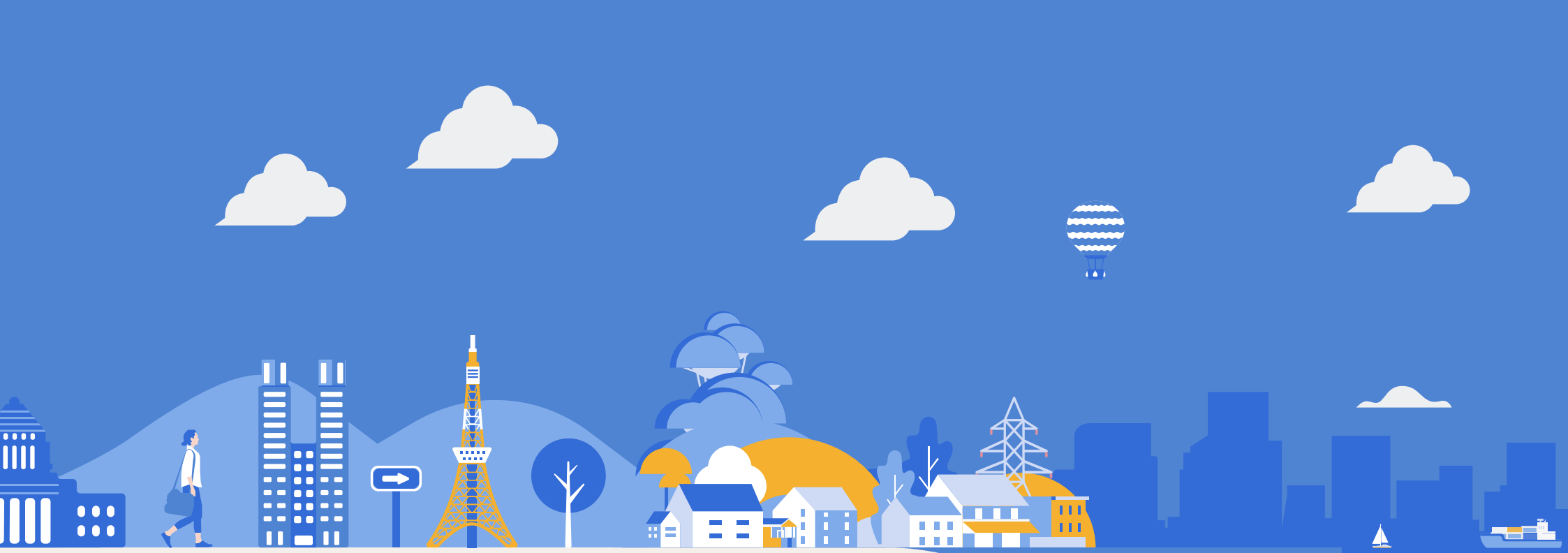
The Wavelength Advantage



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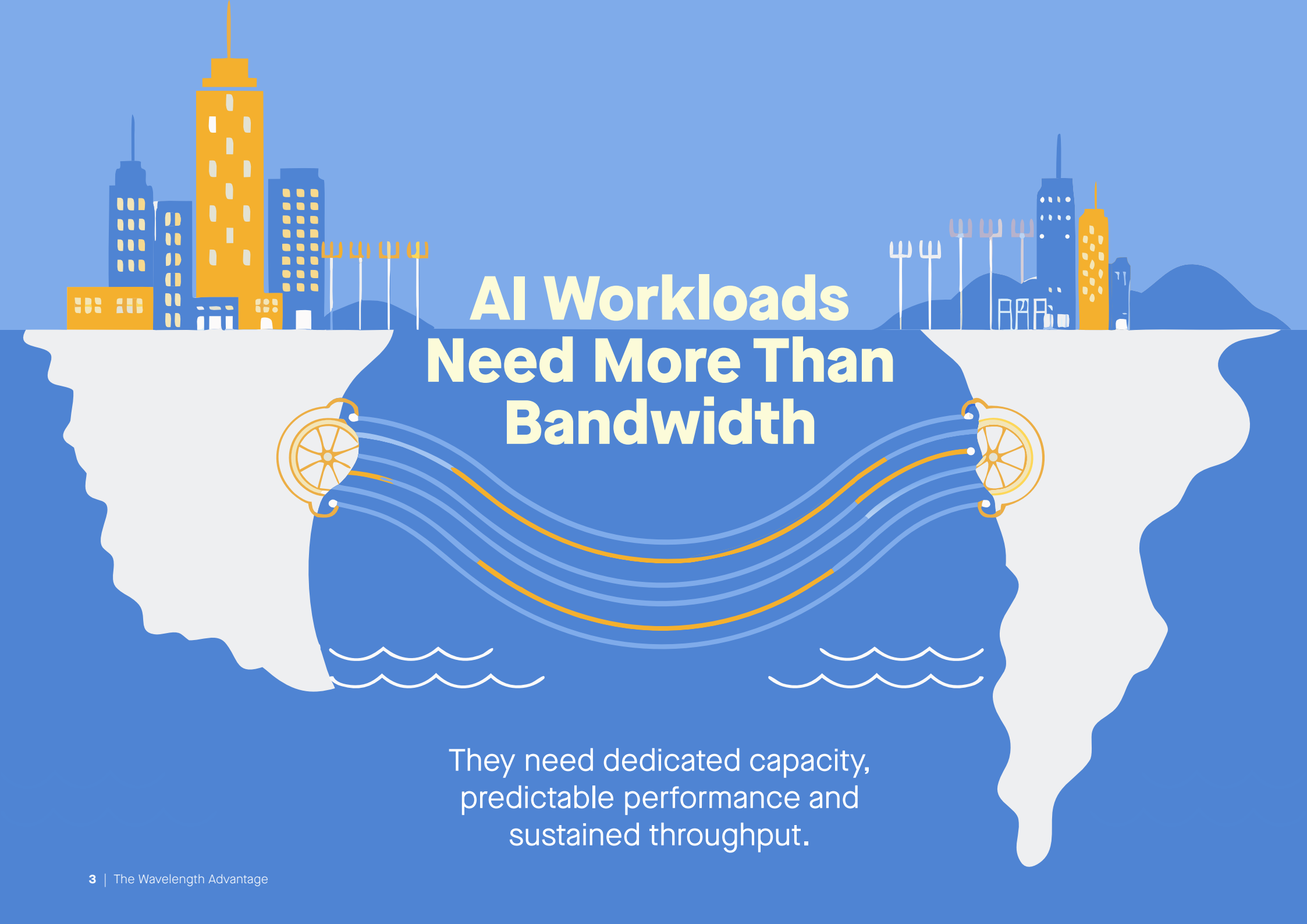
How carriers are staying ahead of the bandwidth curve



The Bandwidth Curve is Changing. Is Your Network Ready?

AI training and inference traffic is hitting backbones in massive, unpredictable bursts, creating new demand for sustained bandwidth, predictable performance and low-latency connectivity.

Customers won’t wait while you catch up.



AI Workloads Need More Than Bandwidth

They need dedicated capacity, predictable performance and sustained throughput.

Wavelength delivers a dedicated point-to-point optical channel for high-volume traffic, helping AI workloads move massive datasets between data centres with consistent latency and dedicated capacity.

Consistent performance, even at peak load.

While Ethernet is still highly capable, Wavelength is better suited for sustained, high-capacity AI traffic.

No contention.
No congestion-driven latency spikes.
Just capacity that holds.

Wavelength vs. Ethernet, MPLS, and DIA

Not every use case needs Wavelength. The right choice depends on bandwidth, distance, performance requirements and the level of control needed.



VS. Ethernet and DIA

Ethernet and Dedicated Internet Access (DIA) are well suited to a broad range of connectivity needs, particularly where very high sustained bandwidth or dedicated optical capacity isn't required. Wavelength becomes the stronger fit when customers need dedicated, high-capacity, predictable performance between specific locations. It provides the dedicated optical foundation for the most performance-sensitive connections.



