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YANG Data Model for OSPFv3 Segment Routing
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Abstract

This document defines a YANG data module augmenting the IETF OSPF Segment Routing (SR) YANG model to support OSPFv3 extensions for SR. It can be used to configure and manage OSPFv3 Segment Routing in MPLS dataplane.

Status of This Memo

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1. Overview

YANG [RFC6020] [RFC7950] is a data definition language used to define the contents of a conceptual data store that allows networked devices to be managed using NETCONF [RFC6241]. YANG is proving relevant beyond its initial confines, as bindings to other interfaces (e.g., ReST) and encodings other than XML (e.g., JSON) are being defined. Furthermore, YANG data models can be used as the basis for implementation of other interfaces, such as CLI and programmatic APIs.

This document defines a YANG data module augmenting the IETF OSPF SR YANG model [I-D.ietf-ospf-sr-yang], and can be used to configure and manage OSPFv3 extensions for Segment Routing [I-D.ietf-ospf-ospfv3-segment-routing-extensions].

The augmentation defined in this document requires support for both the OSPF SR model and the OSPF base model[I-D.ietf-ospf-yang].

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

2. Tree Diagrams

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

3. OSPFv3 Extensions for Segment Routing

This document defines a YANG module for OSPFv3 extensions for Segment Routing [I-D.ietf-ospf-ospfv3-segment-routing-extensions]. It is an augmentation of the OSPF SR base model.

```
module: ietf-ospfv3-sr
  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*   uint8
    +--ro sid-range-tlvs
    |  +--ro sid-range-tlv*
    |     +--ro range-size?    uint24
    |     +--ro sid-sub-tlv
    |        +--ro sid?   uint32
    +--ro local-block-tlvs
    |  +--ro local-block-tlv*
    |     +--ro range-size?    uint24
    |     +--ro sid-sub-tlv
    |        +--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*   uint8
    +--ro sid-range-tlvs
    |  +--ro sid-range-tlv*
    |     +--ro range-size?    uint24
    |     +--ro sid-sub-tlv
    |        +--ro sid?   uint32
    +--ro local-block-tlvs
    |  +--ro local-block-tlv*
    |     +--ro range-size?    uint24
    |     +--ro sid-sub-tlv
    |        +--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*   uint8
      +--ro sid-range-tlvs
      |  +--ro sid-range-tlv*
      |     +--ro range-size?    uint24
      |     +--ro sid-sub-tlv
      |        +--ro sid?   uint32
      +--ro local-block-tlvs
      |  +--ro local-block-tlv*
      |     +--ro range-size?    uint24
      |     +--ro sid-sub-tlv
      |        +--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?                    uint8
            +--ro range-size?            uint16
            +--ro prefix?                inet:ip-prefix
            +--ro perfix-sid-sub-tlvs
            |  +--ro prefix-sid-sub-tlv*
            |     +--ro ospfv3-prefix-sid-flags
            |     |  +--ro bits*   identityref
            |     +--ro algorithm?                 uint8
            |     +--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-intra-area-prefix:
      +--ro ospfv3-extended-prefix-range-tlvs
         +--ro extended-prefix-range-tlv*
            +--ro prefix-length?         uint8
            +--ro af?                    uint8
```

```
            +--ro range-size?            uint16
            +--ro prefix?                inet:ip-prefix
            +--ro perfix-sid-sub-tlvs
            |  +--ro prefix-sid-sub-tlv*
            |     +--ro ospfv3-prefix-sid-flags
            |     |  +--ro bits*   identityref
            |     +--ro algorithm?                 uint8
            |     +--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?                    uint8
            +--ro range-size?            uint16
            +--ro prefix?                inet:ip-prefix
            +--ro perfix-sid-sub-tlvs
            |  +--ro prefix-sid-sub-tlv*
            |     +--ro ospfv3-prefix-sid-flags
            |     |  +--ro bits*   identityref
            |     +--ro algorithm?                 uint8
            |     +--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-inter-area-prefix:
      +--ro ospfv3-extended-prefix-range-tlvs
         +--ro extended-prefix-range-tlv*
            +--ro prefix-length?         uint8
            +--ro af?                    uint8
            +--ro range-size?            uint16
            +--ro prefix?                inet:ip-prefix
            +--ro perfix-sid-sub-tlvs
            |  +--ro prefix-sid-sub-tlv*
```

```
            |     +--ro ospfv3-prefix-sid-flags
            |     |  +--ro bits*   identityref
            |     +--ro algorithm?                uint8
            |     +--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-as-external:
      +--ro ospfv3-extended-prefix-range-tlvs
         +--ro extended-prefix-range-tlv*
            +--ro prefix-length?         uint8
            +--ro af?                    uint8
            +--ro range-size?            uint16
            +--ro prefix?                inet:ip-prefix
            +--ro perfix-sid-sub-tlvs
            |  +--ro prefix-sid-sub-tlv*
            |     +--ro ospfv3-prefix-sid-flags
            |     |  +--ro bits*   identityref
