



Connectivity is critical

Meeting today's enterprise demands with high-bandwidth, low-latency wholesale wavelength services



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As enterprises centralize and virtualize their data, applications and IT infrastructure, service providers are challenged to deliver high-speed, high performance connectivity – securely, reliably and scalably. At the same time, these providers need to protect their own ability to enter new markets and launch new services quickly and cost-effectively. Wavelength connectivity has the inherent characteristics to meet the requirements of both connectivity providers and their customers. For those looking to grow their business in Canada, wholesale Wavelength service from Bell gives access to a scalable, robust and reliable infrastructure with both managed and unmanaged options to suit providers' individual preferences.

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Speed, capacity and reliability: What enterprises need from their connectivity

With massive volumes of data, applications and IT infrastructure moving to offsite data centres or into the cloud, the pressure on service providers to deliver secure, reliable high-speed connectivity to enterprise customers is intense.

Signs of that pressure are everywhere. Telegeography reports that international bandwidth more than doubled between 2017 to 2019 to reach 1,503 Tbps.¹

This growth is being driven by mission-critical business applications, cloud services, high-definition media and Big Data, all of which demand ultra-fast network speeds with low latency – and many of which have to be handled in compliance with strict regulations. What's more, enterprises aren't just looking for faster, more reliable connectivity: many are also seeking to extend that connectivity across Canada, into the U.S. and around the world.

To address all of these needs at the lowest cost per bit, service providers, content providers, mobile network operators and carriers alike need to economically and efficiently expand their footprints, scale their services and guarantee high levels of network performance from end to end. At the same time, they have to maintain their own 'service velocity' – that is, the ability to bring competitive offerings to market quickly with interoperability, resiliency, end-to-end management and multiple classes of service.

Wavelength connectivity has the capacity, speed and performance characteristics to meet the requirements of both service providers and their enterprise customers – especially those in sectors such as finance, healthcare and cloud services where performance cannot be compromised.

¹ Telegeography, "Let's Just Say Demand is Thriving in the Global Bandwidth Market", May 2020.
<https://blog.telegeography.com/lets-just-say-demand-is-thriving-in-the-global-bandwidth-market>

Five common goals of connectivity providers

Regardless of market space or service type, connectivity providers have some shared goals in facing the challenges and opportunities of today's enterprise reality:

1. **Build network infrastructure to support business growth.** The key ingredients for any future-facing infrastructure are flexibility, scalability and cost-effectiveness – with the ability to support multiple protocols and bandwidths, up to 100 Gbps.
2. **Provide high-performance data centre interconnectivity.** As enterprises increasingly house their data, applications and IT resources in their own or third-party data centres, high-performance interconnections are essential to ensuring business flows seamlessly, in real time.
3. **Extend the reach of business services into metro networks.** Because the majority of enterprises are located in major centres, presence in the metro network is critical for providers entering new markets.
4. **Extend reach to carrier hotel or exchange sites.** To grow their businesses quickly and affordably, connectivity providers need to leverage the infrastructure and networks of other carriers through interconnections at carrier hotels and exchange points.
5. **Deliver high-definition media.** Consumption of high-bandwidth content such as video is growing exponentially among business customers and consumers, requiring high-speed, high-capacity, ultra-low latency connectivity for real-time transmission and distribution.

Global IP traffic will grow at a Compound Annual Growth Rate (CAGR) of 26% from 2017 to 2022, reaching an annual run rate of 4.8 ZB per year by 2022.²

How these goals are pursued – and which of them take priority – varies by provider profile. Canadian carriers and enterprises, for example, may focus on extending their cross-country reach or accessing the U.S. and global markets, while American carriers may seek access to the Canadian market. International carriers, meanwhile, are looking for affordable access to the North American market.

For Internet service providers, the main concerns are building network infrastructure and connecting to core IP routing sites. Content providers, on the other hand, are preoccupied with speed: having the options to scale and suit high-bandwidth media traffic in particular. Finally, mobile network operators contending with the growth of mobile broadband need to build networks with core connectivity ports that scale to 10 Gbps and beyond.

