The urgency of high-performance edge-to-data center connectivity

High-bandwidth, low-latency, edge-to-data-center connectivity is crucial for digital transformation and innovation in an evolving AI ecosystem.

The volume and mission-critical nature of traffic moving between data centers and edge locations are soaring as companies deploy new real-time applications that rely on processing data as close to the source as possible.

By 2028, more than two-thirds of enterprise-managed data will be created and processed outside the data center or cloud., according to a Gartner Research report.[1]



That growth is driven by organizations extending their digital transformation efforts to the far reaches of their distributed enterprises in virtually all vertical industries. Examples include retailers digitizing their stores and manufacturers collecting and processing assembly line data from internet of things (IoT) sensors.

Then there's the artificial intelligence (AI) ecosystem. Organizations are building new applications that leverage machine learning (ML) and AI. On top of that, the software vendors that provide productivity, business process, security, and other types of applications to the enterprise are all embedding ML and AI into their offerings.

IDC research shows that about 27% of organizations have already deployed edge AI, with an additional 54% planning implementation within the next two years..[2] Use cases are evolving from those focused on simple digital pipelines and basic automation to richer edge AI and even generative AI at the edge.

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The evolving AI ecosystem

As more computation and data storage move to the distributed edges of the network, exciting new capabilities become possible but new challenges also arise. Foremost among them is the availability of secure, reliable, scalable connectivity between edge locations and the data center.

Lumen Chief Technology & Product Officer Jim Fowler says, "AI training and inference depend on moving massive volumes of data between where it lives and where compute runs. Without high-bandwidth, low-latency connectivity, those systems can't operate in real time."

Providing high-bandwidth, low-latency, scalable, secure edge-to-data center connectivity is important not only for the performance of current business-critical applications but also AI-powered applications.

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Not having that capacity can prevent companies from successfully deploying new AI applications that are critical for driving digital transformation and providing competitive advantage.

For CIOs to deliver the underlying connectivity that supports digital transformation and innovation in an evolving AI ecosystem, a mindset shift is required. Traditional point-to-point or hub-and-spoke topologies are no longer adequate. Organizations need to leverage connectivity based on a fabric architecture. A fabric provides on-demand bandwidth and services that can automatically scale to meet the rapidly expanding requirements of the business and AI ecosystem.



As organizations extend connectivity across distributed environments, traditional approaches built on internet-based overlays can introduce variability in performance, security, and reliability. Lumen Chief Technology & Product Officer Jim Fowler says, "The perimeter isn't a building anymore – it's the whole internet – and the workforce is far more distributed than it used to be. When connectivity is riding on internet-based overlays, you introduce variability in performance, security, and reliability. That's why organizations are increasingly moving critical workloads onto private connectivity frameworks that isolate traffic from the open internet and reduce exposure."

To support high-bandwidth, latency-sensitive workloads, that connectivity foundation must be built on an underlay that delivers dynamic, flexible performance aligned to business needs. Examples include SD-WAN over public broadband for bandwidth needs in the 1–2Gbps range, Ethernet for use cases up to 10Gbps, and fiber optic waves for traffic that exceeds 10Gbps.

Lumen offers on-demand services such as internet, Ethernet, and IP virtual private network (VPN), enabling rapid, scalable, reliable edge-to-data center connectivity, all in a pay-as-you-go model. And, as organizations embrace AI, the demand for rapid data movement is unprecedented, requiring a network that can handle the load with agility and speed. Lumen offers a modular approach for designing a custom network architecture providing the scalability, flexibility, and security needed to meet the demands of AI.

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Footnote(s)/Disclaimer(s)

1. Gartner® Predicts 2026: Physical AI Pushes I&O to the Edge
2. The Unified Edge: Simplifying Secure, AI Ready Infrastructure for the Distributed Enterprise 2026

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