

YANG Data Models for fine grain Optical Transport Network

CCAMP WG, IETF125

draft-tan-ccamp-fgotn-yang-06

Author:

Yanxia Tan (ChinaUnicom)

Yanlei Zheng (ChinaUnicom)

Italo Busi (Huawei)

Chaode Yu (Huawei)

Xing Zhao (CAICT)

Contributor:

Chen Li (Fiberhome)

Zelin Wang (ChinaUnicom)

Main Ideas and Changes

➤ Main ideas:

- ✓ Describe the control interface requirements of fgOTN and three scenarios that require special consideration.
- ✓ Defines three YANG modules for fgOTN topology, fgOTN tunnel and fgOTN types.

➤ Main changes from -04 to -06

- ✓ Add a new ietf-fgotn-types YANG module to define the fgOTN-related types.
- ✓ Updated some changes to the fgOTN topology module.
- ✓ Updated minor refinements to the fgOTN tunnel module.
- ✓ Updated description of the multi-domain fgOTN hitless resizing process.
- ✓ Editorial updates.

What to be added in fgOTN types YANG module?

- Add a new ietf-fgotn-types YANG module to define the fgOTN-related types.

```
identity fgODUflex {  
    base l1-types:odu-type;  
    description  
        "fgODUflex type (fine grain flexible bit rate, resizable).";  
}
```

- **Changes to the fgOTN topology module:** max-link-bandwidth and unreserved-bandwidth structure.
- Add a when statement making it applicable only when the odu-type is fgODUflex.

```
leaf fgotn-bandwidth {  
    when 'derived-from-or-self(..otnt:odu-type,'  
        + '"fgotn-types:fgODUflex")' {  
        description  
            "Applicable when odu-type is fgODUflex.";  
    }  
    type uint16;  
    units "megabits per second";  
    description  
        "It is used to indicate how much of the bandwidth has been  
        allocated for the usage of fgOTN.";  
}
```

```
leaf fgotn-bandwidth {  
    when 'derived-from-or-self(..otnt:odu-type,'  
        + '"fgotn-types:fgODUflex")' {  
        description  
            "Applicable when odu-type is fgODUflex.";  
    }  
    type uint16;  
    units "megabits per second";  
    description  
        "The unreserved bandwidth of fgOTN before the server ODUk  
        is set up";  
}
```

- **Changes to the fgOTN tunnel module:** Move the fgoduflex-bandwidth under the otn-bandwidth container with a when statement making it applicable only when the odu-type is fgODUflex.

How to describe the bandwidth of links which can support fgOTN

➤ Define a new data type **ts-list** in ietf-fgotn-topology to describe the string pattern, the data type of the odu-ts-number has been changed from uint16 to ts-list.

- max-link-bandwidth
 - If a link can support fgOTN switching, we need to know the maximum bandwidth allocated for fgOTN 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?  uint16
```

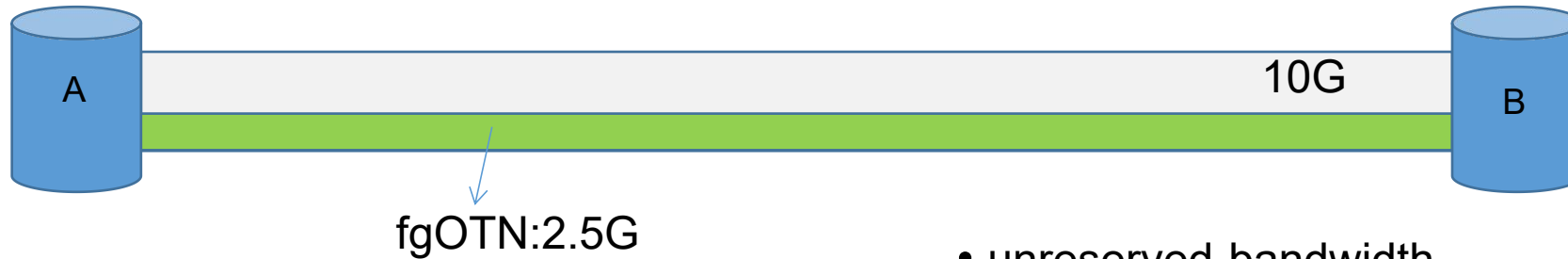
- unreserved-bandwidth
 - odu-type
 - odu-ts-number
 - fgotn-bandwidth

