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Masanori Miyazawa
Tomohiro Otani
KDDI R&D Labs
Thomas D. Nadeau
Cisco Systems
Kenji Kumaki
KDDI Corporation
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**Traffic Engineering Database Management Information Base
in support of GMPLS**
draft-ietf-ccamp-gmpls-ospf-mib-01.txt

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Abstract

This memo defines the Management Information Base (MIB) objects in order to manage traffic engineering database (TED) information with extension in support of Multi-protocol label switching (MPLS) as well as Generalized MPLS (GMPLS) for use with network management protocols.

Table of Contents

Status of this Memo.....	1
Abstract.....	1
1. Introduction..	3

[2. Terminology](#).....[3](#)

T. Otani et al. [1](#)
Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](#) October 2006

2.1 Conventions used in this document.....	3
2.2 Terminology.....	3
2.3 Acronyms.....	3
3. Motivations.....	4
4. Brief description of MIB Objects.....	4
4.1 teTEDTable.....	4
4.2 teLocalIntIpAddrTable.....	4
4.3 teRemoteIntIpAddrTable.....	4
4.4 teSwCapTable.....	4
4.5 teSrlgTable.....	4
5. TED MIB Definitions in support of GMPLS.....	4
6. Security consideration.....	19
7. IANA Considerations.....	19
7.1 IANA Considerations for TED-STD-MIB.....	19
8. References.....	19
8.1 Normative References.....	19
8.2 Informative References.....	19
9. Acknowledgment.....	21
10. Author's Address.....	21
11. Intellectual Property Statement.....	21
12. Copyright Statement.....	22

T. Otani et al. [2](#)
Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](#) October 2006

[1. Introduction](#)

The OSPF MIB is defined as [[OSPFMIB](#)] being extended by [[OSPFMIB UPDATE](#)] and The ISIS MIB as [[ISISMIB](#)]. On the other side, MPLS/GMPLS based traffic engineering has so far extended OSPF/ISIS routing protocol with TE functionality [[GMPLSrouting](#), [RFC3630](#), [GMPLSisis](#), [RFC3784](#)]. To manage such MPLS/GMPLS networks effectively, routing information associated with MPLS/GMPLS TE parameters (TED) is preferred for the network management, however, there is no clear definition of MPLS/GMPLS TE information in existing MIBs related with OSPF/ISIS.

This memo defines the Management Information Base (MIB) objects for managing TED in support of MPLS/GMPLS for use with network management protocols.

This MIB module should be used in conjunction with OSPF/ISIS MIB as well as other MIBs defined in [[RFC3812](#), [RFC3813](#), [GMPLSLSRMIB](#), [GMPLSTEMIB](#)] for the management of MPLS/GMPLS based traffic engineering information.

2. Terminology

2.1 Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC-2119](#) [[RFC2119](#)].

2.2 Terminology

Definitions of key terms for MPLS OAM and GMPLS are found in [MPLS-OAM, [RFC3945](#)] and the reader is assumed to be familiar with those definitions which are not repeated here.

2.3 Acronyms

GMPLS: Generalized Multi-Protocol Label Switching
LDP: Label Distribution Protocol
LSP: Label Switching Path
LSR: Label Switching Router
MIB: Management Information Base
OAM: Operations and Management
OA&M: Operations, Administration and Maintenance.
OSPF: Open Shortest Path First
RSVP: Resource reSerVation Protocol
TE: Traffic Engineering
PSC: Packet switch capable
LSC: Lambda switch capable
FSC: Fiber switch capable
TDM: Time Division Multiplexing
SRLG: Shared risk link group
LSA: Link state advertisement

T. Otani et al.

3

Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](#) October 2006

3. Motivations

The existing OSPF, MPLS and GMPLS MIBs do not provide for the management of all of the extensions to the OSPF protocol. To manage GMPLS TE attributes, MIB objects to indicate such GMPLS TED is significant.

4. Brief description of MIB Objects

The objects described in this section support the management of TED described in [GMPLSrouting], [[GMPLSOSPF](#)] and [[GMPLSisis](#)] for GMPLS extensions as well as in [[RFC3630](#)] and [[RFC3784](#)] for MPLS/GMPLS.

