DATA SHEET

5170

Ciena's 5170 Platform cost-effectively addresses business opportunities related to high-bandwidth applications at the network edge. With IP router configurations and universal aggregation, the 5170 delivers up to 100GbE connectivity to enterprises, mobile backhaul sites, and Data Center Interconnect (DCI) in a small-footprint, low-power solution to address today's network challenges.

Driving the industry toward 10GbE and 100GbE service delivery

Continued annual growth in bandwidth demands, from access to metro, is resulting in a mix of connections and services, from 1GbE to 10GbE aggregation and 10GbE to 100GbE aggregation. In addition, demand for high-speed 100GbE UNI services is increasing unabated. The rising popularity of services exceeding 1 Gb/s—and even 10 Gb/s rates—is creating new business opportunities for highly optimized 10GbE to 100GbE aggregation. This shift to higher-bandwidth services means regional IP and Ethernet networks, once optimized for lower 1GbE rates, are no longer aligned to ongoing and emerging metro network traffic trends. The specific mix of speeds and feeds of the 5170 is purpose-built to address this shift towards higher rates towards the edge.

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 10G-capable equipment, incurring additional collocation rental and power costs. The 5170's density allows the addition of 10GbE services without increasing the operator's footprint.

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 delivery. Addressing bandwidth demand growth by deploying more and/or larger equipment is simply unsustainable business—economically and environtmentally. Ciena's 5170 cost-effectively offers dense 100GbE service delivery in a 1RU, 600mm deep, fixed form-factor with dual pluggable power supplies and redundant cooling fans to minimize any downtime.

Features and benefits

- Outstanding 10GbE and 100GbE density in compact form to address space constraints
- 4 x 100GbE (SFP28) + 36 x 1GbE/10GbE SPF+ Ports + 4 x 1GbE/10GbE/25GbE SFP28 Ports
- Hardware-assisted OAM scaled to deliver 100GbE services with guaranteed SLA differentiation
- Advanced QoS with Hierarchical Egress Shaping and Hierarchical Ingress Metering
- Carrier Ethernet, IP Routing, MPLS and Segment Routing
- ZTP for rapid, secure, and error-free turn up of services
- Integrated, line-rate Service Activation Testing capabilities with built-in 100 Gb/s traffic generation and analysis
- Ciena's MCP multi-layer provisioning support for end-to-end network management control and planning
- NETCONF/YANG mechanisms to enable a fully open SDN environment
- Redundant, hot-swappable power supplies (AC or DC) and fan modules

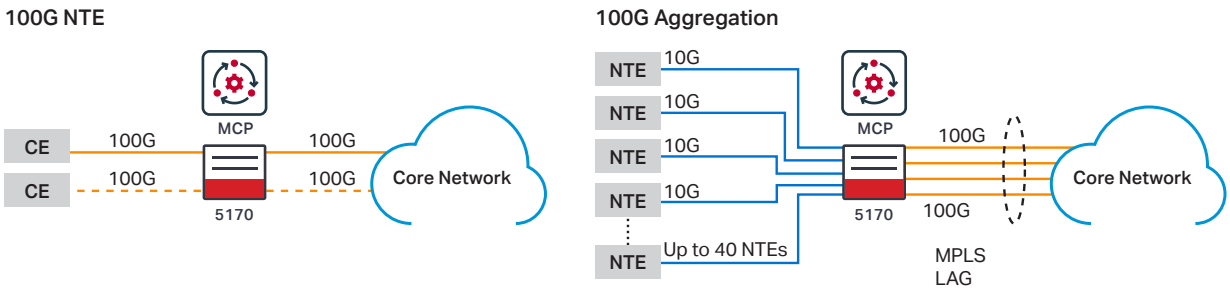

Figure 1. 5170 service delivery and aggregation functions

Differentiation through accelerated 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 business opportunities. The 5170 implements Ciena's unique Zero-Touch Provisioning (ZTP) capabilities, allowing service providers to rapidly deploy new IP/MPLS services in a fully automated manner. By reducing or eliminating costly and time-consuming manual intervention, provisioning errors are completely eliminated via ZTP to ensure the utmost in service security and reliability.

