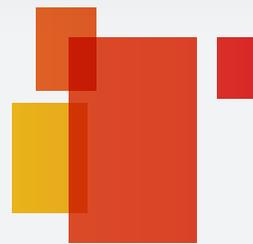
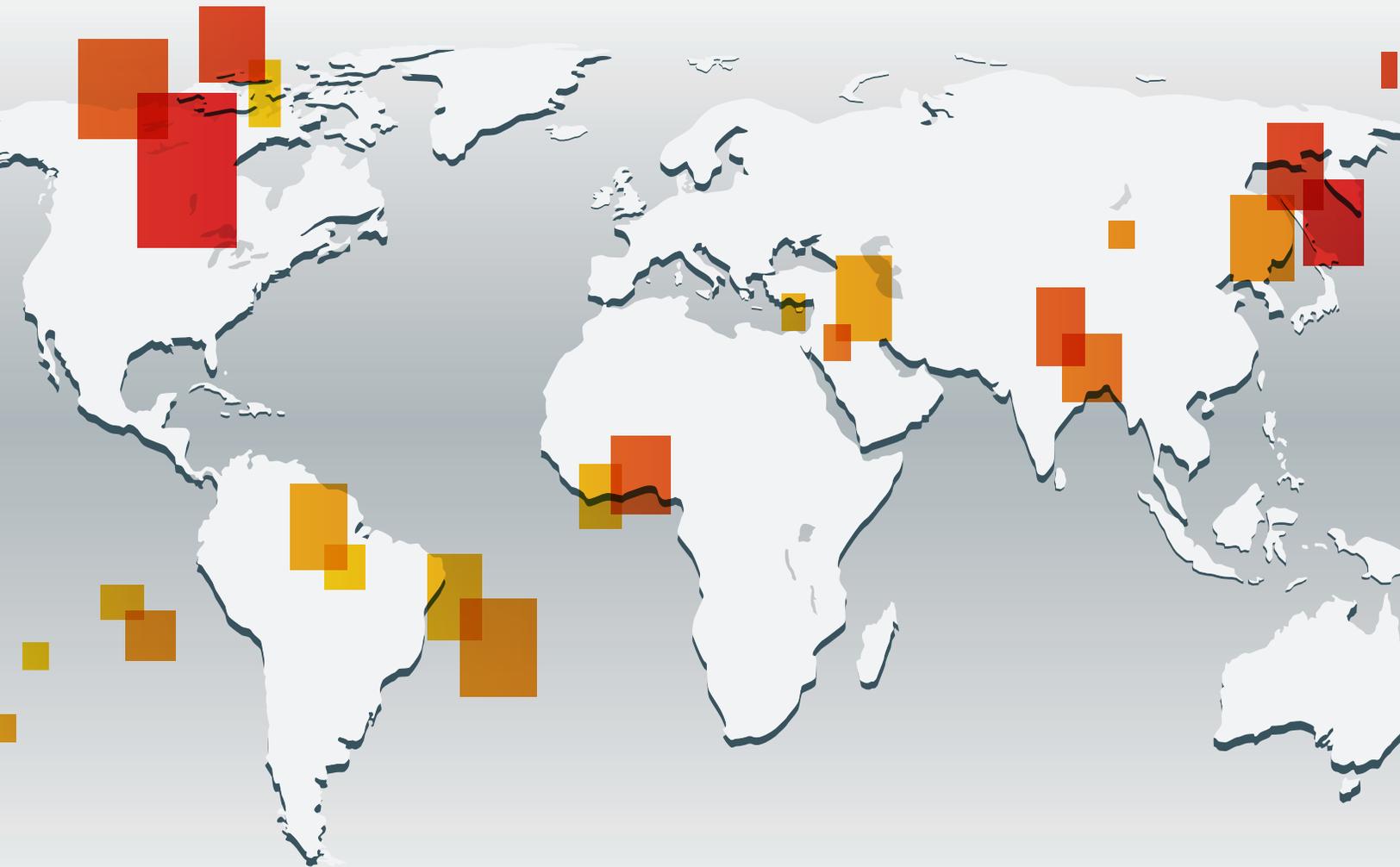


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# AN INTRODUCTION TO CIENA'S **PACKET NETWORKING** PORTFOLIO



## Ciena's Packet Networking Portfolio

combines intelligent devices and software to create the infrastructure necessary for low-touch, high-velocity Ethernet access and metro networks, and provide a common, consistent way to deliver the full range of Ethernet services from the access edge to the core. Network operators can now realize unparalleled speed in the delivery, agility, and assurance of their Ethernet services, resulting in significant differentiation in this ever-competitive market.

