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OSPF Version 2 Management Information Base

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Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in TCP/IP-based internets. In particular, it defines objects for managing the Open Shortest Path First Routing Protocol.

This memo is intended to update and possibly obsolete [RFC 1850](#), however, it is designed to be backwards compatible. The functional differences between this memo and [RFC 1580](#) are explained in [Appendix B](#).

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[1](#) Overview

[1.1](#) The SNMPv2 Network Management Framework

This document describes aspects of the SNMPv2 Network Management Framework, which consists of a number of components. They are:

- An overall architecture, described in [RFC 2571](#) [[1](#)].
- Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and described in STD 16, [RFC 1155](#) [[2](#)], STD 16, [RFC 1212](#) [[3](#)] and [RFC 1215](#) [[4](#)]. The second version, called SMIV2, is described in STD 58, [RFC 2578](#) [[5](#)], [RFC 2579](#) [[6](#)] and [RFC 2580](#) [[7](#)].
- Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, [RFC 1157](#) [[8](#)]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in [RFC 1901](#) [[9](#)] and [RFC 1906](#) [[10](#)]. The third version of the message protocol is called SNMPv3 and described in [RFC 1906](#) [[10](#)], [RFC 2572](#) [[11](#)] and [RFC 2574](#) [[12](#)].
- Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, [RFC 1157](#) [[8](#)]. A second set of protocol operations and associated PDU formats is described in [RFC 1905](#) [[13](#)].
- A set of fundamental applications described in [RFC 2573](#) [[14](#)] and the view-based access control mechanism described in [RFC 2575](#) [[15](#)].

[1.2](#) The SMI, and Object Definitions

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Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations.

1.3 Object Identification

Objects in the SMI are defined by types, and are named by an OBJECT IDENTIFIER, which is an administratively assigned name. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the descriptor, to refer to the object type.

1.4 Textual Conventions

Several data types in this MIB document are termed textual conventions. Textual conventions enhance the readability of the specification and can ease comparison with other specifications if appropriate. It should be noted that textual conventions have no effect on either the syntax nor the semantics of any managed objects. Objects defined in terms of one of these methods are always encoded by means of the rules that define the primitive type. Textual conventions are used for the convenience of readers and writers in pursuit of the goal of clear, concise, and unambiguous MIB documents.

1.5 Conceptual Row Creation

For the benefit of row-creation in "conceptual" tables, DEFVAL (Default Value) clauses are included in the definitions in [section 3](#), suggesting values which an agent should use for instances of variables which need to be created due to a Set-Request, but which are not specified in the Set-Request. DEFVAL clauses have not been specified for some objects which are read-only, implying that they are zeroed upon row creation. These objects are of the SYNTAX Counter32 or Gauge32.

For those objects not having a DEFVAL clause, both management stations and agents should heed the Robustness Principle of the Internet (see [RFC-791](#)):

"be liberal in what you accept, conservative in what you send"

Therefor, management stations should include as many of these
columnar objects as possible (e.g., all read-write objects) in a Set-

Request when creating a conceptual row. Agents should accept a Set-Request with as few of these columnar objects as they need (e.g., the minimum contents of a "row-creating" SET consists of those objects for which, as they cannot be intuited, no default is specified.).

1.6 Default Configuration

OSPF is a powerful routing protocol, equipped with features to handle virtually any configuration requirement that might reasonably be found within an Autonomous System. With this power comes a fair degree of complexity, which the sheer number of objects in the MIB will attest to. Care has therefore been taken, in constructing this MIB, to define default values for virtually every object, to minimize the amount of parameterization required in the typical case. That default configuration is as follows:

Given the following assumptions:

- IP has already been configured
- The ifTable has already been configured
- ifSpeed is estimated by the interface drivers
- The OSPF Process automatically discovers all IP Interfaces and creates corresponding OSPF Interfaces
- The OSPF Process automatically creates the Areas required for the Interfaces

The simplest configuration of an OSPF process requires that:

- The OSPF Process be Enabled.

This can be accomplished with a single SET:

```
ospfAdminStat := enabled.
```

The configured system will have the following attributes:

- The RouterID will be one of the IP addresses of the device
- The device will be neither an Area Border Router nor an Autonomous System Border Router.
- Every IP Interface, with or without an address, will be an OSPF Interface.

- The AreaID of each interface will be 0.0.0.0, the Backbone.

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- Authentication will be disabled
- All Broadcast and Point to Point interfaces will be operational. NBMA Interfaces require the configuration of at least one neighbor.
- Timers on all direct interfaces will be:

Hello Interval:	10 seconds
Dead Timeout:	40 Seconds
Retransmission:	5 Seconds
Transit Delay:	1 Second
Poll Interval:	120 Seconds
- No direct links to hosts will be configured.
- No addresses will be summarized
- Metrics, being a measure of bit duration, are unambiguous and intelligent.
- No Virtual Links will be configured.

2 Structure of this MIB

This MIB is composed of the following sections:

- General Variables
- Area Data Structure
- Area Stub Metric Table
- Link State Database
- Address Range Table
- Host Table
- Interface Table
- Interface Metric Table
- Virtual Interface Table
- Neighbor Table
- Virtual Neighbor Table
- External Link State Database
- Aggregate Range Table
- Local Link State Database

There exists a separate MIB for notifications ("traps"), which is entirely optional.

2.1 The Purposes of the sections in this MIB

2.1.1 General Variables

The General Variables describe (as it may seem from the name)

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variables which are global to the OSPF Process.

2.1.2 Area Data Structure and Area Stub Metric Table

The Area Data Structure describes all of the OSPF Areas that the router participates in. The Area Table includes data for NSSA translation.

The Area Stub Metric Table describes the metrics advertised into a stub area by the default router(s).

2.1.3 Link State Database and External Link State Database

The Link State Database is provided primarily to provide detailed information for network debugging.

2.1.4 Address Table and Host Tables

The Address Range Table and Host Table are provided to view configured Network Summary and Host Route information.

2.1.5 Interface and Interface Metric Tables

The Table and the Interface Metric Table together describe the various IP interfaces to OSPF. The metrics are placed in separate tables in order to simplify dealing with multiple types of service. The Interface table includes Link-Local (Opaque Type-9) LSA statistics.

2.1.6 Virtual Interface Table

The Virtual Interface Table describes virtual links to the OSPF Process, similarly to the (non-Virtual)Interface Tables. This table includes Link-Local (Opaque Type-9) LSA statistics.

2.1.7 Neighbor and Virtual Neighbor Tables

The Neighbor Table and the Virtual Neighbor Table describe the neighbors to the OSPF Process.

2.1.8 Local Link State Database Table and Virtual Local Link State Database Table

The Local Link State Database Table and Virtual Local Link State Database Table are identical to the OSPF LSDB Table in format, but contain only Link-Local (Opaque Type-9) Link State Advertisements for non-virtual and virtual links.

OSPF-MIB DEFINITIONS ::= BEGIN

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IMPORTS

```
MODULE-IDENTITY, OBJECT-TYPE, Counter32, Gauge32,
Integer32, IpAddress
    FROM SNMPv2-SMI
TEXTUAL-CONVENTION, TruthValue, RowStatus
    FROM SNMPv2-TC
MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF
mib-2
    FROM RFC1213-MIB;
```

ospf MODULE-IDENTITY

```
LAST-UPDATED "0004021225Z" -- Sun Apr 02 12:25:50 GMT 2000
ORGANIZATION "IETF OSPF Working Group"
CONTACT-INFO
    "      Spencer Giacalone
Postal: Predictive Systems
      145 Hudson Street
      New York, New York 10013
Tel:    +1 (973) 301-5695
E-Mail: spencer.giacalone@predictive.com

      Dan Joyal
Postal: Nortel Networks
      600 Technology Park Drive
      Billerica, MA 01821
Tel:    +1 (978) 288-2629
E-Mail: djoyal@nortelnetworks.com"
DESCRIPTION
    "The MIB module to describe the OSPF Version 2
    Protocol"
REVISION "0004021225Z" -- Sun Apr 02 12:25:50 GMT 2000
DESCRIPTION
    "Updated for latest changes to OSPF Version 2"
 ::= { mib-2 14 }
```

```
-- Note the Area ID, in OSPF, has the same format as an IP Address,
-- but has the function of defining a summarization point for
-- Link State Advertisements
```

```
AreaID ::= TEXTUAL-CONVENTION
    STATUS      current
    DESCRIPTION
        "An OSPF Area Identifier."
    SYNTAX      IpAddress
```

```
-- Note: The Router ID, in OSPF, has the same format as an IP
```

-- Address, but identifies the router independent of its IP Address.

RouterID ::= TEXTUAL-CONVENTION

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```
STATUS      current
DESCRIPTION
  "A OSPF Router Identifier."
SYNTAX      IPAddress
```

-- Note the OSPF Metric is defined as an unsigned value in the range

```
Metric ::= TEXTUAL-CONVENTION
STATUS      current
DESCRIPTION
  "The OSPF Internal Metric."
SYNTAX      Integer32 (0..'FFFF'h)
```

```
BigMetric ::= TEXTUAL-CONVENTION
STATUS      current
DESCRIPTION
  "The OSPF External Metric."
SYNTAX      Integer32 (0..'FFFFFF'h)
```

-- Status Values

```
Status ::= TEXTUAL-CONVENTION
STATUS      current
DESCRIPTION
  "An indication of the operability of an OSPF
  function or feature. For example, The status
  of an interface: 'enabled' indicates that
  it is willing to communicate with other OSPF Routers,
  while 'disabled' indicates that it is not."
SYNTAX      INTEGER { enabled (1), disabled (2) }
```

-- Note that the following Time Durations are measured in seconds

```
PositiveInteger ::= TEXTUAL-CONVENTION
STATUS      current
DESCRIPTION
  "A positive integer. Values in excess are precluded as
  unnecessary and prone to interoperability issues."
SYNTAX      Integer32 (0..'7FFFFFFF'h)
```

```
HelloRange ::= TEXTUAL-CONVENTION
STATUS      current
DESCRIPTION
  "The range of intervals on which hello messages are
  exchanged."
SYNTAX      Integer32 (1..'FFFF'h)
```

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

DESCRIPTION

"The values that one might find or configure for

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variables bounded by the maximum age of an LSA."
 SYNTAX Integer32 (0..3600)

-- The range of ifIndex

InterfaceIndex ::= TEXTUAL-CONVENTION
 STATUS current
 DESCRIPTION
 "The range of ifIndex."
 SYNTAX Integer32

-- Potential Priorities for the Designated Router Election

DesignatedRouterPriority ::= TEXTUAL-CONVENTION
 STATUS current
 DESCRIPTION
 "The values defined for the priority of a system for
 becoming the designated router."
 SYNTAX Integer32 (0..'FF'h)

TOSType ::= TEXTUAL-CONVENTION
 STATUS current
 DESCRIPTION
 "Type of Service is defined as a mapping to the IP Type of
 Service Flags as defined in the IP Forwarding Table MIB

```

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

```

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

The remaining values are left for future definition."
 SYNTAX Integer32 (0..30)

-- OSPF General Variables

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-- Note: These parameters apply globally to the Router's
-- OSPF Process.

ospfGeneralGroup OBJECT IDENTIFIER ::= { ospf 1 }

ospfRouterId OBJECT-TYPE

SYNTAX RouterID

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"A 32-bit integer uniquely identifying the
router in the Autonomous System.

By convention, to ensure uniqueness, this
should default to the value of one of the
router's IP interface addresses."

REFERENCE

"OSPF Version 2, C.1 Global parameters"

::= { ospfGeneralGroup 1 }

ospfAdminStat OBJECT-TYPE

SYNTAX Status

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The administrative status of OSPF in the
router. The value 'enabled' denotes that the
OSPF Process is active on at least one inter-
face; 'disabled' disables it on all inter-
faces."

::= { ospfGeneralGroup 2 }

ospfVersionNumber OBJECT-TYPE

SYNTAX INTEGER { version2 (2) }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The current version number of the OSPF proto-
col is 2."

REFERENCE

"OSPF Version 2, Title"

::= { ospfGeneralGroup 3 }

ospfAreaBdrRtrStatus OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A flag to note whether this router is an area

border router."

REFERENCE

"OSPF Version 2, [Section 3](#) Splitting the AS into

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Areas"
 ::= { ospfGeneralGroup 4 }

ospfASBdrRtrStatus OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "A flag to note whether this router is configured as an Autonomous System border router."
REFERENCE
 "OSPF Version 2, [Section 3.3](#) Classification of routers"
 ::= { ospfGeneralGroup 5 }

ospfExternLsaCount OBJECT-TYPE
SYNTAX Gauge32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of external (LS type 5) link-state advertisements in the link-state database."
REFERENCE
 "OSPF Version 2, [Appendix A.4.5](#) AS external link advertisements"
 ::= { ospfGeneralGroup 6 }

ospfExternLsaCksumSum OBJECT-TYPE
SYNTAX Integer32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The 32-bit unsigned sum of the LS checksums of the external link-state advertisements contained in the link-state database. This sum can be used to determine if there has been a change in a router's link state database, and to compare the link-state database of two routers."
 ::= { ospfGeneralGroup 7 }

ospfTOSSupport OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-write
STATUS current
DESCRIPTION
 "The router's support for type-of-service routing."

REFERENCE

"OSPF Version 2, [Appendix F.1.2](#) Optional TOS support"

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```
::= { ospfGeneralGroup 8 }
```

```
ospfOriginateNewLsas OBJECT-TYPE
```

```
SYNTAX Counter32
```

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

```
STATUS current
```

```
DESCRIPTION
```

"The number of new link-state advertisements that have been originated. This number is incremented each time the router originates a new LSA."

```
::= { ospfGeneralGroup 9 }
```

```
ospfRxNewLsas OBJECT-TYPE
```

```
SYNTAX Counter32
```

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

```
STATUS current
```

```
DESCRIPTION
```

"The number of link-state advertisements received determined to be new instantiations. This number does not include newer instantiations of self-originated link-state advertisements."

```
::= { ospfGeneralGroup 10 }
```

```
ospfExtLsdbLimit OBJECT-TYPE
```

```
SYNTAX Integer32 (-1..'7FFFFFFF'h)
```

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

```
STATUS current
```

```
DESCRIPTION
```

"The maximum number of non-default AS-external-LSAs entries that can be stored in the link-state database. If the value is -1, then there is no limit."

When the number of non-default AS-external-LSAs in a router's link-state database reaches ospfExtLsdbLimit, the router enters Overflow-State. The router never holds more than ospfExtLsdbLimit non-default AS-external-LSAs in its database. OspfExtLsdbLimit MUST be set identically in all routers attached to the OSPF backbone and/or any regular OSPF area. (i.e., OSPF stub areas and NSSAs are excluded)."

```
DEFVAL { -1 }
```

```
::= { ospfGeneralGroup 11 }
```

```
ospfMulticastExtensions OBJECT-TYPE
```

SYNTAX	Integer32
MAX-ACCESS	read-write
STATUS	current

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DESCRIPTION

"A Bit Mask indicating whether the router is forwarding IP multicast (Class D) datagrams based on the algorithms defined in the Multicast Extensions to OSPF.

Bit 0, if set, indicates that the router can forward IP multicast datagrams in the router's directly attached areas (called intra-area multicast routing).

Bit 1, if set, indicates that the router can forward IP multicast datagrams between OSPF areas (called inter-area multicast routing).

Bit 2, if set, indicates that the router can forward IP multicast datagrams between Autonomous Systems (called inter-AS multicast routing).

