

A Yang Data Model for Optical Impairment-aware Topology

draft-ietf-ccamp-optical-impairment-topology-yang-13

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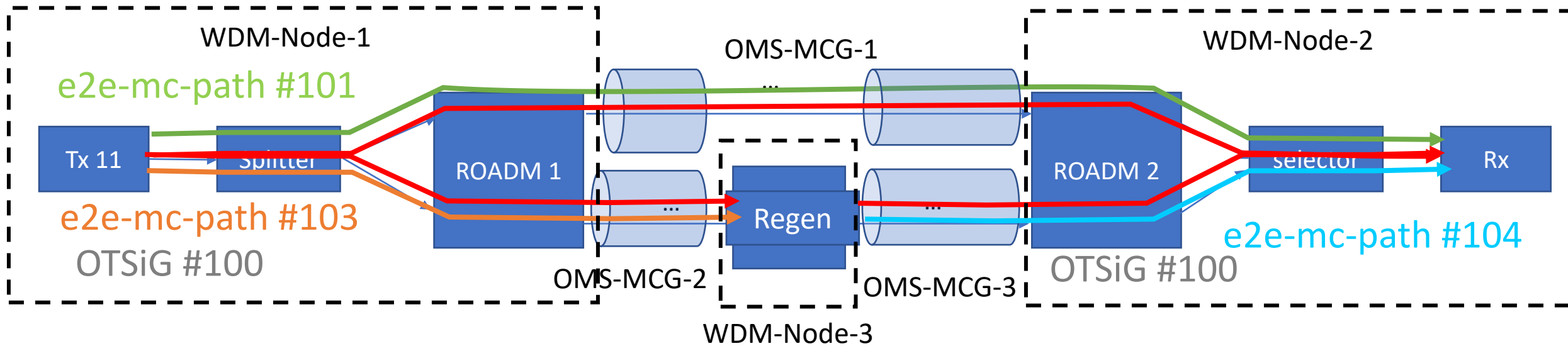
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Major Updates Since IETF 116

- OMS Protection text refinement
 - Added new pictures and text for OMS MCG protection (section 2.10.1 and 2.10.2)
- Added text explanation on how to apply the model for protection switching in case the regeneration happens on one leg only.
- YANG model updates following the YANGDOCTOR review and technical suggestion
- Fixed some of the issues in the YANG module highlighted by Tom Petch
 - See details of the [updates](#)
- Measurement units alignment in YANG model for both RFC9093-bis and Optical Impairments Topology

Individual OTSi Protection with a 3R regenerator

- In case of individual OTSi protection, there are two end-to-end MC paths associated with the OTSi signal.
- If a 3R regenerator is crossed on one of the two legs or even on both legs, the end-to-end MCs are terminated on both sides of the 3R regenerator
- The "*configured-termination-type*" attribute set to "*3r-regeneration*" shall be used to indicate that the transceivers are forming a 3R regenerator instead of terminating the layer 0 tunnel
- At WDM-nodes containing a 3R regenerator, the end-2-end MCs are stitched together forming the end-to-end path for the layer 0 tunnel.



```
"ietf-optical-impairment-topology:otsi": {
  "otsi-group": [{
    "otsi-group-id": 100,
    "otsi": {
      "otsi-carrier-id": 52,
      "otsi-carrier-frequency": 193.100000,
      "e2e-mc-path-id": [101, 103, 104]
    }
  }]
}
```

```
[case of unidir regen]
"ietf-optical-impairment-topology:transponders": {
  "transponder": [
    {
      "transponder-id": 1,
      "transceiver": {
        "transceiver-id": 11,
        "outgoing-otsi": {
          "otsi-group-ref": 100,
          "otsi-ref": 52
        },
        "incoming-otsi": {
          "otsi-group-ref": 100,
          "otsi-ref": 52
        }
      },
      "configured-termination-type": 3r-regeneration
    }
  ]
}
```

```
"ietf-network-topology:link": [{
  "link-id": 1,
  "ietf-te-topology:te": {
    "te-link-attributes": {
      "ietf-optical-impairment-topology:OMS-attributes": {
        "media-channel-groups": {
          "media-channel-group": [{
            "i": 1,
            "media-channels": {
              "flexi-n": 0,
              "flexi-m": 4,
              "otsi-group-ref": 100,
              "otsi-ref": [{
                "otsi-carrier-ref": 52,
                "e2e-mc-path-ref": 101
              }]
            }
          }]
        }
      }
    }
  ]
}]
```

