

LUMEN®

# Accelerating Enterprise Network Transformation With Wavelengths



Lumen Wavelengths deliver the high-performance, low-latency connectivity enterprises need to support modern, distributed architectures. As integration across public clouds, private data centers and edge environments becomes more complex, dedicated 100G/400G optical transport services offer the deterministic performance and secure bandwidth required for latency-sensitive, AI/ML-enabled workloads.

As part of the Lumen® Private Connectivity Fabric™ (PCF), Wavelengths provide a resilient foundation that simplifies network complexity, enhances data protection and supports the seamless movement of critical applications. This advanced framework allows you to scale securely, connect with precision and confidently power next-generation use cases.



## Cross-industry impact

Lumen® Wavelengths support critical use cases across key verticals:

**Healthcare** - Transfer massive imaging files, enable telemedicine, and connect campuses and clinics with secure, high-speed links designed to reduce latency and enhance patient care.

**Finance** - Enable latency-critical data flows, large modeling datasets, and global replication via low latency encrypted connections between data centers and cloud.

**Media and entertainment** - Deliver premium viewing experiences with high-bandwidth connectivity for real-time content delivery, remote production and global distribution.

**Oil and gas** - Enable real-time decision-making in remote operations by backhauling field data to centralized hubs, data centers and cloud platforms.

**Pharma and life sciences** - Accelerate R&D and data analysis with scalable connectivity for genome sequencing, molecular modeling and hybrid cloud workloads across research campuses.

# The Lumen network by the numbers



**~340,000**  
total route miles



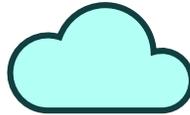
**78,000+**  
400G route miles



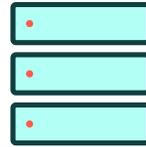
**400+**  
PoPs with 400G connectivity



**~163,000**  
on-net sites



**125+**  
cloud on-ramps (AWS,  
Azure, Google Cloud)



**2,200+**  
third-party data centers

## Trusted partner. Proven performance.

With Lumen Wavelengths, you get the reach, resiliency and simplicity to support even your most demanding workloads. Transparent routing, built-in encryption and diverse paths protect performance while giving you enhanced control over how and where your data moves. As part of the Lumen PCF, Wavelengths connect you to major cloud providers, distributed environments and emerging technologies like AI with the speed and scale required to help you stay competitive in a data-driven world.



## Award-winning AI-ready network infrastructure



**#1 in Wavelength Services in  
North America 2024**  
- Frost Radar



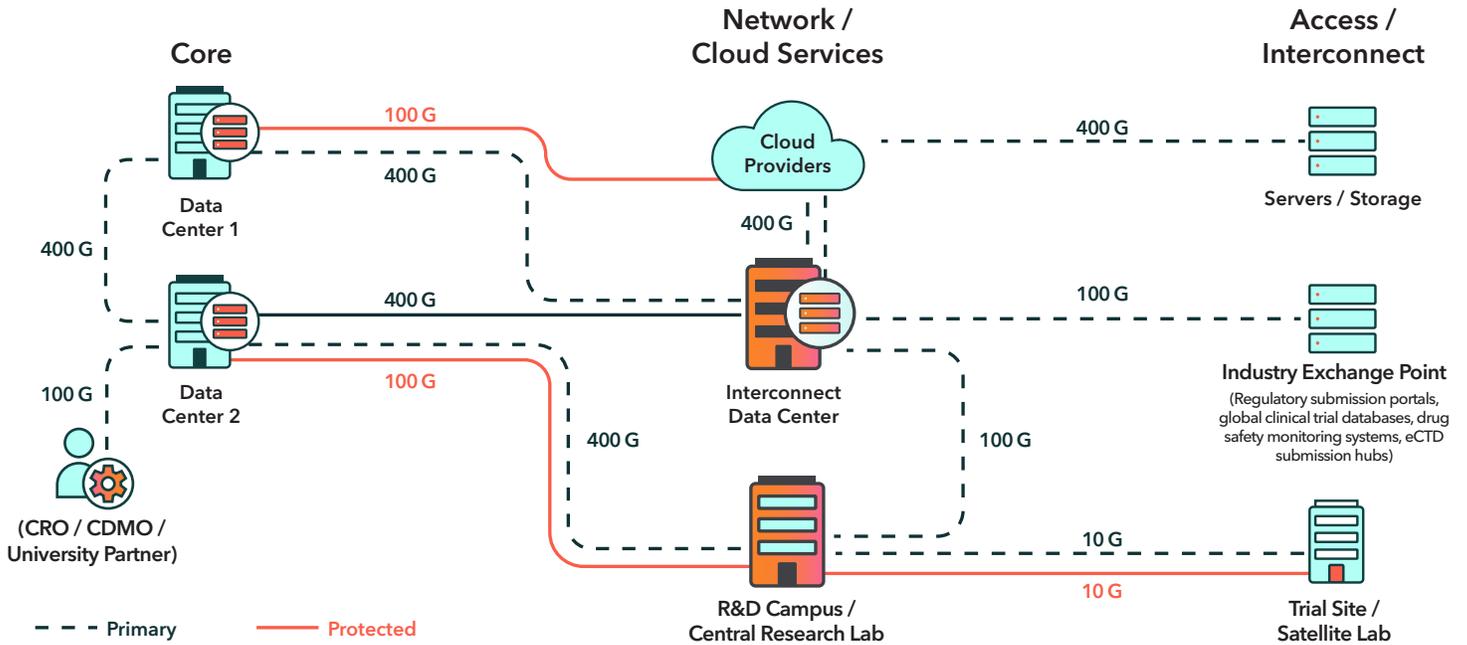
**#1 U.S. Wavelength Services  
Provider (4th consecutive time)**  
- Vertical Systems Group



