Use cases for 100G per lane MMF PMDs

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100Gb/s Wavelength Short Reach PHYs Study Group
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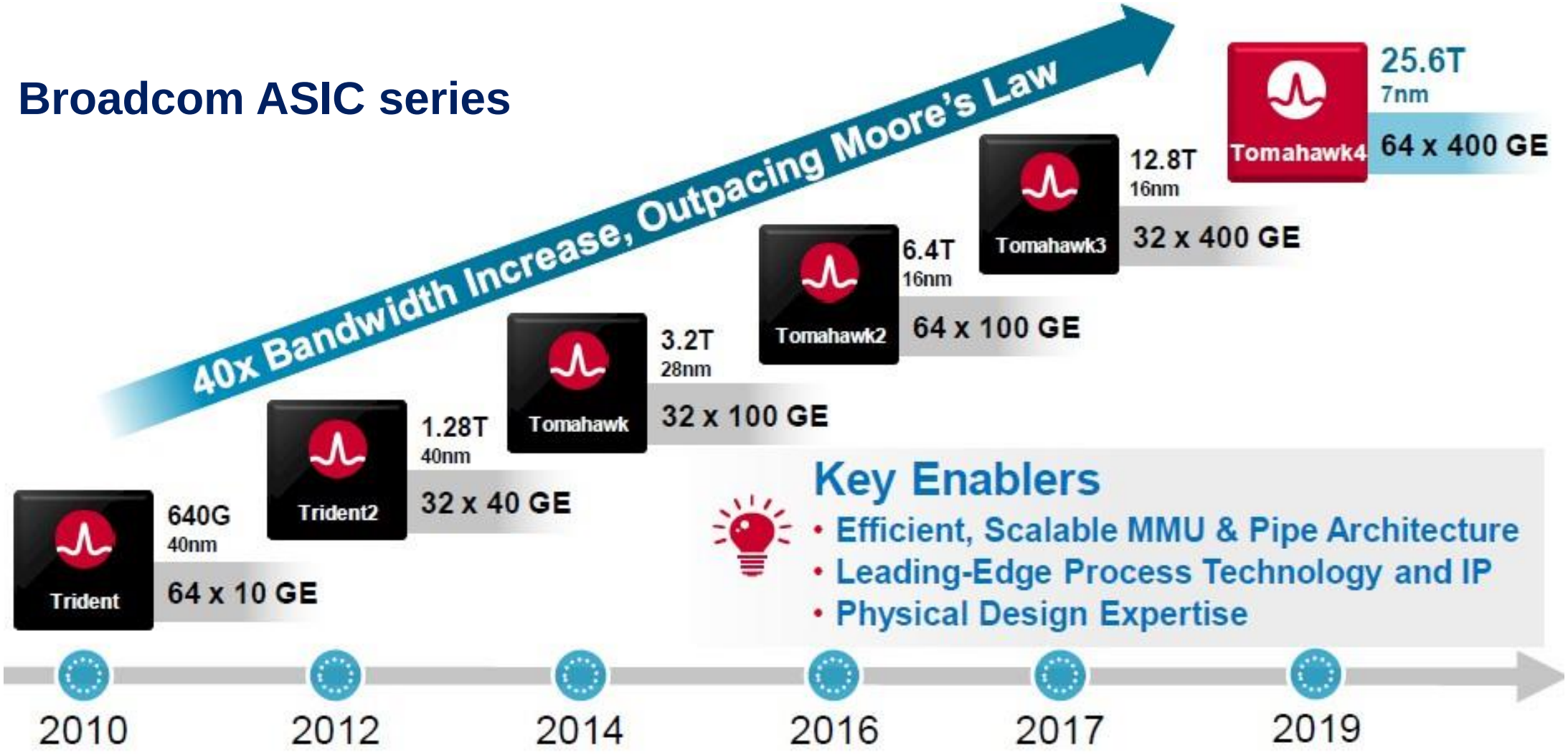
Example of evolution of switch ASICs



