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**MPLS Transport Profile Linear Protection MIB**  
**draft-smiler-mpls-tp-linear-protection-mib-02**

Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols. In particular it defines objects for managing MPLS Transport Profile (MPLS-TP) Linear Protection.

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## [1.](#) Introduction

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols. In particular it defines objects for managing MPLS Transport Profile (MPLS-TP) Linear Protection.

This MIB module should be used for configuring and managing the MPLS TP linear protection for MPLS TP LSPs.

## [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. Conventions**

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](#)].

### **4. Overview**

[RFC6378] defines the protocol to provide a linear protection switching mechanism for MPLS transport profile with protection domain as point-to-point LSP. The detailed protocol specification of MPLS transport profile linear protection is described in [[RFC6378](#)]. This document specifies a MIB module for the LER that supports MPLS TP Linear protection (which includes 1:n protection architecture) and a MIB module that defines textual conventions.

### **5. Structure of the MIB Module**

#### **5.1. Textual Conventions**

The following new textual conventions are defined in a separate MIB module in this document

- MplsLpsReq
- MplsLpsFpathPath
- MplsLpsCommand

#### **5.2. The MPLS TP Linear Protection Subtree**

MPLS-TP-LPS-MIB is the MIB module defined in this document, and it is put under mplsStdMIB.

#### **5.3. The Notifications Subtree**

Notifications are defined to inform the management station about switchover and mode mismatch of linear protection switching group. Two notifications are defined for this purpose. The notification,



mplsLpsEventSwitchover is to inform the management station about the switchover of the active path and the notification  
mplsLpsEventModeMismatch is to inform the management station about the mismatch in the revertive mode across the end point of the protection domain.

#### 5.4. The Table Structures

The MPLS TP Linear protection MIB module has four tables. The tables are as follows

##### o mplsLpsConfigTable

This table is used to configure MPLS TP Linear protection switching Group. The protection switching group is identified by mplsLpsConfigGroupName. The other attributes in this table can be used to configure properties that are specific to the protection switching group.

##### o mplsLpsStatusTable

This table provides the current status information of mpls linear protection groups that have been configured on the system. When a protection group is configured or deleted in the mplsLpsConfigTable, then the corresponding row of that session in the mplsLpsStatusTable is, respectively, automatically created or deleted.

##### o mplsLpsMeConfigTable

This table is used to associate the Maintenance Entities (MEs) to the protection switching group. The ME is identified by mplsOamIdMegIndex, mplsOamIdMeIndex and mplsOamIdMeMpIndex.

##### o mplsLpsMeStatusTable

This table provides the current information about the protection state of MEs that have been configured on the system. When a ME configured or deleted in the mplsLpsMeConfigTable, then the corresponding row of that session in the mplsLpsMeStatusTable is, respectively, automatically created or deleted.

## 6. Relationship to Other MIB Modules

### 6.1. Relationship to the MPLS OAM maintenance identifiers MIB module

There is a dependency between the MPLS-TP-LPS-MIB module and [MPLS-



OAM-ID-STD-MIB] defined in [draft-ietf-mpls-tp-oam-id-mib](#). The mplsOamIdMegIndex, mplsOamIdMeIndex and mplsOamIdMeMpIndex defined in mplsOamIdMeTable of [MPLS-OAM-ID-STD-MIB] is used as the index of the mplsLpsMeConfigTable defined in the MPLS-TP-LPS-MIB module. Each time that an entry is created in the mplsOamIdMeTable for which the LER supports MPLS TP Linear protection a row is created automatically in the mplsLpsMeConfigTable.

