DATA CENTERS

A holistic view of the data center
and the opportunities to enhance
its infrastructure to meet current
and future demands

COMMSCOPE®

Chapter 4

High Speed Migration

High Speed Migration

Redesigning data center connectivity for a higher-speed future

To support the rapid growth of cloud-based storage and compute services, data centers are adapting their traditional three-layer switching topologies to accommodate highly agile, low-latency performance. These new architectures resemble "warehouse scale" facilities that are designed to support many different enterprise applications.
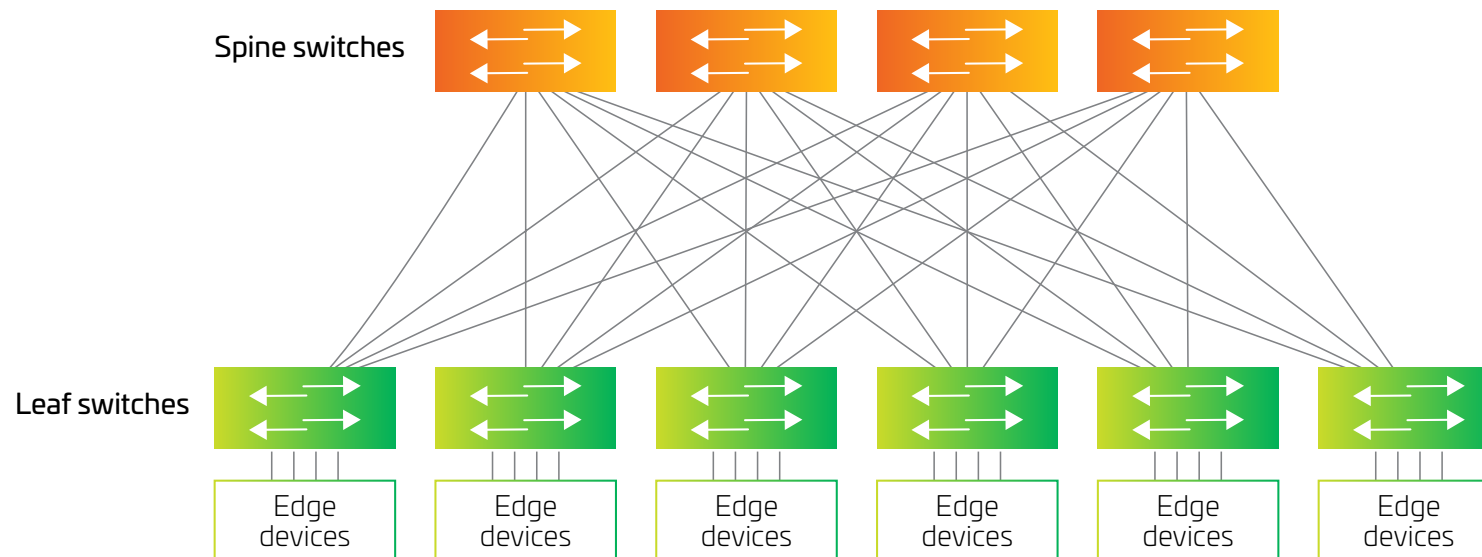

Leaf-spine architectures, for example, create an optimized path for server-to server communication that can accommodate additional nodes, as well as higher line rates, as the network grows. The meshed connections between leaf-and-spine switches allow applications on any compute and storage device to work together in a predictable, scalable way regardless of their physical location within the data center.

Future-ready fabric network technology

Demand for lower costs and higher capacities in the data center is growing. New fabric network systems that can better support cloud-based compute and storage systems are becoming the architecture of choice. Their ability to deliver any-to-any connectivity with predictable capacity and lower latency makes today's fabric networks a key to enabling universal cloud services.
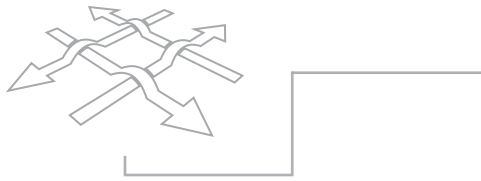
These fabric networks can take many forms: fabric extensions in a top-of-rack deployment, fabric at the horizontal or intermediate distribution area, and fabric in a centralized architecture. In all cases, consideration must be given to how the physical layer infrastructure is designed and implemented to ensure the switch fabric can scale easily and efficiently.
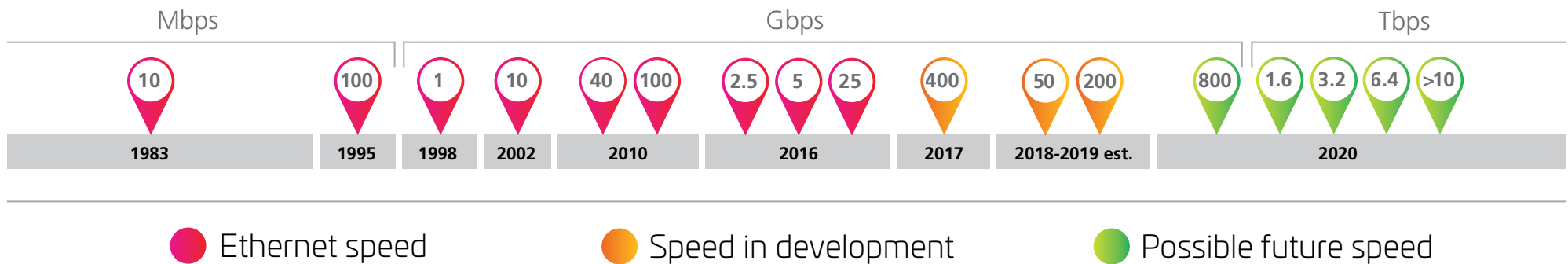
The fabric has inherent redundancy, with multiple switching resources interconnected across the data center to help ensure better application availability. These meshed network designs can be much more cost-effective to deploy and scale when compared to very large, traditional switching platforms.

