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

Status of this Memo

This document specifies an Internet standards track protocol for the
Internet community, and requests discussion and suggestions for
improvements. Please refer to the current edition of the "Internet
Official Protocol Standards" (STD 1) for the standardization state
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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

   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 Multiprotocol Label Switching (MPLS) protocols described in
   [RFC3031] and [RFC3032]. Utilizing all 4 MIB Modules allows an
   operator to configure LDP sessions using 3 different Layer 2 media.
   The Layer 2 media supported by the MIB Modules are 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].

For an introduction to the concepts of MPLS, see [RFC3031]. For
further on LDP refer to [RFC3037] and [RFC3215].

2. The Internet-Standard Management Framework

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

Managed objects are accessed via a virtual information store, termed
the Management Information Base or MIB. MIB objects are generally
accessed through the Simple Network Management Protocol (SNMP).
Objects in the MIB are defined using the mechanisms defined in the
Structure of Management Information (SMI). This memo specifies a MIB
module that is compliant to the SMIv2, which is described in STD 58,
RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580
[RFC2580].

3. Structure of the MIB Modules

This section describes the structure of the LDP MIB Modules.

3.1. Overview

There are 4 MIB Modules in this document. These MIB Modules are the
MPLS-LDP-STD-MIB, the MPLS-LDP-GENERIC-STD-MIB, the MPLS-LDP-ATM-STD-
MIB and the MPLS-LDP-FRAME-RELAY-STD-MIB. The MPLS-LDP-STD-MIB
defines objects which are common to all LDP implementations. The
MPLS-LDP-GENERIC-STD-MIB defines Layer 2 Per Platform Label Space
objects for use with the MPLS-LDP-STD-MIB. The MPLS-LDP-ATM-STD-MIB
defines Layer 2 Asynchronous Transfer Mode (ATM) objects for use with
the MPLS-LDP-STD-MIB. The MPLS-LDP-FRAME-RELAY-STD-MIB defines Layer
2 FRAME-RELAY objects for use with the MPLS-LDP-STD-MIB.

The MPLS-LDP-STD-MIB Module MUST be implemented and at least one of
the Layer 2 MIB Modules MUST be implemented by an Agent developer on
an Label Switching Router (LSR) or Label Edge Router (LER). As an
example, if a Label Switching Router (LSR) or Label Edge Router (LER)
implementation intends to support LDP utilizing a Layer 2 of
Ethernet, then the MPLS-LDP-STD-MIB and the MPLS-LDP-GENERIC-STD-MIB
Modules MUST implemented. If an LSR/LER implementation intends to
support LDP utilizing a Layer 2 of ATM, then the MPLS-LDP-STD-MIB
Module and the MPLS-LDP-ATM-MIB Module MUST be implemented. If an
LSR/LER implementation intends to support LDP utilizing a Layer 2 of

FRAME-RELAY, then the MPLS-LDP-STD-MIB Module and the MPLS-LDP-FRAME-
RELAY-STD-MIB Module MUST be implemented. An LDP implementation that
utilizes all three Layer 2 media (Ethernet, Frame-Relay, ATM) MUST
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
compliance statement is for full compliance which allows both
configuration and monitoring via SNMP. The other compliance
statement is for read-only compliance which allows 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.

[RFC2684] does not describe VP merge capability and so this feature
has not been included.

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

3.3. Interface Indexing

Interface Indexes as specified in [RFC2863] are used in these MIB
Modules. The descriptions of the ifIndexes denote which ifIndex is
being used. 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 described in the Introduction, this document
is almost entirely based on the LDP specification. The differences
are documented here.

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 MPLS-LDP-STD-MIB module.
Please note, they can certainly be changed during row creation or a
subsequent SET request.

A second difference is the mplsLdpEntityGenericLRTable in the MPLS-LDP-GENERIC-STD-MIB Module. 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-STD-MIB [RFC3811]. This TC was added to restrict vci values to be greater than 31 as described in RFC 3035 [RFC3035].

3.5. The MPLS-LDP-STD-MIB Module

This MIB Module contains objects which are common to all LDP implementations. This MIB Module MUST always be implemented along with one or more of the Layer 2 MIB Modules. This MIB Module IMPORTS IndexInteger and IndexIntegerNextFree TEXTUAL-CONVENTIONs from [RFC3289], and IMPORTS InetAddressPrefixLength, InetAddressType, InetAddressInetPortNumber TEXTUAL-CONVENTIONs from [RFC3291].

The mplsLdpEntityTable table allows the Label Edge Router (LER) or the Label Switching Router (LSR) to initiate and/or receive requests to establish LDP sessions. As the LDP protocol distributes labels and establishes sessions with Peers most of the tables in this module 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.

Some scalars and each table in the MPLS-LDP-STD-MIB Module are described in the following subsections.

3.5.1. LDP Scalar Objects

There are several scalar objects in the LDP MIB module. The mplsLdpLsrId is a read-only scalar object which reports Label Switching Router's (LSR's) Identifier. This MUST be a globally unique value, such as the 32-bit router ID assigned to the LSR.

The mplsLdpLsrLoopDetectionCapable scalar object denotes whether the LSR is capable of supporting loop detection and if so, which form of loop detection.

There are two LastChange scalar objects, mplsLdpEntityLastChange and
mplsLdpPeerLastChange. These objects give an indication of there was
a change in the number of entries in the table, or if any of the
values in the respective tables changed. Please see the object's
description for more details.

The mplsLdpEntityIndexNext scalar object is described in the next
section.

3.5.2. The LDP Entity Table

The MPLS-LDP-STD-MIB provides objects to configure/set-up potential
LDP sessions on a specific LSR/LER. The mplsLdpEntityTable is used
to configure information which is used by the LDP protocol to setup
potential LDP Sessions.

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/LER is not able to create another LDP Entity at that time.

3.5.2.1. 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 intialization, 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.
Assuming that the configuration was done correctly, then a new
session will be created.

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
mplsLdpSessionTable). Also, if the MPLS-LSR-STD-MIB module [RFC3813]
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 MIB modules. [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.

3.5.3. The LDP Entity Statistics Table

The mplsLpdEntityStatsTable is a read-only table which contains
statistical information related to failed attempts to establish
sessions. Each row in 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 mplsLdpEntityStatsSessionRejectedLRErrors Counter
object was increasing, then this would indicate that the Label Range
(LR) may need to be adjusted.

3.5.4. The LDP Peer Table

The mplsLdpPeerTable 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.

3.5.5. The LDP Session Table

   The mplsLdpSessionTable 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
   establishment. NOTE: rows in this table will appear during session
   intialization.

3.5.6. The LDP Session Statistics Table

   The mplsLdpSessionStatsTable is a read-only table which contains
   statistical information on sessions. This table AUGMENTS the
   mplsLdpPeerTable.

3.5.7. The LDP Hello Adjacency 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 removed.

3.5.8. The LDP LSP Tables

   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
   [RFC3813]. 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 incoming label with a specific
   outgoing label. The mplsInSegmentTable stores the incoming label's
   information, and the mplsOutSegmentTable stores the outgoing label's
   information.

   The LDP Session that created the LSP and the LSP's (incoming label,
   outgoing label) pair along with other information is contained in the
   MPLS-LSR-STD-MIB module's mplsXCTable, the mplsInSegmentTable and the
   mplsOutSegmentTable.

In order to utilize the MPLS-LSR-STD-MIB module'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 mplsInSegmentLdpLspTable and
mplsOutSegmentLdpLspTable in this MIB contain information to find the
LDP LSP entries in the mplsInSegmentTable, mplsOutSegmentTable and
the mplsXCTable.

These two tables, the mplsInSegmentLdpLspTable and
mplsOutSegmentLdpLspTable, 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
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.

3.5.9. The FEC Tables

The mplsLdpFecTable 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.

3.5.10. The LDP Session Peer Address Table

The mplsLdpSessionPeerAddrTable 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. There are no objects
which enable or disable notifications from being generated. RFC 3413
[RFC3413] contains MIB modules which can be implemented that will
enable or disable these notifications from being generated.

The mplsLdpInitSessionThresholdExceeded 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
mplsLdpSessionState object. If the value of

mplsLdpEntityInitSessionThreshold is 0 (zero) then this is equal to
specifying the value of infinity for the threshold, and the
mplsLdpInitSessionThresholdExceeded 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
mplsLdpSessionState object, e.g., when sessions change state (Up to
Down for the mplsLdpSessionDown notification, or Down to Up for the
mplsLdpSessionUp notification). There was discussion about combining
these two notifications into a single notification, however, some NMS
applications can utilize two different notifications, rather than
having to parse the varbind list of a single notification. For
example, the SessionDown is matched to a SessionUp notification more
easily by some NMS applications, than having to parse a Varbind list
in a SessionChange type of notification.

3.7. LDP Notification Frequency

LDP Notifications are expected to be few in number when LDP is
ubiquitously deployed in a relatively stable network. A notification
receiver, e.g., an NMS, that receives these notifications should not
be overwhelmed by the frequency of LDP notifications. If this
assertion proves to be inaccurate, then a throttling object to
throttle these notifications may be added to future versions of the
MPLS-LDP-STD-MIB.

4. MPLS Label Distribution Protocol MIB Definitions

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

    IMPORTS
        OBJECT-TYPE, MODULE-IDENTITY, NOTIFICATION-TYPE,
        Integer32, Counter32, Unsigned32
            FROM SNMPv2-SMI   -- [RFC2578]

        MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
            FROM SNMPv2-CONF   -- [RFC2580]

        RowStatus, TimeInterval, TruthValue,
        TimeStamp, StorageType

```
        FROM SNMPv2-TC                                 -- [RFC2579]

     InetAddressPrefixLength,
     InetAddressType,
     InetAddress,
     InetPortNumber
        FROM INET-ADDRESS-MIB                          -- [RFC3291]

     IndexInteger,
     IndexIntegerNextFree
        FROM DIFFSERV-MIB                              -- [RFC3289]

     mplsStdMIB,
     MplsLabelDistributionMethod,
     MplsLdpIdentifier,
     MplsLdpLabelType,
     MplsLspType,
     MplsLsrIdentifier,
     MplsRetentionMode
        FROM MPLS-TC-STD-MIB                           -- [RFC3811]

     MplsIndexType
        FROM MPLS-LSR-STD-MIB;                         -- [RFC3813]

 mplsLdpStdMIB MODULE-IDENTITY
     LAST-UPDATED "200406030000Z"  -- June 3, 2004
     ORGANIZATION "Multiprotocol Label Switching (mpls)
                   Working Group"
     CONTACT-INFO

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          MPLS Working Group, email: mpls@uu.net"

     DESCRIPTION
         "Copyright (C) The Internet Society (2004). The
          initial version of this MIB module was published
```

                    in RFC 3815. For full legal notices see the RFC
                    itself or see:
                    http://www.ietf.org/copyrights/ianamib.html

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

              REVISION "200406030000Z" -- June 3, 2004
              DESCRIPTION
                 "Initial version published as part of RFC 3815."

              ::= { mplsStdMIB 4 }

       --***

       mplsLdpNotifications OBJECT IDENTIFIER ::= { mplsLdpStdMIB 0 }
       mplsLdpObjects   OBJECT IDENTIFIER ::= { mplsLdpStdMIB 1 }
       mplsLdpConformance   OBJECT IDENTIFIER ::= { mplsLdpStdMIB 2 }

       --***
       -- 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 Label Switching Router's Identifier."
           ::= { mplsLdpLsrObjects 1 }

       mplsLdpLsrLoopDetectionCapable OBJECT-TYPE
           SYNTAX   INTEGER {
                               none(1),
                               other(2),
                               hopCount(3),
                               pathVector(4),
                               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/from the mplsLdpEntityTable/mplsLdpEntityStatsTable, or
             the most recent change in value of any objects in the
             mplsLdpEntityTable.
```

                  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   IndexIntegerNextFree
             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."
            ::= { 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)
                  or Label Edge Router (LER)."
               ::= { 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   IndexInteger,
             mplsLdpEntityProtocolVersion   Unsigned32,
             mplsLdpEntityAdminStatus   INTEGER,
             mplsLdpEntityOperStatus   INTEGER,
             mplsLdpEntityTcpPort   InetPortNumber,
             mplsLdpEntityUdpDscPort   InetPortNumber,

```
            mplsLdpEntityMaxPduLength          Unsigned32,
            mplsLdpEntityKeepAliveHoldTimer    Unsigned32,
            mplsLdpEntityHelloHoldTimer        Unsigned32,
            mplsLdpEntityInitSessionThreshold  Integer32,
            mplsLdpEntityLabelDistMethod       MplsLabelDistributionMethod,
            mplsLdpEntityLabelRetentionMode    MplsRetentionMode,
            mplsLdpEntityPathVectorLimit       Integer32,
            mplsLdpEntityHopCountLimit          Integer32,
            mplsLdpEntityTransportAddrKind     INTEGER,
            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        IndexInteger
          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
              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."
        ::= { mplsLdpEntityEntry 2 }

    mplsLdpEntityProtocolVersion OBJECT-TYPE
        SYNTAX        Unsigned32(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.  This
           further implies that a 'tear-down' for that session
           is issued and the session and all information related
           to that session cease to exist).

