

CCAMP Working Group
Internet Draft
Intended status: Standard Track
Expires: April 19, 2019

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October 18, 2018

A Yang Data Model for WSON Optical Networks

[draft-ietf-ccamp-wson-yang-14](#)

Abstract

This document provides a YANG data model for the routing and wavelength assignment (RWA) TE topology in wavelength switched optical networks (WSONs).

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Internet-Draft

WSOY YANG Model

October 2018

This Internet-Draft will expire on April 19, 2019.

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[1.](#) Introduction

This document provides a YANG data model for the routing and wavelength assignment (RWA) Traffic Engineering (TE) topology in wavelength switched optical networks (WSONs). The YANG model described in this document is a WSON technology-specific Yang model based on the information model developed in [[RFC7446](#)] and the two

encoding documents [[RFC7581](#)] and [[RFC7579](#)] that developed protocol independent encodings based on [[RFC7446](#)].

This document augments the generic TE topology draft [[TE-TOP0](#)].

What is not in scope of this document is both impairment-aware WSON and flex-grid.

This document defines two YANG models: ietf-wson-topology ([Section 3](#)) and ietf-layer0-types ([Section 4](#)).

[1.1](#). Terminology

Refer to [[RFC7446](#)] and [[RFC7581](#)] for the key terms used in this document.

The following terms are defined in [[RFC7950](#)] and are not redefined here:

- o client
- o server
- o augment
- o data model
- o data node

The following terms are defined in [[RFC6241](#)] and are not redefined here:

- o configuration data
- o state data

The terminology for describing YANG data models is found in [\[RFC7950\]](#).

[1.2.](#) Tree diagram

A simplified graphical representation of the data model is used in chapter 2 of this this document. The meaning of the symbols in these diagrams is defined in [\[RFC8340\]](#).

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WSON YANG Model

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[1.3.](#) Prefixes in Data Node Names

In this document, names of data nodes and other data model objects are prefixed using the standard prefix associated with the corresponding YANG imported modules, as shown in Table 1.

Prefix	YANG module	Reference
layer0-type	ietf-layer0-types	[RFCXXXX]
wson	ietf-wson-topology	[RFCXXXX]
nw	ietf-network	[RFC8345]
nt	ietf-network-topology	[RFC8345]
tet	ietf-te-topology	[TE-TOP0]

Table 1: Prefixes and corresponding YANG modules

Note: The RFC Editor will replace XXXX with the number assigned to the RFC once this draft becomes an RFC.

[2.](#) YANG Model (Tree Structure)

```
module: ietf-wson-topology
  augment /nw:networks/nw:network/nw:network-types/tet:te-topology:
    +---rw wson-topology!
  augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes:
  augment /nw:networks/nw:network/nw:node/nt:termination-point/tet:te:
    +---rw supported-payload-types* [index]
```

```

    |   +--rw index                uint16
    |   +--rw payload-type?       string
    +--rw client-facing?          boolean
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-attributes:
  +--rw wson-node
    +--rw node-type?             identityref
augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-poin
  +--rw supported-operational-modes*   layer0-types:operational-mode
  +--rw configured-operational-modes?  layer0-types:operational-mode
  +--rw supported-fec-types*           identityref
  +--rw supported-termination-types*   identityref
  +--rw supports-bit-stuffing?         boolean
  +--rw is-tunable?                   boolean
  +--rw max-subcarrier-channel-num?    uint8
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:

```

```

  +--:(wson)
    +--rw bandwidth-type?           identityref
augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-
attributes/tet:connectivity-matrices/tet:path-constraints/tet:te-
bandwidth/tet:technology:
  +--:(wson)
    +--rw supported-bandwidth-list*  identityref
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:
  +--:(wson)
    +--rw supported-bandwidth-list*  identityref
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-
entry/tet:connectivity-matrices/tet:path-constraints/tet:te-
bandwidth/tet:technology:
  +--:(wson)
    +--ro supported-bandwidth-list*  identityref
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:
  +--:(wson)
    +--ro supported-bandwidth-list*  identityref
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:

```

```

    +--:(wson)
      +--rw supported-bandwidth-list*   identityref
    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:
    +--:(wson)
      +--rw supported-bandwidth-list*   identityref
    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:
    +--:(wson)
      +--rw supported-bandwidth-list*   identityref
    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:
    +--:(wson)
      +--rw bandwidth-type?   identityref
    augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes/tet:
link-bandwidth/tet:te-bandwidth/tet:technology:
    +--:(wson)
      +--rw supported-bandwidth-list*   identityref
    augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes/tet:
resv-link-bandwidth/tet:te-bandwidth/tet:technology:
    +--:(wson)

```

```

    +--rw supported-bandwidth-list*   identityref
    augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-
attributes/tet:unreserved-bandwidth/tet:te-bandwidth/tet:technology:
    +--:(wson)
      +--rw supported-bandwidth-list*   identityref
    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:
    +--:(wson)
      +--ro bandwidth-type?   identityref
    augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-
entry/tet:max-link-bandwidth/tet:te-bandwidth/tet:technology:
    +--:(wson)
      +--ro supported-bandwidth-list*   identityref
    augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-
entry/tet:max-resv-link-bandwidth/tet:te-bandwidth/tet:technology:
    +--:(wson)

```

```

        +--ro supported-bandwidth-list*   identityref
    augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-
entry/tet:unreserved-bandwidth/tet:te-bandwidth/tet:technology:
        +--:(wson)
            +--ro supported-bandwidth-list*   identityref
            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:
                +--:(wson)
                    +--rw bandwidth-type?   identityref
                    augment /nw:networks/tet:te/tet:templates/tet:link-template/tet:te-link-
attributes/tet:max-link-bandwidth/tet:te-bandwidth/tet:technology:
                        +--:(wson)
                            +--rw supported-bandwidth-list*   identityref
                            augment /nw:networks/tet:te/tet:templates/tet:link-template/tet:te-link-
attributes/tet:max-resv-link-bandwidth/tet:te-bandwidth/tet:technology:
                                +--:(wson)
                                    +--rw supported-bandwidth-list*   identityref
                                    augment /nw:networks/tet:te/tet:templates/tet:link-template/tet:te-link-
attributes/tet:unreserved-bandwidth/tet:te-bandwidth/tet:technology:
                                        +--:(wson)
                                            +--rw supported-bandwidth-list*   identityref
                                            augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-
attributes/tet:connectivity-matrices/tet:label-restrictions/tet:label-restri
+--rw grid-type?   identityref
+--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:
        +--:(wson)
            +--rw (grid-type)?
                +--:(dwdm)

```

```

| +--rw channel-freq?           frequency-thz
+--:(cwdm)
    +--rw channel-wavelength?   uint32
    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:
        +--:(wson)
            +--rw (grid-type)?
                +--:(dwdm)

