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OSPF Version 2 MIB for Multi-Topology (MT) Routing
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Abstract

This memo defines an extension to the Open Shortest Path First version 2 Management Information Base (OSPFv2 MIB) for use with network management protocols in the Internet community. In particular it describes objects and lists considerations for the management of OSPF Multi-Topology routing.

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Table of Contents

1.	Introduction	3
1.1.	Change Log	3
1.1.1.	Initial version	3
1.1.2.	August 2007 version	3
1.1.3.	April 2008 version	3
1.1.4.	November 2008 version	3
1.1.5.	December 2009 version	3
2.	The Internet-Standard Management Framework	4
3.	Short Overview of Multi-topology routing.	4
4.	Relationship to Other MIBs	5
5.	MIB Overview	5
5.1.	Conformance Groups	5
5.1.1.	The ospfMtGeneralGroup	5
5.1.2.	The ospfMtConfigurationGroup	5
5.1.3.	The ospfMtAreaGroup	5
5.1.4.	The ospfMtAreaTopoGroup	5
5.1.5.	The ospfMtStubAreaGroup	5
5.1.6.	The ospfMtHostGroup	6
5.1.7.	The ospfMtIfMetricGroup	6
5.1.8.	The ospfMtVirtIfMetricGroup	6
5.1.9.	The ospfMtAreaAggregateGroup	6
5.2.	The OSPFv2-MT-MIB Module	6
5.2.1.	Mib Module	6
6.	Acknowledgements	27
7.	References	27
7.1.	Normative References	27
7.2.	Informative References	27
Appendix A.	IANA Considerations	28
Appendix B.	Security Considerations	28

1. Introduction

This memo defines an extension to the Open Shortest Path First version 2 Management Information Base (OSPFv2 MIB) for use with network management protocols in the Internet community. In particular it describes objects and lists considerations for the management of OSPFv2 Multi-Topology routing.

1.1. Change Log

This section to be deleted when the document becomes approved.

1.1.1. Initial version

The initial version was submitted to the OSPF working group as a working group document on January 12, 2007.

1.1.2. August 2007 version

The following changes were made for the version submitted to the IETF as [draft-ietf-ospf-mt-mib-01.txt](#):

Revised issue date.

Changed references to internet draft [draft-ietf-ospf-mt-07](#) to references to [RFC4915](#).

1.1.3. April 2008 version

The following changes were made for the version submitted to the IETF as [draft-ietf-ospf-mt-mib-02.txt](#):

Revised issue date.

1.1.4. November 2008 version

The following changes were made for the version submitted to the IETF as [draft-ietf-ospf-mt-mib-03.txt](#):

Revised issue date.

1.1.5. December 2009 version

The following changes were made for the version submitted to the IETF as [draft-ietf-ospf-mt-mib-04.txt](#):

Revised issue date.

Updated author information.

2. The Internet-Standard Management Framework

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

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIV2, which is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

3. Short Overview of Multi-topology routing.

The multi-topology extensions to OSPFv2 are changes to the base version 2 specification enabling the construction of multiple routing topologies through a network of routing nodes participating in the protocol (through the use of these extensions). Multi-topology routing (MT routing) is most useful in conjunction with class-based packet forwarding. An individual routing topology may be associated with a packet classifier; packets belonging to some defined class are routed according to its associated routing topology.

Fundamentally, MT routing engenders a routing node with the ability to automatically construct orthogonal routing topologies that provide a node with the means to forward distinct IP packets having identical destination IP addresses to different nexthop routers. A routing node may, through packet inspection, associate a packet to a class; a class may be associated with a distinct topology. For example, a packet classifier may be defined that associates TCP traffic with topology A and UDP traffic with topology B. It may be the case, for example, that at any single instant of time, an IP packet bearing a TCP payload destined for IP address Y is routed out interface I1 whereas an IP packet bearing a UDP payload destined for IP address Y is routed out interface I2. This because I1 leads to the nexthop router for topology A and I2 leads to the nexthop router for B; the exemplified nexthop routers being distinct.

