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

August 1998

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This memo defines an experimental 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) as defined in [17].

This memo does not specify a standard for the Internet community.

1. The SNMP Management Framework

   The SNMP Management Framework presently consists of five major components:

   o An overall architecture, described in RFC 2271 [1].

   o Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIv1 and described in RFC 1155 [2], RFC 1212 [3] and RFC 1215 [4]. The second version, called SMIv2, is described in RFC 1902 [5], RFC 1903 [6] and RFC 1904 [7].

   o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in RFC 1157 [8]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in RFC 1901 [9] and RFC 1906 [10]. The third version of the message protocol is called SNMPv3 and described in RFC 1906 [10], RFC 2272 [11] and RFC 2274 [12].

   o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in RFC 1157 [8]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [13].

   o A set of fundamental applications described in RFC 2273 [14] and the view-based access control mechanism described in RFC 2275 [15].

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

This memo specifies a MIB module that is compliant to the SMIv2. A
MIB conforming to the SMIv1 can be produced through the appropriate translations. The resulting translated MIB must be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIv2 will be converted into textual descriptions in SMIv1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

1.1. Object Definitions

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively assigned name. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the descriptor, to also refer to the object type.
2. Structure of the MIB

The following aspects are not addressed in this document: Interfaces with respect to the IFMIB (e.g. is ldp an interface in the sense of being stacked onto of the data link layer, and its relationship to the network layer), VPN issues (i.e. potential MIB objects such as the VPN Identifier are not included at this time), and lastly, multicast issues are not discussed.

Some of these issues need further clarification before adding to this MIB.

Currently, there is two groups. The MPLS LDP General Group and the MPLS LDP Notifications Group.

2.1. The MPLS LDP General Group

This group contains information about the specific LDP Entities which are associated with this agent. Each LSR must have one LDP Entity.

2.1.1. The Label Distribution Protocol’s Entity Table

The LDP Entity Table represents the LDP Entities which exist on a single Label Switch Router (LSR). The LDP Entity performs the LDP protocol. There must be at least one LDP Entity for the LSR to support LDP.

Each entry/row in this table represents a single LDP Entity.

2.1.2. The Label Distribution Protocol’s Entity Statistics Table

The LDP Entity Statistics Table will maintain counters related to an LDP Entity. This Table should be a read-only table which contains statistical information.

Each row in this table will be related to a single LDP Entity.

2.1.3. The LDP Peer Table

The LDP Peer Table contains information about LDP Peers. Each row in this table represents an LDP Peer which is known to an LDP Entity.
2.1.4.  The LDP Sessions Table

Each entry in this table represents a session between an LDP Entity and a Peer.

2.1.5.  The LDP Adjacencies Table

This is a table of all adjacencies between all LDP Entities and all LDP Peers. A Session may have one or more adjacencies.

2.1.6.  The LDP Label Information Base (LIB) Table

TBD. Some potential objects: incoming label, outgoing label, and the mid.

2.2.  The LDP Notifications Group

2.2.1.  LDP Notifications

Currently, there is one notification which will be sent when an LDP attempts to initialize the same session beyond the configured threshold.

3.  MPLS Label Distribution Protocol MIB Definitions

MPLS-LDP-MIB DEFINITIONS ::= BEGIN

IMPORTS
  MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
  experimental,
  Integer32, Counter32, Unsigned32
  FROM SNMPv2-SMI
  MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
  FROM SNMPv2-CONF
  TEXTUAL-CONVENTION, TruthValue, RowStatus, TimeInterval
  FROM SNMPv2-TC

;
mplsLdpMIB MODULE-IDENTITY
LAST-UPDATED "9808261200Z" -- August 26, 1998
ORGANIZATION "Multiprotocol Label Switching (mpls) Working Group"
CONTACT-INFO
"Joan Cucchiara (joanc@baynetworks.com)
Bay Networks
Hans Sjostrand (hans.sjostrand@etx.ericsson.se)
Ericsson
James V. Luciani (luciani@baynetworks.com)
Bay Networks"
DESCRIPTION
"This MIB contains managed object definitions for the
Multiprotocol Label Switching, Label Distribution
Protocol, LDP, as defined in draft-ietf-mpls-ldp-01.txt."
 ::= { experimental 9876 } -- to be assigned