### Benefits

- Provides standards-based, interoperable Ethernet solutions that deliver significant service differentiation and create competitive barriers
- Enables high-velocity and automated service creation, activation, and management for faster time to market, revenue, and profitability
- Integrates next-generation Carrier Ethernet Quality of Service (QoS) for predictable service delivery, OAM for service assurance, and resiliency for service protection
- Features a common Service-Aware Operating System (SAOS) that delivers consistency across all Ethernet access and aggregation platforms

Ciena's advanced Operations, Administration and Maintenance (OAM) underpins many applications and solutions such as Ethernet business services, wireless backhaul and many others. Dependable and predictable service delivery, combined with connection-oriented Ethernet with low latency and carrier-grade restoration, allow service providers to monetize their network infrastructure through verifiable Service Level Agreements (SLAs).

Key differentiators for the Packet Networking portfolio include the packet service activation and assurance capabilities of Ciena's OneControl Unified Management System. OneControl provides a single, comprehensive network management solution across domains (access, metro and core) with unprecedented visibility through protocol layers (WDM, OTN, packet services). While Ciena's packet platforms unleash the power of Ethernet in a wide variety of applications, the management system makes the deployment and maintenance of these applications a simple, efficient and complete task. From network navigation to fault and discovery inventory management, packet service management is an important component of any successful Carrier Ethernet service turn-up.

This document provides an overview of each of these building blocks and how they unlock the service provider's potential in delivering highly reliable, easy-to-manage and scalable Ethernet-based services. Ciena's packet products, depicted in Figures 1 and 2, enable service providers



to realize new levels of speed, differentiation, operational scalability, and reliability in delivering revenue-generating Ethernet business services, mobile backhaul services, and residential broadband aggregation.

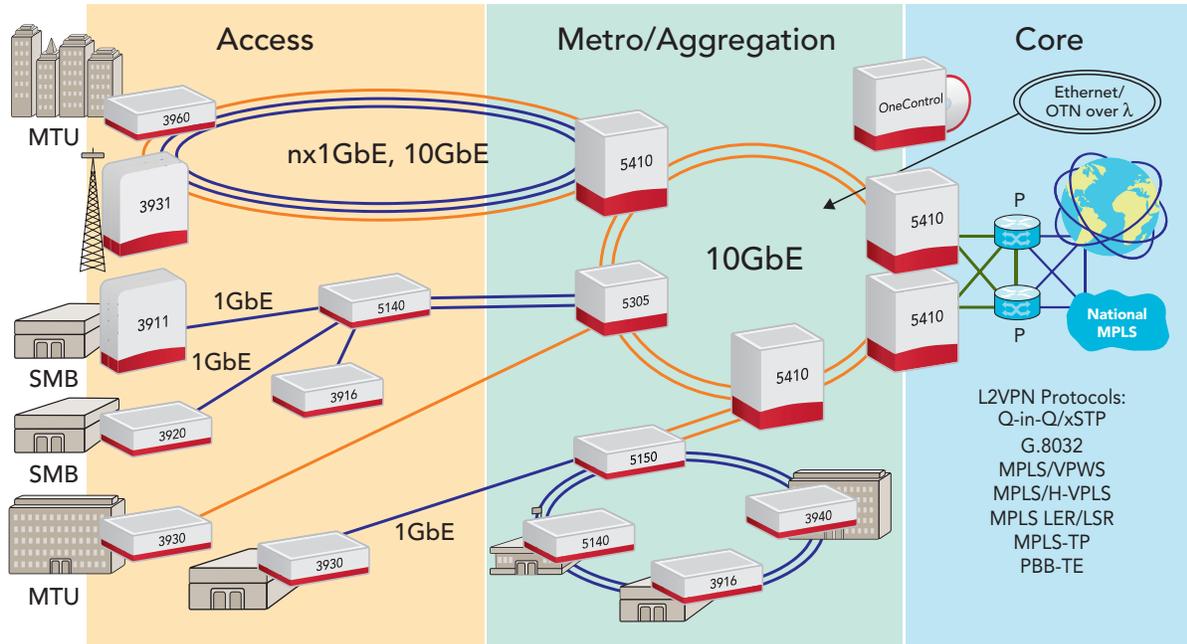


Figure 1. End-to-end packet network

## Service Delivery Switches

Ciena's Service Delivery Switches are available with a range of 10/100M Ethernet, Gigabit Ethernet (GbE) and 10GbE physical port counts, to fit small, medium, and large customer sites and multi-tenant office buildings precisely, with placement in customer premises, on the sides of buildings, or on utility poles.

