



Routing and Switching

Is your network ready?



It's time to rethink current metro and edge networks

New users, applications, and endless content are creating an explosion in demand for connectivity at the network edge—where users connect to content. But are your metro and edge networks ready?

These networks must evolve to become more open, automated, and simple. It's the only way to find your edge, capitalizing on new revenue opportunities and delivering a compelling end-customer experience.

Whether you're supporting modern or legacy business services or exploring emerging business opportunities, like broadband, cloud, and 5G, you need a capable, adaptive routing and switching network to drive your business forward.

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Adaptive IP™

Automated, open, lean

Accelerate network expansion and the introduction of new services via programmable routing, switching, and coherent network elements.

Leverage Layer 0 to Layer 3 route optimization and assurance, combined with simpler, streamlined protocol support, rich telemetry, and programmability.

[Learn more](#)

3801/3802/uOLT 10G PON

Low-cost metro access for residential, SMB, and SME

Shared fiber symmetrical 10G XGS-PON

XGS-PON

Desktop ONUs and pluggable uOLTs

Low-cost shared fiber residential, small- to medium-sized business and enterprise (SMB/SME) services. Best suited to grow addressable Ethernet Private Line (ELP) and Ethernet Virtual Private Line (EVPL) revenue streams.

3801

[Learn more](#)

3802

[Learn more](#)

uOLT

[Learn more](#)



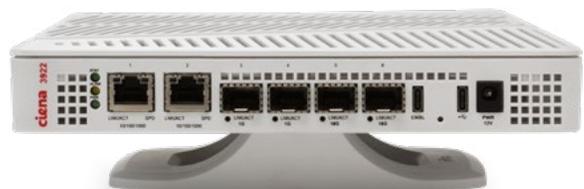
3922 Service Access

1/10GbE service delivery in a variety of business environments

24 Gb/s

Compact, cost-effective plastic- or metal-housed fanless design with two 1/10GbE fiber ports, two 100M/1GbE fiber ports, and two 10M/100M/1GbE fixed copper ports. Low footprint 1RU L2VPN service delivery.

[Learn more](#)



3924 Service Access

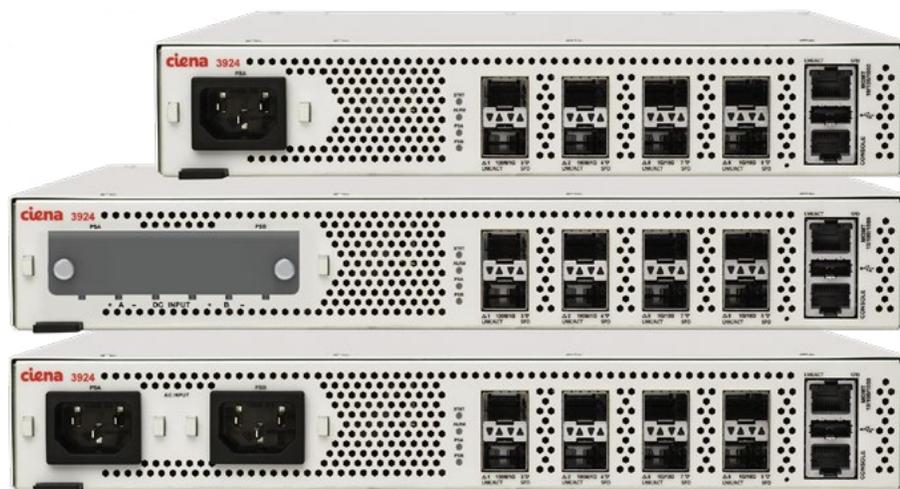
1/10GbE service demarcation

44 Gb/s

Simplex AC or redundant AC or DC power

Cost-effective 1/10GbE wireline, 10GbE synchronized and non-synchronized services. Best suited for carrier class Layer 2, Layer 3, and EVPN services.

