

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

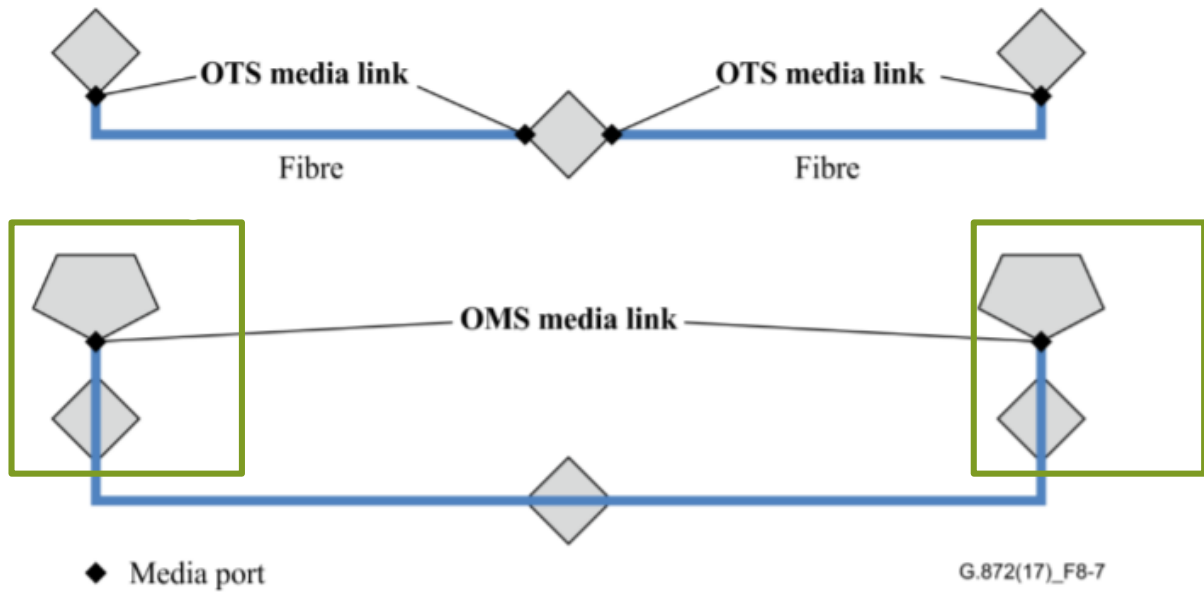


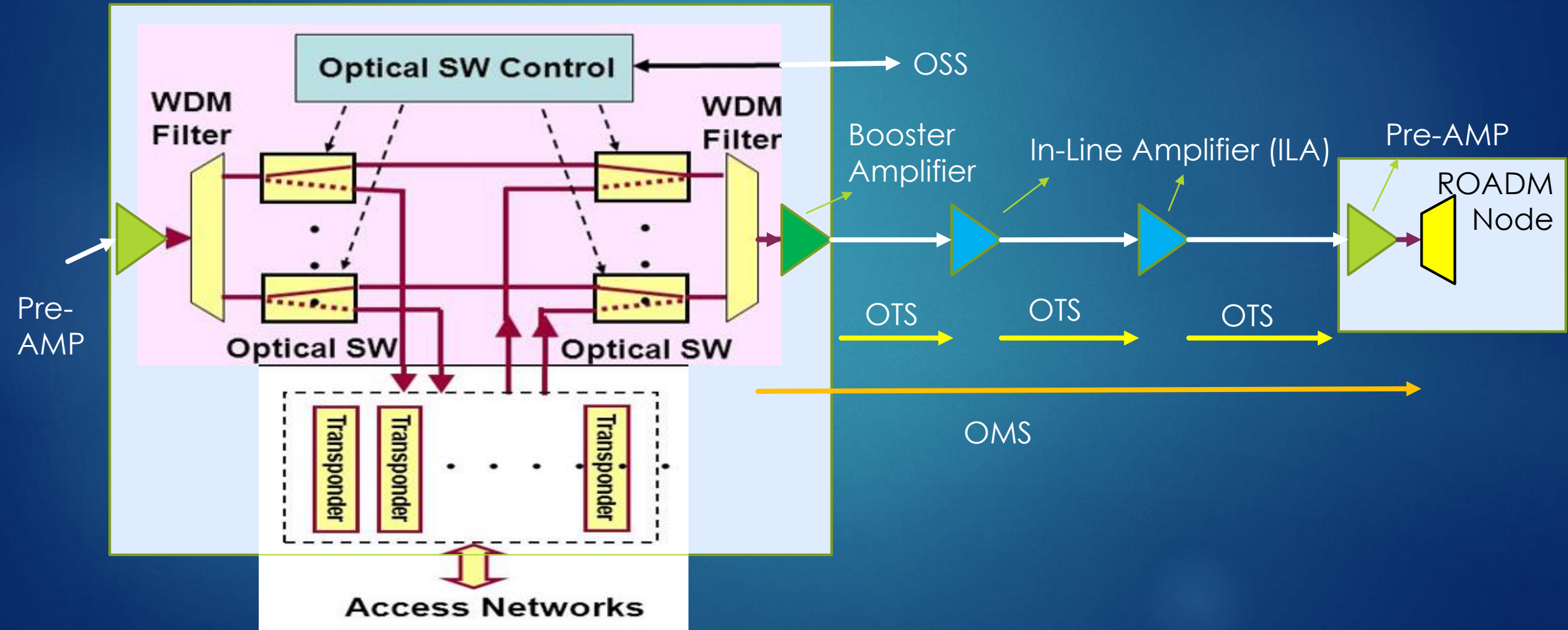
Figure 8-7 – OTS and OMS media links with optical amplifiers

- 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.

