high-capacity wavelength routes: Asia to the US

a strategic guide for network operators

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Global connectivity demand is no longer evenly distributed. Instead, traffic is increasingly concentrated across a small number of high-value international corridors – driven by cloud expansion, AI workloads, and hyperscale data centre interconnection.

For carriers and network operators, this shift requires a more deliberate approach to network design. High-capacity wavelength services now form the foundation of international backbone connectivity, enabling predictable performance, scalability, and operational control across key routes.

Key Takeaways

Where high-capacity wavelength demand is concentrated

Why these corridors matter for modern network design

How to architect routes for performance and resilience

What to consider when scaling international connectivity

networking by the numbers

$10.2B

global optical wavelength services market by 2030

ResearchAndMarkets

400G

is the fastest-growing segment driven by AI workloads and hyperscale demand

Omdia

Global bandwidth demand has exceeded

6.4 Pbps

TeleGeography

100G

remains widely deployed, forming the baseline for current backbone networks

Terabit Systems

why these routes matter now

International network design has fundamentally changed. Instead of building for broad geographic reach, operators are now optimising for performance across specific, high-demand corridors.

This shift is driven by how traffic flows today. Cloud regions, data centres, and application ecosystems are concentrated in key locations, and traffic naturally follows these paths.

At the same time, shared IP and Ethernet networks introduce performance variability during peak periods. For latency-sensitive applications such as AI workloads, financial trading, and real-time platforms, this is no longer acceptable.

The result is a clear shift from distributed global routing to corridor-based network design.

what is wavelength connectivity?

Wavelength services provide dedicated, point-to-point optical connectivity at Layer 1, creating private, high-capacity links between two locations.

Using DWDM technology, multiple high-capacity channels – such as 100G and 400G – can run across the same fibre pair, enabling scalable long-haul transmission without redesigning the underlying infrastructure.

Unlike shared networks, wavelength connectivity delivers predictable performance, with consistent throughput regardless of peak demand.

In simple terms

A wavelength acts as a clean, dedicated optical path between two endpoints.

why wavelength over shared networks

Traditional connectivity models rely on shared infrastructure, where performance can fluctuate depending on traffic conditions.

Wavelength services take a different approach – providing dedicated capacity that ensures stability and control.

This is particularly important for operators delivering high-value services across international routes, where performance consistency directly impacts customer experience.

Key Advantages

- Predictable performance without congestion
- Scalable bandwidth from 10G to 400G
- Greater control over routing and traffic flows

core benefits

Wavelength connectivity enables network operators to deliver high-performance services at scale.

Performance Scale Control Security

It provides consistent throughput, low latency, and minimal jitter, making it ideal for mission-critical applications. At the same time, its scalability allows operators to expand capacity as demand grows – without rearchitecting the network.

With dedicated optical paths and fewer points of interception, wavelength services also enhance security while simplifying operations across international routes.

key high-capacity corridors

Today's international wavelength demand is concentrated across three primary corridors:

- **Hong Kong ⟷ Singapore**
- **Singapore ⟷ Japan**
- **Japan ⟷ United States (West Coast)**

These routes connect major cloud regions, financial hubs, and content ecosystems, forming the backbone of modern international connectivity.

