

How Lumen Wavelengths helped power a leading cloud software company's AI ambitions

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Summary

A leading cloud software company was preparing to scale an AI-powered search platform across its user base when the infrastructure underneath the initiative hit a wall. It was hitting compute and connectivity limits at one of its main colocation data centers, forcing it to relocate into a larger facility and upgrade backbone connectivity — all under an accelerated timeline tied to its AI launch.

The company turned to Lumen, which was already a carrier on parts of its network and which had already helped other leading companies and hyperscalers with their network modernization efforts. What started as a bandwidth request evolved into a months-long collaboration. It involved over twenty design iterations across roughly a dozen US metros, custom routing to ensure carrier diversity, and an architecture shaped around long-term AI ambitions rather than just immediate needs.

The resulting deployment positioned the customer to support both its AI launch and any subsequent growth.



About Lumen Wavelength Solutions

Lumen Wavelengths delivers dedicated 100G and 400G optical transport as part of the Lumen Private Connectivity Fabric (PCF), providing deterministic performance, AES-256 encryption, and physically diverse routing for latency-sensitive, data-intensive workloads.



~340,000
total route miles



100,300
next-gen, 400G-enabled wavelength miles



400+
PoPs with 400G connectivity



2,200+
third-party data centers



#1
in Wavelength Services, North America for the third consecutive year — Frost Radar, 2025



#1
U.S. Wavelength Services Provider for the fifth consecutive time by Vertical Systems Group, 2025

Situation and Challenges

The customer operates multiple large data centers that support latency-sensitive, data-intensive workloads for both enterprise and consumer users. It planned a rollout of an AI-powered search platform that routes each user query to whichever external large language model is best suited to handle it. That meant low-latency bandwidth demand across the company's backbone was about to climb sharply.

One of the company's main metro area data centers — a critical hub in its infrastructure — had to be vacated. The colocation provider was relocating tenants, requiring the customer to move to a larger facility. In doing so, it took the opportunity to plan its network capacity for future growth. Rather than simply replicating the existing 100G links at the new location, the company opted to upgrade to 400G wavelengths while the architecture was being reworked.

Complicating things further, the new capacity had to be operational by a hard deadline tied to the AI platform's rollout timeline. The scope wasn't limited to a single metro. The customer required high-capacity connectivity across roughly a dozen major US metropolitan areas, each with its own routing constraints and diversity requirements relative to a second carrier.





The Solution:
Partnership Over Procurement

Lumen was already providing services to the customer, and the account team had built a working relationship grounded in years of familiarity. When the scale of the AI-driven infrastructure challenge became apparent, the team's objective wasn't to quote on a bandwidth order and move on — it was to think alongside the customer over the long term.

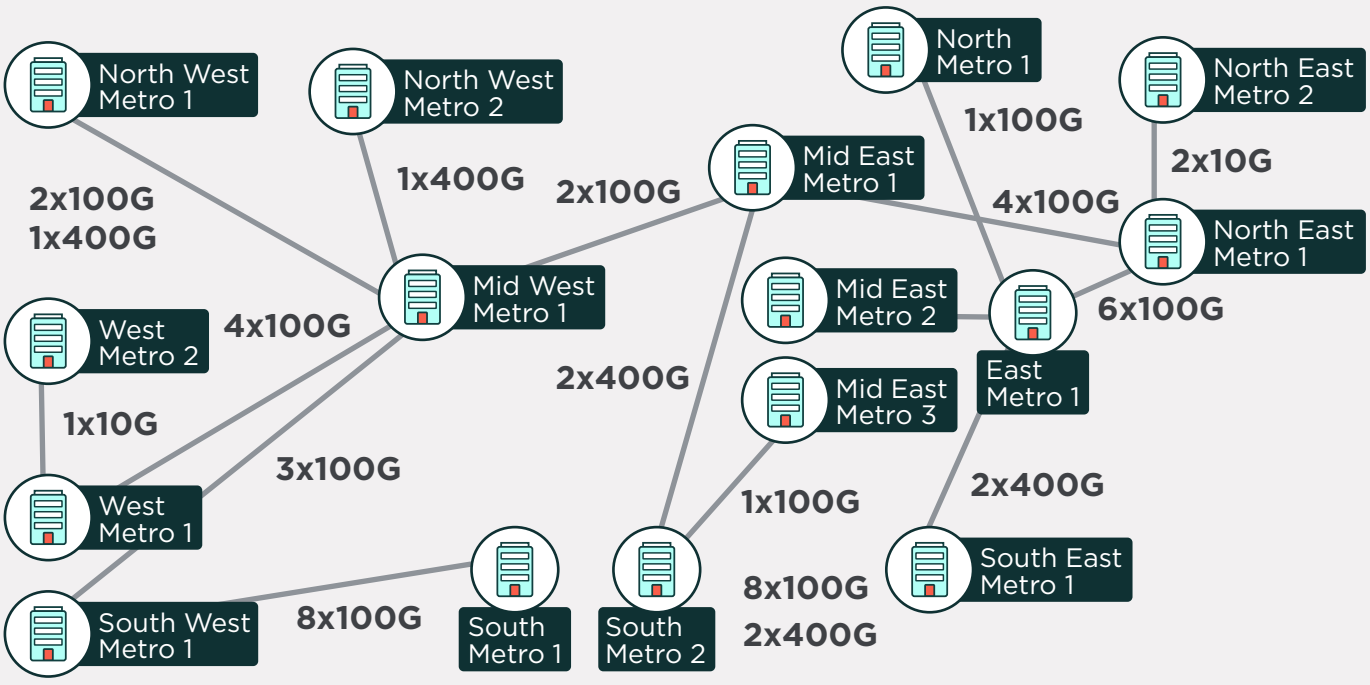
That longer view mattered. Through sustained conversations, Lumen's team pieced together the full picture: the data center migration, the AI platform's broader rollout, and plans to expand into additional markets. Each revelation reshaped the solution, turning a narrow connectivity project into a multi-metro network redesign.