4.1 teTEDTable

The teTEDTable is basically used to indicate TED information of OSPF-TE or ISIS-TE. However, this table does not contain the information of Local/Remote interface IP address, Interface Switching Capcability Descriptor and Shared Risk Link Group information within the sub-TLVs for the Link-TLV.

4.2 teLocalIntIpAddrTable

The teLocalIntIpAddrTable is identical to the Local interface IP address information in a sub-TLV for the Link-TLV. This is independently defined, because the Interface IP Address sub-TLV may appear more than once within the same Link-TLV.

4.3 teRemoteIntIpAddrTable

The teRemoteIntIpAddrTable is identical to the Remote interface IP address information in a sub-TLV of the Link-TLV. This is also independently utilized, because one or more local interface IP address sub TLVs may exist in the same Link-TLV.

4.4 teSwCapTable

The teSwCapTable represents Interface Switching Capability Descriptor information. This is independently defined due to the possibility of multiple appearances of the sub TLV within the same Link-TLV.

4.5 teSrlgTable

The teSrlgTable contains the Sub-TLV information of Shared Risk Link Group (SRLG) information. This is separately defined, because more than one sub TLVs may appear in the same Link-TLV.

5. TED MIB Definitions in support of GMPLS

T. Otani et al.

4

Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](http://www.ietf.org/internet-drafts/draft-ietf-ccamp-gmpls-ospf-mib-01.txt) October 2006

TED-DRAFT01-MIB DEFINITIONS ::= BEGIN

IMPORTS

 MODULE-IDENTITY, OBJECT-TYPE, Integer32, Unsigned32, transmission,
 IpAddress

 FROM SNMPv2-SMI -- [RFC2578]

 MODULE-COMPLIANCE, OBJECT-GROUP

 FROM SNMPv2-CONF -- [RFC2580]

RowPointer

```
FROM SNMPv2-TC -- [RFC2579]
  ospfAreaId, ospfLsdbLsid, ospfLsdbRouterId
    FROM OSPF-MIB; -- [OSPFMIB UPDATE]
  IsisISLevel, IsisLinkStatePDUID, IsisSystemID
    FROM ISIS-MIB; -- [ISISMIB]
```

```
teMIB MODULE-IDENTITY
  LAST-UPDATED "200510240000Z" -- 04 July 2005 00:00:00 GMT
  ORGANIZATION "IETF CCAMP Working Group."
  CONTACT-INFO
```

```
  " Tomohiro Otani
    otani@kddilabs.jp
```

```
  Masanori Miyazawa
    ma-miyazawa@kddilabs.jp
```

```
  Thomas D. Nadeau
    tnadeau@cisco.com
```

```
  Kenji Kumaki
    ke-kumaki@kddi.com
```

```
  Comments and discussion to ccamp@ietf.org"
```

DESCRIPTION

```
"This MIB contains managed object definitions for
TED in support of MPLS/GMPLS Traffic
Engineering (TE) Database.
```

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

```
-- Revision history.
```

REVISION

```
"200506041200Z" -- 04 July 2005 12:00:00 GMT
```

DESCRIPTION

```
"Initial version. Published as RFC xxxx." -- RFC-editor pls fill
                                         --in xxx
 ::= { transmission 9988 } -- assigned by IANA, see section 7.1 for
                                         -- details
```

```
-- Textual Conventions.
```

```
-- Top level components of this MIB.
```

```
teNotifications OBJECT IDENTIFIER ::= { teMIB 0 }
```

