A Yang Data Model for Optical Impairment-aware Topology

draft-lee-ccamp-optical-impairment-topology-yang-01

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Introduction

- The intent of this document is to provide a Yang data model, which can be utilized by an Multi Domain Service Coordinator (MDSC) to collect states of WSON/SSON impairment data from the Transport PNCs to enable impairment-aware optical path computation according to the ACTN Architecture [RFC8453].
- The draft is built upon [RFC7446] defining RWA information model for WSON and supports both WSON and Flexi-grid (SSON) optical networks.
- This document augments the generic TE topology draft [TE-TOPO] and make use of ietf-layer0-types (TBD) for common groupings.
- The impairment-aware topology this draft is addressing is scoped to complement the optical interface model defined in [draft-dharini]
OTS/OMS Clarification

- OTS Media Link represents a fiber link between booster amplifier embedded in ROADM and In Line Amplifier (ILA), between ILA and ILA, or between ILA and pre-amplifier embedded in ROADM.

- OMS Media Link combines a list of OTS links and amplifiers, between two ROADMs.

- Exposing OTS media links state to the controller may have a use-case that is useful for some use-case such as fault isolation, etc. On the other hand, in most applications and use-cases, OMS media links state would be sufficient level of abstraction. This is subject to further investigation.
The OMS includes booster and pre-amp amplifiers at each end, usually both are physically part of ROADM nodes.
Yang Model (Part 1)

module: ietf-optical-impairment-topology
augment /nw:networks/nw:network/nw:network-types/tet:te-topology:
  +--rw optical-impairment-topology!
  +--rw optical-impairment-topology
augment /nw:networks/nw:network/nt:link/tet:te/tet:te-link-attributes:
  +--ro OMS-attributes
    +--ro generalized-snr? decimal64
    +--ro equalization-mode identityref
    +--ro (power-param)?
      |  +--:(channel-power)
      |    +--ro nominal-channel-power? decimal64
      |  +--:(power-spectral-density)
      |    +--ro nominal-power-spectral-density? decimal64
  +--ro network-media-channel-group* [i]
    |    +--ro i int16
    |  +--ro current-channels* [flex-n]
    |    |  +--ro flex-n uint16
    |    |  +--ro flex-m? uint16
    |  +--ro OTSIG-container* [carrier-id]
    |    |  +--ro carrier-id int16
    |    |  +--ro OTSi-carrier-frequency? decimal64
    |    |  +--ro OTSi-signal-width? decimal64
    |    |  +--ro channel-delta-power? decimal64
  +--ro OMS-elements* [elt-index]
    |    +--ro elt-index uint16
    |    +--ro uid? string
    |    +--ro type identityref
    |    +--ro element
    |      +--ro (element)?
    |        +--:(amplifier)
    |        |  +--ro amplifier
    |        |    |  +--ro type_variety string
    |        |    |  +--ro operational
    |        |    |    |  +--ro actual-gain decimal64
    |        |    |    |  +--ro tilt-target decimal64
    |        |    |    |  +--ro out-voa decimal64
    |        |    |    |  +--ro in-voa decimal64
    |        |    |    |    |  +--ro (power-param)?
    |        |    |    |    |    |  +--:(channel-power)
    |        |    |    |    |    |    |  +--ro nominal-channel-power? decimal64
    |        |    |    |    |    |  +--:(power-spectral-density)
    |        |    |    |    |    |    |  +--ro nominal-power-spectral-density? decimal64
    |    |    |  +--:(fiber)
    |    |    |    |  +--ro fiber
    |    |    |    |    |  +--ro type_variety string
    |    |    |    |    |  +--ro length decimal64
    |    |    |    |    |  +--ro loss_coef decimal64
    |    |    |    |    |  +--ro total_loss decimal64
    |    |    |    |    |    |  +--ro pmd? decimal64
    |    |    |    |    |    |  +--ro conn_in? decimal64
    |    |    |    |    |    |  +--ro conn_out? decimal64
    |    |    |    |    |    |  +--:(concentratedloss)
    |    |    |    |    |    |  +--ro concentratedloss
    |    |    |    |    |    |  +--ro loss? decimal64
Yang Model (Part 2)

augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point:
  +--ro transponders-list* [transponder-id]
    +--ro transponder-id  uint32
    +--ro (mode)?
      |  +--:G.692.2
      |   |  +-- G.692.2?  layer0-types:standard-mode
      |  +--:organizational_mode
      |   |  +--ro operational-mode?  layer0-types:operational-mode
      |   |  +--ro organization-identifier?  layer0-types:vendor-identifier
      |  +--:explicit_mode
      |   |  +--ro available-modulation*  identityref
      |   |  +--ro modulation-type?  identityref
      |   |  +--ro available-baud-rates*  uint32
      |   |  +--ro configured-baud-rate?  uint32
      |   |  +--ro available-FEC*  identityref
      |   |  +--ro FEC-type?  identityref
      |   |  +--ro FEC-code-rate?  decimal64
      |   |  +--ro FEC-threshold?  decimal64
    +--ro power?  int32
    +--ro power-min?  int32
    +--ro power-max?  int32

augment /nw:networks/nw:network/nw:node/tet:te/tet:tunnel-termination-point:
  +--ro transponder-list* [carrier-id]
    +--ro carrier-id  uint32
Relationships between this draft and Dharini draft

- **draft-dharini** is an **interface model**.
- **draft-lee** is a **network topology model** (that has a larger scope than interface model).
- These two drafts are **complementary and full consistency will be ensured at the WG level**.
- **Ietf-type0-types** will keep some common groupings/types.
Model Relationships:

draft-lee-ccamp-optical-impairment-topology-yang

ietf-network-topology (RFC8345)

import

ietf-layer0-types

import

import

ietf-te-topology

import

augment

ietf-optical-impairment-topology

augment
Model Relationships:
draft-dharini-ccamp-dwdm-if-param-yang
Next Step

- Request for WG adoption
- Work on model consistency with Dharini draft
- Enhance OMS link model
- Enhance optical spectrum description (OTSi-G) relationship with network media channel
- Two off-line sessions are scheduled:
  - 3/26 9-11AM
  - 3/26 4-6 PM
Thank You!