

# 8180 Coherent Networking Platform: Connecting the Edge

## Aggregation and the densified edge

It is happening everywhere: IoT usage is exploding. The total number of IoT device connections, including cars, intelligent appliances, industrial control, and consumer electronics, will grow from 35 billion in 2020 to 83 billion by 2024.<sup>1</sup> With inherent dependence on IP-based networking technologies, these and many other new systems are driving an ever-increasing amount of data, burdening an already taxed network.

Additionally, on-demand audio and video streaming services are surging as consumers turn away from traditional consumption models. Armed with faster Internet connections, media streaming devices, and the explosion of mobile video, consumers see their Internet connections as the oxygen of life—a life that is fueling the next generation of fiber access.

To support these new demands, the wireless industry is adding more higher-capacity devices to enable the proliferation of higher data rates per user for better quality of experience. Multiple Service Operators (MSOs) are modernizing their metro/access networks by evolving Hybrid Fiber-Coax (HFC) networks into modern optical infrastructures to provide higher-capacity connectivity and services to subscribers. Emerging leaf/spine architectures need dense aggregation for high-capacity switching applications.

These applications require huge amounts of bandwidth at low latency, and the supporting network infrastructure must offer the flexibility to cope with increasingly dynamic traffic flows. This is driving the need for a solution that can provide dense aggregation across high-capacity coherent optical connections to reduce footprint and power requirements, increase fiber utilization, and provide scalable programmability of existing fiber assets.

Wireless operators and MSOs need high-density, compact solutions to manage connectivity, offer higher-capacity services, and improve operations through ease of use as the metro network becomes densified. Similarly, emerging leaf/spine

## Benefits

- Reduces transport and routing costs, footprint, and power consumption by integrating high-density aggregation with high-capacity coherent optical
- Incorporates a fully nonblocking 6.4 Tb/s network fabric, offering scalability for high-capacity 10GbE, 40GbE, and 100GbE applications (400GbE future)
- Offers efficient transport for Ethernet, IP, and MPLS services
- Provides the industry's highest-capacity, most spectrally efficient coherent technology to maximize capacity for all applications, with tunability from 100 to 400 Gb/s
- Future-proof, ready for higher-capacity services and coherent modem technologies
- Features full integration with photonic line system to simplify network installation and turn-up for both optical and packet layer
- Offers a modular design and pay-as-you-grow benefits
- Allows for management flexibility through Ciena's MCP and open APIs for software programmability, automated provisioning, and model-driven streaming telemetry

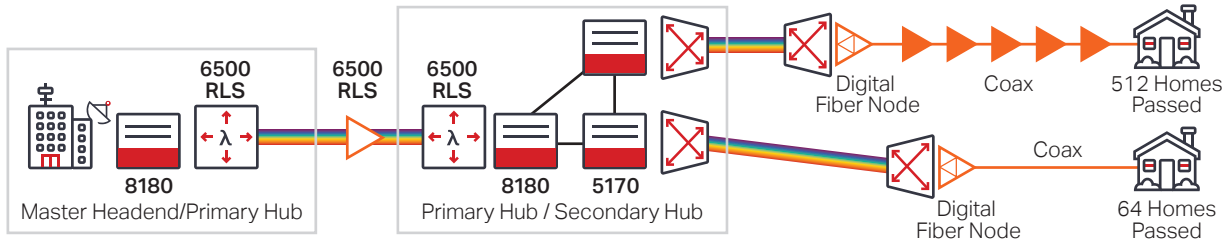


Figure 1. MSO metro/access network modernization application

architectures require infrastructure solutions to reduce footprint requirements while providing dense aggregation and switching for high-capacity connections.

### Introducing the 8180

Ciena's 8180 Coherent Networking Platform is built to eliminate complexity from network deployments by combining the industry-leading capacity and embedded intelligence of WaveLogic™ coherent solutions with the density, openness, and programmability of a spine switch. It simplifies the network by eliminating the cost and complexity associated with deploying separate routing, switching, and optical devices.



Figure 2. Ciena's 8180 Coherent Networking Platform

As part of an end-to-end solution that peers with both routing and switching devices, and coherent networking platforms, the 8180 provides a high-density on-ramp onto the coherent optical network. It is compact, requiring only two rack-units of space; but despite its compact size, the 8180 offers up to 6.4 Tb/s of switching capacity by integrating the latest high-capacity switching technologies. Built with WaveLogic Ai coherent technology, it dramatically increases fiber capacity, delivering up to 30.4 Tb/s per fiber pair to deliver the scale operators need for evolving their networks to support higher-capacity applications.

As part of the Ciena's Fiber Deep Solution, the 8180 delivers more bandwidth and scalability between hub and headend locations, so network operators can reduce power and space, with a highly dense Ethernet switch that integrates coherent optics in a compact, modular platform. The 8180 provides an efficient mechanism to consolidate multiple

100 Gb/s connections from the access network into 400 Gb/s wavelengths for transport across the metro core to alleviate fiber congestion and reduce footprint at hub and headend locations.

