

Lumen ExaSwitch®

Fueling Mission Success Through Innovation

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The rising pulse of technology in defense



Cybersecurity

Mitigating increasingly complex cyberattacks and securing mission critical data and applications



Artificial intelligence

Integration of machine learning and analytics tools impacting decision intelligence



Devices & data

Increasing number of innovative and digital defense tools facilitate large data models to support operational efficiency



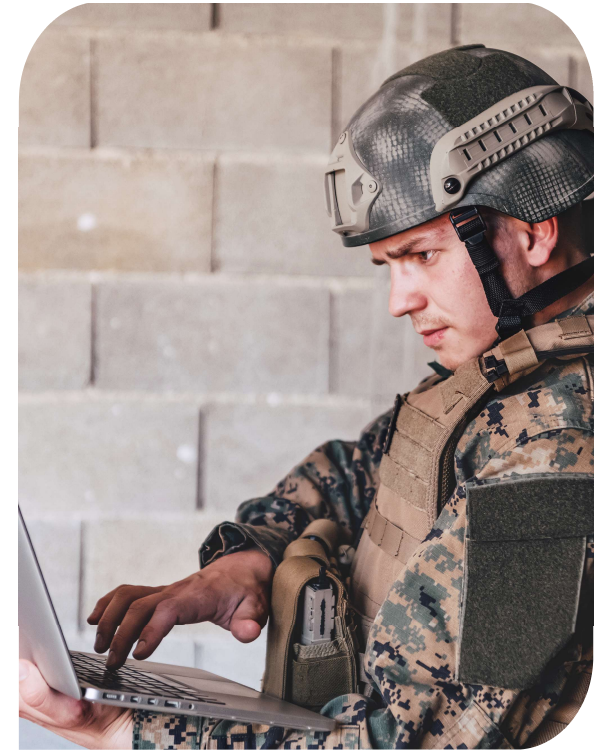
Network capacity

Growing bandwidth needs encouraging the disaggregation of compute storage



Rate of response

Necessity to leverage these tools to help enable efficient response to geopolitical situations



Embracing complexity with agile solutions



Defense architectures are facing increased pressure to:

- Maximize flexibility, access, and availability of DoDIN
- Support efficient access to critical applications
- Prepare for rapid expansion of network infrastructures
- Proactively protect against threats and prepare for conflicts



Military forces need a solution that:

- Adapts to the dynamic threat environment
- Enables immediate access to clouds in dispersed locations
- Efficiently scales to meet changing demands on DoD networks
- Provides high-bandwidth capacity to support secure movement of data and large workloads

Rapid deployment of DoDIN PoPs



Automated Optical Fabric Interconnection via ExaSwitch

Automating cross connects at DoDIN PoPs to swiftly manage war reserve capacity, using ExaSwitch for real-time provisioning and interconnection to IndoPac bases could significantly streamline operations and enhance the DoDIN backbone's resilience, allowing DISA or Lumen to quickly identify available paths and establish real-time connections.