## Service Aggregation Switches

Ciena's Service Aggregation Switches provide Fast Ethernet/GbE/10GbE aggregation to better fill the transport facilities within both the metro access and aggregation tiers and ultimately minimize the number of router ports with which they interwork. These switches can be deployed in a wide variety of locations, including business parks, outside plant cabinets, and in central offices.

The Packet Networking portfolio incorporates the latest innovations in Ethernet switching technology, control plane protocols, encapsulation techniques, QoS capabilities, and OAM mechanisms.

3000 Family (Service Delivery Switches)						
Model	Description	NNI/UNI Ports	UNI Ports	Total Gb/s	Form Factor	Temp Range
3180	Multiservice Pseudowire Gateway (8T1/E1)	(2) 100M/GbE SFP	(8) 10/100M RJ45 (8) T1/E1	2	1RU	-40°C to +65°C
3181	Multiservice Pseudowire Gateway (16T1/E1)	(2) 100M/GbE SFP	(8) 10/100M RJ45 (16) T1/E1	2	1RU	-40°C to +65°C
3190	Multiservice Delivery and Aggregation	(40) 100M/GbE SFP (2+2) 10G SFP+	96 T1/E1 SAToP 16/32 OC3/STM-1 SAToP or ATMoP/CEP 4/16 OC12/STM-4 SAToP or ATMoP/CEP 8 OC48/STM-16 CEP	84	3RU	0°C to +50°C
3902	SMB Intelligent Network Interface Device (2 port)	1000M SFP	10/100/1000M RJ45	2	Desk/Wall	0°C to +50°C
3911	Weatherproof Ethernet Demarcation (10-port)	(2) 100M/GbE SFP	(8) 10/100/1000M RJ45	10	Outdoor	-40°C to +65°C
3916	Ethernet Demarcation (6-port)	(2) GbE SFP	(2) 100M/GbE SFP (2) 100MGbE SFP/RJ45	6	1RU ETSI ~280mm (w)	0°C to +50°C
3920	Ethernet Demarcation (12-port)	(4) 100M/GbE SFP	(8) 10/100/1000M RJ45	12	1RU ETSI	0°C to +50°C
3930	Extended-temp Ethernet Service Delivery	(2) GbE/10G SFP+	(4) 100M/GbE SFP (4)100M/GbE SFP/RJ45	28	1RU ETSI	-40°C to +65°C
3931	Weatherproof Ethernet Service Delivery	(2) GbE/10G SFP+	(4) 100M/GbE SFP (4)100M/GbE SFP/RJ45	28	Outdoor	-40°C to +65°C
3940	1st Tier Ethernet Aggregation	(4) 100M/GbE SFP/RJ45	(20) 100M/GbE SFP/RJ45	24	1RU	0°C to +50°C
3960	10G Ethernet Service Delivery	(2) 10G XFP	(2) 10G XFP (8) 100M/GbE SFP/RJ45	48	1RU	0°C to +50°C
5000 Family (Service Aggregation Switches)						
5140	Extended-temp 1st Tier Aggregation	(4) 100M/GbE SFP/RJ45	(20) 100M/GbE SFP/RJ45	24	2RU ETSI	-40°C to +65°C
5150	Extended-temp Aggregation/MPLS Edge	(2) Dual 10G XFP Option Slots	(48) 100M/GbE SFP	88	2RU ETSI	-40°C to +65°C
5305	Ethernet Aggregation/MPLS Edge	(5) Slots-> (10) 10G or (120) GbE	NA	50	6RU	0°C to +40°C
5410	High-capacity Aggregation/MPLS Edge	(10) Slots-> (40) 10G or (480) GbE	NA	1000	22RU	0°C to +40°C

Figure 2. Platform Summary

This combination enables the service provider to deliver carrier-grade business services backed up by verifiable SLAs with rigorous performance and availability guarantees. However, the portfolio is much more than just a set of network devices. It is a unified portfolio that employs a common Service-Aware Operating System (SAOS) and OneControl to provide exceptional operational efficiency and consistent system and service attributes across all Ethernet access and aggregation applications.