[Learn more](#)



3906/3926 Service Virtualization Platforms

1GbE 3906, 10GbE 3926 Demarcation

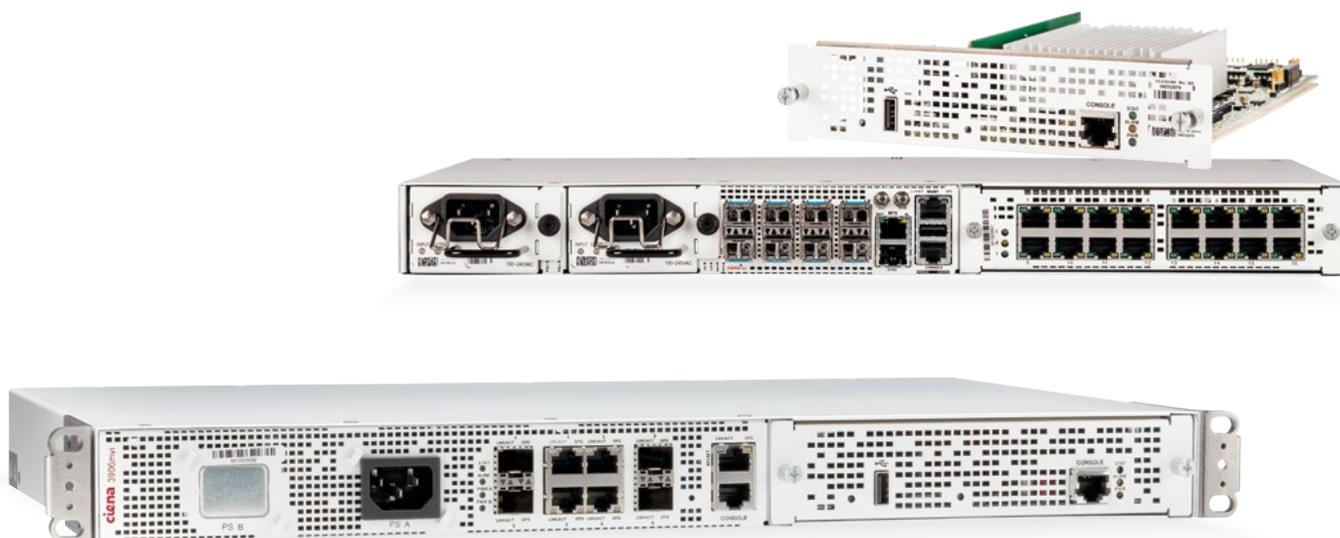
6/82 Gb/s (3906/3926)

TDM, Ethernet, and medium/large server modules for D-NFVI hosting

Smart customer premises equipment delivering 1GbE or 10GbE, TDM CEM, and third-party virtual network functionality with or without Ciena's D-NFVI software.

3906
Learn more

3926
Learn more



5130

5G xHaul Router

Cost-effective 100GbE access, 4G and 5G xHaul, with 1/10/25GbE to 100GbE aggregation. IP routing, SR-MPLS, Carrier Ethernet, and SRv6 ready, with soft and hard (FlexEthernet [FlexE]) service isolation.

360 Gb/s

Soft and hard (FlexE) service isolation

The 5130 is the first step to converge 4G and 5G xHaul on to a simpler infrastructure to de-risk the unique 4G to 5G journeys of mobile and wholesale operators.

[Learn more](#)



5131 Weatherproof 5G xHaul

Ruggedized router for deployment in harsh outdoor environments

360 Gb/s

1/10/25GbE, PON, soft and hard (FlexE) service isolation

Ideal for Multiple System Operators (MSOs), Mobile Network Operators (MNOs), and wholesalers to expand in the most challenging outdoor and uncontrolled environments.

[Learn more](#)



5132 Coherent Access

100GbE Demarcation

Coherent WaveLogic™ 5 Nano (WL5n), AC/DC, and extended temperature

The first 100GbE coherent NID for a variety of business and wholesale environments. Drive new revenue streams with guaranteed low-latency service isolation, made possible with soft and hard (FlexE) service isolation.