Only certain combinations of bit settings are allowed, namely: 0 (no multicast forwarding is enabled), 1 (intra-area multicasting only), 3 (intra-area and inter-area multicasting), 5 (intra-area and inter-AS multicasting) and 7 (multicasting everywhere). By default, no multicast forwarding is enabled."

DEFVAL { 0 }

::= { ospfGeneralGroup 12 }

ospfExitOverflowInterval OBJECT-TYPE

SYNTAX PositiveInteger

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The number of seconds that, after entering OverflowState, a router will attempt to leave OverflowState. This allows the router to again originate non-default AS-external-LSAs. When set to 0, the router will not leave OverflowState until restarted."

DEFVAL { 0 }

::= { ospfGeneralGroup 13 }

ospfDemandExtensions OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The router's support for demand routing."

REFERENCE

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"Extending OSPF to Support Demand Circuits"
::= { ospfGeneralGroup 14 }

ospfRFC1583Compatibility OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Indicates metrics used to choose among multiple AS-external-LSAs. When RFC1583Compatibility is set to enabled, only cost will be used when choosing among multiple AS-external-LSAs advertising the same destination. When RFC1583Compatibility is set to disabled, preference will be driven first by type of path using cost only to break ties."

REFERENCE

"OSPF Version 2, [Section 16.4.1](#) External path preferences"

::= { ospfGeneralGroup 15 }

ospfOpaqueLsaSupport OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The router's support for Opaque LSA types."

REFERENCE

"The OSPF Opaque LSA Option"

::= { ospfGeneralGroup 16 }

ospfTrafficEngineeringSupport OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The router's support for OSPF traffic engineering."

::= { ospfGeneralGroup 17 }

ospfAsOpaqueLsdbLimit OBJECT-TYPE

SYNTAX Integer32 (-1..'7FFFFFFF'h)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The maximum number of type-11 Opaque LSA entries that can be stored in the link-state database. If the value is -1, then there is no limit."

When the number of type-11 Opaque LSAs in a router's link-state database reaches

ospfAsOpaqueLsdbLimit, the router enters Overflow-
State. The router never holds more than
ospfAsOpaqueLsdbLimit type-11 Opaque LSAs

```
        in its database. OspfAsOpaqueLsdbLimit MUST be set
        identically in all routers in the OSPF domain."
    DEFVAL { -1 }
    ::= { ospfGeneralGroup 18 }
```

-- OSPF Area Data Structure

```
-- The OSPF Area Data Structure contains information
-- regarding the various areas. The interfaces and
-- virtual links are configured as part of these areas.
-- Area 0.0.0.0, by definition, is the Backbone Area
```

ospfAreaTable OBJECT-TYPE

```
    SYNTAX          SEQUENCE OF OspfAreaEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "Information describing the configured parameters and cumulative
        statistics of the router's attached areas."
    REFERENCE
        "OSPF Version 2, Section 6 The Area Data Structure"
    ::= { ospf 2 }
```

ospfAreaEntry OBJECT-TYPE

```
    SYNTAX          OspfAreaEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "Information describing the configured parameters and cumulative
        statistics of one of the router's attached areas."
    INDEX { ospfAreaId }
    ::= { ospfAreaTable 1 }
```

OspfAreaEntry ::=

```
    SEQUENCE {
        ospfAreaId
            AreaID,
        ospfAuthType
            Integer32,
        ospfImportAsExtern
            INTEGER,
        ospfSpfRuns
            Counter32,
        ospfAreaBdrRtrCount
```

Gauge32,
ospfAsBdrRtrCount
Gauge32,

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```
    ospfAreaLsaCount
        Gauge32,
    ospfAreaLsaCksumSum
        Integer32,
    ospfAreaSummary
        INTEGER,
    ospfAreaStatus
        RowStatus
    ospfAreaNssaTranslatorRole
        INTEGER,
    ospfAreaNssaTranslatorState
        INTEGER,
    ospfAreaNssaTranslatorStabilityInterval
        PositiveInteger,
    ospfAreaNssaTranslatorEvents
        Counter32
}
```

ospfAreaId OBJECT-TYPE

```
SYNTAX      AreaID
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "A 32-bit integer uniquely identifying an area.
    Area ID 0.0.0.0 is used for the OSPF backbone."
REFERENCE
    "OSPF Version 2, Appendix C.2 Area parameters"
::= { ospfAreaEntry 1 }
```

ospfAuthType OBJECT-TYPE

```
SYNTAX      Integer32
            -- none (0),
            -- simplePassword (1)
            -- md5 (2)
            -- reserved for specification by IANA (> 2)
MAX-ACCESS  read-create
STATUS      obsolete
DESCRIPTION
    "The authentication type specified for an area.
    Additional authentication types may be assigned
    locally on a per Area basis."
REFERENCE
    "OSPF Version 2, Appendix D Authentication"
DEFVAL { 0 } -- no authentication, by default
::= { ospfAreaEntry 2 }
```

ospfImportAsExtern OBJECT-TYPE

```
SYNTAX      INTEGER {
```

```
importExternal (1),  
importNoExternal (2),  
importNssa (3)
```

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```
    }
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "Indicates whether an area is a Stub area, NSSA, or standard
    area. Type-5 AS-External LSAs and Type-11 Opaque LSAs are
    not imported into Stub Areas or NSSAs. NSSAs import AS-
    External data as Type-7 LSAs"
REFERENCE
    "OSPF Version 2, Appendix C.2 Area parameters"
DEFVAL { importExternal }
::= { ospfAreaEntry 3 }
```

ospfSpfRuns OBJECT-TYPE

```
SYNTAX          Counter32
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
    "The number of times that the intra-area route
    table has been calculated using this area's
    link-state database. This is typically done
    using Dijkstra's algorithm."
::= { ospfAreaEntry 4 }
```

ospfAreaBdrRtrCount OBJECT-TYPE

```
SYNTAX          Gauge32
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
    "The total number of area border routers reach-
    able within this area. This is initially zero,
    and is calculated in each SPF Pass."
::= { ospfAreaEntry 5 }
```

ospfAsBdrRtrCount OBJECT-TYPE

```
SYNTAX          Gauge32
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
    "The total number of Autonomous System border
    routers reachable within this area. This is
    initially zero, and is calculated in each SPF
    Pass."
::= { ospfAreaEntry 6 }
```

ospfAreaLsaCount OBJECT-TYPE

```
SYNTAX          Gauge32
MAX-ACCESS      read-only
```

STATUS current

DESCRIPTION

"The total number of link-state advertisements

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in this area's link-state database, excluding
AS External LSA's."
::= { ospfAreaEntry 7 }

ospfAreaLsaCksumSum OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The 32-bit unsigned sum of the link-state advertisements' LS checksums contained in this area's link-state database. This sum excludes external (LS type 5) link-state advertisements. The sum can be used to determine if there has been a change in a router's link state database, and to compare the link-state database of two routers."

DEFVAL { 0 }

::= { ospfAreaEntry 8 }

ospfAreaSummary OBJECT-TYPE

SYNTAX INTEGER {
noAreaSummary (1),
sendAreaSummary (2)
}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The variable ospfAreaSummary controls the import of summary LSAs into stub and NSSA areas. It has no effect on other areas.

If it is noAreaSummary, the router will neither originate nor propagate summary LSAs into the stub or NSSA area. It will rely entirely on its default route.

If it is sendAreaSummary, the router will both summarize and propagate summary LSAs."

DEFVAL { noAreaSummary }

::= { ospfAreaEntry 9 }

ospfAreaStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This variable displays the status of the en-

try. Setting it to 'invalid' has the effect of rendering it inoperative. The internal effect (row removal) is implementation dependent."

```
::= { ospfAreaEntry 10 }
```

ospfAreaNssaTranslatorRole OBJECT-TYPE

SYNTAX INTEGER { always (1), candidate (2) }

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Indicates an NSSA Border router's ability to perform NSSA translation of type-7 LSAs into type-5 LSAs."

DEFVAL { candidate }

```
::= { ospfAreaEntry 11 }
```

ospfAreaNssaTranslatorState OBJECT-TYPE

SYNTAX INTEGER { enabled (1),
elected (2),
disabled (3)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates if and how an NSSA Border router is performing NSSA translation of type-7 LSAs into type-5 LSAs. When this object set to enabled, the NSSA Border router's OspfAreaNssaExtTranslatorRole has been set to always. When this object is set to elected, a candidate NSSA Border router is Translating type-7 LSAs into type-5. When this object is set to disabled, a candidate NSSA Border router is NOT translating type-7 LSAs into type-5."

```
::= { ospfAreaEntry 12 }
```

ospfAreaNssaTranslatorStabilityInterval OBJECT-TYPE

SYNTAX PositiveInteger

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"The number of seconds after an elected translator determines its services are no longer required, that it should continue to perform its translation duties."

DEFVAL { 40 }

```
::= { ospfAreaEntry 13 }
```

ospfAreaNssaTranslatorEvents OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the number of Translator State changes

```
that have occurred since the last boot-up."  
::= { ospfAreaEntry 14 }
```

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```
-- OSPF Area Default Metric Table

-- The OSPF Area Default Metric Table describes the metrics
-- that a default Area Border Router will advertise into a
-- Stub area.
```

```
ospfStubAreaTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF OspfStubAreaEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The set of metrics that will be advertised by
        a default Area Border Router into a stub area."
    REFERENCE
        "OSPF Version 2, Appendix C.2, Area Parameters"
    ::= { ospf 3 }
```

```
ospfStubAreaEntry OBJECT-TYPE
    SYNTAX      OspfStubAreaEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The metric for a given Type of Service that
        will be advertised by a default Area Border
        Router into a stub area."
    REFERENCE
        "OSPF Version 2, Appendix C.2, Area Parameters"
    INDEX { ospfStubAreaId, ospfStubTOS }
    ::= { ospfStubAreaTable 1 }
```

```
OspfStubAreaEntry ::=
    SEQUENCE {
        ospfStubAreaId
            AreaID,
        ospfStubTOS
            TOSType,
        ospfStubMetric
            BigMetric,
        ospfStubStatus
            RowStatus,
        ospfStubMetricType
            INTEGER
    }
```

```
ospfStubAreaId OBJECT-TYPE
    SYNTAX      AreaID
    MAX-ACCESS  read-only
```

STATUS current

DESCRIPTION

"The 32 bit identifier for the Stub Area. On

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creation, this can be derived from the instance."

::= { ospfStubAreaEntry 1 }

ospfStubTOS OBJECT-TYPE

SYNTAX TOSType

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Type of Service associated with the metric. On creation, this can be derived from the instance."

::= { ospfStubAreaEntry 2 }

ospfStubMetric OBJECT-TYPE

SYNTAX BigMetric

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The metric value applied at the indicated type of service. By default, this equals the least metric at the type of service among the interfaces to other areas."

::= { ospfStubAreaEntry 3 }

ospfStubStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This variable displays the status of the entry. Setting it to 'invalid' has the effect of rendering it inoperative. The internal effect (row removal) is implementation dependent."

::= { ospfStubAreaEntry 4 }

ospfStubMetricType OBJECT-TYPE

SYNTAX INTEGER {
ospfMetric (1), -- OSPF Metric
comparableCost (2), -- external type 1
nonComparable (3) -- external type 2
}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This variable displays the type of metric advertised as a default route."

DEFVAL { ospfMetric }

```
::= { ospfStubAreaEntry 5 }
```

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-- OSPF Link State Database

-- The Link State Database contains the Link State
-- Advertisements from throughout the areas that the
-- device is attached to.

ospfLsdbTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfLsdbEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The OSPF Process's Link State Database."

REFERENCE

"OSPF Version 2, [Section 12](#) Link State Adver-
tisements"

::= { ospf 4 }

ospfLsdbEntry OBJECT-TYPE

SYNTAX OspfLsdbEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A single Link State Advertisement."

INDEX { ospfLsdbAreaId, ospfLsdbType,
ospfLsdbLsid, ospfLsdbRouterId }

::= { ospfLsdbTable 1 }

OspfLsdbEntry ::=

SEQUENCE {

ospfLsdbAreaId

AreaID,

ospfLsdbType

INTEGER,

ospfLsdbLsid

IpAddress,

ospfLsdbRouterId

RouterID,

ospfLsdbSequence

Integer32,

ospfLsdbAge

Integer32,

ospfLsdbChecksum

Integer32,

ospfLsdbAdvertisement

OCTET STRING

}

ospfLsdbAreaId OBJECT-TYPE

SYNTAX	AreaID
MAX-ACCESS	read-only
STATUS	current

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DESCRIPTION

"The 32 bit identifier of the Area from which the LSA was received."

REFERENCE

"OSPF Version 2, [Appendix C.2](#) Area parameters"

::= { ospfLsdbEntry 1 }

-- Note: External Link State Advertisements are permitted
-- for backward compatibility, but should be displayed in
-- the ospfExtLsdbTable rather than here.

ospfLsdbType OBJECT-TYPE

SYNTAX INTEGER {
 routerLink (1),
 networkLink (2),
 summaryLink (3),
 asSummaryLink (4),
 asExternalLink (5), -- but see ospfExtLsdbTable
 multicastLink (6),
 nssaExternalLink (7),
 areaOpaqueLink (10)
}

MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The type of the link state advertisement.
Each link state type has a separate advertisement format."

REFERENCE

"OSPF Version 2, [Appendix A.4.1](#) The Link State Advertisement header"

::= { ospfLsdbEntry 2 }

ospfLsdbLsid OBJECT-TYPE

SYNTAX IpAddress
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The Link State ID is an LS Type Specific field containing either a Router ID or an IP Address; it identifies the piece of the routing domain that is being described by the advertisement."

REFERENCE

"OSPF Version 2, [Section 12.1.4](#) Link State ID"

::= { ospfLsdbEntry 3 }

ospfLsdbRouterId OBJECT-TYPE

SYNTAX RouterID

MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	

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"The 32 bit number that uniquely identifies the
originating router in the Autonomous System."

REFERENCE

"OSPF Version 2, [Appendix C.1](#) Global parameters"
::= { ospfLsdbEntry 4 }

-- Note that the OSPF Sequence Number is a 32 bit signed
-- integer. It starts with the value '80000001'h,
-- or -'7FFFFFFF'h, and increments until '7FFFFFFF'h
-- Thus, a typical sequence number will be very negative.

ospfLsdbSequence OBJECT-TYPE

SYNTAX Integer32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The sequence number field is a signed 32-bit
integer. It is used to detect old and dupli-
cate link state advertisements. The space of
sequence numbers is linearly ordered. The
larger the sequence number the more recent the
advertisement."

REFERENCE

"OSPF Version 2, [Section 12.1.6](#) LS sequence
number"
::= { ospfLsdbEntry 5 }

ospfLsdbAge OBJECT-TYPE

SYNTAX Integer32 -- Should be 0..MaxAge, except when
-- doNotAge bit is set
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"This field is the age of the link state adver-
tisement in seconds."

REFERENCE

"OSPF Version 2, [Section 12.1.1](#) LS age"
::= { ospfLsdbEntry 6 }

ospfLsdbChecksum OBJECT-TYPE

SYNTAX Integer32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"This field is the checksum of the complete
contents of the advertisement, excepting the
age field. The age field is excepted so that
an advertisement's age can be incremented

without updating the checksum. The checksum used is the same that is used for ISO connectionless datagrams; it is commonly referred to

as the Fletcher checksum."

REFERENCE

"OSPF Version 2, [Section 12.1.7](#) LS checksum"

::= { ospfLsdbEntry 7 }

ospfLsdbAdvertisement OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (1..65535))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The entire Link State Advertisement, including its header."

REFERENCE

"OSPF Version 2, [Section 12](#) Link State Advertisements"

::= { ospfLsdbEntry 8 }

-- Address Range Table

-- The Address Range Table acts as an adjunct to the Area
-- Table; It describes those Address Range Summaries that
-- are configured to be propagated from an Area to reduce
-- the amount of information about it which is known beyond
-- its borders.

ospfAreaRangeTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfAreaRangeEntry

MAX-ACCESS not-accessible

STATUS obsolete

DESCRIPTION

"A range of IP addresses specified by an IP address/IP network mask pair. For example, class B address range of X.X.X.X with a network mask of 255.255.0.0 includes all IP addresses from X.X.0.0 to X.X.255.255"

REFERENCE

"OSPF Version 2, [Appendix C.2](#) Area parameters"

::= { ospf 5 }

ospfAreaRangeEntry OBJECT-TYPE

SYNTAX OspfAreaRangeEntry

MAX-ACCESS not-accessible

STATUS obsolete

DESCRIPTION

"A range of IP addresses specified by an IP address/IP network mask pair. For example, class B address range of X.X.X.X with a network

mask of 255.255.0.0 includes all IP addresses
from X.X.0.0 to X.X.255.255"
REFERENCE

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"OSPF Version 2, [Appendix C.2](#) Area parameters"
INDEX { ospfAreaRangeAreaId, ospfAreaRangeNet }
::= { ospfAreaRangeTable 1 }

OspfAreaRangeEntry ::=

