

8180

Coherent Networking Platform



Ciena's 8180 Coherent Networking Platform delivers industry-leading capacity—up to 6.4 Tb/s in two rack units—with integrated WaveLogic™ coherent optical and advanced packet switching. The 8180 addresses the increasing need for dense aggregation for high-capacity routing and switching applications.

Hyperscale data centers, cable MSOs, and 4G/5G applications all have a common objective: improve how customers connect. With faster Internet connections, media streaming devices, and mobile video, consumers are pushing existing service infrastructures to the limit. To deliver the full potential of next-generation fiber access, operators must have deep fiber resources enabled to grow when the network grows.

The 8180 is purpose-built to eliminate complexity from network deployments by combining the industry-leading WaveLogic coherent solutions with the density, openness, and programmability of a spine/L3 Ethernet switch. As part of an end-to-end solution that peers with routing, switching, and coherent networking platforms, it provides a high-density on-ramp to the coherent optical network, seamlessly connecting packet flows and L2 and L3 services over a carrier-class, connection-oriented infrastructure. It operates using Ethernet, IP/MPLS, and support of Segment Routing (SR) for complete control over forwarding paths.

Ciena's 8180 also provides readiness for open, programmable networks by supporting YANG-model-driven NETCONF and gNMI interfaces, enabling a fully open SDN environment with full visibility via telemetry and automated provisioning using open APIs. It cost-effectively and reliably addresses 100GbE advanced Ethernet, MPLS, packet flow, and IP service conveyance and aggregation challenges that require massive bandwidth.

Driving industry toward 10GbE, 100GbE, 400GbE, and beyond

Continued annual growth in metro network bandwidth demand is driving a change in the mix of connections and services (Figure 1), from 10GbE aggregation to 100GbE. In addition, demand for high-speed 100GbE UNI services and the shift from 10GbE to 25GbE server connections is steadily increasing. This shift toward higher-bandwidth

Features and benefits

- Reduces transport and routing costs, footprint, and power consumption by integrating high-density aggregation with high-capacity coherent optical
- Utilizes Ciena's WaveLogic Ai coherent technology for tremendous scalability and high performance to maximize capacity at any distance from metro to long-haul
- Provides maximum port speeds and capacities with four flexible slots, from 100G to 800G
- Offers 32 x 100G fixed ports
- Provides industry-leading capacity of up to 6.4Tb/s in 2 rack units
- Features full integration with photonic line system to simplify network installation and turn-up for both data and optical layers
- Utilizes Carrier Ethernet, IP routing, and MPLS
- Open Networking via direct flow table control, ONF ONOS Controller, or other SDN controller
- Ciena's Manage, Control and Plan multi-layer support for end-to-end network management control and planning
- Reduces ongoing energy costs via ultra-low power per bit

