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 [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
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

Nadeau et al. Expires July 2002 [Page 3]
"200101041200Z" -- 4 January 2002 12:00:00 GMT

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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
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.

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

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

rsvp(4) - The Resource Reservation 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]."
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)

MplsTunnelInstanceId ::= 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.

5. References


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