

Wavelength Services: High Performance Connectivity Powering the AI-Fueled Digital Ecosystem



Jan Hein Bakkers
Senior Research Director, IDC



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Introduction & summary

The digitalization of the global economy is in full swing as organizations worldwide adapt their business models, ways of working, and customer experience to become digital-first, cloud-centric, and AI-fueled.

Carriers, cloud providers, and infrastructure owners play a **pivotal role** in the **digital ecosystem**. They depend on high-performance connectivity to interconnect their facilities, expand their footprint and serve their end-customers in the digital future.



The digital ecosystem will increasingly be shaped by the proliferation of AI solutions. The future success of digital service providers will depend on a **performant network** that is **secure, scalable, and agile**.



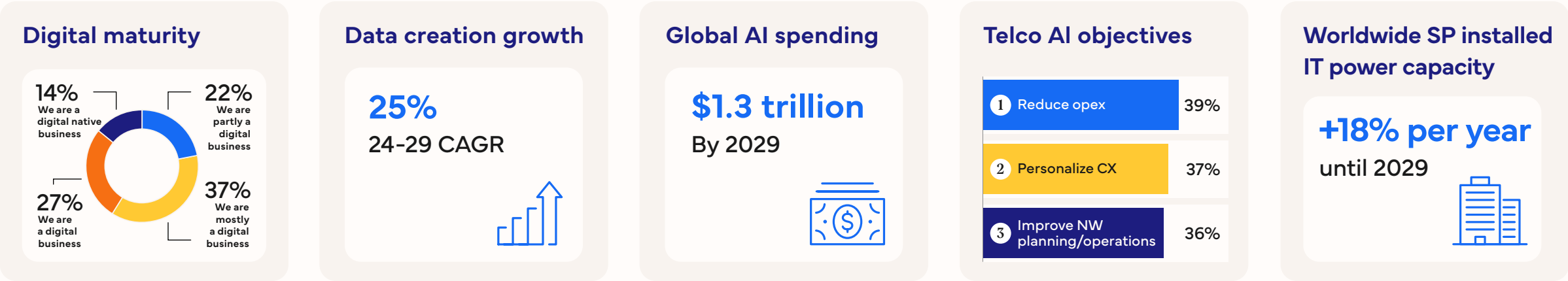
Wavelength services meet the high-performance requirements of this Future Network. They can provide **very high capacity** for mission-critical traffic with **ultra-low latency** and **predictable performance**.



Carriers, cloud providers, and infrastructure owners will use wavelength connectivity to underpin their growing footprint, increasing traffic and evolving end-user services. **Bandwidth and network as a service (NaaS)** developments will ensure wavelength services are ready for tomorrow's demands.

AI is redefining the digital economy

- ➔ Digital maturity continues to rise, and organizations across the world are fast progressing on their digital journeys. The vast majority now **identify themselves as mostly or completely digital business** in which value creation is based and dependent on the use of digital technologies, including AI.
- ➔ The relentless digitization of economy and society drives a massive increase in data volumes. IDC’s Global DataSphere, which measures the volume of digital data generated each year by consumers and enterprises, is expected to grow at an average annual pace of **25% to reach 527 zettabytes by 2029**. This growth is driven by an increasingly diverse set of endpoints and workloads and is set to accelerate exponentially as the impact of AI usage kicks in.
- ➔ The emergence of AI as a leading workload continues to drive investments in IT products and services. The advent of agentic AI will trigger a surge in spending on AI and generative AI (GenAI) solutions by service providers and enterprises. Global AI spending will grow at an average rate of **32% per year to reach \$1.3 trillion by 2029**.
- ➔ For telcos, AI features prominently on their agendas — their key objective for AI implementations is to **reduce operating expenses** as a means to address growing capacity requirements. Operators also look at AI solutions to improve the experience across the customer life cycle, from quoting to ordering, delivering, and billing. Improving network planning and operations rounds out the top three goals.
- ➔ Massive amounts of money are being earmarked for investment in AI facilities. Investors, datacenter operators and service providers — established and new entrants like Neoclouds — are looking to **build more datacenter capacity** to address the opportunity and position themselves for growth in the era of AI everywhere.



