

DATA SHEET

8190



Ciena's 8190 Coherent Metro Router is purpose-built for 400GbE services and aggregation. With dense 100/200/400GbE any-to-any port Wide Area Network (WAN) aggregation and with the option of WaveLogic™ 5 Nano (WL5n), the 8190 addresses the need for dense any-to-any high-capacity routing and switching metro applications.

Any-to-any service and 100/200/400 Gb/s transport

Edge-to-metro and metro dynamics are driving bandwidth demand at unprecedented rates. The tremendous growth in these dynamics includes annual growth by 5G Radio Access Network (RAN), even higher-speed broadband, and the requirements for enterprise cloud service growing at twice the rate of others—all driving the metro to 100/200/400GbE connections and services.

Operators have also been expanding their metro networks and deploying new connectivity to the surrounding metro areas as well as a new Point of Presence (PoP) in data center facilities. These new PoPs further establish some metro areas as new connectivity hubs—helping relieve some of the strain on legacy carrier hotels when they exist without compromising performance speed, connectivity diversity, or bandwidth capabilities.

As operators plan for the mix and scale of these connections and services, the impact on the metro will require any-to-any WAN aggregation traffic flows.

The front-accessible 8190 Coherent Aggregation Router's high-density 400G ports can provide significant savings in power, cooling, and transport costs—including tremendous reductions in space that allow providers to reach to each other's internet and cloud backbones.

Features and benefits

- Commercial temperature (0°C to +40°C) for space-constrained locations
- 36 x 100/200/400GbE fixed ports
- IP routing, BGP-LU, SR-MPLS, Carrier Ethernet, and SRv6-ready
- MACsec-ready
- Secure ZTP for rapid and error-free turn-up of services
- SDN-ready next-generation management, including support for protocols such as NETCONF/YANG, gNMI/gRPC, and GRPC dial-in/dial-out telemetry
- Ciena's MCP multi-layer support for end-to-end network management control and planning
- Redundant AC or DC power

