

400G PMD for broad market potential and breakout

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Data Center Requirements

- Need to consider breakout as a key feature of any data center variant

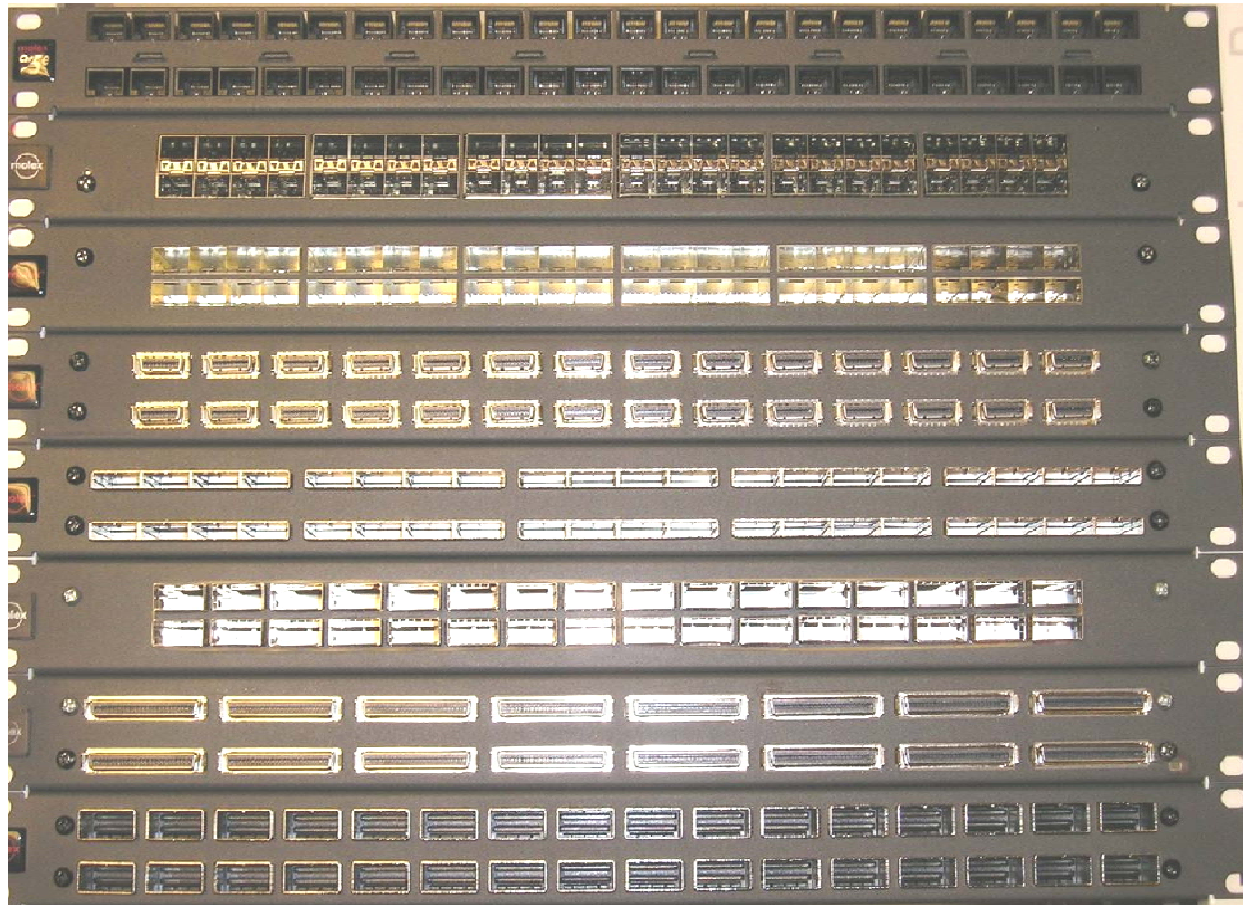
What reaches should be considered for data center?

- 3-5m over passive copper
- 100m over MMF
- 500m over SMF
- 2km over SMF

What are the requirements for broad market potential?

