ACTN POI work and relations

ACTN POI (step 1)
- Inventory, Service and Topology Discovery
- Establishment of L2VPN/L3VPN with TE requirements

ACTN POI (step 2a) – service assurance
- Optical Network failures and degradation
- IP/Optical Edge failures

TEAS WG

ACTN POI (step 2b) – pluggable
- Pluggable WDM interfaces on routers

(no draft)

Network Scenarios, Use cases and gaps
Under ACTN framework (slot 1)
draft-poidt-ccamp-actn-poi-pluggable-usecases-gaps-00

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Modeling of Coherent Pluggables (slot2)

draft to be: draft-poidt-ccamp-actn-wdm-pluggable-modelling

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IETF 119 – CCAMP Meeting

Use cases, Network Scenarios and gap analysis for Packet Optical Integration (POI) with coherent pluggables under ACTN Framework

draft-poidt-ccamp-actn-poi-pluggable-usecases-gaps-00

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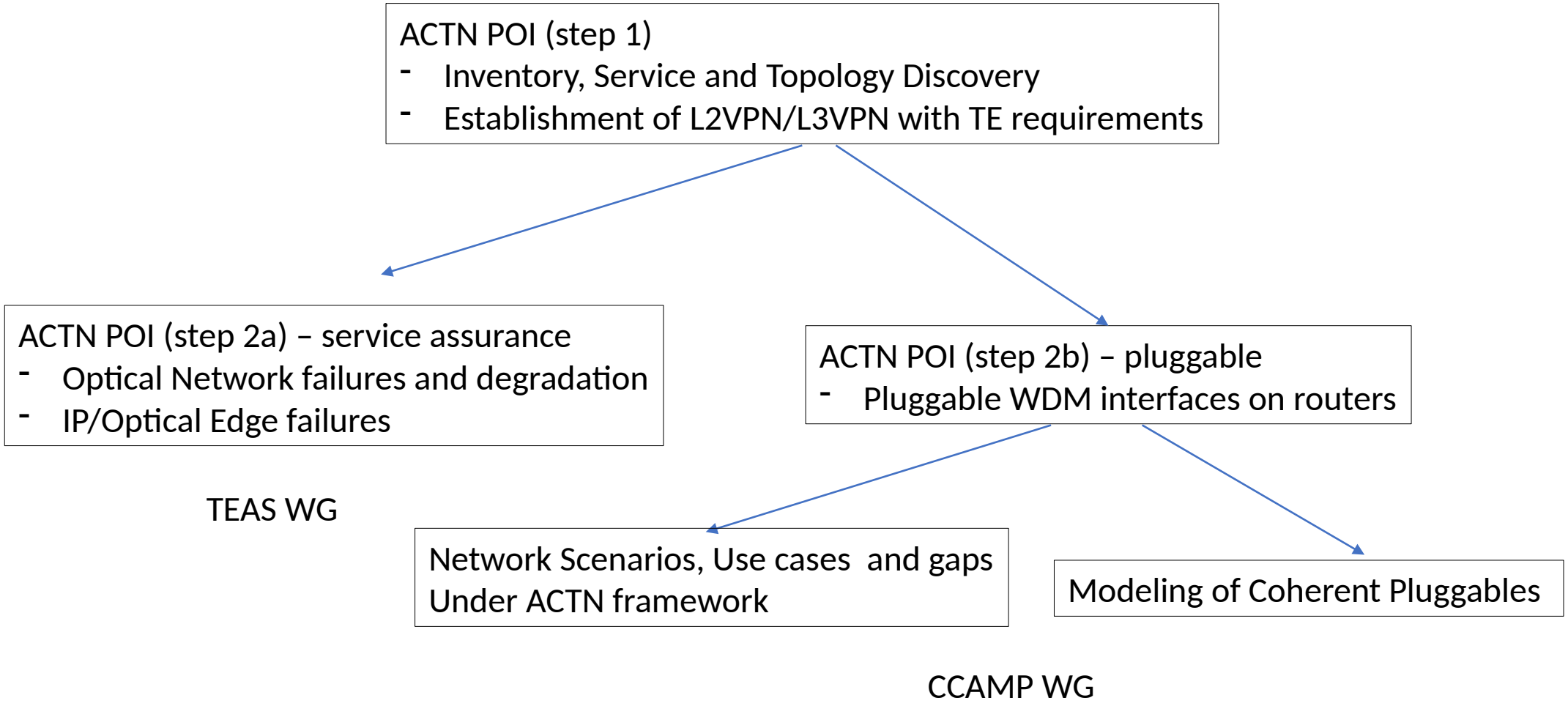
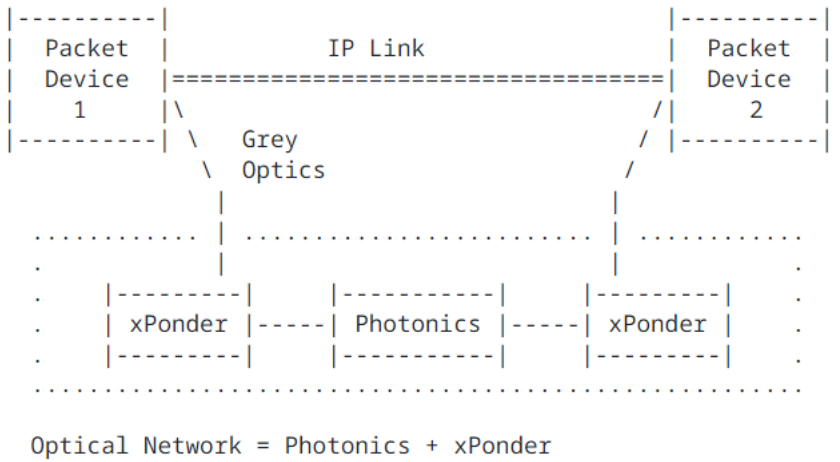
Motivation

