

CCAMP Working Group
Internet-Draft
Intended status: Standards Track
Expires: 18 April 2026

I. Busi
Huawei Technologies
A. Guo
Futurewei Technologies
S. Belotti
Nokia
15 October 2025

A YANG Data Model for requesting Path Computation in an Optical
Transport Network (OTN)
draft-ietf-ccamp-otn-path-computation-yang-06

Abstract

This document provides a mechanism to request path computation in an Optical Transport Network (OTN) by augmenting the Remote Procedure Calls (RPCs) defined in RFC YYYY.

[RFC EDITOR NOTE: Please replace RFC YYYY with the RFC number of draft-ietf-teas-yang-path-computation once it has been published.]

About This Document

This note is to be removed before publishing as an RFC.

The latest revision of this draft can be found at <https://ietf-ccamp-wg.github.io/ietf-ccamp-otn-path-computation/draft-ietf-ccamp-otn-path-computation-yang.html>. Status information for this document may be found at <https://datatracker.ietf.org/doc/draft-ietf-ccamp-otn-path-computation-yang/>.

Discussion of this document takes place on the Common Control and Measurement Plane Working Group mailing list (<mailto:ccamp@ietf.org>), which is archived at <https://mailarchive.ietf.org/arch/browse/ccamp/>. Subscribe at <https://www.ietf.org/mailman/listinfo/ccamp/>.

Source for this draft and an issue tracker can be found at <https://github.com/ietf-ccamp-wg/ietf-ccamp-otn-path-computation>.

Status of This Memo

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

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <https://datatracker.ietf.org/drafts/current/>.

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."

This Internet-Draft will expire on 18 April 2026.

Copyright Notice

Copyright (c) 2025 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 (<https://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 Revised BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Revised BSD License.

Table of Contents

1. Introduction	3
1.1. Terminology and Notations	3
1.2. Tree Diagram	4
1.3. Prefix in Data Node Names	4
2. YANG Data Model for OTN Path Computation	4
2.1. YANG Model Overview	4
2.2. Bandwidth Augmentation	5
2.3. Label Augmentations	5
3. OTN Path Computation Tree Diagram	5
4. YANG Model for OTN Path Computation	10
5. Manageability Considerations	16
6. Security Considerations	16
7. IANA Considerations	17
8. References	17
8.1. Normative References	17
8.2. Informative References	18
Appendix A. Change Log	19
Acknowledgments	19
Contributors	20
Authors' Addresses	20

1. Introduction

[I-D.ietf-teas-yang-path-computation] describes key use cases, where a client needs to request underlying SDN controllers for path computation. In some of these use cases, the underlying SDN controller can control an Optical Transport Network (OTN).

This document defines a YANG data model, which augment the generic Path Computation RPC defined in [I-D.ietf-teas-yang-path-computation], with OTN technology-specific augmentations required to request path computation to an underlying OTN SDN controller. These models allow a client to delegate path computation tasks to the underlying SDN controller without having to obtain OTN detailed information from the controller and performing feasible path computation itself.

1.1. Terminology and Notations

Refer to [I-D.ietf-ccamp-otn-topo-yang] and [I-D.ietf-ccamp-layer1-types] for the OTN specific terms used in this document.

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

- * 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 document. The meaning of the symbols in these diagrams is defined in [RFC8340].

1.3. Prefix 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
ll-types	ietf-layer1-types	[RFCZZZZ]
te	ietf-te	[RFCXXXX]
te-pc	ietf-te-path-computation	[RFCYYYY]
otn-pc	ietf-otn-path-computation	RFCXXXX

Table 1: Prefixes and corresponding YANG modules

RFC Editor Note: Please replace XXXX with the RFC number assigned to this document. Please replace YYYY with the RFC number assigned to [I-D.ietf-teas-yang-path-computation]. Please replace ZZZZ with the RFC number assigned to [I-D.ietf-ccamp-layer1-types]. Please replace KKKK with the RFC number assigned to [I-D.ietf-teas-yang-te]. Please remove this note.

2. YANG Data Model for OTN Path Computation

2.1. YANG Model Overview

The YANG data model for requesting OTN path computation is defined as an augmentation of the generic Path Computation RPC defined in [I-D.ietf-teas-yang-path-computation], as shown in Figure 1.

