

# Impact of Switch Radix on Server Cabling

NGMMF Study Group

Next-gen 200 & 400 Gb/s PHYs over Fewer MMF Pairs

*Rick Pimpinella*

*Panduit Labs, Panduit Corp.*

February 8, 2018

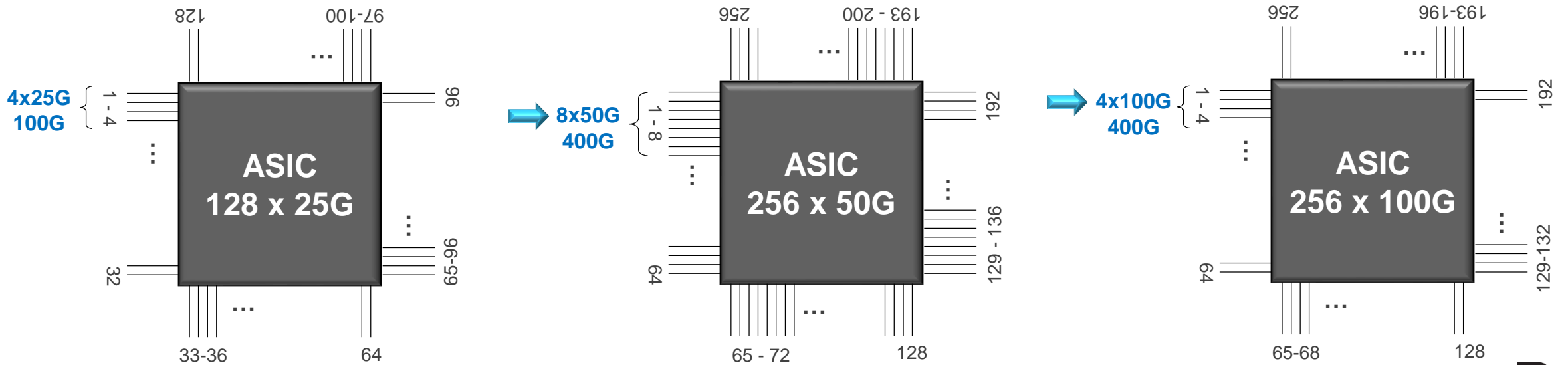
# Evolution of switch radix

- Radix increases

- 64 x 10G
- 128 x 25G
- 256 x 50G
- 256 x 100G

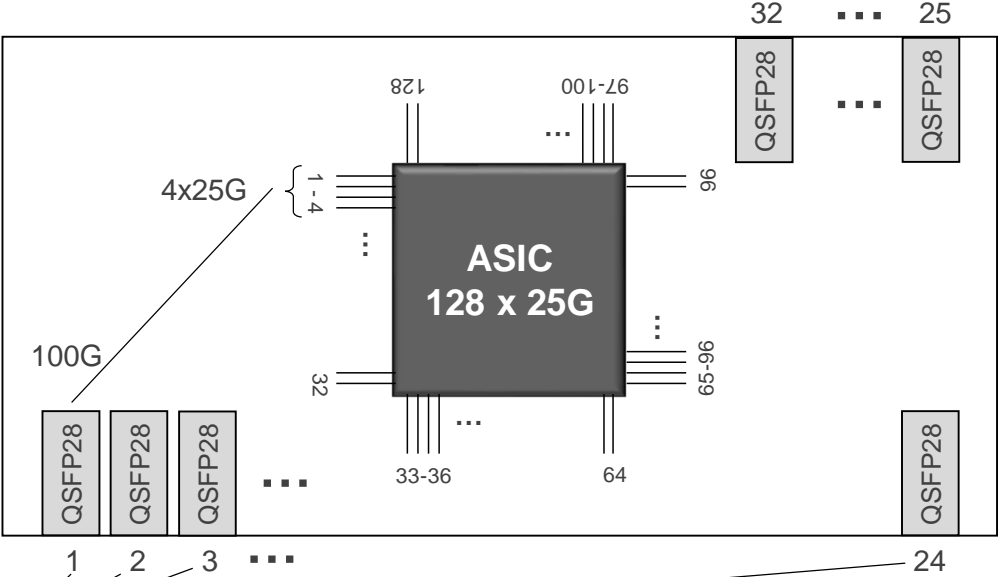
- **Current 256 x 50G ASIC supports 12.8 Tb/s**

