

Network Working Group
Internet-Draft
Expires April 2003

J. Cucchiara
Crescent Networks
H. Sjostrand
IP Unplugged
J. Luciani
Crescent Networks
October 2002

Definitions of Managed Objects for
the Multiprotocol Label Switching, Label Distribution Protocol (LDP)

<[draft-ietf-mpls-ldp-mib-09.txt](#)>

Status of this Memo

This document is an Internet-Draft and is in full conformance with all provisions of [Section 10 of RFC 2026](#). Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress".

The list of current Internet-Drafts can be accessed at
<http://www.ietf.org/ietf/lid-abstracts.txt>

The list of Internet-Draft Shadow Directories can be accessed at
<http://www.ietf.org/shadow.html>

Distribution of this document is unlimited. Please send comments to the Multiprotocol Label Switching (mpls) Working Group, mpls@uu.net.

Copyright Notice

Copyright (C) The Internet Society (2002). All Rights Reserved.

Abstract

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for the Multiprotocol Label Switching, Label Distribution Protocol (LDP).

Table of Contents

1	Introduction	3
2	The SNMP Management Framework	3
3	Structure of the MIB	5
3.1	Overview	5
3.2	Future Considerations	5
3.3	Interface Indexing	6
3.4	Differences from the LDP Specification	6
3.5	The MPLS-LDP-MIB Module	6
3.5.1	The LDP Entity Table	7
3.5.1.1	Changing Values After Session Establishment	7
3.5.2	The LDP Entity Statistics Table	8
3.5.3	The LDP Peer Table	8
3.5.4	The LDP Session Table	8
3.5.5	The LDP Session Statistics Table	9
3.5.6	The LDP Hello Adjacencies Table	9
3.5.7	The LDP LSP Table	9
3.5.8	The FEC Table	10
3.5.9	The LDP Session Peer Address Table	10
3.6	LDP Notifications	10
4	MPLS Label Distribution Protocol MIB Definitions	11
4.1	The MPLS-LDP-GENERIC-MIB Module	54
4.2	The MPLS-LDP-ATM-MIB Module	60
4.2.1	The LDP ATM Session Table	60
4.3	The MPLS-LDP-FRAME-RELAY-MIB Module	73
4.3.1	The LDP Frame Relay Session Table	74
5	Revision History	85
5.1	Changes from <draft-ietf-mpls-ldp-mib-08.txt>	85
5.2	Changes from <draft-ietf-mpls-ldp-mib-07.txt>	87
5.3	Changes from <draft-ietf-mpls-ldp-mib-06.txt>	88
5.4	Changes from <draft-ietf-mpls-ldp-mib-05.txt>	88
5.5	Changes from <draft-ietf-mpls-ldp-mib-04.txt>	90
5.6	Changes from <draft-ietf-mpls-ldp-mib-03.txt>	92
5.7	Changes from <draft-ietf-mpls-ldp-mib-02.txt>	94
5.8	Changes from <draft-ietf-mpls-ldp-mib-01.txt>	94
5.9	Changes from <draft-ietf-mpls-ldp-mib-00.txt>	95
6	Acknowledgments	96
7	Normative References	97
8	Informative References	99
9	Security Considerations	100
10	Authors' Addresses	100
11	Full Copyright Statement	101

INTERNET-DRAFT

MPLS LDP MIB

October 2002

1. Introduction

This document defines 4 MIB Modules which together support the configuration and monitoring of the Label Distribution Protocol (LDP). The Label Distribution Protocol (LDP) [[RFC3036](#)] is one type of Multi Protocol Label Switching (MPLS) protocols described in [[RFC3031](#)] and [[RFC3032](#)]. Utilizing all 4 MIB Modules allows an operator to configure LDP sessions using Layer 2 media of Ethernet, ATM and Frame Relay as described in [[RFC3036](#)], [[RFC3034](#)] and [[RFC3035](#)].

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. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in [RFC 2571](#) [[RFC2571](#)].
- o Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and described in STD 16, [RFC 1155](#) [[RFC1155](#)], STD 16, [RFC 1212](#) [[RFC1212](#)] and [RFC 1215](#) [[RFC1215](#)]. The second version, called SMIV2, is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].
- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, [RFC 1157](#) [[RFC1157](#)]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in [RFC 1901](#)

[[RFC1901](#)] and [RFC 1906](#) [[RFC1906](#)]. The third version of the message protocol is called SNMPv3 and described in [RFC 1906](#) [[RFC1906](#)], [RFC 2572](#) [[RFC2572](#)] and [RFC 2574](#) [[RFC2574](#)].

- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, [RFC 1157](#) [[RFC1157](#)]. A second set of protocol operations and associated PDU formats is described in [RFC 1905](#) [[RFC1905](#)].
- o A set of fundamental applications described in [RFC 2573](#) [[RFC2573](#)] and the view-based access control mechanism described in [RFC 2575](#) [[RFC2575](#)].

Expires April 2003

[Page 3]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

A more detailed introduction to the current SNMP Management Framework can be found in [RFC 2570](#) [[RFC2570](#)].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

[3.](#) Structure of the MIB

This section describes the structure of the LDP MIB.

[3.1.](#) Overview

There are 4 MIB Modules in this document. These MIB Modules are the MPLS-LDP-MIB, the MPLS-LDP-GENERIC-MIB, the MPLS-LDP-ATM-MIB and the MPLS-LDP-FRAME-RELAY-MIB. The MPLS-LDP-MIB defines objects which are specific to LDP without any Layer 2 objects. The MPLS-LDP-GENERIC-MIB defines Layer 2 Per Platform Label Space objects for use with the MPLS-LDP-MIB. The MPLS-LDP-ATM-MIB defines Layer 2 Asynchronous Transfer Mode (ATM) objects for use with the MPLS-LDP-MIB. The MPLS-LDP-FRAME-RELAY-MIB defines Layer 2 FRAME-RELAY objects for use with the MPLS-LDP-MIB.

The MPLS-LDP-MIB Module MUST be supported and at least one of the Layer 2 MIB Modules MUST be supported. As an example, if an LSR implementation wants to support LDP utilizing a Layer 2 of Ethernet, then the MPLS-LDP-GENERIC-MIB Module would be supported. If an LSR implementation wants to support LDP utilizing a Layer 2 of ATM, then

the MPLS-LDP-ATM-MIB Module would be supported. If an LSR implementation wants to support LDP utilizing a Layer 2 of FRAME-RELAY, then the MPLS-LDP-FRAME-RELAY-MIB Module would be supported. An LDP implementation that utilizes all 3 Layer 2 media (Ethernet, Frame-Relay, ATM) would support all 4 MIB Modules. Each of the Modules will be discussed in detail in the following sections.

There are 2 Compliance statements for each MIB Module. One which is for FULL Compliance which includes configuration and monitoring via SNMP. The other is a READ-ONLY Compliance which is only monitoring via SNMP.

[3.2.](#) Future Considerations

The LDP Specification [[RFC3036](#)] does not specify the use of VPNs or multicast for LDP, and thus, objects related to these areas have not been included in the MIB.

This MIB does not include VP merge configuration either. [[RFC2684](#)] does not yet describe this capability and so it has been excluded from the MIB.

These areas need to be specified in the LDP Specification prior to being added in this or any other MIB.

Expires April 2003

[Page 5]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

[3.3.](#) Interface Indexing

Interface Indexes as specified in [[RFC2863](#)] are used in the MIB. The descriptions of the ifIndexes denote which ifIndex is being used.
NOTE: the use of ifIndex is for actual existing connections.

[3.4.](#) Differences from the LDP Specification

Currently, there are 3 differences between this specification and the LDP Specification. As previously mentioned, this MIB is almost entirely based on the LDP specification. The differences are documented here in the hope to avoid any confusion between the two documents.

The first difference is that the LDP Entity Table contains some DEFVAL clauses which are not specified explicitly in the LDP Specification. These values, although not documented in the LDP Specification are widely used by existing LDP MIB implementations and thus, have been adopted within this MIB. Please note, they can certainly be changed during row creation or a subsequent set request.

A second difference is the `mplsLdpEntityConfGenericLabelRangeTable`. This table, although provided as a way to reserve a range of generic labels, does not exist in the LDP Specification. It was added to the MIB due to a request from the working group and because this table was considered useful for reserving a range of generic labels.

The third difference is documented by the TEXTUAL-CONVENTION, `MplsAtmVcIdentifier` which is in the MPLS-TC-MIB [[MPLSTCMIB](#)]. This TC was added to restrict vci values to be greater than 31 as described in [RFC 3035](#) [[RFC3035](#)].

[3.5.](#) The MPLS-LDP-MIB Module

This MIB Module contains objects which would be common to all LDP implementations. This MIB Module MUST always be implemented along with one or more of the other Layer 2 MIB Modules.

NOTE, this table allows the LSR to initiate and receive requests to establish LDP sessions. As the LDP protocol distributes labels and establishes sessions with Peers most of the tables in this MIB are populated by the agent as instructed by the LDP protocol. The exception is the `mplsFecTable` and the `mplsLdpLspFecTable` which can be configured by the operator to specify Forwarding Equivalence Class information for an LSP.

Each table in this MIB Module is described in the following subsections.

[3.5.1.](#) The LDP Entity Table

The MPLS-LDP-MIB provides objects to configure/set-up potential LDP sessions on a specific LSR. The `mplsLdpEntityTable` is used to configure potential LDP Sessions, where each row in the table represents a potential LDP Session.

Each entry/row in this table represents a single LDP Entity. There is no maximum number of LDP Entities specified. However, there is an `mplsLdpEntityIndexNext` object which should be retrieved by the command generator prior to creating an LDP Entity. If the `mplsLdpEntityIndexNext` object is zero, this indicates that the LSR is not able to create another LDP Entity at that time.

3.5.1.1. Changing Values After Session Establishment

One way to manually modify a session's parameters is by using SNMP to change the MIB objects related to that session. Please note special care should be taken if MIB objects which are used in the MPLS LDP Session Initialization need to be modified. If the modification of any of these MIB variables takes place anytime after the start of session initialization, then the entire session must be halted. Any information learned by that session must be discarded. The objects should then be modified, and session initialization started.

For example, assume that an operator wishes to change the configuration of a Label Range which is used by a Session that has already been established. The operator should change the `mplsLdpEntityAdminStatus` to "disable(2)". Setting the `mplsLdpEntityAdminStatus` to "disable(2)" will cause the session to be torn down (i.e. this will signal to LDP that it should send out tear down messages for that session). Also, all information related to that session should be removed from this MIB by the Agent. This includes Peer information (i.e. relevant row in the `mplsPeerTable`) and Session statistics (i.e. relevant row in the `mplsLdpSesTable`). Also, if the LSR MIB is implemented and the optional Mapping Table objects are implemented, then all information related to the LSPs in this session should be removed from these MIBs. [For more information please see the section on "The Mapping Tables".] At this point, the operator could modify the Label Range. Lastly, the operator should set the `mplsLdpEntityAdminStatus` to "enable(1)". At this point session initialization should occur. The LDP Entity goes through the Session Initialization in order to communicate the new Label Ranges to the Peer and establish new LSPs.

[3.5.2.](#) The LDP Entity Statistics Table

The `mplsLdpEntityStatsTable` is a read-only table which contains statistical information related to failed attempts to establish sessions. Each row in this table is related to a single LDP entity and this table AUGMENTS an `mplsLdpEntityEntry`. This table could be used to give insight into how to reconfigure values so that a session could be successfully established. For example, if the `mplsLdpSesRejectedLRErrors` Counter object was increasing, then this would indicate that the Label Range (LR) may need to be adjusted.

[3.5.3.](#) The LDP Peer Table

The LDP Peer Table is a read-only table which contains information about LDP Peers known to LDP Entities. In other words, the Peer information is learned by LDP through initialization or discovery. This table should be populated by the agent as directed by the LDP protocol.

A row in this table is related to one or more rows in the Hello Adjacency Table and related to a single row in the Session Table. The values in the Peer table are specific to a Peer and may or may not be the same values used in the session. The reason is that the Peer and Entity negotiate certain values. The Entity's values are configured in the `mplsLdpEntityTable` and the Peer's values are learned (and placed into the `mplsLdpPeerTable`). The `mplsLdpSessionTable` shows the values used in establishing the session.

One example, of when the Peer's values and the Session's values may differ is with the Peer's Path Limit information. The Peer's Path Limit information is learned from the session initialization phase. The actual value for the Path Vector Limit is the Peer's value and may not be the same value that appears in the session. There could be a mismatch in this value between the Entity and the Peer. In the event of a mismatch, then the session will use the Path Limit set by the Entity (and not the Peer).

The Peer Table information was placed in a separate table from the Session information to allow for a more comprehensive and coherent MIB model.

[3.5.4.](#) The LDP Session Table

The LDP Session Table is a read-only table. Each entry in this table represents a single session between an LDP Entity and a Peer. The `mplsLdpSessionEntry` AUGMENTS the `mplsLdpPeerEntry`.

The information in this table is learned during session

INTERNET-DRAFT

MPLS LDP MIB

October 2002

establishment. NOTE: rows in this table will appear during session initialization.

[3.5.5.](#) The LDP Session Statistics Table

The MPLS LDP Session Stats Table is a read-only table which contains statistical information on sessions.

[3.5.6.](#) The LDP Hello Adjacencies Table

This is a table of all adjacencies between all LDP Entities and all LDP Peers. A Session may have one or more adjacencies. A session should not have zero adjacencies, because this indicates that the session has lost contact with the Peer. A session which has zero Hello Adjacencies should be eventually removed.

[3.5.7.](#) The LDP LSP Table

The Label Information Base (LIB) contains information about labels learned by the LSR. The LIB for LDP, CR-LDP and MPLS-RSVP (i.e. all currently defined MPLS protocols) is represented in the LSR MIB [[LSRMIB](#)]. The LIB is represented by the LSR MIB's `mplsXCTable` (`mpls Cross Connect Table`), `mplsInSegmentTable` (`mpls In Segment Table`) and the `mplsOutSegmentTable` (`mpls Out Segment Table`). The `mplsXCTable` models the cross-connection of the ingress label with a specific egress label. The `mplsInSegmentTable` stores the ingress label's information, and the `mplsOutSegmentTable` stores the egress label's information.

The LDP Session that created the LSP and the LSP's (ingress label, egress label) pair along with other information is contained in the LSR MIB's `mplsXCTable`, the `mplsInSegmentTable` and the `mplsOutSegmentTable`.

In order to utilize the LSR MIB's `mplsXCTable`, `mplsInSegmentTable` and `mplsOutSegmentTable` for LDP LSPs, there needs to be a mechanism to associate LDP sessions with LDP LSPs created as a result of those LDP sessions. The `mplsLdpLspTable` in this MIB contains `RowPointers` which point to instances of objects in the LSR MIB's `mplsXCTable`, `mplsInSegmentTable` and `mplsOutSegmentTable`.

In order to expedite development, these RowPointer objects have been made optional in the conformance section of the MIB. They only need to be supported if the LSR MIBs `mplsInSegmentTable`, `mplsOutSegmentTable` and `mplsXCTable` are implemented.

As discussed in the section, "Changing Values after Session

Expires April 2003

[Page 9]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

Establishment", if a session is torn down, then all the information related to this session, must be removed from the both LDP MIB and, if implemented, from the LSR MIB.

[3.5.8.](#) The FEC Table

The FEC Table is a table which contains FEC (Forwarding Equivalence Class) information. Each entry/row represents a single FEC Element. There is also an LDP LSP FEC Table, `mplsLdpLspFecTable`, which associates FECs with the LSPs.

[3.5.9.](#) The LDP Session Peer Address Table

The MPLS LDP Session Peer Address Table is a table which extends the `mplsLdpSessionTable`. This table is a read-only table which stores Addresses learned after session initialization via Address Message advertisement.

[3.6.](#) LDP Notifications

Currently, there are several notifications which are specific for LDP. These are described in this section.

The `mplsLdpInitSesThresholdExceeded` notification indicates to the operator that there may be a misconfigured `mplsLdpEntityEntry` because the session associated with this Entity is not being established, and the Entity keeps trying to establish the session. A side effect of this situation is that a row in the `mplsLdpSessionTable` may not be reaching the operational state as indicated by the `mplsLdpSesState` object. If the value of `mplsLdpEntityInitSesThreshold` is 0 (zero) then this is equal to specifying the value of infinity for the threshold, and the `mplsLdpInitSesThresholdExceeded` notification will

never be sent.

The `mplsLdpPathVectorLimitMismatch` notification is generated when there is a mismatch in the Path Vector Limits between the Entity and Peer during session initialization. The session uses the value which is configured as the Entity's Path Vector Limit. However, a notification should be generated to indicate that a mismatch occurred. For further details, please see [Section 3.5.3](#) of the LDP Specification [[RFC3036](#)].

The `mplsLdpSessionUp` and `mplsLdpSessionDown` notifications are generated when there is an appropriate change in the `mplsLdpSesState` object, e.g. when sessions change state (Up to Down for the `mplsLdpSessionDown` trap, or Down to Up for the `mplsLdpSessionUp` trap).

Expires April 2003

[Page 10]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

[4.](#) MPLS Label Distribution Protocol MIB Definitions

```
MPLS-LDP-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    OBJECT-TYPE, MODULE-IDENTITY, NOTIFICATION-TYPE,  
    Integer32, Counter32, Unsigned32
```

```
    FROM SNMPv2-SMI
```

```
    MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
```

```
    FROM SNMPv2-CONF
```

```
    RowPointer, RowStatus, TimeInterval, TruthValue,  
    TimeStamp, StorageType
```

```
    FROM SNMPv2-TC
```

```
    InterfaceIndex
```

```
    FROM IF-MIB
```

```
    InetAddressType,
```

```
    InetAddress,
```

```
    InetPortNumber
```

```
    FROM INET-ADDRESS-MIB
```

```
    mplsMIB,
```

```
    MplsLabel,
```

```
    MplsLabelDistributionMethod,
```

```
    MplsLdpIdentifier,
```

MplsLdpLabelType,
MplsLspType,
MplsLsrIdentifier,
MplsRetentionMode

FROM MPLS-TC-MIB
;

mplsLdpMIB MODULE-IDENTITY

LAST-UPDATED "200208081200Z" -- 8 August 2002
ORGANIZATION "Multiprotocol Label Switching (mpls)
Working Group"

CONTACT-INFO

"Joan Cucchiara (jcucchiara@crescentnetworks.com)
Crescent Networks

Hans Sjostrand (hans@ipunplugged.com)
ipUnplugged

James V. Luciani (jluciani@crescentnetworks.com)
Crescent Networks

Expires April 2003

[Page 11]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

Working Group Chairs:

George Swallow, email: swallow@cisco.com
Loa Andersson, email: loa.andersson@utfors.se

MPLS Working Group, email: mpls@uu.net

"

DESCRIPTION

"This MIB contains managed object definitions for the
'Multiprotocol Label Switching, Label Distribution
Protocol, LDP' document."

