

# 40Gb/s PMD Considerations

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CFI Planning Meeting: 40Gb/s single lane PMD

IEEE 802.3 Interim Meeting

Norfolk, Virginia

13 May 2014

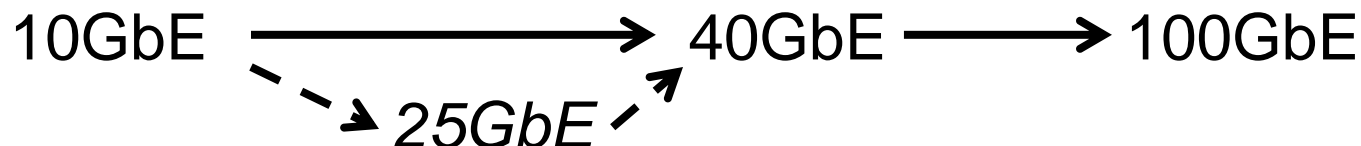
Chris Cole

*Finisar*<sup>®</sup>

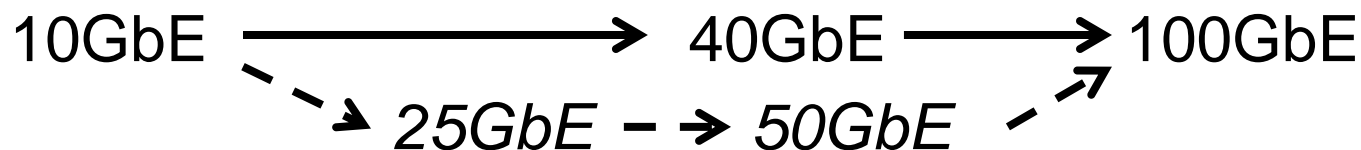
# Next Server PMD Rate Alternatives

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- Mainstream server roadmap:



- Alternate server roadmap:



- Next server PMD rate alternatives:

- 40Gb/s
- 50Gb/s
- 40-50Gb/s (similar to dual rate 20-25Gb/s PMDs today)

- Can we spec 50Gb/s single lane PMDs in an 802.3 40Gb/s single lane project w/o an adopted 50Gb/s MAC rate?