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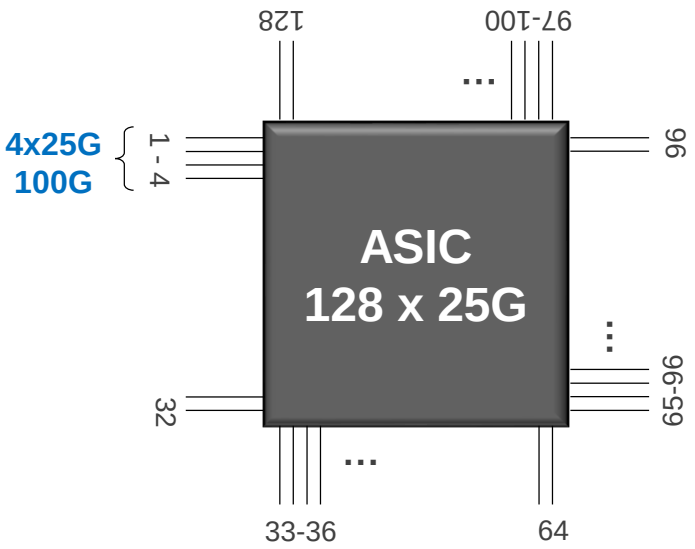
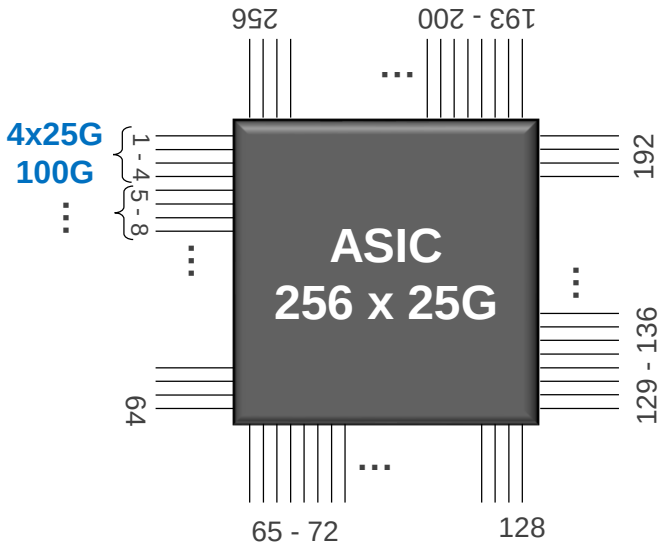
Evolution of Switch Radix

Radix	Switch Ports	Example
128 x 25Gbps	32 x 100GbE	Tomahawk
256 x 25Gbps	64 x 100GbE	Tomahawk 2
256 x 50Gbps	32 x 400GbE	Tomahawk 3
2x (256 x 50Gbps)*	64 x 400GbE	Tomahawk 4

