Microsoft 100G/400G Coherent use case

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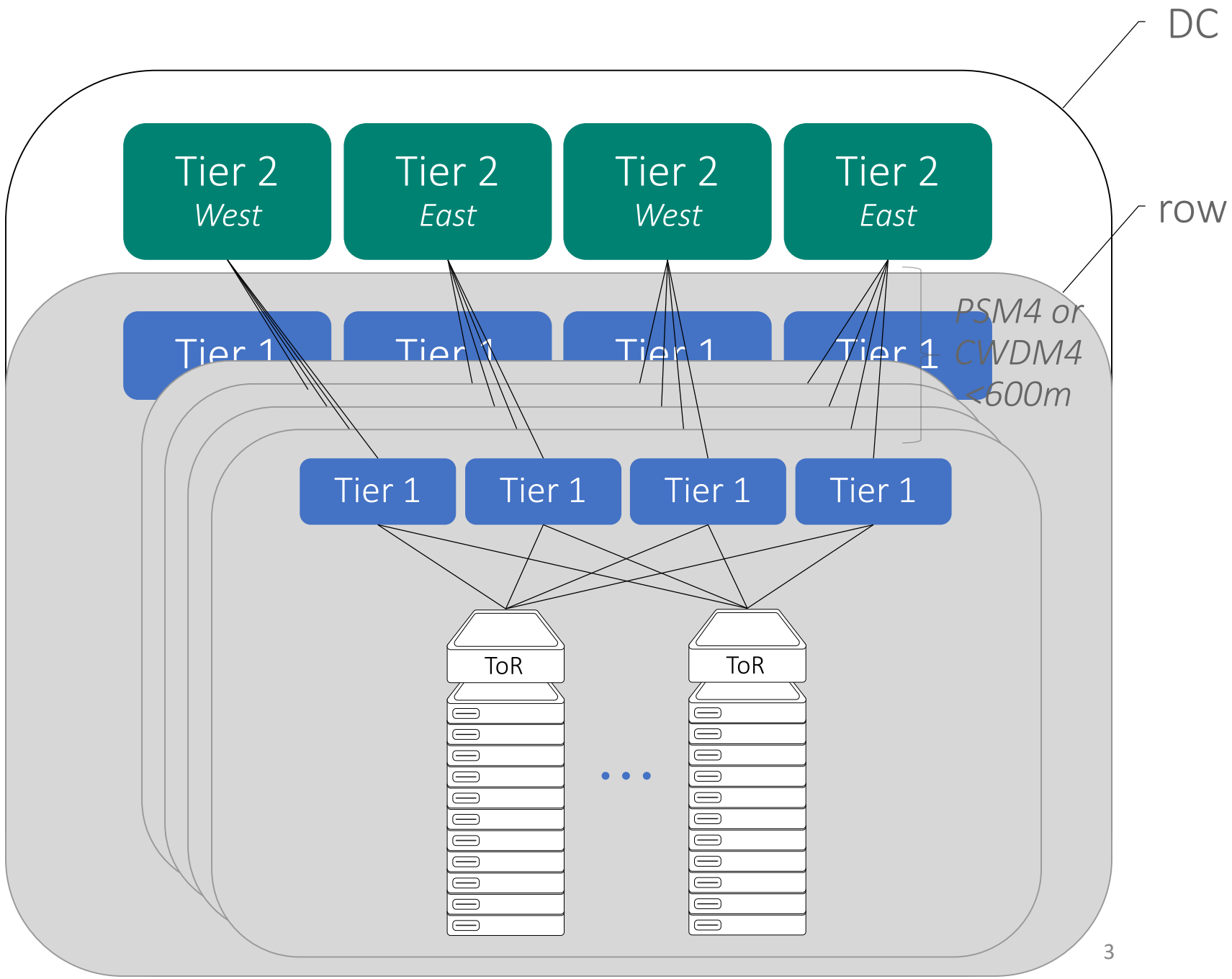
Supporters