MT routing is essentially a reincarnation of TOS-based routing, the principal difference being that packet classification decisions are decoupled from the routing protocol itself -- any criteria may be used to associate a packet with a topology, not simply the policy implied by the encoded TOS byte definitions.

4. Relationship to Other MIBs

The OSPFv2 MIB [[RFC1850](#)][RFC4750] defines basic information for the management of OSPFv2.

This MIB extends [[RFC1850](#)][RFC4750] to enable the management of MT capable routing nodes. This MIB module introduces a scalar used to determine a routing node's Multi-topology routing capabilities and a set of tables that are used instead of, or in addition to, their named equivalents contained within [[RFC1850](#)][RFC4750], in order to manage Multi-topology routing.

It is envisaged that the value of the scalar 'ospfMtSupport', or the absence of an instance of this object in a router's MIB, will be used by applications to discover MT-capable routing nodes and hence used to select an appropriate set of objects from within this MIB and those contained within [[RFC1850](#)][RFC4750] to manage the device.

5. MIB Overview

This document defines the OSPFv2-MT-MIB module.

5.1. Conformance Groups

5.1.1. The ospfMtGeneralGroup

This group contains one object used to support the discovery of MT-capable routers.

5.1.2. The ospfMtConfigurationGroup

This group contains objects used to associate a name with a multi-topology identifier (MTID).

5.1.3. The ospfMtAreaGroup

This group contains an object used to configure an area-specific, multi-topology routing specific parameter.

5.1.4. The ospfMtAreaTopoGroup

This group contains objects used to collect statistics and configure parameters applicable to a topology within an area.

5.1.5. The ospfMtStubAreaGroup

This group contains objects used to configure metrics for topologies advertised by a default Area Border Router into a stub area.

5.1.6. The ospfMtHostGroup

This group contains objects used to configure metrics for topologies associated with attached hosts.

5.1.7. The ospfMtIfMetricGroup

This group contains objects used to configure metrics for topologies configured on interfaces.

5.1.8. The ospfMtVirtIfMetricGroup

This group contains objects used to configure metrics for topologies configured on virtual interfaces.

5.1.9. The ospfMtAreaAggregateGroup

This group contains objects used to configure address aggregation for topologies.

5.2. The OSPFv2-MT-MIB Module

5.2.1. Mib Module

```
OSPFv2-MT-MIB  DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE,
    mib-2,
    Integer32,
    Counter32,
    IPAddress                               FROM SNMPv2-SMI    -- [RFC2578]
    MODULE-COMPLIANCE, OBJECT-GROUP        FROM SNMPv2-CONF    -- [RFC2580]
    TEXTUAL-CONVENTION,
    RowStatus,
    TruthValue                             FROM SNMPv2-TC      -- [RFC2579]
    InterfaceIndexOrZero                   FROM IF-MIB          -- [RFC2863]
    AreaID,
    ospfAreaEntry,
    RouterID,
    Metric,
    BigMetric                             FROM OSPF-MIB;        -- [RFC1850]
                                                                    [RFC4750]
```

```
ospfMtMIB  MODULE-IDENTITY
```

```
    LAST-UPDATED  "200912100000Z"
```

```
    ORGANIZATION  "IETF OSPF Working Group"
```


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DESCRIPTION

"The MIB module for the management of OSPF Version 2 Multi-topology routing. This MIB module is used in conjunction with the OSPFv2 MIB module to support the Multi-topology extensions.

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This version of this MIB module is part of
RFC XXXX; see the RFC itself for full legal
notices."

REVISION "200912100000Z"

DESCRIPTION

"Initial version of this MIB."

