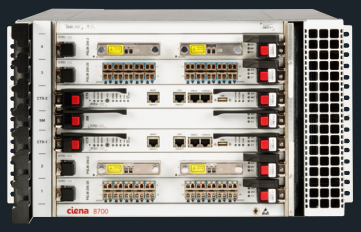
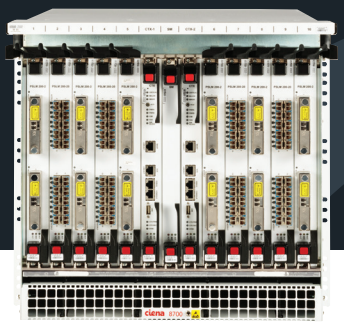
DATA SHEET

8700

Packetwave Platform





Ciena's 8700 Packetwave® Platform—a multi-terabit programmable coherent DWDM packet switch—addresses the growing need to efficiently aggregate and switch large quantities of traffic while guaranteeing stringent Service Level Agreements (SLAs), revolutionizing the capital and operational economics of 10GbE and 100GbE services in metro and regional networks.

As data center and end-user applications continue to proliferate, IP/MPLS-dominated traffic is surging, running from user to content and from content to content. This growth creates significant changes to the patterns, dynamics, and scale of traffic within metro networks. The 8700 is purpose-built to provide seamless, MEF-compliant services, together with L3 services, over a carrier-class, connection-oriented infrastructure. The 8700 uses both MPLS-TE and MPLS-TP, with future support of segment routing for further scalability and programmability.

Due to continued bandwidth demand growth in metro networks worldwide, this particular part of the global network infrastructure has become the crux of network transformation opportunity. The rising popularity of 10GbE and 100GbE ports, connections, and services has created a new business requirement for optimized 10GbE to 100GbE switching and aggregation that leverages the very latest in routing and switching and Ciena's WaveLogic™ 3 Nano 100G coherent DWDM optical technologies. Available in both 4-slot and 10-slot variants (counting only I/O slots), the 8700 provides 1G/10G/40G/100G ports with up to 680 Gb/s per slot, for a total non-blocking capacity of up to 2.7 Tb/s (4-slot) and 6.8 Tb/s (10-slot).

Features and benefits

- Exceptional 1GbE, 10GbE, 40GbE, and 100GbE density to address space constraints
- Flexible port configurations up to 300 x 1GbE, 300 x 10GbE, 80 x 40GbE, 20 x 100G DWDM, or 60 x 100GbE
- Low power consumption to keep operating expenses in check
- Multiple configuration options with fully modular 4-slot or 10-slot chassis variants
- MEF CE 2.0-certified for E-Line, E-LAN, E-Tree, and E-Access for improved service offerings; E-Line and E-Access up to and including 100GbE
- Hardware-assisted OAM capabilities for guaranteed SLA differentiation
- Zero-Touch Provisioning (ZTP) for rapid, secure, and error-free turn-up of services
- Ciena's MCP multi-layer provisioning support for end-to-end network management control and planning
- Integrated Service Activation Testing capabilities
- Seamless integration with Ciena's WaveLogic Photonics platforms