Source: IDC Future Enterprise Resiliency & Spending Survey Wave 7, August, 2025

Source: IDC Global DataSphere Forecast, 2025-2029, May 2025

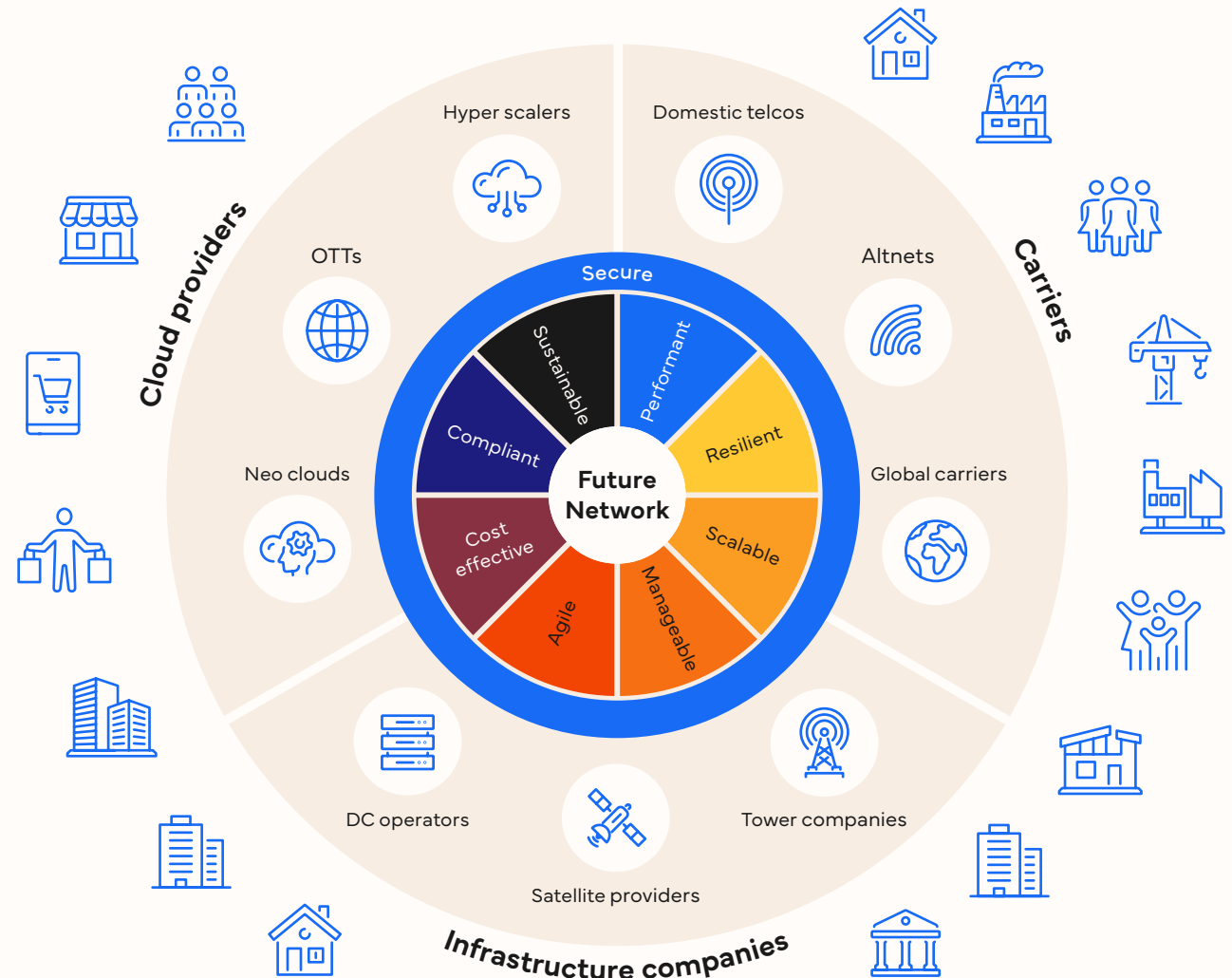
Source: IDC Worldwide AI and Generative AI Spending Guide, August 2025

Source: IDC EMEA Telco Survey, 2025 (n=150)

Source: IDC Worldwide and U.S. Datacenter Installation Census and Construction Forecast, 2025-2029, June 2025

The digital world is founded upon robust connectivity. Digital service providers, such as carriers, cloud providers, and infrastructure companies, rely on network infrastructure to connect their facilities and serve end-customers in the consumer and enterprise markets. To succeed in tomorrow's marketplace, they will need Future Network connectivity that is:

- ✓ Performant
- ✓ Resilient
- ✓ Scalable
- ✓ Manageable
- ✓ Agile
- ✓ Cost effective
- ✓ Compliant
- ✓ Sustainable
- ✓ Secure



Wavelength services meet high performance network requirements

Wavelength services provide very high capacity for mission critical traffic.