Service providers can optimize all aspects of the service lifecycle, accelerate time to revenue, and increase profitability. The common SAOS and OneControl automate device and service provisioning and provide the ability to implement the latest standards-based Ethernet technical advances across all platforms in a network rapidly and automatically.

Ciena's Ethernet business service solutions enable the transition to service-driven networks—combining software intelligence and programmable devices to create low-touch, high-velocity networks.

## 3180 and 3181 Multiservice Delivery Switches

### Product Overview

Ciena's 3180 and 3181 provide Pseudowire Emulation (PWE) services for TDM, ATM, and Ethernet access traffic, offering legacy on-ramp services over Packet-Switched Networks (PSNs) for mobile backhaul and business services applications.

The 3180 has 8 T1/E1 ports and 8 Ethernet access ports with 2 Gigabit Ethernet (GbE) uplink ports. The 3181 has the same number of Ethernet access and uplink ports, but has 16 T1/E1 access ports. The MEF18-certified 3180 and 3181 feature flexible, programmable designs that enable sophisticated service classification; traffic management; prioritization; protection; OAM; and network synchronization. This synchronization includes both Synchronous Ethernet and IEEE 1588v2 over GbE trunk interfaces for cost-effective interworking with Ethernet switches and routers.

3180/3181 Features	Benefits
Multiservice: PWE services for TDM, ATM, and Ethernet	Enables transport flexibility in transitioning to converged Carrier Ethernet infrastructures
Carrier-class QoS	Delivers carrier-class QoS and OAM mechanisms to ensure enforceable SLAs Maximizes service availability by supporting G.8032, G.8031, PBB-TE and Link Aggregation protection mechanisms
Supports both Synchronous Ethernet and IEEE 1588v2	Meets traffic synchronization requirements and ensures reliable transport for wireless backhaul applications
Small form factor and temperature-hardened hardware	Enables easy cell tower or customer premises deployments



## 3190 Multiservice Delivery Switch

### Product Overview

Ciena's 3190 combines carrier-class Ethernet switching with robust and scalable PWE services for TDM and ATM. It can be located anywhere in the edge or aggregation portion of a metro or core packet network, providing robust packet switching along with legacy service delivery over packet. The 3190 offers T1/E1 over SONET/SDH grooming, and SONET/SDH transport over a PSN. It combines low power consumption, high service availability, excellent port densities, and a fully redundant architecture into a modular and compact (3RU) footprint.

3190 Features	Benefits
Multiservice platform that combines carrier-class Ethernet switching with robust and scalable PWE services for TDM and ATM	Enables transport flexibility in transitioning to converged packet infrastructures
Carrier-class QoS	Delivers carrier-class QoS and OAM mechanisms to ensure enforceable SLAs
Supports Synchronous Ethernet	Meets traffic synchronization requirements and ensures reliable transport for wireless backhaul applications
Compact footprint	Provides compact (3RU) form factor for deployment at a Mobile Switch Center or an intermediate aggregation point
Industry-leading scalability with 84 Gb/s switching capacity and a dense mixture of 10GE, GbE, and PDH/SONET/SDH interfaces	Provides scalable and future-proof Carrier Ethernet solution to meet today and tomorrow's growth



## 3902 Service Delivery Switch

### Product Overview

Ciena's 3902 is an advanced cost-effective, single port Ethernet business demarcation device in a compact form factor. Positioned at the Ethernet demarcation point in the customer premise, the low cost 3902 offers advanced service creation, standards-based OAM tools and performance monitoring.

3902 Features	Benefits
Service-Aware Operating System (SAOS)	MEF EPL, EVPL and E-LAN Encapsulations: 802.1Q, Q-in-Q Provides comprehensive and consistent management at all customer demarcation points
Sophisticated OAM	IEEE 802.3ah link layer OAM IEEE 802.1ag Connectivity Fault Management ITU-T Y.1731 Performance Monitoring: delay, jitter, loss RFC 2544 Reflector for Performance Measurement
Enables a wide variety of applications	Intelligent Ethernet demarcation Inter-carrier demarcation Media conversion Aggregation platform extension device
Provides flexible deployment options	Very small form factor for desktop or wall installation



## 3911 Service Delivery Switch

### Product Overview

Ciena's 3911 is an Ethernet access system that cost-effectively delivers business, transport, and wireless backhaul Ethernet services via fiber or copper connections. The 3911 features an environmentally sealed and physically secure enclosure suitable for deployment outdoors or in unconditioned indoor environments, enabling support for a wide variety of service application scenarios and network topologies.

