."
        INDEX {  isisCircIndex,
                 isisISAdjIndex,
                 isisISAdjProtSuppProtocol }
    ::= { isisISAdjProtSuppTable 1 }

    IsisISAdjProtSuppEntry ::=
        SEQUENCE {
```

```
            isisISAdjProtSuppProtocol
                IsisSupportedProtocol
        }

    isisISAdjProtSuppProtocol OBJECT-TYPE
        SYNTAX IsisSupportedProtocol
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "One supported protocol as reported in IIH PDUs received
             from the neighbor."
    ::= { isisISAdjProtSuppEntry 1 }

-- The Reachable Address Group
--
-- The Reachable Address Table
-- Each entry records information about a reachable address
-- (NSAP or address prefix) manually configured on the system
-- or learned through another protocol.

    isisRATable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisRAEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The table of Reachable Addresses to NSAPs or Address
             Prefixes."
    ::= { isisReachAddr 1 }

    isisRAEntry OBJECT-TYPE
        SYNTAX IsisRAEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry defines a configured Reachable Address
             to an NSAP or Address Prefix.

             Dynamically created rows MUST survive an agent reboot."
        INDEX { isisCircIndex,
                isisRAIndex }
    ::= { isisRATable 1 }

    IsisRAEntry ::=
        SEQUENCE {
            isisRAIndex
                Unsigned32,
            isisRAExistState
                RowStatus,
```

```
            isisRAAdminState
                IsisAdminState,
            isisRAAddrPrefix
                IsisOSINSAddress,
            isisRAMapType
                INTEGER,
            isisRAMetric
                IsisDefaultMetric,
            isisRAMetricType
                IsisMetricType,
            isisRASNPAAddress
                IsisOSINSAddress,
            isisRASNPAMask
                IsisOSINSAddress,
            isisRASNPAPrefix
                IsisOSINSAddress,
            isisRAType
                INTEGER
        }

    isisRAIndex OBJECT-TYPE
        SYNTAX Unsigned32(1..4294967295)
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The identifier for this isisRAEntry.  This value must be
             unique amongst all Reachable Addresses on the same parent
             Circuit."
    ::= { isisRAEntry 1 }

    isisRAExistState OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The existence state of this Reachable Address.  This
             object follows the ManualOrAutomatic behaviors.  Support
             for 'createAndWait' and 'notInService' is not required.

             A row entry cannot be modified when the value of this
             object is 'active'."
    ::= { isisRAEntry 2 }

    isisRAAdminState OBJECT-TYPE
        SYNTAX IsisAdminState
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
```

```
            "The administrative state of the Reachable Address.  This
             object follows the ManualOrAutomatic behaviors."
        DEFVAL { off }
    ::= { isisRAEntry 3 }

    isisRAAddrPrefix OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The destination of this Reachable Address.  This is an
             Address Prefix.  This object follows the
             ReplaceOnlyWhileDisabled and ManualOrAutomatic
             behaviors."
        REFERENCE "{ISIS.aoi addressPrefix (98)}"
    ::= { isisRAEntry 4 }

    isisRAMapType OBJECT-TYPE
        SYNTAX INTEGER
            {
                none (1),
                explicit (2),
                extractIDI (3),
                extractDSP (4)
            }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The type of mapping to be employed to ascertain the SNPA
             Address that should be used in forwarding PDUs for this
             Reachable Address prefix.  This object follows the
             ManualOrAutomatic behavior.  The following values of
             mapping type are defined:

                 none: The mapping is null because the neighbor SNPA is
                       implicit by nature of the subnetwork (e.g., a
                       point-to-point linkage).

                 explicit: The subnetwork addresses in the object
                       isisRASNPAAddress are to be used.

                 extractIDI: The SNPA is embedded in the IDI of
                       the destination NSAP Address.  The mapping
                       algorithm extracts the SNPA to be used
                       according to the format and encoding rules of
                       ISO8473/Add2.  This SNPA extraction algorithm can
                       be used in conjunction with Reachable Address
                       prefixes from the X.121, F.69, E.163, and E.164
```

```
                        addressing subdomains.

                    extractDSP: All, or a suffix, of the SNPA is embedded
                        in the DSP of the destination address.  This SNPA
                        extraction algorithm extracts the embedded
                        subnetwork addressing information by performing a
                        logical AND of the isisRASNPAMask object value
                        with the destination address.  The part of the
                        SNPA extracted from the destination NSAP is
                        appended to the isisRASNPAPrefix object value to
                        form the next hop subnetwork addressing
                        information."

        REFERENCE "{ISO10589-ISIS.aoi mappingType (107)}"
    ::= { isisRAEntry 5 }

    isisRAMetric OBJECT-TYPE
        SYNTAX IsisDefaultMetric
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The metric value for reaching the specified
             prefix over this circuit.  This object follows the
             ManualOrAutomatic behavior."
        REFERENCE "{ISIS.aoi DefaultMetric (99)}"
        DEFVAL { 20 }
    ::= { isisRAEntry 6 }

    isisRAMetricType OBJECT-TYPE
        SYNTAX IsisMetricType
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Indicates whether the metric is internal or
             external.  This object follows the ManualOrAutomatic
             behavior."
        REFERENCE "{ISIS.aoi DefaultMetricType (103)}"
        DEFVAL { internal }
    ::= { isisRAEntry 7 }

    isisRASNPAAddress OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The SNPA Address to which a PDU may be forwarded in
             order to reach a destination that matches the address
             prefix of the Reachable Address.  This object follows the
```

```
            ManualOrAutomatic behavior."
        REFERENCE "{ISIS.aoi sNPAAddresses (109)}"
-- Note only one address may be specified per Reachable Address
-- in the MIB
        DEFVAL { ''H }
    ::= { isisRAEntry 8 }

    isisRASNPAMask OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "A bit mask with 1 bit indicating the positions in the
             effective destination address from which embedded SNPA
             information is to be extracted.  For the extraction, the
             first octet of the isisRASNPAMask object value is aligned
             with the first octet (AFI) of the NSAP Address.  If the
             isisRASNPAMask object value and NSAP Address are of
             different lengths, the shorter of the two is logically
             padded with zeros before performing the extraction.  This
             object follows the ManualOrAutomatic behavior."
        REFERENCE "{ISIS.aoi sNPAMask (122)}"
        DEFVAL { '00'H }
    ::= { isisRAEntry 9 }

    isisRASNPAPrefix OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "A fixed SNPA prefix for use when the isisRAMapType is
             extractDSP.  The SNPA Address to use is formed by
             concatenating the fixed SNPA prefix with a variable SNPA
             part that is extracted from the effective destination
             address.  For Reachable Address prefixes in which the
             entire SNPA is embedded in the DSP, the SNPA Prefix shall
             be null.  This object follows the ManualOrAutomatic
             behavior."
        REFERENCE "{ISIS.aoi sNPAPrefix (123)}"
        DEFVAL { '00'H }
    ::= { isisRAEntry 10 }

    isisRAType OBJECT-TYPE
        SYNTAX INTEGER
            {
                manual (1),
                automatic (2)
            }
```

