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A YANG Data Model for OSPF Segment Routing for the MPLS Data Plane
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Abstract

This document defines a YANG data module that can be used to configure and manage OSPF Extensions for Segment Routing for the MPLS data plane.

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1. Overview

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

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.

1.2. Tree Diagrams

This document uses the graphical representation of data models defined in [RFC8340].

2. OSPF Segment Routing

This document defines a model for OSPF Segment Routing Extensions for both OSPFv2 [RFC8665] and OSPFv3 [RFC8666]. It is an augmentation of the OSPF base model.

The OSPF SR 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 OSPF base model [RFC9129] which defines basic OSPF configuration and state.

module: ietf-ospf-sr-mpls

```

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/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:database/ospf:link-scope-lsa-type
    /ospf:link-scope-lsas/ospf:link-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 flags*      identityref
+--ro prefix?                        inet:ipv4-prefix
+--ro prefix-sid-sub-tlvs
|   +--ro prefix-sid-sub-tlv* []
|   |   +--ro prefix-sid-flags
|   |   |   +--ro flags*      identityref
|   |   +--ro mt-id?          uint8
|   |   +--ro algorithm?      identityref
|   |   +--ro sid?            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:
+--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 flags*   identityref
+---ro prefix?                               inet:ipv4-prefix
+---ro prefix-sid-sub-tlvs
|   +---ro prefix-sid-sub-tlv* []
|       +---ro prefix-sid-flags
|       |   +---ro flags*   identityref
|       |   +---ro mt-id?       uint8
|       |   +---ro algorithm?   identityref
|       |   +---ro sid?         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 flags*   identityref
+---ro prefix?                               inet:ipv4-prefix
+---ro prefix-sid-sub-tlvs
|   +---ro prefix-sid-sub-tlv* []
|       +---ro prefix-sid-flags
|       |   +---ro flags*   identityref
|       |   +---ro mt-id?       uint8
|       |   +---ro algorithm?   identityref
|       |   +---ro sid?         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: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 flags*   identityref
+---ro mt-id?          uint8
+---ro algorithm?      identityref
+---ro sid?            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-prefix-opaque/ospf:extended-prefix-tlv:
+---ro prefix-sid-sub-tlvs
+---ro prefix-sid-sub-tlv* []
+---ro prefix-sid-flags
|   +---ro flags*   identityref
+---ro mt-id?          uint8
+---ro algorithm?      identityref
+---ro sid?            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 flags*   identityref
+---ro mt-id?          uint8
+---ro algorithm?      identityref
+---ro sid?            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 flags*   identityref
|   +---ro mt-id?          uint8
|   +---ro weight?         uint8
|   +---ro sid?            uint32
+---ro lan-adj-sid-sub-tlvs

```

```

    +---ro lan-adj-sid-sub-tlv* []
    |   +---ro lan-adj-sid-flags
    |   |   +---ro flags*      identityref
    |   +---ro mt-id?          uint8
    |   +---ro weight?         uint8
    |   +---ro neighbor-router-id?  rt-types:router-id
    |   +---ro sid?            uint32
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: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-sub-tlv
|   |   |   +---ro length?    uint16
|   |   |   +---ro sid?      uint32
+---ro local-block-tlvs
|   +---ro local-block-tlv* []
|   |   +---ro range-size?    rt-types:uint24
|   |   +---ro sid-sub-tlv
|   |   |   +---ro length?    uint16
|   |   |   +---ro sid?      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: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-sub-tlv
|   |   |   +---ro length?    uint16
|   |   |   +---ro sid?      uint32
+---ro local-block-tlvs
|   +---ro local-block-tlv* []
|   |   +---ro range-size?    rt-types:uint24
|   |   +---ro sid-sub-tlv