T. Otani et al.

5

Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](#) October 2006

```
teObjects      OBJECT IDENTIFIER ::= { teMIB 1 }
teScalars      OBJECT IDENTIFIER ::= { teObjects 1 }
teTables       OBJECT IDENTIFIER ::= { teObjects 2 }
```

```

teConformance OBJECT IDENTIFIER ::= { teMIB 2 }

-- MIB Definitions

--

-- Scalar Objects
--

-- TE DB Table
--


teTEDTable OBJECT-TYPE
SYNTAX      SEQUENCE OF TeTEDEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This table indicates multiple TED information which has been
supported by [OSPF-TE]."
::= { teTables 1 }

teTEDEntry OBJECT-TYPE
SYNTAX      TeTEDEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This entry contains TED information commonly utilized in both
MPLS and GMPLS"
INDEX { ospfAreaId, ospfLsdbLsid, ospfLsdbRouterId }
::= { teTEDTable 1 }

TeTEDEntry ::= SEQUENCE {
    teLinkInformationSource          INTEGER,
    teAreaLevelID                   OCTET STRING,
    teLSPDUID                        OCTET STRING,
    teRouterSystemID                 OCTET STRING,
    teLinkType                        INTEGER,
    teLinkIdAddr                     InetAddress,
    teMetric                          Integer32,
    teMaxBandwidth                   OCTET STRING,
    teMaxReservableBandwidth         OCTET STRING,
    teUnreservedBandwidthPri0        OCTET STRING,
    teUnreservedBandwidthPri1        OCTET STRING,
    teUnreservedBandwidthPri2        OCTET STRING,
    teUnreservedBandwidthPri3        OCTET STRING,
    teUnreservedBandwidthPri4        OCTET STRING,
    teUnreservedBandwidthPri5        OCTET STRING,
    teUnreservedBandwidthPri6        OCTET STRING,
    teUnreservedBandwidthPri7        OCTET STRING,
    teAdministrativeGroup            Integer32,
}

```

```
    teLocalId          Integer32,
    teRemoteId         Integer32,
    teLinkProtectionType BITS,
    teLinkInformationData RowPointer,
}
```

```
teLinkInformationSource OBJECT-TYPE
    SYNTAX  INTEGER {
        unknown(0),
        locallyConfigured(1),
        ospf(2),
        isis(3),
        other(4)
    }
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        "This object indicates the source of the information about
the TE link"
    ::= { teTEDEntry 1 }
```

```
teAreaLevelId OBJECT-TYPE
    SYNTAX Unsigned32 {ospfAreaId, IsisISLevel}
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        This is corresponding to area ID in OSPF and level ID in
ISIS
    ::= { teTEDEntry 2 }
```

```
teOSPDUID OBJECT-TYPE
    SYNTAX Unsigned32 {ospfLsdbLsid, IsisLinkStatePDUID}
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        This is corresponding to link state ID in OSPF and link
state PDU ID in ISIS
    ::= { teTEDEntry 3 }
```

```
teRouterSystem OBJECT-TYPE
    SYNTAX Unsigned32 {ospfLsdbRouterId, IsisSystemID}
    MAX-ACCESS read-only
    STATUS   current
    DESCRIPTION
        This is corresponding to the router ID in OSPF and the
```

```

system ID in ISIS
 ::= { teTEDEntry 4 }

teLinkType OBJECT-TYPE
  SYNTAX      INTEGER {
                  pointToPoint (1),
                  multiAccess (2)
}

T. Otani et al.                               7
Internet Drafts draft-ietf-ccamp-gmpls-ospf-mib-01.txt October 2006

}
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "This indicates the type of the link such as point-to-point
or multi-access"
 ::= { teTEDEntry 5 }

teLinkIdAddr OBJECT-TYPE
  SYNTAX      IpAddress
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
  "This indicates the Router ID of the neighbor in the case
of point-to-point links. This also indicates the interface address
of the designated router in the case of multi-access links."
 ::= { teTEDEntry 6 }

teMetric OBJECT-TYPE
  SYNTAX      Integer32
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
  "This indicates the traffic engineering metric value of the
TE link."
 ::= { teTEDEntry 7 }

teMaxBandwidth OBJECT-TYPE
  SYNTAX      OCTET STRING (SIZE( 4 ))
  UNITS      "Byte per seconds"
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
  "This indicates the maximum bandwidth that
can be used on this link in this direction"
 ::= { teTEDEntry 8 }

teMaxReservableBandwidth OBJECT-TYPE
  SYNTAX      OCTET STRING (SIZE (4))
  UNITS      "Byte per seconds"

