YANG Data Models for fine grain Optical Transport Network

CCAMP WG, interim-2025-ccamp-02

draft-tan-ccamp-fgotn-yang-03

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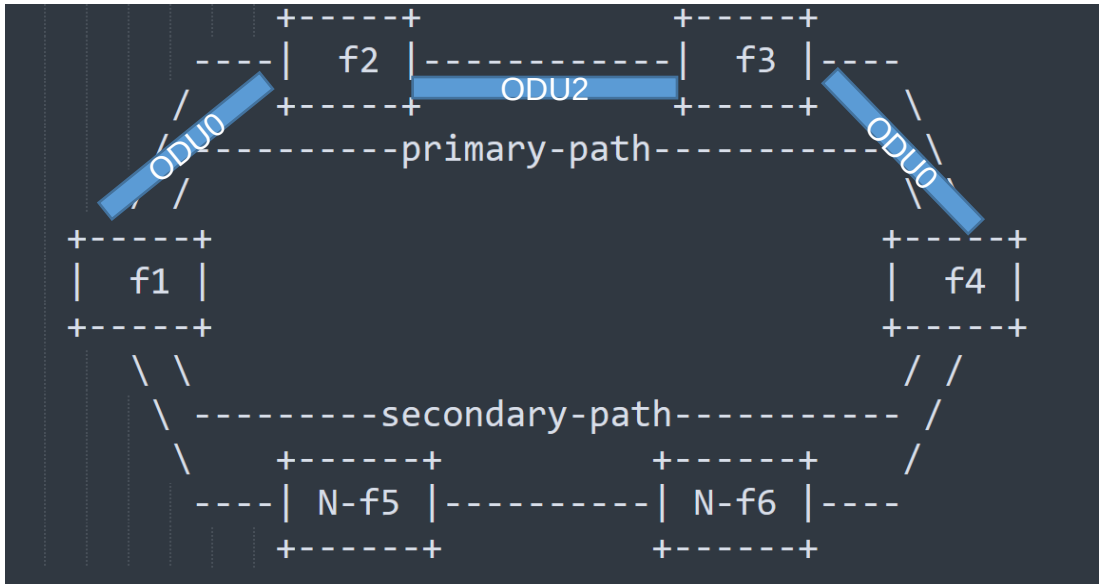
Main Ideas and Changes

- **Main ideas:**
  - ✓ Presents the control interface requirements of fgOTN and present three scenarios that require special consideration.
  - ✓ Defines two YANG data models for fgOTN topology and fgOTN tunnel.
- **Main changes from -01 to -03**
  - ✓ We further discussed the scenarios present in the draft and made some editorial changes:
    - Rename the “Private Line Service Provisioning Scenario of fgOTN” with “Retrieve Server Tunnels Scenario of fgOTN” and modify corresponding content;
    - Rename the “Service Protection Scenario of fgOTN” with “Multi-layer Path Splicing Scenario of fgOTN” and modify corresponding content;
    - For the hitless resizing scenario of fgOTN, we add some more description of inter-domain service resizing and modify the figure to contain both intra&inter domain scenario.
  - ✓ Modify the description of YANG data model section, and further illustrate the relationship with OTN topology and OTN tunnel model.

Open Discussion1 : How to define a generic structure to support multi-layer path

- Two options:
  1. Make extension on the dependency tunnel structure
  2. Make extension on the path element
- Option1: Make extension on the dependency tunnel