```

```

    |         +---ro length?   uint16
    |         +---ro sid?     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-sub-tlv
|   |   |   +---ro length?   uint16
|   |   |   +---ro sid?     uint32
+---ro local-block-tlvs
|   +---ro local-block-tlv* []
|   |   +---ro range-size?   rt-types:uint24
|   |   +---ro sid-sub-tlv
|   |   |   +---ro length?   uint16
|   |   |   +---ro sid?     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-sub-tlv
|   |   |   +---ro length?   uint16
|   |   |   +---ro sid?     uint32
+---ro local-block-tlvs
|   +---ro local-block-tlv* []
|   |   +---ro range-size?   rt-types:uint24
|   |   +---ro sid-sub-tlv
|   |   |   +---ro length?   uint16
|   |   |   +---ro sid?     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-sub-tlv
|           +---ro length?   uint16
|           +---ro sid?      uint32
+---ro local-block-tlvs
|   +---ro local-block-tlv* []
|       +---ro range-size?   rt-types:uint24
|       +---ro sid-sub-tlv
|           +---ro length?   uint16
|           +---ro sid?      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: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
    /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-sub-tlv
|           +---ro length?   uint16
|           +---ro sid?      uint32
+---ro local-block-tlvs
|   +---ro local-block-tlv* []
|       +---ro range-size?   rt-types:uint24
|       +---ro sid-sub-tlv
|           +---ro length?   uint16
|           +---ro sid?      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 flags* identityref
|       |       |       +---ro algorithm? identityref
|       |       |       +---ro sid?      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 flags* identityref
|       |       |       +---ro algorithm? identityref
|       |       |       +---ro sid?      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 flags* identityref
      |     +--ro algorithm?          identityref
      |     +--ro sid?                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 flags* identityref
      |     +--ro algorithm?          identityref
      |     +--ro sid?                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:
+---ro prefix-sid-sub-tlvs
+---ro prefix-sid-sub-tlv* []
+---ro ospfv3-prefix-sid-flags
|   +---ro flags*      identityref
+---ro algorithm?      identityref
+---ro sid?            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:
+---ro prefix-sid-sub-tlvs
+---ro prefix-sid-sub-tlv* []
+---ro ospfv3-prefix-sid-flags
|   +---ro flags*      identityref
+---ro algorithm?      identityref
+---ro sid?            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:
+---ro prefix-sid-sub-tlvs
+---ro prefix-sid-sub-tlv* []
+---ro ospfv3-prefix-sid-flags
|   +---ro flags*      identityref
+---ro algorithm?      identityref
+---ro sid?            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:
+---ro prefix-sid-sub-tlvs
+---ro prefix-sid-sub-tlv* []
+---ro ospfv3-prefix-sid-flags
|   +---ro flags*      identityref
+---ro algorithm?      identityref

```

```

        +---ro sid?                               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:
+---ro prefix-sid-sub-tlvs
    +---ro prefix-sid-sub-tlv* []
    +---ro ospfv3-prefix-sid-flags
    |   +---ro flags*      identityref
    +---ro algorithm?      identityref
    +---ro sid?             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:
+---ro adj-sid-sub-tlvs
    |   +---ro adj-sid-sub-tlv* []
    |   +---ro adj-sid-flags
    |   |   +---ro flags*      identityref
    |   +---ro weight?         uint8
    |   +---ro sid?            uint32
+---ro lan-adj-sid-sub-tlvs
    +---ro lan-adj-sid-sub-tlv* []
    +---ro lan-adj-sid-flags
    |   +---ro flags*      identityref
    +---ro weight?         uint8
    +---ro neighbor-router-id?  rt-types:router-id
    +---ro sid?             uint32

```

2.1. OSPF Segment Routing YANG Module

[RFC2328], [RFC4750], [RFC4915], [RFC5340], [RFC5643], [RFC5838], [RFC6991], [RFC8102], [RFC8294], [RFC8343], [RFC8476], [RFC8349] and [I-D.ietf-rtgwg-segment-routing-ti-lfa] are referenced in the YANG data model.

```
<CODE BEGINS> file "ietf-ospf-sr-mpls@2024-01-18.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 XXXX - YANG Data Model for OSPFv3 Extended LSAs";
  }
}
```

organization

"IETF LSR - Link State Routing Working Group";

contact

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Author: Ing-Wher Chen
<<mailto:ingwherchen@mitre.org>>;

description

"This YANG module defines the generic configuration and operational state for OSPF Segment Routing (SR), which is common across all of the vendor implementations. It is intended that the module will be extended by vendors to define vendor-specific OSPF Segment Routing configuration and operational parameters for the MPLS data plane.

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

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Redistribution and use in source and binary forms, with or without modification, is permitted pursuant to, and subject to the license terms contained in, the Revised BSD License set forth in Section 4.c of the IETF Trust's Legal Provisions Relating to IETF Documents (<https://trustee.ietf.org/license-info>).

This version of this YANG module is part of RFC XXXX (<https://www.rfc-editor.org/info/rfcXXXX>); 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.