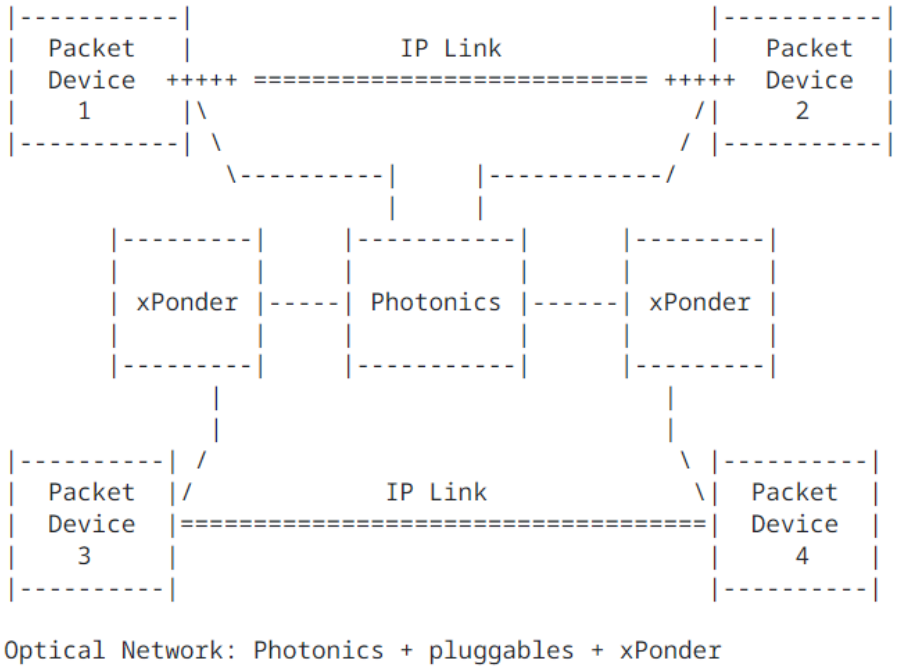
- The new coherent pluggable technology is **mature** (in particular 400G), deployed in field and ready to come into operator's network
- The operators are targeting to have end-to-end SDN control management of the full network including those new DWDM pluggables in the Routers.
- The work is a continuation of draft-ietf-teas-actn-poi-applicability and draft-poidt-teas-poi-assurance for the new scenarios.
- During the last IETF meetings the discussions were stucked in controversy about who controls the pluggble (optical vs packet controller)
- Agreement to move forward together with focus on **scenarios, use cases and modelling work** under general ACTN framework.
- **Network scenarios and use cases** are defined in the common draft led by operators.
- Modelling work has started in parallel (focus on the pluggable).
- Coordination with TEAS were ACTN and PoI are defined is required.