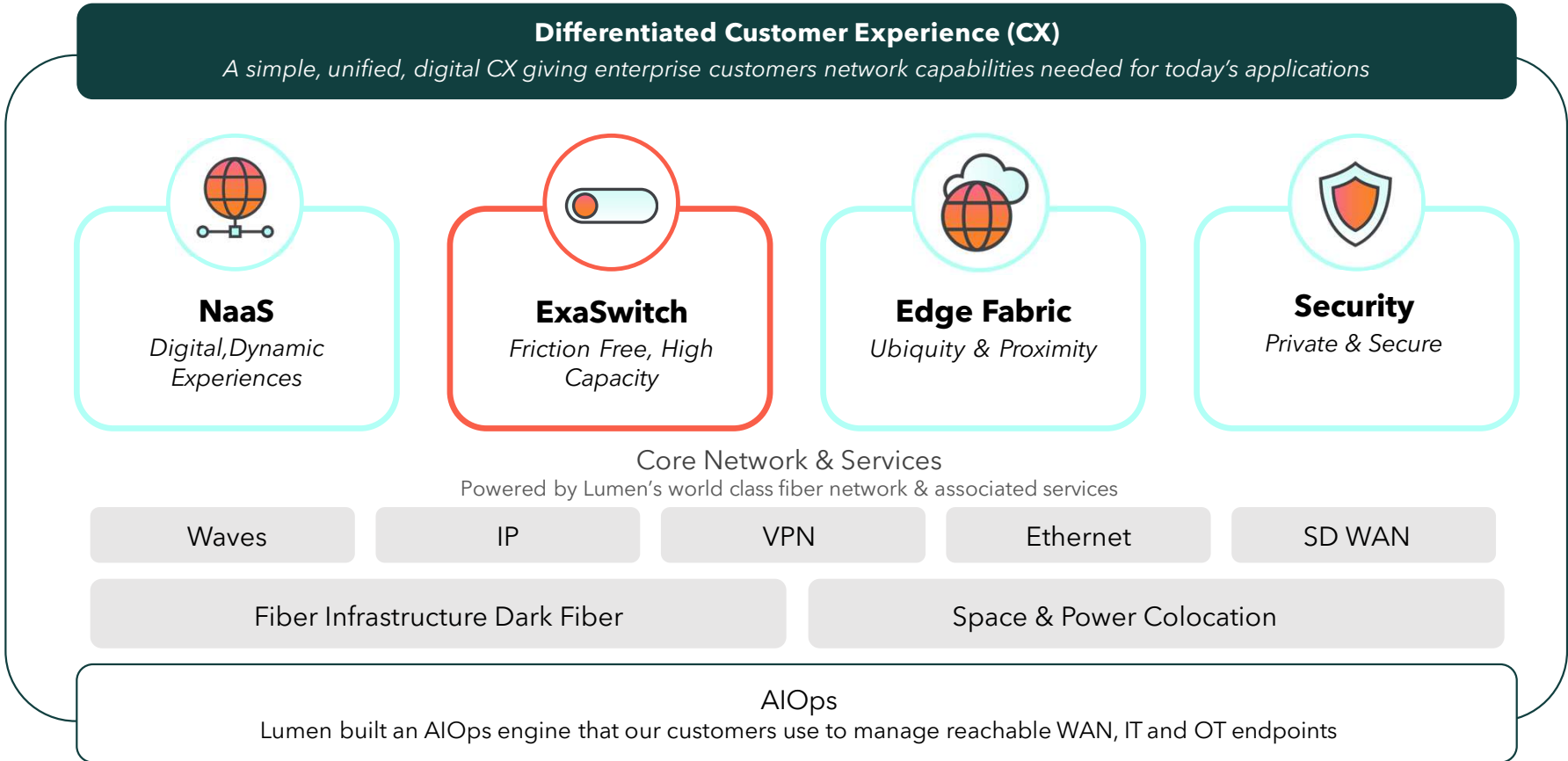
The problem

- Enterprises need to:
 - Move **more data** than ever across **on-premises, edge, and partner environments**
 - Improve **speed, cost, simplicity and security** to serve the increasing demands of applications