```
augment /nw:networks/nw:network/nt:link/tet:te
    /tet:te-link-attributes/tet:unreserved-bandwidth
    /tet:te-bandwidth/otnt:otn-bandwidth/otnt:odulist:
    +-rw fgotn-bandwidth?  uint16
```

```
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  fgotnt:ts-list
    +-rw fgotn-bandwidth?  uint16
```

An Example of link bandwidth-Step1

Step1: No server ODUk are setup on the link between node A and node B



- max-link-bandwidth

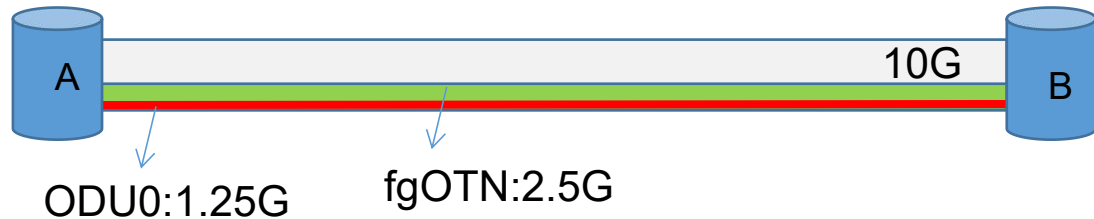
```
"max-link-bandwidth": {  
  "te-bandwidth": {  
    "ietf-otn-topology:otn-bandwidth": {  
      "odulist": [  
        {  
          "odu-type": "ietf-layer1-types:ODU2",  
          "number": 1  
        },  
        ...  
        {  
          "odu-type": "ietf-fgotn-types:fgODUflex",  
          "ietf-fgotn-topology:fgotn-bandwidth": 2500  
        }  
      ]  
    }  
  }  
}
```

- unreserved-bandwidth

```
"unreserved-bandwidth": [ {  
  "priority": 7,  
  "te-bandwidth": {  
    "ietf-otn-topology:otn-bandwidth": {  
      "odulist": [  
        {  
          "odu-type": "ietf-layer1-types:ODU2",  
          "number": 1  
        },  
        ...  
        {  
          "odu-type": "ietf-fgotn-types:fgODUflex",  
          "ietf-fgotn-topology:fgotn-bandwidth": 2500  
        }  
      ]  
    }  
  }  
}]
```

An Example of link bandwidth-Step 2

Step2: One server ODU0 has been setup on the link between node A and node B to carry fgOTN traffic



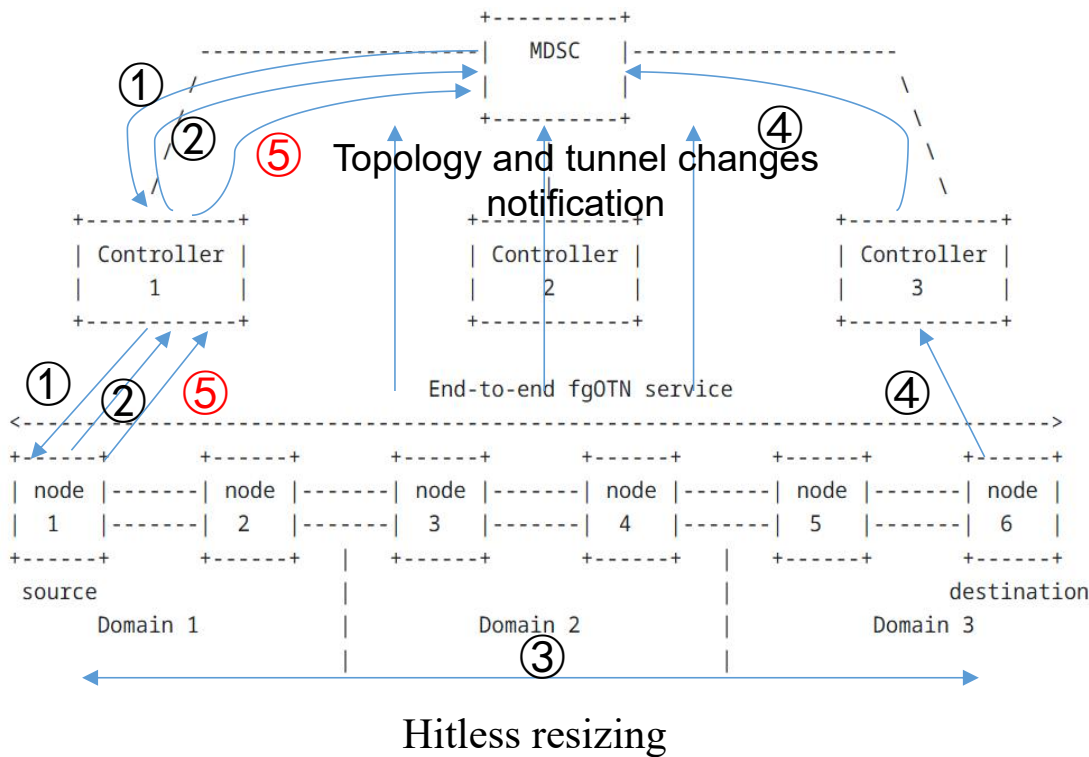
- max-link-bandwidth