--********************************************************************
-- MPLS LDP Textual Conventions
--********************************************************************

MplsLdpIANAAddrFamily ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
"An address family. Values are defined in Assigned Numbers,
RFC1700. Note that not all these values make sense in all
contexts where this type is used in this MIB, but they are
included for completeness."
REFERENCE
"Assigned Numbers, RFC1700, ADDRESS FAMILY NUMBERS"
SYNTAX INTEGER {
other(0),
ipV4(1),
ipV6(2),
nsap(3),
hdlc(4),
bnn1822(5),
ieee802(6),
e163(7),
e164(8),
f69(9),
x121(10),
px(11),
appleTalk(12),
decnetIV(13),
bannyVines(14),
e164WithNsap(15)
}

MplsLdpGenAddr ::= TEXTUAL-CONVENTION
  STATUS current
  DESCRIPTION "The value of an network layer or data link layer address."
  SYNTAX OCTET STRING (SIZE (0..60))

AtmVpIdentifier ::= TEXTUAL-CONVENTION
  STATUS current
  DESCRIPTION "The VPI value for a VPL. The value VPI=0 is not
  used for a VPL not associated with a VCL. For ATM
  UNIs supporting VPCs the VPI value ranges from 1
  to 255. For ATM UNIs supporting VCCs the VPI value
  ranges from 0 to 255. The maximum VPI value
  cannot exceed the value allowable by
  atmInterfaceMaxVpiBits defined in ATM-MIB."
  SYNTAX Unsigned32 (0..4095)

AtmVcIdentifier ::= TEXTUAL-CONVENTION
  STATUS current
  DESCRIPTION "The VCI value for a VCL. The maximum VCI value
  cannot exceed the value allowable by
  atmInterfaceMaxVc1Bits defined in ATM-MIB."
  SYNTAX Unsigned32 (0..65535)

-- Top-level structure of the MIB

mplsLdpObjects OBJECT IDENTIFIER ::= { mplsLdpMIB 1 }
mplsLdpNotifications OBJECT IDENTIFIER ::= { mplsLdpMIB 2 }
mplsLdpConformance OBJECT IDENTIFIER ::= { mplsLdpMIB 3 }

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

mplsLdpEntityObjects OBJECT IDENTIFIER ::= { mplsLdpObjects 1 }

--
-- The MPLS Label Distribution Protocol Entity Table
--

mplsLdpEntityTable OBJECT-TYPE
  SYNTAX SEQUENCE OF MplsLdpEntityEntry

Expires February 1999
The table contains information about the MPLS Label Distribution Protocol Entities which exist on this LSR.

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

A locally arbitrary, but unique identifier for this entity. An agent assigns a unique identifier when the row is created.

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A locally arbitrary, but unique identifier for this entity. An agent assigns a unique identifier when the row is created.
DESCRIPTION

"The LDP identifier of this LDP Entity."
 ::= { mplsLdpEntityEntry 2 }

mplsLdpEntityConfDefVpi OBJECT-TYPE
SYNTAX   AtmVpIdentifier
MAX-ACCESS read-create
STATUS    current
DESCRIPTION
"The Default VPI value used in the label for the default VPI."
 ::= { mplsLdpEntityEntry 3 }

mplsLdpEntityConfDefVci OBJECT-TYPE
SYNTAX   AtmVcIdentifier
MAX-ACCESS read-create
STATUS    current
DESCRIPTION
"The Default VCI value used in the label for the default VCI."
 ::= { mplsLdpEntityEntry 4 }

mplsLdpEntityConfWellKnownDiscoveryPort OBJECT-TYPE
SYNTAX   Unsigned32
MAX-ACCESS read-create
STATUS    current
DESCRIPTION
"The well known LDP Discovery Port."
 ::= { mplsLdpEntityEntry 5 }

mplsLdpEntityConfMtu OBJECT-TYPE
SYNTAX   Integer32 (0..65535)
MAX-ACCESS read-create
STATUS    current
DESCRIPTION
"The maximum transmission unit (MTU) that was configured for this entity."
 ::= { mplsLdpEntityEntry 6 }