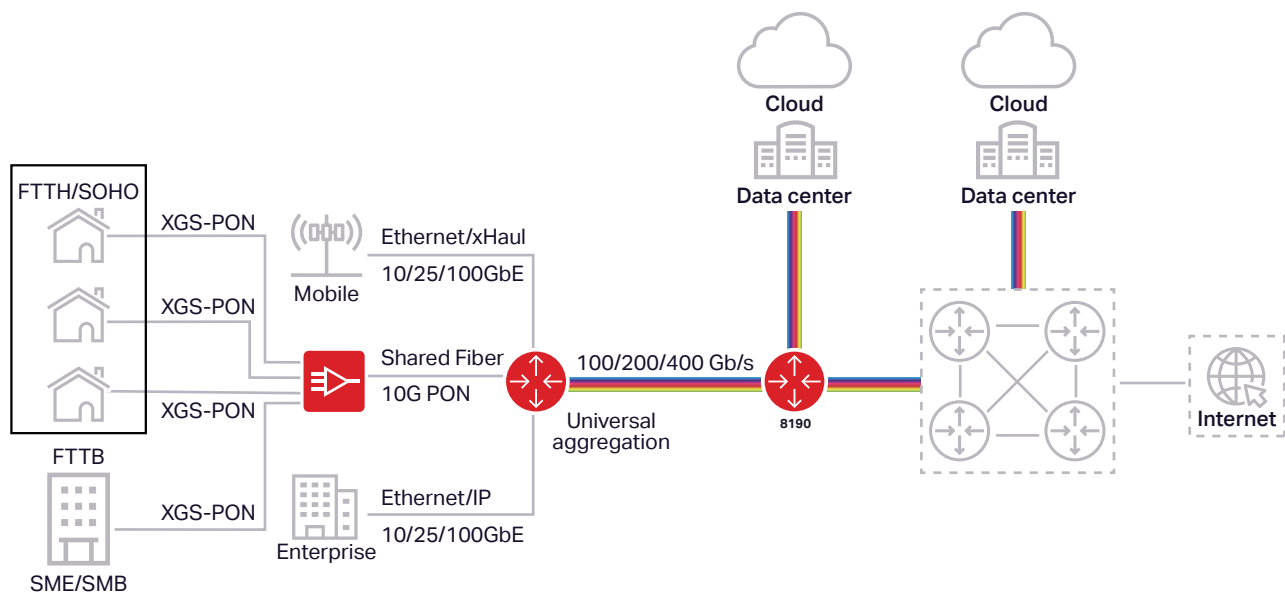


Figure 1. Any-to-any (8190) metro WAN aggregation

Dense, compact form-factor platform

Efficient use of real estate assets is a growing concern for network operators who either host their own network equipment or lease power and space in collocation facilities. As services multiply, operators have been forced to stack 10/25/100G-capable equipment, incurring additional collocation rental and power costs.

Space is increasingly limited and expensive. Network operators face substantial capital expenditures to activate new locations or must retire active equipment to free space for new service delivery. Addressing bandwidth demand growth by deploying more and larger equipment is simply not a sustainable business model—economically or environmentally.

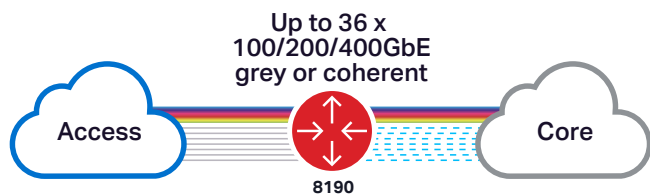


Figure 1. Any-to-any (8190) metro WAN aggregation

The 8190's sleek, 2RU form-factor and 14.4 Tb/s of full-service routing and switching capacity enable and facilitate any-to-any metro WAN aggregation, while Ciena's industry-leading WL5n 100/200/400G ZR, ZR+ and additional higher operation performance modes

of coherent optics allow for optimum transport of all 36 x QSFP-DD ports. The 8190 also supports QSFP28 and QSFP56 form-factor coherent optical ports.

Coherent metro routing

Ciena's 8190 provides 36 x fixed ports, of which all 36 ports can support Ethernet or coherent transceivers. The edge-to-metro and metro networks are prime candidates for this IP/Optical architecture, adding any-to-any multi-traffic flows and high-traffic routes. This is one resonating use case of Ciena's coherent aggregation products thus far.

Multi-layer convergence

Successful IP/Optical convergence requires more than just collapsing layers of the network—a holistic approach driven by multi-layer operations is needed. Ciena's Coherent Routing Solution is based on purpose-built routers driven by a next-generation IP Network Operating System (NOS), integrated with the industry's leading coherent pluggables and optimized photonics. But it doesn't stop there. On the cutting edge of multi-layer operations, Ciena's Manage, Control and Plan (MCP) domain controller provides integrated planning and powerful analytics that span network layers. In a single pane of glass, Ciena's Coherent Routing Solution helps easily build and manage converged networks and optimize performance. The result is a highly-efficient and sustainable network, ready to dynamically adapt to market demands.

Advanced multi-layer protocol support

The 8190 supports a flexible selection of service offerings, including Layer 2 (L2) and Layer 3 (L3) services over a carrier-class, connection-oriented infrastructure using Multi-Protocol Label Switching (MPLS) and Segment Routing (SR).

The platform supports a rich suite of L2/L3 features with Ethernet, MPLS, Seamless MPLS, ACL, QoS, IGP (IS-IS, OSPFv2), ISIS-SR, BGP, TI-LFA, and SR functionality.

Carrier Transport P-Router

Ciena's 8190 can function as a Label Switch Router (LSR) that supports both traditional MPLS and SR-MPLS and can quickly screen labels and forward packets to packets without having to check and compute data each time it routes packets.

Support for SR anycast Segment ID (SID) allows for redundancy and fast convergence. Anycast SID allows the router to discover nodes sharing the same anycast SID to perform Designated Forwarder (DF) election. Configurable SR Global Block (SRGB) ensures that the labels are predictable across SR domains. SR adjacency segments can be configured with a hold time to enable faster convergence after a link fails. Even more, with SR it is possible to assign an anycast SID to a pair of dual-homed nodes and use it as a next hop when advertising routes throughout the Autonomous System (AS).