```
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The type of Reachable address.  Those of type
             manual are created by the network manager.  Those
             of type automatic are created through propagation
             of routing information from another routing
             protocol (e.g., IDRP). "
        DEFVAL {manual}
    ::= {isisRAEntry 11 }


-- The IP Reachable Address Table

-- Each entry records information about one IP reachable
-- address manually configured on this system or learned from
-- another protocol.

    isisIPRATable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisIPRAEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The table of IP Reachable Addresses to networks,
             subnetworks, or hosts either manually configured or
             learned from another protocol."
    ::= { isisIPReachAddr 1 }

    isisIPRAEntry OBJECT-TYPE
        SYNTAX IsisIPRAEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry defines an IP Reachable Address to a network,
             subnetwork, or host.

             Each IP Reachable Address may have multiple entries in the
             table, one for each equal cost path to the reachable
             address.

             Dynamically created rows MUST survive an agent reboot.

             Implementers need to be aware that if the total number
             of elements (octets or sub-identifiers) in
             isisIPRADestr, isisIPRADestPrefixLen, and
             isisIPRANextHopIndex is too great, then OIDs of column
             instances in this table will have more than 128
             subidentifiers and cannot be accessed using SNMPv1,
```

```
            SNMPv2c, or SNMPv3."
        INDEX {  isisSysLevelIndex,
                 isisIPRADestType,
                 isisIPRADest,
                 isisIPRADestPrefixLen,
                 isisIPRANextHopIndex }
    ::= { isisIPRATable 1 }

    IsisIPRAEntry ::=
        SEQUENCE {
            isisIPRADestType
                InetAddressType,
            isisIPRADest
                InetAddress,
            isisIPRADestPrefixLen
                InetAddressPrefixLength,
            isisIPRANextHopIndex
                Unsigned32,
            isisIPRANextHopType
                InetAddressType,
            isisIPRANextHop
                InetAddress,
            isisIPRAType
                INTEGER,
            isisIPRAExistState
                RowStatus,
            isisIPRAAdminState
                IsisAdminState,
            isisIPRAMetric
                IsisDefaultMetric,
            isisIPRAMetricType
                IsisMetricType,
            isisIPRAFullMetric
                IsisFullMetric,
            isisIPRASNPAAddress
                IsisOSINSAddress,
            isisIPRASourceType
                INTEGER
        }

    isisIPRADestType OBJECT-TYPE
        SYNTAX InetAddressType
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The type of this IP Reachable Address."
    ::= { isisIPRAEntry 1 }
```

```
    isisIPRADest OBJECT-TYPE
        SYNTAX InetAddress
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The destination of this IP Reachable Address.  This is
             a network address, subnetwork address, or host
             address.

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

    ::= { isisIPRAEntry 2 }

    isisIPRADestPrefixLen OBJECT-TYPE
        SYNTAX InetAddressPrefixLength
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The length of the IP Netmask for Reachability Address.

             The values for the index objects isisIPRADest and
             isisIPRADestPrefixLen must be consistent.  When the value
             of isisIPRADest (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 isisIPRADestPrefixLen 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."
    ::= { isisIPRAEntry 3 }

    isisIPRANextHopIndex OBJECT-TYPE
        SYNTAX Unsigned32(1..4294967295)
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Index of next hop.  Used when there are multiple Equal
             Cost Multipath alternatives for the same destination."
    ::= { isisIPRAEntry 4 }

    isisIPRANextHopType OBJECT-TYPE
        SYNTAX InetAddressType
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The type of the IP next hop address."
    ::= { isisIPRAEntry 5 }
```

```
    isisIPRANextHop OBJECT-TYPE
        SYNTAX InetAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The IP next hop to this destination.

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

    isisIPRAType OBJECT-TYPE
        SYNTAX INTEGER
            {
                manual (1),
                automatic (2)
            }
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The type of this IP Reachable Address.  Those of type
             manual are created by the network manager.  Those of type
             automatic are created through propagation of routing
             information from another routing protocol.  This object
             follows the ManualOrAutomatic behavior."
    ::= { isisIPRAEntry 7 }

    isisIPRAExistState OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The state of this IP Reachable Address.  This object
             follows the ExistenceState and ManualOrAutomatic
             behaviors.  Support for 'createAndWait' and
             'notInService' is not required.

             A row entry cannot be modified when the value of this
             object is 'active'."
    ::= { isisIPRAEntry 8 }

    isisIPRAAdminState OBJECT-TYPE
        SYNTAX IsisAdminState
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The administrative state of the IP Reachable Address.  This
             object follows the IsisAdminState and ManualOrAutomatic
```

```
            behaviors."
        DEFVAL { off }
    ::= { isisIPRAEntry 9 }

    isisIPRAMetric OBJECT-TYPE
        SYNTAX IsisDefaultMetric
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The metric value for reaching the specified
             destination over this circuit.  This object follows the
             ManualOrAutomatic behavior."
        DEFVAL { 10 }
    ::= { isisIPRAEntry 10 }

    isisIPRAMetricType OBJECT-TYPE
        SYNTAX IsisMetricType
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "Indicates whether the metric is internal or
             external.  This object follows the ManualOrAutomatic
             behavior."
        DEFVAL { internal }
    ::= { isisIPRAEntry 11 }

    isisIPRAFullMetric OBJECT-TYPE
        SYNTAX IsisFullMetric
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The wide metric value for reaching the specified
             destination over this circuit.  This object follows the
             ManualOrAutomatic behavior."
        DEFVAL { 10 }
    ::= { isisIPRAEntry 12 }

    isisIPRASNPAAddress OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The SNPA Address to which a PDU may be forwarded in
             order to reach a destination that matches this IP
             Reachable Address.  This object follows the
             ManualOrAutomatic behavior."
        DEFVAL { ''H }
    ::= { isisIPRAEntry 13 }
```

```
    isisIPRASourceType OBJECT-TYPE
        SYNTAX INTEGER
            {
                static (1),
                direct (2),
                ospfv2 (3),
                ospfv3 (4),
                isis   (5),
                rip    (6),
                igrp   (7),
                eigrp  (8),
                bgp    (9),
                other (10)
            }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The origin of this route."
    ::= { isisIPRAEntry 14 }

-- The LSP Database Table
--
-- The first table provides Summary Information about LSPs
-- The next table provides a complete record

    isisLSPSummaryTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisLSPSummaryEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The table of LSP Headers."
    ::= { isisLSPDataBase 1 }

    isisLSPSummaryEntry OBJECT-TYPE
        SYNTAX IsisLSPSummaryEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry provides a summary describing an
             LSP currently stored in the system.

