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A Yang Data Model for WSON Tunnel
draft-ietf-ccamp-wson-tunnel-model-04

Abstract

This document provides a YANG data model for WSON TE tunnel.

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1. Introduction

This document provides a YANG data model for WSON tunnel model. The YANG model described in this document is a WSON technology-specific Yang Tunnel model based on the information model developed in [RFC7446] and the two encoding documents [RFC7579] and [RFC7581] that developed protocol independent encodings based on [RFC7446].

This document augments the generic TE tunnel model [I-D.ietf-teas-yang-te].

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

- server
- augment
- data model
- data node

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

- configuration data
- 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 Section 3 of this this document. The meaning of the symbols in these diagrams is defined in [RFC8340].

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. The module ietf-layer0-types specified in [I-D.ietf-ccamp-layer0-types], ietf-layer1-types specified in [I-D.ietf-ccamp-layer1-types], ietf-te-path-computation specified in [I-D.ietf-teas-yang-path-computation] and ietf-te specified in [I-D.ietf-teas-yang-te] are imported in this module.

Prefix	YANG module	Reference
layer0-types	ietf-layer0-types	[I-D.ietf-ccamp-layer0-types]
layer1-types	ietf-layer1-types	[I-D.ietf-ccamp-layer1-types]
tepc	ietf-te-path-computation	[I-D.ietf-teas-yang-path-computation]
te	ietf-te	[I-D.ietf-teas-yang-te]
wson-tunnel	ietf-wson-tunnel	[RFC XXXX]

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

2. WSON Tunnel Model Description

2.1. Overview of WSON Tunnel Model

The WSON tunnel model is using TE tunnel [I-D.ietf-teas-yang-te] and TE types [I-D.ietf-teas-yang-te-types] as a basic model and augment to the TE tunnel with WSON-specific parameters, including the bandwidth information and label information. It is also worth noting that the WSON tunnel provisioning is usually based on the WSON topology. Therefore the WSON tunnel model is usually used together with WSON topology model specified in [I-D.ietf-ccamp-wson-yang].

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

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

2.2. WSON-specific Parameters in Tunnel Model

WSON specific parameters have been augmenting to the TE tunnel models. The attributes on both of the source and destination need to be configured when setting up the tunnel. Typical parameters, including bandwidth and grid information, are required in the WSON tunnel model. These parameters are consistent with the framework in [RFC6163], and the specification in [RFC7579] and [RFC7581].