Reference Architecture

- The OMS includes booster and pre-amp amplifiers at each end, usually both are physically part of ROADMs nodes

ROADM Node



Yang Model (Part 1)

```
module: ietf-optical-impairment-topology
  augment /nw:networks/nw:network/nw:network-types/tet:te-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:

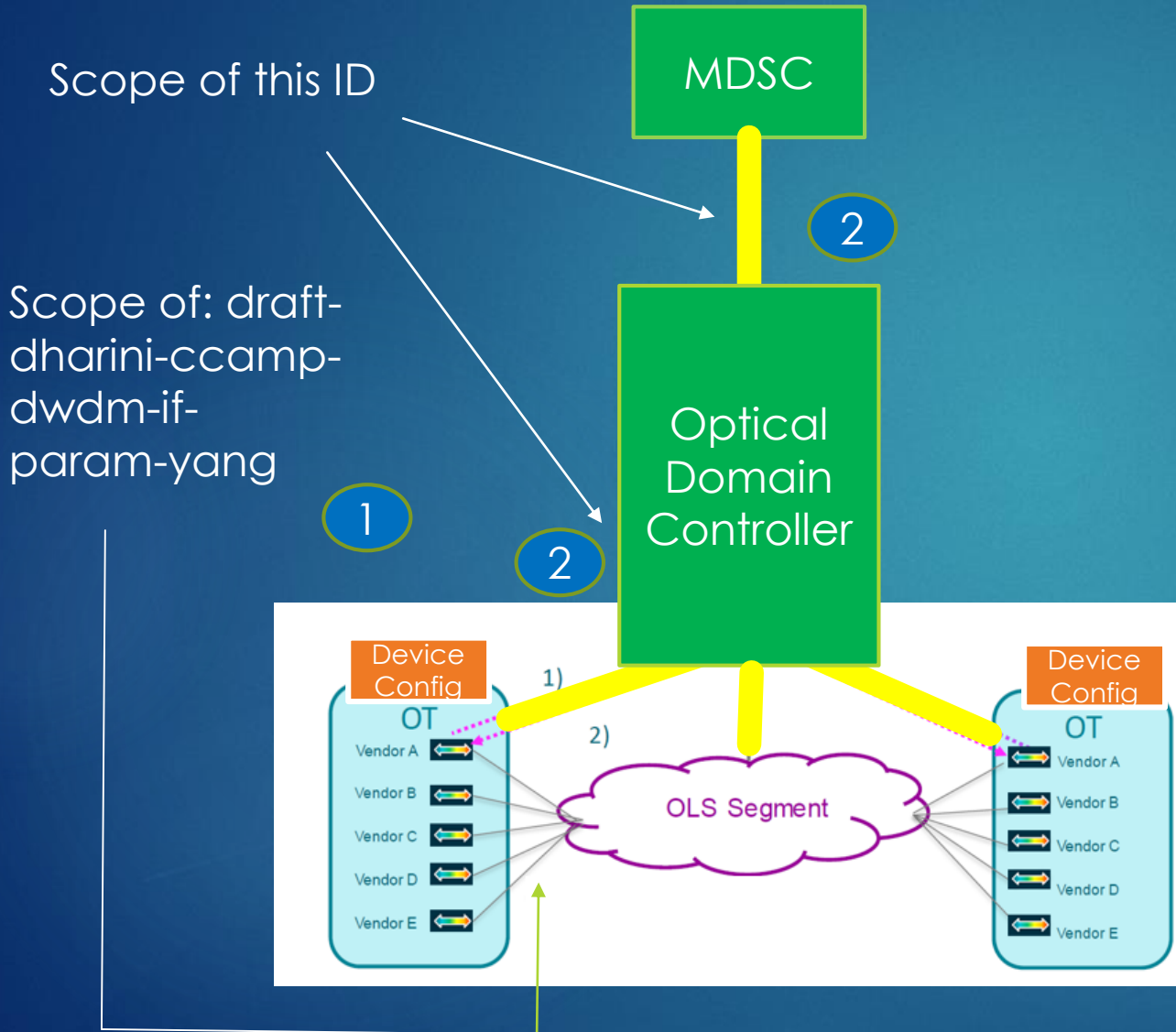
+--ro transponders-list* [transponder-id]

+--ro transponder-id uint32
+--ro (mode)?
| **+--:(G.692.2)**
| | +--ro 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

