

A futuristic cityscape with a network overlay. The scene is dominated by a vibrant cyan and magenta color palette. In the foreground, a complex network of glowing lines and nodes is superimposed over a city skyline. The buildings are rendered in a stylized, almost wireframe-like manner, with some appearing as solid blocks of color. The background shows a dense urban environment with various skyscrapers under a hazy, cyan sky. The overall aesthetic is high-tech and digital.

# AI-Ready Networks: 5 Keys to Success

In a world where AI's insatiable appetite for bandwidth grows daily, businesses must invest in robust networks to stay ahead and harness the full potential of emerging technologies.

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## Introduction

In the era of artificial intelligence (AI), the ability to connect, process and analyze data at unprecedented speeds is not just an advantage—it's a necessity. As organizations across industries embark on their AI journeys, the underlying network infrastructure becomes the backbone of their success. Yet a staggering **86% of CIOs don't think their enterprise networks are prepared for the AI revolution**<sup>1</sup>—underscoring the urgent need for a new approach to business connectivity.

In this eBook, we explore the advantages of a robust, adaptable network fabric designed to harness the full potential of AI—and how partnering with Lumen can help you achieve the network of tomorrow, today.





## Fueling AI's insatiable appetite

AI technologies are transforming the way we live and work, offering solutions that range from predictive analytics to autonomous systems. However, the effectiveness of these solutions is heavily dependent on the network's ability to handle the increased demands of AI and machine learning (ML) workloads, which require processing enormous volumes of data in flight at lightning-fast speeds.

**By 2030, worldwide data will grow to over 660 zettabytes of data—equivalent to 610 iPhones worth of data per person in the world.<sup>2</sup>**

# Optimizing AI performance in data-driven industries

Connectivity is the lifeline that helps ensure data flows seamlessly from sensors to servers, from clouds to clients and from devices to data centers. As AI continues to evolve, the demand for fast, high-bandwidth network resources grows more critical, especially in these key sectors.

# 72%

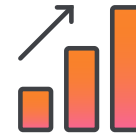
of respondents say their organizations are regularly using generative AI in at least one business function, up from 50% in 2022 and just 20% in 2017.<sup>3</sup>

The common thread tying these use cases together is the need for robust connectivity to support the heavy data loads and real-time processing capabilities of AI systems. Whether you are implementing AI now or plan to in the future, you need a strong network backbone designed to help you fully realize all the potential AI has to offer.



## Healthcare

AI-powered diagnostic tools and telemedicine services rely on high-speed networks to process and transmit large medical datasets, enabling faster and more accurate patient care.



## Finance

AI algorithms in the financial sector process vast amounts of transactional data for fraud detection and algorithmic trading, requiring low-latency networks to deliver real-time insights.



## Retail

In retail, AI is used for personalized shopping experiences and inventory management. Enhanced networks enable seamless integration of online and in-store data for better customer service.



## Manufacturing

AI-driven predictive maintenance and quality control systems in manufacturing need continuous data flow from IoT devices, which is only possible with reliable network connectivity.



## Public Sector

Digitization of citizen services involves leveraging advanced technologies like IoT and AI to enhance citizen experiences through smart cities, transport and security, while identifying bad actors for the safety and security of digital infrastructures and services.

# The 5 keys to unleashing your network's AI potential

AI is the new catalyst for innovation and growth, yet many organizations still overlook the strategic importance of networking in their AI initiatives. They tend to focus on computational power and data processing capabilities instead—even though the network that supports compute resources is an equally critical component of AI infrastructure. Whether housed in data centers or distributed across edge devices, robust and high-bandwidth networks are essential for seamless data flow, real-time processing and efficient communication between AI systems.

Understanding and optimizing your network's potential is crucial to unlocking the full capabilities of your AI applications. Here are the five essential keys to achieving this.

**Only 44% of IT leaders currently view their network as a key enabler of digital innovation, with 33% acknowledging its pivotal role in business evolution. Nearly a quarter still perceive networks merely as utilities for connectivity.<sup>4</sup>**

1

## Scalable infrastructure

Like many applications, AI platform demand can fluctuate quickly when driven by seasonal variations, market trends, global events and regulatory changes. Your network connectivity framework must be able to scale dynamically to handle varying demands.