- Next Gen will double to 256 x 100G (25.6 Tb/s), mass deployment by 2021



# Switch Radix 128 x 25G – ToR Topology

32 x 100G Port Switch  
3.2 Tb/s

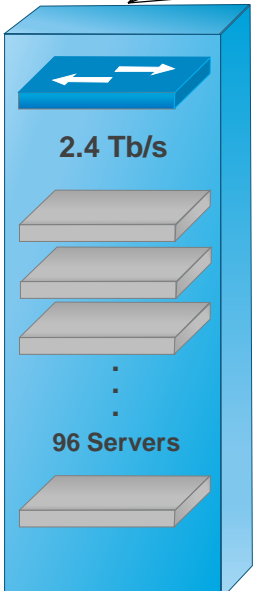


8 x 100G (32 x 25G ) Uplinks (800 Gb/s)  
3:1 Over Subscription

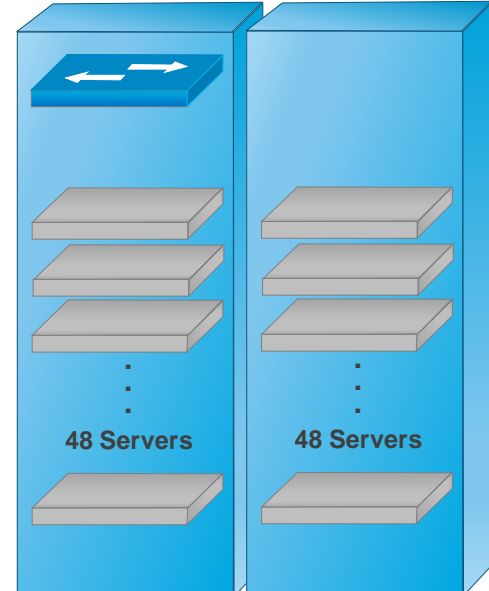
*DAC or AOC Breakout*

24 x 100G (96 x 25G) Downlinks (2.4 Tb/s)