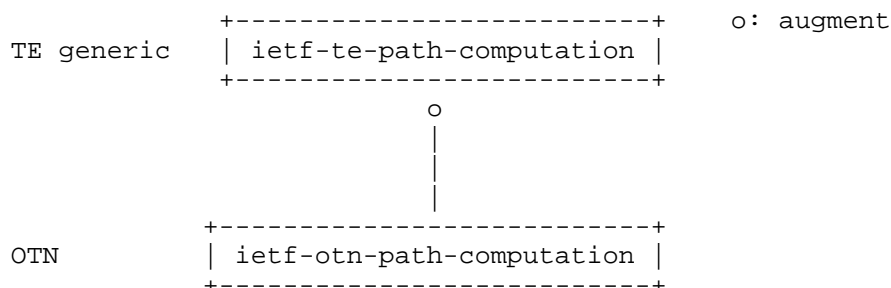


Figure 1: Relationship between OTN and TE path computation models

The entities and Traffic Engineering (TE) attributes, such as requested path and tunnel attributes, defined in [I-D.ietf-teas-yang-path-computation], are still applicable when requesting OTN path computation and the models defined in this document only specifies the additional OTN technology-specific attributes/information, using the attributes defined in [I-D.ietf-ccamp-layer1-types].

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

2.2. Bandwidth Augmentation

The OTN path computation model augments all the occurrences of the `te-bandwidth` container with the OTN technology-specific attributes using the `otn-link-bandwidth` and `otn-path-bandwidth` groupings defined in [I-D.ietf-ccamp-layer1-types].

2.3. Label Augmentations

The OTN path computation model augments all the occurrences of the `label-restriction` list with OTN technology-specific attributes using the `otn-label-range-info` grouping defined in [I-D.ietf-ccamp-layer1-types].

Moreover, the model augments all the occurrences of the `te-label` container with the OTN technology-specific attributes using the `otn-label-start-end`, `otn-label-hop` and `otn-label-step` groupings defined in [I-D.ietf-ccamp-layer1-types].

3. OTN Path Computation Tree Diagram

Figure 2 below shows the tree diagram of the YANG data model defined in module `ietf-otn-path-computation.yang`.

```

module: ietf-otn-path-computation

augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:te-bandwidth/te-pc:technology:
  +--:(otn)
    +-- otn
      +-- odu-type?                                identityref
      +-- (oduflex-type)?
        +--:(generic)
          | +-- nominal-bit-rate                    union
        +--:(cbr)
          | +-- client-type                          identityref
        +--:(gfp-n-k)
          | +-- gfp-n                                uint8
          | +-- gfp-k?                               gfp-k
        +--:(flexe-client)
          | +-- flexe-client                          flexe-client-rate
        +--:(flexe-aware)
          | +-- flexe-aware-n                          uint16
        +--:(packet)
          +-- opuflex-payload-rate                    union
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:tunnel-attributes/te-pc:te-bandwidth
  /te-pc:technology:
  +--:(otn)
    +-- otn
      +-- odu-type?                                identityref
      +-- (oduflex-type)?
        +--:(generic)
          | +-- nominal-bit-rate                    union
        +--:(cbr)
          | +-- client-type                          identityref
        +--:(gfp-n-k)
          | +-- gfp-n                                uint8
          | +-- gfp-k?                               gfp-k
        +--:(flexe-client)
          | +-- flexe-client                          flexe-client-rate
        +--:(flexe-aware)
          | +-- flexe-aware-n                          uint16
        +--:(packet)
          +-- opuflex-payload-rate                    union
augment /te:tunnels-path-compute/te:output/te:path-compute-result
  /te-pc:response/te-pc:computed-paths-properties
  /te-pc:computed-path-properties/te-pc:path-properties
  /te-pc:te-bandwidth/te-pc:technology:
  +--:(otn)
    +--ro otn
      +--ro odu-type?                                identityref

