

## 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 1Gb/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® modular 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 (SPF+)
- Hardware-assisted packet OAM scaled to deliver 100GbE services with guaranteed SLA differentiation
- Advanced QoS with Hierarchical Egress Shaping and Hierarchical Ingress Metering
- Secure Zero-Touch Provisioning (SZTP) for rapid, secure, and error-free turn-up of packet services
- Advanced packet synchronization
- Integrated, line-rate Service Activation Testing capabilities with built-in 100 Gb/s traffic generation and analysis
- 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

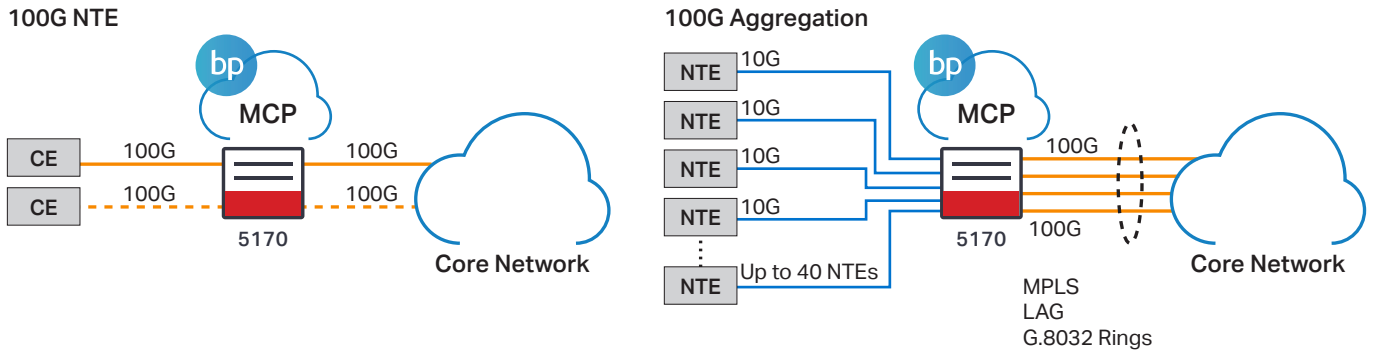


Figure 1. 5170 Service delivery and aggregation functions

## 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. Ciena also supports Secure ZTP, providing enhanced security with full turn-up automation.

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). The 5170 is architected to power SLA metrics and OAM at a high scale, enabling operators to take full advantage

of the port density and 800G fabric to deliver the maximum number of services at a lower cost. Consistent with this SLA focus, the 5170 has an embedded line-rate Service Activation Test engine (RFC2544 and Y.1564 KPI's) with traffic generation to a full 100 Gb/s—to guarantee and manage strict, market-differentiating SLAs without relying on external test equipment.

## Protected services

Given the sheer volume of customer traffic being transported by the 5170, reliability and security are paramount considerations. With excellent MTBF characteristics, the 5170 achieves five-9s availability. Resiliency protocol support also enables further reliability to be achieved through the network architecture. 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.

100GbE: Closer to the Edge,  
Closer to Reality | Read our blog



## Flexible service delivery configurations

The 5170 supports a flexible menu of service offerings including 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.

Fine-grained SLA monitoring and enforcement techniques 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.

The 5170 also provides extra-deep buffers to maximize traffic throughput and reliability. SAOS enables the operator to optimize or adjust buffer depths to match service types and SLAs such as minimizing latency or maximizing packet delivery.

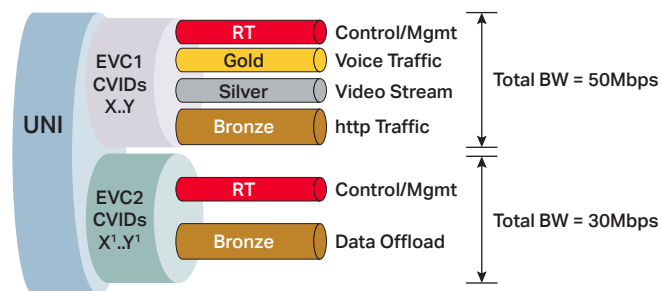


Figure 2. Hierarchical QoS supports multiple services

## Technical Information

### Interfaces

4 x 100G/40G QSFP28  
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  
Multi-chassis LAG (MC-LAG) active/standby  
Jumbo frames to 10,222 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 3.0 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  
RFC 2544 Benchmarking Methodology for  
Network Interconnect Devices  
Generation and Reflection at 100GbE  
ITU-T Y.1731 Performance Monitoring  
(SLM;DM) with simultaneous sessions  
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.8262 Synchronous Ethernet  
IEEE 1588v2 PTP\*  
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 (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)  
MPLS AIS-LDI with Signal Degrade  
MPLS Static VC Shaping  
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  
Topology LDP  
MPLS Multi-Segment Pseudowires  
MPLS Virtual Private Wire Service (VPWS)  
OSPF/IS-IS for Dynamic MPLS-TP Control  
Plane  
RFC 2205 RSVP  
IS-IS L1/L2  
IS-IS Route Summarization.  
RFC 3031 MPLS architecture  
RFC 3209 RSVP-TE: Extensions to RSVP for LSP  
RFC 3630 OSPF-T  
RFC 4447 Pseudowire Setup & Maintenance  
using Label Distribution Protocol (LDP)

## Technical Information continued

### Networking Protocols continued

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  
Control Channel types CC1, CC2, CC4  
Connectivity Verification types 1, 2  
VCCV BFD based PW Pseudowire Switchover Multicast  
DHCPv4 Relay Agent with Option 82  
G.8032/IGMP interworking  
DHCPv6  
IGMPv3 with SSM  
IGMP over MPLS-TP

### 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 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  
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:

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	
170-5170-905	5170, (4)100G QSFP28, (40)10/1G SFP+, SYNC, (2) SLOTS AC OR DC PSU
170-0092-900	5170, DC PLUGGABLE POWER SUPPLY, -42V
170-0093-900	5170, AC PLUGGABLE POWER SUPPLY, WIDE RANGE 120/240V
170-0130-900	SPARE 5170 PLUGGABLE FAN UNIT
Software	
Required OS Base System Perpetual Software Licenses	
S70-0031-900	SAOS ADVANCED ETHERNET & OAM PERPETUAL SOFTWARE LICENSE FOR 5170
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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