There is also the option to support BGP-LU in conjunction with SR-MPLS. Ciena's interoperability tests demonstrate its track record in maximizing high-bandwidth traffic across any distance and showcases successful interworking of Ciena and third-party platforms.

iBGP and eBGP capabilities

8190 can support both internal Border Gateway Protocol (iBGP) and external BGP (eBGP) capabilities that can provide security, performance, and reliability benefits. BGP inter-AS is beneficial for easier deployment and troubleshooting, SLA demarcation between providers, and flexibility in the protocol selection per AS. BGP inline route reflectors allow iBGP devices within an AS to discover available routes without introducing loops. BGP large communities enable the tagging of routes and modification of BGP routing policies on routers. BGP table maps allow for the filtering of the BGP routes marked for installation into the Routing Information Base (RIB) to control the unnecessary downloading of certain BGP routes to the RIB.

The 8190 can serve as an IS-IS L1/L2 router that maintains two pieces of link-state database information for L1 and L2 respectively. 8190 can also act as a high-density WAN aggregator that supports Media Access Control (MAC) learning and Internet Group Management Protocol (IGMP) snooping, which can help prevent bandwidth waste and networking information leakage. Q-in-Q tunneling and Virtual Local Area Network (VLAN) translation enable the creation of a L2 Ethernet connection between customer sites.

The 8190 is ideal for deployment as a L2/L3 WAN aggregator in a non-blocking 2-layer network architecture model. This is preferred over a traditional 3-layer access-aggregation-core model of traditional north-south architecture patterns with high oversubscription ratio. This is due to its support of port density to aggregate a high concentration of trunk ports from leaf switches in a non-blocking 1:1 oversubscription ratio.

Multicast

The 8190 supports both IGMP version 3 (IGMPv3) and Protocol Independent Multicast-Source-Specific Multicast (PIM-SSM). SSM requires IGMPv3 to support inclusion and exclusion of multicast traffic from a specific multicast source directly.

IGMPv3 adds support for 'source filtering' in addition to multicast membership join and leave, as per the v1 and v2 of the protocol. Version 3 enables a host or Customer Premise Equipment (CPE) to signal to the 8190 the groups from which it wants to receive multicast traffic and from which sources this traffic is expected. This fine-grained membership information enables the 8190 to forward traffic only from the sources where the receivers requested the traffic from.

PIM-SSM can be used to perform multicast forwarding through its unicast routing table for Reserve Path Forwarding (RFP), as well as check back to reachability to the multicast source to downstream forwarding decision and the receiving clients. SSM of PIM allows for efficient data delivery in a one-to-many multicast stream from the source and its multicast listeners. One of the benefits of SSM is that receiving clients provide content directly from the source instead of receiving from a shared Rendezvous Point (RP).

Technical Information

Interfaces

Fixed Ethernet Ports

- 36 x 100/200/400GbE QSFP-DD, QSFP28/ QSFP56 (grey or coherent)

Other

- 1 x USB-C Off-switch memory
- 1 x USB-C Console
- 1 x RJ45 Time-of-Day (ToD + 1PPS in/out)
- 1 x SMB Phase input (1 pps or 10MHz in/out)
- 1 x SMB GNSS antenna
- 1 x RJ45 Management (MGMT)

Ethernet

- IEEE 802.1D MAC Bridges
- IEEE 802.1p Class of Service (CoS) prioritization
- IEEE 802.1Q VLANs
- IEEE 802.3-2018 IEEE Standard for Ethernet and supporting following rates:
 - IEEE 802.3ba-2010 100Gb/s
 - IEEE 802.3bs-2017 200/400Gb/s

Physical Characteristics

Dimensions:

- 17.48" (W) x 17.36" (D) x 3.19" (H)
- 444mm (W) x 441mm (D) x 81mm (H)

Weight

- 54.5 lbs; 24.7 kg

Power

- AC input: 180-240 Vac (nominal)
- DC input: -48 Vdc (nominal)
- ETSI EN 300 132-2 V1.1.1 (2002-1) AC
- ETSI EN 300 132-3 V2.1.1 (2003-01) DC
- 8190-900 (w):
- AC 1290/1430 nominal/max.
- DC 1540/1680 nominal/ max.

