

DATA SHEET

5170

Service Aggregation Switch



Ciena's 5170 Service Aggregation Switch addresses the increasing need for high-bandwidth services at the edge of the network. Capable of delivering up to 100GbE to enterprises, mobile backhaul sites, and data center interconnect applications, the 1RU device provides a low-footprint, low-power solution addressing today's key network challenges.

As data center and end-user applications continue to proliferate, bandwidth demand continues to multiply, resulting in significant changes to the patterns, dynamics, and scale of traffic within metro networks. The 5170 is purpose-built to provide seamless MEF-compliant L2 and L3 services over a carrier-class, connection-oriented infrastructure. It operates using Ethernet, MPLS-TE, or MPLS-TP, with future support of segment routing for complete control over forwarding paths.

This ongoing, global bandwidth demand growth in metro networks has focused attention on the aggregation part of the infrastructure for network transformation initiatives. The rising popularity of services using connections exceeding 1 Gb/s and even 10 Gb/s has created a new business requirement for optimized (read: cost-effective) 10GbE to 100GbE switching and aggregation.

Ciena's 5170 provides a cost-effective fixed form factor solution for smaller installations complementing the larger-capacity 8700 Packetwave® Platform. Together, they address 100GbE/10GbE/1GbE service delivery and aggregation challenges, for which massive bandwidth is needed in a cost-effective and reliable manner. Reliability is ensured on the 5170 with redundant power supply, fan module options, and NEBS compliance, leading to outstanding Mean-Time-Between-Failure (MTBF) characteristics.

Features and Benefits

- Outstanding 10GbE and 100GbE density in compact form to address space constraints
- 4 x 100GbE (QSFP28) and 40 x 1/10GbE (SFP+)
- Hardware-assisted packet OAM scaled to deliver 100GbE services with guaranteed SLA differentiation
- Advanced QoS with Hierarchical Egress Shaping and Hierarchical Ingress Metering
- Zero-Touch Provisioning (ZTP) for rapid, secure, and error-free turn-up of packet services
- Advanced packet synchronization
- Integrated, line-rate Service Activation Testing capabilities
- Ciena's Blue Planet MCP multi-layer provisioning support for end-to-end network management control and planning
- Low power consumption to keep operating expenses in check
- Flexible configuration options with redundant power supply (AC or DC) and fan modules
- Future integration with Ciena's WaveLogic Photonics

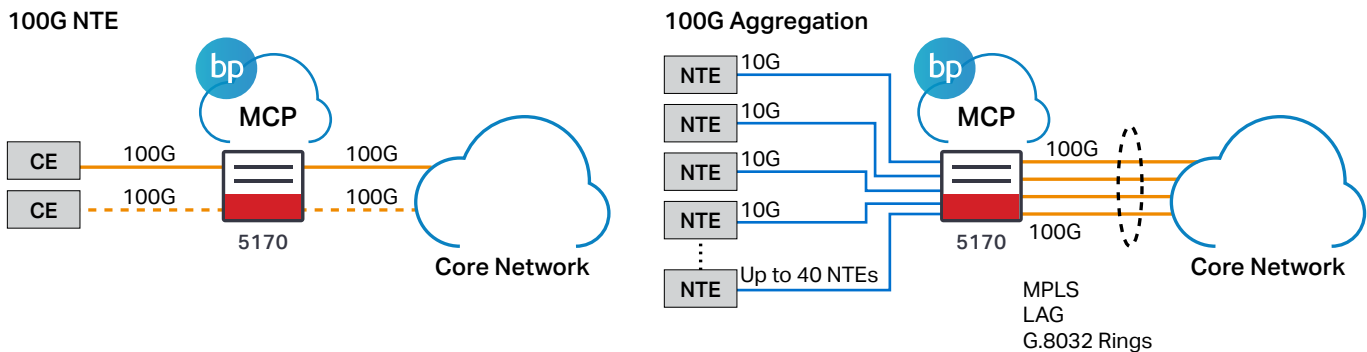


Figure 1. 5170 Service delivery and aggregation functions

Increased reach and flexibility

With future integration of Ciena’s award-winning WaveLogic photonics, in addition to a broad range of pluggable optics, the 5170 offers the ultimate flexibility of reach and price-point. Key far-away sites can now be brought online at unprecedented data rates for long-range service delivery.

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 5170 implements Ciena’s unique 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.

Implemented as an NTE device, the 5170 can leverage its built-in x86 CPU complex, which powers SAOS and its open VNF hosting capabilities. These can include OAM, service monitoring, and telemetry capabilities that further automate repetitive and time-consuming tasks.

Rich packet OAM capabilities

As network operators and their customers increasingly rely on new packet-based networks, providers must maintain guaranteed service levels. Packet networks must support a broad array of packet Operations, 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 5170 supports a comprehensive set of hardware-assisted packet OAM capabilities—including per-service Ethernet fault (IEEE 802.1ag) and performance monitoring (ITU-T Y.1731 and TWAMP), and embedded, line-rate Service Activation Test (RFC2544 and Y.1564 KPI’s) to a full 100 Gb/s—to help guarantee and manage strict, market-differentiating SLAs.

Multi-chassis Link Aggregation (MC-LAG), G.8032 Ethernet ring protection, or MPLS-TP alternate path capabilities provide redundancy and resilience by addressing single-point-of failure concerns and maintaining high levels of customer satisfaction.

Simplified multilayer management and control

Ciena’s Blue Planet Manage Control and Plan (MCP) software suite 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 packet layers. With this innovative management approach, Blue Planet MCP returns control of the metro packet network and services directly to the network operator. By providing a unified view of the network from the photonic layer to the packet layer, network operations are simple, secure, and highly cost-effective.

