Proliferation & Consolidation

Dan Dove, Dove Networking Solutions

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Outline

- Introduction
- Proliferation… Is it good or bad for the industry?
- Consolidation… Good or bad?
- PMD Considerations for P802.3bs
- Conclusion

Introduction

- Common euphemisms explained:
  - “Hindsight is 20/20” – Suggests that if we look at the past, we can prevent mistakes made previously and achieve a glorious future.
  - “If you have a hammer, everything looks like a nail” – Suggests that regardless of historical lessons, people who own hammers are bound to want to see that a nail will solve the immediate problem.
  - “Not Invented Here” – A natural disinclination to consider alternative approaches because ‘if they were a good idea, we would have thought of them’.
  - “Proliferation is a bad thing” – Used to disqualify a particular proposed solution because its different than yours.

Proliferation

- A wise man once said “Proliferation is only bad when the other guy is doing it”.
- In fact, proliferation itself is not bad, but proliferation of many alternatives that essentially overlap is the problem.
  - The IEEE 802.3 “Criteria (CSD)” specifically call for “Distinct Identity” to avoid proliferation of equivalent solutions into the market.
- Recently 4 different MSAs were formed to specify 100G, 500m-2km PMDs, some of which are virtually identical to each other.
  - LR4-Lite, CWDM4, CLR4, CWDM 1550
  - The result, will be fragmentation of the supplier base and ultimately a higher overall cost-per-unit than would have been achieved by a single broad-market solution.
  - Scale matters: Market ÷ 4 << Market

Proliferation

- 802.3 standards have traditionally produced multiple PMDs for any given rate but used market segmentation to justify each one.
  - For instance:
    - Backplane – Inside a box
    - Copper – Short reach to TOR or EOR switches
    - MMF – Moderate reach to distant EOR switches
    - SMF
      - Long reach to distant core switches
      - Longer Reach to distant buildings, or metro areas
- Supporting different applications with different solutions is NOT proliferation, it's satisfying broad market need.

