



Optical LANs Enable Greater Operational Efficiencies for Reduced Costs and Improved Network Performance and Security

A Gartner study finds that improving efficiency and security, reducing costs and improving IT applications and infrastructure are top priorities for chief information officers (CIOs).¹ Tellabs™ Optical LAN Solution and Tellabs™ Panorama™ PON Manager deliver on all goals by increasing the speed of LAN configurations, monitoring, troubleshooting and MACs. At the same time, enterprises see a decrease in human error, lowered operational costs and reduced security risks.

Tellabs™ Optical LAN Solution

Tellabs Optical LAN is a simple, smart, stable, secure and scalable means of achieving operational efficiencies for high-performance local area networks (LANs) [Figure 1]. The solution enables a number of key benefits, including:

- Increasing operational efficiencies by automating management functions
- Eliminating the inefficiencies of legacy copper-based LAN
- Automating element management tasks
- Enabling systemwide management controls
- Taking advantage of advancements in fiber
- Utilizing the inherent efficiencies of ONTs
- Enabling the IT staff to work more efficiently



Optical LANs drive network efficiencies by:

- Promoting automation with machine-to-machine actions and limiting human-to-machine actions
- Reducing mission-critical yet repetitive operational tasks to effectively zero dollars
- Providing quick views, fast isolation and easy drill-down uncovers root causes and speeds resolution

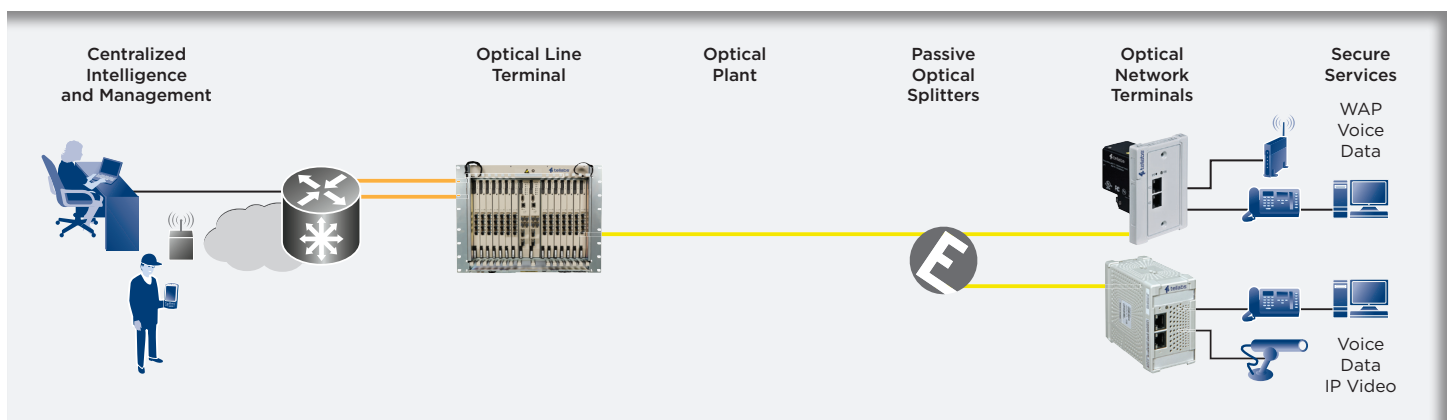


Figure 1: Tellabs Optical LAN is a simple, smart, stable, secure and scalable means of achieving operational efficiencies.

¹ Gartner 2013 — http://www.gartnerinfo.com/sym23/evtm_219_CIOtop10%5B3%5D.pdf

Increasing operational efficiencies by automating management functions

Improving operational efficiencies is directly connected to how element management, network management and machine-to-machine (M2M) connectivity is administered. All three can take place in the cloud, wide area networks (WANs) or LAN in a centralized building and across a campus. They are critical parts of the Internet of Things (IoT), the cloud, Software-Defined Networks (SDN) and big data initiatives. They touch wireline, wireless and most information and communications technology (ICT) services and applications, and impact a wide range of services and applications, including:

- Telemetry
- Automation
- Monitoring and control
- Logistics
- Smart grid/cities/buildings

Research finds that human actions have a great impact on network performance. A Gartner study finds that people and process issues cause 80% of mission-critical network outages, and more than 50% of those outages are caused by change and configuration management issues.² Infonetics Research finds that human error is the main cause of network downtime, and large enterprises lose ~3.6% of annual revenue due to LAN downtime. The study finds that the human factor is the biggest contributor, responsible for 50% to 80% network outages.³ Ponemon Institute finds that the root cause of data breaches is 42% malicious/criminal attacks, 30% human error and 29% system glitch.⁴ This research illustrates that to improve operational efficiencies, it is safer to automate policies, procedures and overarching processes. This can be done by promoting M2M actions and limiting human-to-machine actions whenever possible.