            |     +--ro algorithm?                uint8
            |     +--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?                    uint8
            +--ro range-size?            uint16
            +--ro prefix?                inet:ip-prefix
            +--ro perfix-sid-sub-tlvs
            |  +--ro prefix-sid-sub-tlv*
            |     +--ro ospfv3-prefix-sid-flags
            |     |  +--ro bits*   identityref
            |     +--ro algorithm?                uint8
            |     +--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?                    uint8
            +--ro range-size?            uint16
            +--ro prefix?                inet:ip-prefix
            +--ro perfix-sid-sub-tlvs
            |  +--ro prefix-sid-sub-tlv*
            |     +--ro ospfv3-prefix-sid-flags
            |     |  +--ro bits*   identityref
            |     +--ro algorithm?                uint8
            |     +--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-nssa:
      +--ro ospfv3-extended-prefix-range-tlvs
         +--ro extended-prefix-range-tlv*
            +--ro prefix-length?         uint8
            +--ro af?                    uint8
            +--ro range-size?            uint16
            +--ro prefix?                inet:ip-prefix
            +--ro perfix-sid-sub-tlvs
            |  +--ro prefix-sid-sub-tlv*
            |     +--ro ospfv3-prefix-sid-flags
            |     |  +--ro bits*   identityref
            |     +--ro algorithm?                uint8
            |     +--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-link/ospfv3-e-lsa:e-link-tlvs
            /ospfv3-e-lsa:intra-prefix-tlv:
      +--ro perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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-link/ospfv3-e-lsa:e-link-tlvs
            /ospfv3-e-lsa:intra-prefix-tlv:
      +--ro perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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 perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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-intra-area-prefix
            /ospfv3-e-lsa:e-intra-prefix-tlvs
            /ospfv3-e-lsa:intra-prefix-tlv:
      +--ro perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
```

```
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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 perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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-inter-area-prefix
            /ospfv3-e-lsa:e-inter-prefix-tlvs
            /ospfv3-e-lsa:inter-prefix-tlv:
      +--ro perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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-as-external
            /ospfv3-e-lsa:e-external-tlvs
            /ospfv3-e-lsa:external-prefix-tlv:
      +--ro perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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 perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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 perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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-nssa/ospfv3-e-lsa:e-external-tlvs
            /ospfv3-e-lsa:external-prefix-tlv:
      +--ro perfix-sid-sub-tlvs
         +--ro prefix-sid-sub-tlv*
            +--ro ospfv3-prefix-sid-flags
            |  +--ro bits*   identityref
            +--ro algorithm?                 uint8
            +--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 bits*   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 bits*   identityref
            +--ro weight?               uint8
            +--ro neighbor-router-id?   yang:dotted-quad
```

```
            +--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-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 bits*   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 bits*   identityref
            +--ro weight?               uint8
            +--ro neighbor-router-id?   yang:dotted-quad
            +--ro sid?                  uint32
```

```
<CODE BEGINS> file "ietf-ospfv3-sr@2019-08-13.yang"
module ietf-ospfv3-sr {
  namespace "urn:ietf:params:xml:ns:yang:ietf-ospfv3-sr";

  prefix ospfv3-sr;

  import ietf-inet-types {
    prefix "inet";
  }

  import ietf-yang-types {
    prefix "yang";
  }

  import ietf-routing {
    prefix "rt";
  }

  import ietf-ospf {
    prefix "ospf";
  }

  import ietf-ospfv3-extended-lsa {
    prefix "ospfv3-e-lsa";
  }

  import ietf-ospf-sr {
```

```
    prefix "ospf-sr";
  }

  organization
    "IETF LSR - Link State Routing Working Group";

  contact
     "WG Web:   <http://tools.ietf.org/wg/lsr>
      WG List:  <mailto:lsr@ietf.org>

      Author:   Yingzhen Qu
                <mailto:yqu@futurewei.com>
      Author:   Acee Lindem
                <mailto:acee@cisco.com>";

  description
    "This YANG module defines the operational state for OSPFv3
     Segment Routing, which is common across all of the vendor
     implementations. It is intended that the module will be
     extended by vendors to define vendor-specific OSPFv3
     Segment Routing configuration and operational parameters
     and policies.

     Copyright (c) 2019 IETF Trust and the persons identified as
     authors of the code.  All rights reserved.

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

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