# 40Gb/s PMD Modulation Alternatives

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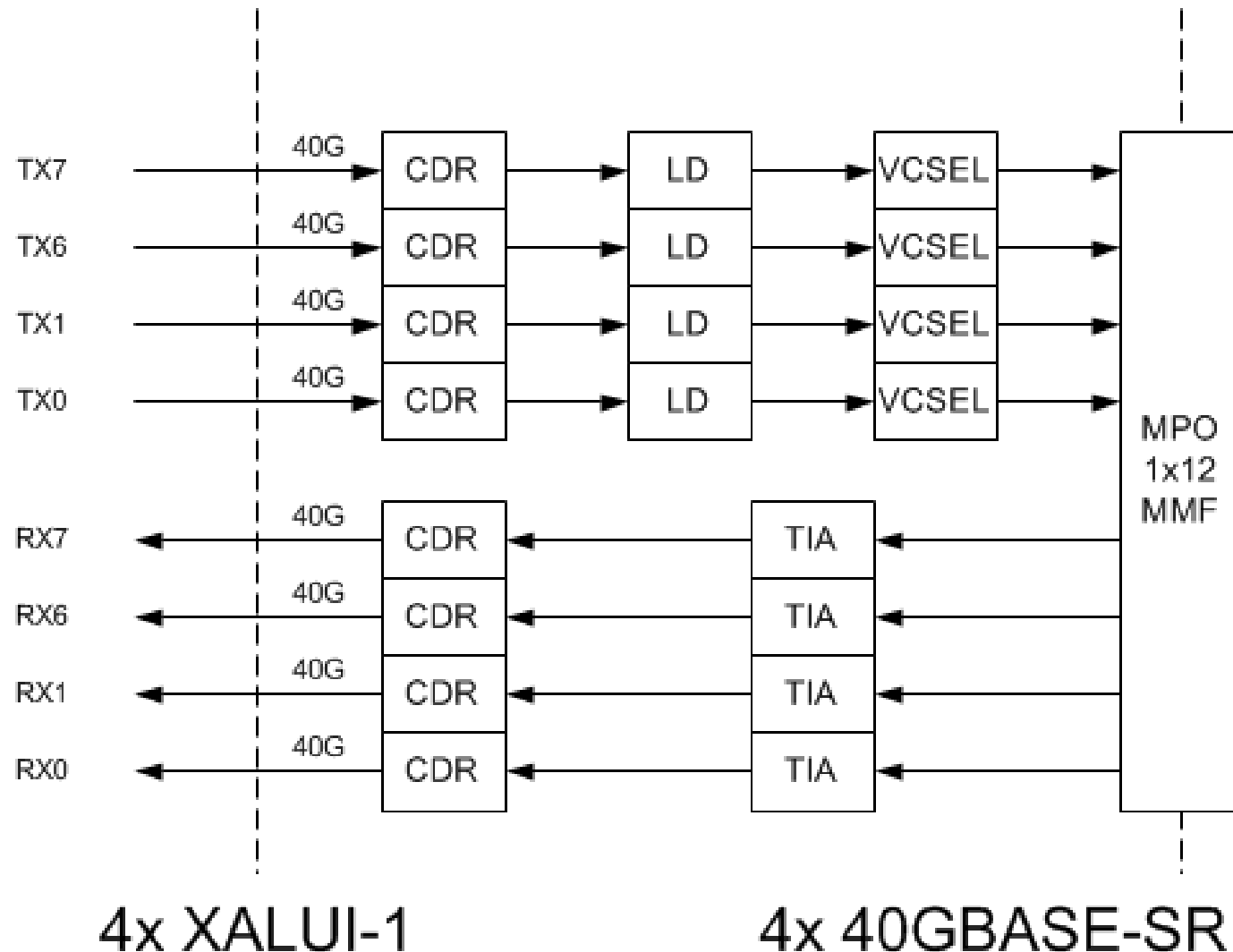
- Electrical 40Gb/s single lane (XLAUI-1):
  - 40GBaud NRZ
  - 20GBaud PAM-4
- Optical 40Gb/s duplex fiber (-xR, -xR2):
  - 1x 40GBaud NRZ  $\lambda$
  - 2x 20GBaud NRZ  $\lambda$
  - 1x 20GBaud PAM-4  $\lambda$
- Twin-ax cable 40Gb/s modulation not discussed here
- Critical to define electrical 40Gb/s single lane architecture
  - OIF CEI-56G-VSR (chip-to-module) will specify down to 40Gb/s single lane rate
  - VSR modulation choice important to defining optimal optical PMD modulation

