

# 3920 SERVICE DELIVERY SWITCH



## Features and Benefits

- Offers compact (1RU) next-generation GbE service delivery for business and transport applications, including wireless backhaul
- Supports 8 GbE 10/100/1000 BaseTX subscriber UNI ports with RJ45 connectors, 4 GbE 100/1000BaseX NNI/UNI ports with Small Form-factor Pluggable (SFP) connectors, and fixed AC or DC power supplies
- Provides front access to all power, data, and management interfaces, and is suitable for deployment in cabinets and conditioned telecom huts
- Architected with a state-of-the-art hardware design and field-proven, modular service-aware OS for reliability and resiliency
- Provides advanced Ethernet switching, control, and VLAN features with comprehensive QoS and Ethernet OAM, for guaranteed Service Level Agreements (SLAs)
- Ensures future-proof investment protection, with all ports GbE-ready for easy upgrade from 100 Mb/s
- Supports diverse network topologies, including fiber rings, point-to-point fiber, dual-homed network uplinks, fiber or copper network uplinks, fiber or copper to subscriber

Ciena's 3920 Service Delivery Switch (SDS) is a next-generation Ethernet access system that cost-effectively delivers business and transport Ethernet services via fiber or copper connections. It features a high-capacity switching fabric with all-Gigabit Ethernet (GbE) ports in a compact single rack unit (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.

The 3920 is based on Ciena's field-proven True Carrier Ethernet® technology, deployed by dozens of network operators in tens of thousands of homes and businesses. It combines the low cost and high capacity of Ethernet with the reliability, management, and service quality usually associated with SONET/SDH networking systems. The 3920 software architecture is based on a common service-aware

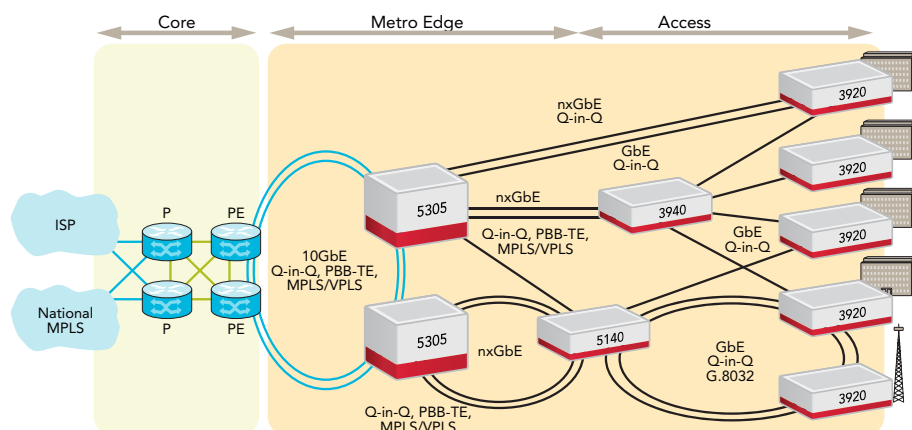


Figure 1. 3920 deployment diagram

operating system used in all Ciena Service Delivery and Service Aggregation Switches to provide operational efficiency and consistent system and service attributes.

The core of the 3920 is a high-performance switching platform that incorporates the latest innovations in Ethernet switching technology, Ethernet control plane protocols, Ethernet encapsulation techniques and Carrier Ethernet Operations, Administration, and Maintenance (OAM) mechanisms. The result is a state-of-the-art design that enables the 3920 to deliver the sophisticated Quality of Service (QoS) capabilities, superior Virtual LAN (VLAN) and virtual switching functions, and robust management and performance monitoring features required to support carrier-grade Layer 2 Virtual Private Networks (L2 VPNs), mission-critical data, high-speed Internet, and high-quality IPTV and VoIP services.

The advanced design and service-rich architecture of the 3920, shown in Figure 1, enable network operators to deploy reliable and scalable offerings that leverage the inherent high capacity and cost-effectiveness of Ethernet technology to generate maximum revenue. Ethernet business and transport services can be rolled out quickly and reliably, with scalable performance that ensures reduced Operating Expenses (OPEX) for low cost per subscriber in the short term, while delivering high system productivity and availability over the long term.

### **Advanced Features Deliver Carrier-Grade Data, Voice, and Video Services**

The 3920 design features the latest high-performance hardware components and advanced software capabilities, including:

#### **Advanced Ethernet control plane features**

- IEEE 802.1D STP/RSTP
- IGMPv3 and Multicast
- Per-port Broadcast Containment and Media Access Control (MAC) learning control
- Link Aggregation (LAG) with Manual LAG
- Link Aggregation Control Protocol (LACP)

#### **Sophisticated VLAN encapsulation and tagging**

- IEEE 802.1Q C-VLANs
- IEEE 802.1ad Provider Bridging (Q-in-Q) S-VLANs
- VLAN priority and VLAN tag manipulation
- Untagged frames to default provider S-VLAN
- C-VLAN to S-VLAN priority tag mapping
- Layer 2-to-Layer 3 and Layer 3-to-Layer 2 QoS priority tag translation

