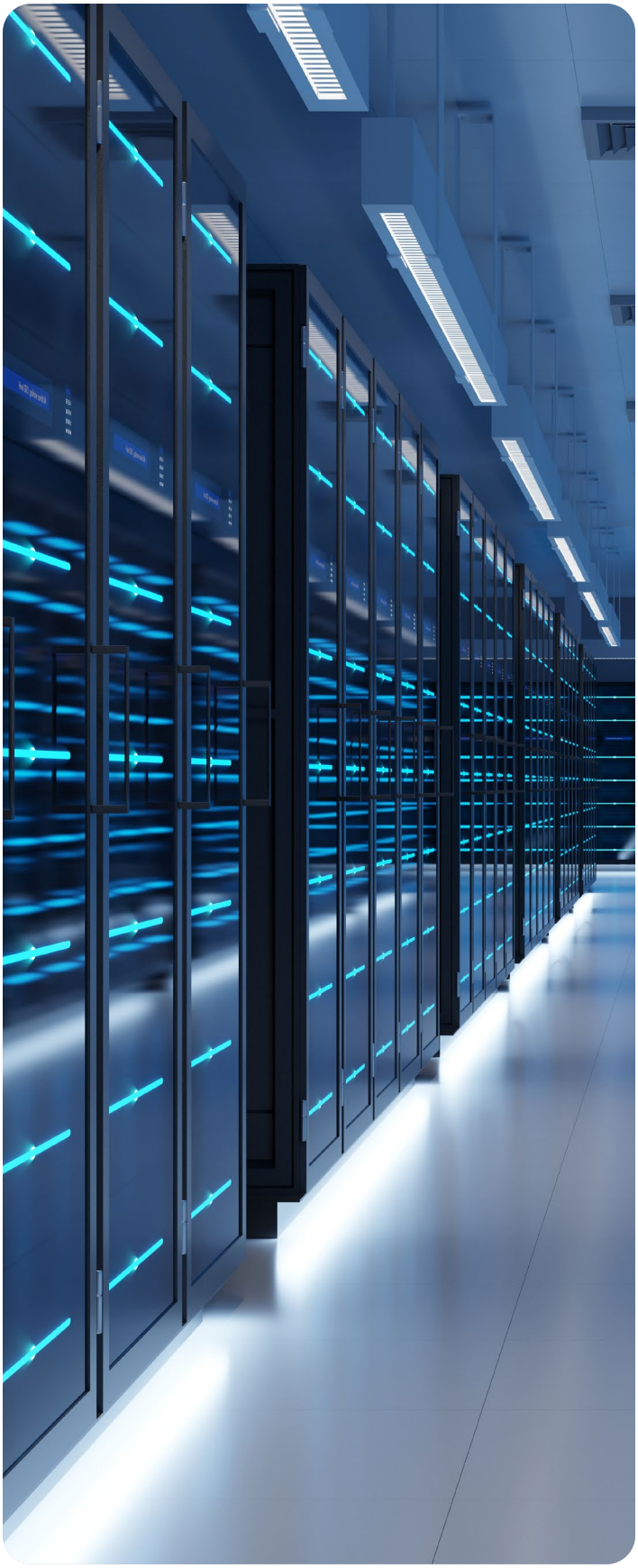
White paper

AT&T Business

Wavelength services meet high-capacity demands

How enterprise business relies on wavelength services to manage data-heavy workloads



Executive summary

Enterprise organizations often manage heavy AI workloads and multi-cloud environments that require transmitting huge amounts of data in real time. To meet ever-increasing performance, security, bandwidth, and capacity needs, organizations are turning to wavelength services.

Data bottlenecks can cause frozen videos, garbled VoIP calls, delays loading web pages, slow file transfers, and other issues that negatively affect operations. Wavelength service is fiber-based, dedicated, point-to-point connectivity that addresses capacity problems caused by data bottlenecks and packet loss.

Wavelength service uses powerful dense wavelength -division multiplexing (or DWDM) technology. DWDM dramatically increases capacity, efficiency, and bandwidth. It acts as a massive multiplier, allowing a single strand of fiber to carry multiple terabits of data per second.

Wavelength service benefits include:

- Reliability
- High bandwidth
- Ultra-low latency
- Security and compliance
- Speeds of up to 400G

Data centers often rely on wavelength service to transmit volumes of information. Financial services, healthcare, and manufacturing also rely on this solution.