ACTN POI work and relations



Traditional vs new deployement

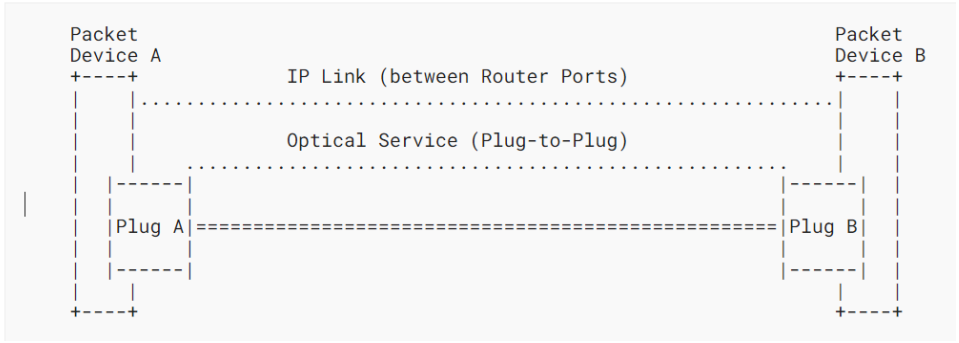




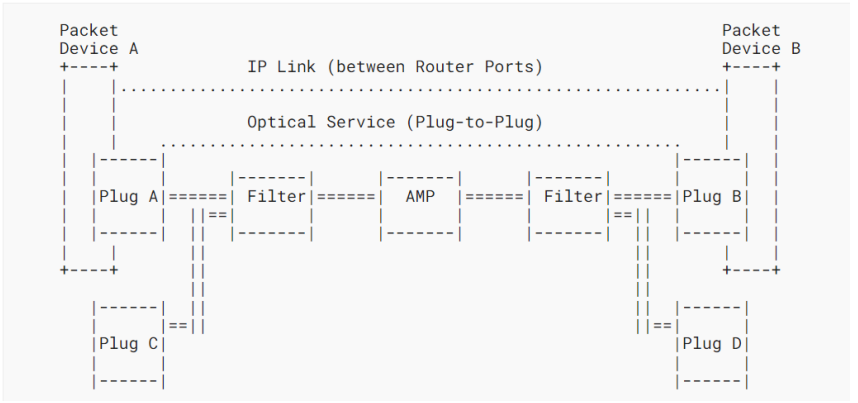
Network scenarios

- What are the network scenarios we're targeting?

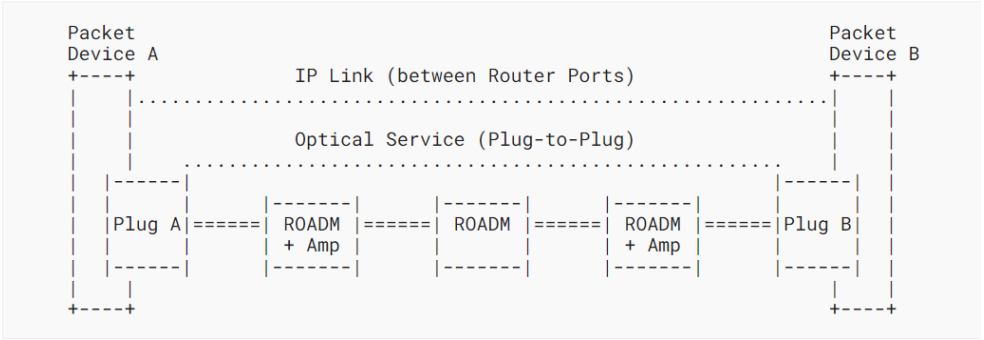
A) High capacity point to point connection over dedicated direct fiber



