

Technical University of Denmark



Advanced Functionalities in Optical Data Links

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Publication date:
2015

Document Version
Peer reviewed version

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Citation (APA):
Puerta Ramírez, R., Tatarczak, A., Cimoli, B., Estaran Tolosa, J. M., Vegas Olmos, J. J., & Tafur Monroy, I. (2015). Advanced Functionalities in Optical Data Links. Poster session presented at DTU Fotonik Seminar 2015, Lyngby, Denmark.

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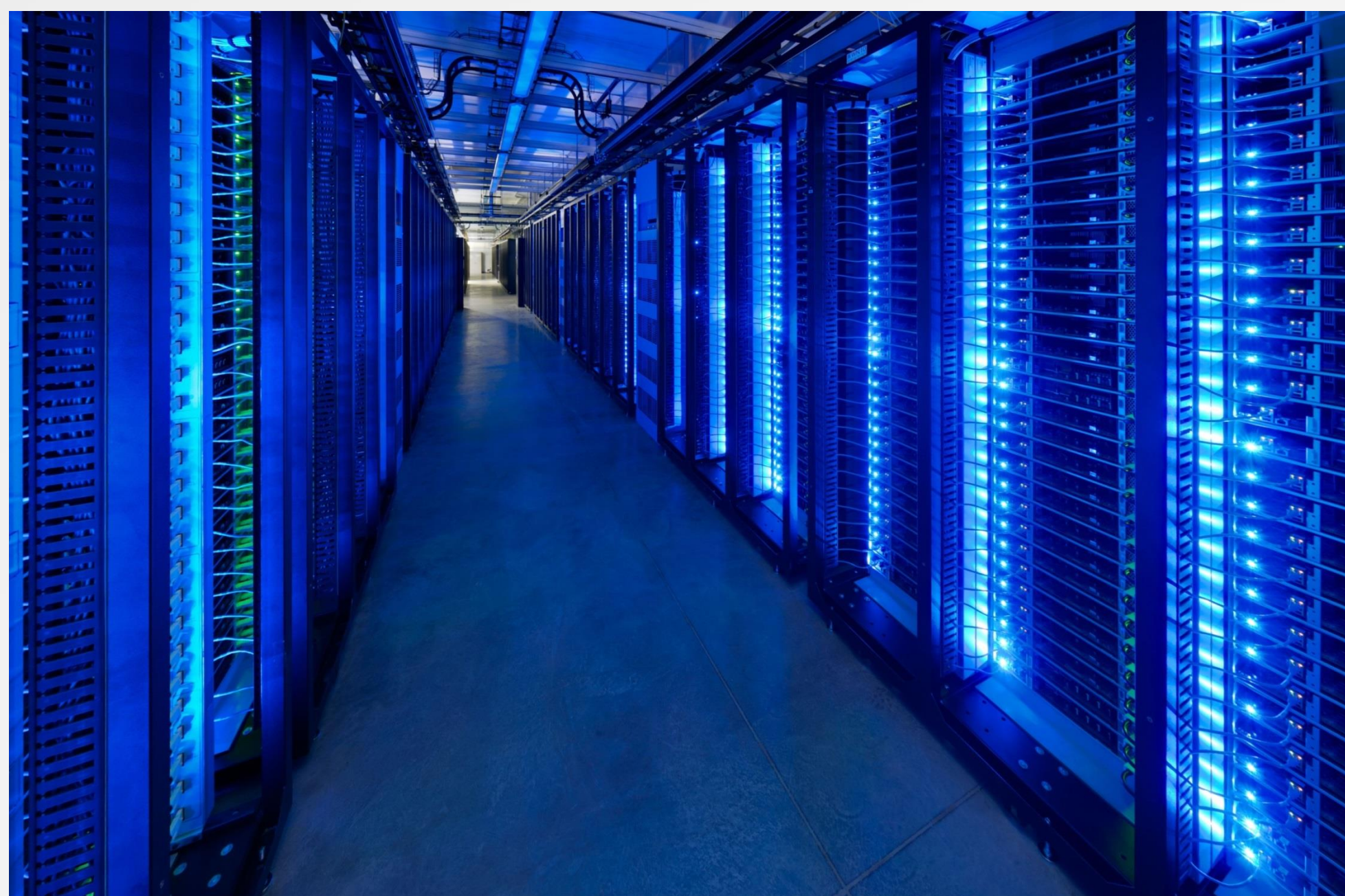
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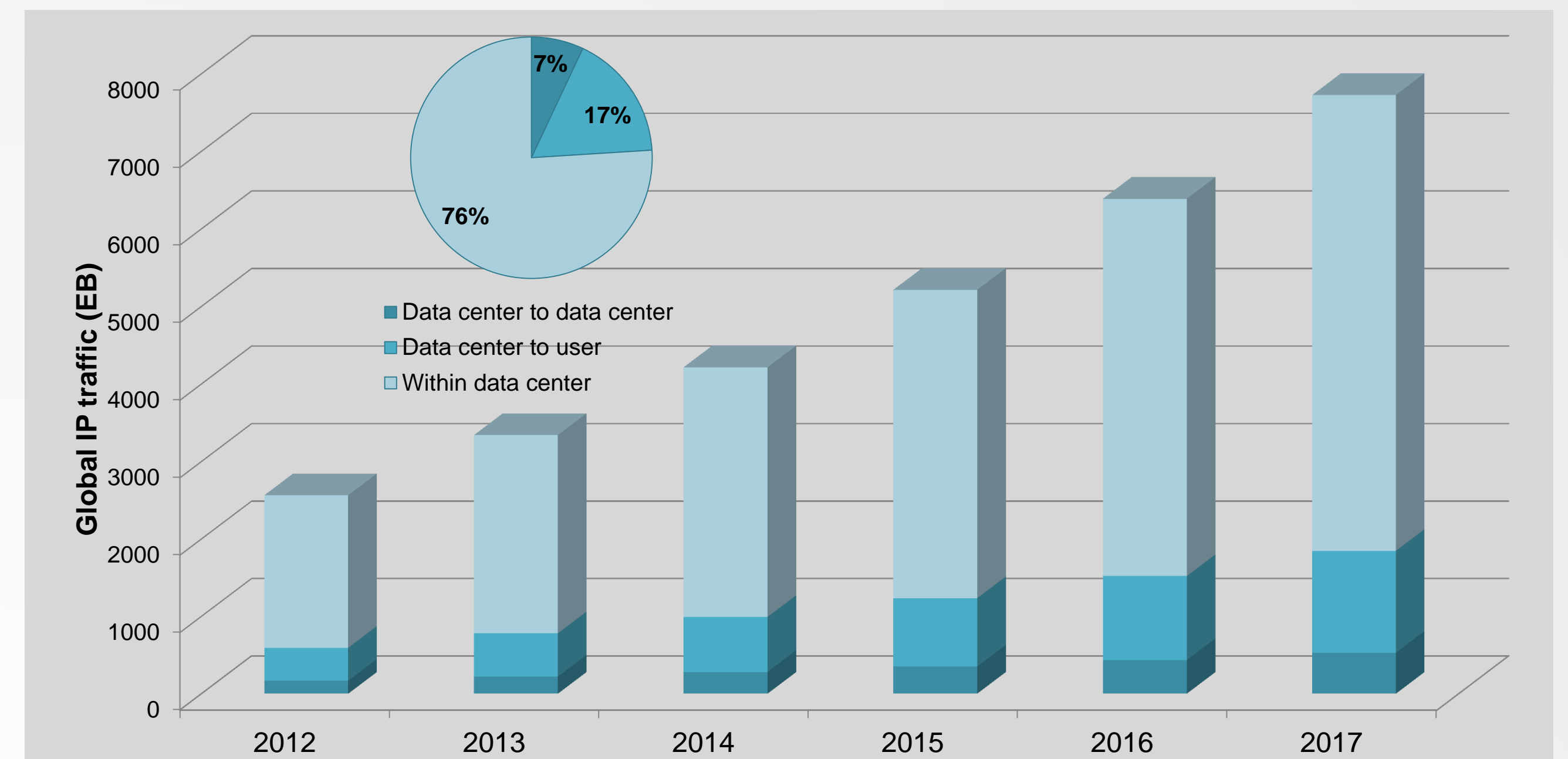


