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RFC 9903
A YANG Data Model for OSPF Segment Routing over the MPLS Data Plane

Abstract

This document defines a YANG data model that can be used to manage OSPF extensions for Segment Routing over the MPLS data plane.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at https://www.rfc-editor.org/info/rfc9903.

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1. Overview

This document defines a YANG data model [RFC7950] that can be used to manage OSPFv2 extensions for Segment Routing [RFC2328] [RFC8665] and OSPFv3 extensions for Segment Routing [RFC5340] [RFC8666] over the MPLS data plane. The defined YANG data model is an augmentation to the OSPF YANG data model [RFC9129].

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.

1.2. Tree Diagrams

This document uses the graphical representation of a data model as defined in [RFC8340].

2. Design of the YANG Module for OSPF MPLS Segment Routing

The YANG data model in this document consists of a single YANG module, "ietf-ospf-sr-mpls". The "ietf-ospf-sr-mpls" YANG module includes OSPF Segment Routing extensions for the MPLS data plane for both OSPFv2 [RFC8665] and OSPFv3 [RFC8666].

The "ietf-ospf-sr-mpls" YANG module requires support for the base Segment Routing module [RFC9020], which defines the global Segment Routing configuration independent of any specific routing protocol configuration, and support of the OSPF base model [RFC9129], which defines the basic OSPF configuration and state.

The "ietf-ospf-sr-mpls" module defines both the data nodes to configure OSPF Segment Routing MPLS extensions and the additions to OSPF Link State Advertisements (LSAs) necessary to support Segment Routing over MPLS (SR-MPLS). The OSPF configuration includes:

- OSPF instance level configuration imported from the "ietf-segment-routing-mpls" YANG module, including the mapping server bindings and the per-protocol Segment Routing Global Block (SRGB) (refer to the "sr-control-plane" grouping [RFC9020]).
- OSPF area level configuration, which enables SR-MPLS on all interfaces as well as advertisement of SR-MPLS information in Link State Advertisements (LSAs).
- OSPF interface level configuration for Adjacency Segment Identifiers (Adj-SIDs) corresponding to specific neighbors on multi-access interfaces (OSPF interface type broadcast or Non-Broadcast Multi-Access (NBMA)). The adjacency-sid definitions are imported from the "ietf-segment-routing-mpls" YANG module (refer to the "igp-interface" grouping [RFC9020]).
- OSPF interface level configuration for Topology Independent Loop-Free Alternative (TI-LFA) using the MPLS data plane. TI-LFA is described in [RFC9855].

The operational state (read-only) additions specific to OSPFv2 LSA include:

- OSPFv2 Extended Prefix Range TLV encodings [RFC8665] in the OSPF Extended Prefix Opaque LSA [RFC7684].
- OSPFv2 Prefix-SID Sub-TLV encodings [RFC8665], including the OSPF Extended Prefix TLV, which is advertised in the OSPF Extended Prefix Opaque LSA [RFC7684].
- OSPFv2 SR-Algorithm, SID/Label Range TLV, SR Local Block TLV, and Segment Routing Mapping Server (SRMS) Preference TLV [RFC8665] advertised in the OSPFv2 Router Information Opaque LSA [RFC7770].

The operational state (read-only) additions specific to OSPFv3 LSA include:

- OSPFv3 Extended Prefix Range TLV encodings [RFC8666] in the OSPFv3 E-Intra-Area-Prefix-LSA, E-Inter-Area-Prefix-LSA, E-AS-External-LSA, and E-Type-7-LSA [RFC8362].
- OSPFv3 Prefix-SID Sub-TLV encodings [RFC8666] in the OSPFv3 Intra-Area-Prefix TLV, Inter-Area-Prefix TLV, External-Prefix TLV [RFC8362], and OSPFv3 Extended Prefix Range TLV [RFC8666].

- OSPFv3 Adj-SID Sub-TLV [RFC8666] in the OSPFv3 Router-Link TLV [RFC8362].
- OSPFv3 LAN Adj-SID Sub-TLV [RFC8666] in the OSPFv3 Router-Link TLV [RFC8362].
- OSPFv3 SR-Algorithm, SID/Label Range TLV, SR Local Block TLV, and SRMS Preference TLV [RFC8666] advertised in the OSPFv3 Router Information LSA [RFC7770].

