Broadband Services Drive MSO Revenues
MSOs earn more from broadband services than from the video services they originally offered. In the past five years, cable providers have overtaken telecommunications service providers in net service adds by delivering higher-speed data.

These broadband services are essentially high-speed data (HSD) provided to residences and small to medium businesses. HSD is delivered via DOCSIS over hybrid fiber-coaxial (HFC) networks. The goal is to provide gigabit services, which are difficult to accommodate via HFC under DOCSIS 3.0. MSOs that upgrade to DOCSIS 3.1 will find it easier to offer gigabit services, but the upgrade is not trivial. The expense of upgrading to DOCSIS 3.1 is almost as great as upgrading HFC to fiber.

An all-fiber network, of course, provides a competitive advantage. Fiber futureproofs the network, is easier to scale, and is less expensive to operate than a coaxial cable network. Upgrading to a dark fiber plant using PON technology gives MSOs the greatest competitive advantage versus telco-based FTTH services.

Figure 1: Video and broadband contributions to total cable industry revenues

These broadband services are expected to grow rapidly in the future. The demand for high-speed data continues to grow, and competition is creating downward pressure on price. Customers are cutting the cord on pay-TV video service, reducing household expenses and creating custom viewing and channel lineups with on-demand OTT services. Generally, customers want more for less.

High-speed data customers want greater capacity—specifically, gigabit service. MSOs must cost-effectively deliver high-capacity data services with flexible scaling to address low-, medium-, and high-density markets.

Upgrading MSO networks involves addressing physical challenges—footprint, power, and heating and cooling—at headends.

In summary, MSOs need faster networks to meet broadband demands and retain premium customers, and those networks are needed now.

Figure 2: North American Internet data demand will continue to increase rapidly.

MSO customers are seeking higher performance and lower prices.

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**Smoothly Migrating MSOs to 10G-EPON**

**A Blade-based 10G-EPON Solution**
The Fujitsu 1FINITY A100 Access Blade is an optical line terminal (OLT) that provides a scalable, cost-effective, 10G-EPON solution to fiber networks—a solution superior to DOCSIS over HFC. The access blade deploys 10G-EPON optical line termination in a compact form factor and features non-blocking uplinks, automated provisioning, coexistence with 1G-EPON, and centralized software control.

The revolutionary 1FINITY platform has a disaggregated architecture that delivers individual functions on independent blades.

Traditional OLTs have converged shelf designs with large chassis footprints that consume valuable real estate. These devices require high power service connections that place significant demands on the heating and cooling systems of enclosures, buildings, or both. This results in substantial cost inefficiencies, since initial deployments typically involve just a few chassis slots. Use of the innovative A100 10G-EPON blade will reduce first cost and overall operating costs compared with traditional converged shelf designs.

The 1FINITY A100 has a 1RU form factor that allows full utilization of rack space. This design eliminates rack partitioning due to large chassis boundaries. Separating the blades from a traditional converged shelf provides service velocity and agile customization of the network—blades can be improved and replaced independently as quickly as technology advances.

With the 1RU granularity of the 1FINITY A100 blade, service providers can cost-efficiently size the OLT to match near-term requirements for low-, medium-, or high-density service. The scalability of a blade-centric architecture makes it possible to follow a pay-as-you-grow paradigm, with significant savings in hardware, floor space, real estate, and HVAC services.

**Non-blocking Uplinks Provide Competitive Advantages**
Service providers frequently offer additional bandwidth by reducing service oversubscription rates. Reducing the oversubscription rate on large chassis configurations results in unusable chassis slots. The non-blocking design of the 1FINITY A100 Access Blade eliminates this inefficient configuration and protects investments. The design provides flexible scaling from an oversubscribed configuration to non-blocking without changing OLT hardware.

**Compatible with Existing Systems**
With support for DOCSIS provisioning of EPON (DPoE), the 1FINITY A100 can be provisioned by the DOCSIS OSS. This capability offers quick and seamless integration into the service provider’s operating system, reduces PON deployment expense, and provides a central management path to SDN control. SNMP and command line interfaces seamlessly interoperate with existing alarm and performance monitoring applications.

MSOs that deploy 10G-EPON networks with the 1FINITY A100 can serve most customers initially with low-cost, widely available 1G ONUs. As demand increases for higher-performance service, higher-capacity 10G ONUs can be added as needed. Because industry-standard 1G ONUs and 10G ONUs can coexist on the network, operators can minimize both capital and operating expenses.

**Centralized Software Control**
As networks migrate to software automation and control, the 1FINITY A100 easily adapts to the SDN management architecture. Fujitsu integrates SDN control and network management applications on a common platform, providing a unique software solution for next-generation hardware. This architecture eliminates data redundancy and allows software-defined network control functions to take advantage of high-performance service assurance functions. Virtuora™ control applications have been developed on the OpenDaylight controller and may be ported to other controller frameworks. The control and management applications share a highly available and scalable platform. The modularity of Virtuora applications allows flexible deployment with the use of SDN control functions, NMS functions, or both.

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Smoothly Migrating MSOs to 10G-EPON

Conclusion
The 1FINITY A100 is part of a family of disaggregated blades that perform access, transport, lambda, and switch functions. This revolutionary architecture provides operational convergence, efficient scaling, evergreen technology, optimal rack space utilization, an open ecosystem, and a pay-as-you-grow approach.

The 1FINITY A100 Access Blade addresses the primary challenges of broadband service by offering fast time-to-market, efficient scaling, and low initial investment. Its blade architecture is a game-changer that solves the OLT space, power, and environmental challenges associated with converged shelf designs. The 1FINITY A100 provides non-blocking uplinks, works with the existing DOCSIS management operating system, and offers a path to centralized software control. The result is a highly cost-efficient and scalable solution for low-, medium-, and high-density applications providing gigabit services.