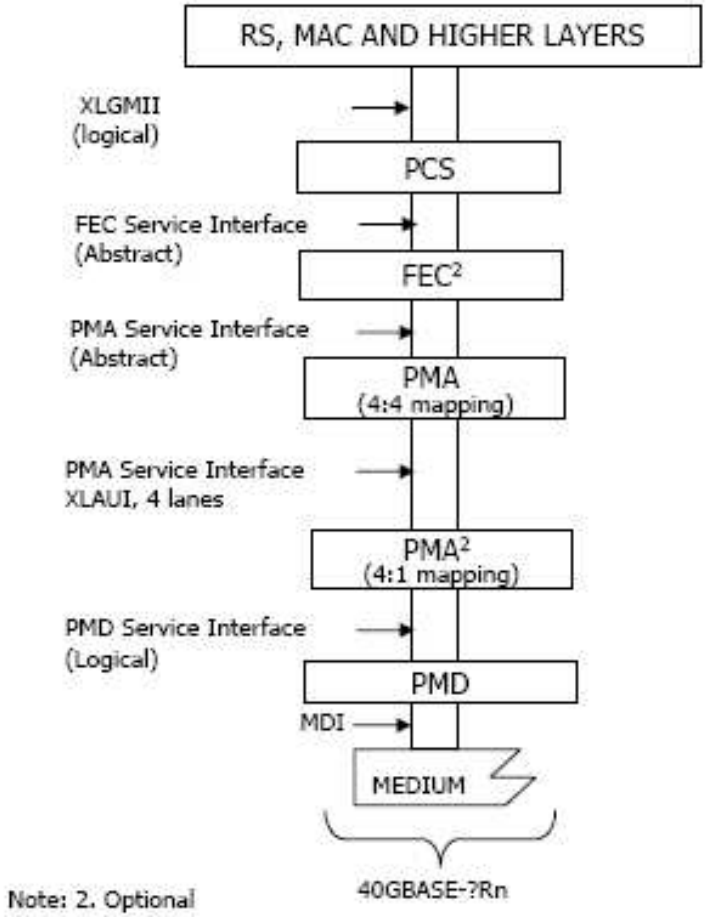
Level Setting – Interfaces and Architecture

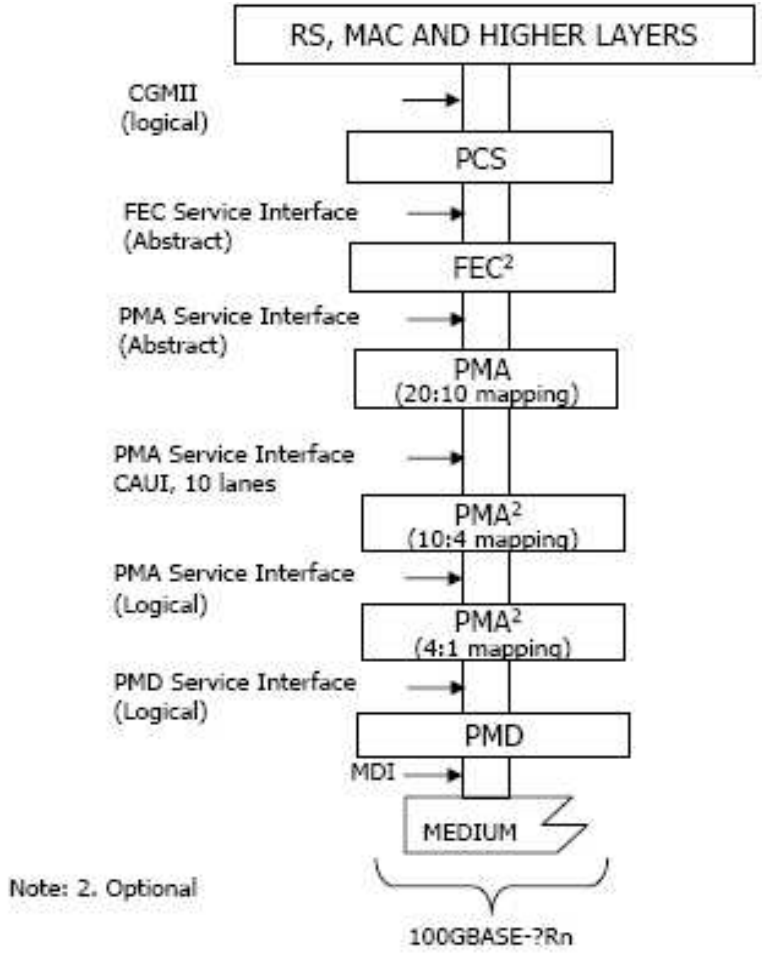
Gary Nicholl, Cisco
Mark Nowell, Cisco
John D'Ambrosia, Force10 Networks
Ilango Ganga, Intel
Adam Healey, LSI

IEEE P802.3ba May 2008 Interim, Munich, Germany

Introduction - Architecture / Interfaces

- Proposal - ganga_01_0308 (see figures below)