3. OSPF Segment Routing over MPLS YANG Module

[RFC4915], [RFC6991], [RFC8102], [RFC8294], [RFC8349], [RFC8665], [RFC8666], [RFC9020], [RFC9129], [RFC9587], and [RFC9855] are referenced in the YANG module.

```
<CODE BEGINS> file "ietf-ospf-sr-mpls@2025-12-09.yang"

module ietf-ospf-sr-mpls {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-ospf-sr-mpls";
  prefix ospf-sr-mpls;

  import ietf-inet-types {
    prefix inet;
    reference
      "RFC 6991: Common YANG Data Types";
  }
  import ietf-routing-types {
    prefix rt-types;
    reference
      "RFC 8294: Common YANG Data Types for the Routing Area";
  }
  import iana-routing-types {
    prefix iana-rt-types;
    reference
      "RFC 8294: Common YANG Data Types for the Routing Area";
  }
  import ietf-routing {
    prefix rt;
    reference
      "RFC 8349: A YANG Data Model for Routing
                 Management (NMDA Version)";
  }
  import ietf-segment-routing-common {
    prefix sr-cmn;
    reference
      "RFC 9020: YANG Data Model for Segment Routing";
  }
  import ietf-segment-routing-mpls {
    prefix sr-mpls;
    reference
      "RFC 9020: YANG Data Model for Segment Routing";
  }
  import ietf-ospf {
    prefix ospf;
    reference
      "RFC 9129: YANG Data Model for the OSPF Protocol";
  }
  import ietf-ospfv3-extended-lsa {
    prefix ospfv3-e-lsa;
    reference
      "RFC 9587: YANG Data Model for OSPFv3 Extended LSAs";
  }

  organization
    "IETF LSR - Link State Routing Working Group";
  contact
    "WG Web:   <https://datatracker.ietf.org/wg/lsr/>
     WG List:  <mailto:lsr@ietf.org>

     Author:   Yingzhen Qu
               <mailto:yingzhen.ietf@gmail.com>
```

```
         Author:   Acee Lindem
                   <mailto:acee.ietf@gmail.com>
         Author:   Jeffrey Zhang
                   <mailto:zzhang@juniper.net>
         Author:   Ing-Wher Chen
                   <mailto:ichen@redhat.com>";
    description
      "This YANG module defines the generic configuration
       and operational state for OSPF Segment Routing (SR).

       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.

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       set forth in Section 4.c of the IETF Trust's Legal Provisions
       Relating to IETF Documents
       (https://trustee.ietf.org/license-info).

       All revisions of IETF and IANA published modules can be found
       at the YANG Parameters registry
       (https://www.iana.org/assignments/yang-parameters).

       This version of this YANG module is part of RFC 9903; see
       the RFC itself for full legal notices.";

    revision 2025-12-09 {
      description
        "Initial revision.";
      reference
        "RFC 9903: A YANG Data Model for OSPF Segment Routing
         over the MPLS Data Plane";
    }

    feature remote-lfa-sr {
      description
        "Enhance Remote Loop-Free Alternate (RLFA) to use an SR path.";
      reference
        "RFC 8102: Remote-LFA Node Protection and Manageability";
    }

    feature ti-lfa {
      description
        "Topology Independent Loop-Free Alternate (TI-LFA)
         computation using Segment Routing.";
      reference
        "RFC 9855: Topology Independent Fast Reroute Using Segment
         Routing";
    }

    identity prefix-sid-flag {
```

```
      description
        "Base identity for Prefix-SID Sub-TLV flags.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 5
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
    }

    identity np-flag {
      base prefix-sid-flag;
      description
        "No-PHP (No Penultimate Hop-Popping) flag.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 5
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
    }

    identity m-flag {
      base prefix-sid-flag;
      description
        "Mapping server flag.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 5
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
    }

    identity e-flag {
      base prefix-sid-flag;
      description
        "Explicit-NULL flag.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 5
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
    }

    identity v-flag {
      base prefix-sid-flag;
      description
        "Value/Index flag.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 5
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
    }

    identity l-flag {
      base prefix-sid-flag;
      description
        "Local flag.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 5
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
    }

    identity extended-prefix-range-flag {
      description
        "Base identity for Extended Prefix Range TLV flags.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 4
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 5";
```

```
        }

    identity ia-flag {
      base extended-prefix-range-flag;
      description
        "Inter-Area flag.  Note that this is only applicable to OSPFv2
         since OSPFv3 advertises separate Inter-Area extended-LSAs.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 4";
    }

    identity adj-sid-flag {
      description
        "Base identity for Adj-SID Sub-TLV flags.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 6
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
    }

    identity b-flag {
      base adj-sid-flag;
      description
        "Backup flag.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 6
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
    }

    identity vi-flag {
      base adj-sid-flag;
      description
        "Value/Index flag - corresponds to V-Flag in references.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 6
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
    }

    identity lg-flag {
      base adj-sid-flag;
      description
        "Local/Global flag - corresponds to L-Flag in references.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 6
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
    }

    identity g-flag {
      base adj-sid-flag;
      description
        "Group flag.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 6
         RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
    }

    identity p-flag {
      base adj-sid-flag;
      description
```

```
            "Persistent flag.";
          reference
            "RFC 8665: OSPF Extensions for Segment Routing, Section 6
             RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
        }

        /* Groupings */

        grouping sid-tlv-encoding {
          description
            "SID TLV Encoding - 20-bit label or 32-bit SID index whose
             interpretation is dependent on the TLV length (3 for an
             MPLS label or 4 for a 32-bit value)  or the TLV V-Flag and
             L-Flag settings:

              If the V-Flag is set to 0 and L-Flag is set to 0:
              The SID/Index/Label field is a 4-octet index defining
              the offset in the SID/Label space advertised by this
              router.

              If the V-Flag is set to 1 and L-Flag is set to 1:
              The SID/Index/Label field is a 3-octet local label where the
              20 rightmost bits are used for encoding the label value.";
          reference
            "RFC 8665: OSPF Extensions for Segment Routing, Section 2.1
             RFC 8665: OSPF Extensions for Segment Routing, Section 5
             RFC 8666: OSPFv3 Extensions for Segment Routing, Section 3";
          choice sid {
            case sid-label {
              leaf label-value {
                type uint32 {
                  range "0 .. 1048575";
                }
                description
                  "A 20-bit MPLS label.";
              }
            }
            case sid-index {
              leaf index-value {
                type uint32;
                description
                  "Index into a label space advertised by this router.";
              }
            }
            description
              "Choice of either a 20-bit MPLS label or 32-bit index into
               an advertised label space.";
          }
        }

        grouping ospfv2-prefix-sid-sub-tlvs {
          description
            "OSPFv2 Prefix Segment ID (SID) Sub-TLVs.";
          reference
            "RFC 8665: OSPF Extensions for Segment Routing, Section 5";
          container prefix-sid-sub-tlvs {
            description
              "Prefix-SID Sub-TLV.";
```

```
      list prefix-sid-sub-tlv {
        description
          "Prefix-SID Sub-TLV.";
        container prefix-sid-flags {
          leaf-list flag {
            type identityref {
              base prefix-sid-flag;
            }
            description
              "Prefix-SID Sub-TLV flags.";
          }
          description
            "SID flags.";
        }
        leaf mt-id {
          type uint8 {
            range "0 .. 127";
          }
          description
            "Multi-topology ID.";
          reference
            "RFC 4915: Multi-Topology (MT) Routing in OSPF";
        }
        leaf algorithm {
          type identityref {
            base sr-cmn:prefix-sid-algorithm;
          }
          description
            "Algorithm associated with the Prefix-SID.";
        }
        uses sid-tlv-encoding;
      }
    }
  }

  grouping ospfv2-extended-prefix-range-tlvs {
    description
      "OSPFv2 Extended Prefix Range TLV grouping.";
    reference
      "RFC 8665: OSPF Extensions for Segment Routing, Section 4";
    container extended-prefix-range-tlvs {
      description
        "List of prefix ranges.";
      list extended-prefix-range-tlv {
        description
          "Range of prefixes.";
        leaf prefix-length {
          type uint8;
          description
            "Length of prefix in bits.";
        }
        leaf af {
          type iana-rt-types:address-family;
          description
            "Address family for the prefix.";
        }
        leaf range-size {
          type uint16;
```

```
                    description
                      "Number of prefixes covered by the
                       advertisement.";
                  }
                  container extended-prefix-range-flags {
                    leaf-list flag {
                      type identityref {
                        base extended-prefix-range-flag;
                      }
                      description
                        "Extended Prefix Range TLV flags.";
                    }
                    description
                      "Extended Prefix Range TLV flags.";
                  }
                  leaf prefix {
                    type inet:ipv4-prefix;
                    description
                      "IPv4 prefix.";
                  }
                  uses ospfv2-prefix-sid-sub-tlvs;
                  uses ospf:unknown-tlvs;
                }
              }
            }

    grouping ospfv2-adj-sid-sub-tlvs {
      description
        "OSPFv2 Adj-SID Sub-TLV grouping.";
      container adj-sid-sub-tlvs {
        description
          "Adj-SID optional sub-TLVs.";
        list adj-sid-sub-tlv {
          description
            "List of Adj-SID Sub-TLVs.";
          container adj-sid-flags {
            leaf-list flag {
              type identityref {
                base adj-sid-flag;
              }
              description
                "Adj-SID Sub-TLV flags.";
            }
            description
              "Adj-SID Sub-TLV flags.";
          }
          leaf mt-id {
            type uint8 {
              range "0 .. 127";
            }
            description
              "Multi-topology ID.  Topologies range from 0-127 and
               return of any other value would indicate an error.";
            reference
              "RFC 4915: Multi-Topology (MT) Routing in OSPF";
          }
          leaf weight {
            type uint8;
```

```
                  description
                    "Weight used for load-balancing.";
                }
                uses sid-tlv-encoding;
              }
            }
          }

    grouping ospfv2-lan-adj-sid-sub-tlvs {
       description
         "OSPFv2 LAN Adj-SID Sub-TLV grouping.";
       container lan-adj-sid-sub-tlvs {
         description
           "LAN Adj-SID optional sub-TLVs.";
         reference
           "RFC 8665: OSPF Extensions for Segment Routing, Section 6";
         list lan-adj-sid-sub-tlv {
           description
             "List of LAN Adj-SID Sub-TLVs.";
           container lan-adj-sid-flags {
             leaf-list flag {
               type identityref {
                 base adj-sid-flag;
               }
               description
                 "LAN Adj-SID Sub-TLV flags.";
             }
             description
               "LAN Adj-SID Sub-TLV flags.";
           }
           leaf mt-id {
             type uint8 {
               range "0 .. 127";
             }
             description
               "Multi-topology ID.  Topologies range from 0-127 and
                return of any other value would indicate an error.";
             reference
               "RFC 4915: Multi-Topology (MT) Routing in OSPF";
           }
           leaf weight {
             type uint8;
             description
               "Weight used for load-balancing.";
           }
           leaf neighbor-router-id {
             type rt-types:router-id;
             description
               "Neighbor router ID.";
           }
           uses sid-tlv-encoding;
         }
       }
    }

    grouping sr-algorithm-tlv {
       description
         "SR-Algorithm TLV grouping.";
```

```
              reference
                "RFC 8665: OSPF Extensions for Segment Routing, Section 3.1";
              container sr-algorithm-tlv {
                description
                  "All SR-Algorithm TLVs.";
                leaf-list sr-algorithm {
                  type identityref {
                    base sr-cmn:prefix-sid-algorithm;
                  }
                  description
                    "Segment Routing (SR) algorithms that the router is
                     currently using.";
                }
              }
            }

            grouping sid-range-tlvs {
              description
                "SID Range TLV grouping.";
              reference
                "RFC 8665: OSPF Extensions for Segment Routing, Section 3.2";
              container sid-range-tlvs {
                description
                  "List of SID Range TLVs.";
                list sid-range-tlv {
                  description
                    "SID Range TLV.";
                  leaf range-size {
                    type rt-types:uint24;
                    description
                      "SID range.  The return of a zero value would indicate
                       an error.";
                  }
                  uses sid-tlv-encoding;
                }
              }
            }

            grouping local-block-tlvs {
              description
                "The SR Local Block TLV contains the
                 range of labels reserved for local SIDs.";
              reference
                "RFC 8665: OSPF Extensions for Segment Routing, Section 3.3";
              container local-block-tlvs {
                description
                  "List of Segment Routing Local Block (SRLB) TLVs.";