 Very high bandwidth rates of 10,100, and, increasingly, 400Gbps, with a future technology roadmap to 800Gbps and beyond

 High availability, typically backed by stringent SLAs

 Ultra-low latency

 Deterministic network over a known path to ensure predictable performance and address sovereignty requirements

 Typically available with protected paths, diverse routing and fail-over options

 Separated optical path to provide secure and dedicated capacity

 Cost per bit can be favorable compared to other alternatives, including switched Ethernet, dark fiber and self-build, subject to location, requirements and in-house capabilities.

 Additional wavelengths can be added if more capacity is required on a specific route.

→ Future Network requirements

- ✓ Performant
- ✓ Resilient
- ✓ Secure
- ✓ Cost-effective
- ✓ Scalable

Wavelength services may be referred to in the marketplace under different names, such as waves, optical, WDM, and dedicated ethernet

NaaS brings agility and automation to the network

- ➔ As-a-service functionality is coming to the network. Such programmable platforms will enable users to adopt network connectivity and related services in an automated and on-demand fashion, either through a portal or API.
- ➔ NaaS platforms will provide users with an automated network that enables better responsiveness, quicker turn up of new connections and a simple way to scale capacity over time as requirements grow.
- ➔ NaaS is still in its infancy. More platforms will be launched in the coming years, while propositions will evolve. The current offerings mostly cover Ethernet and IP services. Wavelength connectivity will become increasingly available in a NaaS model in the coming years, to provide a flexible and dynamic solution for spikey workloads, like AI training.

NaaS can support carrier network priorities.

1#

Network automation is the top networking priority for carriers – 37% see it as a key priority.¹

NaaS can help organizations deliver on their network vision.

80%

of worldwide organizations expect their connectivity to be proactive or intelligent in two years.^{2,3}

Organizations are ready to invest in NaaS.

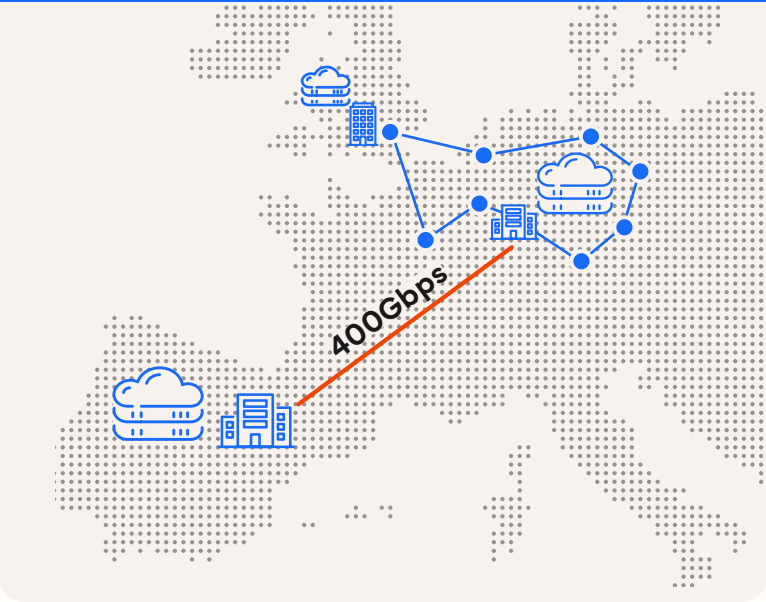
62%

of organizations plan to increase spending on NaaS in the coming year.³

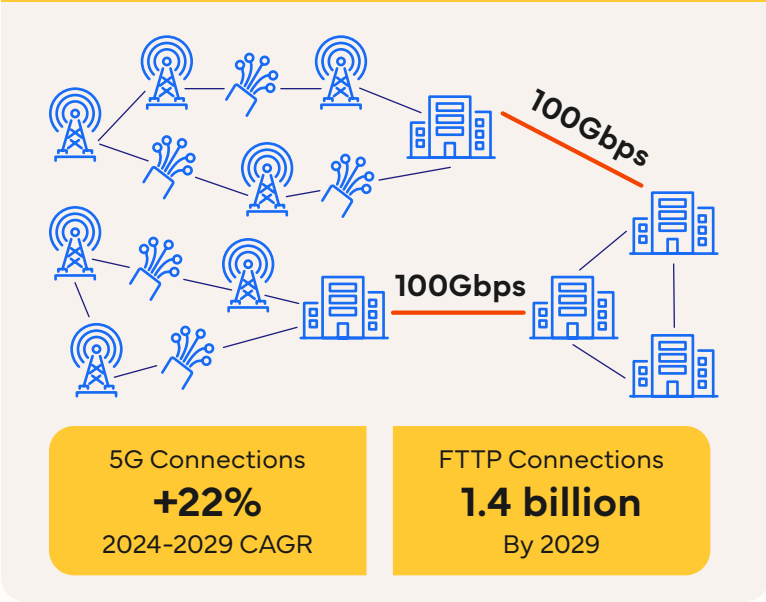
¹ Source: IDC EMEA Telco Survey, 2025 (n=150); ² Companies that evaluate their connectivity in 2 years as “part of the enterprise fabric with proactive digital capabilities” or “networks are intelligent, edge-enabled and self-aware”; ³ Source: IDC Future Enterprise Connectivity Infrastructure and Services Survey, 2025 (n=758)

