

Residential Broadband for Consulting and Engineering Firms

The importance of closing the digital divide and supporting digital inclusion has received increased attention since 2020—but it is not new for Consulting and Engineering Firms (CEFs). For years, CEFs have been at the center of the expansion of broadband services, supporting Internet Service Providers (ISPs), Regional Service Providers (RSPs), municipalities, and utility co-ops to develop their business plans, design their networks, deploy the infrastructure, and—in some cases—manage their entire solution and service lifecycles. Today, with a once-in-a-generation public and private investment in broadband networks, the role of CEFs will grow substantially.

Promoting digital inclusion in rural and remote areas is an important mission. In most cases, it can surpass the capabilities of medium and small network operators. In this case, CEFs become more than trusted advisors—acting instead as the glue that binds different stakeholders to help them work together to provide broadband for all.

A closed, legacy approach limits the ability of CEFs to best support customers

CEFs have been advising network operators for over a decade in how to build and operate their network infrastructure—focusing on solving the challenge ahead and leveraging the best available technology.

Now is a disruptive moment. Broadband connectivity has transitioned from being a luxury to becoming a critical utility—one that people are deeply dependent on. The CEF mission has evolved, and they now need to support network operators in building a sustainable network that can meet the current needs of cities, regions, and communities, and create a clear path for the future. As new application and market dynamics are significantly changing residential broadband service requirements, CEFs must rethink how they architect network designs and choose technology partners that can provide the required scalability, performance, reliability, symmetry, and cost-efficiency network operators need now and in the future.

The legacy approaches of incumbent vendors are limiting the ability of CEFs to properly design those networks, forcing network operators to compromise between

Highlights

- The adoption of home-based activities like working and learning changed broadband service requirements related to performance and symmetry
- CEFs must now help their customers implement a best-of-breed and future-proof network, integrate multiple vendors and technologies, develop operational expertise, and focus on long-term sustainability
- CEFs must revisit their partnerships to design a next-generation residential broadband network for their customers—making them more open, modular, and scalable
- Unlike incumbent vendors with closed legacy approaches, Ciena helps operators build a sustainable residential broadband network without compromise

