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A YANG Data Model for Optical Transport Network Client Signals
draft-zheng-ccamp-otn-client-signal-yang-01

Abstract

A transport network is a server-layer network to provide connectivity services to its client. The topology and tunnel information in the transport layer has already been defined by Traffic-engineered models and OTN models, however, the access to the network has not been described. These information is useful to both client and provider.

This draft describe how the client signals are carried over OTN and defined corresponding YANG data model which is required during configuration procedure. More specifically, several client signal (of OTN) models including ETH, STM-n, FC and so on, are defined in this draft.

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. Currently there has been topology and tunnel model defined for transport network, such as [I-D.ietf-ccamp-otn-topo-yang] and [I-D.ietf-ccamp-otn-tunnel-model], which has described the network model between PEs. However, there is a missing piece between the PE and CE, which is expected to be solved in this document.

This document defines a data model of all OTN network client signals, using YANG language defined in [RFC7950]. The model can be used by applications exposing to a transport controller via a REST interface. Furthermore, it can be used by an application for the following purposes (but not limited to):

- To request/update an end-to-end service by driving a new OTN tunnel to be set up to support this service;
- To request/update an end-to-end service by using an existing OTN tunnel;
- To receive notification with regard to the information change of the given service;

The YANG model defined in this document is independent of control plane protocols and captures topology related information pertaining to an Optical Transport Networks (OTN)-electrical layer, as the scope specified by [RFC7062] and [RFC7139]. Furthermore, it is not a stand-alone model, but augmenting from the TE topology YANG model defined in [I-D.ietf-teas-yang-te-topo].

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. OTN Client Signal Overview

The OTN is usually a server-layer network designed to provide connectivity services for a client-layer network to carry the client traffic opaquely across the server-layer network resources. A transport network may be constructed from equipments utilizing any of a number of different transport technologies such as the evolving optical transport infrastructure (SONET/SDH and OTN) or packet transport as epitomized by the MPLS Transport Profile (MPLS-TP).

A full list of G-PID was summarized in [RFC7139], which can be divided into a few categories of OTN client signal. The first category of service type is Ethernet related, including GE, WAN/LAN to support EPL/EVPL service. Another category of service type would be client service which includes SDH/SONET, OTN service, SAN storage (FICON, Fiber Channel) and other applications such as video service (HD-SDI, 3G-SDI, etc.).

