

DATA SHEET

# 3984



**Ciena's 3984 Platform is an advanced edge router able to deliver Carrier Ethernet, Cell Site Router (CSR), Passive Optical Network (PON), and wholesale mobile services to almost any environment without sacrificing leading-edge functionality. The 3984 incorporates a complete Operations, Administration, and Maintenance (OAM) suite to support the network and service performance monitoring requirements of small-scale Ethernet deployments while reducing network operating costs.**

## Building out the service edge

Network operators are looking to quickly terminate multiple business service offerings, including carrier-grade Ethernet, mobile backhaul, CSR, and IP services.

This compact, cost-effective open network edge router is powered by dual AC/DC power supplies and designed to fit a variety of deployments.

Ciena's 3984 is a carrier-grade router based on the Service-Aware Operating System (SAOS) used in all Ciena's Routing and Switching Platforms to deliver a consistent set of benefits, including interoperability between platforms, improved efficiency of operations, and service consistency among applications.

The 3984 supports applications such as business services Network Termination Element (NTE) or demarcation devices for retail and wholesale, as well as managed Customer Premises Equipment (CPE) for L2VPN and L3VPN. Additionally, the nimble 3984 can support wholesale mobile backhaul services, has CSR functionality, and 10G PON support. All ports are 1/10/25GbE, offering investment protection to both operator and customer. This means no forklift change-outs are needed to migrate to higher bandwidths, and no capital investments are wasted.

## Features and benefits

- Temperature hardened
- 6 x 1/10/25GbE XGS-PON ports
- IP routing, SR-MPLS, Carrier Ethernet, and SRv6-ready
- Routing and switching OAM scaled to deliver 25GbE services with guaranteed SLA differentiation
- SZTP for rapid, secure, and error-free turn-up of services
- Advanced synchronization, including SYNCE, 1588v2/PTP, and NTPv4
- Built-in RFC 2544 and ITU-T Y.1564 SAT with 25 Gb/s traffic generation and analysis
- SDN-ready, next-generation management including support for NETCONF/YANG and gNMI/gRPC
- MCP multi-layer support for end-to-end network management control and planning
- Fixed AC or DC dual power

## Dense, compact form-factor platform

The 3984 brings clear demarcation and rightsized aggregation capacity closer to the lean multi-service edge. With 6 x 1/10/25GbE—supporting enhanced Common Public Radio Interface (eCPRI) and micro Optical Line Terminal (uOLT) pluggables—the 3984 enables concurrent enterprise, mobile, and residential services. These services can be delivered over dedicated and shared fiber on the same cost-effective router where they are needed—without sacrificing leading-edge aggregation functionality, as shown in Figure 1.

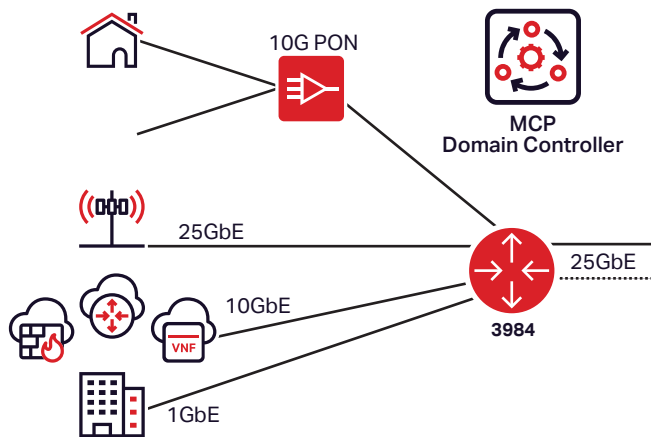


Figure 1. 3984 multi-edge aggregation

## Pushing DAA further

Distributed Access Architecture (DAA) pushes distributed fiber nodes and fiber-deep infrastructures further. The compact, temperature-controlled design of the 3984 allows for high-capacity Remote PHY Devices (RPD), Remote MAC/PHY Devices (RPDs/R-MAC/PHY), and remote OLT (rOLT) at the edge. Instead of building siloed, standalone architectures to support different types of services, Multiple System Operators (MSOs) and wholesale operators can now bring more value to their networks by supporting concurrent PON,