           At this point the operator is able to change values
           which are related to this entity.

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

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

    mplsLdpEntityOperStatus OBJECT-TYPE
        SYNTAX        INTEGER {
                        unknown(1),
                        enabled(2),
                        disabled(3)
                      }
        MAX-ACCESS  read-only
        STATUS        current
        DESCRIPTION
            "The operational status of this LDP Entity.

            The value of unknown(1) indicates that the
            operational status cannot be determined at
            this time.  The value of unknown should be
            a transient condition before changing
            to enabled(2) or disabled(3)."
        ::= { mplsLdpEntityEntry 5 }

    mplsLdpEntityTcpPort OBJECT-TYPE
        SYNTAX        InetPortNumber
        MAX-ACCESS  read-create
        STATUS        current
        DESCRIPTION
            "The TCP Port for
            LDP.  The default value is the well-known
            value of this port."
        REFERENCE
            "RFC3036, LDP Specification, 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
                "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   Unsigned32 (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   Unsigned32 (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
interpretted 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
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 }

       mplsLdpEntityInitSessionThreshold 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,
               'mplsLdpInitSessionThresholdExceeded', 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. The notification should be generated
                    each time this threshold is exceeded and
                    for every subsequent Initialization message
                    which is NAK'd with an Error Notification
                    message after this threshold is exceeded.

                    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 }

        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 Detection 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 }

       mplsLdpEntityTransportAddrKind OBJECT-TYPE
           SYNTAX   INTEGER {
                                   interface(1),
                                   loopback(2)
                           }
           MAX-ACCESS read-create
           STATUS   current

        DESCRIPTION
            "This specifies whether the loopback or interface
            address is to be used as the transport address
            in the transport address TLV of the
            hello message.

            If the value is interface(1), then the IP
            address of the interface from which hello
            messages are sent is used as the transport
            address in the hello message.

            Otherwise, if the value is loopback(2), then the IP
            address of the loopback interface is used as the
            transport address in the hello message."
        DEFVAL { loopback }
        ::= { mplsLdpEntityEntry 16 }

    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 17 }

    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 18 }

    mplsLdpEntityTargetPeerAddr OBJECT-TYPE
        SYNTAX   InetAddress
        MAX-ACCESS read-create
        STATUS   current
        DESCRIPTION
            "The value of the internetwork layer address
            used for the Extended Discovery. The value of
            mplsLdpEntityTargetPeerAddrType specifies how
            this address is to be interpreted."
        ::= { mplsLdpEntityEntry 19 }

```
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
        mplsLdpEntityAtmTable, which
        corresponds to this entry.

        If the value is frameRelayParameters(3) then
        a row must be created in the
        mplsLdpEntityFrameRelayTable, which
        corresponds to this entry."
    REFERENCE
        "RFC3036, LDP Specification, Section 3.5.3.,
        Initialization Message."
    ::= { mplsLdpEntityEntry 20 }

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 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 21 }

mplsLdpEntityStorageType  OBJECT-TYPE
    SYNTAX      StorageType
    MAX-ACCESS  read-create
    STATUS      current
```

        DESCRIPTION
            "The storage type for this conceptual row.
            Conceptual rows having the value 'permanent(4)'
            need not allow write-access to any columnar
            objects in the row."
        DEFVAL{ nonVolatile }
        ::= { mplsLdpEntityEntry 22 }

    mplsLdpEntityRowStatus OBJECT-TYPE
        SYNTAX   RowStatus
        MAX-ACCESS   read-create
        STATUS   current
        DESCRIPTION
            "The status of this conceptual row. All writable
             objects in this row may be modified at any
             time, however, as described in detail in
             the section entitled, 'Changing Values After
             Session Establishment', and again described
             in the DESCRIPTION clause of the
             mplsLdpEntityAdminStatus object, if a session
             has been initiated with a Peer, changing objects
             in this table will wreak havoc with the session
             and interrupt traffic. To repeat again:
             the recommended procedure is to
             set the mplsLdpEntityAdminStatus to down, thereby
             explicitly causing a session to be torn down. Then,
             change objects in this entry, then set
             the mplsLdpEntityAdminStatus to enable,
             which enables a new session to be initiated."
        ::= { mplsLdpEntityEntry 23 }

    --
    -- 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., the Session
                 remains), then the error is counted in the
                 mplsLdpSessionStatsEntry."
             AUGMENTS       {    mplsLdpEntityEntry  }
             ::= { mplsLdpEntityStatsTable 1 }

     MplsLdpEntityStatsEntry ::= SEQUENCE {
         mplsLdpEntityStatsSessionAttempts                 Counter32,
         mplsLdpEntityStatsSessionRejectedNoHelloErrors    Counter32,
         mplsLdpEntityStatsSessionRejectedAdErrors         Counter32,
         mplsLdpEntityStatsSessionRejectedMaxPduErrors     Counter32,
         mplsLdpEntityStatsSessionRejectedLRErrors         Counter32,
         mplsLdpEntityStatsBadLdpIdentifierErrors          Counter32,
         mplsLdpEntityStatsBadPduLengthErrors              Counter32,
         mplsLdpEntityStatsBadMessageLengthErrors          Counter32,
         mplsLdpEntityStatsBadTlvLengthErrors              Counter32,
         mplsLdpEntityStatsMalformedTlvValueErrors         Counter32,
         mplsLdpEntityStatsKeepAliveTimerExpErrors         Counter32,
         mplsLdpEntityStatsShutdownReceivedNotifications   Counter32,
         mplsLdpEntityStatsShutdownSentNotifications       Counter32
     }

     mplsLdpEntityStatsSessionAttempts OBJECT-TYPE
         SYNTAX       Counter32
         MAX-ACCESS   read-only
         STATUS       current
         DESCRIPTION
             "A count of the Session Initialization messages
             which were sent or received by this LDP Entity and
             were NAK'd.   In other words, this counter counts
             the number of session initializations that failed.

             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 }

    mplsLdpEntityStatsSessionRejectedNoHelloErrors 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 }

    mplsLdpEntityStatsSessionRejectedAdErrors 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.

             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 }

    mplsLdpEntityStatsSessionRejectedMaxPduErrors 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 }
```

```
   mplsLdpEntityStatsSessionRejectedLRErrors 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 }

   mplsLdpEntityStatsBadLdpIdentifierErrors 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."
       REFERENCE
          "RFC3036, LDP Specification, Section 3.5.1.2."
       ::= { mplsLdpEntityStatsEntry 6 }

   mplsLdpEntityStatsBadPduLengthErrors 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 }
```

```
   mplsLdpEntityStatsBadMessageLengthErrors 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 }

   mplsLdpEntityStatsBadTlvLengthErrors 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 }

   mplsLdpEntityStatsMalformedTlvValueErrors 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 }

        mplsLdpEntityStatsKeepAliveTimerExpErrors 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 }

        mplsLdpEntityStatsShutdownReceivedNotifications 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 }

        mplsLdpEntityStatsShutdownSentNotifications OBJECT-TYPE
            SYNTAX        Counter32
            MAX-ACCESS    read-only
            STATUS        current
            DESCRIPTION
                "This object counts the number of Shutdown Notfications
                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/from the
            mplsLdpPeerTable/mplsLdpSessionTable."
        ::= { 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.  This table is augmented by
            the mplsLdpSessionTable."
        INDEX        { mplsLdpEntityLdpId,
                      mplsLdpEntityIndex,
                      mplsLdpPeerLdpId }
        ::= { mplsLdpPeerTable 1 }

    MplsLdpPeerEntry ::= SEQUENCE {
        mplsLdpPeerLdpId                 MplsLdpIdentifier,
        mplsLdpPeerLabelDistMethod       MplsLabelDistributionMethod,
```

```
        mplsLdpPeerPathVectorLimit        Integer32,
        mplsLdpPeerTransportAddrType      InetAddressType,
        mplsLdpPeerTransportAddr          InetAddress
    }

    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."
        REFERENCE
           "RFC3036, LDP Specification, Section 2.8 Loop Dection,
           Section 3.4.5 Path Vector TLV."
        ::= { mplsLdpPeerEntry 3 }

