Generalized MDI Connector Update

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What is a Port (Electrical/Optical) ?

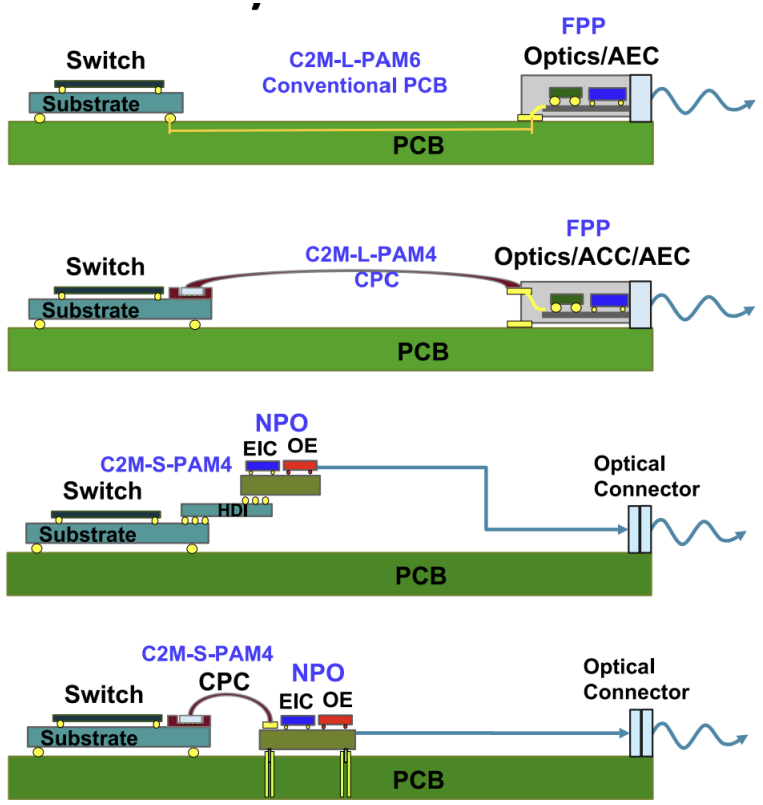
- For simplicity, historically “Port” = “MDI”
- As architectures continue to evolve how do we define a Port?
  - At what PMD? At what density?

Table 179C–1—Number of PMDs supportable for each connector type

MDI connector type	200GBASE-CR1	400GBASE-CR2	800GBASE-CR4	1.6TBASE-CR8	Reference
QSFP224	1, 2, 4	1, 2	1	—	179C.2.1
QSFP-DD1600	1, 2, 4, 8	1, 2, 4	1, 2	1	179C.2.2
OSFP1600	1, 2, 4, 8	1, 2, 4	1, 2	1	179C.2.3

Table 180A–1—Number of PMDs supported by each MDI connector type

MDI connector type	200GBASE-DR1, 200GBASE-DR1-2	400GBASE-DR2, 400GBASE-DR2-2	800GBASE-DR4, 800GBASE-DR4-2	1.6TBASE-DR8, 1.6TBASE-DR8-2
Single-fiber connector	1	—	—	—
Single-row 12-fiber	1, 2, or 4	1 or 2	1	—
Single-row 16-fiber	1, 2, 4, or 8	1, 2, or 4	1 or 2	1