4. YANG Model for OTN Client Signal

4.1. YANG Tree for Ethernet Service

```
module: ietf-eth-tran-service
    +--rw etht-svc
       +--rw globals
       |  +--rw etht-svc-bandwidth-profiles* [bandwidth-profile-name]
       |     +--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
       +--rw etht-svc-instances* [etht-svc-name]
          +--rw etht-svc-name    -> ../config/etht-svc-name
          +--rw config
          |  +--rw etht-svc-name?           string
          |  +--rw access-provider-id?      te-types:te-global-id
          |  +--rw access-client-id?        te-types:te-global-id
          |  +--rw access-topology-id?      te-types:te-topology-id
          |  +--rw admin-status?            identityref
          |  +--rw etht-svc-access-ports* [access-port-id]
          |  |  +--rw access-port-id                          uint16
          |  |  +--rw access-node-id?                         te-types:te-node-
id
          |  |  +--rw access-ltp-id?                          te-types:te-tp-id
```

```
          |  |  +--rw service-classification-type?            identityref
          |  |  +--rw (service-classification)?
          |  |  |  +--:(port-classification)
          |  |  |  +--:(vlan-classification)
          |  |  |     +--rw outer-tag!
          |  |  |     |  +--rw tag-type?     etht-types:eth-tag-classify
          |  |  |     |  +--rw (individual-bundling-vlan)?
          |  |  |     |     +--:(individual-vlan)
          |  |  |     |     |  +--rw vlan-value?   etht-types:vlanid
          |  |  |     |     +--:(vlan-bundling)
          |  |  |     |        +--rw vlan-range?   etht-types:vid-range-type
          |  |  |     +--rw second-tag!
          |  |  |        +--rw tag-type?     etht-types:eth-tag-classify
          |  |  |        +--rw (individual-bundling-vlan)?
          |  |  |           +--:(individual-vlan)
          |  |  |           |  +--rw vlan-value?   etht-types:vlanid
          |  |  |           +--:(vlan-bundling)
          |  |  |              +--rw vlan-range?   etht-types:vid-range-type
          |  |  +--rw (direction)?
          |  |  |  +--:(symmetrical)
          |  |  |  |  +--rw ingress-egress-bandwidth-profile-name?   string
          |  |  |  +--:(asymmetrical)
          |  |  |     +--rw ingress-bandwidth-profile-name?          string
          |  |  |     +--rw egress-bandwidth-profile-name?           string
          |  |  +--rw vlan-operations
          |  |     +--rw (direction)?
          |  |        +--:(symmetrical)
          |  |        |  +--rw symmetrical-operation
          |  |        |     +--rw pop-tags?    uint8
          |  |        |     +--rw push-tags
          |  |        |        +--rw outer-tag!
          |  |        |        |  +--rw tag-type?     etht-types:eth-tag-type
          |  |        |        |  +--rw vlan-value?   etht-types:vlanid
          |  |        |        +--rw second-tag!
          |  |        |           +--rw tag-type?     etht-types:eth-tag-type
          |  |        |           +--rw vlan-value?   etht-types:vlanid
          |  |        +--:(asymmetrical)
          |  |           +--rw asymmetrical-operation
          |  |              +--rw ingress
          |  |              |  +--rw pop-tags?    uint8
          |  |              |  +--rw push-tags
          |  |              |     +--rw outer-tag!
          |  |              |     |  +--rw tag-type?     etht-types:eth-tag-type
          |  |              |     |  +--rw vlan-value?   etht-types:vlanid
          |  |              |     +--rw second-tag!
          |  |              |        +--rw tag-type?     etht-types:eth-tag-type
          |  |              |        +--rw vlan-value?   etht-types:vlanid
          |  |              +--rw egress
```

```
          |  |                +--rw pop-tags?    uint8
          |  |                +--rw push-tags
          |  |                   +--rw outer-tag!
          |  |                   |  +--rw tag-type?     etht-types:eth-tag-type
          |  |                   |  +--rw vlan-value?   etht-types:vlanid
          |  |                   +--rw second-tag!