3911 Features	Benefits
Provides a complete "System-in-a-Box" including switching module, interface connectors, fiber management, and optional UPS power system	<ul style="list-style-type: none"> <li>Lowers implementation and management costs at hard-to-service and remote locations in harsh environments</li> <li>Reduces hardware and sparring costs for remote locations</li> </ul>
Includes environmentally hardened and physically secure enclosure and electronics (-40°C to +65°C)	<ul style="list-style-type: none"> <li>Delivers Carrier Ethernet services to virtually any location</li> <li>Eliminates the cost and hassle of a separate, nonintegrated enclosure</li> <li>Protects hardware investments</li> </ul>
Provides high-capacity, next-generation GbE service delivery for business, residential, and transport applications (including wireless backhaul)	<ul style="list-style-type: none"> <li>Enables the same services and easy-to-manage features to be combined with non-hardened devices to deliver the same suite of services, regardless of location</li> </ul>



## 3916 Service Delivery Switch

### Product Overview

Ciena's 3916 is an advanced Carrier Ethernet demarcation switch that offers sophisticated OAM capabilities, wire-speed L2 switching and a SAOS in a cost-effective and compact (1RU) form factor. These attributes make the 3916 a perfect fit for Ethernet Business Services applications.

3916 Features	Benefits
Accelerated and automated service creation and turn-up with Ciena's SAOS	Dramatic OPEX savings through on-board Performance Benchmarking
Exceptional performance monitoring capabilities in small form factor to ensure SLAs	Delivers cost and footprint optimized for CPE solution
Sophisticated service differentiation including Hierarchical QoS (H-QoS)	Provides compelling service offerings through rich QoS and resiliency capabilities
End-to-end SLA verification without a truck roll through on-board RFC 2544 Performance Benchmark testing capabilities	Allows faster service troubleshooting and service restoration
	Allows seamless interoperability with the rest of Ciena's Packet Networking portfolio



## 3920 Service Delivery Switch

### Product Overview

Ciena's 3920 is an Ethernet access system that cost-effectively delivers business and transport Ethernet services via fiber or copper connections. The 3920 features a high-capacity switching fabric with all-GbE ports in a compact (1RU) ETSI form factor that provides front access to all data, management, and power interfaces. This efficient packaging design enables the 3920 to be deployed in a wide variety of physical environments with service delivery switch topologies supporting business customers, wireless backhaul providers, and MTU/MDU scenarios.

3920 Features	Benefits
Provides front access to all power, data, and management interfaces, suitable for deployment in office environments, central offices and conditioned cabinets and telecom huts	<ul style="list-style-type: none"> <li>Lowers deployment and implementation costs</li> <li>Decreases service delivery and service provisioning times, decreasing time to revenue</li> </ul>
Ensures future-proof investment protection, with all ports GbE-ready for easy upgrade from 100 Mb/s	<ul style="list-style-type: none"> <li>Decreases time to revenue for new service delivery</li> <li>Increases customer satisfaction with faster service provisioning</li> <li>Delivers right-sized, customer-appropriate services</li> </ul>
Offers compact (1RU) next-generation GbE service delivery platform for business and transport applications, including wireless backhaul	<ul style="list-style-type: none"> <li>Lowers footprint and rack storage costs</li> <li>Lowers energy and cooling costs with a smaller footprint and more efficient unit</li> </ul>



## 3930 Service Delivery Switch

### Product Overview

Ciena's 3930 is an advanced Carrier Ethernet system focused on the transition to high-bandwidth applications requiring sophisticated QoS capabilities, including mobile backhaul and Ethernet business services. The 3930 incorporates a complete OAM suite to support the network and service performance monitoring requirements of large-scale Ethernet deployments, while reducing network operating costs.

