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**A YANG Data Model for Client-layer Topology
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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.

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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 either applications exposing to a network controller or among controllers. 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 [[RFC8340](#)]. 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. YANG Model for Topology of Client Layer

3.1. YANG Tree for Ethernet Topology

```

module: ietf-eth-te-topology
  augment /nw:networks/nw:network/nw:network-types/tet:te-topology:
    +--rw eth-tran-topology!
  augment /nw:networks/nw:network/nw:node/nt:termination-point:
    +--rw ltp-mac-address?          yang:mac-address
    +--rw port-vlan-id?            etht-types:vlanid
    +--rw maximum-frame-size?     uint16
    +--rw (direction)?
      | +--:(symmetrical)
      | | +--rw ingress-egress-bandwidth-profile
      | |   +--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
      | +--:(asymmetrical)

```

```

|     +--rw ingress-bandwidth-profile
|     |     +--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 egress-bandwidth-profile
|     |     +--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 svc!
  +--rw client-facing?                      boolean
  +--rw supported-classification
  |   +--rw transparent?                    boolean
  |   +--rw port-classification?          boolean
  |   +--rw vlan-classification
  |   |   +--rw vlan-tag-classification?    boolean
  |   |   +--rw outer-tag
  |   |   |   +--rw supported-tag-types*    etht-types:eth-tag-classify
  |   |   |   +--rw vlan-bundling?         boolean
  |   |   |   +--rw vlan-range?           etht-types:vid-range-type
  |   |   +--rw second-tag
  |   |   |   +--rw second-tag-classification?    boolean
  |   |   |   +--rw supported-tag-types*          etht-types:eth-tag-classify
  |   |   |   +--rw vlan-bundling?                boolean
  |   |   |   +--rw vlan-range?                    etht-types:vid-range-type
  +--rw supported-vlan-operations
  |   +--rw asymmetrical-operations?        boolean
  |   +--rw transparent-vlan-operations?    boolean
  |   +--rw vlan-pop
  |   |   +--rw vlan-pop-operations?        boolean
  |   |   +--rw max-pop-tags?              uint8
  |   +--rw vlan-push
  |   |   +--rw vlan-push-operation?        boolean
  |   |   +--rw outer-tag
  |   |   |   +--rw supported-tag-types*    etht-types:eth-tag-type
  |   |   |   +--rw vlan-range?           etht-types:vid-range-type
  |   |   +--rw second-tag
  |   |   |   +--rw push-second-tag?        boolean
  |   |   |   +--rw supported-tag-types*    etht-types:eth-tag-type

```

```

        +--rw vlan-range?          etht-types:vid-range-type
augment /nw:networks/nw:network/nw:node/nt:termination-point/tet:te
  /tet:interface-switching-capability/tet:max-lsp-bandwidth
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?   uint64
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
  /tet:connectivity-matrices/tet:path-constraints
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?   uint64
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
  /tet:connectivity-matrices/tet:connectivity-matrix
  /tet:path-constraints/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?   uint64
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:path-constraints
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--ro eth-bandwidth?   uint64
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix
  /tet:path-constraints/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--ro eth-bandwidth?   uint64
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:client-layer-adaptation/tet:switching-capability
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?   uint64
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:path-constraints
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?   uint64
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:path-constraints/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?   uint64
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
  /tet:interface-switching-capability/tet:max-lsp-bandwidth
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?   uint64
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
  /tet:max-link-bandwidth/tet:te-bandwidth/tet:technology:

```

```

+--:(eth)
  +--rw eth-bandwidth?  uint64
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
  /tet:max-resv-link-bandwidth/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?  uint64
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
  /tet:unreserved-bandwidth/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?  uint64
augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-entry
  /tet:interface-switching-capability/tet:max-lsp-bandwidth
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--ro eth-bandwidth?  uint64
augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-entry
  /tet:max-link-bandwidth/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--ro eth-bandwidth?  uint64
augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-entry
  /tet:max-resv-link-bandwidth/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--ro eth-bandwidth?  uint64
augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-entry
  /tet:unreserved-bandwidth/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--ro eth-bandwidth?  uint64
augment /nw:networks/tet:te/tet:templates/tet:link-template
  /tet:te-link-attributes/tet:interface-switching-capability
  /tet:max-lsp-bandwidth/tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?  uint64
augment /nw:networks/tet:te/tet:templates/tet:link-template
  /tet:te-link-attributes/tet:max-link-bandwidth
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?  uint64
augment /nw:networks/tet:te/tet:templates/tet:link-template
  /tet:te-link-attributes/tet:max-resv-link-bandwidth
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?  uint64
augment /nw:networks/tet:te/tet:templates/tet:link-template
  /tet:te-link-attributes/tet:unreserved-bandwidth
  /tet:te-bandwidth/tet:technology:
+--:(eth)
  +--rw eth-bandwidth?  uint64
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes

```

```

        /tet:connectivity-matrices/tet:label-restrictions
        /tet:label-restriction:
    +--rw tag-type?   etht-types:eth-tag-type
    +--rw priority?   uint8
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
        /tet:connectivity-matrices/tet:label-restrictions
        /tet:label-restriction/tet:label-start/tet:te-label/tet:technology:
    +--:(eth)
        +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
        /tet:connectivity-matrices/tet:label-restrictions
        /tet:label-restriction/tet:label-end/tet:te-label/tet:technology:
    +--:(eth)
        +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
        /tet:connectivity-matrices/tet:label-restrictions
        /tet:label-restriction/tet:label-step/tet:technology:
    +--:(eth)
        +--rw eth-step?   uint16
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
        /tet:connectivity-matrices/tet:underlay/tet:primary-path
        /tet:path-element/tet:type/tet:label/tet:label-hop
        /tet:te-label/tet:technology:
    +--:(eth)
        +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
        /tet:connectivity-matrices/tet:underlay/tet:backup-path
        /tet:path-element/tet:type/tet:label/tet:label-hop
        /tet:te-label/tet:technology:
    +--:(eth)
        +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
        /tet:connectivity-matrices/tet:optimizations/tet:algorithm
        /tet:metric/tet:optimization-metric
        /tet:explicit-route-exclude-objects/tet:route-object-exclude-object
        /tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology:
    +--:(eth)
        +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
        /tet:connectivity-matrices/tet:optimizations/tet:algorithm
        /tet:metric/tet:optimization-metric
        /tet:explicit-route-include-objects/tet:route-object-include-object
        /tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology:
    +--:(eth)
        +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
        /tet:connectivity-matrices/tet:path-properties
        /tet:path-route-objects/tet:path-route-object/tet:type/tet:label