REVISION "200208081200Z" -- 8 August 2002

DESCRIPTION

"Initial version published as part of RFC XXXX."

::= { mplsMIB 3 } -- to be assigned

--*****

mplsLdpObjects OBJECT IDENTIFIER ::= { mplsLdpMIB 1 }

```

mplsLdpNotifications OBJECT IDENTIFIER ::= { mplsLdpMIB 2 }
mplsLdpConformance    OBJECT IDENTIFIER ::= { mplsLdpMIB 3 }

--*****
-- MPLS LDP Objects
--*****

mplsLdpLsrObjects      OBJECT IDENTIFIER ::= { mplsLdpObjects 1 }

mplsLdpEntityObjects   OBJECT IDENTIFIER ::= { mplsLdpObjects 2 }

--
-- The MPLS Label Distribution Protocol's
-- Label Switching Router Objects
--

mplsLdpLsrId OBJECT-TYPE
    SYNTAX      MplsLsrIdentifier
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The LSR's Identifier."
    ::= { mplsLdpLsrObjects 1 }

mplsLdpLsrLoopDetectionCapable OBJECT-TYPE
    SYNTAX      INTEGER {
                                none(1),
                                other(2),
                                hopCount(3),
                                pathVector(4),

```

Expires April 2003

[Page 12]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

                                hopCountAndPathVector(5)
                                }
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "A indication of whether this
        Label Switching Router supports
        loop detection.

        none(1) -- Loop Detection is not supported
                  on this LSR.

```

other(2) -- Loop Detection is supported but
by a method other than those
listed below.

hopCount(3) -- Loop Detection is supported by
Hop Count only.

pathVector(4) -- Loop Detection is supported by
Path Vector only.

hopCountAndPathVector(5) -- Loop Detection is
supported by both Hop Count
And Path Vector.

Since Loop Detection is determined during
Session Initialization, an individual session
may not be running with loop detection. This
object simply gives an indication of whether or not the
LSR has the ability to support Loop Detection and
which types."

::= { mplsLdpLsrObjects 2 }

--

-- The MPLS Label Distribution Protocol Entity Objects

--

mplsLdpEntityLastChange OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime at the time of the most
recent addition or deletion of an entry
to the mplsLdpEntityTable/mpsLdpEntityStatsTable.

If no such changes have occurred since the last

re-initialization of the local management subsystem,
then this object contains a zero value."

::= { mplsLdpEntityObjects 1 }

```

mplsLdpEntityIndexNext OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4294967295)
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object contains an appropriate value to
        be used for mplsLdpEntityIndex when creating
        entries in the mplsLdpEntityTable. The value
        0 indicates that no unassigned entries are
        available. To obtain the mplsLdpEntityIndex
        value for a new entry, the manager issues a
        management protocol retrieval operation to obtain
        the current value of this object. After each
        retrieval, the agent should modify the value to
        the next unassigned index."
    ::= { mplsLdpEntityObjects 2 }

mplsLdpEntityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MplsLdpEntityEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This table contains information about the
        MPLS Label Distribution Protocol Entities which
        exist on this Label Switching Router (LSR)."
    ::= { mplsLdpEntityObjects 3 }

mplsLdpEntityEntry OBJECT-TYPE
    SYNTAX      MplsLdpEntityEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "An entry in this table represents an LDP entity.
        An entry can be created by a network administrator
        or by an SNMP agent as instructed by LDP."
    INDEX       { mplsLdpEntityLdpId, mplsLdpEntityIndex }
    ::= { mplsLdpEntityTable 1 }

MplsLdpEntityEntry ::= SEQUENCE {
    mplsLdpEntityLdpId          MplsLdpIdentifier,
    mplsLdpEntityIndex          Unsigned32,
    mplsLdpEntityProtocolVersion Integer32,
    mplsLdpEntityAdminStatus    INTEGER,
    mplsLdpEntityOperStatus     INTEGER,
    mplsLdpEntityTcpDscPort     InetPortNumber,

```



```

mplsLdpEntityUdpDscPort      InetPortNumber,
mplsLdpEntityMaxPduLength    Unsigned32,
mplsLdpEntityKeepAliveHoldTimer Integer32,
mplsLdpEntityHelloHoldTimer Integer32,
mplsLdpEntityInitSesThreshold Integer32,
mplsLdpEntityLabelDistMethod MplsLabelDistributionMethod,
mplsLdpEntityLabelRetentionMode MplsRetentionMode,
mplsLdpEntityPathVectorLimit Integer32,
mplsLdpEntityHopCountLimit   Integer32,
mplsLdpEntityTargetPeer      TruthValue,
mplsLdpEntityTargetPeerAddrType InetAddressType,
mplsLdpEntityTargetPeerAddr   InetAddress,
mplsLdpEntityLabelType        MplsLdpLabelType,
mplsLdpEntityDiscontinuityTime TimeStamp,
mplsLdpEntityStorageType      StorageType,
mplsLdpEntityRowStatus        RowStatus
}

mplsLdpEntityLdpId OBJECT-TYPE
    SYNTAX      MplsLdpIdentifier
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "The LDP identifier."
    REFERENCE
        "[RFC3036] LDP Specification, Section on LDP Identifiers."
    ::= { mplsLdpEntityEntry 1 }

```

```

mplsLdpEntityIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "This index is used as a secondary index to uniquely
        identify this row.  Before creating a row in this table,
        the 'mplsLdpEntityIndexNext' object should be retrieved.
        That value should be used for the value of this index
        when creating a row in this table.  (NOTE:  if a value
        of zero (0) is retrieved, that indicates that no rows
        can be created in this table at this time.

```

A secondary index (this object) is meaningful to some but not all, LDP implementations. For example in an LDP implementation which uses PPP would use this index to differentiate PPP sub-links.

Another way to use this index is to give this the value of ifIndex. However, this is dependant on the implementation."

Expires April 2003

[Page 15]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

::= { mplsLdpEntityEntry 2 }

mplsLdpEntityProtocolVersion OBJECT-TYPE

SYNTAX Integer32(1..65535)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The version number of the LDP protocol which will be used in the session initialization message.

[Section 3.5.3](#) in the LDP Specification specifies that the version of the LDP protocol is negotiated during session establishment. The value of this object represents the value that is sent in the initialization message."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.3](#) Initialization Message."

DEFVAL { 1 }

::= { mplsLdpEntityEntry 3 }

mplsLdpEntityAdminStatus OBJECT-TYPE

SYNTAX INTEGER {
 enable(1),
 disable(2)
}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The administrative status of this LDP Entity. If this object is changed from 'enable' to 'disable' and this entity has already attempted to establish contact with a Peer, then all contact with that Peer is lost and all information from that Peer needs to be removed from the MIB. (This implies that the network management subsystem should clean up any related entry in the mplsLdpPeerTable).

At this point the user is able to change values

which are related to this entity.

When the admin status is set back to 'up', then this Entity will attempt to establish a new session with the Peer."

```
DEFVAL { enable }  
::= { mplsLdpEntityEntry 4 }
```

```
mplsLdpEntityOperStatus OBJECT-TYPE  
    SYNTAX      INTEGER {
```

Expires April 2003

[Page 16]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```
        unknown(1),  
        enabled(2),  
        disabled(3)  
    }  
    MAX-ACCESS read-only  
    STATUS      current  
    DESCRIPTION  
        "The operational status of this LDP Entity."  
    ::= { mplsLdpEntityEntry 5 }
```

```
mplsLdpEntityTcpDscPort OBJECT-TYPE  
    SYNTAX      InetPortNumber  
    MAX-ACCESS read-create  
    STATUS      current  
    DESCRIPTION  
        "The TCP Discovery Port for  
        LDP. The default value is the well-known  
        value of this port."  
    REFERENCE  
        "[RFC3036], LDP Specification, Section 2.4.1,  
        Basic Discovery Mechanism, Section 2.4.2,  
        Extended Discovery Mechanism, Section  
        3.10, Well-known Numbers, and Section 3.10.1.  
        UDP and TCP Ports."  
    DEFVAL { 646 }  
    ::= { mplsLdpEntityEntry 6 }
```

```
mplsLdpEntityUdpDscPort OBJECT-TYPE  
    SYNTAX      InetPortNumber  
    MAX-ACCESS read-create  
    STATUS      current
```

DESCRIPTION

"The UDP Discovery Port for LDP. The default value is the well-known value for this port."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 2.4.1](#), Basic Discovery Mechanism, [Section 2.4.2](#), Extended Discovery Mechanism, [Section 3.10](#), Well-known Numbers, and [Section 3.10.1](#). UDP and TCP Ports."

DEFVAL { 646 }

::= { mplsLdpEntityEntry 7 }

mplsLdpEntityMaxPduLength OBJECT-TYPE

SYNTAX Unsigned32 (256..65535)

UNITS "octets"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

Expires April 2003

[Page 17]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

"The maximum PDU Length that is sent in the Common Session Parameters of an Initialization Message. According to the LDP Specification [[RFC3036](#)] a value of 255 or less specifies the default maximum length of 4096 octets, this is why the value of this object starts at 256. The operator should explicitly choose the default value (i.e. 4096), or some other value.

The receiving LSR MUST calculate the maximum PDU length for the session by using the smaller of its and its peer's proposals for Max PDU Length."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.3](#). Initialization Message."

DEFVAL { 4096 }

::= { mplsLdpEntityEntry 8 }

mplsLdpEntityKeepAliveHoldTimer OBJECT-TYPE

SYNTAX Integer32 (1..65535)

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The 16-bit integer value which is the proposed keep alive hold timer for this LDP Entity."

DEFVAL { 40 }

::= { mplsLdpEntityEntry 9 }

mplsLdpEntityHelloHoldTimer OBJECT-TYPE

SYNTAX Integer32 (0..65535)

UNITS "seconds"

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The 16-bit integer value which is the proposed Hello hold timer for this LDP Entity. The Hello Hold time in seconds.

An LSR maintains a record of Hellos received from potential peers. This object represents the Hold Time in the Common Hello Parameters TLV of the Hello Message.

A value of 0 is a default value and should be interpreted in conjunction with the mplsLdpEntityTargetPeer object.

If the value of this object is 0: if the value of the mplsLdpEntityTargetPeer object is false(2), then this

Expires April 2003

[Page 18]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

specifies that the Hold Time's actual default value is 15 seconds (i.e. the default Hold time for Link Hellos is 15 seconds). Otherwise if the value of the mplsLdpEntityTargetPeer object is true(1), then this specifies that the Hold Time's actual default value is 45 seconds (i.e. the default Hold time for Targeted Hellos is 45 seconds).

A value of 65535 means infinite (i.e. wait forever).

All other values represent the amount of time in seconds to wait for a Hello Message. Setting the hold time to a value smaller than 15 is not recommended, although not forbidden according to [[RFC3036](#)]."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.2.](#),
Hello Message."

DEFVAL { 0 }

::= { mplsLdpEntityEntry 10 }

mplsLdpEntityInitSesThreshold OBJECT-TYPE

SYNTAX Integer32(0..100)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"When attempting to establish a session with a given Peer, the given LDP Entity should send out the SNMP notification, 'mplsLdpInitSesThresholdExceeded', when the number of Session Initialization messages sent exceeds this threshold. The notification is used to notify an operator when this Entity and its Peer are possibly engaged in an endless sequence of messages as each NAKs the other's Initialization messages with Error Notification messages. Setting this threshold which triggers the notification is one way to notify the operator.

A value of 0 (zero) for this object indicates that the threshold is infinity, thus the SNMP notification will never be generated."

REFERENCE

"[[RFC3036](#)], LDP Specification,
[Section 2.5.3](#) Session Initialization."

DEFVAL { 8 }

::= { mplsLdpEntityEntry 11 }

Expires April 2003

[Page 19]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

mplsLdpEntityLabelDistMethod OBJECT-TYPE

SYNTAX MplsLabelDistributionMethod

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"For any given LDP session, the method of label distribution must be specified."

::= { mplsLdpEntityEntry 12 }

mplsLdpEntityLabelRetentionMode OBJECT-TYPE

SYNTAX MplsRetentionMode

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The LDP Entity can be configured to use either conservative or liberal label retention mode.

If the value of this object is conservative(1) then advertized label mappings are retained only if they will be used to forward packets, i.e. if label came from a valid next hop.

If the value of this object is liberal(2) then all advertized label mappings are retained whether they are from a valid next hop or not."

::= { mplsLdpEntityEntry 13 }

mplsLdpEntityPathVectorLimit OBJECT-TYPE

SYNTAX Integer32 (0..255)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"If the value of this object is 0 (zero) then Loop Dection for Path Vectors is disabled.

Otherwise, if this object has a value greater than zero, then Loop Dection for Path Vectors is enabled, and the Path Vector Limit is this value.

Also, the value of the object, 'mplsLdpLsrLoopDetectionCapable', must be set to either 'pathVector(4)' or 'hopCountAndPathVector(5)', if this object has a value greater than 0 (zero), otherwise it is ignored."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 2.8](#) Loop Dection, [Section 3.4.5](#) Path Vector TLV."

::= { mplsLdpEntityEntry 14 }

mplsLdpEntityHopCountLimit OBJECT-TYPE

SYNTAX Integer32 (0..255)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"If the value of this object is 0 (zero), then Loop Detection using Hop Counters is disabled.

If the value of this object is greater than 0 (zero) then Loop Detection using Hop Counters is enabled, and this object specifies this Entity's maximum allowable value for the Hop Count.

Also, the value of the object mplsLdpLsrLoopDetectionCapable must be set to either 'hopCount(3)' or 'hopCountAndPathVector(5)' if this object has a value greater than 0 (zero), otherwise it is ignored."

DEFVAL { 0 }

::= { mplsLdpEntityEntry 15 }

mplsLdpEntityTargetPeer OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"If this LDP entity uses targeted peer then set this to true."

DEFVAL { false }

::= { mplsLdpEntityEntry 16 }

mplsLdpEntityTargetPeerAddrType OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The type of the internetwork layer address used for the Extended Discovery. This object indicates how the value of mplsLdpEntityTargetPeerAddr is to be interpreted."

::= { mplsLdpEntityEntry 17 }

mplsLdpEntityTargetPeerAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The value of the internetwork layer address used for the Extended Discovery."

::= { mplsLdpEntityEntry 18 }

INTERNET-DRAFT

MPLS LDP MIB

October 2002

mplsLdpEntityLabelType OBJECT-TYPE

SYNTAX MplsLdpLabelType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Specifies the optional parameters for the LDP Initialization Message. If the value is generic(1) then no optional parameters will be sent in the LDP Initialization message associated with this Entity.

If the value is atmParameters(2) then a row must be created in the mplsLdpEntityAtmParms Table, which corresponds to this entry.

If the value is frameRelayParameters(3) then a row must be created in the mplsLdpEntityFrameRelayParms Table, which corresponds to this entry."

REFERENCE

"[RFC3036], LDP Specification, [Section 3.5.3.](#), Initialization Message."

::= { mplsLdpEntityEntry 19 }

mplsLdpEntityDiscontinuityTime OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime on the most recent occasion at which any one or more of this entity's counters suffered a discontinuity. The relevant counters are the specific instances associated with this entity of any Counter32, or Counter64 object contained in the 'mplsLdpEntityStatsTable'. If no such discontinuities have occurred since the last re-initialization of the local management subsystem, then this object contains a zero value."

::= { mplsLdpEntityEntry 20 }

mplsLdpEntityStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "The storage type for this entry."
 ::= { mplsLdpEntityEntry 21 }

mplsLdpEntityRowStatus OBJECT-TYPE

Expires April 2003

[Page 22]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
 "An object that allows entries in this table to
 be created and deleted using the
 RowStatus convention."
 ::= { mplsLdpEntityEntry 22 }

--
--
--

-- The MPLS LDP Entity Statistics Table

mplsLdpEntityStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF MplsLdpEntityStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "This table is a read-only table which augments
 the mplsLdpEntityTable. The purpose of this
 table is to keep statistical information about
 the LDP Entities on the LSR."
 ::= { mplsLdpEntityObjects 4 }

mplsLdpEntityStatsEntry OBJECT-TYPE

SYNTAX MplsLdpEntityStatsEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
 "A row in this table contains statistical information
 about an LDP Entity. Some counters contained in a
 row are for fatal errors received during a former
 LDP Session associated with this entry. For example,
 an Ldp Pdu received on a TCP connection during an

LDP Session contains a fatal error. That error is counted here, because the session is terminated.

