

CCAMP Working Group
Internet Draft
Intended status: Standard Track
Expires: September 7, 2019

Y. Lee
D. Dhody
A. Guo
Huawei

V. Lopez
Telefonica

D. King
U. of Lancaster

B. Yoon
ETRI

R. Vilalta
CTTC

March 7, 2019

A Yang Data Model for WSON Tunnel

draft-ietf-ccamp-wson-tunnel-model-03

Abstract

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

Status of this Memo

This Internet-Draft is submitted to IETF in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at
<http://www.ietf.org/ietf/lid-abstracts.txt>

The list of Internet-Draft Shadow Directories can be accessed at
<http://www.ietf.org/shadow.html>

This Internet-Draft will expire on September 7, 2019.
Lee, et al.

Expires September 2019

[Page 1]

Copyright Notice

Copyright (c) 2019 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1. Introduction.....	2
1.1. Terminology.....	3
1.2. Tree diagram.....	3
1.3. Prefixes in Data Node Names.....	3
2. YANG Model (Tree Structure).....	4
3. TE Tunnel Model for WSON.....	16
4. Security Considerations.....	33
5. IANA Considerations.....	34
6. Acknowledgments.....	34
7. References.....	35
7.1. Normative References.....	35
7.2. Informative References.....	35
8. Contributors.....	36
Authors' Addresses.....	36

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 [RFC7581] and [RFC7579] that developed protocol independent encodings based on [RFC7446].

This document augments the generic TE tunnel model [TE-Tunnel].

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].

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-types	ietf-layer0-types	[WSON-TOPO]
wson-tunnel	ietf-wson-tunnel	[RFCXXXX]
tepc	ietf-te-path-computation	[TE-PC]
te	ietf-te	[TE-Tunnel]

otn-types	ietf-otn-types	[OTN-TOPO]	
+-----+	+-----+	+-----+	+-----+

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-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?                int16
    |       +-:(super)
    |           +-rw subcarrier-dwdm-n*    int16
    +-:(cwdm)
    |   +-rw cwdm-n?                int16
    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?                int16
    |       |       +-:(super)
    |       |           +-rw subcarrier-dwdm-n*    int16
    |       +-:(cwdm)
    |           +-rw cwdm-n?                int16
    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?    int16
    |       +-:(cwdm)
    |           +-rw cwdm-n?    int16
    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?    int16
    |       +-:(cwdm)
    |           +-rw cwdm-n?    int16
    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?    int16
            +-(cwdm)
                +-rw cwdm-n?    int16
    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?    int16
            +-(cwdm)
                +-rw cwdm-n?    int16
    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?                int16
                    +-(super)
                        +-rw subcarrier-dwdm-n*    int16
            +-(cwdm)
                +-rw cwdm-n?                int16
    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?                int16
                    +-(super)

```

```

        |           +-rw subcarrier-dwdm-n*    int16
    +-:(cwdm)
        +-rw cwdm-n?                            int16
    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?                    int16
        |   +-:(super)
        |   |   +-rw subcarrier-dwdm-n*    int16
    +-:(cwdm)
        +-rw cwdm-n?                            int16
    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?                    int16
        |   +-:(super)
        |   |   +-rw subcarrier-dwdm-n*    int16
    +-:(cwdm)
        +-rw cwdm-n?                            int16
    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?    int16
    +-:(cwdm)
        +-rw cwdm-n?    int16
    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?    int16
    +-: (cwdm)
      +-rw cwdm-n?    int16
  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?    int16
        +-: (cwdm)
          +-rw cwdm-n?    int16
      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?    int16
            +-: (cwdm)
              +-rw cwdm-n?    int16
          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?                int16
                    +-: (super)
                      +-ro subcarrier-dwdm-n*      int16
                +-: (cwdm)
                  +-ro cwdm-n?                int16
              augment /te:te/te:tunnels/te:tunnel/te:p2p-primary-paths/te:p2p-primary-
path/te:lsp/te:lsp/te:lsp-record-route-information/te:lsp-record-route-
information/te:type/te:label/te:label-hop/te:te-label/te:technology:

```