Rich Operations, Administration, and Maintenance (OAM) suite of capabilities

As network operators and their customers increasingly rely on new IP/MPLS networks, providers must offer and reliably maintain guaranteed service levels. This is achieved via a rich suite of OAM capabilities to ensure operators can proactively and reactively maintain and report on the ongoing health of their offered network services. The 5170 also supports a comprehensive set of hardware-assisted OAM capabilities. The 5170 is architected to power Service Level Agreement (SLA) metrics and OAM at a high scale allowing operators to take full advantage of the port density and 800 Gb/s fabric for delivering the maximum number of services at the lower cost. Consistent with this SLA focus, the 5170 has an embedded line-rate Service Activation Test (SAT) engine (RFC2544, Y.1564) with traffic generation to a full 100 Gb/s to guarantee strict, market-differentiating SLAs, without relying on costly external test equipment.

Simplified multi-layer management and control

Ciena's Manage, Control and Plan (MCP) domain controller offers a unique and comprehensive solution for the administration and management of mission-critical networks that span access, metro, and core network domains. It provides unprecedented multi-layer visibility from photonic to packet layer. With its innovative management, MCP supports a programmable and automatable solution that provides a fully open approach to installing, manipulating, and monitoring service behaviors in an SDN environment.

Advanced QoS support

5170 supports fine-grained SLA monitoring and enforcement techniques to help operators successfully deliver upon stringent SLA guarantees. These capabilities enable greater revenue generation by optimizing available asset utilization. The platform offers deep buffers managed by Ciena's Service-Aware Operating System (SAOS) to adapt to specific application requirements. Sophisticated VLAN tag manipulation and control supports innovative customer traffic separation approaches alongside a rich set of classification-of-service flows through the platform's fabric.

Ingress metering can be configured, 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 deep buffers to maximize traffic throughput and reliability by enabling operators to optimize and/or adjust buffer depths to match service types and SLA requirements, such as minimizing latency or maximizing delivery.