ExaSwitch® is the answer

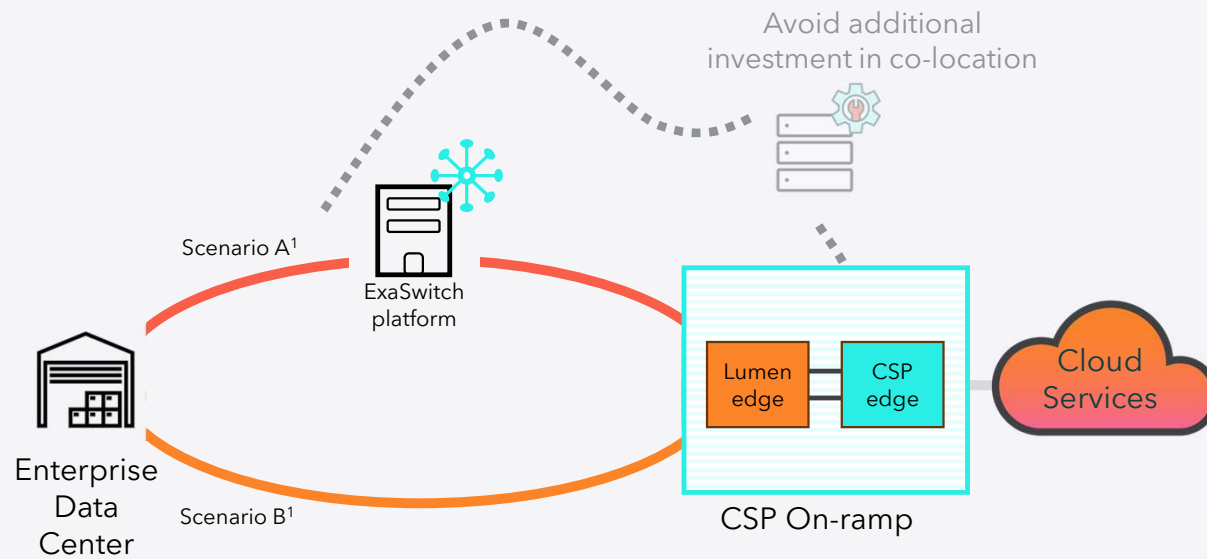
- Lumen ExaSwitch® is an innovative optical solution with API/portal functionality built into Lumen's large and growing high bandwidth (100-400Gb*) wave network
- ExaSwitch® can help reduce costs and complexity while helping to ensure consistent speed by providing **direct optical connection & self-provisioning** between data stores
- ExaSwitch® effectively manages:
 - coverage of entire metro areas
 - systematic resilience/diversity
 - in dedicated facilities
 - free from the crowding and costs of third-party data centers

The Lumen Digital Platform



ExaSwitch® Cloud Connectivity Concept

ExaSwitch® will enable high bandwidth direct connectivity to the cloud



¹Available architecture/scenario depends on locations/regions and CSP

Simplicity

- Eliminates the need to build or expand network edge in on-ramp data centers - avoiding unnecessary equipment, fiber, and operational expense
- Pre-wired handoff with no LOA-involvement