Wavelength services give carriers capacity where they need it

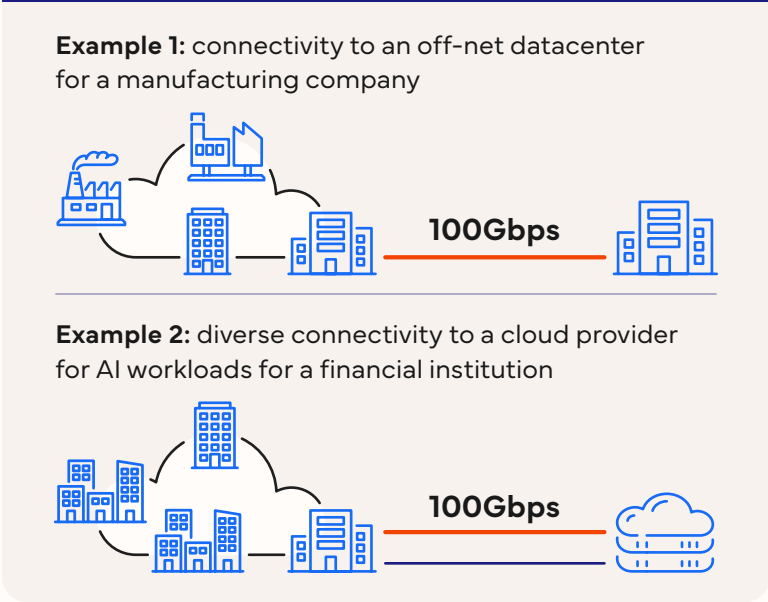
Expansion of core network to new POPs to improve cloud connectivity or expand addressable market



Aggregation of access networks



Providing diversity or off-net reach to service individual end-customers



Source: IDC Worldwide Semiannual Telecom Services Tracker, 25H1, November 2025

Wavelength services help cloud providers connect increasingly distributed footprints



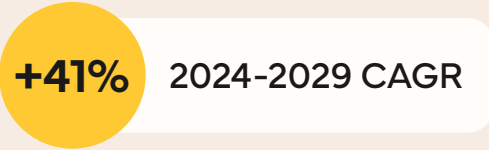
Cloud providers expand their footprint

AI-centric neoclouds are building coverage. At the same time, established providers are expanding their networks to get closer to end users in order to cope with growing demand, improve performance, reduce latency, and/or provide sovereign and compliant solutions.

Traffic volumes accelerate

Rising cloud adoption and accelerating usage of AI solutions is driving traffic growth. Training of AI models will fuel transfer volumes between datacenters, which will be exacerbated by growing replication and synchronization requirements between distributed locations.

Cloud-based data generation



Source: IDC Global DataSphere Forecast, 2025-2029, May 2025



Quest for space and power outside of the traditional connectivity hubs

A significant share of investment in AI facilities will be geared towards new locations that can meet the space and power requirements more easily than some more established markets. This will drive demand for new fiber infrastructure routes.

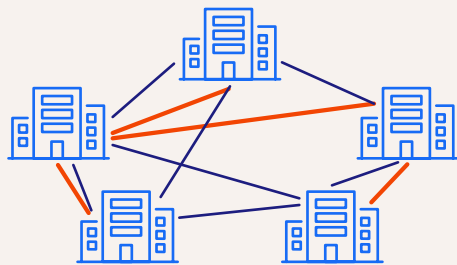
Resilience becomes more important than ever

Resilience is a key consideration for cloud providers, as datacenters and connectivity underpin the very core of their business. Major service providers are now typically looking at three-to-four geographically diverse routes for their datacenters.