**2024 NaaS Service Provider of  
the Year, North America**  
- MEF

# Pharmaceuticals & Life Sciences

Pharma companies, research institutions, and biotech partners rely on secure, high-performance connectivity to move massive datasets, synchronize global trials, and accelerate discovery. From genome sequencing and digital pathology to AI-driven modeling and regulatory submissions, Lumen Wavelengths support data flows across research campuses, CROs, and manufacturing environments with consistent performance and in-flight encryption.



## Challenge

- Large-scale datasets from sequencing, compound screening, and clinical trials require fast, secure transfer
- Collaboration across contract research organizations (CROs), contract development and manufacturing organizations (CDMOs), and global partners demands predictable performance
- Compliance with GxP, HIPAA, and international data privacy laws increases the need for auditability and data protection
- Real-time analytics and AI/ML modeling require low-latency connections between lab, data center, and cloud infrastructure

## Solution

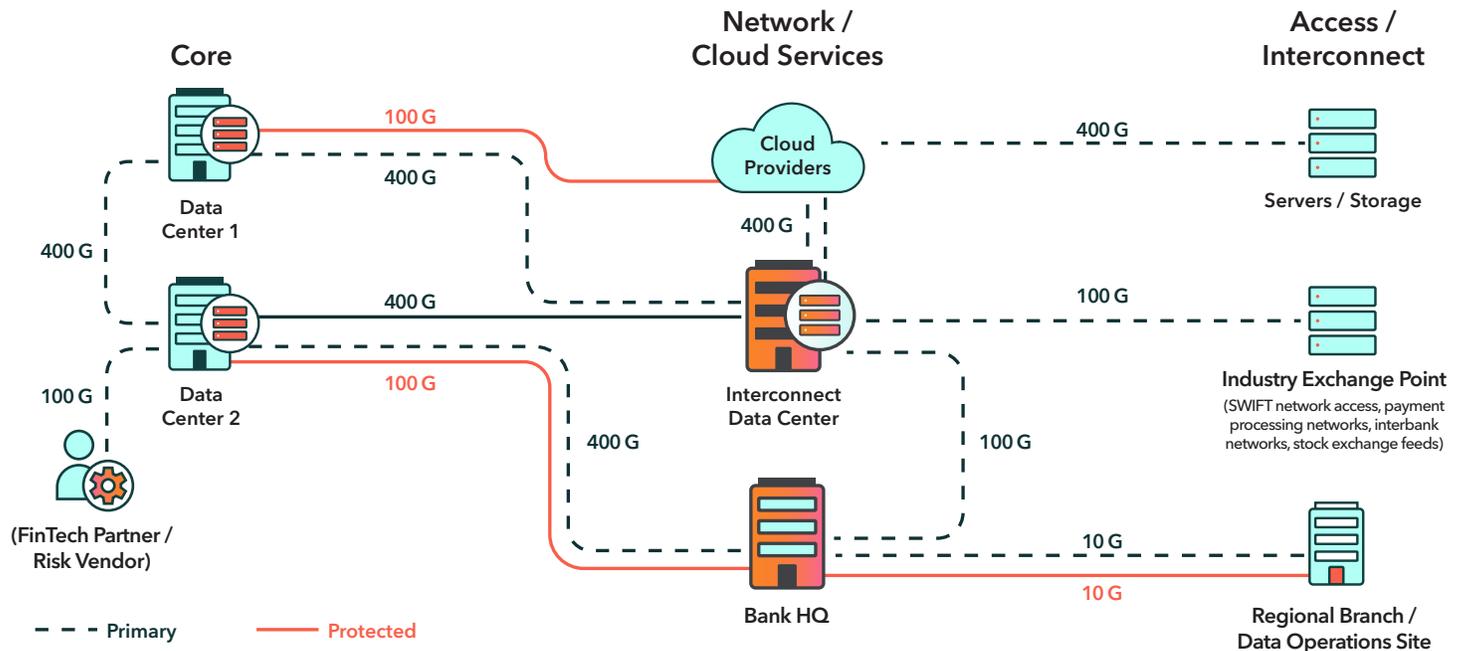
- Dedicated Layer 1 optical transport with AES-256 encryption for secure data movement
- Scalable 10G–400G bandwidth to support genomics, modeling, and multi-site trial coordination
- Diverse routing and deterministic latency to help reduce disruptions across research and manufacturing workflows
- Seamless integration between lab systems, cloud platforms, and regulatory data submission portals