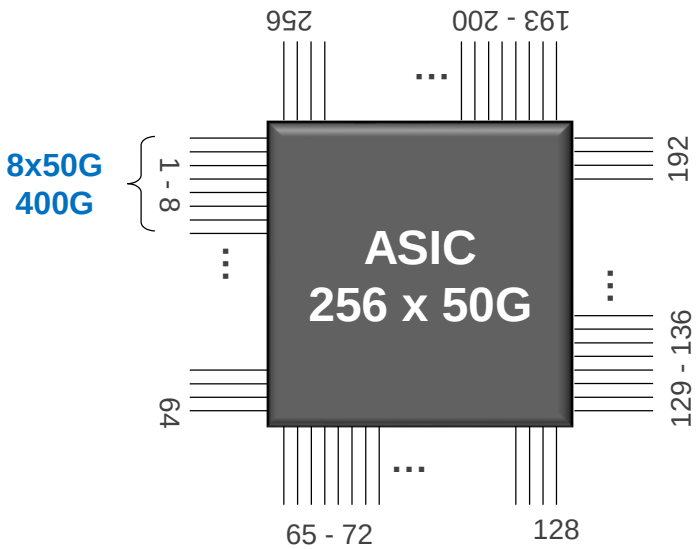
* 512 instances of 50G PAM4 SerDes



32 x 100GbE Ports



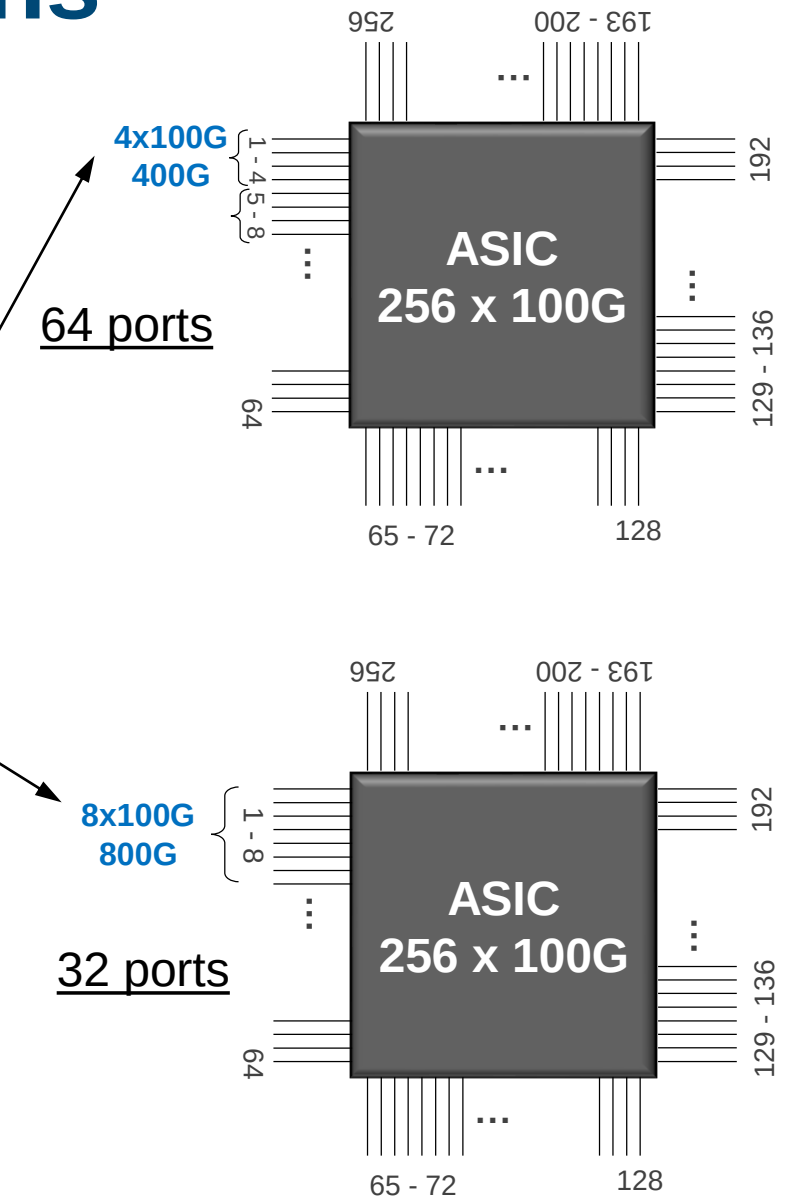
64 x 100GbE Ports



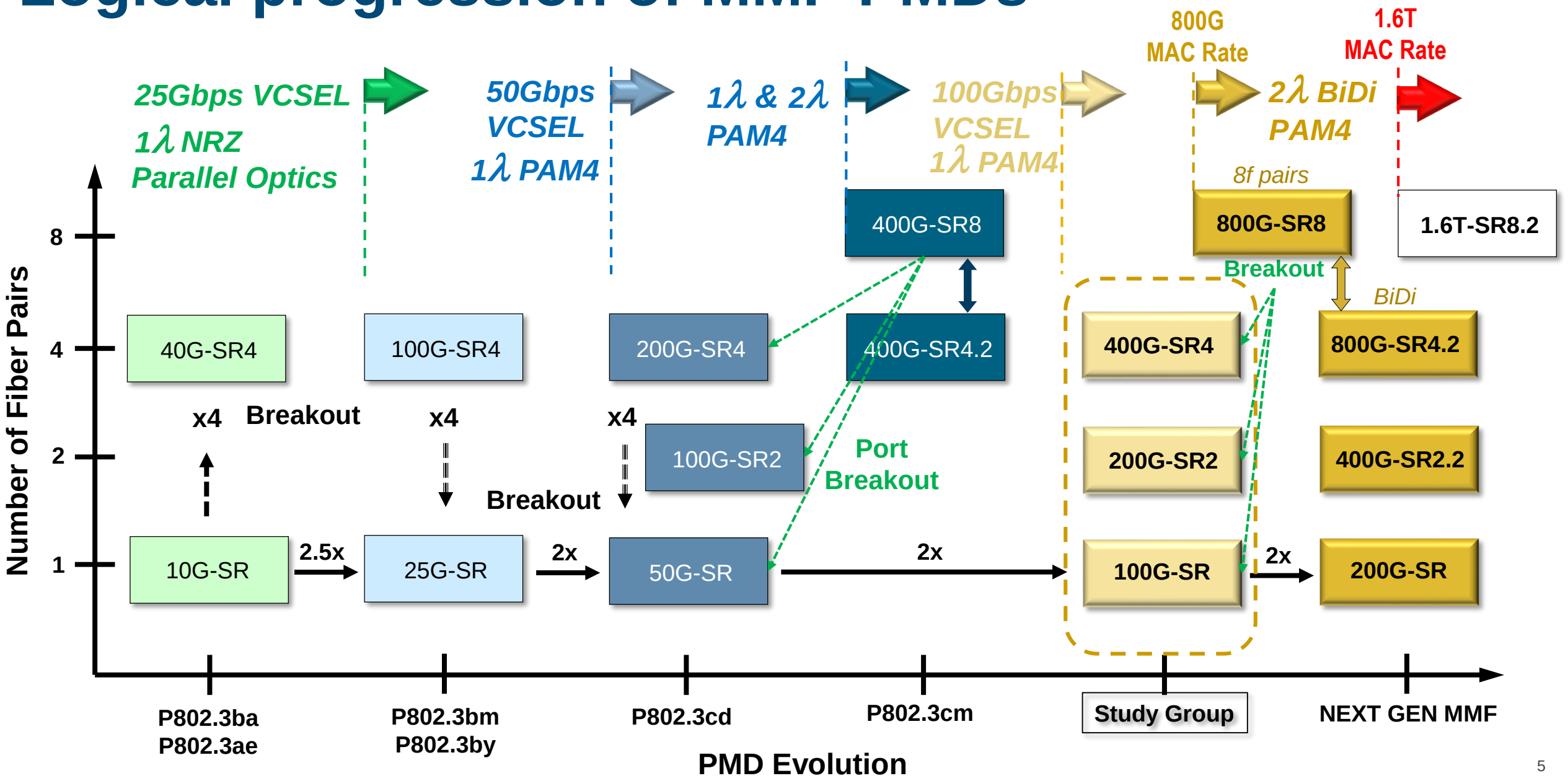
32 x 400GbE Ports

100Gbps per lane Radix options

Radix	Switch Ports	Example
128 x 25Gbps	32 x 100GbE	Tomahawk
256 x 25Gbps	64 x 100GbE	Tomahawk 2
256 x 50Gbps	32 x 400GbE	Tomahawk 3
2x (256 x 50Gbps)*	64 x 400GbE	Tomahawk 4
256 x 100Gbps	64 x 400GbE	400G MAC
256 x 100Gbps	32 x 800GbE	800G MAC