    mplsLdpPeerTransportAddrType OBJECT-TYPE
        SYNTAX        InetAddressType
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The type of the Internet address for the
            mplsLdpPeerTransportAddr object.  The LDP
            specification describes this as being either
            an IPv4 Transport Address or IPv6 Transport
```

                    Address which is used in opening the LDP session's
                    TCP connection, or if the optional TLV is not
                    present, then this is the IPv4/IPv6 source
                    address for the UPD packet carrying the Hellos.

                    This object specifies how the value of the
                    mplsLdpPeerTransportAddr object should be
                    interpreted."
                REFERENCE
                    "RFC3036, LDP Specification, Section 2.5.2
                    Transport Connection Establishment and
                    Section 3.5.2.1 Hello Message Procedures."
                ::= { mplsLdpPeerEntry 4 }

        mplsLdpPeerTransportAddr OBJECT-TYPE
                SYNTAX   InetAddress
                MAX-ACCESS   read-only
                STATUS   current
                DESCRIPTION
                    "The Internet address advertised by the peer
                    in the Hello Message or the Hello source address.

                    The type of this address is specified by the
                    value of the mplsLdpPeerTransportAddrType
                    object."
                REFERENCE
                    "RFC3036, LDP Specification, Section 2.5.2
                    Transport Connection Establishment and
                    Section 3.5.2.1 Hello Message Procedures."
                ::= { mplsLdpPeerEntry 5 }

        --
        -- 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. This table AUGMENTS the
                    mplsLdpPeerTable. Each row in this table
                    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 the
            mplsLdpPeerPathVectorLimit object in the
            mplsLdpPeerTable.

            Values which may differ from those configured are
            noted in the objects of this table, the
            mplsLdpAtmSessionTable and the
            mplsLdpFrameRelaySessionTable. 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 {
        mplsLdpSessionStateLastChange        TimeStamp,
        mplsLdpSessionState                  INTEGER,
        mplsLdpSessionRole                   INTEGER,
        mplsLdpSessionProtocolVersion        Unsigned32,
        mplsLdpSessionKeepAliveHoldTimeRem   TimeInterval,
        mplsLdpSessionKeepAliveTime          Unsigned32,
        mplsLdpSessionMaxPduLength           Unsigned32,
        mplsLdpSessionDiscontinuityTime      TimeStamp
    }

    mplsLdpSessionStateLastChange OBJECT-TYPE
        SYNTAX TimeStamp
        MAX-ACCESS  read-only
        STATUS       current
        DESCRIPTION
            "The value of sysUpTime at the time this
            Session entered its current state as
            denoted by the mplsLdpSessionState
            object."
        ::= { mplsLdpSessionEntry 1 }
```

```
    mplsLdpSessionState 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 }

    mplsLdpSessionRole OBJECT-TYPE
        SYNTAX       INTEGER {
                        unknown(1),
                        active(2),
                        passive(3)
                    }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "During session establishment the LSR/LER takes either
            the active role or the passive role based on address
            comparisons.  This object indicates whether this LSR/LER
            was behaving in an active role or passive role during
            this session's establishment.

            The value of unknown(1), indicates that the role is not
            able to be determined at the present time."
        REFERENCE
            "RFC3036, LDP Specification, Section 2.5.3.,
            Session Initialization"
        ::= { mplsLdpSessionEntry 3 }

    mplsLdpSessionProtocolVersion OBJECT-TYPE
        SYNTAX       Unsigned32(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 4 }

       mplsLdpSessionKeepAliveHoldTimeRem OBJECT-TYPE
          SYNTAX   TimeInterval
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
             "The keep alive hold time remaining for
             this session."
          ::= { mplsLdpSessionEntry 5 }

       mplsLdpSessionKeepAliveTime OBJECT-TYPE
          SYNTAX   Unsigned32 (1..65535)
          UNITS   "seconds"
          MAX-ACCESS   read-only
          STATUS   current
          DESCRIPTION
              "The negotiated KeepAlive Time which
              represents the amount of seconds between
              keep alive messages. The
              mplsLdpEntityKeepAliveHoldTimer
              related to this Session is the
              value that was proposed as the
              KeepAlive Time for this session.

              This value is negotiated during
              session initialization between
              the entity's proposed value
              (i.e., the value configured in
              mplsLdpEntityKeepAliveHoldTimer)
              and the peer's proposed
              KeepAlive Hold Timer value.
              This value is the smaller
              of the two proposed values."
          REFERENCE
             "RFC3036, LDP Specification, Section 3.5.3,
             Initialization Message."
          ::= { mplsLdpSessionEntry 6 }

       mplsLdpSessionMaxPduLength 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."
             REFERENCE
                 "RFC3036, LDP Specification, Section 3.5.3,
                 Initialization Message."
             ::= { mplsLdpSessionEntry 7 }

     mplsLdpSessionDiscontinuityTime 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 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 a new
                 session is established. This value would change and
                 thus indicate to the command generator that this is a
                 different session."
             ::= { mplsLdpSessionEntry 8 }

     --
     -- The MPLS LDP Session Statistics Table
     --

     mplsLdpSessionStatsTable OBJECT-TYPE
             SYNTAX   SEQUENCE OF MplsLdpSessionStatsEntry
             MAX-ACCESS   not-accessible
             STATUS   current
             DESCRIPTION
                 "A table of statistics for Sessions between
                 LDP Entities and LDP Peers. This table AUGMENTS

            the mplsLdpPeerTable."
        ::= { mplsLdpSessionObjects 4 }

    mplsLdpSessionStatsEntry OBJECT-TYPE
        SYNTAX   MplsLdpSessionStatsEntry
        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 }
        ::= { mplsLdpSessionStatsTable 1 }

    MplsLdpSessionStatsEntry ::= SEQUENCE {
        mplsLdpSessionStatsUnknownMesTypeErrors Counter32,
        mplsLdpSessionStatsUnknownTlvErrors   Counter32
    }

    mplsLdpSessionStatsUnknownMesTypeErrors OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "This object counts the number of Unknown Message Type
            Errors detected by this LSR/LER 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."
        ::= { mplsLdpSessionStatsEntry 1 }

    mplsLdpSessionStatsUnknownTlvErrors OBJECT-TYPE
        SYNTAX   Counter32
        MAX-ACCESS read-only
        STATUS   current
        DESCRIPTION
            "This object counts the number of Unknown TLV Errors
            detected by this LSR/LER 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."
        ::= { mplsLdpSessionStatsEntry 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,
                             mplsLdpHelloAdjacencyIndex }
         ::= { mplsLdpHelloAdjacencyTable 1 }

     MplsLdpHelloAdjacencyEntry ::= SEQUENCE {
         mplsLdpHelloAdjacencyIndex         Unsigned32,
         mplsLdpHelloAdjacencyHoldTimeRem   TimeInterval,
         mplsLdpHelloAdjacencyHoldTime      Unsigned32,
         mplsLdpHelloAdjacencyType          INTEGER
     }

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

     mplsLdpHelloAdjacencyHoldTimeRem OBJECT-TYPE
         SYNTAX       TimeInterval
         UNITS        "seconds"
         MAX-ACCESS   read-only
```

```
            STATUS        current
            DESCRIPTION
                "If the value of this object is 65535,
                this means that the hold time is infinite
                (i.e., wait forever).

                Otherwise, the time remaining for
                this Hello Adjacency to receive its
                next Hello Message.

                This interval will change when the 'next'
                Hello Message which corresponds to this
                Hello Adjacency is received unless it
                is infinite."
            ::= { mplsLdpHelloAdjacencyEntry 2 }

        mplsLdpHelloAdjacencyHoldTime OBJECT-TYPE
            SYNTAX Unsigned32 (0..65535)
            MAX-ACCESS  read-only
            STATUS        current
            DESCRIPTION
                "The Hello hold time which is negotiated between
                the Entity and the Peer.  The entity associated
                with this Hello Adjacency issues a proposed
                Hello Hold Time value in the
                mplsLdpEntityHelloHoldTimer object.  The peer
                also proposes a value and this object represents
                the negotiated value.

                A value of 0 means the default,
                which is 15 seconds for Link Hellos
                and 45 seconds for Targeted Hellos.
                A value of 65535 indicates an
                infinite hold time."
            REFERENCE
                "RFC3036, LDP Specification, Section 3.5.2 Hello Message"
            ::= { mplsLdpHelloAdjacencyEntry 3 }

    mplsLdpHelloAdjacencyType 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 4 }

       --
       -- Session Label (LSP) Mapping to LSR MIB's
       -- In Segment LIB Information.
       --
       --
       -- NOTE: the next 2 tables map to the
       -- MPLS-LSR-STD-MIB's MplsInSegmentTable
       -- and MplsOutSegmentTable. The
       -- cross-connect (XC) information is not
       -- represented here as it can be gleaned
       -- from the MPLS-LSR-STD-MIB.
       --

       mplsInSegmentLdpLspTable OBJECT-TYPE
            SYNTAX   SEQUENCE OF MplsInSegmentLdpLspEntry
            MAX-ACCESS   not-accessible
            STATUS   current
            DESCRIPTION
                "A table of LDP LSP's which
                map to the mplsInSegmentTable in the
                MPLS-LSR-STD-MIB module."
            ::= { mplsLdpSessionObjects 6 }

       mplsInSegmentLdpLspEntry OBJECT-TYPE
            SYNTAX   MplsInSegmentLdpLspEntry
            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 for the mplsInSegmentTable
                (mplsInSegmentLdpLspLabelIndex) from the
                MPLS-LSR-STD-MIB.

                The information contained in a row is read-only."
            INDEX   { mplsLdpEntityLdpId,
                           mplsLdpEntityIndex,
                           mplsLdpPeerLdpId,
                           mplsInSegmentLdpLspIndex
                         }
            ::= { mplsInSegmentLdpLspTable 1 }

```
    MplsInSegmentLdpLspEntry ::= SEQUENCE {
        mplsInSegmentLdpLspIndex                 MplsIndexType,
        mplsInSegmentLdpLspLabelType             MplsLdpLabelType,
        mplsInSegmentLdpLspType                  MplsLspType
    }

    mplsInSegmentLdpLspIndex OBJECT-TYPE
        SYNTAX          MplsIndexType
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "This contains the same value as the
            mplsInSegmentIndex in the
            MPLS-LSR-STD-MIB's mplsInSegmentTable."
        ::= { mplsInSegmentLdpLspEntry 1 }

    mplsInSegmentLdpLspLabelType  OBJECT-TYPE
        SYNTAX          MplsLdpLabelType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "The Layer 2 Label Type."
        ::= { mplsInSegmentLdpLspEntry 2 }

    mplsInSegmentLdpLspType OBJECT-TYPE
        SYNTAX          MplsLspType
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
            "The type of LSP connection."
        ::= { mplsInSegmentLdpLspEntry 3 }

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

    mplsOutSegmentLdpLspTable OBJECT-TYPE
        SYNTAX          SEQUENCE OF MplsOutSegmentLdpLspEntry
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "A table of LDP LSP's which
            map to the mplsOutSegmentTable in the
          MPLS-LSR-STD-MIB."
        ::= { mplsLdpSessionObjects 7 }

    mplsOutSegmentLdpLspEntry OBJECT-TYPE
```

```
        SYNTAX      MplsOutSegmentLdpLspEntry
        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 (mplsOutSegmentLdpLspIndex)
            for the mplsOutSegmentTable.

            The information contained in a row is read-only."
        INDEX       { mplsLdpEntityLdpId,
                      mplsLdpEntityIndex,
                      mplsLdpPeerLdpId,
                      mplsOutSegmentLdpLspIndex
                    }
        ::= { mplsOutSegmentLdpLspTable 1 }

    MplsOutSegmentLdpLspEntry ::= SEQUENCE {
        mplsOutSegmentLdpLspIndex                   MplsIndexType,
        mplsOutSegmentLdpLspLabelType               MplsLdpLabelType,
        mplsOutSegmentLdpLspType                    MplsLspType
    }

    mplsOutSegmentLdpLspIndex OBJECT-TYPE
        SYNTAX      MplsIndexType
        MAX-ACCESS  not-accessible
        STATUS      current
        DESCRIPTION
            "This contains the same value as the
            mplsOutSegmentIndex in the
            MPLS-LSR-STD-MIB's mplsOutSegmentTable."
        ::= { mplsOutSegmentLdpLspEntry 1 }

    mplsOutSegmentLdpLspLabelType  OBJECT-TYPE
        SYNTAX      MplsLdpLabelType
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "The Layer 2 Label Type."
        ::= { mplsOutSegmentLdpLspEntry 2 }

    mplsOutSegmentLdpLspType OBJECT-TYPE
        SYNTAX      MplsLspType
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
```

```
            "The type of LSP connection."
        ::= { mplsOutSegmentLdpLspEntry 3 }

    --
    -- Mpls FEC Table
    --

    mplsFecObjects OBJECT IDENTIFIER ::=
                                { mplsLdpSessionObjects 8 }

    mplsFecLastChange OBJECT-TYPE
        SYNTAX   TimeStamp
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
            "The value of sysUpTime at the time of the most
            recent addition/deletion of an entry
            to/from the mplsLdpFectTable or
            the most recent change in values to any objects
            in the mplsLdpFecTable.

            If no such changes have occurred since the last
            re-initialization of the local management subsystem,
            then this object contains a zero value."
        ::= { mplsFecObjects 1 }

    mplsFecIndexNext  OBJECT-TYPE
        SYNTAX           IndexIntegerNextFree
        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."
        ::= { mplsFecObjects 2 }

    mplsFecTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF MplsFecEntry
        MAX-ACCESS  not-accessible
        STATUS        current
        DESCRIPTION
            "This table represents the FEC
            (Forwarding Equivalence Class)
            Information associated with an LSP."
        ::= { mplsFecObjects 3 }
```

```
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                IndexInteger,
    mplsFecType                 INTEGER,
    mplsFecAddrType             InetAddressType,
    mplsFecAddr                 InetAddress,
    mplsFecAddrPrefixLength     InetAddressPrefixLength,
    mplsFecStorageType          StorageType,
    mplsFecRowStatus            RowStatus
}

mplsFecIndex OBJECT-TYPE
    SYNTAX        IndexInteger
    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 an address prefix.

        If the value of this object is 'hostAddress(2)' then
        the FEC type described by this row is a host address."
    REFERENCE
        "RFC3036, Section 3.4.1. FEC TLV."
    ::= { mplsFecEntry 2 }

mplsFecAddrType  OBJECT-TYPE
    SYNTAX        InetAddressType
    MAX-ACCESS  read-create
```

```
        STATUS        current
        DESCRIPTION
            "The value of this object is the type of the
            Internet address.  The value of this object,
            decides how the value of the mplsFecAddr object
            is interpreted."
        REFERENCE
            "RFC3036, Section 3.4.1. FEC TLV."
        ::= { mplsFecEntry 4 }

    mplsFecAddr       OBJECT-TYPE
        SYNTAX        InetAddress
        MAX-ACCESS  read-create
        STATUS        current
        DESCRIPTION
            "The value of this object is interpreted based
            on the value of the 'mplsFecAddrType' object.

            This address is then further interpretted as
            an being used with the address prefix,
            or as the host address.  This further interpretation
            is indicated by the 'mplsFecType' object.
            In other words, the FEC element is populated
            according to the Prefix FEC Element value encoding, or
            the Host Address FEC Element encoding."
        REFERENCE
            "RFC3036, Section 3.4.1 FEC TLV."
        ::= { mplsFecEntry 5 }

    mplsFecAddrPrefixLength  OBJECT-TYPE
        SYNTAX        InetAddressPrefixLength
        MAX-ACCESS  read-create
        STATUS        current
        DESCRIPTION
            "If the value of the 'mplsFecType' is 'hostAddress(2)'
            then this object is undefined.

            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 zero.  If the value of this
            object is zero, this indicates that the
            prefix matches all addresses.  In this case the
            address prefix MUST also be zero (i.e., 'mplsFecAddr'
            should have the value of zero.)"
        REFERENCE
            "RFC3036, Section 3.4.1. FEC TLV."
        DEFVAL { 0 }
```

```
                ::= { mplsFecEntry 3 }

        mplsFecStorageType  OBJECT-TYPE
            SYNTAX        StorageType
            MAX-ACCESS    read-create
            STATUS        current
            DESCRIPTION
                "The storage type for this conceptual row.
                Conceptual rows having the value 'permanent(4)'
                need not allow write-access to any columnar
                objects in the row."
            DEFVAL { nonVolatile }
            ::= { mplsFecEntry 6 }

        mplsFecRowStatus OBJECT-TYPE
            SYNTAX        RowStatus
            MAX-ACCESS    read-create
            STATUS        current
            DESCRIPTION
                "The status of this conceptual row.  If the value of this
                object is 'active(1)', then none of the writable objects
                of this entry can be modified, except to set this object
                to 'destroy(6)'.