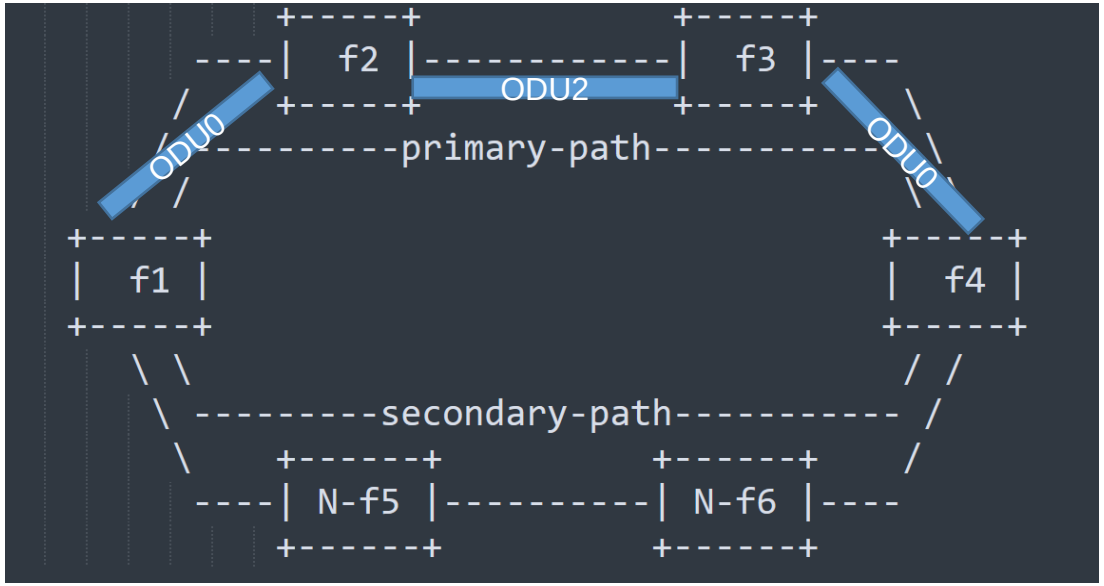


•dependency tunnel:

- (1)
- "name": {ODU-tunnel-1},
- "encoding": {lsp-encoding-oduk},
- "switching-type": {switching-otn},
- "index": {1},
- "working-role": {working}
- (2)
- "name": {ODU-tunnel-2},
- "encoding": {lsp-encoding-oduk},
- "switching-type": {switching-otn},
- "index": {2},
- "working-role": {working}
- (3)
- "name": {ODU-tunnel-3},
- "encoding": {lsp-encoding-oduk},
- "switching-type": {switching-otn},
- "index": {3},
- "working-role": {working}
- (4)
- "name": {ODU-tunnel-4},
- "encoding": {lsp-encoding-oduk},
- "switching-type": {switching-otn},
- "index": {4},
- "working-role": {protecting}

Open Discussion1 : How to define a generic structure to support multi-layer path

- Option2: Make extension on the path element



Route objects of primary path (1):

- (1) link-hop (2)
- "link-tp-id": "f1-f2-link"
- "underlay-tunnel"
  - "name": {ODU-tunnel-1},
  - "encoding": {lsp-encoding-oduk},
  - "switching-type": {switching-otn}
- (2) link-hop (2)
- "link-tp-id": "f2-f3-link"
- "underlay-tunnel"
  - "name": {ODU-tunnel-2},
  - "encoding": {lsp-encoding-oduk},
  - "switching-type": {switching-otn}
- (3) link-hop (2)
- "link-tp-id": "f3-f4-link"
- "underlay-tunnel"
  - "name": {ODU-tunnel-3},
  - "encoding": {lsp-encoding-oduk},
    - "switching-type": {switching-otn}

Route objects of secondary path (1):

- (1) link-hop (2)
- "link-tp-id": "f1-f4-link"
- "underlay-tunnel"
  - "name": {ODU-tunnel-4},
  - "encoding": {lsp-encoding-oduk},
  - "switching-type": {switching-otn}

(1) Could be:
- explicit-route-objects (for path constraints)
- path-route-objects (for computed paths)
- lsp-actual-route-information (for LSPs)

(2) Could be:
- unnumbered-link-hop
- numbered-link-hop

Open Discussion2 : How to filter the TPs which support fgOTN

- **Current solution**: Augment one attribute under the termination point to indicate whether the TP can support fgOTN.

```
augment /nw:networks/nw:network/nw:node/nt:termination-point
          /tet:te:
  +--rw supported-fgotn-tp?   boolean
```

- **One possible solution**: Make extension on switching-capability and encoding.
- **Another possible solution:** Define a new odu-type (signal-type in GMPLS).
- Both solutions could have some impact on PCEP and GMPLS protocol.
  - ✓ Need to collaborate with draft-lin-ccamp-gmpls-fgotn-applicability.

