OIF CEI-28G-VSR and the IEEE 802.3ba-2010 Architecture

John D'Ambrosia, Force10 Networks

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Initial Thoughts

- Where could OIF CEI-28G-VSR be applicable
  - Electrical interfaces
  - for a 100GBASE-nR4 PHY?
- Are there inherent limits based on existing 100GBASE-nR4 PMDs

Summary of Interfaces

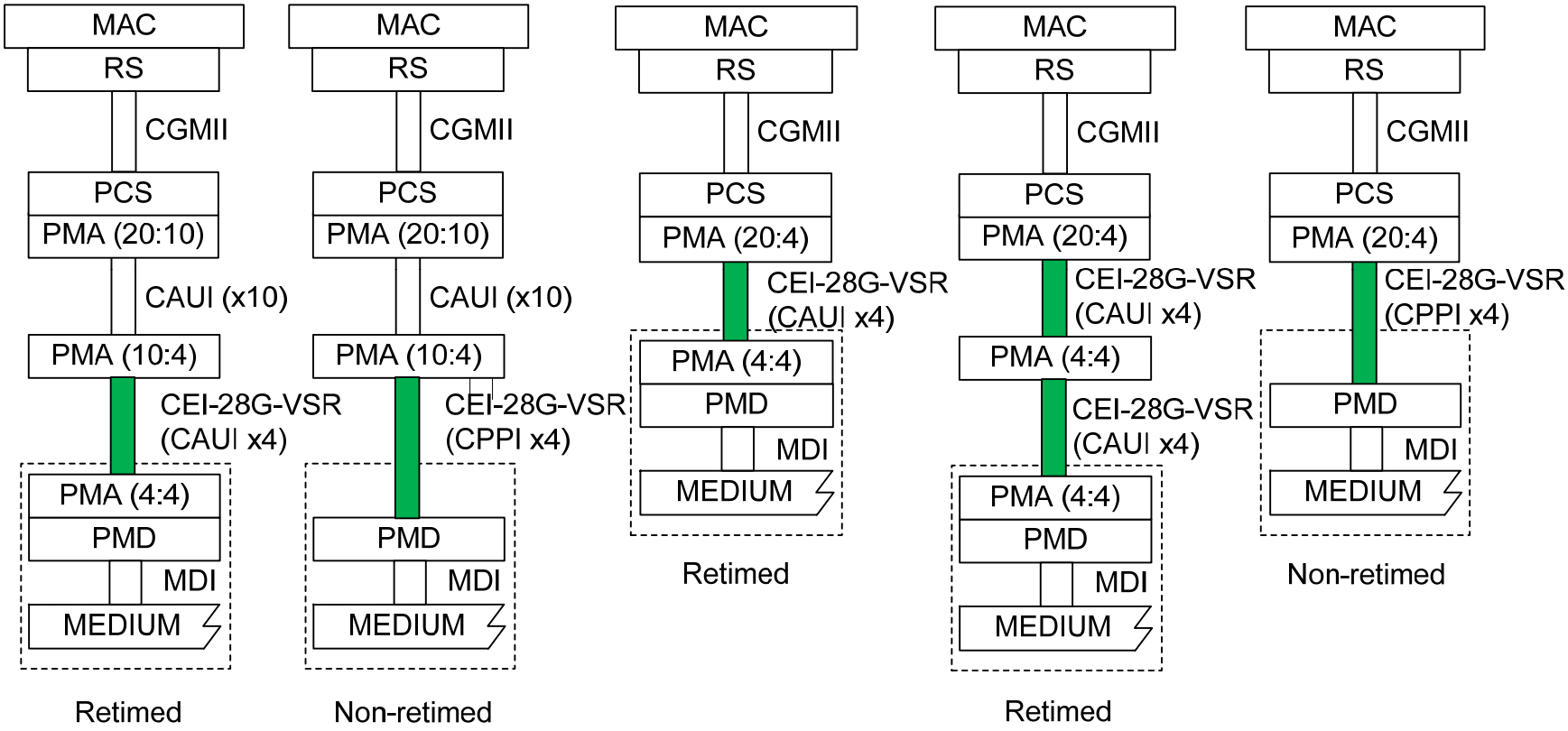
- IEEE 802.3ba-2010
  - Annex 83A: CAUI chip-to-chip
    - Approximately 25 cm (10 inches)
    - Retimed
  - Annex 83B: CAUI chip-to-module
    - 7.9 dB for host trace (about 8 inches)
    - 2.1 dB for module trace
    - Retimed
  - Annex 86A
    - 3.5dB for host trace (4 inches)
    - Non-retimed
- OIF
  - CEI-28G-SR
    - Retimed
    - 300mm
  - CEI-28G-VSR
    - Retimed? Non-retimed? Partial retiming?
    - 100mm

100GbE PMD Types

Port Type	Description	100GbE
100GBASE-LR4	At least 10km SMF	✓
100GBASE-ER4	At least 40km SMF	✓
100GBASE-KR4	Backplane	Possible Future
100GBASE-CR4	CU Cable Assembly	Possible Future
100GBASE-SR4	MMF	Possible Future
100GBASE-FR4	At least 2km SMF	Possible Future

- For 100GBASE-LR4 and 100GBASE-ER4, the retimer function and PMD service interface are beyond the scope of IEEE 802.3ba-2010.
  - But the Optical Tx (see Table 88-7) and Rx (see Table 88-8) characteristics must be supported.