                NOTE: if this row is being referenced by any entry in
                the mplsLdpLspFecTable, then a request to destroy
                this row, will result in an inconsistentValue error."
            ::= { mplsFecEntry 7 }

        --
        --  LDP LSP FEC Table
        --

        mplsLdpLspFecLastChange OBJECT-TYPE
           SYNTAX TimeStamp
           MAX-ACCESS read-only
           STATUS current
           DESCRIPTION
                "The value of sysUpTime at the time of the most
                recent addition/deletion of an entry
                to/from the mplsLdpLspFecTable or
                the most recent change in values to any objects in the
                mplsLdpLspFecTable.

                If no such changes have occurred since the last
                re-initialization of the local management subsystem,
                then this object contains a zero value."
          ::= { mplsLdpSessionObjects 9 }
```

```
    mplsLdpLspFecTable OBJECT-TYPE
       SYNTAX        SEQUENCE OF MplsLdpLspFecEntry
       MAX-ACCESS  not-accessible
       STATUS        current
       DESCRIPTION
          "A table which shows the relationship between
          LDP LSPs and FECs.  Each row represents
          a single LDP LSP to FEC association."
     ::= { mplsLdpSessionObjects 10 }

    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,
                      mplsLdpLspFecSegment,
                      mplsLdpLspFecSegmentIndex,
                      mplsLdpLspFecIndex
                    }
     ::= { mplsLdpLspFecTable 1 }

    MplsLdpLspFecEntry ::= SEQUENCE {
       mplsLdpLspFecSegment         INTEGER,
       mplsLdpLspFecSegmentIndex  MplsIndexType,
       mplsLdpLspFecIndex           IndexInteger,
       mplsLdpLspFecStorageType   StorageType,
       mplsLdpLspFecRowStatus       RowStatus
    }

    mplsLdpLspFecSegment OBJECT-TYPE
       SYNTAX INTEGER {
                         inSegment(1),
                         outSegment(2)
                     }
       MAX-ACCESS  not-accessible
       STATUS        current
       DESCRIPTION
          "If the value is inSegment(1), then this
          indicates that the following index,
          mplsLdpLspFecSegmentIndex, contains the same
          value as the mplsInSegmentLdpLspIndex.

          Otherwise, if the value of this object is
```

```
                outSegment(2),  then this
                indicates that following index,
                mplsLdpLspFecSegmentIndex, contains the same
                value as the mplsOutSegmentLdpLspIndex."
            ::= { mplsLdpLspFecEntry 1 }

        mplsLdpLspFecSegmentIndex OBJECT-TYPE
            SYNTAX        MplsIndexType
            MAX-ACCESS  not-accessible
            STATUS        current
            DESCRIPTION
                "This index is interpretted by using the value
                of the mplsLdpLspFecSegment.

                If the mplsLdpLspFecSegment is inSegment(1),
                then this index has the same value as
                mplsInSegmentLdpLspIndex.

                If the mplsLdpLspFecSegment is outSegment(2),
                then this index has the same value as
                mplsOutSegmentLdpLspIndex."
            ::= { mplsLdpLspFecEntry 2 }

        mplsLdpLspFecIndex   OBJECT-TYPE
            SYNTAX        IndexInteger
            MAX-ACCESS  not-accessible
            STATUS        current
            DESCRIPTION
                "This index identifies the FEC entry in the
                 mplsFecTable associated with this session.
                 In other words, the value of this index
                 is the same as the value of the mplsFecIndex
                 that denotes the FEC associated with this
                 Session."
            ::= { mplsLdpLspFecEntry 3 }

        mplsLdpLspFecStorageType  OBJECT-TYPE
            SYNTAX        StorageType
            MAX-ACCESS  read-create
            STATUS        current
            DESCRIPTION
                "The storage type for this conceptual row.
                Conceptual rows having the value 'permanent(4)'
                need not allow write-access to any columnar
                objects in the row."
            DEFVAL { nonVolatile }
            ::= { mplsLdpLspFecEntry 4 }
```

        mplsLdpLspFecRowStatus OBJECT-TYPE
           SYNTAX   RowStatus
           MAX-ACCESS read-create
           STATUS   current
           DESCRIPTION
               "The status of this conceptual row. If the
                value of this object is 'active(1)', then
                none of the writable objects of this entry
                can be modified.

                The Agent should delete this row when
                the session ceases to exist. If an
                operator wants to associate the session with
                a different FEC, the recommended
                procedure is (as described in detail in the section
                entitled, 'Changing Values After Session
                Establishment', and again described in the
                DESCRIPTION clause of the
                mplsLdpEntityAdminStatus object)
                is to set the mplsLdpEntityAdminStatus to
                down, thereby explicitly causing a session
                to be torn down. This will also
                cause this entry to be deleted.

                Then, set the mplsLdpEntityAdminStatus
                to enable which enables a new session to be initiated.
                Once the session is initiated, an entry may be
                added to this table to associate the new session
                with a FEC."
           ::= { mplsLdpLspFecEntry 5 }

     --
     -- 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.
     --

     mplsLdpSessionPeerAddrTable OBJECT-TYPE
         SYNTAX   SEQUENCE OF MplsLdpSessionPeerAddrEntry
         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 'sparse augments',
                   the mplsLdpSessionTable's information."
              ::= { mplsLdpSessionObjects 11 }

         mplsLdpSessionPeerAddrEntry OBJECT-TYPE
              SYNTAX        MplsLdpSessionPeerAddrEntry
              MAX-ACCESS    not-accessible
              STATUS        current
              DESCRIPTION
                   "An entry in this table represents information on
                   a session's 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,
                             mplsLdpSessionPeerAddrIndex
                             }
              ::= { mplsLdpSessionPeerAddrTable 1 }

         MplsLdpSessionPeerAddrEntry ::= SEQUENCE {
              mplsLdpSessionPeerAddrIndex        Unsigned32,
              mplsLdpSessionPeerNextHopAddrType InetAddressType,
              mplsLdpSessionPeerNextHopAddr      InetAddress
         }

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

         mplsLdpSessionPeerNextHopAddrType OBJECT-TYPE
              SYNTAX        InetAddressType
              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
```

```
             mplsLdpSessionPeerNextHopAddr."
         ::= { mplsLdpSessionPeerAddrEntry 2 }

     mplsLdpSessionPeerNextHopAddr OBJECT-TYPE
         SYNTAX       InetAddress
         MAX-ACCESS   read-only
         STATUS       current
         DESCRIPTION
             "The next hop address.  The type of this address
             is specified by the value of the
             mplsLdpSessionPeerNextHopAddrType."
         REFERENCE
             "RFC3036, Section 2.7. LDP Identifiers
             and Next Hop Addresses"
          ::= { mplsLdpSessionPeerAddrEntry 3 }

     ---
     --- Notifications
     ---

     mplsLdpInitSessionThresholdExceeded NOTIFICATION-TYPE
         OBJECTS     {
                         mplsLdpEntityInitSessionThreshold
                     }
         STATUS      current
         DESCRIPTION
            "This notification is generated when the value of
            the 'mplsLdpEntityInitSessionThreshold' object
            is not zero, and the number of Session
            Initialization messages exceeds the value
            of the 'mplsLdpEntityInitSessionThreshold' object."
         ::= { mplsLdpNotifications 1 }

     mplsLdpPathVectorLimitMismatch NOTIFICATION-TYPE
         OBJECTS     {
                         mplsLdpEntityPathVectorLimit,
                         mplsLdpPeerPathVectorLimit
                     }
         STATUS      current
         DESCRIPTION
            "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."
         ::= { mplsLdpNotifications 2 }
```

```
    mplsLdpSessionUp NOTIFICATION-TYPE
        OBJECTS      {
                        mplsLdpSessionState,
                        mplsLdpSessionDiscontinuityTime,
                        mplsLdpSessionStatsUnknownMesTypeErrors,
                        mplsLdpSessionStatsUnknownTlvErrors
                     }
        STATUS       current
        DESCRIPTION
           "If this notification is sent when the
           value of 'mplsLdpSessionState' enters
           the 'operational(5)' state."
        ::= { mplsLdpNotifications 3 }

    mplsLdpSessionDown NOTIFICATION-TYPE
        OBJECTS      {
                        mplsLdpSessionState,
                        mplsLdpSessionDiscontinuityTime,
                        mplsLdpSessionStatsUnknownMesTypeErrors,
                        mplsLdpSessionStatsUnknownTlvErrors

                     }
        STATUS       current
        DESCRIPTION
           "This notification is sent when the
           value of 'mplsLdpSessionState' leaves
           the 'operational(5)' state."
        ::= { mplsLdpNotifications 4 }

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

    mplsLdpGroups
        OBJECT IDENTIFIER ::= { mplsLdpConformance 1 }

    mplsLdpCompliances
        OBJECT IDENTIFIER ::= { mplsLdpConformance 2 }


    --
    -- 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,
                                     mplsLdpNotificationsGroup
                                   }
         GROUP mplsLdpLspGroup
         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)', IPv4 and globally unique IPv6 addresses."

         OBJECT mplsLdpEntityTargetPeerAddr
         SYNTAX InetAddress (SIZE(0|4|16))
         DESCRIPTION
             "An implementation is only required to support IPv4 and
             globally unique 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 mplsFecAddrType
         SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }
         DESCRIPTION
            "An implementation is only required to support
            'unknown(0)', IPv4 and globally unique IPv6 addresses."

         OBJECT mplsFecAddr
         SYNTAX InetAddress (SIZE(0|4|16))
         DESCRIPTION
             "An implementation is only required to support IPv4 and
             globally unique IPv6 addresses."

         OBJECT mplsFecRowStatus
         SYNTAX RowStatus { active(1) }
         WRITE-SYNTAX RowStatus { createAndGo(4), destroy(6) }
         DESCRIPTION
```

```
                "Support for createAndWait and notInService is not
                required."

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

        OBJECT mplsLdpSessionPeerNextHopAddrType
        SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }
        DESCRIPTION
                "An implementation is only required to support
                'unknown(0)', IPv4 and globally unique IPv6 addresses."

        OBJECT mplsLdpSessionPeerNextHopAddr
        SYNTAX InetAddress (SIZE(0|4|16))
        DESCRIPTION
                "An implementation is only required to support IPv4
                and globally unique IPv6 addresses."

        ::= { mplsLdpCompliances 1 }

    --
    -- Read-Only Compliance
    --

    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,
                                  mplsLdpNotificationsGroup
                                }

        GROUP mplsLdpLspGroup
        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         mplsLdpEntityTcpPort
        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."

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

        OBJECT         mplsLdpEntityInitSessionThreshold
        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          mplsLdpEntityTransportAddrKind
        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)', IPv4 and globally unique IPv6 addresses."

        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
            globally unique 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       mplsFecAddrPrefixLength
        MIN-ACCESS   read-only
        DESCRIPTION
            "Write access is not required."

        OBJECT       mplsFecAddrType
        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)', IPv4 and globally unique IPv6 addresses."

        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
            globally unique IPv6 addresses."

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

        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       mplsLdpLspFecStorageType
        MIN-ACCESS   read-only
        DESCRIPTION
            "Write access is not required."
```

```
        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 mplsLdpSessionPeerNextHopAddrType
        SYNTAX InetAddressType { unknown(0), ipv4(1), ipv6(2) }
        DESCRIPTION
           "An implementation is only required to support
            'unknown(0)', IPv4 and globally unique IPv6 addresses."


        OBJECT mplsLdpSessionPeerNextHopAddr
        SYNTAX InetAddress (SIZE(0|4|16))
        DESCRIPTION
            "An implementation is only required to support IPv4
             and globally unique IPv6 addresses."

        ::= { mplsLdpCompliances 2 }

    -- units of conformance

    mplsLdpGeneralGroup OBJECT-GROUP
        OBJECTS {
        mplsLdpLsrId,
        mplsLdpLsrLoopDetectionCapable,
        mplsLdpEntityLastChange,
        mplsLdpEntityIndexNext,
        mplsLdpEntityProtocolVersion,
        mplsLdpEntityAdminStatus,
        mplsLdpEntityOperStatus,
        mplsLdpEntityTcpPort,
        mplsLdpEntityUdpDscPort,
        mplsLdpEntityMaxPduLength,
        mplsLdpEntityKeepAliveHoldTimer,
        mplsLdpEntityHelloHoldTimer,
        mplsLdpEntityInitSessionThreshold,
        mplsLdpEntityLabelDistMethod,
        mplsLdpEntityLabelRetentionMode,
        mplsLdpEntityPathVectorLimit,
        mplsLdpEntityHopCountLimit,
        mplsLdpEntityTransportAddrKind,
        mplsLdpEntityTargetPeer,
        mplsLdpEntityTargetPeerAddrType,
        mplsLdpEntityTargetPeerAddr,
        mplsLdpEntityLabelType,
```

```
        mplsLdpEntityDiscontinuityTime,
        mplsLdpEntityStorageType,
        mplsLdpEntityRowStatus,
        mplsLdpEntityStatsSessionAttempts,
        mplsLdpEntityStatsSessionRejectedNoHelloErrors,
        mplsLdpEntityStatsSessionRejectedAdErrors,
        mplsLdpEntityStatsSessionRejectedMaxPduErrors,
        mplsLdpEntityStatsSessionRejectedLRErrors,
        mplsLdpEntityStatsBadLdpIdentifierErrors,
        mplsLdpEntityStatsBadPduLengthErrors,
        mplsLdpEntityStatsBadMessageLengthErrors,
        mplsLdpEntityStatsBadTlvLengthErrors,
        mplsLdpEntityStatsMalformedTlvValueErrors,
        mplsLdpEntityStatsKeepAliveTimerExpErrors,
        mplsLdpEntityStatsShutdownReceivedNotifications,
        mplsLdpEntityStatsShutdownSentNotifications,
        mplsLdpPeerLastChange,
        mplsLdpPeerLabelDistMethod,
        mplsLdpPeerPathVectorLimit,
        mplsLdpPeerTransportAddrType,
        mplsLdpPeerTransportAddr,
        mplsLdpHelloAdjacencyHoldTimeRem,
        mplsLdpHelloAdjacencyHoldTime,
        mplsLdpHelloAdjacencyType,
        mplsLdpSessionStateLastChange,
        mplsLdpSessionState,
        mplsLdpSessionRole,
        mplsLdpSessionProtocolVersion,
        mplsLdpSessionKeepAliveHoldTimeRem,
        mplsLdpSessionKeepAliveTime,
        mplsLdpSessionMaxPduLength,
        mplsLdpSessionDiscontinuityTime,
        mplsLdpSessionStatsUnknownMesTypeErrors,
        mplsLdpSessionStatsUnknownTlvErrors,
        mplsLdpSessionPeerNextHopAddrType,
        mplsLdpSessionPeerNextHopAddr,
        mplsFecLastChange,
        mplsFecIndexNext,
        mplsFecType,
        mplsFecAddrType,
        mplsFecAddr,
        mplsFecAddrPrefixLength,
        mplsFecStorageType,
        mplsFecRowStatus
        }
        STATUS     current
        DESCRIPTION
            "Objects that apply to all MPLS LDP implementations."
```

```
            ::= { mplsLdpGroups 1 }

    mplsLdpLspGroup OBJECT-GROUP
        OBJECTS {
        mplsInSegmentLdpLspLabelType,
        mplsInSegmentLdpLspType,
        mplsOutSegmentLdpLspLabelType,
        mplsOutSegmentLdpLspType,
        mplsLdpLspFecLastChange,
        mplsLdpLspFecStorageType,
        mplsLdpLspFecRowStatus
        }
        STATUS     current
        DESCRIPTION
            "These objects are for LDP implementations
            which interface to the Label Information Base (LIB)
            in the MPLS-LSR-STD-MIB.  The LIB is
            represented in the mplsInSegmentTable,
            mplsOutSegmentTable and mplsXCTable."
        ::= { mplsLdpGroups 2 }

    mplsLdpNotificationsGroup NOTIFICATION-GROUP
        NOTIFICATIONS { mplsLdpInitSessionThresholdExceeded,
                        mplsLdpPathVectorLimitMismatch,
                        mplsLdpSessionUp,
                        mplsLdpSessionDown
                          }
        STATUS    current
        DESCRIPTION
            "The notification for an MPLS LDP implementation."
        ::= { mplsLdpGroups 3 }

    END
```