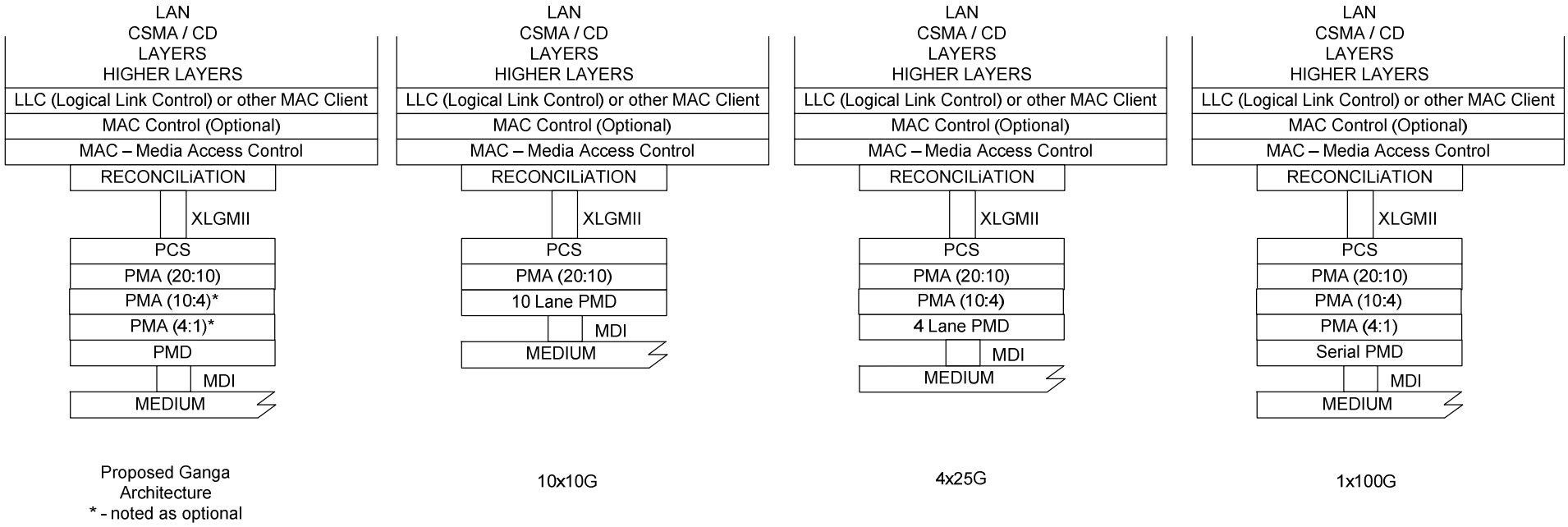




Discussions to date

- There are a number of issues which have been impacting forward progress:
  - Electrical Interface Definition
    - XLAUI/CAUI
    - PMD service interface ?
    - Linear / Limiting / Retimed Interface Discussions
    - MMF Reach Discussions
  - MMF Objective
    - Cost / power / density sensitivity of 100m applications
    - Reach extension beyond 100m for OM3 fiber
    - Even further extension using OM4 fiber
    - Informative annex?
  - Test Point definition (TP1,TP2,TP3, etc,etc)
- Need to revisit architecture to see if these issues can be segmented.

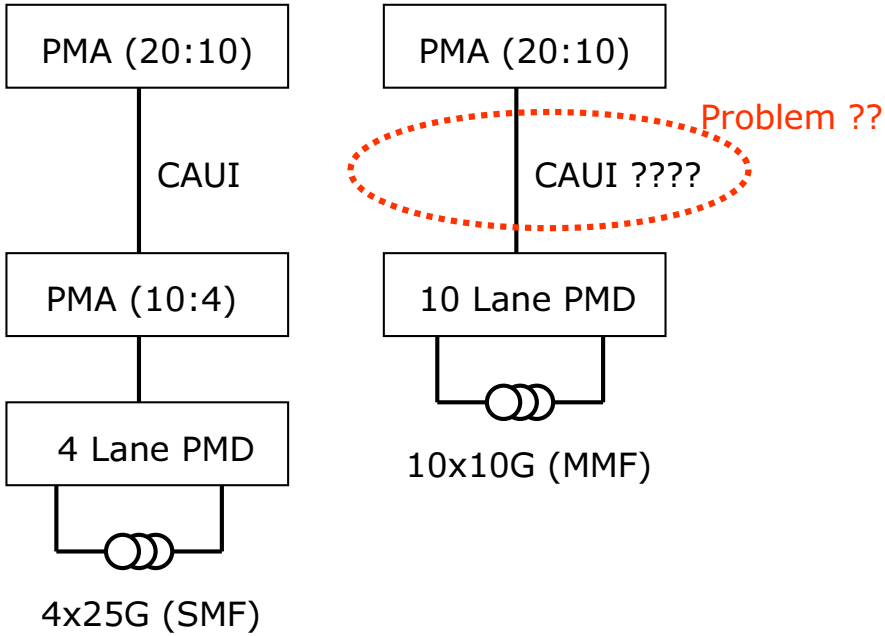
Revisiting the Proposed Layer Diagram for 100GbE



- "Optional" PMA sublayers are not optional BUT dependent on which PHY is being built
- PMD service interfaces will have logical definitions ("n" x 10G, 40G serial, 4x25G, 100G Serial)
- Need to ensure consistency between appropriate PMA and PMD service interface definitions

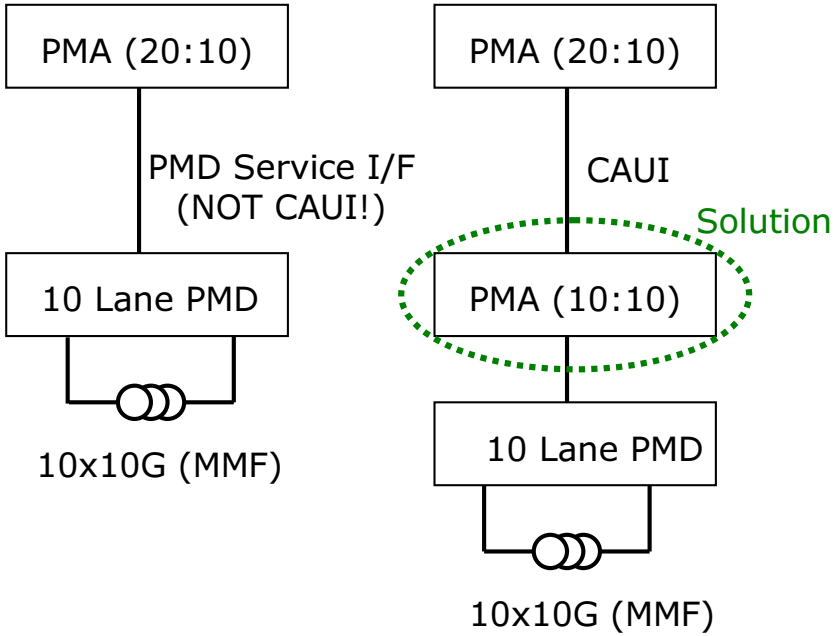
The Problem ….. (using 100GE as an example)