# 40Gb/s single lane PMD Alternatives

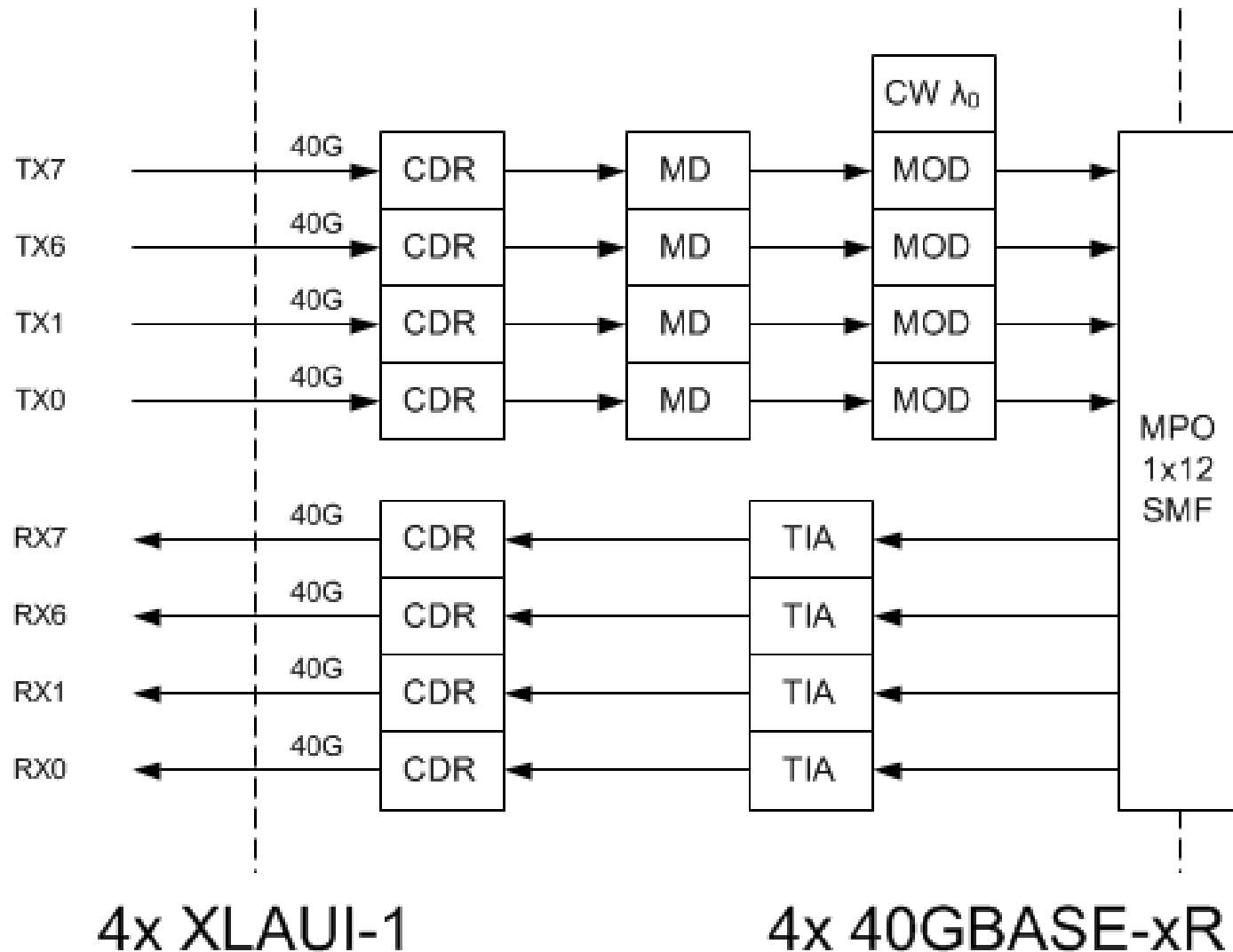
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- 40GBASE existing:
  - FR duplex SMF (2km)
- 40GBASE down-links (perceived to have strong interest):
  - CR duplex twin-ax cable (3/5m)
  - SR duplex MMF (100m)
  - xR duplex SMF (500m)
- 40GBASE up-links (perceived to have little current interest because 100Gb/s is the preferred solution):
  - LR duplex SMF (10km)
  - ER duplex SMF (40km)
- Two  $\lambda$  40GBASE duplex solutions would have
  - xR2 designations

# Quad 40G duplex MMF (4x 40GBASE-SR)



# Quad 40G duplex SMF (4x 40GBASE-xR)



# 40Gb/s single lane PMDs CFI Straw Polls

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## ■ Straw Poll #1

Would you support a 40Gb/s single lane PMDs CFI (assume it's whatever you want it to be)?

Yes:  $12+18+21 +1 = 52$

No:  $2+4+2=8$

## ■ Straw Poll #2

Which 40GBASE PMDs (approx. reach) would you support in a 40Gb/s single lane PMDs project (Chicago Rules)?

-CR duplex twin-ax cable (3-5m):  $9+18+19+1=47$

-SR duplex MMF (~100m):  $13+17+18+1=49$

-xR duplex SMF (~500m):  $7+11+17+1=36$

-LR duplex SMF (10km):  $0+1+2 = 3$

-ER duplex SMF (40km):  $0 + 0 +1 = 1$

# 40Gb/s single lane PMDs CFI Straw Polls

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- Straw Poll #3

If there is a 40Gb/s single lane PMDs CFI, would you support extending the specifications to 50Gb/s?

Yes:  $3 + 8 + 2 = 13$

No:  $4 + 9 + 12 = 25$

- Straw Poll #4

When should the 40Gb/s single lane PMDs CFI be held?

Nov. 14 Plenary:  $2 + 7 + 11 = 20$

Mar. 15 Plenary:  $9 + 5 + 10 + 1 = 25$

July. 15 Plenary:  $2 + 0 + 0 = 2$

- Room Count:  $30 + 33 + 19 + 1 = 83$



# 40Gb/s Project Considerations

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Thank you