Logical progression of MMF PMDs

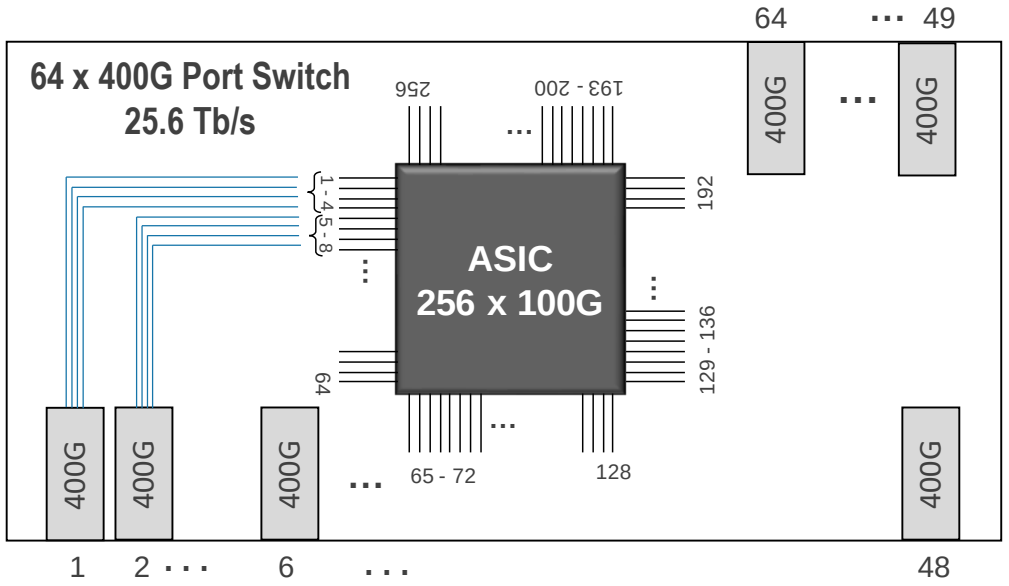


Estimated application channel reaches

256 x 100G Switch Radix Application – 3:1 over subscription

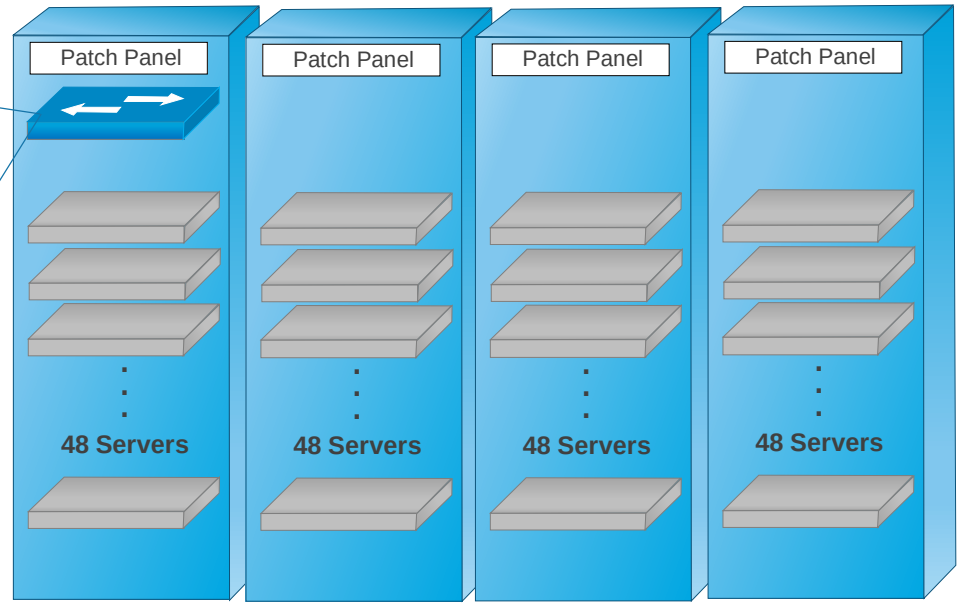
- High density 64 x 400G port switch
- 100G servers supported by
  - 400G-SR4 to 100G-SR breakout

16 x 400G (64 x 100G) Uplinks (6.4 Tb)