If the error is NOT fatal (i.e. and the Session remains), then the error is counted in the mplsLdpSesStatsEntry."

```
AUGMENTS      { mplsLdpEntityEntry }  
 ::= { mplsLdpEntityStatsTable 1 }
```

```
MplsLdpEntityStatsEntry ::= SEQUENCE {  
    mplsLdpAttemptedSessions      Counter32,  
    mplsLdpSesRejectedNoHelloErrors Counter32,  
    mplsLdpSesRejectedAdErrors    Counter32,  
    mplsLdpSesRejectedMaxPduErrors Counter32,
```

Expires April 2003

[Page 23]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```
    mplsLdpSesRejectedLRErrors      Counter32,  
    mplsLdpBadLdpIdentifierErrors    Counter32,  
    mplsLdpBadPduLengthErrors        Counter32,  
    mplsLdpBadMessageLengthErrors    Counter32,  
    mplsLdpBadTlvLengthErrors        Counter32,  
    mplsLdpMalformedTlvValueErrors    Counter32,  
    mplsLdpKeepAliveTimerExpErrors    Counter32,  
    mplsLdpShutdownNotifReceived      Counter32,  
    mplsLdpShutdownNotifSent          Counter32  
}
```

mplsLdpAttemptedSessions OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A count of the total attempted sessions for this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

```
::= { mplsLdpEntityStatsEntry 1 }
```

mplsLdpSesRejectedNoHelloErrors OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"A count of the Session Rejected/No Hello Error Notification Messages sent or received by this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

::= { mplsLdpEntityStatsEntry 2 }

mplsLdpSesRejectedAdErrors OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"A count of the Session Rejected/Parameters Advertisement Mode Error Notification Messages sent or received by this LDP Entity.

Expires April 2003

[Page 24]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

::= { mplsLdpEntityStatsEntry 3 }

mplsLdpSesRejectedMaxPduErrors OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION

"A count of the Session Rejected/Parameters Max Pdu Length Error Notification Messages sent or received by this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

::= { mplsLdpEntityStatsEntry 4 }

mplsLdpSesRejectedLRErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A count of the Session Rejected/Parameters Label Range Notification Messages sent or received by this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

::= { mplsLdpEntityStatsEntry 5 }

mplsLdpBadLdpIdentifierErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object counts the number of Bad LDP Identifier Fatal Errors detected by the session(s) (past and present) associated with this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

Expires April 2003

[Page 25]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.1.2](#)."
::= { mplsLdpEntityStatsEntry 6 }

mplsLdpBadPduLengthErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object counts the number of Bad Pdu Length Fatal Errors detected by the session(s) (past and present) associated with this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.1.2](#)."
::= { mplsLdpEntityStatsEntry 7 }

mplsLdpBadMessageLengthErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object counts the number of Bad Message Length Fatal Errors detected by the session(s) (past and present) associated with this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.1.2](#)."
::= { mplsLdpEntityStatsEntry 8 }

mplsLdpBadTlvLengthErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object counts the number of Bad TLV Length Fatal Errors detected by the session(s) (past and present) associated with this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of

mplsLdpEntityDiscontinuityTime."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.1.2](#)."
::= { mplsLdpEntityStatsEntry 9 }

mplsLdpMalformedTlvValueErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object counts the number of Malformed TLV Value Fatal Errors detected by the session(s) (past and present) associated with this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.1.2](#)."

::= { mplsLdpEntityStatsEntry 10 }

mplsLdpKeepAliveTimerExpErrors OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object counts the number of Session Keep Alive Timer Expired Errors detected by the session(s) (past and present) associated with this LDP Entity.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of mplsLdpEntityDiscontinuityTime."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.1.2](#)."

::= { mplsLdpEntityStatsEntry 11 }

mplsLdpShutdownNotifReceived OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object counts the number of Shutdown Notifications received related to session(s) (past and present) associated with this LDP Entity.

Discontinuities in the value of this counter can occur

```
        at re-initialization of the management system, and at
        other times as indicated by the value of
        mplsLdpEntityDiscontinuityTime."
 ::= { mplsLdpEntityStatsEntry 12 }

mplsLdpShutdownNotifSent OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object counts the number of Shutdown Notifications
        sent related to session(s) (past and present) associated
        with this LDP Entity.

        Discontinuities in the value of this counter can occur
        at re-initialization of the management system, and at
        other times as indicated by the value of
        mplsLdpEntityDiscontinuityTime."
 ::= { mplsLdpEntityStatsEntry 13 }

--
-- The MPLS LDP Peer Table
--

mplsLdpSessionObjects OBJECT IDENTIFIER ::=
    { mplsLdpObjects 3 }

mplsLdpPeerLastChange OBJECT-TYPE
    SYNTAX      TimeStamp
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The value of sysUpTime at the time of the most
        recent addition or deletion to the
        mplsLdpPeerTable/mpsLdpSessionTable."
 ::= { mplsLdpSessionObjects 1 }

mplsLdpPeerTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MplsLdpPeerEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "Information about LDP peers known by Entities in
        the mplsLdpEntityTable. The information in this table
        is based on information from the Entity-Peer interaction
```


during session initialization but is not appropriate for the mplsLdpSessionTable, because objects in this table may or may not be used in session establishment."

```
::= { mplsLdpSessionObjects 2 }
```

mplsLdpPeerEntry OBJECT-TYPE

SYNTAX MplsLdpPeerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about a single Peer which is related to a Session. NOTE: this table is augmented by the mplsLdpSessionTable."

INDEX { mplsLdpEntityLdpId,
mplsLdpEntityIndex,
mplsLdpPeerLdpId }

```
::= { mplsLdpPeerTable 1 }
```

MplsLdpPeerEntry ::= SEQUENCE {

mplsLdpPeerLdpId MplsLdpIdentifier,

mplsLdpPeerLabelDistMethod MplsLabelDistributionMethod,

mplsLdpPeerPathVectorLimit Integer32

}

mplsLdpPeerLdpId OBJECT-TYPE

SYNTAX MplsLdpIdentifier

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The LDP identifier of this LDP Peer."

```
::= { mplsLdpPeerEntry 1 }
```

mplsLdpPeerLabelDistMethod OBJECT-TYPE

SYNTAX MplsLabelDistributionMethod

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"For any given LDP session, the method of label distribution must be specified."

```
::= { mplsLdpPeerEntry 2 }
```

mplsLdpPeerPathVectorLimit OBJECT-TYPE

SYNTAX Integer32 (0..255)

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"If the value of this object is 0 (zero) then Loop Dection for Path Vectors for this Peer is disabled.

Otherwise, if this object has a value greater than zero, then Loop Dection for Path Vectors for this Peer is enabled and the Path Vector Limit is this value."

Expires April 2003

[Page 29]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 2.8](#) Loop Dection, [Section 3.4.5](#) Path Vector TLV."

::= { mplsLdpPeerEntry 3 }

--

-- The MPLS LDP Sessions Table

--

mplsLdpSessionTable OBJECT-TYPE

SYNTAX SEQUENCE OF MplsLdpSessionEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table of Sessions between the LDP Entities and LDP Peers. Each row represents a single session."

::= { mplsLdpSessionObjects 3 }

mplsLdpSessionEntry OBJECT-TYPE

SYNTAX MplsLdpSessionEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table represents information on a single session between an LDP Entity and LDP Peer. The information contained in a row is read-only.

Please note: the Path Vector Limit for the Session is the value which is configured in the corresponding mplsLdpEntityEntry. The

Peer's Path Vector Limit is in noted in the
mplsLdpPeerTable.

Values which may differ from those configured are
noted in the objects of this table, the
mplsLdpAtmSesTable and the
mplsLdpFrameRelaySesTable. A value will
differ if it was negotiated between the
Entity and the Peer. Values may or may not
be negotiated. For example, if the values
are the same then no negotiation takes place.
If they are negotiated, then they may differ."

AUGMENTS { mplsLdpPeerEntry }
::= { mplsLdpSessionTable 1 }

MplsLdpSessionEntry ::= SEQUENCE {
 mplsLdpSesStateLastChange TimeStamp,
 mplsLdpSesState INTEGER,
 mplsLdpSesProtocolVersion Integer32,

Expires April 2003

[Page 30]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

 mplsLdpSesKeepAliveHoldTimeRem TimeInterval,
 mplsLdpSesMaxPduLength Unsigned32,
 mplsLdpSesDiscontinuityTime TimeStamp
}

mplsLdpSesStateLastChange OBJECT-TYPE

 SYNTAX TimeStamp

 MAX-ACCESS read-only

 STATUS current

 DESCRIPTION

 "The value of this object is sysUpTime when the
 most recent change in the mplsLdpSesState
 object occurred. When the entry is created, then
 this object has the value of sysUpTime when the
 entry was created."

 ::= { mplsLdpSessionEntry 1 }

mplsLdpSesState OBJECT-TYPE

 SYNTAX INTEGER {
 nonexistent(1),
 initialized(2),
 openrec(3),
 opensent(4),

```

        operational(5)
    }
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The current state of the session, all of the
        states 1 to 5 are based on the state machine for
        session negotiation behavior."
    REFERENCE
        "[RFC3036], LDP Specification, Section 2.5.4,
        Initialization State Machine."
    ::= { mplsLdpSessionEntry 2 }

```

```

mplsLdpSesProtocolVersion OBJECT-TYPE
    SYNTAX        Integer32(1..65535)
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The version of the LDP Protocol which
        this session is using. This is the version of
        the LDP protocol which has been negotiated during
        session initialization."
    REFERENCE
        "[RFC3036], LDP Specification, Section 3.5.3,
        Initialization Message."
    ::= { mplsLdpSessionEntry 3 }

```

Expires April 2003

[Page 31]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

mplsLdpSesKeepAliveHoldTimeRem OBJECT-TYPE
    SYNTAX        TimeInterval
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The keep alive hold time remaining for this session."
    ::= { mplsLdpSessionEntry 4 }

```

```

mplsLdpSesMaxPduLength OBJECT-TYPE
    SYNTAX        Unsigned32 (1..65535)
    UNITS          "octets"
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The value of maximum allowable length for LDP PDUs for
        this session. This value may have been negotiated during

```

the Session Initialization. This object is related to the mplsLdpEntityMaxPduLength object. The mplsLdpEntityMaxPduLength object specifies the requested LDP PDU length, and this object reflects the negotiated LDP PDU length between the Entity and the Peer."

```
::= { mplsLdpSessionEntry 5 }
```

mplsLdpSesDiscontinuityTime OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime on the most recent occasion at which any one or more of this session's counters suffered a discontinuity. The relevant counters are the specific instances associated with this session of any Counter32 or Counter64 object contained in the mplsLdpSessionStatsTable.

The initial value of this object is the value of sysUpTime when the entry was created in this table.

Also, a command generator can distinguish when a session between a given Entity and Peer goes away and then is 're-established'. This value would change and thus indicate to the command generator that this is a different session."

```
::= { mplsLdpSessionEntry 6 }
```

--

-- The MPLS LDP Session Statistics Table

--

Expires April 2003

[Page 32]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

mplsLdpSesStatsTable OBJECT-TYPE

SYNTAX SEQUENCE OF MplsLdpSesStatsEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table of statistics for Sessions between LDP Entities and LDP Peers."

```
::= { mplsLdpSessionObjects 4 }
```

```

mplsLdpSesStatsEntry OBJECT-TYPE
    SYNTAX      MplsLdpSesStatsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry in this table represents statistical
        information on a single session between an LDP
        Entity and LDP Peer."
    AUGMENTS    { mplsLdpPeerEntry }
    ::= { mplsLdpSesStatsTable 1 }

MplsLdpSesStatsEntry ::= SEQUENCE {
    mplsLdpSesStatsUnkMesTypeErrors Counter32,
    mplsLdpSesStatsUnkTlvErrors      Counter32
}

mplsLdpSesStatsUnkMesTypeErrors OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object counts the number of Unknown Message Type
        Errors detected during this session.

        Discontinuities in the value of this counter can occur
        at re-initialization of the management system, and at
        other times as indicated by the value of
        mplsLdpSesDiscontinuityTime."
    ::= { mplsLdpSesStatsEntry 1 }

mplsLdpSesStatsUnkTlvErrors OBJECT-TYPE
    SYNTAX      Counter32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This object counts the number of Unknown TLV Errors
        detected during this session.

        Discontinuities in the value of this counter can occur
        at re-initialization of the management system, and at
        other times as indicated by the value of

```

```

        mplsLdpSessionDiscontinuityTime."
 ::= { mplsLdpSesStatsEntry 2 }

--
-- The MPLS LDP Hello Adjacency Table
--

mplsLdpHelloAdjacencyObjects OBJECT IDENTIFIER ::=
    { mplsLdpSessionObjects 5 }

mplsLdpHelloAdjacencyTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MplsLdpHelloAdjacencyEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table of Hello Adjacencies for Sessions."
    ::= { mplsLdpHelloAdjacencyObjects 1 }

mplsLdpHelloAdjacencyEntry OBJECT-TYPE
    SYNTAX      MplsLdpHelloAdjacencyEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Each row represents a single LDP Hello Adjacency.
        An LDP Session can have one or more Hello adjacencies."
    INDEX       { mplsLdpEntityLdpId,
                  mplsLdpEntityIndex,
                  mplsLdpPeerLdpId,
                  mplsLdpHelloAdjIndex }
    ::= { mplsLdpHelloAdjacencyTable 1 }

MplsLdpHelloAdjacencyEntry ::= SEQUENCE {
    mplsLdpHelloAdjIndex      Unsigned32,
    mplsLdpHelloAdjHoldTimeRem TimeInterval,
    mplsLdpHelloAdjType       INTEGER
}

mplsLdpHelloAdjIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An identifier for this specific adjacency."
    ::= { mplsLdpHelloAdjacencyEntry 1 }

mplsLdpHelloAdjHoldTimeRem OBJECT-TYPE
    SYNTAX      TimeInterval
    MAX-ACCESS  read-only
    STATUS      current

```

INTERNET-DRAFT

MPLS LDP MIB

October 2002

DESCRIPTION

"The time remaining for this Hello Adjacency.
This interval will change when the 'next'
Hello message which corresponds to this
Hello Adjacency is received."

::= { mplsLdpHelloAdjacencyEntry 2 }

mplsLdpHelloAdjType OBJECT-TYPE

SYNTAX INTEGER {
link(1),
targeted(2)
}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This adjacency is the result of a 'link'
hello if the value of this object is link(1).
Otherwise, it is a result of a 'targeted'
hello, targeted(2)."

::= { mplsLdpHelloAdjacencyEntry 3 }

--

-- Session Label (LSP) Mapping to LSR MIB's LIB Information.

--

mplsLdpLspTable OBJECT-TYPE

SYNTAX SEQUENCE OF MplsLdpLspEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table of LDP LSP's which
map to a Segment Table in the
the LSR MIB's (either the mplsInSegmentTable
or mplsOutSegmentTable) AND to the
LSR MIB's mplsXCTable."

::= { mplsLdpSessionObjects 6 }

mplsLdpLspEntry OBJECT-TYPE

SYNTAX MplsLdpLspEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table represents information on a single LDP LSP which is represented by a session's index triple (mplsLdpEntityLdpId, mplsLdpEntityIndex, mplsLdpPeerLdpId) AND the index tuple (mplsLdpLspIfIndex, mplsLdpLspLabel).

The information contained in a row is read-only."

Expires April 2003

[Page 35]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```
INDEX          { mplsLdpEntityLdpId,
                  mplsLdpEntityIndex,
                  mplsLdpPeerLdpId,
                  mplsLdpLspIfIndex,
                  mplsLdpLspLabel
                }
 ::= { mplsLdpLspTable 1 }

mplsLdpLspEntry ::= SEQUENCE {
    mplsLdpLspIfIndex      InterfaceIndex,
    mplsLdpLspLabel        MplsLabel,
    mplsLdpLspLabelType    MplsLdpLabelType,
    mplsLdpLspType         MplsLspType,
    mplsLdpLspLsrInSegmentPointer RowPointer,
    mplsLdpLspLsrOutSegmentPointer RowPointer,
    mplsLdpLspLsrXCPointer  RowPointer
}

mplsLdpLspIfIndex OBJECT-TYPE
    SYNTAX      InterfaceIndex
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "The ifIndex value associated with this LSP."
    ::= { mplsLdpLspEntry 1 }

mplsLdpLspLabel OBJECT-TYPE
    SYNTAX      MplsLabel
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "The LDP label for this LSP."
    ::= { mplsLdpLspEntry 2 }

mplsLdpLspLabelType OBJECT-TYPE
```

SYNTAX MplsLdpLabelType
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The Layer 2 Label Type."
 ::= { mplsLdpLspEntry 3 }

mplsLdpLspType OBJECT-TYPE
 SYNTAX MplsLspType
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The type of LSP connection.
 The possible values are:

Expires April 2003

[Page 36]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

unknown(1) -- if the LSP is not known
 to be one of the following.

terminatingLsp(2) -- if the LSP terminates
 on the LSR, then this
 is an ingressing LSP
 which ends on the LSR,

originatingLsp(3) -- if the LSP originates
 from the LSR, then this
 is an egressing LSP which is
 the head-end of the LSP,

crossConnectingLsp(4) -- if the LSP ingresses
 and egresses on the LSR,
 then it is cross-connecting
 on that LSR."

::= { mplsLdpLspEntry 4 }

mplsLdpLspLsrInSegmentPointer OBJECT-TYPE
 SYNTAX RowPointer
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "If this LSP terminates or is cross-connecting
 on this LSR, then this RowPointer should point
 to an instance of an object in the
 mplsLsrInSegmentTable. In other words if

the value of mplsLdpLspType is terminatingLsp(2) or crossConnectingLsp(4), then this should point to an instance of an object in the LSR-MIB's mplsInSegmentTable.

Otherwise, a value of zeroDotzero indicates that this LSP has no corresponding mplsInSegmentEntry."
 ::= { mplsLdpLspEntry 5 }

mplsLdpLspLsrOutSegmentPointer OBJECT-TYPE

SYNTAX RowPointer

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"If this LSP originates or is cross-connecting on this LSR, then this RowPointer should point to an instance of an object in the LSR-MIB's mplsOutSegmentTable. In other words if the value of mplsLdpLspType is originatingLsp(3) or crossConnectingLsp(4), then this should point to an instance of an object in the LSR-MIB's mplsOutSegmentTable.

Expires April 2003

[Page 37]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

Otherwise, a value of zeroDotzero indicates that this LSP has no corresponding mplsOutSegmentEntry."
 ::= { mplsLdpLspEntry 6 }

mplsLdpLspLsrXCPointer OBJECT-TYPE

SYNTAX RowPointer

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"If this LSP is cross-connecting on this LSR, then this RowPointer should point to an instance of an object in the LSR-MIB's mplsXCTable. In other words if the value of mplsLdpLspType is crossConnectingLsp(4), then this should point to an instance of an object in the LSR-MIB's mplsXCTable.

Otherwise, a value of zeroDotzero indicates that this LSP has no corresponding mplsXCEntry."
 ::= { mplsLdpLspEntry 7 }

```

--
-- Mpls FEC Table
--

mplsFecObjects OBJECT IDENTIFIER ::=
    { mplsLdpSessionObjects 7 }

mplsFecIndexNext OBJECT-TYPE
    SYNTAX      Unsigned32 (0..4294967295)
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object contains an appropriate value to
        be used for mplsFecIndex when creating
        entries in the mplsFecTable. The value
        0 indicates that no unassigned entries are
        available. To obtain the mplsFecIndex
        value for a new entry, the manager issues a
        management protocol retrieval operation to obtain
        the current value of this object. After each
        retrieval, the agent should modify the value to
        the next unassigned index."
    ::= { mplsFecObjects 1 }

mplsFecTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MplsFecEntry
    MAX-ACCESS   not-accessible

```

Expires April 2003

[Page 38]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

    STATUS       current
    DESCRIPTION
        "This table represents the FEC
        (Forwarding Equivalence Class)
        Information associated with an LSP."
    ::= { mplsFecObjects 2 }

mplsFecEntry OBJECT-TYPE
    SYNTAX      MplsFecEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION

```

"Each row represents a single FEC Element."
INDEX { mplsFecIndex }
::= { mplsFecTable 1 }

```
MplsFecEntry ::= SEQUENCE {
    mplsFecIndex      Unsigned32,
    mplsFecType       INTEGER,
    mplsFecAddrLength Integer32,
    mplsFecAddrFamily InetAddressType,
    mplsFecAddr        InetAddress,
    mplsFecStorageType StorageType,
    mplsFecRowStatus   RowStatus
}
```

```
mplsFecIndex OBJECT-TYPE
    SYNTAX      Unsigned32(1..4294967295)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The index which uniquely identifies this entry."
    ::= { mplsFecEntry 1 }
```

```
mplsFecType OBJECT-TYPE
    SYNTAX      INTEGER {
                    prefix(1),
                    hostAddress(2)
                }
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "The type of the FEC.  If the value of this object
        is 'prefix(1)' then the FEC type described by this
        row is for address prefixes.

        If the value of this object is 'hostAddress(2)' then
        the FEC type described by this row is a host address."
    ::= { mplsFecEntry 2 }
```

```
mplsFecAddrLength OBJECT-TYPE
    SYNTAX      Integer32(0..255)
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
```

"If the value of 'mplsFecType' is 'prefix(1)' then the value of this object is the length in bits of the address prefix represented by 'mplsFecAddr', or if the length is zero then this is a special value which indicates that the prefix matches all addresses. In this case the prefix is also zero (i.e. 'mplsFecAddr' will have the value of zero.)"

