COMMSCOPE®

AI

Scaling Data Centers for AI :
The Critical Role of Fiber Infrastructure

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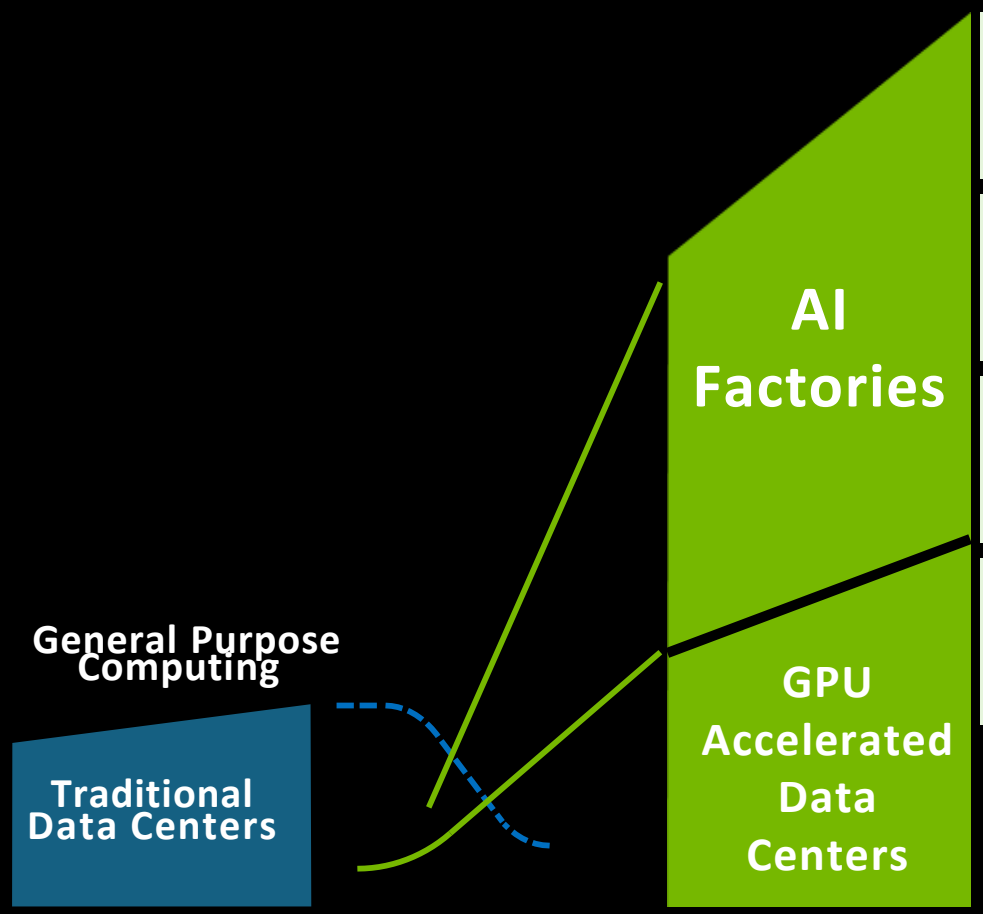
Data Center Bicsi CERTIFIED DCDC Design Consultant

CDCE®

Your Trusted Advisor
System Engineering APAC
Driving Technical Excellence

AI Driving Industry Transformation



$1 Trillion
The installed base of DC infrastructure being modernized

Reinvented for Gen AI
The entire computing stack

Intelligence Tokens
The new commodity

AI Factories
The driver for $2T+ of Data Center footprint

A New Industrial Revolution
Are you ready?

Traditional vs AI Compute Cabling Impact

Traditional Compute

8-32 Servers

8 x CPU / Server

8-32 LC + MPO

32+ Fibers

H200

4 x DGX Nodes

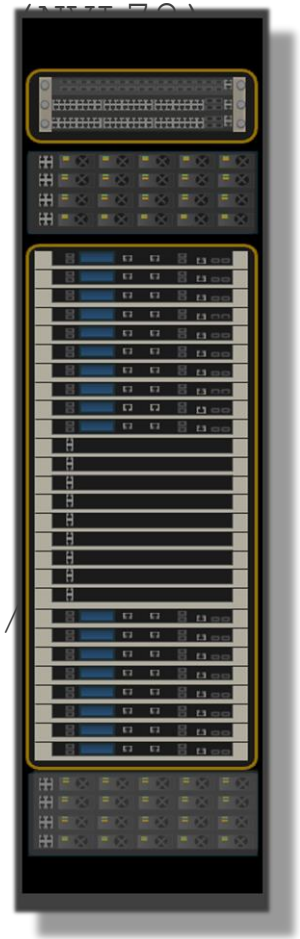
8 x GPU + 1-2 x CPU / Node

32 GPU + 4-8 CPU

40-80 MPO

320-640+ Fibers!