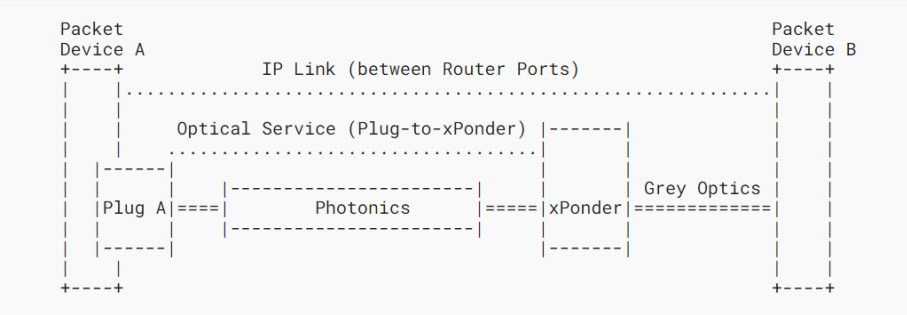
B) High capacity point to point over shared fiber



C) High capacity point to point over metro-regional shared meshed network



D) High capacity point to point optical connection between standard pluggable and xPonder



Use Cases

- A set of use cases has been compiled and prioritized.
- For each use case, it is identified if it applies for the general PoI, or just for scenarios with pluggables.
- **Top priority:** End-to-end **multi-layer visibility**
  - Discovery and inventory of the End-to-end multi-layer network
    - Coherent DWDM pluggable insertion in the router linecard port
    - Inventory of the pluggable (after inserted)
    - Pluggable-to-pluggable OTSi service discovery
  - End-to-end multi-layer event/fault management
  - End-to-end multi-layer performance management
- Inter-domain link validation
  - Verify the connection between pluggable in the router and the ROADM
- Service provisioning/fulfillment:
  - Pluggable to pluggable service Provisioning
  - End-to-end service multi-layer fulfilment with SLA constraints (TE constraints)
  - End-to-end service multi-layer fulfilment with SLA constraints (TE constraints) and optical restoration support

Next steps

- Feedback from CCAMP WG
- Get reviews of the draft
- Provide additional use cases: Open to contributions!
- Keep alignment on draft-ietf-teas-actn-poi-applicability and draft-poidt-teas-poi-assurance
- Harmonize terminology
- Keep improving the draft

Modelling of Optical Pluggables in Packet Over Optical Network

draft to be: draft-poidt-ccamp-actn-wdm-pluggable-modelling
(draft not yet uploaded)

CCAMP WG
March 2024 (IETF 119)