```

```

    +--ro (oduflex-type)?
      +--:(generic)
        | +--ro nominal-bit-rate          union
      +--:(cbr)
        | +--ro client-type              identityref
      +--:(gfp-n-k)
        | +--ro gfp-n                    uint8
        | +--ro gfp-k?                   gfp-k
      +--:(flexe-client)
        | +--ro flexe-client              flexe-client-rate
      +--:(flexe-aware)
        | +--ro flexe-aware-n            uint16
      +--:(packet)
        +--ro opuflex-payload-rate        union
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:path-in-segment
  /te-pc:label-restrictions/te-pc:label-restriction:
+-- otn-label-range
  +-- range-type?          otn-label-range-type
  +-- tsg?                  identityref
  +-- odu-type-list*        identityref
  +-- priority?            uint8
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:path-out-segment
  /te-pc:label-restrictions/te-pc:label-restriction:
+-- otn-label-range
  +-- range-type?          otn-label-range-type
  +-- tsg?                  identityref
  +-- odu-type-list*        identityref
  +-- priority?            uint8
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:optimizations/te-pc:algorithm
  /te-pc:metric/te-pc:optimization-metric
  /te-pc:explicit-route-exclude-objects
  /te-pc:route-object-exclude-object/te-pc:type/te-pc:label
  /te-pc:label-hop/te-pc:te-label/te-pc:technology:
+--:(otn)
  +-- otn
    +-- tpn?              otn-tpn
    +-- tsg?              identityref
    +-- ts-list?          string
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:optimizations/te-pc:algorithm
  /te-pc:metric/te-pc:optimization-metric
  /te-pc:explicit-route-include-objects
  /te-pc:route-object-include-object/te-pc:type/te-pc:label
  /te-pc:label-hop/te-pc:te-label/te-pc:technology:
+--:(otn)

```

```

    +-- otn
      +-- tpn?          otn-tpn
      +-- tsg?          identityref
      +-- ts-list?      string
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:explicit-route-objects-always
  /te-pc:route-object-exclude-always/te-pc:type/te-pc:label
  /te-pc:label-hop/te-pc:te-label/te-pc:technology:
+--:(otn)
  +-- otn
    +-- tpn?          otn-tpn
    +-- tsg?          identityref
    +-- ts-list?      string
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:explicit-route-objects-always
  /te-pc:route-object-include-exclude/te-pc:type
  /te-pc:label/te-pc:label-hop/te-pc:te-label
  /te-pc:technology:
+--:(otn)
  +-- otn
    +-- tpn?          otn-tpn
    +-- tsg?          identityref
    +-- ts-list?      string
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:path-in-segment
  /te-pc:label-restrictions/te-pc:label-restriction
  /te-pc:label-start/te-pc:te-label/te-pc:technology:
+--:(otn)
  +-- otn
    +-- (range-type)?
      +--:(trib-port)
      | +-- tpn?      otn-tpn
      +--:(trib-slot)
      +-- ts?         otn-ts
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:path-in-segment
  /te-pc:label-restrictions/te-pc:label-restriction
  /te-pc:label-end/te-pc:te-label/te-pc:technology:
+--:(otn)
  +-- otn
    +-- (range-type)?
      +--:(trib-port)
      | +-- tpn?      otn-tpn
      +--:(trib-slot)
      +-- ts?         otn-ts
augment /te:tunnels-path-compute/te:input/te:path-compute-info
  /te-pc:path-request/te-pc:path-in-segment
  /te-pc:label-restrictions/te-pc:label-restriction

