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A YANG Data Model for Client-layer Topology
draft-zheng-ccamp-client-topo-yang-01

Abstract

A transport network is a server-layer network to provide connectivity services to its client. In this draft the topology of client is described.

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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This Internet-Draft will expire on May 3, 2018.

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1. Introduction

A transport network is a server-layer network designed to provide connectivity services for a client-layer network to carry the client traffic transparently across the server-layer network resources. The topology model in Traffic-Engineered network has been defined in both generic way and technology-specific way. The generic model, which is the base TE YANG model, can be found at [I-D.ietf-teas-yang-te-topo]. Technology-specific models, such as OTN/WSON topology model, have also been defined in [I-D.ietf-ccamp-otn-topo-yang] and [I-D.ietf-ccamp-wson-yang] respectively. Corresponding topology on client-layer is also required, to have a complete topology view from the perspective of network controllers.

This document defines a data model of all client-layer Topology, using YANG language defined in [RFC7950]. The model is augmenting the generic TE topology model, and can be used by applications exposing to a network controller via a REST interface. Furthermore,

it can be used by an application for topology description in client-layer network.

2. Terminology and Notations

A simplified graphical representation of the data model is used in this document. The meaning of the symbols in the YANG data tree presented later in this document is defined in [I-D.ietf-netmod-yang-tree-diagrams]. They are provided below for reference.

- Brackets "[" and "]" enclose list keys.
- Abbreviations before data node names: "rw" means configuration (read-write) and "ro" state data (read-only).
- Symbols after data node names: "?" means an optional node, "!" means a presence container, and "*" denotes a list and leaf-list.
- Parentheses enclose choice and case nodes, and case nodes are also marked with a colon (":").
- Ellipsis ("...") stands for contents of subtrees that are not shown.

3. YANG Model for Topology of Client Layer

3.1. YANG Tree for Ethernet Topology

```
module: ietf-eth-te-topology
  augment /nd:networks/nd:network/nd:network-types/tet:te-topology:
    +--rw eth-tran-topology!
  augment /nd:networks/nd:network:
    +--rw name?   string
  augment /nd:networks/nd:network/nd:node:
    +--rw name?               string
    +--rw node-mac-address?   yang:mac-address
  augment /nd:networks/nd:network/lnk:link/tet:te/tet:config:
    +--rw max-bandwidth?          uint64
    +--rw available-bandwidth?    uint64
    +--rw available-vlan-range?   etht-types:vid-range-type
  augment /nd:networks/nd:network/lnk:link/tet:te/tet:state:
    +--ro max-bandwidth?          uint64
    +--ro available-bandwidth?    uint64
    +--ro available-vlan-range?   etht-types:vid-range-type
  augment /nd:networks/nd:network/nd:node/lnk:termination-point:
```

```
    +--rw config
    |  +--rw ltp-mac-address?                  yang:mac-address
    |  +--rw port-vlan-id?                     etht-types:vlanid
    |  +--rw access-link-bandwidth-profiles
    |     +--rw bandwidth-profile-name?   string
    |     +--rw bandwidth-profile-type?   etht-types:bandwidth-profile-type
    |     +--rw CIR?                      uint64
    |     +--rw CBS?                      uint64
    |     +--rw EIR?                      uint64
    |     +--rw EBS?                      uint64
    |     +--rw color-aware?              boolean
    |     +--rw coupling-flag?            boolean
    +--ro state
       +--ro ltp-mac-address?                  yang:mac-address
       +--ro port-vlan-id?                     etht-types:vlanid
       +--ro access-link-bandwidth-profiles
          +--ro bandwidth-profile-name?   string
          +--ro bandwidth-profile-type?   etht-types:bandwidth-profile-type
          +--ro CIR?                      uint64
          +--ro CBS?                      uint64
          +--ro EIR?                      uint64
          +--ro EBS?                      uint64
          +--ro color-aware?              boolean
          +--ro coupling-flag?            boolean
  augment /nd:networks/nd:network/nd:node/lnk:termination-point/tet:te/tet:confi
g:
    +--rw client-facing?        empty
    +--rw maximum-frame-size?   uint16
  augment /nd:networks/nd:network/nd:node/lnk:termination-point/tet:te/tet:state
:
    +--ro client-facing?        empty
    +--ro maximum-frame-size?   uint16
```

3.2. YANG Tree for topology Model of other Client Layer

This section will be completed later.

