



The ABC's of Motorola's Passive Optical LAN Solution:

How educational institutions can leverage Passive Optical LAN for a cost-effective, green, converged network to support current and future education needs.

Installation of Motorola Passive Optical LAN saves valuable space -

A major university planning construction of a new dormitory recently decided to replace the traditional data, voice and video services with Motorola's Passive Optical LAN solution. The result was a significant drop in IT infrastructure cost and energy consumption, and enough space savings to allow the architect to add 20 more beds to the new dormitory building.

As students and faculty have developed an insatiable appetite for bandwidth, IT professionals and educational institutions are scrambling to bolster their traditional IT infrastructure to handle the increasing demand. More switches, more routers, more copper wire, and more access points – and that means higher cost, more power consumption, more strain on heating and cooling, and an ever-increasing carbon footprint.

Motorola's Passive Optical LAN (POL) solution provides educational institutions with an alternative architecture that requires fewer resources to deploy and maintain, and less capital/operational expenses than a traditional Ethernet LAN architecture. Most importantly, Motorola's POL enhances learning opportunities and experiences for students through the use of advanced communication technologies that enable rapid access to resources throughout the campus and out into world.

What Is Passive Optical LAN?

Motorola's POL solution is a highly reliable and economically disruptive enterprise LAN solution that offers converged voice, data and video at gigabit speeds to any Ethernet end point such as end user devices, access points and wireless controllers, application servers and printers. The POL solution is ideal for campus environments, new buildings or buildings undergoing major renovations, and provides schools with the ability to rapidly address evolving LAN requirements while dramatically simplifying the LAN and greatly reducing total life cycle costs.

Adapted from technology used in its widely deployed gigabit passive optical network (GPON) technology, Motorola's POL solution provides a great option for enterprises investigating long-term LAN strategies

and looking to drive capital and operational costs out of their network. The POL architecture consists of an Enterprise Aggregation Switch (EAS), end user devices called Work Group Terminals (WGTs), a fiber distribution hub (FDH) that includes passive splitters, a fiber distribution terminal (FDT), and the actual fiber infrastructure.

Motorola Enterprise Aggregation Switch (EAS):

Motorola's EAS enables the delivery of secure IP voice, video and data services over a single fiber to any stationary Ethernet device or system in the enterprise. The Motorola EAS is an aggregation switch that is generally collocated with a core switch router and supports up to 7168 Gigabit Ethernet ports per chassis, via 56 passive optical LANs, which each support up to 32 Work Group Terminals (WGT) at a maximum distance of 20km. In addition to the highly scalable nature of the EAS, inherent 128 bit AES encryption ensures a more secure physical layer

LAN infrastructure than ever before.

Motorola AXSvision Advanced Element Management System (EMS): AXSvision is a graphically rich element management application designed to manage all the active elements of the POL environment. Robust and reliable, Motorola's AXSvision software is designed for scalability and supports a broad range of deployment options, offering enterprises the ability to support simplification of their network's operation by reducing the complexity of system operations, monitoring and management.

Motorola Passive Optical LAN Workgroup Terminals (WGT): Motorola's WGTs connect stationary Ethernet devices and systems to the POL, providing line-rate gigabit services at distances of up to about 20km from the EAS. Motorola provides WGTs with various deployment and application options. Generally the WGT provides four 10/100/1000bT Ethernet ports with certain models supporting Power-over-Ethernet (PoE). Each device can be remotely directly monitored, maintained, and upgraded via AXSvision.

The Fiber Distribution Hub (FDH): A passive element that does not require any power (or active electronics), the hub houses the optical splitters, essentially taking the place of workgroup switches.

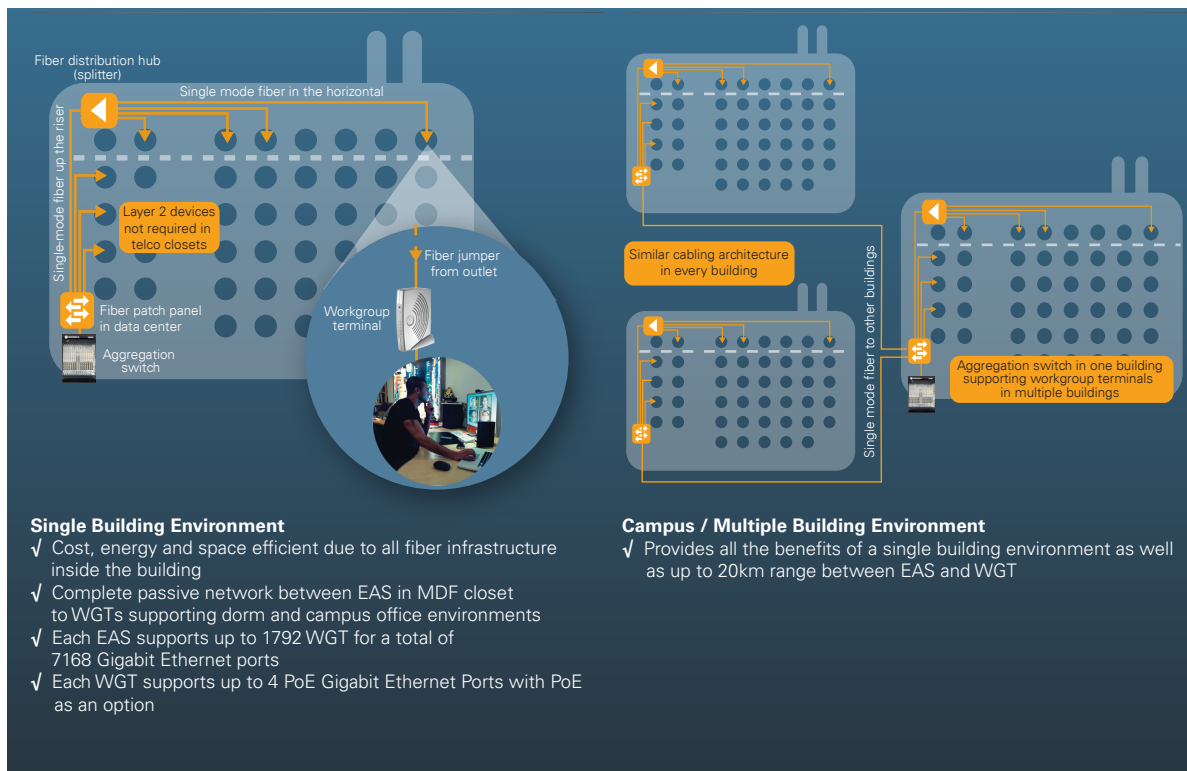
The Fiber Distribution Terminal (FDT): Another passive element that does not require power, the Fiber Distribution Terminal distributes the single POL connection from the FDH to area WGTs.