             Dynamically learned rows will not survive an
             agent reboot."
        INDEX {  isisLSPLevel,
                 isisLSPID }
    ::= { isisLSPSummaryTable 1 }

    IsisLSPSummaryEntry ::=
```

```
        SEQUENCE {
            isisLSPLevel
                IsisISLevel,
            isisLSPID
                IsisLinkStatePDUID,
            isisLSPSeq
                Unsigned32,
            isisLSPZeroLife
                TruthValue,
            isisLSPChecksum
                IsisUnsigned16TC,
            isisLSPLifetimeRemain
                IsisUnsigned16TC,
            isisLSPPDULength
                IsisUnsigned16TC,
            isisLSPAttributes
                IsisUnsigned8TC
        }

    isisLSPLevel OBJECT-TYPE
        SYNTAX IsisISLevel
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "At which level does this LSP appear?"
    ::= { isisLSPSummaryEntry 1 }

    isisLSPID OBJECT-TYPE
        SYNTAX IsisLinkStatePDUID
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The 8-byte LSP ID for this Link State PDU."
    ::= { isisLSPSummaryEntry 2 }

    isisLSPSeq OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The sequence number for this LSP."
    ::= { isisLSPSummaryEntry 3 }

    isisLSPZeroLife OBJECT-TYPE
        SYNTAX TruthValue
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
```

```
            "Is this LSP being purged by this system?"
    ::= { isisLSPSummaryEntry 4 }

    isisLSPChecksum OBJECT-TYPE
        SYNTAX IsisUnsigned16TC
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The 16-bit Fletcher Checksum for this LSP."
    ::= { isisLSPSummaryEntry 5 }

    isisLSPLifetimeRemain OBJECT-TYPE
        SYNTAX IsisUnsigned16TC
        UNITS "seconds"
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The remaining lifetime, in seconds, for this LSP."
    ::= { isisLSPSummaryEntry 6 }

    isisLSPPDULength OBJECT-TYPE
        SYNTAX IsisUnsigned16TC
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The length of this LSP."
    ::= { isisLSPSummaryEntry 7 }

    isisLSPAttributes OBJECT-TYPE
        SYNTAX IsisUnsigned8TC
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "Flags carried by the LSP."
    ::= { isisLSPSummaryEntry 8 }

-- LSP Table
--
-- The full LSP as a sequence of {Type, Len, Value} tuples
-- Since the underlying LSP may have changed while downloading
-- TLVs, we provide the Sequence number and Checksum for each
-- LSP TLV, so the network manager may verify that they are
-- still working on the same version of the LSP.

    isisLSPTLVTable OBJECT-TYPE
        SYNTAX SEQUENCE OF IsisLSPTLVEntry
        MAX-ACCESS not-accessible
        STATUS current
```

```
        DESCRIPTION
            "The table of LSPs in the database."
    ::= { isisLSPDataBase 2 }

    isisLSPTLVEntry OBJECT-TYPE
        SYNTAX IsisLSPTLVEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "Each entry describes a TLV within
             an LSP currently stored in the system.

             Dynamically learned rows will not survive an
             agent reboot."
        INDEX {  isisLSPLevel,
                 isisLSPID,
                 isisLSPTLVIndex }
    ::= { isisLSPTLVTable 1 }

    IsisLSPTLVEntry ::=
        SEQUENCE {
            isisLSPTLVIndex
                Unsigned32,
            isisLSPTLVSeq
                Unsigned32,
            isisLSPTLVChecksum
                IsisUnsigned16TC,
            isisLSPTLVType
                IsisUnsigned8TC,
            isisLSPTLVLen
                IsisUnsigned8TC,
            isisLSPTLVValue
                OCTET STRING
        }

    isisLSPTLVIndex OBJECT-TYPE
        SYNTAX Unsigned32(1..4294967295)
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The index of this TLV in the LSP.  The first TLV has
             index 1, and the Nth TLV has an index of N."
    ::= { isisLSPTLVEntry 1 }

    isisLSPTLVSeq OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS read-only
        STATUS current
```

```
        DESCRIPTION
            "The sequence number for this LSP."
    ::= { isisLSPTLVEntry 2 }

    isisLSPTLVChecksum OBJECT-TYPE
        SYNTAX IsisUnsigned16TC
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The 16-bit Fletcher Checksum for this LSP."
    ::= { isisLSPTLVEntry 3 }

    isisLSPTLVType OBJECT-TYPE
        SYNTAX IsisUnsigned8TC
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The type of this TLV."
    ::= { isisLSPTLVEntry 4 }

    isisLSPTLVLen OBJECT-TYPE
        SYNTAX IsisUnsigned8TC
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The length of this TLV."
    ::= { isisLSPTLVEntry 5 }

    isisLSPTLVValue OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of this TLV."
    ::= { isisLSPTLVEntry 6 }


-- The IS-IS Notification Table

-- The IS-IS Notification Table records fields that are
-- required for notifications

    isisNotificationEntry OBJECT IDENTIFIER
        ::= { isisNotification 1 }

    isisNotificationSysLevelIndex OBJECT-TYPE
        SYNTAX IsisLevel
        MAX-ACCESS accessible-for-notify
```

```
        STATUS current
        DESCRIPTION
            "The system level for this notification."
    ::= { isisNotificationEntry 1 }

    isisNotificationCircIfIndex OBJECT-TYPE
        SYNTAX Unsigned32 (1..2147483647)
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "The identifier of this circuit relevant to
             this notification."
    ::= { isisNotificationEntry 2 }

    isisPduLspId OBJECT-TYPE
        SYNTAX IsisLinkStatePDUID
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "An Octet String that uniquely identifies
             a Link State PDU."
    ::= { isisNotificationEntry 3 }

    isisPduFragment OBJECT-TYPE
        SYNTAX IsisPDUHeader
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "Holds up to 64 initial bytes of a PDU that
             triggered the notification."
    ::= { isisNotificationEntry 4 }

    isisPduFieldLen OBJECT-TYPE
        SYNTAX IsisUnsigned8TC
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "Holds the System ID length reported in PDU we received."
    ::= { isisNotificationEntry 5 }

    isisPduMaxAreaAddress OBJECT-TYPE
        SYNTAX IsisUnsigned8TC
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "Holds the Max Area Addresses reported in a PDU
             we received."
    ::= { isisNotificationEntry 6 }
```

