Network Working Group   Thomas D. Nadeau
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                                               Joan Cucchiara
                                             Crescent Networks

                                             Cheenu Srinivasan
                                          Parama Networks, Inc.

                                             Arun Viswanathan
                                          Force10 Networks, Inc.

                                               Hans Sjostrand
                                                   ipUnplugged

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Definition of Textual Conventions and OBJECT-IDENTITIES for Multiprotocol Label Switching (MPLS) Management

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Status of this Memo

Abstract

   This memo describes Textual Conventions and OBJECT-
   IDENTITIES common to the Management Information Bases
   (MIBs) for managing Multiprotocol Label Switching (MPLS)
   networks.

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1. Introduction

   This memo defines a portion of the Management Information
   Base (MIB) for use with network management protocols in the
   Internet community. In particular, it defines Textual
   Conventions used in IETF MPLS and MPLS-related MIBs.

   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, reference [RFC2119].

   For an introduction to the concepts of MPLS, see [RFC3031].

2. The SNMP Management Framework

   The SNMP Management Framework presently consists of five
   major components:

   - An overall architecture, described in RFC 2571
      [RFC2571].

   - Mechanisms for describing and naming objects and events
      for the purpose of management. The first version of
      this Structure of Management Information (SMI) is
      called SMIv1 and described in STD 16, RFC 1155
      [RFC1155], STD 16, RFC 1212 [RFC1212] and RFC 1215
      [RFC1215]. The second version, called SMIv2, is
      described in STD 58, RFC 2578 [RFC2578], STD 58, RFC
      2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

   - Message protocols for transferring management
      information. The first version of the SNMP message
      protocol is called SNMPv1 and described in STD 15, RFC
      1157 [RFC1157]. A second version of the SNMP message

protocol, which is not an Internet standards track
protocol, is called SNMPv2c and described in [RFC 1901](RFC 1901)

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

- Protocol operations for accessing management
  information. The first set of protocol operations and
  associated PDU formats is described in STD 15, RFC 1157
  [RFC1157]. A second set of protocol operations and
  associated PDU formats is described in RFC 1905
  [RFC1905].

- A set of fundamental applications described in RFC 2573
  [RFC2573] and the view-based access control mechanism
  described in RFC 2575 [RFC2575].

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

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

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

3. MPLS TC MIB Definitions

MPLS-TC-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, Unsigned32, Integer32
        FROM SNMPv2-SMI
    transmission
        FROM RFC1213-MIB
    TEXTUAL-CONVENTION
        FROM SNMPv2-TC;

```
mplsTCMIB MODULE-IDENTITY
    LAST-UPDATED
```

```
        "200101041200Z"  -- 4 January 2002 12:00:00 GMT
    ORGANIZATION
        "Multiprotocol Label Switching (MPLS) Working Group"
    CONTACT-INFO
        "          Thomas D. Nadeau
                   Cisco Systems, Inc.
                   tnadeau@cisco.com

                   Joan Cucchiara
                   Crescent Networks
                   jcucchiara@crescentnetworks.com

                   Cheenu Srinivasan
                   Parama Networks, Inc.
                   cheenu@paramanet.com

                   Arun Viswanathan
                   Force10 Networks, Inc.
                   arun@force10networks.com

                   Hans Sjostrand
                   ipUnplugged
                   hans@ipunplugged.com

        Email comments to the MPLS WG Mailing List at
          mpls@uu.net."
    DESCRIPTION
        "This MIB module defines Textual Conventions and
          OBJECT-IDENTITIES for use in documents defining
          management information bases (MIBs) for managing
          MPLS networks."

      -- Revision history.

    REVISION
        "200101041200Z"  -- 4 January 2002 12:00:00 GMT
    DESCRIPTION
        "Initial version published as part of RFC XXXX."
    ::= { mplsMIB 1 }

-- This object identifier needs to be assigned by IANA.
-- Since mpls has been assigned an ifType of 166 we recommend
-- that this OID be 166 as well.

mplsMIB OBJECT IDENTIFIER
    ::= { transmission xxx }

-- Textual Conventions (sorted alphabetically).
```