Possible Architectures Based on IEEE P802.3ba



“Reach” Discussion

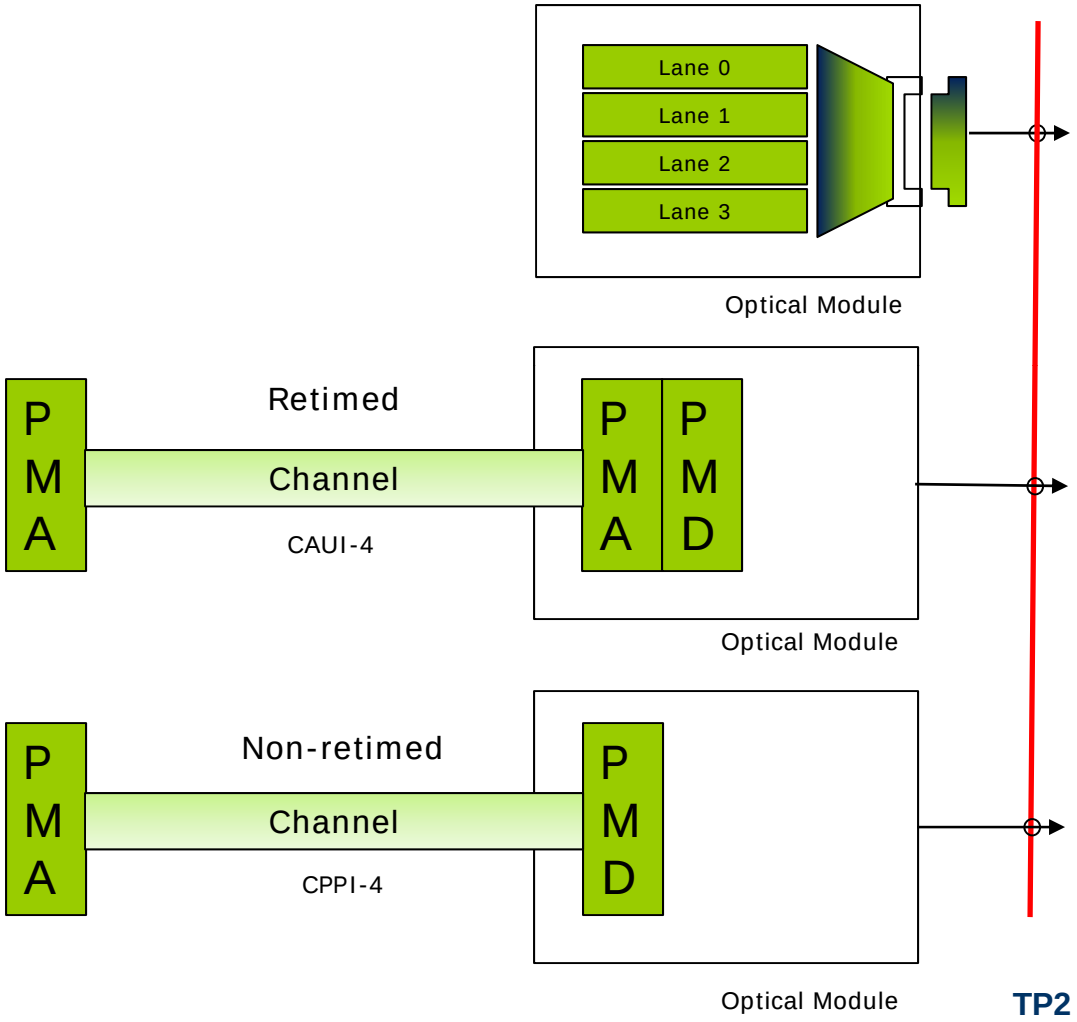
Traces	FR4-6	N4000-13	Megtron 6
Loss at 14 GHz /in	2	1.5	1
Connector loss at 14 GHz	1.4		
Loss allocation for 2 Vias in the channel	1		
Max Module PCB Loss	2.1		
PCB Trace Length Assuming 10 dB Loss Budget	2.7500	3.6667	5.5000
PCB Trace Length Assuming 12 dB Loss Budget	3.75	5.00	7.50

Based on oif2010.092.03

Chip-to-chip trace length	N4000-13	Megtron 6
10dB loss budget	6 inches	9 inches
12 dB loss budget	7.33inches	11 inches