          |  |                      +--rw tag-type?     etht-types:eth-tag-type
          |  |                      +--rw vlan-value?   etht-types:vlanid
          |  +--rw etht-svc-tunnels* [tunnel-name]
          |     +--rw tunnel-name    string
          |     +--rw (svc-multiplexing-tag)?
          |        +--:(other)
          |        +--:(none)
          |        +--:(vlan-tag)
          |        +--:(pw)
          +--ro state
             +--ro etht-svc-name?           string
             +--ro access-provider-id?      te-types:te-global-id
             +--ro access-client-id?        te-types:te-global-id
             +--ro access-topology-id?      te-types:te-topology-id
             +--ro admin-status?            identityref
             +--ro etht-svc-access-ports* [access-port-id]
             |  +--ro access-port-id                          uint16
             |  +--ro access-node-id?                         te-types:te-node-
id
             |  +--ro access-ltp-id?                          te-types:te-tp-id
             |  +--ro service-classification-type?            identityref
             |  +--ro (service-classification)?
             |  |  +--:(port-classification)
             |  |  +--:(vlan-classification)
             |  |     +--ro outer-tag!
             |  |     |  +--ro tag-type?     etht-types:eth-tag-classify
             |  |     |  +--ro (individual-bundling-vlan)?
             |  |     |     +--:(individual-vlan)
             |  |     |     |  +--ro vlan-value?   etht-types:vlanid
             |  |     |     +--:(vlan-bundling)
             |  |     |        +--ro vlan-range?   etht-types:vid-range-type
             |  |     +--ro second-tag!
             |  |        +--ro tag-type?     etht-types:eth-tag-classify
             |  |        +--ro (individual-bundling-vlan)?
             |  |           +--:(individual-vlan)
             |  |           |  +--ro vlan-value?   etht-types:vlanid
             |  |           +--:(vlan-bundling)
             |  |              +--ro vlan-range?   etht-types:vid-range-type
             |  +--ro (direction)?
             |  |  +--:(symmetrical)
             |  |  |  +--ro ingress-egress-bandwidth-profile-name?   string
             |  |  +--:(asymmetrical)
             |  |     +--ro ingress-bandwidth-profile-name?         string
```

```
|  |     +--ro egress-bandwidth-profile-name?          string
|  +--ro vlan-operations
|     +--ro (direction)?
|        +--:(symmetrical)
|        |  +--ro symmetrical-operation
|        |     +--ro pop-tags?    uint8
|        |     +--ro push-tags
|        |        +--ro outer-tag!
|        |        |  +--ro tag-type?     etht-types:eth-tag-type
|        |        |  +--ro vlan-value?   etht-types:vlanid
|        |        +--ro second-tag!
|        |           +--ro tag-type?     etht-types:eth-tag-type
|        |           +--ro vlan-value?   etht-types:vlanid
|        +--:(asymmetrical)
|           +--ro asymmetrical-operation
|              +--ro ingress
|              |  +--ro pop-tags?    uint8
|              |  +--ro push-tags
|              |     +--ro outer-tag!
|              |     |  +--ro tag-type?     etht-types:eth-tag-type
|              |     |  +--ro vlan-value?   etht-types:vlanid
|              |     +--ro second-tag!
|              |        +--ro tag-type?     etht-types:eth-tag-type
|              |        +--ro vlan-value?   etht-types:vlanid
|              +--ro egress
|                 +--ro pop-tags?    uint8
|                 +--ro push-tags
|                    +--ro outer-tag!
|                    |  +--ro tag-type?     etht-types:eth-tag-type
|                    |  +--ro vlan-value?   etht-types:vlanid
|                    +--ro second-tag!
|                       +--ro tag-type?     etht-types:eth-tag-type
|                       +--ro vlan-value?   etht-types:vlanid
|
+--ro etht-svc-tunnels* [tunnel-name]
|  +--ro tunnel-name    string
|  +--ro (svc-multiplexing-tag)?
|     +--:(other)
|     +--:(none)
|     +--:(vlan-tag)
|     +--:(pw)
+--ro operational-state?       identityref
+--ro provisioning-state?      identityref
```

