



COMMSCOPE®

Cloud-to-edge PON solutions for cable operators

Bring HFC and FTTH together with a future-ready network that's built for efficiency



Seize the opportunity for next-generation broadband services

With subscriber demand for high-capacity broadband on the rise, MSOs are poised to deliver a new set of advanced services based on next-generation PON technology. But this opportunity is not exclusive to cable operators. Broadband competition is heating up in a range of markets, with billions in public funding fueling new fiber-to-the-home buildouts by service providers of all kinds in low-density and underserved environments.

For cable operators, staying competitive and seizing the all-fiber opportunity does not mean walking away from existing investments in HFC networks and DOCSIS®. The key to successful network evolution is to extend the lifespan of their existing networks, while deploying PON solutions that can coexist alongside them and provide an evolutionary path to what's next.

Leveraging CommScope's flexible PON solutions and expertise, cable operators can transition to PON using the fiber strategy that makes the most sense for their business. This may include greenfield extensions of PON service to new neighborhoods or major footprint expansions using government funds. It may also include strategic overbuilds within existing HFC footprint, leveraging PON to create new service tiers for high-bandwidth residential and business subscribers to reduce traffic on the HFC network. Subscribers and services can then be added to PON networks over time to provide a gradual cutover that maximizes existing HFC investments while helping cable operators remain competitive.

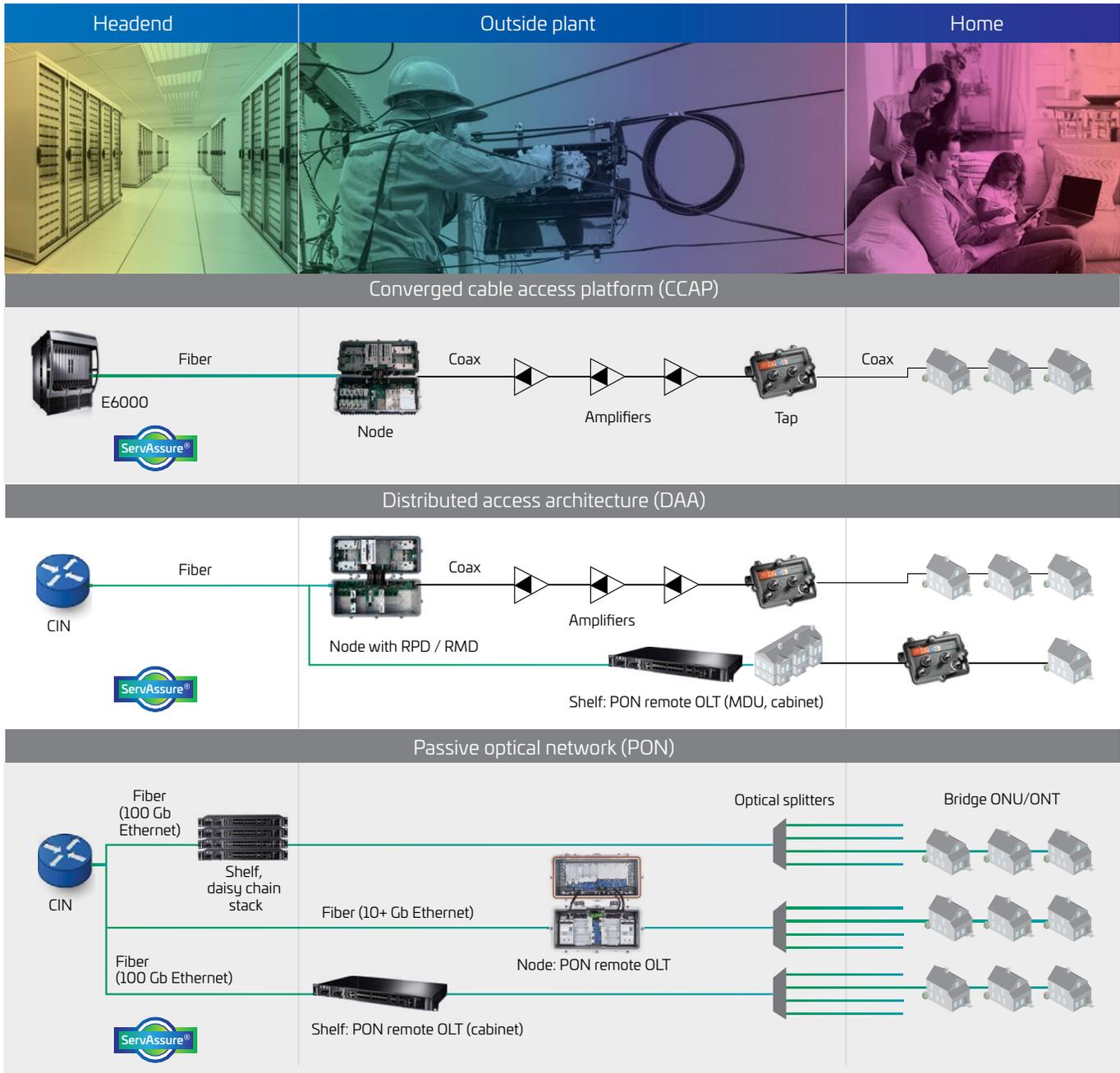
Deploy a flexible, unified network with a built-in competitive edge