Open Discussion3: How to describe the link's bandwidth which can support fgOTN

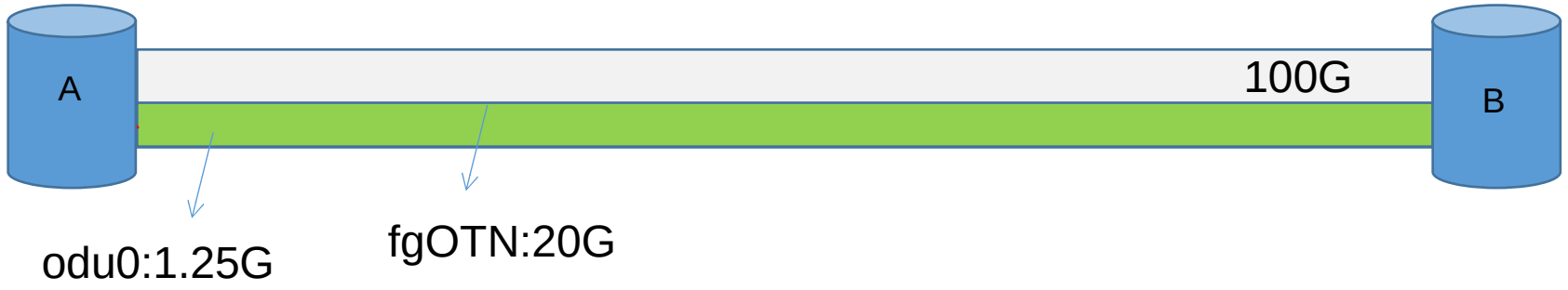
- Bandwidth Augmentation: string or integer(s)?
  - max-link-bandwidth
    - If a link can support traditional OTN switching and fgOTN switching at the same time, we need to know the maximum bandwidth allocated for different switching.

```
augment /nw:networks/nw:network/nt:link/tet:te
          /tet:te-link-attributes/tet:max-link-bandwidth
          /tet:te-bandwidth/otnt:otn-bandwidth/otnt:odulist:
  +--rw fgotn-bandwidth?   string
```

  - unreserved-bandwidth
    - odu-type
    - odu-ts-number
    - fgotn-bandwidth

```
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes
          /tet:unreserved-bandwidth/tet:te-bandwidth
          /otnt:otn-bandwidth:
    +--rw fgotnlist* [odu-type odu-ts-number]
       +--rw odu-type                identityref
       +--rw odu-ts-number?          string
       +--rw fgotn-bandwidth?        string
```

An Example of link bandwidth



- max-link-bandwidth

```
"odulist": [
        {
          "odu-type": "ietf-layer1-types:odu0",
          "number": "80",
          “fgotn-bandwidth”: "20000Mbps"
        }
      ]
```

- unreserved-bandwidth

```
"fgotnlist": [
        {
          "odu-type": "ietf-layer1-types:odu0",
          "odu-ts-number": "1-16",
          "fgotn-bandwidth": "20000Mbps"
        }
      ]
```

Next Step and Working Method

- Continue the discussion of the previous three open issues
  - ✓ Seek coordination with the PCEP and GMPLS protocol experts
- Start the discussion of inter-domain hitless resizing issue
- Request working group adoption

- More information can be found on our github: https://github.com/YuChaode/draft-tan-ccamp-fgotn-yang
- Bi-weekly meetings (Wednesday 8-10am CEST)

Thank You