The Problem



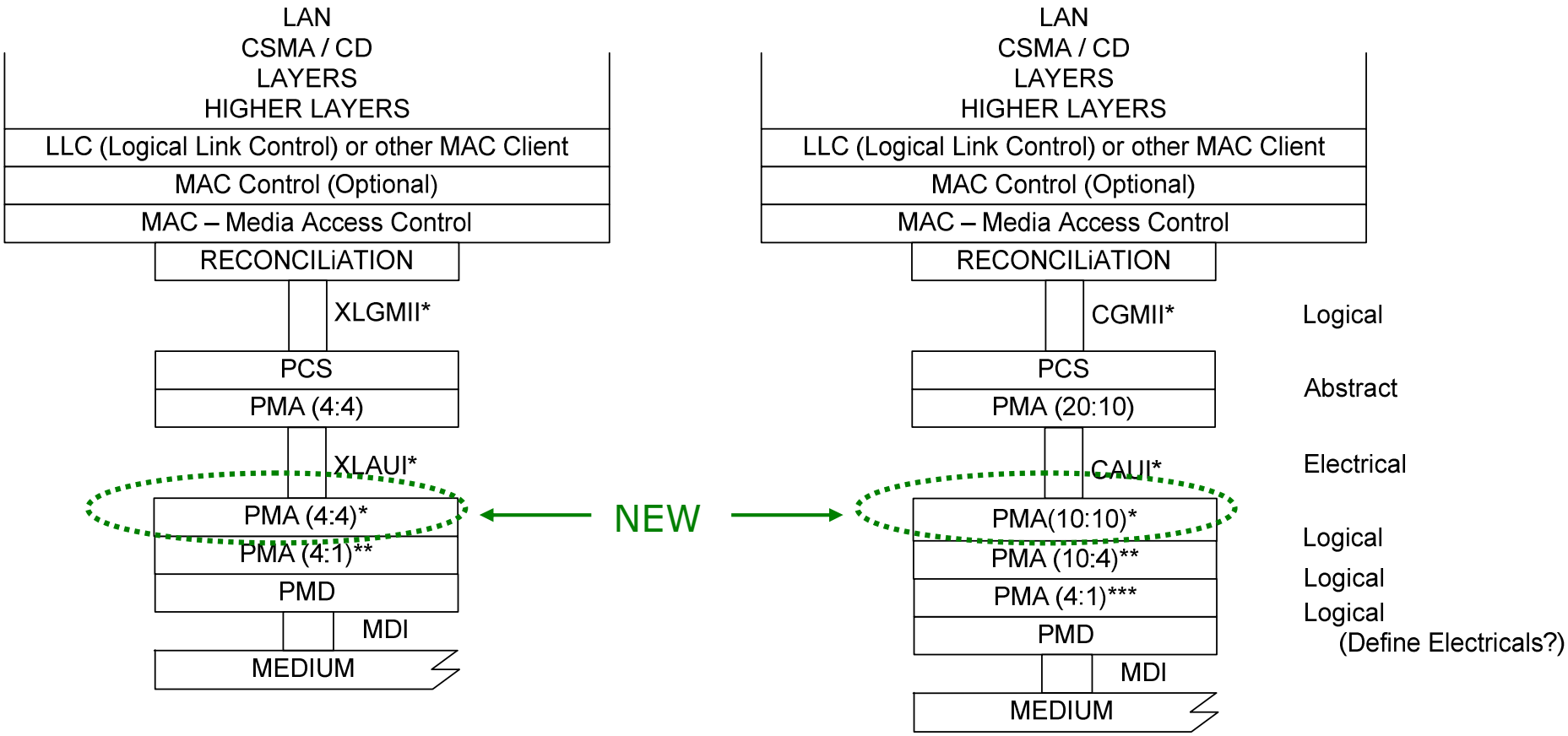
- CAUI defined as an optional, 10G chip-chip interface
- CAUI not defined to account for PMD or Media
- Fine for 4x25G (SMF) PMD. The PMA (10-4) isolates CAUI from PMD Service Interface.
- For the 10x10G (MMF) PMD it gets more complicated. Definition of CAUI gets blurred with the PMD service interface and MMF channel.

Proposed Solution



- Can still connect PMD directly to PMA …. it is just that this interface is not CAUI !!
- To use CAUI with a 10x10G PMD, need to add a PMA (10:10) to decouple CAUI from the PMD service interface
- CAUI must always have a PMA on both ends of the link

Revisiting Basic Layer Diagrams



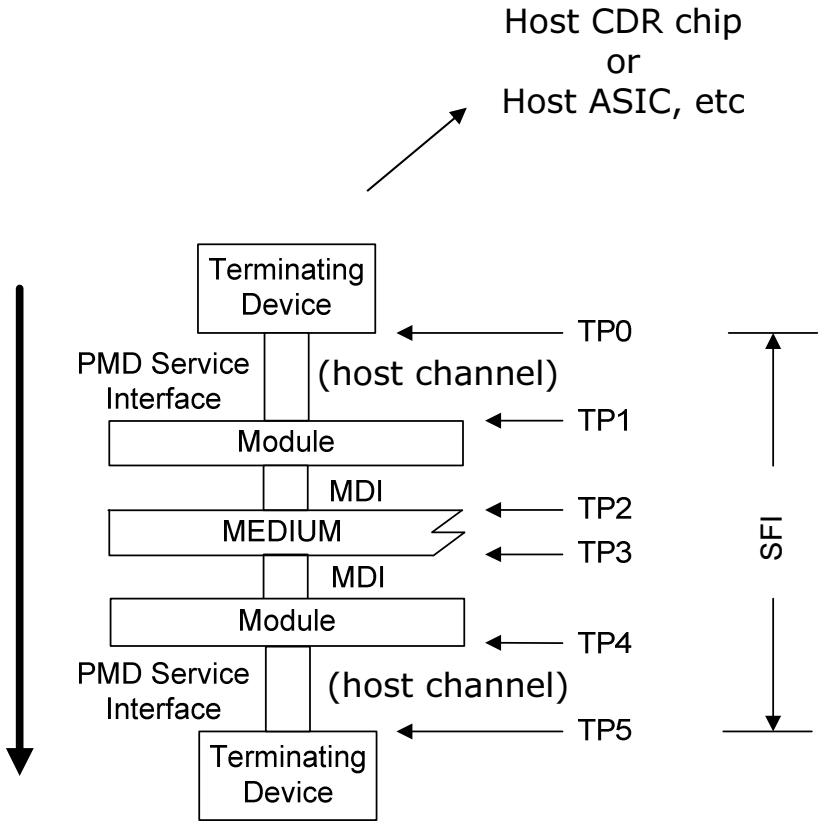
* - Optional
** - Not required for 40GBASE-xR4
Normative for 40GBASE-xR

* - Optional
** - Not required for 100GBASE-xR10
Normative for 100GBASE-xR4
Normative for 100GBASE-x4
*** Not required for 100GBASE-xR10 / 4
Normative for 100GBASE-xR

Notes:
1. XL/CAUI is an optional Electrical Interface
2. BUT if used must be bounded by PMA at both ends.

PMD Service Interfaces

- Let's switch gears and talk about the PMD Service Interface !
- It is now separate from the XLAUI / CAUI discussion (see previous charts)
- There are multiple PMD service interfaces (nx10G, 1x40G, 4x25G, 2x50G,1x100G) and each will have a logical definition
- For n x10G PMD service interface:
  - Define an optional electrical spec ?
  - Where should the electrical definition occur?
    - Inside the IEEE?
    - Outside the IEEE?