The design of high-capacity links is more complex since the number of links and link speeds is increasing. Providing more data center capacity means pushing the limits of existing media and communication channel technologies. As shown below, the Ethernet Alliance Roadmap illustrates existing application standards and future application rates beyond one terabit per second. This will further challenge complexity as application speeds move from duplex transmission to parallel transmission. The advent of new technologies—shortwave wavelength division multiplexing (SWDM), OM5 wideband multimode fiber (WBMMF), bi-directional (BiDi) transmission, coarse wavelength division multiplexing (CWDM) and more efficient line coding—is expected to delay the transition to parallel optics.

ETHERNET ROADMAP

Mbps						Gbps						Tbps				
10		100	1	10	40	100	2.5	5	25	400	50	200	800	1.6	3.2	6.4	>10
1983		**1995**	**1998**	**2002**	**2010**		**2016**			**2017**	**2018-2019 est.**		**2020**				

● Ethernet speed   ● Speed in development   ● Possible future speed

Tomorrow's possible interfaces

OBO

ASIC

0.12-1.2Tb/s

40-400Gb/s

MPO

μQSFP

200-800Gb/s

QSFP-DD

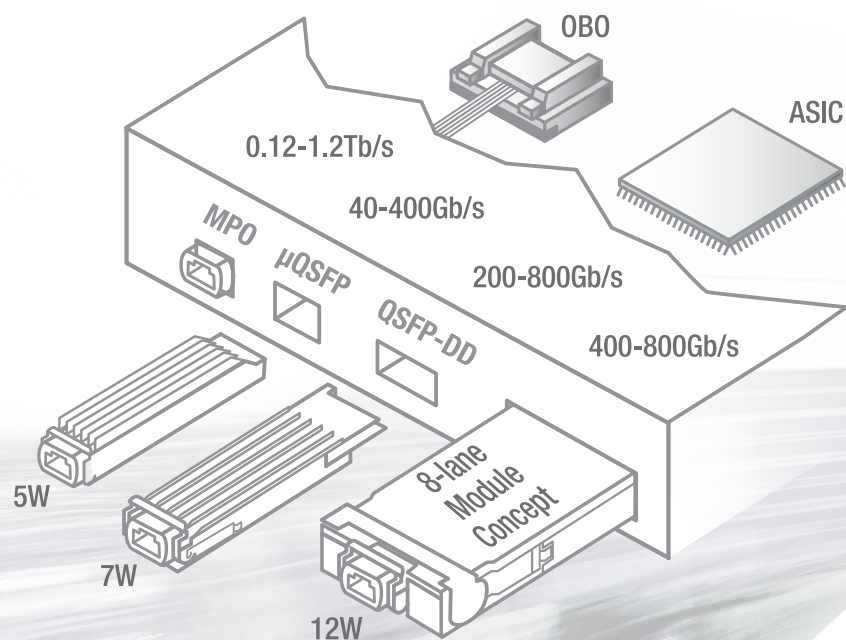400-800Gb/s

5W

7W

8-lane Module Concept

12W

Image Courtesy of the Ethernet Alliance

The combination of shortwave wavelength division multiplexing (SWDM) and OM5 wideband multimode fiber (WBMMF) provides the opportunity to extend the use of multimode technology, which continues to be the most prevalent fiber technology deployed in data centers.

Engineered solutions make complex
fabric networks easy to design, implement and manage.
Preterminated high-performance systems support next-generation network
media, duplex and multifiber modular applications while reducing deployment management
time and expense.

Design guide:

Fabric networks: Designing your
network for the future—
from 10G through 400G and beyond

Brochure:

High Speed Migration

Video:

SYSTIMAX Application Assurance:
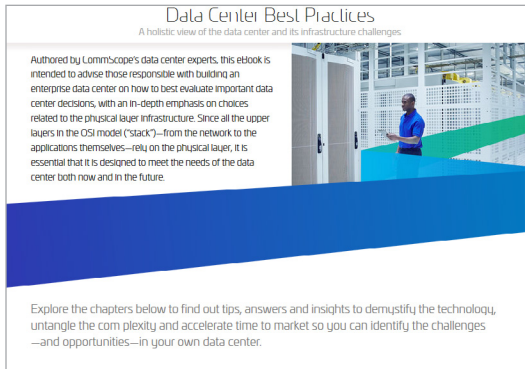High-speed application support—
guaranteed

Application note:

High Speed Migration:
Choosing the right multimode
multi-fiber push on (MPO) system
for your data center

COMMSCOPE®

Data Center Best Practices
A holistic view of the data center and its infrastructure challenges

Authored by CommScope's data center experts, this eBook is intended to advise those responsible with building an enterprise data center on how to best evaluate important data center decisions, with an in-depth emphasis on choices related to the physical layer infrastructure. Since all the upper layers in the OSI model ("stack")—from the network to the applications themselves—rely on the physical layer, it is essential that it is designed to meet the needs of the data center both now and in the future.

Explore the chapters below to find out tips, answers and insights to demystify the technology, untangle the com plexity and accelerate time to market so you can identify the challenges —and opportunities—in your own data center.

For more information on enhancing your data center, reach out to one of our experts now.

CommScope pushes the boundaries of communications technology with game-changing ideas and ground-breaking discoveries that spark profound human achievement.
We collaborate with our customers and partners to design, create and build the world's most advanced networks. It is our passion and commitment to identify the next opportunity and realize a better tomorrow.
Discover more at commscope.com