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H. Zheng
I. Busi
Huawei Technologies
S. Belotti
Nokia
V. Lopez
Telefonica
Y. Xu
CAICT
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OTN Tunnel YANG Model
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Abstract

This document describes the YANG data model for tunnels in OTN TE networks. The model can be used to do the configuration in order to establish the tunnel in OTN network. This work is independent with the control plane protocols. The YANG data model defined in this document conforms to the Network Management Datastore Architecture (NMDA).

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[1.](#) Introduction

OTN transport networks, specified in [\[ITU-Tg709\]](#), can carry various types of client signals. In many cases, the client signal is carried over an OTN tunnel across connected domains in a multi-domain network.

This document provides YANG model for creating OTN tunnel. The model augments the generic TE Tunnel model specified in [\[I-D.ietf-teas-yang-te\]](#).

[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 draft 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.
- o More OTN specific terms can be found in [\[I-D.ietf-ccamp-otn-topo-yang\]](#).

3. OTN Tunnel Model Description

3.1. Overview of OTN Tunnel Model

The OTN tunnel model is using TE tunnel [\[I-D.ietf-teas-yang-te\]](#) as a basic model and augment to the TE tunnel with OTN-specific parameters, including the bandwidth information and label information. It is also worth noting that the OTN tunnel provisioning is usually based on the OTN topology. Therefore the OTN tunnel model is usually used together with OTN topology model specified in [\[I-D.ietf-ccamp-otn-topo-yang\]](#). The OTN tunnel model also imports a few type modules, including `ietf-layer1-types`, `ietf-te-types` and `ietf-inet-types`. The OTN-specific attributes, such as Tributary Slot (TS), Tributary Port Number (TPN), are specified in the module `ietf-layer1-types` in [\[I-D.ietf-ccamp-layer1-types\]](#) and used in this document.

More scenarios and model applications can be found in [\[I-D.ietf-ccamp-transport-nbi-app-statement\]](#) and [\[I-D.ietf-teas-actn-yang\]](#). The current model is following the YANG language specification as [\[RFC7950\]](#), and the corresponding protocol is recommended to be Netconf protocol in [\[RFC6241\]](#) or RESTconf protocol in [\[RFC8040\]](#).

The YANG module `ietf-otn-tunnel` defined in this document conforms to the Network Management Datastore Architecture (NMDA) defined in [\[RFC8342\]](#).

[3.2.](#) OTN-specific Parameters in Tunnel Model

OTN specific parameters have been augmenting to the TE tunnel models. The attributes on both of the source and destination need to be configured when setting up the tunnel. Typical parameters, including client signal, TPN, TSG and corresponding tributary slot information, are required in the OTN tunnel model. These parameters are

consistent with the framework in [\[RFC7062\]](#), and the specification in [\[RFC7138\]](#) and [\[RFC7139\]](#).

The OTN bandwidth information has been augmenting to various sections of TE tunnel models, including tunnel bandwidth, primary path bandwidth and so on. The OTN label information has been augmenting to label hop of a group of routing objects and also LSPs.

[4.](#) OTN Tunnel YANG Tree

```
module: ietf-otn-tunnel
  augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint/te:te-bandwidth/te:technology:
      +--:(otn)
        +--rw otn
          +--rw odu-type?                               identityref
          +--rw (oduflex-type)?
            +--:(generic)
              | +--rw nominal-bit-rate                 uint64
            +--:(cbr)
              | +--rw client-type                       identityref
            +--:(gfp-n-k)
              | +--rw gfp-n                             uint8
              | +--rw gfp-k?                           gfp-k
            +--:(flexe-client)
              | +--rw flexe-client                     flexe-client-rate
            +--:(flexe-aware)
              | +--rw flexe-aware-n                     uint16
```

```

        +---:(packet)
            +---rw opuflex-payload-rate    uint64
augment /te:te/te:tunnels/te:tunnel/te:te-bandwidth/te:technology:
+---:(otn)
  +---rw otn
    +---rw odu-type?                      identityref
    +---rw (oduflex-type)?
      +---:(generic)
        | +---rw nominal-bit-rate        uint64
      +---:(cbr)
        | +---rw client-type             identityref
      +---:(gfp-n-k)
        | +---rw gfp-n                   uint8
        | +---rw gfp-k?                  gfp-k
      +---:(flexe-client)
        | +---rw flexe-client            flexe-client-rate
      +---:(flexe-aware)
        | +---rw flexe-aware-n          uint16
      +---:(packet)

```

```

        +---rw opuflex-payload-rate    uint64
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
  /te:p2p-primary-path/te:te-bandwidth/te:technology:
+---:(otn)
  +---rw otn
    +---rw odu-type?                      identityref
    +---rw (oduflex-type)?
      +---:(generic)
        | +---rw nominal-bit-rate        uint64
      +---:(cbr)
        | +---rw client-type             identityref
      +---:(gfp-n-k)
        | +---rw gfp-n                   uint8
        | +---rw gfp-k?                  gfp-k
      +---:(flexe-client)
        | +---rw flexe-client            flexe-client-rate
      +---:(flexe-aware)
        | +---rw flexe-aware-n          uint16
      +---:(packet)
        +---rw opuflex-payload-rate    uint64
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
  /te:p2p-primary-path/te:p2p-primary-reverse-path