```

```

        /tet:label-hop/tet:te-label/tet:technology:
    +--:(eth)
      +--ro vlanid?   etht-types:vlanid
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
      /tet:connectivity-matrices/tet:connectivity-matrix/tet:from
      /tet:label-restrictions/tet:label-restriction:
    +--rw tag-type?   etht-types:eth-tag-type
    +--rw priority?   uint8
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
      /tet:connectivity-matrices/tet:connectivity-matrix/tet:from
      /tet:label-restrictions/tet:label-restriction/tet:label-start
      /tet:te-label/tet:technology:
    +--:(eth)
      +--rw vlanid?   etht-types:vlanid
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
      /tet:connectivity-matrices/tet:connectivity-matrix/tet:from
      /tet:label-restrictions/tet:label-restriction/tet:label-end
      /tet:te-label/tet:technology:
    +--:(eth)
      +--rw vlanid?   etht-types:vlanid
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
      /tet:connectivity-matrices/tet:connectivity-matrix/tet:from
      /tet:label-restrictions/tet:label-restriction/tet:label-step
      /tet:technology:
    +--:(eth)
      +--rw eth-step?  uint16
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
      /tet:connectivity-matrices/tet:connectivity-matrix/tet:to
      /tet:label-restrictions/tet:label-restriction:
    +--rw tag-type?   etht-types:eth-tag-type
    +--rw priority?   uint8
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
      /tet:connectivity-matrices/tet:connectivity-matrix/tet:to
      /tet:label-restrictions/tet:label-restriction
      /tet:label-start/tet:te-label/tet:technology:
    +--:(eth)
      +--rw vlanid?   etht-types:vlanid
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
      /tet:connectivity-matrices/tet:connectivity-matrix/tet:to
      /tet:label-restrictions/tet:label-restriction/tet:label-end
      /tet:te-label/tet:technology:
    +--:(eth)
      +--rw vlanid?   etht-types:vlanid
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
      /tet:connectivity-matrices/tet:connectivity-matrix/tet:to
      /tet:label-restrictions/tet:label-restriction
      /tet:label-step/tet:technology:
    +--:(eth)

```



```

    +--rw eth-step?   uint16
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:underlay
  /tet:primary-path/tet:path-element/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?    etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:underlay
  /tet:backup-path/tet:path-element/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?    etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
  /tet:connectivity-matrices/tet:connectivity-matrix
  /tet:optimizations/tet:algorithm/tet:metric
  /tet:optimization-metric/tet:explicit-route-exclude-objects
  /tet:route-object-exclude-object/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?    etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
  /tet:connectivity-matrices/tet:connectivity-matrix
  /tet:optimizations/tet:algorithm/tet:metric
  /tet:optimization-metric/tet:explicit-route-include-objects
  /tet:route-object-include-object/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?    etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes
  /tet:connectivity-matrices/tet:connectivity-matrix
  /tet:path-properties/tet:path-route-objects/tet:path-route-object
  /tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?    etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:label-restrictions
  /tet:label-restriction:
  +--ro tag-type?  etht-types:eth-tag-type
  +--ro priority?  uint8
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:label-restrictions
  /tet:label-restriction/tet:label-start/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?    etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:label-restrictions
  /tet:label-restriction/tet:label-end/tet:te-label/tet:technology:

```

```

+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:label-restrictions
  /tet:label-restriction/tet:label-step/tet:technology:
+--:(eth)
  +--ro eth-step?  uint16
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:underlay/tet:primary-path
  /tet:path-element/tet:type/tet:label/tet:label-hop
  /tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:underlay/tet:backup-path
  /tet:path-element/tet:type/tet:label/tet:label-hop
  /tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:optimizations/tet:algorithm/tet:metric
  /tet:optimization-metric/tet:explicit-route-exclude-objects
  /tet:route-object-exclude-object/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:optimizations/tet:algorithm/tet:metric
  /tet:optimization-metric/tet:explicit-route-include-objects
  /tet:route-object-include-object/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:path-properties/tet:path-route-objects
  /tet:path-route-object/tet:type/tet:label/tet:label-hop
  /tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:from
  /tet:label-restrictions/tet:label-restriction:
  +--ro tag-type?  etht-types:eth-tag-type
  +--ro priority?  uint8
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:from
  /tet:label-restrictions/tet:label-restriction/tet:label-start
  /tet:te-label/tet:technology:

```

```

+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:from
  /tet:label-restrictions/tet:label-restriction/tet:label-end
  /tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:from
  /tet:label-restrictions/tet:label-restriction/tet:label-step
  /tet:technology:
+--:(eth)
  +--ro eth-step?  uint16
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:to
  /tet:label-restrictions/tet:label-restriction:
  +--ro tag-type?  etht-types:eth-tag-type
  +--ro priority?  uint8
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:to
  /tet:label-restrictions/tet:label-restriction/tet:label-start
  /tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:to
  /tet:label-restrictions/tet:label-restriction/tet:label-end
  /tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:to
  /tet:label-restrictions/tet:label-restriction/tet:label-step
  /tet:technology:
+--:(eth)
  +--ro eth-step?  uint16
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:underlay
  /tet:primary-path/tet:path-element/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:underlay
  /tet:backup-path/tet:path-element/tet:type/tet:label/tet:label-hop
  /tet:te-label/tet:technology:
+--:(eth)

```

```

    +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:optimizations
  /tet:algorithm/tet:metric/tet:optimization-metric
  /tet:explicit-route-exclude-objects/tet:route-object-exclude-object
  /tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:optimizations
  /tet:algorithm/tet:metric/tet:optimization-metric
  /tet:explicit-route-include-objects/tet:route-object-include-object
  /tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-entry
  /tet:connectivity-matrices/tet:connectivity-matrix/tet:path-
properties
  /tet:path-route-objects/tet:path-route-object/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:label-restrictions
  /tet:label-restriction:
  +--rw tag-type?  etht-types:eth-tag-type
  +--rw priority?  uint8
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:label-restrictions
  /tet:label-restriction/tet:label-start/tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:label-restrictions
  /tet:label-restriction/tet:label-end/tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:label-restrictions
  /tet:label-restriction/tet:label-step/tet:technology:
+--:(eth)
  +--rw eth-step?  uint16
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:underlay/tet:primary-path
  /tet:path-element/tet:type/tet:label/tet:label-hop/tet:te-label
  /tet:technology:
+--:(eth)
  +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point