MplsAtmVcIdentifier ::= TEXTUAL-CONVENTION

           STATUS current
           DESCRIPTION
               "The VCI value for a VCL. The maximum VCI value
                cannot exceed the value allowable by
                atmInterfaceMaxVciBits defined in ATM-MIB. The
                minimum value is 32, values 0 to 31 are reserved
                for other uses by the ITU and ATM Forum. 32 is
                typically the default value for the Control VC."
           REFERENCE
               "Definitions of Textual Conventions and OBJECT-
                IDENTITIES for ATM Management, RFC 2514, Feb.
                1999."
           SYNTAX Integer32 (32..65535)

    MplsBitRate ::= TEXTUAL-CONVENTION
           DISPLAY-HINT "d"
           STATUS   current
           DESCRIPTION
               "An estimate of bandwidth in units of 1,000 bits per
                second. If this object reports a value of 'n' then
                the rate of the object is somewhere in the range of
                'n-500' to 'n+499'. For objects which do not vary
                in bit rate, or for those where no accurate
                estimation can be made, this object should contain
                the nominal bit rate."
           SYNTAX Integer32 (1..2147483647)

    MplsBurstSize ::= TEXTUAL-CONVENTION
           DISPLAY-HINT "d"
           STATUS   current
           DESCRIPTION
               "The number of octets of MPLS data that the stream
                may send back-to-back without concern for
                policing."
           SYNTAX Unsigned32 (1..4294967295)

    MplsExtendedTunnelId ::= TEXTUAL-CONVENTION
           STATUS   current
           DESCRIPTION
               "A unique identifier for an MPLS Tunnel. This MAY
                represent an IpV4 address of the ingress or egress
                LSR for the tunnel. This value is derived from the
                Extended Tunnel Id in RSVP or the Ingress Router ID
                for CR-LDP."
           REFERENCE
               "1. Awduche, D., et al., RSVP-TE: Extensions to RSVP
                for LSP Tunnels, RFC 3209, December 2001.

2. Constraint-Based LSP Setup using LDP, Jamoussi,
        B., et al., draft-ietf-mpls-cr-ldp-06.txt, November
        2001."

     SYNTAX   Unsigned32

MplsInitialCreationSource ::= TEXTUAL-CONVENTION
    STATUS   current
    DESCRIPTION
         "The entity that originally created the object in
          question. The values of this enumeration are
          defined as follows:

         other(1) - This is used when an entity which has not
          been enumerated in this textual convention but
          which is known by the agent.

         snmp(2) - The Simple Network Management Protocol was
          used to configure this object initially.

         ldp(3 - The Label Distribution Protocol was used to
          configure this object initially.

         rsvp(4) - The Resource Reservation Protocol was used
          to configure this object initially.

         crldp(5) - The Constraint-Based Label Distribution
          Protocol was used to configure this object
          initially.

         policyAgent(6) - A policy agent (perhaps in
          combination with one of the above protocols) was
          used to configure this object initially.

         unknown(7) - the agent cannot discern which
          component created the object."
    SYNTAX   INTEGER {
              other(1),
              snmp(2),
              ldp(3),
              rsvp(4),
              crldp(5),
              policyAgent(6),
              unknown (7)
            }

MplsLSPID ::= TEXTUAL-CONVENTION
    STATUS   current
    DESCRIPTION
         "An identifier that is assigned to each LSP and is
          used to uniquely identify it. This is assigned at
          the head end of the LSP and can be used by all LSRs

to identify this LSP. This value is piggybacked by
the signaling protocol when this LSP is signaled

          within the network. This identifier can then be
          used at each LSR to identify which labels are being
          swapped to other labels for this LSP. For IPv4
          addresses this results in a 6-octet long cookie."
    SYNTAX OCTET STRING (SIZE (0..31))

MplsLabel ::= TEXTUAL-CONVENTION
    STATUS   current
    DESCRIPTION
        "This value represents an MPLS label as defined in
          [RFC3031], [RFC3032], [RFC3034] and [RFC3035]."
    REFERENCE
        "1. Multiprotocol Label Switching Architecture, Rosen
          et al, RFC 3031, August 1999.
         2. MPLS Label Stack Encoding, Rosen et al, RFC 3032,
          January 2001.
         3. Use of Label Switching on Frame Relay Networks,
          Conta et al, RFC 3034, January 2001.
         4. MPLS using LDP and ATM VC switching, Davie et al,
          RFC 3035, January 2001."
    SYNTAX Unsigned32 (0..4294967295)