```



```

        /te-pc:label-step/te-pc:technology:
+---:(otn)
+--- otn
+--- (range-type)?
+---:(trib-port)
|   +--- tpn?    otn-tpn
+---:(trib-slot)
+--- ts?    otn-ts
augment /te:tunnels-path-compute/te:input/te:path-compute-info
        /te-pc:path-request/te-pc:path-out-segment
        /te-pc:label-restrictions/te-pc:label-restriction
        /te-pc:label-start/te-pc:te-label/te-pc:technology:
+---:(otn)
+--- otn
+--- (range-type)?
+---:(trib-port)
|   +--- tpn?    otn-tpn
+---:(trib-slot)
+--- ts?    otn-ts
augment /te:tunnels-path-compute/te:input/te:path-compute-info
        /te-pc:path-request/te-pc:path-out-segment
        /te-pc:label-restrictions/te-pc:label-restriction
        /te-pc:label-end/te-pc:te-label/te-pc:technology:
+---:(otn)
+--- otn
+--- (range-type)?
+---:(trib-port)
|   +--- tpn?    otn-tpn
+---:(trib-slot)
+--- ts?    otn-ts
augment /te:tunnels-path-compute/te:input/te:path-compute-info
        /te-pc:path-request/te-pc:path-out-segment
        /te-pc:label-restrictions/te-pc:label-restriction
        /te-pc:label-step/te-pc:technology:
+---:(otn)
+--- otn
+--- (range-type)?
+---:(trib-port)
|   +--- tpn?    otn-tpn
+---:(trib-slot)
+--- ts?    otn-ts
augment /te:tunnels-path-compute/te:input/te:path-compute-info
        /te-pc:synchronization/te-pc:exclude-objects
        /te-pc:excludes/te-pc:type/te-pc:label/te-pc:label-hop
        /te-pc:te-label/te-pc:technology:
+---:(otn)
+--- otn
+--- tpn?    otn-tpn

```

```

    +-- tsg?          identityref
    +-- ts-list?      string
augment /te:tunnels-path-compute/te:output/te:path-compute-result
    /te-pc:response/te-pc:computed-paths-properties
    /te-pc:computed-path-properties/te-pc:path-properties
    /te-pc:path-route-objects/te-pc:path-route-object
    /te-pc:type/te-pc:label/te-pc:label-hop/te-pc:te-label
    /te-pc:technology:
+--:(otn)
  +--ro otn
    +--ro tpn?          otn-tpn
    +--ro tsg?          identityref
    +--ro ts-list?      string

```

Figure 2: OTN path computation tree diagram

4. YANG Model for OTN Path Computation

```

<CODE BEGINS> file "ietf-otn-path-computation@2022-07-10.yang"
module ietf-otn-path-computation {
  yang-version 1.1;
  namespace "urn:ietf:params:xml:ns:yang:ietf-otn-path-computation";
  prefix "otn-pc";

  import ietf-te-path-computation {
    prefix "te-pc";
    revision-date "2021-09-06";
    reference
      "I-D.ietf-teas-yang-path-computation-14: Yang model
      for requesting Path Computation.";
  }

  import ietf-te {
    prefix "te";
    revision-date "2021-02-20";
    reference
      "I-D.ietf-teas-yang-te-19: A YANG Data Model for Traffic
      Engineering Tunnels and Interfaces. ";
  }

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

  organization

```

```
"IETF CCAMP Working Group";
contact
  "WG Web: <https://datatracker.ietf.org/wg/ccamp/>
  WG List: <mailto:ccamp@ietf.org>

  Editor:   Aihua Guo
            <mailto:aihuaguo.ietf@gmail.com>

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

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

description

"This module defines a model for requesting
OTN Path Computation.

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

Copyright (c) 2022 IETF Trust and the persons
identified as authors of the code. All rights reserved.

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

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

```
revision "2022-09-12" {
  description
    "Initial version.";
  reference
    "RFC XXXX: A YANG Data Model for requesting Path Computation
    in an Optical Transport Network (OTN)";
  // RFC Ed.: replace XXXX with actual RFC number, update date
  // information and remove this note
}

/*
 * Data nodes
 */
```

```
/*
 * Augment TE bandwidth
 */

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:te-bandwidth/te-pc:technology" {
  description
    "Augment TE bandwidth of the requested path.";
  case otn {
    uses ll-types:otn-path-bandwidth;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:tunnel-attributes/te-pc:te-bandwidth/"
  + "te-pc:technology" {
  description
    "Augment TE bandwidth of the requested tunnel attributes.";
  case otn {
    uses ll-types:otn-path-bandwidth;
  }
}

augment "/te:tunnels-path-compute/te:output/"
  + "te:path-compute-result/te-pc:response/"
  + "te-pc:computed-paths-properties/"
  + "te-pc:computed-path-properties/te-pc:path-properties/"
  + "te-pc:te-bandwidth/te-pc:technology" {
  description
    "Augment TE bandwidth of the computed path properties.";
  case otn {
    uses ll-types:otn-path-bandwidth;
  }
}

