Advanced Functionalities in Optical Data Links

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Advanced Functionalities in Optical Data Links

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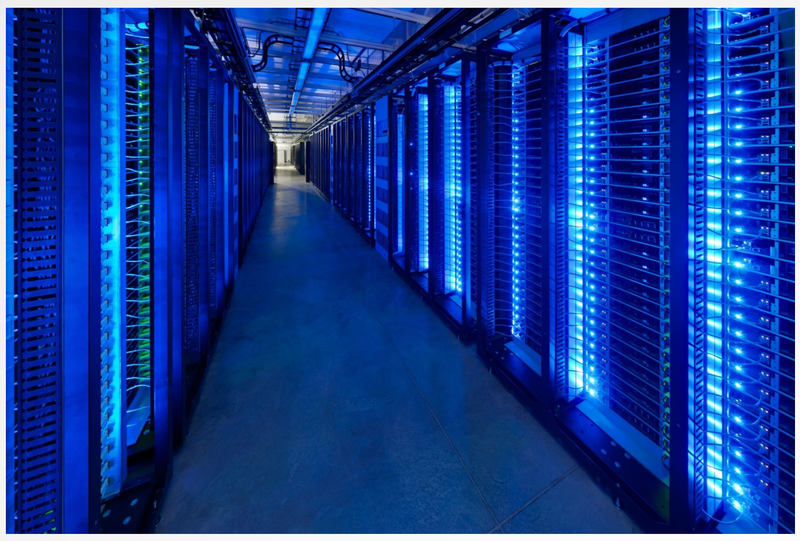
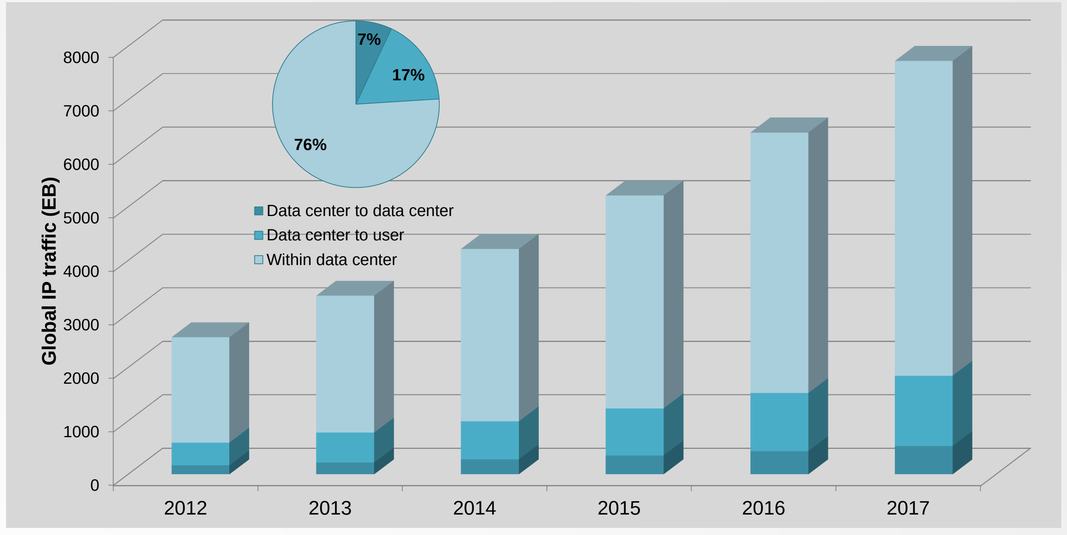
Scenario: Data center



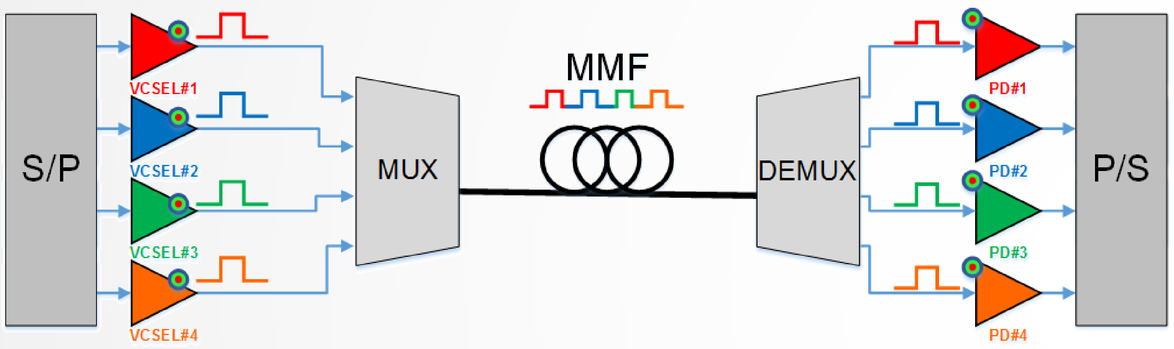
- In 2017 global IP traffic in data centers will be more than the double of 2013.

Need: IP traffic growth



- Short range links within data centers are 76%.