4.2. YANG Tree for other OTN Client Signal Model

This section will be completed later.

5. YANG Code for OTN Client Signal

5.1. The ETH Service YANG Code

<CODE BEGINS> file "ietf-eth-tran-service@2017-09-12.yang"

```
module ietf-eth-tran-service {
  /* TODO: FIXME */
  yang-version 1.1;

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

  prefix "ethtsvc";

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

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

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

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

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    ";
```

```
  description
    "This module defines a YANG data model for describing
     the Ethernet transport services.";

  revision 2017-09-12 {
    description
      "Updated version:

        Changed s-tag to vlan-tag choice in svc-multiplexing-tag
        to support also services where the C-Tag is used
        as service multiplexing tag
        (assume proper coordination/configuration of C-Tag is adopted)

        Added support for bandwidth profiles.

        Split config and state data for Ethernet services.
      ";
  }

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

  /*
  Groupings
  */

  grouping vlan-classification {
    description
      "A grouping which represents classification on an 802.1Q VLAN tag.";

    leaf tag-type {
      type etht-types:eth-tag-classify;
      description
        "The tag type used for VLAN classification.";
    }
    choice individual-bundling-vlan {
      description
        "VLAN based classification can be individual
         or bundling.";

      case individual-vlan {
        leaf vlan-value {
          type etht-types:vlanid;
          description
            "VLAN ID value.";
        }
```

```
      }

      case vlan-bundling {
        leaf vlan-range {
          type etht-types:vid-range-type;
          description
            "List of VLAN ID values.";
        }
      }
    }
  }

  grouping vlan-write {
    description
      "A grouping which represents push/pop operations
       of an 802.1Q VLAN tag.";

    leaf tag-type {
      type etht-types:eth-tag-type;
      description
        "The VLAN tag type to push/swap.";
    }
    leaf vlan-value {
      type etht-types:vlanid;
      description
        "The VLAN ID value to push/swap.";
    }
  }

  grouping vlan-operations {
    description
      "A grouping which represents VLAN operations.";

      leaf pop-tags {
      type uint8 {
        range "1..2";
      }
      description
        "The number of VLAN tags to pop (or swap if used in
         conjunction with push-tags)";
    }
    container push-tags {
      description
        "The VLAN tags to push (or swap if used in
         conjunction with pop-tags)";

      container outer-tag {
        presence
```

```
          "Indicates existence of the outermost VLAN tag to
           push/swap";

        description
          "The outermost VLAN tag to push/swap.";

        uses vlan-write;
      }
      container second-tag {
        must
          '../outer-tag/write-tag-type = "s-vlan-tag-type" and ' +
          'write-tag-type = "c-vlan-tag-type"'
        {

          error-message
            "
              When pushing/swapping two tags, the outermost tag must
              be specified and of S-VLAN type and the second
              outermost tag must be of C-VLAN tag type.
            ";
          description
            "
              For IEEE 802.1Q interoperability, when pushing/swapping
              two tags, it is required that the outermost tag exists
              and is an S-VLAN, and the second outermost tag is a
              C-VLAN.
            ";
        }

        presence
          "Indicates existence of a second outermost VLAN tag to
           push/swap";

        description
          "The second outermost VLAN tag to push/swap.";

        uses vlan-write;
      }
    }
  }

  grouping bandwidth-profiles {
    description
      "A grouping which represent bandwidth profile configuration.";

    choice direction {
      description
        "Whether the bandwidth profiles are symmetrical or
```

```
         asymmetrical";
      case symmetrical {
        description
          "The same bandwidth profile is used to describe the ingress
          and the egress bandwidth profile.";

        leaf ingress-egress-bandwidth-profile-name {
          type "string";
          description
            "Name of the bandwidth profile.";
        }
      }
      case asymmetrical {
        description
          "Ingress and egress bandwidth profiles can be specified.";
        leaf ingress-bandwidth-profile-name {
          type "string";
          description
            "Name of the bandwidth profile used in
             the ingress direction.";
        }
        leaf egress-bandwidth-profile-name {
          type "string";
          description
            "Name of the bandwidth profile used in
             the egress direction.";
        }
      }
    }
  }

  grouping etht-svc-access-parameters {
    description
      "ETH transport services access parameters";

    leaf access-node-id {
      type te-types:te-node-id;
      description
        "The identifier of the access node in
         the ETH transport topology.";
    }
    leaf access-ltp-id {
      type te-types:te-tp-id;
      description
        "The TE link termination point identifier, used
         together with access-node-id to identify the
         access LTP.";
    }
```

```
    leaf service-classification-type {
      type identityref {
        base etht-types:service-classification-type;
      }
      description
        "Service classification type.";
    }

    choice service-classification {
      description
        "Access classification can be port-based or
         VLAN based.";

      case port-classification {
        /* no additional information */
      }

      case vlan-classification {
        container outer-tag {