128x25G ASIC  
Supported by:  
4 x 25G Breakout  
802.3bm/by

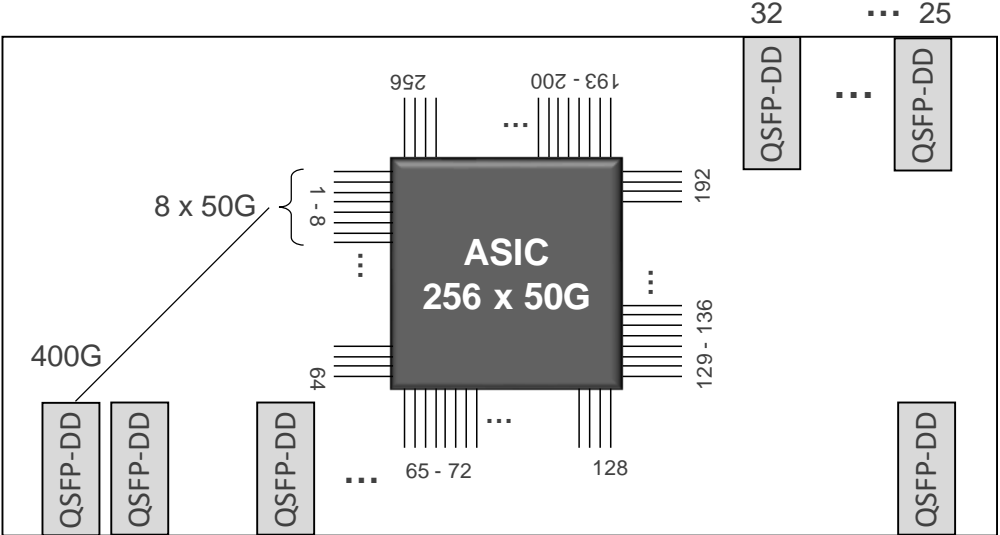


← 1 Rack of 96 Servers  
or  
2 Racks of 48 Servers →



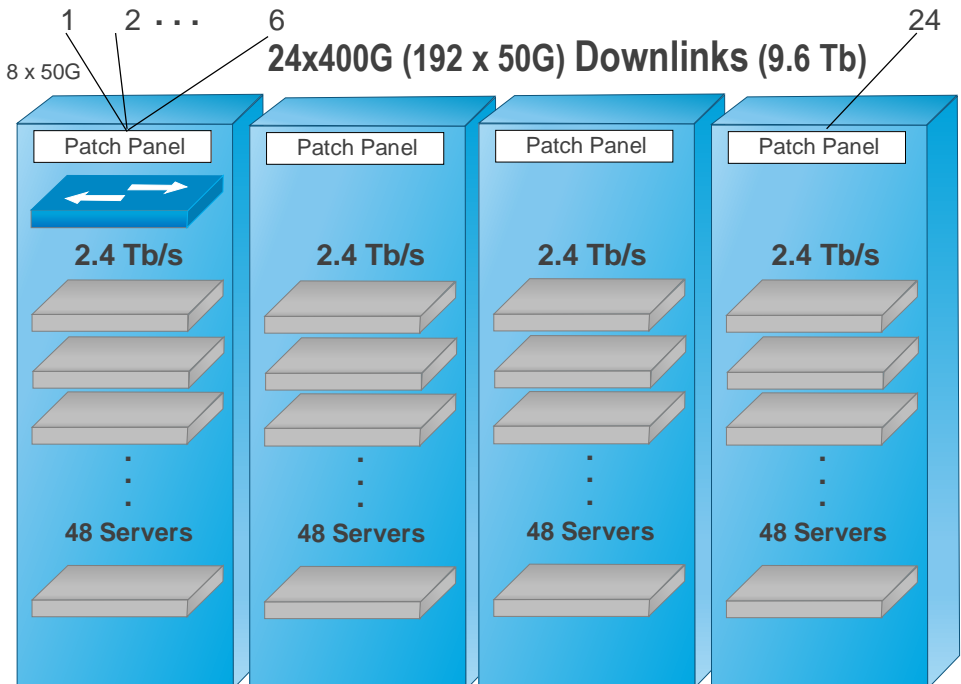
# Current Switch Radix 256 x 50G – 400GBASE-SR8

32 x 400G Port Switch  
12.8 Tb/s



8 x 400G (64 x 50G) Uplinks (3.2 Tb)  
3:1 Over Subscription

6 switch ports / Rack  
16f MPO to 8 Duplex LC Breakout Cables  
6x 16f MPO to 48 duplex LCs



• Servers exceeds Cu cabling reach

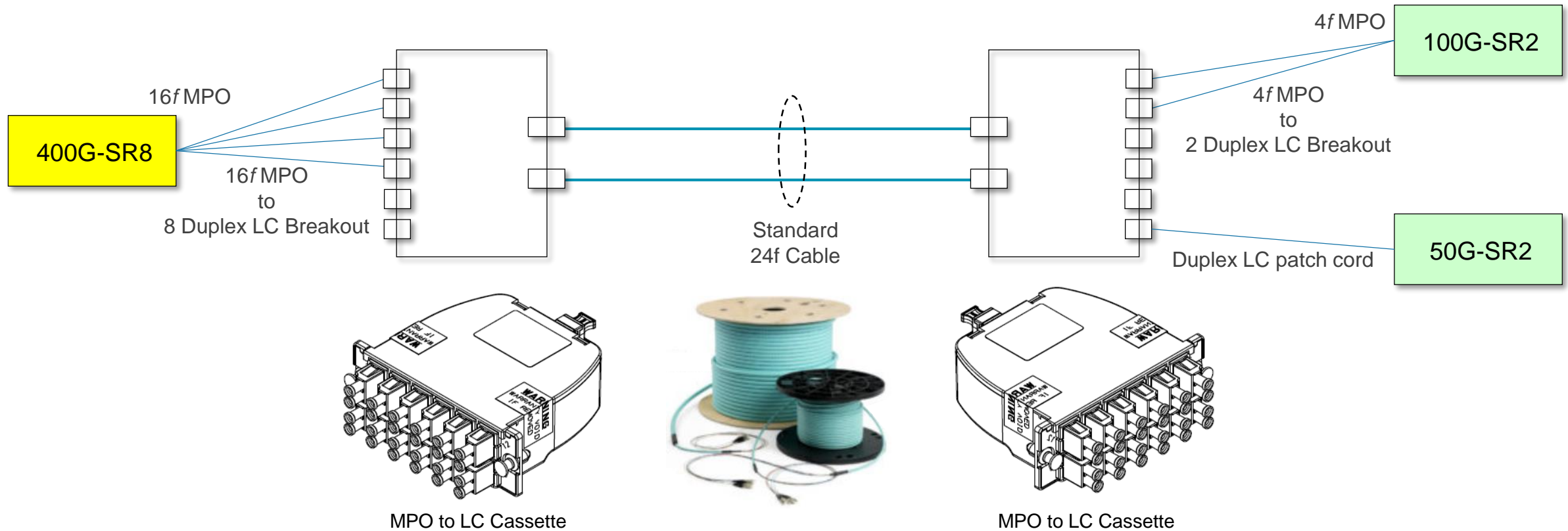
256 x 50G ASIC  
Supported by:  
400G-SR8  
&  
50GBASE-SR