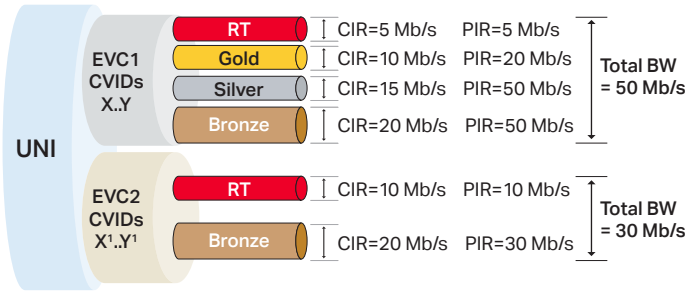

Figure 2. Hierarchical QoS supports multiple services

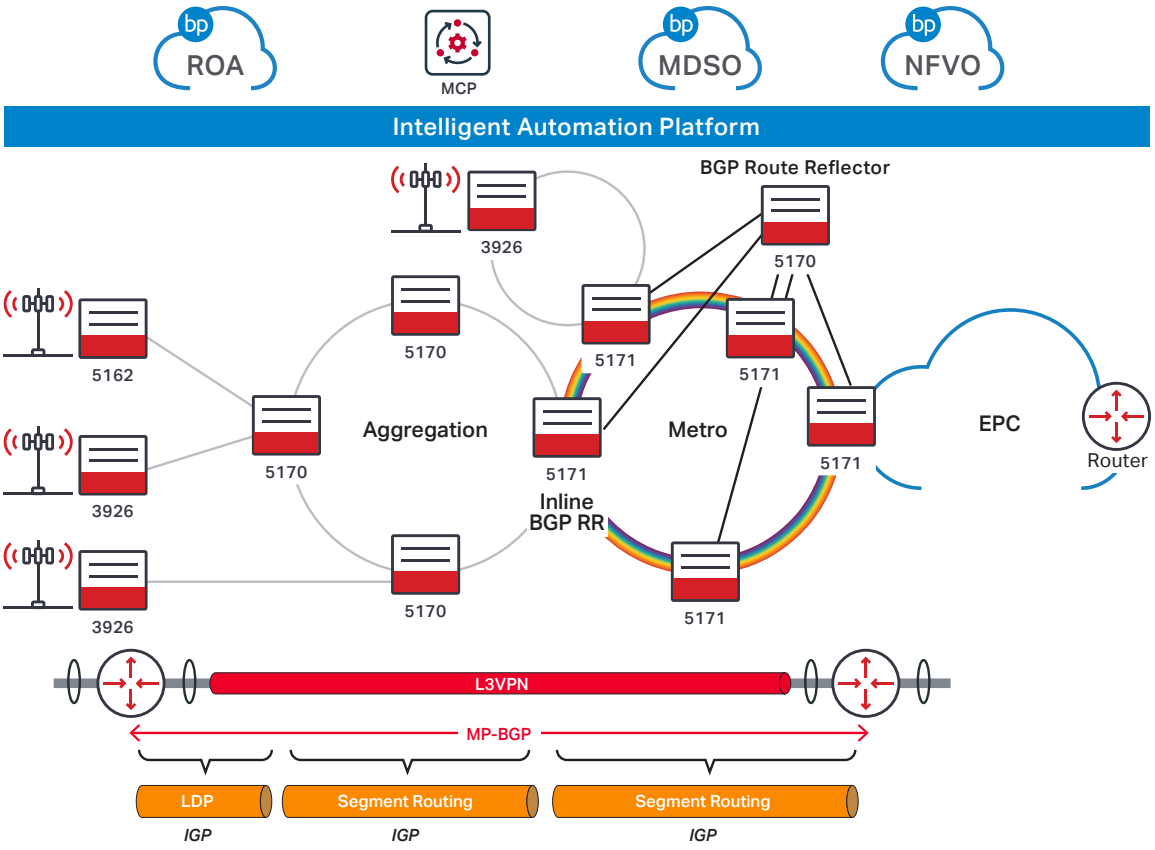

Figure 3. Ciena's Adaptive IP™ solution supporting mobile network evolution

IP Router Configuration (SAOS 10.x)

When configured with SAOS software stream 10.x, the 5170 operates as an IP router supporting NETCONF/YANG to enable an open SDN environment with full visibility via telemetry and automated provisioning using open APIs. The 5170 is purpose-built to provide Layer 2 and Layer 3 services over carrier-grade infrastructure, by supporting a rich suite of Ethernet, IP/MPLS, BGP, IS-IS, OSPF, and Segment Routing. The 5170 is open and standardized, making it the perfect platform for deployments in both greenfield and brownfield scenarios.

Universal Aggregation Configuration (SAOS 8.x)

When configured with the SAOS 8.x software stream, the 5170 operates as a cost-effective universal aggregation solution—including support for Pulse Amplitude Modulation 4 (PAM4) via QSFP28 DWDM pluggable optics—addressing 1/10/100GbE service delivery and aggregation challenges.

Ciena's 5170supports a wide range of service offerings, including MEF CE-compliant E-Line, E-LAN, E-Tree, and E-Access services, over a carrier-grade, connection-oriented infrastructure. It also supports a rich suite of L2 Ethernet, MPLS, OAM, Sync, ACL, and QoS capabilities to support a broad range of applications.

Technical information (SAOS 10.x) – Router Configuration

Interfaces

4 x 100G/40G QSFP28 ports 40 x 1G/10G Ethernet Ports
- 4 x 1GbE/10GbE/25GbE SFP28 ports
- 36 x 1GbE/10GbE SFP+ ports
- 4 x 100GbE SFP28 ports

Ethernet

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

Jumbo frames to 9216 bytes

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

MEF CE 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

Dying Gasp with Syslog and SNMP Traps

EVC Ping (IPv4) (SAOS 8.x)

Generation and Reflection at 100GbE (SAOS 8.x)

IEEE 802.1ab Link Layer Discovery Protocol (LLDP)

IEEE 802.1ag Connectivity Fault Management (CFM)

IEEE 802.3ah EFM Link-fault OAM (SAOS 8.x)

ITU-T Y.1731 Performance Monitoring (SLM; DMM)

Synchronization

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:
1GbE/10GbE In and Out
40GbE/100GbE In and Out
ITU-T G.8262/G.8264 EEC option1 and option2
IEEE 1588v2 PTP

ITU-T G.8262 Synchronous Ethernet Stratum 3E oscillator

Networking Protocols

ISO10598 IS-IS intra-domain routing protocol

OSFP Segment Routing extension

OSFP TI-LFA Topology Independent Fast Reroute using Segment Routing

RFC1195 Use of OSI Is-Is for Routing in TCP/IP and Dual Environments

RFC1997 BGP Community Attribute

RFC2328 OSPF Version 2

BGP Prefix Independent Convergence

EVPN FXC draft-ietf-bess-evpn-vpws-fxc-03.txt

RFC2698 A Two Rate Three Color Marker

RFC2865 Remote Authentication Dial in User Service (RADIUS)