  reference "RFC XXXX";

  revision 2019-08-13 {
    description
      "";
    reference
      "RFC XXXX: A YANG Data Model for OSPF Segment Routing.";
  }

  /* groupings */
  grouping ospfv3-prefix-sid-sub-tlvs {
    description "Prefix Segment ID (SID) sub-TLVs.";
```

```
    container perfix-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 bits {
            type identityref {
              base ospf-sr:prefix-sid-bit;
            }
            description
              "Prefix SID Sub-TLV flag bits list.";
          }
          description "Segment Identifier (SID) Flags.";
        }
        leaf algorithm {
          type uint8;
          description
            "The algorithm associated with the prefix-SID.";
        }
        leaf sid {
          type uint32;
          description "An index or label.";
        }
      }
    }
  }

  grouping ospfv3-extended-prefix-range-tlvs {
    description "Extended prefix range TLV grouping.";

    container ospfv3-extended-prefix-range-tlvs {
      description "The list of range of prefixes.";
      list extended-prefix-range-tlv {    //type=2?
        description "The range of prefixes.";
        leaf prefix-length {
          type uint8;
          description "Length of prefix in bits.";
        }
        leaf af {
          type uint8;
          description "Address family for the prefix.";
        }
        leaf range-size {
          type uint16;
          description "The number of prefixes covered by the
                       advertisement.";
        }
        leaf prefix {
```

```
          type inet:ip-prefix;
          description "Address prefix.";
        }
        uses ospfv3-prefix-sid-sub-tlvs;
        uses ospf:unknown-tlvs;
      }
    }
  }

  grouping ospfv3-adj-sid-sub-tlvs {
    description "Adjacency SID sub TLV grouping.";
    container adj-sid-sub-tlvs {
      description "Adjacency SID optional sub-TLVs.";
      list adj-sid-sub-tlv {
        description "List of Adjacency SID sub-TLVs.";
        container adj-sid-flags {
          leaf-list bits {
            type identityref {
              base ospf-sr:adj-sid-bit;
            }
            description "Adj sid sub-tlv flags list.";
          }
          description "Adj-sid sub-tlv flags.";
        }
        leaf weight {
          type uint8;
          description "Weight used for load-balancing.";
        }
        leaf sid {
          type uint32;
          description "Segment Identifier (SID) index/label.";
        }
      }
    }
  }

  grouping ospfv3-lan-adj-sid-sub-tlvs {
    description "LAN adj-sid sub TLV grouping.";
    container lan-adj-sid-sub-tlvs {
      description "LAN Adjacency SID optional sub-TLVs.";
      list lan-adj-sid-sub-tlv {
        description "List of LAN adjacency SID sub-TLVs.";
        container lan-adj-sid-flags {
          leaf-list bits {
            type identityref {
              base ospf-sr:adj-sid-bit;
            }
            description "LAN adj sid sub-tlv flags list.";
```

```
          }
          description "LAN adj-sid sub-tlv flags.";
        }
        leaf weight {
          type uint8;
          description "Weight used for load-balancing.";
        }
        leaf neighbor-router-id {
          type yang:dotted-quad;
          description "Neighbor router ID.";
        }
        leaf sid {
          type uint32;
          description "Segment Identifier (SID) index/label.";
        }
      }
    }
  }

  /* Database */
  /* 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 "../../../../../../../../"
       + "rt:type = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }
    description
      "SR specific TLVs for OSPFv3 Router Information
       opaque LSA.";
    uses ospf-sr:sr-algorithm-tlv;
    uses ospf-sr:sid-range-tlvs;
    uses ospf-sr:local-block-tlvs;
    uses ospf-sr: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 "../../../../../../../../../../"
       + "rt:type = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }

    description
      "SR specific TLVs for OSPFv3 Router Information LSA.";

    uses ospf-sr:sr-algorithm-tlv;
    uses ospf-sr:sid-range-tlvs;
    uses ospf-sr:local-block-tlvs;
    uses ospf-sr: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 "../../../../../../../../../../../../"
       + "rt:type = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }

    description
      "SR specific TLVs for OSPFv3 Router Information LSA.";

    uses ospf-sr:sr-algorithm-tlv;
    uses ospf-sr:sid-range-tlvs;
    uses ospf-sr:local-block-tlvs;
    uses ospf-sr: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 "../../../../../../../../../../"
      + "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: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-intra-area-prefix" {
    when "'ospf:../../../../../../../../../"
      + "rt:type' = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }
    uses ospfv3-extended-prefix-range-tlvs;
    description
      "OSPFv3 AS-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 "../../../../../../../../../../"
      + "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-inter-area-prefix" {
    when "'ospf:../../../../../../../../../"
      + "rt:type' = 'ospf:ospfv3'" {
```

```
      description
        "This augmentation is only valid for OSPFv3.";
    }
    uses ospfv3-extended-prefix-range-tlvs;