Who Needs 100G?
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Flexible service delivery configurations

The 5170 supports a flexible menu of service offerings ranging from MEF-compliant E-Line/E-LAN/E-Tree/E-Access, along with L3 services, over a carrier-class, connection-oriented infrastructure using MPLS-TE and MPLS-TP.

The 5170 supports fine-grained SLA monitoring and enforcement techniques to help successful operators deliver on tight SLA guarantees. Hierarchical QoS permits delivery of a wide range of traffic types including management, timing/synchronization, multiple customer-prioritized, and best-effort service traffic, without interference or degradation. These capabilities enable greater revenue generation by utilizing available network resources more efficiently.

Sophisticated VLAN tag manipulation and control allow innovative customer traffic separation approaches and a rich set of classification of service flows through the switch. Hierarchical ingress metering can be configured for sub-port services, offering the ultimate in flexible flow control based on L2, L3, and L4 classification. In addition, egress bandwidth shaping on a per-EVC basis is built to allow fine-tuning delay and buffering efficiency within the device.

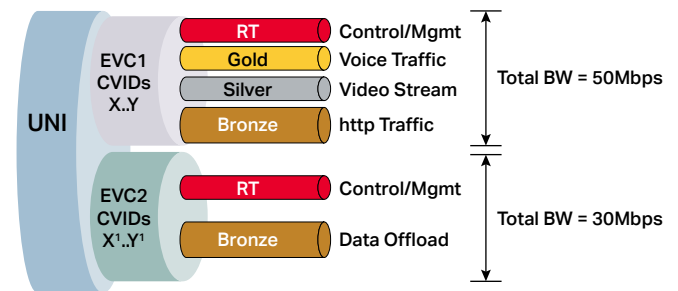


Figure 2. Hierarchical QoS supports multiple services

Technical Information

Interfaces

4 x 100G/40G QSFP28 ports
 40 x 1G/10G SFP+ ports
 1 x 10/100/1000M RJ-45 mgmt port
 1 x serial console (RJ-45, EIA-561)
 1 x USB

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
 Layer 2 Control Frame Tunneling
 Link Aggregation (LAG): Active/Active; Active/ Standby
 MC-LAG
 Jumbo frames to 9216 bytes
 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 Compliant

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
 RFC 2544 Benchmarking Methodology for Network Interconnect Devices
 Generation and Reflection at 100GbE
 ITU-T Y.1731 Performance Monitoring (SLM;DM)
 RFC 5618 TWAMP Responder and Receiver
 TWAMP Sender
 Dying Gasp with Syslog and SNMP Traps

Synchronization

ITU-T G.8262/G.8264 EEC option1 and option2
 ITU-T G.781
 GR-1244
 ITU-T G.813
 ITU-T G.823/G.824
 ITU-T G.8262 Synchronous Ethernet
 Stratum 3E oscillator
 External Timing Interfaces:
 • BITS in or out (1.544Mb/s, 2.048MHz and 2 Mb/s)
 • GPS in or out (1.544MHz, 2.048MHz, and 10MHz)
 • 1pps and ToD in or out (NMEA 0183, MSTs)

Line Timing Interfaces:

- 1GbE/10GbE In and Out
- 40GbE/100GbE In and Out

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)

Technical Information continued

Networking Protocols continued

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

Agency Approvals

Australia RCM (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)
 NOM (Mexico)
 Anatel (Brazil)

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 1493 Bridge MIB
 RFC 1573 MIB II interfaces
 RFC 959 File Transfer Protocol (FTP) RFC 1035
 DNS Client
 RFC 1213 SNMP MIB II
 RFC 1493 Bridge MIB
 RFC 1573 MIB II interfaces
 RFC 1643 Ethernet-like Interface MIBRFC
 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
 RFC 1350 Trivial File Transfer Protocol (TFTP)
 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

Standards Compliance

Emissions:

CISPR 22 Class A
 CISPR 32 Class A
 EN 300 386
 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)
 WEEE 2002/96/EC

Immunity (EMC):

GR-1089 Issue
 6 Power:
 CISPR 24
 EN 300 386
 EN 55024

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)

Ordering Information	
170-5170-910	5170,(4)100G QSFP28,(40)10/1G SFP+,SYNC,(2)SLOTS AC OR DC PSU,(5) SLOTS FAN UNITS
170-0092-900	5170,AC PLUGGABLE POWER SUPPLY, WIDE RANGE 120/240V
170-0093-900	5170,DC PLUGGABLE POWER SUPPLY, WIDE RANGE 24/48V
170-0094-900	5170, PLUGGABLE FAN UNIT, (FRONT-TO-BACK)
TBD	5170, PLUGGABLE FAN UNIT (BACK TO FRONT)
Software	
Required OS Base System Perpetual Software Licenses	
S71-5170-900	SAOS VIRTUAL ADVANCED ETHERNET & OAM PERPETUAL SOFTWARE LICENSE FOR 5170 SYSTEM
Optional OS Applications	
S71-5170-904	SAOS VIRTUAL ADVANCED MPLS APPLICATION PERPETUAL SOFTWARE LICENSE FOR 5170 SYSTEM
S71-5170-905	SAOS VIRTUAL ADVANCED SYNCHRONIZATION PERPETUAL SOFTWARE LICENCE FOR 5170 SYSTEM
S71-5170-910	SAOS VIRTUAL ADVANCED SECURITY PERPETUAL SOFTWARE LICENSE FOR USE WITH 5170
S71-5170-906	SAOS VIRTUAL ADVANCED 100G PERPETUAL SOFTWARE LICENSE FOR 5170

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