                list local-block-tlv {
                  description
                    "SRLB TLV.";
                  leaf range-size {
                    type rt-types:uint24;
                    description
                      "SID range.  The return of a zero value would indicate
                       an error.";
                  }
                  uses sid-tlv-encoding;
                }
```

```
      }
    }

    grouping srms-preference-tlv {
      description
        "The Segment Routing Mapping Server (SRMS) Preference TLV is
         used to advertise a preference associated with the node that
         acts as an SRMS.  SRMS advertisements with a higher
         preference value are preferred over those with a lower
         preference value.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 3.4";
      container srms-preference-tlv {
        description
          "SRMS Preference TLV.";
        leaf preference {
          type uint8;
          description
            "SRMS Preference TLV, value from 0 to 255 with
             255 being the most preferred.";
        }
      }
    }

    grouping ospfv3-prefix-sid-sub-tlvs {
      description
        "OSPFv3 Prefix-SID Sub-TLVs.";
      reference
        "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
      container prefix-sid-sub-tlvs {
        description
          "Prefix-SID Sub-TLV.";
        list prefix-sid-sub-tlv {
          description
            "Prefix-SID Sub-TLV.";
          container ospfv3-prefix-sid-flags {
            leaf-list flag {
              type identityref {
                base prefix-sid-flag;
              }
              description
                "Prefix-SID Sub-TLV flags.";
            }
            description
              "SID flags.";
          }
          leaf algorithm {
            type identityref {
              base sr-cmn:prefix-sid-algorithm;
            }
            description
              "Algorithm associated with the Prefix-SID.";
          }
          uses sid-tlv-encoding;
        }
      }
    }
```

```
  grouping ospfv3-extended-prefix-range-tlvs {
    description
      "OSPFv3 Extended Prefix Range TLV grouping.";
    reference
      "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 5";
    container ospfv3-extended-prefix-range-tlvs {
      description
        "List of Extended Prefix Range TLVs.";
      list extended-prefix-range-tlv {
        description
          "Range of prefixes.";
        leaf prefix-length {
          type uint8;
          description
            "Length of prefix in bits.";
        }
        leaf af {
          type iana-rt-types:address-family;
          description
            "Address family for the prefix.";
        }
        leaf range-size {
          type uint16;
          description
            "Number of prefixes covered by the advertisement.
             The return of a value of zero would indicate an error.";
        }
        leaf prefix {
          type inet:ip-prefix;
          description
            "IPv4 or IPv6 prefix.";
        }
        uses ospfv3-prefix-sid-sub-tlvs;
        uses ospf:unknown-tlvs;
      }
    }
  }

  grouping ospfv3-adj-sid-sub-tlvs {
    description
      "OSPFv3 Adj-SID Sub-TLV grouping.";
    reference
      "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
    container adj-sid-sub-tlvs {
      description
        "Adj-SID optional sub-TLVs.";
      list adj-sid-sub-tlv {
        description
          "List of Adj-SID Sub-TLVs.";
        container adj-sid-flags {
          leaf-list flag {
            type identityref {
              base adj-sid-flag;
            }
            description
              "Adj-SID Sub-TLV flags.";
          }
          description
```

```
              "Adj-SID Sub-TLV flags.";
          }
          leaf weight {
            type uint8;
            description
              "Weight used for load-balancing.";
          }
          uses sid-tlv-encoding;
        }
      }
    }

    grouping ospfv3-lan-adj-sid-sub-tlvs {
      description
        "OSPFv3 LAN Adj-SID Sub-TLV grouping.";
      reference
        "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
      container lan-adj-sid-sub-tlvs {
        description
          "LAN Adj-SID optional sub-TLVs.";
        list lan-adj-sid-sub-tlv {
          description
            "List of LAN Adj-SID Sub-TLVs.";
          container lan-adj-sid-flags {
            leaf-list flag {
              type identityref {
                base adj-sid-flag;
              }
              description
                "LAN Adj-SID Sub-TLV flags.";
            }
            description
              "LAN Adj-SID Sub-TLV flags.";
          }
          leaf weight {
            type uint8;
            description
              "Weight used for load-balancing.";
          }
          leaf neighbor-router-id {
            type rt-types:router-id;
            description
              "Neighbor router ID.";
          }
          uses sid-tlv-encoding;
        }
      }
    }

    /*
     * Augmentations for OSPF SR-MPLS Configuration (read-write)
     * data nodes.
     */

    augment "/rt:routing/rt:control-plane-protocols"
          + "/rt:control-plane-protocol/ospf:ospf" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
          + "rt:control-plane-protocol/rt:type, 'ospf:ospf')" {
```

```
             description
               "This augments the OSPF routing protocol when used.";
         }
         description
           "This augments the OSPF protocol configuration with Segment
            Routing over the MPLS data plane.  The following semantic
            validation is to be performed for the configuration data:
              - Assure prefixes specified in binding policies do not
                overlap.";
         reference
           "RFC 9020: YANG Data Model for Segment Routing";
         uses sr-mpls:sr-control-plane;
         container protocol-srgb {
           if-feature "sr-mpls:protocol-srgb";
           uses sr-cmn:srgb;
           description
             "Per-protocol SRGB.";
         }
       }

       augment "/rt:routing/rt:control-plane-protocols/"
             + "rt:control-plane-protocol/ospf:ospf/"
             + "ospf:areas/ospf:area" {
         when "derived-from(/rt:routing/rt:control-plane-protocols/"
            + "rt:control-plane-protocol/rt:type, 'ospf:ospf') and "
            + "/rt:routing/rt:control-plane-protocols"
            + "/rt:control-plane-protocol/ospf:ospf"
            + "/ospf-sr-mpls:segment-routing/"
            + "ospf-sr-mpls:enabled = 'true'" {
           description
             "This augments the OSPF area configuration when Segment
              Routing is enabled at the OSPF instance level.";
         }
         container segment-routing {
           presence "When present, SR-MPLS is enabled
                     for the area.";
           description
             "OSPF area level Segment Routing configuration.  Enables
              SR-MPLS on all interfaces, and enables advertisement of
              Link State Advertisements (LSAs) and TLVs supporting
              SR-MPLS.";
         }
         description
           "This augments the OSPF protocol area configuration with
            Segment Routing.";
       }

       augment "/rt:routing/rt:control-plane-protocols/"
             + "rt:control-plane-protocol/ospf:ospf/"
             + "ospf:areas/ospf:area/ospf:interfaces/ospf:interface" {
         when "derived-from(/rt:routing/rt:control-plane-protocols/"
            + "rt:control-plane-protocol/rt:type, 'ospf:ospf') and "
            + "/rt:routing/rt:control-plane-protocols/"
            + "rt:control-plane-protocol/ospf:ospf/"
            + "ospf:areas/ospf:area/ospf-sr-mpls:segment-routing" {
           description
             "This augments the OSPF interface configuration when used.";
         }
```

```
        description
          "This augments the OSPF protocol interface
           configuration with Segment Routing.";
        reference
          "RFC 9020: YANG Data Model for Segment Routing";
        uses sr-mpls:igp-interface {
          augment "segment-routing/adjacency-sid/adj-sids" {
            when "((../../../ospf:interface-type = 'broadcast') or
                   (../../../ospf:interface-type = 'non-broadcast'))" {
              description
                "This augments broadcast and non-broadcast multi-access
                  interface with Segment Routing interface
                  configuration.";
            }
            description
              "This augments multi-access interface adj-sids with a
               neighbor-id.";
            leaf neighbor-id {
              type inet:ip-address;
              mandatory true;
              description
                "Neighbor's Router ID, IPv4 address, or IPv6 address.
                 Specification is optional and, if specified, SHOULD
                 specify a neighbor reachable via the interface.";
            }
          }
        }
      }

  augment "/rt:routing/rt:control-plane-protocols/"
        + "rt:control-plane-protocol/ospf:ospf/"
        + "ospf:areas/ospf:area/ospf:interfaces/ospf:interface/"
        + "ospf:fast-reroute/ospf:lfa" {
    when "derived-from(/rt:routing/rt:control-plane-protocols/"
       + "rt:control-plane-protocol/rt:type, 'ospf:ospf')" {
      description
        "This augments the OSPF routing protocol when used.";
    }
    description
      "This augments the OSPF protocol IP Fast Reroute (IP-FRR) with
       TI-LFA.";
    container ti-lfa {
      if-feature "ti-lfa";
      description
        "Topology Independent Loop Free Alternate
         (TI-LFA) support.";
      reference
        "RFC 9855: Topology Independent Fast Reroute Using Segment
         Routing";
      leaf enabled {
        type boolean;
        default "false";
        description
          "Enable TI-LFA computation.";
      }
      container selection-tie-breakers {
        container node-protection {
          presence "Presence of container enables the node
```

```
                        protection tie-breaker.";
              leaf priority {
                type uint8;
                default "128";
                description
                  "Priority for node protection tie-breaker with
                   a lower priority being more preferred.  By default,
                   the priority is in the middle of the priority range.";
              }
              description
                "Enable node protection as a TI-LFA path
                 selection tie-breaker.  A path providing node
                 protection will be selected over one that
                 doesn't provide node protection.";
            }
            container srlg-disjoint {
              presence "Presence of container enables the SRLG
                        disjoint tie-breaker.";
              leaf priority {
                type uint8;
                default "128";
                description
                  "Priority for Shared Risk Link Group (SRLG)
                   disjoint tie-breaker with a lower priority being
                   more preferred.  By default, the priority is in the
                   middle of the priority range.";
              }
              description
                "Enable SRLG disjoint as a TI-LFA path selection
                 tie-breaker.  A path providing a node with a disjoint
                 path for SRLG links from the primary path will be
                 selected over a path that doesn't provide an SRLG
                 disjoint path.";
            }
            description
              "Configure path selection tie-breakers and their
               respective priorities for the TI-LFA computation.
               Multiple tie-breakers and priorities may be configured.";
          }
        }
      }

  augment "/rt:routing/rt:control-plane-protocols/"
        + "rt:control-plane-protocol/ospf:ospf/"
        + "ospf:areas/ospf:area/ospf:interfaces/ospf:interface/"
        + "ospf:fast-reroute/ospf:lfa/ospf:remote-lfa" {
    when "derived-from(/rt:routing/rt:control-plane-protocols/"
        + "rt:control-plane-protocol/rt:type, 'ospf:ospf')" {
      description
        "This augments the OSPF routing protocol when used.";
    }
    description
      "This augments the OSPF protocol IP-FRR with RLFA.";
    reference
      "RFC 9855: Topology Independent Fast Reroute Using Segment
       Routing";
    leaf use-segment-routing-path {
      if-feature "remote-lfa-sr";
```

```
      type boolean;
      default "false";
      description
        "Force RLFA to use a Segment Routing path instead of an
         LDP path.  The value of this leaf is in effect only when
         remote-lfa is enabled.";
    }
  }

  /* Operational states */

  augment "/rt:routing/rt:control-plane-protocols/"
        + "rt:control-plane-protocol/ospf:ospf/"
        + "ospf:areas/ospf:area/ospf:interfaces/ospf:interface/"
        + "ospf:neighbors/ospf:neighbor" {
    when "derived-from(/rt:routing/rt:control-plane-protocols/"
      + "rt:control-plane-protocol/rt:type, 'ospf:ospf')" {
      description
        "This augments the OSPF routing protocol when used.";
    }
    description
      "This augments the OSPF interface adjacency-sid state.";
    list adjacency-sid {
      description
        "List of Adj-SIDs.";
      leaf value {
        type uint32;
        description
          "Value of the Adj-SID.";
      }
      leaf weight {
        type uint8;
        description
          "Weight associated with the Adj-SID.";
      }
      leaf protection-requested {
        type boolean;
        description
          "Indicate if the Adj-SID is protected.";
      }
    }
  }

  /*
   * Augmentations for read-only data nodes corresponding to Segment
   * Routing encodings in OSPFv2 and OSPFv3 Link State Advertisements
   * (LSAs) in OSPF Link State Databases (LSDBs) at the instance,
   * area, and interface level.
   */
  /* Augmentations for OSPFv2 LSAs. */

  augment "/rt:routing/"
        + "rt:control-plane-protocols/rt:control-plane-protocol/"
        + "ospf:ospf/ospf:areas/"
        + "ospf:area/ospf:database/"
        + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
        + "ospf:area-scope-lsa/ospf:version/ospf:ospfv2/"
        + "ospf:ospfv2/ospf:body/ospf:opaque/"
```

```
                + "ospf:extended-prefix-opaque" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
           + "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
          description
            "This augmentation is only valid for OSPFv2.";
        }
        description
          "SR Extended Prefix Range TLV in OSPFv2 Type 10 (area-scoped)
           Extended Prefix Opaque LSAs.";
        reference
          "RFC 8665: OSPF Extensions for Segment Routing, Section 4";
        uses ospfv2-extended-prefix-range-tlvs;
      }

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:database/"
            + "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
            + "ospf:as-scope-lsa/ospf:version/ospf:ospfv2/"
            + "ospf:ospfv2/ospf:body/ospf:opaque/"
            + "ospf:extended-prefix-opaque" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
           + "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