## Expected Outcomes

- Fast turnaround for sequencing, modeling, and trial analysis workflows
- Enhanced collaboration between in-house research teams and third-party CRO/CDMO partners
- Secure and traceable data flows to help customers meet their audit and compliance standards
- Efficient infrastructure for moving critical research data without delays or data loss

# Financial Services

From large real-time data flows to AI-powered risk models, financial institutions rely on low latency, encrypted connections across cloud, data center and core environments. Lumen Wavelengths provide dedicated optical transport with deterministic performance, built-in resiliency and the ability to scale to help customers support their compliance-driven workloads.



## Challenge

- Capital markets have stringent uptime requirements and minimal tolerance for latency
- Complex hybrid environments with workloads moving between data centers, cloud, and colocation sites
- Regulatory pressure to encrypt and protect in-flight data
- Performance degradation from shared or oversubscribed services

## Solution

- Dedicated Layer 1 optical transport with AES-256 encryption
- Low-latency, deterministic paths with physically diverse routing
- Seamless integration across cloud, private data centers, and exchange locations
- Scalable capacity from 10G to 400G for moving large data sets, analytics, and replication workloads

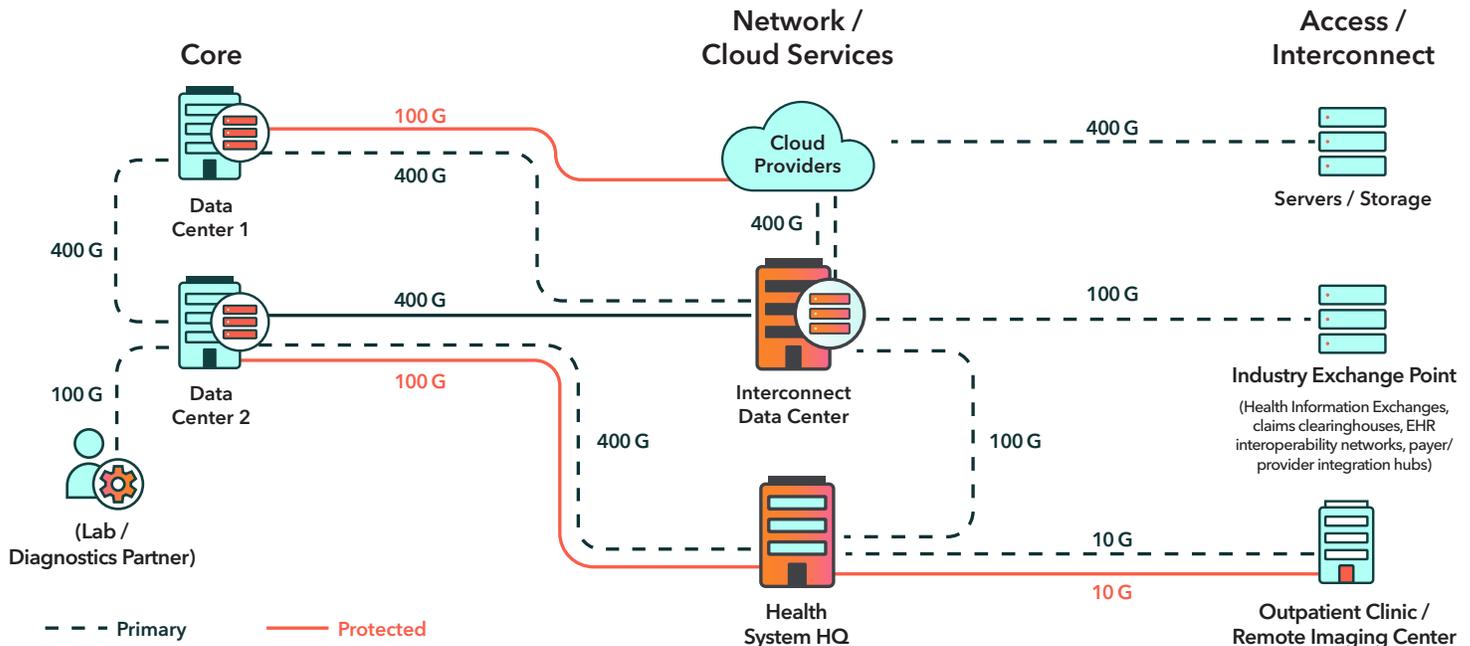
## Expected Outcomes

- Consistent performance across market data, stress testing, and compliance
- Protection of financial data with encrypted, private connections
- Enhanced availability and failover support for continuous operations
- Simplified architecture to support growing analytics and hybrid infrastructure needs

A leading bank deployed Lumen Wavelengths for secure, low latency connectivity between core data centers and cloud platforms, enabling real-time market data flows and large dataset transfers for stress testing and risk modeling.

# Healthcare

Hospitals, research networks, and care delivery organizations depend on high-speed, secure connectivity to move patient data, imaging files, and real-time telemetry between systems and sites. From diagnostic imaging and remote surgeries to cloud-based EHRs and AI-driven diagnostics, Lumen Wavelengths support the movement of clinical data with the performance, scale and reliability healthcare systems need.



## Challenge

- Latency-sensitive applications like remote diagnostics, imaging, and telemetry
- Large file transfers between PACS systems, cloud-hosted EHR platforms, and analytics tools
- Security and compliance concerns around PHI (protected health information) in motion
- Fragmented connectivity across distributed clinics, labs, and research campuses

## Solution

- Dedicated Layer 1 optical transport with AES-256 encryption
- Deterministic latency and diverse routing for uptime and data protection
- Seamless integration across on-prem EHRs, hybrid cloud platforms, and imaging archives
- Scalable 10G-400G capacity for high-throughput workloads like imaging, genomics, and telehealth