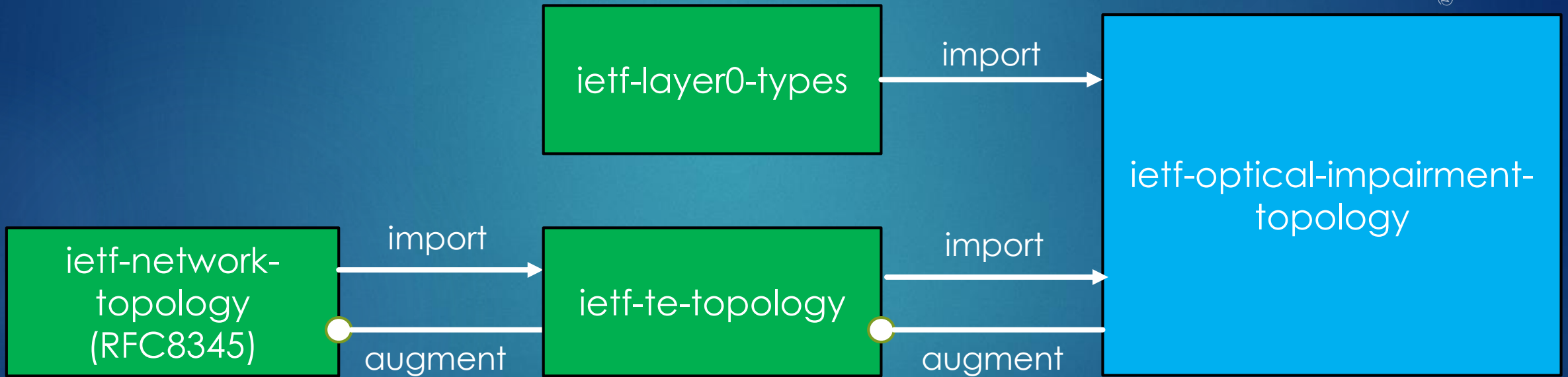
Relationships between this draft and Dharini draft



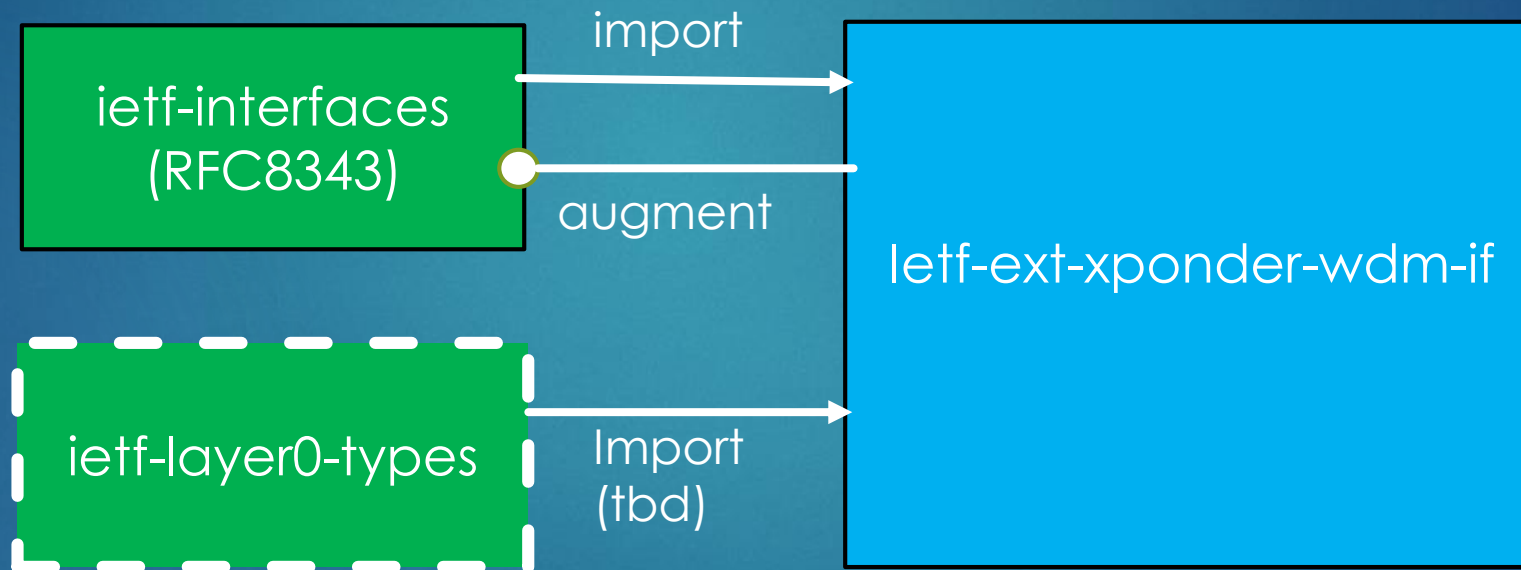
- draft-dharini is an interface model.
- draft-lee is a network topology model (that has a larger scope than interface model)
- These two drafts are complementary and full consistency will be ensured at the WG level.
- left-type0-types will keep some common groupings/types.

Model Relationships:

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



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!