

# 5162



Ciena's 5162 Platform is a fixed configuration, microservices-based, WAN aggregation device. It provides up to 100GbE services for Carrier Ethernet, MPLS, and IP applications in mobile backhaul, business VPN, and Data Center Interconnect (DCI) network solutions.

As end-user applications proliferate in the cloud, bandwidth demand is multiplying and networks are becoming more software-centric. Network architectures are evolving toward a disaggregated model, where hardware and software elements are decoupled to allow more flexibility and agility in building infrastructure and rolling out services. Ciena's 5162 is an open platform that supports the creation of best-in-class solutions by leveraging Software-Defined Networking (SDN), Network Functions Virtualization (NFV), and network management techniques using advanced APIs.

Designed to provide L2 and L3 services over a carrier-class, resilient infrastructure, the 5162 utilizes a software architecture based on containerized micro-services that facilitate maintenance tasks—such as patching, upgrades, and feature enhancements—to greatly reduce OPEX for both carrier and enterprise applications. The 5162 also provides readiness for programmable networks by supporting advanced Ethernet, MPLS, timing distribution, OAM, and telemetry functions, with NETCONF/YANG support and an ability to host native or utility Virtual Network Functions (VNFs).

As an aggregation platform, Ciena's 5162 provides an effective solution in networks where fixed form factor platforms complement existing chassis-based hardware to optimize cost, space, and power requirements—all while maintaining carrier-class resilience and operational ease. Addressing 100GbE/10GbE/1GbE service delivery and aggregation challenges, the device can reduce time-to-market for new services and time-to-revenue for existing offerings. Redundant power supply and fan module options, NEBS compliance, and outstanding Mean-Time-Between-Failure (MTBF) characteristics ensure reliability.

## Features and Benefits

- High-performance 10GbE and 100GbE edge aggregation in a power-efficient and compact 1RU form factor
- 2 x 100GbE/40GbE (QSFP28) and 40 x 1/10GbE (SFP+)
- Containerized functions with data, control, and management plane segregation for disaggregated functions
- x86 'white box' platform optimized for supporting native applications and utility VNFs
- Carrier Ethernet, IP Routing, Segment Routing, and MPLS, including OAM, synchronization, telemetry, and NETCONF/YANG
- 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
- Ciena's MCP multi-layer support for end-to-end network management control and planning
- Flexible configuration options with redundant field-replaceable power supplies (AC or DC) and fan modules