```

```

        /te:te-bandwidth/te:technology:
+---:(otn)
  +---rw otn
    +---rw odu-type?                               identityref
    +---rw (oduflex-type)?
      +---:(generic)
        | +---rw nominal-bit-rate                 uint64
      +---:(cbr)
        | +---rw client-type                     identityref
      +---:(gfp-n-k)
        | +---rw gfp-n                           uint8
        | +---rw gfp-k?                          gfp-k
      +---:(flexe-client)
        | +---rw flexe-client                     flexe-client-rate
      +---:(flexe-aware)
        | +---rw flexe-aware-n                   uint16
      +---:(packet)
        +---rw opuflex-payload-rate             uint64
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
        /te:p2p-secondary-path/te:te-bandwidth/te:technology:
+---:(otn)
  +---rw otn
    +---rw odu-type?                               identityref
    +---rw (oduflex-type)?
      +---:(generic)
        | +---rw nominal-bit-rate                 uint64

```

```

      +---:(cbr)
        | +---rw client-type                     identityref
      +---:(gfp-n-k)
        | +---rw gfp-n                           uint8
        | +---rw gfp-k?                          gfp-k
      +---:(flexe-client)
        | +---rw flexe-client                     flexe-client-rate
      +---:(flexe-aware)
        | +---rw flexe-aware-n                   uint16
      +---:(packet)
        +---rw opuflex-payload-rate             uint64
augment /te:te/te:globals/te:named-path-constraints
        /te:named-path-constraint
        /te:explicit-route-objects-always
        /te:route-object-exclude-always/te:type/te:label

```

```

        /te:label-hop/te:te-label/te:technology:
+---:(otn)
    +---rw otn-tpn?    otn-tpn
    +---rw tsg?       identityref
    +---rw ts-list?   string
augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint
    /te:explicit-route-objects-always
    /te:route-object-include-exclude/te:type/te:label
    /te:label-hop/te:te-label/te:technology:
+---:(otn)
    +---rw otn-tpn?    otn-tpn
    +---rw tsg?       identityref
    +---rw ts-list?   string
augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint/te:path-in-segment
    /te:label-restrictions/te:label-restriction:
+---rw range-type?    otn-label-range-type
+---rw tsg?           identityref
+---rw odu-type-list* identityref
+---rw priority?     uint8
augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint/te:path-in-segment
    /te:label-restrictions/te:label-restriction
    /te:label-start/te:te-label/te:technology:
+---:(otn)
    +---rw (range-type)?
    +---:(trib-port)
    | +---rw otn-tpn?    otn-tpn
    +---:(trib-slot)
    | +---rw otn-ts?    otn-ts
augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint/te:path-in-segment

```

```

        /te:label-restrictions/te:label-restriction/te:label-end
        /te:te-label/te:technology:
+---:(otn)
    +---rw (range-type)?
    +---:(trib-port)
    | +---rw otn-tpn?    otn-tpn
    +---:(trib-slot)
    | +---rw otn-ts?    otn-ts

```

```

augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint/te:path-out-segment
    /te:label-restrictions/te:label-restriction:
+--rw range-type?      otn-label-range-type
+--rw tsg?             identityref
+--rw odu-type-list*   identityref
+--rw priority?       uint8
augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint/te:path-out-segment
    /te:label-restrictions/te:label-restriction
    /te:label-start/te:te-label/te:technology:
+--:(otn)
  +--rw (range-type)?
  +--:(trib-port)
  |   +--rw otn-tpn?    otn-tpn
  +--:(trib-slot)
  |   +--rw otn-ts?     otn-ts
augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint/te:path-out-segment
    /te:label-restrictions/te:label-restriction/te:label-end
    /te:te-label/te:technology:
+--:(otn)
  +--rw (range-type)?
  +--:(trib-port)
  |   +--rw otn-tpn?    otn-tpn
  +--:(trib-slot)
  |   +--rw otn-ts?     otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
    /te:p2p-primary-path/te:optimizations/te:algorithm
    /te:metric/te:optimization-metric
    /te:explicit-route-exclude-objects
    /te:route-object-exclude-object/te:type/te:label
    /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--rw otn-tpn?      otn-tpn
  +--rw tsg?          identityref
  +--rw ts-list?      string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
    /te:p2p-primary-path/te:optimizations/te:algorithm
    /te:metric/te:optimization-metric