```

```

    |   +--rw channel-freq?          frequency-thz
    +--:(cwdm)
        +--rw channel-wavelength?   uint32
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:
+--:(wson)
    +--rw (grid-type)?
    +--:(dwdm)
        |   +--rw (single-or-super-channel)?
        |       +--:(single)
        |           |   +--rw channel-freq?          frequency-thz
        |           +--:(super)
        |               +--rw subcarrier-channels*   frequency-thz
        +--:(cwdm)
            +--rw channel-wavelength?   uint32
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:
+--:(wson)
    +--rw (grid-type)?
    +--:(dwdm)
        |   +--rw (single-or-super-channel)?
        |       +--:(single)
        |           |   +--rw channel-freq?          frequency-thz
        |           +--:(super)
        |               +--rw subcarrier-channels*   frequency-thz
        +--:(cwdm)
            +--rw channel-wavelength?   uint32
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:
+--:(wson)
    +--rw (grid-type)?
    +--:(dwdm)
        |   +--rw (single-or-super-channel)?
        |       +--:(single)
        |           |   +--rw channel-freq?          frequency-thz

```



```

        |      +--rw subcarrier-channels*   frequency-thz
    +--:(cwdm)
        +--rw channel-wavelength?   uint32
    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:
    +--:(wson)
        +--rw (grid-type)?
            +--:(dwdm)
                |   +--rw (single-or-super-channel)?
                |       +--:(single)
                |           |   +--rw channel-freq?           frequency-thz
                |           +--:(super)
                |               +--rw subcarrier-channels*   frequency-thz
            +--:(cwdm)
                +--rw channel-wavelength?   uint32
    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:
    +--:(wson)
        +--ro (grid-type)?
            +--:(dwdm)
                |   +--ro (single-or-super-channel)?
                |       +--:(single)
                |           |   +--ro channel-freq?           frequency-thz
                |           +--:(super)
                |               +--ro subcarrier-channels*   frequency-thz
            +--:(cwdm)
                +--ro channel-wavelength?   uint32
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-
attributes/tet:connectivity-matrices/tet:connectivity-matrix/tet:from/tet:la
restrictions/tet:label-restriction:
        +--rw grid-type?   identityref
        +--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:la
restrictions/tet:label-restriction/tet:label-start/tet:te-label/tet:technolo
    +--:(wson)
        +--rw (grid-type)?
            +--:(dwdm)
                |   +--rw channel-freq?           frequency-thz
            +--:(cwdm)
                +--rw channel-wavelength?   uint32

```

```

    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-
attributes/tet:connectivity-matrices/tet:connectivity-matrix/tet:from/tet:la
restrictions/tet:label-restriction/tet:label-end/tet:te-label/tet:technology
    +--:(wson)
        +--rw (grid-type)?
            +--:(dwdm)
                | +--rw channel-freq?          frequency-thz
            +--:(cwdm)
                +--rw channel-wavelength?    uint32
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-
attributes/tet:connectivity-matrices/tet:connectivity-matrix/tet:to/tet:labe
restrictions/tet:label-restriction:
    +--rw grid-type?    identityref
    +--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:labe
restrictions/tet:label-restriction/tet:label-start/tet:te-label/tet:technolo
    +--:(wson)
        +--rw (grid-type)?
            +--:(dwdm)
                | +--rw channel-freq?          frequency-thz
            +--:(cwdm)
                +--rw channel-wavelength?    uint32
    augment /nw:networks/nw:network/nw:node/tet:te/tet:te-node-
attributes/tet:connectivity-matrices/tet:connectivity-matrix/tet:to/tet:labe
restrictions/tet:label-restriction/tet:label-end/tet:te-label/tet:technology
    +--:(wson)
        +--rw (grid-type)?
            +--:(dwdm)
                | +--rw channel-freq?          frequency-thz
            +--:(cwdm)
                +--rw channel-wavelength?    uint32
    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:
    +--:(wson)
        +--rw (grid-type)?
            +--:(dwdm)
                | +--rw (single-or-super-channel)?
                |     +--:(single)
                |         | +--rw channel-freq?          frequency-thz
                |         +--:(super)
                |             +--rw subcarrier-channels*  frequency-thz
            +--:(cwdm)
                +--rw channel-wavelength?    uint32

```

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:
hop/tet:te-label/tet:technology:

```
+--:(wson)
  +--rw (grid-type)?
    +--:(dwdm)
      | +--rw (single-or-super-channel)?
      |   +--:(single)
      |     | +--rw channel-freq?          frequency-thz
      |     +--:(super)
      |       +--rw subcarrier-channels*    frequency-thz
    +--:(cwdm)
      +--rw channel-wavelength?    uint32
```

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:

```
+--:(wson)
  +--rw (grid-type)?
    +--:(dwdm)
      | +--rw (single-or-super-channel)?
      |   +--:(single)
      |     | +--rw channel-freq?          frequency-thz
      |     +--:(super)
      |       +--rw subcarrier-channels*    frequency-thz
    +--:(cwdm)
      +--rw channel-wavelength?    uint32
```

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:

```
+--:(wson)
  +--rw (grid-type)?
    +--:(dwdm)
      | +--rw (single-or-super-channel)?
      |   +--:(single)
      |     | +--rw channel-freq?          frequency-thz
      |     +--:(super)
```

```

|         +--rw subcarrier-channels*   frequency-thz
+--:(cwdm)
|         +--rw channel-wavelength?    uint32
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:
+--:(wson)
|         +--ro (grid-type)?
|         +--:(dwdm)

```

```

|         +--ro (single-or-super-channel)?
|         +--:(single)
|         |         +--ro channel-freq?           frequency-thz
|         +--:(super)
|         |         +--ro subcarrier-channels*   frequency-thz
+--:(cwdm)
|         +--ro channel-wavelength?    uint32
augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-
entry/tet:connectivity-matrices/tet:label-restrictions/tet:label-restriction
+--ro grid-type?    identityref
+--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:
+--:(wson)
|         +--ro (grid-type)?
|         +--:(dwdm)
|         |         +--ro channel-freq?           frequency-thz
|         +--:(cwdm)
|         |         +--ro channel-wavelength?    uint32
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:
+--:(wson)
|         +--ro (grid-type)?
|         +--:(dwdm)
|         |         +--ro channel-freq?           frequency-thz
|         +--:(cwdm)
|         |         +--ro channel-wavelength?    uint32
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:
  +--:(wson)
    +--ro (grid-type)?
      +--:(dwdm)
        | +--ro (single-or-super-channel)?
        |   +--:(single)
        |     | +--ro channel-freq?          frequency-thz
        |     +--:(super)
        |       +--ro subcarrier-channels*    frequency-thz
      +--:(cwdm)
        +--ro channel-wavelength?    uint32
  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:
  +--:(wson)
    +--ro (grid-type)?
      +--:(dwdm)
        | +--ro (single-or-super-channel)?