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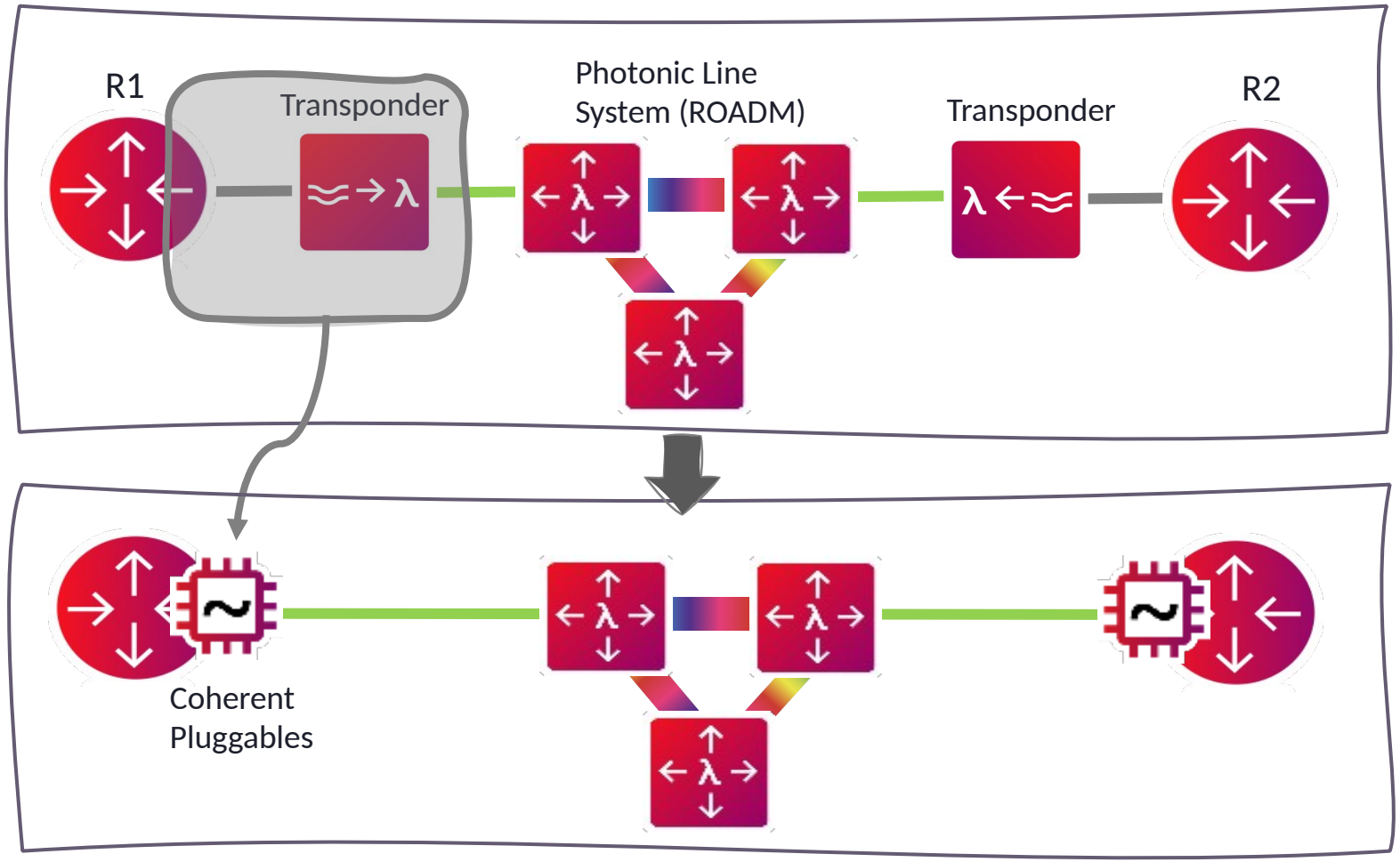
Optical Pluggables

At-A-Glance

Transponder and Grey optics are replaced by **Optical Pluggables** inside Router (Host)