```

```

    /tet:local-link-connectivities/tet:underlay/tet:backup-path
    /tet:path-element/tet:type/tet:label/tet:label-hop/tet:te-label
    /tet:technology:
+--:(eth)
  +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:optimizations/tet:algorithm
  /tet:metric/tet:optimization-metric/tet:explicit-route-exclude-
objects
  /tet:route-object-exclude-object/tet:type/tet:label/tet:label-hop
  /tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:optimizations/tet:algorithm
  /tet:metric/tet:optimization-metric/tet:explicit-route-include-
objects
  /tet:route-object-include-object/tet:type/tet:label/tet:label-hop
  /tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:path-properties
  /tet:path-route-objects/tet:path-route-object/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
+--:(eth)
  +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:label-restrictions/tet:label-restriction:
  +--rw tag-type? etht-types:eth-tag-type
  +--rw priority? uint8
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:label-restrictions/tet:label-restriction/tet:label-start
  /tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:label-restrictions/tet:label-restriction/tet:label-end
  /tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:label-restrictions/tet:label-restriction/tet:label-step
  /tet:technology:
+--:(eth)
  +--rw eth-step? uint16

```



```

augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:underlay/tet:primary-path/tet:path-element/tet:type
  /tet:label/tet:label-hop/tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:underlay/tet:backup-path/tet:path-element/tet:type/tet:label
  /tet:label-hop/tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:optimizations/tet:algorithm/tet:metric/tet:optimization-metric
  /tet:explicit-route-exclude-objects/tet:route-object-exclude-object
  /tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:optimizations/tet:algorithm/tet:metric/tet:optimization-metric
  /tet:explicit-route-include-objects/tet:route-object-include-object
  /tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point
  /tet:local-link-connectivities/tet:local-link-connectivity
  /tet:path-properties/tet:path-route-objects/tet:path-route-object
  /tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology:
  +--:(eth)
    +--ro vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
  /tet:underlay/tet:primary-path/tet:path-element/tet:type
  /tet:label/tet:label-hop/tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
  /tet:underlay/tet:backup-path/tet:path-element/tet:type
  /tet:label/tet:label-hop/tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
  /tet:label-restrictions/tet:label-restriction:
  +--rw tag-type?   etht-types:eth-tag-type
  +--rw priority?   uint8
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
  /tet:label-restrictions/tet:label-restriction/tet:label-start

```

```

    /tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
  augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
    /tet:label-restrictions/tet:label-restriction/tet:label-end
    /tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
  augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
    /tet:label-restrictions/tet:label-restriction/tet:label-step
    /tet:technology:
  +--:(eth)
    +--rw eth-step? uint16
  augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-entry
    /tet:label-restrictions/tet:label-restriction:
  +--ro tag-type?   etht-types:eth-tag-type
  +--ro priority?   uint8
  augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-entry
    /tet:label-restrictions/tet:label-restriction/tet:label-start
    /tet:te-label/tet:technology:
  +--:(eth)
    +--ro vlanid?   etht-types:vlanid
  augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-entry
    /tet:label-restrictions/tet:label-restriction/tet:label-end
    /tet:te-label/tet:technology:
  +--:(eth)
    +--ro vlanid?   etht-types:vlanid
  augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-entry
    /tet:label-restrictions/tet:label-restriction/tet:label-step
    /tet:technology:
  +--:(eth)
    +--ro eth-step? uint16
  augment /nw:networks/tet:te/tet:templates/tet:link-template
    /tet:te-link-attributes/tet:underlay/tet:primary-path
    /tet:path-element/tet:type/tet:label/tet:label-hop
    /tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
  augment /nw:networks/tet:te/tet:templates/tet:link-template
    /tet:te-link-attributes/tet:underlay/tet:backup-path
    /tet:path-element/tet:type/tet:label/tet:label-hop
    /tet:te-label/tet:technology:
  +--:(eth)
    +--rw vlanid?   etht-types:vlanid
  augment /nw:networks/tet:te/tet:templates/tet:link-template
    /tet:te-link-attributes/tet:label-restrictions
    /tet:label-restriction:
  +--rw tag-type?   etht-types:eth-tag-type

```



```

+--rw priority?  uint8
augment /nw:networks/tet:te/tet:templates/tet:link-template
  /tet:te-link-attributes/tet:label-restrictions
  /tet:label-restriction/tet:label-start/tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?  etht-types:vlanid
augment /nw:networks/tet:te/tet:templates/tet:link-template
  /tet:te-link-attributes/tet:label-restrictions
  /tet:label-restriction/tet:label-end/tet:te-label/tet:technology:
+--:(eth)
  +--rw vlanid?  etht-types:vlanid
augment /nw:networks/tet:te/tet:templates/tet:link-template
  /tet:te-link-attributes/tet:label-restrictions
  /tet:label-restriction/tet:label-step/tet:technology:
+--:(eth)
  +--rw eth-step?  uint16

```

[4. YANG Code for Topology Client Layer](#)

[4.1. The ETH Topology YANG Code](#)

<CODE BEGINS> file "ietf-eth-te-topology@2019-03-01.yang"

```

module ietf-eth-te-topology {
//      yang-version 1.1;

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

      prefix "ethtetopo";

      import ietf-network {
          prefix "nw";
      }

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

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

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

