Optical LAN solution

As businesses contemplate how to introduce a new generation of services, improve productivity, lower costs and build a competitive advantage, they are faced with tough decisions about the performance and capacity of their existing local area networks (LAN). With connectivity demanded by devices and users increasing from megabits to a gigabit, 10 gigabits and beyond, new copper cables and switches are often recommended for better performance. However, this upgrade is labor and cost intensive.

The logical alternative is to install a fiber-based network that can lighten the load on your LAN, meeting the needs of the modern-day business while providing a cost-effective evolution as speeds continue to increase. An Optical LAN delivers significantly better performance than a traditional copper-based LAN, enabling network convergence, simpler operations, greater speeds per user, and up to 50% savings in costs.

Bringing the LAN up to light speed

Today's local area networks use a copper architecture and often separate networks are used to carry different services. The copper deployment model creates an environment that is wasteful and inefficient to maintain, leading to crowded equipment rooms, complex wiring closets and increased high-volume air conditioning (HVAC) requirements.

An Optical LAN brings the LAN up to light speed. The advanced performance means all voice, data and video services can be supported on a single fiber distribution architecture with the right user experience. Optical LAN's Quality of Service (QoS) and high bandwidth allow organizations to converge voice, video and data all onto the same fiber network allowing more efficient maintenance, cabling and overall performance. Optical LAN is also light on infrastructure and energy: its single distribution platform significantly reduces network complexity, the amount of equipment needed, and power consumption.

PON: the technology behind Optical LAN

Optical LAN is based on a technology called Passive Optical Networks (GPON and XGS-PON). PON has already been deployed by all the world's largest telecommunications carriers and serves millions of users worldwide. It has quickly established itself as the gold standard for delivering a new generation of services. Among other benefits, PON provides an enormous amount of bandwidth — GPON: 2.5Gbps downstream and 1.25Gbps upstream and XGS-PON: 10Gbps symmetrical over a single strand of glass.

PON architecture uses purely passive components such as splitters between the optical line terminal (OLT) and optical network terminal (ONT), reducing the chance of equipment failure. In Optical LAN, the core underlying technology is still Ethernet, with GPON Encapsulation Mode (GEM) used as the packaging format. GEM packages the IP packets efficiently with minimum overhead as they transit between the OLT and ONT.

Each fiber optic cable can be shared by up to 64 ONTs, minimizing the amount of fiber cabling required. Although multiple users share the same passive optical network (PON), robust QoS and bandwidth mechanisms ensure that the traffic is correctly prioritized and peak bursts enabled, so that each user or device gets the bandwidth they need.

Optical LAN solution highlights

OLT

The foundation of the Optical LAN solution is the OLT with:

- Line cards that support GPON, XGS-PON and next-generation PON technology in the future
- Features to support Layer-2 and Layer-3 network deployments
- 802.1x based user authentication supporting port/MAC/MAB
- DVLAN or dynamic VLAN assignments for user services
- QoS architecture to support the QoS guarantees for user services
- Type-B PON protection.

ONT

The solution comprises ONTs that meet every need:

- GPON and XGS-PON uplink
- Various port densities (1p, 4p, 8p, 24p)
- 1G/2.5G/10G user port rates
- PoE support providing up to 60W power to connected end devices (VOIP phones, Wi-Fi APs, and cameras)
- LLDP-MED protocol support for discovery and setup of connected devices
- Integrated POTS ports
- Integrated Wi-Fi AP.

Optical LAN Management Platform

- The Optical LAN Management Platform provides a web-based and intuitive environment that makes day-to-day operations quick and simple. It is a management solution optimized for performance, advanced troubleshooting, alarm management, and usability in enterprise environments.

Benefits of the Optical LAN solution

An Optical LAN outperforms traditional copper-based LAN in all the key criteria.

Robust security

- Fiber is inherently harder to tap into, has no crosstalk and,unlike copper, is not affected by electromagnetic interference
- An Optical LAN has multiple security schemes preventing the interception of another user's data or introducing a fraudulent ONT into a network (advanced encryption with two-way key exchange, advanced intrusion detection, ONT unique identification, etc.)
- An Optical LAN has protection mechanisms and pro-active monitoring to ensure high availability (link protection, logical layer protection, controller and line card redundancy, etc.).

Lower operating costs

Optical LAN is light on TCO thanks to savings in CAPEX, maintenance, power, space, management, service contracts, testing, certification and upgrades.

- **Energy.** With cutting edge technology and continuous efforts to improve power efficiency
- **Floor space.** The centralized OLT platform enables deployment in a smaller footprint relative to multiple distributed copper-based switches
- **Service contracts.** Optical LAN has significantly fewer active electronics, resulting in maintenance cost savings
- **Fault management.** Again, because of fewer active components, Optical LAN reduces fault management costs.

Scalability

Optical LAN enables flexibility in the network design and can easily scale.

- Optical LAN signals can run for up to 20km without needing any boosters or repeaters. This means the centralized access node (OLT) can be placed anywhere in the building or campus. There are no blind spots and no need for additional switches to reach every endpoint
- It is simple to extend the network with more endpoints or to new buildings from the existing OLT
- The capacity of Optical LAN and QoS mechanisms ensure the delivery of all services in use today and the support of new services in the future
- The ONTs allow any type of deployment (ceiling, wall or desk mounted), provide gigabit and 10 gigabit ethernet interfaces in single or multiport configurations and support different powering options
- Capacity can be easily upgraded in the future using the same cabling and with minimal changes in the OLT.

Nokia is the world leader in fixed access technologies. We have 25+ years of broadband experience, and our equipment powers some of the most advanced fiber networks in the world.

The Optical LAN solution brings your LAN up to light speed, helping enhance productivity and slash costs for governments, businesses and operators worldwide.

For more information about Nokia Optical LAN, click here.

About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.

Nokia OYJ
Karakaari 7
02610 Espoo
Finland
Tel. +358 (0) 10 44 88 000

Document code: CID212520 (September)