Test points

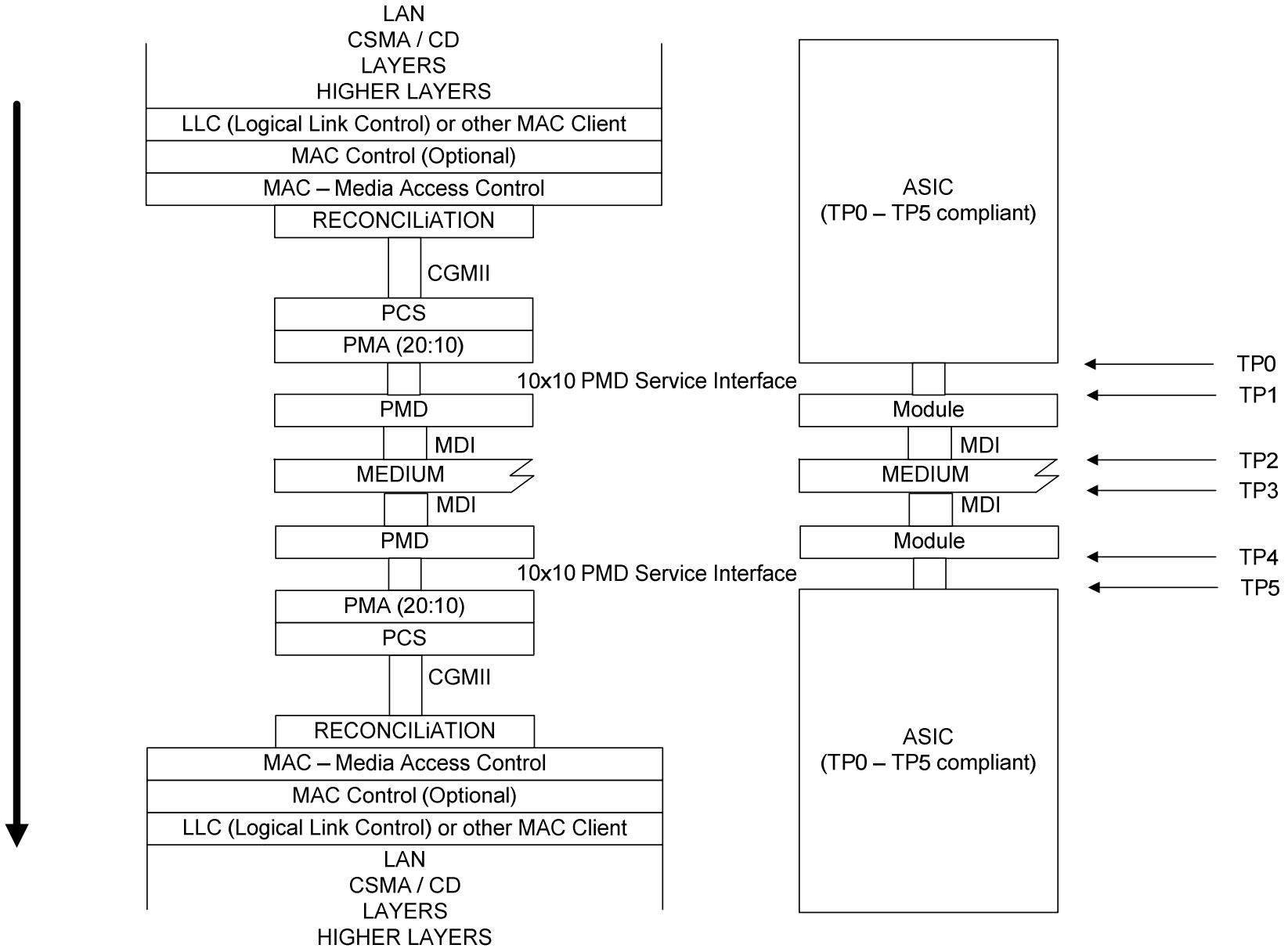
TP2 – TP3 – Normative (IEEE)

TP1 – TP4 - ?

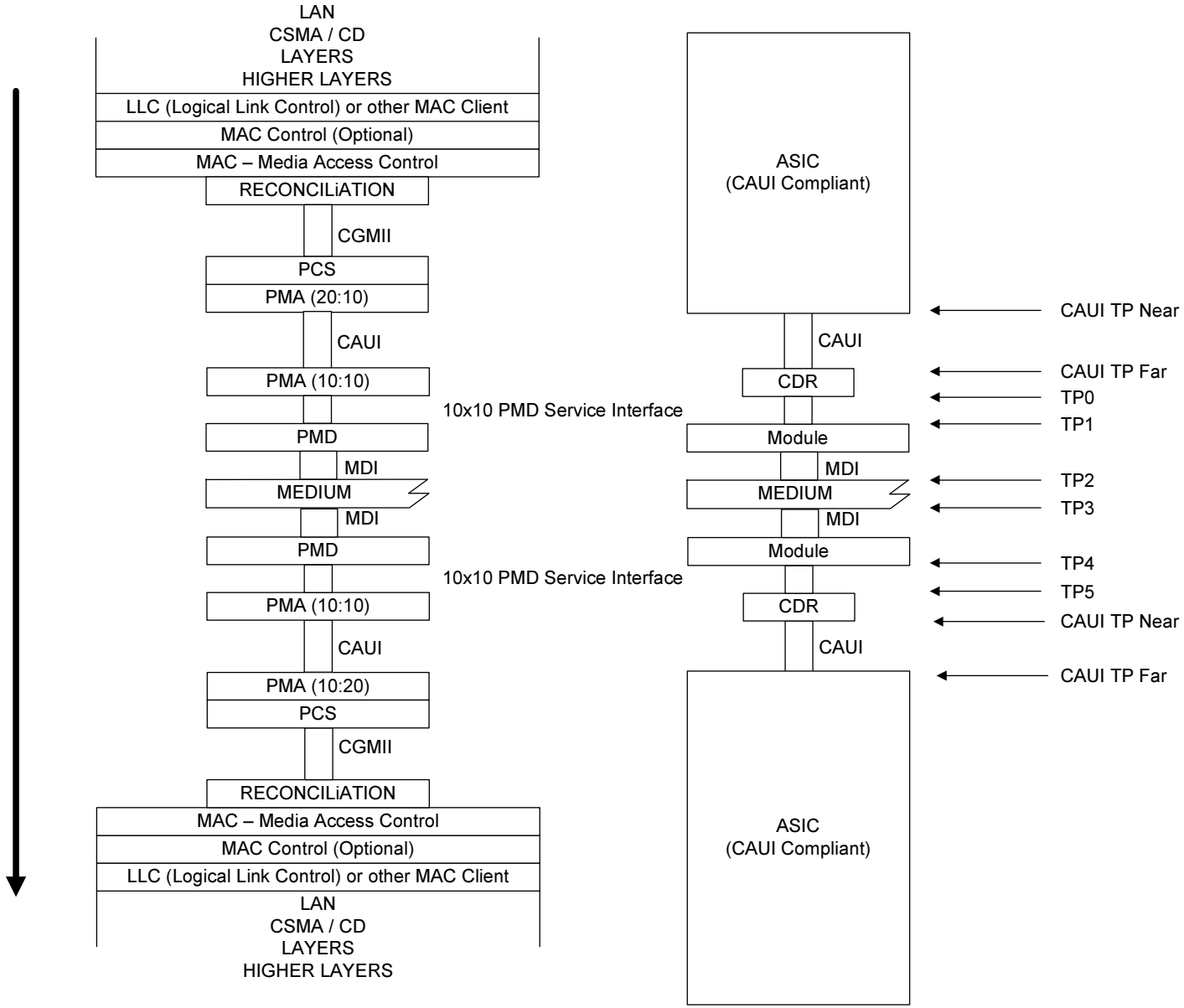
TP0 – TP5 - ?

