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C. Lin
New H3C Technologies
Y. Liu
China Mobile

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A YANG Module for SRv6 Next-Hop RIB Extensions

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Abstract

This document defines a YANG data module for configuring and managing SRv6 next hop information for Routing, which augments the YANG data model for Routing Management (RFC8349).

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction

[RFC8349] provides the core routing data model that includes three YANG [RFC7950] modules (namely, "ietf-routing", "ietf-ipv4-unicast-routing" and "ietf-ipv6-unicast-routing"), which serves as a framework for configuring and managing a routing subsystem. But these YANG modules have not defined SRv6 next hop information when the route needs to be forwarded via SRv6.

This document defines a YANG data model for configuring and managing SRv6 next hop information for Routing, which augments the YANG data model for Routing Management (RFC8349).

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

1.1. Terminology

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

2. Model Overview

One YANG data model is defined in this document.

The "ietf-srv6-nexthop" data model provides SRv6 Next Hop information for Routing. It includes:

- SRv6 Best Effort (BE) parameters, such as SRv6 SID.
- SRv6 Traffic Engineering (TE) parameters, such as Color, Endpoint and SRv6 SID.

3. SRv6 Next Hop YANG Module

3.1. Tree View

The complete tree of the "ietf-srv6-nexthop" yang data model is represented as following. See [RFC8340] for an explanation of the symbols used.

```
   module: ietf-srv6-nexthop

     augment /rt:routing/rt:control-plane-protocols
               /rt:control-plane-protocol/rt:static-routes/v4ur:ipv4
               /v4ur:route/v4ur:next-hop/v4ur:next-hop-options:
       +--:(v4ur:srv6-next-hop-list)
          +--rw v4ur:srv6-next-hop-list
             +--rw v4ur:srv6-next-hop* [index]
                +--rw v4ur:index          string
                +--rw v4ur:srv6-te
                   +--rw v4ur:color       sr-policy-types:color-type
                   +--rw v4ur:endpoint    inet:ip-address
                   +--rw v4ur:srv6-sid    inet:ipv6-prefix
                +--rw v4ur:srv6-be
                   +--rw v4ur:srv6-sid    inet:ipv6-prefix

     augment /rt:routing/rt:control-plane-protocols
               /rt:control-plane-protocol/rt:static-routes/v6ur:ipv6
               /v6ur:route/v6ur:next-hop/v6ur:next-hop-options:
       +--:(v6ur:srv6-next-hop-list)
          +--rw v6ur:srv6-next-hop-list
             +--rw v6ur:srv6-next-hop* [index]
                +--rw v6ur:index          string
                +--rw v6ur:srv6-te
                   +--rw v6ur:color       sr-policy-types:color-type
                   +--rw v6ur:endpoint    inet:ip-address
                   +--rw v6ur:srv6-sid    inet:ipv6-prefix
                +--rw v6ur:srv6-be
                   +--rw v6ur:srv6-sid    inet:ipv6-prefix

     augment /rt:routing/rt:ribs/rt:rib/rt:routes/rt:route
               /rt:next-hop/rt:next-hop-options:
       +--:(srv6-next-hop-list)
          +--ro srv6-next-hop-list
             +--ro srv6-next-hop*
                +--ro srv6-te
                   +--ro color       sr-policy-types:color-type
                   +--ro endpoint    inet:ip-address
                   +--ro srv6-sid    inet:ipv6-prefix
                +--ro srv6-be
                   +--ro srv6-sid    inet:ipv6-prefix

     augment /rt:routing/rt:ribs/rt:rib/rt:active-route/rt:output
               /rt:route/rt:next-hop/rt:next-hop-options:
       +--:(srv6-next-hop-list)
          +--ro srv6-next-hop-list
             +--ro srv6-next-hop*
                +--ro srv6-te
```

```
      +--ro color       sr-policy-types:color-type
      +--ro endpoint    inet:ip-address
      +--ro srv6-sid    inet:ipv6-prefix
   +--ro srv6-be
      +--ro srv6-sid    inet:ipv6-prefix
```

