GUIDE

Building AI-ready networks:

A Public Sector Guide to Lumen® Private Connectivity Fabric (SM)

LUMEN®

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The emerging digital landscape

In early 2025, the incoming Administration announced up to $500B in private sector funding to build and expand the U.S. Artificial Intelligence (AI) infrastructure. This landmark investment signals a pivotal shift: AI is no longer just a technological advancement — it's becoming the foundation for transforming how government serves its citizens.

For public sector organizations, AI represents more than just technological evolution — it's an accelerant for achieving core mission objectives. From enabling data-driven decision making and real-time monitoring to automating routine processes and enhancing cybersecurity, AI can help revolutionize every aspect of government operations. This transformation demands a fundamental rethinking of how we connect people, data and applications.

The impact of AI extends far beyond operational efficiencies — it's a catalyst for community prosperity and economic growth. When properly implemented, AI-powered government services can help streamline business processes, attract new industries and create high-value job opportunities. **Cities and regions with robust AI infrastructure become magnets for innovation, drawing investments that are expected to boost local North American economies by 14.5% by 2030.** From improving emergency response times to optimizing public transportation and enhancing

educational resources, AI technologies help create communities where citizens can thrive and businesses can flourish. These advancements translate directly into tangible benefits: stronger local economies, better public services and an enhanced quality of life for residents.

The success of these AI-driven initiatives hinges on one critical factor: fast, flexible and reliable connectivity. Without robust network infrastructure, even the most sophisticated AI solutions cannot deliver on their promise to create smarter, safer and more sustainable communities — and governments cannot achieve their policy outcomes.

The connectivity challenge

As AI reshapes government operations — 51% of government employees report using an AI application at least daily — it's creating unprecedented demands on network infrastructure. The integration of AI across public services — from automated data processing and real-time monitoring to privacy-preserving data sharing and cloud-based services — requires not just more bandwidth, but smarter, more adaptable networks.

Public sector IT leaders face a unique challenge: They must build networks that can support both current and future AI workloads while providing access across their jurisdictions. This means developing infrastructure that can:

- Enable data-driven decision making through real-time analytics and monitoring.
- Support automated processes and AI-powered services across entire jurisdictions.
- Facilitate secure data sharing while maintaining privacy and compliance.
- Scale to accommodate growing AI computational demands.
- Enable consistent service quality from urban centers to rural communities.

Meanwhile, communications service providers face a connectivity bottleneck with business services architectures that lack a clear path forward for private networking requirements across multi-cloud, multi-data center and Software-as-a-Service (SaaS) environments. This limitation creates a critical bottleneck that threatens to slow the adoption of transformative AI technologies in the public sector, limiting their ability to support their mission objectives and to serve all constituents effectively.

For public sector IT leaders planning their digital transformation and network modernization, the path forward must address several key requirements:

- Infrastructure optimized for AI workloads and hybrid cloud environments
- Networks capable of supporting advanced analytics and real-time monitoring
- Flexibility to adapt as AI capabilities and mission requirements evolve
- Ability to extend AI-powered services to all geographic areas
- Cost-effective solutions that maximize the impact of public funds over time

While SD-WAN and SASE offer valuable management interfaces and automation capabilities, they are constrained by underlying transport layers that weren’t designed for AI’s demanding requirements.

As we move forward, transport/underlay performance and speed of access have become the most critical considerations, particularly when building networks across varying geographic areas.

Introducing Lumen® Private Connectivity Fabric℠

Rather than a single product, Lumen Private Connectivity Fabric is a purpose-built secure network architecture tailored to the unique requirements of customers, providing the flexibility and scalability needed to meet today's and tomorrow's demands in the emerging AI economy. It empowers public sector organizations with resilient infrastructure to support advanced connectivity that helps enable future-ready operations. This approach allows customers to control and adapt the infrastructure, so it evolves with the pace of digital innovation.

Core components and capabilities

Lumen Private Connectivity Fabric reimagines networks from the ground up, starting with the way infrastructure is built and considering the interlinkages and dependencies various services and capabilities have on each other. The Lumen Private Connectivity Fabric framework stresses interconnectivity across all layers, starting with Waves, and Private Networking.