#### **Hierarchical QoS for strict SLAs**

- Eight hardware queues/port, up to 64 ingress meters per port
- Per-port per-VLAN QoS with CIR/EIR settings
- Two rate Three Color Metering (trTCM), Marking, Policing, Shaping
- Per-port Random Early Detection (RED)
- Flexible Deficit Weighted Round Robin (DWRR) and Strict Priority Scheduling, SP/DWRR

#### **Carrier-class Ethernet OAM**

- IEEE 802.3ah EFM
- IEEE 802.1ag Connectivity Fault Management (CFM)
- ITU-T Y.1731 performance management
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IETF RFC 5618 Two-Way Active Management Protocol (TWAMP) with complete sender and receiver capabilities

#### **Comprehensive management and security**

- SNMPv2/v3
- SSHv2
- SFTP
- Telnet
- DHCP
- DNS
- NTP
- Syslog
- RMON Statistics
- RADIUS
- TACACS+ AAA
- IEEE 802.1x
- Port Mirroring
- Enhanced CLI
- Ciena Ethernet Services Manager (ESM) element management system
- Remote auto-configuration and software download

#### **Complete Metro Ethernet Forum (MEF)-compliant Ethernet service offerings**

- Ethernet Private Line
- Ethernet Private LAN
- Ethernet Virtual Private Line
- Ethernet Virtual Private LAN
- All conform to MEF 9 and MEF 14

## Proven Service-Aware Operating System

The 3920 software architecture is based on a common service-aware operating system, used in all Ciena Service Delivery and Service Aggregation Switches, which delivers consistent benefits across all Ethernet access and aggregation applications. These benefits include:

- Rapid implementation of the latest standards-based Ethernet technical advances across all switching products
- Interoperability with multi-vendor Ethernet equipment already installed in a network
- Industry-leading network services based on the latest advances in Ethernet technologies from standards bodies like the IEEE, IETF, and MEF
- Improved efficiency and cost savings resulting from a common deployment and service provisioning model and reduced need for training

The 3920 is preconfigured with default settings to deliver plug-and-play activation—making new service rollout fast and easy. The switch also supports an advanced automatic activation feature that can upgrade the default settings to deploy operator-specific configurations, reducing new platform integration time and enabling network operators to extend services to new subscribers rapidly and efficiently.

## Flexible, Cost-Effective Ethernet Service Delivery

The 3920's advanced design and comprehensive feature set optimize control, predictability, and service quality, and deliver a full range of carrier-class Ethernet services. A compact form factor and efficient physical design enable the 3920 to be deployed in a wide variety of locations, including central offices, conditioned telecom huts and cabinets, equipment closets, and general office environments. Low power consumption and a small footprint minimize rack space and utility costs and enable network operators to use the 3920 as a cost-effective service access/demarcation system for business services and data transport applications, such as wireless backhaul. The 3920 can also be configured as an MTU/MDU aggregation switch to concentrate and integrate Ethernet traffic from other switches.

The 3920 supports four (4) 100/1000 Mb/s SFP optical ports that can be used for network uplinks or for connecting subscriber equipment to the 3920 SDS. These optical ports support diverse network topologies and deliver ease of use, interoperability, and flexibility by enabling the connection of Ciena Carrier Ethernet switching systems and customer equipment at distances of up to 100 km over single-mode fiber, 500 meters over multimode fiber, or 100 meters via an RJ-45 copper SFP. They also minimize costs by allowing service providers to utilize an optimal mix of optical transceivers for their network infrastructure and service deployment scenarios.

The 3920 also supports eight (8) 10/100/1000 Mb/s RJ-45 copper ports. Like the SFP Optical ports, the RJ-45 copper ports can be used for network uplinks or for connections to subscriber equipment to support the delivery of advanced Ethernet services. These flexible port configurations provide superior investment protection because service can be initiated with 100Mb/s optical or copper connections and then easily upgraded to Gigabit Ethernet speeds.

## Technical Information

### Interfaces

4 x 100M/Gig NNI/UNI SFP ports  
8 x 10/100/1000M UNI RJ-45 copper ports  
1 x 10/100/1000BASE-TX RJ-45 Management port  
1 x DB9 Console Port (RS-232)

### Ethernet

IEEE 802.3 Ethernet  
IEEE 802.3u Fast Ethernet  
IEEE 802.3z Gigabit Ethernet  
IEEE 802.1D MAC Bridges  
IEEE 802.1Q VLANs - Including .1p Priority  
IEEE 802.1ad Provider Bridging (Q-in-Q) VLAN  
- full S-VLAN range  
VLAN tunneling (Q-in-Q) for Transparent  
LAN Services (TLS)  
Single and double VLAN tag translations on  
ingress and egress  
Per VLAN MAC Learning Control  
ITU-T G.8032 Ethernet Ring Protection  
Switching  
Jumbo Frames to 9216 bytes  
Layer 2 Control Frame Tunneling