mplsLdpEntityConfKeepAliveHoldTimer OBJECT-TYPE
SYNTAX   Integer32 (1..65535)
UNITS    "seconds"
MAX-ACCESS read-create
STATUS    current
DESCRIPTION
"The two octet value which is the proposed keep alive hold timer for this LDP Entity."
::= { mplsLdpEntityEntry 7 }

mplsLdpEntityLoopDetection OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"A value of true (1) indicates that Loop Detection is ‘on’ for this entity, a value of false (2) indicates that Loop Detection is off."
::= { mplsLdpEntityEntry 8 }

mplsLdpEntityLoopPrevention OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"A value of true(1), indicates that this LDP entity has loop prevention via Diffusion on. A value of false(2), indicates that loop prevention via Diffusion is off."
::= { mplsLdpEntityEntry 9 }

mplsLdpEntityFailedInitSessionThreshold OBJECT-TYPE
SYNTAX Integer32
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"When attempting to establish a session with a given Peer, the given LDP Entity should send out a notification when exceeding this threshold. A value of 0 (zero) for this object indicates that the threshold is infinity. In other words, a notification will not be sent if the value of this object is 0 (zero)."
::= { mplsLdpEntityEntry 10 }

mplsLdpEntityRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"An object that allows entries in this table to be created and deleted using the RowStatus convention."
REFERENCE
::= { mplsLdpEntityEntry 11 }

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

mplsLdpEntityConfAtmLabelRangeTable OBJECT-TYPE
SYNTAX SEQUENCE OF MplsLdpEntityConfAtmLabelRangeEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The MPLS LDP Entity Configurable ATM Label Range Table.
The purpose of this table is to provide a mechanism
for specifying 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."
::= { mplsLdpEntityObjects 2 }

mplsLdpEntityConfAtmLabelRangeEntry OBJECT-TYPE
SYNTAX MplsLdpEntityConfAtmLabelRangeEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A row in the LDP Entity Configurable 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.

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 ConfLowerBound vpi/vci == 0/32, and
ConfUpperBound vpi/vci == 0/100, and a second entry for this
same interface with ConfLowerBound vpi/vci == 0/101 and
ConfUpperBound vpi/vci == 0/200. However, there could not be
a third entry with ConfLowerBound vpi/vci == 0/200 and
ConfUpperBound vpi/vci == 0/300 because this label range overlaps
with the second entry (i.e. both entries now have 0/200).

A row will not be created unless a unique and non-overlapping
range is specified. Thus, row creation implies a one-shot
row creation of LDP EntityIndex and ConfLowerBound vpi/vci and
ConfUpperBound vpi/vci. At least one label range entry
for a specific LDP Entity MUST include the default VPI/VCI
values denoted in the LDP Entity Table."
INDEX { mplsLdpEntityIndex,
mplsLdpEntityConfAtmLabelRangeLowerBoundVPI,
mplsLdpEntityConfAtmLabelRangeLowerBoundVCI  
::= { mplsLdpEntityConfAtmLabelRangeTable 1 }

MplsLdpEntityConfAtmLabelRangeEntry ::= SEQUENCE {
  mplsLdpEntityConfAtmLabelRangeLowerBoundVPI      AtmVpIdentifier,
  mplsLdpEntityConfAtmLabelRangeLowerBoundVCI      AtmVcIdentifier,
  mplsLdpEntityConfAtmLabelRangeUpperBoundVPI      AtmVpIdentifier,
  mplsLdpEntityConfAtmLabelRangeUpperBoundVCI      AtmVcIdentifier,
  mplsLdpEntityConfAtmLabelRangeRowStatus          RowStatus
}

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

mplsLdpEntityConfAtmLabelRangeLowerBoundVCI OBJECT-TYPE
SYNTAX AtmVcIdentifier
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
  "The minimum VCI number configured for this range."
 ::= { mplsLdpEntityConfAtmLabelRangeEntry 2 }

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

mplsLdpEntityConfAtmLabelRangeUpperBoundVCI OBJECT-TYPE
SYNTAX AtmVcIdentifier
MAX-ACCESS read-create
STATUS current
DESCRIPTION
  "The maximum VCI number configured for this range."
 ::= { mplsLdpEntityConfAtmLabelRangeEntry 4 }

mplsLdpEntityConfAtmLabelRangeRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current

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

REFERENCE

::= { mplsLdpEntityConfAtmLabelRangeEntry 5 }

-- 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 MplsLdpConfEntityTable. The purpose of this table is to keep statistical information about the LDP Entities on the LSR."

