TeleGeography

Executive Summary

Transport Networks Research Service

Findings

To many people, the concepts of global network infrastructure and bandwidth markets are difficult to grasp. But those who follow this sector understand that it's a fundamental building block of the global economy. As with other areas of industry, the capacity market can struggle managing growth and uncertainty. Our *Transport Networks Research Service* assesses the state of the global telecom capacity market and evaluates the factors that shape long-term demand and price movements. We look at market conditions on both a global level and on a regional level, focusing on critical submarine cable routes.

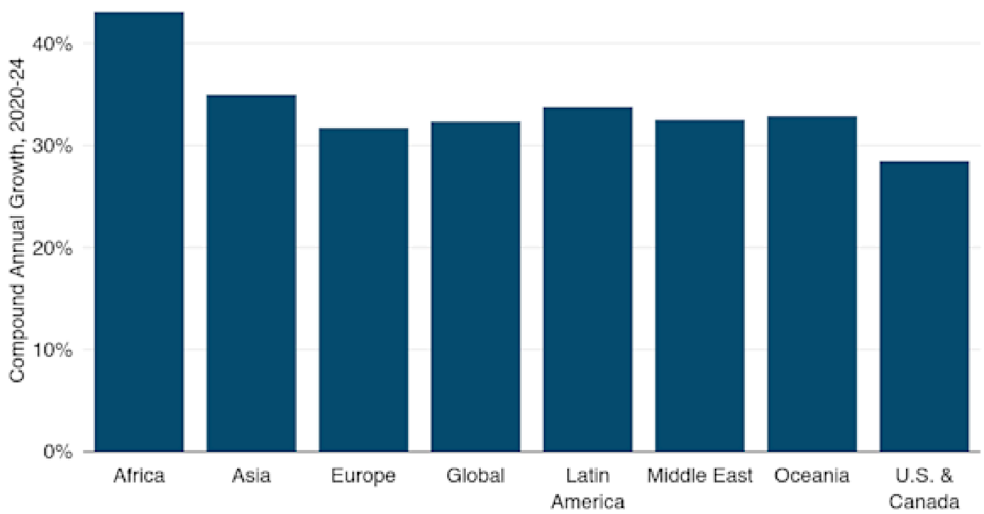
Features of this service include:

- Robust market datasets that can be found in the Summary Data and Charts section of the report.
- Detailed profiles of over 460 network service providers and more than 650 submarine cable systems, also downloadable in Excel.
- A new bandwidth demand search interface with historical data back to 2005 for countries, subregion, regions, and major submarine cable routes.
- A regularly-updated table of Planned Submarine Cables, containing ownership, landings, cost, and other critical information, and divided by route deployment.
- A network database, that allows customers to find carriers and submarine cables by location.
- Latency data from network operators for a variety of long-haul terrestrial and submarine routes.
- The Submarine Cable Fault Database features the latest publicly-disclosed cable fault information.
- An enhanced Submarine Cable Map including tools to search by cable owner, a feature not available in our free map.

Demand Trends

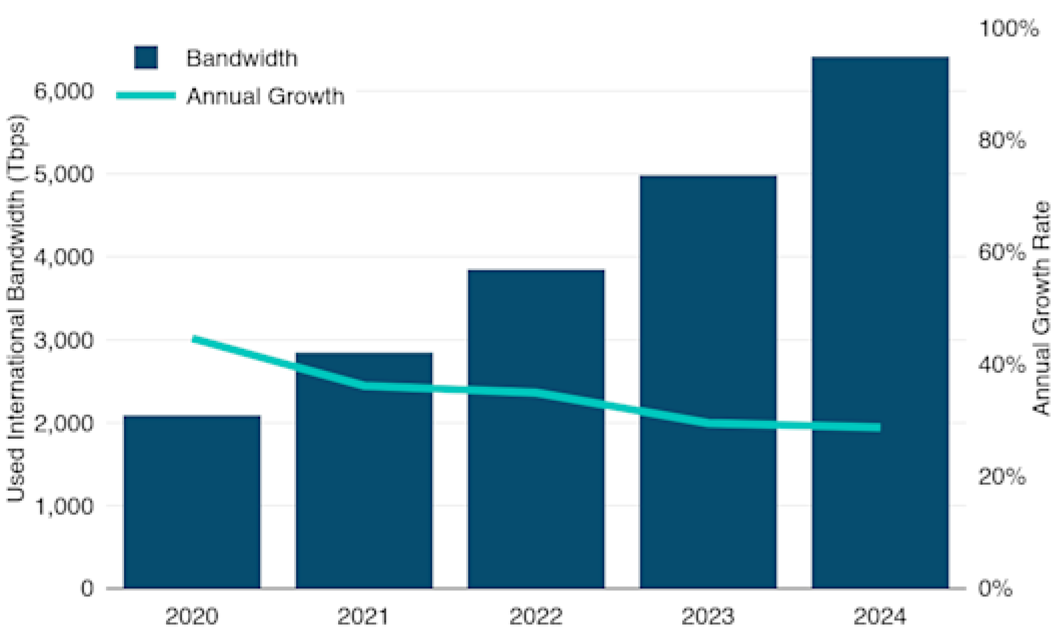
Global bandwidth demand continues to climb, albeit at a steadily slowing rate. As recently as 2020, year-on-year demand had increased 45%, but the pace decelerated to 29% in 2024. Still, this represents a steady 32% CAGR and a tripling of demand between 2020 and 2024, with demand now surpassing 6.4 Pbps.