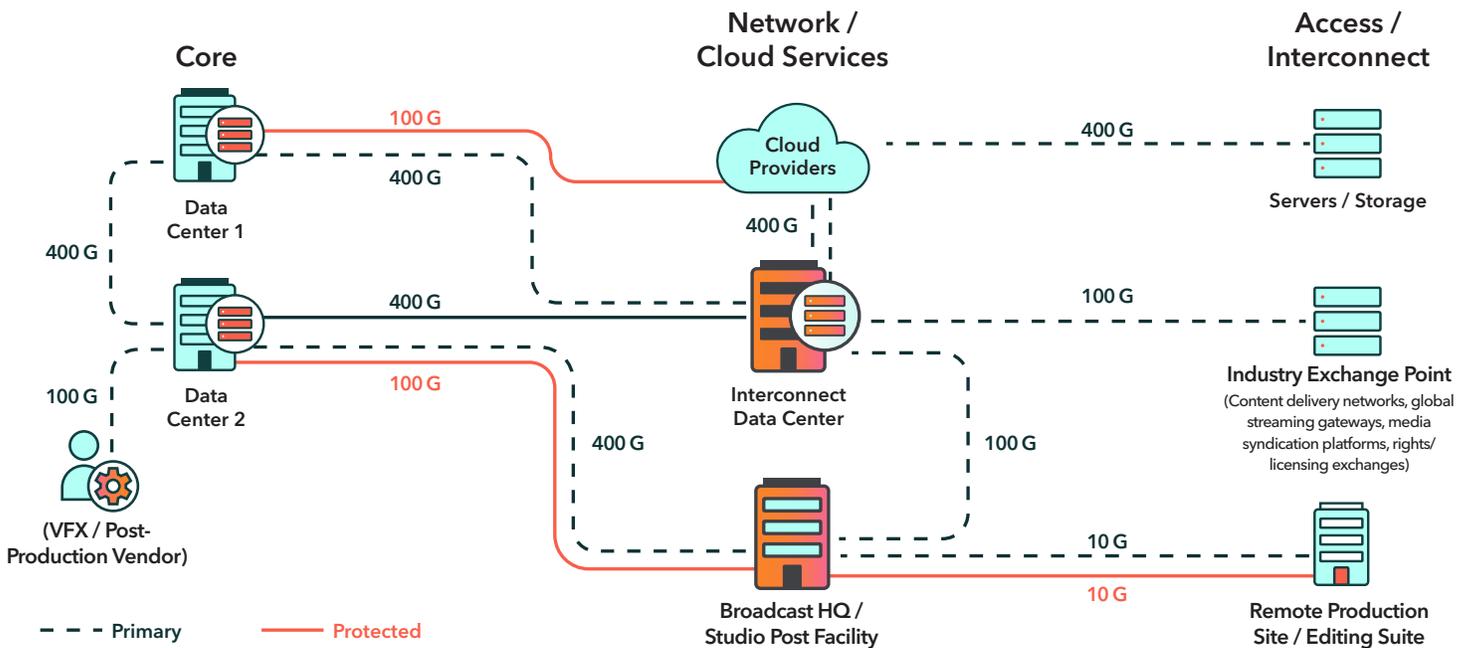
## Expected Outcomes

- Fast transmission of patient imaging, EHR data, and lab results between care sites
- Data protection with encrypted, private connections
- Reliable uptime and low latency to support remote monitoring and diagnostics
- Simplified connectivity for growing demands in telemedicine, AI diagnostics, and compliance reporting

A national healthcare organization adopted Lumen Wavelengths to overcome limitations in bandwidth and agility. The 100G mesh network enabled zero downtime during a major fiber cut, accelerated cloud migration and supported faster deployment of digital health services.

# Media & Entertainment

Studios, broadcasters, and post-production teams need reliable, high-bandwidth transport to move large media files, deliver live events, and collaborate across geographies. From 8K video and virtual production to cloud editing and real-time rendering, Lumen Wavelengths provide the dedicated optical transport and latency control required to help keep creative pipelines moving and content protected.



## Challenge

- Latency sensitivity across live events, remote editing, and post-production workflows
- High throughput requirements for moving uncompressed video, visual effects (VFX) assets, and media archives
- Global collaboration strained by performance gaps and unpredictable bandwidth availability
- Content security, licensing compliance, and intellectual property (IP) protection during file transfer

## Solution

- Dedicated Layer 1 optical transport with AES-256 encryption for secure, high-volume data movement
- Deterministic latency and scalable 10G–400G capacity for transporting 4K/8K, VFX, and AR/VR content
- Seamless integration across cloud storage platforms, on-prem editing suites, and global distribution points
- Physically diverse routing with transparent path monitoring to help reduce jitter and support peak demand