DEFVAL { 0 }

::= { mplsFecEntry 3 }

mplsFecAddrFamily OBJECT-TYPE

SYNTAX InetAddressType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The value of this object is from the Address Family Numbers."

::= { mplsFecEntry 4 }

mplsFecAddr OBJECT-TYPE

SYNTAX InetAddress

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"If the value of 'mplsFecType' is 'prefix(1)' then the value of this object is the address prefix. If the value of the 'mplsFecAddrLength' is object is zero, then this object should also be zero.

If the value of the 'mplsFecType' is 'hostAddress(2)' then this is the host address."

::= { mplsFecEntry 5 }

mplsFecStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type for this entry."

::= { mplsFecEntry 6 }

mplsFecRowStatus OBJECT-TYPE

```
SYNTAX      RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "An object that allows entries in this table to
     be created and deleted using the
     RowStatus convention."
 ::= { mplsFecEntry 7 }

--
--  LDP LSP FEC Table
--

mplsLdpLspFecTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MplsLdpLspFecEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "A table which shows the relationship between
         LDP LSP's and FECs.  Each row represents
         a single LSP to FEC association.
         This table is read-only."
    ::= { mplsLdpSessionObjects 8 }

mplsLdpLspFecEntry OBJECT-TYPE
    SYNTAX      MplsLdpLspFecEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry represents a LDP LSP
         to FEC association."
    INDEX      { mplsLdpEntityLdpId,
                 mplsLdpEntityIndex,
                 mplsLdpPeerLdpId,
                 mplsLdpLspIfIndex,
                 mplsLdpLspLabel,
                 mplsFecIndex
               }
    ::= { mplsLdpLspFecTable 1 }

MplsLdpLspFecEntry ::= SEQUENCE {
    mplsLdpLspFecOperStatus  INTEGER,
    mplsLdpLspFecLastChange  TimeStamp,
    mplsLdpLspFecRowStatus   RowStatus
}
```

mplsLdpLspFecOperStatus OBJECT-TYPE
SYNTAX INTEGER {
unknown(1),

Expires April 2003

[Page 41]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

inUse(2),
notInUse(3)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"An indication of the operational status of
the FEC associated with LDP LSP.

unknown(1) - this is a temporary state which
may indicate the LSP-FEC association
is in a state of transition.

inUse(2) - the FEC associated with the LSP is
currently being applied.

notInUse(3) - the FEC associated with the LSP is
not being applied. Eventually, this
entry may be aged out."
::= { mplsLdpLspFecEntry 1 }

mplsLdpLspFecLastChange OBJECT-TYPE
SYNTAX TimeStamp
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This value of sysUpTime when the
mplsLdpLspFecOperStatus last changed state."
::= { mplsLdpLspFecEntry 2 }

mplsLdpLspFecRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"An object that allows entries in this table to
be created and deleted using the
RowStatus convention."
::= { mplsLdpLspFecEntry 3 }


```
--
-- Address Message/Address Withdraw Message Information
--
-- This information is associated with a specific Session
-- because Label Address Messages are sent after session
-- initialization has taken place.
--
```

mplsLdpSesPeerAddrTable OBJECT-TYPE

Expires April 2003

[Page 42]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

SYNTAX SEQUENCE OF MplsLdpSesPeerAddrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table 'extends' the mplsLdpSessionTable.

This table is used to store Label Address Information from Label Address Messages received by this LSR from Peers. This table is read-only and should be updated when Label Withdraw Address Messages are received, i.e. Rows should be deleted as appropriate.

NOTE: since more than one address may be contained in a Label Address Message, this table 'extends', rather than 'AUGMENTS' the mplsLdpSessionTable's information."

::= { mplsLdpSessionObjects 9 }

mplsLdpSesPeerAddrEntry OBJECT-TYPE

SYNTAX MplsLdpSesPeerAddrEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table represents information on session's for a single next hop address which was advertised in an Address Message from the LDP peer. The information contained in a row is read-only."

INDEX { mplsLdpEntityLdpId,
mplsLdpEntityIndex,
mplsLdpPeerLdpId,
mplsLdpSesPeerAddrIndex
}

```

 ::= { mplsLdpSesPeerAddrTable 1 }

MplsLdpSesPeerAddrEntry ::= SEQUENCE {
    mplsLdpSesPeerAddrIndex      Unsigned32,
    mplsLdpSesPeerNextHopAddrType InetAddressType,
    mplsLdpSesPeerNextHopAddr    InetAddress
}

mplsLdpSesPeerAddrIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..4294967295)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An index which uniquely identifies this entry within
        a given session."
    ::= { mplsLdpSesPeerAddrEntry 1 }

mplsLdpSesPeerNextHopAddrType OBJECT-TYPE
    SYNTAX      InetAddressType

```

Expires April 2003

[Page 43]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The internetwork layer address type of this Next Hop
        Address as specified in the Label Address Message
        associated with this Session. The value of this
        object indicates how to interpret the value of
        mplsLdpSessionPeerNextHopAddress."
    ::= { mplsLdpSesPeerAddrEntry 2 }

mplsLdpSesPeerNextHopAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The value of the next hop address."
    REFERENCE
        "[RFC3036], LDP Specification defines only IPv4 for
        LDP Protocol Version 1, see section 3.4.3."
    ::= { mplsLdpSesPeerAddrEntry 3 }

```

--- Notifications

mplsLdpNotificationPrefix OBJECT IDENTIFIER ::=

{ mplsLdpNotifications 0 }

mplsLdpInitSesThresholdExceeded NOTIFICATION-TYPE

OBJECTS {

mplsLdpEntityInitSesThreshold

}

STATUS current

DESCRIPTION

"This notification is generated when the value of the 'mplsLdpEntityInitSesThreshold' object is not zero, and the number of Session Initialization messages exceeds the value of the 'mplsLdpEntityInitSesThreshold' object."

::= { mplsLdpNotificationPrefix 1 }

mplsLdpPathVectorLimitMismatch NOTIFICATION-TYPE

OBJECTS {

mplsLdpEntityPathVectorLimit,

mplsLdpPeerPathVectorLimit

}

STATUS current

DESCRIPTION

"If this notification is enabled to generated,

Expires April 2003

[Page 44]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

then this notification is sent when the 'mplsLdpEntityPathVectorLimit' does NOT match the value of the 'mplsLdpPeerPathVectorLimit' for a specific Entity."

REFERENCE

"[[RFC3036](#)], LDP Specification, [Section 3.5.3](#)."

::= { mplsLdpNotificationPrefix 2 }

mplsLdpSessionUp NOTIFICATION-TYPE

OBJECTS {

mplsLdpSesState,

mplsLdpSesDiscontinuityTime,

mplsLdpSesStatsUnkMesTypeErrors,

mplsLdpSesStatsUnkTlvErrors

}

```

STATUS      current
DESCRIPTION
    "If this notification is enabled to generated,
    then this notification is sent when the
    value of 'mplsLdpSesState' enters
    the 'operational(5)' state."
    ::= { mplsLdpNotificationPrefix 3 }

mplsLdpSessionDown NOTIFICATION-TYPE
    OBJECTS      {
        mplsLdpSesState,
        mplsLdpSesDiscontinuityTime,
        mplsLdpSesStatsUnkMesTypeErrors,
        mplsLdpSesStatsUnkTlvErrors
    }
    STATUS      current
    DESCRIPTION
        "If this notification is enabled to generated,
        then this notification is sent when the
        the value of 'mplsLdpSesState' leaves
        the 'operational(5)' state."
        ::= { mplsLdpNotificationPrefix 4 }

--*****
-- Module Conformance Statement
--*****

mplsLdpGroups
    OBJECT IDENTIFIER ::= { mplsLdpConformance 1 }

mplsLdpCompliances
    OBJECT IDENTIFIER ::= { mplsLdpConformance 2 }

```

Expires April 2003

[Page 45]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

--
-- Full Compliance
--

```

```

mplsLdpModuleFullCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION

```

"The Module is implemented with support for read-create and read-write. In other words, both monitoring and configuration are available when using this MODULE-COMPLIANCE."

MODULE -- this module

```
MANDATORY-GROUPS { mplsLdpGeneralGroup,
                    mplsLdpLspGroup,
                    mplsLdpNotificationsGroup
                  }
```

GROUP mplsLdpLsrGroup

DESCRIPTION

"This group must be supported if the LSR MIB is implemented, specifically the mplsInSegmentTable, the mplsOutSegmentTable or the mplsXCTable."

OBJECT mplsLdpEntityTargetPeerAddrType

SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }

DESCRIPTION

"An implementation is only required to support 'unknown(0)', and IPv4 addresses. Supporting IPv6 addresses is optional."

OBJECT mplsLdpEntityTargetPeerAddr

SYNTAX InetAddress (SIZE(0|4|16))

DESCRIPTION

"An implementation is only required to support IPv4 and may optionally support IPv6 addresses."

OBJECT mplsLdpEntityRowStatus

SYNTAX RowStatus { active(1) }

WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }

DESCRIPTION

"Support for createAndWait and notInService is not required."

OBJECT mplsFecAddrFamily

SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }

DESCRIPTION

"An implementation is only required to support

'unknown(0)', and IPv4 addresses. Supporting IPv6 addresses is optional."

OBJECT mplsFecAddr

SYNTAX InetAddress (SIZE(0|4|16))

DESCRIPTION

"An implementation is only required to support IPv4 and may optionally support IPv6 addresses."

OBJECT mplsFecRowStatus

SYNTAX RowStatus { active(1) }

WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }

MIN-ACCESS read-only

DESCRIPTION

"Support for createAndWait and notInService is not required. Also, the entries in this table may be created by the agent, so strictly speaking read-create functionality is not necessary, but may be nice to have."

OBJECT mplsLdpLspFecRowStatus

SYNTAX RowStatus { active(1) }

WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }

MIN-ACCESS read-only

DESCRIPTION

"Support for createAndWait and notInService is not required. Also, the entries in this table may be created by the agent, so strictly speaking read-create functionality is not necessary, but may be nice to have."

OBJECT mplsLdpSesPeerNextHopAddrType

SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }

DESCRIPTION

"An implementation is only required to support 'unknown(0)', and IPv4 addresses. Supporting IPv6 addresses is optional."

OBJECT mplsLdpSesPeerNextHopAddr

SYNTAX InetAddress (SIZE(0|4|16))

DESCRIPTION

"An implementation is only required to support IPv4 and may optionally support IPv6 addresses."

::= { mplsLdpCompliances 1 }

--

-- Read-Only Compliance

--

INTERNET-DRAFT

MPLS LDP MIB

October 2002

`mplsLdpModuleReadOnlyCompliance MODULE-COMPLIANCE``STATUS current``DESCRIPTION`

"The Module is implemented with support for read-only. In other words, only monitoring is available by implementing this MODULE-COMPLIANCE."

`MODULE -- this module`

```
MANDATORY-GROUPS    { mplsLdpGeneralGroup,
                        mplsLdpLspGroup,
                        mplsLdpNotificationsGroup
                      }
```

`GROUP mplsLdpLsrGroup``DESCRIPTION`

"This group must be supported if the LSR MIB is implemented, specifically the mplsInSegmentTable, the mplsOutSegmentTable or the mplsXCTable."

`OBJECT mplsLdpEntityProtocolVersion``MIN-ACCESS read-only``DESCRIPTION`

"Write access is not required."

`OBJECT mplsLdpEntityAdminStatus``MIN-ACCESS read-only``DESCRIPTION`

"Write access is not required."

`OBJECT mplsLdpEntityTcpDscPort``MIN-ACCESS read-only``DESCRIPTION`

"Write access is not required."

`OBJECT mplsLdpEntityUdpDscPort``MIN-ACCESS read-only``DESCRIPTION`

"Write access is not required."

`OBJECT mplsLdpEntityMaxPduLength``MIN-ACCESS read-only`

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityKeepAliveHoldTimer

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

Expires April 2003

[Page 48]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

OBJECT mplsLdpEntityHelloHoldTimer

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityInitSesThreshold

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityLabelDistMethod

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityLabelRetentionMode

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityPathVectorLimit

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityHopCountLimit

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityTargetPeer

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityTargetPeerAddrType
SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required.
An implementation is only required to support
'unknown(0)', and IPv4 addresses. Supporting
IPv6 addresses is optional."

OBJECT mplsLdpEntityTargetPeerAddr
SYNTAX InetAddress (SIZE(0|4|16))
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required.
An implementation is only required to support IPv4 and

Expires April 2003

[Page 49]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

may optionally support IPv6 addresses."

OBJECT mplsLdpEntityLabelType
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT mplsLdpEntityStorageType
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT mplsLdpEntityRowStatus
SYNTAX RowStatus { active(1) }
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required, and active is the
only status that needs to be supported."

OBJECT mplsFecType
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT mplsFecAddrLength
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT mplsFecAddrFamily
SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required.
 An implementation is only required to support
 'unknown(0)', and IPv4 addresses. Supporting
 IPv6 addresses is optional."

OBJECT mplsFecAddr
SYNTAX InetAddress (SIZE(0|4|16))
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required.
 An implementation is only required to support IPv4 and
 may optionally support IPv6 addresses."

OBJECT mplsFecStorageType
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

Expires April 2003

[Page 50]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

OBJECT mplsFecRowStatus
SYNTAX RowStatus { active(1) }
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required, and active is the
 only status that needs to be supported."

OBJECT mplsLdpLspFecRowStatus
SYNTAX RowStatus { active(1) }
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required, and active is the
 only status that needs to be supported."

OBJECT mplsLdpSesPeerNextHopAddrType
SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }
DESCRIPTION
 "An implementation is only required to support
 'unknown(0)', and IPv4 addresses. Supporting

IPv6 addresses is optional."

OBJECT mplsLdpSesPeerNextHopAddr

SYNTAX InetAddress (SIZE(0|4|16))

DESCRIPTION

"An implementation is only required to support IPv4
and may optionally support IPv6 addresses."

::= { mplsLdpCompliances 2 }

-- units of conformance

mplsLdpGeneralGroup OBJECT-GROUP

OBJECTS {

mplsLdpLsrId,
mplsLdpLsrLoopDetectionCapable,
mplsLdpEntityLastChange,
mplsLdpEntityIndexNext,
mplsLdpEntityProtocolVersion,
mplsLdpEntityAdminStatus,
mplsLdpEntityOperStatus,
mplsLdpEntityTcpDscPort,
mplsLdpEntityUdpDscPort,
mplsLdpEntityMaxPduLength,
mplsLdpEntityKeepAliveHoldTimer,
mplsLdpEntityHelloHoldTimer,
mplsLdpEntityInitSesThreshold,
mplsLdpEntityLabelDistMethod,
mplsLdpEntityLabelRetentionMode,

Expires April 2003

[Page 51]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

mplsLdpEntityPathVectorLimit,
mplsLdpEntityHopCountLimit,
mplsLdpEntityTargetPeer,
mplsLdpEntityTargetPeerAddrType,
mplsLdpEntityTargetPeerAddr,
mplsLdpEntityLabelType,
mplsLdpEntityDiscontinuityTime,
mplsLdpEntityStorageType,
mplsLdpEntityRowStatus,
mplsLdpAttemptedSessions,
mplsLdpSesRejectedNoHelloErrors,

```

mplsLdpSesRejectedAdErrors,
mplsLdpSesRejectedMaxPduErrors,
mplsLdpSesRejectedLRErrors,
mplsLdpBadLdpIdentifierErrors,
mplsLdpBadPduLengthErrors,
mplsLdpBadMessageLengthErrors,
mplsLdpBadTlvLengthErrors,
mplsLdpMalformedTlvValueErrors,
mplsLdpKeepAliveTimerExpErrors,
mplsLdpShutdownNotifReceived,
mplsLdpShutdownNotifSent,
mplsLdpPeerLastChange,
mplsLdpPeerLabelDistMethod,
mplsLdpPeerPathVectorLimit,
mplsLdpHelloAdjHoldTimeRem,
mplsLdpHelloAdjType,
mplsLdpSesStateLastChange,
mplsLdpSesState,
mplsLdpSesProtocolVersion,
mplsLdpSesKeepAliveHoldTimeRem,
mplsLdpSesMaxPduLength,
mplsLdpSesDiscontinuityTime,
mplsLdpSesStatsUnkMesTypeErrors,
mplsLdpSesStatsUnkTlvErrors,
mplsLdpSesPeerNextHopAddrType,
mplsLdpSesPeerNextHopAddr,
mplsFecIndexNext,
mplsFecType,
mplsFecAddrFamily,
mplsFecAddrLength,
mplsFecAddr,
mplsFecStorageType,
mplsFecRowStatus,
mplsLdpLspFecOperStatus,
mplsLdpLspFecLastChange,
mplsLdpLspFecRowStatus
}
STATUS      current
DESCRIPTION

```

Expires April 2003

[Page 52]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

"Objects that apply to all MPLS LDP implementations."
::= { mplsLdpGroups 1 }

```

mplsLdpLspGroup OBJECT-GROUP

OBJECTS {

mplsLdpLspLabelType,

mplsLdpLspType

}

STATUS current

DESCRIPTION

"These objects are specific to LDP LSPs."

::= { mplsLdpGroups 2 }

mplsLdpLsrGroup OBJECT-GROUP

OBJECTS {

mplsLdpLspLsrInSegmentPointer,

mplsLdpLspLsrOutSegmentPointer,

mplsLdpLspLsrXCPointer

}

STATUS current

DESCRIPTION

"These objects are optional and only need to be supported for LDP implementations which support the following tables in the LSR MIB: mplsInSegmentTable, mplsOutSegmentTable and mplsXCTable."

::= { mplsLdpGroups 3 }

mplsLdpNotificationsGroup NOTIFICATION-GROUP

NOTIFICATIONS { mplsLdpInitSesThresholdExceeded,

mplsLdpPathVectorLimitMismatch,

mplsLdpSessionUp,

mplsLdpSessionDown

}

STATUS current

DESCRIPTION

"The notification(s) which an MPLS LDP implementation is required to implement."

::= { mplsLdpGroups 4 }

END

[4.1.](#) The MPLS-LDP-GENERIC-MIB Module

This MIB Module MUST be supported if LDP uses a Per Platform Label Space. This MIB Module contains a Label Range (LR) table for configuring Mpls Generic Label Ranges. This table is mplsLdpEntityGenericLabelRangeTable. Although the LDP Specification does not provide a way for configuring Label Ranges for Generic Labels, the MIB does provide a way to reserve a range of generic labels because this was thought to be useful by the working group.