/*
 * Augment TE label range information
 */

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:path-in-segment/"
  + "te-pc:label-restrictions/te-pc:label-restriction" {
  description
    "Augment TE label range information for the ingress segment
    of the requested path.";
  uses ll-types:otn-label-range-info;
}
```

```
augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:path-out-segment/"
  + "te-pc:label-restrictions/te-pc:label-restriction" {
  description
    "Augment TE label range information for the egress segment
    of the requested path.";
  uses ll-types:otn-label-range-info;
}

/*
 * Augment TE label.
 */

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:optimizations/te-pc:algorithm/"
  + "te-pc:metric/te-pc:optimization-metric/"
  + "te-pc:explicit-route-exclude-objects/"
  + "te-pc:route-object-exclude-object/te-pc:type/te-pc:label/"
  + "te-pc:label-hop/te-pc:te-label/te-pc:technology" {
  description
    "Augment TE label hop for the optimization of the explicit
    route objects excluded by the path computation of the requested
    path.";
  case otn {
    uses ll-types:otn-label-hop;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:optimizations/te-pc:algorithm/"
  + "te-pc:metric/te-pc:optimization-metric/"
  + "te-pc:explicit-route-include-objects/"
  + "te-pc:route-object-include-object/te-pc:type/te-pc:label/"
  + "te-pc:label-hop/te-pc:te-label/te-pc:technology" {
  description
    "Augment TE label hop for the optimization of the explicit
    route objects included by the path computation of the requested
    path.";
  case otn {
    uses ll-types:otn-label-hop;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:explicit-route-objects-always/"
  + "te-pc:route-object-exclude-always/te-pc:type/te-pc:label/"
  + "te-pc:label-hop/te-pc:te-label/te-pc:technology" {
  description
```

```

    "Augment TE label hop for the explicit route objects always
    excluded by the path computation of the requested path.";
  case otn {
    uses ll-types:otn-label-hop;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:explicit-route-objects-always/"
  + "te-pc:route-object-include-exclude/te-pc:type/"
  + "te-pc:label/te-pc:label-hop/te-pc:te-label/"
  + "te-pc:technology" {
  description
    "Augment TE label hop for the explicit route objects included
    or excluded by the path computation of the requested path.";
  case otn {
    uses ll-types:otn-label-hop;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:path-in-segment/"
  + "te-pc:label-restrictions/te-pc:label-restriction/"
  + "te-pc:label-start/te-pc:te-label/te-pc:technology" {
  description
    "Augment TE label range start for the ingress segment
    of the requested path.";
  case otn {
    uses ll-types:otn-label-start-end;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:path-in-segment/"
  + "te-pc:label-restrictions/te-pc:label-restriction/"
  + "te-pc:label-end/te-pc:te-label/te-pc:technology" {
  description
    "Augment TE label range end for the ingress segment
    of the requested path.";
  case otn {
    uses ll-types:otn-label-start-end;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:path-in-segment/"
  + "te-pc:label-restrictions/te-pc:label-restriction/"
  + "te-pc:label-step/te-pc:technology" {

```

```
    description
      "Augment TE label range step for the ingress segment
      of the requested path.";
    case otn {
      uses ll-types:otn-label-step;
    }
  }

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:path-out-segment/"
  + "te-pc:label-restrictions/te-pc:label-restriction/"
  + "te-pc:label-start/te-pc:te-label/te-pc:technology" {
  description
    "Augment TE label range start for the egress segment
    of the requested path.";
  case otn {
    uses ll-types:otn-label-start-end;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:path-out-segment/"
  + "te-pc:label-restrictions/te-pc:label-restriction/"
  + "te-pc:label-end/te-pc:te-label/te-pc:technology" {
  description
    "Augment TE label range end for the egress segment
    of the requested path.";
  case otn {
    uses ll-types:otn-label-start-end;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:path-request/te-pc:path-out-segment/"
  + "te-pc:label-restrictions/te-pc:label-restriction/"
  + "te-pc:label-step/te-pc:technology" {
  description
    "Augment TE label range end for the egress segment
    of the requested path.";
  case otn {
    uses ll-types:otn-label-step;
  }
}

augment "/te:tunnels-path-compute/te:input/te:path-compute-info/"
  + "te-pc:synchronization/te-pc:exclude-objects/"
  + "te-pc:excludes/te-pc:type/te-pc:label/te-pc:label-hop/"
  + "te-pc:te-label/te-pc:technology" {
```