## 6.2. MIB modules required for IMPORTS

The MPLS-TP-LPS-MIB module requires following MIB modules for IMPORTS:

- o SNMPv2-SMI defined in [[RFC2578](#)]
- o SNMPv2-CONF defined in [[RFC2580](#)]
- o SNMPv2-TC defined in [[RFC2579](#)]
- o MPLS-OAM-ID-STD-MIB defined in [[draft-ietf-mpls-tp-oam-id-mib](#)]

## 7. Definitions

MPLS-TP-LPS-MIB DEFINITIONS ::= BEGIN

### IMPORTS

```
MODULE-IDENTITY, NOTIFICATION-TYPE, OBJECT-TYPE,
Gauge32, Counter32, Integer32, Unsigned32
    FROM SNMPv2-SMI
MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
    FROM SNMPv2-CONF          -- [RFC2580]
TEXTUAL-CONVENTION, RowStatus,
TimeStamp, StorageType
    FROM SNMPv2-TC
SnmpAdminString
    FROM SNMP-FRAMEWORK-MIB
mplsStdMIB
    FROM MPLS-TC-STD-MIB      -- [RFC3811]
mplsOamIdMegIndex, mplsOamIdMeIndex, mplsOamIdMeMpIndex
    FROM MPLS-OAM-ID-STD-MIB;
```

mplsLpsMIB MODULE-IDENTITY

```
LAST-UPDATED "201207150000Z" -- July 15, 2012
ORGANIZATION "Multiprotocol Label Switching (MPLS) Working Group"
CONTACT-INFO
```





"

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#### DESCRIPTION

"This management information module supports the configuration and management of MPLS TP linear protection groups. "

#### REVISION

"201207150000Z" -- July 15, 2012

#### DESCRIPTION

"MPLS Protection Switching Group objects for LSP  
MEPs"

::= { mplsStdMIB xxx } -- xxx to be replaced with  
-- correct value

-- Top level components of this MIB module.

-- traps

mplsLpsNotifications

OBJECT IDENTIFIER ::= { mplsLpsMIB 0 }

-- tables, scalars

mplsLpsObjects

OBJECT IDENTIFIER ::= { mplsLpsMIB 1 }

-- conformance



mplsLpsConformance

OBJECT IDENTIFIER ::= { mplsLpsMIB 2 }

MplsLpsReq ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"This Textual Convention describes an object that stores the PSC Request field of the PSC control packet. The values are as follows

1110 Lockout of Protection  
1100 Forced Switch  
1010 Signal Fail (SF)  
0111 Signal Degrade (SD)  
0101 Manual Switch  
0100 Wait-to-Restore  
0001 Do Not Revert  
0000 No Request"

REFERENCE

"[Section 4.2.2 of RFC6378](#)"

SYNTAX OCTET STRING (SIZE (2))

MplsLpsFpathPath ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"This Textual Convention describes an object that stores the Fault Path (FPath) field and Data Path (Path) field of the PSC control packet.

FPath is located in the first octet and Path is located in the second octet. Bits are numbered from left to right.

The value and the interpretation of FPath field is as follows

2-255 for future extensions  
1 the anomaly condition is on the working path  
0 the anomaly condition is on the protection path

The value and the interpretation of Path field is as follows

2-255 for future extensions  
1 protection path is transporting user data traffic  
0 protection path is not transporting user data traffic  
"

REFERENCE

"[Section 4.2.5](#) and [4.2.6 of RFC6378](#)"

SYNTAX OCTET STRING (SIZE (2))



MplsLpsCommand ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"This command allows a user to perform any action over ME.  
If the protection command cannot be executed because an  
equal or higher priority request is in effect, an  
inconsistentValue error is returned.

The command values are:

noCmd

This value should be returned by a read request when no command  
has been written to the object in question since  
initialization. This value may not be used in a write  
operation. If noCmd is used in a write operation a wrongValue  
error is returned.

clear

Clears all of the commands listed below for the specified ME.

lockoutOfProtection

Prevents any of the working ME from switching to the protection  
ME. The specified ME should be the protection ME, otherwise an  
inconsistentValue error is returned.

forcedSwitchWorkToProtect

Switches the specified working ME to the protection path.  
If the protection ME is specified an inconsistentValue  
error is returned.

manualSwitchWorkToProtect

Switches the specified working ME to the protection ME.  
If the protection ME is specified an inconsistentValue  
error is returned."