```
MPLS-LDP-GENERIC-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    OBJECT-TYPE,  
    MODULE-IDENTITY,  
    Unsigned32  
        FROM SNMPv2-SMI
```

```
    MODULE-COMPLIANCE,  
    OBJECT-GROUP  
        FROM SNMPv2-CONF
```

```
    RowStatus,  
    StorageType  
        FROM SNMPv2-TC
```

```
    InterfaceIndexOrZero  
        FROM IF-MIB
```

```
    mplsMIB  
        FROM MPLS-TC-MIB
```

```
    mplsLdpEntityObjects,  
    mplsLdpEntityLdpId,  
    mplsLdpEntityIndex  
        FROM MPLS-LDP-MIB
```

```
;
```

```
mplsLdpGenericMIB MODULE-IDENTITY  
    LAST-UPDATED "200208081200Z" -- 8 August 2002  
    ORGANIZATION "Multiprotocol Label Switching (mpls)  
                  Working Group"  
    CONTACT-INFO
```

"Joan Cucchiara (jcucchiara@crescentnetworks.com)
Crescent Networks

Expires April 2003

[Page 54]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

Hans Sjostrand (hans@ipunplugged.com)
ipUnplugged

James V. Luciani (jluciani@crescentnetworks.com)
Crescent Networks

Working Group Chairs:

George Swallow, email: swallow@cisco.com

Loa Andersson, email: loa.andersson@utfors.se

MPLS Working Group, email: mpls@uu.net

"

DESCRIPTION

"This MIB contains managed object definitions for the
'Multiprotocol Label Switching, Label Distribution
Protocol, LDP' document which use as their Layer 2
ethernet."

REVISION "200208081200Z" -- 8 August 2002

DESCRIPTION

"Initial version published as part of RFC XXXX."

::= { mplsMIB 6 } -- to be assigned

--*****

mplsLdpGenericObjects

OBJECT IDENTIFIER ::= { mplsLdpGenericMIB 1 }

mplsLdpGenericConformance

OBJECT IDENTIFIER ::= { mplsLdpGenericMIB 3 }

--*****

-- MPLS LDP GENERIC Objects

--*****

--

-- Ldp Entity Objects for Generic Labels

--

```
mplsLdpEntityGenericObjects OBJECT IDENTIFIER ::=
    { mplsLdpEntityObjects 5 }
```

```
--
```

```
-- The MPLS LDP Entity Generic Label Range Table
```

```
--
```

```
mplsLdpEntityGenLRTable OBJECT-TYPE
```

Expires April 2003

[Page 55]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

SYNTAX SEQUENCE OF MplsLdpEntityGenLREntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The MPLS LDP Entity Generic Label Range
Table.

The purpose of this table is to provide a mechanism
for configuring a contiguous range of generic labels,
or a 'label range' for LDP Entities.

LDP Entities which use Generic Labels must have at least
one entry in this table."

```
::= { mplsLdpEntityGenericObjects 1 }
```

```
mplsLdpEntityGenLREntry OBJECT-TYPE
```

SYNTAX MplsLdpEntityGenLREntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A row in the LDP Entity Generic Label
Range Table. One entry in this table contains
information on a single range of labels
represented by the configured Upper and Lower
Bounds pairs. NOTE: there is NO corresponding
LDP message which relates to the information
in this table, however, this table does provide
a way for a user to 'reserve' a generic label
range.

NOTE: The ranges for a specific LDP Entity
are UNIQUE and non-overlapping.

A row will not be created unless a unique and non-overlapping range is specified."

```

INDEX      {  mplsLdpEntityLdpId,
               mplsLdpEntityIndex,
               mplsLdpEntityGenLRMin,
               mplsLdpEntityGenLRMax
             }
 ::= { mplsLdpEntityGenLRTable 1 }

```

```

MplsLdpEntityGenLREntry ::= SEQUENCE {
    mplsLdpEntityGenLRMin      Unsigned32,
    mplsLdpEntityGenLRMax      Unsigned32,
    mplsLdpEntityGenIfIndexOrZero  InterfaceIndexOrZero,
    mplsLdpEntityGenLRStorageType  StorageType,
    mplsLdpEntityGenLRRowStatus    RowStatus
}

```

Expires April 2003

[Page 56]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

mplsLdpEntityGenLRMin OBJECT-TYPE
    SYNTAX      Unsigned32(0..1048575)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The minimum label configured for this range."
    ::= { mplsLdpEntityGenLREntry 1 }

```

```

mplsLdpEntityGenLRMax OBJECT-TYPE
    SYNTAX      Unsigned32(0..1048575)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The maximum label configured for this range."
    ::= { mplsLdpEntityGenLREntry 2 }

```

```

mplsLdpEntityGenIfIndexOrZero OBJECT-TYPE
    SYNTAX      InterfaceIndexOrZero
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        "This value represents either the InterfaceIndex of
        the 'ifLayer' where these Generic Label would be created,
        or 0 (zero). The value of zero means that the
        InterfaceIndex is not known. For example, if

```

the InterfaceIndex is created subsequent to the Generic Label's creation, then it would not be known. However, if the InterfaceIndex is known, then it must be represented by this value.

If an InterfaceIndex becomes known, then the network management entity (e.g. SNMP agent) responsible for this object MUST change the value from 0 (zero) to the value of the InterfaceIndex."

::= { mplsLdpEntityGenLREntry 3 }

mplsLdpEntityGenLRStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type for this entry."

::= { mplsLdpEntityGenLREntry 4 }

mplsLdpEntityGenLRRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"An object that allows entries in this

Expires April 2003

[Page 57]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

table to be created and deleted using the RowStatus convention.

There must exist at least one entry in this table for every LDP Entity that has a generic label configured.

NOTE: This RowStatus object should have the same value of the 'mplsLdpEntityRowStatus' related to this entry."

::= { mplsLdpEntityGenLREntry 5 }

--*****

-- Module Conformance Statement

--*****

```

mplsLdpGenericGroups
    OBJECT IDENTIFIER ::= { mplsLdpGenericConformance 1 }

mplsLdpGenericCompliances
    OBJECT IDENTIFIER ::= { mplsLdpGenericConformance 2 }

--
-- Full Compliance
--

mplsLdpGenModuleFullCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The Module is implemented with support for
        read-create and read-write.  In other words,
        both monitoring and configuration
        are available when using this MODULE-COMPLIANCE."
    MODULE -- this module
        MANDATORY-GROUPS {
            mplsLdpGenericGroup
        }

    OBJECT      mplsLdpEntityGenLRRowStatus
    SYNTAX      RowStatus { active(1) }
    WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }
    DESCRIPTION
        "Support for createAndWait and notInService is not required."

    ::= { mplsLdpGenericCompliances 1 }

--
-- Read-Only Compliance

```

Expires April 2003

[Page 58]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

--

mplsLdpGenModuleROCompliance MODULE-COMPLIANCE
    STATUS current
    DESCRIPTION
        "The Module is implemented with support for
        read-only.  In other words, only monitoring
        is available by implementing this MODULE-COMPLIANCE."
    MODULE -- this module

```

```

MANDATORY-GROUPS    {
                        mplsLdpGenericGroup
                      }

OBJECT               mplsLdpEntityGenIfIndexOrZero
MIN-ACCESS           read-only
DESCRIPTION
    "Write access is not required."

OBJECT               mplsLdpEntityGenLRStorageType
MIN-ACCESS           read-only
DESCRIPTION
    "Write access is not required."

OBJECT               mplsLdpEntityGenLRRowStatus
SYNTAX               RowStatus { active(1) }
MIN-ACCESS           read-only
DESCRIPTION
    "Write access is not required, and active is the
    only status that needs to be supported."

 ::= { mplsLdpGenericCompliances 2 }

--
-- units of conformance
--

mplsLdpGenericGroup OBJECT-GROUP
OBJECTS {
    mplsLdpEntityGenIfIndexOrZero,
    mplsLdpEntityGenLRStorageType,
    mplsLdpEntityGenLRRowStatus
}
STATUS      current
DESCRIPTION
    "Objects that apply to all MPLS LDP implementations
    using Generic Lables."
 ::= { mplsLdpGenericGroups 1 }

```

[4.2.](#) The MPLS-LDP-ATM-MIB Module

This MIB Module MUST be supported if LDP uses ATM as the Layer 2 media. There are three tables in this MIB Module. Two tables are for configuring LDP to use ATM. These tables are the `mplsLdpEntityAtmParmsTable` and the `mplsLdpEntityAtmLabelRangeTable`.

The `mplsLdpEntityAtmParmsTable` provides a way to configure information which would be contained in the "Optional Parameter" portion of an LDP PDU Initialization Message.

The `mplsLdpEntityAtmLabelRangeTable` provides a way to configure information which would be contained in the "ATM Label Range Components" portion of an LDP PDU Initialization Message, see [\[RFC3035\]](#) and [\[RFC3036\]](#).

[4.2.1.](#) The LDP ATM Session Table

The MPLS LDP ATM Session Table is a read-only table which contains session information specific to ATM.

```
MPLS-LDP-ATM-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    OBJECT-TYPE, MODULE-IDENTITY,  
    Unsigned32  
        FROM SNMPv2-SMI  
    MODULE-COMPLIANCE, OBJECT-GROUP  
        FROM SNMPv2-CONF
```

```
    RowStatus,  
    StorageType  
        FROM SNMPv2-TC
```

```
    InterfaceIndexOrZero  
        FROM IF-MIB
```

AtmVpIdentifier
FROM ATM-TC-MIB

mplsMIB,
MplsAtmVcIdentifier
FROM MPLS-TC-MIB

mplsLdpEntityObjects,
mplsLdpSessionObjects,
mplsLdpEntityLdpId,
mplsLdpEntityIndex,
mplsLdpPeerLdpId
FROM MPLS-LDP-MIB

;

mplsLdpAtmMIB MODULE-IDENTITY

LAST-UPDATED "200208081200Z" -- 8 August 2002

ORGANIZATION "Multiprotocol Label Switching (mpls)
Working Group"

CONTACT-INFO

"Joan Cucchiara (jcucchiara@crescentnetworks.com)
Crescent Networks

Hans Sjostrand (hans@ipunplugged.com)
ipUnplugged

James V. Luciani (jluciani@crescentnetworks.com)
Crescent Networks

Working Group Chairs:

George Swallow, email: swallow@cisco.com

Loa Andersson, email: loa.andersson@utfors.se

MPLS Working Group, email: mpls@uu.net

"

DESCRIPTION

"This MIB contains managed object definitions for the
'Multiprotocol Label Switching, Label Distribution
Protocol, LDP' document."

REVISION "200208081200Z" -- 8 August 2002

DESCRIPTION

"Initial version published as part of RFC XXXX."

::= { mplsMIB 4 } -- to be assigned

--*****

Expires April 2003

[Page 61]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```
mplsLdpAtmObjects      OBJECT IDENTIFIER ::= { mplsLdpAtmMIB 1 }
mplsLdpAtmNotifications OBJECT IDENTIFIER ::= { mplsLdpAtmMIB 2 }
mplsLdpAtmConformance  OBJECT IDENTIFIER ::= { mplsLdpAtmMIB 3 }
```

--*****

-- MPLS LDP Frame Relay Objects

--*****

--

-- Ldp Entity Objects for ATM

--

```
mplsLdpEntityAtmObjects OBJECT IDENTIFIER ::=
                        { mplsLdpEntityObjects 6 }
```

```
mplsLdpEntityAtmParmsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MplsLdpEntityAtmParmsEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains information about the
        ATM specific information which could be used
        in the 'Optional Parameters' and other ATM specific
        information."
    ::= { mplsLdpEntityAtmObjects 1 }
```

```
mplsLdpEntityAtmParmsEntry OBJECT-TYPE
    SYNTAX      MplsLdpEntityAtmParmsEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "An entry in this table represents the ATM parameters
        and ATM information for this LDP entity."
    INDEX       { mplsLdpEntityLdpId,
                  mplsLdpEntityIndex
                }
    ::= { mplsLdpEntityAtmParmsTable 1 }
```

```

MplsLdpEntityAtmParmsEntry ::= SEQUENCE {
    mplsLdpEntityAtmIfIndexOrZero      InterfaceIndexOrZero,
    mplsLdpEntityAtmMergeCap            INTEGER,
    mplsLdpEntityAtmLRComponents        Unsigned32,
    mplsLdpEntityAtmVcDirectionality    INTEGER,
    mplsLdpEntityAtmLsrConnectivity     INTEGER,
    mplsLdpEntityDefaultControlVpi      AtmVpIdentifier,
    mplsLdpEntityDefaultControlVci      MplsAtmVcIdentifier,
    mplsLdpEntityUnlabTrafVpi           AtmVpIdentifier,
    mplsLdpEntityUnlabTrafVci           MplsAtmVcIdentifier,

```

Expires April 2003

[Page 62]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

    mplsLdpEntityAtmStorageType      StorageType,
    mplsLdpEntityAtmRowStatus        RowStatus
}

```

mplsLdpEntityAtmIfIndexOrZero OBJECT-TYPE

```

SYNTAX      InterfaceIndexOrZero
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION

```

"This value represents either the InterfaceIndex of the 'ifLayer' where the ATM Labels 'owned' by this entry were created, or 0 (zero). The value of zero means that the InterfaceIndex is not known. For example, if the InterfaceIndex is created subsequent to the ATM Label's creation, then it would not be known. However, if the InterfaceIndex is known, then it must be represented by this value.

If an InterfaceIndex becomes known, then the network management entity (e.g. SNMP agent) responsible for this object MUST change the value from 0 (zero) to the value of the InterfaceIndex. If an ATM Label is being used in forwarding data, then the value of this object MUST be the InterfaceIndex."

```
 ::= { mplsLdpEntityAtmParmsEntry 1 }
```

mplsLdpEntityAtmMergeCap OBJECT-TYPE

```

SYNTAX      INTEGER {
                    notSupported(0),
                    vcMerge(2)

```



```

    }
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION
        "Denotes the Merge Capability of this Entity."
    ::= { mplsLdpEntityAtmParmsEntry 2 }

```

```

mplsLdpEntityAtmLRComponents OBJECT-TYPE
    SYNTAX        Unsigned32 (1..65535)
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION
        "Number of Label Range Components in the Initialization
        message. This also represents the number of entries
        in the mplsLdpEntityAtmLRTable which correspond
        to this entry."
    ::= { mplsLdpEntityAtmParmsEntry 3 }

```

Expires April 2003

[Page 63]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

mplsLdpEntityAtmVcDirectionality OBJECT-TYPE
    SYNTAX        INTEGER {
                                bidirectional(0),
                                unidirectional(1)
                            }
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION
        "If the value of this object is 'bidirectional(0)',
        a given VCI, within a given VPI, is used as a
        label for both directions independently.

        If the value of this object is 'unidirectional(1)',
        a given VCI within a VPI designates one direction."
    ::= { mplsLdpEntityAtmParmsEntry 4 }

```

```

mplsLdpEntityAtmLsrConnectivity OBJECT-TYPE
    SYNTAX        INTEGER {
                                direct(1),
                                indirect(2)
                            }
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION

```

"The peer LSR may be connected indirectly by means of an ATM VP so that the VPI values may be different on either endpoint so the label MUST be encoded entirely within the VCI field."

DEFVAL { direct }

::= { mplsLdpEntityAtmParmsEntry 5 }

mplsLdpEntityDefaultControlVpi OBJECT-TYPE

SYNTAX AtmVpIdentifier

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The default VPI value for the non-MPLS connection. The default value of this is 0 (zero) but other values may be configured. This object allows a different value to be configured."

DEFVAL

{ 0 }

::= { mplsLdpEntityAtmParmsEntry 6 }

mplsLdpEntityDefaultControlVci OBJECT-TYPE

SYNTAX MplsAtmVcIdentifier

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The Default VCI value for a non-MPLS connection. The

Expires April 2003

[Page 64]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

default value of this is 32 but other values may be configured. This object allows a different value to be configured."

DEFVAL

{ 32 }

::= { mplsLdpEntityAtmParmsEntry 7 }

mplsLdpEntityUnlabTrafVpi OBJECT-TYPE

SYNTAX AtmVpIdentifier

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"VPI value of the VCC supporting unlabeled traffic. This non-MPLS connection is used to carry unlabeled (IP) packets. The default value is the same as the default value of the 'mplsLdpEntityDefaultControlVpi', however

```

        another value may be configured."
DEFVAL { 0 }
::= { mplsLdpEntityAtmParmsEntry 8 }

mplsLdpEntityUnlabTrafVci OBJECT-TYPE
    SYNTAX      MplsAtmVcIdentifier
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "VCI value of the VCC supporting unlabeled traffic.
        This non-MPLS connection is used to carry unlabeled (IP)
        packets. The default value is the same as the default
        value of the 'mplsLdpEntityDefaultControlVci', however
        another value may be configured."
    DEFVAL { 32 }
    ::= { mplsLdpEntityAtmParmsEntry 9 }

mplsLdpEntityAtmStorageType OBJECT-TYPE
    SYNTAX      StorageType
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "The storage type for this entry."
    ::= { mplsLdpEntityAtmParmsEntry 10 }

mplsLdpEntityAtmRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "An object that allows entries in this table to
        be created and deleted using the
        RowStatus convention."