Consolidation

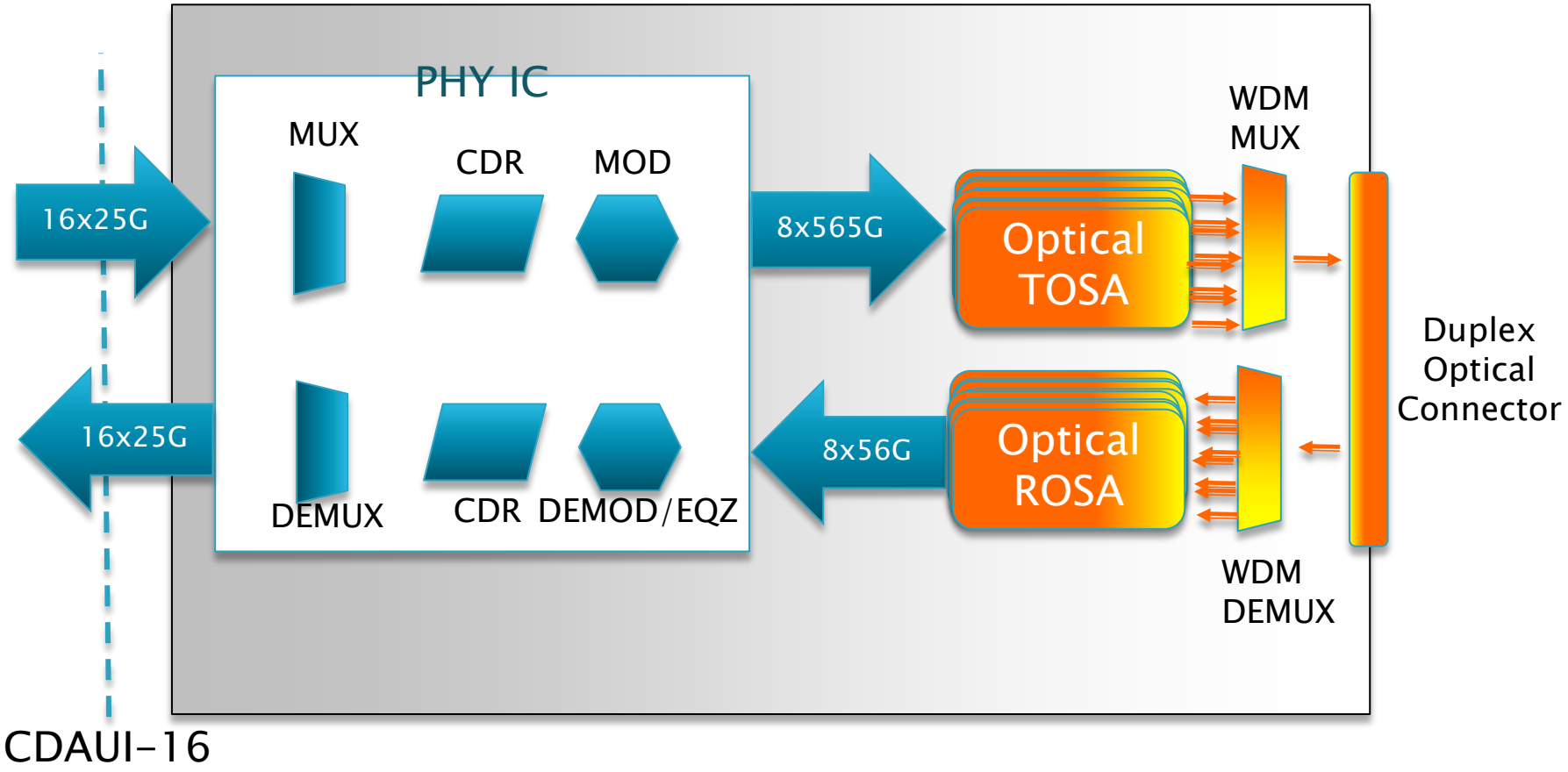
- Consolidation is often considered a “good thing”.
- Scale can be achieved more readily when consolidation around a common technology, architecture, or solution can occur.
- But consolidation, for consolidation’s sake, is not necessarily best.
  - Absurd Example: “A 10km SMF PMD can solve a 1m link need.”
- Yes, its possible, but clearly the cost model for a 10km SMF PMD is not going to satisfy balanced cost, or potentially the volume requirements applied to a 1m link application.
- So we establish multiple PMDs, some focused on cost, some focused on reach, some focused on a balance point between the two.

Consolidation

- Q: But when we select multiple PMDs to satisfy different market needs, is is possible to consolidate upon a common architecture, or a common technology choice to enable broad market development of the solution?
- A: Yes, its possible. Whether or not its appropriate depends on how that architecture or technology choice aligns with the various PMD market requirements.