GB200/GB300



18 x Compute Trays + 9 NVLink Switch Trays

4 GPU + 1-2 CPU / Tra

72 GPU + 18-36 CPU

90-108 MPO

720-864+ Fibers!!!

Rack Scale System (RSS)

Evolution of Rack Scale Systems

NVDIA H200/B200: 8 GPU/Chassis,
4 Chassis/Rack, 256 GPU/Scalable Unit

2024

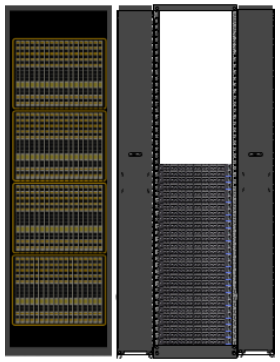
Blackwell Ultra NVL72
4 GPU/Blade, 18 Blades/Rack,
576 GPU/SuperPOD

2025

Rubin NVL144
8 GPU/Blade,
18 Blades/Cabinet,
576 GPU/SuperPOD

2026

Rubin Ultra NVL576
8 GPU/Blade,
18 Blades/Chassis,
4 Chassis/Cabinet,
576 GPU/SuperPOD



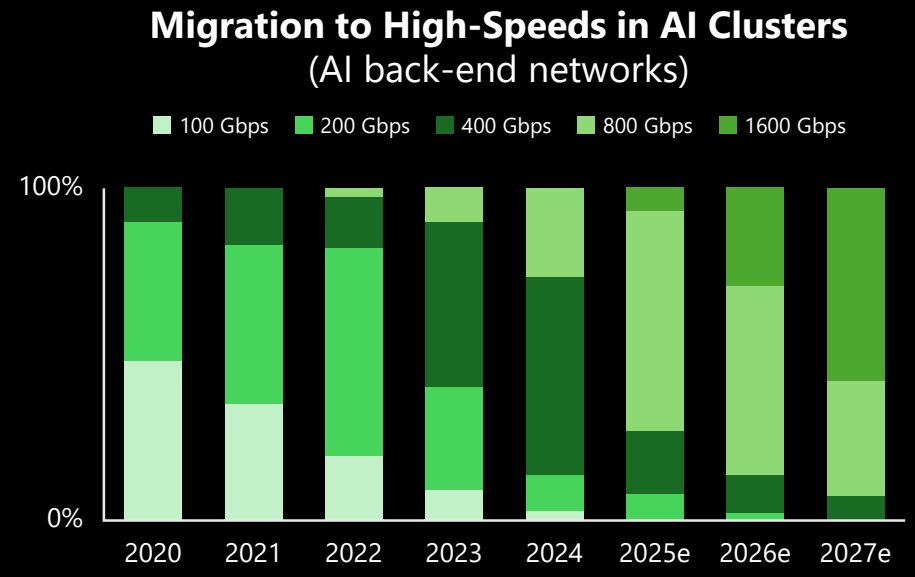
2027

~~18x increase in GPU density~~

More Connectivity in the same physical space

Cable Management is even more important

AI Driving 800G and Beyond



From 400G** (today) **to 800G/1600G/3.2TB ->

- Shift to 16 fiber-based architectures enabling migration and redundancy efficiencies

InfiniBand or Ethernet
(2x400G)

MPO-8/MPO-12

InfiniBand or Ethernet
(1x800G)

