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Yang Data Model for EVPN multicast
draft-ietf-pim-evpn-multicast-yang-03.txt

Abstract

This document describes a YANG data model for EVPN multicast services. The model is agnostic of the underlay as well as RFC 9251. This document mainly focuses on EVPN instance framework.

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1. Introduction

This document describes a YANG data model for EVPN multicast services. Its name is `ietf-evpn-multicast`. [RFC9251] introduces three new BGP EVPN routes to carry IGMP Membership Reports. The module `ietf-evpn-multicast` defines the three new BGP EVPN routes in it. It also defines other attributes for EVPN multicast services.

1.1. Terminology

The terminology for describing YANG data models is found in [RFC6020] and [RFC7950], including:

- * augment
- * data model
- * data node
- * module

1.2. Tree Diagrams

Tree diagrams used in this document follow the notation defined in [RFC8340].

1.3. Prefixes in Data Node Names

In this document, names of data nodes, actions, and other data model objects are often used without a prefix, as long as it is clear from the context in which YANG module each name is defined. Otherwise, names are prefixed using the standard prefix associated with the corresponding YANG module, as shown in Table 1.

Prefix	YANG module	Reference
inet	ietf-inet-types	[RFC6991]
rt-types	ietf-routing-types	[RFC8294]
evpn	ietf-evpn	[draft-ietf-bess-evpn-yang]
es	ietf-ethernet-segment	[draft-ietf-bess-evpn-yang]

Table 1: Prefixes and Corresponding YANG Modules

2. Module Structure

This module extends `ietf-evpn` data model specified in [draft-ietf-bess-evpn-yang] to configure and show EVPN multicast service.

This module conforms to the Network Management Datastore Architecture (NMDA) [RFC8342]. The operational state data is combined with the associated configuration data in the same hierarchy [RFC8407].

2.1. Attributes to control new BGP EVPN routes

This module augments /evpn:evpn/evpn:evpn-instances/evpn:evpn-instance to add some attributes to control the three new BGP EVPN routes to carry IGMP Membership Reports.

If evpn-igmp-proxy is enabled, Trigger an IMET route update with Multicast Flags Extended Community and IGMP proxy bit is set [RFC 9251].

If evpn-mld-proxy is enabled, Trigger an IMET route update with Multicast Flags Extended Community and MLD proxy bit is set [RFC 9251].

```
augment /evpn:evpn/evpn:evpn-instances/evpn:evpn-instance:
  +--rw evpn-igmp-proxy?    boolean {evpn-igmp-proxy}?
  +--rw evpn-mld-proxy?     boolean {evpn-mld-proxy}?
```

2.2. New BGP EVPN routes

This module augments /evpn:evpn/evpn:evpn-instances/evpn:evpn-instance/evpn:routes to add three new BGP EVPN routes to carry IGMP Membership Reports [RFC 9251]. The route types are known as:

- 6 - Selective Multicast Ethernet Tag Route
- 7 - Multicast Membership Report Synch Route
- 8 - Multicast Leave Synch Route

```
augment /evpn:evpn/evpn:evpn-instances/evpn:evpn-instance/evpn:routes:
  +--ro selective-multicast-ethernet-tag-route*
  |   +--ro rd-rt* [route-distinguisher]
  |   |   +--ro route-distinguisher    rt-types:route-distinguisher
  |   |   +--ro vpn-target* [route-target]
  |   |   |   +--ro route-target      rt-types:route-target
  |   +--ro ethernet-tag?                uint32
  |   +--ro multicast-source-address?    inet:ip-address
  |   +--ro multicast-group-address?     rt-types:ip-multicast-group-address
  |   +--ro originator-ip-prefix?       inet:ip-prefix
  +--ro multicast-membership-report-synch-route*
  |   +--ro rd-rt* [route-distinguisher]
  |   |   +--ro route-distinguisher    rt-types:route-distinguisher
  |   |   +--ro vpn-target* [route-target]
  |   |   |   +--ro route-target      rt-types:route-target
  |   +--ro ethernet-segment-identifier? yang:hex-string
  |   +--ro ethernet-tag?                uint32
```

```

|   |--ro multicast-source-address?      inet:ip-address
|   |--ro multicast-group-address?      rt-types:ip-multicast-group-address
|   |--ro originator-ip-prefix?        inet:ip-prefix
+--ro multicast-leave-synch-route*
|   |--ro rd-rt* [route-distinguisher]
|   |   |--ro route-distinguisher      rt-types:route-distinguisher
|   |   |--ro vpn-target* [route-target]
|   |       |--ro route-target          rt-types:route-target
+--ro ethernet-segment-identifier?      yang:hex-string
+--ro ethernet-tag?                     uint32
+--ro multicast-source-address?         inet:ip-address
+--ro multicast-group-address?         rt-types:ip-multicast-group-address
+--ro originator-ip-prefix?            inet:ip-prefix
+--ro maximum-response-time?           uint16