```



```

        /te:route-object-include-object/te:type/te:label
        /te:label-hop/te:te-label/te:technology:
+---:(otn)
    +--rw otn-tpn?    otn-tpn
    +--rw tsg?        identityref
    +--rw ts-list?    string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:explicit-route-objects-always
        /te:route-object-exclude-always/te:type/te:label
        /te:label-hop/te:te-label/te:technology:
+---:(otn)
    +--rw otn-tpn?    otn-tpn
    +--rw tsg?        identityref
    +--rw ts-list?    string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:explicit-route-objects-always
        /te:route-object-include-exclude/te:type/te:label
        /te:label-hop/te:te-label/te:technology:
+---:(otn)
    +--rw otn-tpn?    otn-tpn
    +--rw tsg?        identityref
    +--rw ts-list?    string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:path-in-segment
        /te:label-restrictions/te:label-restriction:
+---rw range-type?    otn-label-range-type
+---rw tsg?            identityref
+---rw odu-type-list*  identityref
+---rw priority?      uint8
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:path-in-segment
        /te:label-restrictions/te:label-restriction
        /te:label-start/te:te-label/te:technology:
+---:(otn)
    +--rw (range-type)?
        +---:(trib-port)
            | +--rw otn-tpn?    otn-tpn
        +---:(trib-slot)
            +--rw otn-ts?      otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:path-in-segment
        /te:label-restrictions/te:label-restriction/te:label-end
        /te:te-label/te:technology:
+---:(otn)
    +--rw (range-type)?
        +---:(trib-port)
            | +--rw otn-tpn?    otn-tpn

```

```

        +---:(trib-slot)
            +---rw otn-ts?    otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:path-out-segment
        /te:label-restrictions/te:label-restriction:
+---rw range-type?        otn-label-range-type
+---rw tsg?                identityref
+---rw odu-type-list*     identityref
+---rw priority?          uint8
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:path-out-segment
        /te:label-restrictions/te:label-restriction
        /te:label-start/te:te-label/te:technology:
+---:(otn)
    +---rw (range-type)?
        +---:(trib-port)
            | +---rw otn-tpn?    otn-tpn
        +---:(trib-slot)
            +---rw otn-ts?    otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:path-out-segment
        /te:label-restrictions/te:label-restriction/te:label-end
        /te:te-label/te:technology:
+---:(otn)
    +---rw (range-type)?
        +---:(trib-port)
            | +---rw otn-tpn?    otn-tpn
        +---:(trib-slot)
            +---rw otn-ts?    otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:computed-paths-properties
        /te:computed-path-properties/te:path-properties
        /te:path-route-objects/te:path-computed-route-object
        /te:type/te:label/te:label-hop/te:te-label/te:technology:
+---:(otn)
    +---ro otn-tpn?    otn-tpn
    +---ro tsg?        identityref
    +---ro ts-list?    string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:lsps/te:lsp
        /te:lsp-record-route-information
        /te:lsp-record-route-information/te:type/te:label
        /te:label-hop/te:te-label/te:technology:
+---:(otn)
    +---ro otn-tpn?    otn-tpn
    +---ro tsg?        identityref

```

```
    +--ro ts-list?   string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
```

```
    /te:p2p-primary-path/te:lsps/te:lsp/te:path-properties
    /te:path-route-objects/te:path-computed-route-object
    /te:type/te:label/te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--ro otn-tpn?   otn-tpn
  +--ro tsg?      identityref
  +--ro ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
  /te:p2p-primary-path/te:p2p-primary-reverse-path
  /te:optimizations/te:algorithm/te:metric
  /te:optimization-metric/te:explicit-route-exclude-objects
  /te:route-object-exclude-object/te:type/te:label
  /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--rw otn-tpn?   otn-tpn
  +--rw tsg?      identityref
  +--rw ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
  /te:p2p-primary-path/te:p2p-primary-reverse-path
  /te:optimizations/te:algorithm/te:metric
  /te:optimization-metric/te:explicit-route-include-objects
  /te:route-object-include-object/te:type/te:label
  /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--rw otn-tpn?   otn-tpn
  +--rw tsg?      identityref
  +--rw ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
  /te:p2p-primary-path/te:p2p-primary-reverse-path
  /te:explicit-route-objects-always
  /te:route-object-exclude-always/te:type/te:label
  /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--rw otn-tpn?   otn-tpn
  +--rw tsg?      identityref
  +--rw ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
  /te:p2p-primary-path/te:p2p-primary-reverse-path
  /te:explicit-route-objects-always
```

```

        /te:route-object-include-exclude/te:type/te:label
        /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--rw otn-tpn?    otn-tpn
  +--rw tsg?       identityref
  +--rw ts-list?   string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:p2p-primary-reverse-path
        /te:path-in-segment/te:label-restrictions

```

```

        /te:label-restriction:
+--rw range-type?    otn-label-range-type
+--rw tsg?           identityref
+--rw odu-type-list* identityref
+--rw priority?     uint8
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:p2p-primary-reverse-path
        /te:path-in-segment/te:label-restrictions
        /te:label-restriction/te:label-start/te:te-label
        /te:technology:
+--:(otn)
  +--rw (range-type)?
    +--:(trib-port)
      | +--rw otn-tpn?    otn-tpn
    +--:(trib-slot)
      +--rw otn-ts?     otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:p2p-primary-reverse-path
        /te:path-in-segment/te:label-restrictions
        /te:label-restriction/te:label-end/te:te-label
        /te:technology:
+--:(otn)
  +--rw (range-type)?
    +--:(trib-port)
      | +--rw otn-tpn?    otn-tpn
    +--:(trib-slot)
      +--rw otn-ts?     otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
        /te:p2p-primary-path/te:p2p-primary-reverse-path
        /te:path-out-segment/te:label-restrictions
        /te:label-restriction:
+--rw range-type?    otn-label-range-type