```

+-:(wson)
  +-ro (grid-type)?
  +-:(dwdm)
    +-ro (single-or-super-channel)?
    +-:(single)
      | +-ro dwdm-n? int16
    +-:(super)
      +-ro subcarrier-dwdm-n* int16
  +-:(cwdm)
    +-ro cwdm-n? int16
  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? int16
      +-:(super)
        +-ro subcarrier-dwdm-n* int16
    +-:(cwdm)
      +-ro cwdm-n? int16
    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? int16
        +-:(super)
          +-rw subcarrier-dwdm-n* int16
      +-:(cwdm)
        +-rw cwdm-n? int16
    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?                int16
    |       +-:(super)
    |           +-rw subcarrier-dwdm-n*    int16
    +-:(cwdm)
    |   +-rw cwdm-n?                        int16
    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?                int16
    |       |       +-:(super)
    |       |           +-rw subcarrier-dwdm-n*    int16
    |       +-:(cwdm)
    |       |   +-rw cwdm-n?                        int16
    |       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?                int16
    |       |       |       +-:(super)
    |       |       |           +-rw subcarrier-dwdm-n*    int16
    |       |       +-:(cwdm)
    |       |       |   +-rw cwdm-n?                        int16
    |       |       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?    int16
    +-:(cwdm)
    +-rw cwdm-n?    int16
    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?    int16
    +-:(cwdm)
    +-rw cwdm-n?    int16
    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?    int16
    +-:(cwdm)
    +-rw cwdm-n?    int16
    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?    int16
    +-:(cwdm)
    +-rw cwdm-n?    int16
    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?                int16
        |         +-:(super)
        |         +-ro subcarrier-dwdm-n*      int16
+-:(cwdm)
    +-ro cwdm-n?                int16
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?                int16
        | | +-:(super)
        | | +-ro subcarrier-dwdm-n*      int16
    +-:(cwdm)
        +-ro cwdm-n?                int16
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?                int16
        | | +-:(super)
        | | +-ro subcarrier-dwdm-n*      int16
    +-:(cwdm)
        +-ro cwdm-n?                int16
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?                int16
        | | +-:(super)
        | | +-rw subcarrier-dwdm-n*      int16

```

```

        +-:(cwdm)
            +-rw cwdm-n?                                int16
        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?                                int16
                +-:(super)
                |   +-rw subcarrier-dwdm-n*    int16
            +-:(cwdm)
                +-rw cwdm-n?                                int16
        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?                                int16
                +-:(super)
                |   +-rw subcarrier-dwdm-n*    int16
            +-:(cwdm)
                +-rw cwdm-n?                                int16
        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?                                int16
                +-:(super)
                |   +-rw subcarrier-dwdm-n*    int16
            +-:(cwdm)
                +-rw cwdm-n?                                int16
        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?      int16
            +-(cwdm)
                +-rw cwdm-n?      int16
    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?      int16
            +-(cwdm)
                +-rw cwdm-n?      int16
    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?      int16
            +-(cwdm)
                +-rw cwdm-n?      int16
    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?      int16
            +-(cwdm)
                +-rw cwdm-n?      int16
    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:te-label/te:label-hop/te:te-label/te:technology:

```

```

+-:(wson)
  +-ro (grid-type)?
  +-:(dwdm)
    +-ro (single-or-super-channel)?
    +-:(single)
      | +-ro dwdm-n? int16
    +-:(super)
      +-ro subcarrier-dwdm-n* int16
  +-:(cwdm)
    +-ro cwdm-n? int16
  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? int16
      +-:(super)
        +-ro subcarrier-dwdm-n* int16
    +-:(cwdm)
      +-ro cwdm-n? int16
    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? int16
      +-:(super)
        +-ro subcarrier-dwdm-n* int16
    +-:(cwdm)
      +-ro cwdm-n? int16
    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? int16

```

