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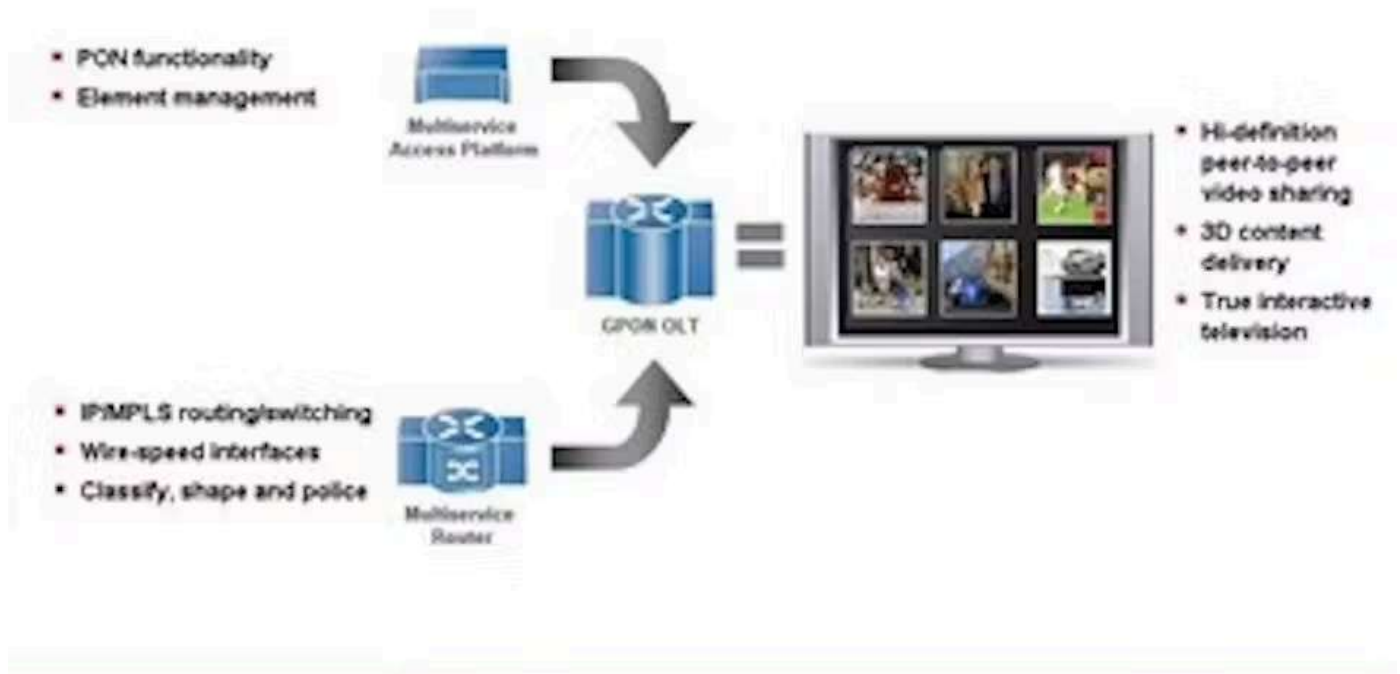
MPLS and GPON: Happy together in the next-generation OLT

By Tom Rarick and Tim Doiron, Tellabs -- When implemented correctly, MPLS in combination with GPON will create a network capable of handling all current services while providing the technology and infrastructure required to deliver tomorrow's services.

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ServiceAware GPON OLT: Economical High Density Applications



When implemented correctly, MPLS in combination with GPON will create a network capable of handling all current services while providing the technology and infrastructure required to deliver tomorrow's services.

By Tom Rarick and Tim Doiron, Tellabs

For generations, the public switched telephone network (PSTN) has delivered communications services with a high degree of reliability. And consumers now demand that same quality—or even better—from services such as voice over Internet Protocol (VoIP), video-on-demand (VoD), and virtual private LAN services (VPLS).

To satisfy customers' demands, these services must be virtualized and the proper quality-of-service (QoS) treatment applied. In some cases, best-of-class service may be acceptable. For example, customers may not mind if high-speed

Internet access slows down during peak utilization periods if the price and service-level agreement (SLA) is appropriate. But if video delivery is hampered, by contrast, consumer satisfaction will certainly plummet.