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

3. WSON Tunnel YANG Tree

```
module: ietf-wson-tunnel
  augment /te:te/te:tunnels/te:tunnel:
    +--rw src-client-signal?   identityref
    +--rw dst-client-signal?   identityref
    +--rw fec-type?            identityref
    +--rw termination-type?    identityref
    +--rw bit-stuffing?        boolean
  augment /te:te/te:globals/te:named-path-constraints
```

```
               /te:named-path-constraint/te:te-bandwidth
               /te:technology:
       +--:(wson)
          +--rw bandwidth-type?   identityref
     augment /te:te/te:tunnels/te:tunnel/te:te-bandwidth
               /te:technology:
       +--:(wson)
          +--rw bandwidth-type?   identityref
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:te-bandwidth
               /te:technology:
       +--:(wson)
          +--rw bandwidth-type?   identityref
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:te-bandwidth/te:technology:
       +--:(wson)
          +--rw bandwidth-type?   identityref
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:te-bandwidth
               /te:technology:
       +--:(wson)
          +--rw bandwidth-type?   identityref
     augment /te:te/te:globals/te:named-path-constraints
               /te:named-path-constraint
               /te:explicit-route-objects-always
               /te:route-object-exclude-always/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:globals/te:named-path-constraints
               /te:named-path-constraint
               /te:explicit-route-objects-always
               /te:route-object-include-exclude/te:type
               /te:label/te:label-hop/te:te-label
               /te:technology:
       +--:(wson)
          +--rw (grid-type)?
```

```
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                         layer0-types:cwdm-n
     augment /te:te/te:globals/te:named-path-constraints
               /te:named-path-constraint/te:path-in-segment
               /te:label-restrictions/te:label-restriction:
       +--rw grid-type?   identityref
       +--rw priority?    uint8
     augment /te:te/te:globals/te:named-path-constraints
               /te:named-path-constraint/te:path-in-segment
               /te:label-restrictions/te:label-restriction
               /te:label-start/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:globals/te:named-path-constraints
               /te:named-path-constraint/te:path-in-segment
               /te:label-restrictions/te:label-restriction
               /te:label-end/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:globals/te:named-path-constraints
               /te:named-path-constraint/te:path-out-segment
               /te:label-restrictions/te:label-restriction:
       +--rw grid-type?   identityref
       +--rw priority?    uint8
     augment /te:te/te:globals/te:named-path-constraints
               /te:named-path-constraint/te:path-out-segment
               /te:label-restrictions/te:label-restriction
               /te:label-start/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
```

```
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:globals/te:named-path-constraints
               /te:named-path-constraint/te:path-out-segment
               /te:label-restrictions/te:label-restriction
               /te:label-end/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:optimizations
               /te:algorithm/te:metric/te:optimization-metric
               /te:explicit-route-exclude-objects
               /te:route-object-exclude-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                         layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:optimizations
               /te:algorithm/te:metric/te:optimization-metric
               /te:explicit-route-include-objects
               /te:route-object-include-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                         layer0-types:cwdm-n
```

```
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path
               /te:explicit-route-objects-always
               /te:route-object-exclude-always/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path
               /te:explicit-route-objects-always
               /te:route-object-include-exclude/te:type
               /te:label/te:label-hop/te:te-label
               /te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:path-in-segment
               /te:label-restrictions/te:label-restriction:
       +--rw grid-type?   identityref
       +--rw priority?    uint8
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:path-in-segment
               /te:label-restrictions/te:label-restriction
               /te:label-start/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
```

```
            +--:(cwdm)
               +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
              /te:p2p-primary-path/te:path-in-segment
              /te:label-restrictions/te:label-restriction
              /te:label-end/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
            +--:(dwdm)
            |  +--rw dwdm-n?   layer0-types:dwdm-n
            +--:(cwdm)
               +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
              /te:p2p-primary-path/te:path-out-segment
              /te:label-restrictions/te:label-restriction:
       +--rw grid-type?   identityref
       +--rw priority?    uint8
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
              /te:p2p-primary-path/te:path-out-segment
              /te:label-restrictions/te:label-restriction
              /te:label-start/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
            +--:(dwdm)
            |  +--rw dwdm-n?   layer0-types:dwdm-n
            +--:(cwdm)
               +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
              /te:p2p-primary-path/te:path-out-segment
              /te:label-restrictions/te:label-restriction
              /te:label-end/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
            +--:(dwdm)
            |  +--rw dwdm-n?   layer0-types:dwdm-n
            +--:(cwdm)
               +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
              /te:p2p-primary-path
              /te:computed-paths-properties
              /te:computed-path-properties/te:path-properties
              /te:path-route-objects
              /te:path-computed-route-object/te:type/te:label
              /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--ro (grid-type)?
            +--:(dwdm)
            |  +--ro (single-or-super-channel)?
```

```
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                         layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:lsps/te:lsp
               /te:lsp-record-route-information
               /te:lsp-record-route-information/te:type
               /te:label/te:label-hop/te:te-label
               /te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                         layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:lsps/te:lsp
               /te:path-properties/te:path-route-objects
               /te:path-computed-route-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                         layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:optimizations/te:algorithm/te:metric