Status of the draft: Open Issues

- Tracking Open Issues, discussions and resolutions linked to YANG model
<https://github.com/ietf-ccamp-wg/draft-ietf-ccamp-optical-impairment-topology-yang/issues>
- 11 issues closed since IETF-116
 - See the [list](#) with details
- 8 open issues :
 - [#145](#): update Security considerations in the draft as indicated by [T- Petch comment](#)
 - [#144](#): complete fixing issue raised by Tom Petch
 - [#134](#): try to shorten the names of attributes that appears too long, related to <https://github.com/ietf-ccamp-wg/ietf-ccamp-layer0-types-ext-RFC9093-bis/issues/69>
 - [#130](#): need to document mandatory profile for OI applications
 - Target: indicate the attributes which are optional because not needed for non-OI applications but required to support the OI applications.
 - [#124](#): removed key from media channel list, making the flexi-n attribute optional.
 - Need to check a YANG statement (e.g. unique statement) avoiding to have more elements in the list with the same flexi-n. (we cannot have 2 media-channel with the same flexi-n). Need to make some json examples and make the validation with yanglint and verify if “unique” statement is still valid when flexi-n is not present.
 - [#123](#): “Boundary between Layer 0 and Layer 1” is going on
 - We need to clarify the boundary between what is in (layer 0) and what is out of scope (layer 1). To be discussed in the context of flexi-grid meeting.
 - E.g. inverse multiplexing and FEC are layer 1 functionality of the transponders which are in the scope of this document
 - [#120](#) : “Muxponders' configuration constraints” (see issue [#56](#) in flexible grid repository)
 - The issue remains open till feedback from discussion in flexible grid context.
 - [#71](#): The issue is relevant for implementers while the draft is work-in-progress.
 - For example, a tag can be issued at each IETF meeting just to capture one important state. It is a generic issue not strictly related to this draft.

Next Steps

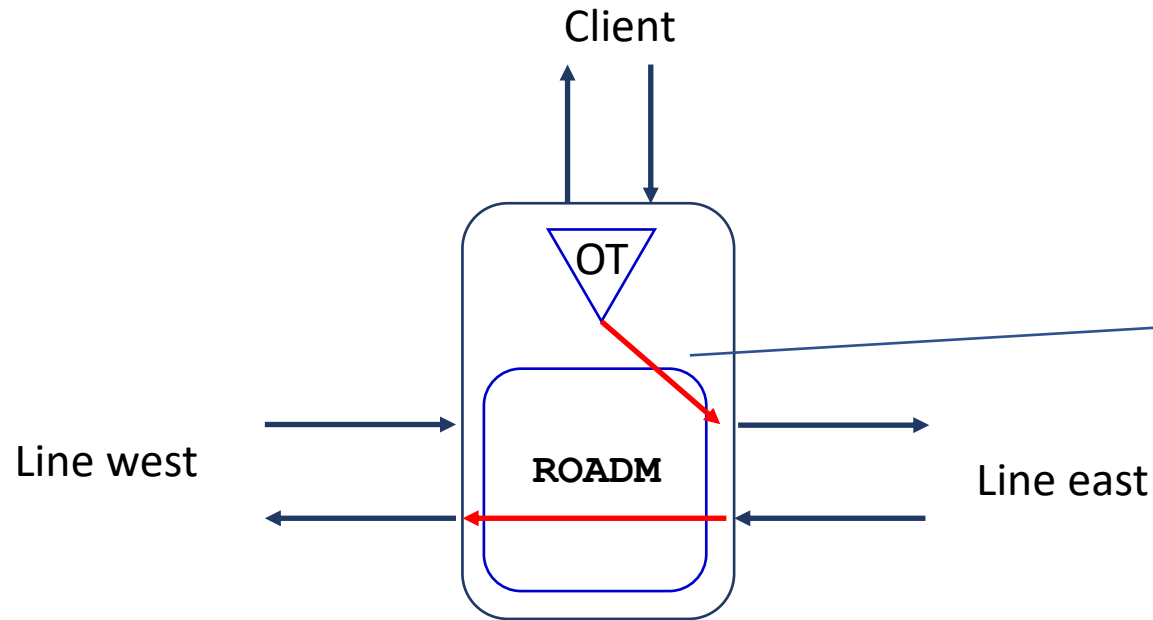
- Address the issues still on the list
- The YANG model is stable: no new requirements triggering complex YANG update foreseen
- The text in the draft has been refined and aligned with ITU-T terminology when needed.
- We intend to close the remaining issues by next IETF and be ready for WG Last Call by IETF 118.