```

3. EVPN Multicast Yang Module

This module references [RFC6991],[RFC8294],[draft-ietf-bess-evpn-yang].

<CODE BEGINS> file ietf-evpn-multicast@2024-03-04.yang

```

module ietf-evpn-multicast {
    namespace "urn:ietf:params:xml:ns:yang:ietf-evpn-multicast";

    prefix "evpn-multicast";

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

    import ietf-routing-types {
        prefix "rt-types";
    }

    import ietf-yang-types {
        prefix yang;
    }

    import ietf-evpn {
        prefix "evpn";
    }

    organization "ietf";

    contact "ietf";

    description "evpn multicast";

    revision "2024-03-04" {
        description "Initial draft";
        reference "";
    }
}

```

```

/*
 * Features
 */

feature evpn-igmp-proxy {
  description
    "Support IGMP Proxy for EVPN.";
  reference
    "RFC 9251";
}

feature evpn-mld-proxy {
  description
    "Support MLD Proxy for EVPN.";
  reference
    "RFC 9251";
}

/* Groupings */

grouping route-rd-rt-grp {
  description "A grouping for a route's route distinguishers " +
    "and route targets";
  list rd-rt {
    key "route-distinguisher";
    leaf route-distinguisher {
      type rt-types:route-distinguisher;
      description "Route distinguisher";
    }
    list vpn-target {
      key "route-target";
      leaf route-target {
        type rt-types:route-target;
        description "BGP route target";
      }
      description "A list of route targets";
    }
    description "A list of route distinguishers and " +
      "corresponding VPN route targets";
  }
}

/* augments */

augment "/evpn:evpn/evpn:evpn-instances/evpn:evpn-instance" {
  description "";
  leaf evpn-igmp-proxy {
    if-feature "evpn-igmp-proxy";
    type boolean;
    description "Trigger an IMET route update with Multicast
      Flags Extended Community and IGMP proxy bit is set.";
  }
}

```

```

    }
    leaf evpn-mld-proxy {
        if-feature "evpn-mld-proxy";
        type boolean;
        description "Trigger an IMET route update with Multicast
            Flags Extended Community and MLD proxy bit is set.";
    }
}

augment "/evpn:evpn/evpn:evpn-instances/evpn:evpn-
instance/evpn:routes" {
    if-feature "evpn-igmp-proxy or evpn-mld-proxy";
    description "Type6~8 route";
    list selective-multicast-ethernet-tag-route {
        uses route-rd-rt-grp;
        leaf ethernet-tag {
            type uint32;
            description "An ethernet tag (etag) indentifying a " +
                "broadcast domain";
        }
        leaf multicast-source-address {
            type inet:ip-address;
            description
                "";
        }
        leaf multicast-group-address {
            type rt-types:ip-multicast-group-address;
            description
                "Multicast group address.";
        }
        leaf originator-ip-prefix {
            type inet:ip-prefix;
            description "originator-ip-prefix";
        }
        description "SMET route (type6)";
    }
    list multicast-membership-report-synch-route {
        uses route-rd-rt-grp;
        leaf ethernet-segment-identifier {
            type yang:hex-string {
                length "29";
            }
            description "Ethernet segment identifier (esi)";
        }
        leaf ethernet-tag {
            type uint32;
            description "An ethernet tag (etag) indentifying a " +
                "broadcast domain";
        }
        leaf multicast-source-address {
            type inet:ip-address;
            description