When properly implemented, AI-powered government services can help streamline business processes, attract new industries and create high-value job opportunities.

This combination allows for granular control over bandwidth, latency, load distribution and redundant paths, all driven by APIs and controlled by routing

protocols within the Lumen Private Connectivity Fabric domain. While fiber and waves address bandwidth constraints, the architecture acknowledges that achieving ubiquity and extended reach necessitates the integration of complementary solutions such as Ethernet and IP, especially as distance increases from the core.

Architectural Innovation

Lumen Private Connectivity Fabric architecture enables the delivery of secure, low-latency, high-bandwidth and on-demand services on advanced network infrastructure. Two fundamental elements enable this powerful capability: ports and services within those ports. The port serves as the head/tail of the pipe, while services enable precise control over:

- Storage
- Bandwidth allocation
- Redundancy and connectivity
- Voice and unified communications
- Security parameters
- SaaS integration
- Cloud Service Provider (CSP) and Data Center Operator (DCO) access

The service layer, including VLANs, Pseudowires (PWEs) and Virtual Routing and Forwarding (VRFs), can now be delivered in an as-a-service model with complete IT and workflow control — delivering on the promise that MPLS made but couldn't fully realize due to protocol and architectural limitations.

Use cases across the public sector

The implementation of Lumen Private Connectivity Fabric across the public sector demonstrates its versatility in addressing diverse mission-critical needs while supporting digital transformation initiatives. Lumen has a long history of partnering with the public sector to deliver exceptional infrastructure.

Federal Agencies are mission-oriented and focus investments on specific operational objectives. The Department of Defense (DoD), runs one of the fiber networks in the United States, and Lumen Private Connectivity Fabric can support critical national security missions while enabling technological advancement.

Cybersecurity and AI Integration In the federal space, network control is increasingly central to cybersecurity strategy, particularly as AI becomes more prevalent. This creates concentric circles of control:

1. Edge control: At the outermost level, agencies maintain high operational control over devices and security policy implementation.

2. Core capabilities: Moving inward, capabilities become more inherent to the transport of data and voice, representing critical control points where Lumen Private Connectivity Fabric provides distinctive value.

3. Endpoint solutions: Further inward, the computers, sensors and controllers connected to the network ports are also managed and monitored with the goal of keeping them safe from threats and bad actors.

The integration of AI plays a central role in automating these controls, processing billions of edge events while maintaining precise management at the core. This automation extends to Security Operations Center (SOC) and Network Operations Center (NOC) functions, enhancing threat detection and response capabilities.

Cities and regions with robust AI infrastructure become magnets for innovation, drawing investments that are expected to boost local North American economies by 14.5% by 2030.

Case study: The network infrastructure backbone for the U.S. Indo Pacific command

Lumen supplies the Defense Information Systems Network with high capacity, end-to-end communications services that enable the U.S. Department of Defense to achieve U.S. national security objectives in the 36-nation Asia Pacific region.

These critical services — which include ethernet, internet and wavelengths — act as the backbone infrastructure that helps to protect America's interests in a diverse, strategically complex region by:

- Delivering secure, resilient network services.
- Transporting data, imagery, video and voice traffic.
- Supporting military and government agencies with innovative, adaptive networking, edge cloud, connected security and collaboration services.
- Leveraging the company's platform for advanced application delivery solutions.

State, Local, Tribal and Territorial (SLTT) Governments While federal agencies focus on mission objectives, state and local governments are primarily driven by public policy outcomes and community impact. Their approach to building more secure and robust infrastructure that connects communities often centers on economic development.

Case study: middle mile broadband

Lumen partnered with the state of California to build an open middle mile network to bring internet connectivity to businesses, homes and community institutions.