Example Implementations

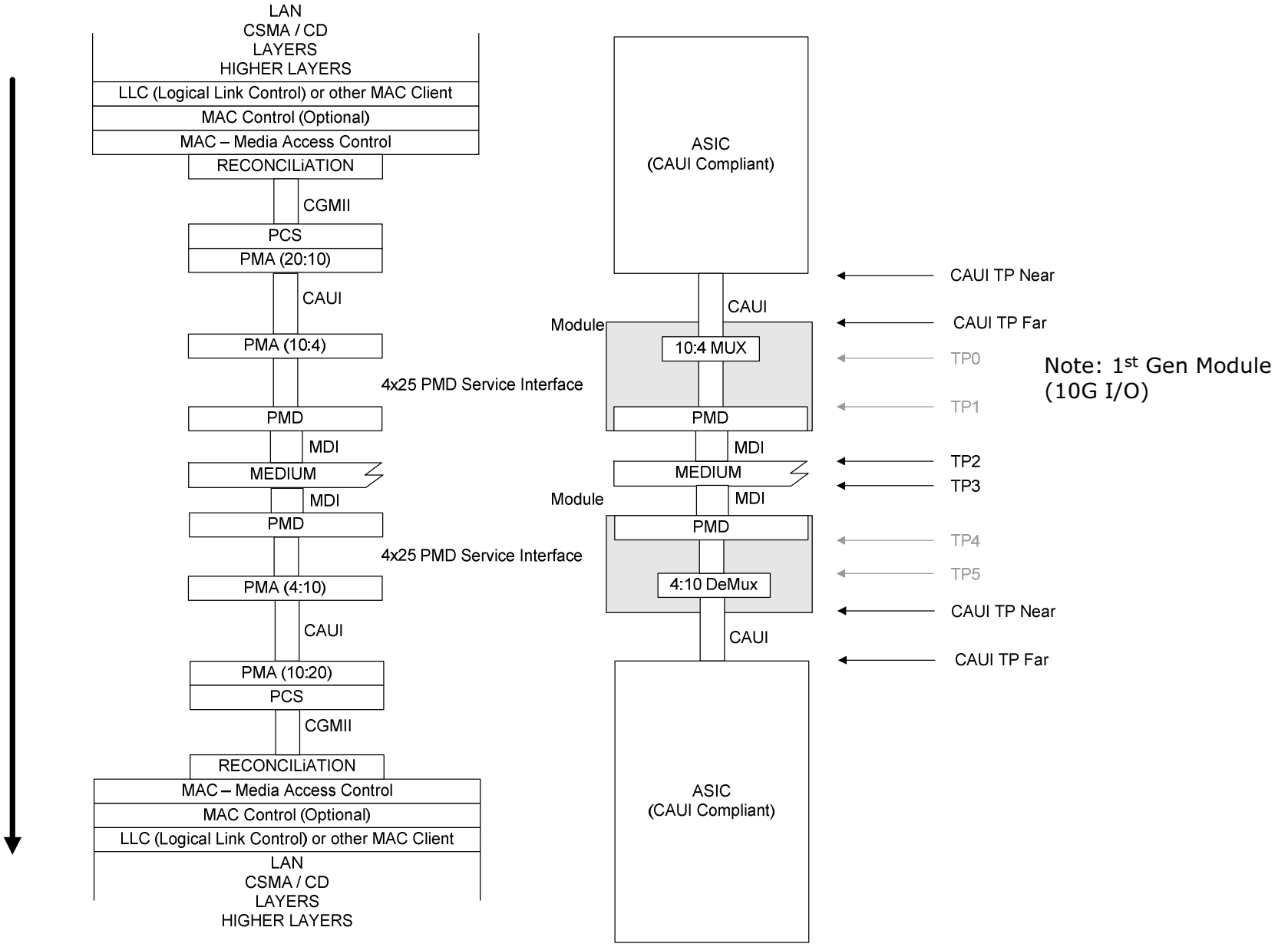
Example 1 - ASIC Driving 100G (10x10) Module