Next-generation PON technologies already deliver speeds of 10Gbps with a roadmap to 25, 50G and beyond. But deploying a new network technology comes with challenges—high costs, a lack of skilled labor, and the need to maintain two networks, to name a few. What if you could deploy a cloud-to-edge next-gen PON solution suite that's flexible enough to ease the transition from HFC to PON and allows you to choose EPON or GPON technology—all while unifying network management and simplifying deployment?

Now you can with CommScope.



Target broadband access architectures



CommScope's deep experience with DAA has helped inspire our cloud-to-edge next-gen PON solution suite. Our solutions are flexible, truly open, and dynamic, and they are designed to evolve seamlessly and cost effectively from HFC to all-fiber. Whether deploying EPON or GPON/XGS-PON, MSOs can trust CommScope to deliver solutions that leverage their existing infrastructure while allowing them to manage mixed networks in parallel through a single pane of glass.

With CommScope, MSOs can choose the right network migration path for their service and business goals, with the expert help they'll need to execute even the most ambitious PON rollouts successfully. And with our complete fiber connectivity portfolio and deep architectural expertise, our customers can trust that their active and passive networks are built to work together and optimized for their unique environments and business goals.

The CommScope FLX™ portfolio

The CommScope FLX portfolio gives MSOs the flexibility they need to migrate their networks to PON on their own terms. Operators can choose to build out an EPON network with DPoE, which provides the fastest path to PON, requires minimal changes to headend and CPE infrastructure, and offers a low total CapEx. They can also deploy a GPON/XGS-PON network for maximum performance and a modern back office. Regardless of the PON technology they choose, operators can rely on CommScope to deliver the solutions and expertise they need to execute the transition to PON successfully.

The CommScope FLX portfolio also allows MSOs to have flexibility in architectural choices. They can begin with a traditional hardware-based infrastructure that runs management and control plane functions within the OLT. When they're ready, operators

can transition to a disaggregated, software-defined architecture that runs these services on COTS servers or in the cloud. This helps improve capital efficiencies, reduce operating expenses, and accelerate the rollout of new features.

CommScope extends this flexibility from cloud to edge, offering OLT devices that can be deployed in central facilities such as the headend or hub, or remote locations such as strand-mounted node enclosures or cabinets. We also offer EPON and GPON ONU solutions that provide 1G and 10G service at the customer premises, and a complete line of network and OLT optics.

| CommScope FLX portfolio | | IEEE PON solution | ITU PON solution |
|---|----------|---|---|
| | | 1G/10G EPON | GPON / XGS PON |
| OLT  | Physical | CommScope FLX XE4202M node OLT (1G/10G EPON) | CommScope FLX XP6164S shelf OLT (GPON, XGS PON, Combo) CommScope FLX XP4202M node OLT (GPON, XGS PON, Combo) |
| | Virtual | OLT Manager | vOLT vOMCI vBNG |
| Optics  | PON OLT | CommScope FLX PON XFP (EPON/10G EPON) | CommScope FLX PON SFP+ (GPON, XGS PON, Combo) |
| | Network | Hardened network uplink optics (10G/100G/DWDM/CWDM options) | |
| ONU/ONT  | | CommScope FLX SF2400E (1G, Turbo EPON) CommScope FLX SF2101XE (10G EPON) | CommScope FLX SF2400G (GPON) CommScope FLX SF2101XG (XGS PON) |

Work smarter, not harder with ServAssure® solutions

When cable operators are ready for what's next in network device management and monitoring, they're ready for ServAssure.

ServAssure is a hardware and vendor-agnostic platform that gives service providers the visibility and control they need to streamline management, detect and prevent outages proactively, improve subscriber experiences, and reduce OpEx.