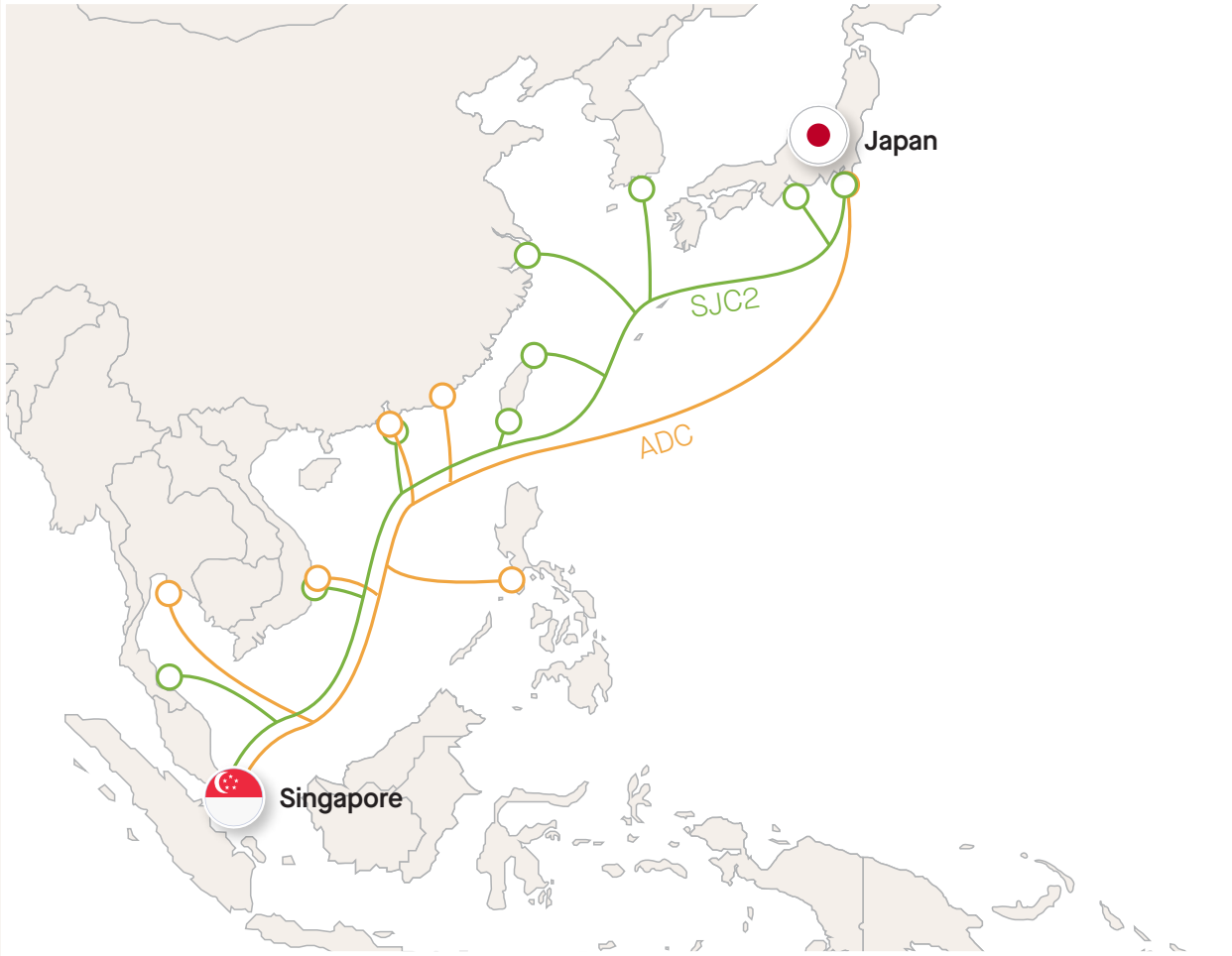
Hong Kong ⟷ Singapore

This corridor connects two of Asia's most important financial and digital hubs, supporting high volumes of latency-sensitive traffic.

Modern subsea systems such as ADC and SJC2 provide the foundation for high-capacity, low-latency connectivity, making this route a priority for regional backbone deployments.

Operators typically design this route with dual-system diversity, ensuring resilience while maintaining consistent performance for applications such as financial replication and cloud interconnection.