```
    isisPduProtocolVersion OBJECT-TYPE
        SYNTAX IsisUnsigned8TC
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "Holds the Protocol version reported in PDU we received."
    ::= { isisNotificationEntry 7 }

    isisPduLspSize OBJECT-TYPE
        SYNTAX Unsigned32 (0..2147483647)
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "Holds the size of LSP we received that is too
             big to forward."
    ::= { isisNotificationEntry 8 }

    isisPduOriginatingBufferSize OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (0..16000)
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "Holds the size of isisSysLevelOrigLSPBuffSize advertised
             by the peer in the originatingLSPBufferSize TLV.
             If the peer does not advertise this TLV, this
             value is set to 0."
    ::= { isisNotificationEntry 9 }

    isisPduBufferSize OBJECT-TYPE
        SYNTAX IsisUnsigned16TC (0..16000)
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "Holds the size of LSP received from peer."
    ::= { isisNotificationEntry 10 }

    isisPduProtocolsSupported OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..255))
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "The list of protocols supported by an
             adjacent system.  This may be empty."
    ::= { isisNotificationEntry 11 }

    isisAdjState OBJECT-TYPE
        SYNTAX INTEGER
            {
```

```
                down (1),
                initializing (2),
                up (3),
                failed(4)
            }
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "The current state of an adjacency."
    ::= { isisNotificationEntry 12 }

    isisErrorOffset OBJECT-TYPE
        SYNTAX Unsigned32
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "An offset to a problem in a PDU.  If the problem
             is a malformed TLV, this points to the beginning
             of the TLV.  If the problem is in the header, this
             points to the byte that is suspicious."
    ::= { isisNotificationEntry 13 }

    isisErrorTLVType OBJECT-TYPE
        SYNTAX Unsigned32 (0..255)
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
             "The type for a malformed TLV."
    ::= { isisNotificationEntry 14 }

    isisNotificationAreaAddress OBJECT-TYPE
        SYNTAX IsisOSINSAddress
        MAX-ACCESS accessible-for-notify
        STATUS current
        DESCRIPTION
            "An Area Address."
    ::= { isisNotificationEntry 15 }

-- Notification definitions
--
-- Note that notifications can be disabled by setting
--     isisSysNotificationEnable false

    isisDatabaseOverload NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisSysLevelState
        }
```

```
        STATUS current
        DESCRIPTION
            "This notification is generated when the system
             enters or leaves the Overload state.  The number
             of times this has been generated and cleared is kept
             track of by isisSysStatLSPDbaseOloads."
    ::= { isisNotifications 1 }

    isisManualAddressDrops NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationAreaAddress
        }
        STATUS current
        DESCRIPTION
            "This notification is generated when one of the
             manual areaAddresses assigned to this system is
             ignored when computing routes.  The object
             isisNotificationAreaAddress describes the area that
             has been dropped.

             The number of times this event has been generated
             is counted by isisSysStatManAddrDropFromAreas.

             The agent must throttle the generation of
             consecutive isisManualAddressDrops notifications
             so that there is at least a 5-second gap between
             notifications of this type.  When notifications
             are throttled, they are dropped, not queued for
             sending at a future time."
    ::= { isisNotifications 2 }

    isisCorruptedLSPDetected NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisPduLspId
        }
        STATUS current
        DESCRIPTION
            "This notification is generated when we find that
             an LSP that was stored in memory has become
             corrupted.  The number of times this has been
             generated is counted by isisSysCorrLSPs.

             We forward an LSP ID.  We may have independent
             knowledge of the ID, but in some implementations
             there is a chance that the ID itself will be
             corrupted."
```

```
    ::= { isisNotifications 3 }

    isisAttemptToExceedMaxSequence NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisPduLspId
        }
        STATUS current
        DESCRIPTION
            "When the sequence number on an LSP we generate
             wraps the 32-bit sequence counter, we purge and
             wait to re-announce this information.  This
             notification describes that event.  Since these
             should not be generated rapidly, we generate
             an event each time this happens.

             While the first 6 bytes of the LSPID are ours,
             the other two contain useful information."

    ::= { isisNotifications 4 }

    isisIDLenMismatch  NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisPduFieldLen,
            isisNotificationCircIfIndex,
            isisPduFragment
        }
        STATUS current
        DESCRIPTION
            "A notification sent when we receive a PDU
             with a different value for the System ID Length.
             This notification includes an index to identify
             the circuit where we saw the PDU and the header of
             the PDU, which may help a network manager identify
             the source of the confusion.

             The agent must throttle the generation of
             consecutive isisIDLenMismatch notifications
             so that there is at least a 5-second gap between
             notifications of this type.  When notifications
             are throttled, they are dropped, not queued for
             sending at a future time."

    ::= { isisNotifications 5 }

    isisMaxAreaAddressesMismatch NOTIFICATION-TYPE
        OBJECTS {
```

```
            isisNotificationSysLevelIndex,
            isisPduMaxAreaAddress,
            isisNotificationCircIfIndex,
            isisPduFragment
        }

        STATUS current
        DESCRIPTION
            "A notification sent when we receive a PDU
             with a different value for the Maximum Area
             Addresses.  This notification includes the
             header of the packet, which may help a
             network manager identify the source of the
             confusion.

             The agent must throttle the generation of
             consecutive isisMaxAreaAddressesMismatch
             notifications so that there is at least a 5-second
             gap between notifications of this type.  When
             notifications are throttled, they are dropped, not
             queued for sending at a future time."

    ::= { isisNotifications 6 }

    isisOwnLSPPurge NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduLspId
        }
        STATUS current
        DESCRIPTION
            "A notification sent when we receive a PDU
             with our systemID and zero age.  This
             notification includes the circuit Index
             and router ID from the LSP, if available,
             which may help a network manager
             identify the source of the confusion."

    ::= { isisNotifications 7 }

    isisSequenceNumberSkip NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduLspId
        }
        STATUS current
```

```
        DESCRIPTION
            "When we receive an LSP with our System ID
             and different contents, we may need to reissue
             the LSP with a higher sequence number.

