Terabit Ethernet on the Horizon

Thomas Vedsmand
Field Application Engineer
Danish Standards, Cabling standards Expert

2023Q2

COMMSCOPE®

Agenda

Datacenter speed trends

Flattening the network

Connectivity types

Prepare for the future

Propel™

Networks are shifting from 2 fiber
over 8 to 16 fiber applications

Propel™

Hyperscales

Cloud

MTDC

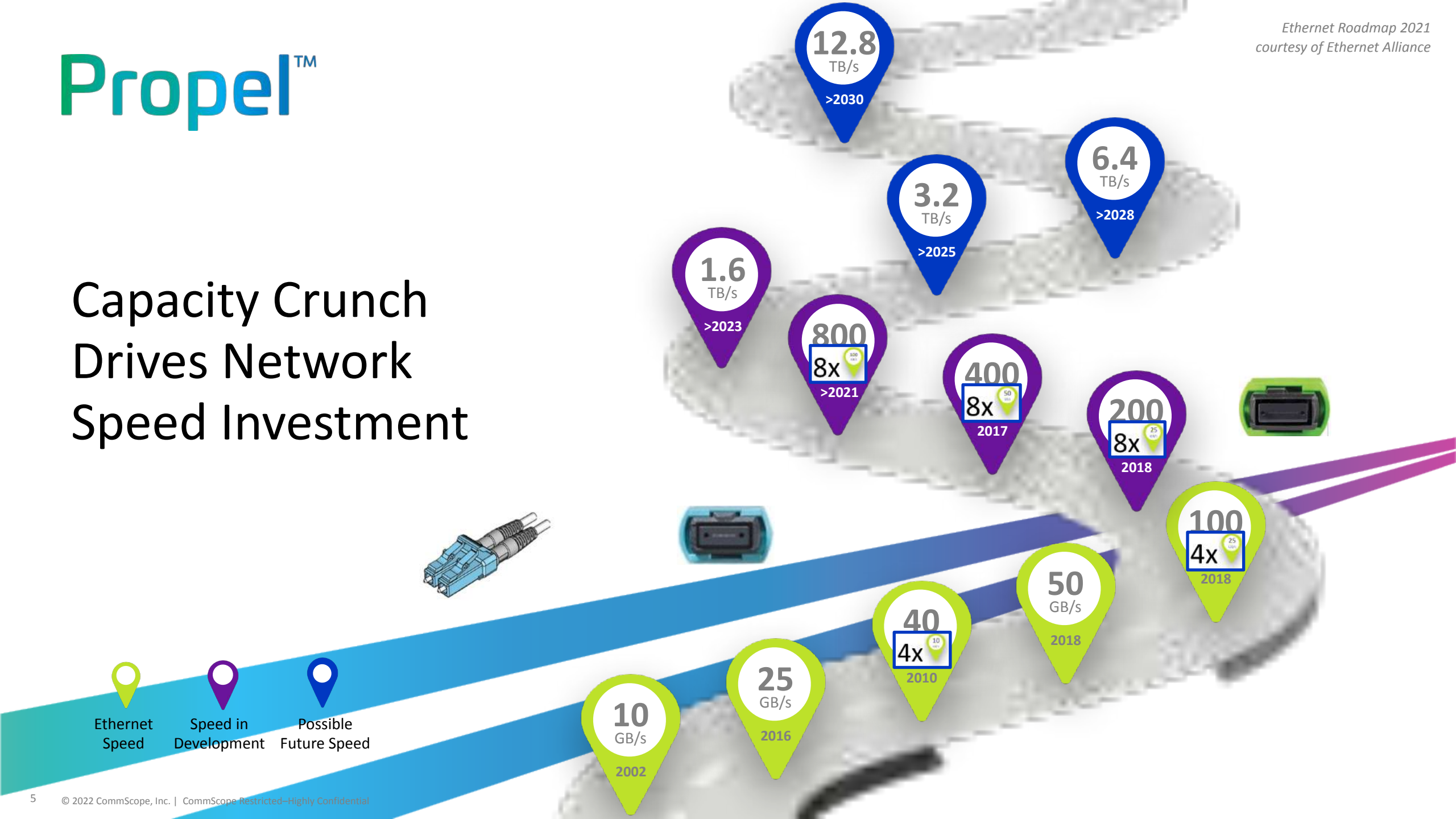
Enterprise

COMMSCOPE®

Propel™

Ethernet Roadmap 2021
courtesy of Ethernet Alliance

Capacity Crunch Drives Network Speed Investment



First Deployed	Electrical I/O [Gb/lane]	Switching Bandwidth	TOR/Leaf Data Center Switch Configuration	
~2010	10G	1.28T	 32xQSFP+ (40G)	Legacy technology
~2015	25G	3.2T	 32xQSFP28 (100G)	128 Electrical I/Os
~2019	25G	6.4T	 32 ports of 200G	
2021	50G	12.8T	 32 ports of 400G	256 Electrical I/Os
2022	100G	25.6T	 32 ports of 800G	

