OSPF Version 2 MIB for Multi-Topology (MT) Routing
draft-ietf-ospf-mt-mib-04

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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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.
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"
CONTACT-INFO

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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 OSFPv2 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 T
  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 ::= 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 interface 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

7.1. Normative References


7.2. Informative References

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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