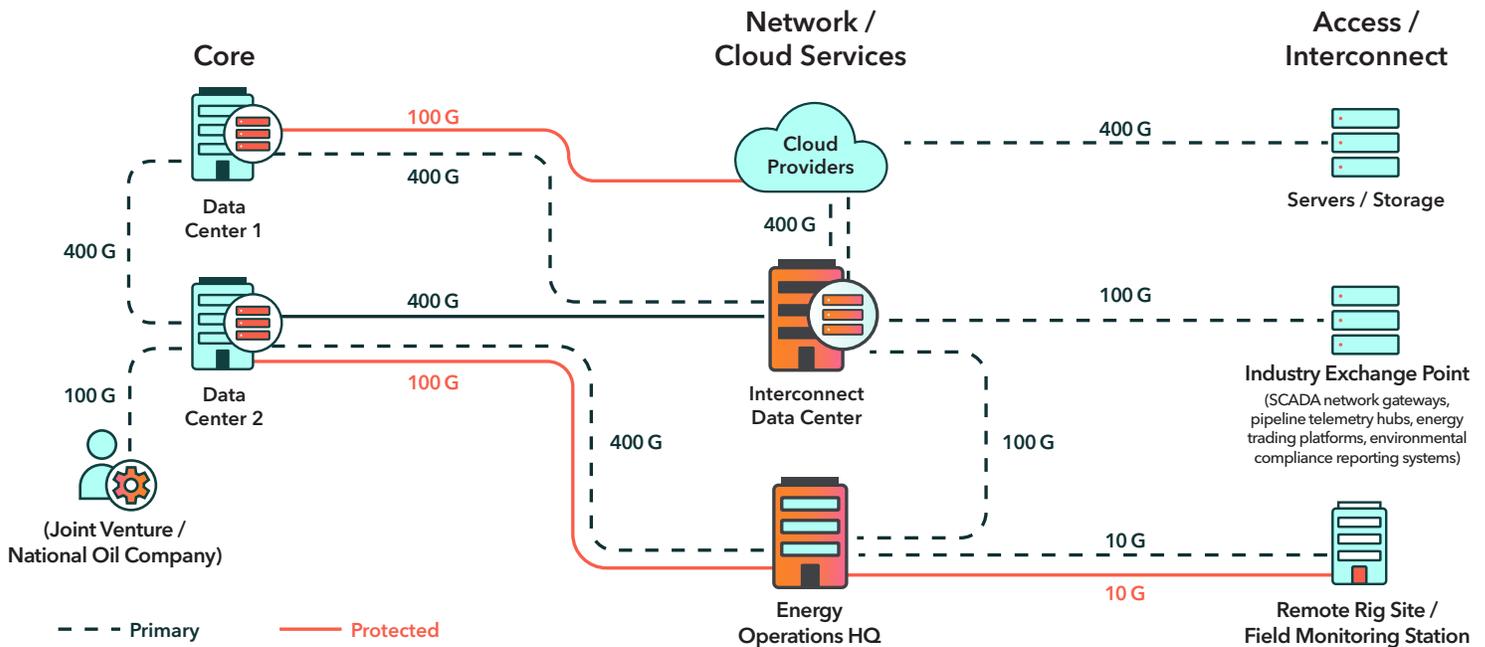
## Expected Outcomes

- Fast, consistent delivery of creative assets between studios, production sites, and distributors
- Reliability for live event production, remote collaboration, and time-sensitive broadcast operations
- Private, protocol-agnostic transport to secure high-value content and help prevent delays in delivery pipelines
- Simplified infrastructure to support evolving formats and multi-location workflows

A major streaming provider leveraged Lumen Wavelengths to deliver high-definition content globally over a low-latency, jitter-free transport layer, enabling consistent performance and premium user experiences, even during peak demand.

# Energy

Oil and gas operations span continents, from offshore rigs and remote pipelines to real-time trading floors and AI-enabled control centers. Across this value chain, partners rely on high-performance, deterministic connectivity to power decisions, promote uptime, and protect operational integrity. Lumen Wavelengths provide the secure, scalable foundation needed to move critical data—from seismic models and SCADA telemetry to digital twins and global trading feeds—with speed, precision and trust.



## Challenge

- Real-time coordination across distributed upstream, midstream and downstream environments
- Seismic data, sensor feeds and control signals require low-latency, high-bandwidth backhaul
- Joint ventures and cloud adoption increase the complexity of secure, protocol-flexible transport
- Market trading and analytics demand low latency and reliable failover for pricing and compliance

## Solution

- Dedicated Layer 1 optical transport with deterministic performance and AES-256 encryption
- Physically diverse routes and transparent path visibility to help customers meet their operational and compliance standards
- Seamless integration across cloud, edge and on-premise environments—including SCADA, AI/ML and digital twins
- Scalable 10G–400G capacity to support seismic surveys, IoT telemetry, reservoir models and trading systems

## Expected Outcomes

- Fast, reliable transfer of mission-critical data from field to cloud to boardroom
- Predictable performance for AI-driven maintenance, modeling, and decision support
- Secure connectivity for joint operations, international data sharing, and regulatory reporting
- A future-ready network infrastructure for energy automation, digital twins and market agility

## Scale your business with Lumen Wavelengths

Schedule a network consultation to learn how your organization can leverage the Lumen Private Connectivity Fabric to address the critical digital infrastructure requirements standing in the way of digital transformation.