Scenario: Data center



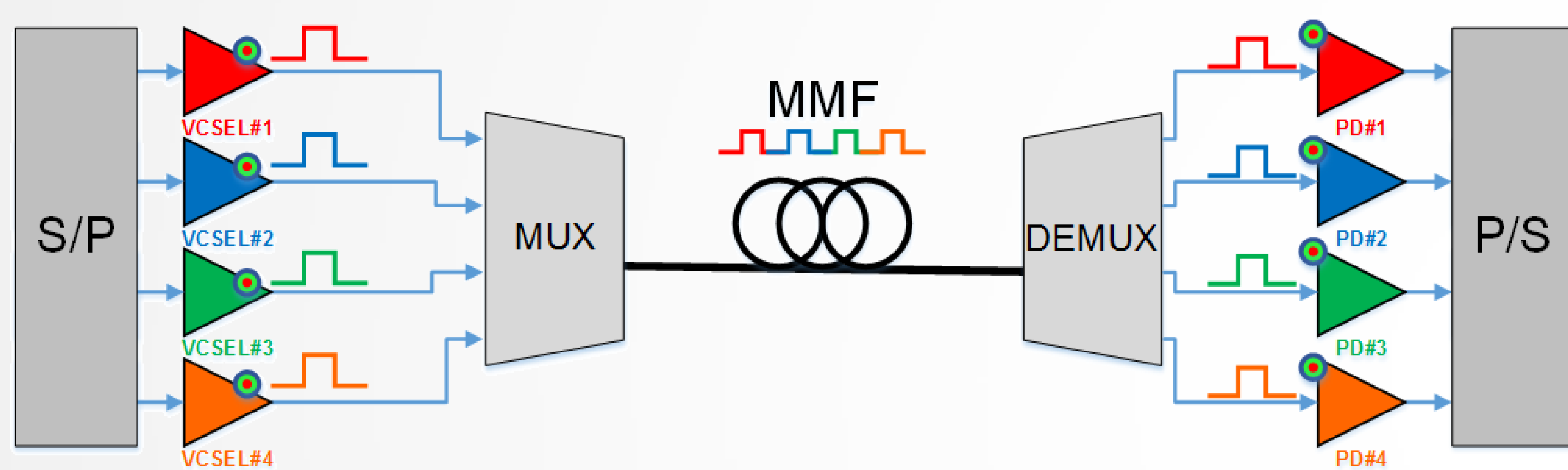
- In 2017 global IP traffic in data centers will be more than the double of 2013.

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)

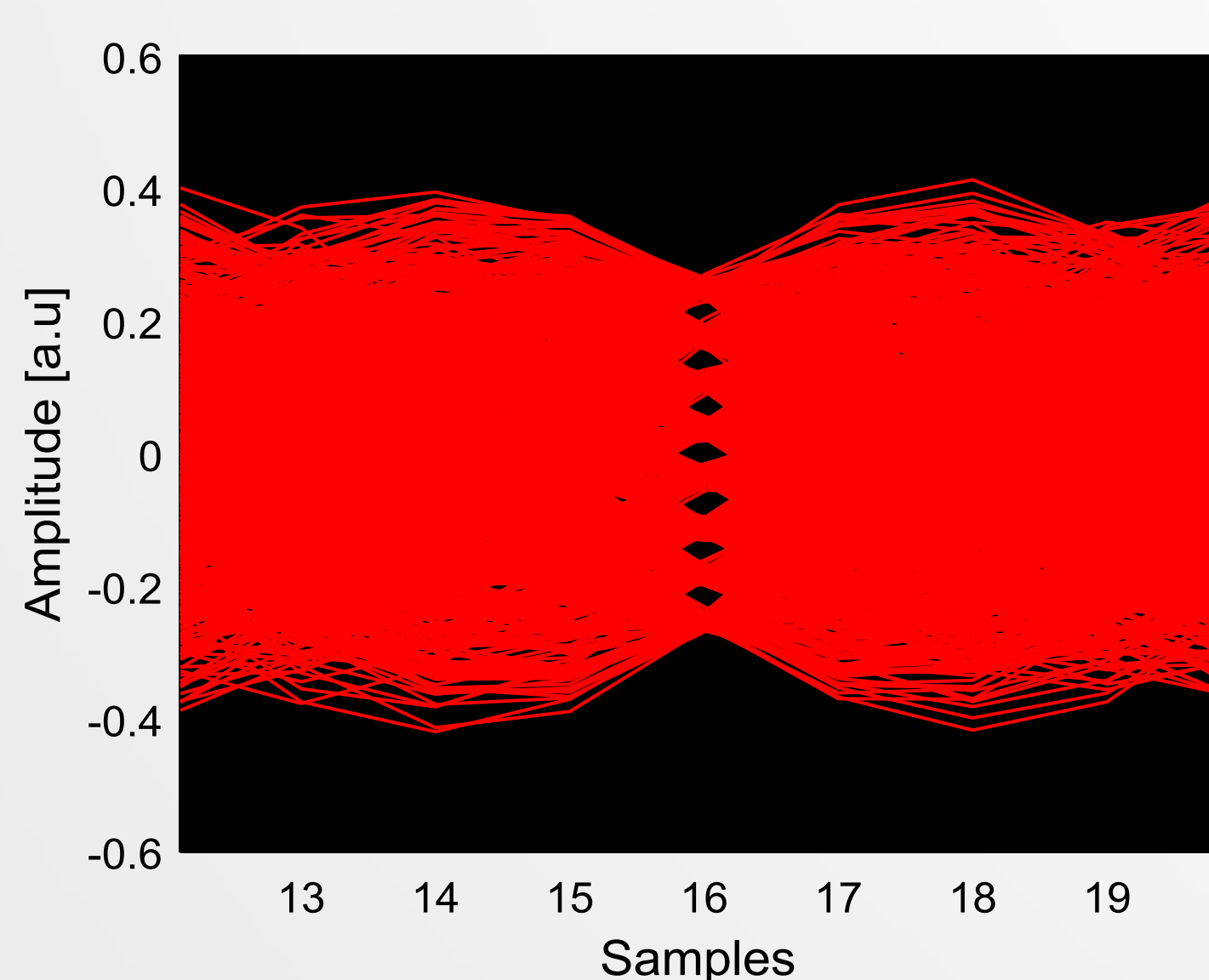
- WDM: 4x25G channels:

- Require MUX and DEMUX
- PIN PD with large operating wavelength range

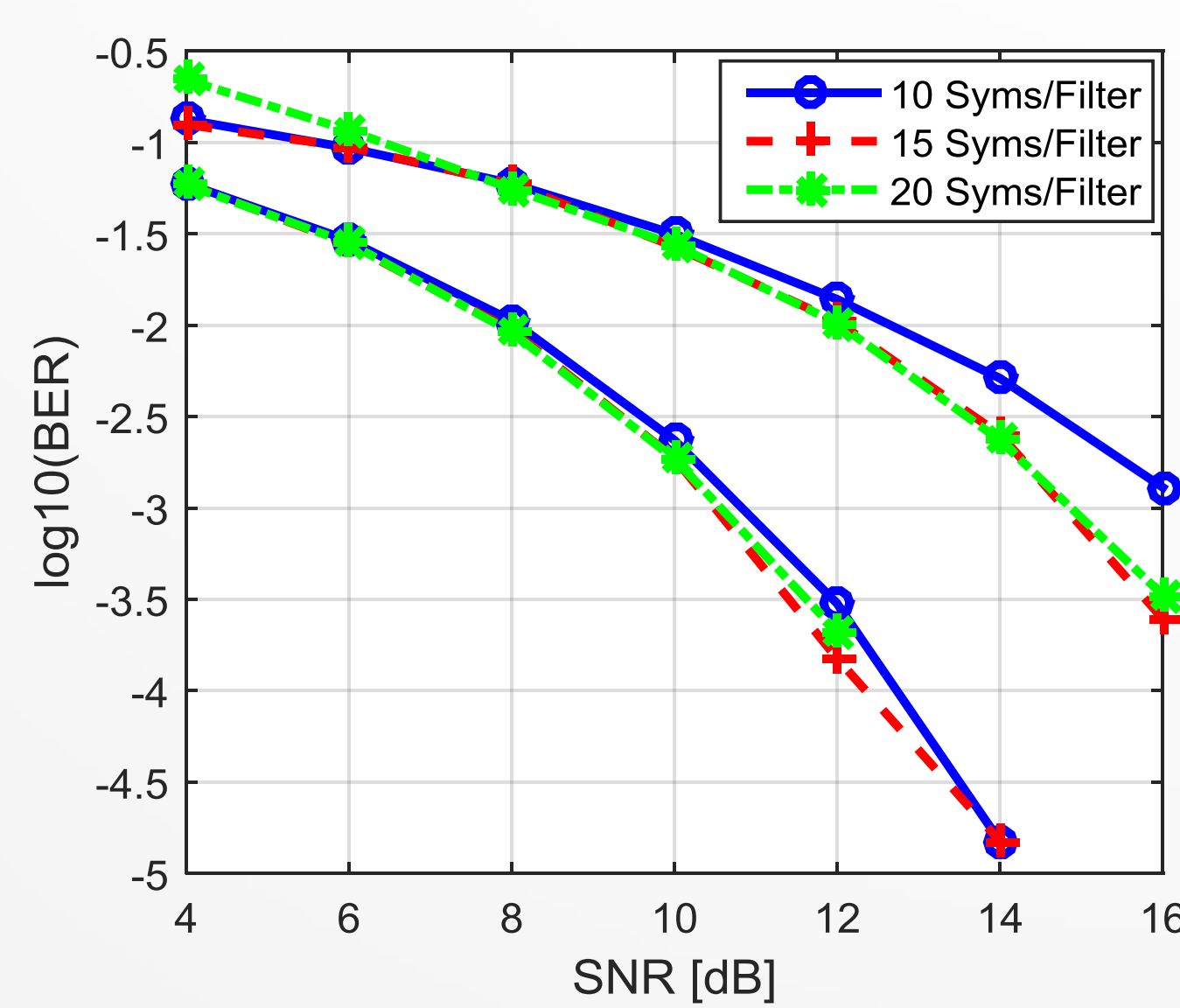


Modulation Formats