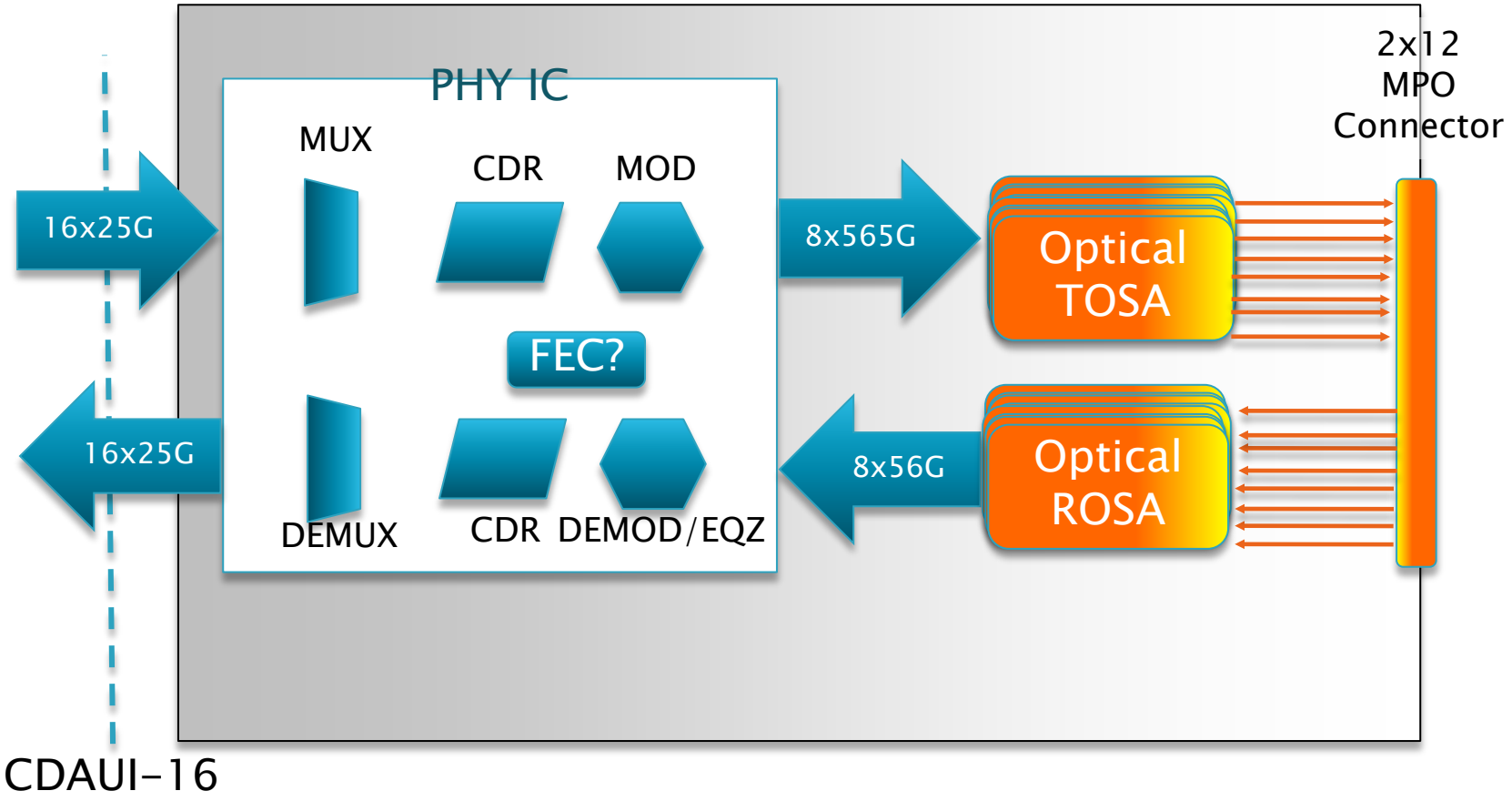
Consolidation

- Example 10km Architecture (8x56G Optical Architecture 400GBASE-LR8)