```

```

        |   +--:(single)
        |     | +--ro channel-freq?          frequency-thz
        |     +--:(super)
        |       +--ro subcarrier-channels*    frequency-thz
      +--:(cwdm)
        +--ro channel-wavelength?    uint32
  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:
  +--:(wson)
    +--ro (grid-type)?
      +--:(dwdm)
        | +--ro (single-or-super-channel)?
        |   +--:(single)
        |     | +--ro channel-freq?          frequency-thz
        |     +--:(super)
        |       +--ro subcarrier-channels*    frequency-thz
      +--:(cwdm)
        +--ro channel-wavelength?    uint32
  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:
  +--:(wson)
    +--ro (grid-type)?
      +--:(dwdm)
        | +--ro (single-or-super-channel)?
        |   +--:(single)
        |     | +--ro channel-freq?          frequency-thz
        |     +--:(super)
        |       +--ro subcarrier-channels*    frequency-thz
      +--:(cwdm)
        +--ro channel-wavelength?    uint32
  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:
  +--:(wson)
    +--ro (grid-type)?
      +--:(dwdm)
        | +--ro (single-or-super-channel)?
        |   +--:(single)
        |     | +--ro channel-freq?          frequency-thz
        |     +--:(super)
        |       +--ro subcarrier-channels*    frequency-thz
      +--:(cwdm)

```

```

      +--ro channel-wavelength?    uint32
  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 grid-type?    identityref
  +--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:technolo
  +--:(wson)
    +--ro (grid-type)?
      +--:(dwdm)
        | +--ro channel-freq?          frequency-thz
      +--:(cwdm)
        +--ro channel-wavelength?    uint32

```

```

    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
    +--:(wson)
        +--ro (grid-type)?
            +--:(dwdm)
                | +--ro channel-freq?          frequency-thz
            +--:(cwdm)
                +--ro channel-wavelength?    uint32
    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 grid-type?    identityref
    +--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
    +--:(wson)
        +--ro (grid-type)?
            +--:(dwdm)
                | +--ro channel-freq?          frequency-thz
            +--:(cwdm)
                +--ro channel-wavelength?    uint32
    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
    +--:(wson)
        +--ro (grid-type)?
            +--:(dwdm)
                | +--ro channel-freq?          frequency-thz
            +--:(cwdm)
                +--ro channel-wavelength?    uint32
    augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-
entry/tet:connectivity-matrices/tet:connectivity-matrix/tet:underlay/tet:pri

```

```

path/tet:path-element/tet:type/tet:label/tet:label-hop/tet:te-
label/tet:technology:
    +--:(wson)
        +--ro (grid-type)?
            +--:(dwdm)
                | +--ro (single-or-super-channel)?
                |     +--:(single)

```

```

        |         |  +--ro channel-freq?          frequency-thz
        |         +---:(super)
        |         +--ro subcarrier-channels*    frequency-thz
    +---:(cwdm)
        +--ro channel-wavelength?    uint32
    augment /nw:networks/nw:network/nw:node/tet:te/tet:information-source-
entry/tet:connectivity-matrices/tet:connectivity-matrix/tet:underlay/tet:back-
path/tet:path-element/tet:type/tet:label/tet:label-hop/tet:te-
label/tet:technology:
    +---:(wson)
        +--ro (grid-type)?
        +---:(dwdm)
            |  +--ro (single-or-super-channel)?
            |  +---:(single)
            |  |  +--ro channel-freq?          frequency-thz
            |  +---:(super)
            |  +--ro subcarrier-channels*    frequency-thz
        +---:(cwdm)
            +--ro channel-wavelength?    uint32
    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:
    +---:(wson)
        +--ro (grid-type)?
        +---:(dwdm)
            |  +--ro (single-or-super-channel)?
            |  +---:(single)
            |  |  +--ro channel-freq?          frequency-thz
            |  +---:(super)
            |  +--ro subcarrier-channels*    frequency-thz
        +---:(cwdm)
            +--ro channel-wavelength?    uint32
    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:
    +---:(wson)
        +--ro (grid-type)?
        +---:(dwdm)

```



```

        |   +--ro (single-or-super-channel)?
        |       +---:(single)
        |           |   +--ro channel-freq?           frequency-thz
        |           +---:(super)
        |               +--ro subcarrier-channels*   frequency-thz
        +---:(cwdm)
            +--ro channel-wavelength?   uint32
    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:
    +---:(wson)
        +--ro (grid-type)?
        +---:(dwdm)
            |   +--ro (single-or-super-channel)?
            |       +---:(single)
            |           |   +--ro channel-freq?           frequency-thz
            |           +---:(super)
            |               +--ro subcarrier-channels*   frequency-thz
            +---:(cwdm)
                +--ro channel-wavelength?   uint32
    augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-
point/tet:local-link-connectivities/tet:label-restrictions/tet:label-restric
    +---rw grid-type?   identityref
    +---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:
    +---:(wson)
        +---rw (grid-type)?
        +---:(dwdm)
            |   +---rw channel-freq?           frequency-thz
            +---:(cwdm)
                +---rw channel-wavelength?   uint32
    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:
    +---:(wson)
        +---rw (grid-type)?
        +---:(dwdm)
            |   +---rw channel-freq?           frequency-thz
            +---:(cwdm)
                +---rw channel-wavelength?   uint32
    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:
    +---:(wson)
        +---rw (grid-type)?
        +---:(dwdm)

```

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```

        |   +--rw (single-or-super-channel)?
        |       +--:(single)
        |           |   +--rw channel-freq?           frequency-thz
        |           +--:(super)
        |               +--rw subcarrier-channels*    frequency-thz
        +--:(cwdm)
            +--rw channel-wavelength?    uint32
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:
+--:(wson)
    +--rw (grid-type)?
    +--:(dwdm)
        |   +--rw (single-or-super-channel)?
        |       +--:(single)
        |           |   +--rw channel-freq?           frequency-thz
        |           +--:(super)
        |               +--rw subcarrier-channels*    frequency-thz
        +--:(cwdm)
            +--rw channel-wavelength?    uint32
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:
+--:(wson)
    +--rw (grid-type)?
    +--:(dwdm)
        |   +--rw (single-or-super-channel)?
        |       +--:(single)
        |           |   +--rw channel-freq?           frequency-thz
        |           +--:(super)
        |               +--rw subcarrier-channels*    frequency-thz
        +--:(cwdm)
            +--rw channel-wavelength?    uint32
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:
+--:(wson)
    +--rw (grid-type)?

```

```

+---:(dwdm)
|   +---rw (single-or-super-channel)?
|       +---:(single)
|           |   +---rw channel-freq?           frequency-thz
|           +---:(super)
|               +---rw subcarrier-channels*   frequency-thz
+---:(cwdm)

```

```

+---rw channel-wavelength?   uint32
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:
+---:(wson)
+---ro (grid-type)?
+---:(dwdm)
|   +---ro (single-or-super-channel)?
|       +---:(single)
|           |   +---ro channel-freq?           frequency-thz
|           +---:(super)
|               +---ro subcarrier-channels*   frequency-thz
+---:(cwdm)
+---ro channel-wavelength?   uint32
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 grid-type?   identityref
+---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:
+---:(wson)
+---rw (grid-type)?
+---:(dwdm)
|   +---rw channel-freq?           frequency-thz
+---:(cwdm)
+---rw channel-wavelength?   uint32
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:
+---:(wson)
+---rw (grid-type)?

```

```

    +---:(dwdm)
    |   +---rw channel-freq?          frequency-thz
    +---:(cwdm)
        +---rw channel-wavelength?   uint32
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:
    +---:(wson)
        +---rw (grid-type)?
            +---:(dwdm)
                |   +---rw (single-or-super-channel)?
                |       +---:(single)
                |       |   +---rw channel-freq?          frequency-thz
                |       +---:(super)

```

