BandwidthIG

WHITE PAPER

Lit Services vs. Dark Fiber

A practical guide to choosing the right network path - and how Bandwidth IG makes dark fiber simple.

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Executive Summary

As data volumes surge and applications grow more bandwidth-intensive, enterprises are rethinking how they build their network infrastructure for the future. Rather than leasing wavelengths and staying locked into a provider's capacity limits, more organizations are choosing to own and operate their own dark fiber networks. This shift gives businesses direct control over their infrastructure, the flexibility to scale bandwidth on their own terms, and a clearer path to managing costs sustainably as demand continues to climb. Choosing between lit services and dark fiber has become a critical infrastructure decision with long-term cost and scalability implications.

With Bandwidth IG (BIG), making the switch from lit services to dark fiber is seamless. Our 100% buried network, combined with private and diverse dark fiber paths, gives your organization the scalability and reliability it needs to grow without limits.

What This Paper Covers

This white paper compares both options, outlines the key signs your organization is ready to manage its own network, and explores how BIG's dark fiber solutions can support your transition to greater control, flexibility, and growth.

1. **Lit Services & the Dark Fiber Parallel —** Lit services, internet circuits, and bandwidth compared to dark fiber.
2. **Lit vs. Dark, Side by Side —** From carrier-owned infrastructure and optics to enterprise-owned infrastructure and optics.
3. **Signs You're Ready for Dark Fiber —** A checklist to determine whether your enterprise is ready to take on a dark fiber network.
4. **Dark Fiber Benefits & Ownership —** Scalability, control, security, TCO, and running your own network end to end.
5. **Objections, De-Bunked —** Cost and manpower myths.
6. **Why Choose BIG —** How BIG makes the switch to dark fiber easy.

Why Customers Order Lit Services

Point-to-Point Bandwidth

Lit services are the traditional go-to for enterprise network needs, and for good reason. With point-to-point bandwidth, you buy exactly what you need — 10G, 100G, 400G, or another defined capacity — under a simple commercial model: you buy bandwidth rather than build an optical network. The carrier delivers a working, active service between two defined endpoints, so there is no optical transport platform to purchase and little upfront investment. In exchange, you get a predictable recurring cost for a defined amount of capacity, which makes lit services especially attractive for one-off, modest, or uncertain bandwidth requirements.

Carrier-Managed

Lit services are fully carrier managed. The carrier provides engineers, monitors, and maintains the optical layer, and your enterprise data rides the carrier's shared optical infrastructure. Because that infrastructure is shared, its cost is spread across many services and customers, which can translate into a lower cost per bit at modest bandwidth levels. The customer avoids responsibility for optical engineering, spares, and troubleshooting, and capacity upgrades are handled commercially.

THE TRADE-OFF

Lit services can be economical when you're buying a relatively small amount of capacity. For a single 100G or 400G link, you select the endpoints and the speed, and the carrier runs the rest.

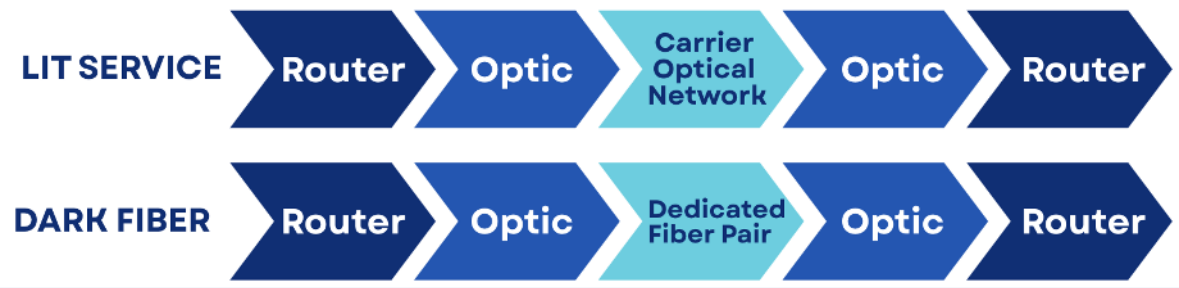
The moment your capacity, sites, or timelines start to grow, the carrier's limits become your limits — and every upgrade is another quote, term, and turn-up. Dark fiber removes the ceiling entirely: you have dedicated glass, set your own pace, and stop paying for someone else's margin.