::= { mplsLdpEntityObjects 3 }

mplsLdpEntityStatsEntry OBJECT-TYPE
SYNTAX     MplsLdpEntityStatsEntry
MAX-ACCESS not-accessible
STATUS      current

DESCRIPTION
"A row in this table contains statistical information about an LDP Entity."

AUGMENTS       { mplsLdpEntityEntry }

::= { mplsLdpEntityStatsTable 1 }

MplsLdpEntityStatsEntry ::= SEQUENCE {
  mplsLdpEstablishedSessions    Counter32,
  mplsLdpAttemptedSessions      Counter32
}

mplsLdpEstablishedSessions OBJECT-TYPE
SYNTAX     Counter32
MAX-ACCESS read-only
STATUS      current

DESCRIPTION
"A count of the total established sessions for this LDP Entity."
::= { mplsLdpEntityStatsEntry 1 }

mplsLdpAttemptedSessions OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "A count of the total attempted sessions for this LDP Entity."
::= { mplsLdpEntityStatsEntry 2 }

--
-- The MPLS LDP Peer Table
--

mplsLdpPeerObjects OBJECT IDENTIFIER ::= { mplsLdpObjects 2 }

mplsLdpPeerTable OBJECT-TYPE
SYNTAX      SEQUENCE OF MplsLdpPeerEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "Information about LDP peers which have been discovered by the LDP Entities that are managed by this agent."
::= { mplsLdpPeerObjects 1 }

mplsLdpPeerEntry OBJECT-TYPE
SYNTAX      MplsLdpPeerEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "Information about a single Peer."
INDEX       { mplsLdpEntityIndex, mplsLdpPeerIndex }
::= { mplsLdpPeerTable 1 }

MplsLdpPeerEntry ::= SEQUENCE {
  mplsLdpPeerIndex                         Integer32,
  mplsLdpPeerId                            OCTET STRING,
  mplsLdpPeerInternetworkAddrType          MplsLdpIANAAddrFamily,
  mplsLdpPeerInternetworkAddr              MplsLdpGenAddr,
  mplsLdpPeerDefaultMtu                    Integer32,
  mplsLdpPeerKeepAliveHoldTimer            Integer32,
  mplsLdpPeerRowStatus                     RowStatus
}
mplsLdpPeerIndex OBJECT-TYPE
SYNTAX   Integer32 (1..65535)
MAX-ACCESS not-accessible
STATUS   current
DESCRIPTION
"An identifier for the LDP peer that is unique within the
scope of this agent."
::= { mplsLdpPeerEntry 1 }

mplsLdpPeerId OBJECT-TYPE
SYNTAX   OCTET STRING (SIZE (6))
MAX-ACCESS read-create
STATUS   current
DESCRIPTION
"The LDP identifier of this LDP Peer."
::= { mplsLdpPeerEntry 2 }

mplsLdpPeerInternetworkAddrType OBJECT-TYPE
SYNTAX   MplsLdpIANAAddrFamily
MAX-ACCESS read-create
STATUS   current
DESCRIPTION
"The type of the internetwork layer address of this
LDP peer. This object indicates how the value of
mplsLdpPeerInternetworkAddr is to be interpreted."
::= { mplsLdpPeerEntry 3 }

mplsLdpPeerInternetworkAddr OBJECT-TYPE
SYNTAX   MplsLdpGenAddr
MAX-ACCESS read-create
STATUS   current
DESCRIPTION
"The value of the internetwork layer address of this LDP peer."
::= { mplsLdpPeerEntry 4 }

mplsLdpPeerDefaultMtu OBJECT-TYPE
SYNTAX   Integer32 (0..65535)
MAX-ACCESS read-create
STATUS   current
DESCRIPTION
"The default maximum transmission unit (MTU) of the
LDP Peer."
DEFVAL   { 9180 }
::= { mplsLdpPeerEntry 5 }

mplsLdpPeerKeepAliveHoldTimer OBJECT-TYPE
SYNTAX   Integer32 (1..65535)
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The two octet unsigned non zero integer that indicates
the number of seconds that this Peer proposes for the
value of the KeepAlive Interval."
::= { mplsLdpPeerEntry 6 }

mplsLdpPeerRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION "An object that allows entries in this table to be created
and deleted using the RowStatus convention."
REFERENCE "Textual Conventions for Version 2 of the Simple Network
Management Protocol (SNMPv2), RFC1903."
::= { mplsLdpPeerEntry 7 }