               /te:optimization-metric
               /te:explicit-route-exclude-objects
```

```
               /te:route-object-exclude-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:optimizations/te:algorithm/te:metric
               /te:optimization-metric
               /te:explicit-route-include-objects
               /te:route-object-include-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:explicit-route-objects-always
               /te:route-object-exclude-always/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
```

```
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:explicit-route-objects-always
               /te:route-object-include-exclude/te:type
               /te:label/te:label-hop/te:te-label
               /te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:path-in-segment/te:label-restrictions
               /te:label-restriction:
       +--rw grid-type?   identityref
       +--rw priority?    uint8
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:path-in-segment/te:label-restrictions
               /te:label-restriction/te:label-start/te:te-label
               /te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:path-in-segment/te:label-restrictions
               /te:label-restriction/te:label-end/te:te-label
               /te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
```

```
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:path-out-segment/te:label-restrictions
               /te:label-restriction:
       +--rw grid-type?   identityref
       +--rw priority?    uint8
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:path-out-segment/te:label-restrictions
               /te:label-restriction/te:label-start/te:te-label
               /te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:path-out-segment/te:label-restrictions
               /te:label-restriction/te:label-end/te:te-label
               /te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:computed-paths-properties
               /te:computed-path-properties/te:path-properties
               /te:path-route-objects
               /te:path-computed-route-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
```

```
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:lsps/te:lsp/te:lsp-record-route-information
               /te:lsp-record-route-information/te:type
               /te:label/te:label-hop/te:te-label
               /te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths
               /te:p2p-primary-path/te:p2p-primary-reverse-path
               /te:lsps/te:lsp/te:path-properties
               /te:path-route-objects
               /te:path-computed-route-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:optimizations
               /te:algorithm/te:metric/te:optimization-metric
               /te:explicit-route-exclude-objects
               /te:route-object-exclude-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
```

```
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:optimizations
               /te:algorithm/te:metric/te:optimization-metric
               /te:explicit-route-include-objects
               /te:route-object-include-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path
               /te:explicit-route-objects-always
               /te:route-object-exclude-always/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path
               /te:explicit-route-objects-always
               /te:route-object-include-exclude/te:type
               /te:label/te:label-hop/te:te-label
               /te:technology:
       +--:(wson)
          +--rw (grid-type)?
```

```
             +--:(dwdm)
             |  +--rw (single-or-super-channel)?
             |     +--:(single)
             |     |  +--rw dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--rw subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--rw cwdm-n?
                         layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:path-in-segment
               /te:label-restrictions/te:label-restriction:
       +--rw grid-type?   identityref
       +--rw priority?    uint8
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:path-in-segment
               /te:label-restrictions/te:label-restriction
               /te:label-start/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:path-in-segment
               /te:label-restrictions/te:label-restriction
               /te:label-end/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:path-out-segment
               /te:label-restrictions/te:label-restriction:
       +--rw grid-type?   identityref
       +--rw priority?    uint8
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:path-out-segment
               /te:label-restrictions/te:label-restriction
               /te:label-start/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
```

```
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:path-out-segment
               /te:label-restrictions/te:label-restriction
               /te:label-end/te:te-label/te:technology:
       +--:(wson)
          +--rw (grid-type)?
             +--:(dwdm)
             |  +--rw dwdm-n?   layer0-types:dwdm-n
             +--:(cwdm)
                +--rw cwdm-n?   layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path
               /te:computed-paths-properties
               /te:computed-path-properties/te:path-properties
               /te:path-route-objects
               /te:path-computed-route-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:lsps/te:lsp
               /te:lsp-record-route-information
               /te:lsp-record-route-information/te:type
               /te:label/te:label-hop/te:te-label
               /te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
```

```
                     layer0-types:cwdm-n
     augment /te:te/te:tunnels/te:tunnel/te:p2p-secondary-paths
               /te:p2p-secondary-path/te:lsps/te:lsp
               /te:path-properties/te:path-route-objects
               /te:path-computed-route-object/te:type/te:label
               /te:label-hop/te:te-label/te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                        layer0-types:cwdm-n
     augment /te:te/te:lsps-state/te:lsp
               /te:lsp-record-route-information
               /te:lsp-record-route-information/te:type
               /te:label/te:label-hop/te:te-label
               /te:technology:
       +--:(wson)
          +--ro (grid-type)?
             +--:(dwdm)
             |  +--ro (single-or-super-channel)?
             |     +--:(single)
             |     |  +--ro dwdm-n?
             |     |          layer0-types:dwdm-n
             |     +--:(super)
             |        +--ro subcarrier-dwdm-n*   int16
             +--:(cwdm)
                +--ro cwdm-n?
                        layer0-types:cwdm-n
     augment /te:tunnels-rpc/te:input/te:tunnel-info
               /tepc:path-request:
       +-- src-client-signal?       identityref
       +-- dst-client-signal?       identityref
       +-- fec-type?                identityref
       +-- termination-type?        identityref
       +-- bit-stuffing?            boolean
       +-- wavelength-assignment?   identityref
```