MPO-16

"Hybrid" 800G Network
ie. 2x 400G

"Native" 800G Network
ie. 1x 800G

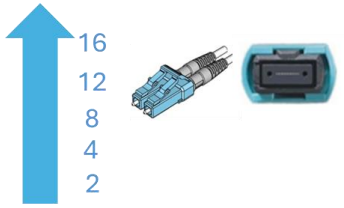
DC Optical Speeds & Feeds

	Multimode / Singlemode				Multi-wavelengths			
Data Rate	PMD	Media	Reach	# of Fibers	# of Wavelengths	Lane Rate	IEEE project / MSA	Publication
1,600G	SR8.2	8-pair MM	100 m	16	2	100G	Terabit BiDi MSA	2023
	VR8.2	8-pair MM	50 m	16	2	100G	Terabit BiDi MSA	2023
	DR8	8-pair SM	500 m	16	1	200G	802.3dj	2026
	DR8-2	8-pair SM	2,000 m	16	1	200G	802.3dj	2026
800G	SR8	8-pair MM	100 m	16	1	100G	802.3df	2024
	VR8	8-pair MM	50 m	16	1	100G	802.3df	2024
	SR4.2	4-pair MM	100 m	8	2	100G	Terabit BiDi MSA	2023
	VR4.2	4-pair MM	50 m	8	2	100G	Terabit BiDi MSA	2023
	DR8	8-pair SM	500 m	16	1	100G	802.3df	2024
	DR8-2	8-pair SM	2,000 m	16	1	100G	802.3df	2024
	FR4	1-pair SM	2,000 m	2	4	200G	802.3dj	2026
	DR4	4-pair SM	500 m	8	1	200G	802.3dj	2026
	DR4-2	4-pair SM	2,000 m	8	1	200G	802.3dj	2026
400G	SR8	8-pair MM	100 m	16	1	50G	802.3cm	2019
	SR4.2	4-pair MM	100 m	8	2	50G	802.3cm	2019
	SR4	4-pair MM	100 m	8	1	100G	802.3db	2022
	VR4	4-pair MM	50 m	8	1	100G	802.3db	2022
	DR4	4-pair SM	500 m	8	1	100G	802.3cm	2019
	FR4	4-pair SM	2,000 m	2	4	100G	802.3cm	2019
	DR2	2-pair SM	500 m	4	1	200G	802.3dj	2026
200G	SR4	4-pair MM	100 m	8	1	50G	802.3bs	2017
	SR2	2-pair MM	100 m	4	1	100G	802.3db	2022
	DR4	4-pair SM	500 m	8	1	50G	802.3bs	2017
	FR4	1-pair SM	2,000 m	2	4	50G	802.3bs	2017
	DR1	1-pair SM	500 m	2	1	200G	802.3dj	2026
	FR1	1-pair SM	2,000 m	2	4	200G	802.3dj	2026
100G	SR4	4-pair MM	100 m	8	1	25G	802.3bm	2015
	SR2	2-pair MM	100 m	4	1	50G	802.3cd	2018
	SR1	1-pair MM	100 m	2	1	100G	802.3db	2022
	VR1	1-pair MM	50 m	2	1	100G	802.3db	2022
	DR1	1-pair SM	500 m	2	1	100G	802.3cd	2018
	CWDM4	1-pair SM	2,000 m	2	4	25G	CWDM4 MSA	2014
	PSM4	4-pair SM	500 m	8	1	25G	PSM4 MSA	2014

Multi-mode Fiber OM4/OM5 for multi-wavelength multi-mode applications
Single-mode Fiber OS2

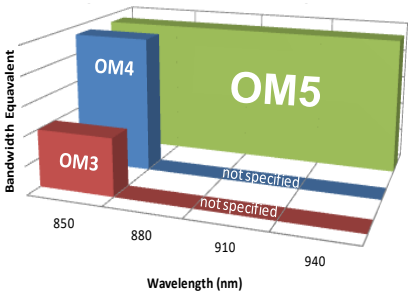
Higher Data Rates Use A Combination Of:

- More Fibres



- Higher Lane Rates

- Multiple Wavelengths (WDM)



AI Clusters and AI Factories: Deployment Challenges

Is Skilled Labor readily Available?

How to shorten installation time?

Is space available for structured cabling?

How much can be configured off-site?