- High density/small form factor for shorter reaches
 - Single lane or quad lane would be best
- Low power

Port Density Options



Channels/Bandwidth

RJ-45 – 48 Channels
10GBaseT = 480 Gbps

SFP+ – 48 Modules
48 Channels
1x50G
50GE = 2.4 Tbps

QSFP+ 36 modules
144 Channels
4x100G
400GE=14.4Tbps

CDFP – 13 modules
104 Channels
8X50G
400GE=5.2 Tbps

Transport Media

- Duplex SMF
- Parallel fiber MMF
- Direct Attach Copper cable
- Parallel fiber SMF

Interface options

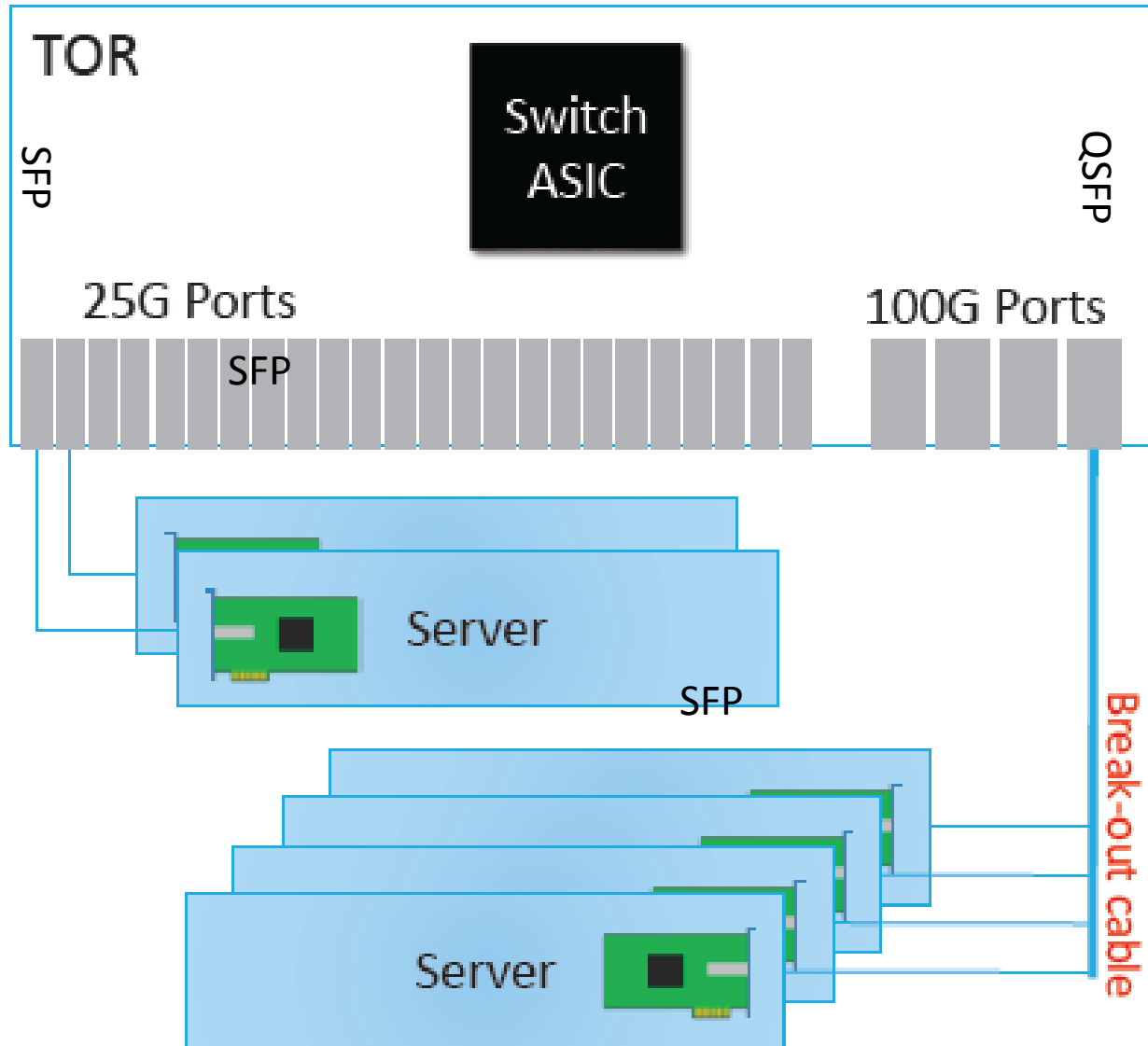
Server/Switch to module interface

- CDAUI16
- CDAUI8
 - NRZ
 - PAM4
- CDAUI4
- Analog (DMT)
- Analog (PAM)