Resilience

- Direct, redundant connectivity to the cloud
- 99.99% uptime SLA available

Speed

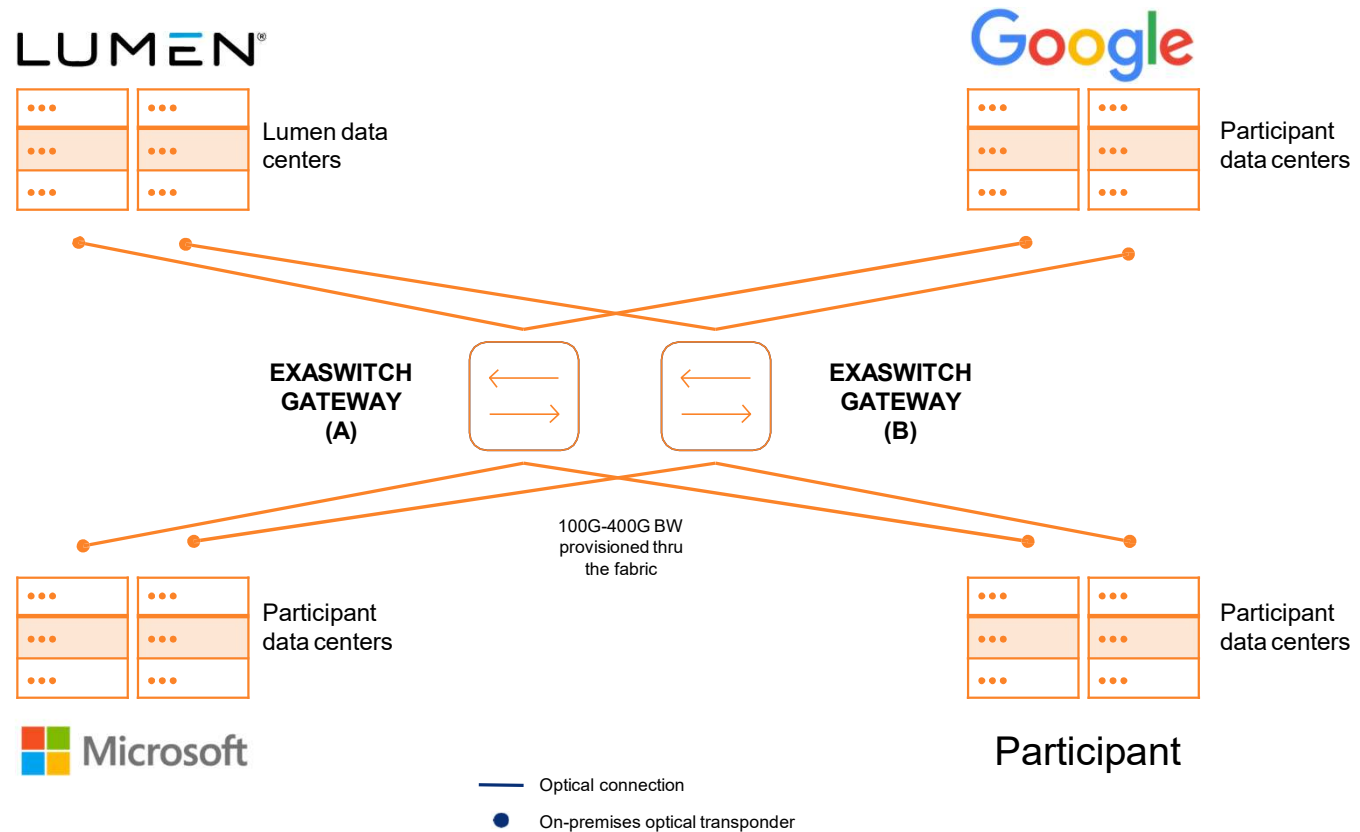
- High bandwidth (100Gb/s) with predictable latency on one of the largest high-bandwidth optical networks in America

ExaSwitch: 1st optical interconnection ecosystem

Solution architecture

Key benefits:

- 100G & 400G optical connections
- On-demand capacity
- Self provisioning via API or portal
- Geo-diverse intra-metro connectivity
- Each node scales to 25Tb/s