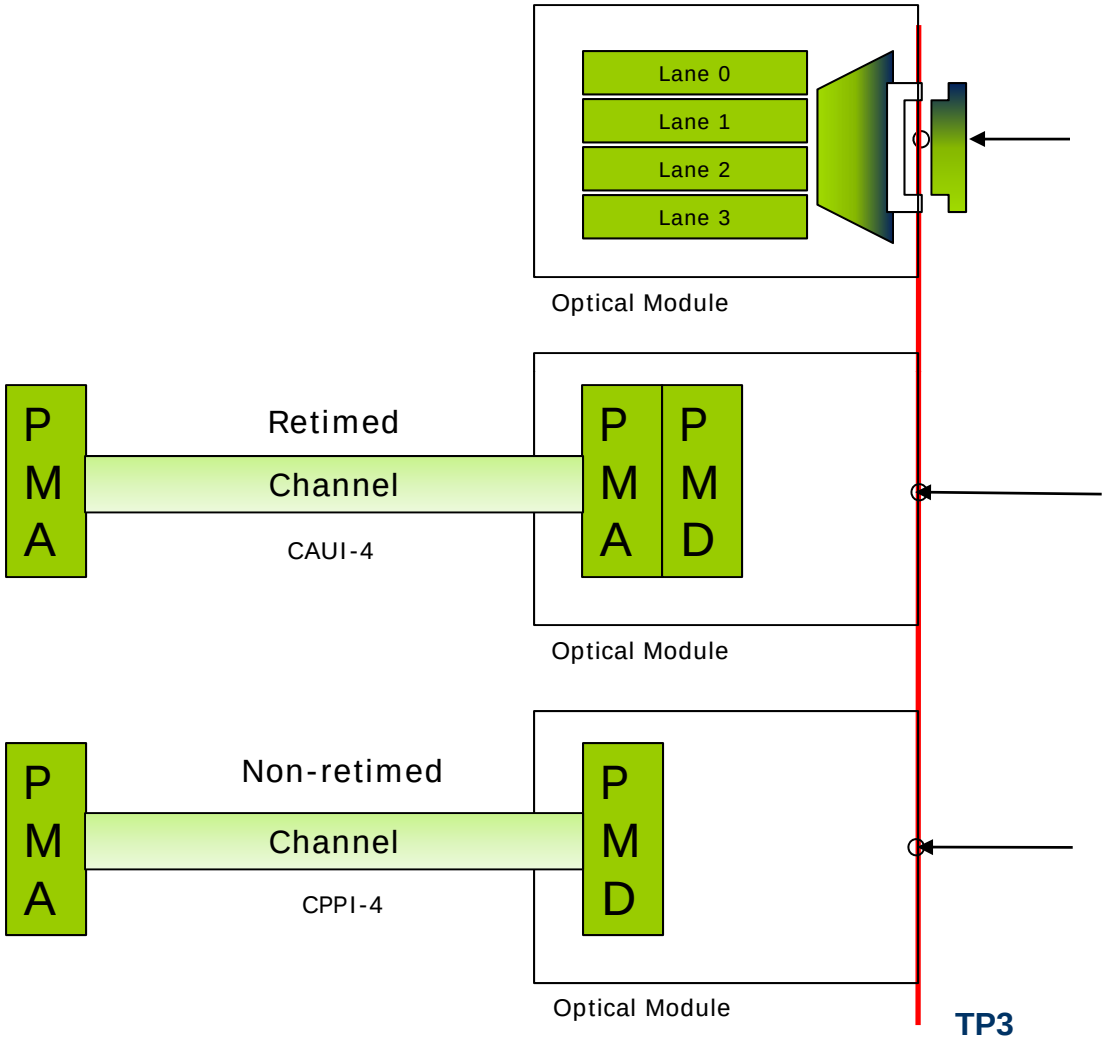
- Based on provided budget numbers for chip to module, if loss for connector / module trace (3.5dB total) are allocated to host trace loss:
  - CAUI-4 (chip-to-chip) 4000-13: 2.33 inches of extra PCB trace length
  - CAUI-4 (chip-to-chip) Megtron 6: 3.5 inches of extra PCB trace length
- 10dB proposed channel similar to CPPI length
- Length for 12dB proposed channel closer to CAUI lengths
- CEI-SR longer than CAUI lengths

At the Transmitter for 100GBASE-LR4 / ER4



- *Assumed that tdp can be met as specified by Clause 88.*
- *Can tdp can be met as specified by Clause 88*

At the Receiver for 100GBASE-LR4 / ER4



- *Based on Clause 88 Rx characteristics -*
- *Based on Clause 88 Rx characteristics – could the module to host TX drive the channel without retiming?*

Summary

- Multiple places where OIF CEI-28G-VSR could fit into IEEE 802.3ba-2010 architecture, but …
  - Application requirements
    - CPPI - 4 inches
      - 10dB proposal
    - CAUI – 8 (chip-to-module) to 10 inches (chip-to-chip)
      - Minimum of 12dB proposal
  - Timed vs non-retimed
- Any 25Gb/s electrical interface will need to support 100GBASE-LR/ER4 optical Tx / Rx specifications