```
SEQUENCE {
    ospfAreaRangeAreaId
        AreaID,
    ospfAreaRangeNet
        IPAddress,
    ospfAreaRangeMask
        IPAddress,
    ospfAreaRangeStatus
        RowStatus,
    ospfAreaRangeEffect
        INTEGER
}
```

ospfAreaRangeAreaId OBJECT-TYPE
SYNTAX AreaID
MAX-ACCESS read-only
STATUS obsolete
DESCRIPTION
"The Area the Address Range is to be found
within."
REFERENCE
"OSPF Version 2, [Appendix C.2](#) Area parameters"
::= { ospfAreaRangeEntry 1 }

ospfAreaRangeNet OBJECT-TYPE
SYNTAX IPAddress
MAX-ACCESS read-only
STATUS obsolete
DESCRIPTION
"The IP Address of the Net or Subnet indicated
by the range."
REFERENCE
"OSPF Version 2, [Appendix C.2](#) Area parameters"
::= { ospfAreaRangeEntry 2 }

ospfAreaRangeMask OBJECT-TYPE
SYNTAX IPAddress
MAX-ACCESS read-create
STATUS obsolete
DESCRIPTION
"The Subnet Mask that pertains to the Net or
Subnet."
REFERENCE

"OSPF Version 2, [Appendix C.2](#) Area parameters"
::= { ospfAreaRangeEntry 3 }

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ospfAreaRangeStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS obsolete

DESCRIPTION

"This variable displays the status of the entry. Setting it to 'invalid' has the effect of rendering it inoperative. The internal effect (row removal) is implementation dependent."

::= { ospfAreaRangeEntry 4 }

ospfAreaRangeEffect OBJECT-TYPE

SYNTAX INTEGER {

advertiseMatching (1),

doNotAdvertiseMatching (2)

}

MAX-ACCESS read-create

STATUS obsolete

DESCRIPTION

"Subnets subsumed by ranges either trigger the advertisement of the indicated summary (advertiseMatching), or result in the subnet's not being advertised at all outside the area."

DEFVAL { advertiseMatching }

::= { ospfAreaRangeEntry 5 }

-- OSPF Host Table

-- The Host/Metric Table indicates what hosts are directly
-- attached to the Router, what metrics and types of
-- service should be advertised for them and what Areas they
-- are found within.

ospfHostTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfHostEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The list of Hosts, and their metrics, that the router will advertise as host routes."

REFERENCE

"OSPF Version 2, [Appendix C.7](#) Host route parameters"

::= { ospf 6 }

ospfHostEntry OBJECT-TYPE

SYNTAX OspfHostEntry

MAX-ACCESS	not-accessible
STATUS	current
DESCRIPTION	

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"A metric to be advertised, for a given type of service, when a given host is reachable."
INDEX { ospfHostIpAddress, ospfHostTOS }
::= { ospfHostTable 1 }

OspfHostEntry ::=
SEQUENCE {
 ospfHostIpAddress
 IpAddress,
 ospfHostTOS
 TOSType,
 ospfHostMetric
 Metric,
 ospfHostStatus
 RowStatus,
 ospfHostAreaID
 AreaID
}

ospfHostIpAddress OBJECT-TYPE
SYNTAX IpAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The IP Address of the Host."
REFERENCE
 "OSPF Version 2, [Appendix C.7](#) Host route parameters"
::= { ospfHostEntry 1 }

ospfHostTOS OBJECT-TYPE
SYNTAX TOSType
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The Type of Service of the route being configured."
REFERENCE
 "OSPF Version 2, [Appendix C.7](#) Host route parameters"
::= { ospfHostEntry 2 }

ospfHostMetric OBJECT-TYPE
SYNTAX Metric
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The Metric to be advertised."

REFERENCE

"OSPF Version 2, [Appendix C.7](#) Host route parameters"

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```
:= { ospfHostEntry 3 }
```

```
ospfHostStatus OBJECT-TYPE
```

```
SYNTAX      RowStatus
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"This variable displays the status of the en-
try. Setting it to 'invalid' has the effect of
rendering it inoperative. The internal effect
(row removal) is implementation dependent."
```

```
::= { ospfHostEntry 4 }
```

```
ospfHostAreaID OBJECT-TYPE
```

```
SYNTAX      AreaID
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The Area the Host Entry is to be found within."
```

```
REFERENCE
```

```
"OSPF Version 2, Appendix C.7 Host parameters"
```

```
::= { ospfHostEntry 5 }
```

```
-- OSPF Interface Table
```

```
-- The OSPF Interface Table augments the ipAddrTable
```

```
-- with OSPF specific information.
```

```
ospfIfTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF OspfIfEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The OSPF Interface Table describes the inter-
faces from the viewpoint of OSPF."
```

```
REFERENCE
```

```
"OSPF Version 2, Appendix C.3 Router interface
parameters"
```

```
::= { ospf 7 }
```

```
ospfIfEntry OBJECT-TYPE
```

```
SYNTAX      OspfIfEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
"The OSPF Interface Entry describes one inter-
face from the viewpoint of OSPF."
```

```
INDEX { ospfIfIpAddress, ospfAddressLessIf }  
::= { ospfIfTable 1 }
```

```
OspfIfEntry ::=
    SEQUENCE {
        ospfIfIpAddress
            IPAddress,
        ospfAddressLessIf
            Integer32,
        ospfIfAreaId
            AreaID,
        ospfIfType
            INTEGER,
        ospfIfAdminStat
            Status,
        ospfIfRtrPriority
            DesignatedRouterPriority,
        ospfIfTransitDelay
            UpToMaxAge,
        ospfIfRetransInterval
            UpToMaxAge,
        ospfIfHelloInterval
            HelloRange,
        ospfIfRtrDeadInterval
            PositiveInteger,
        ospfIfPollInterval
            PositiveInteger,
        ospfIfState
            INTEGER,
        ospfIfDesignatedRouter
            IPAddress,
        ospfIfBackupDesignatedRouter
            IPAddress,
        ospfIfEvents
            Counter32,
        ospfIfAuthType
            INTEGER,
        ospfIfAuthKey
            OCTET STRING,
        ospfIfStatus
            RowStatus,
        ospfIfMulticastForwarding
            INTEGER,
        ospfIfDemand
            TruthValue
        ospfIfLsaCount
            Gauge32,
        ospfIfLsaCksumSum
            Integer32
    }
```

ospfIfIpAddress OBJECT-TYPE
SYNTAX IpAddress

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```
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
    "The IP address of this OSPF interface."
::= { ospfIfEntry 1 }
```

ospfAddressLessIf OBJECT-TYPE

```
SYNTAX        Integer32
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION
    "For the purpose of easing the instancing of
    addressed and address less interfaces; This
    variable takes the value 0 on interfaces with
    IP Addresses, and the corresponding value of
    ifIndex for interfaces having no IP Address."
::= { ospfIfEntry 2 }
```

ospfIfAreaId OBJECT-TYPE

```
SYNTAX        AreaID
MAX-ACCESS    read-create
STATUS        current
DESCRIPTION
    "A 32-bit integer uniquely identifying the area
    to which the interface connects. Area ID
    0.0.0.0 is used for the OSPF backbone."
DEFVAL { '00000000'H } -- 0.0.0.0
::= { ospfIfEntry 3 }
```

ospfIfType OBJECT-TYPE

```
SYNTAX        INTEGER {
                    broadcast (1),
                    nbma (2),
                    pointToPoint (3),
                    pointToMultipoint (5)
                }
MAX-ACCESS    read-create
STATUS        current
DESCRIPTION
    "The OSPF interface type.
    By way of a default, this field may be intuited
    from the corresponding value of ifType. Broad-
    cast LANs, such as Ethernet and IEEE 802.5,
    take the value 'broadcast', X.25 and similar
    technologies take the value 'nbma', and links
    that are definitively point to point take the
    value 'pointToPoint'."
::= { ospfIfEntry 4 }
```

ospfIfAdminStat OBJECT-TYPE
SYNTAX Status

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MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The OSPF interface's administrative status.
 The value formed on the interface, and the in-
 terface will be advertised as an internal route
 to some area. The value 'disabled' denotes
 that the interface is external to OSPF."
DEFVAL { enabled }
::= { ospfIfEntry 5 }

ospfIfRtrPriority OBJECT-TYPE
SYNTAX DesignatedRouterPriority
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The priority of this interface. Used in
 multi-access networks, this field is used in
 the designated router election algorithm. The
 value 0 signifies that the router is not eligi-
 ble to become the designated router on this
 particular network. In the event of a tie in
 this value, routers will use their Router ID as
 a tie breaker."
DEFVAL { 1 }
::= { ospfIfEntry 6 }

ospfIfTransitDelay OBJECT-TYPE
SYNTAX UpToMaxAge
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The estimated number of seconds it takes to
 transmit a link state update packet over this
 interface."
DEFVAL { 1 }
::= { ospfIfEntry 7 }

ospfIfRetransInterval OBJECT-TYPE
SYNTAX UpToMaxAge
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The number of seconds between link-state ad-
 vertisement retransmissions, for adjacencies
 belonging to this interface. This value is
 also used when retransmitting database descrip-
 tion and link-state request packets."

```
DEFVAL { 5 }  
::= { ospfIfEntry 8 }
```

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ospfIfHelloInterval OBJECT-TYPE

SYNTAX HelloRange

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The length of time, in seconds, between the Hello packets that the router sends on the interface. This value must be the same for all routers attached to a common network."

DEFVAL { 10 }

::= { ospfIfEntry 9 }

ospfIfRtrDeadInterval OBJECT-TYPE

SYNTAX PositiveInteger

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The number of seconds that a router's Hello packets have not been seen before it's neighbors declare the router down. This should be some multiple of the Hello interval. This value must be the same for all routers attached to a common network."

DEFVAL { 40 }

::= { ospfIfEntry 10 }

ospfIfPollInterval OBJECT-TYPE

SYNTAX PositiveInteger

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The larger time interval, in seconds, between the Hello packets sent to an inactive non-broadcast multi-access neighbor."

DEFVAL { 120 }

::= { ospfIfEntry 11 }

ospfIfState OBJECT-TYPE

SYNTAX INTEGER {
 down (1),
 loopback (2),
 waiting (3),
 pointToPoint (4),
 designatedRouter (5),
 backupDesignatedRouter (6),
 otherDesignatedRouter (7)
}

MAX-ACCESS read-only

STATUS	current
DESCRIPTION	"The OSPF Interface State."

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```
DEFVAL { down }
::= { ospfIfEntry 12 }
```

ospfIfDesignatedRouter OBJECT-TYPE

```
SYNTAX      IPAddress
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The IP Address of the Designated Router."
DEFVAL { '00000000'H } -- 0.0.0.0
::= { ospfIfEntry 13 }
```

ospfIfBackupDesignatedRouter OBJECT-TYPE

```
SYNTAX      IPAddress
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The IP Address of the Backup Designated
    Router."
DEFVAL { '00000000'H } -- 0.0.0.0
::= { ospfIfEntry 14 }
```

ospfIfEvents OBJECT-TYPE

```
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of times this OSPF interface has
    changed its state, or an error has occurred."
::= { ospfIfEntry 15 }
```

ospfIfAuthType OBJECT-TYPE

```
SYNTAX      INTEGER (0..255)
            -- none (0),
            -- simplePassword (1)
            -- md5 (2)
            -- reserved for specification by IANA (> 2)
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The authentication type specified for an in-
    terface. Additional authentication types may
    be assigned locally."
REFERENCE
    "OSPF Version 2, Appendix D Authentication"
DEFVAL { 0 } -- no authentication, by default
::= { ospfIfEntry 16 }
```

ospfIfAuthKey OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (0..256))

MAX-ACCESS read-create

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STATUS current

DESCRIPTION

"The Authentication Key. If the Area's Authorization Type is simplePassword, and the key length is shorter than 8 octets, the agent will left adjust and zero fill to 8 octets.

Note that unauthenticated interfaces need no authentication key, and simple password authentication cannot use a key of more than 8 octets. Larger keys are useful only with authentication mechanisms not specified in this document.

When read, ospfIfAuthKey always returns an Octet String of length zero."

REFERENCE

"OSPF Version 2, [Section 9](#) The Interface Data Structure"

DEFVAL { '0000000000000000'H } -- 0.0.0.0.0.0.0.0
::= { ospfIfEntry 17 }

ospfIfStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This variable displays the status of the entry. Setting it to 'invalid' has the effect of rendering it inoperative. The internal effect (row removal) is implementation dependent."

::= { ospfIfEntry 18 }

ospfIfMulticastForwarding OBJECT-TYPE

SYNTAX INTEGER {
 blocked (1), -- no multicast forwarding
 multicast (2), -- using multicast address
 unicast (3) -- to each OSPF neighbor
}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The way multicasts should be forwarded on this interface; not forwarded, forwarded as data link multicasts, or forwarded as data link unicasts. Data link multicasting is not meaningful on point to point and NBMA interfaces, and setting ospfMulticastForwarding to 0 effective-

```
ly disables all multicast forwarding."  
DEFVAL { blocked }  
::= { ospfIfEntry 19 }
```

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ospfIfDemand OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Indicates whether Demand OSPF procedures (hello suppression to FULL neighbors and setting the DoNotAge flag on propagated LSAs) should be performed on this interface."

DEFVAL { false }

::= { ospfIfEntry 20 }

ospfIfLsaCount OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of link-local link state advertisements in this interface's link-local link state database."

::= { ospfIfEntry 21 }

ospfIfLsaChecksumSum OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The 32-bit unsigned sum of the link-state advertisements' LS checksums contained in this interface's link-local link state database.

The sum can be used to determine if there has been a change in the interface's link state database, and to compare the interface link-state database of routers attached to the same subnet."

::= { ospfIfEntry 22 }

-- OSPF Interface Metric Table

-- The Metric Table describes the metrics to be advertised
-- for a specified interface at the various types of service.
-- As such, this table is an adjunct of the OSPF Interface
-- Table.