² Cisco Visual Networking Index, 2017–2022

Hallmarks of a well-rounded wavelength service

Given these challenges and opportunities, a robust wholesale wavelength service needs to offer:

- **Multiple speed options** – to suit different applications and content and accommodate growth
- **Low latency** – for high-quality, reliable delivery of data, apps and media
- **Multiple protocols** – for maximum interoperability and interconnectivity (see Figure 1)
- **High-density port availability** – for easy scalability and faster service delivery
- **Strong service-level agreements (SLAs)** – so connectivity providers can meet their customers' performance expectations
- **National and global coverage** – for maximum reach

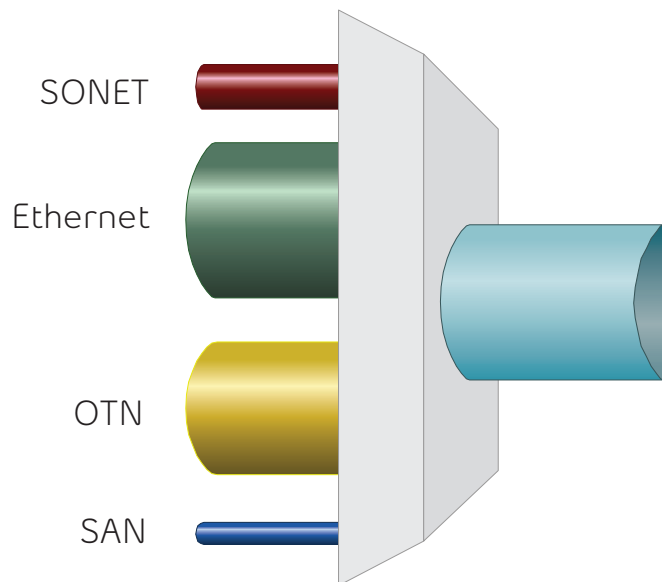


Figure 1. Multiple protocols over a single wavelength

Wavelength service from Bell delivers a scalable and robust network infrastructure that allows providers to expand their presence and complement existing business service offerings while extending reach to enterprise customers' headquarters and to data centres across Canada.

Wavelength service from Bell

Wavelength service from Bell is a high-bandwidth, low-latency, fibre optic transport service that provides nationwide presence across Canada as well as the U.S. and Europe. Its connections support local area network (LAN), storage area network (SAN) and wide area network (WAN) connectivity.

In addition to multiple speed options (up to 100 Gbps), Wavelength service from Bell has the transparency required for full-rate transmission of services such as 10 Gigabit Ethernet. Its support for multiple protocols on a single wavelength – as well as networking standards, including Ethernet, optical transport network (OTN) and synchronous optical networking (SONET) – provides a high degree of interoperability.

Wavelength service from Bell at a glance

- Multiple speed options (1, 2, 2.5, 4, 5, 8, 10, and 100 Gbps)
- Multi-protocol support
- High-density port availability
- Customer premise equipment (CPE) optimized for efficient space and power utilization
- Protection options (single protected circuit, two-times unprotected circuit)
- National coverage (service in more than 400 Canadian cities)

Wavelength service from Bell allows connectivity providers to offer enterprise customers competitive SLAs through its own service-level commitments on latency and availability, backed by a four-hour mean time to repair (MTTR). It also includes two protection options:

- A single protected circuit option that automatically re-routes traffic to an alternate standby route in the core network in case of failure
- A two-times unprotected circuit on diverse routing that allows carriers to configure their own fault-tolerant mechanisms

Managed and unmanaged options with Wavelength service from Bell

Bell offers flexible managed and unmanaged service configurations to suit providers' individual preferences. The Bell managed Wavelength service offers service providers their own private dense wavelength division multiplexing (DWDM) network for delivering high-bandwidth enterprise services.

There are a number of scenarios in which a managed service may be preferable, at one or both ends of the circuit, including:

- Interconnecting storage applications between remote data centres
- Networking mainframes between long-distance locations and data centres
- Establishing low-latency routes for financial trading exchanges
- Transporting uncompressed video in real time
- Adding capacity to transport native fibre channel traffic in a SAN

The benefits of choosing a managed option in situations like these include access to the network expertise of an experienced third party, minimized downtime due to guaranteed service levels, and capital and operational savings through the reduced need for facility and network management.