VS. MPLS

Multiprotocol Label Switching (MPLS) is well-established for mission-critical traffic, particularly where dynamic routing and traffic splitting are priorities. By contrast, Wavelength provides dedicated optical capacity from 10G to 400G and beyond, making it a natural fit as bandwidth requirements climb.



VS. Dark Fibre

Dark fibre offers similar dedicated-capacity benefits to wavelength, but at a materially higher cost and operational overhead; the carrier is responsible for lighting, managing, and maintaining the fibre itself. Wavelength delivers dedicated capacity without that infrastructure burden, making it a simpler and more efficient option for carriers that don't want to own and manage the underlying fibre.

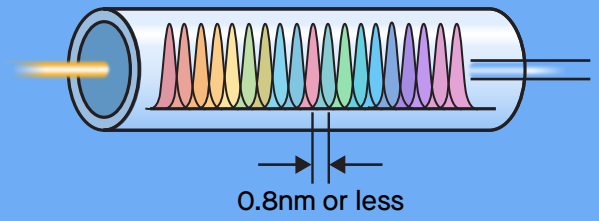
The practical takeaway

For mission-critical, high-capacity, latency-sensitive traffic (AI/GPU interconnects, real-time financial data, large-scale content distribution), wavelength is increasingly the default choice, not the premium option.

How Wavelength Works

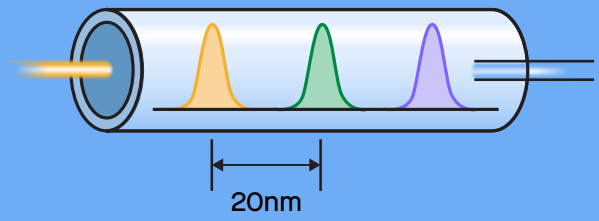
Optical networks use Wavelength Division Multiplexing (WDM) to send multiple data signals down a single strand of fibre simultaneously, each carried on its own wavelength of light. This is what allows one physical fibre route to carry dozens of independent, high-capacity connections without needing dozens of separate cables.

There are two main variants, and the difference matters for network design:



Dense Wavelength Division Multiplexing (DWDM)

packs channels tightly together, maximising the number of signals a single fibre cancarry. This is what makes long-haul, high-capacity backbone connectivity possible at global scale — it's the technology behind most carrier-grade wavelength services, including Epsilon's.



Coarse Wavelength Division Multiplexing (CWDM)

spaces channels further apart, which limits total channel count but simplifies equipment and cost. It's better suited to shorter-reach metro and access networks where ultra-high capacity over long distances isn't the priority.

For carriers building or extending backbone capacity, particularly to support data centre interconnection, cloud on-ramps, and international routes, DWDM-based wavelength is the technology doing the heavy lifting. It delivers connections that are transparent, point-to-point, dedicated, and secure, purpose-built to scale as demand grows rather than requiring a fresh infrastructure overhaul every time capacity needs to increase. Because wavelength operates at Layer 1, it can transparently transport protocols such as Ethernet, Fibre Channel and OTN without the carrier needing to terminate the underlying traffic.

Where Wavelength Delivers the Biggest Impact

AI and hyperscale interconnection

Training clusters and inference workloads generate the kind of concentrated, high-volume east-west traffic that shared networks struggle to absorb. Dedicated wavelength capacity between data centres helps eliminate contention on the connection



Cloud and data centre interconnection

As enterprises spread workloads across multiple cloud providers, low-latency, high-capacity links between data centres and cloud on-ramps become essential infrastructure rather than a nice-to-have



Real-time financial services

Trading systems where microseconds determine profitability need guaranteed throughput and consistent low latency, exactly what a dedicated wavelength connection is built to deliver



Global content and media delivery

Live-streamed events and large-scale content distribution require uninterrupted, high-quality data streams across international routes, often with built-in redundancy in case a primary route is disrupted



Network expansion and backhaul

As carriers extend their own networks into new markets, wavelength offers a way to add high-capacity backbone routes without the multi-year lead time of laying new fibre



The Business Case

For carriers and service providers, the appeal of wavelength isn't just technical. It's economic.