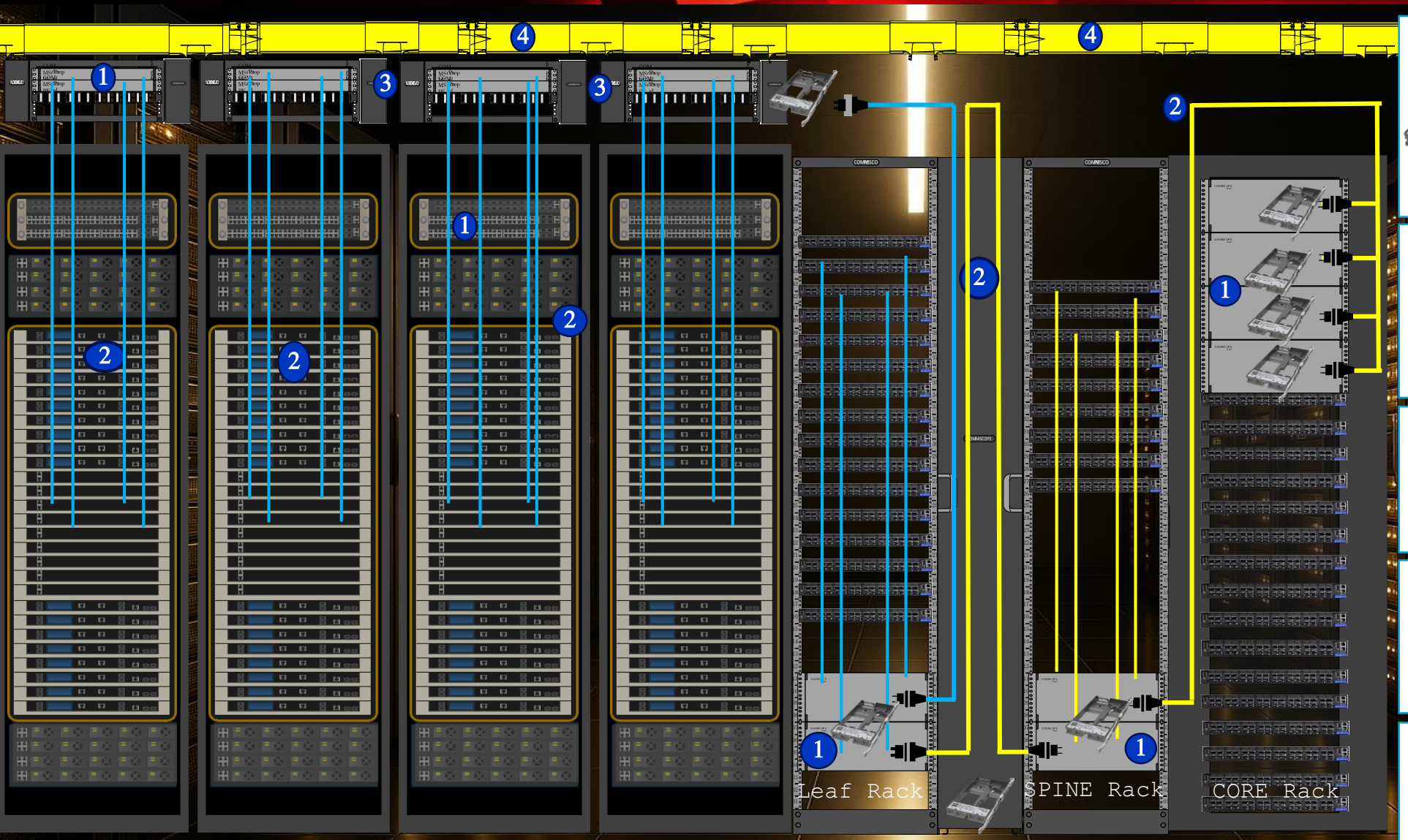
How to reduce the number of “clicks” to install cabling?

How is the access to connections and cable routing , Day 2 ops ..?

What will be the impact of future upgrades?

How to speed up testing and troubleshooting?

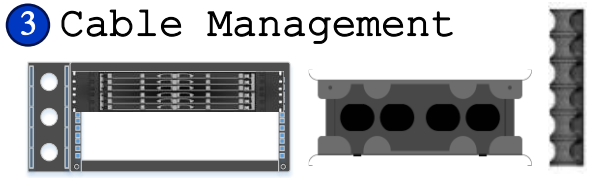
Current Best Practice - Structured Cabling for AI



