

Flexi-Grid YANG Models Update

CCAMP Working Group
IETF 113

A YANG Data Model for Flexi-Grid Optical Networks

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Versions: ([draft-ietf-ccamp-flexigrid-media-channel-yang-00](#))

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A YANG Data Model for Flexi-Grid Tunnels
[draft-ietf-ccamp-flexigrid-tunnel-yang-00](#)

<https://github.com/ietf-ccamp-wg/draft-ietf-ccamp-flexigrid-yang>

A YANG Data Model for Flexi-Grid Media Channels

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A YANG Data Model for Flexi-Grid Optical Networks
[draft-ietf-ccamp-flexigrid-yang-11](#)

Abstract

This document defines a YANG module for managing flexi-grid optical networks. The model defined in this document specifies a flexi-grid traffic engineering database that is used to describe the topology of a flexi-grid network. It is based on and augments existing YANG models that describe network and traffic engineering topologies.

The YANG data model defined in this document conforms to the Network Management Datastore Architecture (NMDA).

<https://github.com/ietf-ccamp-wg/draft-ietf-ccamp-flexigrid-media-channel-yang>

A YANG Data Model for Flexi-Grid Optical Topologies

- Used to describe the flexi-grid optical topology
 - [draft-ietf-ccamp-flexigrid-yang](#)
 - Current version is draft-ietf-ccamp-flexigrid-yang-11
 - New version in progress, and includes fixes for:
 - Addressed YANG Dr Early Review Comments
 - Tom's Last Call comments
 - Adrian's Last Call comments
 - Reverted to original code using relative paths, instead of “ancestor” function, more on this later
 - Update to Security section based on recent RFC Editor best practice
 - New version (v12) will be posted shortly after IETF 113

A YANG Data Model for Flexi-Grid Media Channels

- Used to describe the flexi-grid optical media channel
 - [draft-ietf-ccamp-flexigrid-media-channel-yang](#)
 - Current version of the I-D is draft-ietf-ccamp-flexigrid-tunnel-yang-00
 - Several ongoing activities with the I-D
 - #49 Align with RFC9093-bis
 - #47 Relationship between OTSiG and tunnel identifiers
 - #46 WDM technology-specific constraints
 - #42 Improve the model overview
 - For the full list of open issues see:
 - <https://github.com/ietf-ccamp-wg/draft-ietf-ccamp-flexigrid-media-channel-yang/issues>
 - Resuming Flexi-Grid Tunnel Calls after IETF 113
 - Thursdays at 14:00 CEST
 - <https://us06web.zoom.us/j/82073911629?pwd=aXhYZnM0OVJM02lrZkNlQlduZVdJUT09>

A moment for our YANG Doctors

- Many, many YANG modules from CCAMP have numerous augmentations, many 10s, and in some cases more than a 100, almost all controlled by “WHEN”
- The “WHEN” statements are almost all performing the same test for a presence container for the network type but because the tree is often many levels deep
- The augments take place at different levels and the “WHEN” use the relative form of the XPATH statement.
- There is a solution! See next slide.

Use of WHEN statements in I-D

- Augmentation uses “when” statement and relative path
 - In the Flexi-grid YANG code it is used more than 40 times and depending on the augmentation several levels are required
 - This makes life a little hard for a human reading/reviewing the YANG code

```
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:label-restrictions/tet:label-restriction" {
when "../..../..../..../nw:network-types/tet:te-topology/"
  + "flexgt:flexi-grid-topology" {
  description
    "Augmentation parameters apply only for networks with
    flexi-grid topology type.";
}
description
  "Augment TE label range information for the TE node
  connectivity matrices.";
uses l0-types:flexi-grid-label-range-info;
}
```

```
181 augment "/nw:networks/nw:network/nw:node/tet:te/"
182   + "tet:information-source-entry/tet:connectivity-matrices/"
183   + "tet:connectivity-matrix/"
184   + "tet:from/tet:label-restrictions/tet:label-restriction" {
185 when "../..../..../..../nw:network-types/tet:te-topology/"
186   + "flexgt:flexi-grid-topology" {
187   description
188     "Augmentation parameters apply only for networks with
189     flexi-grid topology type.";
190   }
191   description
192     "Augment TE label range information for the source LTP
193     of the connectivity matrix entry information source.";
194   uses l0-types:flexi-grid-label-range-info;
195   }
196
197 augment "/nw:networks/nw:network/nw:node/tet:te/"
198   + "tet:information-source-entry/tet:connectivity-matrices/"
199   + "tet:connectivity-matrix/"
200   + "tet:to/tet:label-restrictions/tet:label-restriction" {
201 when "../..../..../..../nw:network-types/tet:te-topology/"
202   + "flexgt:flexi-grid-topology" {
203   description
204     "Augmentation parameters apply only for networks with
205     flexi-grid topology type.";
206   }
207   description
208     "Augment TE label range information for the destination LTP
209     of the connectivity matrix entry information source.";
210   uses l0-types:flexi-grid-label-range-info;
211   }
212
213 augment "/nw:networks/nw:network/nw:node/tet:te/"
214   + "tet:tunnel-termination-point/"
215   + "tet:local-link-connectivities/"
216   + "tet:label-restrictions/tet:label-restriction" {
217 when "../..../..../..../nw:network-types/tet:te-topology/"
218   + "flexgt:flexi-grid-topology" {
219   description
220     "Augmentation parameters apply only for networks with
221     flexi-grid topology type.";
222   }
223   description
224     "Augment TE label range information for the tunnel
```

XML Axis Constructs

- Introducing “Ancestor” function
- Augmentation uses “ancestor” statement, instead of requiring the relative path.

```
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:label-restrictions/tet:label-restriction" {
when "ancestor::nw:network/nw:network-types/tet:te-topology/"
  + "flexgt:flexi-grid-topology" {
  description
    "Augmentation parameters apply only for networks with
    flexi-grid topology type.";
}
description
  "Augment TE label range information for the TE node
  connectivity matrices.";
uses l0-types:flexi-grid-label-range-info;
}
```

- This makes the code far easier to check, versus:

```
augment "/nw:networks/nw:network/nw:node/tet:te/"
  + "tet:te-node-attributes/tet:connectivity-matrices/"
  + "tet:label-restrictions/tet:label-restriction" {
when "../../../../../../../../nw:network-types/tet:te-topology/"
  + "flexgt:flexi-grid-topology" {
```

XML Axis Constructs

- Yes, but... The Flexi-Grid YANG code failed yanglint when we used the feature:

```
libyang err : Invalid character 'a'[1] of expression 'ancestor::nw:network/nw:network-types/tet:te-topology/flexgt:flexi-grid-topology'. (/ietf-flexi-grid-topology:{augment='/nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes/tet:underlay/tet:primary-path/tet:path-element/tet:type/tet:label/tet:label-hop/tet:te-label/tet:technology'}) YANGLINT[E]: Processing schema module from /var/yang/tmp/yangvalidator/yangvalidator-v2-workdir-tNQJZOjl/ietf-flexi-grid-topology.yang failed.
```

- However, yanglint uses its own XPath implementation, which unfortunately does not support axes, hence the error.
- So, for now we reverted to the previous code and no longer use the Ancestor function.
- This issue was raised in NETMOD
 - <https://mailarchive.ietf.org/arch/msg/netmod/HgEW08KZ1VCj2hmabeSfuVCFSPI/>
- What does the Working Group think?
 - Should be proceed with the I-D using the original code?
 - Request a tools update to fix the axes deficiency?
 - Another option?