          presence "The outermost VLAN tag exists";
          description
            "Classifies traffic using the outermost VLAN tag.";

          uses vlan-classification;
        }
        container second-tag {
          must
            '../outer-tag/access-tag-type = "classify-s-vlan" and ' +
            'access-tag-type = "classify-s-vlan"'
          {

            error-message
              "
                When matching two tags, the outermost tag must be
                specified and of S-VLAN type and the second
                outermost tag must be of C-VLAN tag type.
              ";
            description
              "
                For IEEE 802.1Q interoperability, when matching two
                tags, it is required that the outermost tag exists
                and is an S-VLAN, and the second outermost tag is a
                C-VLAN.
              ";
          }
          presence "The second outermost VLAN tag exists";

          description
```

```
            "Classifies traffic using the second outermost VLAN tag.";

          uses vlan-classification;
        }
      }
    }

    uses bandwidth-profiles;

    container vlan-operations {
      choice direction {
        description
          "Whether the VLAN operations are symmetrical or
           asymmetrical";
        case symmetrical {
          container symmetrical-operation {
            uses vlan-operations;
            description
              "Symmetrical operations.
               Expressed in the ingress direction, but
               the reverse operation is applied to egress traffic";
          }
        }
        case asymmetrical {
          container asymmetrical-operation {
            description "Asymmetrical operations";
            container ingress {
              uses vlan-operations;
              description "Ingress operations";
            }
            container egress {
              uses vlan-operations;
              description "Egress operations";
            }
          }
        }
      }
    }
  }

  grouping etht-svc-tunnel-parameters {
    description
      "ETH transport services tunnel parameters";

    leaf tunnel-name {
      type string;
      description
        "TE service tunnel instance name.";
```

```
    }
    choice svc-multiplexing-tag {
      description
        "Service multiplexing is optional and flexible.";

      case other {
        /*
         placeholder to support proprietary multiplexing
         (for further discussion)
        */
    }

      case none {
        /* no additional information is needed */
    }

      case vlan-tag {
        /*
          No additional information is needed
          The C-Tag or S-Tag used for service mulitplexing is defined
          by the VLAN classification and operations configured in the
          etht-svc-access-parameters grouping
        */
    }

      case pw {
        /* to be completed (for further discussion) */
    }
    }
  }

  grouping te-topology-identifier {
    leaf access-provider-id {
      type te-types:te-global-id;
      description
        "An identifier to uniquely identify a provider.";
    }
    leaf access-client-id {
      type te-types:te-global-id;
      description
        "An identifier to uniquely identify a client.";
    }
    leaf access-topology-id {
      type te-types:te-topology-id;
      description
        "Identifies the topology the
        service access ports belong to.";
    }
```

```
  }

  grouping  etht-svc-instance_config {
    description
      "Configuraiton parameters for Ethernet services.";

    leaf etht-svc-name {
      type string;
      description
        "Name of the p2p ETH transport service.";
    }

    uses te-topology-identifier;

    leaf admin-status {
      type identityref {
        base te-types:state-type;
      }
      default te-types:state-up;
      description "ETH service administrative state.";
    }

    list etht-svc-access-ports {
      key access-port-id;
      min-elements "1";
      /* to be updated if extended to mp services */
      max-elements "2";
      description
        "List of the ETH trasport services access port instances.";

      leaf access-port-id {
        type uint16;
        description
          "ID of the service access port instance";
      }
        uses etht-svc-access-parameters;
    }
    list etht-svc-tunnels {
      key tunnel-name;
      description
        "List of the TE Tunnels supporting the ETH
        transport service.";

      uses etht-svc-tunnel-parameters;
    }
  }

  grouping  etht-svc-instance_state {
```

```
    description
      "State parameters for Ethernet services.";

    leaf operational-state {
      type identityref {
        base te-types:state-type;
      }
      description "ETH service operational state.";
    }
    leaf provisioning-state {
      type identityref {
        base te-types:prov-state-type;
      }
      description "ETH service provisioning state.";
    }
  }

  /*
  Data nodes
  */

  container etht-svc {
    description
      "ETH transport services.";

    container globals {
      list etht-svc-bandwidth-profiles {
        key bandwidth-profile-name;
        description
          "List of bandwidth profile templates used by
           Ethernet services.";

        uses etht-types:etht-bandwidth-profiles;
      }
    }

    list etht-svc-instances {
      key etht-svc-name;
      description
        "The list of p2p ETH transport service instances";

      leaf etht-svc-name {
        type leafref {
          path "../config/etht-svc-name";
        }
        description
          "ID of the p2p ETH transport service instance.";
      }
```

```
      container config {
        description
          "Configuration of intended parameters.";

        uses etht-svc-instance_config;
      }

      container state {
        config false;
        description
          "Configuration of applied parameters and states.";

        uses etht-svc-instance_config;
        uses etht-svc-instance_state;
      }
    }
  }
}

<CODE ENDS>
```