4 rack of 48 servers  
or  
8 racks of 24 servers

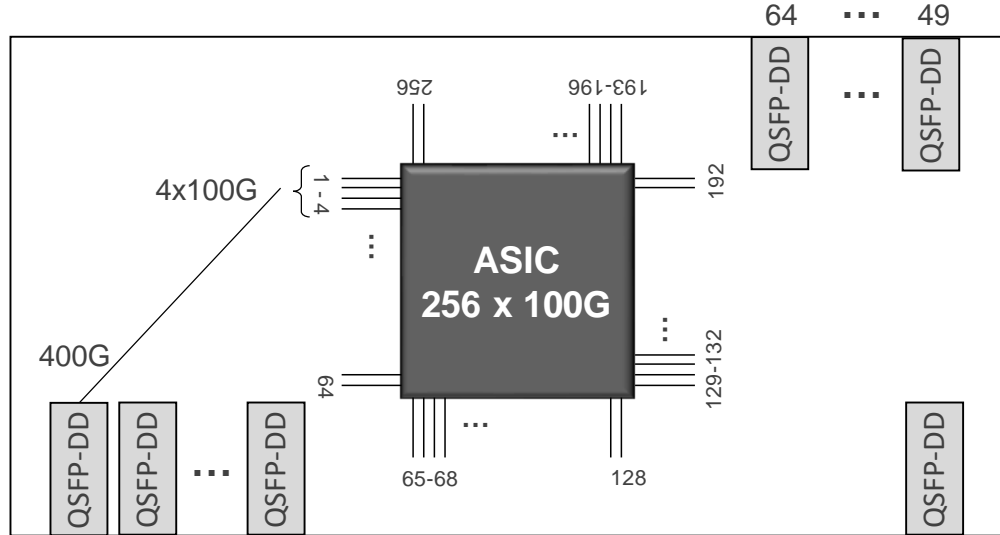
# 400G-SR8 supported over existing structured cabling

- Only requires breakout cables



# Next Gen Switch Radix 256 x 100G – 64 port switch required

64 x 400G Port Switch  
25.6 Tb/s



16 x 400G (64 x 100G) Uplinks (6.4 Tb)  
3:1 Over Subscription

8f MPO to 4 Duplex LC breakout cables  
12x 8f MPO to 48 duplex LCs per rack

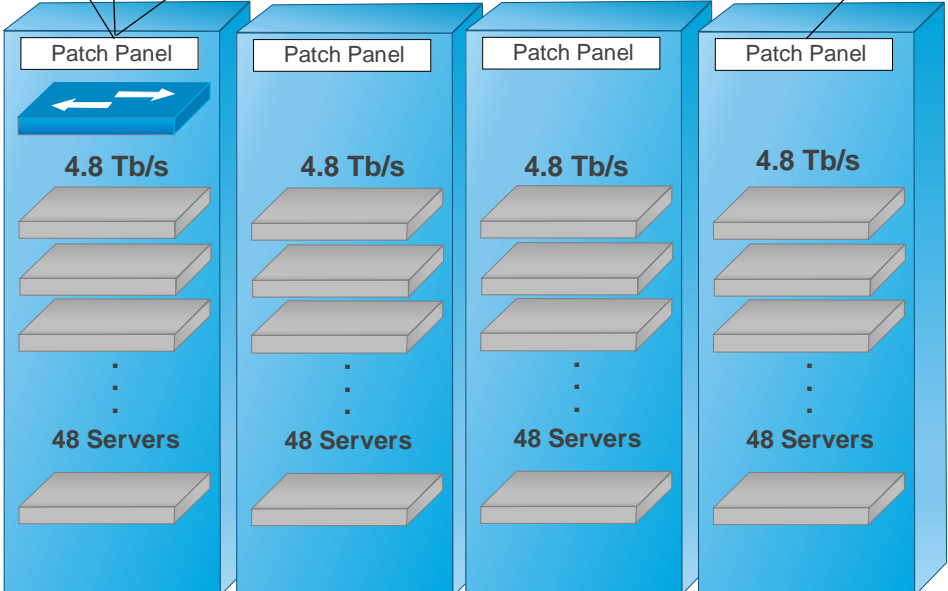
48x400G (192 x 100G) Downlinks (19.2 Tb)