```

    |   +---rw subcarrier-channels*   frequency-thz
    +---:(cwdm)
        +---rw channel-wavelength?   uint32
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:
    +---:(wson)
        +---rw (grid-type)?
            +---:(dwdm)
                |   +---rw (single-or-super-channel)?
                |       +---:(single)
                |       |   +---rw channel-freq?          frequency-thz
                |       +---:(super)
                |       +---rw subcarrier-channels*   frequency-thz
            +---:(cwdm)
                +---rw channel-wavelength?   uint32
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:
    +---:(wson)
        +---rw (grid-type)?
            +---:(dwdm)
                |   +---rw (single-or-super-channel)?

```

```

|      +--:(single)
|      | +--rw channel-freq?          frequency-thz
|      +--:(super)
|      +--rw subcarrier-channels*    frequency-thz
+--:(cwdm)
+--rw channel-wavelength?    uint32
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:
+--:(wson)
+--rw (grid-type)?
+--:(dwdm)
| +--rw (single-or-super-channel)?
| +--:(single)
| | +--rw channel-freq?          frequency-thz
| +--:(super)
| +--rw subcarrier-channels*    frequency-thz
+--:(cwdm)
+--rw channel-wavelength?    uint32
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:
+--:(wson)
+--ro (grid-type)?
+--:(dwdm)
| +--ro (single-or-super-channel)?
| +--:(single)
| | +--ro channel-freq?          frequency-thz
| +--:(super)
| +--ro subcarrier-channels*    frequency-thz
+--:(cwdm)
+--ro channel-wavelength?    uint32
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:
+--:(wson)
+--rw (grid-type)?
+--:(dwdm)

```

```

    |   +--rw (single-or-super-channel)?
    |       +--:(single)
    |           |   +--rw channel-freq?          frequency-thz
    |           +--:(super)
    |               +--rw subcarrier-channels*    frequency-thz
    +--:(cwdm)
        +--rw channel-wavelength?    uint32
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:
+--:(wson)
    +--rw (grid-type)?
    +--:(dwdm)
    |   +--rw (single-or-super-channel)?
    |       +--:(single)
    |           |   +--rw channel-freq?          frequency-thz
    |           +--:(super)
    |               +--rw subcarrier-channels*    frequency-thz
    +--:(cwdm)
        +--rw channel-wavelength?    uint32
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes/tet:
restrictions/tet:label-restriction:
    +--rw grid-type?    identityref
    +--rw priority?     uint8
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes/tet:
restrictions/tet:label-restriction/tet:label-start/tet:te-label/tet:technolo
+--:(wson)
    +--rw (grid-type)?
    +--:(dwdm)
    |   +--rw channel-freq?          frequency-thz
    +--:(cwdm)

```

```

        +--rw channel-wavelength?    uint32
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes/tet:
restrictions/tet:label-restriction/tet:label-end/tet:te-label/tet:technology
+--:(wson)
    +--rw (grid-type)?
    +--:(dwdm)
    |   +--rw channel-freq?          frequency-thz
    +--:(cwdm)
        +--rw channel-wavelength?    uint32
augment /nw:networks/nw:network/nt:link/tet:te/tet:information-source-

```

```

entry/tet:label-restrictions/tet:label-restriction:
  +--ro grid-type?    identityref
  +--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:
  +--:(wson)
    +--ro (grid-type)?
      +--:(dwdm)
        | +--ro channel-freq?          frequency-thz
      +--:(cwdm)
        +--ro channel-wavelength?    uint32
  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:
  +--:(wson)
    +--ro (grid-type)?
      +--:(dwdm)
        | +--ro channel-freq?          frequency-thz
      +--:(cwdm)
        +--ro channel-wavelength?    uint32
  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:
  +--:(wson)
    +--rw (grid-type)?
      +--:(dwdm)
        | +--rw (single-or-super-channel)?
        |   +--:(single)
        |     | +--rw channel-freq?          frequency-thz
        |     +--:(super)
        |       +--rw subcarrier-channels*   frequency-thz
      +--:(cwdm)
        +--rw channel-wavelength?    uint32
  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:
  +--:(wson)
    +--rw (grid-type)?

```

```

+--:(dwdm)
| +--rw (single-or-super-channel)?

```

```

        |      +--:(single)
        |      |      +--rw channel-freq?          frequency-thz
        |      +--:(super)
        |      +--rw subcarrier-channels*      frequency-thz
    +--:(cwdm)
        +--rw channel-wavelength?      uint32
    augment /nw:networks/tet:te/tet:templates/tet:link-template/tet:te-link-
attributes/tet:label-restrictions/tet:label-restriction:
        +--rw grid-type?      identityref
        +--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:
label/tet:technology:
        +--:(wson)
            +--rw (grid-type)?
                +--:(dwdm)
                    |      +--rw channel-freq?          frequency-thz
                +--:(cwdm)
                    +--rw channel-wavelength?      uint32
    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:
        +--:(wson)
            +--rw (grid-type)?
                +--:(dwdm)
                    |      +--rw channel-freq?          frequency-thz
                +--:(cwdm)
                    +--rw channel-wavelength?      uint32

```

[3. IETF-WSON-Topology YANG Model](#)

<CODE BEGINS> file "ietf-wson-topology@2018-10-15.yang"

```

module ietf-wson-topology {

    yang-version 1.1;

```



```
namespace "urn:ietf:params:xml:ns:yang:ietf-wson-topology";

prefix "wson";

import ietf-network {
    prefix "nw";
}

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

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

import ietf-layer0-types {
    prefix "layer0-types";
}

organization
    "IETF CCAMP Working Group";

contact
    "Editor:   Young Lee   <leeyoung@huawei.com>
     Editor:   Aihua Guo  <aihuaguo@huawei.com>";

description
    "This module contains a collection of YANG definitions for
    RWA WSON.

    Copyright (c) 2018 IETF Trust and the persons identified
    as authors of the code.  All rights reserved.

    Redistribution and use in source and binary forms, with
    or without modification, is permitted pursuant to, and
    subject to the license terms contained in, the Simplified BSD
    License set forth in Section 4.c of the IETF Trust's Legal
    Provisions Relating to IETF Documents
    (http://trustee.ietf.org/license-info).";

revision 2018-10-15 {
    description
        "version 14.";

    reference
```

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```
    "RFC XXX: A Yang Data Model for WSON Optical Networks ";
}

/*
 * Groupings
 */
grouping wson-node-attributes {
  description "WSOON node attributes";
  container wson-node {
    description "WSOON node attrttributes.";
    leaf node-type {
      type identityref {
        base layer0-types:layer0-node-type;
      }
      description "WSOON node type.";
    }
  }
}

grouping wson-link-attributes {
  description
    "Future WSON link attributes extensions";
}

grouping wson-tp-attributes {
  description "wson-tp-attributes";

  list supported-payload-types {
    key "index";
    description
      "Supported payload types of a TP. The payload type is defined
      as the generalized PIDs in GMPLS.";
    leaf index {
      type uint16;
      description "payload type index";
    }
    leaf payload-type {
      type string;
      description "the payload type supported by this client tp";
      reference
        "http://www.iana.org/assignments/gmpls-sig-parameters
        /gmpls-sig-parameters.xhtml";
    }
  }
}
```

```

    }
}
leaf client-facing {
    type boolean;
    default 'false';