             We send this notification if we need to increase
             the sequence number by more than one.  If two
             Intermediate Systems are configured with the same
             System ID, this notification will fire."

    ::= { isisNotifications 8 }

    isisAuthenticationTypeFailure NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduFragment
        }
        STATUS current
        DESCRIPTION
            "A notification sent when we receive a PDU
             with the wrong authentication type field.
             This notification includes the header of the
             packet, which may help a network manager
             identify the source of the confusion.

             The agent must throttle the generation of
             consecutive isisAuthenticationTypeFailure
             notifications so that there is at least a 5-second
             gap between notifications of this type.  When
             notifications are throttled, they are dropped, not
             queued for sending at a future time."

    ::= { isisNotifications 9 }

    isisAuthenticationFailure NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduFragment
        }
        STATUS current
        DESCRIPTION
            "A notification sent when we receive a PDU
             with an incorrect authentication information
             field.  This notification includes the header
             of the packet, which may help a network manager
             identify the source of the confusion.
```

```
            The agent must throttle the generation of
            consecutive isisAuthenticationFailure
            notifications so that there is at least a 5-second
            gap between notifications of this type.  When
            notifications are throttled, they are dropped, not
            queued for sending at a future time."

    ::= { isisNotifications 10 }

    isisVersionSkew NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduProtocolVersion,
            isisPduFragment
        }
        STATUS current
        DESCRIPTION
            "A notification sent when we receive a Hello
             PDU from an IS running a different version
             of the protocol.  This notification includes
             the header of the packet, which may help a
             network manager identify the source of the
             confusion.

             The agent must throttle the generation of
             consecutive isisVersionSkew notifications
             so that there is at least a 5-second gap
             between notifications of this type.  When
             notifications are throttled, they are dropped, not
             queued for sending at a future time."

    ::= { isisNotifications 11 }

    isisAreaMismatch NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationCircIfIndex,
            isisPduFragment
        }
        STATUS current
        DESCRIPTION
            "A notification sent when we receive a Hello
             PDU from an IS that does not share any
             area address.  This notification includes
             the header of the packet, which may help a
             network manager identify the source of the
             confusion.
```

```
            The agent must throttle the generation of
            consecutive isisAreaMismatch notifications
            so that there is at least a 5-second gap
            between notifications of this type.  When
            notifications are throttled, they are dropped, not
            queued for sending at a future time."

    ::= { isisNotifications 12 }

    isisRejectedAdjacency NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduFragment
        }
        STATUS current
        DESCRIPTION
            "A notification sent when we receive a Hello
             PDU from an IS but do not establish an
             adjacency for some reason.

             The agent must throttle the generation of
             consecutive isisRejectedAdjacency notifications
             so that there is at least a 5-second gap
             between notifications of this type.  When
             notifications are throttled, they are dropped, not
             queued for sending at a future time."

    ::= { isisNotifications 13 }

    isisLSPTooLargeToPropagate NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduLspSize,
            isisPduLspId
        }
        STATUS current
        DESCRIPTION
            "A notification sent when we attempt to propagate
             an LSP that is larger than the dataLinkBlockSize
             for the circuit.

             The agent must throttle the generation of
             consecutive isisLSPTooLargeToPropagate notifications
             so that there is at least a 5-second gap
             between notifications of this type.  When
             notifications are throttled, they are dropped, not
```

```
          queued for sending at a future time."

    ::= { isisNotifications 14 }

    isisOrigLSPBuffSizeMismatch NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduLspId,
            isisPduOriginatingBufferSize,
            isisPduBufferSize
        }
        STATUS current
        DESCRIPTION
            "A notification sent when a Level 1 LSP or Level
             2 LSP is received that is larger than the local
             value for isisSysLevelOrigLSPBuffSize, or when an
             LSP is received that contains the supported Buffer Size
             option and the value in the PDU option field does
             not match the local value for isisSysLevelOrigLSPBuffSize.
             We pass up the size from the option field and the
             size of the LSP when one of them exceeds our configuration.

             The agent must throttle the generation of
             consecutive isisOrigLSPBuffSizeMismatch notifications
             so that there is at least a 5-second gap
             between notifications of this type.  When
             notifications are throttled, they are dropped, not
             queued for sending at a future time."

    ::= { isisNotifications 15 }

    isisProtocolsSupportedMismatch NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduProtocolsSupported,
            isisPduLspId,
            isisPduFragment
        }
        STATUS current
        DESCRIPTION
            "A notification sent when a non-pseudonode
             segment 0 LSP is received that has no matching
             protocols supported.  This may be because the system
             does not generate the field, or because there are no
             common elements.  The list of protocols supported
             should be included in the notification: it may be
```

```
            empty if the TLV is not supported, or if the
            TLV is empty.

            The agent must throttle the generation of
            consecutive isisProtocolsSupportedMismatch
            notifications so that there is at least a 5-second
            gap between notifications of this type.  When
            notifications are throttled, they are dropped, not
            queued for sending at a future time."

    ::= { isisNotifications 16 }

    isisAdjacencyChange NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduLspId,
            isisAdjState
        }
        STATUS current
        DESCRIPTION
            "A notification sent when an adjacency changes
             state, entering or leaving state up.
             The first 6 bytes of the isisPduLspId are the
             SystemID of the adjacent IS.
             The isisAdjState is the new state of the adjacency."

    ::= { isisNotifications 17 }

    isisLSPErrorDetected NOTIFICATION-TYPE
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisPduLspId,
            isisNotificationCircIfIndex,
            isisPduFragment,
            isisErrorOffset,
            isisErrorTLVType
        }
        STATUS current
        DESCRIPTION
            "This notification is generated when we receive
             an LSP with a parse error.  The isisCircIfIndex
             holds an index of the circuit on which the PDU
             arrived.  The isisPduFragment holds the start of the
             LSP, and the isisErrorOffset points to the problem.

             If the problem is a malformed TLV, isisErrorOffset
             points to the start of the TLV, and isisErrorTLVType
```

```
            holds the value of the type.

            If the problem is with the LSP header, isisErrorOffset
            points to the suspicious byte.

            The number of such LSPs is accumulated in
            isisSysStatLSPErrors."

    ::= { isisNotifications 18 }

-- Agent Conformance Definitions
-- We define the objects a conformant agent must define

isisCompliances OBJECT IDENTIFIER ::= { isisConformance 1 }
isisGroups      OBJECT IDENTIFIER ::= { isisConformance 2 }

-- compliance statements

    isisCompliance MODULE-COMPLIANCE
        STATUS current
        DESCRIPTION
            "The compliance statement for agents that support
            the IS-IS MIB.