• Servers exceeds Cu cabling reach

4x 100G Breakout  
Supported by:

400GBASE-SR4.2 & 100GBASE-SR1.2

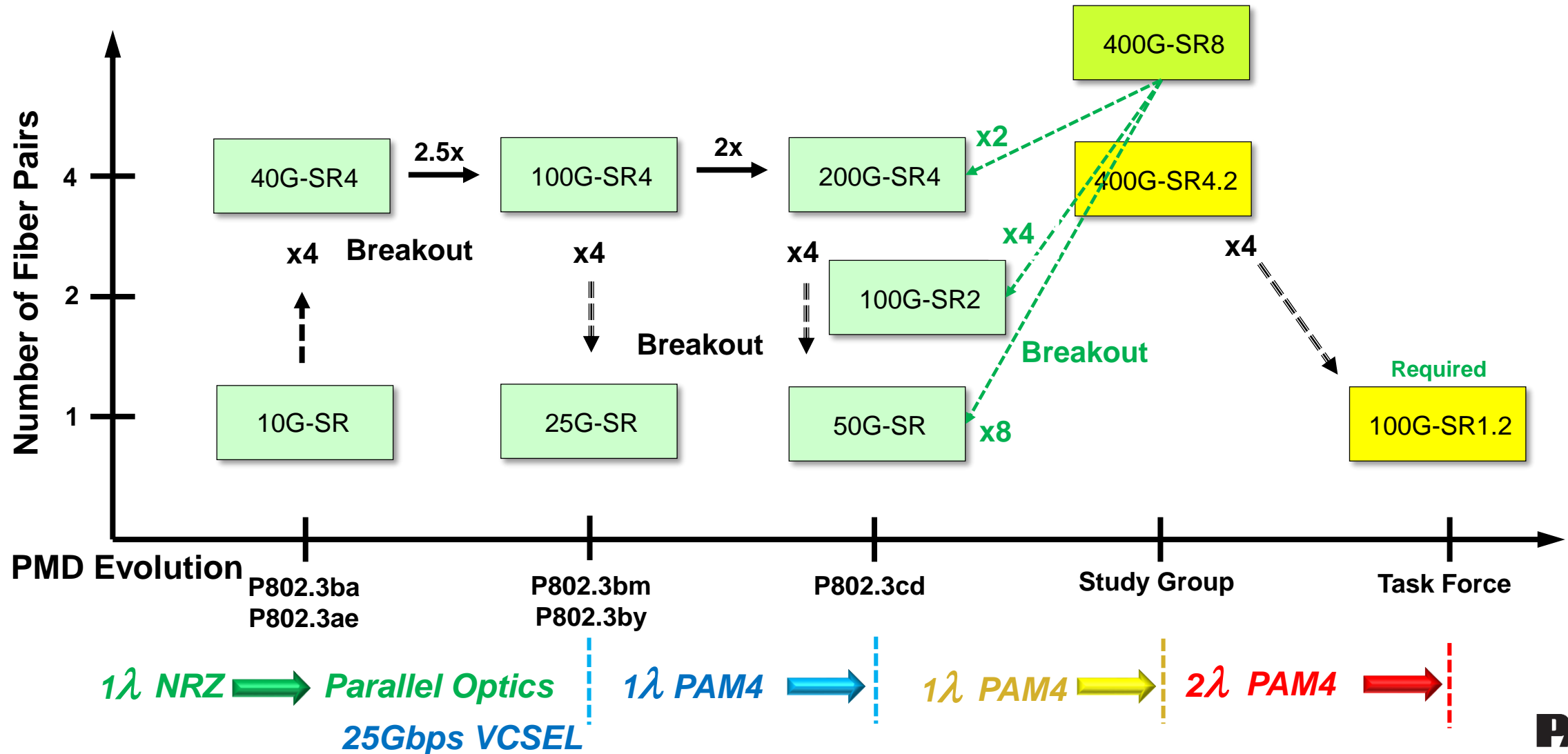
Can also be supported with  
400GBASE-SR8 & 100GBASE-SR2