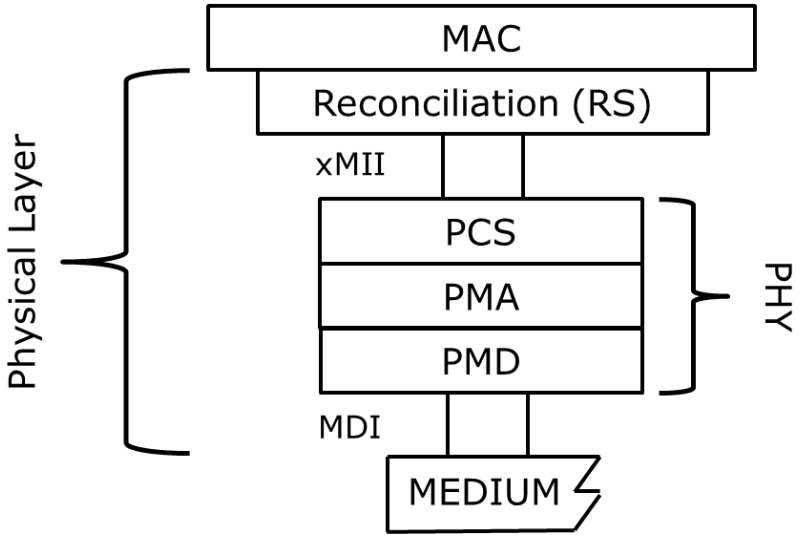


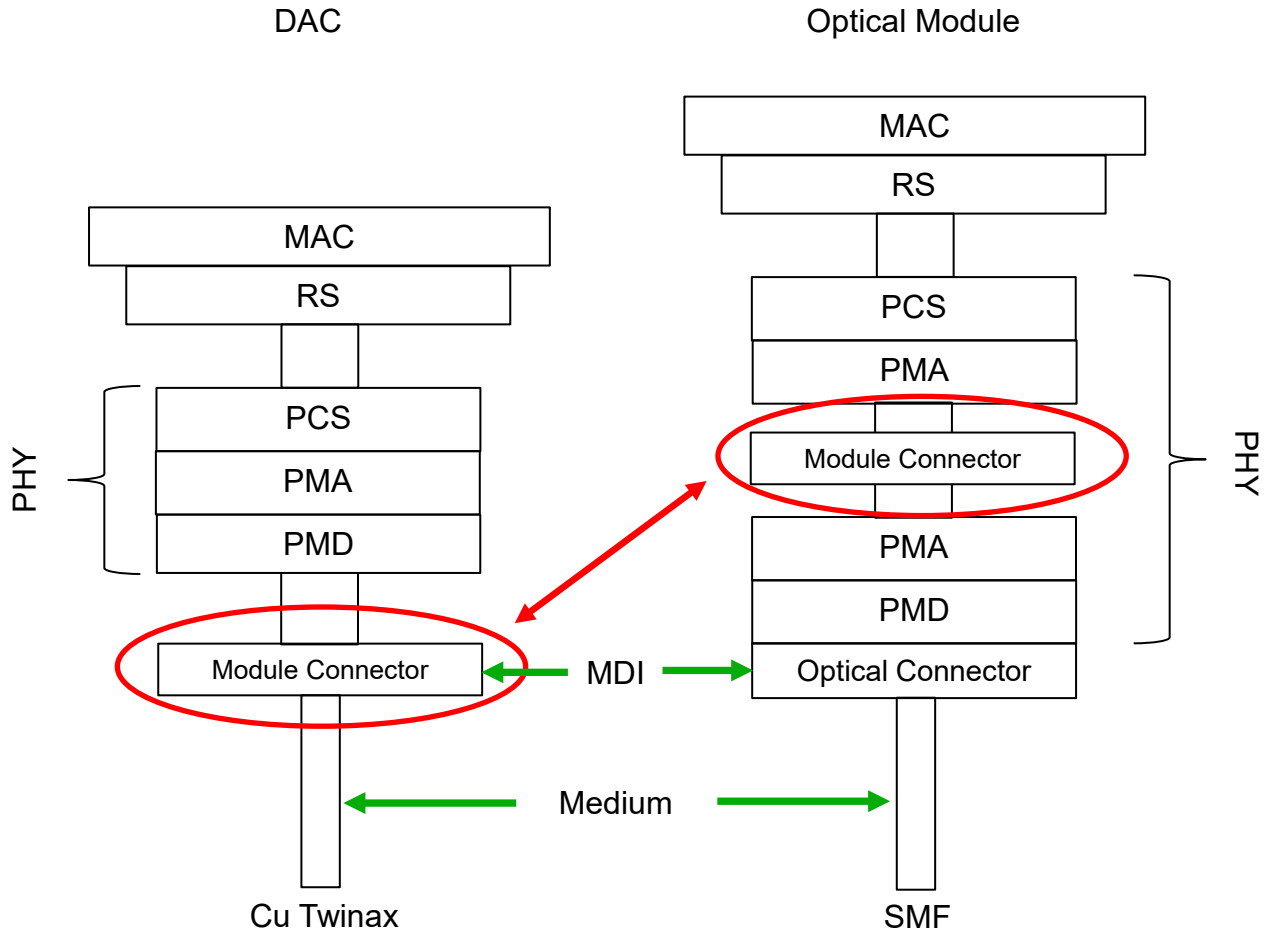
FPP – Front Panel Pluggable

NPO - Near package optics

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Understanding the MDI





A “connector” is not necessarily an MDI

Potential (Electrical) MDI to Consider

Recent presentations and press releases noted connectors being developed note support 400 Gb/s per lane electrical signaling -

- OSFP – EA TEF 2026 Panel 7 – “The Evolution of Pluggable Optics”, Andreas Bechtolsheim *
- XPO – EA TEF 2026 Panel 7 – “The Evolution of Pluggable Optics”, Andreas Bechtolsheim *
- USFP (newly announced effort) – see https://newsroom.cisco.com/c/r/newsroom/en/us/a/y2026/m10/nvidia-and-cisco-new-pluggable-optics-to-scale-ai-factories.html
- Future Innovation?

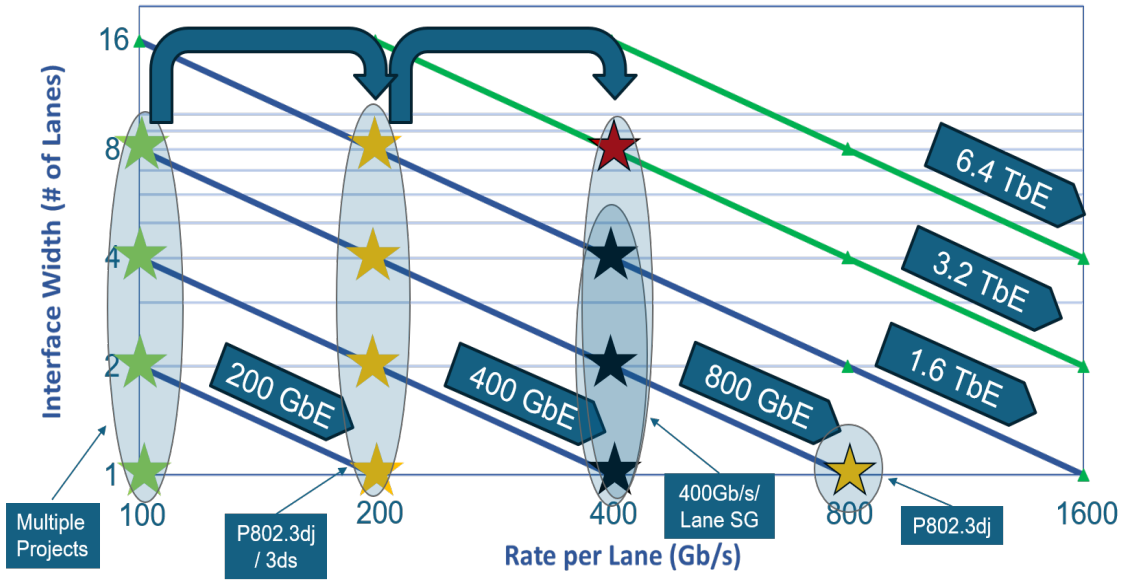
- If we continue down the path of previous projects, we’ll need to align on specific form factors and pinmaps to include in an 802.3dv appendix
  - References to public specifications is required prior to publication

- Are passive copper cables (CR) viable in all of these (Electrical) MDI?

* Liaison from Ethernet Alliance - https://www.ieee802.org/3/minutes/nov26/incoming/EA_TEF_Liaison_Redacted.pdf

Potential “Generalized” MDI Approach

- *Trend of industry development is to support groupings of 8*



MDI Connector Configuration	200GBASE-CR1	400GBASE-CR2	800GBASE-CR4	...
Single-lane connector	1	—	—	—
4-lane connector	1, 2, or 4	1 or 2	1	—
8-lane connector	1, 2, 4, or 8	1, 2, or 4	1 or 2	—
16-lane connector	1, 2, 4, 8, or 16	1, 2, 4, or 8	1, 2, or 4	—
32-lane connector	1, 2, 4, 8, 16, or 32	1, 2, 4, 8, or 16	1, 2, 4, or 8	—
64-lane connector	1, 2, 4, 8, 16, 32, or 64	1, 2, 4, 8, 16, or 32	1, 2, 4, 8, or 16	—