::= { mib-2 nnn } -- to be determined later

ospfMtMIBObjects	OBJECT IDENTIFIER ::= { ospfMtMIB 1 }
ospfMtMIBConformance	OBJECT IDENTIFIER ::= { ospfMtMIB 2 }
ospfMtMIBNotifications	OBJECT IDENTIFIER ::= { ospfMtMIB 0 }
ospfMtGeneral	OBJECT IDENTIFIER ::= { ospfMtMIBObjects 1 }
ospfMtConfiguration	OBJECT IDENTIFIER ::= { ospfMtMIBObjects 2 }
ospfMt	OBJECT IDENTIFIER ::= { ospfMtMIBObjects 3 }

-- Textual Conventions

TopologyID ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d-0"


```
STATUS      current
DESCRIPTION
    "A topology identifier.

    Section 3.7 of RFC 4915 defines the mapping
    of the topology id space."
REFERENCE
    "RFC 4915, Multi-Topology (MT) Routing in OSPF"
SYNTAX      Integer32 (0..127)

--
-- The objects used to manage OSPF MT
--

ospfMtSupport OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "This entity's support for Multi-topology routing.
        When this object has a value of 'true' this entity
        supports multi-topology routing. When the value is
        'false' or when this object doesn't exist, this
        entity doesn't support MT routing. This object is
        instantiated by the agent during the managed system's
        initialization."
    ::= { ospfMtGeneral 1 }

-- OSPF MT Topology Information

-- A table containing a list of topologies configured on the
-- ospf router and each topology's name.

ospfMtTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF OspfMtEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "A table mapping a configured topology id to a name."
    REFERENCE
        "RFC 4915, Multi-Topology (MT) Routing in OSPF"
    ::= { ospfMtConfiguration 1 }

ospfMtEntry OBJECT-TYPE
    SYNTAX      OspfMtEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
```


"Information describing one of the topologies on the router.

The managed system creates a row for the device's default topology. This row cannot be destroyed by a management station."

REFERENCE

"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

INDEX { ospfMtTopoId }

::= { ospfMtTable 1 }

OspfMtEntry ::= SEQUENCE {
 ospfMtTopoId TopologyID,
 ospfMtTopoName OCTET STRING,
 ospfMtTopoStatus RowStatus
}

ospfMtTopoId OBJECT-TYPE

SYNTAX TopologyID
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION

"The ID for a topology."

REFERENCE

"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

::= { ospfMtEntry 1 }

ospfMtTopoName OBJECT-TYPE

SYNTAX OCTET STRING (SIZE(0..255))
MAX-ACCESS read-only
STATUS current

DESCRIPTION

"The name of the topology."

REFERENCE

"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

::= { ospfMtEntry 2 }

ospfMtTopoStatus OBJECT-TYPE

SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"This object permits management of the table by facilitating actions such as row creation, construction and destruction. The value of this object has no effect on whether other objects in this conceptual row can be modified."

::= { ospfMtEntry 3 }

-- Multi Topology OSPF Area Table

-- The OSPF MT 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. A
-- new object is added to the data structure to indicate
-- area's MT Routing Exclusion capability.

ospfMtAreaTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfMtAreaEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information describing area parameters supporting
Multi-topology routing.

The entries in this table augment the entries contained
within the ospfAreaTable; an augmenting entry is created
by the managed system when the value of ospfMtSupport is
'true'."

REFERENCE

"OSPF Version 2, [Section 6](#) The Area Data Structure
and [RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

::= { ospfMt 1 }

ospfMtAreaEntry OBJECT-TYPE

SYNTAX OspfMtAreaEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information describing the configured parameters
and cumulative statistics of one of the router's
attached areas."

AUGMENTS { ospfAreaEntry }

::= { ospfMtAreaTable 1 }

OspfMtAreaEntry ::= SEQUENCE {
ospfMtAreaExclusion TruthValue
}

ospfMtAreaExclusion OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Describes the area's MT default exclusion
capability."

REFERENCE

"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"
::= { ospfMtAreaEntry 1 }

-- Multi Topology OSPF Area Topology Table
-- This table gives topology specific information for the area.

ospfMtAreaTopoTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfMtAreaTopoEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Information describing the configured parameters
and cumulative statistics of the router's topologies
in an area."