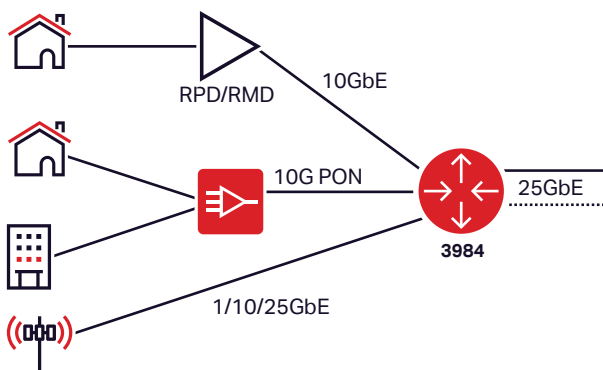


Figure 2. DAA outdoor aggregator

IP, and Ethernet services on the same platform with improved customer satisfaction, choice, and business value control, as shown in Figure 2.

## Cell site router

Ciena's 3984 CSR serves many purposes: demarcation, multi-service, aggregation, and protection switching. CSRs connect each cell site to the rest of the 3GPP network. Each port of the 3984 is designed to support multiple IP interfaces running over multiple Virtual Local Area Networks (VLANs) for Mobile Network Operators (MNOs).

## Versatile for wholesalers and utilities

Ciena's 3984 is purpose-built to meet the needs of small-scale converged access. As an edge aggregator, it sets the stage for cost-effective low-density 1/10/25GbE and 10G PON pluggables.

The interfaces and capabilities of the 3984 make it versatile and applicable to many other wholesale and utility use cases that require reliable service delivery in compact buildouts.

## Differentiation through accelerated service velocity

The 3984 implements Ciena's unique Secure Zero-Touch Provisioning (SZTP) capabilities, allowing operators to deploy new services rapidly and securely in a fully automated manner. By reducing or eliminating costly and time-consuming manual intervention, provisioning errors are eliminated via SZTP. Most importantly, SZTP improves service deployment velocity and provides a significant competitive advantage.

## Operational discipline with fine-grained SLA monitoring and enforcement

As network operators and their customers increasingly rely on new networks, providers must maintain guaranteed service levels. Networks must support a broad array of routing and switching OAM capabilities to ensure that operators can proactively and reactively maintain and report on the ongoing health of their networks and delivered services. The 3984 also supports a comprehensive set of OAM capabilities and is architected to provide Service Level Agreement (SLA) metrics and OAM at high scale. This enables operators to take full advantage of the port density and 80 Gb/s fabric for delivering the maximum number of services.

## Single multi-layer management and control

Ciena's 3984 is managed by Ciena's Manage, Control and Plan (MCP) domain controller, which offers a unique and comprehensive solution for the administration of networks that span access, metro, and core domains, and provides unprecedented

multi-layer visibility from the photonic to the data layers. With this innovative management solution, MCP supports an automatable solution that provides a fully open approach to installing, manipulating, and monitoring service behaviors in a Software-Defined Networking (SDN) environment.

## Technical Information

### Interfaces

#### Ethernet Ports

- 6 x 1/10/25G SFP28
- 10G PON SFP+

#### Other

- 1 x USB-C Off-switch memory
- 1 x USB-C Console
- 1 x RJ45 Time-of-Day (ToD)
- 1 x SMB Phase input (1 pps in/out)
- 1 x RJ45 Management (MGMT)

### Ethernet

- IEEE 802.1ad Provider Bridging (Q-in-Q) VLAN full S-VLAN range
- IEEE 802.1D MAC Bridges
- IEEE 802.1Q VLANs - Including .1p Priority
- IEEE 802.3 Ethernet
- IEEE 802.3ab 1000Base-T via copper SFP
- IEEE 802.3by-2016 25Gb/s
- IEEE 802.3z Gigabit Ethernet
- Layer 2 Control Frame Tunneling
- Link Aggregation (LAG: Active/Active; Active/Standby)
- VLAN tunneling (Q-in-Q) for Transparent LAN Services (TLS)

### 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.1731 Performance Monitoring
- RFC 2544 Performance Benchmarking Test Generation and Reflection
- ITU-T Y.1564-compliant architecture