    description
      "OSPFv3 AS-Scoped E-Inter-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-as-external" {
    when "../../../../../../../../../../"
      + "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-AS-External 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 "'ospf:../../../../../../../../../"
      + "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 "../../../../../../../../../../"
```

```
      + "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-NSSA 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-nssa" {
    when "'ospf:../../../../../../../../../../"
      + "rt:type' = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }
    uses ospfv3-extended-prefix-range-tlvs;
    description
      "OSPFv3 AS-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: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-link/"
    + "ospfv3-e-lsa:e-link-tlvs/ospfv3-e-lsa:intra-prefix-tlv" {
    when "../../../../../../../../../../../../"
      + "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.";
  }

    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-link/"
    + "ospfv3-e-lsa:e-link-tlvs/ospfv3-e-lsa:intra-prefix-tlv" {
    when "'ospf:../../../../../../../../../"
      + "rt:type' = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }
    uses ospfv3-prefix-sid-sub-tlvs;
    description
      "OSPFv3 AS-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 "../../../../../../../../../../../../"
      + "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.";
  }

    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-intra-area-prefix/"
    + "ospfv3-e-lsa:e-intra-prefix-tlvs/ospfv3-e-lsa:intra-prefix-tlv" {
    when "'ospf:../../../../../../../../../"
      + "rt:type' = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }
    uses ospfv3-prefix-sid-sub-tlvs;
    description
      "OSPFv3 AS-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 "../../../../../../../../../../../../../"
      + "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.";
  }

    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-inter-area-prefix/"
    + "ospfv3-e-lsa:e-inter-prefix-tlvs/ospfv3-e-lsa:inter-prefix-tlv" {
    when "'ospf:../../../../../../../../../../"
      + "rt:type' = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }
    uses ospfv3-prefix-sid-sub-tlvs;
    description
      "OSPFv3 AS-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: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-as-external/"
    + "ospfv3-e-lsa:e-external-tlvs/ospfv3-e-lsa:external-prefix-tlv" {
    when "../../../../../../../../../../../../../"
      + "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 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 "'ospf:../../../../../../../../../../"
      + "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 "../../../../../../../../../../../../"
      + "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 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-nssa/"
```

```
    + "ospfv3-e-lsa:e-external-tlvs/ospfv3-e-lsa:external-prefix-tlv" {
    when "'ospf:../../../../../../../../../"
      + "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.";
  }

  /* 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 "../../../../../../../../../../../../"
      + "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.";
  }

    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-router/"
    + "ospfv3-e-lsa:e-router-tlvs/ospfv3-e-lsa:link-tlv" {
    when "'ospf:../../../../../../../../../"
      + "rt:type' = 'ospf:ospfv3'" {
      description
        "This augmentation is only valid for OSPFv3.";
    }
    uses ospfv3-adj-sid-sub-tlvs;
    uses ospfv3-lan-adj-sid-sub-tlvs;
    description
      "OSPFv3 AS-Scoped Adj-SID Sub-TLV.";
  }
```

```
}
<CODE ENDS>
```

4. Security Considerations

The YANG modules specified in this document define a schema for data that is designed to be accessed via network management protocols such as NETCONF [RFC6241] or RESTCONF [RFC8040]. The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH) [RFC6242]. The lowest RESTCONF layer is HTTPS, and the mandatory-to-implement secure transport is TLS [RFC5246].

The NETCONF access control model [RFC6536] 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 modules 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.

Some of the readable data nodes in the modules may be considered sensitive or vulnerable in some network environments. It is thus important to control read access (e.g., via get, get-config, or notification) to these data nodes. The exposure of the Link State Database (LSDB) will expose the detailed topology of the network. This may be undesirable since both due to the fact that exposure may facilitate other attacks. Additionally, network operators may consider their topologies to be sensitive confidential data.

5. IANA Considerations

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

```
URI: urn:ietf:params:xml:ns:yang:ietf-ospfv3-sr
Registrant Contact: The IESG.
XML: N/A, the requested URI is an XML namespace.
```

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

```
name: ietf-ospfv3-sr
namespace: urn:ietf:params:xml:ns:yang:ietf-ospfv3-sr
prefix: ospfv3-sr
reference: RFC XXXX
```

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7. References

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