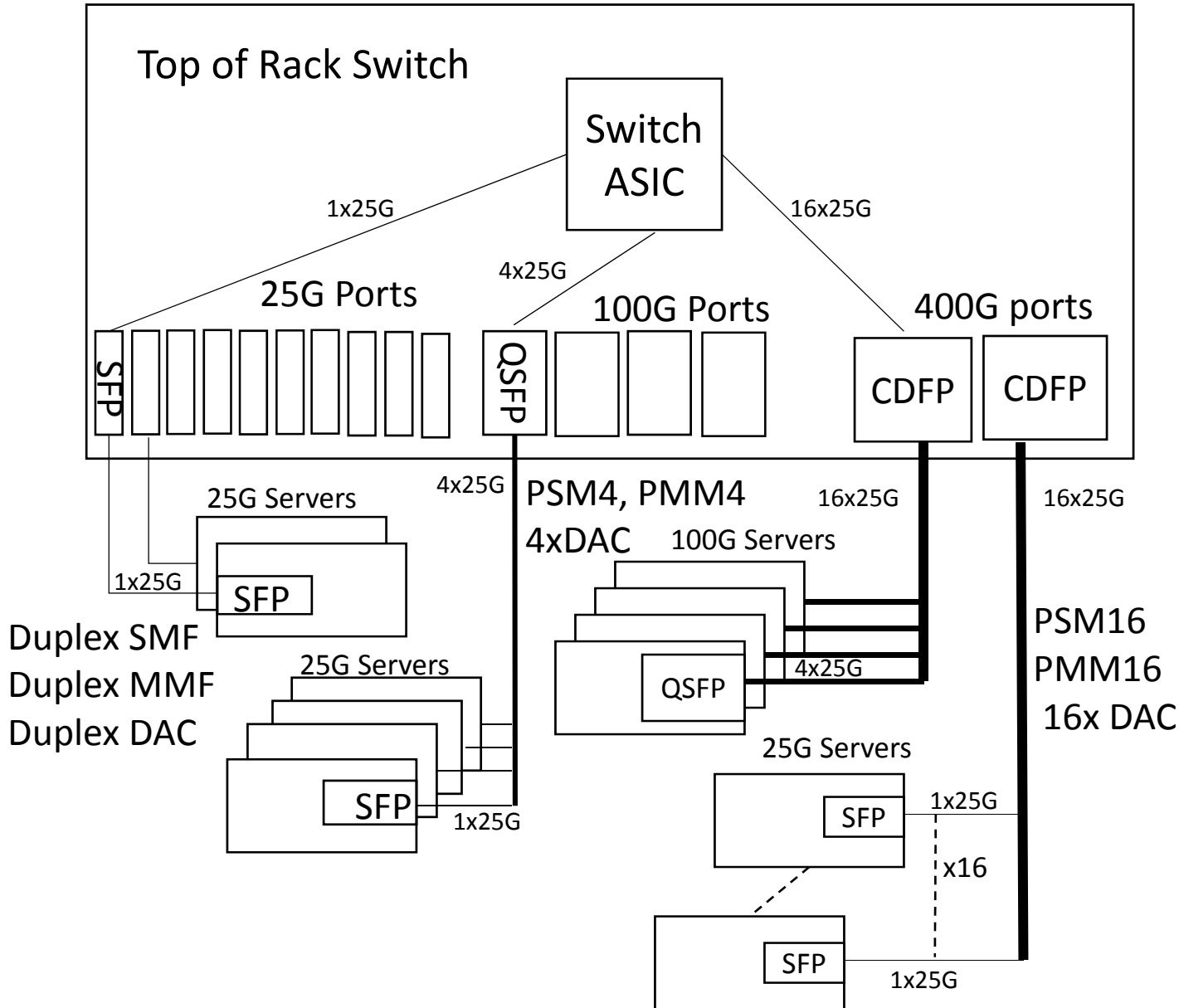
Optical/Copper Transport Media

- Parallel MMF:
 - PMM16-NRZ
 - PMM8-NRZ or PAM4
- Parallel SMF
 - PSM8-NRZ
 - PSM4-PAM4 or DMT
- Duplex SMF
 - NRZ (8 lambda)
 - PAM4 (4 lambda)
 - DMT (4 lambda)
- Passive Copper
 - 16x25G
 - 8x50G
 - 4x100G