2

## Low latency

AI thrives on speed. To be an AI innovator, you need a low-latency network that ensures the right data reaches the right destination at the right time. By 2030, worldwide data will grow to over 660 zettabytes—equivalent to 610 iPhones worth of data per person in the world.<sup>2</sup> Much of this data will be data in motion—driven by real-time data processing needs from IoT devices, autonomous vehicles, financial trading algorithms, eCommerce platforms and other technologies.

3

## High bandwidth

AI systems need to transfer large datasets efficiently. High-bandwidth networks prevent bottlenecks for smooth data flow and optimal AI performance. They enable rapid data transmission, real-time processing and support for multiple devices, minimizing latency and enhancing edge computing. This scalability is crucial for handling huge datasets and maintaining performance, while also improving user experiences with seamless connectivity and quick response times.

4

## Robust security

AI systems require large datasets for training—and how that data is collected, stored and used raises significant privacy concerns. Your network will need robust security measures in place to protect data integrity and privacy anywhere your data is transported.

5

## Flexibility and control

AI workloads can be unpredictable. Networks that offer flexibility and control allow businesses to adapt quickly to changing AI needs. This can include optimizing resources and costs for seamless integration with existing systems and providing the ability to scale up or down based on demand.

By prioritizing these five areas, your organization will be empowered to achieve an AI-ready network that can keep you competitive for years to come.



# A trusted network for the AI era

Driven by major demand for connectivity fueled by AI, companies across industry sectors are turning to Lumen to secure fiber capacity. They understand that we're gearing up for a future dominated by AI, where robust network infrastructure is essential for businesses to succeed.

## Microsoft and Lumen partner to power the future of AI

On July 24, 2024, Microsoft and Lumen announced a key, new strategic partnership to power the future of AI and enable digital transformation to benefit hundreds of millions of customers.

Datacenters have become critical infrastructure that power the compute capabilities for the millions of people and organizations who rely on and trust the Microsoft Cloud. Microsoft is playing the leading role in ushering in the era of AI, offering tools and platforms like Azure OpenAI Service, Microsoft Copilot and others to help people be more creative, more productive and to help solve some of humanity's biggest challenges.\*

As Microsoft continues to evolve and scale its ecosystem, it is turning to Lumen as a strategic supplier for its network infrastructure needs and is investing with Lumen to support its next generation of applications for Microsoft platform customers worldwide.\*

**“Lumen has the expansive network and the digital services to create a reliable and scalable infrastructure that prepares us for the next generation of applications and services and ensures we remain at the forefront of the AI revolution.”**

**– Erin Chapple**

Corporate Vice President, Azure Infrastructure, Microsoft

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\*Lumen Technologies and Microsoft Corp., *Microsoft and Lumen Technologies partner to power the future of AI and enable digital transformation to benefit hundreds of millions of customers [Press release]*, July 24, 2024.



# A checklist: Preparing for AI

In a data-driven world, having a network that's ready for AI is key to staying ahead. Here's a handy checklist to make sure your network is up to the task.

## Assess your current infrastructure

- Thoroughly evaluate your existing hardware, software and network capabilities
- Identify gaps and areas needing upgrades to support data-intensive AI workloads

## Increase your computational power

- Invest in high-performance processors to handle intensive AI computation
- Ensure sufficient memory and processing power for AI applications

## Data storage and management

- Implement scalable storage solutions to manage large volumes of data
- Ensure robust data management practices for data quality, accessibility and security

## Optimize your network

- If you're building AI applications, you'll need the capacity to handle massive data in motion, combined with near-zero latency
- If you're running AI, you'll need to digitize your network to make it more agile, intelligent and responsive

## Integrate cloud services

- Leverage cloud platforms for scalable and flexible AI infrastructure
- Ensure seamless integration between on-premises and cloud environments

## Strengthen security and compliance

- Upgrade cybersecurity measures to protect AI systems and data
- Ensure compliance with relevant data protection regulations in your industry

## Identify low-risk use cases

- Start with pilot projects to test AI applications and gain experience
- Use pilot results to refine strategies and scale successful initiatives

Follow these steps to help you gain a network and workforce that are ready to support your current and future AI needs, keeping your organization at the forefront of your industry.