- RFC 5618 TWAMP Responder and Receiver TWAMP Sender
- Dying Gasp with Syslog and SNMP Traps

### Synchronization

- Timing Interfaces
  - ITU-T G.703 Frequency in or out (2.048MHz, and 10MHz)
  - ITU-T G.703 1pps and ToD in or out
- Integrated GNSS receiver
- ITU-T G.8262/G.8264 EED option1 and option2
- G.8273.2 clock, Class C
- ITU-T G.8275.1 full timing support T-GM, T-BC and T-TSC
- G.8275.2 Telecom Profile
- IEEE 1588v2 PTP

### Networking Protocols

- ISO10598 IS-IS intra-domain routing protocol
- OSPF Segment Routing extension
- OSPF 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 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
- RFC7911 Advertisement of Multiple Paths in BGP
- RFC8214 Virtual Private Wire Service Support in Ethernet VPN
- Network Management
- Alarm Management and Monitoring Configuration
- Event and Alarm Notification/Generation Comprehensive Management
- Via CLI Management
- Via Netconf/YANG Models
- gRPC-based Streaming telemetry
- IPv4 and IPv6 Management Support
- IPv4 Management ACL (in-band)
- IPv6 Management ACL (in-band)
- RADIUS, AAA
- RFC 2131 DHCP Client
- RFC 3046 DHCP Relay

## Technical Information

### Networking Protocols continued

- RFC 5905 NTP Client
- Secure File Transfer Protocol (SFTP)
- Secure Shell (SSHv2)
- RFC 8572 Secure Zero-Touch Provisioning (SZTP)
- Software upgrade via FTP, SFTP
- Syslog Accounting
- TACACS + AAA
- Web GUI

### Physical Characteristics

#### Dimensions

- 11.54" (W) x 9.96" (D) x 1.73" (H)
- 293mm (W) x 253mm (D) x 44mm (H)

#### Weight

- 7.5 lbs; 3.4 Kg

#### Power

- DC input: -48V DC
- AC input: 100-240V AC, 50/60Hz
- 3984-900/901 100w (nominal)
- 3984-900/901 125w (Maximum)

### Standards Compliance (EMC)

- CISPR 24
- CISPR 32 Class A
- EN 55024
- EN 55032
- EN 300 386
- GR-1089 Issue 6 & 7
- FCC Part 15 Subpart B, Class A
- Industry Canada ICES-003 Class A
- VCCI Class A

### Standards Compliance (Safety)

- CAN/CSA C22.2 No. 60950-1-07
- EN 62368-1
- EN 62368-1
- UL 60950-1 2nd Ed
- UL 62368-1 2nd Ed

### Power

- ETSI EN 300 132-2
- ETSI EN 300 132-3

### Environmental

- RoHS2 Directive (2011/65/EU)
- WEEE Directive (2002/96/EC)

### Temperature

- Operating -40°F to +149°F (-40°F to +65°C)
- Storage -40°F to +158°F (-40°C to +70°C)
- Humidity 5% to 100%

## Ordering information

Part Number	Description
170-3984-900	3984,(6)25G/10G/1G SFP/SFP+,SAOS 10.X,SYNC,EXT. TEMP,DUAL DC POWER
170-3984-901	3984,(6)25G/10G/1G SFP/SFP+,SAOS 10.X,SYNC,EXT. TEMP,DUAL AC

### Required OS Base System Perpetual Software Licenses

S75-LIC-3984EO-P	SAOS BASE OS, ETHERNET & OAM, FLEXE, SOFTWARE LICENSE FOR 3984, PERPETUAL
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### Optional OS Applications

S75-LIC-3984MPLS-P	SAOS ROUTING AND MPLS SOFTWARE LICENSE FOR 3984, PERPETUAL
S75-LIC-3984SYNC-P	SAOS SYNCHRONIZATION SOFTWARE LICENSE FOR 3984, PERPETUAL
S75-LIC-3984SEC-P	SAOS SECURITY SOFTWARE LICENSE FOR 3984, PERPETUAL
S75-LIC-3984EVPN-P	SAOS EVPN SOFTWARE LICENSE FOR 3984, PERPETUAL
S75-LIC-3984BNDL01-P	SAOS ALL LICENSES FOR 3984, PERPETUAL

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