```

```
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "This indicates the maximum bandwidth that may be reserved on
this link in this direction"
 ::= { teTEDEntry 9 }
```

```
teUnreservedBandwidthPri0 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

T. Otani et al. 8
Internet Drafts draft-ietf-ccamp-gmpls-ospf-mib-01.txt October 2006

```
    "This indicates the amount of bandwidth not yet reserved at
the priority 0"
 ::= { teTEDEntry 10 }
```

```
teUnreservedBandwidthPri1 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
    "This indicates the amount of bandwidth not yet reserved at
the priority 1"
 ::= { teTEDEntry 11 }
```

```
teUnreservedBandwidthPri2 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
    "This indicates the amount of bandwidth not yet reserved at
the priority 2"
 ::= { teTEDEntry 12 }
```

```
teUnreservedBandwidthPri3 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
    "This indicates the amount of bandwidth not yet reserved at
the priority 3"
 ::= { teTEDEntry 13 }
```

```
teUnreservedBandwidthPri4 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This indicates the amount of bandwidth not yet reserved at
the priority 4"
::= { teTEDEntry 14 }
```

```
teUnreservedBandwidthPri5 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This indicates the amount of bandwidth not yet reserved at
the priority 5"
::= { teTEDEntry 15 }
```

T. Otani et al.

9

Internet Drafts draft-ietf-ccamp-gmpls-ospf-mib-01.txt October 2006

```
teUnreservedBandwidthPri6 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This indicates the amount of bandwidth not yet reserved at
the priority 6"
::= { teTEDEntry 16 }
```

```
teUnreservedBandwidthPri7 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This indicates the amount of bandwidth not yet reserved at
the priority 7"
::= { teTEDEntry 17 }
```

```
teAdministrativeGroup OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This indicates the Administrative Group which the link
belong to. Since the value is a bit mask, the link can belong to
```

```

multiple groups. This is also called Resource Class/Color."
 ::= { teTEDEntry 18 }

teLocalId OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This indicates the Link local identifier of an unnumbered
link."
 ::= { teTEDEntry 19 }

teRemoteId OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This indicates the Link remote identifier of an unnumbered
link."
 ::= { teTEDEntry 20 }

```

```

teLinkProtectionType OBJECT-TYPE
    SYNTAX  BITS {
        extraTraffic(0),
        unprotected(1),
        shared (2),
        dedicatedOneToOne (3),

```

T. Otani et al. 10
Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](http://www.ietf.org/internet-drafts/draft-ietf-ccamp-gmpls-ospf-mib-01.txt) October 2006

```

        dedicatedOnePlusOne(4),
        enhanced(5)
    }
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
        "This object indicates the protection type of the TE link"
 ::= { teTEDEntry 21 }

```

```

teLinkInformationData OBJECT-TYPE
    SYNTAX  RowPointer
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
        "This object cross-references the source of the information
about this TE link and should be interpreted in the context of
teLinkInformationSource.

```

If teLinkInformationSource has the value unknown(0) this
object SHOULD contain a value of zeroDotZero.
If teLinkInformationSource has the value

locallyConfigured(1), this object MAY contain the identifier of the corresponding row entry in the teLinkTable of TE-LINK-STD-MIB, MAY contain the identifier of the corresponding row in a local proprietary TE link MIB module, or otherwise SHOULD contain the value of zeroDotZero.

If teLinkInformationSource has the value ospf(2), this object MAY contain the identifier of the corresponding row entry in the ospfLocalLsdbTable of [OSPF-MIB], or otherwise SHOULD contain the value of zeroDotZero.

If teLinkInformationSource has the value isis(3) this object MAY contain the identifier of the corresponding row entry in the isisAreaAddr of [ISIS-MIB], or otherwise SHOULD contain the value of zeroDotZero.

If teLinkInformationSource has the value other(4) this object MAY contain the identifier of the corresponding row entry a local proprietary MIB module, or otherwise SHOULD contain the value of zeroDotZero."

```
::= { teTEDEntry 22 }
```

```
--  
-- TED Local Interface IP Address Table  
--
```

teLocalIntAddrTable OBJECT-TYPE

SYNTAX SEQUENCE OF TeLocalIntAddrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains the IP address information of a local TE link."