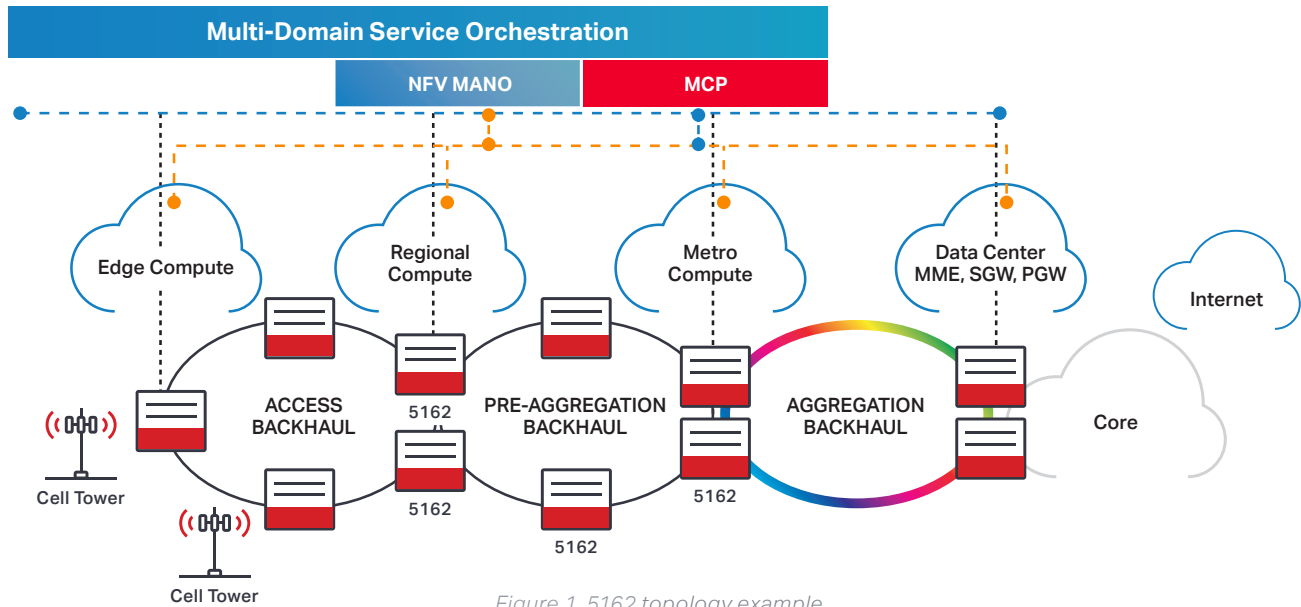


Figure 1. 5162 topology example

### Addressing key industry needs

Network applications demand increasing bandwidth and scale for IP-based services. Ciena’s Service-Aware Operating System (SAOS)—which is used across all Ciena’s Ethernet platforms—utilizes key virtualization and disaggregation techniques to provide IP edge capabilities to reduce costs while addressing this growth. For 5G backhaul, for example, Ciena’s SAOS avoids the cost and complexity of traditional routed solutions by providing features designed to meet its specific functional requirements. These features support a programmable and automatable solution that leverages NETCONF/YANG mechanisms to provide fully open approaches to installing, manipulating, and monitoring service behaviors in an SDN environment.

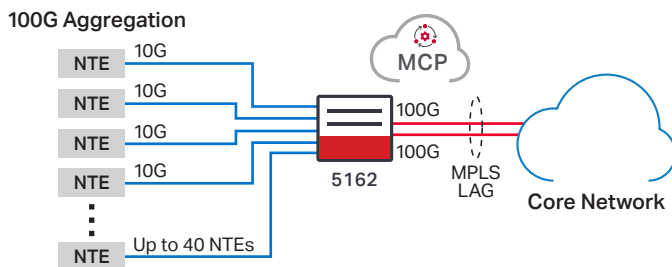
Ciena 5162 with disaggregated software is also ready for any leaf/spine architectures in data center or Central Office Re-architected as a Datacenter (CORD) environments.

### Compact, dense capacity

Efficient use of real estate is a growing concern for network operators who either house their own network equipment or lease space in colocation facilities. As services multiply, operators are forced to ‘stack’ 10G-capable equipment, incurring additional colocation rental and power costs. With two 100G QSFP28 ports and 40 10G SFP+ ports housed in a 1RU, ETSI-compliant chassis, the 5162 allows for rapid expansion of 10GbE services without growing the operator’s footprint.

### Differentiation through service velocity

Service velocity is a critical competitive advantage for network operators. In many cases, service velocity is the determining factor in winning new service sales. The 5162 implements Ciena’s unique Zero-Touch Provisioning (ZTP) capabilities, allowing network operators to deploy new packet-based services rapidly in a completely automated manner. With no human intervention required, manual provisioning errors are eliminated. Most importantly, ZTP improves service deployment velocity, and provides a significant competitive advantage.



## Advanced multi-layer protocol support

The 5162 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.

The device supports a rich suite of L2 and L3 features with Ethernet, MPLS, OAM, Sync, ACL, QoS, BGP, ISIS, OSPFv2, TACACS+, RADIUS, Telemetry, Netconf/YANG, and segment routing functionality.

## 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 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 5162 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)—to help guarantee and manage strict, market-differentiating SLAs.

Loop Free Alternate (LFA/RLFA) provides alternate path capabilities for redundancy and resilience by addressing single-point-of failure concerns and maintaining high levels of customer satisfaction.