RFC3031 Multiprotocol Label Switching (MPLS) Architecture

RFC3032 MPLS label stack encoding

RFC3107 Support BGP carry Label for MPLS

RFC4271 A Border Gateway Protocol 4 (BGP-4)

RFC4360 BGP Extended Communities Attribute

RFC4364 BGP/MPLS IP Virtual Private Networks (VPNs)

RFC4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)

RFC4632 Classless Inter-domain Routing (CIDR): The Internet Address Assignment and Aggregation Plan

RFC4760 Multiprotocol Extensions for BGP-4

RFC4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling (HVPLS)

RFC5004 Avoid BGP Best Path Transitions from One External to Another

RFC5036 LDP Specification

RFC5037 Experience with the LDP protocol

RFC5301 Dynamic Hostname Exchange Mechanism for IS-IS

RFC5302 Domain-Wide Prefix Distribution with Two-Level IS-IS

RFC5303 Three-Way Handshake for IS-IS Point-to-Point Adjacencies

RFC5309 Point-to-Point Operation over LAN in Link State Routing Protocols

RFC5396 Textual Representation of Autonomous System (AS) Numbers

RFC5398 Autonomous System (AS) Number Reservation for Documentation Use

RFC5492 Capabilities Advertise with BGP-4

RFC5561 LDP Capabilities

RFC5668 4-Octet AS Specific BGP Extended Community

RFC6241 Network Configuration Protocol (NETCONF)

RFC6310 Pseudowire (PW) Operations, Administration, and Maintenance (OAM) Message Mapping

RFC6793 BGP Support for Four-Octet Autonomous System (AS) Number Space

RFC7432 EVPN VPWS/VPLS

RFC7737 Label Switched Route (LSP) Ping and Traceroute Reply Mode Simplification SR-MPLS TI-LFA Topology Independent Loop Free Alternate

Reroute using Segment Routing draft-ietfrtgwg-segment-routing-ti-lfa-03

RFC7911 Advertisement of Multiple Paths in BGP

RFC8214 Virtual Private Wire Service Support in Ethernet VPN

Network Management

Alarm Management & Monitoring Configuration

Event and Alarm Notification/Generation Comprehensive Management
- Via CLI Management
- Via Netconf/YANG Models

IPv4 & 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

Secure Zero-Touch Provisioning (SZTP)

Technical Information (SAOS 8.x) – Universal Aggregation Configuration

Interfaces

Ethernet Ports

- 4 x 1GbE/10GbE/25GbE SFP28 ports
- 36 x 1GbE/10GbE SFP+ ports
- 4 x 100GbE SFP28 ports

Other

1 x RJ-45 BITS input/output port
1 x SMB frequency input/output ports
1 x SMB 1pps phase input/output ports
1 x 10/100/1000M RJ-45 management port
1 x serial console (RJ-45, EIA-561)
1 USB2.0 Off-switch memory

Ethernet

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
Jumbo frames to 9216 bytes
VLAN tunneling (Q-in-Q) for Transparent LAN Services (TLS)
Hierarchical Quality of Service (HQoS) including Ingress Metering/Egress shaping
Private Forwarding Groups
Multi-chassis LAG (MC-LAG) active/standby
MEF 10.2 Egress Bandwidth Shaping per EVC per COS
Per-VLAN MAC Learning Control

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

MEF 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

Dying Gasp with Syslog and SNMP Traps
EVC Ping (IPv4) (SAOS 8.x)
Generation and Reflection at 100GbE (SAOS 8.x)
IEEE 802.1ab Link Layer Discovery Protocol (LLDP)
IEEE 802.1ag Connectivity Fault Management (CFM)
IEEE 802.3ah EFM Link-fault OAM (SAOS 8.x)
ITU-T Y.1731 Performance Monitoring (SLM; DMM)
ITU-T Y.1731 Performance Monitoring (SLM; DM) with simultaneous session
RFC 2544 Benchmarking Methodology for Network Interconnect Device
RFC 5618 TWAMP Responder and Receiver TWAMP Sender

External Timing Interfaces

- ITU-T G.703 Frequency in or out (2.048MHz, and 10MHz)
- ITU-T G.703 1pps and ToD in or out
- ITU-T G.8262/G.8264 EEC option1 and option2
- ITU-T G.8275.1 full timing support T-GM, T-BC and T-TSC
- G.8275.2 clock, Class C*
- Stratum 3E oscillator

