High-capacity Aggregation Opens New PON Possibilities

Single highly efficient platform yields greater revenue and resiliency

Build a high-capacity aggregation network—a new approach to boost efficiency and multiply revenues by supporting multiple services and customer types.

Until very recently, 1G and 2.5G Passive Optical Network (PON) architectures were typically adequate for providing broadband services for residential and Small and Medium Business (SMB) customers, but no longer. With increased home and remote working—and near-ubiquitous adoption of video streaming, social networking, and gaming—operators are now looking to migrate to 10G XGS-PON and beyond. But when it comes to building this type of network, there's a clear path to success: *using a single, highly efficient architecture that can deliver multiple services simultaneously while scaling to meet future demands.*

But as 10G XGS-PON becomes an urgent priority, the question for operators is how can they build this kind of network in a way that minimizes deployment costs, simplifies operations, maximizes efficiency, and unlocks additional future revenue streams? Solutions for 10G XGS-PON also need to anticipate mid-term growth in bandwidth demand by providing a seamless technology roadmap to 25G PON with no need for significant redesign of the architecture.

Typically, operators built separate network infrastructures for business and residential services, including PON. But things have changed. Ciena's Universal Aggregation (UA) solution makes it possible to aggregate and deliver traffic from residential and business Ethernet networks on the same, highly efficient architecture, allowing operators to achieve new levels of operating efficiency and maximize their revenue potential.

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Out with the old

Traditionally, chassis-based PON architectures pair an Optical Line Terminal (OLT) with a dedicated router for each PON port. The OLT separates PON traffic, such as residential broadband traffic, from other services on the network—allowing it to be connected to the appropriate Internet exchange (IX), Broadband Network Gateway (BNG)/virtual BNG (vBNG), or aggregation site as appropriate.

Deployment of traditional PON architectures can also be inefficient because it becomes necessary to purchase multiport line cards, even if additional OLT support is not needed. Futhermore, two software developments are required to interface to the north-bound management or Software-Defined Networking (SDN) controller, leading to high development costs and increased overall Total Cost of Ownership (TCO). It also negatively impacts the space and power requirements, making the network less efficient and sustainable.

Perhaps most importantly, traditional PON architectures require separate infrastructures for each kind of service delivered over the network. For example, a traditional PON network might restrict an operator to delivering just pure-play residential services, even if the fiber route passes within meters of a complex of corporate offices. In other words, it is impossible to pick up business revenues in the area.

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Traditional vendor platforms	Ciena's Universal Aggregation
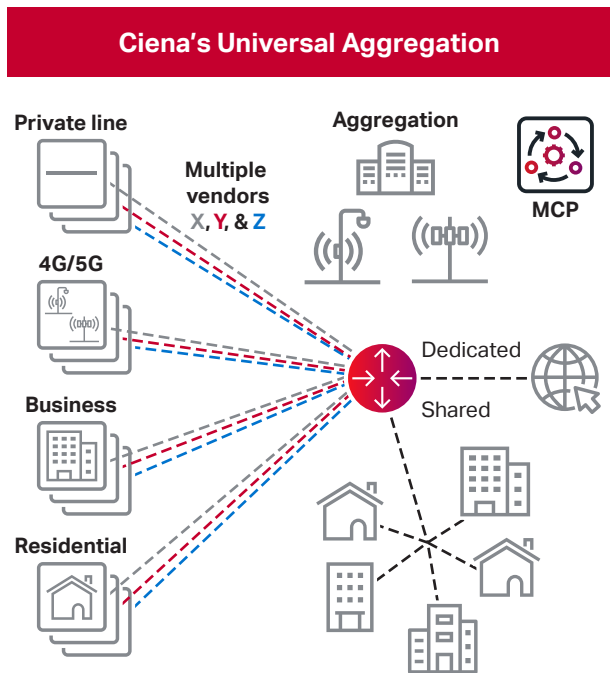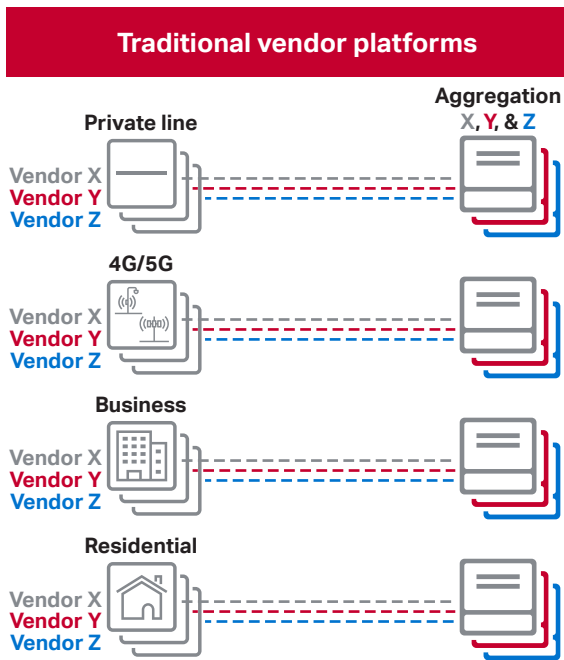
In with the new

Ciena's UA solution provides all the components and management software needed for an advanced PON network—in a single platform.