SYNTAX INTEGER {  
    noCmd(1),  
    clear(2),  
    lockoutOfProtection(3),  
    forcedSwitchWorkToProtect(4),  
    manualSwitchWorkToProtect(5)  
}



```
-- Start of MPLS Transport Profile Protection Switching
-- Table
-- MPLS TP Protection Switching Configuration Table
-- This table supports the addition, configuration and deletion
-- of MPLS TP Protection Switching groups.
```

**mplsLpsConfigGroups OBJECT-TYPE**

```
SYNTAX      Gauge32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The object hold the count of MPLS Protection Switching
    groups. This count includes all rows in mplsLpsConfigTable,
    regardless of the value of mplsLpsConfigRowStatus."
 ::= { mplsLpsObjects 1 }
```

**mplsLpsConfigTable OBJECT-TYPE**

```
SYNTAX      SEQUENCE OF MplsLpsConfigEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "This table lists the mpls linear protection groups that
    have been configured on the system."
 ::= { mplsLpsObjects 2 }
```

**mplsLpsConfigEntry OBJECT-TYPE**

```
SYNTAX      MplsLpsConfigEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "A conceptual row in the mplsLpsConfigTable."
INDEX { mplsLpsConfigGroupIndex }
 ::= { mplsLpsConfigTable 1 }
```

**MplsLpsConfigEntry ::= SEQUENCE {**

mplsLpsConfigGroupIndex	Unsigned32,
mplsLpsConfigGroupName	SnmpAdminString,
mplsLpsConfigRowStatus	RowStatus,
mplsLpsConfigMode	INTEGER,
mplsLpsConfigRevertive	INTEGER,
mplsLpsConfigProtectionScheme	INTEGER,
mplsLpsConfigSdThreshold	Integer32,
mplsLpsConfigWaitToRestore	Integer32,
mplsLpsConfigContinualTxInterval	Integer32,
mplsLpsConfigRapidTxInterval	Integer32,
mplsLpsConfigCreationTime	TimeStamp,
mplsLpsConfigStorageType	StorageType





```
}
```

```
mplsLpsConfigGroupIndex OBJECT-TYPE
```

```
    SYNTAX      Unsigned32
```

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

```
    STATUS       current
```

```
    DESCRIPTION
```

```
        "Index for the conceptual row identifying a protection group."
```

```
    ::= { mplsLpsConfigEntry 1 }
```

```
mplsLpsConfigGroupName OBJECT-TYPE
```

```
    SYNTAX      SnmpAdminString (SIZE (1..32))
```

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

```
    STATUS       current
```

```
    DESCRIPTION
```

```
        "Textual name represents the mpls tp protection group.
```

```
        Each Protection Group is identified by a unique  
        protection group name. "
```

```
    ::= { mplsLpsConfigEntry 2 }
```

```
mplsLpsConfigRowStatus OBJECT-TYPE
```

```
    SYNTAX      RowStatus
```

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

```
    STATUS       current
```

```
    DESCRIPTION
```

```
        "This represents the status of the MPLS TP Linear  
        Protection group Entry. This variable is used to  
        create, modify, and/or delete a row in this table.  
        An entry may not exist in the active state unless all  
        objects in the entry have an appropriate value."
```

```
    ::= { mplsLpsConfigEntry 3 }
```

```
mplsLpsConfigMode OBJECT-TYPE
```

```
    SYNTAX INTEGER {
```

```
        onePlusOne(1),
```

```
        oneColonOne(2),
```

```
        oneColonN(3)
```

```
    }
```

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

```
    STATUS       current
```

```
    DESCRIPTION
```

```
        "The architectural mode of the Protection group. This can  
        either be 1+1, 1:1, 1:n.
```

```
        1+1
```

```
        In the 1+1 protection scheme, a fully dedicated  
        protection entity is allocated. Data traffic is copied
```



and fed at the source to both the working and the protection entities. The traffic on the working and the protection entities is transmitted simultaneously to the sink of the protection domain, where selection between the working and protection entities is performed

#### 1:1

In the 1:1 scheme, a protection path is allocated to protect against a defect, failure, or a degradation in a working path. In normal conditions, data traffic is transmitted over the working entity, while the protection entity functions in the idle state. If there is a defect on the working entity or a specific administrative request, traffic is switched to the protection entity.