            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.
            Those requirements and similar requirements for
            related objects are expressed below, in
            pseudo-OBJECT clause form, in this description:

            -- OBJECT isisSummAddressType
            -- SYNTAX InetAddressType { ipv4(1), ipv6(2) }
            --
            -- DESCRIPTION
            --    The MIB requires support for IPv4 Summary
            --    Addresses and anticipates the support of
            --    IPv6 addresses.
            --
            --
            -- OBJECT isisRedistributeAddrType
            -- SYNTAX InetAddressType { ipv4(1), ipv6(2) }
            --
            -- DESCRIPTION
            --    The MIB requires support for IPv4
            --    Redistribution Addresses and anticipates
            --    the support of IPv6 addresses."
            --
```

```
            --
            -- OBJECT isisISAdjIPAddrType
            -- SYNTAX InetAddressType { ipv4(1), ipv6(2) }
            --
            -- DESCRIPTION
            --    The MIB requires support for IPv4
            --    Adjacency Addresses and anticipates the
            --    support of IPv6 addresses.
        MODULE -- this module
            MANDATORY-GROUPS {
                    isisSystemGroup,
                    isisCircuitGroup,
                    isisISAdjGroup,
                    isisNotificationObjectGroup,
                    isisNotificationGroup
            }
    ::= { isisCompliances 1 }

    -- List of all groups, mandatory and optional
    isisAdvancedCompliance MODULE-COMPLIANCE
        STATUS current
        DESCRIPTION
            "The compliance statement for agents that fully
             support the IS-IS MIB.

             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.
             Those requirements and similar requirements for
             related objects are expressed below, in
             pseudo-OBJECT clause form, in this description:

             -- OBJECT isisSummAddressType
             -- SYNTAX InetAddressType { ipv4(1), ipv6(2) }
             --
             -- DESCRIPTION
             --    The MIB requires support for IPv4 Summary
             --    Addresses and anticipates the support of
             --    IPv6 addresses.
             --
             --
             -- OBJECT isisRedistributeAddrType
             -- SYNTAX InetAddressType { ipv4(1), ipv6(2) }
             --
             -- DESCRIPTION
             --    The MIB requires support for IPv4
             --    Redistribution Addresses and anticipates
             --    the support of IPv6 addresses."
```

```
            --
            --
            -- OBJECT isisISAdjIPAddrType
            -- SYNTAX InetAddressType { ipv4(1), ipv6(2) }
            --
            -- DESCRIPTION
            --    The MIB requires support for IPv4
            --    Adjacency Addresses and anticipates the
            --    support of IPv6 addresses.
            --
            --
            -- OBJECT isisIPRADestType
            -- SYNTAX InetAddressType { ipv4(1), ipv6(2) }
            --
            -- DESCRIPTION
            --    The MIB requires support for IPv4 RA
            --    Addresses and anticipates the support of
            --    IPv6 addresses.
            --
            --
            -- OBJECT isisIPRANextHopType
            -- SYNTAX InetAddressType { ipv4(1), ipv6(2) }
            --
            -- DESCRIPTION
            --    The MIB requires support for IPv4 NextHop
            --    Addresses and anticipates the support of
            --    IPv6 addresses.
        MODULE -- this module
            MANDATORY-GROUPS {
                    isisSystemGroup,
                    isisCircuitGroup,
                    isisISAdjGroup,
                    isisNotificationObjectGroup,
                    isisNotificationGroup,
                    isisISPDUCounterGroup,
                    isisRATableGroup,
                    isisISIPRADestGroup,
                    isisLSPGroup
            }
    ::= { isisCompliances 2 }

    isisReadOnlyCompliance 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.  Such
                a device can then be monitored but cannot be
```

```
            configured with this MIB."
        MODULE -- this module
             MANDATORY-GROUPS {
                     isisSystemGroup,
                     isisCircuitGroup,
                     isisISAdjGroup
             }

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

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

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

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

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

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

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

        OBJECT isisSysL2toL1Leaking
        MIN-ACCESS read-only
        DESCRIPTION
             "Write access is not required."
```

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

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

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

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

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

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

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

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

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

        OBJECT isisSysReceiveLSPBufferSize
        MIN-ACCESS read-only
        DESCRIPTION
```

```
            "Write access is not required."

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

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

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

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

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

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

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

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

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

        OBJECT isisCircPassiveCircuit
```

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

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

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

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

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

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

        OBJECT isisCirc3WayEnabled
        MIN-ACCESS read-only
        DESCRIPTION
             "Write access is not required."

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

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

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

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

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

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

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

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

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

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

    ::= { isisCompliances 3 }

-- MIB Grouping

    isisSystemGroup OBJECT-GROUP
        OBJECTS {
            isisSysVersion,
            isisSysLevelType,
            isisSysID,
            isisSysMaxPathSplits,
            isisSysMaxLSPGenInt,
            isisSysPollESHelloRate,
            isisSysWaitTime,
```

```
            isisSysAdminState,
            isisSysL2toL1Leaking,
            isisSysMaxAge,
            isisSysProtSupported,
            isisSysNotificationEnable,
            isisManAreaAddrExistState,
            isisSysLevelOrigLSPBuffSize,
            isisSysLevelMinLSPGenInt,
            isisSysLevelState,
            isisSysLevelSetOverload,
            isisSysLevelSetOverloadUntil,
            isisSysLevelMetricStyle,
            isisSysLevelSPFConsiders,
            isisSysLevelTEEnabled,
            isisSysReceiveLSPBufferSize,
            isisSummAddrExistState,
            isisSummAddrMetric,
            isisAreaAddr,
            isisSummAddrFullMetric,
            isisRedistributeAddrExistState,
            isisRouterHostName,
            isisRouterID,
            isisSysStatCorrLSPs,
            isisSysStatLSPDbaseOloads,
            isisSysStatManAddrDropFromAreas,
            isisSysStatAttmptToExMaxSeqNums,
            isisSysStatSeqNumSkips,
            isisSysStatOwnLSPPurges,
            isisSysStatIDFieldLenMismatches,
            isisSysStatPartChanges,
            isisSysStatSPFRuns,
            isisSysStatAuthTypeFails,
            isisSysStatAuthFails,
            isisSysStatLSPErrors
        }
        STATUS current
        DESCRIPTION
            "The collections of objects used to manage an
             IS-IS router."
    ::= { isisGroups 1 }

    isisCircuitGroup OBJECT-GROUP
        OBJECTS {
            isisNextCircIndex,
            isisCircAdminState,
            isisCircExistState,
            isisCircType,
            isisCircExtDomain,
```