512 Electrical I/Os coming soon?

Rapid succession of technology

NVIDIA announced the SPECTRUM-4
a 2U switch with 128 ports of 400G
51.2T = 1024 I/Os
expected power savings = 40%

Propel™

QSFP-DD and OSFP Modules

- 8 electrical I/Os (8 transmit / 8 receive)
- The only way to use ASIC capacity
- 50G and 100G electrical I/Os up to 800G (today)
- New options for
  - Up to 8-way breakouts, 4-way popular for brownfield
  - New optical connectors to enable these breakouts
  - Multimode fiber and singlemode fiber options

QSFP-DD

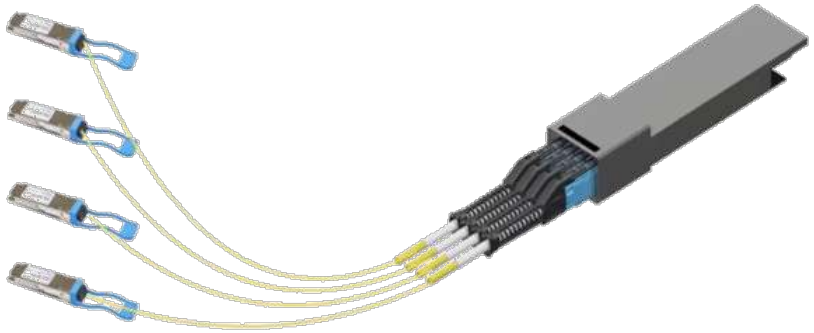
OSFP

400G MDIs

Media dependent interface (MDI)