```
"max-link-bandwidth": {  
  "te-bandwidth": {  
    "ietf-otn-topology:otn-bandwidth": {  
      "odulist": [  
        {  
          "odu-type": "ietf-layer1-types:ODU2",  
          "number": 1  
        },  
        ...  
        {  
          "odu-type": "ietf-fgotn-types:fgODUflex",  
          "ietf-fgotn-topology:fgotn-bandwidth": 2500  
        }  
      ]  
    }  
  }  
}
```

- unreserved-bandwidth

```
"unreserved-bandwidth": [ {  
  "priority": 7,  
  "te-bandwidth": {  
    "ietf-otn-topology:otn-bandwidth": {  
      "odulist": [ {  
        "odu-type": "ietf-layer1-types:ODU2",  
        "number": 0  
      },  
      {  
        "odu-type": "ietf-layer1-types:ODU1",  
        "number": 3  
      },  
      {  
        "odu-type": "ietf-layer1-types:ODU0",  
        "number": 7  
      },  
      {  
        "odu-type": "ietf-fgotn-types:fgODUflex",  
        "ietf-fgotn-topology:fgotn-bandwidth": 1250  
      }  
    ],  
    "ietf-fgotn-topology:fgotnlist": [  
      {  
        "odu-type": "ietf-layer1-types:ODU0",  
        "odu-ts-number": "1",  
        "fgotn-bandwidth": 1250  
      }  
    ]  
  }  
]
```

Multi-domain fgOTN Hitless Resizing Process



Step 1: The MDSC coordinator sends an resizing command to the source node (Node1) via Controller 1.

Step 2: Controller 1 will report a bandwidth adjustment starting status notification, e.g. `ietf-te-types:lsp-path-modifying`, to the MDSC.

Step 3: Node 1 to node 6 will modify their configuration in the forward direction through data plane node by node. **The detail of this process can reference to Annex O.2 of [ITU-T_G.709].**

Step 4: At the same time, the reverse direction bandwidth resizing will be **triggered automatically by the data plane** in node 6. Controller 3 needs to report an bandwidth adjustment starting status notification, `ietf-te-types:lsp-bandwidth-modifying`, to the MDSC.

Step 5: After the reverse direction (Node 6 to Node 1) resizing is completed, Controller 1 will report an ending status notification, `ietf-te-types:lsp-bandwidth-modified-ok`, to the MDSC.

- The source controller alone report the bandwidth adjustment status to the MDSC coordinator upon completion.

Next Step and Working Method

- Request working group adoption.
 - ✓ The open issues are not blocking for WG adoption and can be addressed as part of the WG development process.
- Continue the discussion of the open issues on github.
 - ✓ More discussion is needed for fgOTN over ODUCn.
 - ✓ Updates the JSON examples for fgOTN topology, and include the JSON examples in an appendix.
 - ✓ Additional editorial improvements to the text.
- 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