```
            isisCircLevelType,
            isisCircAdjChanges,
            isisCircNumAdj,
            isisCircInitFails,
            isisCircRejAdjs,
            isisCircIDFieldLenMismatches,
            isisCircMaxAreaAddrMismatches,
            isisCircAuthTypeFails,
            isisCircAuthFails,
            isisCircLANDesISChanges,
            isisCircPassiveCircuit,
            isisCircMeshGroupEnabled,
            isisCircMeshGroup,
            isisCircSmallHellos,
            isisCircLastUpTime,
            isisCirc3WayEnabled,
            isisCircExtendedCircID,
            isisCircIfIndex,
            isisCircLevelMetric,
            isisCircLevelWideMetric,
            isisCircLevelISPriority,
            isisCircLevelIDOctet,
            isisCircLevelID,
            isisCircLevelDesIS,
            isisCircLevelHelloMultiplier,
            isisCircLevelHelloTimer,
            isisCircLevelDRHelloTimer,
            isisCircLevelLSPThrottle,
            isisCircLevelMinLSPRetransInt,
            isisCircLevelCSNPInterval,
            isisCircLevelPartSNPInterval
        }
        STATUS current
        DESCRIPTION
            "The collections of objects used to describe an
             IS-IS Circuit."
    ::= { isisGroups 2 }

    isisISAdjGroup OBJECT-GROUP
        OBJECTS {
            isisISAdjState,
            isisISAdj3WayState,
            isisISAdjNeighSNPAAddress,
            isisISAdjNeighSysType,
            isisISAdjNeighSysID,
            isisISAdjNbrExtendedCircID,
            isisISAdjUsage,
            isisISAdjHoldTimer,
```

```
            isisISAdjNeighPriority,
            isisISAdjLastUpTime,
            isisISAdjAreaAddress,
            isisISAdjIPAddrType,
            isisISAdjIPAddrAddress,
            isisISAdjProtSuppProtocol
        }
        STATUS current
        DESCRIPTION
            "The collections of objects used to manage an
             IS-IS Adjacency."
    ::= { isisGroups 3 }

    isisNotificationObjectGroup OBJECT-GROUP
        OBJECTS {
            isisNotificationSysLevelIndex,
            isisNotificationCircIfIndex,
            isisPduLspId,
            isisPduFragment,
            isisPduFieldLen,
            isisPduMaxAreaAddress,
            isisPduProtocolVersion,
            isisPduLspSize,
            isisPduOriginatingBufferSize,
            isisPduBufferSize,
            isisPduProtocolsSupported,
            isisAdjState,
            isisErrorOffset,
            isisErrorTLVType,
            isisNotificationAreaAddress
        }
        STATUS current
        DESCRIPTION
            "The objects used to record notification parameters."
    ::= { isisGroups 4 }


    isisNotificationGroup        NOTIFICATION-GROUP
        NOTIFICATIONS {
            isisDatabaseOverload,
            isisManualAddressDrops,
            isisCorruptedLSPDetected,
            isisAttemptToExceedMaxSequence,
            isisIDLenMismatch,
            isisMaxAreaAddressesMismatch,
            isisOwnLSPPurge,
            isisSequenceNumberSkip,
            isisAuthenticationTypeFailure,
```

```
            isisAuthenticationFailure,
            isisVersionSkew,
            isisAreaMismatch,
            isisRejectedAdjacency,
            isisLSPTooLargeToPropagate,
            isisOrigLSPBuffSizeMismatch,
            isisProtocolsSupportedMismatch,
            isisAdjacencyChange,
            isisLSPErrorDetected
        }
        STATUS current
        DESCRIPTION
            "The collections of notifications sent by an IS."
    ::= { isisGroups 5 }


    isisISPDUCounterGroup OBJECT-GROUP
        OBJECTS {
            isisPacketCountIIHello,
            isisPacketCountISHello,
            isisPacketCountESHello,
            isisPacketCountLSP,
            isisPacketCountCSNP,
            isisPacketCountPSNP,
            isisPacketCountUnknown
        }
        STATUS current
        DESCRIPTION
            "The collections of objects used to count protocol PDUs."
    ::= { isisGroups 6 }


    isisRATableGroup OBJECT-GROUP
        OBJECTS {
            isisRAExistState,
            isisRAAdminState,
            isisRAAddrPrefix,
            isisRAMapType,
            isisRAMetric,
            isisRAMetricType,
            isisRASNPAAddress,
            isisRASNPAMask,
            isisRASNPAPrefix,
            isisRAType
        }
        STATUS current
        DESCRIPTION
            "The collections of objects used to manage the
```

```
            reachable NSAP prefixes."
    ::= { isisGroups 7 }


    isisISIPRADestGroup OBJECT-GROUP
        OBJECTS {
            isisIPRANextHopType,
            isisIPRANextHop,
            isisIPRAType,
            isisIPRAExistState,
            isisIPRAAdminState,
            isisIPRAMetric,
            isisIPRAFullMetric,
            isisIPRAMetricType,
            isisIPRASNPAAddress,
            isisIPRASourceType
        }
        STATUS current
        DESCRIPTION
            "The collections of objects used to manage configured
             IP addresses."
    ::= { isisGroups 8 }

    isisLSPGroup OBJECT-GROUP
        OBJECTS {
            isisLSPSeq,
            isisLSPZeroLife,
            isisLSPChecksum,
            isisLSPLifetimeRemain,
            isisLSPPDULength,
            isisLSPAttributes,
            isisLSPTLVSeq,
            isisLSPTLVChecksum,
            isisLSPTLVType,
            isisLSPTLVLen,
            isisLSPTLVValue
        }
        STATUS current
        DESCRIPTION
            "The collections of objects used to observe the LSP
             Database."
    ::= { isisGroups 9 }