- Your name here

DC architecture

Datacenter

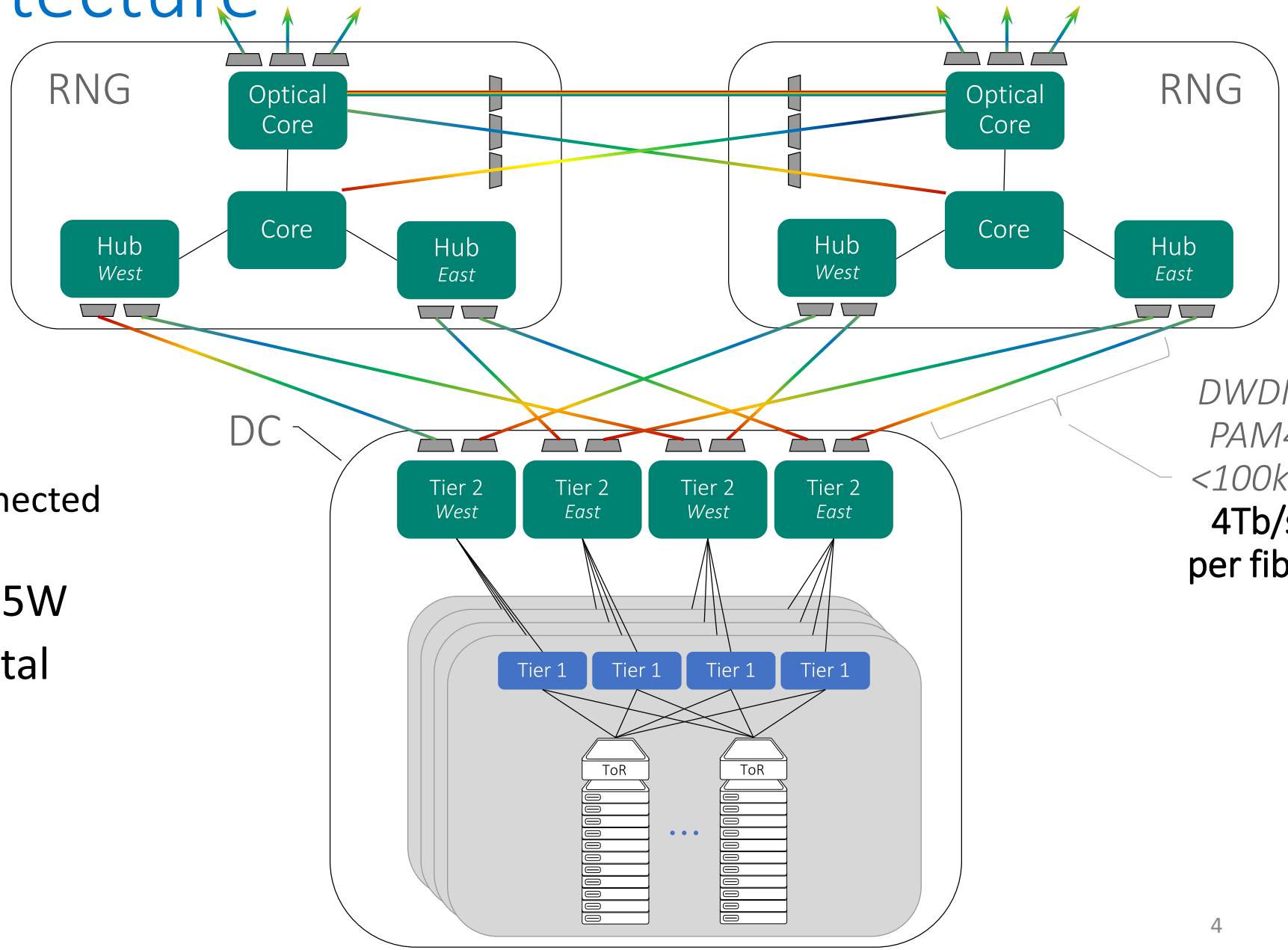
- “lots” of rows / DC
- Tier 1 to Tier 2 connected < 600m with parallel fiber via PSM4
  - Legacy builds with duplex via CWDM4
- massively parallel Tier 2
- 100G PSM4 / CWDM4 power = 3.0 – 3.5 W