```

```

    ";
}
leaf multicast-group-address {
    type rt-types:ip-multicast-group-address;
    description
        "Multicast group address.";
}
leaf originator-ip-prefix {
    type inet:ip-prefix;
    description "originator-ip-prefix";
}
description "type7 route";
}
list multicast-leave-synch-route {
    uses route-rd-rt-grp;
    leaf ethernet-segment-identifier {
        type yang:hex-string {
            length "29";
        }
        description "Ethernet segment identifier (esi)";
    }
    leaf ethernet-tag {
        type uint32;
        description "An ethernet tag (etag) indentifying a " +
            "broadcast domain";
    }
    leaf multicast-source-address {
        type inet:ip-address;
        description
            "";
    }
    leaf multicast-group-address {
        type rt-types:ip-multicast-group-address;
        description
            "Multicast group address.";
    }
    leaf originator-ip-prefix {
        type inet:ip-prefix;
        description "originator-ip-prefix";
    }
    leaf maximum-response-time {
        type uint16;
        units "seconds";
        description
            "Query maximum response time specifies the maximum time
            allowed before sending a responding report.";
        reference
            "Sections 4.1.1, 8.3 of RFC 3376: Internet Group
            Management Protocol, Version 3";
    }
    description "type8 route";
}
}

```



```

    }
  }
<CODE ENDS>

```

4. Security Considerations

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

There are a number of data nodes defined in this YANG module that are writable/creatable/deletable (i.e., config true, which is the default). 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:

Under /evpn:evpn/evpn:evpn-instances/evpn:evpn-instance:/

evpn-multicast:evpn-igmp-proxy

evpn-multicast:evpn-mld-proxy

Unauthorized access to any data node of these subtrees can adversely affect the EVPN multicast service of both the local device and the network. This may lead to network malfunctions, delivery of packets to inappropriate destinations, and other problems.

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

Under /evpn:evpn/evpn:evpn-instances/evpn:evpn-instance:/

evpn-multicast:evpn-igmp-proxy

evpn-multicast:evpn-mld-proxy

Under augment /evpn:evpn/evpn:evpn-instances/evpn:evpn-instance/evpn:routes:/
Zhao & Liu, etc

evpn-multicast:selective-multicast-ethernet-tag-route

evpn-multicast:multicast-membership-report-synch-route

evpn-multicast:multicast-leave-synch-route

Unauthorized access to any data node of these subtrees can disclose the operational state information of EVPN multicast service on this device.

5. IANA Considerations

RFC Ed.: In this section, replace all occurrences of 'XXXX' with the actual RFC number (and remove this note).

5.1. XML Registry

This document registers the following namespace URIs in the IETF XML registry [RFC3688]:

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

5.2. YANG Module Names Registry

This document registers the following YANG modules in the YANG Module Names registry [RFC7950]:

```
-----
name:      ietf-evpn-multicast
namespace: urn:ietf:params:xml:ns:yang:ietf-evpn-multicast
prefix:    evpn-multicast
reference:  RFC XXXX
-----
```

6. References

6.1. Normative References

[RFC3688] Mealling, M., "The IETF XML Registry", RFC 3688, January 2004.

- [RFC6020] Bjorklund, M., Ed., "YANG - A Data Modeling Language for the Network Configuration Protocol (NETCONF)", RFC 6020, October 2010.
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- [RFC6991] Schoenwaelder, J., Ed., "Common YANG Data Types", RFC 6991, July 2013.
- [RFC7950] M. Bjorklund, Ed., "The YANG 1.1 Data Modeling Language", RFC 7950, August 2016.
- [RFC8040] A. Bierman, M. Bjorklund, K. Watsen, "RESTCONF Protocol", RFC 8040, January 2017.
- [RFC8294] X. Liu, Y. Qu, A. Lindem, C. Hopps, L. Berger, "Common YANG Data Types for the Routing Area", RFC 8294, December 2017.
- [RFC8341] Bierman, A. and M. Bjorklund, "Network Configuration Access Control Model", RFC 8341, March 2018.
- [RFC8446] Rescorla, E., "The Transport Layer Security (TLS) Protocol Version 1.3", RFC 8446, August 2018.
- [RFC9251] A. Sajassi, S. Thoria, M. Mishra, K. Patel, J. Drake, W. Lin, "Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Proxies for Ethernet VPN (EVPN)", RFC 9251, June 2022.
- [draft-ietf-bess-evpn-yang] P. Brissette, H. Shah, I. Chen, I. Hussain, K. Tiruveedhula, J. Rabadan, "Yang Data Model for EVPN", draft-ietf-bess-evpn-yang-07, March 2019.

6.2. Informative References

- [RFC8407] A. Bierman, "Guidelines for Authors and Reviewers of Documents Containing YANG Data Models", RFC 8407, October 2018.

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