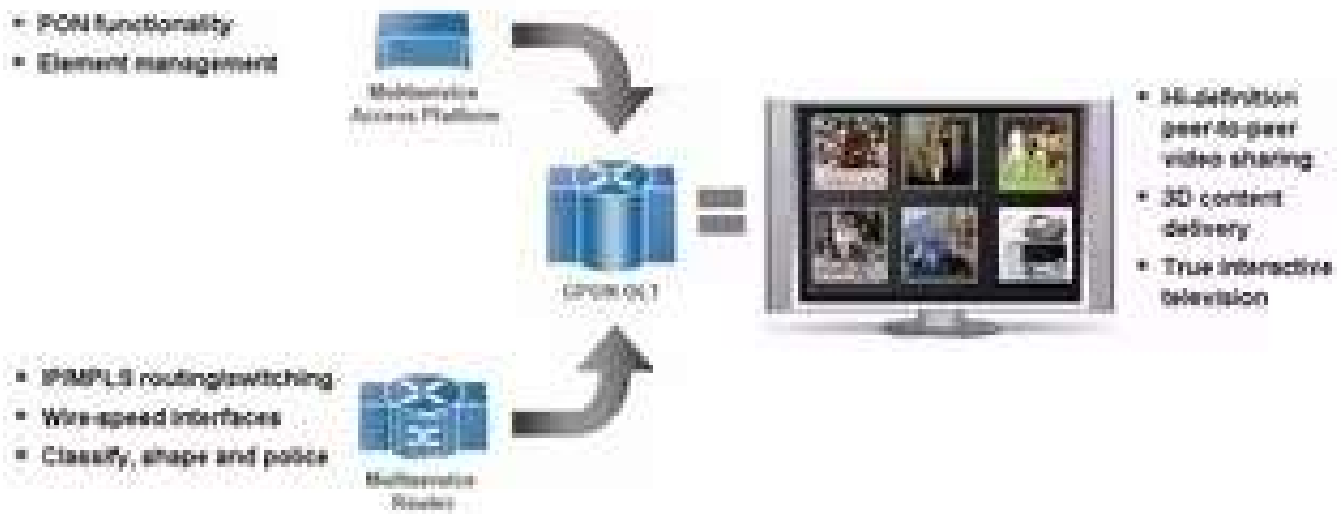
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Gigabit passive optical network (GPON) technology provides the requisite bandwidth to support new revenue-generating services. Industry-leading GPON networks deliver 2.5 Gbits/sec downstream and 1.2 Gbits/sec upstream. However, service providers still need a way to ensure the quality and reliability of the content riding over GPON. One logical way to accomplish this goal is to push multiprotocol label switching (MPLS) functionality out to the optical line terminal (OLT). By doing so, service providers can guarantee bandwidth and ensure QoS all the way to the subscriber's home.



ServiceAware GPON OLT: Economical High Density Applications



The MPLS-enabled OLT pushes subscriber-centric, service-aware intelligence to the end user, while integrated service edge router functionality enables service providers to reduce operational and capital equipment costs.

An MPLS-enabled GPON architecture offers a number of features not possible with an all-IP, class-of-service-based network:

- It is far more scalable than an all-Ethernet network because individual subscriber media access controller (MAC) addresses are managed by the OLTs, not the core switches.
- Integrating service edge router functionality into OLTs inherently adds subscriber awareness, ensuring that subscribers' service expectations are met.
- The traffic engineering capabilities of MPLS enable simple connection admission control (CAC) processes for individual sessions. Therefore, if enough bandwidth is available, a session is allowed to proceed.

- Service providers can easily monitor the utilization of MPLS trunks to determine whether capacity changes are needed.

Quality assurance, opex reduction

With MPLS, service providers can combine a large number of networks and services onto a single, unified core network, enabling service providers to more effectively engineer traffic, be it voice, video, or data. The MPLS-enabled OLT terminates Ethernet-based networks toward the subscriber and forwards Layer 3 traffic to the core network over traffic-engineered MPLS trunks.