```
description
  "Augment TE label hop for the explicit route objects to always
  exclude from synchronized path computation.";
case otn {
  uses ll-types:otn-label-hop;
}
}

augment "/te:tunnels-path-compute/te:output/"
+ "te:path-compute-result/te-pc:response/"
+ "te-pc:computed-paths-properties/"
+ "te-pc:computed-path-properties/te-pc:path-properties/"
+ "te-pc:path-route-objects/te-pc:path-route-object/"
+ "te-pc:type/te-pc:label/"
+ "te-pc:label-hop/te-pc:te-label/te-pc:technology" {
  description
    "Augment TE label hop for the route object of the computed
    path.";
  case otn {
    uses ll-types:otn-label-hop;
  }
}
}
<CODE ENDS>
```

Figure 3: OTN path computation YANG module

5. Manageability Considerations

This document provides a method for requesting path computations for OTN tunnels. Consideration of mechanisms to gather and collate information required for the path computations will be necessary. Furthermore, storing path computation requests and responses and triggering actions will also need to be carefully managed and secured.

Future versions of this document will contain additional information.

6. Security Considerations

The YANG module defined in this document will be accessed via the NETCONF protocol [RFC6241] or RESTCONF protocol [RFC8040]. The lowest NETCONF layer is the secure transport layer, and the mandatory-to-implement secure transport is Secure Shell (SSH) [RFC6242]. The lowest RESTCONF layer is HTTPS and the mandatory-to-implement secure transport is TLS [RFC8446].

The Network Configuration Access Control Model (NACM) [RFC8341] provides the means to restrict access to particular NETCONF or RESTCONF users to a pre-configured subset of all available NETCONF or RESTCONF protocol operations and content.

Some of the RPC operations defined in this YANG module may be considered sensitive or vulnerable in some network environments. It is thus essential to control access to these operations.

Operations defined in this document, and their sensitivities and possible vulnerabilities, will be discussed further in future versions of this document.

7. IANA Considerations

This document registers the following URIs in the "ns" subregistry within the "IETF XML registry" [RFC3688].

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

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

name: ietf-otn-path-computation
namespace: urn:ietf:params:xml:ns:yang:ietf-otn-path-computation
prefix: otn-pc
reference: this document

8. References

8.1. Normative References

- [I-D.ietf-ccamp-layer1-types]
Zheng, H. and I. Busi, "Common YANG Data Types for Layer 1 Networks", Work in Progress, Internet-Draft, draft-ietf-ccamp-layer1-types-18, 23 February 2024, <<https://datatracker.ietf.org/doc/html/draft-ietf-ccamp-layer1-types-18>>.
- [I-D.ietf-teas-yang-path-computation]
Busi, I., Belotti, S., de Dios, O. G., Sharma, A., and Y. Shi, "A YANG Data Model for requesting path computation", Work in Progress, Internet-Draft, draft-ietf-teas-yang-path-computation-25, 11 August 2025, <<https://datatracker.ietf.org/doc/html/draft-ietf-teas-yang-path-computation-25>>.

[I-D.ietf-teas-yang-te]

Saad, T., Gandhi, R., Liu, X., Beeram, V. P., and I. Bryskin, "A YANG Data Model for Traffic Engineering Tunnels, Label Switched Paths and Interfaces", Work in Progress, Internet-Draft, draft-ietf-teas-yang-te-38, 29 May 2025, <<https://datatracker.ietf.org/doc/html/draft-ietf-teas-yang-te-38>>.

[RFC3688] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688, DOI 10.17487/RFC3688, January 2004, <<https://www.rfc-editor.org/rfc/rfc3688>>.