```

```
import ietf-eth-tran-types {
    prefix "eth-t-types";
}

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

    ID-draft editor:
    Haomian Zheng (zhenghaomian@huawei.com);
    Italo Busi (italo.busi@huawei.com);
    Aihua Guo (aihuaguo@huawei.com);
    Yunbin Xu (xuyunbin@ritt.cn);
    Yang Zhao (zhaoyangy@chinamobile.com);
    Xufeng Liu (Xufeng_Liu@jabil.com);
";

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

revision 2019-03-01 {
    description
        "Updated version to align with TE topology";
    reference
        "draft-zheng-ccamp-client-topo-yang";
}

/*
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 ltp-bandwidth-profiles {
    description
        "A grouping which represents the bandwidth profile(s)
for the ETH LTP.";
```



```

        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.";
                container ingress-egress-bandwidth-profile {
                    description
                        "The bandwidth profile used in
the ingress and egress direction.";
                    uses etht-types:etht-bandwidth-
profiles;
                }
            }
            case asymmetrical {
                description
                    "Different ingress and egress bandwidth
profiles
                    can be specified.";
                container ingress-bandwidth-profile {
                    description
                        "The bandwidth profile used in
the ingress direction.";
                    uses etht-types:etht-bandwidth-
profiles;
                }
                container egress-bandwidth-profile {
                    description
                        "The bandwidth profile used in
the egress direction.";
                    uses etht-types:etht-bandwidth-
profiles;
                }
            }
        }
    }

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

        /*
        Open Issue: should we remove this attribute (duplicates
with I2RS L2 attributes)?
        */
        leaf ltp-mac-address {
            type yang:mac-address;
            description "the MAC address of the LTP.";
        }
    }

```

```
    }  
    /*  
    Open Issue: should we remove this attribute (duplicates  
with I2RS L2 attributes)?  
    */  
    leaf port-vlan-id {
```

```

        type etht-types:vlanid;
        description "the port VLAN ID of the LTP.";
    }
    /*
    Open Issue: should we remove this attribute (duplicates
with I2RS L2 attributes)?
    */
    leaf maximum-frame-size {
        type uint16 {
            range "64 .. 65535";
        }
        description
            "Maximum frame size";
    }
    uses ltp-bandwidth-profiles;
}

grouping svc-vlan-classification {
    description
        "Grouping defining the capabilities for VLAN
classification.";

    leaf-list supported-tag-types {
        type etht-types:eth-tag-classify;
        description
            "List of VLAN tag types that can be used for
the VLAN classification.
            In case VLAN classification is not supported,
the list is empty.";
    }
    leaf vlan-bundling {
        type boolean;
        description
            "In case VLAN classification is supported,
indicates whether VLAN bundling classification is also supported.";
    }
    leaf vlan-range {
        type etht-types:vid-range-type;
        description
            "In case VLAN classification is supported,
indicates the of available VLAN ID values.";
    }
}

grouping svc-vlan-push {
    description
        "Grouping defining the capabilities for VLAN push or
swap operations.";

    leaf-list supported-tag-types {
        type etht-types:eth-tag-type;
        description
            "List of VLAN tag types that can be used to

```

push or swap a VLAN tag.

```
list is empty.";  
    }
```

In case VLAN push/swap is not supported, the

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```
        leaf vlan-range {
            type eth-types:vid-range-type;
            description
                "In case VLAN push/swap operation is supported,
the range of available VLAN ID values.";
        }
    }

    grouping eth-ltp-svc-attributes {
        description
            "Ethernet link termination point (LTP) service
attributes.";

        leaf client-facing {
            type boolean;
            description
                "indicates whether this LTP is a client-facing
ltp.";
        }

        container supported-classification {
            description
                "Service classification capabilities supported
by the ETH LTP.";

            leaf transparent{
                type boolean;
                description
                    "Indicates that the ETH LTP support
transparent ETH client service.";
            }

            leaf port-classification {
                type boolean;
                description
                    "Indicates that the ETH LTP support
port-based service classification.";
            }

            container vlan-classification {
                description
                    "Service classification capabilities
based on the VLAN tag(s)
supported by the ETH LTP.";

                leaf vlan-tag-classification {
                    type boolean;
                    description
                        "Indicates that the ETH LTP
supports VLAN service classification.";
                }

                container outer-tag {
                    description
                        "Service classification
capabilities based on the outer VLAN tag,
supported by the ETH LTP.";
                }
            }
        }
    }
}
```



```
        uses svc-vlan-classification;
    }
    container second-tag {
        description
```

```

capabilities based on the second VLAN tag,
/*
second-tag-classification can be True only if
also True.
*/
leaf second-tag-classification {
    type boolean;
    description
        "Service classification
        supported by the ETH LTP.";
        Open issue: indicates that
        outer-tag-classification is
        "Indicates that the ETH
        based on the second
LTP support VLAN service classification
VLAN tag.";
}
uses svc-vlan-classification;
}
}

container supported-vlan-operations {
    description
        "Description.";
    leaf asymmetrical-operations {
        type boolean;
        description
            "Indicates whether the ETH LTP supports
            also asymmetrical VLAN operations.
            It is assumed that symmetrical VLAN
            operations are always supported.";
    }
    leaf transparent-vlan-operations {
        type boolean;
        description
            "Indicates that the ETH LTP supports
transparent operations.";
    }
    container vlan-pop {
        description
            "Indicates VLAN pop or swap operations
capabilities.";
        leaf vlan-pop-operations {
            type boolean;
            description
                "Indicates that the ETH LTP
supports VLAN pop or swap operations.";
        }
        leaf max-pop-tags {
            type uint8 {
                range "1..2";
            }
        }
    }
}

```

```
    }
    description
    "Indicates the maximum number
of tags that can be popped/swapped.";
    }
}
```

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```

        container vlan-push {
            description
                "Indicates VLAN push or swap operations
capabilities.";

            leaf vlan-push-operation {
                type boolean;
                description
                    "Indicates that the ETH LTP
supports VLAN push or swap operations.";
            }
            container outer-tag {
                description
                    "Indicates the supported VLAN
operation capabilities on the outer VLAN tag.";
                uses svc-vlan-push;
            }
            container second-tag {
                description
                    "Indicates the supported VLAN
operation capabilities on the second VLAN tag.";

                leaf push-second-tag {
                    type boolean;
                    description
                        "Indicates that the ETH
LTP supports VLAN push or swap operations
tag.";
                        for the second VLAN
                }
                uses svc-vlan-push;
            }
        }
    }
}

/*
Data nodes
*/

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

    uses eth-tran-topology-type;
}

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