Using traffic-engineered label switched paths (LSPs), service providers can provide adequate bandwidth between nodes. They can also provide logical separation between different Layer 3 networks running over the same physical infrastructure.

By pushing MPLS technology to the OLT, service providers can easily separate and manage the various services as they converge on the OLT. Applications such as video, high-speed Internet access, VoIP, and future services will all come from separate service networks and converge at one point—the OLT. MPLS provides the tools for each of these services to be virtualized at the OLT and given the proper QoS treatment.

Moreover, MPLS CAC functions can be used to match service bandwidth demands against bandwidth availability. Therefore, if additional bandwidth is required for a particular service, the OLT will use CAC functions to determine whether that bandwidth is available. That service will either be delivered under predefined QoS parameters, or it will be denied until proper QoS can be delivered.



ServiceAware OLT: Service Differentiation and QoS

Undifferentiated Service Delivery

- > All services in one best-effort path
- > No service differentiation
- > Fixed service profiles per subscriber

Virtualized Service Delivery

- > Segment services bandwidth & QoS
- > Participate in services "value chain"
- > Dynamic virtual services per subscriber



Extending MPLS to the OLT enables service providers to provide segmented and virtualized services to ensure proper QoS treatment and subscriber satisfaction.

MPLS also offers high reliability via fast reroute (FRR), which ensures both the quality and the availability of services provided by an MPLS-enabled OLT. With MPLS FRR capabilities, the network can maintain high availability even in the event of a failure. Industry-leading FRR implementations can switch traffic around an outage point and onto an alternative network path in less than 50 msec, leaving customers unaware that an outage occurred.

Finally, with MPLS in the OLT, service providers can meet customers' needs while maximizing network assets and reducing operational and capital equipment costs. Under alternative IP networking approaches, network capacity must be overbuilt in an attempt to meet service expectations. The MPLS-enabled OLT, by contrast, integrates the functionality of the service edge router, thereby eliminating costly electronics and reducing interconnecting ports and integrated

hardware. The MPLS-based architecture results in a significantly lower cost per subscriber versus an architecture that employs separate devices.

Conclusion

One of the best ways for service providers to guarantee quality is to combine MPLS with GPON technology. The superior traffic engineering and reliability of MPLS and the high bandwidth offered by GPON enable service providers to satisfy subscribers' demands for traditional services such as voice, video, and Internet access. More importantly, the combination of MPLS and GPON also provides a strong foundation for the delivery of future, cutting-edge services such as 3D video and integrated merchandising.

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Building Broadband: Comcast is lighting up Duvall, Washington, with symmetrical broadband; Ezeek kicks off the first phase of its Santa Fe, New Mexico, fiber build

In this latest issue of Building Broadband, we're tracking new broadband deployments from Comcast, Ezeek Fiber, Gateway Fiber, Lyte Fiber, Mediacom, Surf Internet and TDS Telecom.

[Sean Buckley](#)

Oct. 23, 2025

7 min read





Comcast, Ezeek Fiber, Gateway Fiber, Lyte Fiber, Mediacom, Ripple Fiber, Surf
Internet and TDS Telecom are all expanding broadband in various communities

through a mix of venture capital and state funding sources.



Initial Phase of Expansion Brings Xfinity and Comcast Business Services to more than 1,400 Residents and Businesses for the First Time.

Comcast is lighting up Duvall, Washington, with symmetrical broadband

Comcast is connecting over 1,400 homes and businesses in Duvall, Washington, to symmetrical fiber Internet through the initial expansion of its network to the region—bringing Internet, mobile, entertainment, and security services

from [Xfinity](#) and [Comcast Business](#) to

residents and businesses for the first time. In October, Comcast will connect 200 homes and more than 600 in November, and another 600 in December for a total of more than 1,400 by the end of 2025. The company also expects to extend its network to an additional 2,000 homes and businesses in Duvall in 2026. Over the past three years, Comcast has invested more than \$1.2 billion in technology and infrastructure in Washington state.