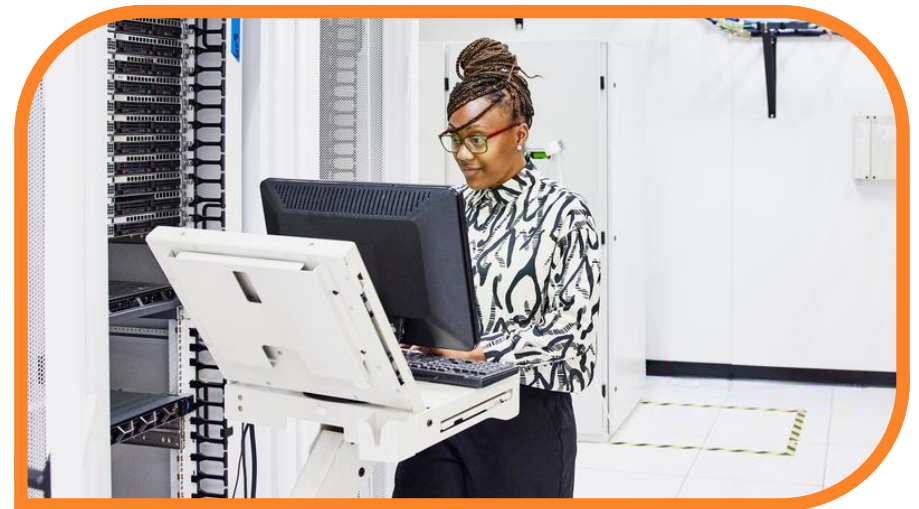
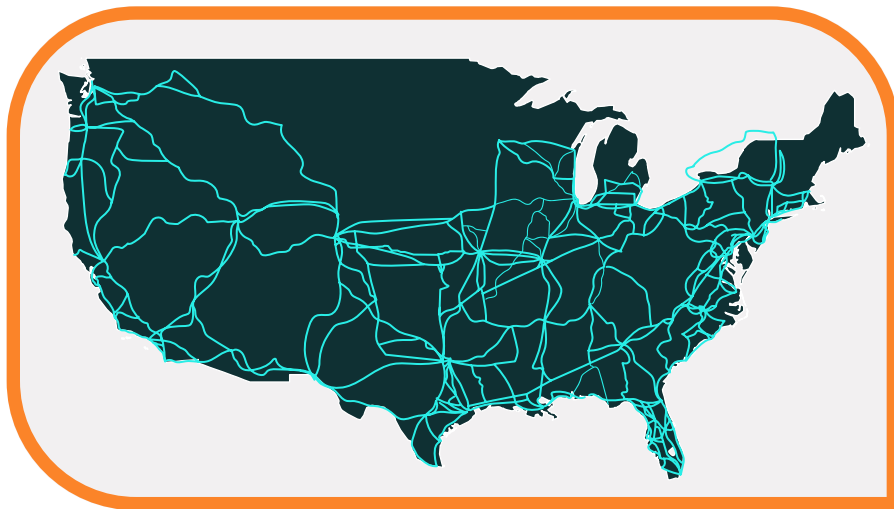


# The Lumen Network: Designed to be the #1 provider of AI-ready infrastructure

As we stand on the brink of an AI revolution, the network is becoming the backbone of innovation. Lumen—with its expansive fiber network and cutting-edge solutions—is at the forefront of this transformation, meeting the essential requirements for AI-ready networks.

## Speed and latency

The Lumen Network is designed for the rapid movement of data, providing real-time responses and interactions that are crucial for AI applications. That's because it is designed to deliver  $\leq 5\text{ms}$  latency at the edge for 97% of U.S. business demand.