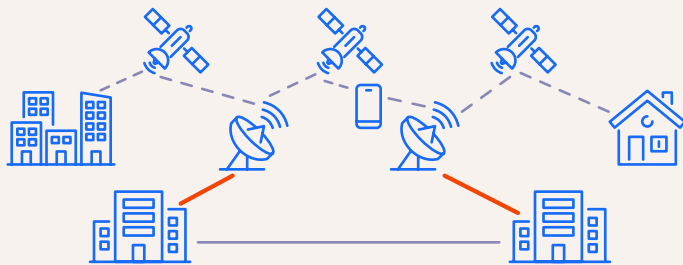
Wavelength services let infrastructure owners quickly deploy and scale network capacity

Datacenter operators need capacity for secure and resilient interconnection fabrics to support AI workloads.



Wavelength services provide very high bandwidth connectivity that is low-latency, secure and scalable. They can serve as the primary means of connectivity or add a layer of diversity for the growing AI ecosystem.

Growing uptake of satellite connectivity drives backhaul requirements.



Backhaul requirements for satellite operators accelerate as end-user demand and the number of satellite gateways grow significantly. **Wavelength services can provide very high throughput** that is easy to deploy and scale.

Tower companies move up the stack with transport service offerings.



Tower companies can add active transport services to their tenants to complement their passive infrastructure offering. **Wavelength services can provide the capacity** they need to aggregate the backhaul from their towers.

Next steps

Step 1

Analyze your future connectivity requirements, in terms of infrastructure builds, customers, routes, and resulting bandwidth demand. Map these requirements to your in-house capabilities to **assess which very high bandwidth solutions provides the best fit**. Explore how NaaS platforms could help address your future needs.

Step 2

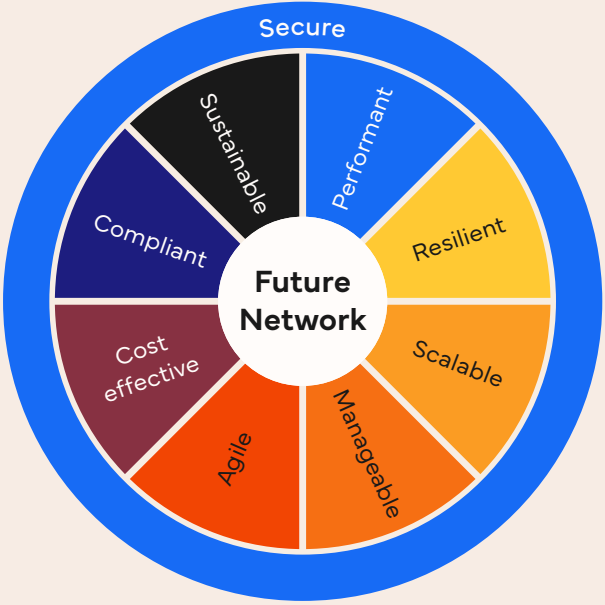
Look for a connectivity partner with the capabilities to address your specific needs.

Key criteria to consider include:

- **Network coverage** — Are they present where you need them?
- **Assets** — What infrastructure do they have and what does this mean for current and future capabilities?
- **Time to market** — How fast can a new location be turned up?
- **Roadmap** — What products are in development in terms of capacity and NaaS?
- **Credentials** — What experience do they have with customers with a similar profile to yours?

Step 3

Evolve your network into an **automated connectivity fabric** that can support you in the era of AI everywhere. Work closely with your partner to ensure your Future Network provides the performance, scalability, agility and security that will allow you to always be ready for the requirements of tomorrow.



About the IDC analyst



Jan Hein Bakkers
Senior Research Director, IDC

Jan Hein Bakkers is responsible for IDC’s research efforts in the European enterprise and wholesale communications domain. His personal areas of expertise include internet access and WAN services, as well as wholesale connectivity markets. His research has a particular focus on the evolution of wholesale models, WAN transformation and the role of key growth segments, such as SD-WAN, cloud connectivity and very high bandwidth services within that.

[More about Jan Hein Bakkers →](#)

Message from the sponsors



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- High-capacity connectivity for mission-critical operations and AI-driven applications
- Secure & intelligent infrastructure that ensures resilience and supports automation
- Future-ready networks designed for cloud integration, real-time communication, and next-generation digital services

Through their combined strengths — spanning broad geographic coverage, diverse infrastructure capabilities, rapid delivery of high-capacity routes, evolving technology roadmaps, and experience serving customers with complex requirements — they support organizations as they adapt to rising connectivity demands.

This collaboration brings together global scale and technological innovation. Vodafone Carrier Services and Ciena help carriers, cloud providers, and infrastructure owners accelerate transformation, unlock new opportunities, and deliver exceptional experiences to their customers.

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