1 Propel™ Fiber Panels

2 ULL Cable Assemblies

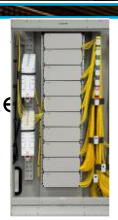
3 Cable Management



4 FiberGuide®

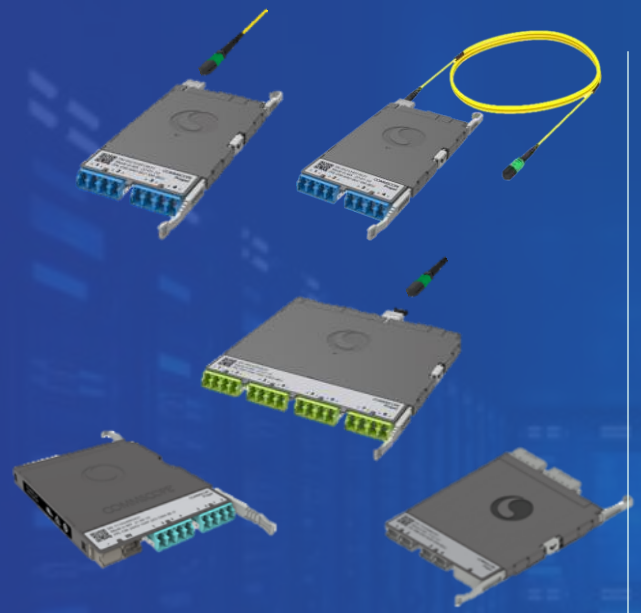
5 ODF & Cabinets

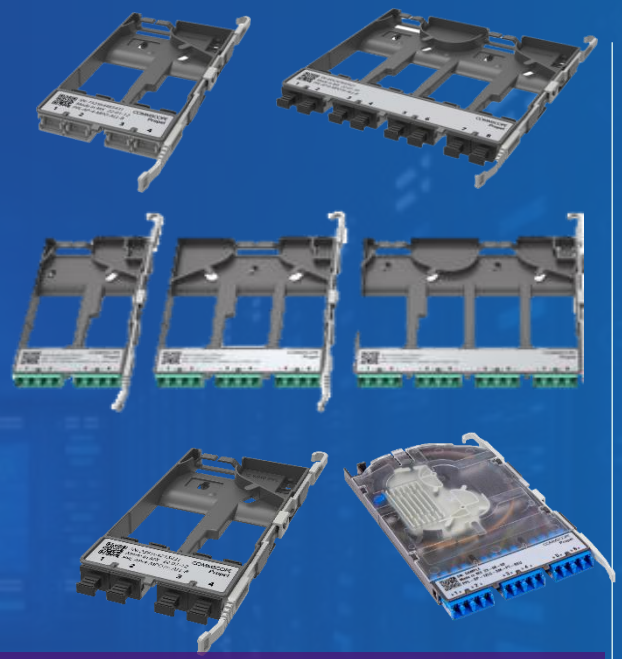
High Density Cross Conne

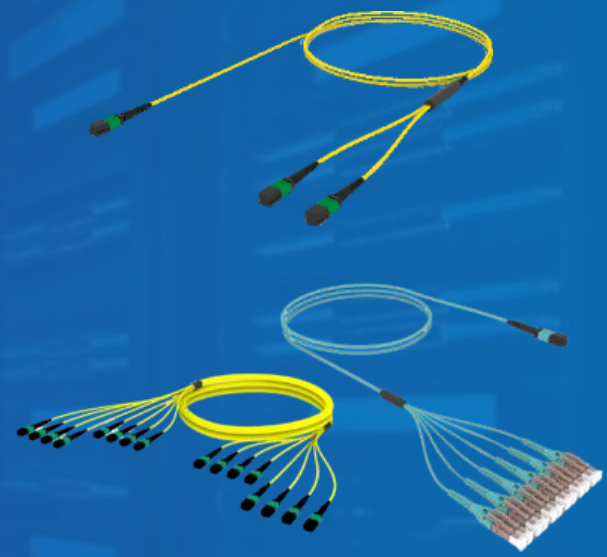


+Copper Category 6A for Out of Band Management

Propel™ Gen AI Density With Applications & Future In Mind







Panels

- 1, 2, & 4RU Sliding panels
- 72 Duplex LC/MPO per RU High Density (144f)
- 144 SN per RU – Double Duplex Density (288f)

Modules & Cassettes

- MM: LC, MPO8 & MPO16
- SM: LC, SN, MPO8 and MPO16
- Front facing breakout
- Mesh 4x4 Module
- CMODs (Cabled modules)

Adapter Packs / Splice Cassettes

- LC, SN, MPO8, 12, 24 & MPO16
- Internal Dust Shutters
- Splice Cassettes 12f, 24f

Cable Assemblies

MM & SM APC options

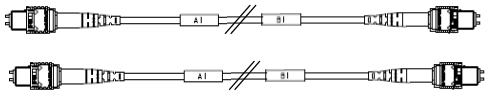
- MPO8, MPO12, MPO16, Trunks
- Duplex LC Uniboot, SN, Patch and Array cable assemblies

Support for **multiple network generations** within the same panel

Structured Cabling design offers flexibility of Breakouts

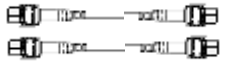
MPO8 APC Unpinned Array

MPO adapter pack



MPO8-MPO8 Trunk (pinned)

MPO Adapter pack

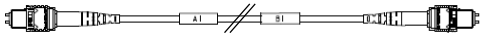


MPO8 APC unpinned Array

MPO8 patchcord

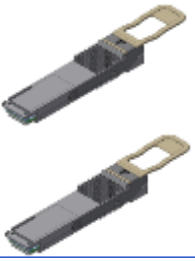
MPO adapter pack

MPO8-MPO8 trunk (pinned)



MPO adapter pack

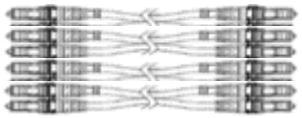
MPO8-2xMPO4 APC array



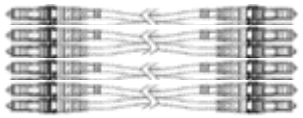
MPO8-MPO8 trunk (pinned)