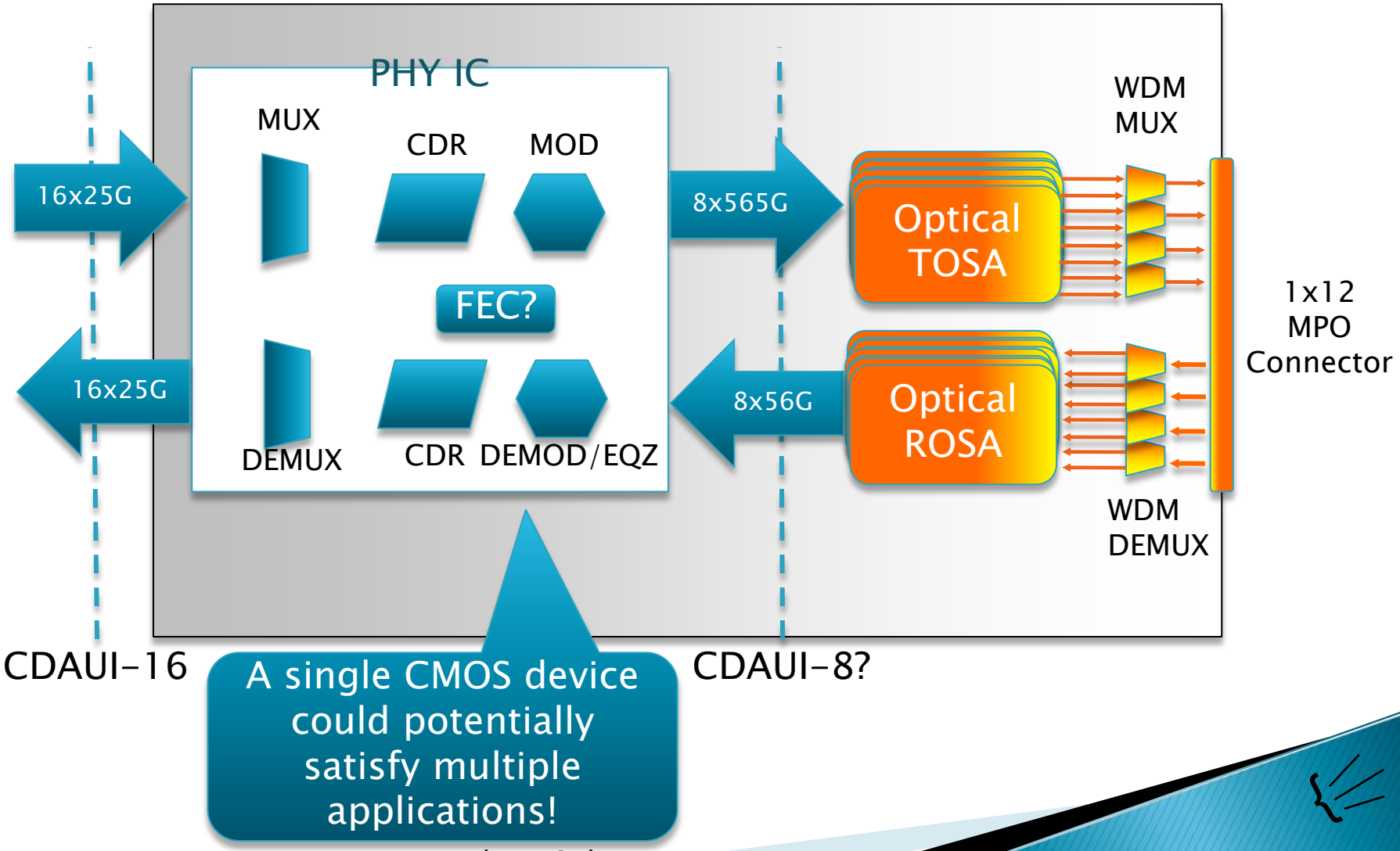
Consolidation

- Example 500m Architecture (8x56G Optical Architecture 400GBASE-PSR8)