4.1. The MPLS-LDP-ATM-STD-MIB Module

This MIB Module MUST be supported if LDP uses ATM as the Layer 2
medium. There are three tables in this MIB Module. Two tables are
for configuring LDP to use ATM. These tables are the
mplsLdpEntityAtmTable and the mplsLdpEntityAtmLRTable. The third
table is the mplsLdpAtmSessionTable which is a read-only table. This
MIB Module IMPORTS the AtmVpIdentifier TEXTUAL-CONVENTION from
[RFC2514].

4.1.1. The LDP Entity ATM Table

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

4.1.2. The LDP Entity ATM Label Range Table

   The mplsLdpEntityAtmLRTable provides a way to configure information
   which would be contained in the "ATM Label Range Components" portion
   of an LDP PDU Intialization Message, see [RFC3035] and [RFC3036].

4.1.3. 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-STD-MIB DEFINITIONS ::= BEGIN

   IMPORTS
       OBJECT-TYPE, MODULE-IDENTITY,
       Unsigned32
           FROM SNMPv2-SMI   -- [RFC2578]
       MODULE-COMPLIANCE, OBJECT-GROUP
           FROM SNMPv2-CONF   -- [RFC2580]
       RowStatus,
       StorageType
           FROM SNMPv2-TC   -- [RFC2579]

       InterfaceIndexOrZero
           FROM IF-MIB   -- [RFC2020]

       AtmVpIdentifier
           FROM ATM-TC-MIB   -- [RFC2514]

       mplsStdMIB,
       MplsAtmVcIdentifier
           FROM MPLS-TC-STD-MIB   -- [RFC3811]

       mplsLdpEntityLdpId,
       mplsLdpEntityIndex,
       mplsLdpPeerLdpId
           FROM MPLS-LDP-STD-MIB   -- [RFC3813]

       ;

   mplsLdpAtmStdMIB MODULE-IDENTITY
       LAST-UPDATED "200406030000Z" -- June 3, 2004

```
         ORGANIZATION "Multiprotocol Label Switching (mpls)
                      Working Group"
         CONTACT-INFO
             "Joan Cucchiara (jcucchiara@mindspring.com)
              Marconi Communications, Inc.

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              James V. Luciani (james_luciani@mindspring.com)
              Marconi Communications, Inc.

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

              MPLS Working Group, email: mpls@uu.net
          "
         DESCRIPTION
             "Copyright (C) The Internet Society (2004). The
              initial version of this MIB module was published
              in RFC 3815. For full legal notices see the RFC
              itself or see:
              http://www.ietf.org/copyrights/ianamib.html

              This MIB contains managed object definitions for
              configuring and monitoring the Multiprotocol Label
              Switching (MPLS), Label Distribution Protocol (LDP),
              utilizing Asynchronous Transfer Mode (ATM) as the Layer 2
              media."
         REVISION "200406030000Z"  -- June 3, 2004
         DESCRIPTION
             "Initial version published as part of RFC 3815."

         ::= { mplsStdMIB 5 }

    --********************************************************************

    mplsLdpAtmObjects          OBJECT IDENTIFIER
                                   ::= { mplsLdpAtmStdMIB 1 }
    mplsLdpAtmConformance   OBJECT IDENTIFIER
                                   ::= { mplsLdpAtmStdMIB 2 }

    --********************************************************************
    -- MPLS LDP ATM Objects
    --********************************************************************
    --
    -- Ldp Entity Objects for ATM
```

```
   --

   mplsLdpEntityAtmObjects  OBJECT IDENTIFIER ::=
                               { mplsLdpAtmObjects 1 }

   mplsLdpEntityAtmTable  OBJECT-TYPE
       SYNTAX        SEQUENCE OF MplsLdpEntityAtmEntry
       MAX-ACCESS  not-accessible
       STATUS        current
       DESCRIPTION
           "This table contains ATM specific information
           which could be used in the
           'Optional Parameters' and other ATM specific
           information.

           This table 'sparse augments' the mplsLdpEntityTable
           when ATM is the Layer 2 medium."
       ::= { mplsLdpEntityAtmObjects 1 }

   mplsLdpEntityAtmEntry OBJECT-TYPE
       SYNTAX        MplsLdpEntityAtmEntry
       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
                     }
       ::= { mplsLdpEntityAtmTable 1 }


   MplsLdpEntityAtmEntry ::= SEQUENCE {
       mplsLdpEntityAtmIfIndexOrZero           InterfaceIndexOrZero,
       mplsLdpEntityAtmMergeCap                INTEGER,
       mplsLdpEntityAtmLRComponents            Unsigned32,
       mplsLdpEntityAtmVcDirectionality        INTEGER,
       mplsLdpEntityAtmLsrConnectivity         INTEGER,
       mplsLdpEntityAtmDefaultControlVpi       AtmVpIdentifier,
       mplsLdpEntityAtmDefaultControlVci       MplsAtmVcIdentifier,
       mplsLdpEntityAtmUnlabTrafVpi            AtmVpIdentifier,
       mplsLdpEntityAtmUnlabTrafVci            MplsAtmVcIdentifier,
       mplsLdpEntityAtmStorageType             StorageType,
       mplsLdpEntityAtmRowStatus               RowStatus
   }

   mplsLdpEntityAtmIfIndexOrZero  OBJECT-TYPE
       SYNTAX        InterfaceIndexOrZero
```

```
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
           "This value represents either the InterfaceIndex
            or 0 (zero).  The value of zero means that the
            InterfaceIndex is not 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."
        ::= { mplsLdpEntityAtmEntry 1 }

     mplsLdpEntityAtmMergeCap OBJECT-TYPE
        SYNTAX       INTEGER {
                        notSupported(0),
                        vpMerge(1),
                        vcMerge(2),
                        vpAndVcMerge(3)
                     }
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
           "Denotes the Merge Capability of this Entity.
            This is the EXACT value for the ATM Session
            Parameter, field M (for ATM Merge Capabilities).
            The ATM Session Parameter is an optional
            parameter in the Initialization Message.

            The description from rfc3036.txt is:

            'M, ATM Merge Capabilities
               Specifies the merge capabilities of an ATM switch.  The
               following values are supported in this version of the
               specification:

                        Value           Meaning

                        0               Merge not supported
                        1               VP Merge supported
                        2               VC Merge supported
                        3               VP & VC Merge supported
```

                 If the merge capabilities of the LSRs differ, then:
                 - Non-merge and VC-merge LSRs may freely interoperate.

                 - The interoperability of VP-merge-capable switches
                    with non-VP-merge-capable switches is a subject
                    for future study. When the LSRs differ on the
                    use of VP-merge, the session is established,
                    but VP merge is not used.'

                 Please refer to the following reference for a
                 complete description of this feature."
          REFERENCE
              "RFC3036, LDP Specification, Section 3.5.3
              Initialization Message."
          ::= { mplsLdpEntityAtmEntry 2 }

       mplsLdpEntityAtmLRComponents OBJECT-TYPE
           SYNTAX   Unsigned32 (1..65535)
           MAX-ACCESS read-only
           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.

              This is the EXACT value for the ATM Session Parameter,
              field N (for Number of label range components).
              The ATM Session Parameter is an optional parameter
              in the Initialization Message.

              The description from rfc3036.txt is:

              'N, Number of label range components
                 Specifies the number of ATM Label Range
                 Components included in the TLV.'

               Please refer to the following reference for
               a complete description of this feature."
            REFERENCE
              "RFC3036, LDP Specification, Section 3.5.3
              Initialization Message."
          ::= { mplsLdpEntityAtmEntry 3 }

       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.

              This is the EXACT value for the ATM Session Parameter,
              field D (for VC Directionality). The ATM Session
              Parameter is an optional parameter in the
              Initialization Message.

              The description from rfc3036.txt is:

              'D, VC Directionality
                 A value of 0 specifies bidirectional VC capability,
                 meaning the LSR can (within a given VPI) support
                 the use of a given VCI as a label for both link
                 directions independently. A value of 1
                 specifies unidirectional VC capability, meaning
                 (within a given VPI) a given VCI may appear in
                 a label mapping for one direction on the link
                 only. When either or both of the peers
                 specifies unidirectional VC capability, both
                 LSRs use unidirectional VC label assignment for
                 the link as follows. The LSRs compare their
                 LDP Identifiers as unsigned integers. The LSR
                 with the larger LDP Identifier may assign
                 only odd-numbered VCIs in the VPI/VCI
                 range as labels. The system with the smaller
                 LDP Identifier may assign only even-numbered
                 VCIs in the VPI/VCI range as labels.'