Singapore ⟷ Japan

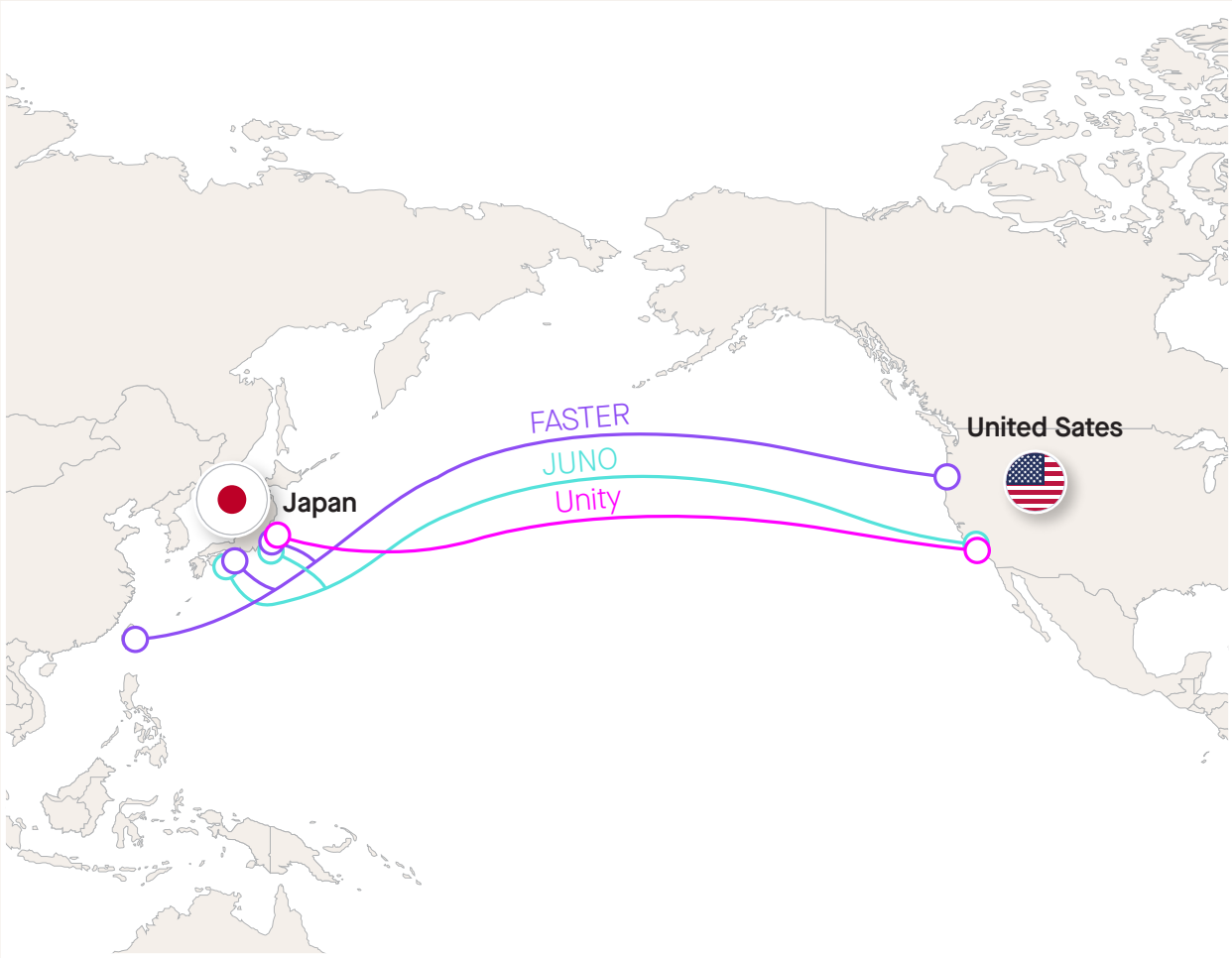


Singapore to Japan is a critical backbone route linking Southeast Asia to North Asia's cloud and content ecosystems.

Demand on this corridor is driven by hyperscalers, gaming platforms, and enterprise workloads that require sustained high-capacity connectivity.

With modern systems such as ADC and SJC2, operators can scale from initial deployments to multi-100G or 400G architectures, while maintaining predictable latency and performance.

Japan ⟷ United States



The Japan–US corridor is one of the most bandwidth-intensive routes globally, supporting AI workloads, cloud backbones, and large-scale content delivery.

Operators typically adopt a layered approach:

- JUNO for low-latency, point-to-point performance
- FASTER and UNITY for capacity scale and route diversity

This allows performance and scalability to be managed independently, ensuring both reliability and long-term growth.

architecture & design principles

Designing wavelength connectivity across these corridors requires a structured approach.

Operators prioritise route transparency, ensuring visibility into subsea systems and landing points. This enables accurate latency expectations and clearer operational control.

Diversity is built into the architecture using multiple cable systems, reducing risk and improving resilience. At the same time, DWDM technology enables incremental scaling, allowing capacity to grow without network redesign.

High-capacity wavelength underpins the most demanding global workloads.

Typical Use Cases

AI & Cloud Backbone

Financial Trading & Replication

CDN & Content Delivery

Carrier Backbone Expansion

proof of scale

Delivering connectivity for a global sporting event required a highly resilient, high-capacity network capable of supporting massive traffic volumes in real time.

By implementing diverse wavelength routes and integrating multiple international connectivity services, a total of approximately 500Gbps of capacity was delivered across key global locations.

This ensured uninterrupted, high-quality streaming for one of the most widely viewed events globally, demonstrating the critical role of wavelength connectivity in large-scale deployments.

build your high-capacity network with confidence

As global traffic continues to concentrate along key international corridors, wavelength connectivity provides a practical and scalable foundation for modern network design.

By aligning deployments with these high-demand routes, carriers and network operators can deliver predictable performance, scale efficiently, and support the next generation of digital services.

Choosing the Right Partner

- Global reach across key hubs and landing stations
- Access to multiple subsea systems for route diversity
- Transparent routing and clear service design
- SLA-backed performance and availability
- Simple provisioning and operational management

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interconnecting your world:
20 years of wavelength experience

Epsilon Telecommunications is a global connectivity provider delivering software-defined networking solutions, including high-capacity wavelength services, to carriers and digital infrastructure operators worldwide.

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 take your wavelength strategy further?

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