[RFC6241] Enns, R., Ed., Bjorklund, M., Ed., Schoenwaelder, J., Ed., and A. Bierman, Ed., "Network Configuration Protocol (NETCONF)", RFC 6241, DOI 10.17487/RFC6241, June 2011, <<https://www.rfc-editor.org/rfc/rfc6241>>.

[RFC6242] Wasserman, M., "Using the NETCONF Protocol over Secure Shell (SSH)", RFC 6242, DOI 10.17487/RFC6242, June 2011, <<https://www.rfc-editor.org/rfc/rfc6242>>.

[RFC7950] Bjorklund, M., Ed., "The YANG 1.1 Data Modeling Language", RFC 7950, DOI 10.17487/RFC7950, August 2016, <<https://www.rfc-editor.org/rfc/rfc7950>>.

[RFC8040] Bierman, A., Bjorklund, M., and K. Watsen, "RESTCONF Protocol", RFC 8040, DOI 10.17487/RFC8040, January 2017, <<https://www.rfc-editor.org/rfc/rfc8040>>.

[RFC8340] Bjorklund, M. and L. Berger, Ed., "YANG Tree Diagrams", BCP 215, RFC 8340, DOI 10.17487/RFC8340, March 2018, <<https://www.rfc-editor.org/rfc/rfc8340>>.

[RFC8341] Bierman, A. and M. Bjorklund, "Network Configuration Access Control Model", STD 91, RFC 8341, DOI 10.17487/RFC8341, March 2018, <<https://www.rfc-editor.org/rfc/rfc8341>>.

[RFC8342] Bjorklund, M., Schoenwaelder, J., Shafer, P., Watsen, K., and R. Wilton, "Network Management Datastore Architecture (NMDA)", RFC 8342, DOI 10.17487/RFC8342, March 2018, <<https://www.rfc-editor.org/rfc/rfc8342>>.

[RFC8446] Rescorla, E., "The Transport Layer Security (TLS) Protocol Version 1.3", RFC 8446, DOI 10.17487/RFC8446, August 2018, <<https://www.rfc-editor.org/rfc/rfc8446>>.

8.2. Informative References

[I-D.draft-gbb-ccamp-optical-path-computation-yang]

Busi, I., Guo, A., and S. Belotti, "YANG Data Models for requesting Path Computation in Optical Networks", Work in Progress, Internet-Draft, draft-gbb-ccamp-optical-path-computation-yang-02, 12 September 2022, <<https://datatracker.ietf.org/doc/html/draft-gbb-ccamp-optical-path-computation-yang-02>>.

[I-D.ietf-ccamp-otn-topo-yang]

Zheng, H., Busi, I., Liu, X., Belotti, S., and O. G. de Dios, "A YANG Data Model for Optical Transport Network Topology", Work in Progress, Internet-Draft, draft-ietf-ccamp-otn-topo-yang-20, 7 November 2024, <<https://datatracker.ietf.org/doc/html/draft-ietf-ccamp-otn-topo-yang-20>>.

[I-D.ietf-teas-actn-poi-applicability]

Peruzzini, F., Bouquier, J., Busi, I., King, D., and D. Ceccarelli, "Applicability of Abstraction and Control of Traffic Engineered Networks (ACTN) to Packet Optical Integration (POI)", Work in Progress, Internet-Draft, draft-ietf-teas-actn-poi-applicability-16, 9 October 2025, <<https://datatracker.ietf.org/doc/html/draft-ietf-teas-actn-poi-applicability-16>>.

Appendix A. Change Log

The initial YANG data model requesting path computation in optical networks was draft-gbb-ccamp-optical-path-computation-yang-00. This document included path computation request capabilities for WSON, Flexi-Grid and OTN technologies. However, it was proposed at IETF 113 (March 25, 2022) to split the initial document into separate documents for WDM (WSON and Flexi-Grid) and OTN technologies, as each technology may be developed and implemented separately.

The WDM technology capabilities were kept in [I-D.draft-gbb-ccamp-optical-path-computation-yang], and the OTN capabilities were moved into this document.

Editors note, please remove this appendix before publication.

Acknowledgments

The authors of this document would like to thank the authors of [I-D.ietf-teas-actn-poi-applicability] for having identified the gap and requirements to trigger this work.

This document was prepared using kramdown.

Contributors

Daniel King
Old Dog Consulting
Email: daniel@olddog.co.uk

Authors' Addresses

Italo Busi
Huawei Technologies
Email: italo.busi@huawei.com

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

Sergio Belotti
Nokia
Email: sergio.belotti@nokia.com