Once you decide upon wavelength services for your enterprise, shop for a solution provider. AT&T Business has deep experience in this area and can support your transition.

AT&T wavelength features that stand out against the competition include:

Ultra-fast speeds, from 1G to 400G

99.999% guaranteed up-time service level agreements (SLAs)

Ultra-low latency of .05 milliseconds

1.4 million+ route miles of fiber

Introduction

With rapid expansion of AI capabilities, applications must process, store, and analyze massive volumes of data. Your business tools are more powerful than ever before. These workloads require vast computational power, high-speed networks, or specialized cloud storage architectures for your applications to perform smoothly. Can your network handle the load? We'll help you decide.

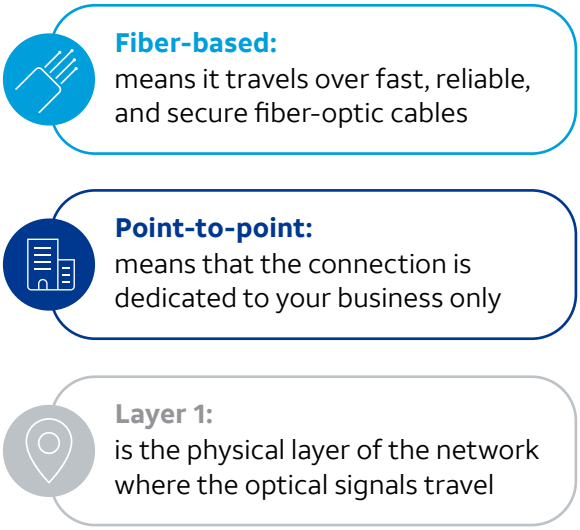
Wavelength service is a solution that enterprises turn to for their high data transmission needs. This fiber optic technology meets capacity demands by providing fast, reliable, and secure connectivity that you can scale for tomorrow. Wavelength services move large amounts of data at high speeds between two business locations.

In this white paper, we explain wavelength services technology and how it can help your organization meet AI-driven application demands. The technical specifications help ensure wavelength service is the right match for your organization. Finally, a data center use case and brief AT&T product descriptions provide real-life examples of this technology in action.

What is wavelength service?

Wavelength service is a fiber-based, point-to-point, Layer 1 transport capability that connects two locations.

Let's break down this explanation:



Wavelength service is ideal for data center interconnect, cloud on-ramps, and latency-sensitive workloads. It delivers high bandwidth with low latency by avoiding the public internet. Other internet services break data into packets, move it into queues, and re-route it. With wavelength service, data is left intact and the path is direct. Think of wavelength service as a private strand of light between two locations. Optical signals travel over fiber using dense wavelength-division multiplexing (or DWDM) technology.

How does it work?

DWDM, the fiber-optic technology behind wavelength services, dramatically increases capacity, efficiency, and bandwidth. It works by combining multiple data streams (or channels). DWDM then transmits the streams simultaneously, at different wavelengths of light, over a single optical fiber. This is a massive multiplier. It allows a single strand of fiber to carry multiple terabits of data per second. DWDM uses tighter channel-spacing so a single fiber can accommodate more channels. Each channel carries its own distinct data stream, which travels over a unique color, or wavelength of light. Since the data streams are separate, they do not interfere with one another. Also, DWDM can optically amplify signals for long haul wavelength service. Optical amplification allows massive amounts of data to move over long distances.

Enterprise challenges

Does your organization process massive AI workloads, manage multi-cloud environments, and transmit large quantities of data in real time? Does it use cloud apps, video, and IoT? If so, these data-heavy workloads can overwhelm your network.

When networks can't keep up with growing demand, enterprises often investigate a wavelength services solution.

How do you know the network is having trouble keeping up with demand? If adding more bandwidth doesn't help, your network architecture may be the problem. A new internet plan is futile. In other words, the problem is structural. Perhaps your enterprise has more applications, users, and devices than the network was originally designed to support. Look to your IT team for more definite answers.

IT typically tracks trends such as speed, traffic spikes, latency, packet loss, and throughput. This helps determine whether demand is exceeding capacity. They may also look for devices or applications that consume excessive bandwidth. When negative trends persist, that's another sign that your network no longer keeps up with demand. Structural issues lead enterprises towards high-capacity wavelength services with dedicated bandwidth and predictable performance.

