Bridging the Gaps in Data Center Connectivity

How hyperscalers and enterprises can overcome speed, security, and visibility challenges while transforming their networks for the AI-powered economy.

Challenges

As enterprises accelerate digital transformation and embrace the AI revolution, the need to connect data centers with speed, security, and intelligence has never been more critical. Yet this evolution brings significant hurdles. Organizations are grappling with infrastructure limitations that strain under the demands of AI and real-time analytics, while also facing heightened security risks in increasingly distributed environments.

Compounding these issues is a lack of visibility and real-time control across hybrid and multi-cloud architectures, making it difficult to optimize performance or respond swiftly to disruptions. Addressing these challenges is essential for building a future-ready connectivity strategy.

When connecting data centers, especially in the context of AI, cloud, and edge computing, organizations face a range of complex challenges. Drawing from expert insights, here are three of the most pressing challenges:

Infrastructure limitations and latency pressures

As AI workloads and real-time analytics scale, traditional long-haul fiber infrastructure often proves insufficient. Enterprises now require ultra-high-speed, low-latency connectivity to support massive data flows between data centers. This is especially critical for hyperscalers and large enterprises that need to move data seamlessly across distributed environments. The rapid advancement of generative artificial intelligence requires at least 10 times more fiber connections within data centers, as well as a robust fiber network to transmit information between these data hubs, [1] which make it difficult to plan and scale effectively for current and future AI workloads.

Security and resilience in a distributed Environment

With the rise of multi-cloud and hybrid-cloud strategies, enterprises must ensure secure and resilient connectivity across diverse platforms. This is complicated by the need to balance performance with robust security measures, especially as cyber threats become more sophisticated. A single breach can have severe financial and reputational consequences, making secure inter-data center communication a top priority.

Lack of Visibility and Real-Time Control

As data center environments become more distributed and dynamic, enterprises struggle with gaining real-time visibility into traffic flows, performance bottlenecks, and security threats. This lack of transparency makes it difficult to optimize workloads, enforce policies, or respond quickly to incidents. According to industry insights [2], this is especially problematic in hybrid and multi-cloud environments where centralized control is limited.

Solutions

Recognizing the need for robust, scalable, and intelligent connectivity, Lumen delivers a future-ready solution designed for the demands of AI, cloud, and big data.

With Lumen Private Connectivity Fabric℠ (PCF), hyperscalers and large enterprises can seamlessly integrate into the largest ultra-low-loss intercity fiber network in North America, enabling them to move massive volumes of data with speed, security, and precision.

> "With 400G connectivity speeds today and a seamless upgrade path to 1.2 terabits, Lumen stands as the trusted network for AI"
>
> **– Dave Ward**
> Chief Technology and Product Officer, Lumen

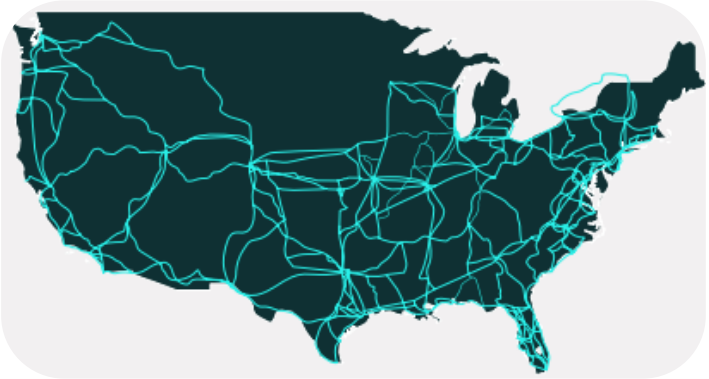
Lumen® distinguishes its network from others in the industry by continuously upgrading its infrastructure using a multi-conduit system, allowing for the quick deployment of the latest fiber technology and its U.S. intercity network includes diverse routes to more than 50 major cities across the country. [3]

Lumen continues to invest aggressively in next-generation fiber infrastructure, achieving record-breaking connectivity speeds.

With 400G connectivity available today and a seamless upgrade path to 1.2 terabits, Lumen is positioned as the trusted network for AI workloads. [4]

The deployment of new near loss-less fiber from Corning further enhances Lumen's data center infrastructure.

This is designed to significantly reduce signal degradation and enhance performance across long-haul routes. As part of a strategic agreement securing 10% of Corning's global fiber capacity for each of the next two years, this next-generation optical cable accelerates the transmission of massive AI workloads and supports the rapid expansion of cloud and edge computing. By more than doubling its U.S. intercity fiber miles, Lumen is not only boosting capacity but also reinforcing its position as the backbone of the AI economy [5]



Why Lumen Private Connectivity Fabric?

Ultra-Low Latency & High-Speed Connectivity

Purpose-built to support AI and real-time analytics, PCF is a tailored solution to deliver the performance needed to move data between distributed environments without compromise.

Scalability & Flexibility:

Designed to grow with your workloads, PCF supports dynamic scaling and seamless integration across hybrid and multi-cloud architectures.

Security & Resilience

Built with enterprise-grade security and redundancy, PCF helps ensure your data stays protected.

Operational Visibility & Control:

Gain real-time insights into traffic flows and performance, enabling fast decision-making and proactive optimization.

Learn more at Lumen.com/PCF

Why Lumen?

Lumen is unleashing the world's digital potential. We ignite business growth by connecting people, data, and applications quickly, securely, and effortlessly. As the trusted network for AI, Lumen uses the scale of our network to help companies realize AI's full potential. From metro connectivity to long-haul data transport to our edge cloud, security, managed service, and digital platform capabilities, we meet our customers' needs today and as they build for tomorrow

1. Corning and Lumen Reach Supply Agreement on Next-Generation Fiber-Optic Cable to Support Data Center AI Demands - Aug 1, 2024
2. Overcoming the Top 5 Challenges of Data Center Interconnect - Ciena
3. Same as 1
4. Lumen and Ciena Transmit Record-breaking 1.2 Tbps Wavelength Service Across 3,050 Kilometers - Mar 27, 2025
5. Same as 1

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