3.2. Yang Module

<CODE BEGINS> file "ietf-srv6-nexthop@2025-07-05.yang"

```
module ietf-srv6-nexthop {
  yang-version "1.1";
  namespace "urn:ietf:params:xml:ns:yang:ietf-srv6-nexthop";
  prefix "srv6-nexthop";
  import ietf-inet-types {
    prefix "inet";
    reference
      "RFC 6991: Common YANG Data Types";
  }
  import ietf-routing {
    prefix "rt";
    reference
      "RFC 8349: A YANG Data Model for Routing Management
       (NMDA Version).";
  }
  import ietf-ipv4-unicast-routing {
    prefix "v4ur";
    reference
      "RFC 8349: A YANG Data Model for Routing Management
       (NMDA Version).";
  }
  import ietf-ipv6-unicast-routing {
    prefix "v6ur";
    reference
      "RFC 8349: A YANG Data Model for Routing Management
       (NMDA Version).";
  }
  import ietf-sr-policy-types {
    prefix "sr-policy-types";
    reference
      "RFC XXXX: YANG Data Model for Segment Routing Policy.";
  }
  organization
    "IETF SPRING Working Group";
  contact
    "TBD";
  description
    "This module describes a YANG model for configuring and
     managing SRv6 next hop information for Routing.
     This YANG model conforms to the Network Management
     Datastore Architecture (NMDA) as described in RFC 8342.
     Copyright (c) 2025 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 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;
        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.";
    revision 2025-07-05 {
      description
        "Initial Version";
      reference
        "RFC XXXX, YANG Data Model for SRv6 Next Hop of Routing";
    }
    grouping srv6-nexthop-info {
      description
        "This group provides the information of SRv6 next hop for
         routing.";
      container srv6-te {
        description
          "The informaton of SRv6 Traffic Engineering forwarding.";
        leaf color {
          type sr-policy-types:color-type;
          description
            "The Color of a SRv6 Policy.";
        }
        leaf endpoint {
          type inet:ip-prefix;
          description
            "The endpoint of a SRv6 Policy.";
        }
        leaf srv6-sid {
          type inet:ipv6-prefix;
          description
            "The SRv6 SID value for SRv6 Traffic Engineering
             forwarding.";
        }
      }
      container srv6-be {
        description
          "The informaton of SRv6 Best Effort forwarding.";
        leaf srv6-sid {
          type inet:ipv6-prefix;
          description
```

```
            "The SRv6 SID value for SRv6 Best Effort forwarding.";
        }
      }
    }
    grouping srv6-nexthop-content {
      description
        "Generic parameters of SRv6 next hop in static routes.";
      container srv6-next-hop-list {
        description
          "Container for multiple SRv6 next hop.";
        list srv6-next-hop {
          key "index";
          description
            "An entry in a SRv6 next hop list.";
          leaf index {
            type string;
            description
              "A user-specified identifier utilized to uniquely
               reference the SRv6 next-hop entry in the SRv6
               next-hop list. The value of this index has no
               semantic meaning other than for referencing the
               entry.";
          }
          uses srv6-nexthop-info;
        }
      }
    }
    grouping srv6-nexthop-state-content {
      description
        "Generic state parameters of SRv6 next hop.";
      container srv6-next-hop-list {
        description
          "Container for multiple SRv6 next hop.";
        list srv6-next-hop {
          description
            "An entry in a SRv6 next hop list.";
          uses srv6-nexthop-info;
        }
      }
    }
    augment "/rt:routing/rt:control-plane-protocols/"
          + "rt:control-plane-protocol/rt:static-routes/v4ur:ipv4/"
          + "v4ur:route/v4ur:next-hop/v4ur:next-hop-options" {
      description
        "Augment 'next-hop-options' in IPv4 unicast route.";
      case srv6-next-hop-list {
        description
          "The case represents a SRv6 next hop list.";
```

```
        uses srv6-nexthop-content;
      }
    }
    augment "/rt:routing/rt:control-plane-protocols/"
          + "rt:control-plane-protocol/rt:static-routes/v6ur:ipv6/"
          + "v6ur:route/v6ur:next-hop/v6ur:next-hop-options" {
      description
        "Augment 'next-hop-options' in IPv6 unicast route.";
      case srv6-next-hop-list {
        description
          "The case represents a SRv6 next hop list.";
        uses srv6-nexthop-content;
      }
    }
    augment "/rt:routing/rt:ribs/rt:rib/rt:routes/rt:route/"
          + "rt:next-hop/rt:next-hop-options" {
      description
        "Augment 'next-hop-options' of a route in RIB.";
      case srv6-next-hop-list {
        description
          "The case represents a SRv6 next hop list.";
        uses srv6-nexthop-state-content;
      }
    }
    augment "/rt:routing/rt:ribs/rt:rib/rt:active-route/rt:output/"
          + "rt:route/rt:next-hop/rt:next-hop-options" {
      description
        "Augment 'next-hop-options' of an active-route in RIB.";
      case srv6-next-hop-list {
        description
          "The case represents a SRv6 next hop list.";
        uses srv6-nexthop-state-content;
      }
    }
  }

  <CODE ENDS>
```

4. Security Considerations

TBD

5. IANA Considerations

TBD

6. References

6.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC7950] Bjorklund, M., Ed., "The YANG 1.1 Data Modeling Language", RFC 7950, DOI 10.17487/RFC7950, August 2016, <https://www.rfc-editor.org/info/rfc7950>.

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[RFC8349] Lhotka, L., Lindem, A., and Y. Qu, "A YANG Data Model for Routing Management (NMDA Version)", RFC 8349, DOI 10.17487/RFC8349, March 2018, <https://www.rfc-editor.org/info/rfc8349>.

6.2. Informative References

[RFC8340] Bjorklund, M. and L. Berger, Ed., "YANG Tree Diagrams", BCP 215, RFC 8340, DOI 10.17487/RFC8340, March 2018, <https://www.rfc-editor.org/info/rfc8340>.

Authors' Addresses

Changwang Lin
New H3C Technologies
China
Email: linchangwang.04414@h3c.com

Yisong Liu
China Mobile

Email: liuyisong@chinamobile.com