4. WSON Tunnel YANG Code

```
<CODE BEGINS>file "ietf-wson-tunnel@2019-09-11.yang"

module ietf-wson-tunnel {
  //yang-version 1.1;

  namespace "urn:ietf:params:xml:ns:yang:ietf-wson-tunnel";
  prefix "wson-tunnel";

  import ietf-te { prefix "te"; }
  import ietf-layer0-types{ prefix "layer0-types"; }
  import ietf-te-path-computation { prefix "tepc"; }
  import ietf-layer1-types { prefix "layer1-types";}

  organization
    "IETF CCAMP Working Group";

  contact
    "WG Web:   <http://tools.ietf.org/wg/ccamp/>
     WG List:  <mailto:ccamp@ietf.org>

     WG Chair: Daniele Ceccarelli
               <daniele.ceccarelli@ericsson.com>

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               <zhangfatai@huawei.com>

     Editor: Young Lee <leeyoung.tx@gmail.com>
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         Editor: Daniel King <d.king@lancaster.ac.uk>
         Editor: Bin Yeong Yoon <byyun@etri.re.kr>
     Editor: Ricard Vilalta <ricard.vilalta@cttc.es>";
     description
       "This module defines a model for WSON Tunnel Services.

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     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).
```

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

  revision "2019-09-11" {
    description
      "Updates to version 4";
    reference "version 4";
  }

  /* Groupings. */
  grouping wson-tunnel-attributes {
    description "Parameters for WSON tunnel.";

    leaf src-client-signal {
      type identityref {
        base layer1-types:client-signal;
      }
      description
        "Client signal at the source endpoint of
         the tunnel.";
    }

    leaf dst-client-signal {
      type identityref {
        base layer1-types:client-signal;
      }
      description
        "Client signal at the destination endpoint of
         the tunnel.";
    }

    leaf fec-type {
      type identityref {
        base layer0-types:fec-type;
      }
      description
        "FEC type.";
    }

    leaf termination-type {
      type identityref {
        base layer0-types:term-type;
      }
      description
        "Termination type.";
    }

    leaf bit-stuffing {
```

```
      type boolean;
      description
        "Bit stuffing enabled/disabled.";
    }
  }

  grouping wson-path-constraints {
    description
      "Global named path constraints configuration
       grouping for WSON tunnel";

    leaf wavelength-assignment {
      type identityref {
        base layer0-types:wavelength-assignment;
      }
      description "Wavelength Allocation Method";
    }
  }

 /*
  * Data nodes
  */

  augment "/te:te/te:tunnels/te:tunnel" {
    description
      "Augment with additional parameters required for WSON tunnel.";
    uses wson-tunnel-attributes;
  }
  /*
   * Augment TE bandwidth
   */

  /* Augment bandwidth of named-path-constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/"
        + "te:te-bandwidth/te:technology" {
    description "WSON bandwidth.";
    case wson {
      uses layer0-types:wson-path-bandwidth;
    }
  }

  /* Augment bandwdith of tunnel */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:te-bandwidth/te:technology" {
    description "WSON bandwidth.";
    case wson {
      uses layer0-types:wson-path-bandwidth;
```

```
    }
  }

  /* Augment bandwidth of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:te-bandwidth/te:technology" {
    description "WSON bandwidth.";
    case wson {
      uses layer0-types:wson-path-bandwidth;
    }
  }

  /* Augment bandwidth of reverse primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:te-bandwidth/te:technology" {
    description "WSON bandwidth.";
    case wson {
      uses layer0-types:wson-path-bandwidth;
    }
  }

  /* Augment bandwidht of secondary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:te-bandwidth/te:technology" {
    description "WSON bandwidth.";
    case wson {
      uses layer0-types:wson-path-bandwidth;
    }
  }

  /*
   * Augment TE label.
   */

  /* Augment label hop of route-object-exclude-always of named-path-
constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/te:explicit-route-objects-always/"
        + "te:route-object-exclude-always/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
```

```
  }

  /* Augment label hop of route-object-include-exclude of named-path-
constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/te:explicit-route-objects-always/"
        + "te:route-object-include-exclude/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label restrictions for the path-in-segment of
     named-path-constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/te:path-in-segment/"
        + "te:label-restrictions/te:label-restriction" {
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }

  /* Augment label restrictions start for the path-in-segment
     of named-path-constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/te:path-in-segment/"
        + "te:label-restrictions/"
        + "te:label-restriction/te:label-start/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label restrictions end for the path-in-segment of
     named-path-constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/te:path-in-segment/"
        + "te:label-restrictions/"
        + "te:label-restriction/te:label-end/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }
```