REFERENCE

"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"
::= { ospfMt 2 }

ospfMtAreaTopoEntry OBJECT-TYPE

SYNTAX OspfMtAreaTopoEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Information describing the configured parameters
and cumulative statistics of a topology in an area."
INDEX { ospfMtAreaTopoId, ospfMtAreaId }
::= { ospfMtAreaTopoTable 1 }

OspfMtAreaTopoEntry ::= SEQUENCE {
ospfMtAreaTopoId TopologyID,
ospfMtAreaId AreaID,
ospfMtSpfRuns Counter32,
ospfMtAreaSummary INTEGER,
ospfMtAreaTopoStatus RowStatus
}

ospfMtAreaTopoId OBJECT-TYPE

SYNTAX TopologyID
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The ID for a topology; this can
be derived from the OSPF instance."
REFERENCE
"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"
::= { ospfMtAreaTopoEntry 1 }

ospfMtAreaId OBJECT-TYPE

SYNTAX AreaID

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The 32 bit identifier for the Area. On creation, this can be derived from the OSPF instance."

::= { ospfMtAreaTopoEntry 2 }

ospfMtSpfRuns OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of times the SPF is run for a given topology."

REFERENCE

"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

::= { ospfMtAreaTopoEntry 3 }

ospfMtAreaSummary OBJECT-TYPE

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

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object controls the importation of summary LSAs into stub areas. It has no effect on other areas."

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

If its value is 'sendAreaSummary', the router will both summarize and propagate summary LSAs."

DEFVAL { noAreaSummary }

::= { ospfMtAreaTopoEntry 4 }

ospfMtAreaTopoStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object permits management of the table by facilitating actions such as row creation,

construction and destruction.

The value of this object has no effect on whether other objects in this conceptual row can be modified."

::= { ospfMtAreaTopoEntry 5 }

-- OSPF MT Area Default Metric Table

-- The OSPF MT Area Default Metric Table describes the metrics
-- that a default Area Border Router advertises into a
-- Stub area for a particular topology. The ABR may advertise
-- different metrics for different topologies.

ospfMtStubAreaTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfMtStubAreaEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The set of metrics that will be advertised
for a specific topology by a default Area
Border Router into a stub area."

REFERENCE

"OSPF Version 2, [Appendix C.2](#), Area Parameters,
and [RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

::= { ospfMt 3 }

ospfMtStubAreaEntry OBJECT-TYPE

SYNTAX OspfMtStubAreaEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The metric for a specific topology that will be
advertised by a default Area Border Router
into a stub area."

REFERENCE

"OSPF Version 2, [Appendix C.2](#), Area Parameters
and [RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

INDEX { ospfMtStubAreaTopoId, ospfMtStubAreaId }

::= { ospfMtStubAreaTable 1 }

OspfMtStubAreaEntry ::= SEQUENCE {

ospfMtStubAreaTopoId TopologyID,

ospfMtStubAreaId AreaID,

ospfMtStubMetric BigMetric,

ospfMtStubMetricType INTEGER,

ospfMtStubStatus RowStatus

}

ospfMtStubAreaTopoId OBJECT-TYPE

SYNTAX TopologyID
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION

"The ID for a topology; this can be derived
from the OSPF instance."

REFERENCE

"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

::= { ospfMtStubAreaEntry 1 }

ospfMtStubAreaId OBJECT-TYPE

SYNTAX AreaID
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION

"The 32 bit identifier for the Stub Area; this
can be derived from the OSPF instance."

::= { ospfMtStubAreaEntry 2 }

ospfMtStubMetric OBJECT-TYPE

SYNTAX BigMetric
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"The metric value associated with a topology."

::= { ospfMtStubAreaEntry 3 }

ospfMtStubMetricType OBJECT-TYPE

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

MAX-ACCESS read-create
STATUS current

DESCRIPTION

"This object contains the type of metric advertised
as a default route."