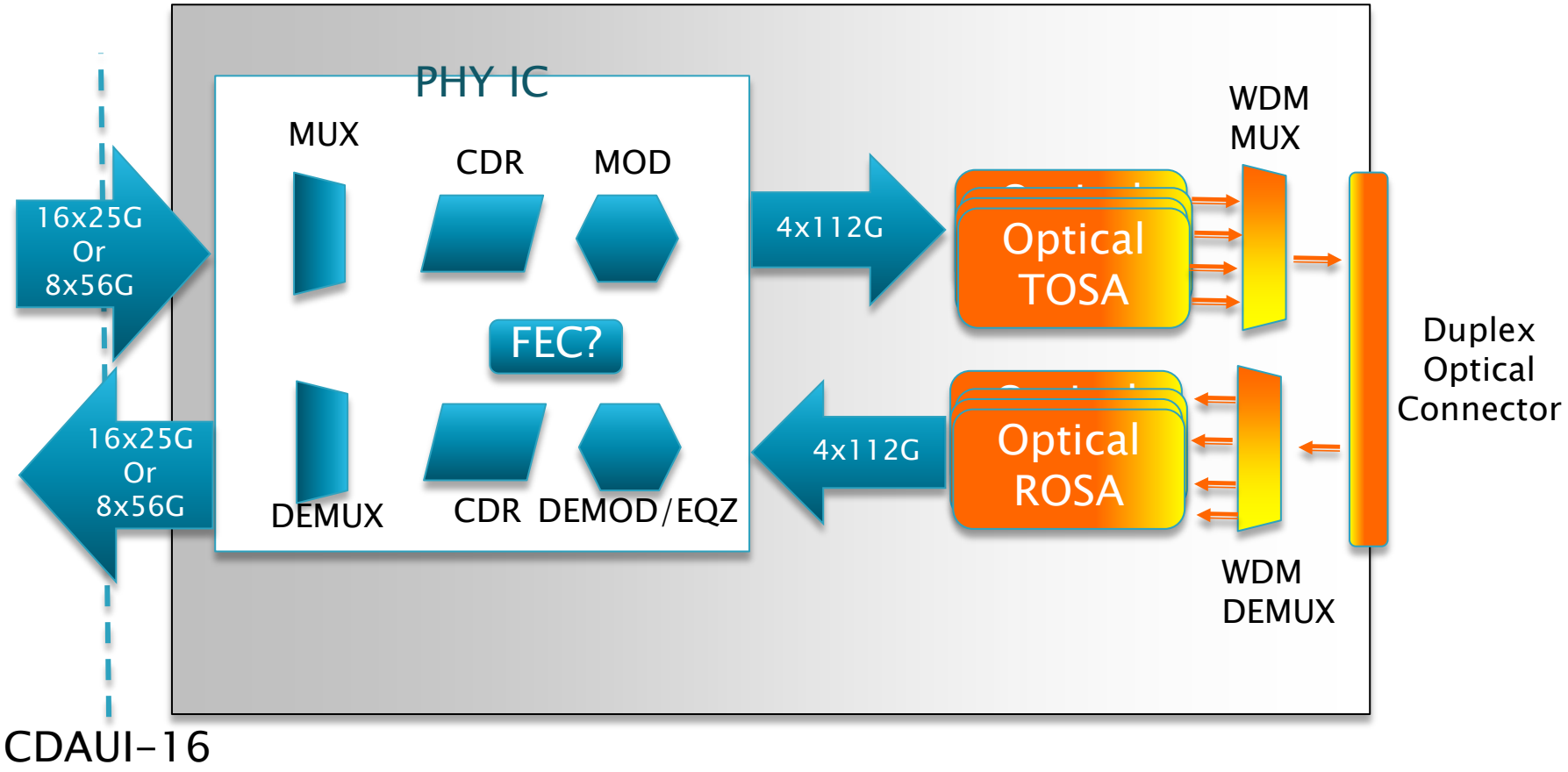
Consolidation

- Example 500m Architecture (8x56G Optical Architecture 400GBASE-PSR8)