```

```

+--rw tsg?          identityref
+--rw odu-type-list* identityref
+--rw priority?     uint8
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
      /te:p2p-primary-path/te:p2p-primary-reverse-path
      /te:path-out-segment/te:label-restrictions
      /te:label-restriction/te:label-start/te:te-label
      /te:technology:
+--:(otn)
  +--rw (range-type)?
  +--:(trib-port)
  |   +--rw otn-tpn?    otn-tpn
  +--:(trib-slot)
  |   +--rw otn-ts?    otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
      /te:p2p-primary-path/te:p2p-primary-reverse-path

```

```

      /te:path-out-segment/te:label-restrictions
      /te:label-restriction/te:label-end/te:te-label
      /te:technology:
+--:(otn)
  +--rw (range-type)?
  +--:(trib-port)
  |   +--rw otn-tpn?    otn-tpn
  +--:(trib-slot)
  |   +--rw otn-ts?    otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
      /te:p2p-primary-path/te:p2p-primary-reverse-path
      /te:computed-paths-properties/te:computed-path-properties
      /te:path-properties/te:path-route-objects
      /te:path-computed-route-object/te:type/te:label
      /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--ro otn-tpn?    otn-tpn
  +--ro tsg?        identityref
  +--ro ts-list?    string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
      /te:p2p-primary-path/te:p2p-primary-reverse-path/te:lsp
      /te:lsp/te:lsp-record-route-information
      /te:lsp-record-route-information/te:type/te:label
      /te:label-hop/te:te-label/te:technology:
+--:(otn)

```

```

    +--ro otn-tpn?   otn-tpn
    +--ro tsg?      identityref
    +--ro ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
    /te:p2p-primary-path/te:p2p-primary-reverse-path/te:lsps
    /te:lsp/te:path-properties/te:path-route-objects
    /te:path-computed-route-object/te:type/te:label
    /te:label-hop/te:te-label/te:technology:
+--:(otn)
    +--ro otn-tpn?   otn-tpn
    +--ro tsg?      identityref
    +--ro ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
    /te:p2p-secondary-path/te:optimizations/te:algorithm
    /te:metric/te:optimization-metric
    /te:explicit-route-exclude-objects
    /te:route-object-exclude-object/te:type/te:label
    /te:label-hop/te:te-label/te:technology:
+--:(otn)
    +--rw otn-tpn?   otn-tpn
    +--rw tsg?      identityref
    +--rw ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths

```

```

    /te:p2p-secondary-path/te:optimizations/te:algorithm
    /te:metric/te:optimization-metric
    /te:explicit-route-include-objects
    /te:route-object-include-object/te:type/te:label
    /te:label-hop/te:te-label/te:technology:
+--:(otn)
    +--rw otn-tpn?   otn-tpn
    +--rw tsg?      identityref
    +--rw ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
    /te:p2p-secondary-path/te:explicit-route-objects-always
    /te:route-object-exclude-always/te:type/te:label
    /te:label-hop/te:te-label/te:technology:
+--:(otn)
    +--rw otn-tpn?   otn-tpn
    +--rw tsg?      identityref
    +--rw ts-list?  string
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths

```

```

        /te:p2p-secondary-path/te:explicit-route-objects-always
        /te:route-object-include-exclude/te:type/te:label
        /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--rw otn-tpn?    otn-tpn
  +--rw tsg?       identityref
  +--rw ts-list?   string
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
  /te:p2p-secondary-path/te:path-in-segment
  /te:label-restrictions/te:label-restriction:
+--rw range-type?    otn-label-range-type
+--rw tsg?           identityref
+--rw odu-type-list* identityref
+--rw priority?     uint8
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
  /te:p2p-secondary-path/te:path-in-segment
  /te:label-restrictions/te:label-restriction
  /te:label-start/te:te-label/te:technology:
+--:(otn)
  +--rw (range-type)?
  +--:(trib-port)
  | +--rw otn-tpn?    otn-tpn
  +--:(trib-slot)
  +--rw otn-ts?     otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
  /te:p2p-secondary-path/te:path-in-segment
  /te:label-restrictions/te:label-restriction/te:label-end
  /te:te-label/te:technology:
+--:(otn)
  +--rw (range-type)?

```

```

+--:(trib-port)
  | +--rw otn-tpn?    otn-tpn
+--:(trib-slot)
  +--rw otn-ts?     otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
  /te:p2p-secondary-path/te:path-out-segment
  /te:label-restrictions/te:label-restriction:
+--rw range-type?    otn-label-range-type
+--rw tsg?           identityref
+--rw odu-type-list* identityref
+--rw priority?     uint8