Predictable performance supports customer retention

With guaranteed throughput and low jitter, wavelength delivers a consistent experience regardless of network load, which is particularly valuable for latency-sensitive customers where unpredictable performance can affect satisfaction and retention



Scalability removes a recurring cost problem

Rather than re-engineering infrastructure every time a customer's bandwidth needs grow, wavelength technology makes it straightforward to scale capacity in line with demand, turning what used to be a capital project into an operational adjustment



Cost efficiency compounds over time

Compared to alternatives like dark fibre, wavelength optimises network bandwidth without the infrastructure and management overhead of lighting and maintaining fibre independently, reducing operating expenses while improving performance



Flexibility supports different risk appetites

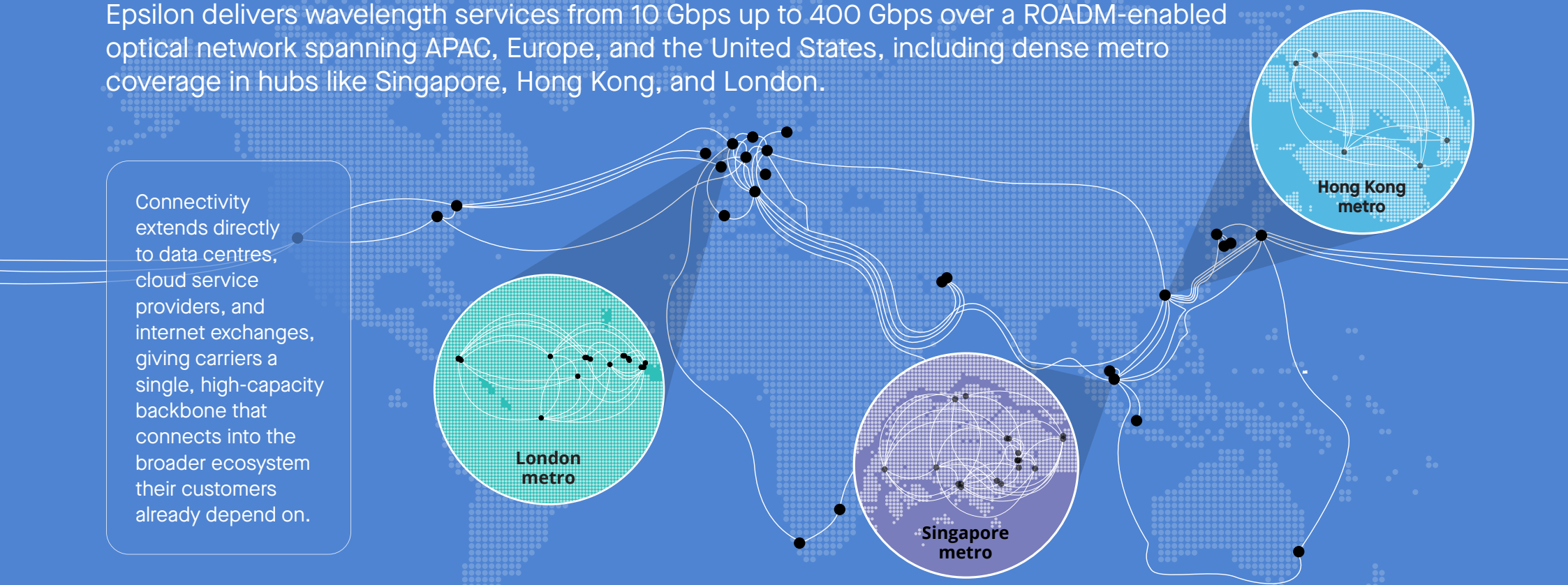
Unprotected, diverse, and protected route options let carriers match resilience levels (and cost) to what each customer segment actually needs, rather than over- or under-provisioning across the board

Put together, Wavelength isn't simply a performance upgrade. It's a way to convert a growing cost centre (network capacity that constantly needs re-engineering) into a scalable, predictable line item.

