

40G Physical Layer Options

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Presentation Objectives

- Demonstrate technical feasibility of the proposed 40G physical layer objectives by reviewing multiple options
- Demonstrate distinct identity between 40G & 100G by highlighting differences in the PHYs
- Identify areas where the Task Force will need to consider economic feasibility in selecting the optimum solution

Proposed 40G PHY Objectives

- Provide Physical Layer specifications which support 40 Gb/s operation over:
 - at least 1m over a backplane
 - at least 10m over a copper cable assembly
 - at least 100m on OM3 MMF

Why These 40G PHY Objectives?

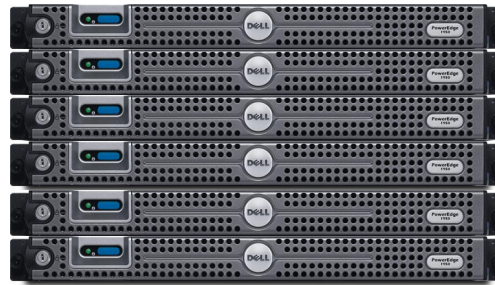
To cover the full range of data center distance requirements and server form factors with cost/power optimized solutions

Blade Servers



1m over a backplane for inside-the-chassis communications

Rack Servers



10m over copper cables for switching within a server rack or row

Pedestal Servers



100m over OM3 MMF to connect systems across the data center

Potential PHY Options

Media Type	Connector Type	Encoding	PCS/PMA Interface	Signaling	Technology Reuse	
					10GbE	100GbE
40G over 1m Backplane						
4-Lane FR-4 Circuit Board ¹	N/A	10GBASE-R	4TBI ² , APL ³	4 x KR ¹	Yes	No
40G over 10m Copper Cable						
8-Pair Twinaxial Cable ⁴	QSFP, CX4+, TBD	10GBASE-R	4TBI ² , APL ³	4 x KR ⁴	Yes	Maybe
40G over 100m OM3 Fiber Optic Cable						
OM3 Cable	QSFP, TBD	10GBASE-R	4TBI ² , APL ³	4 x SR ⁵	Yes	Maybe

References: ⁽¹⁾ ganga_01_0507; ⁽²⁾ gustlin_01_0107, 4TBI = 4 lane version of CTBI proposal; ⁽³⁾ frasier_01_1106; ⁽⁴⁾ diminico_01_0407; ⁽⁵⁾ cole_02_0507

Summary

- Multiple technically feasible 40G physical layer options have been identified
- 40G & 100G will be differentiated by a combination of rate, distance, medium, technology, and target applications
- The Task Force should balance technology reuse vs. cost/performance optimization to ensure the market success of 40G & 100G