4 rack of 48 servers  
or  
8 racks of 24 servers

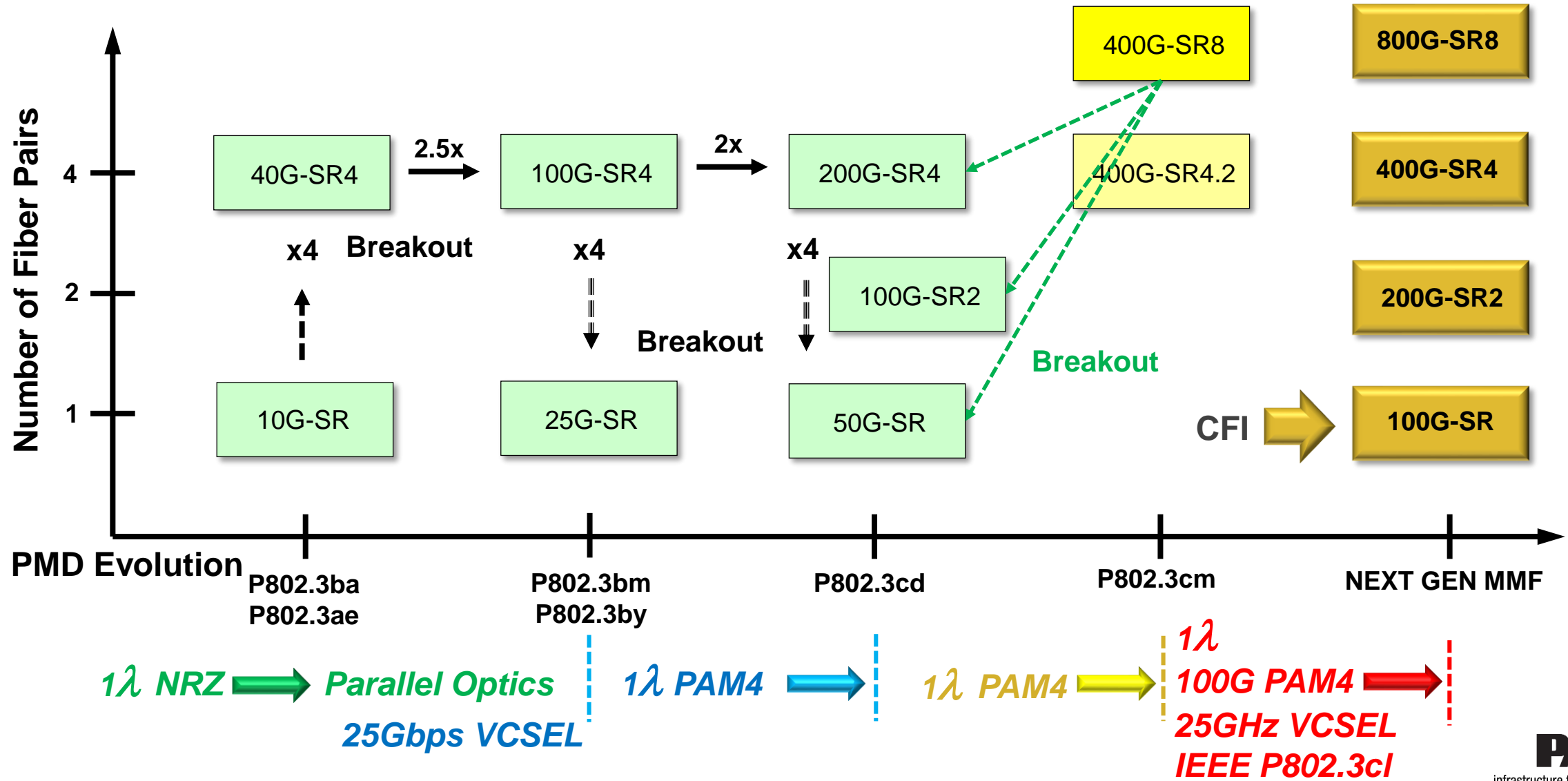
# MMF PMD Required for 256 x 100G Radix

– Should be supported in 802.3cm (100GBASE-SR1.2)



# Alternative progression of MMF PMDs – Single Lambda

– Interoperability within each series





# Summary

- The 400GBASE-SR8 objective will support 50G and 100G breakout over existing structured cabling
  - Enables breakout to 50G servers in high port density 256x50G radix switches
  - Compatibility with 802.3cd enabling multiple applications
  - The 400GBASE-SR8 PMD has broad market potential
- The 400GBASE-SR4.2 enables a seamless upgrade path over current parallel optics applications
  - 100GBASE-SR1.2 is required for future 100Gb/s breakout (can the task force adopt a 100G objective?)
- A CFI for single-lane 100G VCSEL based PMD should be considered later this year
  - A 800Gb/s PMD will support a 256x100G Radix switch with a 32-port density
  - Proof of principle is now being demonstrated