



40GE Serial PMD interest

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Why new 40GE PMDs?

40GbE Deployment Observations

SMF Reach: 2km versus 10km ?

- Q4/2013 shipments¹: 88% 2km (LR4-Lite)
1% 2km (FR)
11% 10km (LR4)
- Clearly 2km (and low cost) is what the industry wants. Is there enough volume of 10km to warrant a unique PMD ?

Lower cost drives market adoption

Fiber Type: MMF versus SMF ?

- Q4/2013 shipments¹: 65% MMF (SR4)
35% SMF (LR4, FR, LR4-lite)
- Strong demand for MMF, indicating a more DC centric application space ? MMF numbers may be skewed (on the high side) by the 4x10G breakout application.
- No data yet on MMF BiDi, to give some insight into preference for MMF ribbon versus MMF duplex

Lower cost drives market adoption

5 (1) Source: LightCounting and all form factors

Lowest cost PMDs

All historical experience in the interconnect industry has shown that when a technical solution is available to enable a serial implementation, it will become the lowest cost solution.

Fewer components = lower cost

Optical

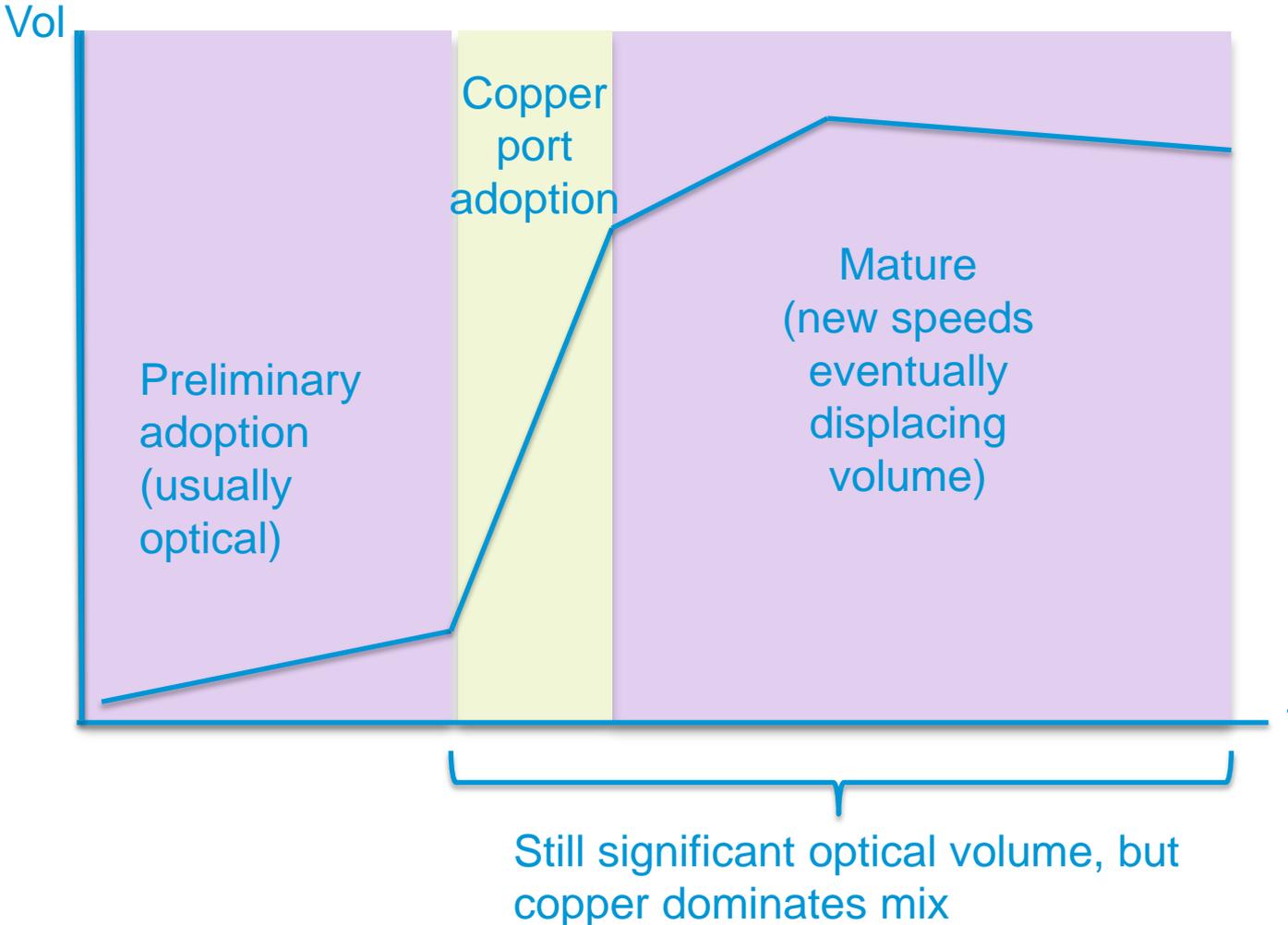
MMF solutions continue to be the dominant low-cost optical solutions

- We now see some swing to SMF-only deployments
- But MMF serial sol'ns may be technically challenged to maintain reach targets



Would 40GE serial PMD be a 25GE killer?

Lifecycle of an Ethernet speed



- 40GE serial PMDs are proposed as a cheaper solution ✓
- 25GE is targeted primarily (only) for copper interfaces for server IO
- Presence of 40GE serial PMDs does not impact the motivation behind 25GE

40GE serial PMD technology

- Need to consider Serdes Ecosystem cadence
 - ... → 1G → 2.5G → 10G → 25G → ...
 - Significant coordination across technologies to support adoption (IC technology node, IC IP, connectors, packaging, PCB fabrication/materials etc...)
- Considerable technology activity around 40GE thin twinax support
 - Mainly based on a 20GBaud PAM4 approach
 - Leverages the 25G serdes ecosystem
- Seems strong opportunity for optical technology to leverage copper and IC serdes ecosystems towards goal of lowest cost optical solution
 - Unclear if 40G NRZ would be at risk of a niche technology approach
- Enabling dense form factor (“SFPxx”) should be a target.



Key takeaways

- Fully support an activity to drive to lower cost solutions for 40GE PMDs
- Maximize technology leverage to drive optimum solution



Thank you.