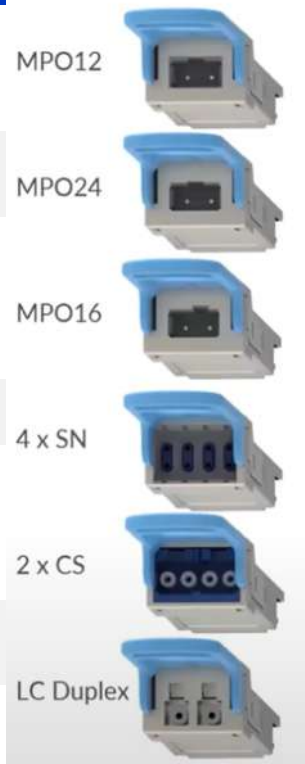
400G capacity QSFP-DD connectors

400G DR4 with 4 duplex 100G-DR fibers



New SN/MDC connector avoids MPO-MTP Splitter cable

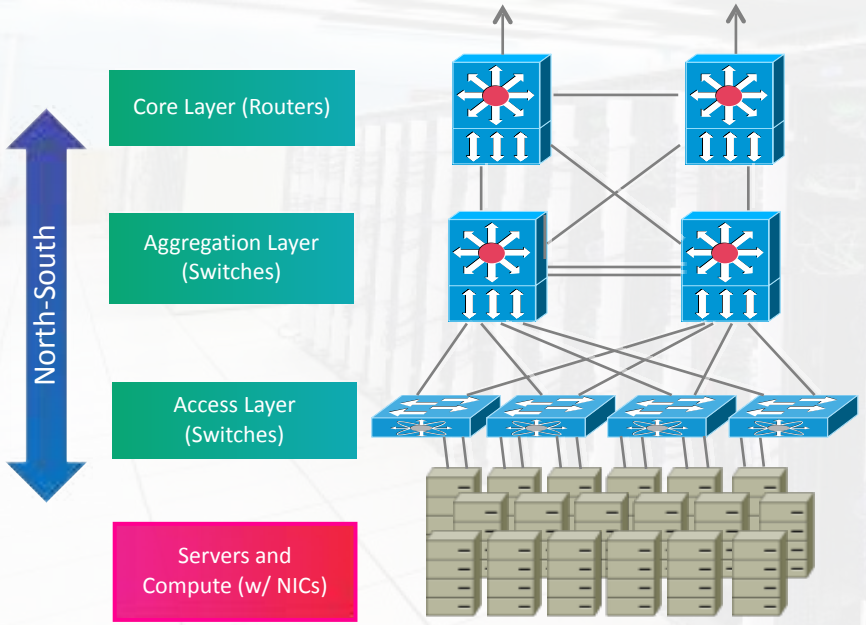
Reach	Name Scheme A	Scheme B	Scheme C	Connector
SR (50-70m)	QDD-400G-SR4.2 QDD-400G-SR8 QDD-400G-SR4	400G-BiDi 400G-SR8 400G-SR4		MPO12 MPO16/MPO24 MPO12
DR (500m)	QDD-2x200G-DR4 QDD-400G-DR4	400G-DR8 400G-DR4		MPO16/MPO24 MPO12
FR (2km)	QDD-4x100G-FR1 QDD-2x200G-FR4 QDD-400G-FR8 QDD-400G-FR4	400G-4xFR1 400G-2xFR4 400G-FR8 400G-FR4	400G-DR4+	MPO12/4xSN 2xCS/(2xSN) LC Duplex LC Duplex
LR (6km)	QDD-400G-LR4-6	400G-LR4-6		LC Duplex
LR (10km)	QDD-4x100G-LR1 QDD-2x200G-LR4 QDD-400G-LR8 QDD-400G-LR4-10	400G-4xLR1 400G-2xLR4 400G-LR8 400G-LR4-10	400G-DR4++	MPO12/4xSN 2xCS/(2xSN) LC Duplex LC Duplex
ER (30-40km)	QDD-400G-ER8 QDD-400ZR	400G-ER8 400ZR		LC Duplex LC Duplex
ZR (80-120km)	QDD-400ZR QDD-400G-ZR	400ZR 400G-ZR		LC Duplex LC Duplex



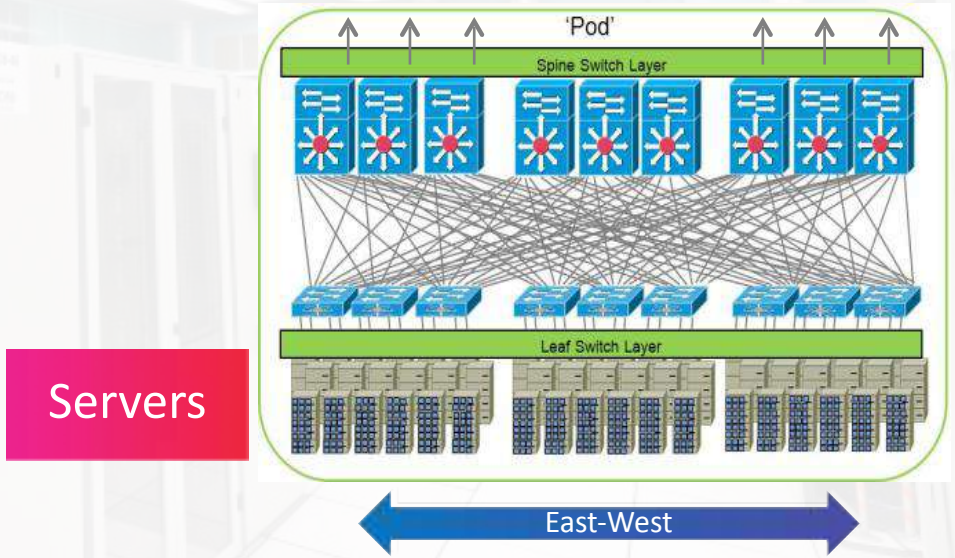
Cloud compute is different

- Change/Risk to upgrade strategies
- Higher speed support when?
- Can I support new network topologies?