```

```

    NOTE: This RowStatus object should
    have the same value of the 'mplsLdpEntityRowStatus'
    related to this entry."
    ::= { mplsLdpEntityAtmParmsEntry 11 }

```

```

--
-- The MPLS LDP Entity ATM Label Range Table
--

```

mplsLdpEntityAtmLRTable OBJECT-TYPE
 SYNTAX SEQUENCE OF MplsLdpEntityAtmLREntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "The MPLS LDP Entity ATM Label Range Table.
 The purpose of this table is to provide a mechanism
 for configuring a contiguous range of vpi's
 with a contiguous range of vci's, or a 'label range'
 for LDP Entities.

 LDP Entities which use ATM must have at least one
 entry in this table."

::= { mplsLdpEntityAtmObjects 2 }

mplsLdpEntityAtmLREntry OBJECT-TYPE
 SYNTAX MplsLdpEntityAtmLREntry
 MAX-ACCESS not-accessible
 STATUS current
 DESCRIPTION
 "A row in the LDP Entity ATM Label
 Range Table. One entry in this table contains
 information on a single range of labels
 represented by the configured Upper and Lower
 Bounds VPI/VCi pairs. These are the same
 data used in the Initialization Message.

 NOTE: The ranges for a specific LDP Entity
 are UNIQUE and non-overlapping. For example,
 for a specific LDP Entity index, there could
 be one entry having LowerBound vpi/vci == 0/32, and
 UpperBound vpi/vci == 0/100, and a second entry
 for this same interface with LowerBound
 vpi/vci == 0/101 and UpperBound vpi/vci == 0/200.
 However, there could not be a third entry with
 LowerBound vpi/vci == 0/200 and
 UpperBound vpi/vci == 0/300 because this label
 range overlaps with the second entry (i.e. both
 entries now have 0/200).

A row will not be created unless a unique and

non-overlapping range is specified. Thus, row

creation implies a one-shot row creation of LDP EntityID and LowerBound vpi/vci and UpperBound vpi/vci. At least one label range entry for a specific LDP Entity MUST include the default VPI/VCI values denoted in the LDP Entity Table."

```
INDEX      { mplsLdpEntityLdpId,
              mplsLdpEntityIndex,
              mplsLdpEntityAtmLRMinVpi,
              mplsLdpEntityAtmLRMinVci
            }
::= { mplsLdpEntityAtmLRTable 1 }
```

```
MplsLdpEntityAtmLREntry ::= SEQUENCE {
    mplsLdpEntityAtmLRMinVpi      AtmVpIdentifier,
    mplsLdpEntityAtmLRMinVci      MplsAtmVcIdentifier,
    mplsLdpEntityAtmLRMaxVpi      AtmVpIdentifier,
    mplsLdpEntityAtmLRMaxVci      MplsAtmVcIdentifier,
    mplsLdpEntityAtmLRStorageType  StorageType,
    mplsLdpEntityAtmLRRowStatus    RowStatus
}
```

```
mplsLdpEntityAtmLRMinVpi OBJECT-TYPE
    SYNTAX AtmVpIdentifier
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The minimum VPI number configured for this range."
    ::= { mplsLdpEntityAtmLREntry 1 }
```

```
mplsLdpEntityAtmLRMinVci OBJECT-TYPE
    SYNTAX MplsAtmVcIdentifier
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The minimum VCI number configured for this range."
    ::= { mplsLdpEntityAtmLREntry 2 }
```

```
mplsLdpEntityAtmLRMaxVpi OBJECT-TYPE
    SYNTAX AtmVpIdentifier
    MAX-ACCESS read-create
    STATUS current
    DESCRIPTION
        "The maximum VPI number configured for this range."
    ::= { mplsLdpEntityAtmLREntry 3 }
```

```
mplsLdpEntityAtmLRMaxVci OBJECT-TYPE
    SYNTAX MplsAtmVcIdentifier
    MAX-ACCESS read-create
```

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```
STATUS current
DESCRIPTION
    "The maximum VCI number configured for this range."
 ::= { mplsLdpEntityAtmLREntry 4 }
```

```
mplsLdpEntityAtmLRStorageType OBJECT-TYPE
SYNTAX      StorageType
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "The storage type for this entry."
 ::= { mplsLdpEntityAtmLREntry 5 }
```

```
mplsLdpEntityAtmLRRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
    "An object that allows entries in this
     table to be created and deleted using
     the RowStatus convention.

    There must exist at least one entry in this
    table for every LDP Entity that has
    'mplsLdpEntityOptionalParameters' object with
    a value of 'atmSessionParameters'.
```

```
NOTE: This RowStatus object should
      have the same value of the 'mplsLdpEntityRowStatus'
      related to this entry."
 ::= { mplsLdpEntityAtmLREntry 6 }
```

```
--
-- MPLS LDP ATM Session Information
--
```

```
mplsLdpAtmSesTable OBJECT-TYPE
SYNTAX      SEQUENCE OF MplsLdpAtmSesEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
    "A table which relates Sessions in the
     'mplsLdpSessionTable' and their label
```

range intersections. There could be one or more label range intersections between an LDP Entity and LDP Peer using ATM as the underlying media. Each row represents a single label range intersection.

NOTE: this table cannot use the 'AUGMENTS'

Expires April 2003

[Page 68]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

clause because there is not necessarily a one-to-one mapping between this table and the mplsLdpSessionTable."
 ::= { mplsLdpSessionObjects 10 }

mplsLdpAtmSesEntry OBJECT-TYPE

SYNTAX MplsLdpAtmSesEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table represents information on a single label range intersection between an LDP Entity and LDP Peer.

The information contained in a row is read-only."

INDEX { mplsLdpEntityLdpId,
 mplsLdpEntityIndex,
 mplsLdpPeerLdpId,
 mplsLdpSesAtmLRLowerBoundVpi,
 mplsLdpSesAtmLRLowerBoundVci
 }

::= { mplsLdpAtmSesTable 1 }

MplsLdpAtmSesEntry ::= SEQUENCE {

mplsLdpSesAtmLRLowerBoundVpi AtmVpIdentifier,

mplsLdpSesAtmLRLowerBoundVci MplsAtmVcIdentifier,

mplsLdpSesAtmLRUpperBoundVpi AtmVpIdentifier,

mplsLdpSesAtmLRUpperBoundVci MplsAtmVcIdentifier

}

mplsLdpSesAtmLRLowerBoundVpi OBJECT-TYPE

SYNTAX AtmVpIdentifier

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

```
        "The minimum VPI number for this range."
 ::= { mplsLdpAtmSesEntry 1 }
```

```
mplsLdpSesAtmLRLowerBoundVci OBJECT-TYPE
    SYNTAX MplsAtmVcIdentifier
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "The minimum VCI number for this range."
 ::= { mplsLdpAtmSesEntry 2 }
```

```
mplsLdpSesAtmLRUpperBoundVpi OBJECT-TYPE
    SYNTAX AtmVpIdentifier
    MAX-ACCESS read-only
    STATUS current
```

Expires April 2003

[Page 69]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```
DESCRIPTION
    "The maximum VPI number for this range."
 ::= { mplsLdpAtmSesEntry 3 }
```

```
mplsLdpSesAtmLRUpperBoundVci OBJECT-TYPE
    SYNTAX MplsAtmVcIdentifier
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The maximum VCI number for this range."
 ::= { mplsLdpAtmSesEntry 4 }
```

```
--*****
-- Module Conformance Statement
--*****
```

```
mplsLdpAtmGroups
    OBJECT IDENTIFIER ::= { mplsLdpAtmConformance 1 }
```

```
mplsLdpAtmCompliances
    OBJECT IDENTIFIER ::= { mplsLdpAtmConformance 2 }
```

```
--
-- Full Compliance
--
```

```
mplsLdpAtmModuleFullCompliance MODULE-COMPLIANCE
```



```

STATUS current
DESCRIPTION
    "The Module is implemented with support for
    read-create and read-write.  In other words,
    both monitoring and configuration
    are available when using this MODULE-COMPLIANCE."
MODULE -- this module
MANDATORY-GROUPS    {
                        mplsLdpAtmGroup
                    }

OBJECT      mplsLdpEntityAtmRowStatus
SYNTAX      RowStatus { active(1) }
WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }
DESCRIPTION
    "Support for createAndWait and notInService is not required."

OBJECT      mplsLdpEntityAtmLRRowStatus
SYNTAX      RowStatus { active(1) }
WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }
DESCRIPTION
    "Support for createAndWait and notInService is not required."

```

Expires April 2003

[Page 70]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

 ::= { mplsLdpAtmCompliances 1 }

--
-- Read-Only Compliance
--

mplsLdpAtmModuleROCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
    "The Module is implemented with support for
    read-only.  In other words, only monitoring
    is available by implementing this MODULE-COMPLIANCE."
MODULE -- this module
MANDATORY-GROUPS    {
                        mplsLdpAtmGroup
                    }

OBJECT      mplsLdpEntityAtmIfIndexOrZero

```

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmMergeCap

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmLRComponents

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmVcDirectionality

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmLsrConnectivity

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityDefaultControlVpi

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityDefaultControlVci

MIN-ACCESS read-only

Expires April 2003

[Page 71]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityUnlabTrafVpi

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityUnlabTrafVci

MIN-ACCESS read-only

DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmStorageType
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmRowStatus
SYNTAX RowStatus { active(1) }
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required, and active is the
only status that needs to be supported."

OBJECT mplsLdpEntityAtmLRMaxVpi
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmLRMaxVci
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmLRStorageType
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required."

OBJECT mplsLdpEntityAtmLRRowStatus
SYNTAX RowStatus { active(1) }
MIN-ACCESS read-only
DESCRIPTION

"Write access is not required, and active is the
only status that needs to be supported."

::= { mplsLdpAtmCompliances 2 }

```

mplsLdpAtmGroup OBJECT-GROUP
    OBJECTS {
        mplsLdpEntityAtmIfIndexOrZero,
        mplsLdpEntityAtmMergeCap,
        mplsLdpEntityAtmLRComponents,
        mplsLdpEntityAtmVcDirectionality,
        mplsLdpEntityAtmLsrConnectivity,
        mplsLdpEntityDefaultControlVpi,
        mplsLdpEntityDefaultControlVci,
        mplsLdpEntityUnlabTrafVpi,
        mplsLdpEntityUnlabTrafVci,
        mplsLdpEntityAtmStorageType,
        mplsLdpEntityAtmRowStatus,
        mplsLdpEntityAtmLRMaxVpi,
        mplsLdpEntityAtmLRMaxVci,
        mplsLdpEntityAtmLRStorageType,
        mplsLdpEntityAtmLRRowStatus,
        mplsLdpSesAtmLRUpperBoundVpi,
        mplsLdpSesAtmLRUpperBoundVci
    }
    STATUS      current
    DESCRIPTION
        "Objects that apply to all MPLS LDP implementations
        using ATM as the Layer 2."
        ::= { mplsLdpAtmGroups 1 }

END

```

[4.3.](#) The MPLS-LDP-FRAME-RELAY-MIB Module

This MIB Module MUST be supported if LDP uses FRAME RELAY as the Layer 2 media. There are three tables in this MIB Module. Two tables are to configure LDP for using Frame Relay. These tables are the mplsLdpEntityFrameRelayParmsTable and the mplsLdpEntityFrLabelRangeTable.

The mplsLdpEntityFrameRelayParmsTable provides a way to configure information which would be contained in the "Optional Parameter" portion of an LDP PDU Initialization Message.

The mplsLdpEntityFrLabelRangeTable provides a way to configure information which would be contained in the "Frame Relay Label Range

Components" portion of an LDP PDU Initialization Message, see [\[RFC3034\]](#) and [\[RFC3036\]](#).

[4.3.1.](#) The LDP Frame Relay Session Table

The MPLS LDP Frame Relay Session Table is a read-only table which contains session information specific to Frame Relay.

```
MPLS-LDP-FRAME-RELAY-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    OBJECT-TYPE,  
    MODULE-IDENTITY,  
    Integer32,  
    Unsigned32  
        FROM SNMPv2-SMI  
    MODULE-COMPLIANCE,  
    OBJECT-GROUP  
        FROM SNMPv2-CONF
```

```
    RowStatus,  
    StorageType  
        FROM SNMPv2-TC
```

```
    InterfaceIndexOrZero  
        FROM IF-MIB
```

```
    mplsMIB  
        FROM MPLS-TC-MIB
```

```
    mplsLdpEntityObjects,  
    mplsLdpSessionObjects,  
    mplsLdpEntityLdpId,  
    mplsLdpEntityIndex,  
    mplsLdpPeerLdpId  
        FROM MPLS-LDP-MIB
```

```
;
```

```
mplsLdpFrameRelayMIB MODULE-IDENTITY
```

```
    LAST-UPDATED "200208081200Z" -- 8 August 2002
```

ORGANIZATION "Multiprotocol Label Switching (mpls)
Working Group"
CONTACT-INFO

Expires April 2003

[Page 74]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

"Joan Cucchiara (jcucchiara@crescentnetworks.com)
Crescent Networks

Hans Sjostrand (hans@ipunplugged.com)
ipUnplugged

James V. Luciani (jluciani@crescentnetworks.com)
Crescent Networks

Working Group Chairs:
George Swallow, email: swallow@cisco.com
Loa Andersson, email: loa.andersson@utfors.se

MPLS Working Group, email: mpls@uu.net

"

DESCRIPTION

"This MIB contains managed object definitions for the
'Multiprotocol Label Switching, Label Distribution
Protocol, LDP' document."

REVISION "200208081200Z" -- 8 August 2002

DESCRIPTION

"Initial version published as part of RFC XXXX."

::= { mplsMIB 5 } -- to be assigned

--*****

mplsLdpFrameRelayObjects

OBJECT IDENTIFIER ::= { mplsLdpFrameRelayMIB 1 }

mplsLdpFrameRelayNotifications

OBJECT IDENTIFIER ::= { mplsLdpFrameRelayMIB 2 }

mplsLdpFrameRelayConformance

OBJECT IDENTIFIER ::= { mplsLdpFrameRelayMIB 3 }

--*****

-- MPLS LDP Frame Relay Objects

--*****

```
--
-- Ldp Entity Objects for Frame Relay
--

mplsLdpEntityFrameRelayObjects OBJECT IDENTIFIER ::=
    { mplsLdpEntityObjects 7 }

mplsLdpEntityFrParmsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF MplsLdpEntityFrParmsEntry
    MAX-ACCESS   not-accessible
```

Expires April 2003

[Page 75]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```
STATUS      current
DESCRIPTION
    "This table contains information about the
    Optional Parameters to specify what this Entity is
    going to specify for Frame Relay specific
    LDP Initialization Messages."
 ::= { mplsLdpEntityFrameRelayObjects 1 }

mplsLdpEntityFrParmsEntry OBJECT-TYPE
    SYNTAX      MplsLdpEntityFrParmsEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "An entry in this table represents the Frame Relay
        optional parameters associated with the LDP entity."
    INDEX      { mplsLdpEntityLdpId,
                 mplsLdpEntityIndex
               }
    ::= { mplsLdpEntityFrParmsTable 1 }

MplsLdpEntityFrParmsEntry ::= SEQUENCE {
    mplsLdpEntityFrIfIndexOrZero      InterfaceIndexOrZero,
    mplsLdpEntityFrMergeCap           INTEGER,
    mplsLdpEntityFrLRComponents       Unsigned32,
    mplsLdpEntityFrLength             INTEGER,
    mplsLdpEntityFrVcDirectionality  INTEGER,
    mplsLdpEntityFrStorageType        StorageType,
    mplsLdpEntityFrRowStatus          RowStatus
}

mplsLdpEntityFrIfIndexOrZero OBJECT-TYPE
```

SYNTAX InterfaceIndexOrZero
MAX-ACCESS read-create
STATUS current
DESCRIPTION

"This value represents either the InterfaceIndex of the 'ifLayer' where the Frame Relay Labels 'owned' by this entry were created, or 0 (zero). The value of zero means that the InterfaceIndex is not known. For example, if the InterfaceIndex is created subsequent to the Frame Relay Label's creation, then it would not be known. However, if the InterfaceIndex is known, then it must be represented by this value.

If an InterfaceIndex becomes known, then the network management entity (e.g. SNMP agent) responsible for this object MUST change the value from 0 (zero) to the value of the InterfaceIndex. If an Frame Relay Label is being used in forwarding data, then the value of this object MUST be the InterfaceIndex."

Expires April 2003

[Page 76]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

::= { mplsLdpEntityFrParmsEntry 1 }

mplsLdpEntityFrMergeCap OBJECT-TYPE

SYNTAX INTEGER {
 notSupported(0),
 supported(1)
 }

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"This represents whether or not Frame Relay merge capability is supported."