-- Types of service, as defined by [RFC 791](#), have the ability
-- to request low delay, high bandwidth, or reliable linkage.

-- For the purposes of this specification, the measure of
-- bandwidth:

-- Metric = 10^8 / ifSpeed

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-- is the default value. For multiple link interfaces, note
-- that ifSpeed is the sum of the individual link speeds.
-- This yields a number having the following typical values:

Network Type/bit rate	Metric
>= 100 MBPS	1
Ethernet/802.3	10
E1	48
T1 (ESF)	65
64 Kbps	1562
56 Kbps	1785
19.2 Kbps	5208
9.6 Kbps	10416

-- Routes that are not specified use the default (TOS 0) metric

ospfIfMetricTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfIfMetricEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The TOS metrics for a non-virtual interface
identified by the interface index."

REFERENCE

"OSPF Version 2, [Appendix C.3](#) Router interface
parameters"

::= { ospf 8 }

ospfIfMetricEntry OBJECT-TYPE

SYNTAX OspfIfMetricEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A particular TOS metric for a non-virtual in-
terface identified by the interface index."

REFERENCE

"OSPF Version 2, [Appendix C.3](#) Router interface
parameters"

INDEX { ospfIfMetricIpAddress,
ospfIfMetricAddressLessIf,
ospfIfMetricTOS }

::= { ospfIfMetricTable 1 }

OspfIfMetricEntry ::=

SEQUENCE {

ospfIfMetricIpAddress

IpAddress,
ospfIfMetricAddressLessIf
Integer32,

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```
    ospfIfMetricTOS
        TOSType,
    ospfIfMetricValue
        Metric,
    ospfIfMetricStatus
        RowStatus
}
```

ospfIfMetricIpAddress OBJECT-TYPE

```
SYNTAX      IpAddress
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The IP address of this OSPF interface. On row
    creation, this can be derived from the in-
    stance."
::= { ospfIfMetricEntry 1 }
```

ospfIfMetricAddressLessIf OBJECT-TYPE

```
SYNTAX      Integer32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "For the purpose of easing the instancing of
    addressed and addressless interfaces; This
    variable takes the value 0 on interfaces with
    IP Addresses, and the value of ifIndex for in-
    terfaces having no IP Address. On row crea-
    tion, this can be derived from the instance."
::= { ospfIfMetricEntry 2 }
```

ospfIfMetricTOS OBJECT-TYPE

```
SYNTAX      TOSType
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The type of service metric being referenced.
    On row creation, this can be derived from the
    instance."
::= { ospfIfMetricEntry 3 }
```

ospfIfMetricValue OBJECT-TYPE

```
SYNTAX      Metric
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The metric of using this type of service on
    this interface. The default value of the TOS 0
```

```
    Metric is 10^8 / ifSpeed."  
 ::= { ospfIfMetricEntry 4 }
```

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ospfIfMetricStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This variable displays the status of the entry. Setting it to 'invalid' has the effect of rendering it inoperative. The internal effect (row removal) is implementation dependent."

::= { ospfIfMetricEntry 5 }

-- OSPF Virtual Interface Table

-- The Virtual Interface Table describes the virtual
-- links that the OSPF Process is configured to
-- carry on.

ospfVirtIfTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfVirtIfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about this router's virtual interfaces."

REFERENCE

"OSPF Version 2, [Appendix C.4](#) Virtual link parameters"

::= { ospf 9 }

ospfVirtIfEntry OBJECT-TYPE

SYNTAX OspfVirtIfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about a single Virtual Interface."

INDEX { ospfVirtIfAreaId, ospfVirtIfNeighbor }

::= { ospfVirtIfTable 1 }

OspfVirtIfEntry ::=

SEQUENCE {

ospfVirtIfAreaId

AreaID,

ospfVirtIfNeighbor

RouterID,

ospfVirtIfTransitDelay

UpToMaxAge,

ospfVirtIfRetransInterval

```
UpToMaxAge,  
ospfVirtIfHelloInterval  
HelloRange,
```

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```
ospfVirtIfRtrDeadInterval
    PositiveInteger,
ospfVirtIfState
    INTEGER,
ospfVirtIfEvents
    Counter32,
ospfVirtIfAuthType
    INTEGER,
ospfVirtIfAuthKey
    OCTET STRING,
ospfVirtIfStatus
    rowStatus
ospfVirtIfLsaCount
    Gauge32,
ospfVirtIfLsaCksumSum
    Integer32
}
```

ospfVirtIfAreaId OBJECT-TYPE

```
SYNTAX      AreaID
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The Transit Area that the Virtual Link
    traverses. By definition, this is not 0.0.0.0"
 ::= { ospfVirtIfEntry 1 }
```

ospfVirtIfNeighbor OBJECT-TYPE

```
SYNTAX      RouterID
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The Router ID of the Virtual Neighbor."
 ::= { ospfVirtIfEntry 2 }
```

ospfVirtIfTransitDelay OBJECT-TYPE

```
SYNTAX      UpToMaxAge
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The estimated number of seconds it takes to
    transmit a link-state update packet over this
    interface."
DEFVAL { 1 }
 ::= { ospfVirtIfEntry 3 }
```

ospfVirtIfRetransInterval OBJECT-TYPE

```
SYNTAX      UpToMaxAge
```

MAX-ACCESS	read-create
STATUS	current
DESCRIPTION	

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"The number of seconds between link-state advertisement retransmissions, for adjacencies belonging to this interface. This value is also used when retransmitting database description and link-state request packets. This value should be well over the expected round-trip time."

DEFVAL { 5 }

::= { ospfVirtIfEntry 4 }

ospfVirtIfHelloInterval OBJECT-TYPE

SYNTAX HelloRange

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The length of time, in seconds, between the Hello packets that the router sends on the interface. This value must be the same for the virtual neighbor."

DEFVAL { 10 }

::= { ospfVirtIfEntry 5 }

ospfVirtIfRtrDeadInterval OBJECT-TYPE

SYNTAX PositiveInteger

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The number of seconds that a router's Hello packets have not been seen before it's neighbors declare the router down. This should be some multiple of the Hello interval. This value must be the same for the virtual neighbor."

DEFVAL { 60 }

::= { ospfVirtIfEntry 6 }

ospfVirtIfState OBJECT-TYPE

SYNTAX INTEGER {
 down (1), -- these use the same encoding
 pointToPoint (4) -- as the ospfIfTable
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"OSPF virtual interface states."

DEFVAL { down }

::= { ospfVirtIfEntry 7 }

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

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```
STATUS      current
DESCRIPTION
    "The number of state changes or error events on
    this Virtual Link"
 ::= { ospfVirtIfEntry 8 }

ospfVirtIfAuthKey OBJECT-TYPE
SYNTAX      OCTET STRING (SIZE(0..256))
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "If Authentication Type is simplePassword, the
    device will left adjust and zero fill to 8 oc-
    tets.

    Note that unauthenticated interfaces need no
    authentication key, and simple password authen-
    tication cannot use a key of more than 8 oc-
    tets. Larger keys are useful only with authen-
    tication mechanisms not specified in this docu-
    ment.

    When read, ospfVifAuthKey always returns a
    string of length zero."
REFERENCE
    "OSPF Version 2, Section 9 The Interface Data
    Structure"
DEFVAL { '0000000000000000'H } -- 0.0.0.0.0.0.0.0
 ::= { ospfVirtIfEntry 9 }

ospfVirtIfStatus OBJECT-TYPE
SYNTAX      RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This variable displays the status of the en-
    try. Setting it to 'invalid' has the effect of
    rendering it inoperative. The internal effect
    (row removal) is implementation dependent."
 ::= { ospfVirtIfEntry 10 }

ospfVirtIfAuthType OBJECT-TYPE
SYNTAX      INTEGER (0..255)
            -- none (0),
            -- simplePassword (1)
            -- md5 (2)
            -- reserved for specification by IANA (> 2)
MAX-ACCESS  read-create
```

STATUS current

DESCRIPTION

"The authentication type specified for a virtu-

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al interface. Additional authentication types
may be assigned locally."

REFERENCE

"OSPF Version 2, [Appendix E](#) Authentication"

DEFVAL { 0 } -- no authentication, by default

::= { ospfVirtIfEntry 11 }

ospfVirtIfLsaCount OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The total number of link-local link state advertisements
in this virtual interface's link-local link state database."

::= { ospfVirtIfEntry 12 }

ospfVirtIfLsaChecksumSum OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The 32-bit unsigned sum of the link-state ad-
vertisements' LS checksums contained in this
virtual interface's link-local link state database.

The sum can be used to determine if there has
been a change in the virtual interface's link state data-
base, and to compare the virtual interface link-state
database of the virtual neighbors."

::= { ospfVirtIfEntry 13 }

-- OSPF Neighbor Table

-- The OSPF Neighbor Table describes all neighbors in
-- the locality of the subject router.

ospfNbrTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfNbrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table of non-virtual neighbor information."

REFERENCE

"OSPF Version 2, [Section 10](#) The Neighbor Data
Structure"

::= { ospf 10 }

ospfNbrEntry OBJECT-TYPE

SYNTAX	OspfNbrEntry
MAX-ACCESS	not-accessible
STATUS	current

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DESCRIPTION

"The information regarding a single neighbor."

REFERENCE

"OSPF Version 2, [Section 10](#) The Neighbor Data Structure"

INDEX { ospfNbrIpAddress, ospfNbrAddressLessIndex }
 ::= { ospfNbrTable 1 }

OspfNbrEntry ::=

```
SEQUENCE {  
    ospfNbrIpAddress  
        IPAddress,  
    ospfNbrAddressLessIndex  
        InterfaceIndex,  
    ospfNbrRtrId  
        RouterID,  
    ospfNbrOptions  
        Integer32,  
    ospfNbrPriority  
        DesignatedRouterPriority,  
    ospfNbrState  
        INTEGER,  
    ospfNbrEvents  
        Counter32,  
    ospfNbrLsRetransQLen  
        Gauge32,  
    ospfNbmaNbrStatus  
        RowStatus,  
    ospfNbmaNbrPermanence  
        INTEGER,  
    ospfNbrHelloSuppressed  
        TruthValue  
}
```

ospfNbrIpAddress OBJECT-TYPE

```
SYNTAX      IPAddress  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The IP address this neighbor is using in its IP Source Address. Note that, on addressless links, this will not be 0.0.0.0, but the address of another of the neighbor's interfaces."

::= { ospfNbrEntry 1 }

ospfNbrAddressLessIndex OBJECT-TYPE

```
SYNTAX      InterfaceIndex  
MAX-ACCESS  read-only
```

STATUS current

DESCRIPTION

"On an interface having an IP Address, zero.

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On addressless interfaces, the corresponding value of ifIndex in the Internet Standard MIB. On row creation, this can be derived from the instance."

::= { ospfNbrEntry 2 }

ospfNbrRtrId OBJECT-TYPE

SYNTAX RouterID
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"A 32-bit integer (represented as a type IpAddress) uniquely identifying the neighboring router in the Autonomous System."

DEFVAL { '00000000'H } -- 0.0.0.0

::= { ospfNbrEntry 3 }

ospfNbrOptions OBJECT-TYPE

SYNTAX Integer32
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"A Bit Mask corresponding to the neighbor's options field.

Bit 0, if set, indicates that the system will operate on Type of Service metrics other than TOS 0. If zero, the neighbor will ignore all metrics except the TOS 0 metric.

Bit 1, if set, indicates that the associated area accepts and operates on external information; if zero, it is a stub area.

Bit 2, if set, indicates that the system is capable of routing IP Multicast datagrams; i.e., that it implements the Multicast Extensions to OSPF.

Bit 3, if set, indicates that the associated area is an NSSA. These areas are capable of carrying type 7 external advertisements, which are translated into type 5 external advertisements at NSSA borders."

REFERENCE

"OSPF Version 2, [Section 12.1.2](#) Options"

DEFVAL { 0 }

::= { ospfNbrEntry 4 }

ospfNbrPriority OBJECT-TYPE

SYNTAX DesignatedRouterPriority

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MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The priority of this neighbor in the designat-
 ed router election algorithm. The value 0 sig-
 nifies that the neighbor is not eligible to be-
 come the designated router on this particular
 network."
DEFVAL { 1 }
::= { ospfNbrEntry 5 }

ospfNbrState OBJECT-TYPE

SYNTAX INTEGER {
 down (1),
 attempt (2),
 init (3),
 twoWay (4),
 exchangeStart (5),
 exchange (6),
 loading (7),
 full (8)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The State of the relationship with this Neigh-
 bor."
REFERENCE
 "OSPF Version 2, [Section 10.1](#) Neighbor States"
DEFVAL { down }
::= { ospfNbrEntry 6 }

ospfNbrEvents OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of times this neighbor relationship
 has changed state, or an error has occurred."
::= { ospfNbrEntry 7 }

ospfNbrLsRetransQLen OBJECT-TYPE

SYNTAX Gauge32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The current length of the retransmission
 queue."

```
::= { ospfNbrEntry 8 }
```

```
ospfNbmaNbrStatus OBJECT-TYPE
```

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```
SYNTAX      RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This variable displays the status of the en-
    try. Setting it to 'invalid' has the effect of
    rendering it inoperative. The internal effect
    (row removal) is implementation dependent."
::= { ospfNbrEntry 9 }
```

ospfNbmaNbrPermanence OBJECT-TYPE

```
SYNTAX      INTEGER {
                dynamic (1), -- learned through protocol
                permanent (2) -- configured address
            }
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This variable displays the status of the en-
    try. 'dynamic' and 'permanent' refer to how
    the neighbor became known."
DEFVAL { permanent }
::= { ospfNbrEntry 10 }
```

ospfNbrHelloSuppressed OBJECT-TYPE

```
SYNTAX      TruthValue
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Indicates whether Hellos are being suppressed
    to the neighbor"
::= { ospfNbrEntry 11 }
```

-- OSPF Virtual Neighbor Table

```
-- This table describes all virtual neighbors.
-- Since Virtual Links are configured in the
-- virtual interface table, this table is read-only.
```

ospfVirtNbrTable OBJECT-TYPE

```
SYNTAX      SEQUENCE OF OspfVirtNbrEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "A table of virtual neighbor information."
REFERENCE
    "OSPF Version 2, Section 15 Virtual Links"
```

```
::= { ospf 11 }
```

```
ospfVirtNbrEntry OBJECT-TYPE
```

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SYNTAX OspfVirtNbrEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "Virtual neighbor information."
INDEX { ospfVirtNbrArea, ospfVirtNbrRtrId }
 ::= { ospfVirtNbrTable 1 }

OspfVirtNbrEntry ::=