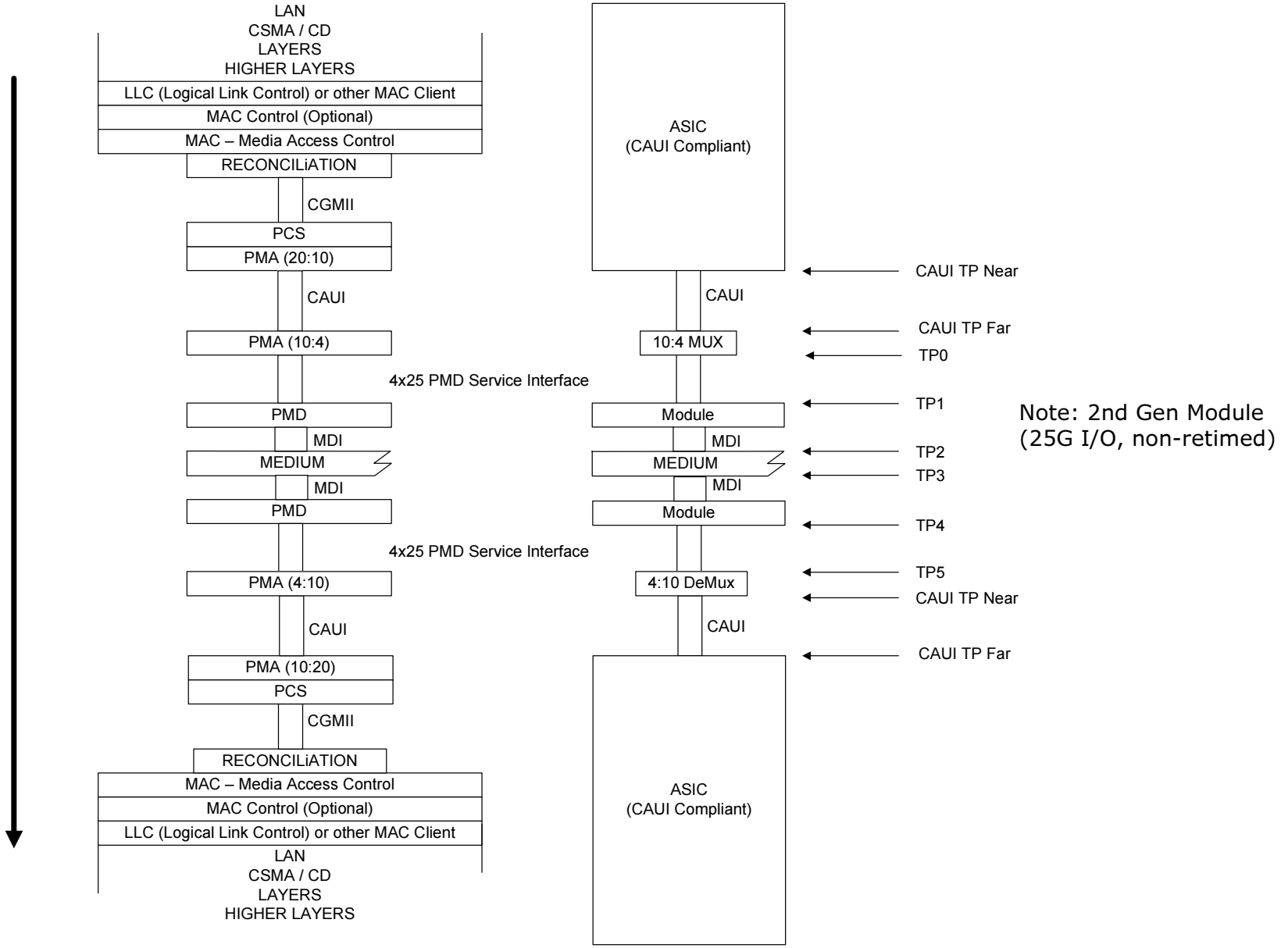
Example 2 - ASIC Driving 100G (10x10) Module w/ External CDR



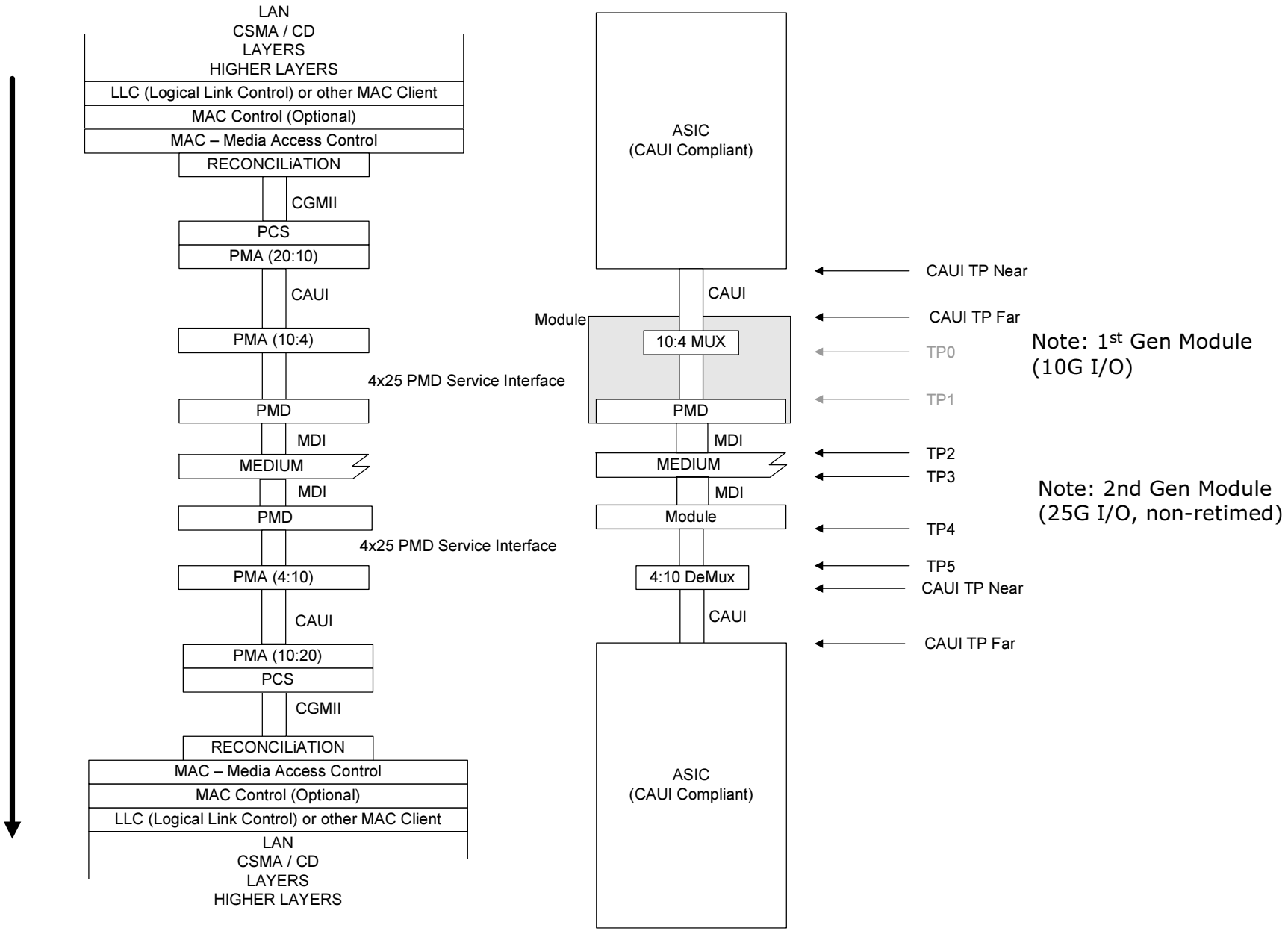
Example 3 – ASIC Driving CAUI to 100G (4X25) Module with Internal Mux