```
::= { teTables 2 }
```

teLocalIntAddrEntry OBJECT-TYPE

SYNTAX TeLocalIntAddrEntry

T. Otani et al.

11

Internet Drafts draft-ietf-ccamp-gmpls-ospf-mib-01.txt October 2006

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This entry contains the IP address information of the local TE link."

INDEX { ospfAreaId, ospfLsdbLsid, ospfLsdbRouterId,
teLocalIntAddrIndex }

```
::= { teLocalIntAddrTable 1 }
```

```
TeLocalIntAddrEntry ::= SEQUENCE {  
    teLocalIntAddrIndex Unsigned32,  
    teLocalIntAddr      IpAddress,  
}
```

```

teLocalIntAddrIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This indicates the index to identify multiple local TE links"
::= { teLocalIntAddrEntry 1 }

teLocalIntAddr OBJECT-TYPE
    SYNTAX      IpAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object indicates the address of the local TE link."
::= { teLocalIntAddrEntry 2 }

-- 
-- TED Remote Interface IP Address Table
--

teRemoteIntAddrTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF TeRemoteIntAddrEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the IP address information of a remote
TE link."
::= { teTables 3 }

teRemoteIntAddrEntry OBJECT-TYPE
    SYNTAX      TeRemoteIntAddrEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This entry contains the IP address information of the remote
TE link."
INDEX { ospfAreaId, ospfLsdbLsid, ospfLsdbRouterId,
teRemoteIntAddrIndex }
::= { teRemoteIntAddrTable 1 }

```

T. Otani et al. 12
Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](https://datatracker.ietf.org/doc/draft-ietf-ccamp-gmpls-ospf-mib-01.txt) October 2006

```

TeRemoteIntAddrEntry ::= SEQUENCE {
    teRemoteIntAddrIndex Unsigned32,
    teRemoteIntAddr      IpAddress,
}

```

teRemoteIntAddrIndex OBJECT-TYPE

```

SYNTAX      Unsigned32
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This indicates the index to identify multiple remote TE
links."
 ::= { teRemoteIntAddrEntry 1 }

teRemoteIntAddr OBJECT-TYPE
    SYNTAX      IpAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object indicates the address of the remote TE link."
 ::= { teRemoteIntAddrEntry 2 }

-- 
-- TED Switch Capable Table
--

teSwCapTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF TeSwCapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the GMPLS TED switching capability
information."
 ::= { teTables 4 }

teSwCapEntry OBJECT-TYPE
    SYNTAX      TeSwCapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This entry relates each TE link with its GMPLS TE switching
capability information. IF the MIB deals with only OSPF-TE
information, the value of each object related with GMPLS TE
extensions should be null."
    INDEX { ospfAreaId, ospfLsdbLsid, ospfLsdbRouterId,
teSwCapIndex }
 ::= { teSwCapTable 1 }

TeSwCapEntry ::= SEQUENCE {
    teSwCapIndex          Unsigned32,
    teSwitchingType       INTEGER,
    teEncoding            INTEGER,

```

```

teMaxLspBandwidthPri0    OCTET STRING,
teMaxLspBandwidthPri1    OCTET STRING,
teMaxLspBandwidthPri2    OCTET STRING,
teMaxLspBandwidthPri3    OCTET STRING,
teMaxLspBandwidthPri4    OCTET STRING,
teMaxLspBandwidthPri5    OCTET STRING,
teMaxLspBandwidthPri6    OCTET STRING,
teMaxLspBandwidthPri7    OCTET STRING,
teMinLspBandwidth        OCTET STRING,
teIntMtu                 Integer32,
teIndication              INTEGER
}

teSwCapIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS     current
    DESCRIPTION
        "This index is utilized to identify multiple switching
functions on a local or remote TE link."
::= { teSwCapEntry 1 }

teSwitchingType OBJECT-TYPE
    SYNTAX  INTEGER {
        unknown   (0),
        psc1     (1),
        psc2     (2),
        psc3     (3),
        psc4     (4),
        l2sc     (51),
        tdm      (100),
        lsc      (150),
        fsc      (200)
    }
    MAX-ACCESS read-only
    STATUS  current
    DESCRIPTION
        "This object indicates the GMPLS switching capability
assigned to the TE link."
::= { teSwCapEntry 2 }

teEncoding OBJECT-TYPE
    SYNTAX  INTEGER {
        packet          (1),
        ethernet        (2),
        ansiEtsiPdh    (3),
        sdhSonet        (5),
        digitalWrapper (7),
        lambda          (8),
        fiber           (9),
        fiberChannel   (11)
    }

```

