

In support of 400GBASE-SR8 Broad Market Potential

*Rick Pimpinella and Brett Lane
Panduit Labs, Panduit Corp.*

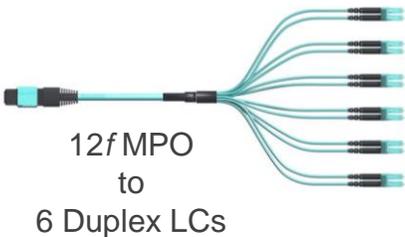
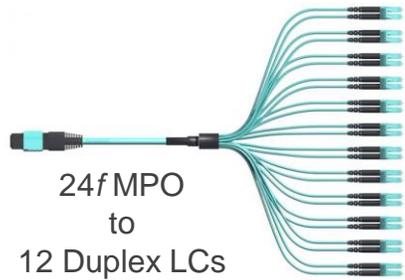
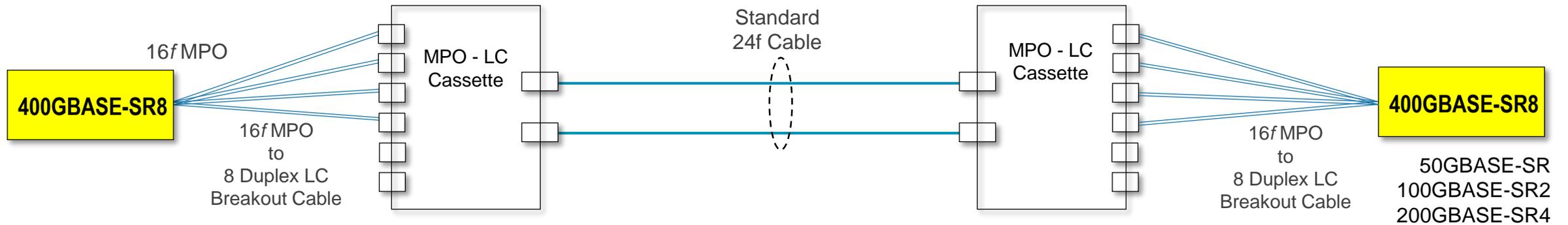
Next-gen 200 & 400 Gb/s PHYs over Fewer MMF Pairs
Rosemont, March 2018

Overview

- Applications for 400GBASE-SR8
- Looking ahead
- Summary

400GBASE-SR8 supported over existing structured cabling

- *Compatible with all 802.3cd PMDs, only requires breakout cables*



MPO to LC Cassette



MPO terminated structured cabling



MPO to LC Cassette



400GBASE-SR8 would be cost effective – Although it requires more fibers

XCVR TYPES:

400GBASE-SR8	400GBASE-SR4.2
--------------	----------------

n

δ

Cost multipliers =

8.0

1.25

STRUCTURED CABLING:

Parallel Cabling	Duplex Cabling
------------------	----------------

Fiber Type =

OM4

OM5

Cable fiber count =

24

24

No. of used fibers =

16

8

No. of channel links =

2

2

No. of patch cords =

3

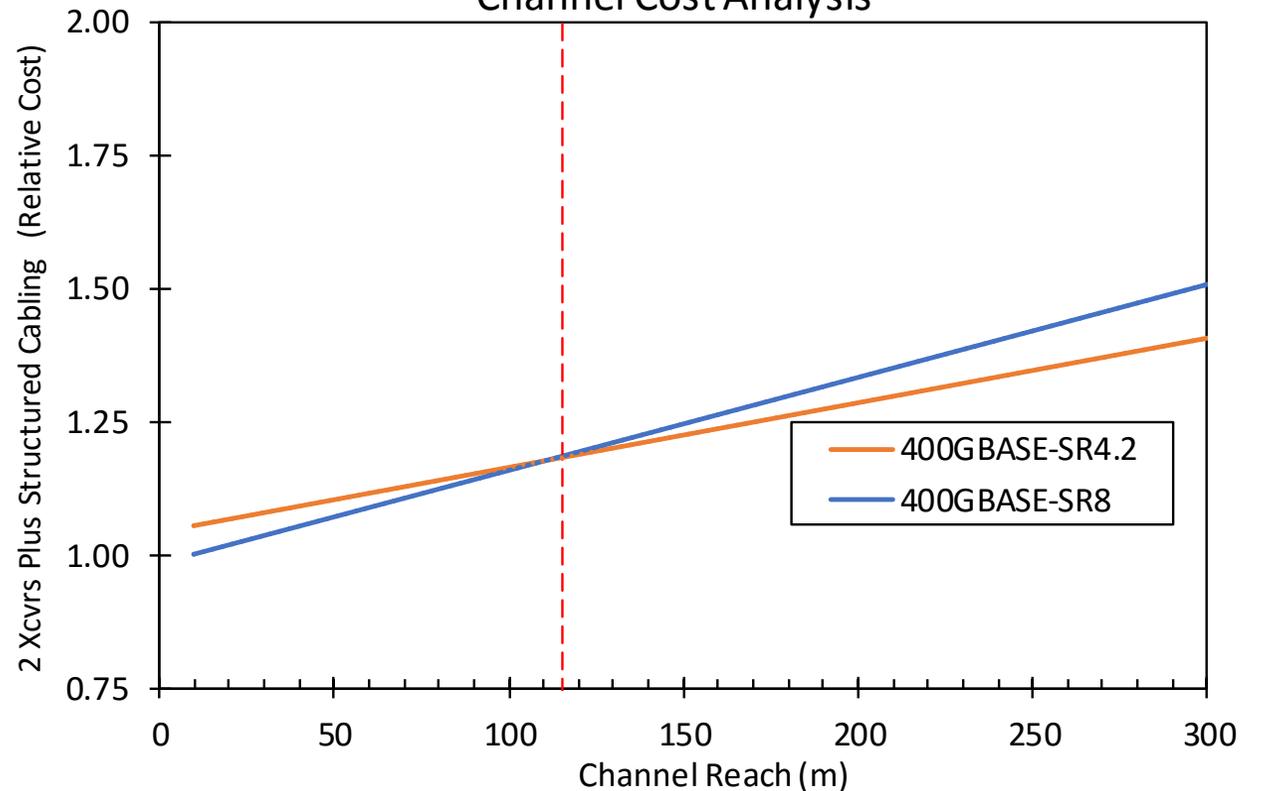
3

n = Cost multiplier for SR8 relative to 10GBASE-SR SFP+ transceiver

δ = Cost multiplier for SR4.2 relative to SR8 (cost = $n \cdot \delta$)