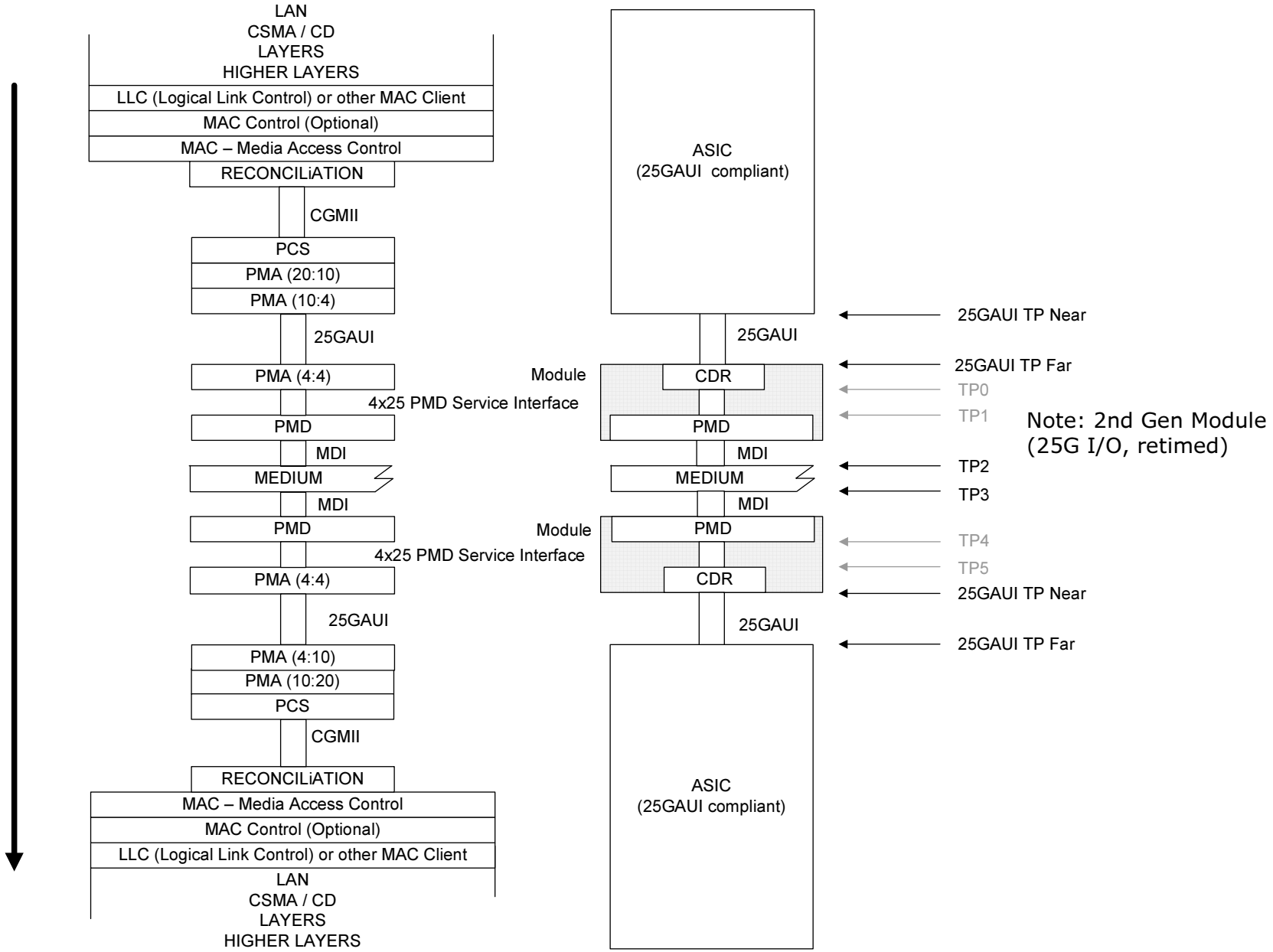
Example 4- ASIC Driving CAUI to 100G (4X25) Module with External Mux



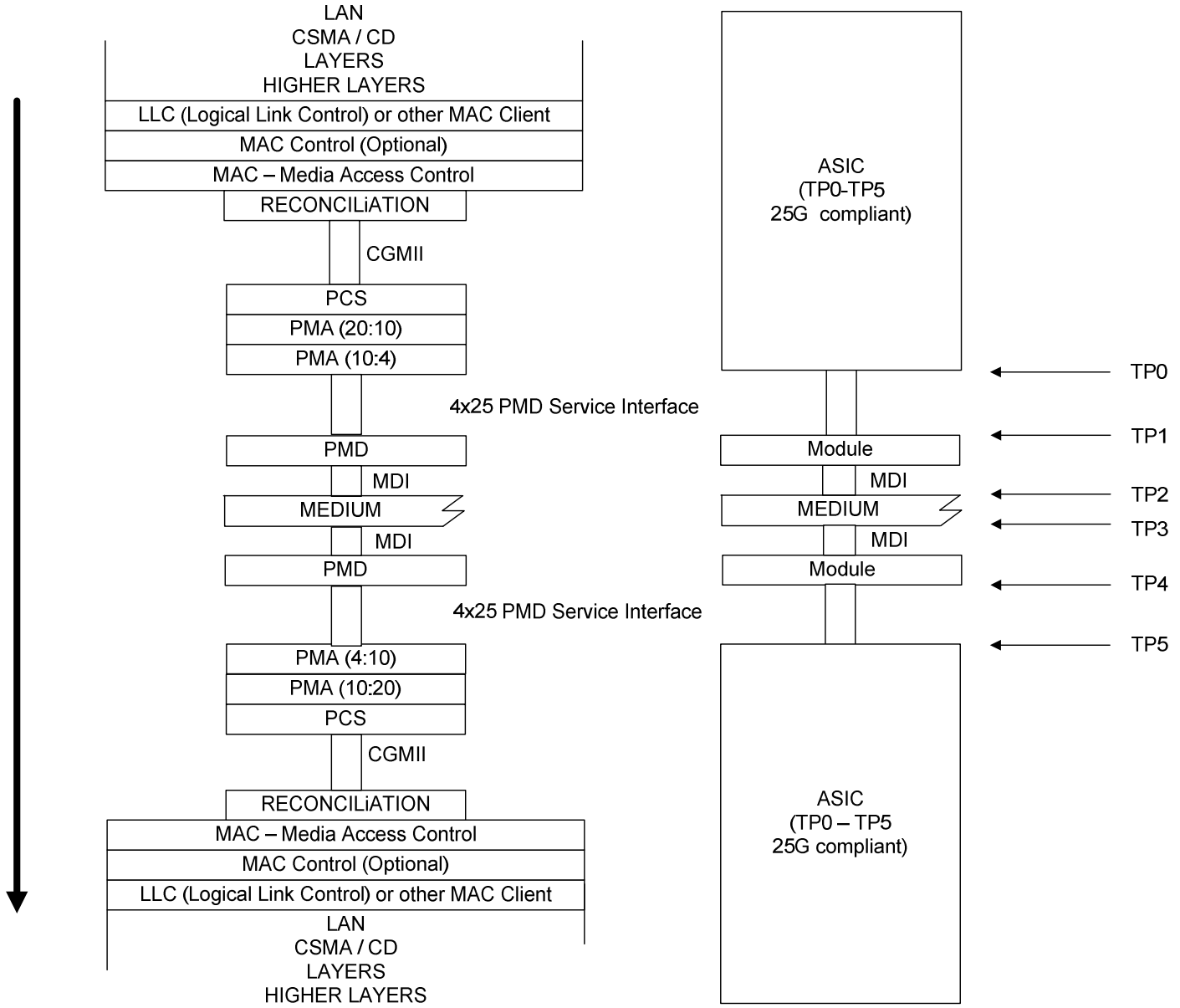
Example 5 - ASIC Driving CAUI with Different 100G (4x25) Modules