#### 1:n

In case of 1:n linear protection, one protection entity is allocated to protect n working entities. The protection entity might not have sufficient resources to protect all the working entities that may be affected by fault conditions at a specific time. In this case, in order to guaranteed protection, the protection entity should support enough capacity and bandwidth to protect any of the n working entities."

```
DEFVAL {onePlusOne}
::= { mplsLpsConfigEntry 4 }
```

#### mplsLpsConfigRevertive OBJECT-TYPE

```
SYNTAX      INTEGER { nonrevertive(1), revertive(2) }
```

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

```
STATUS      current
```

##### DESCRIPTION

"This object represents the reversion mode of the Linear Protection Switching group. The reversion mode of

protection mechanism may be either revertive or non-revertive.

#### nonrevertive

In non-revertive mode, after a service has been recovered, traffic will be forwarded on the recovery



path

revertive

In revertive mode, after a service has been recovered, traffic will be redirected back onto the original working path."

DEFVAL { nonrevertive }  
::= { mplsLpsConfigEntry 5 }

mplsLpsConfigProtectionScheme OBJECT-TYPE

SYNTAX INTEGER { bidirectional(1), unidirectional(2) }

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The object represents the operational scheme of protection switching group. The protection scheme may either be unidirectional or bidirectional.

bidirectional

In bidirectional protection scheme, both the directions will be switched simultaneously even if the fault applies to only one direction of the path.

unidirectional

In unidirectional protection scheme protection switching will be performed independently for each direction of a bidirectional transport path

This object may not be modified if the associated mplsLpsConfigRowStatus object is equal to active(1). "

DEFVAL {bidirectional}  
::= { mplsLpsConfigEntry 6 }

mplsLpsConfigSdThreshold OBJECT-TYPE

SYNTAX Integer32 (1..9)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object holds the threshold value of the Signal Degrade.

When the MPLS DM OAM reaches this threshold value, the



Signal Degrade event will be given to this protection domain.

This object may be modified if the associated mplsLpsConfigRowStatus object is equal to active(1)."

::= { mplsLpsConfigEntry 7 }

mplsLpsConfigWaitToRestore OBJECT-TYPE

SYNTAX Integer32 (0..720)

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This object hold the Wait To Restore timer value in seconds.

The WTR timer is used to delay reversion of PSC state to Normal state when recovering from a failure condition on the working path when the protection domain is configured for revertive behavior

This object may not be modified if the associated mplsLpsConfigRowStatus object is equal to active(1)."

DEFVAL { 300 }

::= { mplsLpsConfigEntry 8 }

mplsLpsConfigContinualTxInterval OBJECT-TYPE

SYNTAX Integer32 (1..20)

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The Continual Tx Time in Seconds. Represents the time interval to send the continual LPS packet to the other end based on the current state."

DEFVAL { 5 }

::= { mplsLpsConfigEntry 9 }

mplsLpsConfigRapidTxInterval OBJECT-TYPE

SYNTAX Integer32 (1000..20000)

UNITS "micro-seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The Rapid Tx interval in micro-Seconds. Represents the time interval to send the LPS packet to the other end, when there is a change in state of Linear Protection domain due to local input. The default value is 3.3 milli-seconds which is 3300 micro-seconds"





```
DEFVAL { 3300 }
::= { mplsLpsConfigEntry 10 }
```

```
mplsLpsConfigCreationTime OBJECT-TYPE
```

```
SYNTAX      TimeStamp
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The value of sysUpTime at the time the row was
    created"
```

```
::= { mplsLpsConfigEntry 11 }
```

```
mplsLpsConfigStorageType OBJECT-TYPE
```

```
SYNTAX      StorageType
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "The storage type for this conceptual row.
    Conceptual rows having the value 'permanent' need not
    allow write-access to any columnar objects in the row."
```

```
DEFVAL      { nonVolatile }
```

```
::= { mplsLpsConfigEntry 12 }
```

```
--
```

```
-- MPLS TP Linear Protection Switching Status Table
```

```
-- MPLS Linear Protection ME Association Configuration Table
```

```
-- This table supports the addition, configuration and deletion
```

```
-- of MPLS Linear Protection Maintenance Entities in Protection
```

```
-- Switching groups.
```

```
mplsLpsMeConfigTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF MplsLpsMeConfigEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```