ServAssure Domain Manager: Future-ready, universal infrastructure

ServAssure Domain Manager is a standards-based platform that gives service providers a single location from which to manage hardware and services. Automated workflows and tools provide continuous visibility and control across domains and vendors. The Domain Manager is modular and extendable with a variety of platform deployment options (cloud/virtualization).

Key benefits

- Optimize operations with a centralized, universal platform
- Simplify device onboarding, configuring and licensing with secure access
- Save time managing devices with automation
- Improve performance with event and telemetry logging, visibility and export tools
- Reduce IT costs with automated, agile deployment options

ServAssure NXT Performance Manager: Anticipate and solve tomorrow's problems today

The system uses artificial intelligence (AI), machine learning (ML) and domain-specific analysis to predict and help remediate service disruptions, often before they affect subscribers. Reduce customer calls, truck rolls and service costs. Ideal for large system deployments, it's also available as a hosted service for smaller to midsize service providers.

CommScope has deep expertise in network management software, with thousands of subscriber termination systems that represent all major brands. CommScope's solutions help service providers unleash the power of data to prevent and solve performance issues.

Key benefits

- Accelerate diagnosis/resolution times and enhance quality of technician visits with AI and ML
- Identify and minimize risks proactively with actionable, detailed insights
- Monitor network performance proactively and continuously with real-time service alarms
- Simplify troubleshooting with advanced tools for field technicians and network operations centers
- Improve situational awareness using geo and logic map views



Trusted FTTH cabling and connectivity solutions

By leveraging CommScope's complete line of FTTH passives and our deep expertise in inside and outside plant architectures, cable operators can trust that their next-gen PON networks are easy to deploy and optimized for end-to-end high performance. We offer a diverse line of cabinets, closures, terminals, and cabling to support any deployment type. Our innovative fiber indexing and optical tap technologies reduce the need for skilled labor and splicing in the outside plant. And with CommScope's NOVUX™, the industry's first modular FTTH ecosystem, we're making connectivity easier to deploy than ever before.

CommScope has been building passive networks for over 40 years. Our experience helps us guide cable operators on the right topologies for their unique networks, while considering the many factors that impact these critical decisions.

For example, our interactive FTTH ePlanner helps network engineers and consultants easily understand and navigate the choices that go into transforming their conceptual network vision into a working design. From the central office, feeder, and distribution network to the inside of the customer's home, each section introduces the key topologies, product types, and design considerations involved in building out the network. It uses interactive decision trees to help guide users through key decisions as they configure a customized broadband network design.



CommScope solves the unique PON challenges of rural deployment

In rural environments, where housing density is low, deploying PON in a traditional centralized architecture can be a challenge from a cost and time to deploy perspective. However, MSOs can leverage their existing nodes infrastructure, available feeder fiber and take advantage of R-OLTs that can be housed into these nodes to significantly improve both time and costs of rural deployment. These benefits are revealed in detail when we review the key takeaways from a recent study conducted in an area with an average of 7.6 homes per mile (4.7 homes per kilometer). Similar to DAA deployments, the R-OLTs can be easily provisioned, monitored and new features updated in the field with additional operational efficiencies and savings coming from the use of a single management system for both technologies.



Reduced facilities costs and deployment time



Increased hardware utilization



Improved management and service efficiency



Optimized outside plant investments

Constructing a traditional walk-in facility can cost hundreds of thousands of dollars per site and take several months to complete. But a 40-80% savings has been demonstrated with the re-use of existing housings and power available at the node and the use of environmentally hardened, smaller power footprint R-OLTs. We also found deployment time to be reduced by 70-80% when compared to the construction of traditional facilities, due to the reduction or elimination of costly and time-consuming permitting requirements.

Many of today's existing OLTs have been designed for high-density environments, which leads to inefficiencies in hardware utilization when they are deployed in rural markets. In our study, the use of environmentally hardened R-OLTs that can be deployed with low initial port counts and scaled through the addition of ports and the transition from a 1:128 split ratio to a 1:64 split ratio when more bandwidth capacity is required.

In rural environments, it is critical to control the costs of network maintenance and management. We discovered that R-OLTs contributed to a reduction in the volume and complexity of truck rolls in low-density environments. These savings are derived from several features of CommScope's R-OLT and ServAssure solutions, which include cloud-based management, zero-touch provisioning, proactive performance management, and the ability to deliver updates and new features over the network, which is similar with DAA deployments.