DEFVAL { ospfMtMetric }

::= { ospfMtStubAreaEntry 4 }

ospfMtStubStatus OBJECT-TYPE

SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current

DESCRIPTION

"This object permits management of the table by

facilitating actions such as row creation,
construction and destruction.

The value of this object has no effect on
whether other objects in this conceptual row can be
modified."

::= { ospfMtStubAreaEntry 5 }

-- OSPF MT Host Table

-- The Host/Metric Table is used to indicate which hosts are
-- directly attached to the managed router, and the set of metrics
-- that should be advertised for them.
--

ospfMtHostTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfMtHostEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

REFERENCE

"OSPF Version 2, [Appendix C.6](#) Host route parameters
and [RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

::= { ospfMt 4 }

ospfMtHostEntry OBJECT-TYPE

SYNTAX OspfMtHostEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A metric to be advertised, for a specific topology,
when a given host is reachable."

INDEX { ospfMtHostTopoId, ospfMtHostIpAddress }

::= { ospfMtHostTable 1 }

OspfMtHostEntry ::= SEQUENCE {

ospfMtHostTopoId TopologyID,

ospfMtHostIpAddress IpAddress,

ospfMtHostMetric Metric,

ospfMtHostAreaID AreaID,

ospfMtHostStatus RowStatus

}

ospfMtHostTopoId OBJECT-TYPE

SYNTAX TopologyID

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The ID for a topology."

REFERENCE

"[RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

::= { ospfMtHostEntry 1 }

ospfMtHostIpAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The IP Address of the Host."

REFERENCE

"OSPF Version 2, [Appendix C.6](#) Host route parameters."

::= { ospfMtHostEntry 2 }

ospfMtHostMetric OBJECT-TYPE

SYNTAX Metric

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The Metric to be advertised."

REFERENCE

"OSPF Version 2, [Appendix C.6](#) Host route parameters."

::= { ospfMtHostEntry 3 }

ospfMtHostAreaID OBJECT-TYPE

SYNTAX AreaID

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The Area in which the Host Entry is to be found.
By default, the area that a subsuming OSPF in-
terface is in, or 0.0.0.0."

REFERENCE

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

::= { ospfMtHostEntry 4 }

ospfMtHostStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object permits management of the table by
facilitating actions such as row creation,
construction and destruction.

The value of this object has no effect on


```

        whether other objects in this conceptual row can be
        modified."
 ::= { ospfMtHostEntry 5 }

-- OSPF MT Interface Metric Table

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

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

--      Metric = 10^8 / ifSpeed

-- 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
ospfMtIfMetricTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF OspfMtIfMetricEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "The topology specific metrics for a non-virtual
        interface identified by the interface index."
    REFERENCE
        "OSPF Version 2, Appendix C.3 Router interface
        parameters and RFC 4915, Multi-Topology (MT) Routing
        in OSPF"
    ::= { ospfMt 5 }

ospfMtIfMetricEntry OBJECT-TYPE
    SYNTAX      OspfMtIfMetricEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION

```


"A particular topology specific metric for a non-virtual interface identified by the interface index."

REFERENCE

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

INDEX { ospfMtIfMetricTopoId,
ospfMtIfMetricIpAddress,
ospfMtIfMetricAddressLessIf }
::= { ospfMtIfMetricTable 1 }

OspfMtIfMetricEntry ::= SEQUENCE {
ospfMtIfMetricTopoId TopologyID,
ospfMtIfMetricIpAddress IpAddress,
ospfMtIfMetricAddressLessIf InterfaceIndexOrZero,
ospfMtIfMetricValue Metric,
ospfMtIfMetricTopoStatus RowStatus
}

ospfMtIfMetricTopoId OBJECT-TYPE

SYNTAX TopologyID
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"The topology specific metric being referenced.
On row creation, this can be derived from the
OSPF instance."