                 Please refer to the following reference
                 for a complete description of this feature."
           REFERENCE
              "RFC3036, LDP Specification, Section 3.5.3
              Initialization Message."
          ::= { mplsLdpEntityAtmEntry 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 }
        ::= { mplsLdpEntityAtmEntry 5 }

    mplsLdpEntityAtmDefaultControlVpi 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 }
        ::= { mplsLdpEntityAtmEntry 6 }

    mplsLdpEntityAtmDefaultControlVci OBJECT-TYPE
        SYNTAX      MplsAtmVcIdentifier
        MAX-ACCESS  read-create
        STATUS      current
        DESCRIPTION
            "The Default VCI value for a non-MPLS connection.  The
            default value of this is 32 but other values may be
            configured.  This object allows a different value to
            be configured."
        DEFVAL { 32 }
        ::= { mplsLdpEntityAtmEntry 7 }

    mplsLdpEntityAtmUnlabTrafVpi 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 'mplsLdpEntityAtmDefaultControlVpi', however
            another value may be configured."
        DEFVAL  { 0 }
        ::= { mplsLdpEntityAtmEntry 8 }
```

```
    mplsLdpEntityAtmUnlabTrafVci 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 'mplsLdpEntityAtmDefaultControlVci', however
            another value may be configured."
        DEFVAL  { 32 }
        ::= { mplsLdpEntityAtmEntry 9 }

    mplsLdpEntityAtmStorageType  OBJECT-TYPE
        SYNTAX       StorageType
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "The storage type for this conceptual row.
            Conceptual rows having the value 'permanent(4)'
            need not allow write-access to any columnar
            objects in the row."
        DEFVAL { nonVolatile }
        ::= { mplsLdpEntityAtmEntry 10 }

    mplsLdpEntityAtmRowStatus OBJECT-TYPE
        SYNTAX       RowStatus
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "The status of this conceptual row.  All writable
             objects in this row may be modified at any time,
             however, as described in detail in the section
             entitled, 'Changing Values After Session
             Establishment', and again described in the
             DESCRIPTION clause of the mplsLdpEntityAdminStatus
             object, if a session has been initiated with a Peer,
             changing objects in this table will wreak havoc
             with the session and interrupt traffic.  To repeat again:
             the recommended procedure is to set the
             mplsLdpEntityAdminStatus to down, thereby explicitly
             causing a session to be torn down. Then,
             change objects in this entry, then set the
             mplsLdpEntityAdminStatus to enable
             which enables a new session to be initiated."
        ::= { mplsLdpEntityAtmEntry 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 (LR) 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.

                There must exist at least one entry in this
                table for every LDP Entity that has
                'mplsLdpEntityOptionalParameters' object with
                a value of 'atmSessionParameters'."
            ::= { 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 become active unless a unique and
        non-overlapping range is specified.

        At least one label range entry for a
        specific LDP Entity MUST
        include the default VPI/VCI  values denoted
        in the LDP Entity Table.

        A request to create a row with an overlapping
        range should result in an inconsistentValue
        error."
    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.
        The value of zero is a valid value for the VPI portion
        of the label."
    ::= { 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
        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 conceptual row.
            Conceptual rows having the value 'permanent(4)'
            need not allow write-access to any columnar
            objects in the row."
        DEFVAL { nonVolatile }
        ::= { mplsLdpEntityAtmLREntry 5 }

    mplsLdpEntityAtmLRRowStatus OBJECT-TYPE
        SYNTAX RowStatus
        MAX-ACCESS read-create
        STATUS current
        DESCRIPTION
            "The status of this conceptual row.  All writable
             objects in this row may be modified at any time,
             however, as described in detail in the section
             entitled, 'Changing Values After Session
             Establishment', and again described in the
             DESCRIPTION clause of the
             mplsLdpEntityAdminStatus object,
             if a session has been initiated with a Peer,
             changing objects in this table will
             wreak havoc with the session and interrupt traffic.
             To repeat again:  the recommended procedure
             is to set the mplsLdpEntityAdminStatus to
             down, thereby explicitly causing a session
             to be torn down. Then, change objects in this
             entry, then set the mplsLdpEntityAdminStatus
             to enable which enables a new session
             to be initiated."
        ::= { mplsLdpEntityAtmLREntry 6 }
```

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

   mplsLdpAtmSessionObjects OBJECT IDENTIFIER ::=
                                  { mplsLdpAtmObjects 2 }

   mplsLdpAtmSessionTable OBJECT-TYPE
       SYNTAX        SEQUENCE OF MplsLdpAtmSessionEntry
       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.

           This table cannot use the 'AUGMENTS'
           clause because there is not necessarily
           a one-to-one mapping between this table
           and the mplsLdpSessionTable."
       ::= { mplsLdpAtmSessionObjects 1 }

   mplsLdpAtmSessionEntry OBJECT-TYPE
       SYNTAX        MplsLdpAtmSessionEntry
       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,
                       mplsLdpSessionAtmLRLowerBoundVpi,
                       mplsLdpSessionAtmLRLowerBoundVci
                     }
       ::= { mplsLdpAtmSessionTable 1 }

   MplsLdpAtmSessionEntry ::= SEQUENCE {
       mplsLdpSessionAtmLRLowerBoundVpi        AtmVpIdentifier,
       mplsLdpSessionAtmLRLowerBoundVci        MplsAtmVcIdentifier,
       mplsLdpSessionAtmLRUpperBoundVpi        AtmVpIdentifier,
```

```
        mplsLdpSessionAtmLRUpperBoundVci      MplsAtmVcIdentifier
    }

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

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

mplsLdpSessionAtmLRUpperBoundVpi OBJECT-TYPE
    SYNTAX AtmVpIdentifier
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The maximum VPI number for this range."
    ::= { mplsLdpAtmSessionEntry 3 }

mplsLdpSessionAtmLRUpperBoundVci OBJECT-TYPE
    SYNTAX MplsAtmVcIdentifier
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "The maximum VCI number for this range."
    ::= { mplsLdpAtmSessionEntry 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."

        ::= { mplsLdpAtmCompliances 1 }

    --
    -- Read-Only Compliance
    --

    mplsLdpAtmModuleReadOnlyCompliance 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        mplsLdpEntityAtmVcDirectionality
        MIN-ACCESS   read-only
        DESCRIPTION
           "Write access is not required."

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

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

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

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

        OBJECT        mplsLdpEntityAtmUnlabTrafVci
        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 }

   --
   -- units of conformance
   --

   mplsLdpAtmGroup OBJECT-GROUP
        OBJECTS {
        mplsLdpEntityAtmIfIndexOrZero,
        mplsLdpEntityAtmMergeCap,
        mplsLdpEntityAtmLRComponents,
        mplsLdpEntityAtmVcDirectionality,
        mplsLdpEntityAtmLsrConnectivity,
        mplsLdpEntityAtmDefaultControlVpi,
        mplsLdpEntityAtmDefaultControlVci,
        mplsLdpEntityAtmUnlabTrafVpi,
        mplsLdpEntityAtmUnlabTrafVci,
        mplsLdpEntityAtmStorageType,
        mplsLdpEntityAtmRowStatus,
        mplsLdpEntityAtmLRMaxVpi,
        mplsLdpEntityAtmLRMaxVci,
        mplsLdpEntityAtmLRStorageType,
        mplsLdpEntityAtmLRRowStatus,
        mplsLdpSessionAtmLRUpperBoundVpi,
        mplsLdpSessionAtmLRUpperBoundVci

        }
        STATUS     current
```

          DESCRIPTION
              "Objects that apply to all MPLS LDP implementations
              using ATM as the Layer 2."
          ::= { mplsLdpAtmGroups 1 }

     END

4.2. The MPLS-LDP-FRAME-RELAY-STD-MIB Module

   This MIB Module MUST be supported if LDP uses FRAME RELAY as the
   Layer 2 medium. There are three tables in this MIB Module. Two
   tables are to configure LDP for using Frame Relay. These tables are
   the mplsLdpEntityFrameRelayTable and the
   mplsLdpEntityFrameRelayLRTable. The third table,
   mplsLdpFrameRelaySessionTable, is a read-only table. This MIB Module
   IMPORTS the DLCI TEXTUAL-CONVENTION from [RFC2115].

4.2.1. The LDP Entity Frame Relay Table

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

4.2.2. The LDP Entity Frame Relay Label Range Table

   The mplsLdpEntityFrameRelayLRTable provides a way to configure
   information which would be contained in the "Frame Relay Label Range
   Components" portion of an LDP PDU Intialization Message, see
   [RFC3034] and [RFC3036].

4.2.3. The LDP Frame Relay Session Table

   The mplsLdpFrameRelaySessionTable is a table which contains session
   information specific to Frame Relay.

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

   IMPORTS
       OBJECT-TYPE,
       MODULE-IDENTITY,
       Unsigned32
           FROM SNMPv2-SMI   -- [RFC2578]
       MODULE-COMPLIANCE,
       OBJECT-GROUP
           FROM SNMPv2-CONF   -- [RFC2580]

       RowStatus,
       StorageType

```
          FROM SNMPv2-TC                                 -- [RFC2579]

      DLCI
          FROM FRAME-RELAY-DTE-MIB                        -- [RFC2115]

      InterfaceIndexOrZero
          FROM IF-MIB                                     -- [RFC2020]

      mplsStdMIB
          FROM MPLS-TC-STD-MIB                            -- [RFC3811]

      mplsLdpEntityLdpId,
      mplsLdpEntityIndex,
      mplsLdpPeerLdpId
          FROM MPLS-LDP-STD-MIB                           -- [RFC3813]
      ;

   mplsLdpFrameRelayStdMIB MODULE-IDENTITY
       LAST-UPDATED "200406030000Z"   -- June 3, 2004
       ORGANIZATION "Multiprotocol Label Switching (mpls)
                     Working Group"
       CONTACT-INFO
           "Joan Cucchiara (jcucchiara@mindspring.com)
            Marconi Communications, Inc.

            Hans Sjostrand (hans@ipunplugged.com)
            ipUnplugged

            James V. Luciani (james_luciani@mindspring.com)
            Marconi Communications, Inc.

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

            MPLS Working Group, email: mpls@uu.net
           "
       DESCRIPTION
           "Copyright (C) The Internet Society (year). The
           initial version of this MIB module was published
           in RFC 3815. For full legal notices see the RFC
           itself or see:
           http://www.ietf.org/copyrights/ianamib.html

           This MIB contains managed object definitions for
           configuring and monitoring the Multiprotocol Label
           Switching (MPLS), Label Distribution Protocol (LDP),
           utilizing Frame Relay as the Layer 2 media."
```

```
     REVISION "200406030000Z"  -- June 6, 2004
     DESCRIPTION
         "Initial version published as part of RFC 3815."

     ::= { mplsStdMIB 6 }


  --****************************************************************

  mplsLdpFrameRelayObjects  OBJECT IDENTIFIER
                              ::= { mplsLdpFrameRelayStdMIB 1 }

  mplsLdpFrameRelayConformance   OBJECT IDENTIFIER
                              ::= { mplsLdpFrameRelayStdMIB 2 }


  --****************************************************************
  -- MPLS LDP Frame Relay Objects
  --****************************************************************

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

  mplsLdpEntityFrameRelayObjects OBJECT IDENTIFIER ::=
                                   { mplsLdpFrameRelayObjects 1 }

  mplsLdpEntityFrameRelayTable  OBJECT-TYPE
      SYNTAX      SEQUENCE OF MplsLdpEntityFrameRelayEntry
      MAX-ACCESS  not-accessible
      STATUS      current
      DESCRIPTION
          "This table contains Frame Relay specific
           information which could be used in the
           'Optional Parameters' and other Frame Relay
           specific information.

           This table 'sparse augments' the mplsLdpEntityTable
           when Frame Relay is the Layer 2 medium."
      ::= { mplsLdpEntityFrameRelayObjects 1 }

  mplsLdpEntityFrameRelayEntry OBJECT-TYPE
      SYNTAX      MplsLdpEntityFrameRelayEntry
      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
```

```
                }
        ::= { mplsLdpEntityFrameRelayTable 1 }

    MplsLdpEntityFrameRelayEntry ::= SEQUENCE {
        mplsLdpEntityFrameRelayIfIndexOrZero        InterfaceIndexOrZero,
        mplsLdpEntityFrameRelayMergeCap             INTEGER,
        mplsLdpEntityFrameRelayLRComponents         Unsigned32,
        mplsLdpEntityFrameRelayVcDirectionality     INTEGER,
        mplsLdpEntityFrameRelayStorageType          StorageType,
        mplsLdpEntityFrameRelayRowStatus            RowStatus
    }

    mplsLdpEntityFrameRelayIfIndexOrZero 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."
        ::= { mplsLdpEntityFrameRelayEntry 1 }

    mplsLdpEntityFrameRelayMergeCap OBJECT-TYPE
        SYNTAX          INTEGER {
                           notSupported(0),
                           supported(1)
                        }
        MAX-ACCESS   read-create
        STATUS        current
        DESCRIPTION
            "This represents whether or not the Frame Relay merge
            capability is supported.  This is the EXACT value for the
            Frame Relay Session Parameter, field M (for Frame Relay
            Merge Capabilities).  The Frame Relay Session Parameter
            is an optional parameter in the Initialization Message.
```

            The description from rfc3036.txt is:
            'M, Frame Relay Merge Capabilities
              Specifies the merge capabilities of a Frame
              Relay switch. The following values are
              supported in this version of the
              specification:

                    Value   Meaning

                      0   Merge not supported
                      1   Merge supported

            Non-merge and merge Frame Relay LSRs may
            freely interoperate.'