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

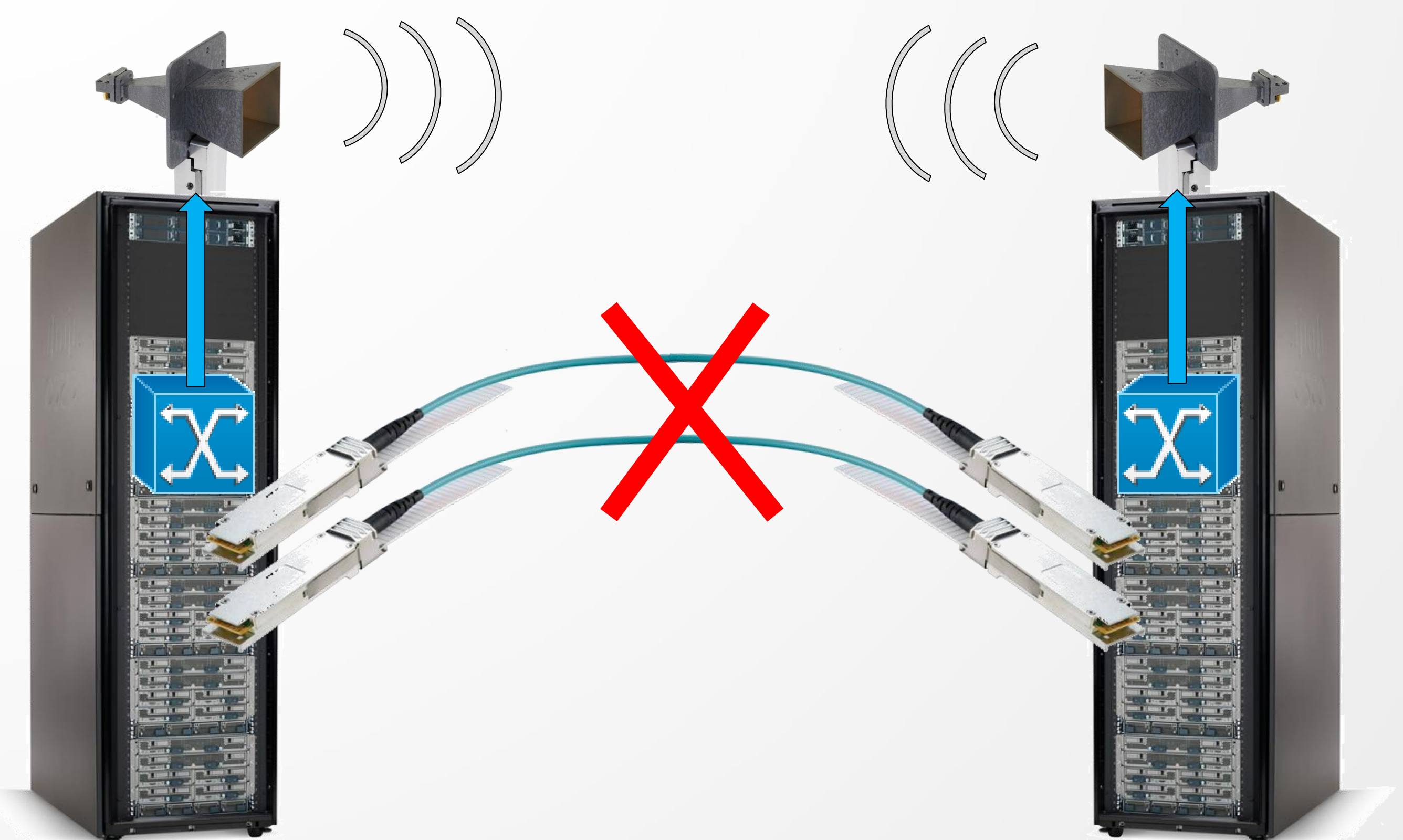


Eye Diagram



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.