```

    |      +-:(super)
    |      +-ro subcarrier-dwdm-n*    int16
+-:(cwdm)
    +-ro cwdm-n?                      int16
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

```

3. TE Tunnel Model for WSON

<CODE BEGINS> file "ietf-wson-tunnel@2019-03-06.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-otn-types { prefix "otn-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
               <mailto:daniele.ceccarelli@ericsson.com>

    WG Chair: Fatai Zhang
               <mailto:zhangfatai@huawei.com>

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

```



```
Editor: Dhruv Dhody <dhruv.ietf@gmail.com>
Editor: Ricard Vilalta <ricard.vilalta@cttc.es>;
description
  "This module defines a model for WSON Tunnel Services.";

revision "2019-03-06" {
  description
    "Updates to version 3";
  reference "version 3";
}

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

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

  leaf dst-client-signal {
    type identityref {
      base otn-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 "WSO bandwidth.";
    case wson {
        uses layer0-types:wson-path-bandwidth;
    }
}
```

```
}

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

4. 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.

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.

5. IANA Considerations

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

```
-----  
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 the following YANG modules in the YANG Module

Names registry [RFC7950]:

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

6. Acknowledgments

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

7. References

7.1. Normative References

- [TE-Tunnel] T. Saad, Ed., X. Liu, V. Beeram, H. Shah, and I. Bryskin, "A YANG Data Model for Traffic Engineering Tunnels and Interfaces", draft-ietf-teas-yang-te, work in progress.
- [WSON-TOPO] Y. Lee, Ed., D. Dhody, A. Guo, V. Lopez, D. King, B. Yoon, and R. Vilalta, "A Yang Data Model for WSON Optical Networks", draft-ietf-ccamp-wson-yang, work in progress.
- [TE-PC] Italo Busi (Ed.), Sergio Belotti (Ed.), "Yang model for requesting Path Computation", draft-ietf-teas-yang-path-computation, work in progress.
- [OTN-TOPO] H. Zheng, et al, "A YANG Data Model for Optical Transport Network Topology", draft-ietf-ccamp-otn-topo-yang, work in progress.

7.2. Informative References

- [RFC3688] M. Mealling, "The IETF XML Registry", RFC 3688, January 2004.
- [RFC6241] R. Enns, Ed., M. Bjorklund, Ed., J. Schoenwaelder, Ed., and A. Bierman, Ed., "Network Configuration Protocol (NETCONF)", RFC 6241, June 2011.
- [RFC7446] Y. Lee, G. Bernstein, D. Li, W. Imajuku, "Routing and Wavelength Assignment Information Model for Wavelength Switched Optical Networks", RFC 7446, February 2015.
- [RFC7579] G. Bernstein, Y. Lee, D. Li, W. Imajuku, "General 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.

[RFC8341] A. Bierman and M. Bjorklund, "Network Configuration Access Control Model", March 2018.

8. Contributors

Italo Busi
Huawei
Email: Italo.Busi@huawei.com

Authors' Addresses

Young Lee (ed.)
Huawei Technologies
5340 Legacy Drive, Building 3
Plano, TX 75023
USA

Phone: (469) 277-5838
Email: leeyoung@huawei.com

Dhruv Dhody
Huawei Technologies India Pvt. Ltd,
Near EPIP Industrial Area, Kundalahalli Village, Whitefield,
Bangalore - 560 037 [H1-2A-245]

Email: dhruv.dhody@huawei.com

Aihua Guo
Huawei
Email: aihuaguo@huawei.com

Victor Lopez
Telefonica
Email: victor.lopezalvarez@telefonica.com

Daniel King
University of Lancaster
Email: d.king@lancaster.ac.uk

Bin Yeong Yoon
ETRI
218 Gaijeongro, Yuseong-gu
Daejeon, Korea
Email: byyun@etri.re.kr

Ricard Vilalta
CTTC
Email: ricard.vilalta@cttc.es