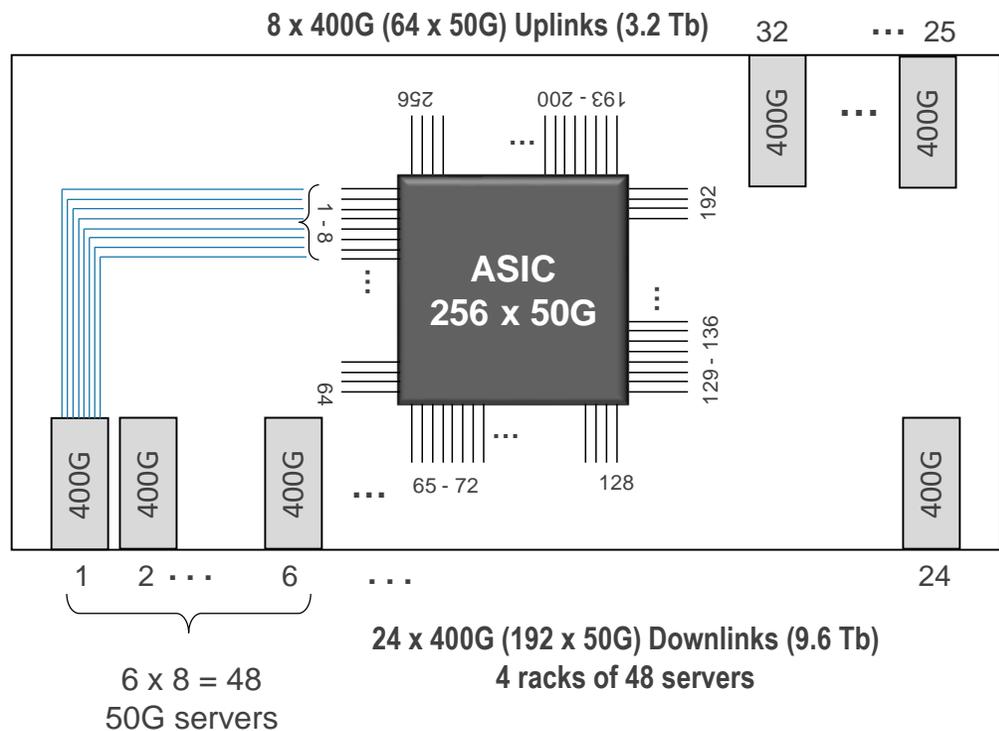
Cost crossover = 115 m

Channel Cost Analysis

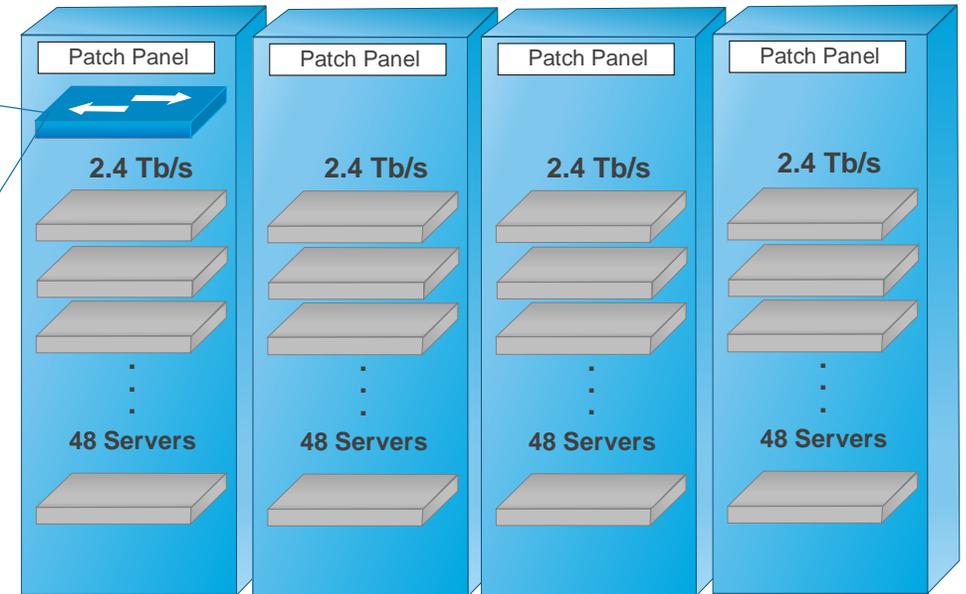


256 x 50G Switch Radix Application – 3:1 over subscription

- High density 32 x 400G port switch
- 50G servers supported by
 - 400G-SR8 to 50G-SR breakout
- Breakout not supported by 400GBASE-SR4.2



6 switch ports / Rack
6x 16f MPO to 8 duplex LCs



4 rack of 48 servers
or
8 racks of 24 servers

Looking ahead

- **The specification of 400GBASE-SR8 will be straight forward**
 - Extension of 802.3cd, 8 x 50Gb/s PAM4 lanes
- **The task force needs to be mindful of 100 Gb/s per lane electrical**
 - Study group will become a task force P802.3cl
 - Support a MAC data rate of 100 Gb/s, 200 Gb/s and 400 Gb/s
 - It will require optical media
- **Will there be a new CFI later this year for 100Gb/s lane rate?**
 - What impact if any, will it have on our two 400Gb/s solutions?
 - 100Gb/s per lane is not supported by either of our two 400G solutions
 - Requires gearbox
 - High latency

Anticipated next-gen 100G lane rate family

- Interoperability within each series

	Data Rate Gb/s	Nomenclature	Lane Rate Gb/s	Number of fiber pairs	Number of wavelengths	Year Standardized
10G PMD Series	10	10GBASE-SR	10	1	1	2002
	40	40GBASE-SR4		4		2015
25G PMD Series	25	25GBASE-SR	25	1	1	2016
	100	100GBASE-SR4		4		2015
50G PMD Series	50	50GBASE-SR	50	1	1	2018
	100	100GBASE-SR2		2		
	200	200GBASE-SR4		4		
NEW →	400	400GBASE-SR8		8		~2021
NEXT-GEN 100G PMD Series	100	CFI	100	1	1	TBD
	200			2		
	400			4		
	800 (Future*)			8		

* Support 800G to 8x 100G breakout

Summary

- The 400GBASE-SR8 satisfies the CFI objective for 400G over fewer MMFs
 - Supports 400G channels over existing structured cabling
 - Enables breakout to 50G servers for high port density 256 x 50G radix switches
 - Compatible with 802.3cd enabling multiple breakout scenarios
 - The 400GBASE-SR8 PMD should have broad market potential based on the success of prior breakout applications
- The Task Force should be mindful of 100G per lane developments in specifying next-gen PMDs
 - A CFI later this year for 100/200/400GBASE-SRn would be in sync with the 802.3 100G single-lane PHY
 - Potential commonality with Fibre Channel PI-8, 128Gb/s per lane
 - 400GBASE-SR4 and 100GBASE-SR would support next-gen 256 x 100G switch radix with breakout options