```
        }
MAX-ACCESS read-only
STATUS current
```

T. Otani et al.

14

Internet Drafts draft-ietf-ccamp-gmpls-ospf-mib-01.txt October 2006

DESCRIPTION

"This object indicates the GMPLS encoding type assigned to the TE link."

```
::= { teSwCapEntry 3 }
```

teMaxLspBandwidthPri0 OBJECT-TYPE

```
SYNTAX      OCTET STRING (SIZE (4))
UNITS      "Byte per seconds"
MAX-ACCESS  read-only
STATUS     current
```

DESCRIPTION

"This object indicates the maximum bandwidth of the TE link at the priority 0 for GMPLS LSP creation."

```
::= { teSwCapEntry 4 }
```

teMaxLspBandwidthPri1 OBJECT-TYPE

```
SYNTAX      OCTET STRING (SIZE (4))
UNITS      "Byte per seconds"
MAX-ACCESS  read-only
STATUS     current
```

DESCRIPTION

"This object indicates the maximum bandwidth of the TE link at the priority 1 for GMPLS LSP creation."

```
::= { teSwCapEntry 5 }
```

teMaxLspBandwidthPri2 OBJECT-TYPE

```
SYNTAX      OCTET STRING (SIZE (4))
UNITS      "Byte per seconds"
MAX-ACCESS  read-only
STATUS     current
```

DESCRIPTION

"This object indicates the maximum bandwidth of the TE link at the priority 2 for GMPLS LSP creation."

```
::= { teSwCapEntry 6 }
```

teMaxLspBandwidthPri3 OBJECT-TYPE

```
SYNTAX      OCTET STRING (SIZE (4))
UNITS      "Byte per seconds"
MAX-ACCESS  read-only
STATUS     current
```

DESCRIPTION

"This object indicates the maximum bandwidth of the TE link at the priority 3 for GMPLS LSP creation."

```
::= { teSwCapEntry 7 }
```

```
teMaxLspBandwidthPri4 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This object indicates the maximum bandwidth of the TE link
at the priority 4 for GMPLS LSP creation."
::= { teSwCapEntry 8 }
```

T. Otani et al.

15

Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](http://www.ietf.org/internet-drafts/draft-ietf-ccamp-gmpls-ospf-mib-01.txt) October 2006

```
teMaxLspBandwidthPri5 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"

    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This object indicates the maximum bandwidth of the TE link
at the priority 5 for GMPLS LSP creation."
::= { teSwCapEntry 9 }
```

```
teMaxLspBandwidthPri6 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This object indicates the maximum bandwidth of the TE link
at the priority 6 for GMPLS LSP creation."
::= { teSwCapEntry 10 }
```

```
teMaxLspBandwidthPri7 OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS     current
    DESCRIPTION
        "This object indicates the maximum bandwidth of the TE link
at the priority 7 for GMPLS LSP creation."
::= { teSwCapEntry 11 }
```

```
teMinLspBandwidth OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (4))
    UNITS      "Byte per seconds"
    MAX-ACCESS  read-only
    STATUS     current
```

```

DESCRIPTION
    "This object indicates the minimum bandwidth of the TE link
for GMPLS LSP creation if the switching capability field is TDM, PSC-
1, PSC-2, PSC-3, or PSC-4."
 ::= { teSwCapEntry 12 }

teIntMtu OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object indicates the MTU of the local or remote TE
link"
 ::= { teSwCapEntry 13 }

teIndication OBJECT-TYPE
    SYNTAX      INTEGER {
                    standard (0),
                    arbitrary (1)
                }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object indicates whether the interface supports
Standard or Arbitrary SONET/SDH."
 ::= { teSwCapEntry 14 }