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

6 switch ports / Rack
6x 16f MPO to 48 duplex LCs

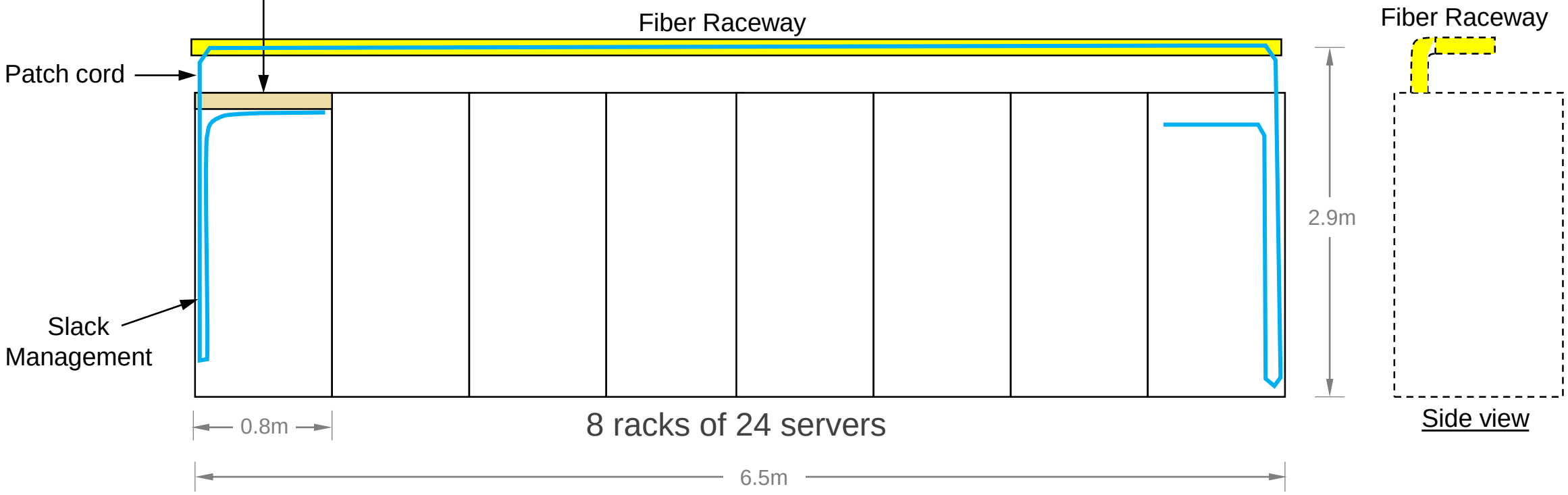


4 rack of 48 servers
or
8 racks of 24 servers

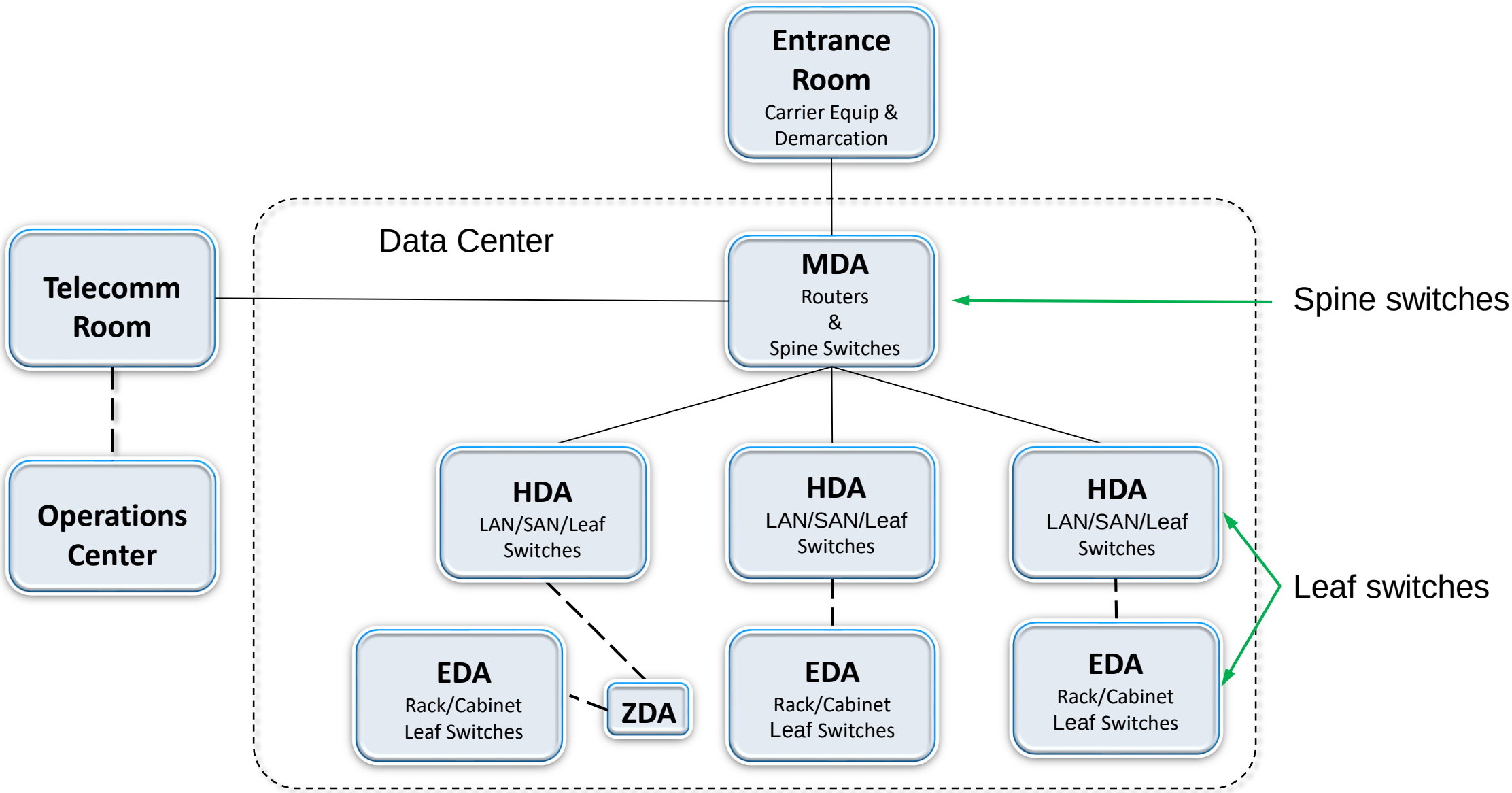
256 x 100GbE switch to server channel reach