CE 2.0 MEF CERTIFIED

MEF 3.0 CERTIFIED

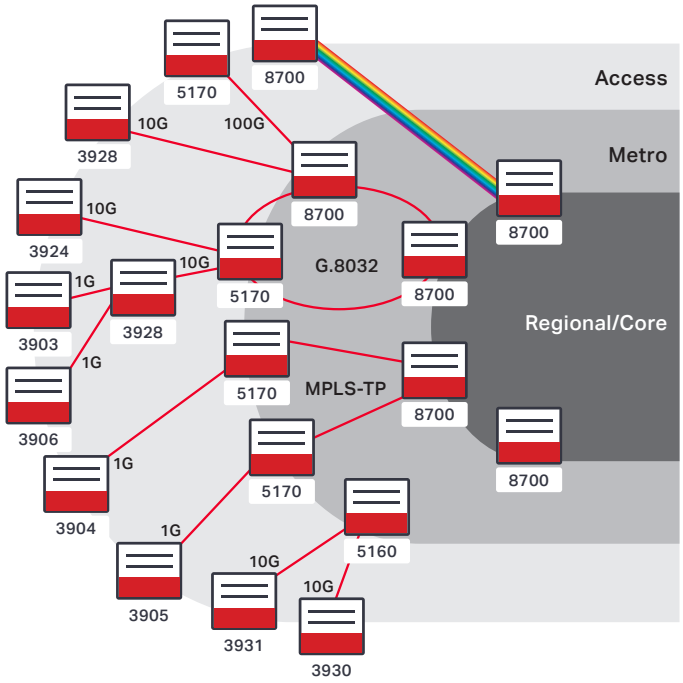


Figure 1. 8700 Packetwave Platform network applications

Industry-leading 10GbE and 100GbE density

Continued annual growth in metro networks bandwidth demand is driving a change in the mix of connections and services, from 1GbE aggregation into 10GbE to 10GbE aggregation into 100GbE. In addition, demand for high-speed 100GbE UNI services is steadily increasing. This shift toward higher bandwidth services means that metro and regional Ethernet networks, once optimized for lower, 1GbE rates, are no longer aligned to changing metro network traffic trends. The 8700 is specifically optimized for 10GbE to 100GbE switching and aggregation, allowing network operators to intercept a rapidly shifting market toward higher rate ports, services, and connections.

Three key factors are essential for designing today's routing and switching networks: density, power consumption, and scalability. For density, it is important to integrate as much bandwidth as possible and use very high-speed links. Reducing power means using a minimum number of efficient integrated links and reducing the number of off-chip interfaces on a highly scalable fabric. Most importantly, networks should use a highly efficient scalable Ethernet/OTN fabric to connect those high-speed links.

Compact, dense capacity

Efficient use of real estate assets is a growing concern for network operators who either house their own network equipment or lease space in collocation facilities. Financial margins are under pressure from over-the-top applications and services that drive network expansion faster than revenues.

Space is increasingly limited and expensive, and network operators face substantial capital expenditures to open up new locations, or must retire active equipment to free space for new, denser equipment. Addressing bandwidth demand growth by deploying more and larger equipment is simply not a sustainable business model.

Ciena's 8700 platform offers industry-leading 10GbE and 100GbE with high port density and multiple fabric options in two modular chassis, providing greater choice, flexibility, and capacity.

Energy-efficient 10GbE and 100GbE

Energy costs are the primary contributor to surging monthly operating expenses for most network operators, fueled by the massive demand for connectivity. The increasing affordability of smart devices, high-speed access, and seamless video streaming drive the pressing need for innovative networking solutions that consume significantly less energy for powering and cooling network equipment.

The 8700 achieves high energy efficiency and low energy consumption, so it is better for the environment and network operators' bottom line.

Learn more about how the 8700 Packetwave Platform can lower energy costs

Massive scalability

In addition to low power and footprint, the service aggregation switch should scale to support subscriber interfaces. Ciena's 8700 was purpose-built for new market trends, scaling to a massive 6.8 Tb/s.

Expanding Demands Need Routing and Switching Perfomance
Download white paper

Simpler metro and regional networks

With the changing scale and dynamics of metro and regional networks, continuing to build out networks in traditional ways is simply unsustainable. The platform leverages Ciena's Service-Aware Operating System (SAOS), which supports advanced OAM, QoS, and MPLS features and protocols. The platform paves the way for seamless MPLS and future technologies such as segment routing.

Game-changing WaveLogic Photonics integration

The two technologies that have most impacted the efficiency and economics of metro networking in the past decade are Ethernet and photonics. Technology in both of these areas continues to advance at a frenetic pace, with no signs of abating. By combining these two important technologies into a common Ethernet switching and aggregation platform, network operators can optimize their metro and regional networks, yielding measurable benefits in simplicity, capacity, scalability, power, and space efficiency, along with compelling economics. Ciena combines the advanced routing and switching capabilities of SAOS with the latest award-winning WaveLogic Photonics and WaveLogic 3 Nano technologies in the 8700 Packetwave platform, allowing network operators to build intelligent, packet-optimized photonic networks that are both simpler and highly cost-effective.