```
    "This table lists Maintenance Association that have been
    configured in Protection groups."
```

```
::= { mplsLpsObjects 3 }
```

```
mplsLpsMeConfigEntry OBJECT-TYPE
```

```
SYNTAX      MplsLpsMeConfigEntry
```

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

```
STATUS      current
```

```
DESCRIPTION
```



"A conceptual row in the mplsLpsMeConfigTable."  
INDEX {mplsOamIdMegIndex, mplsOamIdMeIndex, mplsOamIdMeMpIndex}  
::= { mplsLpsMeConfigTable 1 }

MplsLpsMeConfigEntry ::= SEQUENCE {  
    mplsLpsMeConfigGroupIndex           Unsigned32,  
    mplsLpsMeConfigRowStatus            RowStatus,  
    mplsLpsMeConfigState                INTEGER,  
    mplsLpsMeConfigCommand             MplsLpsCommand,  
    mplsLpsMeConfigHoldOff             Integer32,  
    mplsLpsMeConfigStorageType         StorageType  
}

mplsLpsMeConfigGroupIndex OBJECT-TYPE  
    SYNTAX        Unsigned32  
    MAX-ACCESS    not-accessible  
    STATUS        current  
    DESCRIPTION  
        "This object holds the Protection group index wherein  
        this ME included in. If this ME is not part of a protection  
        group this value is set to 0. "  
    ::= { mplsLpsMeConfigEntry 1 }

mplsLpsMeConfigRowStatus OBJECT-TYPE  
    SYNTAX        RowStatus  
    MAX-ACCESS    read-create  
    STATUS        current  
    DESCRIPTION  
        "The status of this Protection Switching ME entry.  
        An entry may not exist in the active state unless all  
        objects in the entry have an appropriate value."  
    ::= { mplsLpsMeConfigEntry 2 }

mplsLpsMeConfigState OBJECT-TYPE  
    SYNTAX        INTEGER { primary(1), backup(2) }  
  
    MAX-ACCESS    read-create  
    STATUS        current  
    DESCRIPTION  
        "This object represents the operational state of the ME  
        as either primary or backup"  
    ::= { mplsLpsMeConfigEntry 3 }

mplsLpsMeConfigCommand OBJECT-TYPE  
    SYNTAX        MplsLpsCommand  
    MAX-ACCESS    read-write  
    STATUS        current  
    DESCRIPTION



"Allows the initiation of an MPLS Linear protection command on the protection group and the ME specified by the index values. When read this object returns the last command written or noCmd if no command has been written to this ME since initialization. The return of the last command written does not imply that this command is currently in effect. This request may have been preempted by a higher priority local or remote request.

The value lockoutOfProtection should only be applied to the protection path / ME since that switch command prevents any of the working path / ME from switching to the protection path. Following the same logic, forcedSwitchWorkToProtect and manualSwitchWorkToProtect should only be applied to a working ME."

::= { mplsLpsMeConfigEntry 4 }

mplsLpsMeConfigHoldOff OBJECT-TYPE

SYNTAX Integer32 (0..10000)

UNITS "milli-seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The hold-off time in milliseconds. Represents the time between SF/SD condition detection and declaration of an SF/SD request to the protection switching logic. It is intended to avoid unnecessary switching when a lower-layer protection mechanism is in place.