48 x 400G (192 x 100G) Downlinks (19.2 Tb)

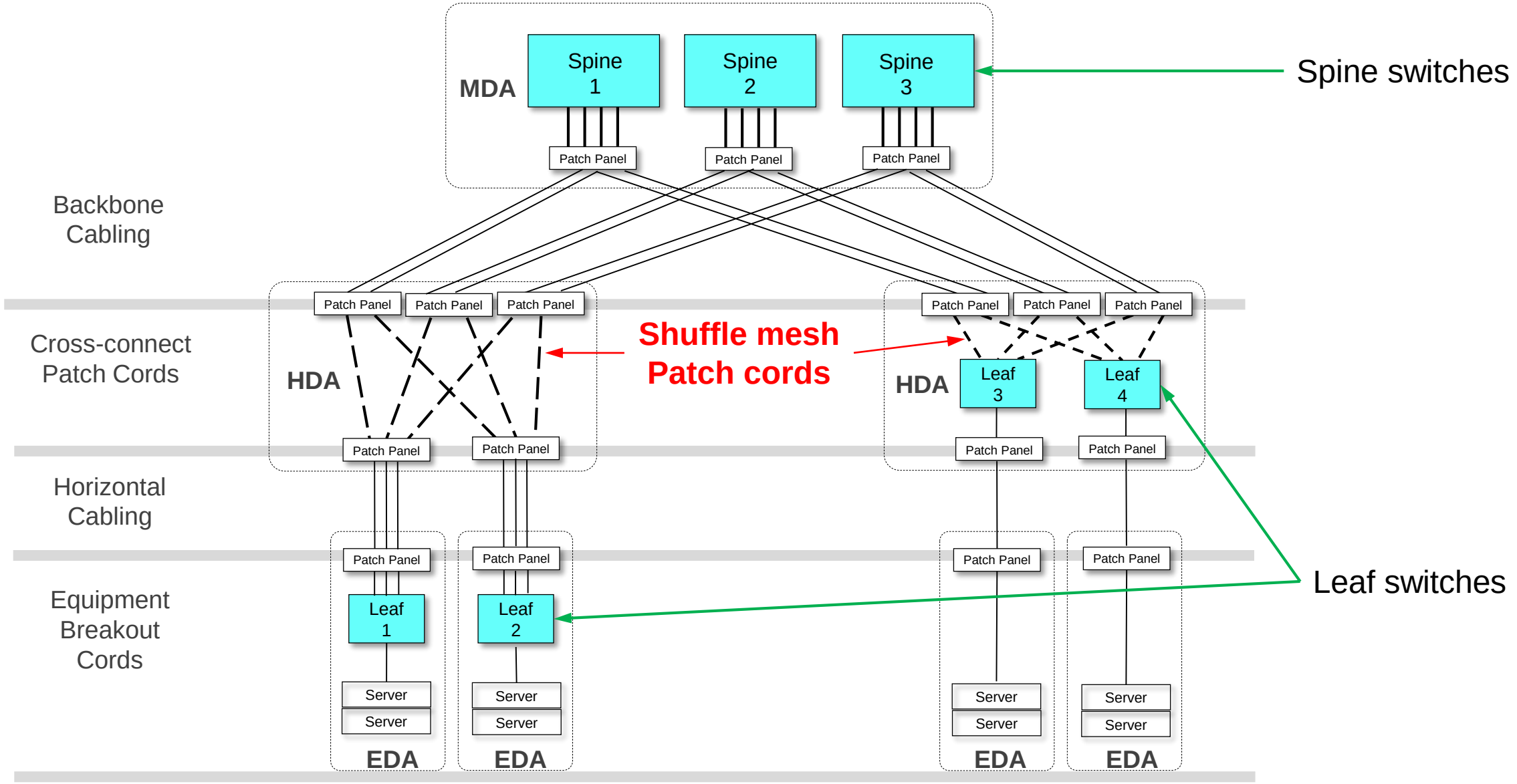
Approximate maximum reach = 18 m



TIA 942 Data Center Standard

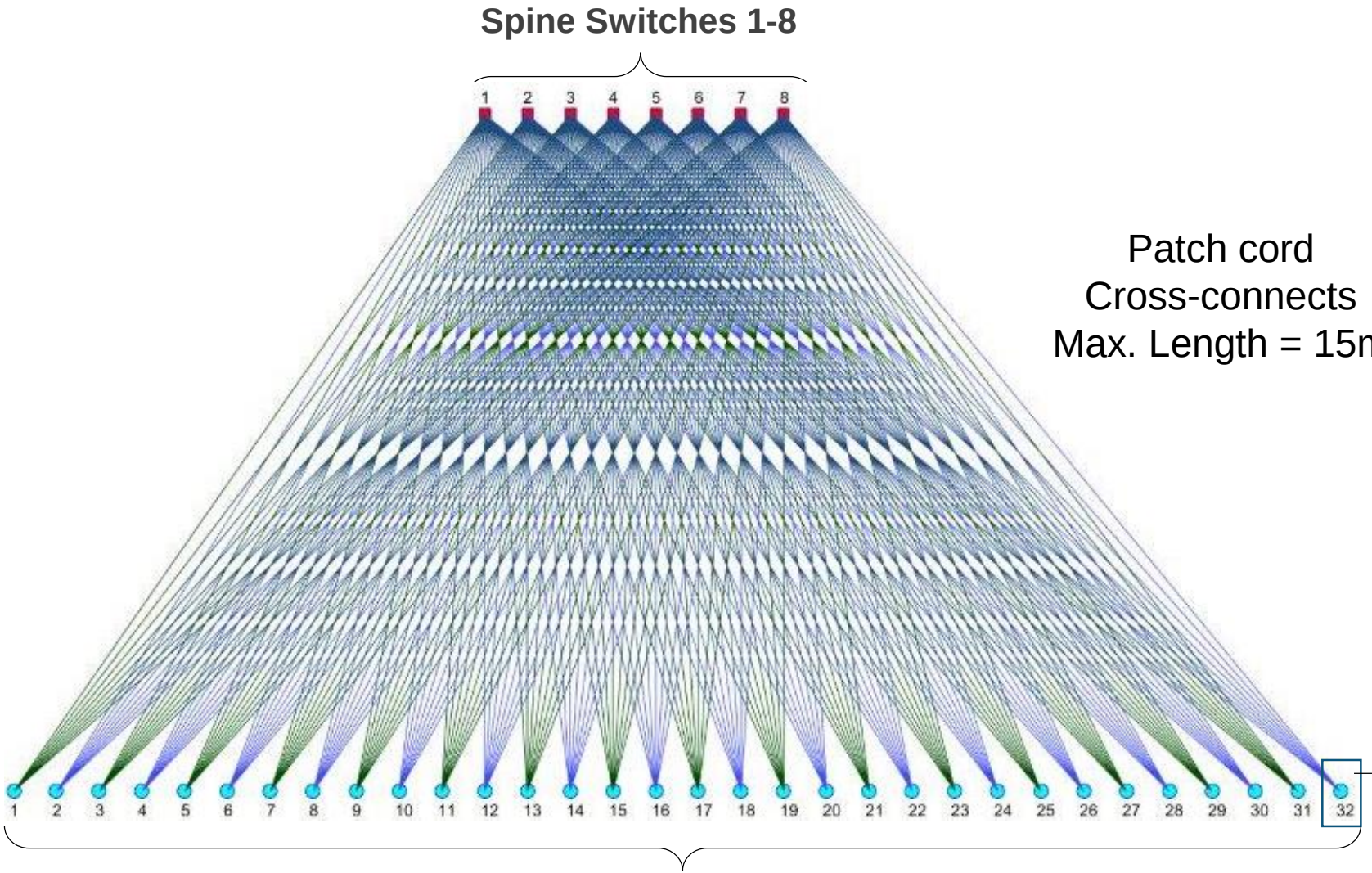


Spine-Leaf (Fat Tree) switch options



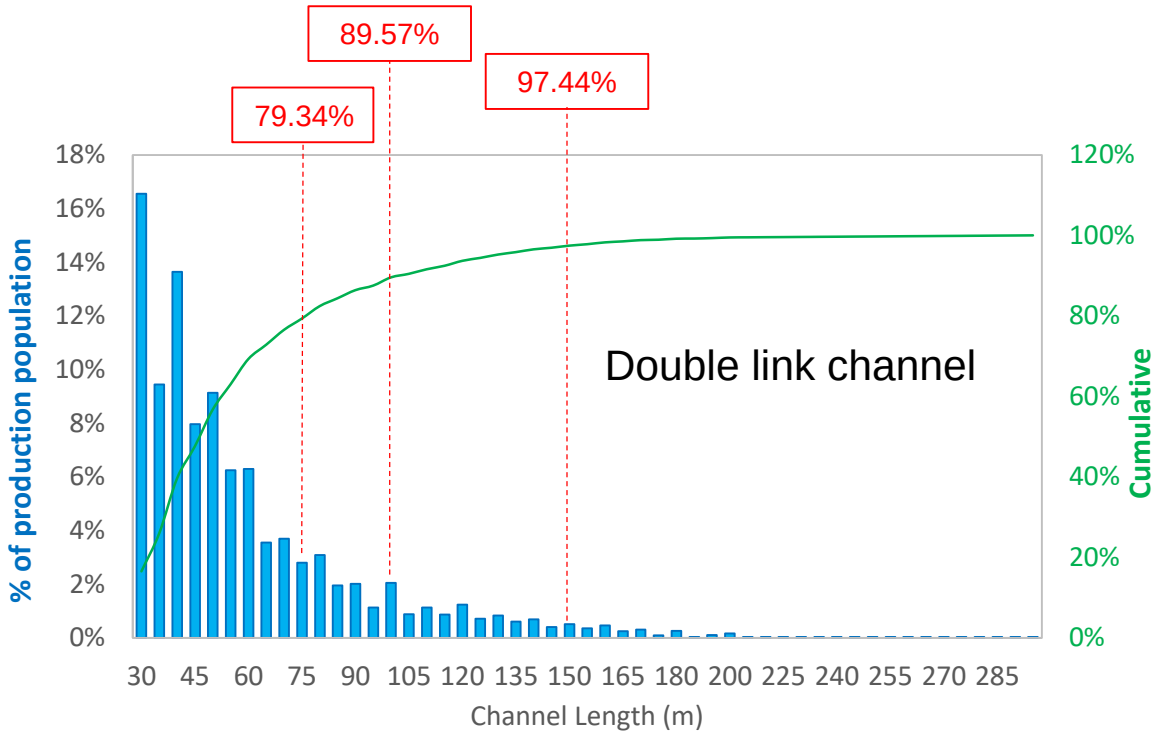
Spine-Leaf interconnection fabric

32 Port Switches w/ 3:1 over subscription



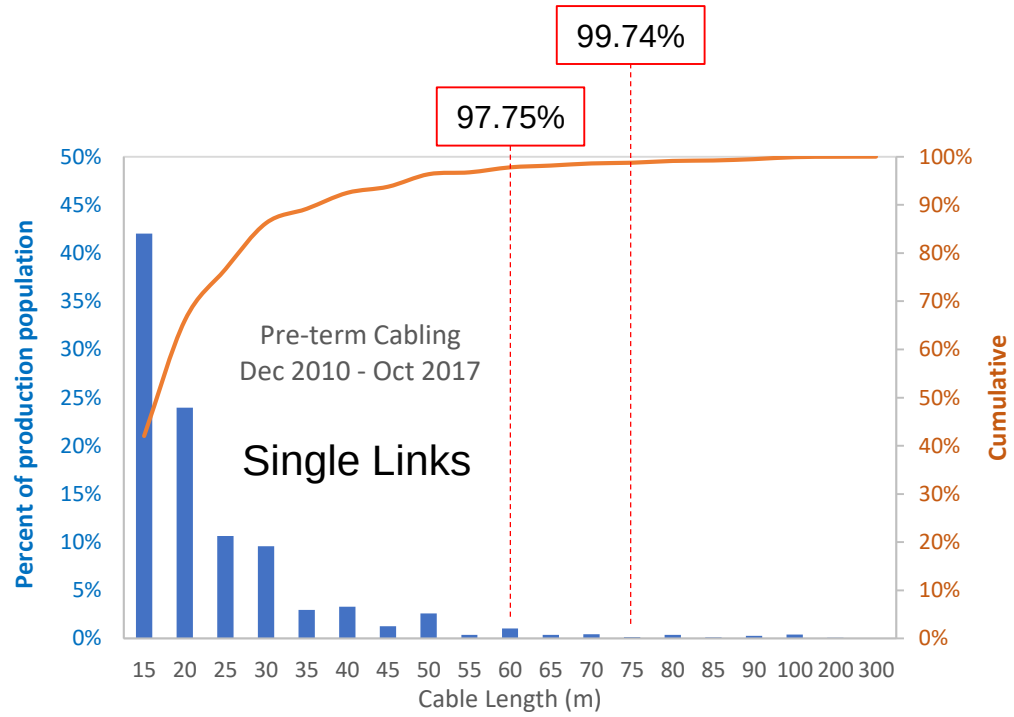
Channel reach for Leaf switch located in EDA

Leaf switch located in EDA



- 100% of the switch-to-server links are supported
- For a maximum reach > 75m, the uplinks are better support by 400GBASE-SR4.2 (150 m)

Leaf switch located in HDA



Maximum reach = 75m Trunk cable
or
60m trunk cable + 15m patch cord

Conclusions

- **The progression for 100G per lane PMDs is 100G, 200G, and 400G**
  - *800G requires a 800GMII and a new MAC data rate*
  - *Given a higher data rate MII, we have a clear path to 1.6Tbps employing BiDi*
- **For Leaf switch deployments in the EDA, a 75 m channel reach will support 100% of the switch-to-server links, however, uplink cabling is better served with other MMF PMDs**
  - *Ex. 400GBASE-SR4.2 with a reach of 150m (supports 97%)*
  - *A 100m reach for 400GBASE-SR4 will only support 84% of the links*
- **For Leaf switch deployments in the HDA**
  - *A 75 m reach will support > 97% of the backbone and horizontal cabling*
- **A maximum reach of 20 m for OM3 would support:**
  - 100% of the switch-to-server links for switches located in the EDA