```

```

augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
    /te:p2p-secondary-path/te:path-out-segment
    /te:label-restrictions/te:label-restriction
    /te:label-start/te:te-label/te:technology:
+--:(otn)
  +--rw (range-type)?
    +--:(trib-port)
      | +--rw otn-tpn?    otn-tpn
    +--:(trib-slot)
      +--rw otn-ts?     otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
    /te:p2p-secondary-path/te:path-out-segment
    /te:label-restrictions/te:label-restriction/te:label-end
    /te:te-label/te:technology:
+--:(otn)
  +--rw (range-type)?
    +--:(trib-port)
      | +--rw otn-tpn?    otn-tpn
    +--:(trib-slot)
      +--rw otn-ts?     otn-ts
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
    /te:p2p-secondary-path/te:computed-paths-properties
    /te:computed-path-properties/te:path-properties
    /te:path-route-objects/te:path-computed-route-object
    /te:type/te:label/te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--ro otn-tpn?    otn-tpn
  +--ro tsg?        identityref
  +--ro ts-list?    string
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
    /te:p2p-secondary-path/te:lsps/te:lsp
    /te:lsp-record-route-information
    /te:lsp-record-route-information/te:type/te:label
    /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--ro otn-tpn?    otn-tpn
  +--ro tsg?        identityref

```

```

+--ro ts-list?    string
augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
    /te:p2p-secondary-path/te:lsps/te:lsp/te:path-properties
    /te:path-route-objects/te:path-computed-route-object

```



```

        /te:type/te:label/te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--ro otn-tpn?    otn-tpn
  +--ro tsg?       identityref
  +--ro ts-list?   string
augment /te:te/te:lsp-state/te:lsp/te:lsp-record-route-information
        /te:lsp-record-route-information/te:type/te:label
        /te:label-hop/te:te-label/te:technology:
+--:(otn)
  +--ro otn-tpn?    otn-tpn
  +--ro tsg?       identityref
  +--ro ts-list?   string

```

5. OTN Tunnel YANG Code

```

<CODE BEGINS>file "ietf-otn-tunnel@2021-02-10.yang"
module ietf-otn-tunnel {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-otn-tunnel";
  prefix "otn-tunnel";

  import ietf-te {
    prefix "te";
    revision-date "2019-02-15";
    reference
    "I-D.ietf-teas-yang-te-19: A YANG Data Model for Traffic
    Engineering Tunnels and Interfaces. ";
  }

  import ietf-layer1-types {
    prefix "l1-types";
    reference
    "I-D.ietf-ccamp-layer1-types:
    A YANG Data Model for Layer 1 Types. ";
  }

  organization
    "IETF CCAMP Working Group";
  contact
    "WG Web: <http://tools.ietf.org/wg/ccamp/>
    WG List: <mailto:ccamp@ietf.org>

```

Editor: Haomian Zheng
<mailto:zhenghaomian@huawei.com>

Editor: Italo Busi
<mailto:italo.busi@huawei.com>

Editor: Sergio Belotti
<mailto:sergio.belotti@nokia.com>

Editor: Victor Lopez
<mailto:victor.lopezalvarez@telefonica.com>

Editor: Yunbin Xu
<mailto:xuyunbin@ritt.cn>";

description

"This module defines a model for OTN Tunnel Services.

The model fully conforms to the Network Management
Datastore Architecture (NMDA).

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(<https://trustee.ietf.org/license-info>).

This version of this YANG module is part of RFC XXXX; see
the RFC itself for full legal notices.";

```
revision "2021-02-10" {
  description
    "Initial Revision";
  reference
    "RFC XXXX: OTN Tunnel YANG Model";
  // RFC Ed.: replace XXXX with actual RFC number, update date
  // information and remove this note
}

/*
 * Data nodes
 */
```

/*

```

* Augment TE bandwidth
*/

/* Augment bandwidth of named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"
  + "te:named-path-constraint/"
  + "te:te-bandwidth/te:technology" {
  description "OTN bandwidth.";
  case otn {
    uses l1-types:otn-path-bandwidth;
  }
}

/* Augment bandwidth of tunnel */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:te-bandwidth/te:technology" {
  description "OTN bandwidth.";
  case otn {
    uses l1-types:otn-path-bandwidth;
  }
}

/* Augment bandwidth of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:te-bandwidth/te:technology" {
  description "OTN bandwidth.";
  case otn {
    uses l1-types:otn-path-bandwidth;
  }
}

/* Augment bandwidth of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:te-bandwidth/te:technology" {
  description "OTN bandwidth.";
  case otn {
    uses l1-types:otn-path-bandwidth;
  }
}
```

```

    }
}

/* Augment bandwidth of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-secondary-paths/te:p2p-secondary-path/"
    + "te:te-bandwidth/te:technology" {
    description "OTN bandwidth.";
}

```

```

    case otn {
        uses l1-types:otn-path-bandwidth;
    }
}

/*
 * Augment TE label.
 */

/* Augment label hop of route-object-exclude-always of
   named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"
    + "te:named-path-constraint/"
    + "te:explicit-route-objects-always/"
    + "te:route-object-exclude-always/te:type/te:label/"
    + "te:label-hop/te:te-label/te:technology" {
    description "OTN label.";
    case otn {
        uses l1-types:otn-label-hop;
    }
}

/* Augment label hop of route-object-include-exclude of
   named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"
    + "te:named-path-constraint/"
    + "te:explicit-route-objects-always/"
    + "te:route-object-include-exclude/te:type/te:label/"
    + "te:label-hop/te:te-label/te:technology" {
    description "OTN label.";
    case otn {
        uses l1-types:otn-label-hop;
    }
}