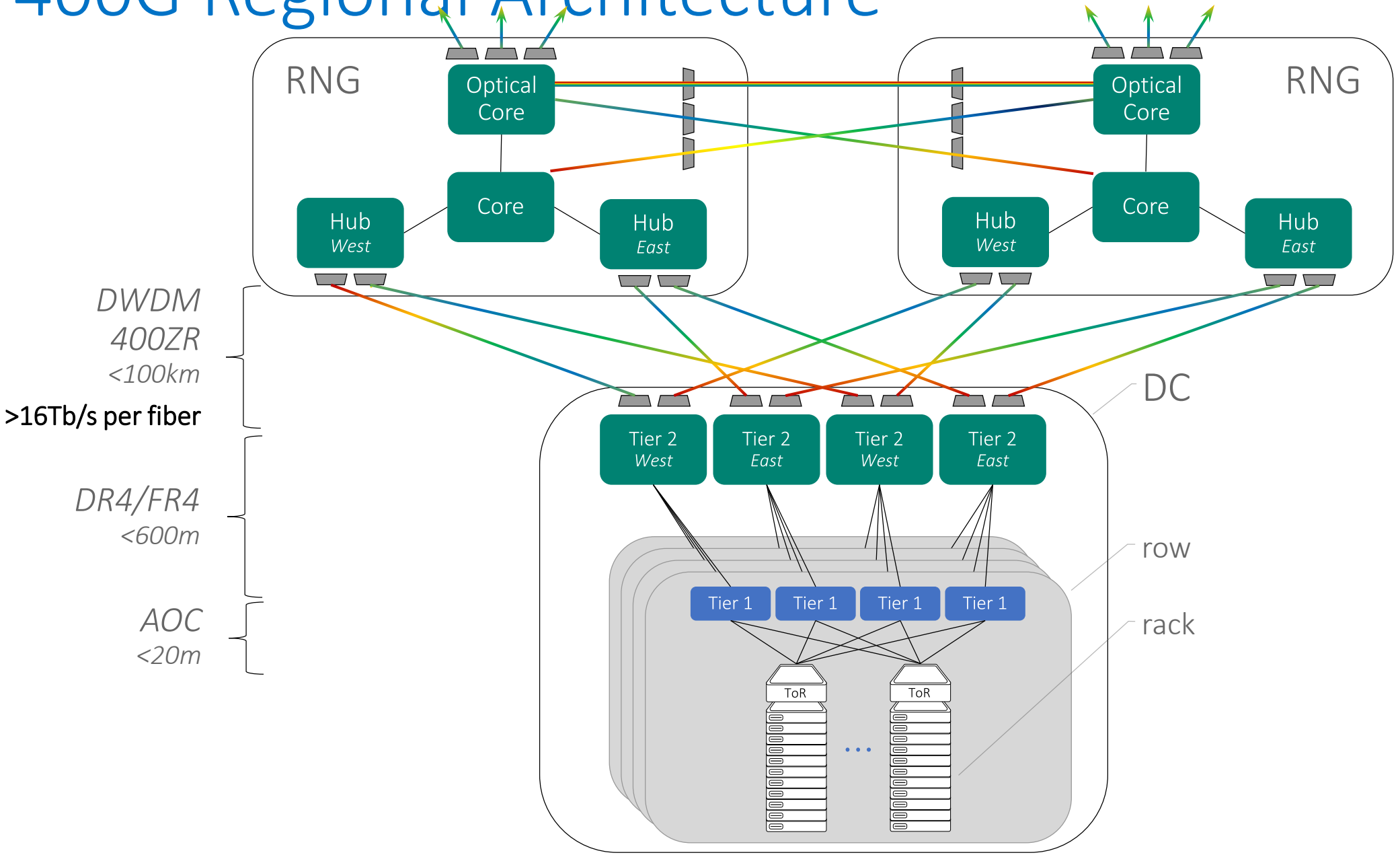
Regional architecture

Region

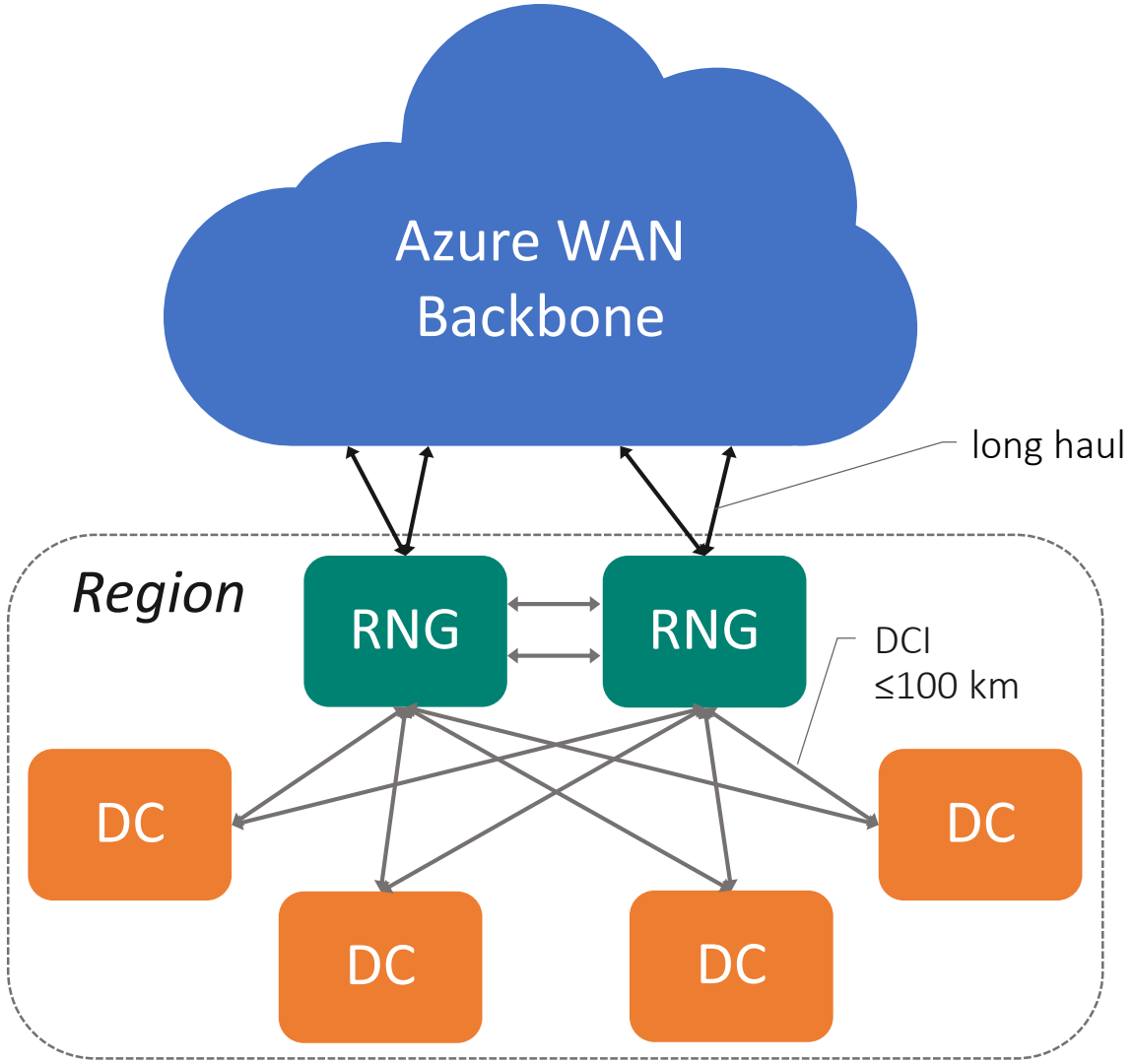
- "lots" of DCs / region possible
- DC-RNG and RNG-RNG connected ≤ 100km via DWDM PAM4
  - Some campus builds connected via bulk fiber (< 2km)
- 100G PAM4 power = 4.5W
- single percentage of total server BW in DCI