```

```
}  
description  
    "Augment ETH LTP attributes";
```

```

        uses eth-ltp-attributes;
        container svc {
            presence "client-facing LTP.";

            description
                "ETH LTP Service attributes.";
            uses eth-ltp-svc-attributes;
        }
    }
}

/*
 * Augment TE bandwidth
 */

/* Augment maximum LSP bandwidth of link terminationpoint (LTP) */
augment "/nw:networks/nw:network/nw:node/nt:termination-point/"
    + "tet:te/"
    + "tet:interface-switching-capability/tet:max-lsp-bandwidth/"
    + "tet:te-bandwidth/tet:technology" {
    when "../..../nw:network-types/tet:te-topology/"
        + "ethtetopo:eth-tran-topology" {
        description "Augment Ethernet TE bandwidth";
    }
    description "Ethernet bandwidth.";
    case eth {
        uses etht-types:eth-bandwidth;
    }
}

/* Augment bandwidth path constraints of connectivity-matrices */
augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:te-node-attributes/tet:connectivity-matrices/"
    + "tet:path-constraints/tet:te-bandwidth/tet:technology" {
    when "../..../nw:network-types/tet:te-topology/"
        + "ethtetopo:eth-tran-topology" {
        description "Augment Ethernet TE bandwidth";
    }
    description "Ethernet bandwidth.";
    case eth {
        uses etht-types:eth-bandwidth;
    }
}

/* Augment bandwidth path constraints of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:te-node-attributes/tet:connectivity-matrices/"
    + "tet:connectivity-matrix/"
    + "tet:path-constraints/tet:te-bandwidth/tet:technology" {
    when "../..../nw:network-types/tet:te-topology/"

```

```
    + "ethtetopo:eth-tran-topology" {
      description "Augment Ethernet TE bandwidth";
    }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/* Augment bandwidth path constraints of connectivity-matrices information-
source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/tet:connectivity-matrices/"
  + "tet:path-constraints/tet:te-bandwidth/tet:technology" {
  when "../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment Ethernet TE bandwidth";
  }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/* Augment bandwidth path constraints of connectivity-matrix information-
source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/"
  + "tet:path-constraints/tet:te-bandwidth/tet:technology" {
  when "../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment Ethernet TE bandwidth";
  }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/* Augment client bandwidth of tunnel termination point (TTP) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:client-layer-adaptation/tet:switching-capability/"
  + "tet:te-bandwidth/tet:technology" {
  when "../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment Ethernet TE bandwidth";
  }
  description "Ethernet bandwidth.";
}
```



```
    case eth {
      uses etht-types:eth-bandwidth;
    }
  }

/* Augment bandwidth path constraints of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/tet:path-constraints/"
  + "tet:te-bandwidth/tet:technology" {
  when "../..../..../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment Ethernet TE bandwidth";
  }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/* Augment bandwidth path constraints of local-link-connectivity (LLC) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:local-link-connectivity/tet:path-constraints/"
  + "tet:te-bandwidth/tet:technology" {
  when "../..../..../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment Ethernet TE bandwidth";
  }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/* Augment maximum LSP bandwidth of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:te-link-attributes/"
  + "tet:interface-switching-capability/tet:max-lsp-bandwidth/"
  + "tet:te-bandwidth/tet:technology" {
  when "../..../..../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
  }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}
```

```
    }
  }

/* Augment maximum bandwidth of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:te-link-attributes/"
  + "tet:max-link-bandwidth/"
  + "tet:te-bandwidth/tet:technology" {
  when "../..../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
  }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/* Augment maximum reservable bandwidth of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:te-link-attributes/"
  + "tet:max-resv-link-bandwidth/"
  + "tet:te-bandwidth/tet:technology" {
  when "../..../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
  }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/* Augment unreserved bandwidth of TE Link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:te-link-attributes/"
  + "tet:unreserved-bandwidth/"
  + "tet:te-bandwidth/tet:technology" {
  when "../..../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
  }
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}
/* Augment maximum LSP bandwidth of TE link information-source */
```



```
        + "tet:unreserved-bandwidth/"
        + "tet:te-bandwidth/tet:technology" {
when "../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
}
description "Ethernet bandwidth.";
case eth {
    uses etht-types:eth-bandwidth;
}
}

/* Augment maximum LSP bandwidth of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
    + "tet:link-template/tet:te-link-attributes/"
    + "tet:interface-switching-capability/"
    + "tet:max-lsp-bandwidth/"
    + "tet:te-bandwidth/tet:technology" {
/*
when "../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
}
*/
description "Ethernet bandwidth.";
case eth {
    uses etht-types:eth-bandwidth;
}
}

/* Augment maximum bandwidth of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
    + "tet:link-template/tet:te-link-attributes/"
    + "tet:max-link-bandwidth/"
    + "tet:te-bandwidth/tet:technology" {
/*
when "../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
}
*/
description "Ethernet bandwidth.";
case eth {
    uses etht-types:eth-bandwidth;
}
}

/* Augment maximum reservable bandwidth of TE link template */
```

```

augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes/"
  + "tet:max-resv-link-bandwidth/"
  + "tet:te-bandwidth/tet:technology" {
/*
  when "../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
  }
*/
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/* Augment unreserved bandwidth of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes/"
  + "tet:unreserved-bandwidth/"
  + "tet:te-bandwidth/tet:technology" {
/*
  when "../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Ethernet TE bandwidth.";
  }
*/
  description "Ethernet bandwidth.";
  case eth {
    uses etht-types:eth-bandwidth;
  }
}

/*
* Augment TE label.
*/

/* Augment label restrictions of connectivity-matrices */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:label-restrictions/tet:label-restriction" {
  when "../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
  description "Ethernet label restriction.";
  uses etht-types:eth-label-restriction;
}

```



```

    + "tet:underlay/tet:primary-path/tet:path-element/"
    + "tet:type/tet:label/tet:label-hop/"
    + "tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
    }
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}
/* Augment label hop of underlay backup path of connectivity-matrices */
augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:te-node-attributes/tet:connectivity-matrices/"
    + "tet:underlay/tet:backup-path/tet:path-element/"
    + "tet:type/tet:label/tet:label-hop/"
    + "tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
    }
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}
/* Augment label hop of route-exclude of connectivity-matrices */
augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:te-node-attributes/tet:connectivity-matrices/"
    + "tet:optimizations/tet:algorithm/tet:metric/"
    + "tet:optimization-metric/"
    + "tet:explicit-route-exclude-objects/"
    + "tet:route-object-exclude-object/"
    + "tet:type/tet:label/tet:label-hop/"
    + "tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
    }
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}