FIGURE 2
Used International Bandwidth Growth by Region



Source: TeleGeography

FIGURE 1
Worldwide International Bandwidth Growth



Source: TeleGeography

Now take a look at the bar chart below. On a regional level, most parts of the world have seen very comparable growth at about 32-35% CAGR since 2020. Africa outpaces other regions with more than 40% CAGR demand growth, and the mature U.S. market falls slightly below the average with about 29% growth in bandwidth demand.

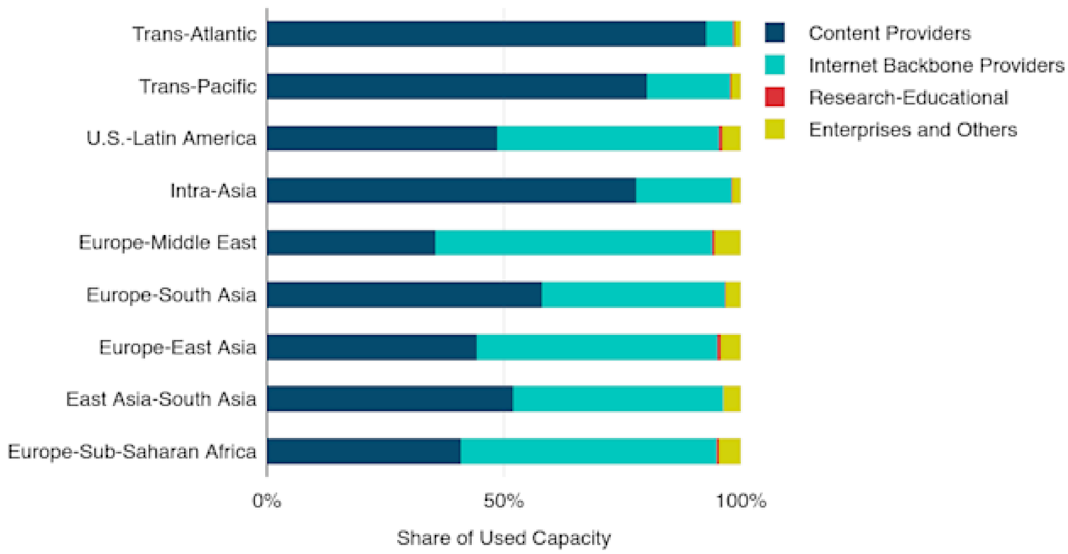
The Role of Content Providers

Content and cloud providers—most specifically a handful of companies like Google, Meta, Microsoft, and Amazon—overwhelmingly account for most of the world's international bandwidth usage. As recently as 2016, internet backbone providers accounted for the majority of demand. Not anymore. In 2024, content and cloud networks accounted for almost three quarters of all bandwidth demand.

Take a look at the 100% bar chart below. You can see here that, while content providers' share of total demand varies by route, it's becoming dominant just about everywhere. On the massive trans-Atlantic, trans-Pacific, and intra-Asian routes, these networks account for at least 80% of bandwidth demand.