::= { mplsLdpEntityFrParmsEntry 2 }

mplsLdpEntityFrLRComponents OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Number of LabelRange Components in the Initialization message. This also represents the number of entries in the mplsLdpEntityConfFrLRTable which correspond to this entry."


```

 ::= { mplsLdpEntityFrParmsEntry 3 }

mplsLdpEntityFrLength OBJECT-TYPE
    SYNTAX      INTEGER {
                    tenDlciBits(0),
                    twentyThreeDlciBits(2)
                }
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "This object specifies the length of the DLCI bits."
    ::= { mplsLdpEntityFrParmsEntry 4 }

mplsLdpEntityFrVcDirectionality OBJECT-TYPE
    SYNTAX      INTEGER {
                    bidirectional(0),
                    unidirection(1)
                }
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "If the value of this object is 'bidirectional(0)', then
        the LSR supports the use of a given DLCI as a label for
        both directions independently.  If the value of
        this object is 'unidirectional(1)', then the LSR
        uses the given DLCI as a label in only one direction."
    ::= { mplsLdpEntityFrParmsEntry 5 }

```

Expires April 2003

[Page 77]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```

mplsLdpEntityFrStorageType OBJECT-TYPE
    SYNTAX      StorageType
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "The storage type for this entry."
    ::= { mplsLdpEntityFrParmsEntry 6 }

```

```

mplsLdpEntityFrRowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS   read-create
    STATUS       current
    DESCRIPTION
        "An object that allows entries in this table to

```

be created and deleted using the
RowStatus convention.

NOTE: This RowStatus object should
have the same value of the 'mplsLdpEntityRowStatus'
related to this entry."

::= { mplsLdpEntityFrParmsEntry 7 }

--

-- Frame Relay Label Range Components

--

mplsLdpEntityFrLRTable OBJECT-TYPE

SYNTAX SEQUENCE OF MplsLdpEntityFrLREntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains information about the
Optional Parameters to specify what this Entity is
going to specify for Frame Relay specific
LDP Initialization Messages."

::= { mplsLdpEntityFrameRelayObjects 2 }

mplsLdpEntityFrLREntry OBJECT-TYPE

SYNTAX MplsLdpEntityFrLREntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table represents the Frame Relay
optional parameters associated with the LDP entity."

INDEX { mplsLdpEntityLdpId,
mplsLdpEntityIndex,
mplsLdpEntityFrLRMinDlci
}

Expires April 2003

[Page 78]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

::= { mplsLdpEntityFrLRTable 1 }

MplsLdpEntityFrLREntry ::= SEQUENCE {

mplsLdpEntityFrLRMinDlci

Integer32,

mplsLdpEntityFrLRMaxDlci

Integer32,

mplsLdpEntityFrLRStorageType

StorageType,

mplsLdpEntityFrLRRowStatus

RowStatus

}

mplsLdpEntityFrLRMinDlci OBJECT-TYPE

SYNTAX Integer32(0..4194303)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The lower bound which is supported. This value should be the same as that in the Frame Relay Label Range Component's Minimum DLCI field."

::= { mplsLdpEntityFrLREntry 1 }

mplsLdpEntityFrLRMaxDlci OBJECT-TYPE

SYNTAX Integer32 (0..4194303)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The upper bound which is supported. This value should be the same as that in the Frame Relay Label Range Component's Maximum DLCI field."

::= { mplsLdpEntityFrLREntry 2 }

mplsLdpEntityFrLRStorageType OBJECT-TYPE

SYNTAX StorageType

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The storage type for this entry."

::= { mplsLdpEntityFrLREntry 3 }

mplsLdpEntityFrLRRowStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"An object that allows entries in this table to be created and deleted using the RowStatus convention.

If the value of the object
'mplsLdpEntityOptionalParameters' contains the

value of 'frameRelaySessionParameters(3)' then there must be at least one corresponding entry in this table.

NOTE: This RowStatus object should have the same value of the 'mplsLdpEntityRowStatus' related to this entry."

::= { mplsLdpEntityFrLREntry 4 }

--

-- MPLS LDP Frame Relay Session Information

--

mplsLdpFrameRelaySesTable OBJECT-TYPE

SYNTAX SEQUENCE OF MplsLdpFrameRelaySesEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table of Frame Relay label range intersections between the LDP Entities and LDP Peers. Each row represents a single label range intersection.

NOTE: this table cannot use the 'AUGMENTS' clause because there is not necessarily a one-to-one mapping between this table and the mplsLdpSessionTable."

::= { mplsLdpSessionObjects 11 }

mplsLdpFrameRelaySesEntry OBJECT-TYPE

SYNTAX MplsLdpFrameRelaySesEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table represents information on a single label range intersection between an LDP Entity and LDP Peer.

The information contained in a row is read-only."

INDEX { mplsLdpEntityLdpId,
mplsLdpEntityIndex,
mplsLdpPeerLdpId,
mplsLdpFrSesMinDlci
}

::= { mplsLdpFrameRelaySesTable 1 }

MplsLdpFrameRelaySesEntry ::= SEQUENCE {

mplsLdpFrSesMinDlci Integer32,

mplsLdpFrSesMaxDlci Integer32,

mplsLdpFrSesLength INTEGER

}

INTERNET-DRAFT

MPLS LDP MIB

October 2002

```
mplsLdpFrSesMinDlci OBJECT-TYPE
    SYNTAX      Integer32(0..4194303)
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
        "The lower bound of DLCIs which are supported."
    ::= { mplsLdpFrameRelaySesEntry 1 }
```

```
mplsLdpFrSesMaxDlci OBJECT-TYPE
    SYNTAX      Integer32 (0..4194303)
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The upper bound of DLCIs which are supported."
    ::= { mplsLdpFrameRelaySesEntry 2 }
```

```
mplsLdpFrSesLength OBJECT-TYPE
    SYNTAX      INTEGER {
                    tenDlciBits(0),
                    twentyThreeDlciBits(2)
                }
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "This object specifies the DLCI bits."
    ::= { mplsLdpFrameRelaySesEntry 3 }
```

```
--*****
-- Module Conformance Statement
--*****
```

```
mplsLdpFrameRelayGroups
    OBJECT IDENTIFIER ::= { mplsLdpFrameRelayConformance 1 }
```

```
mplsLdpFrameRelayCompliances
    OBJECT IDENTIFIER ::= { mplsLdpFrameRelayConformance 2 }
```