[Learn more](#)



5164 xHaul Router

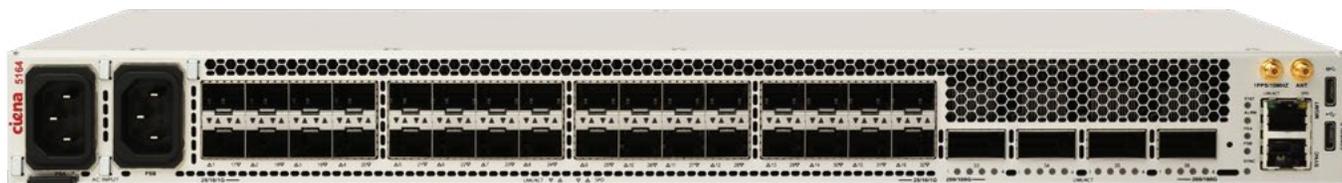
1/10/25GbE and PON to 100/200GbE aggregation and routing

800 Gb/s

Soft and hard network slicing capabilities including FlexE

High-density routing and coherent aggregation perfect for residential broadband, business services, converged 4G/5G fronthaul, midhaul, backhaul, and much more. Delivers power, space and density savings along with programmability and simplicity.

[Learn more](#)



6500 Packet Transport System

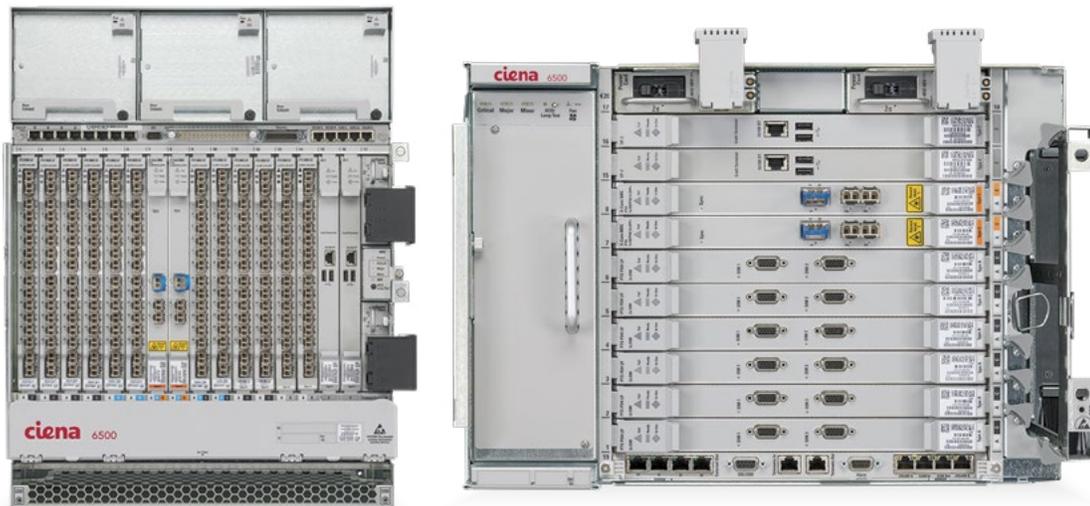
DS1, DS3, E1, E3, OC-3/12/48/192, STM-1/4/16/64, and 10/100/1GbE/
10GbE/40GbE/100GbE routing, switching, and aggregation

800 Gb/s

6500 chassis options (8-slot, 14-slot)

Provides better control of TDM services while future-proofing investment toward an all-packet network modernization—saving significant space, power while maintaining substantial mission-critical private line services.

[Learn more](#)



8110

Coherent Aggregation Router

Dense 100GbE to 100/200/400 GbE

2.4 Tb/s

Modular coherent aggregation

IPv4/IPv6 routing platform supporting IP aggregation, Provider Edge (PE), Provider Router (P), and Carrier Ethernet functions. Includes support for QSFP-DD and CFP2-DCO coherent optics and a variety of field replaceable I/O modules offering 100/200/400 connectivity options.