          description
            "This augmentation is only valid for OSPFv2.";
        }
        description
          "SR Extended Prefix Range TLV in OSPFv2 Type 11 (AS-scoped)
           Extended Prefix Opaque LSAs.";
        reference
          "RFC 8665: OSPF Extensions for Segment Routing, Section 4";
        uses ospfv2-extended-prefix-range-tlvs;
      }

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:areas/"
            + "ospf:area/ospf:database/"
            + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
            + "ospf:area-scope-lsa/ospf:version/ospf:ospfv2/"
            + "ospf:ospfv2/ospf:body/ospf:opaque/"
            + "ospf:extended-prefix-opaque/ospf:extended-prefix-tlv" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
           + "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
          description
            "This augmentation is only valid for OSPFv2.";
        }
        description
          "SR Prefix-SID Sub-TLVs for OSPFv2 Extended Prefix TLVs
           in OSPFv2 Type 10 (area-scoped) Extended Prefix Opaque LSAs.";
        uses ospfv2-prefix-sid-sub-tlvs;
        reference
          "RFC 8665: OSPF Extensions for Segment Routing, Section 5";
      }

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:database/"
```

```
              + "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
              + "ospf:as-scope-lsa/ospf:version/ospf:ospfv2/"
              + "ospf:ospfv2/ospf:body/ospf:opaque/"
              + "ospf:extended-prefix-opaque/ospf:extended-prefix-tlv" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
         + "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
        description
          "This augmentation is only valid for OSPFv2.";
      }
      description
        "SR Prefix-SID Sub-TLVs for OSPFv2 Extended Prefix TLVs
         in OSPFv2 Type 11 (AS-scoped) Extended Prefix Opaque LSAs.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 5";
      uses ospfv2-prefix-sid-sub-tlvs;
    }

    augment "/rt:routing/"
          + "rt:control-plane-protocols/rt:control-plane-protocol/"
          + "ospf:ospf/ospf:areas/"
          + "ospf:area/ospf:database/"
          + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
          + "ospf:area-scope-lsa/ospf:version/ospf:ospfv2/"
          + "ospf:ospfv2/ospf:body/ospf:opaque/"
          + "ospf:extended-link-opaque/ospf:extended-link-tlv" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
         + "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
        description
          "This augmentation is only valid for OSPFv2.";
      }
      description
        "SR TLVs for OSPFv2 Extended Link TLV in OSPFv2 Type 10
         (area-scoped) Extended Link Opaque LSAs.";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 6";
      uses ospfv2-adj-sid-sub-tlvs;
      uses ospfv2-lan-adj-sid-sub-tlvs;
    }

    augment "/rt:routing/"
          + "rt:control-plane-protocols/rt:control-plane-protocol/"
          + "ospf:ospf/ospf:areas/"
          + "ospf:area/ospf:database/"
          + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
          + "ospf:area-scope-lsa/ospf:version/ospf:ospfv2/"
          + "ospf:ospfv2/ospf:body/ospf:opaque/ospf:ri-opaque" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
         + "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
        description
          "This augmentation is only valid for OSPFv2.";
      }
      description
        "SR TLVs for OSPFv2 Router Information Type 10 (area-scoped)
         Opaque LSAs";
      reference
        "RFC 8665: OSPF Extensions for Segment Routing, Section 3";
      uses sr-algorithm-tlv;
      uses sid-range-tlvs;
```

```
            uses local-block-tlvs;
            uses srms-preference-tlv;
          }

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:database/"
            + "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
            + "ospf:as-scope-lsa/ospf:version/ospf:ospfv2/"
            + "ospf:ospfv2/ospf:body/ospf:opaque/ospf:ri-opaque" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
           + "rt:control-plane-protocol/rt:type, 'ospf:ospfv2')" {
          description
            "This augmentation is only valid for OSPFv2.";
        }
        description
          "SR TLVs for OSPFv2 Router Information Type 11 (AS-scoped)
           Opaque LSAs.";
        reference
          "RFC 8665: OSPF Extensions for Segment Routing, Section 3";
        uses sr-algorithm-tlv;
        uses sid-range-tlvs;
        uses local-block-tlvs;
        uses srms-preference-tlv;
      }

      /* Augmentations for OSPFv3 LSAs. */

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:database/"
            + "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
            + "ospf:as-scope-lsa/ospf:version/ospf:ospfv3/"
            + "ospf:ospfv3/ospf:body/ospf:router-information" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
           + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
          description
            "This augmentation is only valid for OSPFv3.";
        }
        description
          "SR-specific TLVs for OSPFv3 Router Information LSA
           (area-scoped).";
        reference
          "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 4";
        uses sr-algorithm-tlv;
        uses sid-range-tlvs;
        uses local-block-tlvs;
        uses srms-preference-tlv;
      }

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:areas/"
            + "ospf:area/ospf:database/"
            + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
            + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
            + "ospf:ospfv3/ospf:body/ospf:router-information" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
```

```
            + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
          description
            "This augmentation is only valid for OSPFv3.";
        }
        description
          "SR-specific TLVs for OSPFv3 Router Information LSA
           (AS-scoped).";
        reference
          "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 4";
        uses sr-algorithm-tlv;
        uses sid-range-tlvs;
        uses local-block-tlvs;
        uses srms-preference-tlv;
      }

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
            + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
            + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
            + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-intra-area-prefix" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
           + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
          description
            "This augmentation is only valid for OSPFv3.";
        }
        uses ospfv3-extended-prefix-range-tlvs;
        description
          "SR Extended Prefix Range TLVs in OSPFv3
           E-Intra-Area-Prefix LSAs.";
      }

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
            + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
            + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
            + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-inter-area-prefix" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
           + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
          description
            "This augmentation is only valid for OSPFv3.";
        }
        description
          "SR Extended Prefix Range TLVs in OSPFv3
           E-Inter-Area-Prefix LSAs.";
        reference
          "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 5";
        uses ospfv3-extended-prefix-range-tlvs;
      }

      augment "/rt:routing/"
            + "rt:control-plane-protocols/rt:control-plane-protocol/"
            + "ospf:ospf/ospf:database/"
            + "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
            + "ospf:as-scope-lsa/ospf:version/ospf:ospfv3/"
            + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-as-external" {
        when "derived-from(/rt:routing/rt:control-plane-protocols/"
```

```
                 + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
              description
                "This augmentation is only valid for OSPFv3.";
            }
            description
              "SR Extended Prefix Range TLVs in OSPFv3 E-AS-External LSAs.";
            reference
              "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 5";
            uses ospfv3-extended-prefix-range-tlvs;
          }

          augment "/rt:routing/"
                + "rt:control-plane-protocols/rt:control-plane-protocol/"
                + "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
                + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
                + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
                + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-nssa" {
            when "derived-from(/rt:routing/rt:control-plane-protocols/"
               + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
              description
                "This augmentation is only valid for OSPFv3.";
            }
            description
              "SR Extended Prefix Range TLVs in OSPFv3 E-NSSA LSAs.";
            reference
              "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 5";
            uses ospfv3-extended-prefix-range-tlvs;
          }

          augment "/rt:routing/"
                + "rt:control-plane-protocols/rt:control-plane-protocol/"
                + "ospf:ospf/ospf:areas/ospf:area/ospf:interfaces/"
                + "ospf:interface/"
                + "ospf:database/ospf:link-scope-lsa-type/"
                + "ospf:link-scope-lsas/ospf:link-scope-lsa/"
                + "ospf:version/ospf:ospfv3/ospf:ospfv3/"
                + "ospf:body/ospfv3-e-lsa:e-link/"
                + "ospfv3-e-lsa:e-link-tlvs/ospfv3-e-lsa:intra-prefix-tlv/"
                + "ospfv3-e-lsa:sub-tlvs" {
            when "derived-from(/rt:routing/rt:control-plane-protocols/"
               + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
              description
                "This augmentation is only valid for OSPFv3.";
            }
            description
              "SR Prefix-SID Sub-TLV in OSPFv3 Intra-Area-Prefix
               TLV for OSPFv3 E-Link LSAs.";
            reference
              "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
            uses ospfv3-prefix-sid-sub-tlvs;
          }

          augment "/rt:routing/"
                + "rt:control-plane-protocols/rt:control-plane-protocol/"
                + "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
                + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
                + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
                + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-intra-area-prefix/"
```

```
              + "ospfv3-e-lsa:e-intra-prefix-tlvs/"
              + "ospfv3-e-lsa:intra-prefix-tlv/"
              + "ospfv3-e-lsa:sub-tlvs" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
        + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
        description
          "This augmentation is only valid for OSPFv3
           E-Router LSAs.";
      }
      description
        "SR Prefix-SID Sub-TLV in OSPFv3 Intra-Area-Prefix
         TLV for OSPFv3 E-Intra-Area-Prefix LSAs.";
      reference
        "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
      uses ospfv3-prefix-sid-sub-tlvs;
    }

    augment "/rt:routing/"
          + "rt:control-plane-protocols/rt:control-plane-protocol/"
          + "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
          + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
          + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
          + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-inter-area-prefix/"
          + "ospfv3-e-lsa:e-inter-prefix-tlvs/"
          + "ospfv3-e-lsa:inter-prefix-tlv/"
          + "ospfv3-e-lsa:sub-tlvs" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
        + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
        description
          "This augmentation is only valid for OSPFv3.";
      }
      description
        "SR Prefix-SID Sub-TLV in OSPFv3 Intra-Area-Prefix
         TLV for OSPFv3 E-Inter-Area-Prefix LSAs.";
      reference
        "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
      uses ospfv3-prefix-sid-sub-tlvs;
    }

    augment "/rt:routing/"
          + "rt:control-plane-protocols/rt:control-plane-protocol/"
          + "ospf:ospf/ospf:database/"
          + "ospf:as-scope-lsa-type/ospf:as-scope-lsas/"
          + "ospf:as-scope-lsa/ospf:version/ospf:ospfv3/"
          + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-as-external/"
          + "ospfv3-e-lsa:e-external-tlvs/"
          + "ospfv3-e-lsa:external-prefix-tlv/"
          + "ospfv3-e-lsa:sub-tlvs" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
        + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
        description
          "This augmentation is only valid for OSPFv3.";
      }
      description
        "SR Prefix-SID Sub-TLV in OSPFv3 External-Prefix TLV
         for OSPFv3 E-AS-External LSAs.";
      reference
        "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
```

```
        uses ospfv3-prefix-sid-sub-tlvs;
    }

    augment "/rt:routing/"
          + "rt:control-plane-protocols/rt:control-plane-protocol/"
          + "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
          + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
          + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
          + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-nssa/"
          + "ospfv3-e-lsa:e-external-tlvs/"
          + "ospfv3-e-lsa:external-prefix-tlv/"
          + "ospfv3-e-lsa:sub-tlvs" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
         + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
        description
          "This augmentation is only valid for OSPFv3.";
      }
      description
        "SR Prefix-SID Sub-TLV in OSPFv3 External-Prefix TLV
         for OSPFv3 E-NSSA LSAs.";
      reference
        "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 6";
      uses ospfv3-prefix-sid-sub-tlvs;
    }

    augment "/rt:routing/"
          + "rt:control-plane-protocols/rt:control-plane-protocol/"
          + "ospf:ospf/ospf:areas/ospf:area/ospf:database/"
          + "ospf:area-scope-lsa-type/ospf:area-scope-lsas/"
          + "ospf:area-scope-lsa/ospf:version/ospf:ospfv3/"
          + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-router/"
          + "ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv/"
          + "ospfv3-e-lsa:sub-tlvs" {
      when "derived-from(/rt:routing/rt:control-plane-protocols/"
         + "rt:control-plane-protocol/rt:type, 'ospf:ospfv3')" {
        description
          "This augmentation is only valid for OSPFv3
           E-Router LSAs.";
      }
      description
        "SR Sub-TLVs in OSPFv3 Router-Link TLV for OSPFv3 E-Router
         LSAs.";
      reference
        "RFC 8666: OSPFv3 Extensions for Segment Routing, Section 7";
      uses ospfv3-adj-sid-sub-tlvs;
      uses ospfv3-lan-adj-sid-sub-tlvs;
    }
  }

  <CODE ENDS>
```