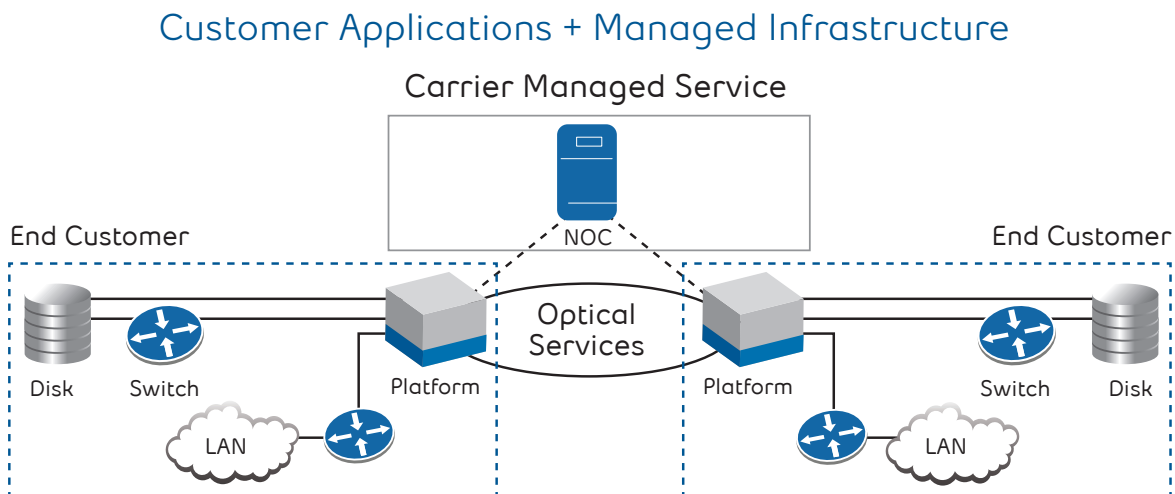


Figure 2. Customer Applications and Managed Infrastructure

The following provides a brief overview of how Bell differentiates its managed and unmanaged Wavelength service options:

	Managed	Unmanaged
Connection	<ul style="list-style-type: none"> ✓ Bell-owned customer equipment demarcation device with proactive 24/7 monitoring 	<ul style="list-style-type: none"> ✓ Direct fibre connection from customer fibre patch panel to Wavelength service card in first Bell central office (CO) ✓ Single mode fibre
Options and availability	<ul style="list-style-type: none"> ✓ Available anywhere ✓ Protected and unprotected access and core options 	<ul style="list-style-type: none"> ✓ Available at customer premise and co-location facility (e.g., Bell CO, data centres, carrier hotels) ✓ Available at all COs equipped with optical equipment that supports OTN mapping and aggregation ✓ Unprotected access with core protected or diversity options (additional circuit on diverse path)
Benefits	<ul style="list-style-type: none"> ✓ Remote diagnostics ✓ Faster change management ✓ SLA, MTTR and end-to-end availability ✓ Ability to change protocols remotely, saving on-site service charges turn-up time ✓ Savings on fibre access, as one pair of fibres can carry multiple protocols 	<ul style="list-style-type: none"> ✓ Savings in on-site space and power

Advantages of Wavelength service from Bell

The extent, capabilities and interconnections of the Bell network create opportunities for service providers to realize a number of benefits, including:

- **Lower cost of ownership** – Bell enables network expansion without heavy upfront investments while its managed service option minimizes network complexity.
- **Scalability** – Bell was the first wholesale provider in the Canadian market to offer up to 100 Gbps service, allowing providers to scale as high as needed.
- **Ultra-low latency** – for mission-critical data and apps.
- **Extensive, resilient reach** – Bell not only makes it possible for providers to move large amounts of data but it also has an extensive coast to coast footprint in Canada, with built-in redundancy and resilience.
- **Easy, flexible interconnections** – Bell has one of the largest Canadian presence in U.S. carrier hotels and exchange points as well as diverse, low-latency routes between North America and Europe.
- **Simplified migration and management** – The managed version of Wavelength service from Bell offers enhanced monitoring, notifications in the case of signal failures and service protection for increased availability, making it easier for providers to offer industry-standard SLAs to customers.

Wavelength service from Bell provides wholesale customers with the capacity, protocols, resiliency options and manageability to transport all types of voice, video, data and business traffic. It is designed to meet the demanding requirements of cloud infrastructure, built on technology that has been tested and qualified by leading data centre equipment providers.

To learn more, contact your [Bell Wholesale representative](#) today.

About Bell Wholesale

Bell Wholesale provides industry-leading broadband, IP and voice wholesale products and services across Canada and at key points in the U.S. and Europe – helping you grow your businesses and meet the needs of your customers.

As Canada's largest communications company, Bell has more than 270,000 kilometres of fibre and 161 Points of Presence (PoP) across the country, the most in Canada. Our convenient "meet me" points in the U.S. and Europe provide seamless access to the largest network in Canada.

With an extensive team of professional services experts and 24/7 help desk availability, Bell provides high-quality support to interexchange carriers, local exchange carriers, wireless service providers, resellers, Internet service providers, over-the-top providers, system integrators, telcos and cablecos.



For more information,
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