```

```

}

/* Augment label hop of route-include of connectivity-matrices (added) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:optimizations/tet:algorithm/tet:metric/"
  + "tet:optimization-metric/"
  + "tet:explicit-route-include-objects/"
  + "tet:route-object-include-object/"
  + "tet:type/tet:label/tet:label-hop/"
  + "tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of path-route of connectivity-matrices */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:path-properties/tet:path-route-objects/"
  + "tet:path-route-object/tet:type/tet:label/tet:label-hop/"
  + "tet:te-label/tet:technology"{
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment ingress label restrictions of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/tet:from/"
  + "tet:label-restrictions/tet:label-restriction" {
when "../../../../../../../../../../../nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
}

```



```
description "Ethernet label.";
uses etht-types:eth-label-restriction;
}

/* Augment ingress label restrictions start of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/tet:from/"
  + "tet:label-restrictions/tet:label-restriction/tet:label-start/"
  + "tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment ingress label restrictions end of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/tet:from/"
  + "tet:label-restrictions/tet:label-restriction/tet:label-end/"
  + "tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment ingress label restrictions step of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/tet:from/"
  + "tet:label-restrictions/tet:label-restriction/tet:label-step/"
  + "tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
```



```
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment egress label restrictions step of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/tet:to/"
  + "tet:label-restrictions/tet:label-restriction/tet:label-step/"
  + "tet:technology" {
when "../../../../../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label-step;
}
}

/* Augment label hop of underlay primary path of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/"
  + "tet:underlay/tet:primary-path/tet:path-element/"
  + "tet:type/tet:label/tet:label-hop/"
  + "tet:te-label/tet:technology" {
when "../../../../../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of underlay backup path of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/"
  + "tet:underlay/tet:backup-path/tet:path-element/"
  + "tet:type/tet:label/tet:label-hop/"
  + "tet:te-label/tet:technology" {
```

```

when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of route-exclude of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/tet:optimizations/"
  + "tet:algorithm/tet:metric/tet:optimization-metric/"
  + "tet:explicit-route-exclude-objects/"
  + "tet:route-object-exclude-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of route-include of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/tet:optimizations/"
  + "tet:algorithm/tet:metric/tet:optimization-metric/"
  + "tet:explicit-route-include-objects/"
  + "tet:route-object-include-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}
}

```

```

/* Augment label hop of path-route of connectivity-matrix */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/"
  + "tet:path-properties/tet:path-route-objects/"
  + "tet:path-route-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label restrictions of connectivity-matrices information-source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/"
  + "tet:connectivity-matrices/tet:label-restrictions/tet:label-
restriction" {
  when "../../../../../../../nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
uses etht-types:eth-label-restriction;
}

/* Augment label restrictions start of connectivity-matrices information-
source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/"
  + "tet:connectivity-matrices/tet:label-restrictions/tet:label-
restriction/"
  + "tet:label-start/tet:te-label/tet:technology" {
when "../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label restrictions end of connectivity-matrices information-source
*/
augment "/nw:networks/nw:network/nw:node/tet:te/"

```



```

    + "tet:information-source-entry/"
    + "tet:connectivity-matrices/tet:label-restrictions/tet:label-
restriction/"
    + "tet:label-end/tet:te-label/tet:technology" {
when "../.../.../.../.../.../.../.../.../.../..."
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}
}

/* Augment label restrictions step of connectivity-matrices information-
source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:information-source-entry/"
    + "tet:connectivity-matrices/tet:label-restrictions/tet:label-
restriction/"
    + "tet:label-step/tet:technology" {
when "../.../.../.../.../.../.../.../.../..."
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
    uses etht-types:eth-label-step;
}
}
}

/* Augment label hop of underlay primary path of connectivity-matrices
information-source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:information-source-entry/tet:connectivity-matrices/"
    + "tet:underlay/tet:primary-path/tet:path-element/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../.../.../.../.../.../.../.../.../..."
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}
}

/* Augment label hop of underlay backup path of connectivity-matrices
information-source */
augment "/nw:networks/nw:network/nw:node/tet:te/"

```



```

    + "tet:information-source-entry/tet:connectivity-matrices/"
    + "tet:underlay/tet:backup-path/tet:path-element/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
    }
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}
}

```

/* Augment label hop of route-exclude of connectivity-matrices information-source */

```

augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:information-source-entry/tet:connectivity-matrices/"
    + "tet:optimizations/tet:algorithm/tet:metric/"
    + "tet:optimization-metric/"
    + "tet:explicit-route-exclude-objects/"
    + "tet:route-object-exclude-object/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
    }
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}
}

```

/* Augment label hop of route-include of connectivity-matrices information-source */

```

augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:information-source-entry/tet:connectivity-matrices/"
    + "tet:optimizations/tet:algorithm/tet:metric/"
    + "tet:optimization-metric/"
    + "tet:explicit-route-include-objects/"
    + "tet:route-object-include-object/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
    }
description "Ethernet label.";
case eth {

