# All-optical POL: The new choice for campus network construction

More secure and reliable than Ethernet, high-bandwidth Passive Optical LAN (POL) campus networks simplify cabling architecture and require far less equipment, space, and power.

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Fiber-optic Passive Optical Networks (PON) offer clear advantages over copper networks in terms of bandwidth, access distance, power consumption, reliability, and lifespan.

With operators widely adopting PON, the industry chain is maturing, and PON technology is increasingly common in enterprise campus networks. POL is a new PON-based area network technology that businesses can use to reconstruct the currently prevalent Ethernet-based campus networks or build new Local Area Networks (LAN). POL enables high-bandwidth networks that support integrated services.

## Three reasons to reconstruct

Campus network reconstruction is driven by, one, demand for higher bandwidth; two, north-south traffic models; and, three, IoT integration.

Work is getting increasingly smarter and information-based. HD video conferencing, cloud services, massive data switching, mobile office, and CATV are some of the many digital tools that companies now use for business, all of which require greater bandwidth and upgraded LANs.

The campus network service model is also changing, with the widespread use of virtual desktops, BYOD, and cloud computing, causing a data center traffic exchange model to replace multilevel local switching architecture.
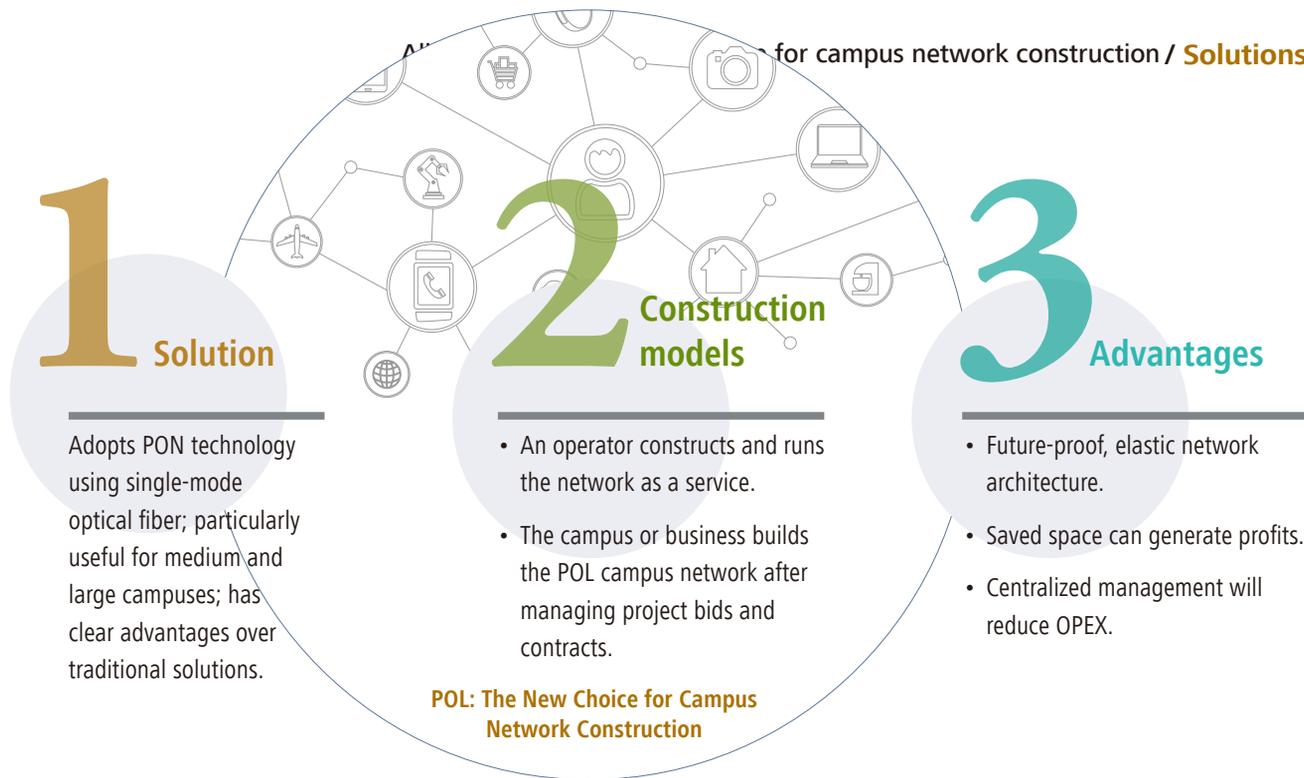
Traffic is starting to move north to south, directly between businesses' internal network terminals, cloud applications, and storage servers. Gartner predicts that by 2016, 90 percent of traffic in enterprise campus networks will flow from north to south.

To smartify and automate campuses, companies need to build campus IoT that connects building management systems with functions like intelligent parking, door control, security, surveillance, fire-fighting, and energy conservation.