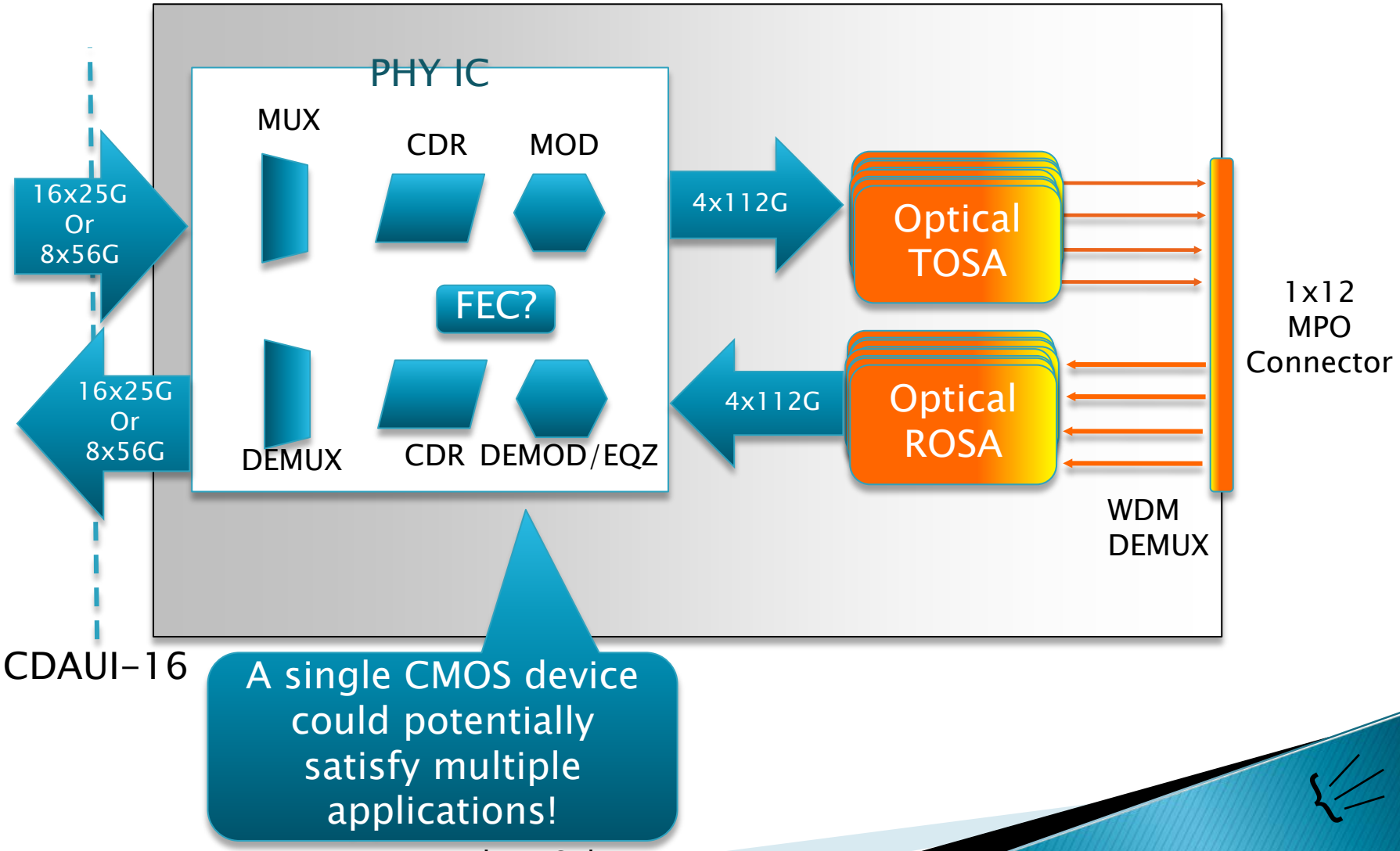
Consolidation

- Example 2km Architecture (4x112G Optical Architecture 400GBASE-FR4)