5.2. YANG Code for ETH transport type

```
   <CODE BEGINS> file "ietf-eth-tran-types@2017-09-12.yang"


   module ietf-eth-tran-types {
     /* TODO: FIXME */
     yang-version 1.1;

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

     prefix "etht-types";

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

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        ";

    description
      "This module defines the ETH transport types.";

    revision 2017-09-12 {
      description
        "Updeated version:

          Added bandwidth-profile-type
        ";
    }

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

    /*
    Identities
    */

    identity eth-vlan-tag-type {
      description
        "ETH VLAN tag type.";
    }

    identity c-vlan-tag-type {
      base eth-vlan-tag-type;
      description
        "802.1Q Customer VLAN";
    }

    identity s-vlan-tag-type {
      base eth-vlan-tag-type;
      description
      "802.1Q Service VLAN (QinQ)";
    }

    identity service-classification-type {
      description
        "Service classification.";
    }

    identity port-classification {
      base service-classification-type;
```

```
    description
      "Port classification.";
  }

  identity vlan-classification {
    base service-classification-type;
    description
      "VLAN classification.";
  }

  identity eth-vlan-tag-classify {
    description
      "VLAN tag classification.";
  }

  identity classify-c-vlan {
    base eth-vlan-tag-classify;
    description
      "Classify 802.1Q Customer VLAN tag.
       Only C-tag type is accepted";
  }

  identity classify-s-vlan {
    base eth-vlan-tag-classify;
    description
      "Classify 802.1Q Service VLAN (QinQ) tag.
       Only S-tag type is accepted";
  }

  identity classify-s-or-c-vlan {
    base eth-vlan-tag-classify;
    description
      "Classify S-VLAN or C-VLAN tag-classify.
       Either tag is accepted";
  }

  identity bandwidth-profile-type {
    description
      "Bandwidth Profile Types";
  }

  identity mef-10-bwp {
    base bandwidth-profile-type;
    description
      "MEF 10 Bandwidth Profile";
  }

  identity rfc-2697-bwp {
```

```
      base bandwidth-profile-type;
      description
        "RFC 2697 Bandwidth Profile";
    }

    identity rfc-2698-bwp {
      base bandwidth-profile-type;
      description
        "RFC 2698 Bandwidth Profile";
    }

    identity rfc-4115-bwp {
      base bandwidth-profile-type;
      description
        "RFC 4115 Bandwidth Profile";
    }

    /*
    Type Definitions
    */

    typedef eth-tag-type {
      type identityref {
        base eth-vlan-tag-type;
      }
      description
        "Identifies a specific ETH VLAN tag type.";
    }

    typedef eth-tag-classify {
      type identityref {
        base eth-vlan-tag-classify;
      }
      description
        "Identifies a specific VLAN tag classification.";
    }

    typedef vlanid {
      type uint16 {
        range "1..4094";
      }
      description
        "The 12-bit VLAN-ID used in the VLAN Tag header.";
    }

    typedef vid-range-type {
      type string {
        pattern  "([1-9][0-9]{0,3}(-[1-9][0-9]{0,3})?" +
```

```
                "(,[1-9][0-9]{0,3}(-[1-9][0-9]{0,3})?)*)";
      }
      description
        "A list of VLAN Ids, or non overlapping VLAN ranges, in
        ascending order, between 1 and 4094.

          This type is used to match an ordered list of VLAN Ids, or
          contiguous ranges of VLAN Ids. Valid VLAN Ids must be in the
          range 1 to 4094, and included in the list in non overlapping
          ascending order.

          For example: 1,10-100,50,500-1000";
    }

    typedef bandwidth-profile-type {
      type identityref {
        base bandwidth-profile-type;
      }
      description
        "Identifies a specific Bandwidth Profile type.";
    }

    /*
    Grouping Definitions
    */
    grouping etht-bandwidth-profiles {
      description
        "Bandwidth profile configuration paramters.";

      leaf bandwidth-profile-name {
        type string;
        description
          "Name of the bandwidth profile.";
      }
      leaf bandwidth-profile-type {
        type etht-types:bandwidth-profile-type;
        description
          "The type of bandwidth profile.";
      }
      leaf CIR {
        type uint64;
        description
          "Committed Information Rate in Kbps";
      }
      leaf CBS {
        type uint64;
        description
          "Committed Burst Size in in KBytes";
```

```
        }
        leaf EIR {
          type uint64;
          /*
            Need to indicate that EIR is not supported by RFC 2697

            must
              '../bw-profile-type = "mef-10-bwp" or ' +
              '../bw-profile-type = "rfc-2698-bwp" or ' +
              '../bw-profile-type = "rfc-4115-bwp"'

            must
              '../bw-profile-type != "rfc-2697-bwp"'
          */
          description
            "Excess Information Rate in Kbps
             In case of RFC 2698, PIR = CIR + EIR";
        }
        leaf EBS {
          type uint64;
          description
            "Excess Burst Size in KBytes.
             In case of RFC 2698, PBS = CBS + EBS";
        }
        leaf color-aware {
          type boolean;
          description
            "Indicates weather the color-mode is
             color-aware or color-blind.";
        }
        leaf coupling-flag {
          type boolean;
          /*
            Need to indicate Coupling Flag is defined only for MEF 10

            must
              '../bw-profile-type = "mef-10-bwp"'
          */
          description
            "Coupling Flag.";
        }
      }
    }
```

<CODE ENDS>

5.3. Other OTN client signal YANG Code

TBD.

6. 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. Currently this work only covers the Ethernet related service model. Other client signals would be defined in later version. We currently assume that there won't be much common part between Ethernet service model and other client signals service model, therefore the two groups of models are defined independetly.

It is possible that there can be something in common for Ethernet service and other client signal service. If there is any need to construct a base model, we will also work it out in this draft. It is worth noting that a previous ID draft [I-D.zhang-teas-transport-service-model] is also addressing the same problem by defining a base model. But unfortunately we have not found any chance to augment to that model. Need to determine how we should go depending on the discussion in WG.

7. IANA Considerations

TBD.

8. Manageability Considerations

TBD.

9. 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.

10. Acknowledgements

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