```
SEQUENCE {
    ospfVirtNbrArea
        AreaID,
    ospfVirtNbrRtrId
        RouterID,
    ospfVirtNbrIpAddr
        IpAddress,
    ospfVirtNbrOptions
        Integer32,
    ospfVirtNbrState
        INTEGER,
    ospfVirtNbrEvents
        Counter32,
    ospfVirtNbrLsRetransQLen
        Gauge32,
    ospfVirtNbrHelloSuppressed
        TruthValue
}
```

ospfVirtNbrArea OBJECT-TYPE

SYNTAX AreaID
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The Transit Area Identifier."
 ::= { ospfVirtNbrEntry 1 }

ospfVirtNbrRtrId OBJECT-TYPE

SYNTAX RouterID
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "A 32-bit integer uniquely identifying the
 neighboring router in the Autonomous System."
 ::= { ospfVirtNbrEntry 2 }

ospfVirtNbrIpAddr OBJECT-TYPE

SYNTAX IpAddress
MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The IP address this Virtual Neighbor is us-

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```
        ing."
 ::= { ospfVirtNbrEntry 3 }

ospfVirtNbrOptions OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "A Bit Mask corresponding to the neighbor's op-
        tions field.

        Bit 1, if set, indicates that the system will
        operate on Type of Service metrics other than
        TOS 0. If zero, the neighbor will ignore all
        metrics except the TOS 0 metric.

        Bit 2, if set, indicates that the system is
        Network Multicast capable; ie, that it imple-
        ments OSPF Multicast Routing."
 ::= { ospfVirtNbrEntry 4 }

ospfVirtNbrState OBJECT-TYPE
    SYNTAX      INTEGER {
        down (1),
        attempt (2),
        init (3),
        twoWay (4),
        exchangeStart (5),
        exchange (6),
        loading (7),
        full (8)
        }
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The state of the Virtual Neighbor Relation-
        ship."
 ::= { ospfVirtNbrEntry 5 }

ospfVirtNbrEvents OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The number of times this virtual link has
        changed its state, or an error has occurred."
 ::= { ospfVirtNbrEntry 6 }
```

ospfVirtNbrLsRetransQLen OBJECT-TYPE

SYNTAX Gauge32

MAX-ACCESS read-only

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```
STATUS      current
DESCRIPTION
    "The current length of the retransmission
    queue."
```

```
::= { ospfVirtNbrEntry 7 }
```

```
ospfVirtNbrHelloSuppressed OBJECT-TYPE
```

```
SYNTAX      TruthValue
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Indicates whether Hellos are being suppressed
    to the neighbor"
```

```
::= { ospfVirtNbrEntry 8 }
```

```
-- OSPF Link State Database, External
```

```
-- The Link State Database contains the Link State
-- Advertisements from throughout the areas that the
-- device is attached to.
```

```
-- This table is identical to the OSPF LSDB Table in
-- format, but contains only Link State Advertisements with
-- global flooding scope. The purpose is to allow external
-- LSAs to be displayed once for the router rather
-- than once in each non-stub area.
```

```
ospfExtLsdbTable OBJECT-TYPE
```

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

```
    "The OSPF Process's Links State Database."
```

```
REFERENCE
```

```
    "OSPF Version 2, Section 12 Link State Adver-
    tisements"
```

```
::= { ospf 12 }
```

```
ospfExtLsdbEntry OBJECT-TYPE
```

```
SYNTAX      OspfExtLsdbEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
```

```
    "A single Link State Advertisement."
```

```
INDEX { ospfExtLsdbType, ospfExtLsdbLsid, ospfExtLsdbRouterId }
```

```
::= { ospfExtLsdbTable 1 }
```

```
OspfExtLsdbEntry ::=
```

```
SEQUENCE {  
    ospfExtLsdbType
```

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```
    INTEGER,  
    ospfExtLsdbLsid  
        IPAddress,  
    ospfExtLsdbRouterId  
        RouterID,  
    ospfExtLsdbSequence  
        Integer32,  
    ospfExtLsdbAge  
        Integer32,  
    ospfExtLsdbChecksum  
        Integer32,  
    ospfExtLsdbAdvertisement  
        OCTET STRING  
}
```

ospfExtLsdbType OBJECT-TYPE

```
SYNTAX      INTEGER {  
                asExternalLink (5),  
                asOpaqueLink (11)  
            }
```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The type of the link state advertisement.
Each link state type has a separate advertisement format."

REFERENCE

"OSPF Version 2, [Appendix A.4.1](#) The Link State Advertisement header"

::= { ospfExtLsdbEntry 1 }

ospfExtLsdbLsid OBJECT-TYPE

```
SYNTAX      IPAddress
```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Link State ID is an LS Type Specific field containing either a Router ID or an IP Address; it identifies the piece of the routing domain that is being described by the advertisement."

REFERENCE

"OSPF Version 2, [Section 12.1.4](#) Link State ID"

::= { ospfExtLsdbEntry 2 }

ospfExtLsdbRouterId OBJECT-TYPE

```
SYNTAX      RouterID
```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The 32 bit number that uniquely identifies the
originating router in the Autonomous System."

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REFERENCE

"OSPF Version 2, [Appendix C.1](#) Global parameters"
::= { ospfExtLsdbEntry 3 }

-- Note that the OSPF Sequence Number is a 32 bit signed
-- integer. It starts with the value '80000001'h,
-- or -'7FFFFFFF'h, and increments until '7FFFFFFF'h
-- Thus, a typical sequence number will be very negative.

ospfExtLsdbSequence OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The sequence number field is a signed 32-bit integer. It is used to detect old and duplicate link state advertisements. The space of sequence numbers is linearly ordered. The larger the sequence number the more recent the advertisement."

REFERENCE

"OSPF Version 2, Section 12.1.6 LS sequence number"

::= { ospfExtLsdbEntry 4 }

ospfExtLsdbAge OBJECT-TYPE

SYNTAX Integer32 -- Should be 0..MaxAge, except when
-- doNotAge bit is set

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This field is the age of the link state advertisement in seconds."

REFERENCE

"OSPF Version 2, [Section 12.1.1](#) LS age"

::= { ospfExtLsdbEntry 5 }

ospfExtLsdbChecksum OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This field is the checksum of the complete contents of the advertisement, excepting the age field. The age field is excepted so that an advertisement's age can be incremented without updating the checksum. The checksum used is the same that is used for ISO connec-

tionless datagrams; it is commonly referred to
as the Fletcher checksum."

REFERENCE

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```
"OSPF Version 2, Section 12.1.7 LS checksum"  
::= { ospfExtLsdbEntry 6 }
```

```
ospfExtLsdbAdvertisement OBJECT-TYPE  
    SYNTAX      OCTET STRING (SIZE(36))  
    MAX-ACCESS   read-only  
    STATUS       current  
    DESCRIPTION  
        "The entire Link State Advertisement, including  
        its header."  
    REFERENCE  
        "OSPF Version 2, Section 12 Link State Adver-  
        tisements"  
    ::= { ospfExtLsdbEntry 7 }
```

```
-- OSPF Use of the CIDR Route Table
```

```
ospfRouteGroup      OBJECT IDENTIFIER ::= { ospf 13 }
```

```
-- The IP Forwarding Table defines a number of objects for use by  
-- the routing protocol to externalize its information. Most of  
-- the variables (ipForwardDest, ipForwardMask, ipForwardPolicy,  
-- ipForwardNextHop, ipForwardIfIndex, ipForwardType,  
-- ipForwardProto, ipForwardAge, and ipForwardNextHopAS) are  
-- defined there.
```

```
-- Those that leave some discretion are defined here.
```

```
-- ipCidrRouteProto is, of course, ospf (13).
```

```
-- ipCidrRouteAge is the time since the route was first calculated,  
-- as opposed to the time since the last SPF run.
```

```
-- ipCidrRouteInfo is an OBJECT IDENTIFIER for use by the routing  
-- protocol. The following values shall be found there depending  
-- on the way the route was calculated.
```

```
ospfIntraArea      OBJECT IDENTIFIER ::= { ospfRouteGroup 1 }  
ospfInterArea      OBJECT IDENTIFIER ::= { ospfRouteGroup 2 }  
ospfExternalType1  OBJECT IDENTIFIER ::= { ospfRouteGroup 3 }  
ospfExternalType2  OBJECT IDENTIFIER ::= { ospfRouteGroup 4 }
```

```
-- ipCidrRouteMetric1 is, by definition, the primary routing  
-- metric. Therefore, it should be the metric that route  
-- selection is based on. For intra-area and inter-area routes,  
-- it is an OSPF metric. For External Type 1 (comparable value)  
-- routes, it is an OSPF metric plus the External Metric. For  
-- external Type 2 (non-comparable value) routes, it is the
```

-- external metric.

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-- ipCidrRouteMetric2 is, by definition, a secondary routing
-- metric. Therefore, it should be the metric that breaks a tie
-- among routes having equal metric1 values and the same
-- calculation rule. For intra-area, inter-area routes, and
-- External Type 1 (comparable value) routes, it is unused. For
-- external Type 2 (non-comparable value) routes, it is the metric
-- to the AS border router.

-- ipCidrRouteMetric3, ipCidrRouteMetric4, and ipCidrRouteMetric5
-- are unused.

-- The OSPF Area Aggregate Table

--

-- This table replaces the OSPF Area Summary Table, being an
-- extension of that for CIDR routers.

ospfAreaAggregateTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfAreaAggregateEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A range of IP addresses specified by an IP address/IP network mask pair. For example, class B address range of X.X.X.X with a network mask of 255.255.0.0 includes all IP addresses from X.X.0.0 to X.X.255.255. Note that if ranges are configured such that one range subsumes another range (e.g., 10.0.0.0 mask 255.0.0.0 and 10.1.0.0 mask 255.255.0.0), the most specific match is the preferred one."

REFERENCE

"OSPF Version 2, [Appendix C.2](#) Area parameters"
 ::= { ospf 14 }

ospfAreaAggregateEntry OBJECT-TYPE

SYNTAX OspfAreaAggregateEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A range of IP addresses specified by an IP address/IP network mask pair. For example, class B address range of X.X.X.X with a network mask of 255.255.0.0 includes all IP addresses from X.X.0.0 to X.X.255.255. Note that if ranges are range configured such that one range subsumes another range (e.g., 10.0.0.0 mask 255.0.0.0 and 10.1.0.0 mask 255.255.0.0), the most specific match is the preferred one."

REFERENCE

"OSPF Version 2, [Appendix C.2](#) Area parameters"

INDEX { ospfAreaAggregateAreaID, ospfAreaAggregateLsdbType,

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```
    ospfAreaAggregateNet, ospfAreaAggregateMask }  
 ::= { ospfAreaAggregateTable 1 }
```

```
OspfAreaAggregateEntry ::=   
    SEQUENCE {  
        ospfAreaAggregateAreaID  
            AreaID,  
        ospfAreaAggregateLsdbType  
            INTEGER,  
        ospfAreaAggregateNet  
            IpAddress,  
        ospfAreaAggregateMask  
            IpAddress,  
        ospfAreaAggregateStatus  
            RowStatus,  
        ospfAreaAggregateEffect  
            INTEGER  
    }
```

```
ospfAreaAggregateAreaID OBJECT-TYPE  
    SYNTAX      AreaID  
    MAX-ACCESS  read-only  
    STATUS      current  
    DESCRIPTION  
        "The Area the Address Aggregate is to be found  
        within."  
    REFERENCE  
        "OSPF Version 2, Appendix C.2 Area parameters"  
 ::= { ospfAreaAggregateEntry 1 }
```

```
ospfAreaAggregateLsdbType OBJECT-TYPE  
    SYNTAX      INTEGER {  
        summaryLink (3),  
        nssaExternalLink (7)  
    }  
    MAX-ACCESS  read-only  
    STATUS      current  
    DESCRIPTION  
        "The type of the Address Aggregate. This field  
        specifies the Lsdb type that this Address Ag-  
        gregate applies to."  
    REFERENCE  
        "OSPF Version 2, Appendix A.4.1 The Link State  
        Advertisement header"  
 ::= { ospfAreaAggregateEntry 2 }
```

```
ospfAreaAggregateNet OBJECT-TYPE  
    SYNTAX      IpAddress
```

MAX-ACCESS read-only
STATUS current
DESCRIPTION

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"The IP Address of the Net or Subnet indicated by the range."

REFERENCE

"OSPF Version 2, [Appendix C.2](#) Area parameters"

::= { ospfAreaAggregateEntry 3 }

ospfAreaAggregateMask OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Subnet Mask that pertains to the Net or Subnet."

REFERENCE

"OSPF Version 2, [Appendix C.2](#) Area parameters"

::= { ospfAreaAggregateEntry 4 }

ospfAreaAggregateStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This variable displays the status of the entry. Setting it to 'invalid' has the effect of rendering it inoperative. The internal effect (row removal) is implementation dependent."

::= { ospfAreaAggregateEntry 5 }

ospfAreaAggregateEffect OBJECT-TYPE

SYNTAX INTEGER {
 advertiseMatching (1),
 doNotAdvertiseMatching (2)
 }

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Subnets subsumed by ranges either trigger the advertisement of the indicated aggregate (advertiseMatching), or result in the subnet's not being advertised at all outside the area."

DEFVAL { advertiseMatching }

::= { ospfAreaAggregateEntry 6 }

-- OSPF Link State Database, Link-Local for non-virtual links

-- This table is identical to the OSPF LSDB Table in
-- format, but contains only Link-Local Link State

-- Advertisements for non-virtual links. The purpose is
-- to allow Link-Local LSAs to be displayed for each
-- non-virtual interface. This table is implemented to

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```
--      support type-9 LSAs which are defined in
--      "The OSPF Opaque LSA Option".
```

```
ospfLocalLsdbTable OBJECT-TYPE
```

```
    SYNTAX      SEQUENCE OF OspfLocalLsdbEntry
```

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

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "The OSPF Process's Link-Local Link State Database
        for non-virtual links."
```

```
    REFERENCE
```

```
        "OSPF Version 2, Section 12 Link State Adver-
        tisements and The OSPF Opaque LSA Option"
```

```
    ::= { ospf 15 }
```

```
ospfLocalLsdbEntry OBJECT-TYPE
```

```
    SYNTAX      OspfLocalLsdbEntry
```

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

```
    STATUS      current
```

```
    DESCRIPTION
```

```
        "A single Link State Advertisement."
```

```
    INDEX { ospfLocalLsdbIpAddress, ospfLocalLsdbAddressLessIf,
             ospfLocalLsdbType, ospfLocalLsdbLsid, ospfLocalLsdbRouterId
           }
```

```
    ::= { ospfLocalLsdbTable 1 }
```

```
OspfLocalLsdbEntry ::=
```

```
    SEQUENCE {
```

```
        ospfLocalLsdbIpAddress
```

```
        IpAddress,
```

```
        ospfLocalLsdbAddressLessIf
```

```
        Integer32,
```

```
        ospfLocalLsdbType
```

```
        INTEGER,
```

```
        ospfLocalLsdbLsid
```

```
        IpAddress,
```

```
        ospfLocalLsdbRouterId
```

```
        RouterID,
```

```
        ospfLocalLsdbSequence
```

```
        Integer32,
```

```
        ospfLocalLsdbAge
```

```
        Integer32,
```

```
        ospfLocalLsdbChecksum
```

```
        Integer32,
```

```
        ospfLocalLsdbAdvertisement
```

```
        OCTET STRING
```

```
    }
```

ospfLocalLsdbIpAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

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STATUS current
DESCRIPTION
 "The IP Address of the interface from
 which the LSA was received if the interface is
 numbered."
REFERENCE
 "OSPF Version 2, [Appendix C.3](#) Interface parameters"
::= { ospfLocalLsdbEntry 1 }

ospfLocalLsdbAddressLessIf OBJECT-TYPE

SYNTAX Integer32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The Interface Index of the interface from
 which the LSA was received if the interface is
 unnumbered."
REFERENCE
 "OSPF Version 2, [Appendix C.3](#) Interface parameters"
::= { ospfLocalLsdbEntry 2 }

ospfLocalLsdbType OBJECT-TYPE

SYNTAX INTEGER { localOpaqueLink (9) }
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The type of the link state advertisement.
 Each link state type has a separate advertise-
 ment format."
REFERENCE
 "OSPF Version 2, [Appendix A.4.1](#) The Link State
 Advertisement header and "
::= { ospfLocalLsdbEntry 3 }

ospfLocalLsdbLsid OBJECT-TYPE

SYNTAX IpAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The Link State ID is an LS Type Specific field
 containing a 32 bit identifier in IP address format;
 it identifies the piece of the routing domain
 that is being described by the advertisement."
REFERENCE
 "OSPF Version 2, [Section 12.1.4](#) Link State ID"
::= { ospfLocalLsdbEntry 4 }

ospfLocalLsdbRouterId OBJECT-TYPE

SYNTAX	RouterID
MAX-ACCESS	read-only
STATUS	current

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DESCRIPTION

"The 32 bit number that uniquely identifies the originating router in the Autonomous System."