400G Regional Architecture



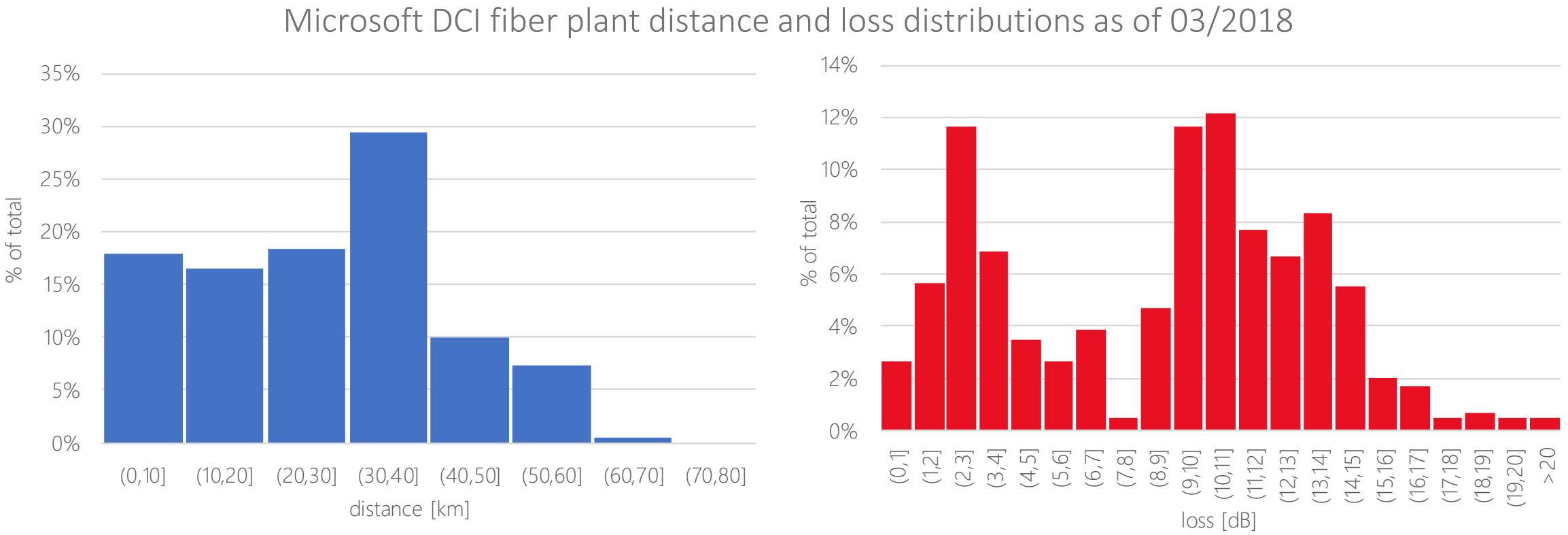
Regional architecture



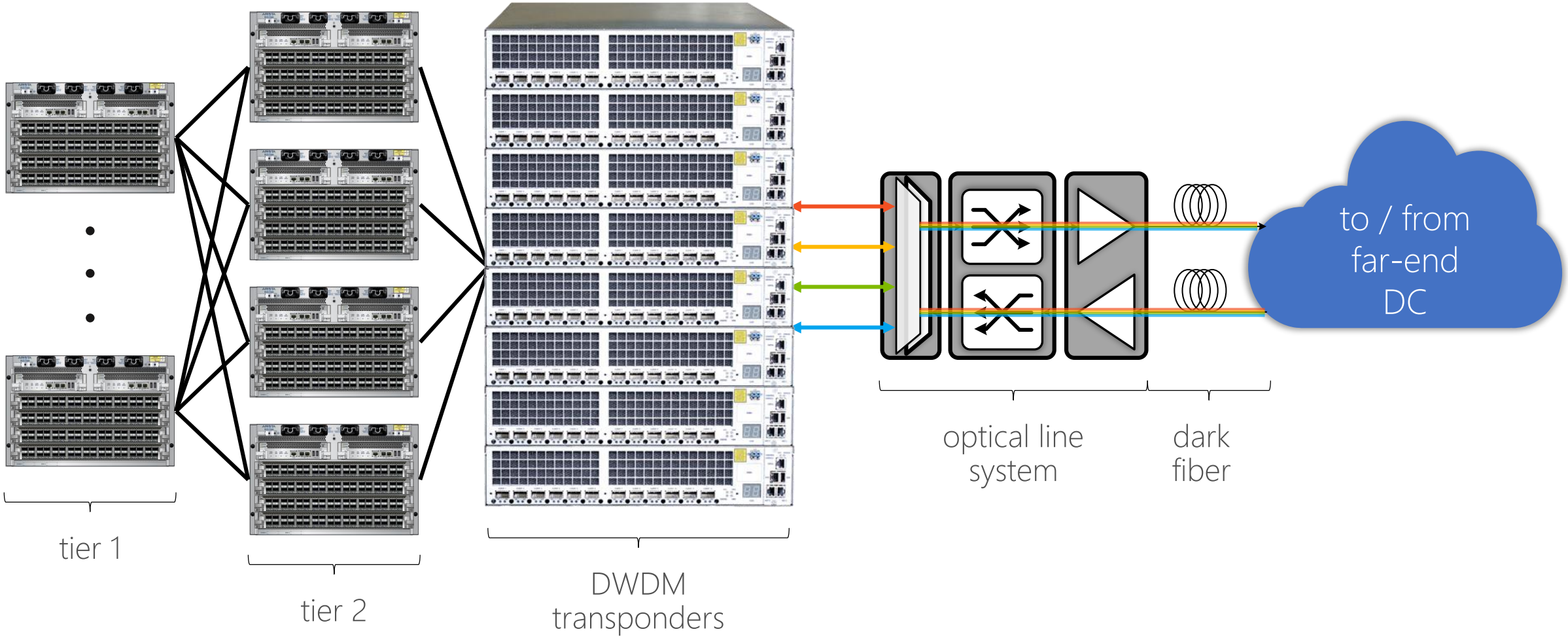
- distributed data center model
- massively parallel and highly resilient
- latency SLAs constrain maximum fiber distances