Can be configured in steps of 100"

DEFVAL { 0 }

::= { mplsLpsMeConfigEntry 5 }

mplsLpsMeConfigStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type for this conceptual row.

Conceptual rows having the value 'permanent' need not allow write-access to any columnar objects in the row."

DEFVAL { nonVolatile }

::= { mplsLpsMeConfigEntry 6 }

--

-- This table provides Protection Switching group statistics.

--

mplsLpsStatusTable OBJECT-TYPE

SYNTAX      SEQUENCE OF MplsLpsStatusEntry

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MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
    "This table provides status information about mpls  
    linear protection groups that have been configured  
    on the system."  
::= { mplsLpsObjects 4 }

mplsLpsStatusEntry OBJECT-TYPE  
SYNTAX MplsLpsStatusEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
    "A conceptual row in the mplsLpsStatusTable."  
AUGMENTS { mplsLpsConfigEntry }  
::= { mplsLpsStatusTable 1 }

MplsLpsStatusEntry ::= SEQUENCE {  
    mplsLpsStatusReqRcv                    MplsLpsReq,  
    mplsLpsStatusReqSent                  MplsLpsReq,  
    mplsLpsStatusFpathPathRcv             MplsLpsFpathPath,  
    mplsLpsStatusFpathPathSent            MplsLpsFpathPath,  
    mplsLpsStatusModeMismatches           Counter32  
}

mplsLpsStatusReqRcv OBJECT-TYPE  
SYNTAX MplsLpsReq  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The current value of the PSC Request field received on  
    more recent PSC packet"  
::= { mplsLpsStatusEntry 1 }

mplsLpsStatusReqSent OBJECT-TYPE  
SYNTAX MplsLpsReq  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
    "The current value of the PSC Request field sent on the  
    more recent PSC packet"  
::= { mplsLpsStatusEntry 2 }

mplsLpsStatusFpathPathRcv OBJECT-TYPE  
SYNTAX MplsLpsFpathPath  
MAX-ACCESS read-only  
  
STATUS current





## DESCRIPTION

"The current value of the FPath and Path fields received  
on more recent PSC packet"

::= { mplsLpsStatusEntry 3 }

## mplsLpsStatusFpathPathSent OBJECT-TYPE

SYNTAX MplsLpsFpathPath

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The current value of the FPath and Path fields sent  
on more recent PSC packet"

::= { mplsLpsStatusEntry 4 }

## mplsLpsStatusModeMismatches OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"This object holds number of occurrences of mismatch in  
revertive mode across the protection domain end points."

::= { mplsLpsStatusEntry 5 }

-- MPLS Linear Protection ME Status Table

-- This table provides Protection Switching ME statistics.

## mplsLpsMeStatusTable OBJECT-TYPE

SYNTAX SEQUENCE OF MplsLpsMeStatusEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This table contains status information of all the ME  
that are included in MPLS Protection groups."

::= { mplsLpsObjects 5 }

## mplsLpsMeStatusEntry OBJECT-TYPE

SYNTAX MplsLpsMeStatusEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"A conceptual row in the mplsLpsMeStatusTable."

AUGMENTS { mplsLpsMeConfigEntry }

::= { mplsLpsMeStatusTable 1 }

MplsLpsMeStatusEntry ::= SEQUENCE {

mplsLpsMeStatusCurrent BITS,

mplsLpsMeStatusSignalDegrades Counter32,



