

A YANG Data Model for WDM Tunnels

draft-ietf-ccamp-wdm-tunnel-yang-01

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Summary of Updates in -01 Rev.

- Focused on YANG model updates. Cosmetic updates on the text.
- YANG model updates:
 - Added under transceiver constraints additional optional parameters to further constraints the transceiver configurations. Examples: constraints line coding bitrates, tx channel power and preferred rx channel power.
 - The transceiver constraints can be applied globally to a WDM tunnel and/or more specifically to a source, destination or 3R regen node used by the tunnel
 - Picked up updates from RFC9093-bis for removing obsolete WDM tunnel constraints and updating types for some power parameters
 - Added descriptions to clarify the use of path-in-transceiver and path-out-transceivers in the scenario of starting/terminating and 3R regen
 - Aligned with latest ietf-te updates and fixed compilation error on relevant augments in this model

Transceiver Parameters

Tunnel-scope

```
augment /te:te/te:tunnels/te:tunnel:
  +--rw wdm-constraint
  +--rw transceiver-constraint
    | +--rw operational-modes*          string
    | +--rw tx-tune-constraints
    | | +--rw min-central-frequency?   frequency-thz
    | | +--rw max-central-frequency?   frequency-thz
    | | +--rw transceiver-tunability?   frequency-ghz
    | +--rw line-coding-bitrate*       identityref
    | +--rw tx-channel-power?          l0-types:power-dbm
    | +--rw preferred-rx-channel-power? l0-types:power-dbm
  +--rw gsnr-extra-margin?             snr
  +--rw use-regen?                     boolean
  +--rw wavelength-conversion?         boolean
  +--rw wavelength-assignment?         identityref
  +--rw guard-band-size?               l0-types:frequency-thz
  +--rw matching-fwd-rev-wavelength?   boolean
  +--rw allow-retuning?                boolean
  +--rw delta-power?                  l0-types:power-ratio
```

- Unified transceiver specifications for both local transponders and integrated remote transponders
- Transceiver configurations are aligned with draft-ietf-ccamp-optical-impairment-topology

Path-scope

```
augment /te:te/te:tunnels/te:tunnel/te:primary-paths
  /te:primary-path/te:explicit-route-objects
  /te:route-object-exclude-always/te:type
  /te:numbered-node-hop/te:numbered-node-hop:
  +--rw path-in-transceiver
    | +--rw transponder-id?            uint32
    | +--rw transceivers* [lane-id]
    | | +--rw lane-id                  uint8
    | | +--rw transceiver-id?         uint32
    | | +--rw operational-modes*      string
    | | +--rw tx-tune-constraints
    | | | +--rw min-central-frequency? frequency-thz
    | | | +--rw max-central-frequency? frequency-thz
    | | | +--rw transceiver-tunability? frequency-ghz
    | | +--rw line-coding-bitrate*    identityref
    | | +--rw tx-channel-power?       l0-types:power-dbm
    | | +--rw preferred-rx-channel-power? l0-types:power-dbm
  +--rw path-out-transceiver
    +--rw transponder-id?            uint32
    +--rw transceivers* [lane-id]
    | +--rw lane-id                  uint8
    | +--rw transceiver-id?         uint32
    | +--rw operational-modes*      string
    | +--rw tx-tune-constraints
    | | +--rw min-central-frequency? frequency-thz
    | | +--rw max-central-frequency? frequency-thz
    | | +--rw transceiver-tunability? frequency-ghz
    | +--rw line-coding-bitrate*    identityref
    | +--rw tx-channel-power?       l0-types:power-dbm
    | +--rw preferred-rx-channel-power? l0-types:power-dbm
```

Updated WDM Label Specifications

- WSON
 - DWDM fixed-grid and CWDM
- Flexi-grid
- Single vs. Multi-carrier

```
augment /te:te/te:globals/te:named-path-constraints
    /te:named-path-constraint/te:explicit-route-objects
    /te:route-object-include-exclude/te:type/te:label
    /te:label-hop/te:te-label/te:technology:
+--:(wdm)
  +--rw (grid-type)?
    +--:(fixed-dwdm)
      | +--rw (fixed-single-or-super-channel)?
      |   +--:(single)
      |     | +--rw dwdm-n?          10-types:dwdm-n
      |     | +--:(multi)
      |     |   +--rw subcarrier-dwdm-n*  10-types:dwdm-n
      |     +--:(cwdm)
      |       | +--rw cwdm-n?          10-types:cwdm-n
      |       +--:(flexi-grid)
      |         +--rw (single-or-super-channel)?
      |           +--:(single)
      |             | +--rw flexi-n?          10-types:flexi-n
      |             | +--rw flexi-m?          10-types:flexi-m
      |             x--:(super)
      |               | x--rw subcarrier-flexi-n* [flexi-n]
      |               |   +--rw flexi-n      10-types:flexi-n
      |               |   +--rw flexi-m?    10-types:flexi-m
      |             +--:(multi)
      |               +--rw frequency-slots
      |                 +--rw frequency-slot* [flexi-n]
```

Open Issues

- Draft text needs proper updates to align with the WDM tunnel YANG model updates
- Modeling of 3R in alignment with OI vs. service function : pros/cons
- The intension is to use this model as SDN controller NBI to support tunnel provisioning for both integrated transponder (e2e) and remote transponder (book-ended).
- Modeling non-L0 attributes, e.g. OTU types, OTU/ODU payload handling, which are relevant to e2e WDM tunnel provisioning at regen nodes
- In the case of remote DWDM interface hosted in packets devices the expectation is to adopt the model as NBI for both IP and Optical controllers. Further gap analysis is needed to ensure this model can coverage of all the scenarios
- Need to discuss how to model the relationship between a WDM tunnel and the resultant OTSi/OTSiG after WDM tunnel instantiation.

Next Steps and Actions

- Address open issues aforementioned
- Seek feedback from the WG and especially from operators and implementers
- Perform gap analysis of this model in the context of pluggables use cases

Weekly team meeting:

Thursday, 14:00 (CET)

CCAMP WebEx Details

<https://ietf.webex.com/ietf/j.php?MTID=ma1ca3bcec716fe1ff93e0a28b3558294>

Join by meeting number

Meeting number (access code): 2422 698 1495

Meeting password: 6UbM2tEJd6

YANG Data Models for requesting Path Computation in WDM Optical Networks

draft-ietf-ccamp-optical-path-computation-yang-03

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Summary of Updates in -03 Rev.

- Introduced a combined YANG data model for path computation on WSON and flexi-grid WDM networks
 - YANG module renamed as ietf-wdm-path-computation (prefix: wdm-pc); obsoleted wson-pc and flexg-pc
- YANG model updates:
 - Aligned with WDM tunnel YANG by using the same constructs (global constraints on transceivers and 3R regens, etc.)
 - Aligned with RFC9093-bis on the WDM label structure definitions
 - Aligned with te-path-computation base model

Open Issues

- Should the draft be renamed to "WDM path computation to keep alignment with the WDM tunnel draft?
- The intension is to use this model as SDN controller NBI to support tunnel path computation for both local transponder (e2e) and remote transponder (book-ended).
- In the case of remote DWDM interface hosted in packets devices the expectation is to adopt the model as NBI for both IP and Optical controllers. Gap analysis is needed to ensure that this model can cover of all the scenarios

Next Steps and Actions

- Expand the list of co-authors contributors
- Continue to align with WDM tunnel on the definitions
- Seek feedback from the WG and especially from operators and implementers
- Perform gap analysis of this model in the context of pluggables use cases

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Thank you!