There is an official weekly CCAMP WebEx meetings (Tue, 2-3pm CET) on the subject, everybody is welcome to attend

- <https://mailarchive.ietf.org/arch/browse/ccamp/?q=optical%20impairments%20invitation>

backup

Impairments attributes on LLCL



TTP local link connectivity would provide the impairments of the ROADM add/drop paths towards the 3R.

```
• +--rw tunnel-termination-point* [tunnel-tp-id]
•   +--rw tunnel-tp-id                binary
•   .....
•   +--rw local-link-connectivities
•     | +--rw number-of-entries?      uint16
•     | .....
•     | +--rw is-allowed?             boolean
•     | .....
•     | +--ro path-properties
•     | | .....
•   /* ADD (Start) */
•     | +--ro add-path-impairments    leafref
•     | +--ro drop-path-impairments  leafref
•   /* ADD (End) */
•     | +--rw local-link-connectivity* [link-tp-ref]
•     |   +--rw link-tp-ref
•     |   | -> ../../../../nt:termination-point/tp-id
•     |   .....
•     |   +--rw is-allowed?          boolean
•     |   .....
•     |   +--ro path-properties
•     |   | .....
•   /* ADD (Start) */
•     |   +--ro add-path-impairments  leafref
•     |   +--ro drop-path-impairments leafref
•   /* ADD (End) */
```

A YANG Data Model for Layer 0 Types

draft-ietf-ccamp-rfc9093-bis-05

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Major Updates Since IETF 116

- Update YANG model accordingly to **Yangdoctors** last call review [#68](#)
- Fix issue regarding **multiple-line coding** for the same ITU-T application code [#62](#)
- Change typedef name related to **power-in-db** data type [#74](#)
 - general power unit can not be dB, unit is dBm
- Align **FEC identities** alignment with respect to layer0-types [#16](#)
 - New FEC definitions introduced: sc-fec, o-fec, c-fec
- Add guidance for vendor/forum-specific **operational-mode** [#9](#)
 - Define operational-mode base identity and use type identityref for operational-mode attribute
 - Implementors need to define in a proper YANG module his own “operational-mode” identities and YANG namespace ensures uniqueness of these values
- Clarify that the advertised available nominal central frequencies must be correlated with a reference **spectrum width** [#61](#)
 - Added reference to RFC8363 clarifying that the available nominal central frequencies are correlated with m=1

operational-mode typedef change to identity

rfc9093-bis-04:

```
typedef operational-mode {  
    type string;  
    description  
        "Organization/vendor specific mode that  
        guarantees interoperability.";
```

rfc9093-bis-05:

```
identity operational-mode {  
    description  
        "Base identity to be used when defining  
        organization/vendor specific modes";  
}
```

...

```
typedef operational-mode {  
    type identityref {  
        base operational-mode;  
    }  
    description  
        "Organization/vendor specific mode that  
        guarantees interoperability.";
```

- Change was done to disambiguate potential name clashes
- Operational mode identities need to be defined in a vendor-specific or organization-specific YANG module
- These vendor/organization specific modules must be supported by the server (to be added to the NETCONF capabilities) => these operational modes can be used in ietf-optical-impairment-topology (transceiver capabilities)

```

module example-identity-base {
  yang-version 1.1;
  namespace "urn:example:identity-base";
  prefix "id-base";

  identity operational-mode {
    description
      "Base identity";
  }
  typedef operational-mode {
    type identityref {
      base operational-mode;
    }
  }
  leaf operational-mode {
    type operational-mode;
  }
}

```

Namespace disambiguates the two cases

"operational-mode": "vendor-a-operational-modes:400G-operational-mode"

operational-mode": "forum-b-operational-modes:400G-operational-mode"

```

module vendor-a-operational-modes {
  yang-version 1.1;
  namespace "urn:vendor-a:example:vendor-a-operational-modes";
  prefix "op-mode";

  import "example-identity-base" {
    prefix "id-base"
  }

  identity 400G-operational-mode {
    base "id-base:operational-mode"
    description
      "Vendor A 400G specific mode.";
  }
}

module forum-b-operational-modes {
  yang-version 1.1;
  namespace "urn:forum-b:example:forum-b-operational-modes";
  prefix "op-mode";

  import "example-identity-base" {
    prefix "id-base"
  }

  identity 400G-operational-mode {
    base "id-base:operational-mode"
    description
      "Forum B 400G specific mode.";
  }
}

```

Open issues

- Tracking Open Issues, discussions and resolutions linked to YANG model
<https://github.com/ietf-ccamp-wg/ietf-ccamp-layer0-types-ext-RFC9093-bis/issues>
- 11 issues closed since IETF-116 (see the [list](#))
 - Priority given to issues creating dependency for stable draft almost ready for LC (e.g. optical impairments)
- Still 17 open issues: most of them already discussed
 - Agreed resolution of some of them ([#33](#), [#56](#))
 - Issue [#65](#) : too long lines in the tree, even if character limit is set to 69 (in pyang) => It seems a general problem not strictly related to this draft
 - Try to shorten the names of attributes [#69](#), this is related to the issue [#65](#)
 - Downref [#64](#) : message from idnits , there is already a proposal how to solve it

Administrative:

- We have weekly call associated with Optical Impairments aware Topology model on **Tuesday 2pm CET**
- <https://mailarchive.ietf.org/arch/browse/ccamp/?q=optical%20impairments%20invitation>

Next Steps

- Address the issues still on the list
- Review terminology
- Get ready for WG LC, with possible target on IETF 118

backup