Figure 1

4. Security Considerations

This section is modeled after the template described in Section 3.7 of [YANG-GUIDE].

The "ietf-ospf-sr-mpls" YANG module defines a data model that is designed to be accessed via YANG-based management protocols, such as NETCONF [RFC6241] and RESTCONF [RFC8040]. These YANG-based management protocols (1) have to use a secure transport layer (e.g., SSH [RFC4252], TLS [RFC8446], and QUIC [RFC9000]) and (2) have to use mutual authentication.

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

There are a number of data nodes defined in this YANG module that are writable/creatable/ deletable (i.e., "config true", which is the default). All writable data nodes are likely to be sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) and delete operations to these data nodes without proper protection or authentication can have a negative effect on network operations. The following subtrees and data nodes have particular sensitivities/vulnerabilities:

- /ospf:ospf/segment-routing/enabled - Modification to the enablement for SR could result in a Denial-of-Service (DoS) attack. If an attacker disables SR, it will cause traffic disruption.
- /ospf:ospf/segment-routing/bindings - Modification to the local bindings could result in a DoS attack.
- /ospf:ospf/protocol-srgb - Modification of the protocol SRGB could be used to mount a DoS attack. For example, if the protocol SRGB size is reduced to a very small value, a lot of existing segments could no longer be installed, leading to a traffic disruption.
- /ospf:interfaces/ospf:interface/segment-routing - Modification of the Adj-SID could be used to mount a DoS attack. Change of an Adj-SID could be used to redirect traffic.
- /ospf:interfaces/ospf:interface/ospf:fast-reroute/ti-lfa - Modification of the TI-LFA enablement could lead to traffic disruption.