The state's approach exemplifies how Lumen Private Connectivity Fabric can support broad public policy objectives. This initiative aims to:

- Connect major metropolitan areas with high-capacity fiber infrastructure
- Enable access for underserved communities
- Support critical institutions including:
  - Healthcare facilities and clinics
  - Educational institutions (K-12 and higher education)
  - Local government facilities
  - Economic development zones

Strategic considerations for IT decision makers

When evaluating network modernization initiatives, public sector IT leaders must address several interconnected priorities that will define their AI readiness:

Funding and sustainability

- Strategic utilization of federal and state funding programs for AI infrastructure
- Building sustainable revenue models through infrastructure commercialization
- Leveraging public-private partnerships to help ensure long-term viability and innovation
- Maximizing return on investment through shared infrastructure models

Infrastructure control and management

- Implementing flexible network ownership models that maintain public sector control
- Developing clear governance frameworks for multi-stakeholder environments
- Integrating advanced security services that protect AI workloads and sensitive data
- Evaluating consumption-based IT service models that optimize resource utilization

Long-term planning considerations

- Building infrastructure that can scale with growing AI computational demands
- Creating flexible architectures that can adapt to emerging technologies
- Establishing clear metrics for measuring AI readiness and performance
- Developing roadmaps that align infrastructure investments with mission objectives

The future: AI, connectivity, and public service

The integration of AI into public sector operations represents a fundamental shift in how governments serve their communities. Understanding current trends and future requirements is crucial for success:

Evolution of infrastructure requirements

- Exponential growth in demand for low-latency, high-bandwidth connections

- Shift toward distributed architectures combining cloud, edge and on-premises resources
- Integration of automated network management and AI-driven optimization
- Growing importance of sustainable power and cooling solutions

Creating long-term value

The commercial value of public sector networks is increasingly tied to their AI-readiness. Critical success factors include:

- Ability to support Hyperscaler requirements
- Capacity for AI model training and deployment
- Flexibility to accommodate emerging technologies
- Potential for service commercialization to support ongoing operations

The path forward

While the full impact of AI on society and infrastructure requirements continues to evolve, certain trends are clear. The rapid adoption of machine learning and AI applications across industries is driving unprecedented demand for processing power and connectivity.

Hyperscalers are responding to this demand with massive investments in AI infrastructure, including data centers, fiber networks and computing resources. However, they face significant challenges, including limited data center capacity and the need for sustainable power solutions.

Lumen stands at the forefront of this transformation, with:

- $12B in secured Hyperscaler network build commitments supporting AI infrastructure – the largest number of builds with the largest players.
- Strategic commitments to purchase 10% of global fiber optic production.
- Proven expertise in building and managing mission-critical networks.

> Without robust network infrastructure, even the most sophisticated AI solutions cannot deliver on their promise to create smarter, safer, and more sustainable communities.

These investments and capabilities position Lumen as a natural partner for public sector organizations looking to build AI-ready infrastructure that will serve their communities today and into the future.

Conclusion

The transformation of public sector networking through Lumen Private Connectivity Fabric represents more than a technical upgrade — it's a strategic investment in future service delivery capabilities. As AI continues to reshape how services are delivered and consumed, the underlying network infrastructure becomes increasingly critical to mission success.

For public sector leaders, the path forward requires careful consideration of both immediate needs and long-term objectives. Lumen Private Connectivity Fabric offers a flexible, scalable approach that can:

- Support current operational requirements.
- Enable future technological advancement.
- Maintain security and control.
- Create opportunities for sustainable funding through infrastructure commercialization.

The time for network modernization is now. As the divide between connected and unconnected communities grows, and as AI drives unprecedented demands on network infrastructure, public sector organizations must act to ensure they can continue to deliver on their missions and serve their communities effectively.

As a leading network provider for enabling AI, Lumen is ideally positioned to help federal and state governments plan, build and run the networks they need to support their missions, better serve their constituencies and promote the kind of innovation that drives stronger economies.

Lumen is the backbone of the AI economy

The vast Lumen fiber network is designed to accelerate AI innovation. We have 12.6 million intercity fiber miles with another 34 million miles expected to be complete by the end of 2028. We give you the capacity to handle massive data in motion, combined with near-zero latency edge fabric and the unsurpassed ability to fully control every layer of your network architecture.

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Footnote

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