-- 
-- TED SRLG Table
--

teSrlgTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF TeSrlgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains the SRLG information of the TE link."
 ::= { teTables 5 }

teSrlgEntry OBJECT-TYPE
    SYNTAX      TeSrlgEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This entry relates each TE link with its SRLG information."
    INDEX { ospfAreaId, ospfLsdbLsid, ospfLsdbRouterId, teSrlgIndex }
 ::= { teSrlgTable 1 }

```

T. Otani et al. 16
Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](https://datatracker.ietf.org/doc/draft-ietf-ccamp-gmpls-ospf-mib-01.txt) October 2006

```

TeSrlgEntry ::= SEQUENCE {
    teSrlgIndex Unsigned32
    teSrlg      Integer32
}

teSrlgIndex OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This index is utilized to identify multiple SRLG values on a
local or remote TE link."
::= { teSrlgTableEntry 1 }

teSrlg OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object indicate the SRLG value assigned to a local or
remote TE link"
::= { teSrlgEntry 2 }

```

T. Otani et al. 17
Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](http://www.ietf.org/internet-drafts/draft-ietf-ccamp-gmpls-ospf-mib-01.txt) October 2006

```

-- Conformance Statement
teGroups
    OBJECT IDENTIFIER ::= { teConformance 1 }

teCompliances
    OBJECT IDENTIFIER ::= { teConformance 2 }

-- Module Compliance

teModuleFullCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Compliance statement for agents provides full support
for the TED MIB"
    MODULE -- this module
        MANDATORY-GROUPS { teMainGroup
                           }
::= { teCompliances 1 }

--
-- ReadOnly Compliance
--
```

```

teModuleReadOnlyCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "Compliance requirement for implementations only provide
        read-only support for TED. Such devices can then be monitored
        but cannot be configured using this MIB module.
        "
    MODULE -- this module
        MANDATORY-GROUPS { teMainGroup
                           }

```

::= { teCompliances 2 }

-- Units of conformance.

```

teMainGroup OBJECT-GROUP
    OBJECTS {
        teLinkInformationSource ,
        teLinkType ,
        teLinkIdAddr ,
        teMetric ,
        teMaxBandwidth ,
        teMaxReservableBandwidth ,
        teUnreservedBandwidthPri0 ,
        teUnreservedBandwidthPri1 ,
        teUnreservedBandwidthPri2 ,
        teUnreservedBandwidthPri3 ,
        teUnreservedBandwidthPri4 ,
        teUnreservedBandwidthPri5 ,
        teUnreservedBandwidthPri6 ,

```

T. Otani et al.

18

Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](http://www.ietf.org/internet-drafts/draft-ietf-ccamp-gmpls-ospf-mib-01.txt) October 2006

```

        teUnreservedBandwidthPri7 ,
        teAdministrativeGroup ,
        teLocalId ,
        teRemoteId ,
        teLinkProtectionType ,
        teLinkInformationData ,
        teLocalIntAddr ,
        teRemoteIntAddr ,
        teSwitchingType ,
        teEncoding ,
        teMaxLspBandwidthPri0 ,
        teMaxLspBandwidthPri1 ,
        teMaxLspBandwidthPri2 ,
        teMaxLspBandwidthPri3 ,
        teMaxLspBandwidthPri4 ,
        teMaxLspBandwidthPri5 ,
        teMaxLspBandwidthPri6 ,

```

```

        teMaxLspBandwidthPri7      ,
        teMinLspBandwidth         ,
        teIntMtu                  ,
        teIndication              ,
        teSrlg
    }
STATUS current
DESCRIPTION
    "Collection of objects for TED management"
::= { teGroups 1 }