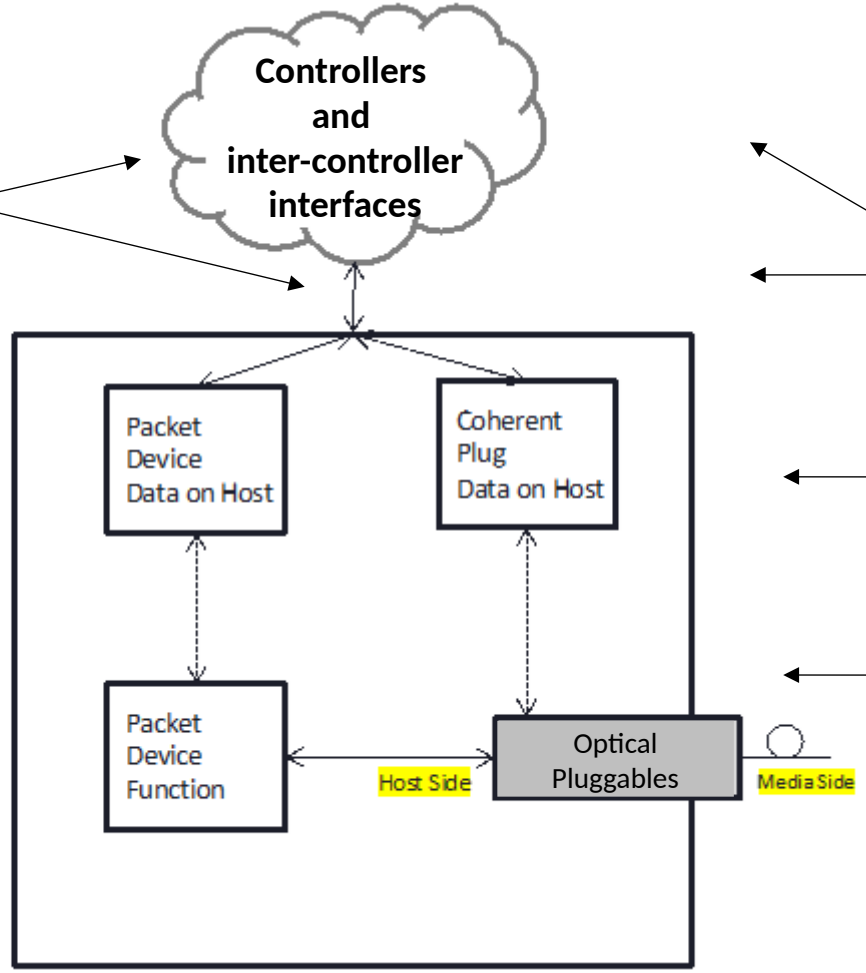
IETF Pluggable Modeling
Is Network-Model or Device-Model ?

CCAMP Pluggable modelling focus:
- Pluggable properties
- Application to existing IETF models

Existing structural/topology models
Existing optical property models
Existing approach to augments etc.
Key input to pluggable modelling work

Optical model properties defined by:
- IETF
- OIF
- ITU-T
- OpenConfig
- TAPI

Considering optical/media characteristics the pluggable is not special, just need to ensure all relevant properties are captured



Model used between device and controllers (device/network model)
In scope for pluggable modelling phase 1

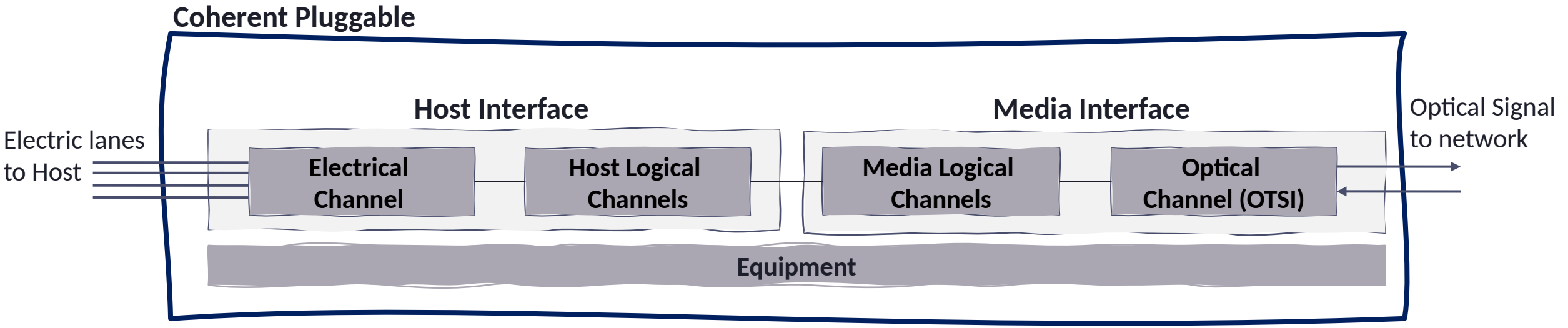
Mapping between properties in plug model and properties exposed in device model
In scope for pluggable modelling phase 2