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

revision 2024-01-18 {
    description
        "Initial revision.";
    reference
        "RFC XXXX: A YANG Data Model for OSPF Segment Routing for
        the MPLS Data Plane";
}

feature remote-lfa-sr {
    description
        "Enhance rLFA to use 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
        "draft-ietf-rtgwg-segment-routing-ti-lfa -
        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
        RFC 8666: OSPFv3 Extensions for Segment Routing";
}

identity np-flag {
    base prefix-sid-flag;
    description
        "No-PHP flag.";
}

identity m-flag {
    base prefix-sid-flag;
    description
        "Mapping server flag.";
}
```



```
identity e-flag {
  base prefix-sid-flag;
  description
    "Explicit-NULL flag.";
}

identity v-flag {
  base prefix-sid-flag;
  description
    "Value/Index flag.";
}

identity l-flag {
  base prefix-sid-flag;
  description
    "Local flag.";
}

identity extended-prefix-range-flag {
  description
    "Base identity for extended prefix range TLV flags.";
}

identity ia-flag {
  base extended-prefix-range-flag;
  description
    "Inter-Area flag. If set, advertisement is of
    inter-area type.";
  reference
    "RFC 8665: OSPF Extensions for Segment Routing";
}

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

identity b-flag {
  base adj-sid-flag;
  description
    "Backup flag.";
}

identity vi-flag {
  base adj-sid-flag;
```

```
    description
      "Value/Index flag.";
  }

  identity lo-flag {
    base adj-sid-flag;
    description
      "Local/Global flag.";
  }

  identity g-flag {
    base adj-sid-flag;
    description
      "Group flag.";
  }

  identity p-flag {
    base adj-sid-flag;
    description
      "Persistent flag.";
  }

  /* Groupings */

  grouping sid-sub-tlv {
    description
      "SID/Label sub-TLV grouping.";
    reference
      "RFC 8665: OSPF Extensions for Segment Routing
      (Section 6)";
    container sid-sub-tlv {
      description
        "Used to advertise the SID/Label associated with a
        prefix or adjacency.";
      leaf length {
        type uint16;
        description
          "Length of the SID value. YANG model specification
          is necessary since it dictates the semantics of the
          SID.";
      }
      leaf sid {
        type uint32;
        description
          "Segment Identifier (SID) - A 20 bit label or
          32 bit SID. If the length is set to 3, then the
          20 rightmost bits represent a label. If the length
          is set to 4, then the value represents a 32-bit SID.";
      }
    }
  }
```

```
    }  
  }  
}  
  
grouping ospfv2-prefix-sid-sub-tlvs {  
  description  
    "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 flags {  
          type identityref {  
            base prefix-sid-flag;  
          }  
          description  
            "Prefix SID Sub-TLV flags.";  
        }  
        description  
          "Segment Identifier (SID) Flags.";  
      }  
      leaf mt-id {  
        type uint8;  
        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 algorithm {  
        type identityref {  
          base sr-cmn:prefix-sid-algorithm;  
        }  
        description  
          "Algorithm associated with the prefix-SID.";  
      }  
      leaf sid {  
        type uint32;  
        description  
          "Segment Identifier (SID) - A 20 bit label or  
          an index into the SID/Label space.";
```

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 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.";

```
    }  
  }  
}  
  
grouping ospfv2-extended-prefix-range-tlvs {  
  description  
    "Extended prefix range TLV grouping.";  
  reference  
    "RFC 8665: OSPF Extensions for Segment Routing  
    (Section 4)";  
  container extended-prefix-range-tlvs {  
    description  
      "List of range of prefixes.";  
    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 flags {  
          type identityref {  
            base extended-prefix-range-flag;  
          }  
          description  
            "List of flags for the prefix range.";  
        }  
      }  
    }  
  }  
}
```

```
        "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 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.";
        }
        uses sid-sub-tlv;
    }
}

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 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-sub-tlv;
        }
    }
}

grouping srms-preference-tlv {
    description
        "The SR Mapping Server (SRMS) preference TLV is
        used to advertise a preference associated with
        the node that acts as an SR Mapping Server. SR
        Mapping Server 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
    "Prefix Segment ID (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 flags {
          type identityref {
            base prefix-sid-flag;
          }
          description
            "Prefix SID sub-TLV flags.";
        }
        description
          "Segment Identifier (SID) Flags.";
      }
      leaf algorithm {
        type identityref {
          base sr-cmn:prefix-sid-algorithm;
        }
        description
          "Algorithm associated with the prefix-SID.";
      }
      leaf sid {
        type uint32;
        description
          "Segment Identifier (SID) - A 20 bit label or
           an index into the SID/Label space.

           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 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.";  
    }  
}  
}  
}  
  
grouping ospfv3-extended-prefix-range-tlvs {  
    description  
        "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
            "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 flags {
                        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.";
            }
            leaf sid {
                type uint32;
                description
                    "Segment Identifier (SID) - A 20 bit label or
                    an index into the SID/Label space.