```

```

    description
        "Indicating if it is a client-facing TP.";
    }
}

grouping wson-ttp-attributes {
    description
        "WSOY tunnel termination point (e.g.transponder)
        attributes";

    leaf-list supported-operational-modes {
        type layer0-types:operational-mode;
        description
            "List of all supported vendor-specific
            mode identifiers";
    }

    leaf configured-operational-modes {
        type layer0-types:operational-mode;
        description
            "Vendor-specific mode identifier configured
            on the TTP.";
    }

    leaf-list supported-fec-types {
        type identityref {
            base layer0-types:fec-type;
        }
        description
            "List of all supported FEC types by this TTP.";
    }

    leaf-list supported-termination-types {
        type identityref {
            base layer0-types:term-type;
        }
        description

```

```

        "List of all supported termination types by this TTP.";
    }

    leaf supports-bit-stuffing {
        type boolean;
        description
            "Indicate whether bit stuffing is supported by this TTP.";
    }

    leaf is-tunable {

```

```

        type boolean;
        description
            "Indicates if the TTP, or transponder, is tunable. Tunable
            transponders are assumed to be fully tunable to any of the
            96 channels within DWDM C-band.";
    }

    leaf max-subcarrier-channel-num {
        type uint8 {
            range "1..max";
        }
        default 1;
        description
            "Indicate the maximum number of subcarrier channels for
            super-channel transponders. When the value equals 1 it
            represents regular single-channel transponder.";
    }
}

/*
 * Data nodes
 */

augment "/nw:networks/nw:network/nw:network-types"
+ "/tet:te-topology" {
    description "wson-topology augmented";
    container wson-topology {
        presence "indicates a topology of WSON";
        description
            "Container to identify WSON topology type";
    }
}

```

```

}

augment "/nw:networks/nw:network/nt:link/tet:te"
  + "/tet:te-link-attributes" {
  when "/nw:networks/nw:network/nw:network-types"
    + "/tet:te-topology/wson:wson-topology" {
    description "This augment is only valid for WSON.";
  }
  description "WSON Link augmentation.";
  uses wson-link-attributes;
}

augment "/nw:networks/nw:network/nw:node/nt:termination-point/"
  + "tet:te" {
  when "/nw:networks/nw:network/nw:network-types"

```

```

    + "/tet:te-topology/wson:wson-topology" {
    description "This augment is only valid for WSON.";
  }
  description "WSON TP attributes.";
  uses wson-tp-attributes;
}

augment "/nw:networks/nw:network/nw:node/tet:te"
  + "/tet:te-node-attributes" {
  when "/nw:networks/nw:network/nw:network-types"
    + "/tet:te-topology/wson:wson-topology" {
    description "This augment is only valid for WSON.";
  }
  description "WSON Node augmentation.";
  uses wson-node-attributes;
}

augment "/nw:networks/nw:network/nw:node/tet:te"
  + "/tet:tunnel-termination-point" {
  when "/nw:networks/nw:network/nw:network-types"
    + "/tet:te-topology/wson:wson-topology" {
    description "This augment is only valid for WSON.";
  }
  description "WSON tunnel termination point augmentation.";
  uses wson-ttp-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/"
  + "wson:wson-topology" {
    description "Augment WSON TE bandwidth";
  }
  description "WSON bandwidth.";
  case wson {
    uses layer0-types:wson-path-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/"
  + "wson:wson-topology" {
    description "Augment WSON TE bandwidth";
  }
  description "WSON bandwidth.";
  case wson {
    uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
    description "Augment WSON TE bandwidth";
  }
}

```

```

    description "WSON bandwidth.";
    case wson {
        uses layer0-types:wson-link-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/"
        + "wson:wson-topology" {
        description "Augment WSON TE bandwidth";
    }
}
description "WSON bandwidth.";
case wson {
    uses layer0-types:wson-link-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/"
        + "wson:wson-topology" {
        description "Augment WSON TE bandwidth";
    }
}
description "WSON bandwidth.";
case wson {
    uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
  description "Augment WSON TE bandwidth";
}
description "WSON bandwidth.";
case wson {
  uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
  description "Augment WSON TE bandwidth";
}
description "WSON bandwidth.";
case wson {
  uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
  description "Augment WSON TE bandwidth";
}
description "WSON bandwidth.";
case wson {
  uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
  description "WSON TE bandwidth.";
}
description "WSON bandwidth.";
case wson {
  uses layer0-types:wson-path-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/"
  + "wson:wson-topology" {
  description "WSON TE bandwidth.";
}
description "WSON bandwidth.";
case wson {
  uses layer0-types:wson-link-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/"

```

```

  + "wson:wson-topology" {
  description "WSON TE bandwidth.";
}
description "WSON bandwidth.";
case wson {
  uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
  description "WSON TE bandwidth.";
}
description "WSON bandwidth.";
case wson {
  uses layer0-types:wson-link-bandwidth;
}
}

/* Augment maximum LSP bandwidth of TE link information-source */
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" {
when "../../../nw:network-types/tet:te-topology/"
  + "wson:wson-topology" {
  description "WSON TE bandwidth.";
}
description "WSON bandwidth.";
case wson {
  uses layer0-types:wson-path-bandwidth;
}
}

/* Augment maximum bandwidth of TE link information-source */
augment "/nw:networks/nw:network/nt:link/tet:te/"
  + "tet:information-source-entry/"
  + "tet:max-link-bandwidth/"
  + "tet:te-bandwidth/tet:technology" {
when "../../../nw:network-types/tet:te-topology/"
  + "wson:wson-topology" {

```

```

  description "WSON TE bandwidth.";
}

```

```

    description "WSON bandwidth.";
    case wson {
        uses layer0-types:wson-link-bandwidth;
    }
}

/* Augment maximum reservable bandwidth of TE link information-source */
augment "/nw:networks/nw:network/nt:link/tet:te/"
    + "tet:information-source-entry/"
    + "tet:max-resv-link-bandwidth/"
    + "tet:te-bandwidth/tet:technology" {
when "../..../nw:network-types/tet:te-topology/"
    + "wson:wson-topology" {
    description "WSON TE bandwidth.";
}
description "WSON bandwidth.";
case wson {
    uses layer0-types:wson-link-bandwidth;
}
}

/* Augment unreserved bandwidth of TE link information-source */
augment "/nw:networks/nw:network/nt:link/tet:te/"
    + "tet:information-source-entry/"
    + "tet:unreserved-bandwidth/"
    + "tet:te-bandwidth/tet:technology" {
when "../..../nw:network-types/tet:te-topology/"
    + "wson:wson-topology" {
    description "WSON TE bandwidth.";
}
description "WSON bandwidth.";
case wson {
    uses layer0-types:wson-link-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/"
    + "wson:wson-topology" {