FIGURE 3

Share of Used Bandwidth by Category for Major Routes



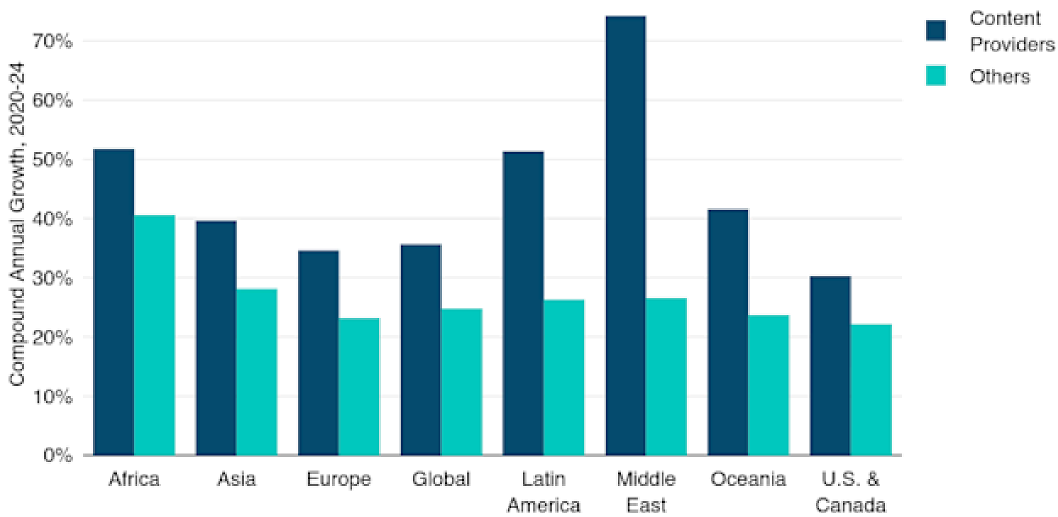
Notes: Data shows used bandwidth as of year-end 2024.

Source: TeleGeography

A few smaller routes like Europe-East Asia and Europe-Sub-Saharan Africa are still driven by internet backbone demand, but the dynamic is shifting even in these locations. This is clearly illustrated in the bar chart below, which shows that content provider demand growth is outpacing that of other network sources on all of the route groupings we track. Take a look at Latin America, where content demand growth is almost double that of other sources. Within the next year, content providers will account for the outright majority of demand on U.S.-Latin American routes.

FIGURE 4

Content Providers versus Others Bandwidth Growth by Region



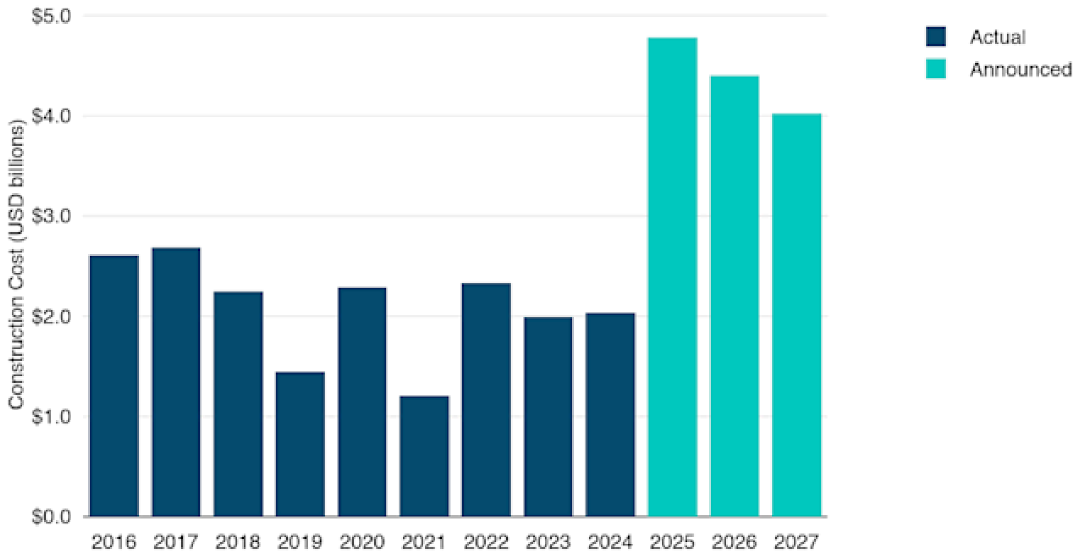
Source: TeleGeography

Meeting Demand Requirements

To keep pace with ever-increasing bandwidth demand, a steady stream of investment has driven tremendous growth in subsea cable infrastructure. Aggregate cost of new construction over the past nine years has averaged over $2 billion per year. With the exception of a few anomalous years, we haven't seen this level of investment on subsea cable infrastructure since 2000-2001—and it's not letting up. The value of new submarine cables planned to enter service from 2025-2027 is forecasted to reach over $13 billion.