Companies also need simple and cost-effective networks to run all their services. They can no longer afford to use separate cabling, equipment, and management systems for voice, video, data, door control, security, and Wi-Fi services. They also need to be able to connect campus systems in an efficient way.

## POL: Equipment-lite

The relatively new POL all-optical campus network solution uses single-mode optical fiber, which has the following benefits: greater bandwidth,

**1** **Solution**

Adopts PON technology using single-mode optical fiber; particularly useful for medium and large campuses; has clear advantages over traditional solutions.

**2** **Construction models**

- An operator constructs and runs the network as a service.

- The campus or business builds the POL campus network after managing project bids and contracts.

**3** **Advantages**

- Future-proof, elastic network architecture.

- Saved space can generate profits.

- Centralized management will reduce OPEX.

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longer transmission distance, lower volume and weight, and lower cost. POL uses PON, so POL doesn't have the distance constraints of Ethernet and benefits from PON's optical splitting function, which doesn't need active aggregation devices. This saves space in equipment rooms, and cuts power distribution and cooling costs.

Unlike traditional solutions, POL benefits medium and large campuses that need long-distance transmission and passive convergence technologies. Huawei research found that only organizations with more than 500 work stations or connections benefit from POL.

There are two POL models for campuses: One, an operator constructs and runs the network as a service, either providing managed construction and services or leasing the network. The operator can then set and swiftly replicate POL all-optical network standards.

Two – and more common – the campus or business builds the POL campus network after managing project bids and contracts. The POL operation center and server are located on

campus, allowing the enterprise to take care of O&M and flexibly expand the network.

One European airport campus provides communication infrastructure services for over 500 businesses. A local operator recognized the need to upgrade the network to meet future demand, and identified POL as the best solution. The main advantages are:

**Future-proof, elastic network architecture:** PON can evolve to meet future bandwidth needs. Current and future PON standards – including GPON, 10G-PON, and 40G-PON – can coexist and evolve on the same ODN, so bandwidth upgrades can occur without network reconstruction. POL networks can overlay different Customer Premises Equipment (CPE) to connect all major services, such as voice, high-speed data, video surveillance, IoT, and cloud services, on one campus network. POL can then flexibly and elastically expand, which protects existing investment.

**Saved space can generate profits:** The airport's existing Ethernet-based campus

*By offering fast connections and mobility, POL gives businesses the unprecedented power to produce, market, and sell their products from anywhere.*

network has more than 200 terminal switch rooms, because of the distance limitations of Ethernet lines. POL's point-to-point technology requires at least 90 fewer rooms, saving rental costs – enough, in fact, to cover the entire cost of the campus network building if the freed up space is rented out for warehousing. The solution will also use up to 70 percent less power as a result.

**Centralized management will reduce OPEX:** The legacy network required separate maintenance on each of the dispersed active sites. However, because POL is centrally managed and O&M is executed on the Optical Line Terminal (OLT), far fewer O&M personnel are needed, cutting costs by a predicted 60 percent or more.

## POL hits the mainstream

POL emerged in North America in 2010, and in 2012, the Association of Passive Optical LAN (APOLAN) was founded. Promotion by APOLAN has seen POL widely deployed in America in campuses and buildings, including the Empire State Building. It's also the solution the United States Armed Forces (USAF) chose for its subsidiaries due to its cost-effectiveness, efficiency, security, and reliability. In 2012, USAF mandated that POL be used in all its new and renovated networks.

Over the past two years, the PON industry has matured, with operators in Europe, the Middle East, China, and the Asia Pacific widely deploying FTTH, which in turn has positively impacted global POL construction. Global PON vendors like Huawei and Alcatel-Lucent have entered the market, and in February 2015, APOLAN set up a European division. POL has become a new choice for CANs around the world, and will soon become a mainstream LAN solution.

For government and enterprise customers, POL satisfies demand for Gigabit networks, reduces OPEX, increases business agility, and guarantees QoS for business-critical services. In hotels, high-bandwidth POL, seamless Wi-Fi, and integrated services improve customer experience, streamline operations, and reduce IT expenditure. Property developers can take advantage of POL's quick fiber optic connections to provide smarter operations for homes, offices, and shopping centers, while schools can use POL technology to support video learning.

The Huawei Xi'an Institute houses 16 office buildings and 15,000 employees over 285,000 square meters. Huawei selected POL because it supports multiple services, including voice, broadband, Wi-Fi backhaul, video conferencing, CATV, video surveillance, and building management automation. Completed at the end of 2015, overall project delivery was twice as fast and 50 percent less expensive than a Cat 5 LAN solution, and the cost of optical cables and transporting equipment was a staggering 70 percent lower.

Elastic, reliable, and cost-effective networks are vital for productivity. POL lets companies and organizations smoothly upgrade to next-gen optical communication standards like PON to XG-PON. By offering fast connections and mobility, POL gives businesses the unprecedented power to produce, market, and sell their products from anywhere.