::= { ospfMtIfMetricEntry 1 }

ospfMtIfMetricIpAddress OBJECT-TYPE

SYNTAX IpAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"The IP address of this OSPF interface. On
row creation, this can be derived from the
OSPF instance."

::= { ospfMtIfMetricEntry 2 }

ospfMtIfMetricAddressLessIf OBJECT-TYPE

SYNTAX InterfaceIndexOrZero
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"For the purpose of easing the instancing of
addressed and addressless interfaces, this
object takes the value 0 on interfaces having
IP Addresses, and the value of ifIndex for


```
        interfaces having no IP Address.  On row
        creation, this can be derived from the
        OSPF instance."
 ::= { ospfMtIfMetricEntry 3 }

ospfMtIfMetricValue OBJECT-TYPE
    SYNTAX      Metric
    MAX-ACCESS   read-create
    STATUS      current
    DESCRIPTION
        "The metric associated with this topology."
 ::= { ospfMtIfMetricEntry 4 }

ospfMtIfMetricTopoStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS   read-create
    STATUS      current
    DESCRIPTION
        "This object permits management of the table by
        facilitating actions such as row creation,
        construction and destruction.

        The value of this object has no effect on
        whether other objects in this conceptual row can be
        modified."
 ::= { ospfMtIfMetricEntry 5 }

-- OSPF MT Virtual Interface Metric Table

-- The Virtual Interface Metric Table describes the metrics to be
-- advertised for a specific virtual interface under a specific
-- topology. As such, this table is an adjunct of the OSPF Virtual
-- Interface Table.

ospfMtVirtIfMetricTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF OspfMtVirtIfMetricEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "The topology specific metrics for a virtual
        interface."
    REFERENCE
        "OSPF Version 2, Appendix C.3 Router interface
        parameters and RFC 4915, Multi-Topology (MT) Routing
        in OSPF"
 ::= { ospfMt 6 }

ospfMtVirtIfMetricEntry OBJECT-TYPE
```


SYNTAX OspfMtVirtIfMetricEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "A particular topology specific metric for
 a virtual interface."
REFERENCE
 "OSPF Version 2, [Appendix C.3](#) Router interface
 parameters."
INDEX { ospfMtVirtIfMetricTopoId,
 ospfMtVirtIfMetricArea,
 ospfMtVirtIfMetricNbrRtrId,
 ospfMtVirtIfMetricNbrIpAddress }
::= { ospfMtVirtIfMetricTable 1 }

OspfMtVirtIfMetricEntry ::= SEQUENCE {
 ospfMtVirtIfMetricTopoId TopologyID,
 ospfMtVirtIfMetricArea AreaID,
 ospfMtVirtIfMetricNbrRtrId RouterID,
 ospfMtVirtIfMetricNbrIpAddress IpAddress,
 ospfMtVirtIfMetricValue Metric,
 ospfMtVirtIfMetricTopoStatus RowStatus
}

ospfMtVirtIfMetricTopoId OBJECT-TYPE

SYNTAX TopologyID
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "The topology specific metric being referenced.
 On row creation, this can be derived from the
 OSPF instance."
::= { ospfMtVirtIfMetricEntry 1 }

ospfMtVirtIfMetricArea OBJECT-TYPE

SYNTAX AreaID
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "A 32 bit identifier for Area ID."
::= { ospfMtVirtIfMetricEntry 2 }

ospfMtVirtIfMetricNbrRtrId OBJECT-TYPE

SYNTAX RouterID
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "A 32 bit identifier for Router ID."


```
::= { ospfMtVirtIfMetricEntry 3 }
```

ospfMtVirtIfMetricNbrIpAddress OBJECT-TYPE

SYNTAX IpAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A 32 bit identifier identifying virtual neighbor
end point IP address."

```
::= { ospfMtVirtIfMetricEntry 4 }
```

ospfMtVirtIfMetricValue OBJECT-TYPE

SYNTAX Metric

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The metric associated with the topology."

```
::= { ospfMtVirtIfMetricEntry 5 }
```

ospfMtVirtIfMetricTopoStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object permits management of the table by
facilitating actions such as row creation,
construction and destruction.