4. YANG Code for Topology Client Layer

4.1. The ETH Topology YANG Code

<CODE BEGINS> file "ietf-eth-te-topology@2017-09-12.yang"

```
module ietf-eth-te-topology {
```

```
        /* TODO: FIXME */
        yang-version 1.1;

        namespace "urn:ietf:params:xml:ns:yang:ietf-eth-tran-topology";

        prefix "ethtetopo";

        import ietf-network {
                prefix "nd";
        }

        import ietf-network-topology {
                prefix "lnk";
        }

        import ietf-te-topology {
                prefix "tet";
        }

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

        import ietf-eth-tran-types {
                prefix "etht-types";
        }

        organization
                "Internet Engineering Task Force (IETF) CCAMP WG";
        contact
                "
                        WG List: <mailto:ccamp@ietf.org>

                        ID-draft editor:
                Haomian Zheng (zhenghaomian@huawei.com);
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                ";

        description
                "This module defines a YANG data model for describing
                 layer-2 Ethernet transport topologies.";

        revision 2017-09-12 {
```

```
                description
                        "Updated version:

                                Moved eth-ltp-svc-attributes grouping to ietf-et
h-tran-svc module.
                        ";
        }

        revision 2017-08-10 {
                description
                        "Initial version";
        }

        /*
        Groupings
        */

        grouping eth-tran-topology-type {
                description
                        "Identifies the Ethernet Transport topology type";

                container eth-tran-topology {
                        presence "indicates a topology type of Ethernet
                                Transport Network.";
                        description "Eth transport topology type";
                }
        }

        grouping eth-topology-attributes {
                description "Ethernet transport topology attributes";

                leaf name {
                        type string;
                        description "the topology name";
                }
        }

        grouping eth-node-attributes {
                description "Ethernet transport node attributes";

                leaf name {
                        type string;
                        description "a name for this node.";
                }
                leaf node-mac-address {
                        type yang:mac-address;
                        description "the MAC address of the node.";
                }
        }
```

```
        grouping eth-link-te-attributes {
                description "Ethernet TE link attributes";

                leaf max-bandwidth {
                        type uint64{
                                range "0..10000000000";
                        }
                        units "Kbps";
                        description "Maximum bandwith value expressed in kilobit
s per second";
                }

                leaf available-bandwidth {
                        type uint64{
                                range "0..10000000000";
                        }
                        units "Kbps";
                                description "Available bandwith value expressed
in kilobits per second";
                }

                leaf available-vlan-range {
                        type etht-types:vid-range-type;
                        description
                                "The range of the VLAN values that are available
.";
                }
        }

        grouping eth-ltp-attributes {
                description "Ethernet transport link termination point attribute
s";

                leaf ltp-mac-address {
                        type yang:mac-address;
                        description "the MAC address of the LTP.";
                }
                leaf port-vlan-id {
                        type etht-types:vlanid;
                        description "the port VLAN ID of the LTP.";
                }
        }

        grouping eth-ltp-te-attributes {
                description "Ethernet transport link termination point TE attrib
utes";

                /*
                        Do we need the client-facing attribute?
                        Cannot we use the svc container presence instead?
                */
                leaf client-facing {
                        type empty;
```

```
                        description
                                "if present, it means this tp is a client-facing
 ltp.";
                }
                leaf maximum-frame-size {
                        type uint16 {
                                range "64 .. 65535";
                        }
                        description
                                "Maximum frame size";
                }
        }

        /*
        Data nodes
        */