```

```

}

/* Augment label restrictions for the forwarding direction of
   path-in-segment of named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"
  + "te:named-path-constraint/te:path-in-segment/"
  + "te:label-restrictions/te:label-restriction" {
  description "OTN label.";
  uses l1-types:otn-label-range-info;
}

/* Augment label restrictions start for the forwarding direction of
   path-in-segment of named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"
  + "te:named-path-constraint/te:path-in-segment/"

```

```

  + "te:label-restrictions/"
  + "te:label-restriction/te:label-start/"
  + "te:te-label/te:technology" {
description "OTN label.";
case otn {
  uses l1-types:otn-label-start-end;
}
}

/* Augment label restrictions end for the forwarding direction of
   path-in-segment of named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"
  + "te:named-path-constraint/te:path-in-segment/"
  + "te:label-restrictions/"
  + "te:label-restriction/te:label-end/"
  + "te:te-label/te:technology" {
description "OTN label.";
case otn {
  uses l1-types:otn-label-start-end;
}
}

/* Augment label restrictions for the forwarding direction of
   path-out-segment of named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"
  + "te:named-path-constraint/te:path-out-segment/"

```

```

    + "te:label-restrictions/"
    + "te:label-restriction" {
description "OTN label.";
uses l1-types:otn-label-range-info;
}

/* Augment label restrictions start for the forwarding direction of
path-out-segment of named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"
    + "te:named-path-constraint/te:path-out-segment/"
    + "te:label-restrictions/"
    + "te:label-restriction/te:label-start/"
    + "te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-start-end;
}
}

/* Augment label restrictions end for the forwarding direction of
path-out-segment of named-path-constraints */
augment "/te:te/te:globals/te:named-path-constraints/"

```

```

    + "te:named-path-constraint/te:path-out-segment/"
    + "te:label-restrictions/"
    + "te:label-restriction/te:label-end/"
    + "te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-start-end;
}
}

/* Augment label hop of route-exclude of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-primary-paths/te:p2p-primary-path/"
    + "te:optimizations/te:algorithm/te:metric/"
    + "te:optimization-metric/te:explicit-route-exclude-objects/"
    + "te:route-object-exclude-object/te:type/te:label/"
    + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";
case otn {

```

```

    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of route-include of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:optimizations/te:algorithm/te:metric/"
  + "te:optimization-metric/te:explicit-route-include-objects/"
  + "te:route-object-include-object/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of route-object-exclude-always of
primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:explicit-route-objects-always/"
  + "te:route-object-exclude-always/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

```

```

/* Augment label hop of route-object-include-exclude of
primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:explicit-route-objects-always/"
  + "te:route-object-include-exclude/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

```

```

/* Augment label restrictions for the path-in-segment of
   primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:path-in-segment/te:label-restrictions/"
  + "te:label-restriction" {
  description "OTN label.";
  uses l1-types:otn-label-range-info;
}

/* Augment label restrictions start for the forwarding direction of
   path-in-segment of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:path-in-segment/te:label-restrictions/"
  + "te:label-restriction/te:label-start/"
  + "te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-start-end;
  }
}

/* Augment label restrictions end for the forwarding direction of
   path-in-segment of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:path-in-segment/te:label-restrictions/"
  + "te:label-restriction/te:label-end/"
  + "te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-start-end;
  }
}

```

```

/* Augment label restrictions for the forwarding direction of
   path-out-segment of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:path-out-segment/te:label-restrictions/"

```



```

    + "te:label-restriction" {
description "OTN label.";
uses l1-types:otn-label-range-info;
}

/* Augment label restrictions start for the forwarding direction of
   path-out-segment of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-primary-paths/te:p2p-primary-path/"
    + "te:path-out-segment/te:label-restrictions/"
    + "te:label-restriction/te:label-start/"
    + "te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-start-end;
}
}

/* Augment label restrictions end for the forwarding direction of
   path-out-segment of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-primary-paths/te:p2p-primary-path/"
    + "te:path-out-segment/te:label-restrictions/"
    + "te:label-restriction/te:label-end/"
    + "te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-start-end;
}
}

/* Augment label hop of path-route of primary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-primary-paths/te:p2p-primary-path/"
    + "te:computed-paths-properties/"
    + "te:computed-path-properties/te:path-properties/"
    + "te:path-route-objects/te:path-computed-route-object/"
    + "te:type/te:label/"
    + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-hop;
}
}

```

```

}

/* Augment label hop of record-route of primary LSP */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:lsp/te:lsp/te:lsp-record-route-information/"
  + "te:lsp-record-route-information/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of path-route of primary LSP */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:lsp/te:lsp/te:path-properties/"
  + "te:path-route-objects/te:path-computed-route-object/"
  + "te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of route-exclude of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:optimizations/te:algorithm/te:metric/"
  + "te:optimization-metric/te:explicit-route-exclude-objects/"
  + "te:route-object-exclude-object/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of route-include of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:optimizations/te:algorithm/te:metric/"
  + "te:optimization-metric/te:explicit-route-include-objects/"
  + "te:route-object-include-object/te:type/te:label/"