8110
Learn more



8114 Coherent Aggregation Router

1/10/25 and PON to 100/200/400 GbE aggregation

2.4 Tb/s

Modular coherent aggregation

Universal Aggregation supporting Carrier Ethernet, 10G PON, and IPv4/IPv6 edge routing. Including support for QSFP-DD and CFP2-DCO coherent optics and a variety of field replaceable I/O modules offering 100/200/400G connectivity options.

8114
Learn more



Glossary

Carrier Ethernet (CE): Built on IEEE Ethernet standards, CE provides standardized services, reliability, service management, and Quality of Service (QoS). CE is used to provide high-value underlay Layer 2 (L2) connectivity services, including certification.

Ethernet: The predominant Local Area Networking (LAN) technology, based on packetized transmissions between physical ports over a variety of electrical and optical media. Ethernet can transport any of several upper-layer protocols, the most popular of which is TCP/IP. Ethernet standards are maintained by the IEEE 802.3 committee. The unqualified term Ethernet usually refers to 10 Mb/s transmission on multi-point copper. Fast Ethernet is used to denote 100 Mb/s transmission, also on multipoint copper facilities. 1/10/100/200/400 Gigabit Ethernet (GbE) utilize optical fiber transmission.

Gigabit Ethernet (GbE): Describes various technologies for implementing Ethernet networking at a nominal speed of one gigabit per second defined by the IEEE 802.3z and 802.3ab standards. 10 Gigabit Ethernet (10GbE) has recently been overtaken by 100 Gigabit Ethernet (100GbE), which ratified in 2014 and provides data rates 10 times greater than that of 10GbE and 100 times 1GbE. While in 2017, IEEE 802.3bs added 200Gb/s and 400Gb/s, which is two and four times 100GbE.

Internet Protocol (IP): A protocol that provides connectionless best effort delivery of data across heterogeneous physical networks. Data is broken down into number of small bundles known as packets, and each packet gets transmitted to the destination separately, possibly along a different route than other packets from the same message. Packets are often retransmitted utilizing TCP when data is dropped due to over constrained routing.

Internet Protocol Television (IPTV): A system where a digital television service is delivered to subscribers using Internet Protocol over a broadband connection. This service is often provided in conjunction with Video on Demand (VoD) and may also include internet services such as web access and VoIP, where it may be called 'triple play', and is typically supplied by a broadband operator using the same infrastructure.

Local Area Network (LAN): A communications infrastructure intended for the local transport of data, video, and voice. Designed to use dedicated wiring over a limited distance (typically a diameter of less than five kilometers) to connect many intercommunicating nodes. Ethernet is the most popular of LAN technologies. LANs are interconnected over distance through Metropolitan Area Networks (MANs) and Wide Area Networks (WANs) that utilize carrier-class transport and switching equipment.

Media Access Control (MAC): The lower sub-layer of the OSI data link layer, the interface between a node's Logical Link Control (LLC) and the network's physical layer. The MAC differs for the various physical media (such as Ethernet, token ring, WLAN). The MAC sub-layer is primarily concerned with:

1. Recognizing where frames begin and end in the bit-stream received from the physical layer (when receiving)
2. Delimiting the frames (when sending), inserting information (e.g., some extra bits) into or among the frames being sent so that the receiver(s) can recognize the beginning and end of the frames
3. Detecting transmission errors by means of inserting a checksum into every frame sent, recalculating, and comparing them on the receiver side
4. Inserting the source and destination MAC addresses into every frame transmitted
5. Filtering out the frames intended for the station by verifying the destination address in the received frames
6. Controlling access to the physical transmission medium (which of the stations attached to the wire or frequency range has the right to transmit)

Metropolitan Area Network (MAN): A network that connects nodes distributed over a metropolitan (citywide) area as opposed to a local area (campus) or wide area (national or global).

Multi-Protocol Label Switching (MPLS): A method used to direct data traffic in networks in which IP over ATM is being used. In MPLS, IP routers at the edge of the network label packets in a way that greatly facilitates their handling by ATM switches at the network core.

