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A YANG Model for MPLS MSD
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Abstract

This document defines a YANG data module augmenting the IETF MPLS YANG model to provide support for MPLS Maximum SID Depths (MSDs) as defined in RFC 8476 and RFC 8491.

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Table of Contents

1. Overview	2
1.1. Requirements Language	2
2. YANG Module for MPLS MSD	3
3. Security Considerations	6
4. IANA Considerations	7
5. Acknowledgements	7
6. References	7
6.1. Normative References	7
6.2. Informative References	9
Authors' Addresses	9

1. Overview

YANG [RFC7950] is a data definition language used to define the contents of a conceptual data store that allows networked devices to be managed using NETCONF [RFC6241] or RESTCONF [RFC8040].

This document defines a YANG data model augmenting the IETF MPLS YANG model [RFC8960], which itself augments [RFC8349], to provide operational state for various MSDs[RFC8662]. The model augments the base MPLS model with a list of various types of node MSDs, as well as various types of MSDs on links.

The augmentation defined in this document requires support for the MPLS base model[RFC8960] which defines basic MPLS configuration and state.

The YANG module in this document conforms to the Network Management Datastore Architecture (NMDA) [RFC8342].

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. YANG Module for MPLS MSD

This document defines a YANG module for MSD extensions [RFC8476][RFC8491] to MPLS base model as defined in [RFC8960].

```
module: ietf-mpls-msd
  augment /rt:routing/mpls:mpls:
    +--ro node-msd
      +--ro node-msds* []
        +--ro msd-type?    identityref
        +--ro msd-value?   uint8
  augment /rt:routing/mpls:mpls/interfaces/mpls:interface:
    +--ro link-msd
      +--ro link-msds* []
        +--ro msd-type?    identityref
        +--ro msd-value?   uint8
```

```
<CODE BEGINS> file "ietf-mpls-msd@2022-10-12.yang"
module ietf-mpls-msd {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-mpls-msd";
  prefix mpls-msd;

  import ietf-routing {
    prefix rt;
    reference
      "RFC 8349: A YANG Data Model for Routing
        Management (NMDA Version)";
  }

  import ietf-mpls {
    prefix mpls;
    reference "RFC 8960: A YANG Data Model for MPLS Base";
  }

  organization
    "IETF Multiprotocol Label Switching (MPLS) Working Group";

  contact
    "WG Web:  <https://datatracker.ietf.org/wg/mpls/>
    WG List:  <mailto:mpls@ietf.org>

    Author:   Yingzhen Qu
              <mailto:yingzhen.qu@futurewei.com>
    Author:   Acee Lindem
              <mailto:acee@cisco.com>
```

Author: Stephane Litkowski
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Author: Jeff Tantsura
 <mailto:jefftant.ietf@gmail.com>

";
description
"The YANG module augments the base MPLS model, and it is to
provide support for different types of Maximum SID Depth (MSD).

This YANG model conforms to the Network Management
Datastore Architecture (NMDA) as described in RFC 8342.

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This version of this YANG module is part of RFC XXXX;
see the RFC itself for full legal notices.

The key words 'MUST', 'MUST NOT', 'REQUIRED', 'SHALL', 'SHALL
NOT', 'SHOULD', 'SHOULD NOT', 'RECOMMENDED', 'NOT RECOMMENDED',
'MAY', and 'OPTIONAL' in this document are to be interpreted as
described in BCP 14 (RFC 2119) (RFC 8174) when, and only when,
they appear in all capitals, as shown here.";

reference "RFC XXXX: YANG Data Model for MPLS MSD.";

revision 2022-10-12 {
 description
 "Initial Version";
 reference "RFC XXXX: YANG Data Model for MPLS MSD.";
}

identity msd-base-type {
 description
 "Base identity for Maximum SID Depth (MSD) Type";
}

identity msd-mpls {
 base msd-base-type;

```
    description
      "Base MPLS Imposition MSD.";
    reference
      "RFC 8491: Signaling Maximum SID Depth (MSD) using IS-IS.
      RFC 8476: Signaling Maximum SID Depth (MSD) using OSPF.";
  }

  identity msd-erld {
    base msd-base-type;
    description
      "msd-erld is defined to advertise the Entropy Readable
      Label Depth (ERLD).";
    reference
      "RFC 8662: Entropy Label for Source Packet Routing in
      Networking (SPRING) Tunnels";
  }

  augment "/rt:routing/mpls:mpls" {
    description
      "This module augments MPLS data model (RFC 8960)
      with node MSD.";
    container node-msd {
      config false;
      description
        "Maximum SID Depth (MSD) of a node.";
      list node-msds {
        leaf msd-type {
          type identityref {
            base msd-base-type;
          }
          description
            "MSD types";
        }
        leaf msd-value {
          type uint8;
          description
            "MSD value, in the range of 0-255.";
        }
        description
          "List of different types of MSDs of the node. A type of
          Node MSD is the smallest same type link MSD supported by
          the node.";
      }
    }
  }

  augment "/rt:routing/mpls:mpls/mpls:interfaces/mpls:interface" {
    description
```

```
    "This module augments MPLS data model (RFC 8960)
    with link MSD.";
  container link-msd {
    config false;
    description
      "Maximum SID Depth (MSD) of an interface.";
    list link-msds {
      leaf msd-type {
        type identityref {
          base msd-base-type;
        }
        description
          "MSD type";
      }
      leaf msd-value {
        type uint8;
        description
          "MSD value, in the range of 0-255.";
      }
      description
        "List of different types of MSDs on the link.";
    }
  }
}
}
}
<CODE ENDS>
```

3. Security Considerations

The YANG modules specified in this document define a schema for data that is designed to be accessed via network management protocols such as NETCONF [RFC6241] or RESTCONF [RFC8040]. The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH) [RFC6242]. The lowest RESTCONF layer is HTTPS, and the mandatory-to-implement secure transport is TLS [RFC8446].

The NETCONF Access Control Model (NACM) [RFC8341] provides the means to restrict access for particular NETCONF or RESTCONF users to a pre-configured subset of all available NETCONF or RESTCONF protocol operations and content.

Some of the readable data nodes in the modules may be considered sensitive or vulnerable in some network environments. It is thus important to control read access (e.g., via get, get-config, or notification) to these data nodes. These are the subtrees and data nodes and their sensitivity/vulnerability:

```
/rt:routing/mpls:mpls/msd/node-msds
```

```
/rt:routing/mpls:mpls/msd/link-msds
```

Exposure of the node's maximum SID depth may be useful in mounting a Denial-of-Service (DoS) attack by sending packets to the node that the router can't process.

4. IANA Considerations

This document registers URIs in the IETF XML registry [RFC3688]. Following the format in [RFC3688], the following registrations is requested to be made:

```
URI: urn:ietf:params:xml:ns:yang:ietf-mpls-msd
Registrant Contact: The IESG.
XML: N/A, the requested URI is an XML namespace.
```

This document registers the YANG modules in the YANG Module Names registry [RFC6020].

```
name: ietf-mpls-msd
namespace: urn:ietf:params:xml:ns:yang:ietf-mpls-msd
prefix: mpls-msd
reference: RFC XXXX
```

5. Acknowledgements

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The YANG model was developed using the suite of YANG tools written and maintained by numerous authors.

6. References

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