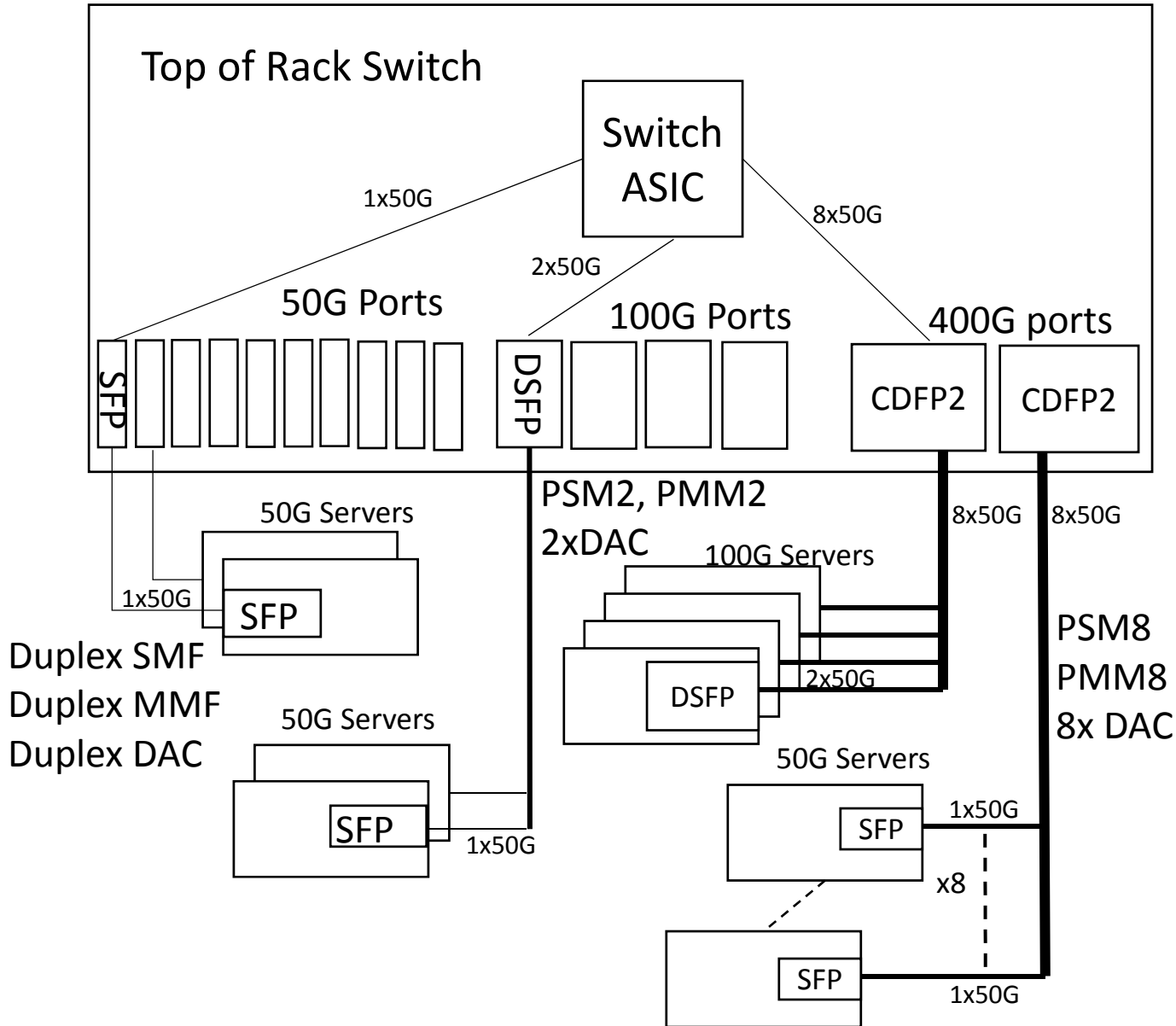
From booth_25GE_01_0914



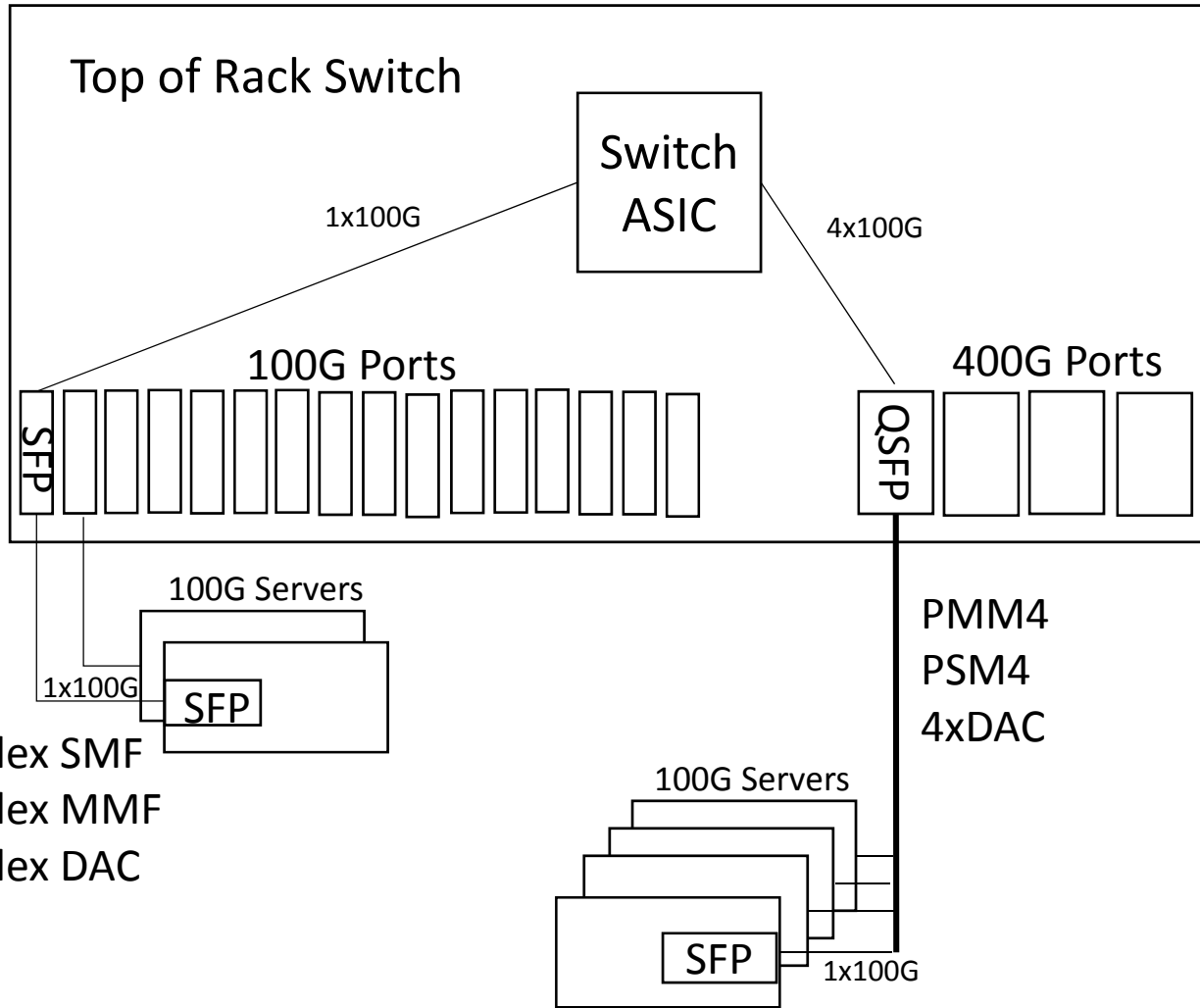
400G 16x25G breakout



400G 8x50G breakout



400G 4x100G Breakout



Conclusions

- PMM16 or DAC with CDAUI16/CR4 works for 25Gb breakout
 - CDFP in TOR
 - QSFP in server
- PMM8 or PSM8 or DAC with CDAUI8/CR2 works for 50Gb breakout
 - CDFP2 (new module type) in TOR
 - DSFP (new module type) in server.
- PMM4 or PSM4 or DAC with CDAUI4/CR1 works for 100Gb breakout.
 - QSFP in TOR with CDAUI4
 - SFP in server
- WDM should not be considered for 500m reach objective