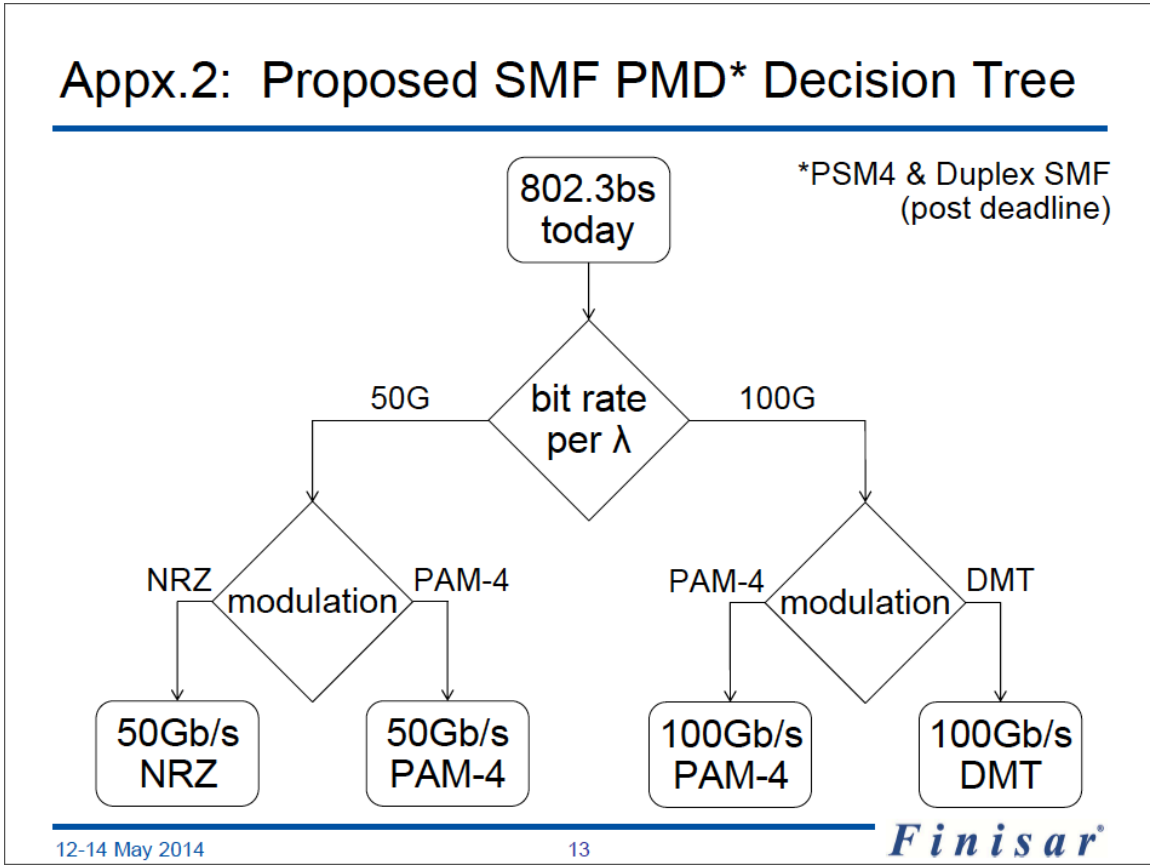
Consolidation

- Example 500m Architecture (8x56G Optical Architecture 400GBASE-PSR4)