3930 Features	Benefits
End-to-end SLA verification without a truck roll through on-board RFC 2544 Performance Benchmark testing capabilities	Enables deployment flexibility to address a multitude of service applications and deployment environments without sacrificing service feature capabilities.
Sophisticated service differentiation including Hierarchical QoS (H-QoS)	Achieves dramatic OPEX savings through on-board Performance Benchmarking
Extended temperature rating (-40°C to +65°C) enables deployment in a wide variety of locations	Provides compelling service offerings through rich QoS and resiliency capabilities Seamless migration to 10G backhaul and 10G UNI without hardware change-out (no forklifting)
Provides low Total Cost of Ownership (TCO), powered by Ciena's SAOS	Allows faster service troubleshooting and service restoration
Exceptional performance monitoring capabilities in small form factor to ensure SLAs	Delivers cost and footprint optimized CPE solution
Hardware-ready for IEEE 1588v2 and Synchronous Ethernet	Ensures high-quality and reliable transport services for mobile backhaul and Long-Term Evolution (LTE)



# Weatherproof Business and Wireless Backhaul Service Delivery

## Product Overview

Ciena's 3931 is a weatherproof advanced Carrier Ethernet system able to deliver Carrier Ethernet services to virtually any location without sacrificing leading-edge functionality. The 3931 incorporates a complete OAM suite with built-in RFC 2544 to support the network and service performance monitoring requirements of large-scale Ethernet deployments while reducing network operating costs.



3931 Features	Benefits
Weatherproof housing, with door-on-door architecture delivers True Carrier Ethernet virtually anywhere	Enables an exceptionally low TCO for operators by eliminating the attracted costs of cabinets, enclosures, and site preparation
End-to-end SLA verification without a truck roll through on-board RFC 2544 Performance Benchmark testing capabilities	Expands operators' addressable service area as Ethernet services can now economically reach strip malls, office parks and SMBs without new cabinets or wiring closets
Sophisticated service differentiation including Hierarchical QoS (H-QoS)	Achieves dramatic OPEX savings through on-board Performance Benchmarking
Hardware-ready for IEEE 1588v2 and Synchronous Ethernet to ensure high-quality and reliable transport services for mobile backhaul and LTE	Allows seamless migration to 10G backhaul and 10G UNI without hardware change-out (no forklifting)
Accelerated and automated service creation and turn-up with Ciena's SAOS	Allows faster service troubleshooting and service restoration

# 3940 Service Delivery Switch

## Product Overview

Ciena's 3940 is an Ethernet access system that cost-effectively delivers sophisticated business and transport services via fiber or copper connections. It features a high-capacity switching fabric with 24 GbE ports in a compact (1RU) form factor that allows front access to all data and management interfaces. This efficient packaging design provides both SFP and RJ-45 connectors for the user ports, enabling the 3940 to be deployed for service demarcation, aggregation, and transport applications in a wide variety of physical environments and network topologies, including fiber and microwave rings, point-to-point fiber, microwave mesh, fiber or copper to subscriber, and more.

3940 Features	Benefits
Copper and optical interfaces for all interface ports	Creates a low-cost migration and upgrade path for both the service provider and the end-user Reduces time to new revenue and increases service delivery times
MAC address and VLAN scalability, interworking flexibility between disparate encapsulation formats, and improved security for customer L2VPNs	Provides interoperability between current and legacy networks Decreases provisioning time for new services and increases the number of services sold over the same platform
Wire-speed Layer 2 switching with 24 Gb/s fabric	Delivers full-rate or "right-sized" services, with the ability to upgrade end-users easily without changing hardware platforms
Operational efficiency and advanced Ethernet features within a modular SAOS	Enables high-end business and transport services including PBB-TE, Ethernet Virtual Private Line/LAN/Tree, and MPLS/H-VPLS



## 3960 Service Delivery Switch

### Product Overview

Ciena's 3960 is an Ethernet access system that cost-effectively delivers 10GbE and 1GbE business and transport Ethernet services via fiber or copper connections. It features a high-capacity switching fabric, four 10GbE ports and eight 1GbE ports in a compact (1RU) form factor with redundant power supply modules. This efficient packaging design enables the 3960 to be deployed in a wide variety of physical environments and service delivery topologies supporting 10G demarcation, enterprise customers, wireless backhaul providers, and 10G/1G applications.