The engineering reflected that ambition. Lumen's technical architect worked directly with the customer through more than twenty design iterations so that the customer could compare them against their second carrier to maintain physical diversity.

When Lumen identified an overlap with the other carrier on a given path, it could quickly pivot to an alternative. That was only feasible because of the underlying network's breadth. A smaller provider might have offered a handful of route options; with the largest ultra-low-loss inter-city fiber network in North America, Lumen gave the customer far more to work with.

Lumen built custom-routed 2×400G wavelength solutions on critical long-haul corridors for the software company. The choice of 400G was forward-looking: current traffic was mostly query-and-response volume, but the customer was positioning for the day it began bringing AI processing in-house.

Solution Architecture



Custom-routed 100G and 400G wavelengths across 15+ U.S. metros, designed for carrier diversity, low latency, and room to grow.

Results

The deployment helped the customer meet its accelerated AI platform timeline while establishing a network architecture that scales with demand. What began as a reactive response to a data center relocation became the foundation for something more durable.



Beat deployment deadline
High-capacity wavelength connectivity was designed to be operational by the customer's launch deadline, supporting the broader rollout of its AI-powered platform.



Next-gen scalability
The customer has already begun asking about 800G wavelengths and dark fiber, indicating how much they're staking on AI growth. The original project scope feels like a starting point rather than a finish line.



Future capacity for AI growth
The 400G wavelengths now in place across key corridors provide the customer with far more headroom than the legacy 100G links. That enables it to absorb the kind of traffic increases that come with scaling an AI platform to a mass user base. When demand does spike, the network won't need to be torn up and re-architected.



Customized strategic approach
This engagement was always more than a vendor transaction. The customer received a more personalized approach, as Lumen identified the right people across large teams and worked with them to tailor the solution to the company's actual situation. That mattered as much as the raw capacity.

Key Takeaways for Network Leaders

This project provides some valuable lessons for enterprise leaders grappling with AI-driven infrastructure decisions:



Build for tomorrow, not today. This customer selected 400G when their traffic could have run on a lower capacity. But ripping out and replacing network infrastructure every time demand increases is expensive and disruptive, and AI workloads tend to grow faster than anyone expects.

Keep talking. The best insights come from ongoing conversations, not RFP responses. Lumen's team identified items the customer hadn't considered, including long-term scaling requirements. These led to architectural choices that will pay off in the years to come. That understanding came from sustained engagement at the engineering level over several months.

Route diversity is non-negotiable at scale. With workloads spread across a dozen-plus metros and traffic split between carriers, the breadth to offer truly diverse physical paths is a baseline requirement.

Why Lumen?

Lumen has spent decades building the network infrastructure that companies depend on when performance, scale, and resilience matter simultaneously. If your organization is navigating AI-driven connectivity needs, Lumen Wavelengths (part of the Lumen Private Connectivity Fabric) can provide the dedicated, high-capacity transport and consultative partnership to help you get there.

Schedule a network consultation to find out how.

Schedule Now



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Lumen connects the world. We are igniting business growth by connecting people, data, and applications – quickly, securely, and effortlessly. Everything we do at Lumen takes advantage of our network strength. From metro connectivity to long-haul data transport to our edge cloud, security, and managed service capabilities, we meet our customers' needs today and as they build for tomorrow.

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