REFERENCE

"OSPF Version 2, [Appendix C.1](#) Global parameters"

::= { ospfLocalLsdbEntry 5 }

-- Note that the OSPF Sequence Number is a 32 bit signed
-- integer. It starts with the value '80000001'h,
-- or -'7FFFFFFF'h, and increments until '7FFFFFFF'h
-- Thus, a typical sequence number will be very negative.

ospfLocalLsdbSequence OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The sequence number field is a signed 32-bit integer. It is used to detect old and duplicate link state advertisements. The space of sequence numbers is linearly ordered. The larger the sequence number the more recent the advertisement."

REFERENCE

"OSPF Version 2, [Section 12.1.6](#) LS sequence number"

::= { ospfLocalLsdbEntry 6 }

ospfLocalLsdbAge OBJECT-TYPE

SYNTAX Integer32 -- Should be 0..MaxAge, except when
-- doNotAge bit is set

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This field is the age of the link state advertisement in seconds."

REFERENCE

"OSPF Version 2, [Section 12.1.1](#) LS age"

::= { ospfLocalLsdbEntry 7 }

ospfLocalLsdbChecksum OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This field is the checksum of the complete contents of the advertisement, excepting the age field. The age field is excepted so that

an advertisement's age can be incremented
without updating the checksum. The checksum
used is the same that is used for ISO connec-

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tionless datagrams; it is commonly referred to as the Fletcher checksum."

REFERENCE

"OSPF Version 2, [Section 12.1.7](#) LS checksum"

::= { ospfLocalLsdbEntry 8 }

ospfLocalLsdbAdvertisement OBJECT-TYPE

SYNTAX OCTET STRING (SIZE (1..65535))

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The entire Link State Advertisement, including its header."

REFERENCE

"OSPF Version 2, [Section 12](#) Link State Advertisements"

::= { ospfLocalLsdbEntry 9 }

-- OSPF Link State Database, Link-Local for virtual Links

-- This table is identical to the OSPF LSDB Table in
-- format, but contains only Link-Local Link State
-- Advertisements for virtual links. The purpose is to
-- allow Link-Local LSAs to be displayed for each virtual
-- interface. This table is implemented to support type-9 LSAs
-- which are defined in "The OSPF Opaque LSA Option".

ospfVirtLocalLsdbTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfVirtLocalLsdbEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The OSPF Process's Link-Local Link State Database for virtual links."

REFERENCE

"OSPF Version 2, [Section 12](#) Link State Advertisements and The OSPF Opaque LSA Option"

::= { ospf 16 }

ospfVirtLocalLsdbEntry OBJECT-TYPE

SYNTAX OspfVirtLocalLsdbEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A single Link State Advertisement."

INDEX { ospfVirtLocalLsdbTransitArea,
ospfVirtLocalLsdbNeighbor,

ospfVirtLocalLsdbType,
ospfVirtLocalLsdbLsid,
ospfVirtLocalLsdbRouterId

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```
    }
    ::= { ospfVirtLocalLsdbTable 1 }

OspfVirtLocalLsdbEntry ::=
    SEQUENCE {
        ospfVirtLocalLsdbTransitArea
            AreaID,
        ospfVirtLocalLsdbNeighbor
            RouterID,
        ospfVirtLocalLsdbType
            INTEGER,
        ospfVirtLocalLsdbLsid
            IPAddress,
        ospfVirtLocalLsdbRouterId
            RouterID,
        ospfVirtLocalLsdbSequence
            Integer32,
        ospfVirtLocalLsdbAge
            Integer32,
        ospfVirtLocalLsdbChecksum
            Integer32,
        ospfVirtLocalLsdbAdvertisement
            OCTET STRING
    }

ospfVirtLocalLsdbTransitArea OBJECT-TYPE
    SYNTAX      AreaID
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The Transit Area that the Virtual Link
        traverses. By definition, this is not 0.0.0.0"
    REFERENCE
        "OSPF Version 2, Appendix C.3 Interface parameters"
    ::= { ospfVirtLocalLsdbEntry 1 }

ospfVirtLocalLsdbNeighbor OBJECT-TYPE
    SYNTAX      RouterID
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The Router ID of the Virtual Neighbor."
    REFERENCE
        "OSPF Version 2, Appendix C.3 Interface parameters"
    ::= { ospfVirtLocalLsdbEntry 2 }

ospfVirtLocalLsdbType OBJECT-TYPE
    SYNTAX      INTEGER { localOpaqueLink (9) }
```

MAX-ACCESS	read-only
STATUS	current
DESCRIPTION	

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"The type of the link state advertisement.
Each link state type has a separate advertise-
ment format."

REFERENCE

"OSPF Version 2, [Appendix A.4.1](#) The Link State
Advertisement header and "

::= { ospfVirtLocalLsdbEntry 3 }

ospfVirtLocalLsdbLsid OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Link State ID is an LS Type Specific field
containing a 32 bit identifier in IP address format;
it identifies the piece of the routing domain
that is being described by the advertisement."

REFERENCE

"OSPF Version 2, [Section 12.1.4](#) Link State ID"

::= { ospfVirtLocalLsdbEntry 4 }

ospfVirtLocalLsdbRouterId OBJECT-TYPE

SYNTAX RouterID

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The 32 bit number that uniquely identifies the
originating router in the Autonomous System."

REFERENCE

"OSPF Version 2, [Appendix C.1](#) Global parameters"

::= { ospfVirtLocalLsdbEntry 5 }

-- Note that the OSPF Sequence Number is a 32 bit signed
-- integer. It starts with the value '80000001'h,
-- or -'7FFFFFFF'h, and increments until '7FFFFFFF'h
-- Thus, a typical sequence number will be very negative.

ospfVirtLocalLsdbSequence OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The sequence number field is a signed 32-bit
integer. It is used to detect old and dupli-
cate link state advertisements. The space of
sequence numbers is linearly ordered. The
larger the sequence number the more recent the
advertisement."

REFERENCE

"OSPF Version 2, [Section 12.1.6](#) LS sequence number"

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```
::= { ospfVirtLocalLsdbEntry 6 }
```

ospfVirtLocalLsdbAge OBJECT-TYPE

```
SYNTAX      Integer32 -- Should be 0..MaxAge, except when
                    -- doNotAge bit is set
```

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

```
STATUS      current
```

DESCRIPTION

"This field is the age of the link state advertisement in seconds."

REFERENCE

"OSPF Version 2, [Section 12.1.1](#) LS age"

```
::= { ospfVirtLocalLsdbEntry 7 }
```

ospfVirtLocalLsdbChecksum OBJECT-TYPE

```
SYNTAX      Integer32
```

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

```
STATUS      current
```

DESCRIPTION

"This field is the checksum of the complete contents of the advertisement, excepting the age field. The age field is excepted so that an advertisement's age can be incremented without updating the checksum. The checksum used is the same that is used for ISO connectionless datagrams; it is commonly referred to as the Fletcher checksum."

REFERENCE

"OSPF Version 2, [Section 12.1.7](#) LS checksum"

```
::= { ospfVirtLocalLsdbEntry 8 }
```

ospfVirtLocalLsdbAdvertisement OBJECT-TYPE

```
SYNTAX      OCTET STRING (SIZE (1..65535))
```

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

```
STATUS      current
```

DESCRIPTION

"The entire Link State Advertisement, including its header."

REFERENCE

"OSPF Version 2, [Section 12](#) Link State Advertisements"

```
::= { ospfVirtLocalLsdbEntry 9 }
```

-- conformance information

ospfConformance OBJECT IDENTIFIER ::= { ospf 20 }

ospfGroups OBJECT IDENTIFIER ::= { ospfConformance 1 }
ospfCompliances OBJECT IDENTIFIER ::= { ospfConformance 2 }

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```
-- compliance statements

-- This compliance statement is deprecated and replaced
-- by ospfCompliance2

ospfCompliance MODULE-COMPLIANCE
    STATUS      deprecated
    DESCRIPTION
        "The compliance statement."
    MODULE      -- this module
    MANDATORY-GROUPS {
        ospfBasicGroup,
        ospfAreaGroup,
        ospfStubAreaGroup,
        ospfIfGroup,
        ospfIfMetricGroup,
        ospfVirtIfGroup,
        ospfNbrGroup,
        ospfVirtNbrGroup,
        ospfAreaAggregateGroup
    }
    ::= { ospfCompliances 1 }

ospfCompliance2 MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement."
    MODULE      -- this module
    MANDATORY-GROUPS {
        ospfBasicGroup2,
        ospfAreaGroup2,
        ospfStubAreaGroup,
        ospfIfGroup2,
        ospfIfMetricGroup,
        ospfVirtIfGroup2,
        ospfNbrGroup,
        ospfVirtNbrGroup,
        ospfAreaAggregateGroup
    }
    GROUP ospfHostGroup
        DESCRIPTION
            "This group is mandatory for OSPF systems that support
            attached hosts."
    GROUP ospfLsdbGroup
        DESCRIPTION
            "This group is mandatory for OSPF systems that display
            their per-area link state database."
    GROUP ospfExtLsdbGroup
```

DESCRIPTION

"This group is mandatory for OSPF systems that display their AS link state database."

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```
GROUP    ospfLocalLsdbGroup
DESCRIPTION
    "This group is mandatory for OSPF systems that display
    their per-link link state database for non-virtual
    links."
GROUP    ospfVirtLocalLsdbGroup
DESCRIPTION
    "This group is mandatory for OSPF systems that display
    their per-link link state database for virtual links."
::= { ospfCompliances 2 }
```

-- units of conformance

-- This object group is deprecated and replaced by ospfBasicGroup2

```
ospfBasicGroup    OBJECT-GROUP
OBJECTS {
    ospfRouterId,
    ospfAdminStat,
    ospfVersionNumber,
    ospfAreaBdrRtrStatus,
    ospfASBdrRtrStatus,
    ospfExternLsaCount,
    ospfExternLsaCksumSum,
    ospfTOSSupport,
    ospfOriginateNewLsas,
    ospfRxNewLsas,
    ospfExtLsdbLimit,
    ospfMulticastExtensions,
    ospfExitOverflowInterval,
    ospfDemandExtensions
}
STATUS    deprecated
DESCRIPTION
    "These objects are required for OSPF systems."
::= { ospfGroups 1 }
```

-- This object group is deprecated and replaced by ospfAreaGroup2

```
ospfAreaGroup    OBJECT-GROUP
OBJECTS {
    ospfAreaId,
    ospfImportAsExtern,
    ospfSpfRuns,
    ospfAreaBdrRtrCount,
    ospfAsBdrRtrCount,
    ospfAreaLsaCount,
```

ospfAreaLsaChecksumSum,
ospfAreaSummary,
ospfAreaStatus

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```
    }
    STATUS          current
    DESCRIPTION
        "These objects are required for OSPF systems
        supporting areas. This statement is included
        for backwards-compatibility. The ospfAreaGroup2
        statement is recommended"
    ::= { ospfGroups 2 }

ospfStubAreaGroup    OBJECT-GROUP
    OBJECTS {
        ospfStubAreaId,
        ospfStubTOS,
        ospfStubMetric,
        ospfStubStatus,
        ospfStubMetricType
    }
    STATUS          current
    DESCRIPTION
        "These objects are required for OSPF systems
        supporting stub areas."
    ::= { ospfGroups 3 }

ospfLsdbGroup        OBJECT-GROUP
    OBJECTS {
        ospfLsdbAreaId,
        ospfLsdbType,
        ospfLsdbLsid,
        ospfLsdbRouterId,
        ospfLsdbSequence,
        ospfLsdbAge,
        ospfLsdbChecksum,
        ospfLsdbAdvertisement
    }
    STATUS          current
    DESCRIPTION
        "These objects are required for OSPF systems
        that display their link state database."
    ::= { ospfGroups 4 }

ospfAreaRangeGroup   OBJECT-GROUP
    OBJECTS {
        ospfAreaRangeAreaId,
        ospfAreaRangeNet,
        ospfAreaRangeMask,
        ospfAreaRangeStatus,
        ospfAreaRangeEffect
    }
```

STATUS obsolete

DESCRIPTION

"These objects are required for non-CIDR OSPF

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```
    systems that support multiple areas."
 ::= { ospfGroups 5 }
```

```
ospfHostGroup      OBJECT-GROUP
  OBJECTS {
    ospfHostIpAddress,
    ospfHostTOS,
    ospfHostMetric,
    ospfHostStatus,
    ospfHostAreaID
  }
  STATUS          current
  DESCRIPTION
    "These objects are required for OSPF systems
    that support attached hosts."
 ::= { ospfGroups 6 }
```

```
-- This object group is deprecated and replaced by ospfIfGroup2
```

```
ospfIfGroup        OBJECT-GROUP
  OBJECTS {
    ospfIfIpAddress,
    ospfAddressLessIf,
    ospfIfAreaId,
    ospfIfType,
    ospfIfAdminStat,
    ospfIfRtrPriority,
    ospfIfTransitDelay,
    ospfIfRetransInterval,
    ospfIfHelloInterval,
    ospfIfRtrDeadInterval,
    ospfIfPollInterval,
    ospfIfState,
    ospfIfDesignatedRouter,
    ospfIfBackupDesignatedRouter,
    ospfIfEvents,
    ospfIfAuthType,
    ospfIfAuthKey,
    ospfIfStatus,
    ospfIfMulticastForwarding,
    ospfIfDemand
  }
  STATUS          deprecated
  DESCRIPTION
    "These objects are required for OSPF systems."
 ::= { ospfGroups 7 }
```

```
ospfIfMetricGroup  OBJECT-GROUP
```

```
OBJECTS {  
    ospfIfMetricIpAddress,  
    ospfIfMetricAddressLessIf,
```

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```
    ospfIfMetricTOS,
    ospfIfMetricValue,
    ospfIfMetricStatus
  }
STATUS      current
DESCRIPTION
    "These objects are required for OSPF systems."
 ::= { ospfGroups 8 }
```

-- This object group is deprecated and replaced by ospfVirtIfGroup2

```
ospfVirtIfGroup    OBJECT-GROUP
  OBJECTS {
    ospfVirtIfAreaId,
    ospfVirtIfNeighbor,
    ospfVirtIfTransitDelay,
    ospfVirtIfRetransInterval,
    ospfVirtIfHelloInterval,
    ospfVirtIfRtrDeadInterval,
    ospfVirtIfState,
    ospfVirtIfEvents,
    ospfVirtIfAuthType,
    ospfVirtIfAuthKey,
    ospfVirtIfStatus
  }
STATUS      deprecated
DESCRIPTION
    "These objects are required for OSPF systems."
 ::= { ospfGroups 9 }
```