Model exposed by plug to host
Out of scope of IETF

Scope of IETF Pluggable work… Optical Pluggables Building Blocks

1. Coherent pluggables are mainly characterized by two interfaces:
   - Optical/photonic and logical channels (i.e., Media Interface)
   - Electrical and logical channels (i.e., Host Interface)
2. Critical focus of the pluggable work:
   - Media Interface attributes (capability, state/telemetry/alarms, provisioning) – Phase 1a
   - Host Interface attributes (capability, state/telemetry/alarms, provisioning) – Phase 1b
3. Focus for phase 2… Which organizations define it? Are these organizations “standard” or not?

Now



Optical Pluggable Property considerations

- Capability: Data that describes what the pluggable can do
- Configuration: The properties that can be controlled/adjusted (provisioning)
- State: The properties that can be monitored in various forms

Sample of work in progress (shared using Google Sheet)

context3	category	discription	comment	attribute type (inc. units)	is configurable (R/W)?	S/W & H/W capability (R/O)?	state (R/O)?	alarm	source
pulse-shaping-type	filter	Raised-cosine (RC), root-raised-cosine (RRC) and OFF. The attribute allows other pulse-shaping types to be encoded as strings. Union of type: string type: oc-opt-term-prop-types:pulse-shaping-type			NO	YES	NO		OpenConfig
fec-coding	fec			union	NO	YES	NO		OpenConfg
fec-type	fec	TAPI: Available FEC		fec-type	NO	YES	NO		tapi/IETF
fec-code-rate	fec	IETF/TAPI: FEC code rate		decimal64 8 digits	NO	YES	NO		IETF/tapi
fec-coding-overhead	fec			decimal64	NO	YES	NO		OpenConfg
fec-coding-gain	fec			decimal64	NO	YES	NO		OpenConfg
fec-state	fec		????						OpenConfg
min-carrier-spacing		This attribute specifies the minimum nominal difference between the carrier frequencies of two homogeneous OTSis (which have the same optical characteristics but the centralfrequencies) such that if they are placed next to each other the interference due to spectrum overlap between them can be considered negligible.	draft-ietf-ccamp-optical-impairment-topology-yang-15 draft-ietf-ccamp-rfc9093-bis-08	frequency-ghz	NO	YES	NO		
			draft-ietf-ccamp-dwdm-if-param-yang-10						

We can categorize the plug attributes

- Example of categories:
  - Laser (Temperature, Bias)
  - Modulation (e.g., Format)
  - FEC
  - Optical Power
  - Spectrum
  - Polarization
  - …
- Note
  - That in each category there are specific parameters has ranges etc.
  - Each parameter will have some combination of capability, configuration and state

Challenges with Property Naming

In summary, the coherent pluggable property names are not consistent. For example,

- Different sources use different naming approaches
- Property names are not consistent within one body
- Names often have unnecessary elements

Opportunity to clean up and make industry more consistent

- Property naming rule
- Need an approach to backward compatibility but also need to advance
- Influence on other bodies OIF, ITU-T, OC, TAPI… many of us are members of many of these

 If we chose to change some of the property names, needs to validate/communicate with IETF, OIF and ITU-T

Next Step

- Finish the coherent/optical properties
- Start working on host side properties
- Deal with pluggable Capability specification
- For telemetry and State properties,
  - use/define a generic mechanism for min, max, threshold ,….
- Identify approach for dealing with proprietary attribute

Thank You !