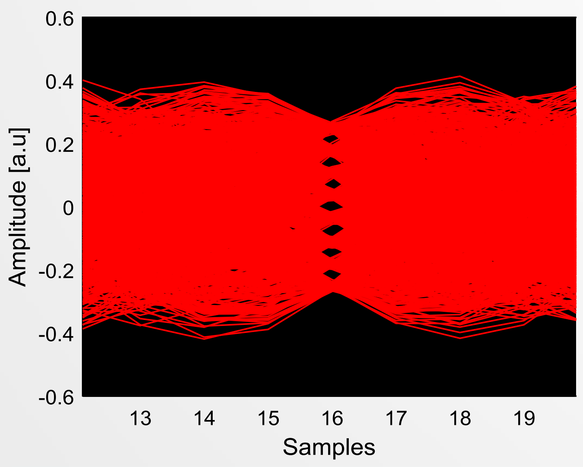
Multiplexing WDM for 100G solutions



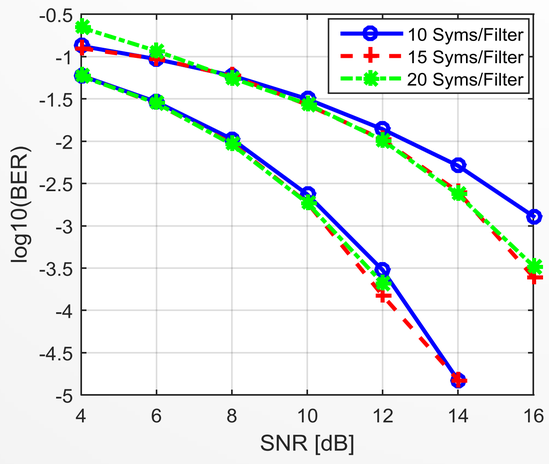
- Short range data links key components:
  - MMF (most common: OM3 and OM4)
  - VCSEL (low power consumption and array integrability)
- WDM: 4x25G channels:
  - Require MUX and DEMUX
  - PIN PD with large operating wavelength range

Modulation Formats

- CAP: Simple receiver (no carrier recovery needed).
- MultiCAP: Multiband CAP approach (advantages of DMT but simpler implementation).

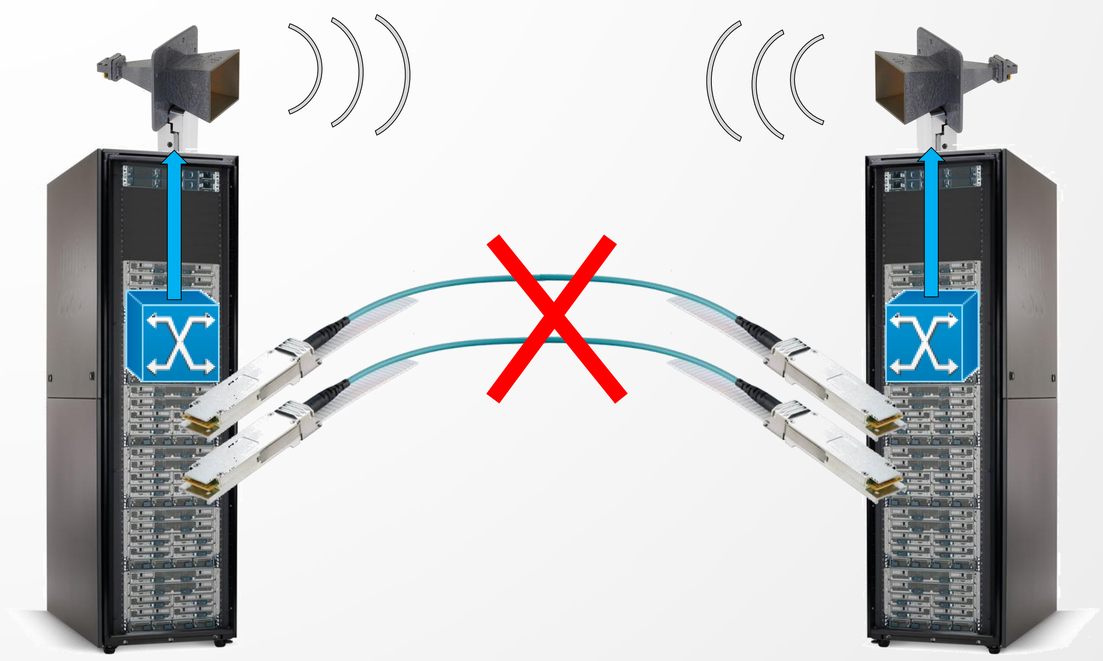


Eye Diagram



BER curves

Switching



Conclusion

- Short range WDM transmission at 100 Gbit/s is feasible with existing technology .

Future Work

- The potential of 100G and upcoming 400G data links using WDM techniques and advanced modulation formats (e.g. Multiband CAP).
- High Dimensional Modulation techniques (Orbital Angular Momentum, 3D/4D Orthogonal Basis Functions).
- High capacity fiber-wireless links using portrayed techniques.

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