MDI Connector Configuration	400GBASE-DR2, 400GBASE-DR2-2	800GBASE-DR4, 800GBASE-DR4-2	1.6TBASE-DR8, 1.6TBASE-DR8-2	....
Single-fiber connector	1	—	—	—
Single-row 12-fiber connector	1, 2, or 4	1 or 2	1	—
Single-row 16-fiber connector	1, 2, 4, or 8	1, 2, or 4	1 or 2	—

Hypothetical Tables

OSFP, as example

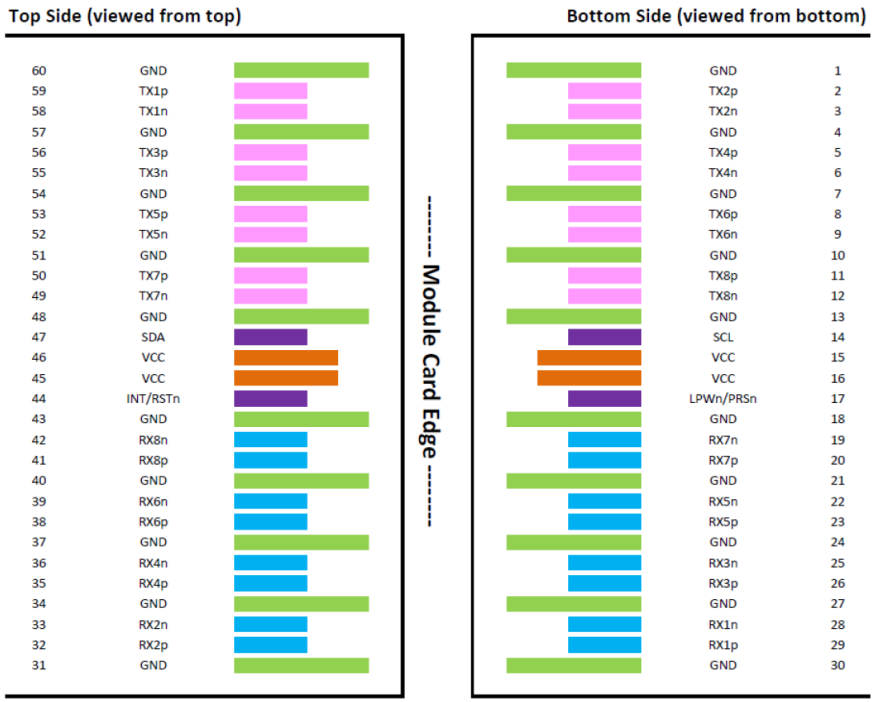
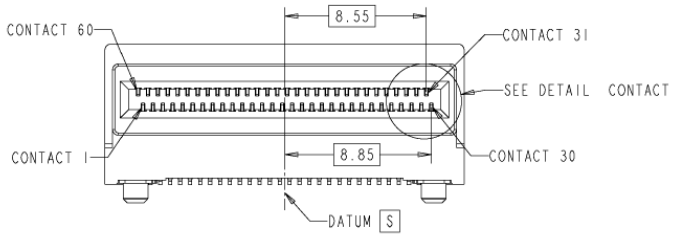
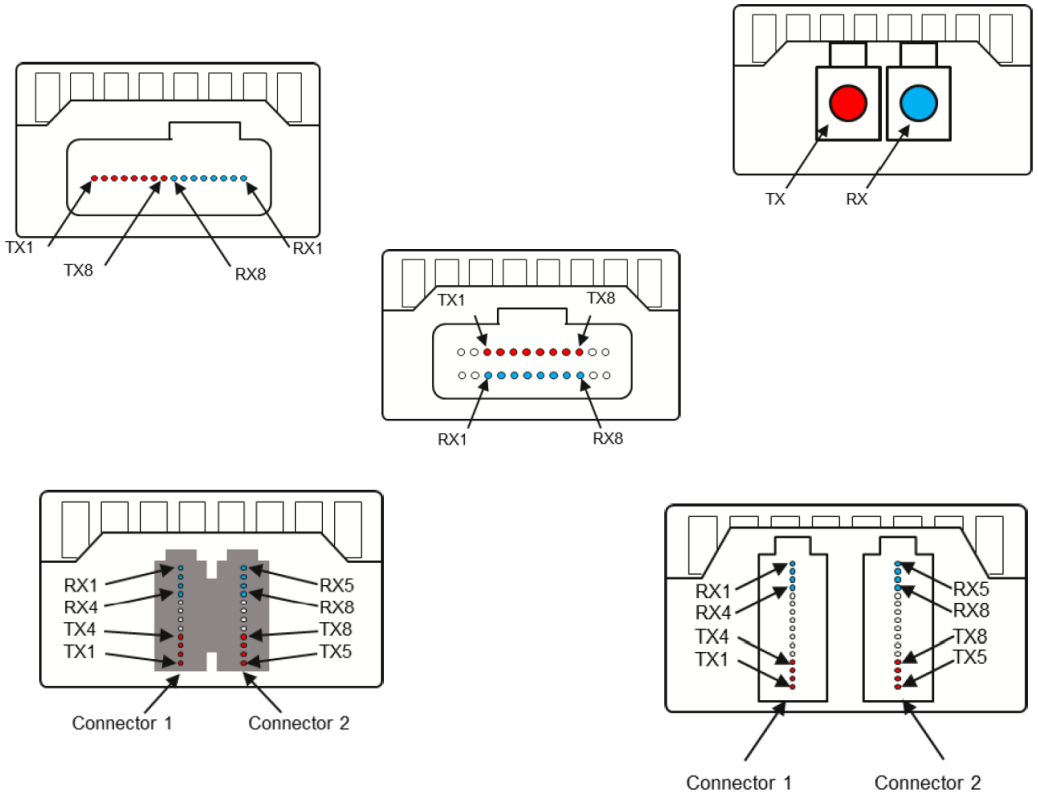


