

# There's No Place Like Home— With a Good Network Connection

## Universal Aggregation for Residential Services

In the 1990s, home connectivity was primarily used for entertainment purposes such as low-resolution internet surfing, text-based email, and basic chat applications—all supported by dial-up modems. Since then, home connectivity has drastically changed. It shifted from being an entertainment tool to the centerpiece of how we work, learn, and play. Residential users need broadband services that are reliable, high performance, secure, and highly cost-effective. Service providers must build next-generation metro and edge networks to support both existing and new residential application requirements to stay financially viable in this growing and highly competitive market.

Providing the required capacity to simultaneously support multiple high-bandwidth applications at home is just the starting point. Video streaming giants like Netflix, Amazon, Apple, and Disney already offer 4K videos that consume around 25 Mb/s per streamed service. Plus, there are already new services using different High Dynamic Range (HDR) technology offering 120 Frames Per Second (FPS) content, which significantly increases network bandwidth requirements. On the horizon are even higher resolution video streaming services.

Performance is another aspect for consideration. Service providers used to treat residential broadband services as best-effort for both availability and latency, but this is changing fast. Why? Because everyone working, learning, and even playing from home requires reliable, stable, and symmetric connectivity. And applications like Augmented Reality (AR) and Virtual Reality (VR) require less than 10 milliseconds of latency to work properly and provide an acceptable Quality of Experience (QoE). Highly immersive cloud gaming is just beginning to take off, yet requires high bandwidth and less than 100 milliseconds to become mainstream. For both gamers and service providers, latency performance can be the difference between winning or losing the game.

Customer perception of value has changed dramatically over the last few years. A highly reliable and stable QoE is, in most cases, more important than price. Customers are unwilling to compromise between working from home, having their kids in virtual classrooms, and watching an Ultra High Definition (UHD) streaming video, often all at the same time. They can, and often will, quickly change their broadband service provider to get the experience they expect and demand—compromise is simply not an option.

This new and rapidly evolving market dynamic provides new business opportunities for service providers ready to invest in the right technology to modernize their network to grow



Light Field Display: 800Mb/s per streaming  
6DoF Video: 500Mb/s per streaming  
8K Video: 100Mb/s per streaming  
4K Video: 25Mb/s per streaming

**Multiple Simultaneous  
High-Bandwidth Applications**



Cloud Gaming: Latency < 100msec  
AR/VR: Latency < 5msec

**New Applications Require  
Higher Performance**



Remote Fitness  
Telemedicine  
Remote Learning  
Working from Home

**Everything from Home**

revenues and increase market share. For service providers that simply add more capacity to legacy networks to maintain pace with bandwidth growth, the path to a more profitable and viable future will be far more challenging.

Ciena's Universal Aggregation solution [Learn more](#)

### New revenues require a new approach

New residential applications are required to grow service provider revenues. It takes a next-generation metro and edge network to achieve this, including:

- **Common infrastructure** for mobile, enterprise, and residential services to reduce both power and space requirements without losing flexibility or performance
- **High-capacity access and aggregation** to provide the scalability necessary to support traditional, new, and future services
- **Service velocity** to allow service providers to rapidly adapt to new and evolving market requirements to ensure competitiveness on an ongoing basis