FIGURE 5

Construction Cost of Submarine Cables



Notes: Total construction costs of all international and domestic submarine cables entering service in designated years. Construction costs exclude the cost of subsequent capacity upgrades and annual operational costs. 2025-2027 construction costs based on announced contract values and TeleGeography estimates. Not all planned cables may be constructed.

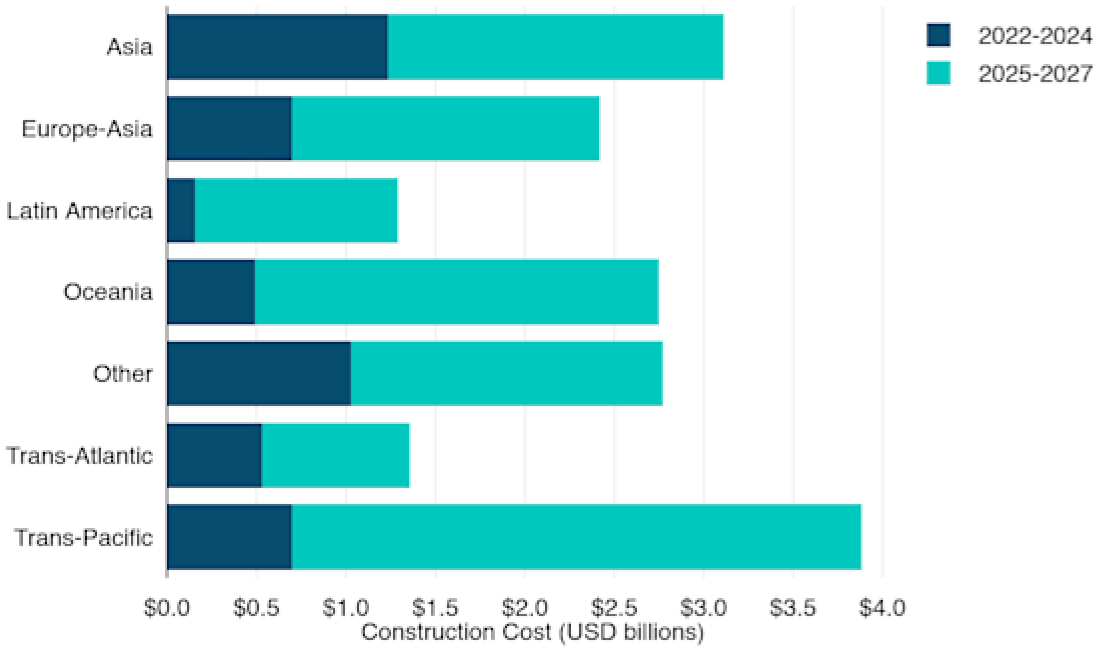
Source: TeleGeography

How is this substantial investment in subsea infrastructure being deployed regionally? In the past three years, no single route stands out versus the others, although intra-Asian routes have had the most extensive investment with $1.2 billion in new cables, and Latin American routes have seen the least with about $200 million in new investment.

Look at the coming three years in the horizontal bar chart below. We see a significant surge in new cable investment across every route we track. The biggest surge by far is expected in the trans-Pacific, where an aggregate of over $3 billion in spend will be driven by multiple Google and Meta-led cables along with several others.

FIGURE 6

Construction Cost of New Submarine Cables Entering Service by Region



Notes: Construction costs based on the year that the cable entered service. Construction costs exclude the cost of subsequent capacity upgrades and annual operating costs. 2025-2027 construction costs based on announced contract values and TeleGeography estimates. Not all planned cables may be constructed.