Differentiation through service velocity

Service velocity has become a critical competitive advantage for network operators the world over. In many cases, service velocity is the determining factor in winning new service sales. In most competitive markets, it is simply no longer viable to ask customers to wait months for new services to be provisioned. The 8700 implements Ciena's unique ZTP capabilities, allowing network operators to rapidly deploy new IP/MPLS services in a completely automated manner. With no human intervention required, manual provisioning errors are eliminated. Most importantly, ZTP improves service deployment and velocity and offers significant competitive advantage.

Rich OAM capabilities

As network operators and their customers migrate away from legacy TDM-based ports, connections, and services to new IP/MPLS networks, guaranteed service levels must be maintained, and, in many cases, improved. Routing and switching must support a broad array of Operation, Administration, and Maintenance (OAM) capabilities to ensure network operators can proactively and reactively maintain and report on the ongoing health of their metro Ethernet networks and services. The 8700 supports a comprehensive set of hardware-assisted OAM capabilities, including per-service Ethernet fault (IEEE 802.1ag) and performance monitoring (ITU-T Y.1731 and TWAMP) and embedded Service Activation Test (RFC2544 and Y.1564 KPI's) to help guarantee and manage strict, market-differentiating SLAs.

Simplified multi-layer management and control

Ciena's Manage Control and Plan (MCP) domain controller offers a unique and comprehensive solution for the administration of mission-critical networks that span across access, metro, and core domains. The MCP provides unprecedented multi-layer visibility from the photonic layer to the packet layer. With this innovative management approach, Ciena's MCP returns control of the metro network and services directly to the network operator. By providing a unified view to the network from the photonic to the packet layer, network operations are simple, secure, and highly cost-effective.

Flexible service delivery configurations

The 8700 Packetwave platform supports a flexible menu of service offerings, including MEF-compliant E-Line/E-LAN/E-Tree/E-Access and L3 services, over a carrier-class, connection-oriented infrastructure using both MPLS-TE and MPLS-TP. Integrated Routing and Bridging (IRB) functions support efficient L3 forwarding that facilitates specific scenarios common in LTE-A and future 5G scenarios.

Future-proof scalability

Making liberal use of Ethernet, IP, and MPLS technology, the 8700 can scale to support any number of network architectures in view of varying market requirements for 5G mobile backhaul, Ethernet Business Service delivery, and Data Center Interconnect (DCI), to name a few.
For example, the use of Seamless MPLS using BGP-LU creates a scalable network hierarchy extending across regional RSVP-TE domains that would otherwise become complex and unwieldy. The solution works with today's MPLS environments, and can evolve to support modern routing and switching technologies such as seamless MPLS and segment routing while leveraging SDN control and programmability.

Technical Specifications

Physical Specifications

Description	4-Slot	10-Slot
W X D X H (mm)	483 X 600 X 267	483 X 600 X 445
W X D X H (Inches)	19 X 23.5 X 10.5	19 X 23.5 X 17.5
Chassis Per Rack	7	4
Weight (Max)	91Lb/42Kg	147Lb/66Kg
DC Input	-40Vdc to -60Vdc	
AC Input	180Vac to 265Vac	
Power Consumption (Watts@ 25°C/ -48V DC) (no optics)	1201 (Typical) 1960 (Maximum)	2113 (Typical) 3043 (Maximum)
Operating Temperature	32°F to 104°F 0°C to 40°C The system has been tested and complies with the NEBS short-term operating requirement of -5°C to 55°C (23°F to 131°F). Short-term is defined in NEBS as a period of not more than 96 consecutive hours and a total of not more than 15 days in one year. (This refers to a total of 360 hours in any given year, but not more than 15 occurrences during that one-year period.)	
Storage Temperature	-40°F to 158°F (-40°C to 70°C)	
Relative Humidity	5% To 90% (Non-Condensing)	
Air Flow	Right Front to Left Rear	Lower Front to Upper Rear

Service Line Modules (SLM):

- PSLM-680-8: 6x QSFP28, 2x QSFP+ ports
- PSLM-400-31: 30x SFP/SFP+, 1x QSFP28 ports
- PSLM-200-20: 20x 1GbE/10GbE SFP/SFP+ ports
- PSLM-200-2: 2x 40GbE/100GbE CFP ports
- CSLM-200-2: 2x 100G OTU-4 wrapped 100GbE over WaveLogic 3 Nano DWDM ports
- PSLM-200-11: 10x SFP/SFP+, 1x QSFP28 ports