```



```
    uses etht-types:eth-label;
  }
}

/* Augment label hop of path-route of connectivity-matrices information-
source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/tet:connectivity-matrices/"
  + "tet:path-properties/tet:path-route-objects/"
  + "tet:path-route-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment ingress label restrictions of connectivity-matrix information-
source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/"
  + "tet:from/tet:label-restrictions/tet:label-restriction" {
when "../../../../../../../nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
uses etht-types:eth-label-restriction;
}

/* Augment ingress label restrictions start of connectivity-matrix
information-source */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/"
  + "tet:from/tet:label-restrictions/tet:label-restriction/"
  + "tet:label-start/tet:te-label/tet:technology" {
when "../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
```



```
    }  
  }
```

```
/* Augment ingress label restrictions end of connectivity-matrix information-  
source */
```

```
augment "/nw:networks/nw:network/nw:node/tet:te/"  
  + "tet:information-source-entry/tet:connectivity-matrices/"  
  + "tet:connectivity-matrix/"  
  + "tet:from/tet:label-restrictions/tet:label-restriction/"  
  + "tet:label-end/tet:te-label/tet:technology" {  
  when "../../../../../../../../../../../"  
    + "nw:network-types/tet:te-topology/"  
    + "ethtetopo:eth-tran-topology" {  
      description "Augment ETH TE label";  
    }  
  description "Ethernet label.";  
  case eth {  
    uses etht-types:eth-label;  
  }  
}
```

```
/* Augment ingress label restrictions step of connectivity-matrix  
information-source */
```

```
augment "/nw:networks/nw:network/nw:node/tet:te/"  
  + "tet:information-source-entry/tet:connectivity-matrices/"  
  + "tet:connectivity-matrix/"  
  + "tet:from/tet:label-restrictions/tet:label-restriction/"  
  + "tet:label-step/tet:technology" {  
  when "../../../../../../../../../../../"  
    + "nw:network-types/tet:te-topology/"  
    + "ethtetopo:eth-tran-topology" {  
      description "Augment ETH TE label";  
    }  
  description "Ethernet label.";  
  case eth {  
    uses etht-types:eth-label-step;  
  }  
}
```

```
/* Augment egress label restrictions of connectivity-matrix information-  
source */
```

```
augment "/nw:networks/nw:network/nw:node/tet:te/"  
  + "tet:information-source-entry/tet:connectivity-matrices/"  
  + "tet:connectivity-matrix/"  
  + "tet:to/tet:label-restrictions/tet:label-restriction" {  
  when "../../../../../../../../../../../nw:network-types/tet:te-topology/"  
    + "ethtetopo:eth-tran-topology" {  
      description "Augment ETH TE label";  
    }  
  description "Ethernet label.";  
  uses etht-types:eth-label-restriction;
```



```
}
```

```
/* Augment egress label restrictions start of connectivity-matrix  
information-source */
```

```
augment "/nw:networks/nw:network/nw:node/tet:te/"  
  + "tet:information-source-entry/tet:connectivity-matrices/"  
  + "tet:connectivity-matrix/"  
  + "tet:to/tet:label-restrictions/tet:label-restriction/"  
  + "tet:label-start/tet:te-label/tet:technology" {  
when "../../../../../../../../../../../"  
  + "nw:network-types/tet:te-topology/"  
  + "ethtetopo:eth-tran-topology" {  
  description "Augment ETH TE label";  
  }  
description "Ethernet label.";  
case eth {  
  uses etht-types:eth-label;  
}  
}
```

```
/* Augment egress label restrictions end of connectivity-matrix information-  
source */
```

```
augment "/nw:networks/nw:network/nw:node/tet:te/"  
  + "tet:information-source-entry/tet:connectivity-matrices/"  
  + "tet:connectivity-matrix/"  
  + "tet:to/tet:label-restrictions/tet:label-restriction/"  
  + "tet:label-end/tet:te-label/tet:technology" {  
when "../../../../../../../../../../../"  
  + "nw:network-types/tet:te-topology/"  
  + "ethtetopo:eth-tran-topology" {  
  description "Augment ETH TE label";  
  }  
description "Ethernet label.";  
case eth {  
  uses etht-types:eth-label;  
}  
}
```

```
/* Augment egress label restrictions step of connectivity-matrix information-  
source */
```

```
augment "/nw:networks/nw:network/nw:node/tet:te/"  
  + "tet:information-source-entry/tet:connectivity-matrices/"  
  + "tet:connectivity-matrix/"  
  + "tet:to/tet:label-restrictions/tet:label-restriction/"  
  + "tet:label-step/tet:technology" {  
when "../../../../../../../../../../../"  
  + "nw:network-types/tet:te-topology/"  
  + "ethtetopo:eth-tran-topology" {  
  description "Augment ETH TE label";  
  }  
description "Ethernet label.";
```



```
    case eth {
      uses etht-types:eth-label-step;
    }
  }

  /* Augment label hop of underlay primary path of connectivity-matrix
  information-source */
  augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:information-source-entry/tet:connectivity-matrices/"
    + "tet:connectivity-matrix/"
    + "tet:underlay/tet:primary-path/tet:path-element/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
  when "../../../../../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label;
  }
}

  /* Augment label hop of underlay backup path of connectivity-matrix
  information-source */
  augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:information-source-entry/tet:connectivity-matrices/"
    + "tet:connectivity-matrix/"
    + "tet:underlay/tet:backup-path/tet:path-element/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
  when "../../../../../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label;
  }
}

  /* Augment label hop of route-exclude of connectivity-matrix information-
  source */
  augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:information-source-entry/tet:connectivity-matrices/"
    + "tet:connectivity-matrix/"
    + "tet:optimizations/tet:algorithm/tet:metric/"
    + "tet:optimization-metric/"
    + "tet:explicit-route-exclude-objects/"
    + "tet:route-object-exclude-object/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
```



```
when "../../../../../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}
```

```
/* Augment label hop of route-include of connectivity-matrix information-
source */
```

```
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/"
  + "tet:optimizations/tet:algorithm/tet:metric/"
  + "tet:optimization-metric/"
  + "tet:explicit-route-include-objects/"
  + "tet:route-object-include-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}
```

```
/* Augment label hop of path-route of connectivity-matrix information-source
*/
```

```
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:information-source-entry/tet:connectivity-matrices/"
  + "tet:connectivity-matrix/"
  + "tet:path-properties/tet:path-route-objects/"
  + "tet:path-route-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}
```



```
/* Augment label restrictions of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:label-restrictions/tet:label-restriction" {
when "../../../../../../../nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
uses etht-types:eth-label-restriction;
}

/* Augment label restrictions start of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:label-restrictions/tet:label-restriction/tet:label-start/"
  + "tet:te-label/tet:technology" {
when "../../../../../../../nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label restrictions end of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:label-restrictions/tet:label-restriction/tet:label-end/"
  + "tet:te-label/tet:technology" {
when "../../../../../../../nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label restrictions step of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
```

```

    + "tet:local-link-connectivities/"
    + "tet:label-restrictions/tet:label-restriction/tet:label-step/"
    + "tet:technology"{
when "../../../../../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
    uses etht-types:eth-label-step;
}
}

/* Augment label hop of underlay primary path of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:tunnel-termination-point/"
    + "tet:local-link-connectivities/"
    + "tet:underlay/tet:primary-path/tet:path-element/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}

/* Augment label hop of underlay backup path of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
    + "tet:tunnel-termination-point/"
    + "tet:local-link-connectivities/"
    + "tet:underlay/tet:backup-path/tet:path-element/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}

/* Augment label hop of route-exclude of local-link-connectivities */