```

```
        description "WSON TE bandwidth.";
    }
*/
    description "WSON bandwidth.";
    case wson {
        uses layer0-types:wson-path-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/"
        + "wson:wson-topology" {
        description "WSON TE bandwidth.";
    }
*/
    description "WSON bandwidth.";
    case wson {
        uses layer0-types:wson-link-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/"
        + "wson:wson-topology" {
        description "WSON TE bandwidth.";
    }
*/
    description "WSON bandwidth.";
    case wson {
        uses layer0-types:wson-link-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/"
```

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```
        + "tet:te-bandwidth/tet:technology" {
/*
  when "../../../nw:network-types/tet:te-topology/"
    + "wson:wson-topology" {
      description "WSON TE bandwidth.";
    }
*/
  description "WSON bandwidth.";
  case wson {
    uses layer0-types:wson-link-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  uses layer0-types:layer0-label-restriction;
}

/* Augment label restrictions start 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/"
  + "tet:label-start/"
  + "tet:te-label/tet:technology" {
  when "../../../nw:network-types/tet:te-topology/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-link-label;
```

```
/* Augment label restrictions end 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/tet:label-end/"
+ "tet:te-label/tet:technology" {
when "../..../..../..../..../..../..../..../"
+ "nw:network-types/tet:te-topology/"
+ "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
case wson {
uses layer0-types:wson-link-label;
}
}

/* Augment label hop of underlay primary path of connectivity-matrices */
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" {
when "../..../..../..../..../..../..../..../"
+ "nw:network-types/tet:te-topology/"
+ "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
case wson {
uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
uses layer0-types:layer0-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/"
  + "wson:wson-topology" {
  description "Augment WSON TE label";
}
description "WSON label.";
case wson {
  uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
  description "Augment WSON TE label";
}
description "WSON label.";
case wson {
  uses layer0-types:wson-link-label;
}
}

/* Augment egress 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:to/"
  + "tet:label-restrictions/tet:label-restriction" {
when "../..../..../..../..../..../..../"
  + "nw:network-types/tet:te-topology/"

```

```

    + "wson:wson-topology" {
      description "Augment WSON TE label";
    }
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }

/* Augment egress 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:to/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-start/"
  + "tet:te-label/tet:technology" {
when "../..../..../..../..../..../..../..../..../"
  + "nw:network-types/tet:te-topology/"
  + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-link-label;
  }
}

```

```

/* Augment egress 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:to/"
  + "tet:label-restrictions/tet:label-restriction/"
  + "tet:label-end/"
  + "tet:te-label/tet:technology" {
when "../..../..../..../..../..../..../..../..../"
  + "nw:network-types/tet:te-topology/"
  + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-link-label;
  }
}

```

```

/* 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/"
  + "wson:wson-topology" {
  description "Augment WSON TE label";
}
description "WSON label.";
case wson {
  uses layer0-types:wson-path-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/"
  + "wson:wson-topology" {
  description "Augment WSON TE label";
}
}

```

```

}
description "WSON label.";
case wson {
  uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
    }
description "WSON label.";
case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
    }
description "WSON label.";
case wson {
    uses layer0-types:wson-path-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/"

```

```

        + "wson:wson-topology" {
        description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-path-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/"
        + "wson:wson-topology" {
        description "Augment WSON TE label";
    }
    description "WSON label.";
    uses layer0-types:layer0-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/"
        + "wson:wson-topology" {
        description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-link-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/"
+ "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
case wson {
uses layer0-types:wson-link-label;
}
}

```

/* 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/"
+ "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
case wson {
uses layer0-types:wson-path-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/"
+ "wson:wson-topology" {
description "Augment WSON TE label";
}
description "WSON label.";
}

```

```

    case wson {
      uses layer0-types:wson-path-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/"
      + "wson:wson-topology" {
        description "Augment WSON TE label";
      }
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-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/"
      + "wson:wson-topology" {
        description "Augment WSON TE label";
      }
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

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

```

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```
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/"
  + "wson:wson-topology" {
  description "Augment WSON TE label";
}
description "WSON label.";
case wson {
  uses layer0-types:wson-path-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/"
  + "wson:wson-topology" {
  description "Augment WSON TE label";
}
description "WSON label.";
uses layer0-types:layer0-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/"
  + "wson:wson-topology" {
```



```

    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-link-label;
  }
}

/* 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/"
  + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  uses layer0-types:layer0-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/"
  + "wson:wson-topology" {

```

```

    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-link-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/"
  + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-link-label;
  }
}

```

```

/* 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/"
    + "wson:wson-topology" {
        description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-path-label;
    }
}

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

```

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```

        + "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/"
    + "wson:wson-topology" {
        description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-path-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/"

```

```

    + "wson:wson-topology" {
      description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
      description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
      description "Augment WSON TE label";
    }
  }
}

```

```

    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-path-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/"
        + "wson:wson-topology" {
        description "Augment WSON TE label";
    }
    description "WSON label.";
    uses layer0-types:layer0-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/"
        + "wson:wson-topology" {
        description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-link-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-link-label;
    }
}

/* 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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
    }
}

```

```

    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
}
description "WSON label.";

```

```

    case wson {
      uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
      description "Augment WSON TE label";
    }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-path-label;
  }
}

/* Augment label restrictions 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" {
  when "../..../..../..../..../..../nw:network-types/tet:te-topology/"
    + "wson:wson-topology" {
      description "Augment WSON TE label";
    }
  description "WSON label.";
  uses layer0-types:layer0-label-restriction;
}

/* Augment label restrictions start 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-start/tet:te-label/tet:technology" {
when "../..../..../..../..../..../..../..../"
    + "nw:network-types/tet:te-topology/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-link-label;
}
}

/* Augment label restrictions end 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-end/tet:te-label/tet:technology" {
when "../..../..../..../..../..../..../..../"
    + "nw:network-types/tet:te-topology/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-link-label;
}
}

/* 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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
}
description "WSON label.";

```

```
    case wson {
      uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-path-label;
  }
}

/* Augment label hop of route-include of local-link-connectivity (LLC) */
augment "/nw:networks/nw:network/nw:node/tet:te/"
```

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```

    + "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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
  }
  description "WSON label.";
  case wson {
    uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";

```

```

    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
    }
    description "WSON label.";
    case wson {
        uses layer0-types:wson-path-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/"
    + "wson:wson-topology" {
description "Augment WSON TE label";
    }
    description "WSON label.";
    uses layer0-types:layer0-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-link-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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
}
description "WSON label.";
case wson {
    uses layer0-types:wson-link-label;
}
}
}

```

```

/* 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/"
    + "wson:wson-topology" {
    description "Augment WSON TE label";
}
description "WSON label.";
uses layer0-types:layer0-label-restriction;
}
}

```

```

/* Augment label restrictions start of TE link information-source */
augment "/nw:networks/nw:network/nt:link/tet:te/"

```



```

        when "../../../nw:network-types/tet:te-topology/"
            + "wson:wson-topology" {
            description "Augment WSON TE label";
        }
    */
    description "WSON label.";
    case wson {
        uses layer0-types:wson-link-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" {
/*
    when "../../../nw:network-types/tet:te-topology/"
        + "wson:wson-topology" {
        description "Augment WSON TE label";
    }
*/
    description "WSON label.";
    case wson {
        uses layer0-types:wson-link-label;
    }
}

```