Benefits to Educational Institutions

POL modernizes the campus and enhances innovative learning

POL provides line rate gigabit services at distance up to 20km from the EAS Aggregation Switch. It utilizes the standard based next generation GPON technology over a fiber infrastructure to deliver advanced services that are ubiquitous in the campuses of today. IT managers can put aside the worry about periodic structured cabling upgrades (such as CAT 5 to CAT 6) because the fiber infrastructure of POL can carry terabits of data supporting campus communications needs well into the future.

➤ **Future-proofing of the structured cabling infrastructure enables IT Managers to plan and accommodate the anticipated communication traffic across its network.**



Single Building Environment

- ✓ Cost, energy and space efficient due to all fiber infrastructure inside the building
- ✓ Complete passive network between EAS in MDF closet to WGTs supporting dorm and campus office environments
- ✓ Each EAS supports up to 1792 WGT for a total of 7168 Gigabit Ethernet ports
- ✓ Each WGT supports up to 4 PoE Gigabit Ethernet Ports with PoE as an option

Campus / Multiple Building Environment

- ✓ Provides all the benefits of a single building environment as well as up to 20km range between EAS and WGT

POL is an eco-friendly solution that provides savings on power, space and cooling

A POL solution is inherently greener than a copper-based Ethernet LAN. By replacing the power hungry distribution and workgroup switches from each floor with passive optical splitters, POL eliminates the current energy needs and corresponding carbon footprint associated with the many thousands of kilowatt hours of power and cooling systems usage on each floor of every building on campus in operation 24 hours a day, 365 days per year.

➤ **According to an independent study, in a building that employs 3200 networking end points, the use of a POL rather than a traditional Ethernet LAN results in a percentage power savings of about 50%.**

In addition, POL enables reduction in necessary floor space needed for traditional distribution or work group switches. This not only results in further reduction in power consumption, but also enables additional return on investment.

POL enables lower Total Cost of Ownership

Implementing a POL solution in lieu of a traditional copper Ethernet LAN provides dramatic savings in the total cost of ownership, both in terms of capital and operational expenditures. Elimination of the costly workgroup and distribution switches from each floor equates to dramatic savings.

➤ **According to a recent independent study conducted by Motorola, the five year total cost of ownership can add up to approximately 68% in savings realized in almost every aspect of implementation including equipment costs, power, cooling, installation and management space.**

POL provides greater security, reliability and ease of management

POL is based upon the same proven Motorola Passive Optical Networking (PON) technology that is established in leading carrier networks around the world. All components of POL deliver five 9s reliability, providing IT managers the opportunity to focus on strategic IT initiatives that will move educational environments into the future rather than the continue the present complex day-to-day

management of a traditional LAN architecture. In addition, the user-friendly graphical user interface (GUI) of the Element Management System (EMS) enables network administrators to provision and troubleshoot any user issue directly across any point in a campus, further reducing time and operational expenses associate with maintaining a traditional LAN.

POL also utilizes 128 bit AES encryption on the already secure fiber infrastructure making the solution less vulnerable to attack. Effective control to the edge also enables administrators to manage security threats in a more effective manner.

POL provides a converged, simplified network

POL enables schools to standardize on a modular chassis-based platform in which all the components are interoperable and changes rarely require more than a swap of a line card. In addition, the same POL solution can be used to carry multiple services such as IP voice, data, IP video and RF video. The ability to carry video (both RF video and IP video) saves network administrators from managing multiple different networks, thereby not only reducing operating costs but also reducing capital costs of installing multiple networks.

➤ **This ability of carrying RF video is especially useful for dormitory applications where the universities like to provide best in class video services to students.**

Conclusion

Communications technology is transforming the way students learn and instructors teach around the world – both inside and outside of the classroom. As schools look to advanced networks to deliver better connectivity and advanced learning tools and capabilities, IT managers will need to ensure they invest in future-proof network infrastructure capable of supporting the long-term strategic vision of the educational environment. Motorola's Passive Optical LAN solution offers schools access to a new and simple approach to connecting LAN services to any stationary Ethernet device or system. Providing superior performance, security, and carrier-class reliability, Motorola's proven Passive Optical LAN solution incorporates years of expertise in both carrier and enterprise networking technology into every element of its architecture and enables educational institutions to deploy advanced technology in a cost-effective manner.

Please contact your Motorola sales representative for more information on Motorola's POL solution or visit: www.motorola.com/pol.



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