PO8 - LC DM

LC Uniboot



LC Uniboot

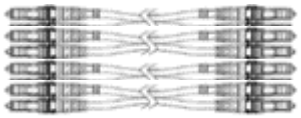


PO8 - LC DM

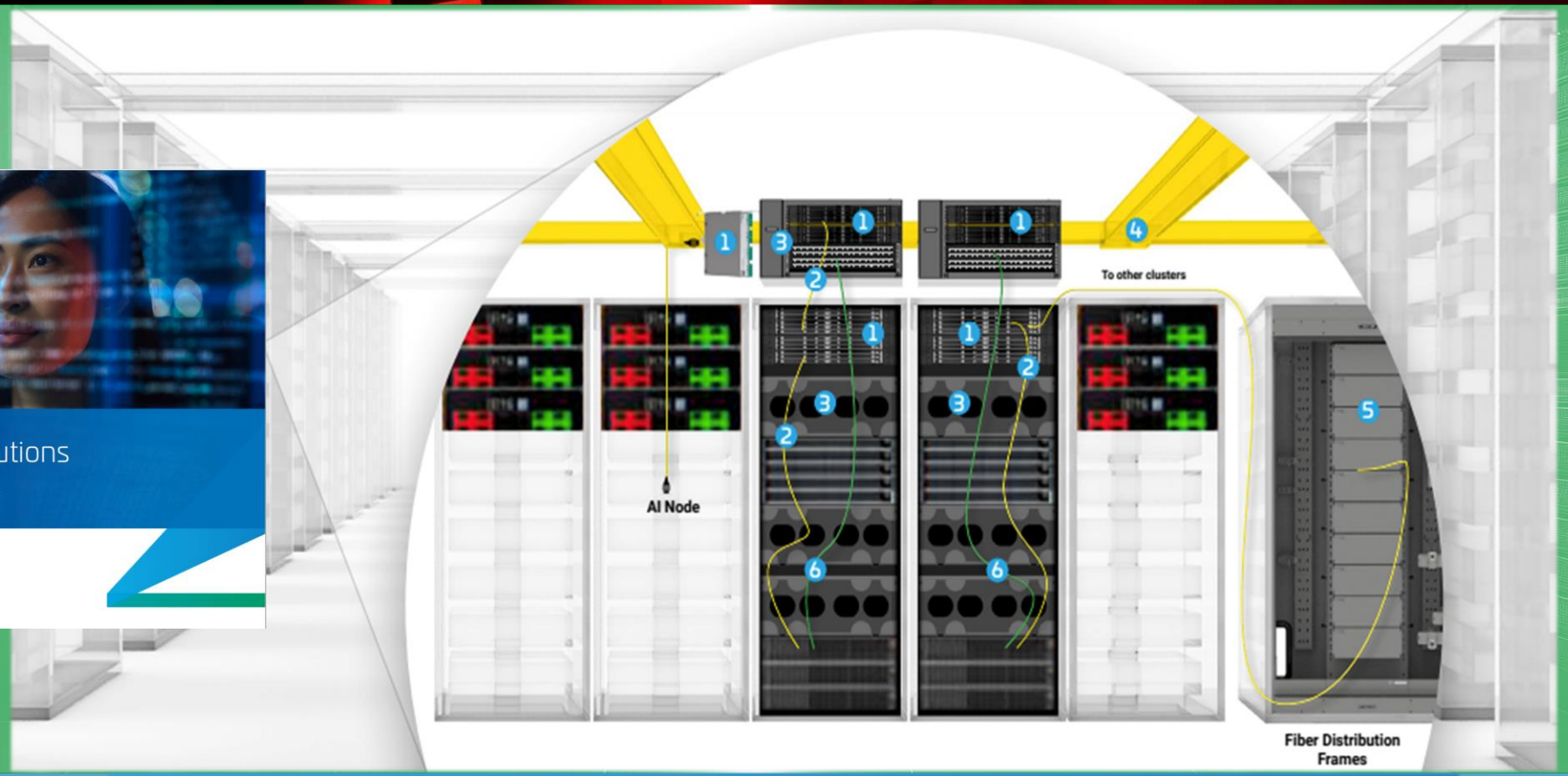
MPO8-MPO8 trunk (pinned)