Figure 15-1: OSFP module pinout

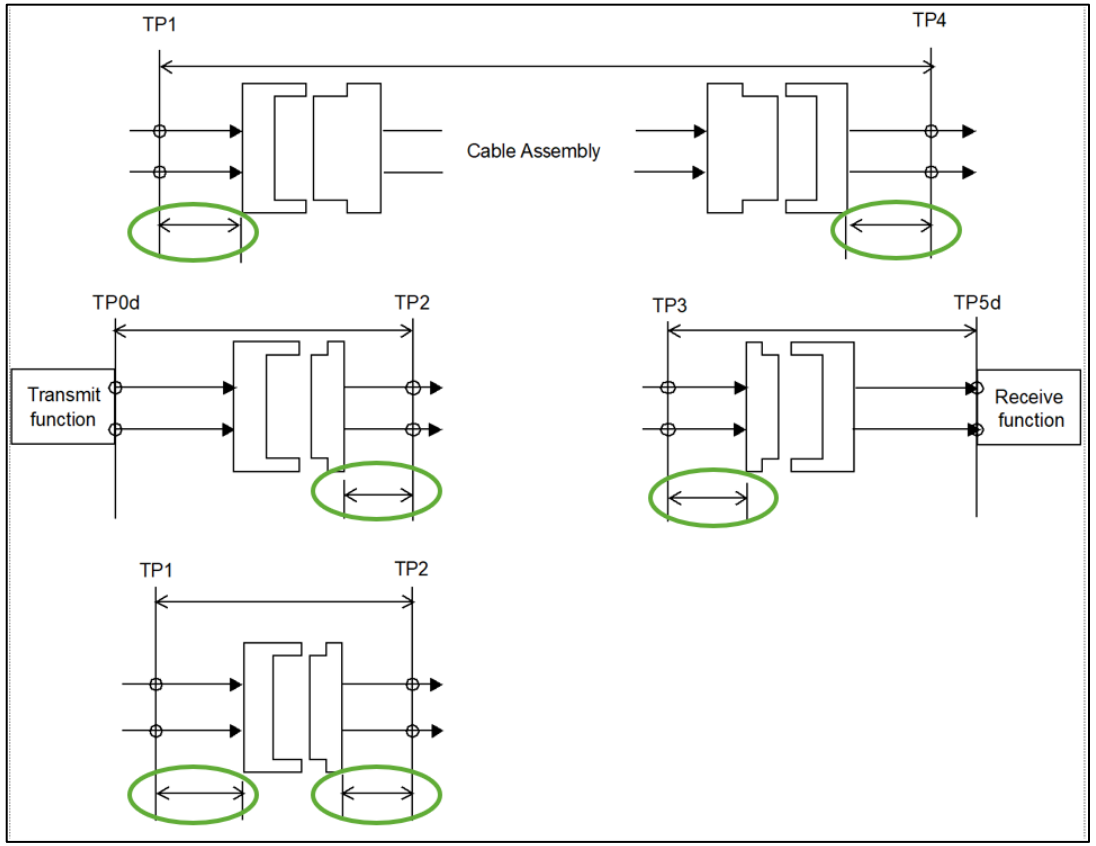


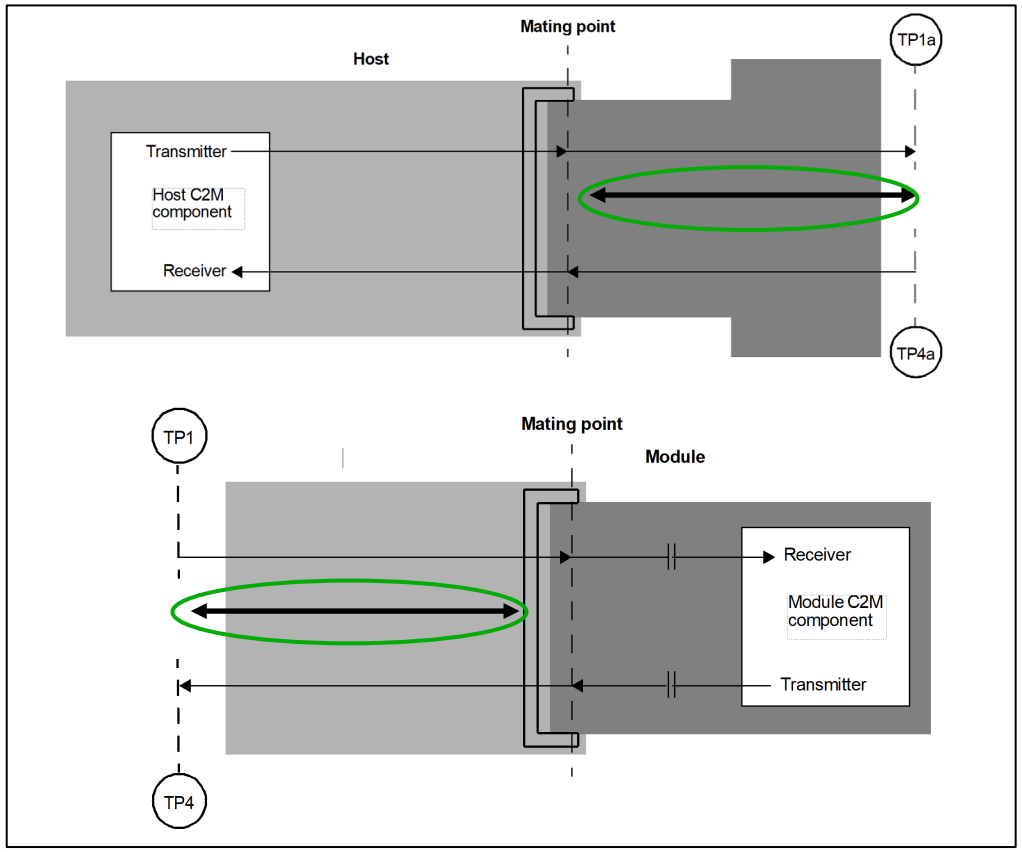
Electrical Example



Optical Example

Channel Considerations for General MDI Definition

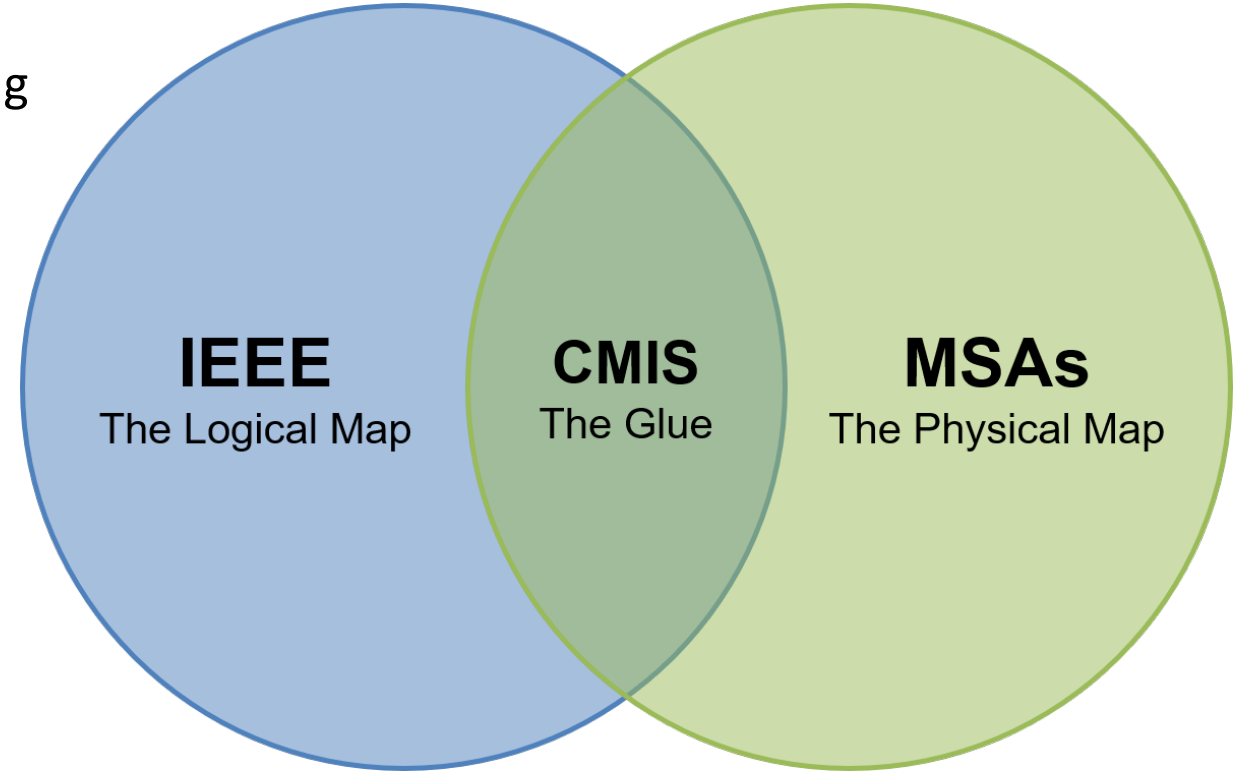




- Applications include “CR” (and “KR” as defined as cabled-backplane) and “C2M”
- Channel discussions are a necessary part of the P802.3dv project, but beyond scope of this contribution

General MDI Definition

- IEEE doesn't need to define everything
  - Today, it doesn't cover every physical mapping
- Already a push to isolate electrical impairments from optical quality
  - Transmitter Functional Test (TFT)
  - See cole_3dv_01_261022
- Traditional channel budgeting is going to be challenging with expected architectures (CPC, NPC -dominated)
- Is the solution confined to the framework mold of past projects?
  …a rearranging of clauses?
  …OR a new "generic" paradigm?



Summary

- Work on “General MDI Specification” proposal is underway
  - Based on observed trend of industry development is to support groupings of 8

- However,
  - Group discussions of proposal have led to channel discussions
    - Connectors capable of 400 Gb/s?
    - Channel budget
    - What is the reference receiver?
    - The overall 802.3 specification
  - Recommend sending liaison to OSFP and XPO MSA’s requesting information on 400 Gb/s capable electrical connectors (see dambrosia_3dv_02_2611)