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The public sector embraces Passive Optical LANs – improving costs and services while fostering sustainability

Publication date:
Apr 2023
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Summary

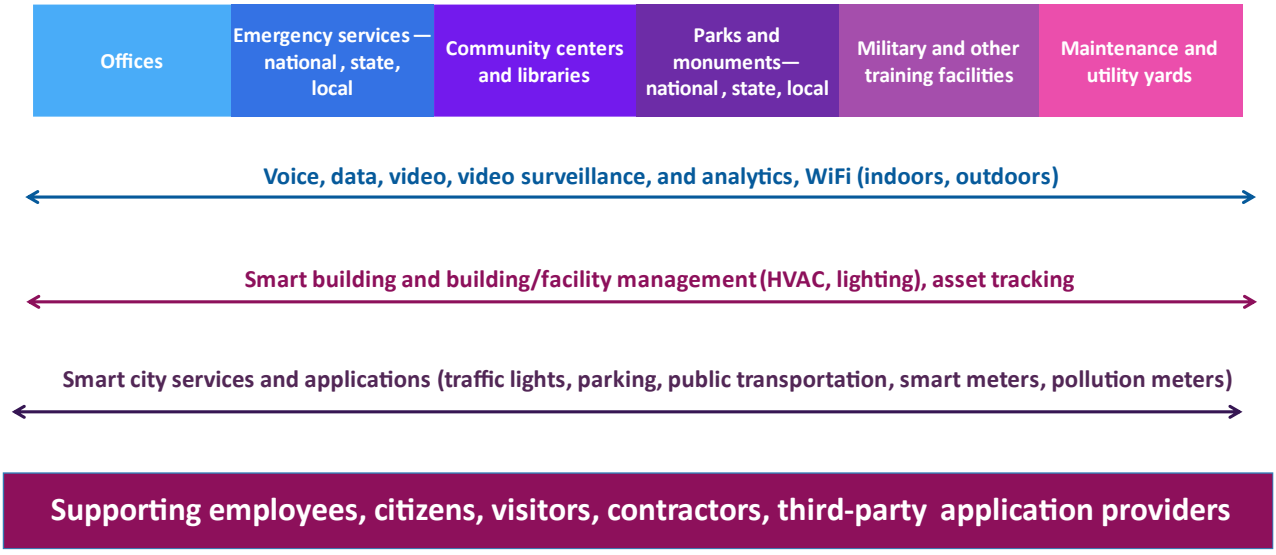
The public sector, including national, regional, and local governments, are facing challenges supplying services while reducing delivery costs and improving customer experiences. Government agencies, both large and small, are planning to upgrade their communications networks according to Omdia's IT Spend Predictor Survey. Many government agencies are adopting optical LANs, known as Passive Optical LANs (POLs). A POL enables governments to support communications and applications for internal use and for delivery of critical services to citizens, visitors, suppliers, and contractors. POLs are future-proof, flexible, sustainable, and secure. POLs can support communications across 20km from a small communications closet, thereby supporting large government campuses while eliminating points of failure and reducing security risks. POLs enable significant space and power savings, while simplifying network management. These advantages translate to lower Total Cost of Ownership (TCO), a key government objective.

The need for POL in the public sector

POLs made their governmental debut in defense departments, meeting the strictest security requirements, including user isolation, user activation, message integrity, and traffic encryption, along with reliability and redundancy. Today, POLs are being deployed within the public sector at all levels of

government, enabling reliable and secure communications with timely delivery of services, while protecting against cyberattacks. **Figure 1** provides an overview of the types of facilities that are served with a POL along with the types of applications that can be supported for different user types.

Figure 1: Public sector scenario—types of facilities, types of applications, types of users



Source: Omdia

POL infrastructure works across a wide range of government/public sector facilities, whether indoor and/or outdoor facilities, ranging from traditional, office settings, to national parks, to military bases, or utility yards. A POL supports traditional communications services, such as voice and data, and high-resolution video, and WiFi, along with smart building management, and smart city services. A POL enables convergence of communications and applications onto a single, passive, upgradeable, scalable, and secure network.

These different type of applications and user types have varying requirements regarding bandwidth, latency, and jitter. POL infrastructure meets these varying requirements with bandwidth, ranging from 2.5G to 10G, to 25G, and even to 50G. Upgrades are possible without touching the underlying fiber cabling, known as the optical distribution network (ODN). Dynamic bandwidth algorithms can assign different traffic priorities to applications and user-types accordingly.

POLs are managed through a single management platform, from a single communications closet or room. The POL can reach 20km without the need for active, field-based components at every 100m. The POL can be virtually sliced, enabling different users, such as office employees, field-based emergency service personnel, and citizens to have their own, end-to-end secure communications networks. A POL network meets the “5 9s” (99.999%) reliability associated with CSP (communications service provider) networks.