        augment "/nd:networks/nd:network/nd:network-types/tet:te-topology" {
                description "Augment network types to include ETH transport newt
ork";

                uses eth-tran-topology-type;
        }

        augment "/nd:networks/nd:network" {
                when "nd:network-types/tet:te-topology/eth-tran-topology" {
                        description "Augment only for ETH transport network";
                }
                description "Augment ETH transport network topology attributes";

                uses eth-topology-attributes;
        }

        augment "/nd:networks/nd:network/nd:node" {
                when "../nd:network-types/tet:te-topology/eth-tran-topology" {
                        description "Augment only for ETH transport network";
                }
                description "Augment ETH transport node attributes";

                uses eth-node-attributes;
        }

        augment "/nd:networks/nd:network/lnk:link/tet:te/tet:config" {
                when "../../../nd:network-types/tet:te-topology/eth-tran-topolog
y" {
                        description "Augment only for ETH transport network.";
                }
                description "Augment ETH transport link config attributes";

                uses eth-link-te-attributes;
        }
```

```
        augment "/nd:networks/nd:network/lnk:link/tet:te/tet:state" {
                when "../../../nd:network-types/tet:te-topology/eth-tran-topolog
y" {
                        description "Augment only for ETH transport network.";
                }
                description "Augment ETH transport link state attributes";

                uses eth-link-te-attributes;
        }

        augment "/nd:networks/nd:network/nd:node/lnk:termination-point" {
                when "../../nd:network-types/tet:te-topology/eth-tran-topology"
{
                        description "Augment only for ETH transport network";
                }
                description "Augment ETH LTP attributes";

                container config {
                        description
                                "ETH LTP configuration data.";
                        uses eth-ltp-attributes;
                        container access-link-bandwidth-profiles {
                                uses etht-types:etht-bandwidth-profiles;
                                description
                                        "Bandwidth profiles for access link.";
                        }
                }
                container state {
                        config false;
                        description
                                "ETH LTP operational state data.";
                        uses eth-ltp-attributes;
                        container access-link-bandwidth-profiles {
                                uses etht-types:etht-bandwidth-profiles;
                                description
                                        "Bandwidth profiles for access link.";
                        }
                }
        }

        augment "/nd:networks/nd:network/nd:node/"
                +"lnk:termination-point/tet:te/tet:config" {
                when "../../nd:network-types/tet:te-topology/eth-tran-topology"
{
                        description "Augment only for ETH transport network";
                }
                description "Augment ETH transport LTP TE config attributes";

                uses eth-ltp-te-attributes;
        }
```

```
        augment "/nd:networks/nd:network/nd:node/"
                +"lnk:termination-point/tet:te/tet:state" {
                when "../../nd:network-types/tet:te-topology/eth-tran-topology"
{
                        description "Augment only for ETH transport network";
                }
                description "Augment ETH transport LTP TE state attributes";

                uses eth-ltp-te-attributes;
        }
}
```

<CODE ENDS>

4.2. Other OTN client signal YANG Code

TBD.

5. Considerations and Open Issue

Editor Notes: This section is used to note temporary discussion/ conclusion that to be fixed in the future version, and will be removed before publication.

6. IANA Considerations

TBD.

7. Manageability Considerations

TBD.

8. Security Considerations

The data following the model defined in this document is exchanged via, for example, the interface between an orchestrator and a transport network controller. The security concerns mentioned in [I-D.ietf-teas-yang-te-topo] for using ietf-te-topology.yang model also applies to this document.

The YANG module defined in this document can be accessed via the RESTCONF protocol defined in [RFC8040], or maybe via the NETCONF protocol [RFC6241].

There are a number of data nodes defined in the YANG module which 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., POST) to these data nodes without proper protection can have a negative effect on network operations.

Editors note: to list specific subtrees and data nodes and their sensitivity/vulnerability.

9. Acknowledgements

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