```
  /* Augment label restrictions for the path-out-segment of
     named-path-constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/te:path-out-segment/"
        + "te:label-restrictions/"
        + "te:label-restriction" {
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }
  /* Augment label restrictions start for the path-out-segment
     of named-path-constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/te:path-out-segment/"
        + "te:label-restrictions/"
        + "te:label-restriction/te:label-start/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label restrictions end for the path-out-segment of
     named-path-constraints */
  augment "/te:te/te:globals/te:named-path-constraints/"
        + "te:named-path-constraint/te:path-out-segment/"
        + "te:label-restrictions/"
        + "te:label-restriction/te:label-end/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label hop of route-exclude of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:optimizations/te:algorithm/te:metric/"
        + "te:optimization-metric/te:explicit-route-exclude-objects/"
        + "te:route-object-exclude-object/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }
```

```
  /* Augment label hop of route-include of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:optimizations/te:algorithm/te:metric/"
        + "te:optimization-metric/te:explicit-route-include-objects/"
        + "te:route-object-include-object/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of route-object-exclude-always of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:explicit-route-objects-always/"
        + "te:route-object-exclude-always/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of route-object-include-exclude of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:explicit-route-objects-always/"
        + "te:route-object-include-exclude/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label restrictions for the path-in-segment of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:path-in-segment/te:label-restrictions/"
        + "te:label-restriction" {
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }

  /* Augment label restrictions start for the path-in-segment of primary path
*/
```

```
  augment "/te:te/te:tunnels/te:tunnel/"
```

```
       + "te:p2p-primary-paths/te:p2p-primary-path/"
       + "te:path-in-segment/te:label-restrictions/"
       + "te:label-restriction/te:label-start/"
       + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label restrictions end for the path-in-segment of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:path-in-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-end/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label restrictions for the path-out-segment of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:path-out-segment/te:label-restrictions/"
        + "te:label-restriction" {
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }

  /* Augment label restrictions start for the path-out-segment of primary path
*/
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:path-out-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-start/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

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

```
        + "te:label-restriction/te:label-end/"
```

```
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label hop of path-route of primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:computed-paths-properties/"
                + "te:computed-path-properties/te:path-properties/"
        + "te:path-route-objects/te:path-computed-route-object/"
        + "te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of record-route of primary LSP */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:lsps/te:lsp/te:lsp-record-route-information/"
        + "te:lsp-record-route-information/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of path-route of primary LSP */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:lsps/te:lsp/te:path-properties/"
        + "te:path-route-objects/te:path-computed-route-object/"
        + "te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

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

```
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:optimizations/te:algorithm/te:metric/"
        + "te:optimization-metric/te:explicit-route-exclude-objects/"
        + "te:route-object-exclude-object/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of route-include of reverse primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:optimizations/te:algorithm/te:metric/"
        + "te:optimization-metric/te:explicit-route-include-objects/"
        + "te:route-object-include-object/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of route-object-exclude-always of reverse primary path
*/
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:explicit-route-objects-always/"
        + "te:route-object-exclude-always/"
        + "te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of route-object-include-exclude of reverse primary path
*/
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:explicit-route-objects-always/"
        + "te:route-object-include-exclude/"
```

```
        + "te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label restrictions for the path-in-segment of reverse primary path
*/
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:path-in-segment/te:label-restrictions/"
        + "te:label-restriction" {
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }

  /* Augment label restrictions start for the path-in-segment of reverse
primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:path-in-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-start/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }
  /* Augment label restrictions end for the path-in-segment of reverse primary
path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:path-in-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-end/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label restrictions for the path-out-segment of reverse primary
path */
```

```
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:path-out-segment/te:label-restrictions/"
```

```
        + "te:label-restriction" {
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }

  /* Augment label restrictions start for the path-out-segment of reverse
primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:path-out-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-start/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label restrictions end for the path-out-segment of reverse primary
path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:path-out-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-end/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label hop of path-route of reverse primary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:computed-paths-properties/"
                + "te:computed-path-properties/te:path-properties/"
        + "te:path-route-objects/te:path-computed-route-object/"
        + "te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }
```

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