Legacy Network



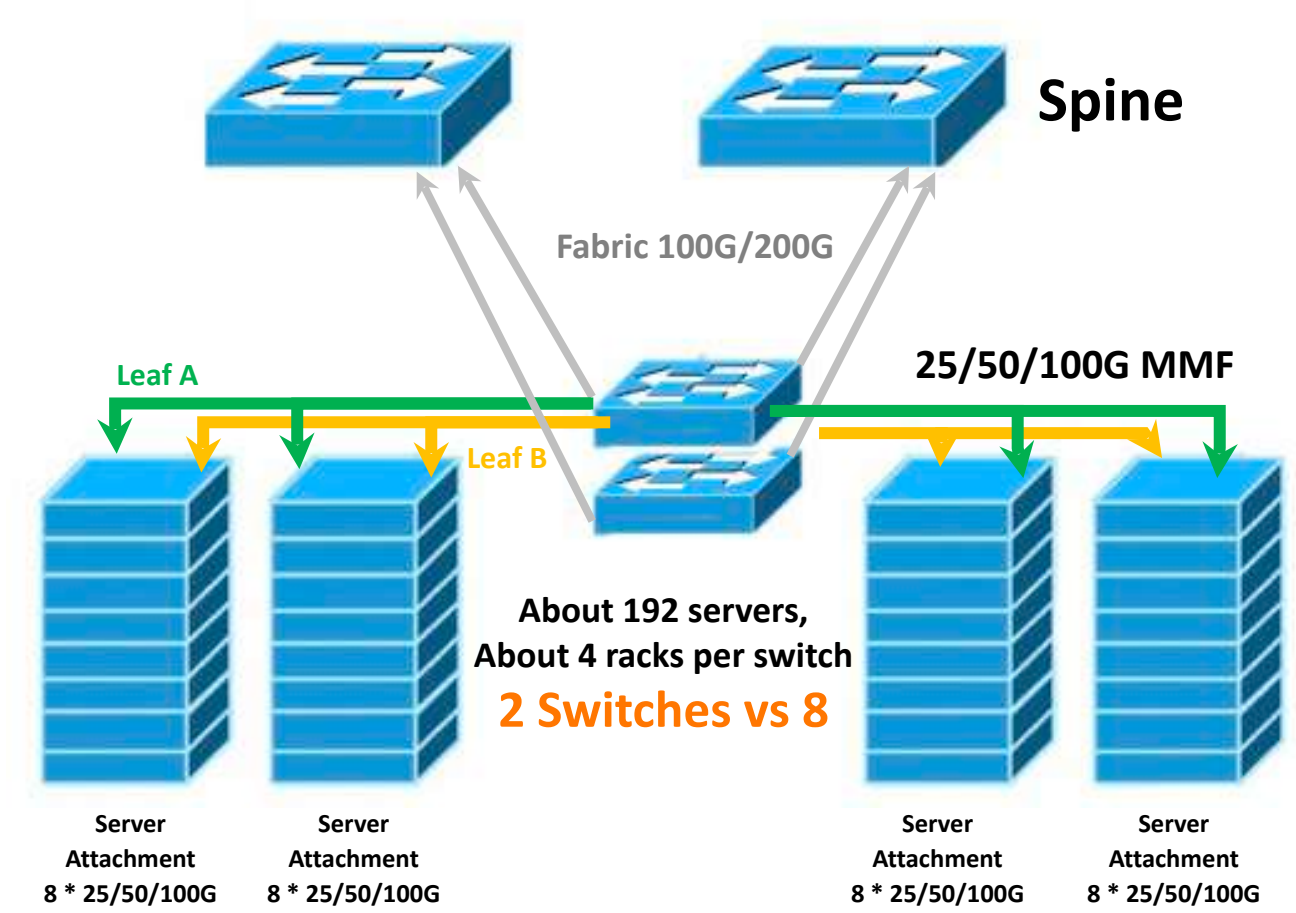
Leaf-Spine Network



DC network topologies continue to evolve

Propel™

Efficient network architectures

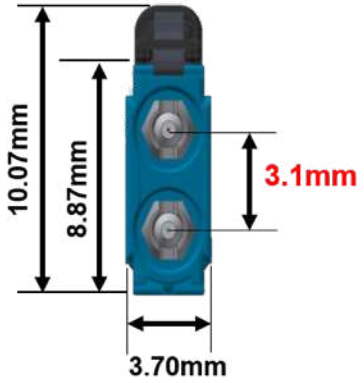


Optical connectors comparison

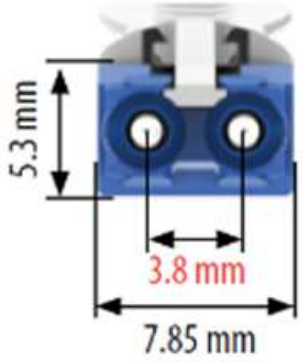
Propel™

SN®

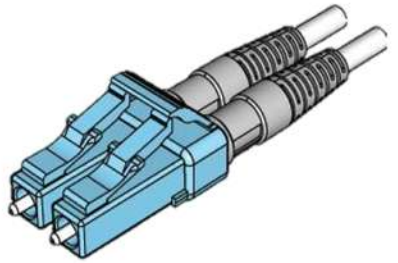
MDC

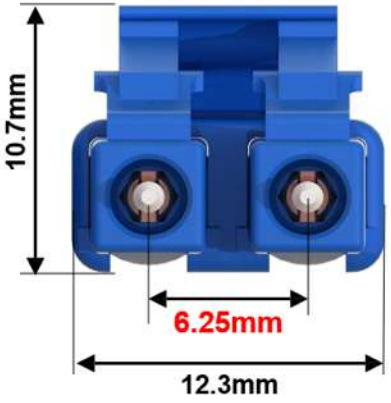


CS

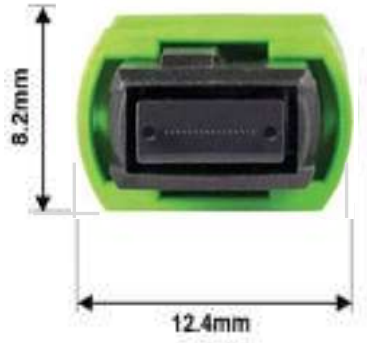


LC Duplex





MPO



COMMSCOPE®

Propel™

Why MPO16

Enables 2, 8 & 16-fiber applications without wasting fibers

Simplifies design and installation

Backward compatible to legacy and migration aligned to 400G/800G + applications

16 fiber applications provide 8:1 vs 4:1 breakouts: Enabling the lowest cost and energy per bit with improved latency

Propel™ Environmental Progress With Promise

100%
Certified

CommScope Manufacturing Facilities
ISO 14001:2015
Environmental Management Systems

100%
Certified

CommScope Manufacturing Facilities
ISO 45001:2018
Health & Safety Management Systems

87.8%

of nonhazardous waste diverted from landfills globally in 2021.
Achieved by reducing waste generation via product design and manufacturing processes by converting waste to energy and reusing and recycling waste.

Conducted 268 sustainability assessments and audits in our supply chain.

9.1% Reduction
Total Global Water Consumption