```
--
-- Full Compliance
--
```

mplsLdpFrModuleFullCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The Module is implemented with support for read-create and read-write. In other words, both monitoring and configuration are available when using this MODULE-COMPLIANCE."

Expires April 2003

[Page 81]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

MODULE -- this module

MANDATORY-GROUPS {
mplsLdpFrameRelayGroup
}

OBJECT mplsLdpEntityFrRowStatus

SYNTAX RowStatus { active(1) }

WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }

DESCRIPTION

"Support for createAndWait and notInService is not required."

OBJECT mplsLdpEntityFrLRRowStatus

SYNTAX RowStatus { active(1) }

WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }

DESCRIPTION

"Support for createAndWait and notInService is not required."

::= { mplsLdpFrameRelayCompliances 1 }

--

-- Read-Only Compliance

--

mplsLdpFrModuleROCompliance MODULE-COMPLIANCE

STATUS current

DESCRIPTION

"The Module is implemented with support for read-only. In other words, only monitoring is available by implementing this MODULE-COMPLIANCE."

MODULE -- this module

MANDATORY-GROUPS {
mplsLdpFrameRelayGroup
}

OBJECT mplsLdpEntityFrIfIndexOrZero
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT mplsLdpEntityFrMergeCap
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT mplsLdpEntityFrLRComponents
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

Expires April 2003

[Page 82]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

OBJECT mplsLdpEntityFrLength
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT mplsLdpEntityFrVcDirectionality
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT mplsLdpEntityFrStorageType
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT mplsLdpEntityFrRowStatus
SYNTAX RowStatus { active(1) }
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required, and active is the
 only status that needs to be supported."

OBJECT mplsLdpEntityFrLRMaxDlci
MIN-ACCESS read-only
DESCRIPTION
 "Write access is not required."

OBJECT mplsLdpEntityFrLRStorageType
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required."

OBJECT mplsLdpEntityFrLRRowStatus
SYNTAX RowStatus { active(1) }
MIN-ACCESS read-only
DESCRIPTION
"Write access is not required, and active is the
only status that needs to be supported."
::= { mplsLdpFrameRelayCompliances 2 }

--
-- units of conformance
--

mplsLdpFrameRelayGroup OBJECT-GROUP
OBJECTS {
mplsLdpEntityFrIfIndexOrZero,
mplsLdpEntityFrMergeCap,
mplsLdpEntityFrLRComponents,
mplsLdpEntityFrLength,

Expires April 2003

[Page 83]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

mplsLdpEntityFrVcDirectionality,
mplsLdpEntityFrStorageType,
mplsLdpEntityFrRowStatus,
mplsLdpEntityFrLRMaxDlci,
mplsLdpEntityFrLRStorageType,
mplsLdpEntityFrLRRowStatus,
mplsLdpFrSesMaxDlci,
mplsLdpFrSesLength
}
STATUS current
DESCRIPTION
"Objects that apply to all MPLS LDP implementations over
Frame Relay."
::= { mplsLdpFrameRelayGroups 1 }

END

[5.](#) Revision History

NOTE TO RFC-Editor: before publishing this document as an RFC, please remove this Revision History (change log) section.

[5.1.](#) Changes from <[draft-ietf-mpls-ldp-mib-08.txt](#)>

The following changes are from the IESG MIB review.

Changed "Label Switch Router" to "Label Switching Router".

Spelling errors fixed (unlabelled, atttempt, subsystem).

Changed some of the enums to start at 1, instead of zero:
mplsLdpPeerLoopDetectionForPV and mplsLdpEntityOperStatus.

Added REFERENCE clauses.

Added a timestamp object for mplsLdpSesState changes.

Changed NMS to command generator as defined in [RFC2571](#).

Added a lastChange objects: mplsLdpEntityLastChange and
mplsLdpPeerLastChange.

Added TEXTUAL-CONVENTIONS for MplsLabelDistributionMethod and
MplsRetentionMode. These TCs have been incorporated into [draft-ietf-mpls-tc-mib-04.txt](#).

Divided up the one MIB MODULE into 3 additional modules for a total
of 4 MIB MODULES: 1) mplsLdpMIB, 2) mplsLdpGenericMIB which includes
objects pertaining to Ethernet as the L2, 3) mplsLdpAtmMIB which
includes objects pertaining to ATM as the L2, and 4)
mplsLdpFrameRelayMIB which includes objects pertaining to Frame Relay
as the L2.

Also, reduced the number of objects by creating the mplsLdpLspTable
and removing the Mapping tables.

In [section 3.1](#) changed "where each row in the table initiates" to
"where each row in the table represents".

Updated Reference Section and divided them into Normative vs.
Informative.

Removed the MplsGenAddress TC and used the INET-ADDRESS-MIB's
InetAddress TC. Objects using this TC are:
mplsLdpEntityTargetPeerAddr, mplsFecAddr, and
mplsLdpSesPeerNextHopAddr and are noted in the conformance statements

supporting: unknown(0), ipv4(1), and ipv6(2).

Removed AddressFamilyNumbers TC and used InetAddressType TC from the
INET-ADDRESS-MIB. One of the MIB compilers as a warning because

apparently one is expected to use InetAddressType and InetAddress together (although, think this restriction is too restrictive). Also, removed the reference for the Address Family Numbers MIB.

Changed the name TargPeer to TargetPeer.

Removed the Enable/Disable trap objects: mplsLdpEntityPVLmisTrapEnable, and mplsLdpSesUpDownTrapEnable. [RFC 2573](#) should be used to enable/disable traps.

Removed the import for "transmission" and instead, imported "mplsMIB from the MPLS-TC-MIB".

Changed mplsLdpEntityPVL to mplsLdpEntityPathVectorLimit and updated the DESCRIPTION clause. Also, the PVL abbreviation was expanded to PathVectorLimit for other objects.

Combined the objects: mplsLdpPeerLoopDetectionForPV and mplsLdpPeerPVL into one object: mplsLdpPeerPathVectorLimit and updated the DESCRIPTION clause.

mplsLdpEntityTcpDscPort uses InetPortNumber TC from the INET-ADDRESS-MIB. Likewise, mplsLdpEntityUdpDscPort uses the InetPortNumber TC from the INET-ADDRESS-MIB. Also a REFERENCE clause was added.

The mplsLdpEntityMaxPduLength object has the SYNTAX range changed to start at 256. Also the DESCRIPTION clause was updated.

The mplsLdpSesMaxPduLen object's name was changed to mplsLdpSesMaxPduLength and a UNITS clause was added, and the DESCRIPTION clause was updated. This object is related to the mplsLdpEntityMaxPduLength object.

The mplsLdpEntityKeepAliveHoldTimer and mplsLdpEntityHelloHoldTimer DESCRIPTION clause was changed from "The two octet value" to "The 16-bit integer value".

The mplsLdpEntityHelloHoldTimer object's DESCRIPTION clause was updated.

A range of Integer32(0..100) was added to the SYNTAX clause of the mplsLdpEntityInitSesThreshold object. Also, the DESCRIPTION clause of this object was updated.

The mplsLdpEntityOptionalParameters object was renamed to

mplsLdpEntityLabelType.

Updated the mplsLdpEntityAdminStatus and mplsLdpEntityRowStatus objects. RowStatus now reflects the status of the row, and Admin status controls enabling/disabling the entry.

Updated the DESCRIPTION clauses for the objects in the mplsLdpEntityStatsTable to refer to the mplsLdpEntityDiscontinuityTime object.

Changed StorType to StorageType.

5.2. Changes from <[draft-ietf-mpls-ldp-mib-07.txt](#)>

There were three types of changes: the first change was that all the MPLS Textual Conventions from this MIB, the LSR and MPLS-TE MIBs were moved into a new document [[MPLSTCMIB](#)], "[draft-ietf-mpls-tc-mib-00.txt](#)". The Textual Conventions are now IMPORTED from [[MPLSTCMIB](#)]. The second type of change was updates based on comments from the IESG. These changes will be discussed below. The third type of changes were based on minor editorial changes from the co-authors.

The "Introduction" and "Structure of the MIB" sections were reworded since they were repetitive.

The "Overview" was rearranged.

References were added to "The LDP Entity ATM Objects" and "The LDP Entity Frame Relay Objects" Sections.

The Working Group mailing list and Chairs were added to the CONTACT-INFO.

Updated the DESCRIPTION clause for the "mplsLdpEntityLdpId" object.

Updated the mplsLdpEntityProtocolVersion to include a range (1..65535).

Updated the "References" Section.

Running the MIB through the smilint MIB compiler showed that some object names were longer than 32 characters, these were shortened to 32 characters or fewer.

The following changes were from the co-authors.

Other minor editorial changes such as fixing typographical errors, and removing MIB comments which are no longer meaningful.

Expires April 2003

[Page 87]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

Page 17 (also page 46) the description was enhanced to describe the version field in the LDP header from [RFC3036](#).

Removed WellKnown from the tcp and upd port names. It's the ports that get set, and the default value is the well known (actually the registered) port number.

mplsLdpEntityInitSesTrapEnable object is useless and was removed since setting mplsLdpEntityInitSesThreshold=0 achieves the same thing. Also removed it from the descriptive text in [section 3](#).

Page 47, mplsLdpSessionDiscontinuityTime The initial value of this was changed to be sysUpTime instead of zero. sysUpTime for when the session starts is more meaningful and was added to the Session Up/Down Traps also. Also, added the Session specific stats to the up/down traps.

[5.3](#). Changes from <[draft-ietf-mpls-ldp-mib-06.txt](#)>

All changes were from the second last call which took place Thursday, July 20th, until Thursday, July 27th, 2000 and are described in the remainder of this section.

Remove the reference to the MPLS framework document.

Add an mplsFecIndexNext type of object.

Change the conformance of the FEC table objects to be part of the mplsLdpGeneralGroup.

The mplsLdpEntityConfGenericTable is no longer needed because the functionality has been absorbed by the mplsLdpEntityConfGenericLabelRangeTable. The mplsLdpEntityConfGenericTable has been removed and the front section was updated accordingly.

Other editorial issues, updating references, typos and so forth.

5.4. Changes from <[draft-ietf-mpls-ldp-mib-05.txt](#)>

The majority of changes in this revision are based on Last Call comments which were received during the last call from Thursday, March 9, 2000 to Friday, March 17, 2000, or slightly thereafter. Also, changes were made to agree with the latest specifications. These changes are described in this section.

Changes due to [draft-ietf-mpls-ldp-07.txt](#) and [draft-ietf-mpls-ldp-08.txt](#). Specifically, removing references to IPv4/IP and using router

Expires April 2003

[Page 88]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

id, as appropriate.

Removed vpMerge and vpAndVcMerge choices from the object, mplsLdpEntityAtmMergeCap. VP Merge is not described in [[RFC3036](#)].

The LIB Table was removed and replaced by mapping tables to map LDP LSPs created by LDP sessions to the mplsInSegment, mplsOutSegment and mplsXC tables in the LSR MIB. The conformance section was updated to include a Mapping Group which is to be implemented iff these LSR MIB tables (mplsInSegmentTable, mplsOutSegmentTable and mplsXCTable) are implemented.

The front section was updated to include information on the Generic label table.

Added more in the front section on on Row Creation/adminStatus/OperStatus in the LDP Entity and related tables.

Added a generic label range table. NOTE: there is NO corresponding LDP message which relates to the information in this table, however, this table does provide a way for a user to 'reserve' a generic label range.

A new TEXTUAL-CONVENTION, MplsAtmVcIdentifier was added. This TC has the same upper bounds as AtmVcIdentifier (from [rfc2514](#)) except that the lower bound is 32 (and not 0). The lower bound is 32 since this value is specified by [[RFC3035](#)].

Removed the scalar object mplsLsrLabelRetentionMode and added mplsLdpEntityLabelRetentionMode. The change was made to allow configuring the retention mode on a per LDP Entity basis, as opposed for the entire LSR.

Typo in [section 3.5.2](#) was fixed.

Typo in the mplsLdpSessionUp notification description was fixed.

Section 'LDP Notifications' was expanded to cover both the 'mplsLdpSessionUp' and 'mplsLdpSessionDown' traps. Also, the objects which enable and disable these traps have been described in this Section:

The 'mplsLdpEntityHopCountLoopDetection' object and the 'mplsLdpEntityHopCount' object have been combined into the new object, 'mplsLdpEntityHopCountLimit'.

MplsLabel has been updated to reflect the VPI value of 12 bits and not 8.

Added DEFVAL clause to the 'mplsLdpEntityWellKnownDiscoveryPort'

Expires April 2003

[Page 89]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

object. The default value is 646.

Added UNITS and DEFVAL clauses to the 'mplsLdpEntityMaxPduLength' object. The default value is 4096 and the units is octets.

Added DEFVAL clause to 'mplsLdpEntityProtocolVersion' object. The default value is 1.

Added DEFVAL clause to 'mplsLdpEntityKeepAliveHoldTimer' of 40 seconds.

Added DEFVAL clause to 'mplsLdpEntityInitSesThreshold' object. The default value is 8.

The mplsLdpEntityWellKnownDiscoveryPort was changed into two objects, one for TCP and one for UDP. The names are

Typo in the description for the

The mplsLdpEntityPeerTable was (re-)named mplsLdpPeerTable. The mplsLdpSessionTable now AUGMENTS the mplsLdpPeerTable in order to show that these two tables are related. There has been wording added to the mplsLdpSessionEntry description and to the description for the mplsLdpPeerTable.

5.5. Changes from <[draft-ietf-mpls-ldp-mib-04.txt](#)>

Editorial changes, fixing typo's, fixing wrapping lines, etc.

Updated references for latest drafts, and added [[RFC3032](#)] and [[RFC3034](#)] to Reference Section.

Added to the Acknowledgements Section.

Changed the SYNTAX and DESCRIPTION of the 'mplsLdpLsrLoopDetectionCapable' object, so that it will also support the loop detection by hop count.

Combined the 'mplsLdpEntityLoopDetectionForPV' and 'mplsLdpEntityPVL' objects. The functionality of the 'mplsLdpEntityLoopDetectionForPV' is now denoted by the value of 0 (zero) in the 'mplsLdpEntityPVL' object. This results in one less object 'mplsLdpEntityLoopDetectionForPV' but does not sacrifice functionality.

Changed 'mplsLdpLibLabelType' into two objects: 'mplsLdpLibInLabelType' and differ from the egress label type. The MIB now reflects this.

The following items were changed as a result of the Frame Relay Forum

Expires April 2003

[Page 90]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

dropping support for 17-bit DLCIs: the MplsLabel TC description has been modified, and other Frame Relay Object descriptions were also modified (as specified in this section).

The MplsLabel TC was also modified and reference 3. was added to the REFERENCE Clause.

MplsLdpLabelTypes TC was modified to use an enum.

InterfaceIndex support was added to the Entity information. This was specifically requested by several members of the working group. An additional table, mplsLdpEntityConfGenericTable as a way to configure Generic Labels, and an object, 'mplsLdpConfGenericIfIndexOrZero' was added to map the InterfaceIndex used by Generic Labels. Objects were also added to the 'mplsLdpEntityAtmParmsTable' and the and 'mplsLdpEntityFrIfIndex', respectively.

Changed the name of the 'mplsLdpEntityMtu' object to be 'mplsLdpEntityMaxPduLength' which is more consistent with the LDP Specification. Also, the description and SYNTAX were changed.

Changed the SYNTAX of the 'mplsLdpSessionMaxPduLength' to unsigned32 and changed the Range from (0..65535) to (1..65535).

Added and improved the front section discussion on SNMP Notifications.

Also, modified the DESCRIPTION clause of the

Added objects to enable/disable the sending of traps:

Added an object to enable/disable sending traps for Sessions changing from Up to Down, or Down to Up.

Added notifications to generate traps from session changing from Up to Down, or Down to up.

Added a StorageType object to the Entity and associated tables which are configurable.

Added a Discontinuity Time object to the Entity Table,

Added discussion on row creation in the Entity and other associated Entity tables. This is a new Section in the Front part of the document called:

Removed the 'mplsLdpEntityControlMethod'.

Made 'mplsLdpFecLspId' as part of the INDEX for the FEC table. This is to allow FECs to map to multiple LSPs. Also add a RowPointer to a

row in the Session Table.

Added an operation status object, 'mplsLdpLspOperStatus' and a last Change object, 'mplsLdpLspLastChange' to the LIB Table. This will be used to detect whether an LSP has changed its status.

Changed the name of the mplsLdpPeerTable to the mplsLdpEntityPeerTable. This table contains information relevant to

Peers which are known to specific Entities. The indexing of this table has also changed to include the Row in the Entity Table that this Peer is known by. The mplsLdpHelloAdjacencyTable and the mplsLdpSessionTable have been moved under this table. Since Hello Adjacencies are related to Entity-Peer information and Sessions are related to Entity-Peer information this was seen as a comprehensive and coherent modelling. Associated descriptions in the front section and in the tables have been changed to reflect this change.

Moved the 'mplsLdpConfFrLen' object from the 'mplsLdpEntityConfFrLabelRangeTable' to the 'mplsLdpEntityFrameRelayParmsTable' since the Frame Relay interface/port can only use one header length at a time, i.e. a specific FR interface supports one address length for all VCs on that interface. Also, changed the object so that it only supports 10 and 23 bit DLCI lengths. (The 17 bit length was dropped by the Frame Relay Forum and thus, is no longer required.) The name of this object was changed from 'mplsLdpConfFrLen' to 'mplsLdpEntityFrLen' to fit in with the 'mplsLdpEntityFrameRelayParmsTable'.

Removed the seventeenDlciBits(1) value from the mplsLdpFrSessionLen object. (The 17 bit length was dropped by the Frame Relay Forum and thus, is no longer required.)

Corrected the range of the 'mplsLdpEntityIndexNext' object to include 0 (zero).

5.6. Changes from <[draft-ietf-mpls-ldp-mib-03.txt](#)>

Reworded the description of the mplsLdpAtmSessionTable to clarify that one or MORE label range intersection(s) is/are represented in this table.

Reworded the description of the mplsLdpFrameRelaySessionTable to clarify that one or MORE label range intersection(s) is/are represented in this table.

Added a new index, mplsLdpSessionPeerIndex, to the mplsLdpSessionPeerAddressTable. This new index uniquely identifies the entry within a given session. (Since adding mplsLdpSessionPeerNextHopAddressType,

mplsLdpSessionPeerNextHopAddress to the INDEX clause of the mplsLdpSessionPeerAddressTable leaves a table with only indices and no objects, the work around was to add a new index which uniquely differentiates an entry within a given session.)

Quite a few changes to the mplsLdpPeerTable. First, removed the mplsLdpPeerIndex from the mplsLdpPeerTable and other tables. This index served no purpose, so was removed. Second, removed the objects: mplsLdpPeerInternetworkAddrType, and mplsLdpPeerInternetworkAddr. Third, reworded the description of this table to include information which is known during Session Initialization attempts, the specific information has to do with Loop Detection based on Path Vectors. Since [Section 3.5.3](#) of the LDP Spec when describing the PVLim says: "Although knowledge of a peer's path vector limit will not change an LSR's behavior, it does enable the LSR to alert an operator to a possible misconfiguration." and the object mplsLdpPeerPVL is sent as a varbind in the mplsLdpPVLMismatch notification.

Removed the mplsLdpPeerIndex from the mplsLdpHelloAdjacencyTable.

Removed the "IANA Address Family Numbers" MIB section.

Updated the boiler.me from the ops web page dated Weds., Dec 22, 1999.

Updated the Security Section from the ops web page.

Added the following objects to the mplsLdpEntityTable: mplsLdpEntityControlMethod, mplsLdpEntityLoopDetectionForPV, and mplsLdpEntityPathVectorLimit.

Removed mplsLdpSessionLabelAdvertisement, mplsLdpSessionLoopDetectionForPV, and mplsLdpSessionPathVectorLimit from the mplsLdpSessionTable.

Changed the mplsLdpPathVectorLimitMismatch Notification to send mplsLdpEntityPathVectorLimit (instead of mplsLdpSessionPathVectorLimit).

Copied the MplsLabel TC from [draft-ietf-mpls-lsr-mib-00.txt](#) and replaced the MplsLdpGenAddr for mplsLdpLibInLabel and mplsLdpLibOutLabel with MplsLabel.

The mplsLdpSessionIndex was removed throughout the MIB. This was replaced by the object mplsLdpSessionDiscontinuityTime. The motivation was to reduce the number of indices.

The descriptions for the objects in the mplsLdpSessionStatsTable, mplsLdpSessionStatsUnknownMessageTypeErrors and

INTERNET-DRAFT

MPLS LDP MIB

October 2002

mplsLdpSessionStatsUnknownTlvErrors, have been updated to include a reference to the mplsLdpSessionDiscontinuityTime object.

5.7. Changes from <[draft-ietf-mpls-ldp-mib-02.txt](#)>

Added Scalar Objects: mplsLdpLsrLoopDetectionPresent, and mplsLdpEntityIndexNext.

Added the following objects to the mplsLdpEntityTable: mplsLdpEntityProtocolVersion, mplsLdpEntityAdminStatus, mplsLdpEntityOperStatus, mplsLdpEntityTargetedPeer, mplsLdpEntityTargetedPeerAddrType, mplsLdpEntityTargetedPeerAddr, and mplsLdpEntityHelloHoldTimer.

Changed the description of the mplsLdpEntityAtmParmsTable and added the following objects to this table: mplsLdpEntityAtmLsrConnectivity, mplsLdpEntityDefaultControlVpi, mplsLdpEntityDefaultControlVci, mplsLdpEntityUnlabTrafVpi, and mplsLdpEntityUnlabTrafVci. NOTE: the last four objects were in Version 01 of the MIB but were mistakenly omitted from Version 02. Now, they are back.

Changed the indexing of the mplsLdpEntityConfAtmLabelRangeTable to include the minimum VPI/VCI. This is to ensure that indices in this table are unique.

Changed the indexing of the mplsLdpEntityConfFrLabelRangeTable, to include the minimum DLCI value. This is to ensure that indices in this table are unique.

Added [[RFC3036](#)] to Reference Section.

5.8. Changes from <[draft-ietf-mpls-ldp-mib-01.txt](#)>

The MIB was updated to correspond to [draft-ietf-mpls-ldp-06.txt](#) of the LDP Specification [[RFC3036](#)].

The front section was updated.

The MIB was made to be less ATM-centric. Essentially, the ATM specific objects were removed from the tables and placed in ATM

specific Tables. A type was added to the base tables and a row is to be created in the ATM/FR/etc. type table. Apropos compliance statements were added to reflect the separation of ATM and Frame Relay objects into their respective tables.

Objects for Loop Detection were removed from describing the LDP implementation (i.e. the scalars were removed) and Loop Dection

Expires April 2003

[Page 94]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

objects were added to the Session Table. (Although as the LDP Specification indicates loop detection should be for an LSR within a domain.)

The following tables were added: mplsLdpEntityAtmParmsTable, mplsLdpEntityConfAtmLabelRangeTable, mplsLdpFrameRelayParmsTable, mplsLdpConfFrLabelRangeTable, mplsLdpAtmSessionTable, mplsLdpFrameRelaySessionTable, mplsLdpSessionPeerAddressTable, mplsLdpLibTable, and the mplsLdpFecTable.

The following notifications were added: notification for Session removal.

The following objects were removed from the Session Table: mplsLdpSessionRole was removed (this can be determined by comparing LSR Ids and does not need to be explicitly in the MIB.) ATM specific objects (mplsLdpSessionAtmLabelRangeLowerBoundVpi, mplsLdpSessionAtmLabelRangeLowerBoundVci, mplsLdpSessionAtmLabelRangeUpperBoundVpi, mplsLdpSessionAtmLabelRangeUpperBoundVci) were removed and put into a separate table. Frame Relay objects were added in a separate table.

Hello Adjacency Table was updated.

The objects, mplsLdpSessionRejectedParamErrors, mplsLdpSessionRejectedNoHelloErrors, mplsLdpBadLdpIdentifierErrors, mplsLdpBadPduLengthErrors, mplsLdpBadMessageLengthErrors, mplsLdpBadTlvLengthErrors, mplsLdpMalformedTlvValueErrors, mplsLdpKeepAliveTimerExpiredErrors, mplsLdpShutdownNotifReceived, and mplsLdpShutdownNotifSent were added to the mplsLdpEntityStatsTable.

The mplsLdpSessionStatsTable was added to count statics based on a per Session basis.

The mplsLdpPeerConfAtmLabelRangeTable has been removed. There is no

need to configure information for a Peer. All information for a peer is learned, thus peer information is read-only.

(Editorial) References were updated to reflect the documents which this version was based on.

5.9. Changes from <[draft-ietf-mpls-ldp-mib-00.txt](#)>

Textual conventions were added for the LSR Identifier and the LDP Identifier.

Top-level mib structure was added. The LDP MIB falls under a proposed hierarchy of mpls.mplsProtocols.

Expires April 2003

[Page 95]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

The mib hierarchy within the LDP MIB was also changed. A new branch, under mpls.mplsProtocols.mplsLdpMIB.mplsLdpObjects was added. This branch is mplsLdpLsrObjects. Currently, this contains several new scalar objects: mplsLdpLsrID, mplsLdpLsrLoopDetectionPresent, mplsLdpLsrLoopDetectinAdminStatus, mplsLdpLsrPathVectorLimit, mplsLdpLsrHopCountLimit, mplsLdpLsrLoopPreventionPresent, mplsLdpLsrLoopPreventionAdminStatus, and mplsLdpLsrLabelRetentionMode.

mplsLdpEntityTable is now indexed by mplsLdpEntityIdentifier, which is the LDP Identifier used in Session establishment. mplsLdpEntityLoopDetection and mplsLdpEntityLoopPrevention objects were removed from this table.

The following objects were added to the mplsLdpEntityTable: mplsLdpEntityLabelSpaceType, mplsLdpEntityUnlabTrafVpi, mplsLdpEntityUnlabTrafVci, mplsLdpEntityMergeCapability, mplsLdpEntityVcDirectionality, and mplsLdpEntityLabelDistributionMethod.

The following objects were added to the mplsLdpPeerEntityTable: mplsLdpPeerLabelDistributionMethod.

The following object was removed from the mplsLdpEntityStatsTable: mplsLdpEntityEstablishedSessions.

References were added and revised.

6. Acknowledgments

The authors would like to thank the following people: Leigh McLellan, Geetha Brown, Geping Chen and Charlan Zhou from Nortel Networks, and Zoltan Takacs and Bo Augustsson from Ericsson. Also, some members of the working group were very helpful with comments and corrections to the MIB; the authors would like to thank Adrian Farrel of Movaz Networks, and Alan Kullberg from NetPlane Systems.

Expires April 2003

[Page 96]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

7. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), Harvard University, March 1997
- [RFC2571] Harrington, D., Presuhn, R., and B. Wijnen, "An Architecture for Describing SNMP Management Frameworks", [RFC 2571](#), April 1999.
- [RFC2578] McCloaghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, [RFC 2578](#), April 1999.
- [RFC2579] McCloaghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, [RFC 2579](#), April 1999.
- [RFC2580] McCloaghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M., and S. Waldbusser, "Conformance Statements for

SMIv2", STD 58, [RFC 2580](#), April 1999.

- [RFC1906] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1906](#), January 1996.
- [RFC2572] Case, J., Harrington D., Presuhn R., and B. Wijnen, "Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)", [RFC 2572](#), April 1999.
- [RFC2574] Blumenthal, U., and B. Wijnen, "User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)", [RFC 2574](#), April 1999.
- [RFC1905] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)", [RFC 1905](#), January 1996.
- [RFC2573] Levi, D., Meyer, P., and B. Stewart, "SNMPv3 Applications", [RFC 2573](#), April 1999.
- [RFC2575] Wijnen, B., Presuhn, R., and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", [RFC 2575](#), April 1999.
- [RFC3036] Andersson, L., Doolan, P., Feldman, N., Fredette, A., and B. Thomas, "LDP Specification", [RFC 3036](#), January 2001.

Expires April 2003

[Page 97]

INTERNET-DRAFT

MPLS LDP MIB

October 2002

- [RFC3291] Daniele, M., Haberman, B., Routhier, S. and J. Schoenwaelder, "Textual Conventions for Internet Network Addresses", [RFC 3291](#), May 2002.
- [LSRMIB] Srinivansan, C., Viswanathan, A., and T. Nadeau "MPLS Label Switching Router Management Information Base Using SMIv2", [draft-ietf-mpls-lsr-mib-08.txt](#), January 2002.
- [MPLSTCMIB] Nadeau, T., Cucchiara, J., Srinivasan, C., Viswanathan, A. and H. Sjostrand, "Definitions of Textual Conventions for Multiprotocol Label Switching Management", [draft-ietf-mpls-tc-mib-04.txt](#), October 2002.

[8.](#) Informative References

- [RFC1155] Rose, M., and K. McCloghrie, "Structure and Identification of Management Information for TCP/IP-based Internets", STD 16, [RFC 1155](#), May 1990.
- [RFC1212] Rose, M., and K. McCloghrie, "Concise MIB Definitions", STD

16, [RFC 1212](#), March 1991.

- [RFC1215] M. Rose, "A Convention for Defining Traps for use with the SNMP", [RFC 1215](#), March 1991.
- [RFC1157] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol", STD 15, [RFC 1157](#), May 1990.
- [RFC1901] Case, J., McCloghrie, K., Rose, M., and S. Waldbusser, "Introduction to Community-based SNMPv2", [RFC 1901](#), January 1996.
- [RFC2570] Case, J., Mundy, R., Partain, D., and B. Stewart, "Introduction to Version 3 of the Internet-standard Network Management Framework", [RFC 2570](#), April 1999.
- [RFC3031] Rosen, E., Viswanathan, A., and R. Callon, "Multiprotocol Label Switching Architecture", [RFC 3031](#), January 2001.
- [RFC2514] Noto, M., E. Spiegel, K. Tesink, editors, "Definition of Textual Conventions and OBJECT-IDENTITIES for ATM Management", [RFC 2514](#), February 1999.
- [RFC2863] McCloghrie, K., F. Kastenholz, "The Interfaces Group MIB using SMIV2", [RFC 2863](#), June 2000.
- [RFC2515] Tesink, K. (ed.) "Definitions of Managed Objects for ATM Management", [RFC 2515](#), February 1999.
- [RFC3035] Davie, B., Lawrence, J., McCloghrie, K., Rosen, E., Swallow, G., Rekhter, Y. and P. Doolan, "MPLS using LDP and ATM VC Switching", [RFC 3035](#), January 2001.
- [RFC2684] Grossman, D., and J. Heinanen, "Multiprotocol Encapsulation over ATM Adaptation Layer 5", [RFC 2684](#), September 1999.
- [RFC3032] Rosen, E., Tappan, D., Fedorkow, G., Rekhter, Y., Farinacci, D., Li, T. and A. Conta, "MPLS Label Stack Encoding", [RFC 3032](#), January 2001.
- [RFC3034] Conta, A., Doolan, P., and A. Malis, "Use of Label Switching on Frame Relay Networks Specification", [RFC 3034](#), January 2001.

Expires April 2003

[Page 99]

- [RFC3215] Boscher, C., Cheval, P., Wu L. and E. Gray, "LDP State Machine", [RFC 3215](#), January 2002.
- [RFC3037] Thomas, B. and E. Gray, "LDP Applicability", [RFC 3037](#), January 2001.

9. Security Considerations

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

There are a number of managed objects in this MIB that may contain sensitive information. These are contained in the mplsLdpEntityTable. The objects contained in this table are responsible for setting up or tearing down LSPs.

It is thus important to control even GET access to these objects and possibly to even encrypt the values of these object when sending them over the network via SNMP. Not all versions of SNMP provide features for such a secure environment.

SNMPv1 by itself is not a secure environment. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB.

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

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

10. Authors' Addresses

James V. Luciani
Crescent Networks
900 Chelmsford Street

INTERNET-DRAFT

MPLS LDP MIB

October 2002

Lowell, MA 01851
USA
Email: jluciani@crescentnetworks.com

Hans Sjostrand
ipUnplugged
P.O. Box 101 60
S-121 28 Stockholm, Sweden
Phone: +46 8 725 5930
Email: hans@ipunplugged.com

Joan Cucchiara
Crescent Networks
900 Chelmsford Street
Lowell, MA 01851
USA
Phone: +1 978 275-3183
Email: jcucchiara@crescentnetworks.com

11. Full Copyright Statement

Copyright (C) The Internet Society (2002). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Expires April 2003

[Page 101]

INTERNET-DRAFT

MPLS LDP MIB

October 2002