Source: TeleGeography

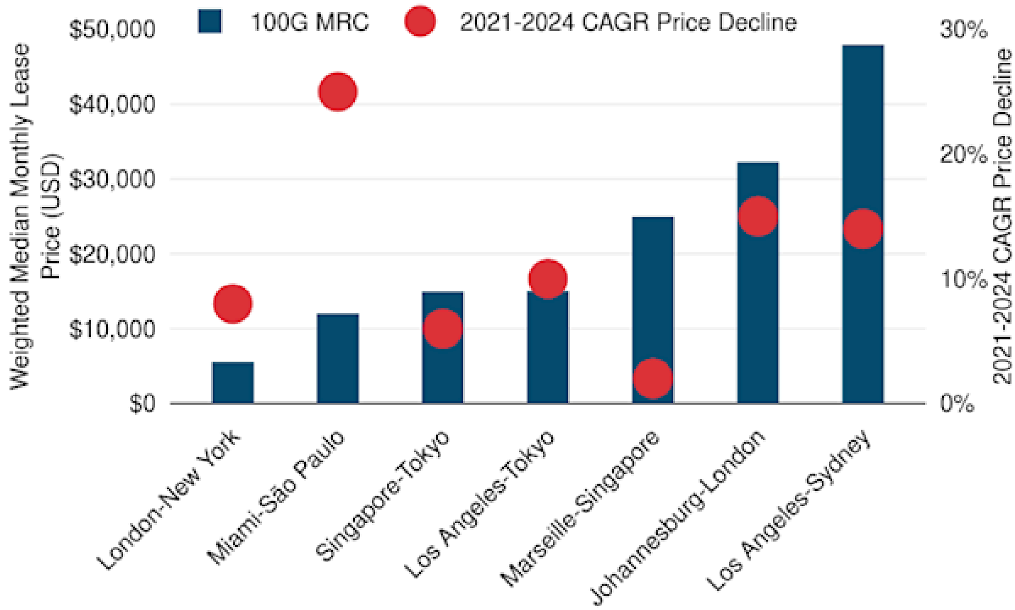
Pricing

Capacity demand has been doubling nearly every three years on many routes. As a result, investment in new submarine cables has surged. In some instances, delays in cable completion (for reasons ranging from geopolitics to supply chain disruptions) has slowed price erosion to single digits. In others, new supply has created intense price competition. But as always seems to be the case, new projects that take advantage of the latest technology impact price. Wavelength prices overall in 2024 continued their steady decline. Between Q4 2021 and Q4 2024, weighted median 100 Gbps wavelength prices across the key global routes below decreased an average of 11% compounded annually.

How these big new investments are impacting each region varies. The figure below maps out the 100 Gbps wavelength price in the dark blue columns and the CAGR price decline in the red circles. What are we seeing?

FIGURE 7

Weighted Median 100 Gbps Wavelength Prices & CAGR Price Decline on Global Routes



Notes: Each column represents the weighted median monthly lease price for an unprotected 100 Gbps wavelength on the listed route. Circles represent the percentage decline of the weighted median price calculated as a three year compound annual growth rate. Prices are in USD and exclude local access and installation fees.

Source: TeleGeography

On routes with more ample supply, price erosion has returned to form as new high capacity cables enter service. For example, the U.S.-Latin America route continues to fall at a brisk pace, a reflection of the imminent launch of Firmina, diverse fiber pair ownership, and upgrades to existing systems. Between 2021 and 2024, 100 Gbps wavelength prices on Miami-São Paulo decreased 25% compounded annually, to $12,000 per month. Similarly, Johannesburg-London, which saw a massive influx of new capacity from the launch of Equiano, recorded an annual 15% price drop for 100 Gbps wavelengths over the past three years. In Q4 2024, weighted median 100 Gbps wavelength prices on the core Africa-Europe route were $32,272 per month. That's 5.9 times the price of London-New York, compared to 7.5 times more expensive just three years ago.

On other routes, planned cables are just starting to come to fruition and geopolitical hurdles remain. As a result, price erosion is still sluggish. Routes connecting to (and within) Asia are a prime example of this. Between 2021 and 2024 100 Gbps prices on Singapore-Tokyo and Marseille-Singapore decreased just 6% and 2% annually from 2021-2024, respectively. This is beginning to change, though. With delayed systems starting to enter service at the end of 2024, these routes are about to receive a substantial amount of new supply and competitors over the next few years, likely setting the stage for increasing price erosion.

Outlook

Numerous factors are shaping the trajectory of the global bandwidth market on the global, regional, and local levels. The individual chapters of the *Transport Networks Research Service* delve into detail on developments shaping each of the route groupings and regions we track. But here, let's focus on a few of the most widely-impactful trends shaping long-haul capacity demand and pricing.

Content Providers Expanding Frontiers

Expect to see content providers increasingly drive long-haul network development across all global routes.