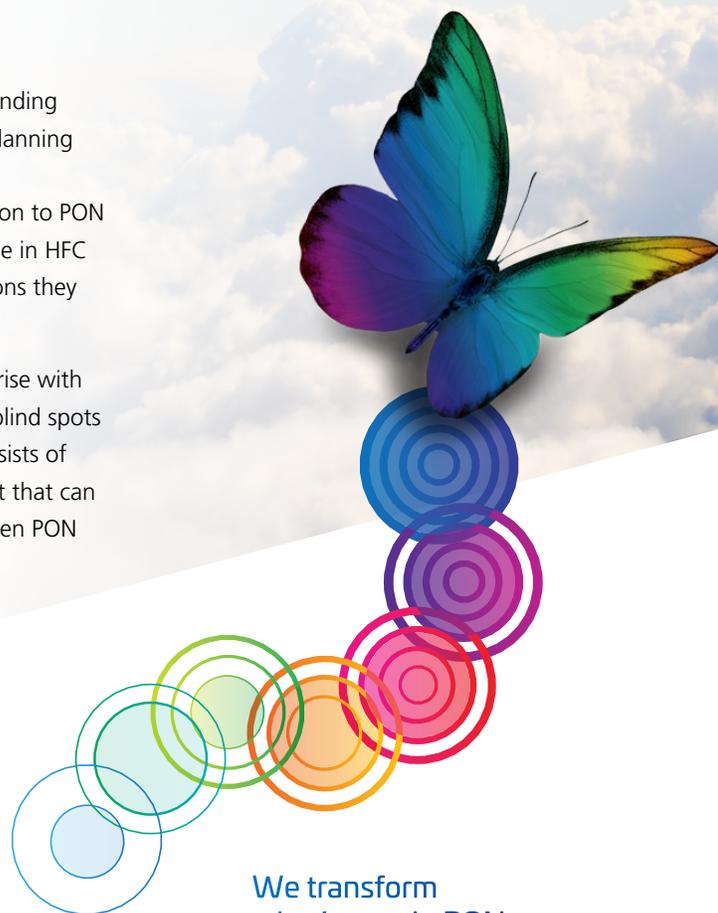
Covering long distances with fiber to reach relatively few homes can strain the finances of rural service providers. But the fiber-efficient nature of R-OLTs combined with sound topology choices were shown to help. By placing the last active device deeper in the network, fiber counts and their associated costs were reduced substantially in the feeder network. Passive connectivity costs were driven even lower thanks to deploying R-OLTs deeper in the network. This allows CommScope's cascaded, tap, and indexing technologies—which benefit from the increased optical budget—to be used, creating up to a 33% savings in labor costs.



A unique combination of PON and HFC expertise

For cable operators, the journey to next-gen PON begins with an understanding of existing network architectures, facilities, and infrastructure—then the planning begins. That’s where an experienced partner can make all the difference. CommScope’s Professional Services team can help MSOs make the transition to PON seamless, while reducing costs and time to deployment. Our deep expertise in HFC and FTTH networks helps us guide cable operators through the key decisions they need to make as they transition to PON.

At CommScope, we understand the complex integration issues that can arise with mixed networks, and we can help ensure that there are no loose ends or blind spots throughout planning and deployment. Our Professional Services team consists of more than 1,300 professionals in 30 countries, and offers a diverse skill set that can expedite and improve the planning, design, and implementation of next-gen PON networks for cable operators worldwide.



Why CommScope?

CommScope not only offers a comprehensive portfolio of solutions that spans multiple network architectures, but we also offer the expertise it takes to bring them together in a 360-degree view. With CommScope on your team, you can anticipate and solve tomorrow’s challenges as you evolve for what is next.

We transform what’s next in PON



Deep expertise

We’ve designed and deployed networks of all types and all sizes—all around the globe. From HFC and DOCSIS to GPON, EPON, and 10G EPON, we’ve helped service providers evolve their networks with speed and success.



Open and independent

Our solutions are built for flexibility, allowing them to integrate into today’s real-world environments seamlessly and at scale. We provide a hardware agnostic approach that is designed for today’s reality of mixed network technologies and multivendor environments.



End-to-end solutions

CommScope’s expertise does not begin and end with our hardware. We take a comprehensive approach to network evolution that spans actives, passives, hardware, software, data center, and cloud—and we offer the expertise it takes to bring it all together.

CommScope pushes the boundaries of communications technology with game-changing ideas and ground-breaking discoveries that spark profound human achievement. We collaborate with our customers and partners to design, create and build the world's most advanced networks. It is our passion and commitment to identify the next opportunity and realize a better tomorrow. Discover more at commscope.com.

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