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Ezee kicks off the first phase of its Santa Fe, New Mexico fiber build

As part of a partnership with the City of Santa Fe, Ezee Fiber plans to begin construction in the public right-of-way to expand the availability of high-speed



internet services. The construction will begin in late October to early November. Ezee Fiber's infrastructure upgrades will make its high-speed internet services available to nearly 5,000 Santa Fe homes in this first phase, which includes Ezee Fiber's full suite of services, including multi-gig broadband speeds for residential and business customers. With construction expected to continue through 2026, Ezee Fiber is committed to ensuring that homes and businesses have the foundational next-generation network in place as soon as practical.

Gateway Fiber begins Moorhead, MN fiber build

Gateway Fiber officially celebrated the start of network construction in Moorhead, Minnesota with a ribbon-cutting ceremony on October 16 at the Hjemkomst Center, commemorating the beginning of its all-fiber network build. The event marked an exciting milestone for residents and businesses eager for faster, more reliable connectivity. City officials, community leaders, and Gateway Fiber team members joined together to celebrate the project, which will deliver 100% fiber optic connections to homes and businesses throughout Moorhead. Gateway Fiber's network will deliver symmetrical upload and download speeds up to 1 Gbps or higher. Its expansion into Moorhead continues the company's growth across Minnesota. The construction phase is now underway, with the first customers expected to come online in the coming months.



Gateway Fiber employees and Fargo-Moorhead Chamber of Commerce members and guests celebrated the start of construction on the internet provider's new 100% fiber internet service in Moorhead, MN, on October 16, 2025.



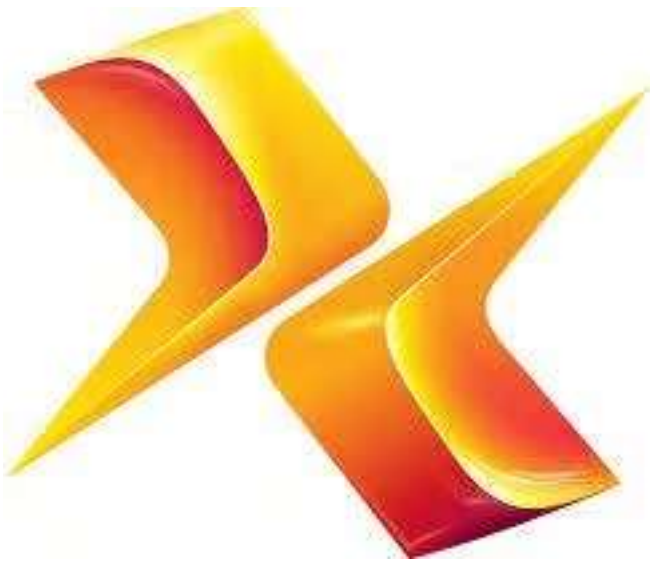
Lyte was only one of 22 applicants who were selected to be selected for BEAD and Texas TMAP funding.

Lyte Fiber wins \$142M in BEAD and TMAP funding to enhance broadband across 7 Texas counties

Houston-based Lyte Fiber has been preliminarily awarded \$142 million by the State of Texas – the third-largest award in the program – to expand high-speed fiber internet to thousands of

unserved and underserved locations across seven counties, outpacing bids from some of the nation's biggest carriers. The grant award includes \$119 million in federal Broadband Equity, Access, and Deployment (BEAD) funding and \$23 million from the Texas Match Assistance Program (TMAP), provided by the state's Broadband Infrastructure Fund, a voter-approved initiative to expand broadband statewide. The program, administered by the Texas Broadband

Development Office under the Office of the Comptroller, drew more than 4,000 applications with an average of six competing projects per service area. Only 22 applicants were selected. Lyte will invest an additional \$40 million privately to expand the reach of its BEAD funding locations. The preliminary awarded projects span Bee, Cass, Harris, Kleberg, Marion, Navarro, and San Patricio counties, connecting nearly 9,700 homes, businesses, and community anchor institutions, such as schools, health clinics, and public safety entities. About 96 percent of the locations will be connected to a fiber network delivering speeds up to 10 Gbps. This latest award follows the nearly \$58 million Lyte received earlier this year through the State's Bringing Online Opportunities to Texas (BOOT) II Program. With significant backing from SDC Capital's \$2.1 billion Digital Infrastructure Opportunity Fund IV and an executive team with over 150 years of telecom experience, Lyte is poised to deliver enduring broadband solutions designed to last.