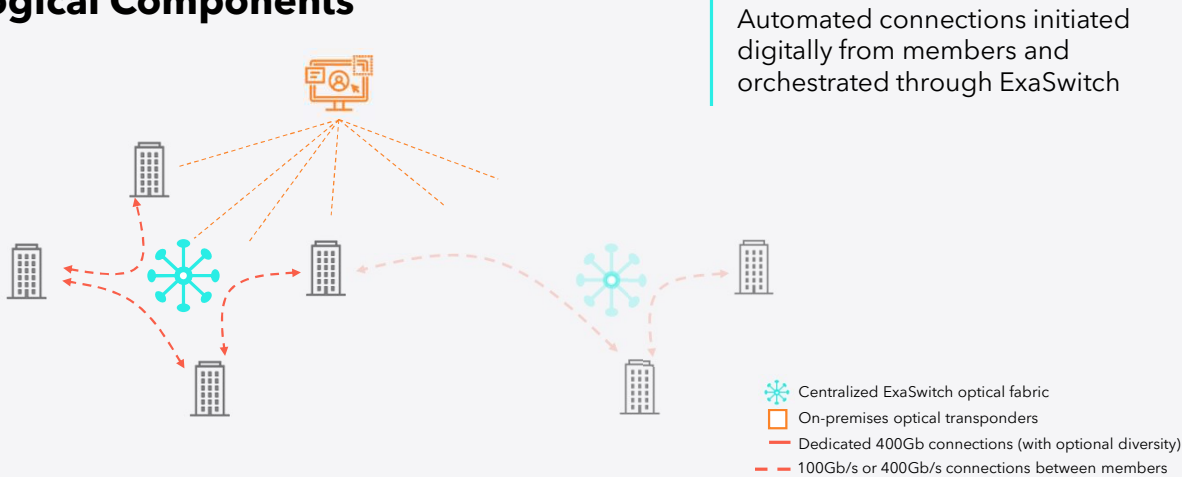


Enterprise ecosystems network architecture with ExaSwitch®

Physical Architecture



Logical Components



• Technical specs

- Optical fabric interconnection ecosystem
- 100Gb/s and 400Gb/s connections established over high capacity (>20Tb/s) DWDM links through the central fabric
- Optical transponder shelves originate/terminate optical connections to/from other member locations
- Real-time service provisioning initiated via API or self-service portal
- Centralized circuit management improves inventory visibility for easier moves, adds, and changes
- Peering relationships come to your edge location. No third-party colocation required

LUMEN®

Lumen is driving technology progress in the public sector



Integrating cybersecurity & AI

Securely deploy and manage AI/ML applications across multiple locations to optimize performance and maximize return on security investments.



Closing the digital divide

Unleash the full power of our network via Digital Inclusion - improving network quality and access, promoting civic engagement and social and economic growth.



Innovating on the network

Versatile, scalable, secure network services supporting data-intensive workloads and immediate cloud access when you need it via Lumen Dark Fiber, NaaS, and ExaSwitch.