With POL, OLTs and ONTs can be upgraded without touching the ODN. This is major advantage compared to traditional LANs. Traditional LANs use CAT cabling, which needs to be completely removed and replaced with the next-generation cabling, to improve network performance. POL upgrades are achieved by replacing the OLTs and ONTs, such as moving from 2.5G to 10G or to 25G equipment and beyond.

In addition, not all ONTs need to be upgraded at the same time. A government's IT administrator or facility director, can upgrade ONTs when and where needed due to bandwidth requirements. POL fiber cabling has a long life which means that the ODN can be left in place for years. In addition to scalability and longevity, POLs are flexible. Additional ONTs can be added as a facility expands or as internal space is changed. For example, the redesign of an office floor or a maintenance yard, can be accommodated easily within POL infrastructure.

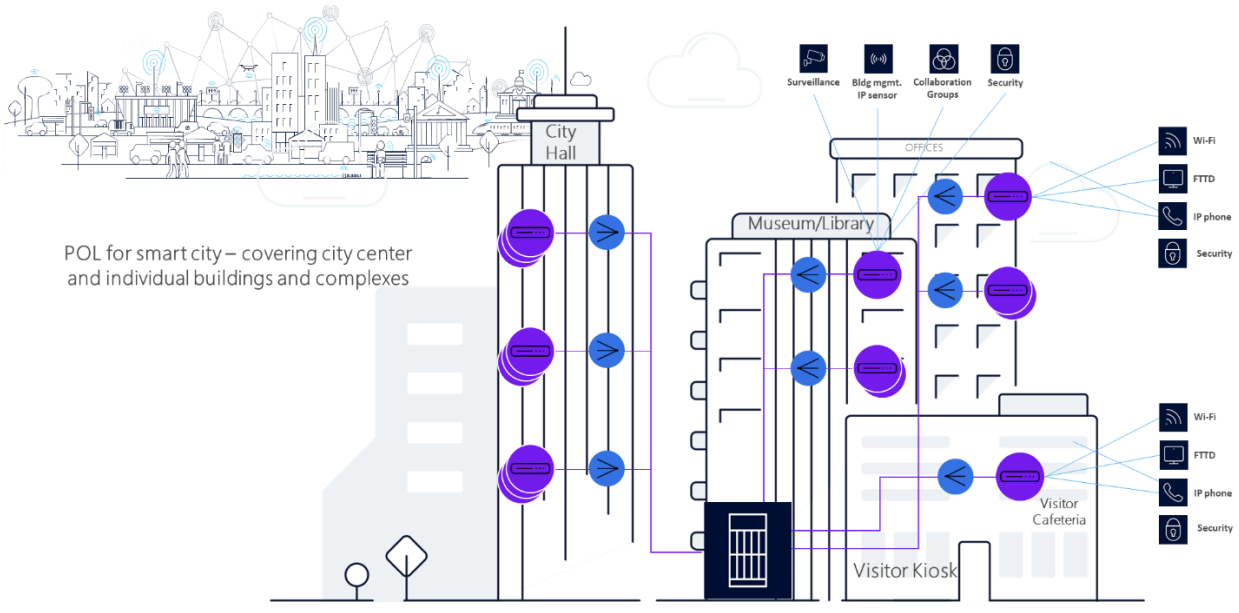
POL infrastructure is considered highly secure, on par with dedicated point-to-point fiber. POL networks encompass end-to-end traffic encryption along with message and user integrity checks. In addition, there are options tor redundancy, such as path protection, OLT equipment redundancy, ONT equipment redundancy, and combinations of these options. Redundancy can be added to mission critical applications, such as emergency services.

POL within the public sector

In the public sector setting, an optical line terminal (OLT) is installed at a central communication point in the campus, such as an office building or city hall, or main police station, for example. POL uses fiber cabling and splitters, enabling support to multiple points, often 64 locations from a single Passive Optical Networking (PON) port. An optical network terminal (ONT) is installed at each end communications point, such as a desk, or library kiosk, or maintenance office, or CCTV, for example. Single-mode fiber supports two-way communications (downstream, upstream) with PON's built-in wavelength management system.

Figure 2 provides a diagram of POL infrastructure within a public sector.