Lit vs. Dark: Not More Complex

The distinction between lit and dark fiber is smaller than it initially seems. With a lit service, you order 100G or 400G between Location A and Location B, and the carrier determines how to transport the signal, providing and operating the optical layer on your behalf. Your team simply connects a router or switch to the carrier handoff, and the capacity you receive is defined by the service you purchased.

With dark fiber, the endpoints and the traffic are the same — what changes is who owns the optical layer. You order a fiber pair between Location A and Location B, confirm the route distance and optical loss, and select optics appropriate for that span. Those compatible optics plug directly into the router or switch at each end and patch to the dedicated fiber pair. From that point on, capacity is defined by the equipment / optics you choose rather than by a service tier.

WHAT ACTUALLY CHANGES?



With lit service, the carrier owns the optics and your capacity depends on their availability. With dark fiber, you own the optics and determine your capacity. There is no carrier transponder, no shared transport platform, and no new service order every time capacity grows.

The Dark Fiber Buying Journey

From confirming locations through ongoing maintenance, ordering dark fiber looks much like ordering any lit circuit. The steps below outline how a typical dark fiber engagement comes together.



1. **Confirm locations.** Identify the data center or building endpoints — your A and Z locations.
2. **Check on-net availability.** Confirm availability of fiber between the two sites.
3. **Review the path.** Review the proposed fiber path, diversity options, and strand count.
4. **Negotiate the contract and equipment.** Agree on the dark fiber contract terms and the equipment involved.
5. **Plan the lighting equipment.** Plan for the customer-owned equipment that will light the fiber.
6. **Coordinate splicing and cross-connects.** Coordinate splicing and cross-connects at each facility.
7. **Test and activate.** Test and activate the connection.
8. **Confirm the maintenance split.** Confirm how maintenance responsibilities are divided going forward.

How to Know When You're Ready for Dark Fiber

Utilize the checklist below to determine if your organization is ready to make the switch to dark fiber.

- ☐ **Your bandwidth keeps growing** — Capacity needs rise year over year, usually on the same routes.
- ☐ **You keep connecting the same sites** — Several circuits run between a consistent pair of locations.
- ☐ **Upgrades mean going back to the carrier** — Each capacity change restarts a quote, term, and turn-up cycle.
- ☐ **You want more say in the network** — Routing, architecture, and security decisions made on your side.
- ☐ **Plans move faster than contracts** — Sites and capacity change inside a multi-year circuit term.
- ☐ **You already operate network equipment** — Or you would bring in a partner to run the optical layer.
- ☐ **You are planning several years out** — A long capacity horizon rather than month-to-month buying.

Where Dark Fiber Typically Pays Off

Separate from the above checklist, your organization will need to consider capacity needs (bandwidth requirements) and distance from A to Z. If your distance is under 120 km, the optics plug straight into your router. Longer routes add amplification points, which we will help you walk through as we design your routes.

Route	Crossover range
Metro – 10 km	**~10G**
Metro — 50 km	**~100G**
Short-haul — 200 km	**100G to 400G**
Long-haul — 500 km	**400G to 800G**

Crossover ranges: ACG Research, three-year TCO, three-node DCI model, 2025 (Cisco-sponsored).

Why Customers Choose Dark Fiber

Enterprises move to dark fiber for more capacity, more control, and predictable costs. Here's what changes when the fiber is yours.