```

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```
        + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-hop;
}
}

/* Augment label hop of route-object-exclude-always of
reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-primary-paths/te:p2p-primary-path/"
    + "te:p2p-primary-reverse-path/"
    + "te:explicit-route-objects-always/"
    + "te:route-object-exclude-always/"
    + "te:type/te:label/"
    + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-hop;
}
}

/* Augment label hop of route-object-include-exclude of
reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-primary-paths/te:p2p-primary-path/"
    + "te:p2p-primary-reverse-path/"
    + "te:explicit-route-objects-always/"
    + "te:route-object-include-exclude/"
    + "te:type/te:label/"
    + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-hop;
}
}

/* Augment label restrictions for the forwarding direction of
path-in-segment of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-primary-paths/te:p2p-primary-path/"
    + "te:p2p-primary-reverse-path/"
```

```
    + "te:path-in-segment/te:label-restrictions/"
    + "te:label-restriction" {
description "OTN label.";
uses l1-types:otn-label-range-info;
}
```

```
/* Augment label restrictions start for the forwarding direction of
   path-in-segment of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:path-in-segment/te:label-restrictions/"
  + "te:label-restriction/te:label-start/"
  + "te:te-label/te:technology" {
description "OTN label.";
case otn {
  uses l1-types:otn-label-start-end;
}
}
```

```
/* Augment label restrictions end for the forwarding direction of
   path-in-segment of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:path-in-segment/te:label-restrictions/"
  + "te:label-restriction/te:label-end/"
  + "te:te-label/te:technology" {
description "OTN label.";
case otn {
  uses l1-types:otn-label-start-end;
}
}
```

```
/* Augment label restrictions for the forwarding direction of
   path-out-segment of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:path-out-segment/te:label-restrictions/"
  + "te:label-restriction" {
```

```

description "OTN label.";
uses l1-types:otn-label-range-info;
}

/* Augment label restrictions start for the forwarding direction of
   path-out-segment of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:path-out-segment/te:label-restrictions/"
  + "te:label-restriction/te:label-start/"
  + "te:te-label/te:technology" {
description "OTN label.";

```

```

case otn {
  uses l1-types:otn-label-start-end;
}
}

/* Augment label restrictions end for the forwarding direction of
   path-out-segment of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:path-out-segment/te:label-restrictions/"
  + "te:label-restriction/te:label-end/"
  + "te:te-label/te:technology" {
description "OTN label.";
case otn {
  uses l1-types:otn-label-start-end;
}
}

/* Augment label hop of path-route of reverse primary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:computed-paths-properties/te:computed-path-properties/"
  + "te:path-properties/te:path-route-objects/"
  + "te:path-computed-route-object/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";

```

```

    case otn {
      uses l1-types:otn-label-hop;
    }
  }

/* Augment label hop of record-route of reverse primary LSP */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:lsp/te:lsp/te:lsp-record-route-information/"
  + "te:lsp-record-route-information/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of path-route of reverse primary LSP */
augment "/te:te/te:tunnels/te:tunnel/"

```

```

  + "te:p2p-primary-paths/te:p2p-primary-path/"
  + "te:p2p-primary-reverse-path/"
  + "te:lsp/te:lsp/te:path-properties/"
  + "te:path-route-objects/te:path-computed-route-object/"
  + "te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of route-exclude of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:optimizations/te:algorithm/te:metric/"
  + "te:optimization-metric/te:explicit-route-exclude-objects/"
  + "te:route-object-exclude-object/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {

```

```

    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of route-include of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:optimizations/te:algorithm/te:metric/"
  + "te:optimization-metric/te:explicit-route-include-objects/"
  + "te:route-object-include-object/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

/* Augment label hop of route-object-exclude-always of
secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:explicit-route-objects-always/"
  + "te:route-object-exclude-always/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

```

```

  }
}

/* Augment label hop of route-object-include-exclude of
secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:explicit-route-objects-always/"
  + "te:route-object-include-exclude/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-hop;
  }
}

```

```

}

/* Augment label restrictions for the forwarding direction of
   path-in-segment of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:path-in-segment/te:label-restrictions/"
  + "te:label-restriction" {
  description "OTN label.";
  uses l1-types:otn-label-range-info;
}

/* Augment label restrictions start for the forwarding direction of
   path-in-segment of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:path-in-segment/te:label-restrictions/"
  + "te:label-restriction/te:label-start/"
  + "te:te-label/te:technology" {
  description "OTN label.";
  case otn {
    uses l1-types:otn-label-start-end;
  }
}

/* Augment label restrictions end for the forwarding direction of
   path-in-segment of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:path-in-segment/te:label-restrictions/"
  + "te:label-restriction/te:label-end/"
  + "te:te-label/te:technology" {
  description "OTN label.";
  case otn {

```

```

    uses l1-types:otn-label-start-end;
  }
}

/* Augment label restrictions for the forwarding direction of
   path-out-segment of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"

```



```

    + "te:p2p-secondary-paths/te:p2p-secondary-path/"
    + "te:path-out-segment/te:label-restrictions/"
    + "te:label-restriction" {
description "OTN label.";
uses l1-types:otn-label-range-info;
}