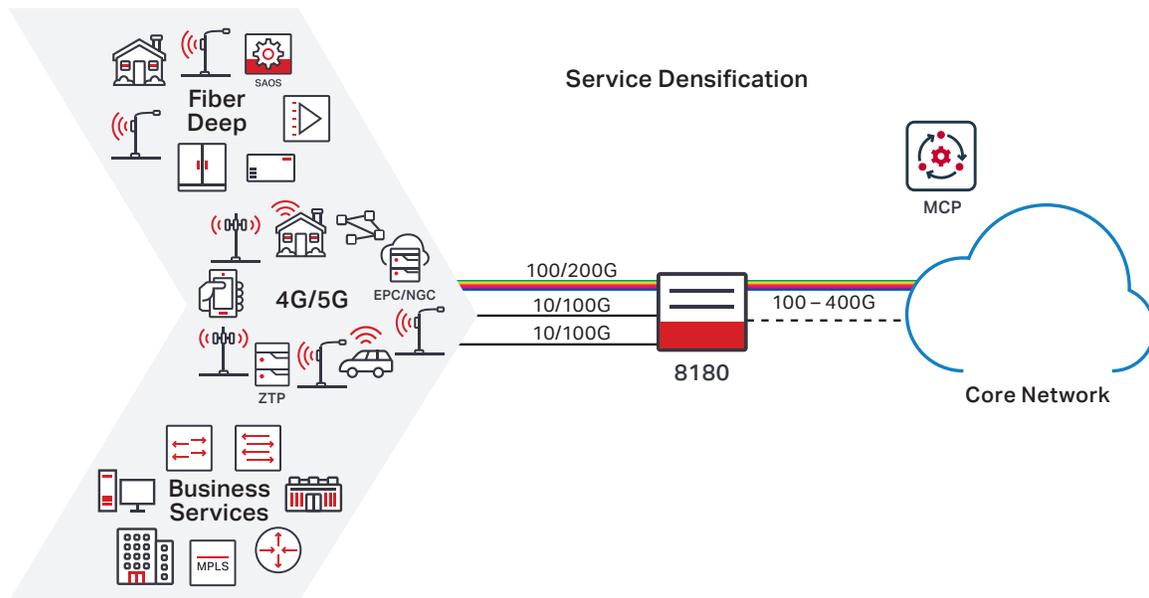


Figure 1. Coherent packet-optical network services

services means metro and regional Ethernet networks, once optimized for lower 1GbE or rates, are no longer aligned to changing metro network traffic trends.

Compact, dense capacity

The use of modern, coherent packet optical technologies and advanced routing and switching technology in the same device is a key benefit in eliminating the cost and complexity associated with deploying separate packet and optical devices.

Harnessing Ciena’s WaveLogic Ai and WaveLogic 5 coherent technology, the 8180 offers the scalability required to satisfy the largest interconnect requirements, from metro to ultra-long-haul distances. With the strong performance and programmability offered by WaveLogic, operators can maximize capacity at any distance by tuning capacity from single-carrier 100Gb/s to 400Gb/s and beyond.

Space is increasingly limited and expensive, and network operators face substantial capital expenditures to activate new locations or must retire active equipment to free space for service conveyance. Addressing bandwidth demand growth by deploying more and larger equipment is simply not a sustainable business model. Using coherent and packet technology simplifies the network by eliminating the cost and complexity associated with deploying separate packet and optical devices.

Ciena’s 8180 efficiently offers 100GbE service conveyance and aggregation in a 2RU fixed form factor, with dual pluggable

power supplies, optics, and coherent optics to reduce space and optimize density.

Combining Ethernet, IP/MPLS, and optical

The 8180 offers non-blocking L3 Ethernet switching and routing, 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 capacity fractionally within a module or on a per-module basis.



Figure 2. Ciena’s 8180 hardware architecture

The in-service replaceable modules integrate WaveLogic coherent technology on the line side, enabling the 8180 to provide high-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 100Gb/s to 200Gb/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 integrated high-capacity routing and switching fabric, the 8180 reduces the quantity of connections required across the network through packet aggregation. The packet fabric provides the ideal mix of routing and switching and aggregation capacity, with flexible service ports enabling aggregation of 10GbE, 40GbE, or 100GbE traffic into coherent DWDM wavelengths up to 400Gb/s in steps of 100Gb/s for transport. Its ultra-dense design offers 32 QSFP28/QSPF+ ports, with support for up to 32 x 100GbE links.

Differentiation through service velocity

Service velocity has become a critical competitive advantage for network operators. In many cases, service velocity is the determining factor in winning new service sales. The 8180 implements Ciena's unique Zero Touch Provisioning (ZTP) capabilities, allowing network operators to rapidly deploy new packet-based services in a completely automated manner. With no human intervention required, manual provisioning errors are eliminated. Most importantly, ZTP improves service deployment velocity and significant competitive advantage.

The 8180's unified ZTP for both optical and data layers, simplifies initial commissioning and turn-up of the 8180, and its integrated test set accelerates turn-up and troubleshooting. It simplifies Ethernet connections management through topology discovery of neighboring devices with Link Layer Discovery Protocol (LLDP).