These network improvements will allow Mediacom to ramp up from the one and two-gigabit offerings of today to speeds of 10 gigabits per second and beyond in the coming years.

Mediacom Communications wraps multi-gig upgrades in Des Moines and Cedar Rapids, Iowa

Caption: The enhancements to Mediacom's fiber-powered network create more responsive end-to-end experiences for consumers

Mediacom Communications recently completed a multi-gigabit and symmetrical speed broadband upgrade in the cities of Des Moines and Cedar Rapids, expanding the company's total number of upgraded homes and

businesses by 200,000. Leveraging new technology that builds upon Mediacom's existing fiber-rich network architecture, these upgrades were completed without the company having to dig up yards, add bulky equipment, or lay new cables. Upgrades are now underway in suburban areas surrounding Des Moines. Together with projects in Mediacom's Delaware, Maryland, Florida

Panhandle, Metro Minneapolis, and Quad Cities markets, the company expects to offer enhanced broadband services to 1 million households by the end of 2026. These network improvements will allow Mediacom to ramp up from the one and two-gigabit offerings of today to speeds of 10 Gbps and beyond in the coming years.



Ripple Fiber continues to progress with its Michigan fiber network buildout.

Ripple Fiber moves forward with Michigan network buildout

Ripple Fiber is launching service for over 35,000 households in Plymouth and Canton, Michigan. This achievement follows the recent launch of service in nearby Allen Park earlier this year. The remainder of Ripple Fiber's current Wayne County project, which will serve over 60,000 homes,

expands into Livonia, Garden City, and Westland, where construction will continue into 2026.

Surf Internet invests \$11.4M in Northern Michigan fiber investment

Surf Internet has launched its expansion into northern Michigan, marking its move into what the company calls its "new northern frontier." With an \$11.4 million private investment, Surf is expanding fiber connectivity to 8,965 homes and businesses—bringing greater access and choice to the communities of Charlevoix, Petoskey, Boyne City, East Jordan, and Harbor Springs.

Construction is planned to begin this winter. Surf's move north builds on its momentum across Michigan's lower peninsula, following recent expansions in communities such as Sparta, Mason, and Fowlerville. The company continues to invest heavily in Michigan's digital future, extending fiber networks to areas that



Michigan's Emmet and Charlevoix counties, marked in orange, are the focus of Surf Internet's latest multi-million-dollar fiber investment.

have historically lacked consistent, high-performance service. Surf has participated in Michigan's Realizing Opportunity with Broadband Infrastructure Networks (ROBIN) grant program and is among the top preliminary recipients in the Federal Broadband Equity, Access, and Deployment (BEAD) program, positioning the company to extend high-speed connectivity to even more unserved and underserved areas across the state.



TDS Telecom to deliver TDS fiber internet to 26,000 homes and businesses in Lake Geneva area.

TDS Telecom launches southeast Wisconsin fiber expansion

TDS Telecommunications is expanding its fiber broadband network to the Lake Geneva area in southeast Wisconsin, accelerating the Madison-based company's fiber growth in its home state. Construction is scheduled to begin in some areas as early as next

month. The soon-to-be TDS fiber communities are located mainly in Walworth County but also in Kenosha and Waukesha counties. Through these projects, the expanded fiber network will provide some of the fastest internet speeds in the world to approximately 26,000 homes and businesses. Communities in TDS' latest fiber expansion plans include Lake Geneva, Burlington, Camp Lake, Como, Delavan, East Troy, Genoa City, Pell Lake, Walworth, and Williams Bay. TDS is currently building fiber networks in virtually every corner of the state. Other communities with ongoing TDS fiber projects include Twin Lakes, Green Bay, Janesville, and Eau Claire. Additionally, TDS is tackling network upgrades in many rural areas within its existing service footprint.

Lightwave is tracking service providers' ongoing efforts to extend broadband to more homes and businesses via our Building Broadband series. If you want to share a new broadband build, contact Lightwave's Editor in Chief Sean Buckley at sbuckley@endeavorb2b.com.

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