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Waves Digital Evolution:
Why wavelength solutions are dominant in digital transformation

What's driving your network evolution?

If you're an executive planning to implement a digital strategy, your network is a crucial component to consider.

- Has a new application or new workload been put into production with a less than stellar performance?

- Do you have adequate bandwidth to accommodate the use of AI for data analysis, automation and other advanced applications?

- Does the data streamed take forever to process and deliver results?

As executives consider their digital transformation initiatives to enable new revenue opportunities and improve the customer experience, it is essential to harness the right technology mix to drive success. Distributed IT applications, cloud native workloads, multi-tenant data centers, high-performance compute/ storage, the Edge and a myriad of AI-enabled emerging technologies have increased the size of technology stacks required to agilely pivot towards the digital age.

What pulls all the pieces together and makes it all work smoothly? It's the network. Many executives are finding that traditional connectivity models – much like compute and storage – need to be replaced with innovative technologies to effectively support business transformation.

Meeting enterprise needs with adaptability

Enterprises are shifting to adjust to the radical evolution of network requirements to be powered by connectivity that's easily scalable and low latency in nature, while enabling an architecture that's highly resilient yet cost-effective. It must securely adapt with the exponential data growth and cloud migration being spearheaded by AI.

So how do enterprises satisfy these competing and seemingly conflicting demands? By embracing and adopting adaptive networks powered by optical wavelengths, or waves.

While optical wavelengths are a relatively simple networking service, they serve as the building blocks of all networks – IP, CDN, Ethernet, voice and video which are in some way, shape or form underpinned by a Waves DWDM network. A flexible network architecture that enables high-capacity, low-latency connectivity from the foundation on up is key to empowering businesses to build their information infrastructure. But why?

Many of the high-level benefits of adaptable wavelengths have been mentioned, but further analysis into the characteristics will answer the question, "why optical wavelengths in the digital age?"

> " Reimagining of the customer experience creates a network refresh opportunity as enterprises assess their digital requirements and evaluate their next steps … "
>
> — Dave Ward, Lumen, EVP
>   Chief Technology & Product Officer

Optimizing applications and internal workloads

Latency is a digital experience killer and a detriment to application performance and UX, so optimizing for it is essential. With the advent of the Edge, there is a bifurcation between centralized data centers doing hard core compute and analytics and the Edge, where end-user applications will reside.

This distributed IT model is replicated on a global basis to enable enterprises to deliver a consistent experience for their various customers, both internal and external.

Along with massive bandwidth scalability (delivering 400G and beyond), private connectivity fabric architecture powered by optical wavelengths can provide predictable low-latency performance. Packet-based solutions can have significant variability when it comes to latency, which can increase the propensity for unpredictable performance.

Compare that with wavelength services that offer predictable capacity on a dedicated network which operates at the speed of light. The optical wavelength routing across the network is predefined and can remain fixed, which means enterprises can experience latency at the lowest possible levels. It's also "deterministic," meaning the latency stays consistent over the life of the service. No more worrying about jitter or packet loss. Applications, no matter the intensity, can run smoothly.

Key Takeaway

Simplifying and streamlining the core network

The reality is that we live in a hybrid networking world. **Gone are the days where an enterprise can rely on a 100% MPLS network infrastructure to meet the needs of the business.** The complexities associated with packet-based networks don't provide capabilities that extend to handing the core connectivity between strategic data centers where a multitude of new and emerging AI-enabled applications are running that interact with the customer and within the enterprise itself.

An optical wavelength network architecture can drive simplicity, streamline operations and accelerate innovation to deliver access at the speed of light. Diverse routing paths between data centers can be defined, mapped and implemented.