```
ospfNbrGroup      OBJECT-GROUP
  OBJECTS {
    ospfNbrIpAddress,
    ospfNbrAddressLessIndex,
    ospfNbrRtrId,
    ospfNbrOptions,
    ospfNbrPriority,
    ospfNbrState,
    ospfNbrEvents,
    ospfNbrLsRetransQLen,
    ospfNbmaNbrStatus,
    ospfNbmaNbrPermanence,
    ospfNbrHelloSuppressed
  }
STATUS      current
DESCRIPTION
    "These objects are required for OSPF systems."
 ::= { ospfGroups 10 }
```

ospfVirtNbrGroup OBJECT-GROUP
 OBJECTS {

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```
        ospfVirtNbrArea,
        ospfVirtNbrRtrId,
        ospfVirtNbrIpAddr,
        ospfVirtNbrOptions,
        ospfVirtNbrState,
        ospfVirtNbrEvents,
        ospfVirtNbrLsRetransQLen,
        ospfVirtNbrHelloSuppressed
    }
STATUS      current
DESCRIPTION
    "These objects are required for OSPF systems."
 ::= { ospfGroups 11 }

ospfExtLsdbGroup      OBJECT-GROUP
OBJECTS {
    ospfExtLsdbType,
    ospfExtLsdbLsid,
    ospfExtLsdbRouterId,
    ospfExtLsdbSequence,
    ospfExtLsdbAge,
    ospfExtLsdbChecksum,
    ospfExtLsdbAdvertisement
}
STATUS      current
DESCRIPTION
    "These objects are required for OSPF systems
    that display their link state database."
 ::= { ospfGroups 12 }

ospfAreaAggregateGroup  OBJECT-GROUP
OBJECTS {
    ospfAreaAggregateAreaID,
    ospfAreaAggregateLsdbType,
    ospfAreaAggregateNet,
    ospfAreaAggregateMask,
    ospfAreaAggregateStatus,
    ospfAreaAggregateEffect
}
STATUS      current
DESCRIPTION
    "These objects are required for OSPF systems."
 ::= { ospfGroups 13 }

ospfLocalLsdbGroup      OBJECT-GROUP
OBJECTS {
    ospfLocalLsdbIpAddress,
    ospfLocalLsdbAddressLessIf,
```

```
ospfLocalLsdbType,  
ospfLocalLsdbLsid,  
ospfLocalLsdbRouterId,
```

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```
        ospfLocalLsdbSequence,
        ospfLocalLsdbAge,
        ospfLocalLsdbChecksum,
        ospfLocalLsdbAdvertisement
    }
STATUS      current
DESCRIPTION
    "These objects are required for OSPF systems
    that display their Link-Local link state databases
    for non-virtual links."
 ::= { ospfGroups 14 }

ospfVirtLocalLsdbGroup    OBJECT-GROUP
OBJECTS {
    ospfVirtLocalLsdbTransitArea,
    ospfVirtLocalLsdbNeighbor,
    ospfVirtLocalLsdbType,
    ospfVirtLocalLsdbLsid,
    ospfVirtLocalLsdbRouterId,
    ospfVirtLocalLsdbSequence,
    ospfVirtLocalLsdbAge,
    ospfVirtLocalLsdbChecksum,
    ospfVirtLocalLsdbAdvertisement
}
STATUS      current
DESCRIPTION
    "These objects are required for OSPF systems
    that display their Link-Local link state databases
    for virtual links."
 ::= { ospfGroups 15 }

ospfBasicGroup2    OBJECT-GROUP
OBJECTS {
    ospfRouterId,
    ospfAdminStat,
    ospfVersionNumber,
    ospfAreaBdrRtrStatus,
    ospfASBdrRtrStatus,
    ospfExternLsaCount,
    ospfExternLsaCksumSum,
    ospfTOSSupport,
    ospfOriginateNewLsas,
    ospfRxNewLsas,
    ospfExtLsdbLimit,
    ospfMulticastExtensions,
    ospfExitOverflowInterval,
    ospfDemandExtensions,
    ospfRFC1583Compatibility,
```

ospfOpaqueLsaSupport,
ospfTrafficEngineeringSupport,
ospfAsOpaqueLsdbLimit

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```
    }
    STATUS          current
    DESCRIPTION
        "These objects are required for OSPF systems."
    ::= { ospfGroups 16 }

ospfAreaGroup2      OBJECT-GROUP
    OBJECTS {
        ospfAreaId,
        ospfImportAsExtern,
        ospfSpfRuns,
        ospfAreaBdrRtrCount,
        ospfAsBdrRtrCount,
        ospfAreaLsaCount,
        ospfAreaLsaCksumSum,
        ospfAreaSummary,
        ospfAreaStatus,
        ospfAreaNssaTranslatorRole,
        ospfAreaNssaTranslatorState,
        ospfAreaNssaTranslatorStabilityInterval,
        ospfAreaNssaTranslatorEvents
    }
    STATUS          current
    DESCRIPTION
        "These objects are required for OSPF systems
        supporting areas. This statement is recommended
        for use. "
    ::= { ospfGroups 17 }

ospfIfGroup2        OBJECT-GROUP
    OBJECTS {
        ospfIfIpAddress,
        ospfAddressLessIf,
        ospfIfAreaId,
        ospfIfType,
        ospfIfAdminStat,
        ospfIfRtrPriority,
        ospfIfTransitDelay,
        ospfIfRetransInterval,
        ospfIfHelloInterval,
        ospfIfRtrDeadInterval,
        ospfIfPollInterval,
        ospfIfState,
        ospfIfDesignatedRouter,
        ospfIfBackupDesignatedRouter,
        ospfIfEvents,
        ospfIfAuthType,
        ospfIfAuthKey,
```

ospfIfStatus,
ospfIfMulticastForwarding,
ospfIfDemand,

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```
        ospfIfLsaCount,
        ospfIfLsaCksumSum
    }
    STATUS          current
    DESCRIPTION
        "These objects are required for OSPF systems."
        ::= { ospfGroups 18 }

ospfVirtIfGroup2    OBJECT-GROUP
    OBJECTS {
        ospfVirtIfAreaId,
        ospfVirtIfNeighbor,
        ospfVirtIfTransitDelay,
        ospfVirtIfRetransInterval,
        ospfVirtIfHelloInterval,
        ospfVirtIfRtrDeadInterval,
        ospfVirtIfState,
        ospfVirtIfEvents,
        ospfVirtIfAuthType,
        ospfVirtIfAuthKey,
        ospfVirtIfStatus,
        ospfVirtIfLsaCount,
        ospfVirtIfLsaCksumSum
    }
    STATUS          current
    DESCRIPTION
        "These objects are required for OSPF systems."
        ::= { ospfGroups 19 }

END
```

[4](#) OSPF Trap Overview

[4.1](#) Introduction

OSPF is an event driven routing protocol, where an event can be a change in an OSPF interface's link-level status, the expiration of an OSPF timer or the reception of an OSPF protocol packet. Many of the actions that OSPF takes as a result of these events will result in a change of the routing topology.

As routing topologies become large and complex it is often difficult to locate the source of a topology change or unpredicted routing path by polling a large number of routers. Because of the difficulty of polling a large number of devices, a more prudent approach is for devices to notify a network manager of potentially critical OSPF events using SNMP traps.

This section defines a set of traps, objects and mechanisms to enhance the ability to manage IP internetworks which use OSPF as its

IGP. It is an optional but very useful extension to the OSPF MIB.

4.2 Approach

The mechanism for sending traps is straight-forward. When an exception event occurs, the application notifies the local agent who sends a trap to the appropriate SNMP management stations. The message includes the trap type and may include a list of trap specific variables. [Section 5](#) gives the trap definitions which includes the variable lists. The router ID of the originator of the trap is included in the variable list so that the network manager may easily determine the source of the trap.

To limit the frequency of OSPF traps, the following additional mechanisms are suggested.

4.3 Ignoring Initial Activity

The majority of critical events occur when OSPF is enabled on a router, at which time the designated router is elected and neighbor adjacencies are formed. During this initial period a potential flood of traps is unnecessary since the events are expected. To avoid unnecessary traps, a router should not originate expected OSPF interface related traps until two of that interface's dead timer intervals have elapsed. The expected OSPF interface traps are `ospfIfStateChange`, `ospfVirtIfStateChange`, `ospfNbrStateChange`, `ospfVirtNbrStateChange`, `ospfTxRetransmit` and `ospfVirtIfTxRetransmit`. Additionally, `ospfMaxAgeLsa` and `ospfOriginateLsa` traps should not be originated until two dead timer intervals have elapsed where the dead timer interval used should be the dead timer with the smallest value.

4.4 Throttling Traps

The mechanism for throttling the traps is similar to the mechanism explained in [RFC 1224](#) [24]. The basic premise of the throttling mechanism is that of a sliding window, defined in seconds and an upper bound on the number of traps that may be generated within this window. Note that unlike [RFC 1224](#), traps are not sent to inform the network manager that the throttling mechanism has kicked in.

A single window should be used to throttle all OSPF traps types except for the `ospfLsdbOverflow` and the `ospfLsdbApproachingOverflow` trap which should not be throttled. For example, with a window time of 3, an upper bound of 3, and events to cause trap types 1,3,5 and 7 (4 traps within a 3 second period), the type 7 (the 4th) trap should not be generated.

Appropriate values are 7 traps with a window time of 10 seconds.

[4.5](#) One Trap Per OSPF Event

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Several of the traps defined in [section 5](#) are generated as the result of finding an unusual condition while parsing an OSPF packet or a processing a timer event. There may be more than one unusual condition detected while handling the event. For example, a link-state update packet may contain several retransmitted link-state advertisements (LSAs), or a retransmitted database description packet may contain several database description entries. To limit the number of traps and variables, OSPF should generate at most one trap per OSPF event. Only the variables associated with the first unusual condition should be included with the trap. Similarly, if more than one type of unusual condition is encountered while parsing the packet, only the first event will generate a trap.

4.6 Polling Event Counters

Many of the tables in the OSPF MIB contain generalized event counters. By enabling the traps defined in this document a network manager can obtain more specific information about these events. A network manager may want to poll these event counters and enable specific OSPF traps when a particular counter starts increasing abnormally.

The following table shows the relationship between the event counters defined in the OSPF MIB and the trap types defined in section x.

Counter32	Trap Type
-----	-----
ospfOriginateNewLsas	ospfOriginateLsa
ospfIfEvents	ospfIfStateChange
	ospfConfigError
	ospfIfAuthFailure
	ospfRxBadPacket
	ospfTxRetransmit
ospfVirtIfEvents	ospfVirtIfStateChange
	ospfVirtIfConfigError
	ospfVirtIfAuthFailure
	ospfVirtIfRxBadPacket
	ospfVirtIfTxRetransmit
ospfNbrEvents	ospfNbrStateChange
ospfVirtNbrEvents	ospfVirtNbrStateChange
ospfExternLSACount	ospfLsdbApproachingOverflow
ospfExternLSACount	ospfLsdbOverflow

OSPF-TRAP-MIB DEFINITIONS ::= BEGIN

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE, IPAddress
FROM SNMPv2-SMI

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MODULE-COMPLIANCE, OBJECT-GROUP

FROM SNMPv2-CONF

ospfRouterId, ospfIfIpAddress, ospfAddressLessIf, ospfIfState,
ospfVirtIfAreaId, ospfVirtIfNeighbor, ospfVirtIfState,
ospfNbrIpAddress, ospfNbrAddressLessIndex, ospfNbrRtrId,
ospfNbrState, ospfVirtNbrArea, ospfVirtNbrRtrId,
ospfVirtNbrState, ospfLsdbType, ospfLsdbLsid, ospfLsdbRouterId,
ospfLsdbAreaId, ospfExtLsdbLimit, ospf, ospfAreaId,
ospfAreaExtNssaTranslatorStatus
FROM OSPF-MIB;

ospfTrap MODULE-IDENTITY

LAST-UPDATED "0004021225Z" -- Sun Apr 02 12:25:50 GMT 2000

ORGANIZATION "IETF OSPF Working Group"

CONTACT-INFO

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600 Technology Park Drive

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Tel: +1 (978) 288-2629

E-Mail: djoyal@nortelnetworks.com"

DESCRIPTION

"The MIB module to describe traps for the OSPF
Version 2 Protocol."

REVISION "0004021225Z" -- Sun Apr 02 12:25:50 GMT 2000

DESCRIPTION

"Updated for latest version of OSPFv2"

::= { ospf 21 }

-- Trap Support Objects

-- The following are support objects for the OSPF traps.

ospfTrapControl OBJECT IDENTIFIER ::= { ospfTrap 1 }

ospfTraps OBJECT IDENTIFIER ::= { ospfTrap 2 }

ospfSetTrap OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(4))

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"A four-octet string serving as a bit map for the trap events defined by the OSPF traps. This object is used to enable and disable specific

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OSPF traps where a 1 in the bit field
represents enabled. The right-most bit (least
significant) represents trap 0."

::= { ospfTrapControl 1 }

ospfConfigErrorType OBJECT-TYPE

SYNTAX INTEGER {
 badVersion (1),
 areaMismatch (2),
 unknownNbmaNbr (3), -- Router is Dr eligible
 unknownVirtualNbr (4),
 authTypeMismatch(5),
 authFailure (6),
 netMaskMismatch (7),
 helloIntervalMismatch (8),
 deadIntervalMismatch (9),
 optionMismatch (10),
 mtuMismatch (11) }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Potential types of configuration conflicts.
Used by the ospfConfigError and ospfConfigVir-
tError traps."

::= { ospfTrapControl 2 }

ospfPacketType OBJECT-TYPE

SYNTAX INTEGER {
 hello (1),
 dbDescript (2),
 lsReq (3),
 lsUpdate (4),
 lsAck (5) }

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"OSPF packet types."

::= { ospfTrapControl 3 }

ospfPacketSrc OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The IP address of an inbound packet that can-
not be identified by a neighbor instance."

::= { ospfTrapControl 4 }

-- Traps

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ospfVirtIfStateChange NOTIFICATION-TYPE

```
OBJECTS { ospfRouterId, -- The originator of the trap
  ospfVirtIfAreaId,
  ospfVirtIfNeighbor,
  ospfVirtIfState -- The new state
}
```

```
STATUS      current
```

DESCRIPTION

"An ospfIfStateChange trap signifies that there has been a change in the state of an OSPF virtual interface.

This trap should be generated when the interface state regresses (e.g., goes from Point-to-Point to Down) or progresses to a terminal state (i.e., Point-to-Point)."

```
::= { ospfTraps 1 }
```

ospfNbrStateChange NOTIFICATION-TYPE

```
OBJECTS { ospfRouterId, -- The originator of the trap
  ospfNbrIpAddr,
  ospfNbrAddressLessIndex,
  ospfNbrRtrId,
  ospfNbrState -- The new state
}
```

```
STATUS      current
```

DESCRIPTION

"An ospfNbrStateChange trap signifies that there has been a change in the state of a non-virtual OSPF neighbor. This trap should be generated when the neighbor state regresses (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., 2-Way or Full). When an neighbor transitions from or to Full on non-broadcast multi-access and broadcast networks, the trap should be generated by the designated router. A designated router transitioning to Down will be noted by ospfIfStateChange."