The 8180 and Fiber Deep  
Learn More
➔

### Combining Ethernet, IP/MPLS, and optical for unprecedented scale

The 8180 offers fully non-blocking switching, scaling to 6.4 Tb/s in a very compact footprint for high-capacity switching and aggregation applications. It has a modular, future-proof design, with four pay-as-you-grow pluggable module slots, offering the flexibility to grow capacity fractionally within a module or on a per-module basis.

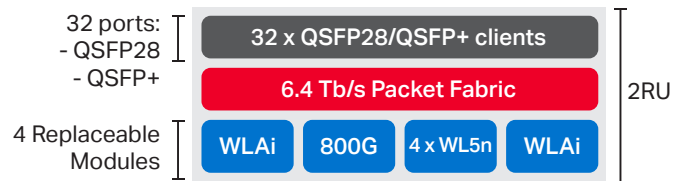


Figure 3. Ciena's 8180 hardware architecture

The in-service replaceable modules integrate WaveLogic coherent technology on the line side, enabling the 8180 to provide the industry's highest capacity per wavelength, supporting single-carrier rates from 100 to 400 Gb/s in 100 Gb/s steps. This allows network operators to match line capacities, and seamlessly interoperate with Waveserver® Ai, to available system margin. This all occurs within a single technology that can optimize performance for any application, from high capacity, short-reach metro to ultra-long-haul applications.

Additionally, 8180 can terminate 100 Gb/s to 200 Gb/s coherent links in the access network with WaveLogic 5 Nano (WL5n) CFP2-DCO based module. The CFP2-DCO module can be installed in any of the four service module slots. WL5n

CFP2-DCO is also interoperable with [100G CableLabs Point-to-Point Coherent Optics](#), and [OpenROADM MSA](#).

With its integrated network fabric, the 8180 reduces the quantity of connections required across the network through aggregation. The 8180 provides the ideal mix of routing, switching, and aggregation capacity, with flexible service ports enabling aggregation of 10GbE, 40GbE, or 100GbE traffic into 400 Gb/s wavelengths for DWDM transport. Its ultra-dense design offers 32 QSFP28/QSFP+ ports, with support for up to 32 x 100GbE or up to 128 x 10GbE links. The 8180 can support Ethernet, IP, or MPLS based services.

### Simple to deploy and operate

The 8180 also improves network operational efficiency with embedded tools and easy-to-use applications. Unified Zero-Touch Provisioning (ZTP) for both optical and packet layers simplifies initial commissioning and turn-up of the 8180, and its integrated test set accelerates turn-up and troubleshooting. It simplifies client connection management through topology discovery of third-party devices with Link Layer Discovery Protocol (LLDP).

Furthermore, the 8180 has been designed to be simple to deploy, and it offers the performance to operate across third-party photonic line systems, enabling flexible deployments from metro to long-haul. The 8180 can operate over flexible grid photonic line systems for optimal spectral efficiency, as well as over fixed grid 50 GHz-channels systems for compatibility with existing deployments. It also interoperates with the Ciena optical transport portfolio, including Waveserver Ai and 6500, enabling unique applications that utilize a mix of hardware elements.

### Advanced programmability and openness

The 8180 brings simplicity to network management as well, with a single management interface to access both optical and IP/MPLS functions. It supports a suite of open APIs for provisioning, management, and programmability, enabling the 8180 to easily integrate into existing management software, tools, and scripts. Its open software architecture supports model-driven configuration and enables streaming telemetry for a modern approach to observe performance and metric data through a data stream rather than a single snapshot.

For operators who prefer a more turnkey approach to network management, the 8180 is also managed by Manage, Control and Plan (MCP), Ciena's domain controller for complete network and service lifecycle operations.

Users gain the following system benefits when deploying 8180 with Ciena optical networks and Blue Planet software solutions:

- Link budget guarantees across wide range of photonic configurations
- Access to capacity planning tools
- Multi-layer provisioning across a single interface
- Faster troubleshooting with Ethernet, IP/MPLS, and optical alarm correlation
- Seamless management across both the photonic line system and coherent transponders
- Improved service availability via line interworking with optical trunk protection and Layer 0 control plane
- Real-time visibility into network performance
- Ability to mine margin and turn on bandwidth on demand as needed
- Multi-domain, multi-vendor service orchestration

### Enabling the Adaptive Network

Built for routing, switching, and aggregation plus optical layer programmability, Ciena's 8180 is ready to adapt to meet the ever-changing needs of network operators to deliver new high-capacity services to end-customers—including 4G/5G wireless expansion and MSO metro/access network modernization.

The Adaptive Network  
Get ready to adapt



With its open architecture and simple-to-deploy operational model, network operators can accelerate deployment and simplify provisioning and management. The 8180 offers the programmability required for the Adaptive Network, enabling intelligent automation and control, and providing improved visibility for monitoring optical network connectivity and performance.

With the 8180, network operators can elevate their end-customers' experience by bringing capacity closer to the edge, with an open, easy to operate, ultra-dense platform that combines the best of optical and packet technologies.

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