Some of the readable data nodes in this YANG module 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. Specifically, the following subtrees and data nodes have particular sensitivities/vulnerabilities:

- The "ietf-ospf-sr-mpls" module augments the base OSPF module Link State Database (LSDB) with various TLVs. Knowledge of these data nodes can be used to attack other routers in the OSPF domain. These attacks are documented in [RFC9129].
- Knowledge of the Prefix and Adjacency SIDs advertised in LSAs could facilitate a targeted attack on the data plane by knowing the topology and path for MPLS segment-routed packets. Examples include the OSPFv2 extended-prefix-opaque-LSA/prefix-sid-sub-tlvs and OSPFv3 e-router-tlvs/link-tlv/sub-tlvs/ospfv3-lan-adj-sid-sub-tlvs.
- Knowledge of Prefix and Adjacency SIDs may also divulge a view of the Segment Routing network topology architecture, which may be considered a proprietary asset.
- Knowledge of the advertised SID/Label Range TLVs, SR Local Block TLVs, and SRMS TLVs may facilitate a DoS attack on the advertising node's SR and SRMS functionality. Examples

include augmentations to the OSPFv2 ri-opaque/sid-range-tlvs and OSPFv3 router-information/local-block-tlvs.

There are no particularly sensitive RPC or action operations.

This YANG module uses groupings from other YANG modules that define nodes that may be considered sensitive or vulnerable in network environments. Refer to the Security Considerations of [RFC9020] for information as to which nodes may be considered sensitive or vulnerable in network environments.

5. IANA Considerations

This document registers a URI in the "IETF XML Registry" [RFC3688]. Following the format in [RFC3688], the following registration has been made:

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

This document registers a YANG module in the "YANG Module Names" registry [RFC6020].

Name: ietf-ospf-sr-mpls
Maintained by IANA?:   N
Namespace: urn:ietf:params:xml:ns:yang:ietf-ospf-sr-mpls
Prefix: ospf-sr-mpls
Reference: RFC 9903

6. References

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Appendix A.   A Configuration Example

The following is an XML example using the "ietf-ospf-sr-mpls" YANG module and [RFC9020].

Note: '\' line wrapping per [RFC8792].

```xml
<?xml version='1.0' encoding='UTF-8'?>
  <routing xmlns="urn:ietf:params:xml:ns:yang:ietf-routing">
    <router-id>1.1.1.1</router-id>
    <control-plane-protocols>
      <control-plane-protocol>
        <type xmlns:ospf="urn:ietf:params:xml:ns:yang:ietf-ospf">\
          ospf:ospfv2</type>
        <name>OSPFv2</name>
        <ospf xmlns="urn:ietf:params:xml:ns:yang:ietf-ospf">
          <areas>
            <area>
              <area-id>0.0.0.0</area-id>
              <segment-routing xmlns="urn:ietf:params:xml:ns:yang:\
                ietf-ospf-sr-mpls"></segment-routing>
              <interfaces>
                <interface>
                  <name>eth0</name>
                  <segment-routing xmlns="urn:ietf:params:xml:ns:\
                    yang:ietf-ospf-sr-mpls">
                    <adjacency-sid>
                      <adj-sids>
                        <value>3888</value>
                      </adj-sids>
                    </adjacency-sid>
                  </segment-routing>
                </interface>
              </interfaces>
            </area>
          </areas>
          <segment-routing xmlns="urn:ietf:params:xml:ns:yang:\
            ietf-ospf-sr-mpls">
            <enabled>true</enabled>
          </segment-routing>
          <protocol-srgb xmlns="urn:ietf:params:xml:ns:yang:\
            ietf-ospf-sr-mpls">
            <srgb>
              <lower-bound>4000</lower-bound>
              <upper-bound>5000</upper-bound>
            </srgb>
          </protocol-srgb>
        </ospf>
      </control-plane-protocol>
    </control-plane-protocols>
  </routing>
```

The following is the same example using JSON format.

```json
{
  "ietf-routing:routing": {
    "router-id": "1.1.1.1",
    "control-plane-protocols": {
      "control-plane-protocol": [
        {
          "type": "ietf-ospf:ospfv2",
          "name": "OSPFv2",
```

```
        "ietf-ospf:ospf": {
          "areas": {
            "area": [
              {
                "area-id": "0.0.0.0",
                "interfaces": {
                  "interface": [
                    {
                      "name": "eth0",
                      "ietf-ospf-sr-mpls:segment-routing": {
                        "adjacency-sid": {
                          "adj-sids": [
                            {
                              "value": 3888
                            }
                          ]
                        }
                      }
                    }
                  ]
                },
                "ietf-ospf-sr-mpls:segment-routing": {}
              }
            ]
          },
          "ietf-ospf-sr-mpls:segment-routing": {
            "enabled": true
          },
          "ietf-ospf-sr-mpls:protocol-srgb": {
            "srgb": [
              {
                "lower-bound": 4000,
                "upper-bound": 5000
              }
            ]
          }
        }
      }
    }
  ]
}
}
}
```