```
::= { ospfTraps 2 }
```

ospfVirtNbrStateChange NOTIFICATION-TYPE

```
OBJECTS { ospfRouterId, -- The originator of the trap
  ospfVirtNbrArea,
  ospfVirtNbrRtrId,
  ospfVirtNbrState -- The new state
}
```

```
STATUS      current
```

DESCRIPTION

"An ospfIfStateChange trap signifies that there has been a change in the state of an OSPF vir-

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tual neighbor. This trap should be generated when the neighbor state regresses (e.g., goes from Attempt or Full to 1-Way or Down) or progresses to a terminal state (e.g., Full)."

::= { ospfTraps 3 }

ospfIfConfigError NOTIFICATION-TYPE

OBJECTS { ospfRouterId, -- The originator of the trap
ospfIfIpAddress,
ospfAddressLessIf,
ospfPacketSrc, -- The source IP address
ospfConfigErrorType, -- Type of error
ospfPacketType
}

STATUS current

DESCRIPTION

"An ospfIfConfigError trap signifies that a packet has been received on a non-virtual interface from a router whose configuration parameters conflict with this router's configuration parameters. Note that the event optionMismatch should cause a trap only if it prevents an adjacency from forming."

::= { ospfTraps 4 }

ospfVirtIfConfigError NOTIFICATION-TYPE

OBJECTS { ospfRouterId, -- The originator of the trap
ospfVirtIfAreaId,
ospfVirtIfNeighbor,
ospfConfigErrorType, -- Type of error
ospfPacketType
}

STATUS current

DESCRIPTION

"An ospfConfigError trap signifies that a packet has been received on a virtual interface from a router whose configuration parameters conflict with this router's configuration parameters. Note that the event optionMismatch should cause a trap only if it prevents an adjacency from forming."

::= { ospfTraps 5 }

ospfIfAuthFailure NOTIFICATION-TYPE

OBJECTS { ospfRouterId, -- The originator of the trap
ospfIfIpAddress,
ospfAddressLessIf,
ospfPacketSrc, -- The source IP address

```
ospfConfigErrorType, -- authTypeMismatch or
                    -- authFailure
ospfPacketType
```

```
    }
    STATUS      current
    DESCRIPTION
        "An ospfIfAuthFailure trap signifies that a
        packet has been received on a non-virtual in-
        terface from a router whose authentication key
        or authentication type conflicts with this
        router's authentication key or authentication
        type."
    ::= { ospfTraps 6 }

ospfVirtIfAuthFailure NOTIFICATION-TYPE
    OBJECTS { ospfRouterId, -- The originator of the trap
        ospfVirtIfAreaId,
        ospfVirtIfNeighbor,
        ospfConfigErrorType, -- authTypeMismatch or
                                -- authFailure
        ospfPacketType
    }
    STATUS      current
    DESCRIPTION
        "An ospfVirtIfAuthFailure trap signifies that a
        packet has been received on a virtual interface
        from a router whose authentication key or au-
        thentication type conflicts with this router's
        authentication key or authentication type."
    ::= { ospfTraps 7 }

ospfIfRxBadPacket NOTIFICATION-TYPE
    OBJECTS { ospfRouterId, -- The originator of the trap
        ospfIfIpAddress,
        ospfAddressLessIf,
        ospfPacketSrc, -- The source IP address
        ospfPacketType
    }
    STATUS      current
    DESCRIPTION
        "An ospfIfRxBadPacket trap signifies that an
        OSPF packet has been received on a non-virtual
        interface that cannot be parsed."
    ::= { ospfTraps 8 }

ospfVirtIfRxBadPacket NOTIFICATION-TYPE
    OBJECTS { ospfRouterId, -- The originator of the trap
        ospfVirtIfAreaId,
        ospfVirtIfNeighbor,
        ospfPacketType
    }
```

STATUS current

DESCRIPTION

"An ospfRxBadPacket trap signifies that an OSPF

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```
    packet has been received on a virtual interface
    that cannot be parsed."
 ::= { ospfTraps 9 }
```

ospfTxRetransmit NOTIFICATION-TYPE

```
OBJECTS { ospfRouterId, -- The originator of the trap
  ospfIfIpAddress,
  ospfAddressLessIf,
  ospfNbrRtrId, -- Destination
  ospfPacketType,
  ospfLsdbType,
  ospfLsdbLsid,
  ospfLsdbRouterId
}
```

STATUS current

DESCRIPTION

"An ospfTxRetransmit trap signifies than an OSPF packet has been retransmitted on a non-virtual interface. All packets that may be retransmitted are associated with an LSDB entry. The LS type, LS ID, and Router ID are used to identify the LSDB entry."

```
::= { ospfTraps 10 }
```

ospfVirtIfTxRetransmit NOTIFICATION-TYPE

```
OBJECTS { ospfRouterId, -- The originator of the trap
  ospfVirtIfAreaId,
  ospfVirtIfNeighbor,
  ospfPacketType,
  ospfLsdbType,
  ospfLsdbLsid,
  ospfLsdbRouterId
}
```

STATUS current

DESCRIPTION

"An ospfTxRetransmit trap signifies than an OSPF packet has been retransmitted on a virtual interface. All packets that may be retransmitted are associated with an LSDB entry. The LS type, LS ID, and Router ID are used to identify the LSDB entry."

```
::= { ospfTraps 11 }
```

ospfOriginatelsa NOTIFICATION-TYPE

```
OBJECTS { ospfRouterId, -- The originator of the trap
  ospfLsdbAreaId, -- 0.0.0.0 for AS Externals
  ospfLsdbType,
  ospfLsdbLsid,
```

```
        ospfLsdbRouterId
    }
STATUS      current
```

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DESCRIPTION

"An ospfOriginateLsa trap signifies that a new LSA has been originated by this router. This trap should not be invoked for simple refreshes of LSAs (which happens every 30 minutes), but instead will only be invoked when an LSA is (re)originated due to a topology change. Additionally, this trap does not include LSAs that are being flushed because they have reached MaxAge."

::= { ospfTraps 12 }

ospfMaxAgeLsa NOTIFICATION-TYPE

OBJECTS { ospfRouterId, -- The originator of the trap
ospfLsdbAreaId, -- 0.0.0.0 for AS Externals
ospfLsdbType,
ospfLsdbLsid,
ospfLsdbRouterId
}

STATUS current

DESCRIPTION

"An ospfMaxAgeLsa trap signifies that one of the LSA in the router's link-state database has aged to MaxAge."

::= { ospfTraps 13 }

ospfLsdbOverflow NOTIFICATION-TYPE

OBJECTS { ospfRouterId, -- The originator of the trap
ospfExtLsdbLimit
}

STATUS current

DESCRIPTION

"An ospfLsdbOverflow trap signifies that the number of LSAs in the router's link-state database has exceeded ospfExtLsdbLimit."

::= { ospfTraps 14 }

ospfLsdbApproachingOverflow NOTIFICATION-TYPE

OBJECTS { ospfRouterId, -- The originator of the trap
ospfExtLsdbLimit
}

STATUS current

DESCRIPTION

"An ospfLsdbApproachingOverflow trap signifies that the number of LSAs in the router's link-state database has exceeded ninety percent of ospfExtLsdbLimit."

::= { ospfTraps 15 }

ospfIfStateChange NOTIFICATION-TYPE

OBJECTS { ospfRouterId, -- The originator of the trap

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```
    ospfIfIpAddress,
    ospfAddressLessIf,
    ospfIfState    -- The new state
  }
STATUS          current
DESCRIPTION
```

```
"An ospfIfStateChange trap signifies that there
has been a change in the state of a non-virtual
OSPF interface. This trap should be generated
when the interface state regresses (e.g., goes
from Dr to Down) or progresses to a terminal
state (i.e., Point-to-Point, DR Other, Dr, or
Backup)."
```

```
::= { ospfTraps 16 }
```

```
ospfNssaTranslatorStatusChange NOTIFICATION-TYPE
```

```
OBJECTS { ospfRouterId, -- The originator of the trap
    ospfAreaId,
    ospfAreaNssaTranslatorState -- The current translation
                                -- status
  }
```

```
STATUS          current
```

```
DESCRIPTION
```

```
"An ospfNssaTranslatorStatusChange trap indicates that there
has been a change in the router's ability to translate OSPF
type-7 LSAs into OSPF type-5 LSAs. This trap should be
generated when the Translator Status transitions from or to
any defined status on a per area basis."
```

```
::= { ospfTraps 17 }
```

```
-- conformance information
```

```
ospfTrapConformance OBJECT IDENTIFIER ::= { ospfTrap 3 }
```

```
ospfTrapGroups      OBJECT IDENTIFIER ::= { ospfTrapConformance 1 }
```

```
ospfTrapCompliances OBJECT IDENTIFIER ::= { ospfTrapConformance 2 }
```

```
-- compliance statements
```

```
ospfTrapCompliance MODULE-COMPLIANCE
```

```
STATUS          current
```

```
DESCRIPTION
```

```
"The compliance statement "
```

```
MODULE          -- this module
```

```
MANDATORY-GROUPS { ospfTrapControlGroup }
```

```
::= { ospfTrapCompliances 1 }
```

```
-- units of conformance
```

```
ospfTrapControlGroup    OBJECT-GROUP
    OBJECTS { ospfSetTrap,
```

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```
    ospfConfigErrorType,  
    ospfPacketType,  
    ospfPacketSrc  
  }  
STATUS      current  
DESCRIPTION  
    "These objects are required to control traps  
    from OSPF systems."  
 ::= { ospfTrapGroups 1 }
```

END

6 Acknowledgements

This document was produced by the OSPF Working Group, and is based on the MIB for OSPF version 2 by Rob Coltun and Fred Baker [[18](#)].

The Authors acknowledge the following individuals:

- John Moy, Sycamore Networks
- Rob Coltun, RedBack Networks
- Pat Murphy, USGS

7 References

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A TOS Support

For backward compatibility with previous versions of the OSPF MIB specification, TOS-specific information has been retained in this document, though the TOS routing option has been deleted from OSPF [[RFC 2178](#)].

B Changes from [RFC 1850](#)

This section documents the differences between this memo and [RFC 1850](#).

[B.1 RFC 1583 Compatibility](#)

Added object ospfRFC1583Compatibility to ospfGeneralGroup to indicate support with "[RFC 1583 Compatibility](#)" This object has DEFVAL of "enabled".

[B.2 OSPF Traffic Engineering Support](#)

Added object ospfTrafficEngineeringSupport to ospfGeneralGroup to indicate support of OSPF traffic engineering.

[B.3 OSPF NSSA Enhancement Support](#)

Added new objects to OspfAreaTable including:

- ospfAreaNssaTranslatorRole to indicate the configured NSSA translation role.

-ospfAreaNssaTranslatorState to indicate the current

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NSSA translation role.

-ospfAreaNssaTranslatorStabilityInterval to indicate time to continue to perform at current translation status.

-ospfAreaNssaTranslatorEvents to indicate the number of times OSPF Translation Status has changed.

Added new object ospfNssaTranslatorStatusChange to ospfTraps in OSPF-TRAP-MIB DEFINITIONS.

Added ospfAreaId to IMPORTS in OSPF-TRAP-MIB DEFINITIONS to support ospfNssaTranslatorStatusChange.

Added ospfAreaExtNssaTranslatorStatus to IMPORTS in OSPF-TRAP-MIB DEFINITIONS to support ospfNssaTranslatorStatusChange.

Modified the DESCRIPTION clause of the ospfAreaSummary object in the ospfAreaTable to indicate support for NSSA.

Modified the DESCRIPTION clause of the ospfImportAsExtern object in the ospfAreaTable for clarity.

B.4 OSPF MTU Mismatch Support

Added mtuMismatch enumeration to ospfConfigErrorType object in ospfTrapControl to imply MTU mismatch trap generation. in ospfIfConfigError.

B.5 Opaque LSA Support

Added object ospfOpaqueLsaSupport to ospfGeneralGroup to indicate support of OSPF Opaque LSAs.

Added object ospfAsOpaqueLsdbLimit to ospfGeneralGroup to indicate a limit of Type-11 LSAs in the LSDB before overflow .

Created ospfLocalLsdbTable, for Link-local (type-9) LSA support. This table is indexed by:

-ospfLocalLsdbIpAddress

-ospfLocalLsdbAddressLessIf

-ospfLocalLsdbType

-ospfLocalLsdbLsid

-ospfLocalLsdbRouterId

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ospfLocalLsdbTable contains the following (columnar) objects:

- ospfLocalLsdbSequence, to indicate LSA instance
- ospfLocalLsdbAge
- ospfLocalLsdbChecksum
- ospfLocalLsdbAdvertisement, containing the entire LSA

Created ospfVirLocalLsdbTable, for Link-local (type-9) LSA support on virtual links. This table is indexed by:

- ospfVirtLocalLsdbTransitArea
- ospfVirtLocalLsdbNeighbor, to indicate the router ID of the virtual neighbor
- ospfVirLocalLsdbType
- ospfVirLocalLsdbLsid
- ospfVirLocalLsdbRouterId

ospfVirLocalLsdbTable contains the following (columnar) objects:

- ospfVirLocalLsdbSequence, to indicate LSA instance
- ospfVirLocalLsdbAge
- ospfVirLocalLsdbChecksum
- ospfVirLocalLsdbAdvertisement, containing the entire LSA

Added objects to ospfIfTable to support Link-local (type-9) LSAs, including:

- ospfIfLsaCount
- ospfIfLsaChecksumSum, to indicate the sum of the type-9 link-state advertisement checksums on this interface

Added objects to ospfVirIfTable, to support Link-local (type-9) LSAs on virtual links, including:

- ospfVirIfLsaCount
- ospfVirIfLsaChecksumSum, to indicate the sum of the type-9 link-state advertisement checksums on this link.

To support area scope (type-10) LSAs, the enumeration

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areaOpaqueLink (10) was added to ospfLsdbType in the ospfLsdbTable.

To support AS scope (type-11) LSAs, the enumeration asOpaqueLink (11) was added to ospfExtLsdbType in the ospfExtLsdbTable.

B.6 OSPF Compliances

Compliance statements were depreciated as needed due to the fact that many new items have been added to the MIB. These statements include:

- ospfCompliance

New compliance statements were added as needed to replace deprecated statements. These Statements include:

- ospfCompliance

Conformance groups were depreciated as needed due to the fact that many new items have been added to the MIB. These groups include:

- ospfBasicGroup

- ospfAreaGroup

- ospfIfGroup

- ospfVirtIfGroup

New conformance groups were added as needed to replace deprecated groups. These groups include:

- ospfBasicGroup2

- ospfAreaGroup2

- ospfIfGroup2

- ospfVirtIfGroup2

Added completely new conformance groups as needed, including:

- ospfLocalLsdbGroup, which specifies support for link local (type-9) LSAs.

- ospfVirtLocalLsdbGroup, which specifies support for link local (type-9) LSAs on virtual links.

B.7 Miscellaneous

Various sections, have been moved and or modified for clarity.

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Most of these changes are semantic in nature, and include, but are not limited to:

- The OSPF Overview section's format was revised. Unneeded information was removed. Removed information includes OSPF TOS default values.
- The Trap Overview section's format and working were revised. Unneeded information was removed.
- Modified description clause of "Status" "TEXTUAL-CONVENTION" for clarity
- The updates section was moved from the Overview to an appendix
- Updating "REFERENCE" clauses in all objects, as needed

Changed the "MAX-ACCESS" clause of "ospfHostStatus" in "ospfHostTable" to "read-create"

C Security Considerations

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.

SNMPv1 by itself is not a secure environment. 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.

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model [RFC 2574](#) [[RFC2574](#)] and the View-based Access Control Model [RFC 2575](#) [[RFC2575](#)] is recommended.

It is then a customer/user responsibility to ensure that the SNMP entity giving access to an instance of this MIB, is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

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