3960 Features	Benefits
High-capacity switch fabric enabling 10G demarcation and 10G/1G service delivery applications	Offers the ability to deliver multiple high-capacity 10G and 1G services on a single platform Delivers a mix of 10G and 1G services; maximizing revenue and diversity of services. Full line-rate speeds of 48 Gb/s
Offers compact (1RU) ETSI form factor and dual AC or DC power supply modules for enhanced reliability	Increases customer satisfaction and the value of the service delivered to the end-user
Delivers 10GbE and 1GbE business and transport Ethernet services via fiber or copper connections	Offers protection for legacy infrastructure and higher-margin, fiber-based services Performance Benchmarking
Operational efficiency and advanced Ethernet features within a modular SAOS	Enables high-end business and transport services including PBB-TE, Ethernet Virtual Private Line/LAN/Tree, and MPLS/H-VPLS



## 5140 Service Aggregation Switch

### Product Overview

Ciena's 5140 is an Ethernet access system that cost-effectively delivers sophisticated business, transport, and residential services via fiber or copper connections. The 5140 features a high-capacity switching fabric with 24 GbE ports in a compact (2RU) form factor that allows front access to power and all system interfaces. The 5140 has an extended temperature range (-40° to +65°C) and a robust physical design that supports deployment in a wide variety of unconditioned environments, including GR-487 and ETSI-compliant outdoor cabinets. Because the 5140 provides both SFP and RJ-45 connectors for each of its 24 GbE interface ports, the switch can support service aggregation, transport, and demarcation applications in a wide variety of network topologies, including fiber and microwave rings, point-to-point fiber, microwave mesh, fiber or copper to subscriber, MTU/MDU/FTTx, and more.

5140 Features	Benefits
-40°C to +65°C extended temperature range	Delivers services in extreme environments Reduces equipment failures and decreases maintenance costs and downtime Extends high-capacity Carrier Ethernet service aggregation to cabinets and uncontrolled environments, unleashing the network design to maximum potential without sacrificing advanced Ethernet features
Enables cost-effective 1G copper and optical Ethernet service aggregation	Lowers implementation and service delivery costs by taking advantage of the current infrastructure the value of the service delivered to the end-user
Wire-speed Layer 2 switching with 24 Gb/s fabric	Delivers high-capacity services from the start or gradually upgrades end-users to high capacity—increasing service revenues and margins while decreasing time to provision new services taking advantage of the current infrastructure
Operational efficiency and advanced Ethernet features within a modular SAOS	Enables high-end business and transport services including PBB-TE, Ethernet Virtual Private Line/LAN/Tree, and MPLS/H-VPLS



# 5150 Service Aggregation Switch

## Product Overview

Ciena's 5150 is a high-density Ethernet aggregation switch that addresses the scalability and cost of the metro network to enable profitable delivery of a wide range of Ethernet services, including a wide range of Ethernet services, including business connectivity (E-Line, E-LAN and E-tree), Layer 2 access to IP services, mobile backhaul, consumer and enterprise triple play backhaul, and public sector network services (utility smart grid, and private healthcare networks).

The 5150 features industry-leading switching capacity and port density in a compact (2RU) form factor. It supports forty-eight GbE ports and up to four 10GbE ports (optional). Additionally, the efficient architecture, extended temperature range and compact packaging design enables the 5150 to be deployed in a wide variety of physical environments, meaning that Ethernet aggregation can be deployed exactly where maximum efficiency of bandwidth and valuable optical fiber resources may be achieved.

5150 Features	Benefits
High-capacity switch fabric enabling 1G to 10G Ethernet aggregation	Creates a bandwidth-efficient aggregation layer before traffic enters the network core for a cost-effective service scalability and better management
Supports diverse network topologies and flexible encapsulation techniques	Delivers services in extreme environments
-40°C to +65°C extended temperature range	Reduces equipment failures and decreases maintenance costs and downtime Extends high-capacity Carrier Ethernet service aggregation to cabinets and uncontrolled environments, unleashing the network design to maximum potential without sacrificing advanced Ethernet features
Supports operational efficiency and advanced Ethernet features within a modular SAOS, for high-end business and transport services including PBB-TE, Ethernet Virtual Private Line/LAN/Tree, and MPLS/H-VPLS	Ensures an optimal network design and end-to-end service alignment Enables service differentiation and extensive OAM capabilities for guaranteed SLAs



# 5305 Service Aggregation Switch

## Product Overview

The 5305 is a modular, chassis-based service aggregation switch that supports high-density GbE connectivity to the subscriber edge and high-performance 10GbE uplinks to the metro core, and features fully redundant commons and a distributed switch fabric for reliability and service continuity. It delivers the cost-effective capacity, scalability and resiliency that service providers need to keep pace with the constantly increasing demand for bandwidth and next-generation network services to support business, mobile backhaul, transport and residential applications.