                    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 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.";
            }
        }
    }
}

```

```
}

grouping ospfv3-lan-adj-sid-sub-tlvs {
  description
    "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 flags {
          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.";
      }
      leaf sid {
        type uint32;
        description
          "Segment Identifier (SID) - A 20 bit label or
          an index into the SID/Label space.

          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 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.";
    }
}
}

/* Configuration */

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 for the MPLS data plane.";
  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/ospf:interfaces/ospf:interface" {
  when "derived-from(/rt:routing/rt:control-plane-protocols/"
    + "rt:control-plane-protocol/rt:type, 'ospf:ospf')" {
    description
      "This augments the OSPF interface configuration
      when used.";
  }
  description
    "This augments the OSPF protocol interface
    configuration with 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.";
      }
    }
  }
}

```

```
    description
      "This augments LAN interface adj-sid with 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-FRR with TI-LFA.";
  container ti-lfa {
    if-feature "ti-lfa";
    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.";
      }
    }
    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 SRLG disjoint tie-breaker with
                a lower priority being more preferred.";
        }
        description
            "Enable SRLG (Shared Resource Link Group)
            disjoint as a TI-LFA path selection tie-breaker.
            A path providing node a disjoint path for SRLG
            links from the primary path will be selected over
            one 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 configured may
        be configured.";
}
description
    "Topology-Independent Loop Free Alternate
    (TI-LFA) support.";
reference
    "draft-ietf-rtgwg-segment-routing-ti-lfa -
    Topology-Independent Fast Reroute using Segment Routing";
}

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 remote LFA.";
    leaf use-segment-routing-path {
        if-feature "remote-lfa-sr";
        type boolean;
    }
}
```

```
    default "false";
    description
        "Force remote LFA to use segment routing path instead of LDP
        path. The value of this leaf is in effect only when
        remote-lfa is enabled.";
  }
}

/* Database */

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: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-specific TLVs for OSPFv2 extended prefix LSA
    in type 9 opaque LSA.";
  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" {
  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-specific TLVs for OSPFv2 extended prefix LSA
    in type 10 opaque LSA.";
  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-specific TLVs for OSPFv2 extended prefix LSA
  in type 11 opaque LSA.";
uses ospfv2-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: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-specific TLVs for OSPFv2 extended prefix TLV
  in type 9 opaque LSA.";
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-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-specific TLVs for OSPFv2 extended prefix TLV
        in type 10 opaque LSA.";
    uses ospfv2-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: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-specific TLVs for OSPFv2 extended prefix TLV
    in type 11 opaque LSA.";
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-specific TLVs for OSPFv2 extended link TLV
    in type 10 opaque LSA.";
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 flags {
        type identityref {
          base adj-sid-flag;
        }
        description
          "Adj-SID sub-TLV flags.";
      }
      description
        "Adj-sid sub-TLV flags.";
    }
    leaf mt-id {
      type uint8;
      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 sid {
      type uint32;
      description
        "Segment Identifier (SID) - A 20 bit label or
        an index into the SID/Label space.

        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 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."
    }
  }
}
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 flags {
        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;
      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.";
    }
    leaf sid {
      type uint32;
      description
        "Segment Identifier (SID) - A 20 bit label or
        an index into the SID/Label space.

        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 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.";
    }
  }
}
```

```
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: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-specific TLVs for OSPFv2 type 9 opaque LSA.";
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: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-specific TLVs for OSPFv2 type 10 opaque LSA.";
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-specific TLVs for OSPFv2 type 11 opaque LSA.";
    uses sr-algorithm-tlv;
    uses sid-range-tlvs;
    uses local-block-tlvs;
    uses srms-preference-tlv;
}

/* Segment Routing Capabilities */

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
        opaque LSA.";
    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.";
    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: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/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.";
uses sr-algorithm-tlv;
uses sid-range-tlvs;
uses local-block-tlvs;
uses srms-preference-tlv;
}

/* OSPFv3 Extended Prefix Range 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
    E-Router LSAs";
}
uses ospfv3-extended-prefix-range-tlvs;
description
    "OSPFv3 Area-Scoped E-Intra-Area-Prefix LSA.";
}

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
        E-Router LSAs";
    }
    uses ospfv3-extended-prefix-range-tlvs;
    description
        "OSPFv3 Area-Scoped E-Inter-Area-Prefix LSA.";
}