Epsilon's Global Wavelength Network

Epsilon delivers wavelength services from 10 Gbps up to 400 Gbps over a ROADM-enabled optical network spanning APAC, Europe, and the United States, including dense metro coverage in hubs like Singapore, Hong Kong, and London.

Connectivity extends directly to data centres, cloud service providers, and internet exchanges, giving carriers a single, high-capacity backbone that connects into the broader ecosystem their customers already depend on.



Network Features

- Speeds from 10 Gbps to 400 Gbps, with Flex Grid channels for future bandwidth needs
- ROADM-enabled optical network supporting flexible, remotely reconfigurable routing
- Robust SLAs guaranteeing up to 99.95% network availability
- Protected and diverse routing options for enhanced network resilience
- 24/7/365 technical support to maintain service continuity
- Ongoing network investment to expand reach, capacity, and capabilities

Choosing the Right Wavelength Partner

Not all wavelength providers are equal. Before committing, it's worth evaluating a potential partner against six criteria:

Network expertise

The optical networking landscape evolves quickly. A partner needs a track record that spans not just current technology, but the judgment to anticipate what's coming next. Epsilon brings over two decades of experience doing exactly that

Robust infrastructure

Redundancy and reliability should be designed in from the start, not bolted on. A network built to prevent failures, not just recover from them, is the difference between an SLA that's a formality and one that actually holds under pressure

Security

Given increasingly sophisticated cyber threats, a provider with a dedicated cybersecurity team and continuous monitoring isn't optional for mission-critical data



Global reach

Look for a carrier-grade backbone that interconnects the hubs your customers actually need: data centres, cloud providers, and internet exchange points. Epsilon's network provides instant access to more than 600 cloud, IX, network, and technology partners

Simple management

An intuitive, API-enabled portal that lets you provision, monitor, and scale services without friction matters more than it sounds. It's often the difference between winning a fast-moving deal and losing it to a competitor who can turn capacity up faster

Competitive, transparent pricing

Flat pricing structured by region or bandwidth, without hidden costs, makes it far easier to model margin on services built on top of the network

Case Study

When the 2022 International Football Tournament in Qatar became one of the most-watched sporting events ever broadcast, the digital delivery challenge was as significant as the sporting one. Much of the international traffic from Asia to Europe relies on a single, heavily congested route via the Egyptian Suez Canal, a chokepoint that risked bottlenecks, outages, and increased latency at exactly the moment global demand would peak.

Epsilon, alongside parent company KT Corp and global partners GBI, Newtelco, and Syniverse, addressed this by deploying diverse, redundant routing across international high-capacity wavelengths, Dedicated Internet Access, IP Transit, and cross-connect services, totalling almost 500 Gbps of capacity across strategic data centre locations.



The result	Uninterrupted, high-quality streaming delivered via a backbone spanning over 500 network nodes across 6 continents, demonstrating the resilience and high-capacity connectivity required when network performance matters most.

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Interconnecting Your World:
20+ Years of Wavelength Experience

Epsilon Telecommunications is a leading global software-defined network provider that offers a comprehensive suite of end-to-end connectivity and communication solutions, including wavelength services, to the world's largest carriers and organisations.

With Infiny, our award-winning Network-as-a-Service (NaaS) platform, we enable seamless on-demand connectivity and colocation in top-tier facilities. Combined with a high-performance and extensive global network that spans Europe, the Middle East, the United States, and Asia, you can achieve complete agility and reach, truly interconnecting your digital world.

Ready to Get on the Right Wavelength?

Talk to an Expert →

GLOBAL HQ
New Tech Park,
151 Lorong Chuan
#06-01A
Singapore 556741

LONDON
Telephone House
2nd Floor, 69-77 Paul Street
EC2A 4NW,
United Kingdom

SOFIA
Business Center Rubix
8 Dimitar Mollov Str.
1750 Sofia, Bulgaria

info@epsilontel.com | epsilontel.com

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