Appendix B. Full Tree Diagram

```
augment /rt:routing/rt:control-plane-protocols
          /rt:control-plane-protocol/ospf:ospf:
  +--rw segment-routing
  |  +--rw enabled?    boolean
  |  +--rw bindings {mapping-server}?
  |     +--rw advertise
  |     |  +--rw policies*   leafref
  |     +--rw receive?       boolean
  +--rw protocol-srgb {sr-mpls:protocol-srgb}?
     +--rw srgb* [lower-bound upper-bound]
```

```
              +--rw lower-bound     uint32
              +--rw upper-bound     uint32
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area:
    +--rw segment-routing!
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area/ospf:interfaces/ospf:interface:
    +--rw segment-routing
       +--rw adjacency-sid
          +--rw adj-sids* [value]
          |  +--rw value-type?     enumeration
          |  +--rw value           uint32
          |  +--rw protected?      boolean
          |  +--rw weight?         uint8
          |  +--rw neighbor-id     inet:ip-address
          +--rw advertise-adj-group-sid* [group-id]
          |  +--rw group-id     uint32
          +--rw advertise-protection?       enumeration
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area/ospf:interfaces/ospf:interface
            /ospf:fast-reroute/ospf:lfa:
    +--rw ti-lfa {ti-lfa}?
       +--rw enabled?                      boolean
       +--rw selection-tie-breakers
          +--rw node-protection!
          |  +--rw priority?   uint8
          +--rw srlg-disjoint!
             +--rw priority?   uint8
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area/ospf:interfaces/ospf:interface
            /ospf:fast-reroute/ospf:lfa/ospf:remote-lfa:
    +--rw use-segment-routing-path?   boolean {remote-lfa-sr}?
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area/ospf:interfaces/ospf:interface/ospf:neighbors
            /ospf:neighbor:
    +--ro adjacency-sid* []
       +--ro value?                  uint32
       +--ro weight?                 uint8
       +--ro protection-requested?   boolean
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area/ospf:database/ospf:area-scope-lsa-type
            /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
            /ospf:ospfv2/ospf:ospfv2/ospf:body/ospf:opaque
            /ospf:extended-prefix-opaque:
    +--ro extended-prefix-range-tlvs
       +--ro extended-prefix-range-tlv* []
          +--ro prefix-length?                uint8
          +--ro af?
          |       iana-rt-types:address-family
          +--ro range-size?                   uint16
          +--ro extended-prefix-range-flags
          |  +--ro flag*   identityref
```

```
               +--ro prefix?                          inet:ipv4-prefix
               +--ro prefix-sid-sub-tlvs
               |  +--ro prefix-sid-sub-tlv* []
               |     +--ro prefix-sid-flags
               |     |  +--ro flag*   identityref
               |     +--ro mt-id?               uint8
               |     +--ro algorithm?           identityref
               |     +--ro (sid)?
               |        +--:(sid-label)
               |        |  +--ro label-value?   uint32
               |        +--:(sid-index)
               |           +--ro index-value?   uint32
               +--ro unknown-tlvs
                  +--ro unknown-tlv* []
                     +--ro type?     uint16
                     +--ro length?   uint16
                     +--ro value?    yang:hex-string
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:database
            /ospf:as-scope-lsa-type/ospf:as-scope-lsas
            /ospf:as-scope-lsa/ospf:version/ospf:ospfv2/ospf:ospfv2
            /ospf:body/ospf:opaque/ospf:extended-prefix-opaque:
    +--ro extended-prefix-range-tlvs
       +--ro extended-prefix-range-tlv* []
          +--ro prefix-length?                uint8
          +--ro af?
          |        iana-rt-types:address-family
          +--ro range-size?                   uint16
          +--ro extended-prefix-range-flags
          |  +--ro flag*   identityref
          +--ro prefix?                       inet:ipv4-prefix
          +--ro prefix-sid-sub-tlvs
          |  +--ro prefix-sid-sub-tlv* []
          |     +--ro prefix-sid-flags
          |     |  +--ro flag*   identityref
          |     +--ro mt-id?               uint8
          |     +--ro algorithm?           identityref
          |     +--ro (sid)?
          |        +--:(sid-label)
          |        |  +--ro label-value?   uint32
          |        +--:(sid-index)
          |           +--ro index-value?   uint32
          +--ro unknown-tlvs
             +--ro unknown-tlv* []
                +--ro type?     uint16
                +--ro length?   uint16
                +--ro value?    yang:hex-string
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area/ospf:database/ospf:area-scope-lsa-type
            /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
            /ospf:ospfv2/ospf:ospfv2/ospf:body/ospf:opaque
            /ospf:extended-prefix-opaque/ospf:extended-prefix-tlv:
    +--ro prefix-sid-sub-tlvs
       +--ro prefix-sid-sub-tlv* []
          +--ro prefix-sid-flags
          |  +--ro flag*   identityref
          +--ro mt-id?               uint8
```

```
                  +--ro algorithm?          identityref
              +--ro (sid)?
                 +--:(sid-label)
                 | +--ro label-value?   uint32
                 +--:(sid-index)
                    +--ro index-value?   uint32
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:database
            /ospf:as-scope-lsa-type/ospf:as-scope-lsas
            /ospf:as-scope-lsa/ospf:version/ospf:ospfv2/ospf:ospfv2
            /ospf:body/ospf:opaque/ospf:extended-prefix-opaque
            /ospf:extended-prefix-tlv:
    +--ro prefix-sid-sub-tlvs
       +--ro prefix-sid-sub-tlv* []
          +--ro prefix-sid-flags
          | +--ro flag*   identityref
          +--ro mt-id?              uint8
          +--ro algorithm?          identityref
          +--ro (sid)?
             +--:(sid-label)
             | +--ro label-value?   uint32
             +--:(sid-index)
                +--ro index-value?   uint32
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area/ospf:database/ospf:area-scope-lsa-type
            /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
            /ospf:ospfv2/ospf:ospfv2/ospf:body/ospf:opaque
            /ospf:extended-link-opaque/ospf:extended-link-tlv:
    +--ro adj-sid-sub-tlvs
    | +--ro adj-sid-sub-tlv* []
    |    +--ro adj-sid-flags
    |    | +--ro flag*   identityref
    |    +--ro mt-id?              uint8
    |    +--ro weight?             uint8
    |    +--ro (sid)?
    |       +--:(sid-label)
    |       | +--ro label-value?   uint32
    |       +--:(sid-index)
    |          +--ro index-value?   uint32
    +--ro lan-adj-sid-sub-tlvs
       +--ro lan-adj-sid-sub-tlv* []
          +--ro lan-adj-sid-flags
          | +--ro flag*   identityref
          +--ro mt-id?                uint8
          +--ro weight?               uint8
          +--ro neighbor-router-id?   rt-types:router-id
          +--ro (sid)?
             +--:(sid-label)
             | +--ro label-value?   uint32
             +--:(sid-index)
                +--ro index-value?   uint32
  augment /rt:routing/rt:control-plane-protocols
            /rt:control-plane-protocol/ospf:ospf/ospf:areas
            /ospf:area/ospf:database/ospf:area-scope-lsa-type
            /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
            /ospf:ospfv2/ospf:ospfv2/ospf:body/ospf:opaque
            /ospf:ri-opaque:
```

```
   +--ro sr-algorithm-tlv
   | +--ro sr-algorithm*   identityref
   +--ro sid-range-tlvs
   | +--ro sid-range-tlv* []
   |    +--ro range-size?           rt-types:uint24
   |    +--ro (sid)?
   |       +--:(sid-label)
   |       | +--ro label-value?   uint32
   |       +--:(sid-index)
   |          +--ro index-value?   uint32
   +--ro local-block-tlvs
   | +--ro local-block-tlv* []
   |    +--ro range-size?           rt-types:uint24
   |    +--ro (sid)?
   |       +--:(sid-label)
   |       | +--ro label-value?   uint32
   |       +--:(sid-index)
   |          +--ro index-value?   uint32
   +--ro srms-preference-tlv
      +--ro preference?   uint8
  augment /rt:routing/rt:control-plane-protocols
          /rt:control-plane-protocol/ospf:ospf/ospf:database
          /ospf:as-scope-lsa-type/ospf:as-scope-lsas
          /ospf:as-scope-lsa/ospf:version/ospf:ospfv2/ospf:ospfv2
          /ospf:body/ospf:opaque/ospf:ri-opaque:
   +--ro sr-algorithm-tlv
   | +--ro sr-algorithm*   identityref
   +--ro sid-range-tlvs
   | +--ro sid-range-tlv* []
   |    +--ro range-size?           rt-types:uint24
   |    +--ro (sid)?
   |       +--:(sid-label)
   |       | +--ro label-value?   uint32
   |       +--:(sid-index)
   |          +--ro index-value?   uint32
   +--ro local-block-tlvs
   | +--ro local-block-tlv* []
   |    +--ro range-size?           rt-types:uint24
   |    +--ro (sid)?
   |       +--:(sid-label)
   |       | +--ro label-value?   uint32
   |       +--:(sid-index)
   |          +--ro index-value?   uint32
   +--ro srms-preference-tlv
      +--ro preference?   uint8
  augment /rt:routing/rt:control-plane-protocols
          /rt:control-plane-protocol/ospf:ospf/ospf:database
          /ospf:as-scope-lsa-type/ospf:as-scope-lsas
          /ospf:as-scope-lsa/ospf:version/ospf:ospfv3/ospf:ospfv3
          /ospf:body/ospf:router-information:
   +--ro sr-algorithm-tlv
   | +--ro sr-algorithm*   identityref
   +--ro sid-range-tlvs
   | +--ro sid-range-tlv* []
   |    +--ro range-size?           rt-types:uint24
   |    +--ro (sid)?
   |       +--:(sid-label)
   |       | +--ro label-value?   uint32
```

```
        |        +--:(sid-index)
        |           +--ro index-value?    uint32
   +--ro local-block-tlvs
   |  +--ro local-block-tlv* []
   |     +--ro range-size?         rt-types:uint24
   |     +--ro (sid)?
   |        +--:(sid-label)
   |        |  +--ro label-value?   uint32
   |        +--:(sid-index)
   |           +--ro index-value?   uint32
   +--ro srms-preference-tlv
      +--ro preference?   uint8
 augment /rt:routing/rt:control-plane-protocols
         /rt:control-plane-protocol/ospf:ospf/ospf:areas
         /ospf:area/ospf:database/ospf:area-scope-lsa-type
         /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
         /ospf:ospfv3/ospf:ospfv3/ospf:body
         /ospf:router-information:
   +--ro sr-algorithm-tlv
   |  +--ro sr-algorithm*   identityref
   +--ro sid-range-tlvs
   |  +--ro sid-range-tlv* []
   |     +--ro range-size?         rt-types:uint24
   |     +--ro (sid)?
   |        +--:(sid-label)
   |        |  +--ro label-value?   uint32
   |        +--:(sid-index)
   |           +--ro index-value?   uint32
   +--ro local-block-tlvs
   |  +--ro local-block-tlv* []