## Simplified multilayer management and control

Ciena's Manage, Control and Plan (MCP) software 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, MCP returns control of the metro packet network and services directly to the network operator. With a unified view of the network from the photonic layer to the packet layer, network operations are simple, secure, and highly cost-effective.

## Advanced QoS support

The 5162 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.

Ciena's 5162 supports gRPC Network Management Interface (gNMI) for telemetry using YANG models to help network monitoring, automation, debugging, and faster deployment. Event triggers are deciphered via system event sensors, and data, events, stats streaming provide telemetry service via gNMI or YANG models.

Visit the Ciena Community  
Get answers to your questions



## Technical Information

### Interfaces

2 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

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 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

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  
RFC1195 Use of OSI Is-Is for Routing in TCP/IP and Dual Environments  
RFC3277 IS-IS Transient Blackhole Avoidance  
RFC3359 Reserved Type, Length and Value (TLV) Codepoints in Intermediate System to Intermediate System  
RFC3719 Recommendations for Interoperable Networks using IS-IS  
RFC3787 Recommendations for Interoperable IP Networks using IS-IS  
RFC.5309 Point-to-Point Operation over LAN in Link State Routing Protocols  
RFC.5303 Three-Way Handshake for IS-IS Point-to-Point Adjacencies  
RFC.5302 Domain-Wide Prefix Distribution with Two-Level IS-IS  
RFC.5301 Dynamic Hostname Exchange Mechanism for IS-IS  
RFC.3906 Calculating Interior Gateway Protocol (IGP) Routes  
RFC 3787 Recommendations for interoperable IP networks using IS-IS  
RFC 3359 Reserved TLV Codepoints in IS-IS  
RFC2842 Capabilities Advertisement with BGP-4  
RFC1772 BGP basic functions support  
RFC1930 Guidelines for creation, selection, and registration of an Autonomous System (AS)  
RFC1997 BGP Community Attribute  
RFC1998 An Application of the BGP Community Attribute in Multi-home Routing  
RFC2270 Using a Dedicated AS for Sites Homed to a Single Provider  
RFC2439 BGP Route Flap Damping  
RFC2519 A Framework for Inter-Domain Route Aggregation  
RFC4364 BGP/MPLS IP Virtual Private Networks (VPNs)  
RFC2918 Route Refresh Capability for BGP-4  
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  
RFC4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)  
RFC4486 Subcodes for BGP Cease Notification Message  
RFC4760 Multiprotocol Extensions for BGP-4  
RFC6793 BGP Support for Four-Octet Autonomous System (AS) Number Space  
RFC5004 Avoid BGP Best Path Transitions from One External to Another  
RFC5396 Textual Representation of Autonomous System (AS) Numbers

RFC5398 Autonomous System (AS) Number Reservation for Documentation Use  
RFC5492 Capabilities Advertisement with BGP-4  
RFC 7911 Advertisement of Multiple Paths in BGP  
RFC4364 BGP/MPLS IP Virtual Private Networks (VPNs)  
RFC4684 Constrained Route Distribution for Border Gateway Protocol/Multiprotocol Label Switching (BGP/MPLS) Internet Protocol (IP) Virtual Private Networks (VPNs)  
RFC5668 4-Octet AS Specific BGP Extended Community  
RFC2764 A Framework for IP Based Virtual Private Networks  
RFC2917 A Core MPLS IP VPN Architecture  
RFC5681 TCP Congestion Control  
RFC2873 TCP Processing of the IPv4 Precedence Field  
RFC 3443 MPLS TTL processing  
RFC 3032 MPLS label stack encoding  
RFC5036 LDP Specification  
RFC3037 LDP Applicability  
RFC3215 LDP State Machine  
RFC5037 Experience with the LDP protocol  
RFC5561 LDP Capabilities  
RFC3031 Multiprotocol Label Switching Architecture  
RFC5462 Multiprotocol Label Switching (MPLS) Label Stack Entry: "EXP" Field Renamed to "Traffic Class" Field  
RFC1321 The MD5 Message-Digest Algorithm  
RFC4250 Protocol Assigned Numbers  
RFC4251 The Secure Shell (SSH) Protocol Architecture  
RFC4252 The Secure Shell (SSH) Authentication Protocol  
RFC4253 The Secure Shell (SSH) Transport Layer Protocol  
RFC4254 The Secure Shell (SSH) Connection Protocol  
RFC4344 The Secure Shell (SSH) Transport Layer Encryption Modes  
SSH File Transfer Protocol, Draft 13  
RFC1812 Requirements for IP Version 4 Routers  
RFC2865 Remote Authentication Dial in User Service (RADIUS)  
RFC2474 Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers  
RFC2475 An Architecture for Differentiated Services  
RFC2597 Assured Forwarding PHB Group  
RFC2697 A Single Rate Three Color Marker.  
RFC2698 A Two Rate Three Color Marker  
RFC3247 Supplemental Information for the New Definition of the EF PHB