- **You own the glass.** Your fiber pair runs directly between your sites, and no one else uses it. With no carrier equipment in the path, you never wait on someone else's network to make a change. Transport cost is set by distance, not traffic.
- **You set the bandwidth.** Capacity comes from the optics you choose, not a service tier. Under 120 km, coherent pluggables go straight into your router. Need more? DWDM adds channels on the same fiber pair.
- **Your costs stop climbing with your traffic.** With lit services, more bandwidth means a bigger monthly bill. With dark fiber, going from 100G to 400G is an optics upgrade, not a new contract, and your fiber cost stays the same.
- **Your traffic stays private.** Your data rides dedicated fiber, not a carrier's shared optical platform, which simplifies security reviews and compliance.
- **You grow on your schedule.** No new quote, term, or turn-up every time your needs change. Most growth happens on the fiber you already have: upgrade to higher-speed optics or add a DWDM mux to carry more wavelengths on the same pair. If you max out your pluggables or optical platform, add another fiber pair on the same route and keep scaling without redesigning your network. We can plan for spare strands up front so that pair is ready when you need it.

The bottom line: with dark fiber, you stop buying bandwidth and start owning the path. Transport becomes a fixed cost, and the more bandwidth you need, the more you save.

Three-Year Dark Fiber TCO Savings vs. Carrier & Wavelength

Metro network, ~50 km

Bandwidth	Carrier Ethernet	Wavelength
>100G	4%	15%
>400G	48%	55%
>800G	67%	67%

ACG Research Table 2, three-year cumulative, 2025.

SAME PAIR OF GLASS

10G → 100G → 400G → 800G+ → 1.6T

Same pair. The transport bill does not move.

What Dark Fiber Delivers

Owning the optical layer changes more than the monthly bill; across five dimensions it hands the enterprise a level of capability that a purchased service cannot match. Capacity and scalability are limited only by the gear you plug the fiber into, not by what your carrier deploys. With no carrier gear in the path to introduce points of failure or configurations requiring compatibility checks, you control your own bandwidth and architecture. The dedicated infrastructure ensures your traffic never touches infrastructure used by other customers, while total cost of ownership stays lower as your bandwidth requirements continue to scale over time. And because every route is purpose-built, it meets your objectives for diversity, resilience, and performance.

Debunking Common Objections

"It costs too much."

REALITY

Every topology is unique, but most of the time dark fiber is cheaper than a lit service if you need more than 100G of throughput between a pair of sites in the same metro.

"It takes too much manpower."

REALITY

If you have IT staff who already manage your network, you can integrate dark fiber into your topology. Your carrier putting their gear on a lit service doesn't help you manage your network.

"Poor visibility and mean-time-to-restore (MTTR)."

REALITY

With a lit service, you are blind to the underlying optical layer and must open a ticket to find out why a circuit is flapping. With dark fiber, your own routers read real-time optical power levels (DOM) directly, while BIG manages 24/7 physical plant protection, locate tickets, and emergency splice restoration.