END

```

6. Security consideration

This document introduces no new security issues beyond those detailed in the OSPF MIB.

7. IANA Considerations

The following "IANA Considerations" subsection requests IANA for a new assignment under the transmission subtree. New assignments can only be made via a Standards Action as specified in [[RFC2434](#)].

7.1 IANA Considerations for TED-STD-MIB

The IANA is requested to assign { teMIB XXX } to the TED-STD-MIB module specified in this document.

8. References

8.1 Normative References

8.2 Informative References

T. Otani et al. 19
 Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](#) October 2006

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

[OSPFMIB] F. Baker, et al, "OSPF Version 2 Management Information Base", [RFC1850](#), Nov. 1995.

[OSPFMIB UPDATE] Dan Joyal, et al, "OSPF Version 2 Management Information Base", [draft-ietf-ospf-mib-update-08.txt](#), December 2003.

[ISISMIB] J. Parker, et al, "Management Information Base for

Intermediate System to Intermediate System (IS-IS) ,
[RFC 4444](#), April 2006.

- [GMPLSRouting] K. Kompella, and Y. Rekhter, "Routing Extensions in Support of Generalized Multi-Protocol Label Switching", [RFC4202](#), Oct. 2005.
- [RFC3630] D. Katz, et al, "Traffic Engineering (TE) Extensions to OSPF Version2", [RFC3630](#), September 2003.
- [GMPLSisis] K. Kompella, and Y. Rekhter, "Intermediate System to Intermediate System (IS-IS) Extensions in Support of Multi-Protocol Label Switching (GMPLS)", [RFC4205](#), Oct. 2005.
- [RFC3784] H. Smit and T. Li, "IS-IS extensions for Traffic Engineering , [RFC 3784](#), June 2004.
- [RFC3812] Srinivasan, C., Viswanathan, A., and T. Nadeau, "Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information Base (MIB)", [RFC 3812](#), June 2004.
- [RFC3813] Srinivasan, C., Viswanathan, A., and T. Nadeau, "Multiprotocol Label Switching (MPLS) Label Switching (LSR) Router Management Information Base (MIB)", [RFC 3813](#), June 2004.
- [GMPLSLSRMIB] T. D. Nadeau and A. Farrel, "Generalized Multiprotocol Label Switching (GMPLS) Label Switching Router (LSR) Management Information Base", [draft-ietf-ccamp-gmpls-lsr-mib-08.txt](#), June 2005.
- [GPLSTEMIB] T. D. Nadeau and A. Farrel, "Generalized Multiprotocol Label Switching (GMPLS) Traffic Engineering Management Information Base", [draft-ietf-ccamp-gmpls-te-mib-09.txt](#), June 2005.
- [MPLS OAM] T. Nadeau, Allan D., et al., "OAM Requirements for MPLS Network"
[draft-ietf-mpls-oam-requirements-05.txt](#), June 2005.

T. Otani et al.
Internet Drafts [draft-ietf-ccamp-gmpls-ospf-mib-01.txt](#) October 2006

- [RFC3945] E. Mannie, "Generalized Multi-Protocol Label Switching Architecture", [RFC3945](#), October, 2004.
- [GMPLSOSPF] K. Kompella, and Y. Rekhter, "OSPF Extensions in Support of Generalized Multi-Protocol Label Switching", [RFC4203](#), Oct. 2005.

[OSPF-TE] Katz, D., et al, "Traffic Engineering (TE) Extensions to OSPF Version 2", [RFC3630](#), September 2003.

[RFC2434] Narten, T. and H. Alvestrand., "Guidelines for Writing an IANA Considerations Section in RFCs" [BCP 26](#), [RFC 2434](#), October 1998.

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10. Author's Address

Tomohiro Otani
KDDI R&D Laboratories, Inc.
2-1-15 Ohara Fujimino Phone: +81-49-278-7357
Saitama, 356-8502. Japan Email: otani@kddilabs.jp

Masanori Miyazawa
KDDI R&D Laboratories, Inc.
2-1-15 Ohara Fujimino Phone: +81-49-278-7559
Saitama, 356-8502. Japan Email: ma-miyazawa@kddilabs.jp

Thomas D. Nadeau
Cisco Systems, Inc.
300 Beaver Brook Road Phone: +1-978-936-1470
Boxboro, MA 01719 Email: tnadeau@cisco.com300

Kenji Kumaki
KDDI Corporation
GARDEN AIR TOWER, 3-10-10, Iidabashi Phone: +81-3-6678-3103
Chiyoda-ku, Tokyo, 102-8460. Japan Email: ke-kumaki@kddi.com

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