RFC3260 New Terminology and Clarifications for Diffserv  
 RFC4632 Classless Inter-domain Routing (CIDR): The Internet Address Assignment and Aggregation Plan  
 RFC6310 Pseudowire (PW) Operations, Administration, and Maintenance (OAM) Message Mapping  
 RFC2328 OSPF Version 2  
 BGP Prefix Independent Convergence draft-ietf-rtgwg-bgp-pic-08.txt  
 EVPN VPWS Flexible Cross-Connect Service draft-ietf-bess-evpn-vpws-01.txt  
 RFC8214 Virtual Private Wire Service Support in Ethernet VPN  
 RFC8572 Secure Zero Touch Provisioning (SZTP)  
 RFC7737 Label Switched Route (LSP) Ping and Traceroute Reply Mode Simplification  
 SR-MPLS TI-LFA Topology Independent Fast Reroute using Segment Routing draft-ietf-rtgwg-segment-routing-ti-lfa-01  
 RFC4762 Virtual Private LAN Service (VPLS) Using Label Distribution Protocol (LDP) Signaling (HVPLS)  
 RFC 6241 Network Configuration Protocol (NETCONF)

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)

**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

**Network Management**

Alarm Management & Monitoring Configuration  
 Event and Alarm Notification/Generation Comprehensive Management  
 Via CLI Management  
 Via Netconf/YANG Models  
 IPv4 & IPv6 Management Support

Ordering Information	
Part Number	Product Description
170-5162-900	5162,(2)100G QSFP28,(40)10/1G SFP+,SYNC,(2)SLOTS AC OR DC
170-0092-900	5162 DC PLUGGABLE POWER SUPPLY, -48V ,FRONT TO BACK AIR
170-0093-900	5162 AC PLUGGABLE POWER SUPPLY, WIDE RANGE 120/240V, FRONT TO BACK AIR
170-0149-900	5162 SPARE PLUGGABLE FAN UNIT
Software	
Required OS Base System Perpetual Software Licenses	
S75-LIC-5162EO-P	SAOS BASE OS, ETHERNET & OAM SOFTWARE LICENSE FOR 5162, PERPETUAL
Software Bundled Perpetual License	
S75-LIC-5162BNL01-P	SAOS AE-OAM, MPLS, SYNCH, SECURITY, APP HOST,100G LICENSE FOR 5162, PERPETUAL
Optional OS Applications	
S75-LIC-5162MPLS-P	SAOS MPLS SOFTWARE LICENSE 5162, PERPETUAL
S75-LIC-5162SYNC-P	SAOS SYNCHRONIZATION SOFTWARE LICENSE 5162, PERPETUAL
S75-LIC-5162SEC-P	SAOS SECURITY SOFTWARE LICENSE 5162, PERPETUAL
S75-LIC-5162HOST-P	SAOS APPLICATION HOSTING SOFTWARE LICENSE 5162, PERPETUAL
S75-LIC-5162100G-P	SAOS 100G SOFTWARE LICENSE 5162, PERPETUAL