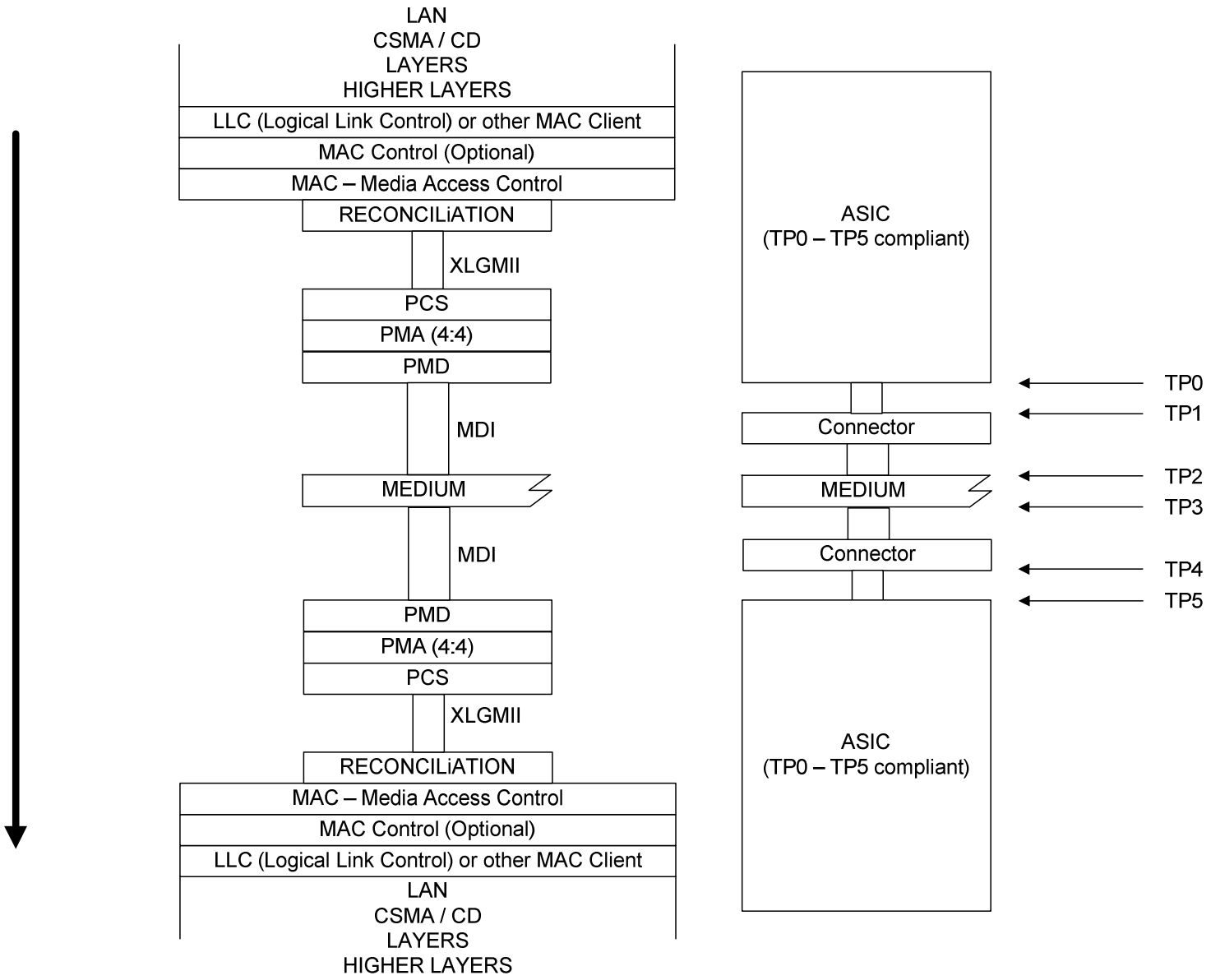
Example 6 – 25G AUI Based Modules With Internal CDR



Example 7 - ASIC Driving 4x25G to 4x25 Module



Example 8 - ASIC Driving 4x10G to Cu Cable Assembly



Summary

- What does this presentation do ?
  - Recognizes the fact that we are specifying an architecture, and that there will be many different implementations
  - Proposes a common frame work which decouples XLAUI/CAUI from the PMD service interface
  - Proposes a set of non-ambiguous test points for both XLAUI/CAUI and the PMD service interface, that are common across all implementations
- What does this presentation not do ?
  - Propose electrical specs for either XLAUI/CAUI or the nx10G PMD service interface
  - Propose where the definition of the electrical specs for the nx10G PMD service electrical interface should be done (i.e. inside or outside of 802.3ba)
  - Discuss whether common electrical specs could be used for to cover both XLAUI/CAUI and nx10G PMD service interface

Thank You!