Standards Compliance

Emissions and Immunity (EMC)

- CISPR 24
- CISPR 32 Class A
- CISPR 35
- ETSI EN 300 386
- ETSI EN 55032
- FCC Part 15 Subpart B, Class A

- GR-1089 Issue 6
- Industry Canada ICES-003 Class A
- VCCI Class A
- NEBS (Network Equipment-Building System)
- LEVEL 3 compliant (except high-temperature)
- GR-63 Issue 5
- Safety
- ANSI/UL 60950-1 2nd edition / ETSI EN 60950-1, A1:2011 and A2:2014
- CAN/CSA-C22.2 No. 60950-2, Amd 1:2011
- Amd 2:2014
- ETSI EN 62368-1:2014+A11:2017 and CSA/ UL 62368-1:2014
- IEC 60825-1
- IEC 60825-2
- Environmental
 - ETSI EN 300-019-2-1
 - ETSI EN 300-019-2-2
 - ETIS EN 300-119-3
 - NEBS Level 3 CO (GR-63 Core)
 - RoHS2 Directive (2011/65/EU)
 - WEEE 2002/96/EU

Operating Temperature

- 32°F to +104°F (0°C to +40°C)

Storage Temperature

- -40°F to +158°F (-40°C to +70°C)

Humidity

- Non-condensing 5% to 90%

Altitude

- 1800m (operating temperature range)
- 4000m (12,000 ft) at reduced temperature (40°C)

Service Security

- Broadcast Containment Egress Port Restriction
- Hardware-based DOS Attack Prevention Layer 2, 3, 4 Protocol Filtering
- User Access Rights Local user authorization

Ordering information

Part Number	Description
170-8190-900	8190,(36)400/200/100G QSFP-DD,(2)SLOTS AC OR DC PLUG PWR SUP
170-8190-910	8190,SECURE,(36)400/200/100G QSFP-DD,(2)SLOTS AC OR DC PLUG PWR SUP
170-0371-900	8190, PLUGGABLE SPARE FAN MODULE
170-0372-900	8140/8190, DC PLUGGABLE POWER SUPPLY -48V
170-0373-900	8140/8190, AC PLUGGABLE POWER SUPPLY
170-0385-900	19 INCHES RACK MOUNT EARS, FOR USE W/ 8190/8140 CHASSIS
170-0386-900	21 INCHES ETSI RACK MOUNT EARS, FOR USE W/ 8190/8140 CHASSIS
170-0387-900	23 INCHES RACK MOUNT EARS, FOR USE W/ 8190/8140 CHASSIS
170-0411-900	19/21-ETSI/23IN 4 POST RACK MOUNT BRACKETS, FOR 600MM DEEP RACK, FOR USE W/8140/8190
170-0412-900	19/21-ETSI/23IN 4 POST RACK MOUNT BRACKETS, FOR 800MM DEEP RACK, FOR USE W/8140/8190
170-0420-900	DC POWER CORD, STRICT DEPTH LEFT EXIT FOR USE WITH 8140/8190
170-0421-900	DC POWER CORD, STRICT DEPTH RIGHT EXIT FOR USE WITH 8140/8190
170-0422-900	DC POWER CORD, STRAIGHT FOR USE WITH 8140/8190

Required OS Base System Perpetual Software Licenses

S75-LIC-8190EO-P	SAOS BASE OS, ETHERNET & OAM SOFTWARE LICENSE FOR 8190, PERPETUAL
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Optional OS Applications

S75-LIC-8190MPLS-P	SAOS ROUTING AND MPLS SOFTWARE LICENSE FOR 8190, PERPETUAL
S75-LIC-8190SEC-P	SAOS SECURITY SOFTWARE LICENSE FOR 8190, PERPETUAL
S75-LIC-8190SYNC-P	SAOS SYNCHRONIZATION SOFTWARE LICENSE FOR 8190, PERPETUAL
S75-LIC-8190EVPN-P	SAOS EVPN SOFTWARE LICENSE FOR 8190, PERPETUAL
S75-LIC-8190MACSEC-P	SAOS MACSEC SOFTWARE LICENSE FOR 8190, PERPETUAL

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