### Carrier Ethernet OAM

IEEE 802.1ag Connectivity Fault Management  
(CFM)  
IEEE 802.3ah Ethernet in the First Mile (EFM)  
IEEE 802.1AB Link Layer Discovery Protocol  
(LLDP)  
ITU-T Y.1731 Performance Monitoring  
RFC 5618 TWAMP Responder and Receiver  
TWAMP Sender  
TWAMP +/- 1ms timestamp accuracy  
Dying Gasp with Syslog and SNMP Traps

### Quality of Service

8 Hardware Queues per Port  
Committed and Excess Information Rate  
(CIR and EIR)  
Classification based on IEEE 802.1D priority  
Classification based on VLAN, source port,  
destination port, TCP/UDP port  
Classification based on IP Precedence and  
IP DSCP  
Layer 2, 3, 4 Quality of Service  
Ingress metering per-port  
Ingress metering per-port per-CoS  
Ingress metering per-port per-VLAN  
Up to 64 Ingress Meters per port  
Up to 512 Ingress Meters per system  
C Priority to S Priority Mapping  
C-VID to S Priority Mapping  
Per-VLAN Classification, Metering, and Statistics  
Per-port per-VLAN QoS with CIR and EIR traffic  
on Egress Queues

### Multicast Management

RFC 2236 IGMPv2 Snooping  
IGMP Domains  
IGMP Message Filtering  
IGMP Inquisitive Leave  
Broadcast/Multicast Storm Control  
Unknown Multicast Filtering  
Well-known Protocol Forwarding

### Network Management

Enhanced CLI  
CLI-based configuration files  
SNMP v1/v2c/v3  
SNMPv3 Authentication and  
Message Encryption  
RFC 1213 SNMP MIB II  
RFC 1493 Bridge MIB  
RFC 1643 Ethernet-like Interface MIB  
RFC 1573 MIB II interfaces  
RFC 1757 RMON MIB - including persistent  
configuration  
RFC 2021 RMON II and RMON Statistics  
Per-VLAN Statistics  
RADIUS Client and RADIUS Authentication  
TACACS + AAA  
RFC 2131 DHCP Client  
RFC 1305 NTP Client  
RFC 1035 DNS Client  
Telnet Server  
RFC 1350 Trivial File Transfer Protocol (TFTP)  
RFC 959 File Transfer Protocol (FTP)  
Secure File Transfer Protocol (SFTP)  
Secure Shell (SSHv2)  
Syslog with Syslog Accounting  
Port State Mirroring  
Local Console Port  
Comprehensive Management via  
Ethernet Services Manager  
Remote Autoconfiguration via TFTP, SFTP  
Software download/upgrade via TFTP, SFTP

### Service Security

Egress Port Restriction  
Layer 2, 3, 4 Protocol Filtering  
IEEE 802.1X Port-based Network Access  
Control  
Broadcast Containment  
User Access Rights  
Per-port or per-VLAN Service Access Control  
Hardware-based DOS Attack Prevention  
Hardware-based Access Control Lists (ACLs)

### MAC Address Table Capacity

16,000 MAC addresses

### Power Requirements

AC Input: 100V to 240V AC  
AC Frequency: 50 to 60 Hz  
Power Consumption: 55W (max)  
DC Input: 24V to 60V DC  
Power Consumption: 36W (max)

### Agency Approvals

**Safety Certifications:** NRTL (TUV Rheinland);  
CB; European Union, CE mark (Declaration  
of Conformity)

**Safety Standards:** UL 60950; IEC 60950 (CB);  
EN 60950 (CE Mark); CAN/CSA-C22.2 No.  
60950-00 (Canadian Safety)

**Emissions:** FCC 47CFR Part 15 Class B;  
EN55022 (2006) Class B; VCCI Class B; AS/  
NZ CISPR22: 2004

**Environmental:** RoHS 2002/95/EC; WEEE  
2002/96/EC

**Immunity:** EN 55024 1998 + A1:2001 +  
A2:2003

**Laser Safety:** FCC 21 CFR subpart (J) (Safety  
of Laser Products); Europe: EN60825-1:1994  
+A11: 1996+A2:2001 (European Safety of  
Lasers)

### Environmental Characteristics

**Operating Temperature:**  
+32°F to +122°F (0°C to +50°C)

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

**Relative Humidity:**  
Non-Condensing 5% to 90%  
GR-63-CORE, Issue 3 – NEBS Level 3  
GR-1089 Issue 5 – NEBS Level 3

### Physical Characteristics

**Dimensions:**  
1.75" (H) x 17.5" (W) x 9.4" (D);  
44.5 mm (H) x 444.5 mm (W) x 238.7 mm (D)

**Weight:**  
8 lbs; 3.6 kg

*\*Denotes feature not currently generally  
available. Please speak with your Ciena  
representative for more information.*

Ciena may from time to time make changes to the products or  
specifications contained herein without notice.  
© 2011 Ciena Corporation. All rights reserved. DS140 7.2011



Networks that change  
the way you compete.

1201 Winterson Road  
Linthicum, MD 21090  
1.800.207.3714 (US and Canada)  
1.410.865.8671 (outside US and Canada)  
+44.20.7012.5555 (international)  
[www.ciena.com](http://www.ciena.com)