







# The Evolution of Data Center Networking: How Advances are Enabling the Digital World

## The Expansion of Data and Bandwidth Needs

As enterprises have shifted more services and operations to the cloud and data center usage has rapidly increased, the volume of data being processed and stored has exploded. According to recent estimates, the volume of data generated worldwide each year will grow to around 175 zettabytes by 2025.

With

this exponential data growth has come a need for data centers and their internal networks to support vastly higher bandwidth requirements to efficiently move and access all this information. Traditional data center network architectures can no longer keep up with skyrocketing traffic demands.

This has driven networking advances focused on increasing throughput, reducing

latency, and enabling highly scalable, automated networks.

## The Rise of Virtualization and Hyperconverged Infrastructure

One of the major developments enabling higher [Data Center Networking](#) densities, workloads, and bandwidth needs has been the rise of server and network virtualization. Virtualization technologies allow multiple virtual machines and workloads to run simultaneously on the same

physical servers. This increases server utilization rates dramatically. At the same time, it introduces new virtual networking requirements within data centers. To support virtualized environments, data center networks needed new

high-performance switching fabrics and automation capabilities. Network virtualization solutions emerged that could provide logical networks on top of physical switching infrastructure. These developments paved the way for hyperconverged infrastructure, where compute, storage, networking, and virtualization are integrated and automated within single nodes or clusters. Hyperconverged infrastructure radically simplified data center design while boosting available networking bandwidth through its built-in virtual fabric.

## The Adoption of High-Speed Optics and Switching Fabrics

To deliver the bandwidth virtualized infrastructure demands, data center networking needed to adopt higher port speeds and switching throughputs.

This

drove a transition from 1 Gigabit and 10 Gigabit Ethernet to 25 Gigabit, 40 Gigabit, 100 Gigabit, and now 400 Gigabit and above Ethernet speeds.

Optics

shifted from multimode fiber to lower cost, higher bandwidth single-mode fiber capable of supporting 100G and beyond. Networking switches proliferated with

high-speed designs and smart controllers, helping to deliver 100Gbit/sec