--
-- The MPLS LDP Peer Configurable ATM Label Range Table
--

mplsLdpPeerConfAtmLabelRangeTable OBJECT-TYPE
SYNTAX SEQUENCE OF MplsLdpPeerConfAtmLabelRangeEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The MPLS LDP Peer Configurable ATM Label Range Table.
The purpose of this table is to provide a mechanism for specifying a contiguous range of vpi’s with a contiguous range of vci’s, or a ‘label range’ for LDP Peers. LDP Peers which use ATM must have at least one entry in this table."
::= { mplsLdpPeerObjects 2 }

mplsLdpPeerConfAtmLabelRangeEntry OBJECT-TYPE
SYNTAX MplsLdpPeerConfAtmLabelRangeEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "A row in the LDP Peer Configurable 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."
NOTE: The ranges for a specific LDP Peer are UNIQUE and non-overlapping. For example, for a specific LDP Peer index, there could be one entry having ConfLowerBound vpi/vci == 0/32, and ConfUpperBound vpi/vci == 0/100, and a second entry for this same interface with ConfLowerBound vpi/vci == 0/101 and ConfUpperBound vpi/vci == 0/200. However, there could not be a third entry with ConfLowerBound vpi/vci == 0/200 and ConfUpperBound vpi/vci == 0/300 because this label range overlaps with the second entry (i.e. both entries now have 0/200).

A row will not be created unless a unique and non-overlapping range is specified. Thus, row creation implies a one-shot row creation of LDP PeerIndex and ConfLowerBound vpi/vci and ConfUpperBound vpi/vci. At least one label range entry for a specific LDP Peer MUST include the default VPI/VCI values denoted in the LDP Peer Table.

INDEX { mplsLdpPeerIndex,
  mplsLdpPeerConfAtmLabelRangeLowerBoundVPI,
  mplsLdpPeerConfAtmLabelRangeLowerBoundVCI } ::= { mplsLdpPeerConfAtmLabelRangeTable 1 }

MplsLdpPeerConfAtmLabelRangeEntry ::= SEQUENCE {
  mplsLdpPeerConfAtmLabelRangeLowerBoundVPI      AtmVpIdentifier,
  mplsLdpPeerConfAtmLabelRangeLowerBoundVCI      AtmVcIdentifier,
  mplsLdpPeerConfAtmLabelRangeUpperBoundVPI      AtmVpIdentifier,
  mplsLdpPeerConfAtmLabelRangeUpperBoundVCI      AtmVcIdentifier,
  mplsLdpPeerConfAtmLabelRangeRowStatus          RowStatus
}

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

mplsLdpPeerConfAtmLabelRangeLowerBoundVCI OBJECT-TYPE
SYNTAX   AtmVcIdentifier
MAX-ACCESS not-accessible
STATUS    current
DESCRIPTION
  "The minimum VCI number configured for this range."
 ::= { mplsLdpPeerConfAtmLabelRangeEntry 2 }

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

mplsLdpPeerConfAtmLabelRangeUpperBoundVCI OBJECT-TYPE
SYNTAX AtmVcIdentifier
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"The maximum VCI number configured for this range."
::= { mplsLdpPeerConfAtmLabelRangeEntry 4 }

mplsLdpPeerConfAtmLabelRangeRowStatus OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"An object that allows entries in this table to be created
and deleted using the RowStatus convention."
REFERENCE
"Textual Conventions for Version 2 of the Simple Network
Management Protocol (SNMPv2), RFC1903."
::= { mplsLdpPeerConfAtmLabelRangeEntry 5 }

--
-- The MPLS LDP Sessions Table
--

mplsLdpSessionObjects OBJECT IDENTIFIER ::= { mplsLdpObjects 3 }

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."
::= { mplsLdpSessionObjects 1 }

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."