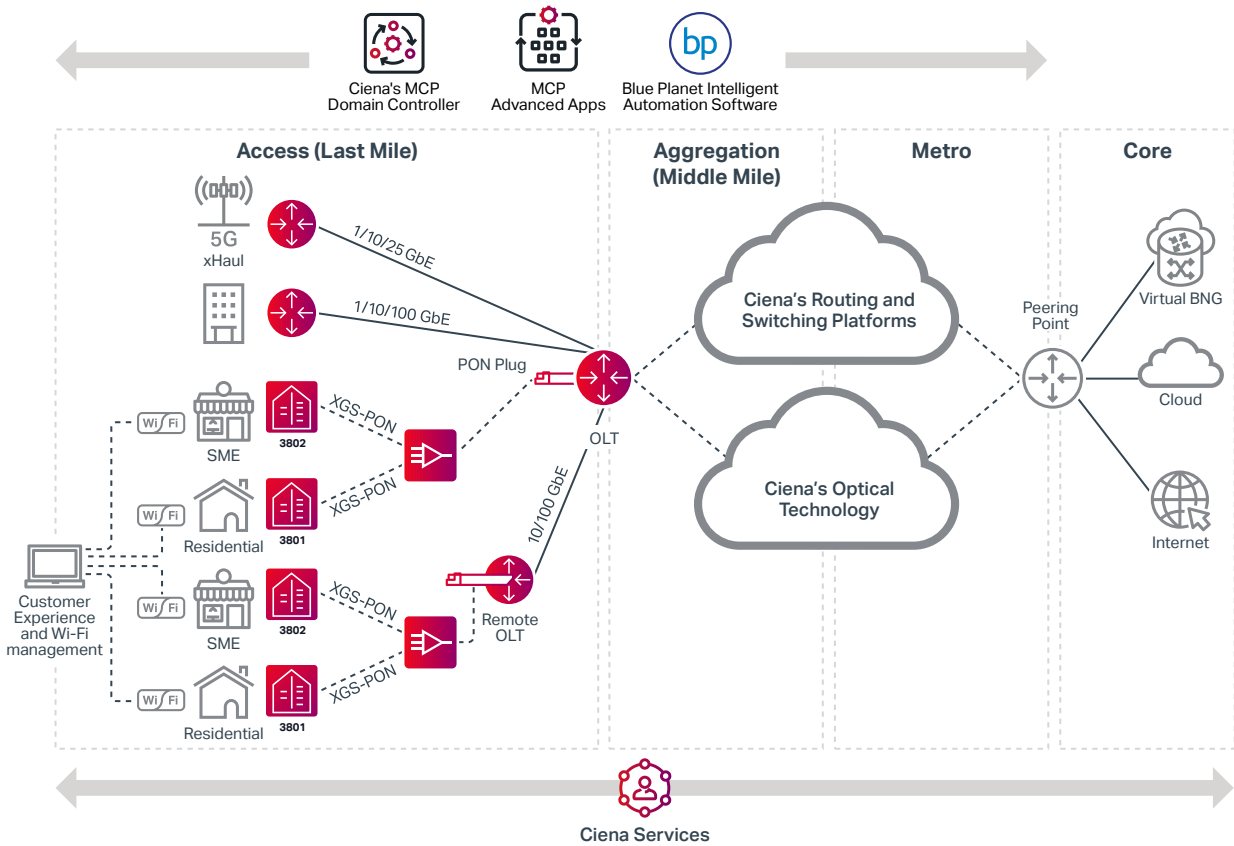


Figure 1. Where Ciena fits in the overall residential broadband network

fundamental functionalities and capabilities on their residential broadband networks. They shouldn't have to choose between:

- Overspending on their initial deployment or limiting their ability to grow
- Supporting only broadband or implementing multiple devices to support multiple services
- Optimizing OPEX or delivering great Quality of Experience (QoE)
- Sustainability or scalability

The mission to create a digital future for all is too important for network operators to compromise.

Ciena's Residential Broadband Solution

Ciena's Residential Broadband Solution is designed to deliver the scalability, openness, and modularity required by network operators to remain competitive, support the mission of bridging the digital divide, and protect their network investment well into the future. To do this, CEFs must properly advise network operators if they are to strengthen their position by offering better technology and expanding their broadband service options.

Ciena's solution leverages the power of Ciena's portfolio, including Routing and Switching platforms with XGS-PON pluggable technology, market-leading optical networking technology, Ciena's Manage, Control and Plan (MCP) domain controller, Blue Planet® Intelligent Automation Software, and Ciena Services.

Universal Aggregation and access over 10G PON transceivers
Learn more



Ciena's solution allows end-customers to access applications for working from home, telemedicine, remote learning, cloud gaming, and Ultra-High Definition (UHD) video streaming. It also enables network operators to upgrade their service portfolio features and capabilities when required by Metaverse and Augmented Reality/Virtual Reality (AR/VR) applications—without the need to rip and replace existing network infrastructure.

Level up network control
Ciena's MCP



Ciena's Residential Broadband Solution allows the convergence of aggregation and Fiber-to-the-Home (FTTH) access functionality by integrating XGS-PON micro Optical Line Terminal (μ OLT) pluggables in Ciena's Routing and Switching Platforms, offering shared fiber broadband services for residential as well as enterprise and mobile network traffic. Ciena offers the best XGS-PON port density per Rack Unit (RU) and the lowest energy consumption per port for typical deployments while allowing customers to buy only the necessary XGS-PON pluggables, when and where required, in a highly cost-effective modular business model. As the market evolves, Ciena's Routing and Switching Platforms are ready to support 25G PON plugs when they are available in the future.

Ciena offers a highly-scalable and modular solution allowing network operators to sustainably go from tens to hundreds of XGS-PON ports without losing sunk platform investments, replacing existing network equipment, or requiring significant upfront costs.

Ciena's Universal Aggregation (UA) and access capabilities support multiple service options in addition to XGS-PON. With solution modularity, network operators can offer enterprise business services over IP or dedicated Ethernet and mobile wholesale services with xHaul transport capabilities. Moreover, they can have a highly-optimized footprint that reduces energy and space requirements allowing for a broader addressable market for increased revenue-generating opportunities. Hardened and weatherproof platforms provide network operators with maximum flexibility and the ability to move their OLTs closer to end-users for improved performance.

By aggregating and supporting multiple services, Ciena's Routing and Switching Platforms deliver unmatched scalability and flexibility to network operators by providing traffic using multiple 100GbE, 200GbE, or 400GbE Network-to-Network Interfaces (NNI).

From the end-user side, Ciena's Residential Broadband Solution offers a family of Optical Network Units (ONUs), allowing end-users to benefit from multi-Gb/s connectivity while being open to supporting other vendors' ONUs to provide increased choice.

Ciena's solution is open by design—allowing CEFs to support network operators to create the best possible network infrastructure by choosing preferred vendors that complement Ciena's network elements. This helps operators protect their

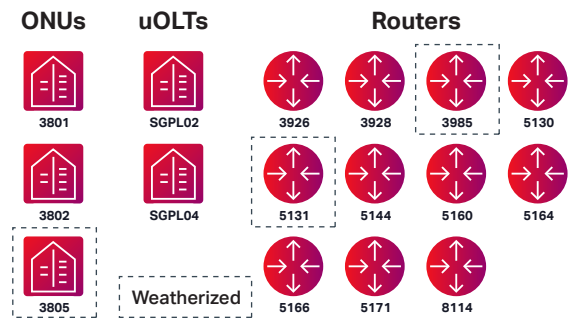


Figure 2. Converged access and aggregation

competitive edge by not limiting their solution to a specific vendor's innovation cycle. This also allows operators to maintain better control over their procurement processes to minimize and outright eliminate lock-in.