```
mplsLpsMeStatusSignalFailures      Counter32,
mplsLpsMeStatusSwitchovers         Counter32,
mplsLpsMeStatusLastSwitchover      TimeStamp,
mplsLpsMeStatusSwitchoverSeconds   Counter32
}
```

mplsLpsMeStatusCurrent OBJECT-TYPE

```
SYNTAX      BITS {
                localLockedOut(0),
                localSd(1),
                localSf(2),
                localSwitched(3),
                localWtr(4),
                remoteLockedout(5)
                remoteSd(6),
                remoteSf(7),
                remoteSwitched(8),
                remoteWtr(9)
            }
```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Indicates the current state of the MA.

localLockedOut

This bit, when it is set on a working ME or working path indicates that the working path is prevented from switching to the protection path because of local request. When it is set on protection / backup path, this bit indicates that none of the working path (in case of 1:n) can switch to the protection path.

localSd

This bit implies that local signal degrade condition is in effect on this ME / path.

localSf

This bit implies that local signal failure condition is in effect on this ME / path.

localSwitched

This bit is only applicable to the working ME / path. It implies that the working path is currently switched to the protection path because of local request.



local wtr

This bit implies that local Wait-to-Restore state is in effect."

remoteLockedOut

This bit, when it is set on a working ME or working path indicates that the working path is prevented from switching to the protection path because of remote request. When it is set on protection / backup path, this bit indicates that none of the working path (in case of 1:n) can switch to the protection path.

remoteSd

This bit implies that remote signal degrade condition is in effect on this ME / path.

remoteSf

This bit implies that remote signal failure condition is in effect on this ME / path.

remoteSwitched

This bit is only applicable to the working ME / path. It implies that the working path is currently switched to the protection path because of remote request.

remoteWtr

This bit implies that remote Wait-to-Restore state is in effect."

::= { mplsLpsMeStatusEntry 1 }

mplsLpsMeStatusSignalDegrades OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Represents the count of Signal Degrade conditions.

This condition occurs when the DM exceeds the currently configured value of the relevant instance of mplsLpsConfigSdThreshold."

::= { mplsLpsMeStatusEntry 2 }

mplsLpsMeStatusSignalFailures OBJECT-TYPE



SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Represents the count of Signal failure conditions.

This condition occurs when the OAM running on this MA detects the Signal Fail event."

::= { mplsLpsMeStatusEntry 3 }

mplsLpsMeStatusSwitchovers OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Represents the count of SwitchOvers happened in this MA.

When the mplsLpsMeConfigState is primary, this object will return the number of times this path has switched to the protection path.

When the mplsLpsMeConfigState is backup, this object will return the number of times that any working paths has been switched back to the working path from this protection path."

::= { mplsLpsMeStatusEntry 4 }

mplsLpsMeStatusLastSwitchover OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object holds the value of sysUpTime wherein the last switchover happened.

When the mplsLpsMeConfigState is primary, this object will return the value of sysUpTime when this path last completed a switchover. If this path has never switched to the protection line, the value 0 will be returned.

When the mplsLpsMeConfigState is backup, this object will return the value of sysUpTime the last time that a working path was switched back to the working path from this protection path. If no working path has ever switched back to the working path from this protection path, the value 0 will be returned."





```
::= { mplsLpsMeStatusEntry 5 }
```

```
mplsLpsMeStatusSwitchoverSeconds OBJECT-TYPE
```

```
SYNTAX      Counter32
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"The cumulative Protection Switching Duration (PSD) time in seconds.

ForM a working path, this is the cumulative number of seconds that traffic was carried on the protection path.

For the protection path, this is the cumulative number of seconds that the protection path has been used to carry any working path traffic."

```
::= { mplsLpsMeStatusEntry 6 }
```

```
mplsLpsNotificationEnable OBJECT-TYPE
```

```
SYNTAX      BITS {  
                switchover(0),  
                modeMismatch(1)  
            }
```

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

```
STATUS      current
```

```
DESCRIPTION
```

"Provides the ability to enable and disable notifications defined in this MIB.

switchover

Indicates mplsLpsEventSwitchover notifications should be generated.