   |     +--ro range-size?         rt-types:uint24
   |     +--ro (sid)?
   |        +--:(sid-label)
   |        |  +--ro label-value?   uint32
   |        +--:(sid-index)
   |           +--ro index-value?   uint32
   +--ro srms-preference-tlv
      +--ro preference?   uint8
 augment /rt:routing/rt:control-plane-protocols
         /rt:control-plane-protocol/ospf:ospf/ospf:areas
         /ospf:area/ospf:database/ospf:area-scope-lsa-type
         /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
         /ospf:ospfv3/ospf:ospfv3/ospf:body
         /ospfv3-e-lsa:e-intra-area-prefix:
   +--ro ospfv3-extended-prefix-range-tlvs
      +--ro extended-prefix-range-tlv* []
         +--ro prefix-length?      uint8
         +--ro af?                 iana-rt-types:address-family
         +--ro range-size?         uint16
         +--ro prefix?             inet:ip-prefix
         +--ro prefix-sid-sub-tlvs
         |  +--ro prefix-sid-sub-tlv* []
         |     +--ro ospfv3-prefix-sid-flags
         |     |  +--ro flag*   identityref
         |     +--ro algorithm?                  identityref
         |     +--ro (sid)?
         |        +--:(sid-label)
         |        |  +--ro label-value?         uint32
```

```
              |       +--:(sid-index)
              |             +--ro index-value?        uint32
          +--ro unknown-tlvs
            +--ro unknown-tlv* []
               +--ro type?      uint16
               +--ro length?    uint16
               +--ro value?     yang:hex-string
     augment /rt:routing/rt:control-plane-protocols
             /rt:control-plane-protocol/ospf:ospf/ospf:areas
             /ospf:area/ospf:database/ospf:area-scope-lsa-type
             /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
             /ospf:ospfv3/ospf:ospfv3/ospf:body
             /ospfv3-e-lsa:e-inter-area-prefix:
       +--ro ospfv3-extended-prefix-range-tlvs
          +--ro extended-prefix-range-tlv* []
             +--ro prefix-length?        uint8
             +--ro af?                   iana-rt-types:address-family
             +--ro range-size?           uint16
             +--ro prefix?               inet:ip-prefix
             +--ro prefix-sid-sub-tlvs
             |  +--ro prefix-sid-sub-tlv* []
             |     +--ro ospfv3-prefix-sid-flags
             |     |  +--ro flag*   identityref
             |     +--ro algorithm?                identityref
             |     +--ro (sid)?
             |        +--:(sid-label)
             |        |  +--ro label-value?        uint32
             |        +--:(sid-index)
             |             +--ro index-value?        uint32
             +--ro unknown-tlvs
               +--ro unknown-tlv* []
                  +--ro type?      uint16
                  +--ro length?    uint16
                  +--ro value?     yang:hex-string
     augment /rt:routing/rt:control-plane-protocols
             /rt:control-plane-protocol/ospf:ospf/ospf:database
             /ospf:as-scope-lsa-type/ospf:as-scope-lsas
             /ospf:as-scope-lsa/ospf:version/ospf:ospfv3/ospf:ospfv3
             /ospf:body/ospfv3-e-lsa:e-as-external:
       +--ro ospfv3-extended-prefix-range-tlvs
          +--ro extended-prefix-range-tlv* []
             +--ro prefix-length?        uint8
             +--ro af?                   iana-rt-types:address-family
             +--ro range-size?           uint16
             +--ro prefix?               inet:ip-prefix
             +--ro prefix-sid-sub-tlvs
             |  +--ro prefix-sid-sub-tlv* []
             |     +--ro ospfv3-prefix-sid-flags
             |     |  +--ro flag*   identityref
             |     +--ro algorithm?                identityref
             |     +--ro (sid)?
             |        +--:(sid-label)
             |        |  +--ro label-value?        uint32
             |        +--:(sid-index)
             |             +--ro index-value?        uint32
             +--ro unknown-tlvs
               +--ro unknown-tlv* []
                  +--ro type?      uint16
```

```
                  +--ro length?    uint16
                  +--ro value?     yang:hex-string
  augment /rt:routing/rt:control-plane-protocols
          /rt:control-plane-protocol/ospf:ospf/ospf:areas
          /ospf:area/ospf:database/ospf:area-scope-lsa-type
          /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
          /ospf:ospfv3/ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-nssa:
    +--ro ospfv3-extended-prefix-range-tlvs
       +--ro extended-prefix-range-tlv* []
          +--ro prefix-length?         uint8
          +--ro af?                    iana-rt-types:address-family
          +--ro range-size?            uint16
          +--ro prefix?                inet:ip-prefix
          +--ro prefix-sid-sub-tlvs
          |  +--ro prefix-sid-sub-tlv* []
          |     +--ro ospfv3-prefix-sid-flags
          |     |  +--ro flag*   identityref
          |     +--ro algorithm?                 identityref
          |     +--ro (sid)?
          |        +--:(sid-label)
          |        |  +--ro label-value?         uint32
          |        +--:(sid-index)
          |           +--ro index-value?         uint32
          +--ro unknown-tlvs
             +--ro unknown-tlv* []
                +--ro type?     uint16
                +--ro length?   uint16
                +--ro value?    yang:hex-string
  augment /rt:routing/rt:control-plane-protocols
          /rt:control-plane-protocol/ospf:ospf/ospf:areas
          /ospf:area/ospf:interfaces/ospf:interface/ospf:database
          /ospf:link-scope-lsa-type/ospf:link-scope-lsas
          /ospf:link-scope-lsa/ospf:version/ospf:ospfv3
          /ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-link
          /ospfv3-e-lsa:e-link-tlvs/ospfv3-e-lsa:intra-prefix-tlv
          /ospfv3-e-lsa:sub-tlvs:
    +--ro prefix-sid-sub-tlvs
       +--ro prefix-sid-sub-tlv* []
          +--ro ospfv3-prefix-sid-flags
          |  +--ro flag*   identityref
          +--ro algorithm?                 identityref
          +--ro (sid)?
             +--:(sid-label)
             |  +--ro label-value?         uint32
             +--:(sid-index)
                +--ro index-value?         uint32
  augment /rt:routing/rt:control-plane-protocols
          /rt:control-plane-protocol/ospf:ospf/ospf:areas
          /ospf:area/ospf:database/ospf:area-scope-lsa-type
          /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
          /ospf:ospfv3/ospf:ospfv3/ospf:body
          /ospfv3-e-lsa:e-intra-area-prefix
          /ospfv3-e-lsa:e-intra-prefix-tlvs
          /ospfv3-e-lsa:intra-prefix-tlv/ospfv3-e-lsa:sub-tlvs:
    +--ro prefix-sid-sub-tlvs
       +--ro prefix-sid-sub-tlv* []
          +--ro ospfv3-prefix-sid-flags
          |  +--ro flag*   identityref
```

```
                +--ro algorithm?                identityref
                +--ro (sid)?
                   +--:(sid-label)
                   |  +--ro label-value?        uint32
                   +--:(sid-index)
                      +--ro index-value?        uint32
     augment /rt:routing/rt:control-plane-protocols
               /rt:control-plane-protocol/ospf:ospf/ospf:areas
               /ospf:area/ospf:database/ospf:area-scope-lsa-type
               /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
               /ospf:ospfv3/ospf:ospfv3/ospf:body
               /ospfv3-e-lsa:e-inter-area-prefix
               /ospfv3-e-lsa:e-inter-prefix-tlvs
               /ospfv3-e-lsa:inter-prefix-tlv/ospfv3-e-lsa:sub-tlvs:
       +--ro prefix-sid-sub-tlvs
          +--ro prefix-sid-sub-tlv* []
             +--ro ospfv3-prefix-sid-flags
             |  +--ro flag*   identityref
             +--ro algorithm?                identityref
             +--ro (sid)?
                +--:(sid-label)
                |  +--ro label-value?        uint32
                +--:(sid-index)
                   +--ro index-value?        uint32
     augment /rt:routing/rt:control-plane-protocols
               /rt:control-plane-protocol/ospf:ospf/ospf:database
               /ospf:as-scope-lsa-type/ospf:as-scope-lsas
               /ospf:as-scope-lsa/ospf:version/ospf:ospfv3/ospf:ospfv3
               /ospf:body/ospfv3-e-lsa:e-as-external
               /ospfv3-e-lsa:e-external-tlvs
               /ospfv3-e-lsa:external-prefix-tlv/ospfv3-e-lsa:sub-tlvs:
       +--ro prefix-sid-sub-tlvs
          +--ro prefix-sid-sub-tlv* []
             +--ro ospfv3-prefix-sid-flags
             |  +--ro flag*   identityref
             +--ro algorithm?                identityref
             +--ro (sid)?
                +--:(sid-label)
                |  +--ro label-value?        uint32
                +--:(sid-index)
                   +--ro index-value?        uint32
     augment /rt:routing/rt:control-plane-protocols
               /rt:control-plane-protocol/ospf:ospf/ospf:areas
               /ospf:area/ospf:database/ospf:area-scope-lsa-type
               /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
               /ospf:ospfv3/ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-nssa
               /ospfv3-e-lsa:e-external-tlvs
               /ospfv3-e-lsa:external-prefix-tlv/ospfv3-e-lsa:sub-tlvs:
       +--ro prefix-sid-sub-tlvs
          +--ro prefix-sid-sub-tlv* []
             +--ro ospfv3-prefix-sid-flags
             |  +--ro flag*   identityref
             +--ro algorithm?                identityref
             +--ro (sid)?
                +--:(sid-label)
                |  +--ro label-value?        uint32
                +--:(sid-index)
                   +--ro index-value?        uint32
```

```
augment /rt:routing/rt:control-plane-protocols
          /rt:control-plane-protocol/ospf:ospf/ospf:areas
          /ospf:area/ospf:database/ospf:area-scope-lsa-type
          /ospf:area-scope-lsas/ospf:area-scope-lsa/ospf:version
          /ospf:ospfv3/ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-router
          /ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv
          /ospfv3-e-lsa:sub-tlvs:
  +--ro adj-sid-sub-tlvs
  |  +--ro adj-sid-sub-tlv* []
  |     +--ro adj-sid-flags
  |     |  +--ro flag*   identityref
  |     +--ro weight?            uint8
  |     +--ro (sid)?
  |        +--:(sid-label)
  |        |  +--ro label-value?   uint32
  |        +--:(sid-index)
  |           +--ro index-value?   uint32
  +--ro lan-adj-sid-sub-tlvs
     +--ro lan-adj-sid-sub-tlv* []
        +--ro lan-adj-sid-flags
        |  +--ro flag*   identityref
        +--ro weight?            uint8
        +--ro neighbor-router-id?   rt-types:router-id
        +--ro (sid)?
           +--:(sid-label)
           |  +--ro label-value?    uint32
           +--:(sid-index)
              +--ro index-value?    uint32
```

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