## High-capacity fiber

We boast the largest ultra-low-loss intercity fiber network in North America, spanning millions of miles of fiber in densely populated urban regions where demand is greatest. Featuring an average fiber count of over 500, **our network delivers 60% more capacity than legacy fiber networks.** This urban capacity, along with next-generation optical networking, enables our customers to incorporate multiple 400 GB waves.

Add to this our reputation as the **#1 provider of Wavelength Services by Vertical Systems Group<sup>5</sup>** not just once, but three consecutive times, underscoring our commitment to addressing our customers' most critical long-term needs in an AI-driven future.

## On-demand scalability

The Lumen Network can scale in real time with customer needs to manage surges effectively. When you need a new connection fast, our **fully digital on-demand networking can get you up and running in five minutes or less**. This speed is possible because of our ability to control layers 1-3 of the internet.

This feature is crucial for AI platforms because it manages physical connections and ensures smooth data transfer, preventing issues like data collisions when multiple devices send data simultaneously, slowing down the network. This maintains network reliability and security. It also optimizes performance for applications needing high-speed processing and real-time responses, ensuring data reaches its destination without delay. Additionally, it allows for rapid scalability to adapt to changing demands, such as unpredictable surges in AI workloads.

Host Layers	Layer 7	Application Layer	Human-computer interaction layer, where applications can access the network services.
	Layer 6	Presentation Layer	Ensures that data is in a usable format and is where data encryption occurs.
	Layer 5	Session Layer	Maintains connections and is responsible for controlling ports and sessions.
	Layer 4	Transport Layer	Transmits data using transmission protocols including TCP and UDP.
Media Layers	Layer 3	Network Layer	Decides which physical path the data will take.
	Layer 2	Data Link Layer	Defines the format of data on the network.
	Layer 1	Physical Layer	Transmits raw bit stream over the physical medium.

Figure 1: Mapping data flow from the cabling and physical media to the application functionality



## Built-in threat intelligence

Embedded security features within Lumen network services help ensure that data remains protected, a non-negotiable aspect of AI networks where sensitive information is often processed and stored.

Every time you switch networks, you introduce more vulnerabilities and potential entry points for cyberattacks. One of the key benefits of staying on the Lumen Network is that you can shrink your attack surface and reduce the risk of exposing your data to malicious actors. **More than half of the data on the Lumen Network stays on our network**, giving us unique visibility into most data traveling along our routes.

To further enhance your data's security, our elite team of in-house threat intelligence experts at Black Lotus Labs® provides 24/7 monitoring and automated, proactive defense against evolving cyberthreats.

## Speed to market

When it comes to launching your AI initiatives, every moment counts—but building connections between your new and existing data centers and the internet backbone can be a long, slow process fraught with a range of obstacles.

Lumen digital experiences and cloud services are not just responsive to your current needs but anticipate future demands, enabling you to quickly adapt and stay ahead in the rapidly evolving digital landscape. On the vast Lumen fiber network, you are empowered to get AI innovation to market years ahead of the competition with:

- More than 6 million miles of U.S. intercity fiber
- Connections to 2,200+ public and private data centers
- 30+ years of network integration expertise



# Embrace the future with Lumen

As you move forward in your AI journey, remember that the infrastructure you choose will be the foundation on which your AI initiatives thrive.

While other network providers are working to upgrade their technology, our forward-looking network is designed to meet today's AI demands, helping you stay ahead of your competitors.

Explore Lumen Digital for personalized solutions that align with your organization's scale and ambitions. Because with Lumen, you're not just prepared for the AI revolution—you're leading it.

[EXPLORE LUMEN DIGITAL](#)

<sup>1</sup>IDC, *Enterprise Horizons 2024*, June 2024.

<sup>2</sup>TechTarget, *How do big data and AI work together?*, August 22, 2023.

<sup>3</sup>McKinsey, *The state of AI in early 2024: Gen AI adoption spikes and starts to generate value*, May 2024.

<sup>4</sup>Hewlett Packard Enterprise, *As digitalization demands increase, IT leaders miss vital connection between the enterprise network and employee experiences*, May 11, 2023.

<sup>5</sup>Vertical Systems Group, *Mid-2024 U.S. Wavelength Services LEADERBOARD*, August 2024.

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