Lumen Next-Gen Optical Network
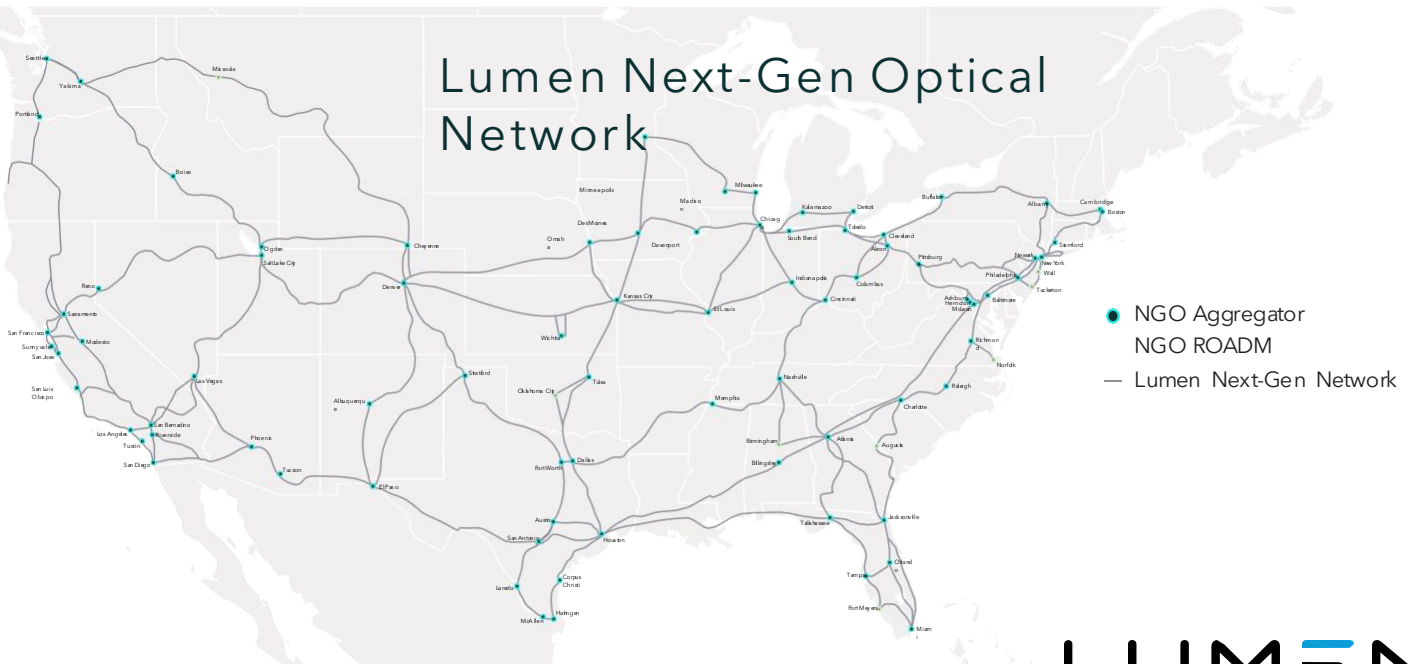
- ● NGO Aggregator
- NGO ROADM
- — Lumen Next-Gen Network

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Optical wavelengths are a flexible solution to achieve an enterprise's resiliency requirements without complicating things.

Network innovation that fuels product innovation

Network agility and the ability to change the network in near-real time isn't relegated to solutions like SD-WAN. The technological advances happening in the DWDM domain allow service providers to simplify the way they operate and manage the network. Software Defined Networking (SDN) is being driven down to the optical layer, abstracting the operational complexity from the connectivity solution that is on the leading edge of the bandwidth continuum.

Coupled with the advancements being made in path computation engines, BSS OSS automation and network visibility/analytics, you have the underpinnings of a whole new innovative operating model. This is where service providers can become true digital service providers, enabling architectures that treat their network as a pool of capacity that they can turn up or down without complications and with service agility that was once thought impossible. What does this new service model ultimately translate into? Product innovation.

Adaptive optical services are much more dynamic in nature with network visibility and control. The ability to define routing parameters and burst to 400G of optical capacity in minutes when needed and then spin down when data intensity subsides provides the flexibility that new applications need. The ability to see a real-time visualization of your optical wavelength network topology, run network diagnostics, detect upcoming network events and know when impairments occur unlocks endless potential, whether portal- or API-driven.

Key Takeaways

As enterprises contend with the promise of AI, they need highly flexible and scalable solutions to enable their vision. Private Connectivity Fabric (PCF) is a modern network architecture designed to enable a customizable portfolio of network solutions built on Lumen wavelengths.

Up to 400 Gbps
Wavelengths capabilities

#1 Provider
in U.S. Wavelength Services for third consecutive year[1]

~160,000
on-net fiber locations

1. Vertical Systems Group, Mid-2024 U.S. Wavelength LEADERBOARD, 2024.

Schedule a network consultation
and learn how your organization can harness optical networking to fulfill your digital transformation requirements.

Why Lumen?

Lumen Wavelengths combines an industry-leading network, using low latency routes, industry-competitive SLA's, network redundancy and a wide range of dynamic bandwidth options for maximum efficiency. Wavelengths provide a highly configurable and secure network solution on which to run your critical applications.

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