Network Attached Storage (NAS): Storage elements that connect to a LAN and provide file access services to computer systems. A NAS storage element consists of an engine, which implements the file services, and one or more devices, on which data is stored. Much like a SAN, a NAS is used to share storage resources across multiple servers; however, NAS technology does not provide LAN traffic relief.

Network Management System (NMS): A system responsible for managing at least part of a network. NMSs communicate with agents to help keep track of network statistics, resources, and performance.

Oversubscription: Scheduling a network line to carry a greater volume of data than the line is designed to carry at any one time. Oversubscribing a line assumes that it is unlikely that any one subscriber (or group of subscribers) will use all the line's capacity at any one time and relies on methods such as QoS to prioritize subscriber traffic during periods of congestion.

Provider (P) router: P routers are routers within the VPN core network that can be used to connect PE routers or to other P routers within the core.

Provider Edge (PE) router: PE routers are WAN routers, either connected to each other or with a P router within a network providers core network; PE routers also connect directly to a router at the customer's site.

Packet-over-SONET/SDH (POS): A communications protocol for transmitting packets over circuit-switched protocols SDH or SONET.

Performance Monitoring (PM): Measures the QoS and identifies degrading or marginally operating systems (before an alarm would be generated).

Segment Routing (SR): A method to simplify IP/MPLS engineering and management by including routing instructions in the IP packets. Source-based routing allows the source to choose a path, adding it to the packet header as an ordered list of segments. Enabling the network to execute on encoded instructions, while removing any state within the network, as it is no longer required.

Small Form-factor Pluggable (SFP): A specification for optical and electrical modular transceivers. The devices are designed for use with small form factor (SFF) connectors, and offer high speed and physical compactness, and are hot-swappable. SFP transceivers perform at data speeds of up to five Gigabits per second (5 Gb/s) and common with Communications Service Provider (CSP) and data provider applications.

Storage Area Network (SAN): A network whose primary purpose is the transfer of data between computer systems and storage elements and among storage elements. A SAN consists of a communication infrastructure, which provides physical connections, and a management layer, which organizes the connections, storage elements, and computer systems so that data transfer is secure and robust. The term SAN is usually (but not necessarily) identified with the Fibre Channel Protocol (FCP) and block I/O services rather than file access services.

Time Division Multiplexing (TDM): A method for transmitting multiple calls over a single line; each call is assigned a recurring timeslot on the line, and a small portion of that call gets transmitted over the line each time its assigned timeslot is available.

Transmission Control Protocol/Internet Protocol (TCP/IP): A family of IP-based protocols which facilitate the transmission of data packets over various media in various circumstances. TCP/IP provides the basis of the internet and many subscriber services, by a set of protocols developed to link dissimilar computers across many kinds of networks.

Virtual Private Network (VPN): A network service which employs encryption and tunneling to provide a subscriber with a secure private network that runs over public network infrastructure.

Virtualization: The act of integrating one or more (back end) services or functions with additional (front end) functionality for the purpose of providing useful abstractions. Virtualization typically hides some of the back end complexity or adds and/or integrates new functionality with existing back end services. Examples of virtualization are the aggregation of multiple instances of a service into one virtualized service, or to add security to an otherwise insecure service. Virtualization can be nested or applied to multiple layers of a system.

Voice-over-Internet Protocol (VoIP): (also called VoIP, IP Telephony, Internet telephony, or Digital Phone). The routing of voice conversations over the internet or any other IP-based network. The voice data flows over a general purpose routing and switching network, instead of traditional dedicated, circuit-switched voice transmission lines.

Next-Generation metro and edge networks

- Transform your network to better compete against traditional and Non-traditional competitors while lowering ongoing total cost of network ownership to counteract declining margins
- Successfully target broadband, 5G, and cloud opportunities in the access/ aggregation/metro network via simpler, cost-effective, purpose-built routing and switching solutions
- Implement a network that can readily adapt to change to future-proof businesses via greater automation, intent-based control, and self-optimization to capitalize on new business opportunities

Was this content useful?

Over 1.5 million

routing and switching devices sold worldwide



ciena