The value of this object has no effect on
whether other objects in this conceptual row can be
modified."

```
::= { ospfMtVirtIfMetricEntry 6 }
```

```
-- The OSPF MT Area Aggregate Table
-- When the value of ospfMtSupport is 'true' this table is
-- used instead of the ospfAreaAggregate table defined
-- in RFC 1850 and RFC 4750. It is used to support aggregation
-- across multiple topologies.
```

ospfMtAreaAggregateTable OBJECT-TYPE

SYNTAX SEQUENCE OF OspfMtAreaAggregateEntry

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.
and [RFC 4915](#), Multi-Topology (MT) Routing in OSPF"

```
::= { ospfMt 7 }
```

ospfMtAreaAggregateEntry OBJECT-TYPE

SYNTAX OspfMtAreaAggregateEntry

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 { ospfMtAreaAggregateTopoId,  
        ospfMtAreaAggregateAreaID,  
        ospfMtAreaAggregateLsdbType,  
        ospfMtAreaAggregateNet,  
        ospfMtAreaAggregateMask }
```

```
::= { ospfMtAreaAggregateTable 1 }
```

OspfMtAreaAggregateEntry ::= SEQUENCE {

```
    ospfMtAreaAggregateTopoId       TopologyID,  
    ospfMtAreaAggregateAreaID       AreaID,  
    ospfMtAreaAggregateLsdbType     INTEGER,  
    ospfMtAreaAggregateNet          IpAddress,  
    ospfMtAreaAggregateMask         IpAddress,  
    ospfMtAreaAggregateEffect       INTEGER,  
    ospfMtAreaAggregateStatus       RowStatus
```

```
}
```

ospfMtAreaAggregateTopoId OBJECT-TYPE

SYNTAX TopologyID

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The ID for a topology."

REFERENCE

"[RFC 4915](#), Multi Topology (MT) Routing in OSPF"

::= { ospfMtAreaAggregateEntry 1 }

ospfMtAreaAggregateAreaID OBJECT-TYPE

SYNTAX AreaID

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The Area in which the Address Aggregate is to be found."

REFERENCE

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

::= { ospfMtAreaAggregateEntry 2 }

ospfMtAreaAggregateLsdbType OBJECT-TYPE

SYNTAX INTEGER {
summaryLink (3),
nssaExternalLink (7)
}

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The type of the Address Aggregate. This field specifies the Lsdb type that this Address Aggregate applies to."

REFERENCE

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

::= { ospfMtAreaAggregateEntry 3 }

ospfMtAreaAggregateNet OBJECT-TYPE

SYNTAX IPAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

REFERENCE

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

::= { ospfMtAreaAggregateEntry 4 }

ospfMtAreaAggregateMask OBJECT-TYPE

SYNTAX IPAddress

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

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

REFERENCE

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

::= { ospfMtAreaAggregateEntry 5 }

ospfMtAreaAggregateEffect 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 }

::= { ospfMtAreaAggregateEntry 6 }

ospfMtAreaAggregateStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object permits management of the table by facilitating actions such as row creation, construction and destruction.

The value of this object has no effect on whether other objects in this conceptual row can be modified."

::= { ospfMtAreaAggregateEntry 7 }

-- Conformance

ospfMtMIBCompliances OBJECT IDENTIFIER ::= { ospfMtMIBConformance 1 }

ospfMtMIBGroups OBJECT IDENTIFIER ::= { ospfMtMIBConformance 2 }

ospfMIBCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The compliance statement for entities which support OSPFv2 Multi-topology routing."

MODULE MANDATORY-GROUPS { ospfMtAreaGroup,
 ospfMtAreaTopoGroup,
 ospfMtStubAreaGroup,
 ospfMtHostGroup,