MplsLdpGenAddr ::= TEXTUAL-CONVENTION
    STATUS   current
    DESCRIPTION
        "The value of an network layer or data link layer
          address."
    SYNTAX OCTET STRING (SIZE (0..64))

MplsLdpIdentifier ::= TEXTUAL-CONVENTION
    STATUS   current
    DESCRIPTION
        "The LDP identifier is a six octet quantity which is
          used to identify an Label Switch Router (LSR) label
          space.

         The first four octets identify the LSR and must be a
          globally unique value, such as a 32-bit router ID
          assigned to the LSR, and the last two octets
          identify a specific label space within the LSR."
    SYNTAX OCTET STRING (SIZE (6))

MplsLdpLabelTypes ::= TEXTUAL-CONVENTION
    STATUS   current
    DESCRIPTION
        "The Layer 2 label types which are defined for MPLS
          LDP/CRLDP are generic(1), atm(2), or

```
        frameRelay(3)."
   SYNTAX  INTEGER {
           generic(1),
```

```
            atm(2),
            frameRelay(3)
        }

MplsLsrIdentifier ::= TEXTUAL-CONVENTION
   STATUS      current
   DESCRIPTION
        "The Label Switch Router (LSR) identifier is the
         first 4 bytes of the Label Distribution Protocol
         (LDP) identifier."
   SYNTAX  OCTET STRING (SIZE (4))

MplsPathIndex ::= TEXTUAL-CONVENTION
   STATUS        current
   DESCRIPTION
        "A unique identifier used to identify a specific path
         used by a tunnel."
   SYNTAX  Unsigned32

MplsPathIndexOrZero ::= TEXTUAL-CONVENTION
   STATUS        current
   DESCRIPTION
        "A unique identifier used to identify a specific path
         used by a tunnel. If this value is set to 0, it
         indicates that no path is in use."
   SYNTAX  Unsigned32

MplsPortNumber ::= TEXTUAL-CONVENTION
   STATUS           current
   DESCRIPTION
        "A TCP or UDP port number. Along with an IP address
         identifies a stream of IP traffic uniquely."
   SYNTAX            Integer32 (0..65535)

MplsTunnelAffinity ::= TEXTUAL-CONVENTION
   STATUS        current
   DESCRIPTION
        "Include-any, include-all, or exclude-all constraint
         for link selection."
   SYNTAX  Unsigned32

MplsTunnelIndex ::= TEXTUAL-CONVENTION
   STATUS        current
   DESCRIPTION
        "Index into mplsTunnelTable."
   SYNTAX  Integer32 (1..65535)

MplsTunnelInstanceIndex ::= TEXTUAL-CONVENTION
```

STATUS   current
         DESCRIPTION

```
        "Instance index into mplsTunnelTable."
   SYNTAX   Unsigned32 (0..65535)

END
```

4. Security Considerations

This memo defines textual conventions and object identities
for use in MPLS MIB modules. Security issues for these MIB
modules are addressed in the memos defining those modules.

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## 6. Authors' Addresses

Thomas D. Nadeau
Cisco Systems, Inc.
250 Apollo Drive
Chelmsford, MA 01824
Phone: +1-978-244-3051
Email: tnadeau@cisco.com

Joan Cucchiara
Crescent Networks

900 Chelmsford Street
Lowell, MA   01851

    Phone: +1-978-275-3183
    email: jcucchiara@crescentnetworks.com

    Cheenu Srinivasan
    Parama Networks, Inc.
    1030 Broad Street
    Shrewsbury, NJ 07702
    Phone: +1-732-544-9120 x731
    Email: cheenu@paramanet.com

    Arun Viswanathan
    Force10 Networks, Inc.
    1440 McCarthy Blvd
    Milpitas, CA 95035
    Phone: +1-408-571-3516
    Email: arun@force10networks.com

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


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