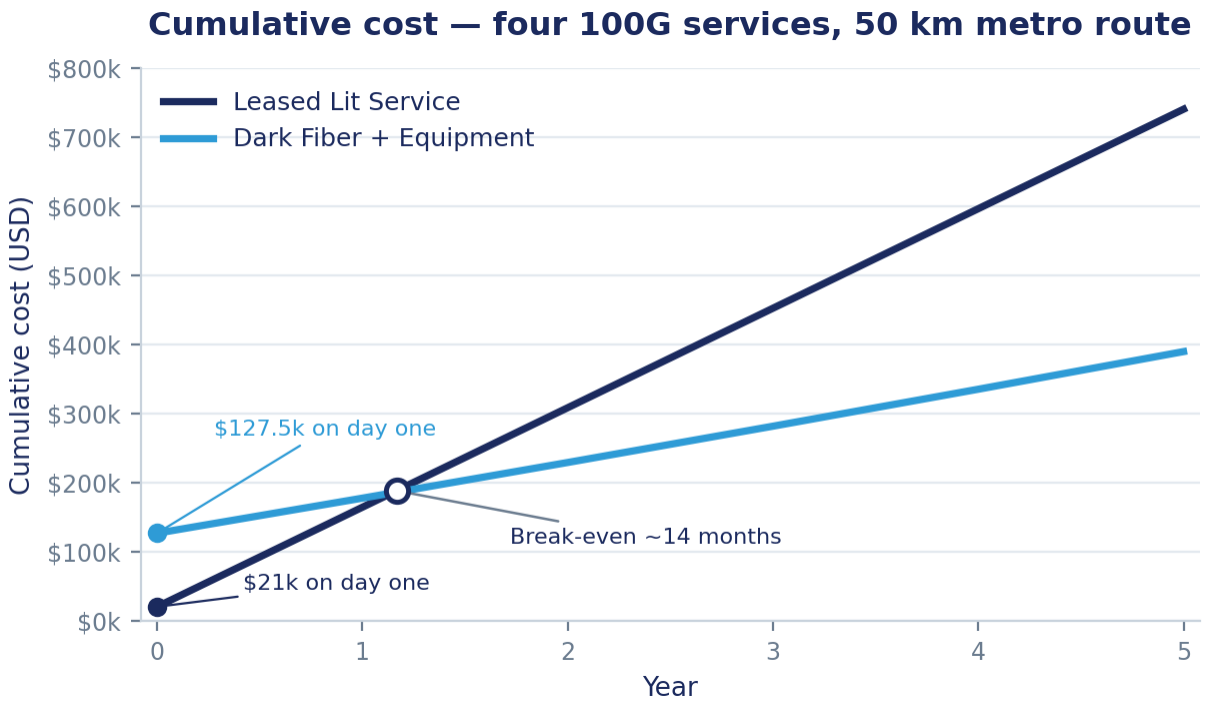
"I don't know optical networking."

REALITY

Organizations that run their own optical hardware (WDM) are great fits for dark fiber — but so are organizations that run only Layer 2 or even Layer 3 hardware and topologies. You don't need optical gear to use dark fiber in a metro environment.

Leased vs. Dark Fiber — Four 100G Metro Services

Say you need four 100G services between two sites. With dark fiber, your main investment is the optical platform. Once it's in place, your monthly cost stays low and predictable. A leased service costs less to get started (a client optic at each end plus turn-up fees), but you'll pay a much higher monthly bill for as long as you keep it. Dark fiber pays for itself around month fourteen. From there, the savings are yours, they grow every month, and you have room to add capacity on the same glass whenever you need it.



Model	Leased Lit Service	Dark Fiber
Upfront cost	about $21,000	about $127,500
Monthly cost, year one	about $12,000	about $4,250
3-year total cost	**about $453,000**	**about $282,000**
5-year total cost	**about $741,000**	**about $390,000**

By year three, the dark fiber option costs roughly half as much as the leased service; by year five the gap widens to $390,000 against $741,000. Figures are illustrative — send us your route and we will build a comparison with your numbers to show your savings by switching to dark.

How to Own Your Network, End to End

Technical

From a protocol perspective, deploying two network devices across a dark fiber link looks exactly like deploying across a Wave or E-Line service. You extend your Layer 2 or Layer 3 topology across the wire at will. Your gear at each endpoint will see each other as adjacent WAN nodes identically to how they would across a traditional lit service.

Route Selection

The most efficient route your provider has available is often perfectly satisfactory. But if you have performance considerations such as uptime or latency, understanding route composition and specifications — like diversity and distance — is key to ensuring those criteria are met.

Equipment Selection

DWDM provides the most bandwidth potential across dark fiber, but switches and routers work just fine as well, as long as they fit your plan for network topology. Use the distance and signal loss characteristics of the dark fiber span to spec the appropriate optics for your gear.