Content providers initially focused their route development on major inter-hub routes. This was reflected in heavy investment on trans-Atlantic, trans-Pacific, and intra-Asian routes. They've since expanded their footprints dramatically. Their investments now include new systems linking all global regions including Africa, the Middle East, India, Oceania, and Latin America.

In 2024, Google announced its Pacific Connect Initiative, a collection of cable systems criss-crossing the world's largest ocean. The earliest of these systems will enter service in 2026, with others coming online as they are completed. Although this initiative does not represent Google's only recent cable investments, it represents a massive chunk of capacity and capital. The cost of these systems is well over $1 billion. Notably, Google is receiving some financial support from the U.S. and Australian governments for these projects, largely to enhance connectivity to islands in the South Pacific

Meta's Project Waterworth is another vast and ambitious plan to reach new markets. This group of planned cables will form a loop around the globe, though detailed landing and routing has not yet been made available.

Locations of Data Centers and Power Optimization

Network optimization will drive long-haul bandwidth growth across routes linking data centers.

Operators are beginning to redistribute computing workloads across data centers to optimize power consumption and processing capacity, a strategy known as "spatial temporal load shifting." Google, for example, leverages its global network to shift workloads based on the real-time availability of renewable energy. As other companies adopt similar strategies, locations with abundant renewable energy options will likely become prime targets for future data center and network infrastructure development. These will add to bandwidth demand on a growing intermeshed network of global data center-to-data center routes that prioritize both access to end users and access to compute and storage resources.

Geopolitical Concerns

Geopolitical tensions will directly affect the timing and location of subsea cable deployments.

While geopolitical concerns have always played a role in determining which companies deploy long-haul networks (and in which locations), several recent developments are reshaping network deployment trends.

The Red Sea currently faces major problems. Competing Yemeni territorial claims have created a permitting nightmare for cable laying vessels attempting to operate there, and Houthi attacks on shipping lanes have manifested a physical threat to operations. The massive 2Africa cable, which is largely laid, has yet to realize deployment of a large length of cable that would lie in Yemeni waters. Other cables planned to traverse the Red Sea in coming years include IEX, Africa-1, Raman, and SeaMeWe-6, which are also awaiting deployment.

Cable repair operations have been threatened in the Red Sea as well. The simultaneous cable faults on AAE-1, EIG, and SEACOM/TGN-Eurasia off the coast of Yemen in late February 2024 resulted in 5 months of delay before maintenance vessels were able to conduct repairs due to the threat of Houthi attacks on shipping. These problems in the southern Red Sea are spurring efforts to develop terrestrial bypass solutions from the Saudi Arabian Red Sea coast across to the U.A.E. and Oman.

Beyond the Red Sea, cable builders are finding it increasingly difficult to receive Chinese permits for new cable deployment in the South China Sea. The ADC intra-Asian cable finally entered service at the end of 2024. The SJC-2 cable should finally enter service in 2025 after multi-year delays. (SJC-2 was originally planned to be in service in Q4 2020!)

These challenges of laying cables in the South China Sea are leading operators to develop new routes. The builders of the planned Apricot cable aim to avoid this problem by laying the cable from Japan to Singapore via a route to the east of the Philippines. In addition, U.S. government opposition to direct China-to-U.S. cables has boosted the development of several cables from Southeast Asia to the U.S. These include Echo and Bifrost.

Artificial Intelligence (AI)

AI will contribute to shifts in traffic patterns—not just locally—but also in the long-haul.

There's hardly a hotter topic in the network world right now than AI. Just as the broader economy braces for the massive but unknown impact of this technological development, we have to ask what kind of effect AI will have on the transport network. In the U.S., terrestrial fiber providers Lumen and Zayo have both cited AI-driven demand as justification for laying new fiber. Lumen has touted big deals with Google, Meta, Amazon, and Microsoft for metro and long-haul fiber.

The impact of AI on network traffic extends far beyond the networks of major hyperscalers. AI-driven traffic is increasingly interwoven with traditional traffic streams carried across all carrier networks. New AI-focused companies may emerge that seek to build their own network infrastructure.

In conclusion, while it's clear that AI will significantly influence long-haul network demand, the precise magnitude and nature of this impact remain uncertain. The rapidly evolving model training techniques and inference deployment strategies make it challenging to predict what the future will hold.

TeleGeography

Washington, D.C. / Exeter

U.S. tel: +1 202 741 0020 / U.K. tel: +44 (0) 1392 493626.

www.telegeography.com