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A YANG Data Model for Optical Transport Network Client Signals
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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.

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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):

- o To request/update an end-to-end service by driving a new OTN tunnel to be set up to support this service;
- o To request/update an end-to-end service by using an existing OTN tunnel;
- o 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.

- o Brackets "[" and "]" enclose list keys.
- o Abbreviations before data node names: "rw" means configuration (read-write) and "ro" state data (read-only).
- o Symbols after data node names: "?" means an optional node, "!" means a presence container, and "*" denotes a list and leaf-list.
- o Parentheses enclose choice and case nodes, and case nodes are also marked with a colon (":").
- o 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

```

id | | +--rw access-ltp-id? te-types:te-tp-

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[Page 4]

```

| | +--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>

            ID-draft editor:
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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
    (assuming 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 eth-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 eth-types:vlanid;
```



```
        description
            "VLAN ID value.";
    }
}
```

```

        case vlan-bundling {
            leaf vlan-range {
                type eth-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 eth-types:eth-tag-type;
        description
            "The VLAN tag type to push/swap.";
    }
    leaf vlan-value {
        type eth-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";

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```

        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 ' +
vlan"'
                    {
                        error-message
                            "
                                When matching
                                specified and
                                outermost tag

                                ";
                        description
                            "
                                For IEEE 802.1Q
                                tags, it is
                                and is an S-
                                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
        by the VLAN classification and
        eth-t-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 eth-t-svc-instance_config {

```

description

"Configuraiton parameters for Ethernet services.";

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```
    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 transport 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>

            ID-draft editor:
                Italo Busi (italo.busi@huawei.com);
                Aihua Guo (aihuaguo@huawei.com);
                Haomian Zheng (zhenghaomian@huawei.com)
        ";

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

    revision 2017-09-12 {
        description
            "Updated 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

non overlapping range 1 to 4094, and included in the list in ascending order.

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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"'

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```

        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 that 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 independently.

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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12. References

12.1. Normative References

[I-D.ietf-ccamp-otn-topo-yang]
zhenghaomian@huawei.com, z., Fan, Z., Sharma, A., Liu, X.,
Belotti, S., Xu, Y., Wang, L., and O. Dios, "A YANG Data
Model for Optical Transport Network Topology", [draft-ietf-
ccamp-otn-topo-yang-01](#) (work in progress), September 2017.

[I-D.ietf-ccamp-otn-tunnel-model]
zhenghaomian@huawei.com, z., Fan, Z., Sharma, A., Rao, R.,
Belotti, S., Lopezalvarez, V., and Y. Li, "OTN Tunnel YANG
Model", [draft-ietf-ccamp-otn-tunnel-model-00](#) (work in
progress), July 2017.

[I-D.ietf-teas-yang-te-topo]
Liu, X., Bryskin, I., Beeram, V., Saad, T., Shah, H., and
O. Dios, "YANG Data Model for TE Topologies", [draft-ietf-
teas-yang-te-topo-12](#) (work in progress), July 2017.

[RFC6241] Enns, R., Ed., Bjorklund, M., Ed., Schoenwaelder, J., Ed.,
and A. Bierman, Ed., "Network Configuration Protocol
(NETCONF)", [RFC 6241](#), DOI 10.17487/RFC6241, June 2011,
<<http://www.rfc-editor.org/info/rfc6241>>.

- [RFC7139] Zhang, F., Ed., Zhang, G., Belotti, S., Ceccarelli, D., and K. Pithewan, "GMPLS Signaling Extensions for Control of Evolving G.709 Optical Transport Networks", [RFC 7139](#), DOI 10.17487/RFC7139, March 2014, <<https://www.rfc-editor.org/info/rfc7139>>.
- [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>>.
- [RFC8040] Bierman, A., Bjorklund, M., and K. Watsen, "RESTCONF Protocol", [RFC 8040](#), DOI 10.17487/RFC8040, January 2017, <<https://www.rfc-editor.org/info/rfc8040>>.

12.2. Informative References

- [I-D.ietf-netmod-yang-tree-diagrams]
Bjorklund, M. and L. Berger, "YANG Tree Diagrams", [draft-ietf-netmod-yang-tree-diagrams-01](#) (work in progress), June 2017.
- [I-D.zhang-teas-transport-service-model]
Zhang, X. and J. Ryoo, "A Service YANG Model for Connection-oriented Transport Networks", [draft-zhang-teas-transport-service-model-01](#) (work in progress), October 2016.
- [RFC7062] Zhang, F., Ed., Li, D., Li, H., Belotti, S., and D. Ceccarelli, "Framework for GMPLS and PCE Control of G.709 Optical Transport Networks", [RFC 7062](#), DOI 10.17487/RFC7062, November 2013, <<https://www.rfc-editor.org/info/rfc7062>>.

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