Network Connectivity Guide:

Ethernet vs. Wavelengths vs. Dark Fiber

As businesses scale their AI initiatives and cloud infrastructure, choosing the right network connectivity becomes crucial for performance and growth. Each solution - Ethernet, Wavelength Services, and Dark Fiber - offers distinct advantages depending on your bandwidth needs, control requirements, and use cases. Whether you're connecting enterprise locations, powering AI workloads, or building hyperscale infrastructure, understanding these options helps you select the path that aligns with your technical demands and business objectives.

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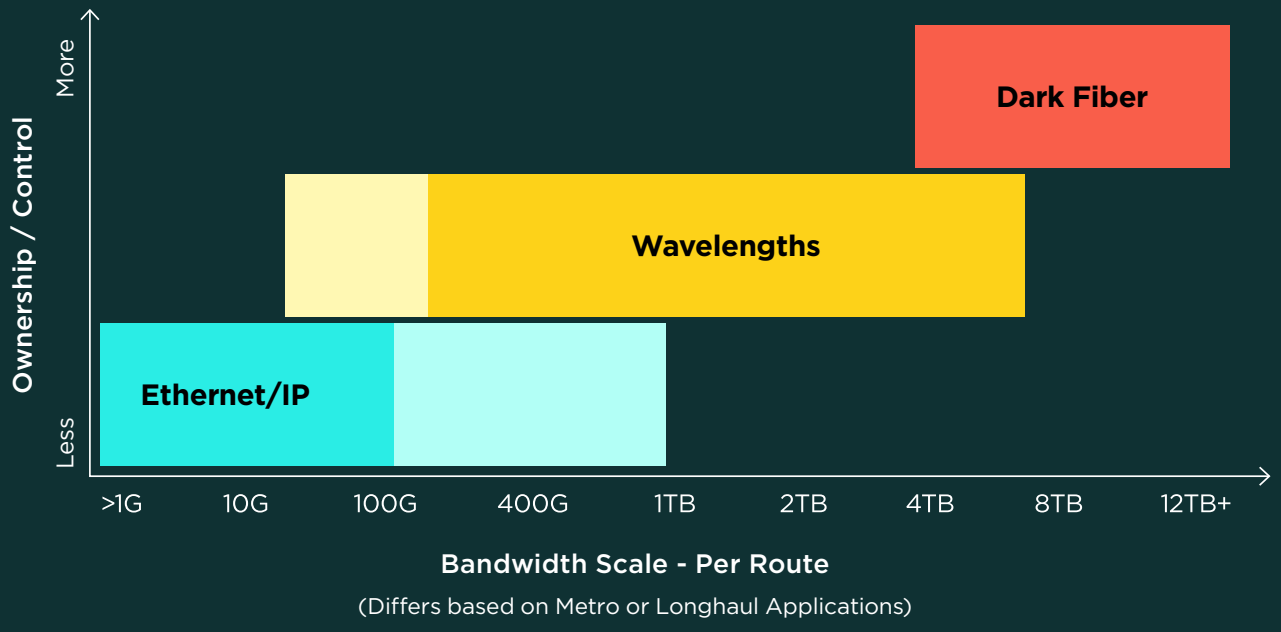
The Bandwidth Continuum and AI



Dark Fiber

Key Characteristics

- Massive scale & capacity needs
- High capital outlay
- Dedicated equipment & fiber
- Field Tech & NOC needed

AI Use Cases

- Hyperscaler & NeoCloud network infrastructure
- Edge Data Center Fabric
- Model Training

Wavelengths

Key Characteristics

- 100G/400G, up to 5TB+
- Secure, dedicated pt to pt connections
- Shared DWDM platforms & fiber
- Opex based model

AI Use Cases

- Scaled AI
- Distributed AI workloads
- Data Center to AI on-ramps
- Large dedicated cloud on-ramp capacity

Ethernet / IP

Key Characteristics

- Packet based connectivity
- Smaller forms factor but scalable
- Meshed and point multipoint
- Naas capabilites
- Multi-cloud connectivity through a single port

AI Use Cases

- Enterprise multi-cloud
- Data center to AI to cloud connectivity
- Consumption, inference & data ingest

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Ethernet vs. Wavelengths vs. Dark Fiber

	Ethernet / IP	Wavelengths	Dark Fiber
Best For	Organizations seeking fast, flexible connectivity with simplified management	Enterprises that prioritize bandwidth, performance, and scalable AI	Businesses that require full control and long-term scalability
Bandwidth Options	Scalable from 1G to 100G, with options up to 400G	High-capacity at 10G, 100G, and 400G, scalable to multi-terabit deployments	Exceptional scale, supporting up to 50TB+ per route
Network Layer	Layer 2 — Ideal for packet-based applications	Layer 1 — Optimized for dedicated optical transport	Layer 0 — Full control over transport protocols
Latency	Efficient performance with support for most enterprise workloads	Low latency with deterministic performance	Ultra-low latency with customer-optimized design
Resiliency & Redundancy	Built-in failover, MPLS, and self-healing capabilities	Optical path protection and optional route diversity	Fully customizable for maximum resiliency based on business needs
Network Control	Managed service with minimal oversight required	Shared control with dedicated paths and performance guarantees	Complete ownership and design flexibility
AI Use Cases	• Enterprise Multi-Cloud • Data Center-to-AI-to-Cloud Connectivity • Consumption, inference & data ingest	• Scaled AI • Distributed AI Workloads • Data Center to AI On-ramps • Large Dedicated Cloud On-ramp Capacity	• Hyperscaler & NeoCloud network infrastructure • Edge Data Center Fabric • Model Training
Provisioning	Rapid setup via marketplace and NaaS tools	Fast quoting & delivery with RapidRoutes℠ or custom-designed networks	Tailored deployment timelines with expert design and planning
Routing Options	Standardized paths optimized for common topologies	Flexible routing, including predefined and custom options	Unlimited routing flexibility — designed to meet exact specifications
Commercial Model	Operational expense model with usage-based flexibility	Flexible: operational or capital-based depending on configuration	Capital-based investment with long-term value
Scalability	Easily scales with business needs using virtual ports and topologies	Scales via multiple waves per route and high-capacity paths	Highest available capacity scaling based on infrastructure ownership
Topology Support	Supports hub-and-spoke, mesh, and point-to-point configurations	Optimized for point-to-point high-throughput connections	Fully customizable to any topology requirement
Security	Private, secure Ethernet circuits ideal for enterprise-grade environments	Encrypted and private Layer 1 connectivity	Maximum control and security — full ownership of infrastructure