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.";
    }
    uses ospfv3-extended-prefix-range-tlvs;
    description
        "OSPFv3 AS-Scoped E-AS-External LSA.";
}

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.";
    }
    uses ospfv3-extended-prefix-range-tlvs;
    description
        "OSPFv3 Area-Scoped E-NSSA LSA.";
}

/* Prefix SID Sub-TLV in Intra-Area Prefix TLV */

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" {
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";
    }
    uses ospfv3-prefix-sid-sub-tlvs;
    description
        "OSPFv3 Link-Scoped Intra-Area Prefix 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/"
    + "ospfv3-e-lsa:e-intra-prefix-tlvs/"
    + "ospfv3-e-lsa:intra-prefix-tlv" {
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";
    }
    uses ospfv3-prefix-sid-sub-tlvs;
    description
        "OSPFv3 Area-Scoped Intra-Area Prefix TLV.";
}

/* Prefix SID Sub-TLV in Inter-Area Prefix 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-inter-area-prefix/"
    + "ospfv3-e-lsa:e-inter-prefix-tlvs/"
    + "ospfv3-e-lsa:inter-prefix-tlv" {

```

```

    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";
    }
    uses ospfv3-prefix-sid-sub-tlvs;
    description
      "OSPFv3 Area-Scoped Inter-Area Prefix TLV.";
  }

/* Prefix SID Sub-TLV in External Prefix 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:ospfv3/"
  + "ospf:ospfv3/ospf:body/ospfv3-e-lsa:e-as-external/"
  + "ospfv3-e-lsa:e-external-tlvs/"
  + "ospfv3-e-lsa:external-prefix-tlv" {
    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-prefix-sid-sub-tlvs;
    description
      "OSPFv3 AS-Scoped External Prefix 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-nssa/"
  + "ospfv3-e-lsa:e-external-tlvs/"
  + "ospfv3-e-lsa:external-prefix-tlv" {
    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-prefix-sid-sub-tlvs;
    description
      "OSPFv3 Area-Scoped External Prefix TLV.";
  }

```



```

/* Adj-SID sub-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-router/"
+ "ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv" {
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";
}
uses ospfv3-adj-sid-sub-tlvs;
uses ospfv3-lan-adj-sid-sub-tlvs;
description
  "OSPFv3 Area-Scoped Adj-SID Sub-TLV.";
}
}
<CODE ENDS>

```

Figure 1

3. Security Considerations

The YANG module 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 Configuration 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.

There are a number of data nodes defined in the module that are writable/creatable/deletable (i.e., config true, which is the default). These data nodes may be considered sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations. These are the subtrees and data nodes and their sensitivity/vulnerability:

/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 Denial-of-Service (Dos) attack.

/ospf:ospf/protocol-srgb - Modification of the protocol SRGB could be used to mount a DoS attack. For example, if the protocol SRBG 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 Adjacency Segment Identifier (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 the 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.

The module ietf-ospf-sr-mpls augments base OSPF module data base with various TLVs. Knowledge of these data nodes can be used to attack other routers in the OSPF domain.

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Author affiliation with The MITRE Corporation is provided for identification purposes only, and is not intended to convey or imply MITRE's concurrence with, or support for, the positions, opinions or viewpoints expressed. MITRE has approved this document for Public Release, Distribution Unlimited, with Public Release Case Number 18-3281.

5. IANA Considerations

This document registers a URI in the IETF XML registry [RFC3688]. Following the format in [RFC3688], the following registration is requested to be 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
namespace: urn:ietf:params:xml:ns:yang:ietf-ospf-sr-mpls
prefix: ospf-sr-mpls
reference: RFC XXXX

6. References

6.1. Normative References

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Appendix A. A Configuration Example

The following is an XML example using the OSPF SR YANG module, and RFC 9020.

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

```
<?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>
            <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.

```

{
  "routing": {
    "router-id": "1.1.1.1",
    "control-plane-protocols": {
      "control-plane-protocol": {
        "type": "ospf:ospfv2",
        "name": "OSPFv2",
        "ospf": {
          "areas": {
            "area": {
              "area-id": "0.0.0.0",
              "interfaces": {
                "interface": {
                  "name": "eth0",
                  "segment-routing": {
                    "adjacency-sid": {
                      "adj-sids": {
                        "value": 3888
                      }
                    }
                  }
                }
              }
            }
          }
        },
        "segment-routing": {
          "enabled": true
        },
        "protocol-srgb": {
          "srgb": {
            "lower-bound": 4000,
            "upper-bound": 5000
          }
        }
      }
    }
  }
}

```

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