PO8 - LC DM

LC Uniboot

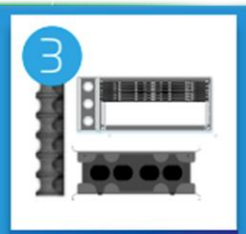


AI Design Solution Portfolio




Propel Fiber Panels


Propel Cable Assemblies


CommScope Cable Management Solutions


CommScope FiberGuide


CommScope Fiber Distribution Frames

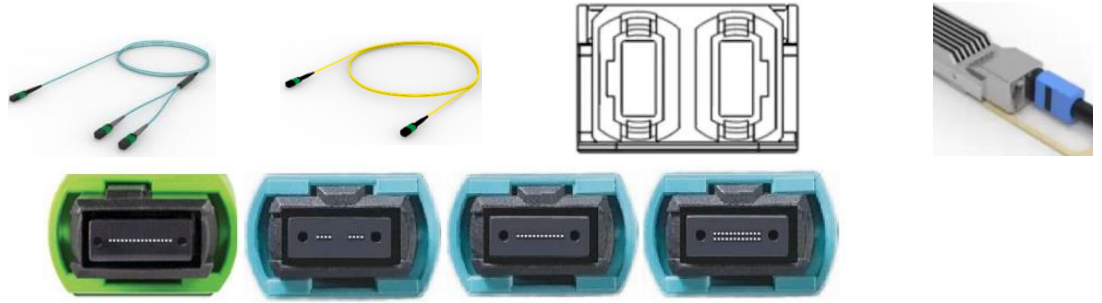

SYSTIMAX Copper Cabling Solutions

Gen AI Fiber Optic Cable And Connector Options Trunk, Patch, & Day-2

EQUIPMENT CORDS:

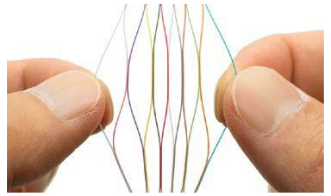
APC (Angled Physical Contact) multimode & singlemode MPO connectors

Mesh cable assemblies 2x2, 4x4, 8x8



MPO16 MPO8 MPO12 MPO24

TRUNK CABLES:
Rollable Ribbon fiber cables save pathway space



96-1728 fibers

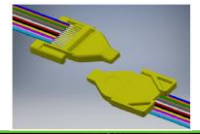
VSSF (VERY SMALL FORM FACTOR) ULTRA LOW LOSS (ULL) CONNECTIVITY, MULTI-PAIR MT:
High fiber count, Factory terminated quality through pathways (conduit/overhead), Provide time and space

MMC16, 24

SN-MT

EXPANDED BEAM OPTICS (EBO):
No additional cleaning required, Day 2 simplicity on-site

EBO 12f, 16f

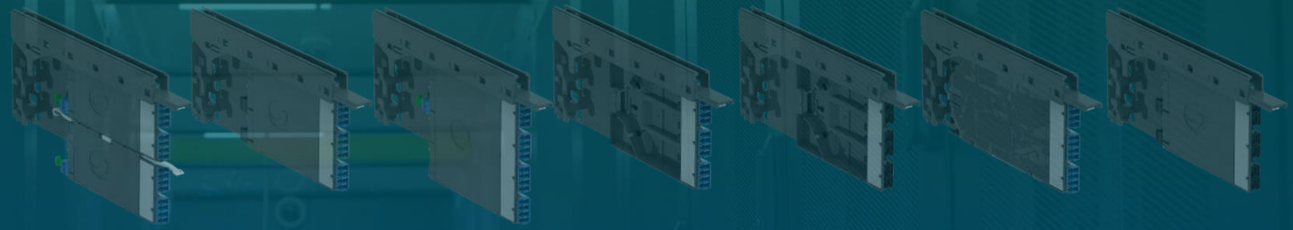


PROPEL X FRAME ODF

High-density design accommodates thousands of fibers to improve cable routing, storage and manageability

Improve density management

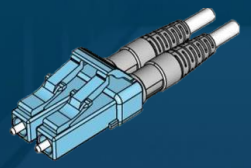
Accepts simplified, high-density Propel modules and cassettes



Fiber per frame? Up to:

3840	6,144	30720
LC duplex	SN duplex	MPOs
(1920)	(3072)	(1920)