This solution provides some very compelling advantages when compared to traditional PON implementations. First, it is incredibly efficient, both in terms of deployment and operations. Second, effective capacity planning is easier to achieve since multiple services are delivered over the same network. Third, it also means there is no port or fiber 'burning' and every network component and resource can be utilized to the fullest degree possible.

Unlocking new revenue potential

When looking at business prospects, Ciena's UA solution opens a range of new revenue and deployment opportunities. It becomes possible to:

- Pick up xHaul traffic from cell towers close to fiber assets, which are straining under the weight of 4G and, increasingly, 5G traffic. Ciena's UA solution allows this mobile traffic to be aggregated with traffic from other services and delivered over the Ciena architecture.

- Serve business customers with dedicated 1/10/25/100G Ethernet services, further monetizing the network and adding to the bottom line.

- Boost efficiency and revenue potential with fiber sharing in the access network, further reducing CAPEX and OPEX.

- Provide full flexibility to meet a wide range of broadband needs, including interoperability with multi-vendor Optical Network Units (ONUs); a range of platforms that support 12 to 48 XGS-PON ports; and temperature-hardened and weatherproof devices that can be mounted on posts in outdoor and challenging environments close to subscribers.

Maximize 5G opportunities and revenues

When it comes to new 5G deployments, operators face scalability and cost issues related to massive traffic transport requirements. To be effective, small cells need high-density optical fiber connectivity, especially in crowded areas such as high-occupancy buildings, shopping malls, and public venues. Additionally, the high-bandwidth apps supported by 5G, such as 4K video calls and gaming, will create a more symmetrical traffic profile.

With Ciena's UA solution, xHaul traffic from 4G and 5G mobile networks can also be aggregated on the same architecture and transported from a building, outside cabinet, or pole. The results are reduced cost, simplified operations, and new revenue opportunities.

Quantifying the commercial benefits

With this approach, operators can achieve the lowest possible cost per 10G XGS-PON port, while also opening the door to new business and mobile services revenues. For example, there is the opportunity to provide lower-cost connectivity services for business customers looking to connect to cloud services.

For these reasons, Ciena's UA solution delivers major commercial benefits when compared with traditional PON networks:

1. First, it reduces the cost of deploying and operating broadband solutions that require both an OLT and a dedicated router at every port. In a network of 10,000 ports—or even 100,000 ports in a large network—the potential savings are extremely large, helping operators achieve far higher service margins.

2. Second, and equally importantly, the possibility of aggregating dedicated business Ethernet services and mobile xHaul traffic on the same Ciena architecture creates major new revenue potential.

To demonstrate this, Ciena's pluggable broadband approach can deliver up to 90 percent in power savings—and 100 percent if space is being leased for the initial application. When converging 1,280 residential users, and 100 ports of either xHaul and/or business Ethernet services at the same location, savings of 25 percent on power and 40 percent for space are easily achievable compared to requirements for dedicated router and PON products. In this way, the solution can deliver CAPEX savings of between 10 and 20 percent, and even higher efficiencies if used in remote locations such as a cabinet or pole.

In the final analysis, the more services added to the network, the more the revenue projection increases. Ciena's (up to) 400G Network-to-Network Interface (NNI) links ensure that the environment can also be scaled quickly and simply to meet the demands of new residential, business, and mobile customers. This means new revenue potential is not stranded and is virtually unlimited when backed with the right business strategy.

UA and XGS-PON use cases
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UA and XGS-PON success stories

Customers are using Ciena's UA and 10G XGS-PON solutions to dramatically increase their network efficiency and to create new revenue streams. To do so, they are creating networks that support home, work, and remote (including mobile) connectivity scenarios.

Ciena consultants can demonstrate how a business case can be tailored for your specific network. Plus, Ciena's new mapping model is underpinned with expert consultancy from Ciena's pre-sales teams. This frees operators from complex GPS-based maps that require specialist knowledge and may not optimize network designs based on the 'density' of subscriber populations.

Access architecture advantages
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