CO^2e

7.8% Decrease
Scope 1 and 2 **Location**-Based Emissions
Reduction of 183,086 metric tons

8.9% Decrease
Scope 1 and 2 **Market**-Based Emissions
Reduction of 17,003 metric tons

AMERICA'S MOST RESPONSIBLE COMPANIES 2021 Newsweek statista

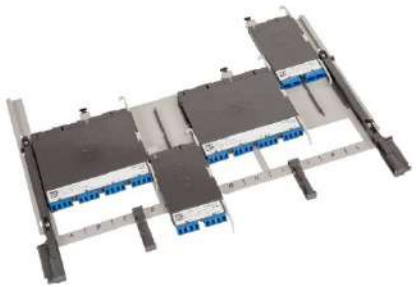
GOLD 2021 ecovadis CSR Rating

yahoo! finance
Low Risk Sustainability Rating

Panels

- **Adapt and grow** as needs change
- **Modular** and **interchangeable**
- **Blade-based** layout
- Minimum **size/weight**
- **Ergonomic & easy access**
- **One person** install
- Module **interchangeability**
- Support 8-12-16 and 24-fiber connectivity and **up to 288** connected fibers per **RU**
- **Method B Enhanced polarity**

Propel™



COMMSCOPE

Flexibility

MPO8, MPO12, MPO16 to LC conversion

MPO24 to LC conversion Multimode only

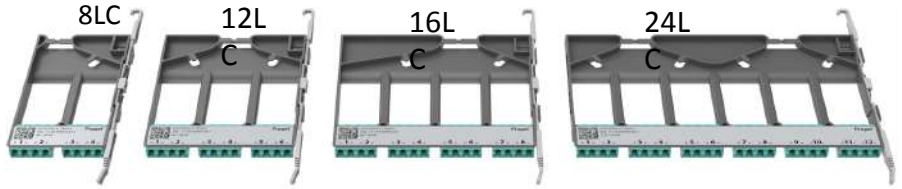
LC adapter modules

MPO8, 12, 16, 24 adapter modules

SN adapter modules

MPO to MPO conversion modules

LC and MPO splice modules



Propel™

Leading with 16-fibers in the enterprise

Most efficient multipair building block for trunk applications

End-to-end APC multimode or singlemode provides application insurance benefits compared to UPC

Enable cost effective backbone switch/breakouts

Supports migrations whether duplex or multipair 4, 8, or 16 fibers; multimode & singlemode

Propel™