modeMismatch

Indicates mplsLpsEventModeMismatch notifications should be generated."

```
DEFVAL { { } }
```

```
::= { mplsLpsObjects 6 }
```

```
-- MPLS Linear Protection EVENTS
```



```
mplsLpsEventSwitchover NOTIFICATION-TYPE
    OBJECTS { mplsLpsMeStatusSwitchovers, mplsLpsMeStatusCurrent }
    STATUS current
    DESCRIPTION
        "An mplsLpsEventSwitchover notification is sent when the
        value of an instance of mplsLpsMeStatusSwitchovers increments."
    ::= { mplsLpsNotifications 1 }

mplsLpsEventModeMismatch NOTIFICATION-TYPE
    OBJECTS { mplsLpsStatusModeMismatches }
    STATUS current
    DESCRIPTION
        "An mplsLpsEventModeMismatch notification is sent when the
        value of an instance of mplsLpsStatusModeMismatches increments."
    ::= { mplsLpsNotifications 2 }

-- End of Notifications.

-- Module Compliance.

mplsLpsGroups
    OBJECT IDENTIFIER ::= { mplsLpsConformance 1 }

mplsLpsCompliances
    OBJECT IDENTIFIER ::= { mplsLpsConformance 2 }

-- Compliance requirement for fully compliant implementations.

mplsLpsModuleFullCompliance MODULE-COMPLIANCE

    STATUS current
    DESCRIPTION "Compliance statement for agents that provide full
        support for MPLS-TP-LPS-MIB. Such devices can
        provide linear protection and also be configured using
        this MIB module."

    MODULE -- This module.
    MANDATORY-GROUPS {
        mplsLpsScalarGroup,
        mplsLpsConfigTableGroup,
        mplsLpsMeTableGroup
    }

    GROUP mplsLpsNotificationGroup
    DESCRIPTION "This group is only mandatory for those
        implementations which can efficiently implement
        the notifications contained in this group."
```



```
::= { mplsLpsCompliances 1 }
```

```
-- Units of conformance.
```

```
mplsLpsScalarGroup OBJECT-GROUP
```

```
  OBJECTS {
```

```
    mplsLpsConfigGroups,
```

```
    mplsLpsNotificationEnable
```

```
  }
```

```
  STATUS current
```

```
  DESCRIPTION
```

```
    "Collection of objects needed for MPLS Linear Protection."
```

```
  ::= { mplsLpsGroups 1 }
```

```
mplsLpsConfigTableGroup OBJECT-GROUP
```

```
  OBJECTS {
```

```
    mplsLpsConfigGroupName,
```

```
    mplsLpsConfigRowStatus,
```

```
    mplsLpsConfigMode,
```

```
    mplsLpsConfigRevertive,
```

```
    mplsLpsConfigProtectionScheme,
```

```
    mplsLpsConfigSdThreshold,
```

```
    mplsLpsConfigWaitToRestore,
```

```
    mplsLpsConfigHoldOff,
```

```
    mplsLpsConfigContinualTxInterval,
```

```
    mplsLpsConfigRapidTxInterval,
```

```
    mplsLpsConfigCreationTime,
```

```
    mplsLpsConfigStorageType,
```

```
    mplsLpsStatusReqRcv,
```

```
    mplsLpsStatusReqSent,
```

```
    mplsLpsStatusFpathPathRcv,
```

```
    mplsLpsStatusFpathPathSent,
```

```
    mplsLpsStatusModeMismatches
```

```
  }
```

```
  STATUS current
```

```
  DESCRIPTION
```

```
    "Collection of objects needed for MPLS Linear Protection  
    configuration and statistics."
```

```
  ::= { mplsLpsGroups 2 }
```

```
mplsLpsMeTableGroup OBJECT-GROUP
```

```
  OBJECTS {
```

```
    mplsLpsMeConfigRowStatus,
```

```
    mplsLpsMeConfigState,
```

```
    mplsLpsMeConfigCommand,
```

```
    mplsLpsMeConfigStorageType,
```

```
    mplsLpsMeStatusCurrent,
```



```
    mplsLpsMeStatusSignalDegrades,
    mplsLpsMeStatusSignalFailures,
    mplsLpsMeStatusSwitchovers,
    mplsLpsMeStatusLastSwitchover,
    mplsLpsMeStatusSwitchoverSeconds
}
STATUS    current
DESCRIPTION
    "Collection of objects needed for MPLS Linear Protection
    ME configuration and statistics."
::= { mplsLpsGroups 3 }

mplsLpsNotificationGroup NOTIFICATION-GROUP
NOTIFICATIONS {
    mplsLpsEventSwitchover,
    mplsLpsEventModeMismatch
}
STATUS    current
DESCRIPTION
    "Collection of objects needed to implement notifications."
::= { mplsLpsGroups 4 }

-- MPLS-TP-LPS-MIB module ends
END
```

## **8. Security Considerations**

There are a number of management objects defined in this MIB module with a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some networks in a non-secure environment without proper protection can have a negative effect on network operations. These are the tables and objects and their sensitivity/vulnerability:

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. These are the tables and objects and their sensitivity/vulnerability:





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

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.

## **[9.](#) IANA Considerations**

To be added in a later version of this document.

## **[10.](#) Contributors**

## **[11.](#) References**

### **[11.1.](#) Normative References**

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- [RFC2579] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Textual Conventions for SMIv2", STD 58, [RFC 2579](#), April 1999.
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### **11.3. URL References**

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