Advanced programmability and openness

The 8180 brings simplicity to network management as well, with a single management interface to access both optical and routing 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.

Simplified multi-layer management and control

MCP software offers a unique and comprehensive solution for the administration of mission-critical networks that span access, metro, and core domains, and provides unprecedented multi-layer visibility from the photonic to the data layers. With this innovative management approach, MCP supports a programmable and automatable solution that leverages NETCONF/YANG mechanisms to provide fully open approaches to installing, manipulating, and monitoring service behaviors in an SDN environment.

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

- Access to capacity planning tools
- Multi-layer provisioning across a single interface
- Faster troubleshooting via packet 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

Advanced multi-layer protocol support

The 8180 supports a selection of flexible service offerings, including L2 and L3 services over a carrier-class infrastructure on a dynamically signaled MPLS data path. Dynamic MPLS data path support includes Border Gateway Protocol Labeled Unicast (BGP-LU), BGPv4, IS-ISv4, MPLS-LSR (IS-IS), IGP-LDP Sync, LDP FRR, and SR-MPLS.

SR provides a highly scalable transport tunneling option with enhanced programmable traffic-engineering capabilities. SR simplifies network architecture and operations by eliminating the need for a dedicated protocol for signaling transport tunnels and managing their state. Topology Independent-Loop Free Alternate (TI-LFA) ensures rapid failover to a pre-computed backup path in the event of a local network failure.

These services can flexibly ride over a variety of transport tunnel options. Comprehensive OAM capabilities—such as EVC ping, SR policy ping, and trace route—offer operators the necessary tools to effectively troubleshoot and manage services over a dynamic MPLS infrastructure.

Technical Information

Interfaces

Fixed Ethernet ports:
32 x 40G/100G QSFP28
4 x Module Slots:
 100/200G WaveLogic 5 Nano - CFP2
 1 x 100G-400G WaveLogic Ai (C-Band)
1 x 10/100/1000M RJ-45 mgmt port
1 x serial console (RJ-45, EIA-561)
1 x RJ45 AUX
1 x RJ45 ILAN1
1 x RJ45 ILAN2
1 x USB
1 x RJ45 BITS IN/OUT
1 x Mini coax frequency in or out
1 x Mini coax 1 PPS in or out

Ethernet

VLAN full S-VLAN range
IEEE 802.1D MAC Bridges
IEEE 802.1p Class of Service (CoS) prioritization
IEEE 802.1Q VLANs
IEEE 802.3 Ethernet
IEEE 802.3ad Link Aggregation Control Protocol (LACP)
IEEE 802.3ba-2010 40GbE & 100GbE
Layer 2 Control Frame Tunneling
Multi-chassis LAG
Port mirroring
Jumbo frames to 9216 bytes
Transparent LAN Services (TLS)

Carrier Ethernet OAM

IEEE 802.1ab Link Layer Discovery Protocol (LLDP)
IEEE 802.1ag Connectivity Fault Management (CFM)
ITU-T Y.1731 Performance Monitoring

Synchronization

ITU-T G.8262 Synchronous Ethernet
IEEE 1588 Precision Timing Protocol
Stratum 3E oscillator
External Timing Interfaces:
 • BITS in or out (1.544Mb/s, 2.048MHz and 2 Mb/s)
 • Frequency in or out (1.544MHz, 2.048MHz, and 10MHz)
 • 1pps and ToD in or out
Line Timing Interfaces:
 • 100GbE In and Out

Quality of Service

8 queues per port
Strict priority, Weight round robin, WDRR scheduling
WRED for congestion management

Networking Protocols

ITU-T G.8032 Ethernet Ring Protection
Precedence Field
RFC0959 File Transfer Protocol (FTP)
RFC1321 The MD5 Message-Digest Algorithm
RFC2697A Single Rate Three Color Marker.
RFC2698 A Two Rate Three Color Marker
RFC2865 Remote Authentication Dial in User
RFC2873TCP Processing of the IPv4
RFC4346 The TLS Protocol (Version 1.1)
Service (RADIUS)