```

    }
}
}

```

<CODE ENDS>

[4. IETF-Layer0-Types YANG Model](#)

<CODE BEGINS> file "ietf-layer0-types@2018-10-18.yang"

```

module ietf-layer0-types {
    namespace "urn:ietf:params:xml:ns:yang:ietf-layer0-types";
    prefix "layer0-types";

    organization
        "IETF CCAMP Working Group";
}

```


contact

WG Web: <<http://tools.ietf.org/wg/ccamp/>>

WG List: <<mailto:ccamp@ietf.org>>

Editor: Young Lee <<mailto:leeyoung@huawei.com>>

Editor: Aihua Guo <<mailto:aihuaguo@huawei.com>>;

description

"This module defines Optical Layer 0 types.";

revision "2018-10-18" {

description

"Revision 1";

reference "TBD";

}

typedef operational-mode {

type string;

description

"Vendor-specific mode that guarantees interoperability.

It must be an string with the following format:

B-DScW-ytz(v) where all these attributes are conformant
to the ITU-T recommendation";

reference "ITU-T G.698.2 (11/2009) [Section 5.3](#)";

}

typedef frequency-thz {

type decimal64 {

fraction-digits 5;

}

units THz;

description

"The DWDM frequency in THz, e.g. 193.12500";

reference

"[RFC6205](#)";

}

typedef frequency-ghz {

type decimal64 {

fraction-digits 5;

}

units GHz;

```
    description
      "The DWDM frequency in GHz, e.g. 193125.00";
    reference
      "RFC6205";
  }
```

```
identity layer0-node-type {
  description
    "layer0 node type.";
  reference
    "RFC6163";
}
```

```
identity flex-grid-node {
  base layer0-node-type;
  description
    "Flex Grid node.";
}
```

```
identity wson-node-foadm {
  base layer0-node-type;
  description
    "Fixed OADM node.";
}
```

```
identity wson-node-roadm {
  base layer0-node-type;
  description
    "ROADM or OXC node.";
}
```

```
identity wson-node-ila {
  base layer0-node-type;
  description
    "ILA (In-Line Amplifier) node.";
}
```

```
identity wavelength-assignment {
  description
    "Wavelength selection base";
}
```

```

identity unspecified-wavelength-assignment {
    base wavelength-assignment;
    description
        "No method specified";
}

identity first-fit-wavelength-assignment {
    base wavelength-assignment;
    description
        "All the available wavelengths are numbered,
        and this WA method chooses the available wavelength
        with the lowest index.";
}

identity random-wavelength-assignment {
    base wavelength-assignment;
    description
        "This WA method chooses an available
        wavelength randomly.";
}

identity least-loaded-wavelength-assignment {
    base wavelength-assignment;
    description
        "This WA method selects the wavelength that
        has the largest residual capacity on the most loaded
        link along the route (in multi-fiber networks).";
}

identity layer0-grid-type {
    description
        "Layer0 grid type.";
}

```

```

identity flex-grid-dwdm {
    base layer0-grid-type;
    description
        "Flex grid.";
}

identity wson-grid-dwdm {

```

```

    base layer0-grid-type;
    description
        "DWDM grid.";
}

identity wson-grid-cwdm {
    base layer0-grid-type;
    description
        "CWDM grid.";
}

identity layer0-bandwidth-type {
    description
        "Bandwidth type carried by a single wavelength channel.";
}

identity bw-otu1 {
    base layer0-bandwidth-type;
    description
        "OTU1 (2.66G)";
}

identity bw-otu1e {
    base layer0-bandwidth-type;
    description
        "OTU1e(11.04G)";
}

identity bw-otu1f {
    base layer0-bandwidth-type;
    description
        "OTU1f(11.27G)";
}

identity bw-otu2 {
    base layer0-bandwidth-type;
    description

```

```

    "OTU2 (10.70G)";
}

identity bw-otu2e {
    base layer0-bandwidth-type;

```

```

    description
        "OTU2e (11.09G)";
}

identity bw-otu2f {
    base layer0-bandwidth-type;
    description
        "OTU2f (11.31G)";
}

identity bw-otu3 {
    base layer0-bandwidth-type;
    description
        "OTU3 (43.01G)";
}

identity bw-otu3e1 {
    base layer0-bandwidth-type;
    description
        "OTU3e1 (44.57G)";
}

identity bw-otu3e2 {
    base layer0-bandwidth-type;
    description
        "OTU3e2 (44.58G)";
}

identity bw-otu4 {
    base layer0-bandwidth-type;
    description
        "OTU4 (111.80G)";
}

identity bw-otucn {
    base layer0-bandwidth-type;
    description
        "OTUCn (beyond 100G)";
}

```

```

identity dwdm-ch-spc-type {
    description

```

```

    "DWDM channel spacing type.";
}

identity dwdm-100ghz {
    base dwdm-ch-spc-type;
    description
        "100GHz channel spacing";
}

identity dwdm-50ghz {
    base dwdm-ch-spc-type;
    description
        "50GHz channel spacing";
}

identity dwdm-25ghz {
    base dwdm-ch-spc-type;
    description
        "25GHz channel spacing";
}

identity dwdm-12p5ghz {
    base dwdm-ch-spc-type;
    description
        "12.5GHz channel spacing";
}

identity dwdm-6p25ghz {
    base dwdm-ch-spc-type;
    description
        "6.25GHz channel spacing";
}

identity cwdm-ch-spc-type {
    description
        "CWDM channel spacing type.";
}

identity cwdm-20nm {
    base cwdm-ch-spc-type;
    description
        "20nm channel spacing";
}

```

```

identity fec-type {
    description
        "FEC type.";
}

identity g-fec {
    base fec-type;
    description
        "G-FEC.";
}
identity e-fec {
    base fec-type;
    description
        "E-FEC.";
}
identity no-fec {
    base fec-type;
    description
        "No FEC.";
}

identity term-type {
    description
        "Termination type.";
}

identity term-phys {
    base term-type;
    description
        "PHYS.";
}
identity term-otu {
    base term-type;
    description
        "OTU.";
}
identity term-odu {
    base term-type;
    description
        "ODU.";
}
identity term-opu {
    base term-type;
    description

```

```
    "OPU.";
}
identity term-section {
    base term-type;
    description
        "Section.";
}

