

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.

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1. The Internet-Standard Management Framework

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

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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),
    levelland2(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 { levelland2 }

::= { 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 llState (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
        isisSysType 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 { levelland2 }
 ::= { 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 11DefaultMetric (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 12IntermediateSystemPriority (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,
    isisSysStatAttmpToExMaxSeqNums
        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 lSPLlDatabaseOverloads (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 }

isisSysStatAttmpToExMaxSeqNums 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,
        isisISAdjNeighSNPAAAddress
            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 }
```

```
isisISAdjNeighSNPAAAddress OBJECT-TYPE
```

```
SYNTAX IsisOSINSAddress
```

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

```
STATUS current
```

```
DESCRIPTION
```

"The SNPA address of the neighboring system."

```
REFERENCE "{ISIS.aoi neighbourSNPAAAddress (79)}"
```

```
::= { isisISAdjEntry 4 }
```

```
isisISAdjNeighSysType OBJECT-TYPE
    SYNTAX INTEGER
    {
        1IntermediateSystem(1),
        2IntermediateSystem(2),
        3L1L2IntermediateSystem(3),
        4unknown(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,
isisRASNPAddress
    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
                      isisRASNPAAAddress 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 }

isisRASNPAAAddress 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,
        isisIPRASNPAAAddress
            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 }

isisIPRASNPAddress 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,
isisSysStatAttmpToExMaxSeqNums,
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,
        isisISAdjNeighSNPAddress,
        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,
        isisRASNPAAAddress,
        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,
        isisIPRASNPAddress,
        isisIPRASourceType
    }
    STATUS current
    DESCRIPTION
        "The collections of objects used to manage configured
        IP addresses."
 ::= { isisGroups 8 }

isisLSPGroup OBJECT-GROUP
    OBJECTS {
        isisLSPSeq,
        isisLSPZeroLife,
        isisLSPChecksum,
        isisLSPLifetimeRemain,
        isisLSPDULength,
        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
isisIPRASNPAddress
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
- isisRASNPAddress
- 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

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