            Please refer to the following reference for a
            complete description of this feature."
         REFERENCE
            "RFC3036, LDP Specification, Section 3.5.3
            Initialization Message."
         ::= { mplsLdpEntityFrameRelayEntry 2 }

  mplsLdpEntityFrameRelayLRComponents OBJECT-TYPE
        SYNTAX   Unsigned32 (1..65535)
        MAX-ACCESS   read-only
        STATUS   current
        DESCRIPTION
            "Number of Label Range Components in the Initialization
            message. This also represents the number of entries
            in the mplsLdpEntityFrameRelayLRTable which correspond
            to this entry.

            This is the EXACT value for the Frame Relay Session
            Parameter, field N (for Number of label range
            components). The Frame Relay Session Parameter
            is an optional parameter in the Initialization
            Message.

            The description from rfc3036.txt is:

            'N, Number of label range components
                Specifies the number of Frame Relay Label
                Range Components included in the TLV.'

             Please refer to the following reference for a
             complete description of this feature."
          REFERENCE
            "RFC3036, LDP Specification, Section 3.5.3

              Initialization Message."
          ::= { mplsLdpEntityFrameRelayEntry 3 }

     mplsLdpEntityFrameRelayVcDirectionality 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.

              This is the EXACT value for the Frame Relay Session
              Parameter, field D (for VC Directionality). The
              Frame Relay Session Parameter is an optional
              parameter in the Initialization Message.

              The description from rfc3036.txt is:

              'D, VC Directionality
                A value of 0 specifies bidirectional VC capability,
                meaning the LSR can support the use of a given
                DLCI as a label for both link directions
                independently. A value of 1 specifies
                unidirectional VC capability, meaning a given
                DLCI may appear in a label mapping for one
                direction on the link only. When either or both
                of the peers specifies unidirectional VC
                capability, both LSRs use unidirectional VC
                label assignment for the link as follows. The
                LSRs compare their LDP Identifiers as unsigned
                integers. The LSR with the larger LDP
                Identifier may assign only odd-numbered DLCIs
                in the range as labels. The system with the
                smaller LDP Identifier may assign only
                even-numbered DLCIs in the range as labels.'

              Please refer to the following reference for a
              complete description of this feature."
           REFERENCE
              "RFC3036, LDP Specification, Section 3.5.3
              Initialization Message."
          ::= { mplsLdpEntityFrameRelayEntry 4 }

```
   mplsLdpEntityFrameRelayStorageType  OBJECT-TYPE
       SYNTAX        StorageType
       MAX-ACCESS  read-create
       STATUS        current
       DESCRIPTION
           "The storage type for this conceptual row.
           Conceptual rows having the value 'permanent(4)'
           need not allow write-access to any columnar
           objects in the row."
       DEFVAL { nonVolatile }
       ::= { mplsLdpEntityFrameRelayEntry 5 }

   mplsLdpEntityFrameRelayRowStatus OBJECT-TYPE
       SYNTAX        RowStatus
       MAX-ACCESS  read-create
       STATUS        current
       DESCRIPTION
           "The status of this conceptual row.  All writable
            objects in this row may be modified at any time,
            however, as described in detail in the section
            entitled, 'Changing Values After Session
            Establishment', and again described in the
            DESCRIPTION clause of the
            mplsLdpEntityAdminStatus object,
            if a session has been initiated with a Peer,
            changing objects in this table will
            wreak havoc with the session and interrupt
            traffic.  To repeat again:
            the recommended procedure is to set the
            mplsLdpEntityAdminStatus to
            down, thereby explicitly causing a
            session to be torn down. Then,
            change objects in this entry, then set
            the mplsLdpEntityAdminStatus
            to enable which enables a new session
            to be initiated."
        ::= { mplsLdpEntityFrameRelayEntry 6 }

   --
   -- Frame Relay Label Range Components
   --

   mplsLdpEntityFrameRelayLRTable  OBJECT-TYPE
       SYNTAX        SEQUENCE OF MplsLdpEntityFrameRelayLREntry
       MAX-ACCESS  not-accessible
       STATUS        current
       DESCRIPTION
           "This table contains information about the
```

            Optional Parameters for the Frame Relay Session
            in the LDP Initialization Message, specifically
            it contains information about the Frame Relay
            Label Range Components.

            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."
        ::= { mplsLdpEntityFrameRelayObjects 2 }

    mplsLdpEntityFrameRelayLREntry OBJECT-TYPE
        SYNTAX   MplsLdpEntityFrameRelayLREntry
        MAX-ACCESS   not-accessible
        STATUS   current
        DESCRIPTION
            "An entry in this table represents the Frame Relay
            Label Range Component associated with the LDP entity."
        INDEX   {   mplsLdpEntityLdpId,
                         mplsLdpEntityIndex,
                         mplsLdpEntityFrameRelayLRMinDlci
                     }
        ::= { mplsLdpEntityFrameRelayLRTable 1 }

    MplsLdpEntityFrameRelayLREntry ::= SEQUENCE {
        mplsLdpEntityFrameRelayLRMinDlci   DLCI,
        mplsLdpEntityFrameRelayLRMaxDlci   DLCI,
        mplsLdpEntityFrameRelayLRLen   INTEGER,
        mplsLdpEntityFrameRelayLRStorageType   StorageType,
        mplsLdpEntityFrameRelayLRRowStatus   RowStatus
    }

    mplsLdpEntityFrameRelayLRMinDlci OBJECT-TYPE
        SYNTAX   DLCI
        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. The value
            of zero is valid for the minimum DLCI field of
            the label."
        REFERENCE
            "RFC3034, Use of Label Switching on Frame Relay
            Networks Specification."
        ::= { mplsLdpEntityFrameRelayLREntry 1 }

    mplsLdpEntityFrameRelayLRMaxDlci OBJECT-TYPE
        SYNTAX   DLCI
        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."
        ::= { mplsLdpEntityFrameRelayLREntry 2 }

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

            This is the EXACT value for the Len field of the
            Frame Relay Label Range Component.

            The description from rfc3036.txt is:

            'Len
                This field specifies the number of bits of the DLCI.
                The following values are supported:

                    Len   DLCI bits

                    0   10
                    2   23

                Len values 1 and 3 are reserved.'

             Please refer to the following reference for a complete
             description of this feature."
         REFERENCE
            "RFC3036, LDP Specification, Section 3.5.3
            Initialization Message."
        ::= { mplsLdpEntityFrameRelayLREntry 3 }

    mplsLdpEntityFrameRelayLRStorageType OBJECT-TYPE
        SYNTAX   StorageType
        MAX-ACCESS read-create
        STATUS   current
        DESCRIPTION

               "The storage type for this conceptual row.
                Conceptual rows having the value 'permanent(4)'
                need not allow write-access to any columnar
                objects in the row."
           DEFVAL { nonVolatile }
           ::= { mplsLdpEntityFrameRelayLREntry 4 }

       mplsLdpEntityFrameRelayLRRowStatus OBJECT-TYPE
           SYNTAX   RowStatus
           MAX-ACCESS   read-create
           STATUS   current
           DESCRIPTION
               "The status of this conceptual row. All writable
                objects in this row may be modified at any time,
                however, as described in detail in the section
                entitled, 'Changing Values After Session
                Establishment', and again described in the
                DESCRIPTION clause of the
                mplsLdpEntityAdminStatus object,
                if a session has been initiated with a Peer,
                changing objects in this table will
                wreak havoc with the session and interrupt
                traffic. To repeat again:
                the recommended procedure is to set the
                mplsLdpEntityAdminStatus to down, thereby
                explicitly causing a session to be torn down. Then,
                change objects in this entry, then set the
                mplsLdpEntityAdminStatus to enable which enables
                a new session to be initiated."
            ::= { mplsLdpEntityFrameRelayLREntry 5 }

       --
       -- MPLS LDP Frame Relay Session Information
       --

       mplsLdpFrameRelaySessionObjects OBJECT IDENTIFIER ::=
                            { mplsLdpFrameRelayObjects 2 }

       mplsLdpFrameRelaySessionTable OBJECT-TYPE
           SYNTAX   SEQUENCE OF MplsLdpFrameRelaySessionEntry
           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."
        ::= { mplsLdpFrameRelaySessionObjects 1 }

    mplsLdpFrameRelaySessionEntry OBJECT-TYPE
        SYNTAX        MplsLdpFrameRelaySessionEntry
        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,
                        mplsLdpFrameRelaySessionMinDlci
                      }
        ::= { mplsLdpFrameRelaySessionTable 1 }

    MplsLdpFrameRelaySessionEntry ::= SEQUENCE {
        mplsLdpFrameRelaySessionMinDlci    DLCI,
        mplsLdpFrameRelaySessionMaxDlci    DLCI,
        mplsLdpFrameRelaySessionLen        INTEGER
    }

    mplsLdpFrameRelaySessionMinDlci OBJECT-TYPE
        SYNTAX        DLCI
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "The lower bound of DLCIs which are supported.
            The value of zero is a valid value for the
            minimum DLCI field of the label."
        REFERENCE
            "RFC3034, Use of Label Switching on Frame Relay
            Networks Specification."
        ::= { mplsLdpFrameRelaySessionEntry 1 }

    mplsLdpFrameRelaySessionMaxDlci OBJECT-TYPE
        SYNTAX        DLCI
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "The upper bound of DLCIs which are supported."
        ::= { mplsLdpFrameRelaySessionEntry 2 }
```

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

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

    mplsLdpFrameRelayGroups
        OBJECT IDENTIFIER ::= { mplsLdpFrameRelayConformance 1 }

    mplsLdpFrameRelayCompliances
        OBJECT IDENTIFIER ::= { mplsLdpFrameRelayConformance 2 }

    --
    -- Full Compliance
    --

    mplsLdpFrameRelayModuleFullCompliance 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     {
                                    mplsLdpFrameRelayGroup
                                 }

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

        OBJECT        mplsLdpEntityFrameRelayLRRowStatus
        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
   --

   mplsLdpFrameRelayModuleReadOnlyCompliance 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   mplsLdpEntityFrameRelayIfIndexOrZero
       MIN-ACCESS   read-only
       DESCRIPTION
          "Write access is not required."

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

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

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

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

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

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

        OBJECT          mplsLdpEntityFrameRelayLRRowStatus
        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 {
       mplsLdpEntityFrameRelayIfIndexOrZero,
       mplsLdpEntityFrameRelayMergeCap,
       mplsLdpEntityFrameRelayLRComponents,
       mplsLdpEntityFrameRelayVcDirectionality,
       mplsLdpEntityFrameRelayStorageType,
       mplsLdpEntityFrameRelayRowStatus,
       mplsLdpEntityFrameRelayLRMaxDlci,
       mplsLdpEntityFrameRelayLRLen,
       mplsLdpEntityFrameRelayLRStorageType,
       mplsLdpEntityFrameRelayLRRowStatus,
       mplsLdpFrameRelaySessionMaxDlci,
       mplsLdpFrameRelaySessionLen
       }
       STATUS     current
       DESCRIPTION
           "Objects that apply to all MPLS LDP implementations
           using Frame Relay as the Layer 2."
       ::= { mplsLdpFrameRelayGroups 1 }

    END
```

4.3. The MPLS-LDP-GENERIC-STD-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
   mplsLdpEntityGenericLRTable. 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-STD-MIB DEFINITIONS ::= BEGIN

   IMPORTS
       OBJECT-TYPE,
       MODULE-IDENTITY,
       Unsigned32
           FROM SNMPv2-SMI   -- [RFC2578]

       MODULE-COMPLIANCE,
       OBJECT-GROUP
           FROM SNMPv2-CONF   -- [RFC2580]

       RowStatus,
       StorageType
           FROM SNMPv2-TC   -- [RFC2579]

       InterfaceIndexOrZero
           FROM IF-MIB   -- [RFC2020]

       mplsStdMIB
           FROM MPLS-TC-STD-MIB   -- [RFC3811]

       mplsLdpEntityLdpId,
       mplsLdpEntityIndex
           FROM MPLS-LDP-STD-MIB   -- [RFC3813]
       ;

   mplsLdpGenericStdMIB MODULE-IDENTITY
       LAST-UPDATED "200406030000Z" -- June 6, 2004
       ORGANIZATION "Multiprotocol Label Switching (mpls)
                     Working Group"
       CONTACT-INFO
          "Joan Cucchiara (jcucchiara@mindspring.com)
           Marconi Communications, Inc.