```
        ospfMtIfMetricGroup,  
        ospfMtVirtIfMetricGroup,  
        ospfMtAreaAggregateGroup }
```

```
GROUP      ospfMtGeneralGroup
```

```
DESCRIPTION
```

```
    "All systems supporting discovery of OSPFv2  
    capabilities should support this group."
```

```
GROUP      ospfMtConfigurationGroup
```

```
DESCRIPTION
```

```
    "Only systems that reference topologies by name  
    instead of number need to support this group."
```

```
::= { ospfMtMIBCompliances 1 }
```

```
-- Units of Conformance
```

```
ospfMtGeneralGroup OBJECT-GROUP
```

```
    OBJECTS { ospfMtSupport }
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "A collection of objects used to manage OSPF  
        entities supporting Multi-topology routing."
```

```
::= { ospfMtMIBGroups 1 }
```

```
ospfMtConfigurationGroup OBJECT-GROUP
```

```
    OBJECTS { ospfMtTopoName,  
              ospfMtTopoStatus }
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "A collection of objects used to manage OSPF  
        entities supporting Multi-topology routing."
```

```
::= { ospfMtMIBGroups 2 }
```

```
ospfMtAreaGroup OBJECT-GROUP
```

```
    OBJECTS { ospfMtAreaExclusion }
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "A collection of objects used to manage OSPF  
        entities supporting Multi-topology routing and  
        areas."
```

```
::= { ospfMtMIBGroups 3 }
```

```
ospfMtAreaTopoGroup OBJECT-GROUP
```

```
    OBJECTS { ospfMtSpfRuns,  
              ospfMtAreaSummary,  
              ospfMtAreaTopoStatus }
```

```
    STATUS current
```


DESCRIPTION

"A collection of objects used to manage OSPF entities supporting Multi-topology routing."

::= { ospfMtMIBGroups 4 }

ospfMtStubAreaGroup OBJECT-GROUP

OBJECTS { ospfMtStubMetric,
ospfMtStubMetricType,
ospfMtStubStatus }

STATUS current

DESCRIPTION

"A collection of objects used to manage OSPF entities supporting Multi-topology routing."

::= { ospfMtMIBGroups 5 }

ospfMtHostGroup OBJECT-GROUP

OBJECTS { ospfMtHostMetric,
ospfMtHostAreaID,
ospfMtHostStatus }

STATUS current

DESCRIPTION

"A collection of objects used to manage OSPF entities supporting Multi-topology routing."

::= { ospfMtMIBGroups 6 }

ospfMtIfMetricGroup OBJECT-GROUP

OBJECTS { ospfMtIfMetricValue,
ospfMtIfMetricTopoStatus }

STATUS current

DESCRIPTION

"A collection of objects used to manage OSPF entities supporting Multi-topology routing."

::= { ospfMtMIBGroups 7 }

ospfMtVirtIfMetricGroup OBJECT-GROUP

OBJECTS { ospfMtVirtIfMetricValue,
ospfMtVirtIfMetricTopoStatus }

STATUS current

DESCRIPTION

"A collection of objects used to manage OSPF entities supporting Multi-topology routing."

::= { ospfMtMIBGroups 8 }

ospfMtAreaAggregateGroup OBJECT-GROUP

OBJECTS { ospfMtAreaAggregateEffect,
ospfMtAreaAggregateStatus }

}

STATUS current

DESCRIPTION

"A collection of objects used to manage OSPF
entities supporting Multi-topology routing."
 ::= { ospfMtMIBGroups 9 }

END

6. Acknowledgements

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7. References

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7.2. Informative References

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"Introduction and Applicability Statements for Internet-
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Appendix A. IANA Considerations

IANA is requested to make a MIB OID assignment for the OSPFv2-MT-MIB module under the appropriate subtree.

Appendix B. Security Considerations

There are many management objects defined in these MIB modules with a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementors consider the security features as provided by the SNMPv3 framework (see [\[RFC3410\], section 8](#)), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

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

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