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# Advanced Functionalities in Optical Data Links

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### Scenario: Data center



## Need: IP traffic growth



- In 2017 global IP traffic in data centers will be more than the lacksquaredouble of 2013.
- Short range links within data centers are 76%. ullet

## Multiplexing WDM for 100G solutions



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

Switching





### Modulation Formats

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





Short range WDM transmission at 100 Gbit/s is feasible with existing technology.  $\bullet$ 

### 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.  $\bullet$

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