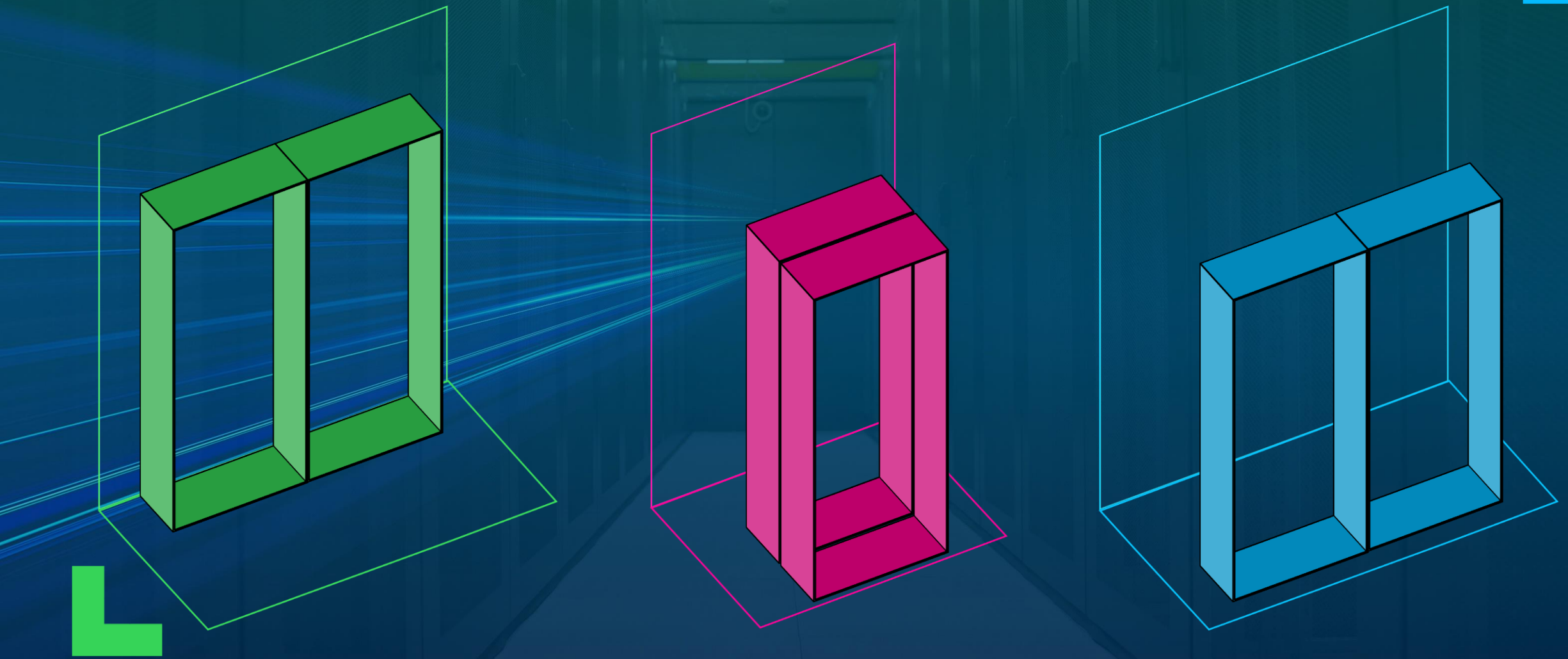
Connector Types

LC Duplex	SN®	MPO
		
		

Supports a variety of standardized connectors and MPO8 to MPO16

Maximize DC space

Place against a wall, back to back or free-standing



COMMSCOPE®

FiberGuide® fiber raceway solutions is the preferred choice in Central Offices, Data Centers and Mobile Switch Centers around the world.

Key Differentiators:

- Scalable, Flexible & Customizable Design
- Installer Friendly, Snap-Fit, Tool less, Fast installation
- Robust "Sturdy" Product
- Extensive design tool suite
- Well known, highly available

Industry's MOST Comprehensive Solution

25+ years of success

- **FiberGuide** – *EST 1989* – Industry standard in Carrier market
- **FiberGuide** – *EST 2008* – Primarily for use in data centers

AI DC Challenges & CommScope Benefits

CHALLENGE	**Build & Deploy Gen AI Compute Faster** Data Center Build Schedules Are Being Compressed From Years & Months To Weeks 	**Secure Supply Chains That Support Gen AI Growth Initiatives** More Fibers = More Terminations More Compute Requires More Power = Builds Outside Traditional Tier 1 Locations 	**Rapid Changes In Gen AI GPU Silicon** Technology Advancements Are Delivering Higher Network Speeds, Faster 
COMMSCOPE SOLUTION BENEFIT	• **Faster Install** Pre-terminated Fiber • **Scale** High Density Solutions • **Assurance** End-to-End Performance	• **Secure Supply Chain** Global Manufacturing • **Local Support** Partner Ecosystem • **Availability** Fiber Capacity Investments	• **Lower TCO** Structured Cable • **Agile Migration Path Modular Solutions** • **Reduced Time To Revenue** Simplified Management

AND Still Maintain Sustainability Commitments

SYSTIMAX®
COMMSCOPE

YOUR NETWORK…

YOUR FUTURE…