INDEX { mplsLdpEntityIndex, mplsLdpPeerIndex, mplsLdpSessionIndex }
::= { mplsLdpSessionTable 1 }

MplsLdpSessionEntry ::= SEQUENCE {
  mplsLdpSessionIndex                          Integer32,
  mplsLdpSessionId                             OCTET STRING,
  mplsLdpSessionProtocolVersion                Integer32,
  mplsLdpSessionKeepAliveHoldTimeRemaining     TimeInterval,
  mplsLdpSessionRole                           INTEGER,
  mplsLdpSessionState                          INTEGER,
  mplsLdpSessionAtmLabelRangeLowerBoundVPI     AtmVpIdentifier,
  mplsLdpSessionAtmLabelRangeLowerBoundVCI     AtmVcIdentifier,
  mplsLdpSessionAtmLabelRangeUpperBoundVPI     AtmVpIdentifier,
  mplsLdpSessionAtmLabelRangeUpperBoundVCI     AtmVcIdentifier,
  mplsLdpSessionRowStatus                      RowStatus
}

mplsLdpSessionIndex OBJECT-TYPE
SYNTAX      Integer32 (1..2147483647)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "An unique identifier for this entry such that it identifies a specific LDP Session."
::= { mplsLdpSessionEntry 1 }

mplsLdpSessionId OBJECT-TYPE
SYNTAX      OCTET STRING(SIZE(6))
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION  "The LDP Session identifier."
::= { mplsLdpSessionEntry 2 }

mplsLdpSessionProtocolVersion OBJECT-TYPE
SYNTAX      Integer32(0..65535)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION  "The version of the LDP Protocol which this session is using."
::= { mplsLdpSessionEntry 3 }
mplsLdpSessionKeepAliveHoldTimeRemaining OBJECT-TYPE
SYNTAX     TimeInterval
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The keep alive hold time remaining for this session."
::= { mplsLdpSessionEntry 4 }

mplsLdpSessionRole OBJECT-TYPE
SYNTAX     INTEGER {
             active(1),
             passive(2)
           }
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"An indication of whether the LDP Entity associated with
this session is acting in an 'active' role or
a 'passive' role."
::= { mplsLdpSessionEntry 5 }

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 - 5 are based on the state machine for
session negotiation behavior."
::= { mplsLdpSessionEntry 6 }

mplsLdpSessionAtmLabelRangeLowerBoundVPI OBJECT-TYPE
SYNTAX AtmVpIdentifier
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The minimum VPI number for this range."
::= { mplsLdpSessionEntry 7 }

mplsLdpSessionAtmLabelRangeLowerBoundVCI OBJECT-TYPE
SYNTAX AtmVcIdentifier
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The minimum VCI number for this range."
::= { mplsLdpSessionEntry 8 }

mplsLdpSessionAtmLabelRangeUpperBoundVPI OBJECT-TYPE
SYNTAX  AtmVpIdentifier
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The maximum VPI number for this range."
::= { mplsLdpSessionEntry 9 }

mplsLdpSessionAtmLabelRangeUpperBoundVCI OBJECT-TYPE
SYNTAX  AtmVcIdentifier
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The maximum VCI number for this range."
::= { mplsLdpSessionEntry 10 }

mplsLdpSessionRowStatus OBJECT-TYPE
SYNTAX      RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
"An object that allows entries in this table to be created
and deleted using the RowStatus convention."
REFERENCE
"Textual Conventions for Version 2 of the Simple Network
Management Protocol (SNMPv2), RFC1903."
::= { mplsLdpSessionEntry 11 }

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

mplsLdpHelloAdjacencyObjects OBJECT IDENTIFIER ::= { mplsLdpObjects 4 }

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       ( mplsLdpSessionIndex, mplsLdpHelloAdjacencyIndex )
::= { mplsLdpHelloAdjacencyTable 1 }

MplsLdpHelloAdjacencyEntry ::= SEQUENCE {
  mplsLdpHelloAdjacencyIndex                  Integer32,
  mplsLdpHelloAdjacencyHoldTimeRemaining      TimeInterval
}

mplsLdpHelloAdjacencyIndex OBJECT-TYPE
SYNTAX      Integer32 (1..2147483647)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
"An identifier for the adjacency."
::= { mplsLdpHelloAdjacencyEntry 1 }

mplsLdpHelloAdjacencyHoldTimeRemaining OBJECT-TYPE
SYNTAX      TimeInterval
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"The time remaining for this Hello Adjacency."
::= { mplsLdpHelloAdjacencyEntry 2 }