```
       + "te:p2p-primary-paths/te:p2p-primary-path/"
       + "te:p2p-primary-reverse-path/"
       + "te:lsps/te:lsp/te:lsp-record-route-information/"
       + "te:lsp-record-route-information/te:type/te:label/"
       + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of path-route of reverse primary LSP */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-primary-paths/te:p2p-primary-path/"
        + "te:p2p-primary-reverse-path/"
        + "te:lsps/te:lsp/te:path-properties/"
        + "te:path-route-objects/te:path-computed-route-object/"
        + "te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of route-exclude of secondary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:optimizations/te:algorithm/te:metric/"
        + "te:optimization-metric/te:explicit-route-exclude-objects/"
        + "te:route-object-exclude-object/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of route-include of secondary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:optimizations/te:algorithm/te:metric/"
        + "te:optimization-metric/te:explicit-route-include-objects/"
        + "te:route-object-include-object/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
```

```
    }
  }

  /* Augment label hop of route-object-exclude-always of secondary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:explicit-route-objects-always/"
        + "te:route-object-exclude-always/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of route-object-include-exclude of secondary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:explicit-route-objects-always/"
        + "te:route-object-include-exclude/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label restrictions for the path-in-segment of secondary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:path-in-segment/te:label-restrictions/"
        + "te:label-restriction" {
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }

  /* Augment label restrictions start for the path-in-segment of secondary path
*/
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:path-in-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-start/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }
```

```
  /* Augment label restrictions end for the path-in-segment of secondary path
*/
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:path-in-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-end/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label restrictions for the path-out-segment of secondary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:path-out-segment/te:label-restrictions/"
        + "te:label-restriction" {
    description "WSON label.";
    uses layer0-types:layer0-label-restriction;
  }

  /* Augment label restrictions start for the path-out-segment of secondary
path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:path-out-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-start/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }

  /* Augment label restrictions end for the path-out-segment of secondary path
*/
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:path-out-segment/te:label-restrictions/"
        + "te:label-restriction/te:label-end/"
        + "te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-link-label;
    }
  }
```

```
  /* Augment label hop of path-route of secondary path */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
```

```
       + "te:computed-paths-properties/"
               + "te:computed-path-properties/te:path-properties/"
               + "te:path-route-objects/"
       + "te:path-computed-route-object/te:type/te:label/"
       + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of record-route of secondary LSP */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:lsps/te:lsp/te:lsp-record-route-information/"
        + "te:lsp-record-route-information/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of path-route of secondary LSP */
  augment "/te:te/te:tunnels/te:tunnel/"
        + "te:p2p-secondary-paths/te:p2p-secondary-path/"
        + "te:lsps/te:lsp/te:path-properties/"
        + "te:path-route-objects/"
        + "te:path-computed-route-object/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  /* Augment label hop of record-route of LSP */
  augment "/te:te/te:lsps-state/"
        + "te:lsp/te:lsp-record-route-information/"
        + "te:lsp-record-route-information/te:type/te:label/"
        + "te:label-hop/te:te-label/te:technology" {
    description "WSON label.";
    case wson {
      uses layer0-types:wson-path-label;
    }
  }

  augment "/te:tunnels-rpc/te:input/te:tunnel-info/"
```

```
        + "tepc:path-request" {
    description
       "Augment with additional constraints WSON
        tunnel.";
    uses wson-tunnel-attributes;
    uses wson-path-constraints;
  }
}


<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 [RFC8341] provides the means to restrict access for particular NETCONF users to a preconfigured subset of all available NETCONF protocol operations and content.

There are a number of data nodes defined in this YANG module that are writable/creatable/deletable (i.e., config true, which is the default). These data nodes may be considered sensitive or vulnerable in some network environments. Write operations (e.g., edit-config) to these data nodes without proper protection can have a negative effect on network operations. These are the subtrees and data nodes and their sensitivity/vulnerability:

/te:te/te:tunnels/te:tunnel /te:te/../te:te-bandwidth/te:technology /te:te/../te:type/te:label/te:label-hop/te:te-label/te:technology /te:te/../te:label-restrictions/te:label-restriction/te:label-start/ te:te-label/te:technology /te:te/../te:label-restrictions/te:label-restriction/te:label-end/te:te-label/te:technology /te:te/../te:label-restrictions/te:label-restriction/ Editors note: we are using simplified description by folding similar branches to avoid repetition.

6. IANA Considerations

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

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

This document registers following YANG modules in the YANG Module Names registry [RFC7950].

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

7. Acknowledgements

TBD.

8. Contributors

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9. References

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