Any module; any slot

Control Timing & Switch Module (CTX/CTX-HD):

- 1x 10/100/1000M RJ-45 Management DCN port
- 1x Console Port (RJ-45, EIA-561)
- CTX, 1 Tb/s
- CTX-HD, 2.27 Tb/s

Switch Module (SM/SM-HD):

- No external interfaces
- SM, 800 Gb/s
- SM-HD, 2.27 Tb/s

Input / Output Module (IOM):

- 16x External alarm inputs; 4 x External alarm outputs
- 2x RJ-45 sync input/output port
- 4x SMB sync input/output ports

Ethernet

Hierarchical Quality of Service (HQoS) including Ingress Metering/Egress shaping

IEEE 802.1ad Provider Bridging (Q-in-Q) 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 802.3ab 1000Base-T via copper SFP

IEEE 802.3ad Link Aggregation Control Protocol (LACP)

IEEE 802.3ba-2010 40GbE & 100GbE

IEEE 802.3z Gigabit Ethernet

Jumbo Frames to 9,600 bytes

Layer 2 Control Frame Tunneling

Link Aggregation (LAG): Active/Active; Active/Standby

Multi Chassis-LAG (MC-LAG): Active/Standby

MEF 10.2 Egress Bandwidth Shaping per EVC per COS

Per-VLAN MAC Learning Control

Private Forwarding Groups

VLAN tunneling (Q-in-Q) for Transparent LAN Services (TLS)

MEF CE 2.0 Certified

- E-Access: Access EPL, Access EVPL
- E-LAN: EP-LAN, EVP-LAN
- E-LINE: EPL, EVPL
- E-Tree: EP-Tree, EVP-Tree

Carrier Ethernet OAM

EVC Ping (IPv4)

IEEE 802.1ab Link Layer Discovery Protocol (LLDP)

IEEE 802.1ag Connectivity Fault Management (CFM)

IEEE 802.3ah EFM Link-fault OAM

ITU-T Y.1564 Ethernet Service Activation Test Methodology

ITU-T Y.1731 Performance Monitoring (S-LM, DM) RFC 2544 Benchmarking Methodology for Network Interconnect Devices

RFC 5618 TWAMP Responder and Receiver TWAMP Sender

Synchronization

Line Timing Interfaces:
- 1GbE/10GbE In and Out (PSLM-200-20)
- 40GbE/100GbE In and Out (PSLM-200-2)
- OTU-4 wrapped 100GbE In and Out (CSLM-200-2)

External Timing Interfaces:
- BITS In or Out (T1: 1.544Mb/s, E1: 2.048MHz and 2.048Mb/s)
- GPS Frequency In or Out (1.544MHz, 2.048MHz, and 10MHz)

GR-1244

ITU-T G.813

ITU-T G.823/G.824

ITU-T G.8262 Synchronous Ethernet

ITU-T G.8262/G.8264 EEC option1 and option2

ITU-T G.781

ITU-T G.8261

Stratum 3E oscillator

Networking Protocols

Alarm Indication Signaling (AIS) with Link Down Indication (LDI) and Remote Defect Indication (RDI)

Automatic Pseudowire Reversion

ITU-T G.8032 v1, v2, v3 Ethernet Ring Protection Switching

Layer 2 Control Frame Tunneling over MPLS Virtual Circuits

MPLS Label Switch Path (LSP) Tunnel Groups MPLS Label Switch Path (LSP) Tunnel

Redundancy

MPLS Multi-Segment Pseudowires

MPLS Virtual Private Wire Service (VPWS) OSPF/IS-IS for Dynamic MPLS-TP Control Plane RFC 2205 RSVP

RFC 3031 MPLS architecture

RFC 3209 RSVP-TE: Extensions to RSVP for LSP RFC 3630 OSPF-TE

RFC 4447 Pseudowire Setup & Maintenance using Label Distribution Protocol (LDP)

RFC 4448 Encapsulation Methods for Transport of Ethernet over MPLS Networks (PW over MPLS)