Figure 2: POL within the public sector



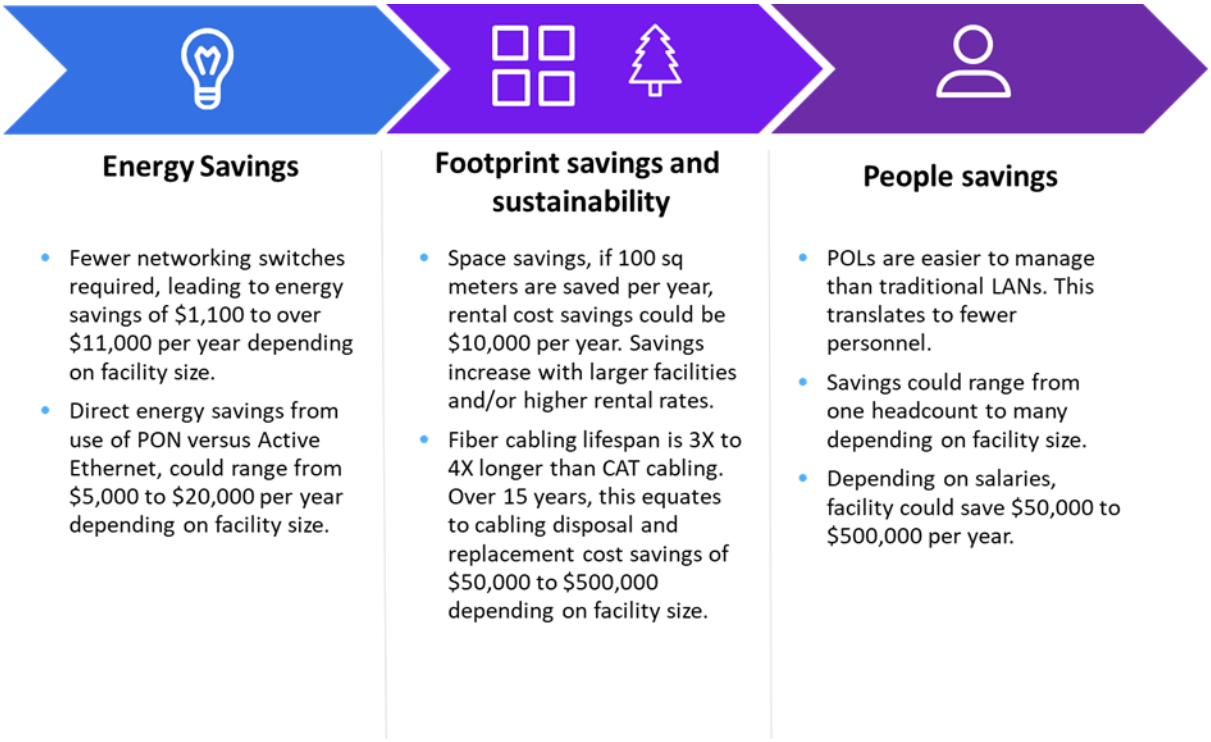
Source: Nokia and Omdia

POL's advantages in the public sector

Commissioned Research

There are numerous advantages to POL infrastructure versus a traditional LAN. First, a POL uses fewer racks and switches than a traditional LAN. In turn, fewer pieces of networking equipment save space and power. In addition, there is less equipment to manage which saves headcount and associated salaries and benefits. Also, optical cabling is smaller than Cat 5 or Cat 6 cabling; thereby reducing the amount of physical space needed for cabling. Consequently, POLs lead to savings in both capital expenditures (capex) and in operational expenditures (opex). These major financial advantages are summarized in **Figure 3**.

Figure 3: POL's major financial advantages—public sector setting



Source: Omdia

The focus has been on the "quantifiable costs" but there are "softer" advantages, such as:

- Setting an example to the private sector by reaching energy-savings goals and meeting sustainability targets.
- Improving user application experiences for employees, citizens, visitors, third-party application developers, and contractors alike.
- Minimizing disruptions to all users.
- Improving security and decreasing cyberattacks.

POL public sector facility managers have cited TCO savings between 20% to 50% compared to a traditional LAN, depending on facility size, network requirements, energy costs, labor costs, and

office/facility rental rates. In addition, these facility managers have commented on the importance of saving taxpayer dollars and leading the movement towards sustainability.

Recommendations and next steps

The public sector is benefiting from investing in POLs, providing clear TCO advantages versus traditional LANs. A POL enables a facility to support multiple applications for different users in different environments, with varying networking requirements, onto a single, secure, upgradeable fiber-based optical network. POLs are environmentally sustainable, using passive components, while reducing energy-consuming network elements. POLs are easy to upgrade without touching the underlying ODN. Furthermore, POLs are adaptable, a key requirement in our ever-changing world. Governments are investing above-average IT budgets in LAN upgrades. A POL will provide a future-proof LAN solution for years to come.

Appendix

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Omdia Commissioned Research

This piece of research was commissioned by Nokia.

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