The 5305 is unique in the industry because it is the only Carrier Ethernet switch to support interworking between Q-in-Q VLANs and PBB-TE encapsulation formats. This interworking functionality supports complete service flexibility and optimal optimization of network resources and traffic engineering architectures.

5305 Features	Benefits
Modular, scalable hardware design	Creates a true “pay-as-you-grow architecture” that allows service providers to manage costs and ramp up support resources as needed
Supports a variety of Carrier Ethernet transport options, including Provider PBB-TE, 802.1q tunnel tags (Q-in-Q)	Offers flexible services while integrating effortlessly into existing network architectures Offers the flexibility to choose which protocols work best for the delivery of new services
Comprehensive QoS for guaranteed SLAs	Increases customer satisfaction and decreases service cancellations



# 5410 Service Aggregation Switch

## Product Overview

Ciena's 5410 is a Carrier Ethernet/ MPLS service aggregation platform that provides terabit switching capacity, massive service scalability, carrier-class resiliency, and a cutting-edge feature set that supports advanced QoS, OAM, and L2VPN capabilities. It enables service providers to keep pace with constantly increasing demand for bandwidth capacity and service density in metro networks to support mobile backhaul and Ethernet transport applications, business VPNs, and business and residential triple play services.

5410 Features	Benefits
Provides 100 Gb/s per slot and 1 Tb/s per system full duplex switching capacity with rich features and scalable services	Ensures high scalability and increased flexibility aggregation platform
Implements advanced Ethernet and comprehensive MPLS features	Supports demanding mobile backhaul, business, transport, and residential service applications, including 3G/4G wireless backhaul, L2VPN service delivery and aggregation, L2 backhaul of L3VPNs, and FTTx/IP DSLAM aggregation
Sophisticated virtual switching architecture	Provides enhanced scale and flexibility for tens of thousands of services on a single system, including up to 128,000 VLANs, 64,000 virtual switches, and up to ten million MAC addresses
Delivers high reliability, six-9s availability, and 50 ms protection on switching resiliency using state-of-the-art hardware and software design coupled with advanced control plane and Ethernet OAM capabilities	Delivers carrier-grade highly resilient service aggregation
Supports interworking between Q-in-Q VLANs, MPLS Virtual Circuits, VPLS/H-VPLS L2VPNs, and PBB-TE connections	Provides complete service flexibility and optimization of network resources
Provides broad service stratification and robust bandwidth allocation	Enables guaranteed SLAs via MEF-14-compliant hierarchical QoS Capabilities



# OneControl Unified Management System

## Product Overview

OneControl unites the management of Ciena's Packet Networking, Converged Packet Optical, and Optical Transport product portfolios under a single solution. With its unique toolset of comprehensive management features, OneControl puts the control of critical networks at the operator's fingertips. Through a unified GUI and common management model, NOC operators can rapidly deploy new service offerings that cut across domains (access, metro, and core) and coordinate across network protocol layers to ensure efficient use of critical network assets and bandwidth optimization.

Ciena's Ethernet management capabilities provide groundbreaking carrier-grade, automated service activation, creation, and management platform for Ciena's Carrier Ethernet service delivery and aggregation switches. These Ethernet management capabilities enable subscriber-managed services and lets users build and deploy large-scale Carrier Ethernet networks efficiently; cut time to market for new services; accelerate service revenue; maximize service availability; assure QoS; and leverage existing systems. These combined functions cut TCO, reduce time to market, and speed revenue. These Ethernet management capabilities also pave the way to implement new services cost-effectively for increased revenue and competitiveness.

Features	Benefits
Comprehensive service assurance	NOC tools that provide transparent service visibility and easily accessible service performance data
Low- and zero-touch provisioning	Lowers the cost and time required to implement new services Reduces engineering costs
Automated configuration	Delivers new services faster and at lower costs than the competition
Subscriber self-management portal	Offers SLA assurance and reduced penalty costs Increases customer satisfaction



Networks that change the way you compete.