These are some recurring signs:

Frozen or choppy video and garbled VoIP calls

Cloud application delays and slow file transfers

Delays loading web pages, caused by packet loss

Slow or lost internet connections, especially during peak hours

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Benefits of wavelength services

The biggest benefit is the ability to move large volumes of data quickly between locations. Wavelength services help modernize operations for AI, multi-cloud, and edge workloads with steadily increasing traffic.

Looking to the future, organizations can scale from 1G to 400G and beyond.

Industries that rely on data centers, including financial trading, healthcare, and manufacturing, typically require speed, consistency, security, and compliance benefits offered by wavelength services.

Benefits include:

Reliability based on dedicated bandwidth

High bandwidth

Security and compliance with sensitive data

Speed, even with data-intensive traffic

Dual-path connectivity in case of an outage

Low-latency data transfers

Wavelength service use case

Wavelength services are meeting the increased demands placed on enterprise networks. Let's explore a common use case.

The data center

Data centers need solutions that can handle heavier workloads and data-intensive applications. They rely on optimal performance and security to ensure the integrity of their data. Employees rely on seamless access to applications and efficient transport to effectively do their jobs. AT&T wavelength service meets these high-capacity requirements.

Carrier hotels are highly connected data center facilities. Multiple carriers, cloud providers, and enterprises interconnect at these metropolitan locations. AT&T wavelength service also meets carrier hotel high-capacity requirements. Plus, AT&T presence in carrier hotels ensures access to diverse fiber routes, redundant paths, and direct cloud on-ramps.

AT&T wavelength services help enterprises share sensitive files and data to and from the data center quickly and securely. A direct, dedicated, high-speed connection links local area networks (LANs) using a fiber-optic, point-to-point connection.

AT&T offers two wavelength service options:

1. **AT&T Wavelength Long-Haul** connectivity provides direct and secure site-to-site connectivity between different metropolitan areas. With AT&T Express Waves over the long-haul network, your organization can activate pre-provisioned routes up to 400 Gbps in as little as 24 hours. If you're doing data replication between locations and backup data centers, this point-to-point connection provides secure and reliable connectivity.

   Technical specifications include:

   - Latency (one-way): ~10 milliseconds per 1,000 route miles (10G) and ~8.2 milliseconds per 1,000 route miles (100G and 400G
   - Availability and outage-credit SLAs with tiers for standard and restorable designs

2. **AT&T Wavelength Metro** provides direct, secure site-to-site connectivity within a single metropolitan area. It's ideal for organizations needing concentrated bandwidth for large data transfers between two locations in the same metro area.

   Technical specifications include:

   - Speeds supported: 1G, 10G, 100G, and 400G
   - Availability and outage-credit SLAs with tiers for standard and protected designs

Conclusion: The bottom line

The rapid expansion of AI combined with data processing capabilities offer increased opportunities for growth. But to take advantage of these capabilities without network slowdowns, your enterprise should take a hard look at its network architecture.

Do you have the capacity you need? Does your capacity account for ever-increasing traffic, plus future growth? If you're noticing signs of network congestion in your daily online interactions, you probably know the answer already. Big decisions require looking at hard facts. Start with your IT team to gather the information you need to make an informed choice.

If you find that your infrastructure lacks network capacity, wavelength service provides significant advantages, including the ability to scale to meet ever-increasing demand. Point-to-point connections and optical wavelengths may offer the bandwidth, speed, and security you need.

AT&T wavelength services provide options that others may not, including proven expertise in delivering connectivity to enterprises including financial trading, healthcare, and manufacturing.

AT&T offers:

- Ultra-fast speeds, from 1G to 400G
- 99.999% guaranteed up-time SLAs
- Ultra-low latency of .05 milliseconds
- 1.4 million+ route miles of fiber

Talk to an AT&T Business sales expert to see how AT&T wavelength services can help you meet your enterprise goals.

Why AT&T Business

See how ultra-fast, reliable fiber, protected by built-in security, and 5G connectivity give you a new level of confidence in the possibilities of your network. Let our experts work with you to solve your challenges and accelerate outcomes. Your business deserves the AT&T Business difference—a new standard for networking.

Learn more about AT&T wavelength service.