High Speed Migration
100G & Beyond

Moses Ngugi
Field Application Engineer
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BANDWIDTH GROWTH

Mobile Data: CAGR: 50+% 
IP Video: CAGR: 35%+
Global Cloud IP Traffic: CAGR: 30%+
Global IP Traffic: CAGR: 20+% 

Source: CISCO
The reality—

2016: What happens in an internet minute?

- Facebook: 701K logins
- Google: 2.4M search queries
- Twitter: 347K new tweets
- YouTube: 2.78M video views
- Amazon: 204K in sales
- Snapchat: 528K photos shared
- Uber: 1,389 Uber rides

One internet minute
The challenge

Adapt your data center infrastructure in order to:

• Increase equipment port count and fiber density
• Support faster lane capacities
• Reduce latency
• Prepare to migrate to higher speeds
A roadmap exists...

...but the path forward is anything but straight
Ethernet Roadmap and Transmission Initial Standards (2010)

Parallel
- 10GBASE-SR
- 10GBASE-LRM
- 10GBASE-LX4

Duplex
- 10GBASE-SR
- 10GBASE-LRM
- 10GBASE-LX4

10 Gb/s 2002
40 Gb/s 2010
100 Gb/s 2010
Many options for moving between duplex and parallel
Which way?

- 8-fiber, 12-fiber, 24-fiber...which MPO?
- 25G/50G is in—40G is ?
- Optics: duplex, parallel or both?
- WBMMF, a game changer
Your network infrastructure must be:

- Agile & Flexible
- High Density & Ultra-Low Loss
- Cloud Friendly
Agile, flexible and future ready

- Respond to sudden and unexpected changes with easy to use panels, modules, fiber and connectors
- Support emerging applications with optimal fiber configuration with a complete portfolio of single and multimode fiber and connector options for all major MPO fiber configurations

MPO-24
MPO-8
MPO-12
Higher speeds - minimal redesign

- **Evolve at your own speed with singlemode or multimode optics**—modular components support 25-, 40-, 50-, 100-, 400 Gbps and beyond
- **Support advanced, attenuation-sensitive technologies**—end-to-end links with multimode ultra-low-loss fiber solutions
- **Increase scalability**— OM5 WideBand (MMF) quadruples capacity while maintaining legacy duplex multimode fiber architectures
Higher density - easier management and lower costs

- **Support the fiber and equipment port density required** for leaf-and-spine networks with high- and ultra-high density fiber panels that keep link connections accessible and manageable.

- **Reduce the time, cost and risk of moves, adds, and changes** with pre-terminated connectivity and plug-and-play installation.
Blueprint for a long-term migration strategy

Create an agile, manageable and fiber-dense infrastructure that can support higher-speed applications and technologies as they continue to evolve—scaling easily with minimal disruption.
HIGH-SPEED MIGRATION COMPONENTS

Fiber panels, cables and connectors

• High-density (HD): 48 duplex LC or 32 MPO ports per RU
• Ultra-high density (UD): 72 duplex LC or 48 MPO ports per RU
  • Both support singlemode, OM4 and OM5 multimode
  • G2 compatible modules and adapter packs
• OM5 WideBand multimode: Enables shortwave division multiplexing and increases capacity by a factor of four
• Ultra-low loss pre-terminated cable: Supports longer link spans and the infrastructure design needed for guaranteed operational availability
• G.657.A2 singlemode: Delivers lowest bend losses—for macro- as well as micro-bending
• Wide range of MPO configurations: 8-, 12- and 24-fiber
• 24-fiber MPO ensures lowest “first cost” duplex deployment

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Example Migration from Duplex to Parallel – OM4

**10GBASE-SR** – 2 fibres

**100GBASE-SR4** – 8 fibres

Trunk cabling is retained
Multimode Fiber Evolution OM5 – Wave Division Multiplexing

- Multiple wavelengths reduce # of fibers
- Need sufficient BW over spectrum
  - 4 wavelengths over a single fibre
  - 25nm spacing for low-cost WDM
Migration from 10G to 100G with SWDM and WBMMF OM5

All cabling is retained (continues to require only 2 strands)
• Moses Ngugi

• moses.ngugi@commscope.com
• +254 720 454177