Ongoing Management

Monitor event logs from your hardware on both ends of the fiber link exactly as you would for a lit service. The good news with dark fiber is that the span is either up or down — so more complex issues like excess latency, packet loss or jitter can immediately rule the fiber out as a root cause.

You Do Not Have to Wait for a Renewal Date

We can start whenever you are ready, and we structure the billing so the transition does not cost you twice.

1. **We deliver, you test.** The fiber is delivered, tested, and accepted while your lit service keeps carrying production traffic. Nothing moves until your team is satisfied.
2. **Delayed billing while you migrate.** We hold billing on the dark fiber while your team validates the route, so you are not paying us and your carrier at the same time.
3. **Cut over on your timeline.** One maintenance window, and then you turn the lit service down when it suits you — rather than when a contract date says so.

Building a new route? Simpler still — the optics go into the design and there is nothing to cut over. Send us the route and we will build this comparison with your numbers.

Why Choose BIG

How we make dark fiber easy — and what sets our network apart.

What BIG Provides

BIG owns and operates its own routes in the San Francisco Bay Area, Greater Atlanta, and Portland, so you get direct answers and fast, innovative solutions. In its core metros the fiber is 100% underground, built for low latency and minimal physical risk, and every path is private dark fiber running directly between the exact facilities you select. That matters for diversity. When you buy lit wavelengths from multiple carriers, it's common to end up with two "diverse" waves that ride the same third-party conduit or cross the same bridge without anyone realizing it. With BIG, you get exact KMZ route maps, splice locations, and handoff points up front, during path review (Step 3 of the Buying Journey), so you know your paths are truly, physically diverse before you commit. Each route is also validated through performance testing before production traffic begins, with built-in headroom in both capacity and new builds to grow with your footprint.

Why Teams Trust BIG's Dark Fiber

That same ownership makes the fiber behave predictably as you add capacity, sites, and workloads, so you never have to rethink your routes. Projects become more predictable, with realistic timelines and fewer contingency buffers when routes behave as expected, and dedicated, scalable fiber shortens time to production by reducing surprises and redesign cycles. The same reliability supports redundancy and uptime commitments, and because planning is built around known routes rather than one-off exceptions for every new build, long-term planning gets simpler.

APPENDIX

Partner Ecosystem

BIG works with a proven ecosystem of optical and networking vendors so that every route is engineered with the right equipment for the job.

Ciena

Ciena collaborates with teams to ensure that networks keep pace with the growing needs of an enterprise. With local regional teams, support is always nearby when it is needed.

RESOURCES

- Financial Enterprises Light Up the Darkness
- Metro Optical Architectures
- Network Management and Control without the IT Infrastructure Burden

CONTACT

- ciena.com
- ciena.com/contact-us/sales
- Toll free: 1-800-207-3714

Cisco

Cisco helps organizations modernize their networks for performance, security, and intelligence in the era of AI — helping ensure businesses are ready for what's next.

RESOURCES

- TCO of Dark Fiber, Waves, Ethernet, etc.
- Mizuho Corporation Switches to Dark Fiber

CONTACT

- cisco.com
- Sales: 1-888-852-2726, press 1

Nokia

With Nokia optics, organizations can scale efficiently, simplify operations, and secure their networks. With local support teams and nearby distribution centers, Nokia helps you scale at a faster pace.

RESOURCES

- Optical Networks Explained
- Adapt, Automate and Scale
- AI and Advanced Connectivity

CONTACT

- nokia.com/optical-networks
- nokia.com/contact-us

PacketLight

PacketLight's “pay as you grow” model gives you the flexibility to scale at your own pace. Their equipment provides control, visibility, and security across your network and ensures your gear is always the right fit.

RESOURCES

- Unlocking the Potential of Dark Fiber Networks
- DCI for Financial Services Company — Case Study
- Fiber Optic Infrastructure — DIY Network

CONTACT

- packetlight.com
- +1-866-315-6903