Networking Protocols

Alarm Indication Signaling (AIS) with Link Down Indication (LDI) and Remote Defect Indication (RDI)
Control Channel types CC1, CC2, CC4 Connectivity Verification types 1, 2
DHCPv4 Relay Agent with Option 82 G.8032/IGMP interworking
DHCPv6
IGMPv3 with SSM IGMP over MPLS-TP
IS-IS Route Summarization
ITU-T G.8032 v1, v2, v3 Ethernet Ring Protection Switching
Layer 2 Control Frame Tunneling over MPLS Virtual Circuits
LSP Dynamic provisioning 1:1 Tunnel protection
MPLS AIS-LDI with Signal Degrade
MPLS Label Switch Path (LSP) Tunnel Groups MPLS Label Switch Path (LSP) Tunnel
MPLS Multi-Segment Pseudo wires
MPLS Static VC Shaping Automatic
MPLS Virtual Private Wire Service (VPWS) OSPF/IS-IS for Dynamic MPLS-TP Control Plane
Pseudowire Reversion
Redundancy Topology LDP
RFC 2205 RSVP IS-IS L1/L2
RFC 3031 MPLS architecture
RFC 3209 RSVP-TE: Extensions to RSVP for LSP RFC 3630 OSPF-T
RFC 4447 Pseudo wire 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
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
VCCV BFD based PW Pseudo wire Switchover Multicast

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) Secure File Transfer Protocol (SFTP)
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 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

Technical information (Common)

Agency Approvals:

Anatel (Brazil)

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,

NOM (Mexico)

VCCI (Japan)

Zone 4 Earthquake NRTL (NA)

Physical Characteristics Dimensions:

17.5" (W) x 22"(D) x 1.75"(H);

444mm (W) x 560mm (D) x 44mm (H)

Weight: 29.6 lb (13.4kg)

Power Requirements:
Max Power Consumption 360W Typical Power Consumption 285W

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

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

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

Humidity:
Non-condensing 5% to 90%

Immunity (EMC):
GR-1089 Issue 6

Power:
CISPR 24

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)

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 (SAOS 10.x) – Router Configuration	
Part Number	Description
170-5170-910	5170,(4)100G QSFP28,(40)10/1G SFP+,SAOS 10.X,SYNC,(2)SLOTS AC OR DC PSU
170-0092-900	5162/5170,DC PLUGGABLE POWER SUPPLY,-48V
170-0093-900	5162/5170,AC PLUGGABLE POWER SUPPLY, WIDE RANGE 120/240V
170-0130-900	5170,SPARE PLUGGABLE FAN UNIT
Required OS Base System Perpetual Software Licenses	
S75-LIC-5170EO-P	SAOS BASE OS, ETHERNET & OAM SOFTWARE LICENSE FOR 5170, PERPETUAL
Optional OS Applications	
S75-LIC-5170MPLS-P	SAOS IP/MPLS APPLICATION PERPETUAL SOFTWARE LICENSE FOR 5171
S75-LIC-5170SYNC-P	SAOS SYNCHRONIZATION PERPETUAL SOFTWARE LICENSE FOR 5171
S75-LIC-5170100G-P	SAOS 100G PERPETUAL SOFTWARE LICENSE FOR 5171
S75-LIC-5170SEC-P	SAOS SECURITY PERPETUAL SOFTWARE LICENSE FOR 5171

Ordering information (SAOS 8.x) – Universal Aggregation Configuration	
Part Number	Description
170-5170-907	5170,(4)100G QSFP28,(40)10/1G SFP+,SAOS 8.X,SYNC,(2) SLOTS AC OR DC PSU
170-0092-900	5162/5170,DC PLUGGABLE POWER SUPPLY,-48V
170-0093-900	5162/5170,AC PLUGGABLE POWER SUPPLY, WIDE RANGE 120/240V
170-0130-900	5170,SPARE PLUGGABLE FAN UNIT
Required OS Base System Perpetual Software Licenses	
S70-0031-900	SAOS ETHERNET & OAM PERPETUAL SOFTWARE LICENSE FOR 5170
Optional OS Applications	
S70-0031-902	SAOS MPLS APPLICATION PERPETUAL SOFTWARE LICENSE FOR 5170
S70-0031-903	SAOS SYNCHRONIZATION PERPETUAL SOFTWARE LICENSE FOR 5170
S70-0031-905	SAOS SECURITY PERPETUAL SOFTWARE LICENSE FOR USE WITH 5170
S70-0031-904	SAOS 100G PERPETUAL SOFTWARE LICENSE FOR 5170

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