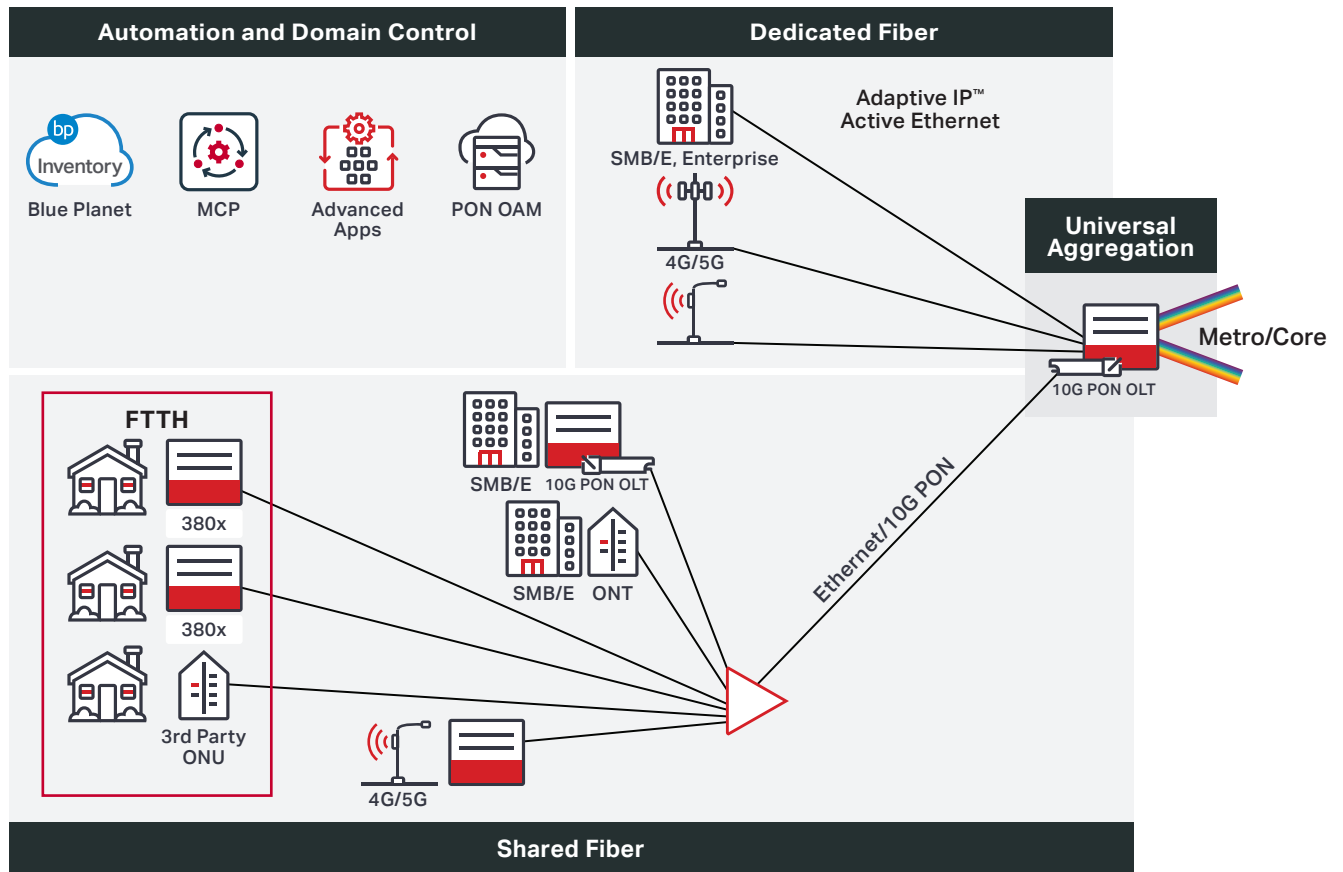
- **Intelligent data-driven automation** to provide improved service agility while reducing operational expenses and eliminating manual, error-prone tasks
- **Openness** to enable best-in-breed physical and virtual network infrastructure that leverages a broader and more secure vendor supply chain

A next-generation metro and edge network is a cost-effective solution that is simpler to deploy, manage, and maintain—and is critical to financial success in this hyper-competitive market, now and into the future.

### Preparing the network for anything

What does it take to master the edge? Fiber To The Home (FTTH) implemented by Ciena's Universal Aggregation solution is the answer.

Ciena's [Universal Aggregation](#) solution powered by [Adaptive IP™](#) provides a FTTH infrastructure that is optimized, scalable, and flexible. It supports 10G Passive Optical Network (PON) access over shared fiber—with a path to evolve to 25G PON and beyond—and is implemented using [μOLT \(Optical Line Terminal\) plugs](#) in Ciena's extensive family of routers. Ciena



offers Optical Network Units (ONUs) specifically designed for residential customer needs at customer premises. Ciena's approach is based on openness, providing service providers with greater choice to select ONUs from a broader ecosystem of vendors. Additionally, the same infrastructure supports 10GbE, 25GbE, and 100GbE access over dedicated fiber with the capacity to aggregate the traffic over multiple 100 Gb/s, 200 Gb/s, or 400 Gb/s grey or coherent optical interfaces. The combined result is a highly optimized network infrastructure that supports multiple diverse customer profiles.

This approach leverages Ciena's next-generation [Manage, Control and Plan \(MCP\) domain controller](#); rich PON Operations, Administration, and Maintenance (OAM) capabilities; and [Blue Planet® Inventory \(BPI\)](#) to automate service creation and manage a multi-layer network. This allows network operators to stay ahead of their customer demands in an agile and cost-effective way.

Ciena's intelligent data-driven approach offers advanced real-time visibility and performance across services in all network layers. This simplifies operations, allowing network planners to make quicker, more informed decisions enabled by advanced Adaptive IP Apps, which are seamlessly integrated with MCP.

The last important piece of Ciena's FTTH approach is [Ciena Services](#), which helps service providers successfully move forward on their unique journey to the Adaptive Network™.


## Unified network, multiplied opportunities

The Adaptive Network approach offers a differentiated value proposition to address FTTH opportunities. It is CAPEX-optimized with purpose-built routers supporting a wide range of services and interfaces. Being highly programmable protects service provider investments as they modernize their network infrastructure for the future.

Ciena's 10G PON μOLT pluggable transceiver family and desktop ONUs allow network operators to leverage a flexible pay-as-you-grow business model. A single platform supports multiple concurrent services to reduce power, space, and costs.

Ciena's solution simplifies the operational side of deploying, maintaining, and managing FTTH infrastructure. This allows for faster services creation, new customer activation, and the ability to modify existing services to rapidly address evolving application requirements. Together, this enables service providers to offer a richer and highly differentiated residential services portfolio to increase both revenues and market share.

Ciena offers the ideal [solution](#) to create a better connected 'home sweet home.'

 **Game on! Universal aggregation for the residence**  
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