- need focused, cloud-friendly solutions for these application spaces

DCI drivers: regional installed fiber plant

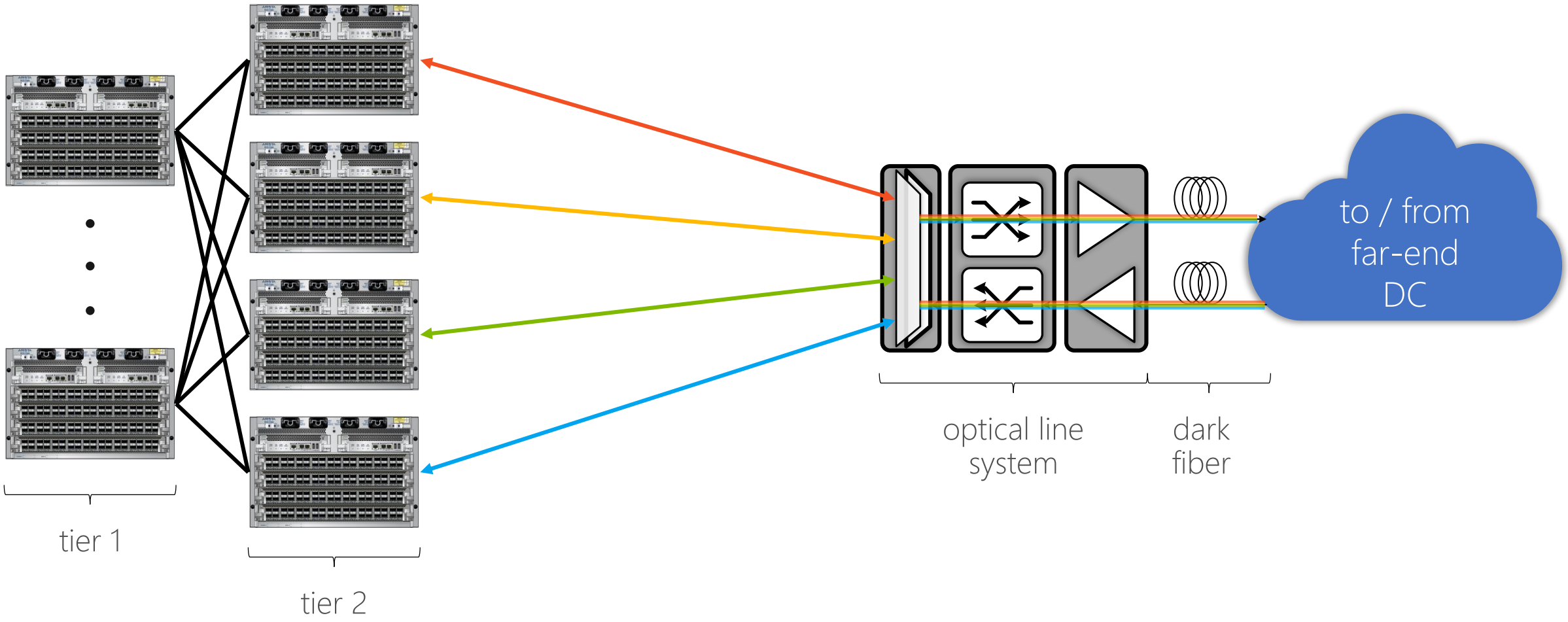
- Today this application space is covered by DWDM PAM4
- Narrowly-focused coherent technology ideal for 400G DCI