END
```

5. IANA Considerations

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

Descriptor	OBJECT IDENTIFIER value
isisMIB	{ mib-2 138 }

6. Acknowledgements

This MIB is based on a March 1994 document by Chris Gunner, who should be held blameless for the errors introduced since then. This version has been modified to include MIB-II syntax, to exclude portions of the protocol that are not relevant to IP, such as the ES-IS protocol, and to add management support for current practice.

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7. Security Considerations

Management information defined in this MIB may be considered sensitive in some network environments.

7.1. Discussion

This MIB may be used to manage an IP router, which is used to direct network traffic. The control of network traffic allows an attacker to deny service to a region of the network or to forward traffic to adversaries. By raising or lowering metrics, traffic may be directed to insecure portions of the network. By disabling the protocol on an interface, the network may be partitioned. Changes to the network topology will force all routers to recompute their routes. Periodic route changes have brought down networks in the past by subjecting routers to stressful recomputations.

There are a number of management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network

environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations. Authentication of received SNMP requests and controlled access to management information should be employed in such environments.

We identify a set of threats and then list attributes that can be used in each form of attack. We discuss the effects that can be obtained by a single change to the variable in each class.

7.2. Threats

- Drop an Adjacency
- Drop all Peers
- Drop Subnetwork
- Split the Network
- Intermittent Outages
- Redirect Traffic
- Delay Convergence
- Avoid Detection
- Prevent Updates
- Hijack LAN
- Create Problems for CLNS Networks

7.2.1. Drop an Adjacency

By changing attributes that are used to peer, we can disrupt an adjacency and bring a link down.

isisCirc3WayEnabled
isisCircAdminState
isisCircExistState
isisCircLevelDRHelloTimer
isisCircLevelHelloTimer
isisCircLevelType
isisCircSmallHellos

7.2.2. Drop All Adjacencies

These attributes can be used to break some or all of a router's adjacencies. In the case of System ID, the adjacency may be restored. However, it will subject the network to additional stress.

isisSysLevelType
isisManAreaAddrExistState
isisSysAdminState
isisSysID

7.2.3. Drop Subnetwork

This attribute can be used to stop advertisement of a subnetwork reachable through a single interface.

- isisCircPassiveCircuit

7.2.4. Split the Network

If the network design depends upon Wide Metrics or TE, we can use these attributes to prevent traffic from passing through a router.

- isisSysLevelMetricStyle
- isisSysLevelOrigLSPBuffSize
- isisSysLevelSPFConsiders
- isisSysLevelTEEnabled
- isisSysReceiveLSPBufferSize

7.2.5. Intermittent Outages

We can use these attributes to subject the network to a series of topology changes, or otherwise force extensive recomputations of routes.

- isisSysLevelMinLSPGenInt
- isisSysLevelSetOverload
- isisSysLevelSetOverloadUntil
- isisSysMaxAge
- isisSysMaxLSPGenInt
- isisSysL2toL1Leaking
- isisSysID

7.2.6. Redirect Traffic

By changing attributes such as metrics, we can push traffic to different parts of the network. This may allow an intruder to observe data traffic from otherwise remote parts of the network.

We may also use these attributes to deny service to parts of the network.

- isisSysMaxPathSplits
- isisCircLevelMetric
- isisCircLevelWideMetric
- isisIPRAAdminState
- isisIPRAExistState
- isisIPRAFullMetric
- isisIPRAMetric

isisIPRAMetricType
isisIPRANextHop
isisIPRANextHopType
isisIPRASNPAAddress
isisIPRAType
isisRedistributeAddrExistState
isisSummAddrExistState
isisSummAddrFullMetric
isisSummAddrMetric
isisSysL2toL1Leaking

7.2.7. Delay Convergence

These attributes can be used to slow convergence by increasing the minimal interval required to update a packet.

isisCircLevelCSNPInterval
isisCircLevelLSPThrottle
isisCircLevelMinLSPRetransInt
isisCircLevelPartSNPInterval
isisSysWaitTime
isisCircPassiveCircuit

7.2.8. Avoid Detection

By turning off traps, we can prevent a Network Management station from observing problems in the network caused by other aspects of an attack.

isisSysNotificationEnable

7.2.9. Prevent Updates

Mesh Groups can be used to prevent the transmission of Link State PDUs on certain interfaces, delaying or preventing the propagation of updates.

isisCircMeshGroup
isisCircMeshGroupEnabled

7.2.10. Hijack LAN

If we have compromised a router, we can use this attribute to become the designated router and lie about the topology of a LAN.

isisCircLevelISPriority

7.2.11. Create Problems for CLNS Networks

This attribute can be used to modify the handling of CLNS traffic.

- isisRAAddrPrefix
- isisRAAdminState
- isisRAExistState
- isisRAMapType
- isisRAMetric
- isisRAMetricType
- isisRASNPAAddress
- isisRASNPAMask
- isisRASNPAPrefix
- isisRAType
- isisSysPollESHelloRate

7.2.12. Mostly Harmless

The following writable attributes do not pose a known security risk.

- isisCircExtDomain
- isisCircExtendedCircID
- isisCircIfIndex
- isisCircLevelHelloMultiplier
- isisCircType

7.2.13. Recommendations

Much of the MIB is used to set or read attributes which are readily visible to any intruder who has access to traffic. None of the security attributes are setable or visible through the MIB. Read access to the MIB does not pose additional risks or vulnerabilities.

If write access is to be provided, 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).

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.

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.

8. Normative References

[ISO10589] ISO 10589, "Intermediate system to Intermediate system routeing information exchange protocol for use in conjunction with the Protocol for providing the Connectionless-mode Network Service (ISO 8473)," ISO/IEC 10589:2002.

[ISO10733] ISO 10733, "Information Processing Systems - Open Systems Interconnection - Specification of the elements of Management Information related to OSI Network layer Standards", September 1998.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC1195] Callon, R., "Use of OSI IS-IS for routing in TCP/IP and dual environments", RFC 1195, December 1990.

[RFC2863] McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", RFC 2863, June 2000.

[RFC3289] Baker, F., Chan, K., and A. Smith, "Management Information Base for the Differentiated Services Architecture", RFC 3289, May 2002.

[RFC3411] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks", STD 62, RFC 3411, December 2002.

[RFC2578] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.

[RFC2579] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.

[RFC2580] McCloghrie, K., Perkins, D., and J. Schoenwaelder, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.

[RFC4001] Daniele, M., Haberman, B., Routhier, S., and J. Schoenwaelder, "Textual Conventions for Internet Network Addresses", RFC 4001, February 2005.

9. Informative References

[RFC2973] Balay, R., Katz, D., and J. Parker, "IS-IS Mesh Groups", RFC 2973, October 2000.

[RFC3373] Katz, D. and R. Saluja, "Three-Way Handshake for Intermediate System to Intermediate System (IS-IS) Point-to-Point Adjacencies", RFC 3373, September 2002.

[RFC3410] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", RFC 3410, December 2002.

Authors' Address

Jeff Parker
Department of Computer Science
Middlebury College,
Middlebury, Vermont 05753

EMail: jeffp@middlebury.edu

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