/* Augment label restrictions start for the forwarding direction of
   path-out-segment of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-secondary-paths/te:p2p-secondary-path/"
    + "te:path-out-segment/te:label-restrictions/"
    + "te:label-restriction/te:label-start/"
    + "te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-start-end;
}
}

/* Augment label restrictions end for the forwarding direction of
   path-out-segment of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-secondary-paths/te:p2p-secondary-path/"
    + "te:path-out-segment/te:label-restrictions/"
    + "te:label-restriction/te:label-end/"
    + "te:te-label/te:technology" {
description "OTN label.";
case otn {
    uses l1-types:otn-label-start-end;
}
}

/* Augment label hop of path-route of secondary path */
augment "/te:te/te:tunnels/te:tunnel/"
    + "te:p2p-secondary-paths/te:p2p-secondary-path/"
    + "te:computed-paths-properties/"
    + "te:computed-path-properties/"
    + "te:path-properties/te:path-route-objects/"
    + "te:path-computed-route-object/te:type/te:label/"
    + "te:label-hop/te:te-label/te:technology" {

```

```

description "OTN label.";
case otn {
  uses l1-types:otn-label-hop;
}
}

/* Augment label hop of record-route of secondary LSP */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:lsps/te:lsp/te:lsp-record-route-information/"
  + "te:lsp-record-route-information/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";
case otn {
  uses l1-types:otn-label-hop;
}
}

/* Augment label hop of path-route of secondary LSP */
augment "/te:te/te:tunnels/te:tunnel/"
  + "te:p2p-secondary-paths/te:p2p-secondary-path/"
  + "te:lsps/te:lsp/te:path-properties/"
  + "te:path-route-objects/"
  + "te:path-computed-route-object/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";
case otn {
  uses l1-types:otn-label-hop;
}
}

/* Augment label hop of record-route of LSP */
augment "/te:te/te:lsps-state/"
  + "te:lsp/te:lsp-record-route-information/"
  + "te:lsp-record-route-information/te:type/te:label/"
  + "te:label-hop/te:te-label/te:technology" {
description "OTN label.";
case otn {
  uses l1-types:otn-label-hop;
}
}
}
}
<CODE ENDS>

```

6. Security Considerations

The YANG module specified in this document defines a schema for data that is designed to be accessed via network management protocols such as NETCONF [[RFC6241](#)] or RESTCONF [[RFC8040](#)]. The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH) [[RFC6242](#)]. The lowest RESTCONF layer is HTTPS, and the mandatory-to-implement secure transport is TLS [[RFC8446](#)].

The NETCONF access control model [[RFC8341](#)] provides the means to restrict access for particular NETCONF or RESTCONF users to a preconfigured subset of all available NETCONF or RESTCONF protocol operations and content.

There are a number of data nodes defined in this YANG module that are writable/creatable/deletable (i.e., config true, which is the default). These data nodes may be considered sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations. Considerations in Section 10 of [[I-D.ietf-teas-yang-te](#)] are also applicable to their subtrees in the module defined in this document.

Some of the readable data nodes in this YANG module may be considered sensitive or vulnerable in some network environments. It is thus important to control read access (e.g., via get, get-config, or notification) to these data nodes. Considerations in Section 10 of [[I-D.ietf-teas-yang-te](#)] are also applicable to their subtrees in the module defined in this document.

7. IANA Considerations

It is proposed that IANA should assign new URIs from the "IETF XML Registry" [[RFC3688](#)] as follows:

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

This document registers following YANG modules in the YANG Module

name: ietf-otn-tunnel
namespace: urn:ietf:params:xml:ns:yang:ietf-otn-tunnel
prefix: otn-tunnel
reference: RFC XXXX

[8.](#) Acknowledgements

TBD.

[9.](#) Contributors

Aihua Guo
Futurewei
Email: aihuaguo.ietf@gmail.com

Anurag Sharma
Google
Email: ansha@google.com

Rajan Rao
Infinera
Email: rrao@infinera.com

Yunbo Li
China Mobile
Email: liyunbo@chinamobile.com

Dieter Beller
Nokia
Email: dieter.beller@nokia.com

Yanlei Zheng
China Unicom
Email: zhengyanlei@chinaunicom.cn

Xian Zhang
Huawei Technologies
Email: zhang.xian@huawei.com

Lei Wang
China Mobile
Email: wangleiyj@chinamobile.com

Oscar Gonzalez de Dios
Telefonica
Email: oscar.gonzalezdedios@telefonica.com

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Authors' Addresses

Haomian Zheng
Huawei Technologies
H1, Huawei Xiliu Beipo Village, Songshan Lake
Dongguan, Guangdong 523808
China

Email: zhenghaomian@huawei.com

Italo Busi
Huawei Technologies
HUAWEI TECHNOLOGIES ITALIA Srl Centro Direzionale Milano 2
Milan, Milan 20090

Italy

Email: Italo.Busi@huawei.com

Sergio Belotti

Nokia

Email: sergio.belotti@nokia.com

Victor Lopez

Telefonica

Email: victor.lopezalvarez@telefonica.com

Yunbin Xu

CAICT

Email: xuyunbin@caict.ac.cn