```

```

augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:optimizations/tet:algorithm/tet:metric/"
  + "tet:optimization-metric/"
  + "tet:explicit-route-exclude-objects/"
  + "tet:route-object-exclude-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of route-include of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:optimizations/tet:algorithm/tet:metric/"
  + "tet:optimization-metric/"
  + "tet:explicit-route-include-objects/"
  + "tet:route-object-include-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of path-route of local-link-connectivities */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:path-properties/tet:path-route-objects/"
  + "tet:path-route-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"

```



```

when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label restrictions step of local-link-connectivity (LLC) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:local-link-connectivity/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-step/tet:technology" {
when "../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
description "Ethernet label.";
case eth {
  uses etht-types:eth-label-step;
}
}

/* Augment label hop of underlay primary path of local-link-connectivity
(LLC) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:local-link-connectivity/"
  + "tet:underlay/tet:primary-path/tet:path-element/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of underlay backup path of local-link-connectivity (LLC)
*/

```



```

augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:local-link-connectivity/"
  + "tet:underlay/tet:backup-path/tet:path-element/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../.../.../.../.../.../.../.../.../.../.../..."
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of route-exclude of local-link-connectivity (LLC) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:local-link-connectivity/"
  + "tet:optimizations/tet:algorithm/tet:metric/"
  + "tet:optimization-metric/"
  + "tet:explicit-route-exclude-objects/"
  + "tet:route-object-exclude-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../.../.../.../.../.../.../.../.../.../.../..."
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of route-include of local-link-connectivity (LLC) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:local-link-connectivity/"
  + "tet:optimizations/tet:algorithm/tet:metric/"
  + "tet:optimization-metric/"
  + "tet:explicit-route-include-objects/"
  + "tet:route-object-include-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {

```

```

when "../../../../../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of path-route of local-link-connectivity (LLC) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:tunnel-termination-point/"
  + "tet:local-link-connectivities/"
  + "tet:local-link-connectivity/"
  + "tet:path-properties/tet:path-route-objects/"
  + "tet:path-route-object/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of underlay primary path of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:te-link-attributes/"
  + "tet:underlay/tet:primary-path/tet:path-element/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label hop of underlay backup path of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"

```

```

    + "tet:te-link-attributes/"
    + "tet:underlay/tet:backup-path/tet:path-element/tet:type/"
    + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
when "../../../../../../../"
    + "nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}

/* Augment label restrictions of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
    + "tet:te-link-attributes/"
    + "tet:label-restrictions/tet:label-restriction" {
when "../../../../../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
uses etht-types:eth-label-restriction;
}

/* Augment label restrictions start of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
    + "tet:te-link-attributes/"
    + "tet:label-restrictions/tet:label-restriction/"
    + "tet:label-start/tet:te-label/tet:technology" {
when "../../../../../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
    uses etht-types:eth-label;
}
}

/* Augment label restrictions end of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
    + "tet:te-link-attributes/"
    + "tet:label-restrictions/tet:label-restriction/"
    + "tet:label-end/tet:te-label/tet:technology" {
when "../../../../../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {

```

```
    description "Augment ETH TE label";
  }
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label;
  }
}

/* Augment label restrictions step of TE link */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:te-link-attributes/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-step/tet:technology" {
  when "../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label-step;
  }
}

/* Augment label restrictions of TE link information-source */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:information-source-entry/"
  + "tet:label-restrictions/tet:label-restriction" {
  when "../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
  description "Ethernet label.";
  uses etht-types:eth-label-restriction;
}

/* Augment label restrictions start of TE link information-source */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:information-source-entry/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-start/tet:te-label/tet:technology" {
  when "../..../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label;
  }
}
```

```

}
/* Augment label restrictions end of TE link information-source */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:information-source-entry/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-end/tet:te-label/tet:technology" {
when "../../../../../../../nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

/* Augment label restrictions step of TE link information-source */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:information-source-entry/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-step/tet:technology" {
when "../../../../../../../nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
description "Ethernet label.";
case eth {
  uses etht-types:eth-label-step;
}
}

/* Augment label hop of underlay primary path of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes/"
  + "tet:underlay/tet:primary-path/tet:path-element/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
/*
when "../../../../../../../../../../../../../../../../../../../"
  + "nw:network-types/tet:te-topology/"
  + "ethtetopo:eth-tran-topology" {
  description "Augment ETH TE label";
}
*/
description "Ethernet label.";
case eth {
  uses etht-types:eth-label;
}
}

```

```

/* Augment label hop of underlay backup path of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes/"
  + "tet:underlay/tet:backup-path/tet:path-element/tet:type/"
  + "tet:label/tet:label-hop/tet:te-label/tet:technology" {
/*
  when "../../../../../../../../../../../../../../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
*/
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label;
  }
}

/* Augment label restrictions of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes/"
  + "tet:label-restrictions/tet:label-restriction" {
/*
  when "../../../../../../../../../../../../../../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
*/
  description "Ethernet label.";
  uses etht-types:eth-label-restriction;
}

/* Augment label restrictions start of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-start/tet:te-label/tet:technology" {
/*
  when "../../../../../../../../../../../../../../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
*/
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label;
  }
}

```



```
/* Augment label restrictions end of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-end/tet:te-label/tet:technology" {
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label;
  }
}

/* Augment label restrictions step of TE link template */
augment "/nw:networks/tet:te/tet:templates/"
  + "tet:link-template/tet:te-link-attributes/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-step/tet:technology" {
/*
  when "../../../nw:network-types/tet:te-topology/"
    + "ethtetopo:eth-tran-topology" {
    description "Augment ETH TE label";
  }
*/
  description "Ethernet label.";
  case eth {
    uses etht-types:eth-label-step;
  }
}
}

<CODE ENDS>
```

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. 201902: we have noticed that Ethernet is the only client signal (on the perspective of OTN) which need a topology. So it is possible that the title of this document will be changed to "A YANG Data Model for Ethernet Topology". The proposal of this work is that the document will follow up the progress of [draft-zheng-ccamp-client-signal-yang](#), with [draft-zheng-ccamp-client-tunnel-yang](#) together. 201902: will have to align with TE topology model, currently is a totally different format with necessary parameters, a big change is expected.

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.

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