           Hans Sjostrand (hans@ipunplugged.com)
           ipUnplugged

                 James V. Luciani (james_luciani@mindspring.com)
                 Marconi Communications, Inc.

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

                 MPLS Working Group, email: mpls@uu.net
           "
         DESCRIPTION
             "Copyright (C) The Internet Society (year). The
             initial version of this MIB module was published
             in RFC 3815. For full legal notices see the RFC
             itself or see:
             http://www.ietf.org/copyrights/ianamib.html

             This MIB contains managed object definitions for
             configuring and monitoring the Multiprotocol Label
             Switching (MPLS), Label Distribution Protocol (LDP),
             utilizing ethernet as the Layer 2 media."
         REVISION "200406030000Z"   -- June 6, 2004
         DESCRIPTION
             "Initial version published as part of RFC 3815."

         ::= { mplsStdMIB 7 }

     --***

     mplsLdpGenericObjects
             OBJECT IDENTIFIER ::= { mplsLdpGenericStdMIB 1 }
     mplsLdpGenericConformance
             OBJECT IDENTIFIER ::= { mplsLdpGenericStdMIB 2 }

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

     --
     -- Ldp Entity Objects for Generic Labels
     --

     mplsLdpEntityGenericObjects OBJECT IDENTIFIER ::=
                                { mplsLdpGenericObjects 1 }

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

```
    mplsLdpEntityGenericLRTable OBJECT-TYPE
        SYNTAX SEQUENCE OF MplsLdpEntityGenericLREntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "The MPLS LDP Entity Generic Label Range (LR)
            Table.

            The purpose of this table is to provide a mechanism
            for configurating 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.  In other words, this table
            'extends' the mpldLdpEntityTable for Generic Labels."
        ::= { mplsLdpEntityGenericObjects 1 }

    mplsLdpEntityGenericLREntry OBJECT-TYPE
        SYNTAX MplsLdpEntityGenericLREntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "A row in the LDP Entity Generic Label
            Range (LR) 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,
                          mplsLdpEntityGenericLRMin,
                          mplsLdpEntityGenericLRMax
                       }
        ::= { mplsLdpEntityGenericLRTable 1 }

   MplsLdpEntityGenericLREntry ::= SEQUENCE {
       mplsLdpEntityGenericLRMin             Unsigned32,
       mplsLdpEntityGenericLRMax             Unsigned32,
       mplsLdpEntityGenericLabelSpace        INTEGER,
```

```
        mplsLdpEntityGenericIfIndexOrZero    InterfaceIndexOrZero,
        mplsLdpEntityGenericLRStorageType    StorageType,
        mplsLdpEntityGenericLRRowStatus      RowStatus
   }

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

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

mplsLdpEntityGenericLabelSpace  OBJECT-TYPE
    SYNTAX        INTEGER {
                            perPlatform(1),
                            perInterface(2)
                           }
    MAX-ACCESS  read-create
    STATUS        current
    DESCRIPTION
        "This value of this object is perPlatform(1), then
        this means that the label space type is
        per platform.

        If this object is perInterface(2), then this
        means that the label space type is per Interface."
    REFERENCE
        "RFC3036, LDP Specification, Section 2.2.1,
        Label Spaces."
    DEFVAL { perPlatform }
    ::= { mplsLdpEntityGenericLREntry 3 }

mplsLdpEntityGenericIfIndexOrZero 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.

              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."
          ::= { mplsLdpEntityGenericLREntry 4 }

      mplsLdpEntityGenericLRStorageType OBJECT-TYPE
          SYNTAX   StorageType
          MAX-ACCESS read-create
          STATUS   current
          DESCRIPTION
              "The storage type for this conceptual row.
              Conceptual rows having the value 'permanent(4)'
              need not allow write-access to any columnar
              objects in the row."
          DEFVAL { nonVolatile }
          ::= { mplsLdpEntityGenericLREntry 5 }

      mplsLdpEntityGenericLRRowStatus OBJECT-TYPE
          SYNTAX RowStatus
          MAX-ACCESS read-create
          STATUS current
          DESCRIPTION
              "The status of this conceptual row. All writable
               objects in this row may be modified at any time,
               however, as described in detail in the section
               entitled, 'Changing Values After Session
               Establishment', and again described in the
               DESCRIPTION clause of the mplsLdpEntityAdminStatus object,
               if a session has been initiated with a Peer,
               changing objects in this table will
               wreak havoc with the session and interrupt traffic.
               To repeat again: the recommended procedure is
               to set the mplsLdpEntityAdminStatus to
               down, thereby explicitly causing a
               session to be torn down. Then, change objects
               in this entry, then set the mplsLdpEntityAdminStatus
               to enable which enables a new session to be initiated.

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

```
        ::= { mplsLdpEntityGenericLREntry 6 }

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

    mplsLdpGenericGroups
        OBJECT IDENTIFIER ::= { mplsLdpGenericConformance 1 }

    mplsLdpGenericCompliances
        OBJECT IDENTIFIER ::= { mplsLdpGenericConformance 2 }

    --
    -- Full Compliance
    --

    mplsLdpGenericModuleFullCompliance 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        mplsLdpEntityGenericLRRowStatus
        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
    --

    mplsLdpGenericModuleReadOnlyCompliance 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        mplsLdpEntityGenericLabelSpace
    MIN-ACCESS    read-only
    DESCRIPTION
       "Write access is not required."

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

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

    OBJECT        mplsLdpEntityGenericLRRowStatus
    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 {
    mplsLdpEntityGenericLabelSpace,
    mplsLdpEntityGenericIfIndexOrZero,
    mplsLdpEntityGenericLRStorageType,
    mplsLdpEntityGenericLRRowStatus
    }
    STATUS    current
    DESCRIPTION
       "Objects that apply to all MPLS LDP implementations
       using Generic Labels as the Layer 2."
    ::= { mplsLdpGenericGroups 1 }

    END
```

5. Acknowledgments

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   Augustsson from Ericsson.

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6.1. Normative References

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7. Security Considerations

   This Security Considerations section consists of 4 subsections, one
   for each of the MIB Modules in this document.

7.1. Security Considerations for MPLS-LDP-STD-MIB

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

   o   the mplsLdpEntityTable contains objects to provision potential
          LDP sessions on the Label Switching Router (LSR) or Label Edge
          Router (LER).   The mplsLdpLspFecTable contains objects which
          associate an LSP with a FEC. Unauthorized access to objects in
          these tables, could result in disruption of traffic on the
          network. This is especially true if an LDP session has been
          established. The use of stronger mechanisms such as SNMPv3
          security should be considered where possible. Specifically,
          SNMPv3 VACM and USM MUST be used with any v3 agent which
          implements this MIB. Administrators should consider whether

          read access to these objects should be allowed, since read
          access may be undesirable under certain circumstances.

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

     o   the mplsLdpEntityTable, mplsLdpPeerTable, mplsLdpSessionTable
          and mplsLdpSessionStatsTable collectively show the LDP LSP
          network topology. If an Administrator does not want to reveal
          the LDP LSP topology of the network, then these tables should be
          considered sensitive/vulnerable.

7.2. Security Considerations for MPLS-LDP-ATM-STD-MIB

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

     o   the mplsLdpEntityAtmTable and mplsLdpEntityAtmLRTable contain
          objects to provision potential LDP sessions on the Label
          Switching Router (LSR) or Label Edge Router (LER) over Layer 2
          of ATM. These tables extend the mplsLdpEntityTable in the MPLS-
          LDP-MIB. Unauthorized access to objects in these tables, could
          result in disruption of traffic on the network. This is
          especially true if an LDP session has been established. The use
          of stronger mechanisms such as SNMPv3 security should be
          considered where possible. Specifically, SNMPv3 VACM and USM
          MUST be used with any v3 agent which implements this MIB.
          Administrators should consider whether read access to these
          objects should be allowed, since read access may be undesirable
          under certain circumstances.

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

   o   the mplsLdpEntityAtmTable and mplsLdpEntityAtmLRTable show the
        Label Ranges for ATM. If an Administrator does not want to
        reveal this information then these tables should be considered
        sensitive/vulnerable and treated accordingly.

7.3. Security Considerations for MPLS-LDP-FRAME-RELAY-STD-MIB

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

   o   the mplsLdpEntityFrameRelayTable and
        mplsLdpEntityFrameRelayLRTable contain objects to provision
        potential LDP sessions on the Label Switching Router (LSR) or
        Label Edge Router (LER) over Layer 2 of Frame Relay. These
        tables extend the mplsLdpEntityTable in the MPLS-LDP-MIB.
        Unauthorized access to objects in these tables, could result in
        disruption of traffic on the network. This is especially true
        if an LDP session has been established. The use of stronger
        mechanisms such as SNMPv3 security should be considered where
        possible. Specifically, SNMPv3 VACM and USM MUST be used with
        any v3 agent which implements this MIB. Administrators should
        consider whether read access to these objects should be allowed,
        since read access may be undesirable under certain
        circumstances.

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

   o   the mplsLdpEntityFrameRelayTable and
        mplsLdpEntityFrameRelayLRTable show the Label Ranges for Frame
        Relay. If an Administrator does not want to reveal this
        information then these tables should be considered
        sensitive/vulnerable and treated accordingly.

7.4. Security Considerations for MPLS-LDP-GENERIC-STD-MIB

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

   o   the mplsLdpEntityGenericLRTable contains objects to provision
          potential LDP sessions on the Label Switching Router (LSR) or
          Label Edge Router (LER) over Layer 2 of Ethernet. This table
          extends the mplsLdpEntityTable in the MPLS-LDP-MIB.
          Unauthorized access to objects in these tables, could result in
          disruption of traffic on the network. This is especially true
          if an LDP session has been established. The use of stronger
          mechanisms such as SNMPv3 security should be considered where
          possible. Specifically, SNMPv3 VACM and USM MUST be used with
          any v3 agent which implements this MIB. Administrators should
          consider whether read access to these objects should be allowed,
          since read access may be undesirable under certain
          circumstances.

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

   o   the mplsLdpEntityGenericLRTable shows the Label Ranges for
          ethernet. If an Administrator does not want to reveal this
          information then these tables should be considered
          sensitive/vulnerable and treated accordingly.

7.5. Additional Security Considerations

   The following paragraphs describe additional security considerations
   which are applicable to all 4 of the MIB Modules in this document.

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

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

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

8.   IANA Considerations

As described in [MPLSMGMT] and as requested in the MPLS-TC-STD-MIB [MPLSTCMIB], MPLS related standards track MIB modules should be rooted under the mplsStdMIB subtree. There are 4 MPLS MIB Modules contained in this document, each of the following "IANA Considerations" subsections lists new IANA assignments under the mplsStdMIB subtree. New assignments can only be made via a Standards Action as specified in [RFC2434].

8.1.   IANA Considerations for MPLS-LDP-STD-MIB

The IANA has assigned { mplsStdMIB 4 } to the MPLS-LDP-STD-MIB module specified in this document.

8.2.   IANA Considerations for MPLS-LDP-ATM-STD-MIB

The IANA has assigned { mplsStdMIB 5 } to the MPLS-LDP-ATM-STD-MIB module specified in this document.

8.3.   IANA Considerations for MPLS-LDP-FRAME-RELAY-STD-MIB

The IANA has assigned { mplsStdMIB 6 } to the MPLS-LDP-FRAME-RELAY-STD-MIB module specified in this document.

8.4.   IANA Considerations for MPLS-LDP-GENERIC-STD-MIB

The IANA has assigned { mplsStdMIB 7 } to the MPLS-LDP-GENERIC-STD-MIB module specified in this document.

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