Network Management

Alarm Management & Monitoring
Event and Alarm Notification/Generation
Comprehensive Management via CLI
Management via NETCONF/YANG Models
IPv4 and IPv6 Management Support
Remote Auto configuration via TFTP, SFTP
RFC2131 DHCP Client
RFC5905 NTP Client
RFC1350 Trivial File Transfer Protocol (TFTP)
Secure File Transfer Protocol (SFTP)
Secure Shell (SSHv2) Software upgrade via FTP, SFTP
Syslog Accounting
TACACS + AAA
gRPC based Telemetry
RADIUS, AAA
Zero-Touch Provisioning

Service Security

Broadcast Containment
Private Forwarding Groups (PFG)
Hardware-based DOS Attack Prevention
Layer 2, 3, 4 Protocol Filtering
User Access Rights
Local user authorization

Physical Characteristics

Dimensions:
17.46" (W) x 19.68" (D) x 3.47" (H);
44.35 cm (W) x 49.99 cm (D) x 8.81 cm (H)
Weight:
38.4 lb/17.42 kg (without modules, no pluggable optical interfaces)
45.6 lb/20.68 kg (with 4 WaveLogic Ai modules, no pluggable optical interfaces)

Standards Compliance

Agency Marks:
CE mark (EU)
NRTL (NA)
BSMI (Taiwan)
VCCI (Japan)
Customer:
NEBS GR-63*
NEBS GR-1089*
ETSI EN 300 019
Emissions:
BSMI (Taiwan)
CISPR 32
EN55024
EN55032 Class A
ETSI EN 300 386 Class A
FCC Part 15 B Class A (US)
ICES-003 Class A (Canada)
VCCI CISPR 32 Class A (Japan)

Environmental:
ROSH3 Directive (2015/863)
WEEE 2012/19/EU'

Power Requirements:
Typical power consumption – Common equipment with power supplies (no pluggable modules) - 529W

Operating Temperature:
+32F to +104F (0C to +40C)

Storage Temperature:
-40F to +158F (-40C to +70C)

Safety:
CAN/CSA 22.2 No. 60950-1-03 (Canada)
EN 60950-1 (EU)
IEC 60950-1 (International)
UL 60950-1 (US)

Visit the Ciena Community
Answer your questions



Ordering Information	
Part Number	Description
192-8180-900	8180 (32)100G QSFP28/QSFP+, (4)FRU SLOTS, (2)SLOTS AC OR DC PSU
192-0001-900	1x WAVELOGIC AI (35/56GBAUD) C-BAND FRU MODULE
192-0002-900	8180 DC PLUGGABLE POWER SUPPLY, -48V
192-0003-900	8180 AC PLUGGABLE POWER SUPPLY, 200V-240V
192-0004-900	8180 -SPARE PLUGGABLE FAN UNIT
192-0005-900	8180 FRU FILLER MODULE
192-0050-900	8180, (4) 100G CFP2 FRU
Required OS Base System Perpetual Software Licenses	
S92-LIC-8180BASESW	8180 BASE PERPETUAL SOFTWARE LICENSE PER CHASSIS
Optional OS Applications	
S92-LIC-8180PACKET	8180 L3/MPLS PACKET SWITCHING PERPETUAL SOFTWARE LICENSE, PER CHASSIS
S92-LIC-8180SEC	8180 ADVANCED SECURITY SOFTWARE LICENSE, PERPETUAL, PER CHASSIS
S92-LIC-8180SYN	8180 SYNCHRONIZATION LICENSE, PERPETUAL, PER CHASSIS
S92-LIC-FORPLUGS	8180 FOREIGN PLUG ADD-ON LICENSE, PER CHASSIS
S92-LIC-8180PACKET	8180 TERABIT SWITCHING ADD-ON CAPACITY (PER 8XQSFP28)
S92-LIC-WLAIPKTOPTICAL	WLAI PACKET OPTICAL SOFTWARE LICENSE, PER WLAI MODULE