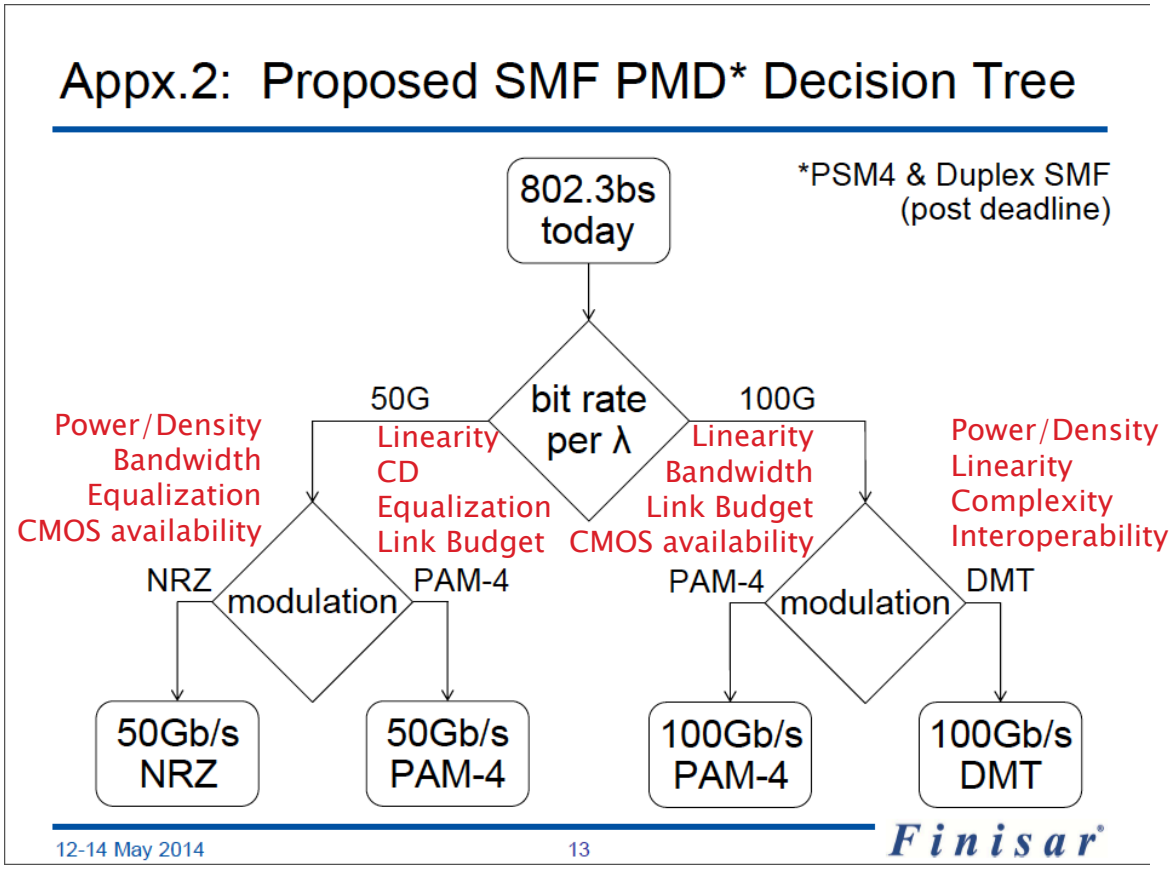
SMF PMD Considerations for P802.3bs

- cole_3bs_01a_0514 decision tree identifies key questions and appropriate order for assessing PMD alternatives.
- The answers for each PMD objective may be different.



SMF PMD Considerations for P802.3bs

- For each PMD decision point, key questions need to be answered.



SMF PMD Considerations for P802.3bs

- 10 km objective for Carrier applications
  - Time To Market & Performance are essential
    - Use of minor technology steps to achieve reasonable cost/power reductions and thus sustainable lifetime are acceptable. Cost, Power, Density less critical.
- 2 km objective for Carrier/IDC/core applications
  - Cost, Power, Density are essential
    - Use of more aggressive technology steps to achieve cost/power/density on duplex fiber are acceptable. TTM less critical.
- 500m objective for DC core
  - Cost, Power, Density are critical
    - Use of parallel fiber and perhaps more aggressive technology to optimize cost/power/density is acceptable. TTM less critical.

Conclusion

- Possible to find common architectural elements that can be leveraged within the industry to reduce overall solution cost.
  - Ex: 8x56G PAM4 (10km, 2km, 500m, CDAUI-8)
  - Ex: 4x112G PAM4 (2km, 500m, future I/O?)
- May find that any one solution is sub-optimal, but overall market benefit is greater.
- For markets/applications where optimization is essential and volumes justify it, may produce an alternative PMD approach to satisfy demand.

Thank You