RFC 4664 Framework of L2VPN (VPLS/VPWS) RFC 4665 Service Requirement of L2 VPN

RFC 4762 VPLS (Virtual Private LAN Service) and Hierarchical VPLS (H-VPLS)

RFC 5654 MPLS-Transport Profile(TP)
- LSP Static provisioning
- LSP Dynamic Provisioning
- 1:1 Tunnel protection

RFC 5884 LSP Bidirectional Forwarding Detection (BFD) via GAL/G-Ach channels

RFC 6215 MPLS Transport Profile User-to-Network and Network-to-Network Interfaces

RFC 6426 MPLS On-demand Connectivity Verification and Route Tracing

RFC 6428 LSP and PW Connectivity Verification and Trace Route

Static ARP and MAC Destination Address Resolution

VCCV (Virtual Circuit Continuity Check) Ping and Trace Route

Multicast

DHCPv4 Relay Agent with Option 82 G.8032/IGMP interworking

IGMP over MPLS-TP

IGMPv3 with SSM

CSLM-200-2 Optical Performance

50GHz/100GHz grid support

FEC Net coding gain: 12.1dB

Nominal full-fiber reach: 120km unamplified to 1,000km amplified

PMD Tolerance: 150ps mean; 450ps instantaneous

Rx Sensitivity: -26 dBm

Service and Photonic Line Interoperability (SPLI) Tunable from 1528.77nm to 1566.72nm

Tx Output Power, provisionable: -11dBm to +7.5dBm

Network Management

Alarm Management & Monitoring Configuration

Comprehensive Management via OneControl Enhanced CLI

Integrated Firewall

IPv4 & IPv6 Management Support Local Console Port

Per-VLAN Statistics Port State Mirroring

RADIUS Client and RADIUS Authentication Remote Auto configuration via TFTP, SFTP Remote Link Loss Forwarding (RLLF)

RFC 959 File Transfer Protocol (FTP)

RFC 1035 DNS Client

RFC 1213 SNMP MIB II

RFC 1350 Trivial File Transfer Protocol (TFTP)

RFC 1493 Bridge MIB

RFC 1573 MIB II interfaces

RFC 1643 Ethernet-like Interface MIB

RFC 1757 RMON MIB - including persistent configuration

RFC 2021 RMON II and RMON Statistics

RFC 2131 DHCP Client

RFC 3877 Alarm MIB

RFC 4291 – IPv6 addressing (for Management Plane)

RFC 4443 – ICMPv6

RFC 4862 – Stateless address auto-configuration

RFC 5905 NTP Client

Secure File Transfer Protocol (SFTP) Secure Shell (SSHv2)

SNMP v1/v2c/v3

SNMP v3 Authentication and Message Encryption

Software upgrade via FTP, SFTP Syslog with Syslog Accounting

TACACS + AAA

Telnet Server

Virtual Link Loss Indication (VLLI)

Zero Touch Provisioning

Service Security

Broadcast Containment Egress Port Restriction

Hardware-based DOS Attack Prevention Layer 2, 3, 4 Protocol Filtering

User Access Rights

Agency Approvals

Australia C-Tick (Australia/New Zealand) CE mark (EU)
- EMC Directive (2014/30/EU)
- LVD Directive (2006/95/EC)
- RoHS2 Directive (2011/65/EU)

ETSI 300 019 Class 1.2, 2.2, 3.2

GR-1089 Issue 6 – NEBS Level 3

GR-63-CORE, Issue 4 – NEBS Level 3, Zone 4 Earthquake

NRTL (NA)

VCCI (Japan)

Standards Compliance

Emissions:

CISPR 22 Class A CISPR 32 Class A EN 300 386

EN 55022

EN 55032

FCC Part 15 Class A GR-1089 Issue 6

Industry Canada ICES-003 Class A VCCI Class A

Environmental:

RoHS2 Directive (2011/65/EU)

Immunity (EMC):

CISPR 24

EN 300 386

EN 55024

GR-1089 Issue 6 Power:

ETSI EN 300 132-2

ETSI EN 300 132-3

Safety:

ANSI/UL 60950-1 2nd edition 2007 CAN/CSA C22.2 No. 60950-1-07 EN 60950-1

IEC 60825-1 2nd edition (2007)

IEC 60825-2 3rd edition (2004)

IEC 60950-1