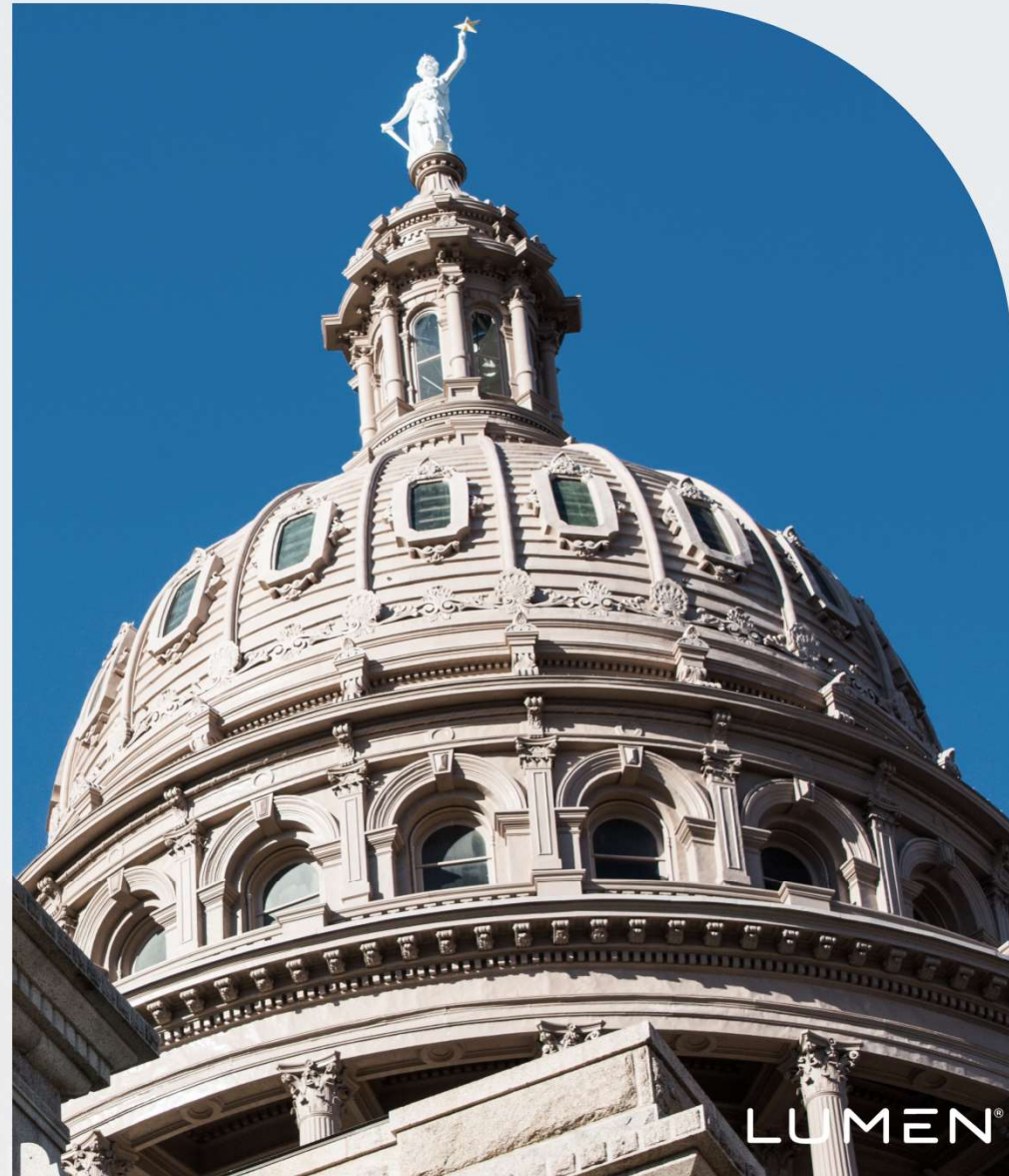
Let's design the future together

Lumen ExaSwitch[®]

'Friction-free, high-capacity' cloud connectivity

At Lumen, we're working with key cloud players, including Google, Microsoft, and others to develop the future of optical cloud networking:

- As part of Lumen Digital, ExaSwitch allows you to:
 - Move data - quickly, securely, and efficiently
 - Avoid unnecessary third-party data center equipment, fiber, and operational expense
 - *Design your network, your way.*
- By partnering with Lumen, you become a strategic innovation partner and **contribute to the future of cloud connectivity**
 - Gain early access to cutting edge technology
 - Directly shape the evolution of ExaSwitch, developing a solution that solves for key defense challenges





Why become a design partner?

- Early access:
 - Gain an advantage over your competition by accessing cutting-edge technology designed for optimal performance.
- Strategic partners:
 - Collaborate with Lumen, a leader in telecommunications and network solutions, and with key cloud providers to contribute to a roadmap that defines the future of cloud connectivity.
- Potential cost efficiency:
 - Experience how ExaSwitch can optimize your cloud expenditure while delivering exceptional performance and reliability.
- Influence innovation:
 - Your feedback will directly shape the evolution of ExaSwitch, creating a product that truly aligns with customer needs and industry trends.

Lumen North America Next Generation Optical Network

Over 5.6PB of capacity deployed and 320+ 400G customer wave circuits installed on Lumen NGO



78,300 Route Miles

- Next Gen, 400G enabled Wave Network. Leverages ULL fiber where deployed

70 NA Markets

- Extensive coverage in Tier 1 and 2 markets

360+ PoPs

- Pushing further to the Metro Edge with 10-20 Data Centers per market

12-24TB Line System

- ROADM, Flex Grid based. Up to 3x more capacity

SDN Enabled

- Allows for automated capacity provisioning

Map information above is current as of 01/01/2024. Lumen network maps are representative of the network in general terms. Information is subject to change. Contact Lumen for updates or details.

Frost's Technology Innovation Leader Award in Interconnection Services

"ExaSwitch **eliminates the more expensive and difficult-to-maintain physical interconnections**, free customers from the burden of procuring, maintaining, and managing specialized data center equipment"

"Lumen's ExaSwitch is a **revolutionary approach** for the network connections industry."

"ExaSwitch reduces the recurring optical interconnection fee, **resulting in significant savings**"

"ExaSwitch enables **easy, cost-efficient, and quick** interconnection to geographically distributed network partners, providing **enhanced connectivity and on-demand scalability** to support the growing volumes of data in the cloud"

"Frost & Sullivan applauds Lumen's ExaSwitch as a cost-efficient technology innovation that simplifies the interconnection process, **servicing entire metro regions irrespective of participants' physical edge locations**"