---
--- Notifications
---

mplsLdpNotificationPrefix OBJECT IDENTIFIER ::= { mplsLdpNotifications 0 }

mplsLdpFailedInitSessionThresholdExceeded NOTIFICATION-TYPE
OBJECTS     {
  mplsLdpEntityFailedInitSessionThreshold
}
STATUS      current
DESCRIPTION
"This notification is generated whenever the value of mplsLdpEntityFailedInitSessionThreshold is
mplsLdpGroups
OBJECT IDENTIFIER ::= { mplsLdpConformance 1 }

mplsLdpCompliances
OBJECT IDENTIFIER ::= { mplsLdpConformance 2 }

mplsLdpModuleCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION "The compliance statement for agents that support
the MPLS LDP MIB."
MODULE -- this module
MANDATORY-GROUPS { mplsLdpGeneralGroup, mplsLdpNotificationsGroup }

OBJECT mplsLdpEntityRowStatus
MIN-ACCESS read-only
DESCRIPTION "The agent is not required to support a SET operation
to this object."

OBJECT mplsLdpPeerRowStatus
MIN-ACCESS read-only
DESCRIPTION "The agent is not required to support a SET operation
to this object."

::= { mplsLdpCompliances 1 }

-- units of conformance

mplsLdpGeneralGroup OBJECT-GROUP
OBJECTS {
  mplsLdpEntityIndex,
  mplsLdpEntityConfId,
  mplsLdpEntityConfDefVpi,
  mplsLdpEntityConfDefVci,
  mplsLdpEntityConfWellKnownDiscoveryPort,
  mplsLdpEntityConfMtu,
mplsLdpEntityConfKeepAliveHoldTimer,
mplsLdpEntityLoopDetection,
mplsLdpEntityLoopPrevention,
mplsLdpEntityFailedInitSessionThreshold,
mplsLdpEntityRowStatus,
mplsLdpEntityConfAtmLabelRangeLowerBoundVPI,
mplsLdpEntityConfAtmLabelRangeLowerBoundVCI,
mplsLdpEntityConfAtmLabelRangeUpperBoundVPI,
mplsLdpEntityConfAtmLabelRangeUpperBoundVCI,
mplsLdpEntityConfAtmLabelRangeRowStatus,
mplsLdpEstablishedSessions,
mplsLdpAttemptedSessions,
mplsLdpPeerIndex,
mplsLdpPeerId,
mplsLdpPeerInternetworkAddrType,
mplsLdpPeerInternetworkAddr,
mplsLdpPeerDefaultMtu,
mplsLdpPeerKeepAliveHoldTimer,
mplsLdpPeerRowStatus,
mplsLdpPeerConfAtmLabelRangeLowerBoundVPI,
mplsLdpPeerConfAtmLabelRangeLowerBoundVCI,
mplsLdpPeerConfAtmLabelRangeUpperBoundVPI,
mplsLdpPeerConfAtmLabelRangeUpperBoundVCI,
mplsLdpPeerConfAtmLabelRangeRowStatus,
mplsLdpSessionIndex,
mplsLdpSessionId,
mplsLdpSessionProtocolVersion,
mplsLdpSessionKeepAliveHoldTimeRemaining,
mplsLdpSessionRole,
mplsLdpSessionState,
mplsLdpSessionAtmLabelRangeLowerBoundVPI,
mplsLdpSessionAtmLabelRangeLowerBoundVCI,
mplsLdpSessionAtmLabelRangeUpperBoundVPI,
mplsLdpSessionAtmLabelRangeUpperBoundVCI,
mplsLdpSessionRowStatus,
mplsLdpHelloAdjacencyIndex,
mplsLdpHelloAdjacencyHoldTimeRemaining
}

STATUS current
DESCRIPTION
"Objects that apply to all MPLS LDP implementations over ATM."
::= { mplsLdpGroups 1 }

mplsLdpNotificationsGroup NOTIFICATION-GROUP
  NOTIFICATIONS { mplsLdpFailedInitSessionThresholdExceeded }
  STATUS current

Expires February 1999 [Page 24]
DESCRIPTION

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

::= { mplsLdpGroups 2 }

END
4. Acknowledgments

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5. References


6. Security Considerations

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