/* Groupings. */
grouping wson-path-bandwidth {
    description "WSON path bandwidth attributes";
    leaf bandwidth-type {
        type identityref {
            base layer0-bandwidth-type;
        }
        description "WSON bandwidth type";
    }
}

grouping wson-link-bandwidth {
    description "WSON link bandwidth attributes";
    leaf-list supported-bandwidth-list {
        type identityref {
            base layer0-bandwidth-type;
        }
        description "WSON bandwidth type";
    }
}

grouping wson-link-label {
    description
        "Generic label for WSON links.";
    choice grid-type {
        description
            "Label for DWDM or CWDM grid";
        case dwdm {
            leaf channel-freq {
                type frequency-thz;
                description
                    "The DWDM fixed-grid channel frequency in THz,
                    e.g. 193.12500";
                reference
                    "RFC6205";
            }
        }
    }
}
```


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```
    case cwm {
      leaf channel-wavelength {
        type uint32;
        units nm;
        description
          "The CWDM wavelength in nanometer, e.g. 1511";
        reference
          "RFC6205";
      }
    }
  }
}

grouping wson-path-label {
  description
    "Generic label for WSON paths";
  choice grid-type {
    description
      "Label for DWDM or CWDM grid";
    case dwdm {
      choice single-or-super-channel {
        description "single of super channel";
        case single {
          leaf channel-freq {
            type frequency-thz;
            description
              "The DWDM fixed-grid channel frequency in THz,
              e.g. 193.12500";
          }
        }
      }
    }
    case super {
      leaf-list subcarrier-channels {
        type frequency-thz;
        description
          "List of subcarrier channels for super channel.";
      }
    }
  }
}

case cwm {
  leaf channel-wavelength {
    type uint32;
```

units nm;
description

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```
        "The CWDM wavelength in nanometer, e.g. 1511";
    reference
        "RFC6205";
    }
}
}
}

grouping layer0-label-restriction {
    description
        "layer0 label restriction.";

    leaf grid-type {
        type identityref {
            base layer0-grid-type;
        }
        description "Grid type";
    }
    leaf priority {
        type uint8;
        description "priority.";
    }
}

grouping wson-label-step {
    description "Label step information for WSON";
    choice layer0-grid-type {
        description
            " WSON grid-type: DWDM, CWDM, etc.";
        case dwdm {
            leaf wson-dwdm {
                type identityref {
                    base dwdm-ch-spc-type;
                }
                description
                    "Label-step is the channel-spacing (GHz), e.g.,
                    100, 50, 25, or 12.5 GHz for DWDM.";
                reference
                    "RFC6205";
            }
        }
    }
}
```

```

    }
    case cwm {
      leaf wson-cwm {
        type identityref {
          base cwm-ch-spc-type;

```

```

    }
    description
      "label-step is the channel-spacing (nm), i.e.,
       20 nm for CWDM, which is the only value defined for CWDM.";
    reference
      "RFC6205";
  }
}
}
}

grouping flex-grid-node-attributes {
  description "Flex-grid node attributes.";

  container flex-grid-node {
    description "Flex-grid node attributes.";
    leaf node-type {
      type identityref {
        base layer0-node-type;
      }
      description "Flex-grid node type.";
    }
  }
}

grouping flex-grid-path-bandwidth {
  description "Flex-grid path bandwidth attributes";
  leaf bandwidth-type {
    type identityref {
      base layer0-bandwidth-type;
    }
    description "Flex-grid bandwidth type";
  }
}

grouping flex-grid-link-bandwidth {
  description "flex-grid link bandwidth attributes";

```

```

leaf-list supported-bandwidth-list {
  type identityref {
    base layer0-bandwidth-type;
  }
  description "Flex-grid bandwidth type";
}
}

```

```

grouping flex-grid-link-label {
  description "Flex-grid link label.";
  leaf central-frequency {
    type frequency-thz;
    description
      "The DWDM flex-grid channel central frequency
       in THz, e.g. 193.12500.";
    reference
      "RFC7698";
  }
}

grouping flex-grid-channel {
  description "Flex-grid channel grouping.";
  leaf central-frequency {
    type frequency-thz;
    description
      "Flex-grid central frequency in THz, e.g. 193.12500.";
    reference
      "RFC7698";
  }
}

leaf slot-width {
  type frequency-ghz;
  description
    "Flex-grid The DWDM slot width in GHz, e.g. 50, 100, 150.";
  reference
    "RFC7698";
}

grouping flex-grid-path-label {
  description "Flex-grid path label.";
  choice single-or-super-channel {

```

```

description "single of super channel";
case single {
    uses flex-grid-channel;
}
case super {
    list subcarrier-channels {
        key central-frequency;
        uses flex-grid-channel;
    }
    description
        "List of subcarrier channels for flex-grid
        super channel.";
}

```

```

    }
}
}

}

grouping flex-grid-label-restriction {
    description
        "Flex Grid-specific label restriction.";
    uses layer0-label-restriction;

    container flex-grid {
        description "flex-grid definition";
        leaf nominal-central-frequency-granularity {
            type frequency-ghz;
            default 6.25;
            description
                "It is the spacing between allowed nominal central
                frequencies and it is set to 6.25 GHz";
            reference
                "RFC7698";
        }

        leaf slot-width-granularity {
            type frequency-ghz;
            default 12.5;
            description
                "Minimum space between slot widths";
            reference
                "RFC7698";
        }
    }
}

```

```

    }

}

grouping flex-grid-label-step {
  description "Label step information for flex grid";
  leaf flex {
    type identityref {
      base dwdm-ch-spc-type;
    }
    description
      "Label-step is the nominal central frequency granularity (GHz), e.g.,
        6.25 GHz.";
    reference

```

```

    "RFC7698";
  }
}
}

```

<CODE ENDS>

[5. Security Considerations](#)

The configuration, state, and action data defined in this document are designed to be accessed via a management protocol with a secure transport layer, such as NETCONF [[RFC6241](#)]. The NETCONF access control model [[RFC6536](#)] provides the means to restrict access for particular NETCONF users to a preconfigured subset of all available NETCONF protocol operations and content.

A number of configuration data nodes defined in this document are writable/deletable (i.e., "config true") These data nodes may be considered sensitive or vulnerable in some network environments.

[6. IANA Considerations](#)

This document registers the following namespace URIs in the IETF XML registry [[RFC3688](#)]:

URI: urn:ietf:params:xml:ns:yang: ietf-wson-topology
Registrant Contact: The IESG.
XML: N/A, the requested URI is an XML namespace.

URI: urn:ietf:params:xml:ns:yang: ietf-layer0-types
Registrant Contact: The IESG.
XML: N/A, the requested URI is an XML namespace.

This document registers the following YANG modules in the YANG
Module Names registry [[RFC7950](#)]:

name: ietf-wson-topology

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namespace: urn:ietf:params:xml:ns:yang:ietf-wson-topology
reference: RFC XXXX (TDB)

name: ietf-layer0-types
namespace: urn:ietf:params:xml:ns:yang: ietf-layer0-types
reference: RFC XXXX (TDB)

[7](#). Acknowledgments

This document was prepared using 2-Word-v2.0.template.dot.

[8](#). References

8.1. Normative References

[TE-TOPO] X. Liu, et al., "YANG Data Model for TE Topologies", work in progress: [draft-ietf-teas-yang-te-topo](#).

8.2. Informative References

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Network Element Constraint Encoding for GMPLS Controlled Networks", [RFC 7579](#), June 2015.

- [RFC7581] G. Bernstein, Y. Lee, D. Li, W. Imajuku, "Routing and Wavelength Assignment Information Encoding for Wavelength Switched Optical Networks", [RFC 7581](#), June 2015.
- [RFC7950] Bjorklund, M., Ed., "The YANG 1.1 Data Modeling Language", [RFC 7950](#), August 2016.
- [RFC8340] M. Bjorklund and L. Berger, Ed., "YANG Tree Diagrams", [RFC 8340](#), March 2018.
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[9](#). Contributors

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