Legacy transponder optical architecture



DWDM PAM4/Coherent DCI optical architecture



DWDM PAM4 considerations

- Requirements / challenges:
  1. Clean outside fiber plant
  2. Powerful line systems
  3. Dispersion compensation

"Coherent is easy. PAM4 is hard!"

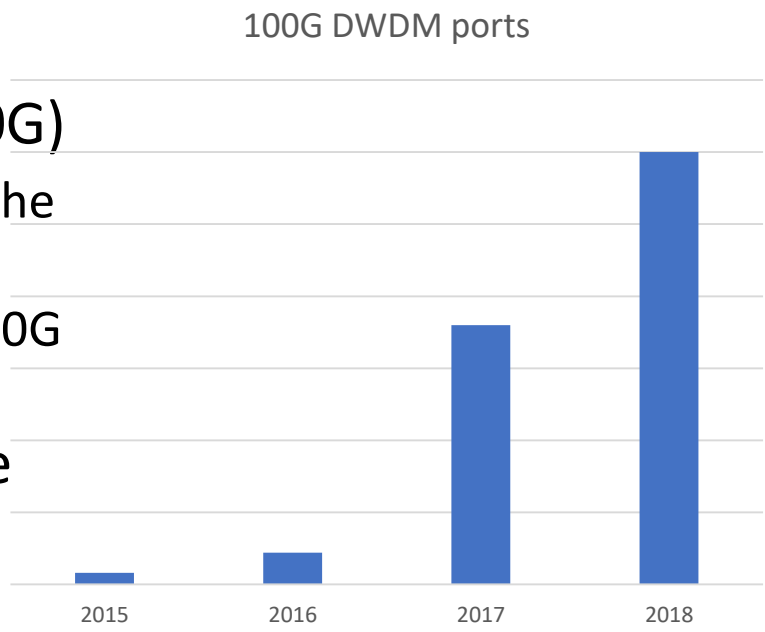
- How to deploy DWDM PAM4 at scale?

→ Move "intelligence" to line system

1. high performing amplifiers (good OSNR, P_{rx})
2. automated amplifier gain provisioning
3. automated line tuning (CD compensation)

DCI deployment growth

- Data center demand continues growing
- Capacity will be met by:
  - Increasing throughput of links (100G –> 400G)
    - Many of our deployments are running close to the 4Tb/s capacity per fiber on day 1
    - These links will max our at 16Tb/s during the 400G technology refresh
  - Adding more data centers in a regional zone



100 Gb/s and 400 Gb/s Coherent Market (coming)

Microsoft desire for 100G/400G Coherent

- 100G coherent makes sense for Microsoft:
  - As a second source
  - For spans where loss is out of range for PAM4 DD
  - Give us experience with setting up Coherent links in our SDN
- 400ZR enables Data Center upgrades
  - Starts from the links connecting data centers to RNGs
  - 400G links in the data center follow (DR4, FR4, AOC, DAC)