Ciena can also collaborate with CEFs, enhancing their ability to provide customers the expertise to plan, design, deploy, manage, maintain, and support their residential networks—as well as train their technical staff.

Deploying broadband is much more than just deploying network elements

Network operators are looking to deliver the best QoE to their customers while increasing operational efficiencies. Broadband network planning, infrastructure commissioning, service fulfillment, and service assurance can be complex as networks have grown. Ciena's PON Operations, Administration, and Maintenance (OAM) software simplifies network and service management. PON OAM gives carrier-class management and control to provide Northbound IP API support for gNMI, NETCONF/YANG, and streaming telemetry over Secure Shell (SSH). PON OAM can be cost-effectively hosted on an external x86 server or internally on Ciena's UA platforms.

Ciena's Residential Broadband Solution also leverages Ciena's MCP domain controller, which allows operators to scale the network—simplifying operations, reducing cost, and delivering the agility and resiliency that customers expect. It provides network operators with the ability to manage and orchestrate their multi-layer network from end to end—including headend, hubs, and Customer Premises Equipment (CPE)—when delivering broadband, enterprise, or mobile wholesale services using a common and integrated platform.

Supporting multi-vendor interop or third-party ONU integration, Ciena's solution avoids vendor lock-in by supporting both ONU Management Control Interface (OMCI) and Ethernet OAM in-band management. With rich, carrier-class OAM and Provisioning

Ciena's Universal Aggregation Solution
Get insights



(OAMP) software, operators can persistently store configurations, provide Performance Monitoring (PM) data collection, perform fault monitoring, and manage firmware images.

The increased scale and complexity of residential broadband networks require end-to-end automation. The Blue Planet Intelligent Automation Software automates service lifecycle management—from service design and resource reservation to orchestration and assurance—and provides real-time end-to-end service control and visibility across multi-domain, multi-layer networks. This helps network operators improve customer experience, increase service agility, reduce OPEX, and streamline their strategic digital transformation initiatives.

Blue Planet Intelligent Automation Software
Learn more



For network operators, igniting a digital future for all requires planning, deployment, management, and support for this emerging technology—and requires specialized skillsets, tools, and depth of knowledge. In some scenarios, CEFs have the requisite capabilities to support their customers, but sometimes they may not. Ciena offers a full suite of professional support services, as well as learning and marketing services, to assure success. Ciena Services are designed to be flexible—they are available individually or as a packaged solution—and consist of Consulting, Implementation, Systems Integration, Maintenance, Managed Services, Optimization, and Learning.

Ciena Services
Learn more



Sustainability cannot be an afterthought

Investing in infrastructure to close the digital divide without considering all relevant environmental and economic sustainability aspects can negatively impact any service provider's long-term financial viability.

At Ciena, we continue to invest in the sustainability of all critical network elements by converging the access infrastructure with best-in-class routers, WaveLogic™ coherent optics, and innovative uOLTs and corresponding ONUs.

Sustainability models show we have already helped our customers avoid more than 550,000 metric tons of CO₂e over an eight-year period (2014–2021) with our Routing and

Switching Platforms—helping our customers' production networks achieve 23 percent savings in power consumption, equaling 96,000,000 kWh saved which resulted in \$12 million per year OPEX savings.¹

Through our WaveLogic coherent optic investments, we introduced the industry's first 400 Gb/s transceiver in 2017 and are delivering the pluggable version five years later at one fifth the power, one tenth the space, and with improved industry-leading systems performance.

Combining Ciena's routing, optical, and PON innovations together offers significant improvements in footprint and power savings to enable more efficient and sustainable networks for our customers—and the planet at large. For example, evolving from a traditional pure PON chassis-based, multi-boxed solution to Ciena's converged access with XGS-PON and routing in a single platform results in a 67 percent reduction in footprint and 63 percent reduction in power consumption. This is just one example and, when applied to 100,000 homes passed at 50 percent market share (12 sites) using a 64 OLT split, can avoid 84,400 kWh annually, resulting in 59.8 metric tons of CO₂e avoided. A higher market share rate or homes passed would yield much larger sustainability results.

Why Ciena for residential broadband

- **Open:** Protects future growth by enabling providers to focus on quality customer experiences while containing cost and offering services at affordable prices
- **Modular:** Allows providers to start small and expand networks where and when residential, business, and institutional customers need it—streamlining operations and ensuring financial sustainability
- **Scalable:** Helps build a high-capacity, affordable, automated residential broadband network that scales dynamically so providers can deliver on customer expectations to ensure quality services

With once-in-a-generation broadband investments, the opportunity is now for CEFs to rethink how they are supporting their customers to build their sustainable residential networks. Focusing on an open, modular, and scalable solution will enable CEFs to become a more trusted advisor to their customers and build a sustainable residential network without compromise.



Was this content useful?

Yes

No

¹ Ciena's Routing and Switching Sustainability Model to Quantify Equivalent CO₂ Emissions Avoided: 2014-2021