The trend toward promoting M2M actions is confirmed by ZDNet, which finds that CIOs, other IT leaders and management are beginning to see the potential of M2M communications to deliver real business benefits.⁵ AT&T research concludes that M2M offers unprecedented opportunity to improve society's resource and time efficiency. ICT can improve the efficiency with which society undertakes tasks large and small in ways that were, until recently, entirely impossible.⁶

Improving efficiency is a money-making endeavor. ZDNet explains that M2M can be tied back to a hard return on investment (ROI) as well as helping to deliver stronger business intelligence, customer engagement, cost savings, business process efficiencies, innovation and potential new revenue streams.⁷ All of these conclusions support the assertion that M2M technology can not only help CIOs and IT pros save money but also "do more with less."

CIO/IT staff performance reviews and compensation are often tied directly to Key Performance Indicators,^{8,9} such as:

- IT savings (IT work that positively impacts the bottom line)
- Dollars saved due to productivity improvement initiatives
- Percent of IT cost versus total revenue of the organization
- Percent of IT cost versus total employees
- Average time to resolution for service tickets

The goal of Tellabs™ Optical LAN Solution and Tellabs™ Panorama™ PON Manager is to improve IT efficiencies with automation and M2M functions by increasing the speed of LAN installations, configurations, monitoring, troubleshooting and MACs while reducing human error and security risks.

Eliminating inefficiencies of legacy copper-based active LANs

Many changes are taking place in the way that LANs are utilized, from the applications and services that are delivered across the LAN to how employees access corporate resources. Expectations for performance, bandwidth, security and reliability are much higher. What haven't changed are the architecture, cabling and equipment of predominantly copper-based active Ethernet LANs. Optical LANs are poised as a viable new contender to meet the needs of the high-performance LAN while enabling additional operational efficiencies.¹⁰

Legacy copper-based LAN — Legacy copper-based LANs and their racks and stacks of workgroup switches in communication rooms are a distributed architecture that pushes complexity and intelligence to the farthest reaches of the network. This complex distributed architecture negatively impacts the control of policies and process consistency. It requires local management and more human touches at all the disparate endpoints, wasting time and resources. Legacy copper-based LANs are inherently less reliable, and their high network downtime negatively impacts operational efficiencies. All of this makes for a more stressful and less productive work environment for the IT staff. And deep distributed network devices add vulnerable access points for malicious activities.

² Gartner — <http://www.evolver.com/blog/downtime-outages-and-failures-understanding-their-true-costs.html>

³ Infonetics — <http://www-05.ibm.com/uk/juniper/pdf/200249.pdf>

⁴ Ponemon — <http://public.dhe.ibm.com/common/ssi/ecm/en/sel03027usen/SEL03027USEN.PDF>

⁵ ZDNet — <http://www.zdnet.com/the-business-benefits-of-machine-to-machine-7000008924/>

⁶ AT&T — http://www.grahampeacedesignmail.com/cwr/cwr_m2m_down_singles.pdf

⁷ ZDNet — <http://www.zdnet.com/the-business-benefits-of-machine-to-machine-7000008924/>

⁸ "A CIO's Voice" — <http://arunmanansingh.wordpress.com/2011/09/13/key-performance-indicators/>

⁹ Future CIO — <http://futureofcio.blogspot.com/2013/03/four-views-of-it-kpis.html>

¹⁰ Tellabs — https://docs1.tellabs.com/media/library/How_enterprises_are_solving_evolving_network_challenges.pdf

Optical LAN — Optical LANs are characterized by centralized intelligence and management, which help control processes and ensure policy consistency with more M2M actions. An Optical LAN's higher availability improves operational efficiencies with industry-leading high network uptime. In turn, process and policy consistency is improved, and fewer IT resources are needed to manage the network.

Deltek, a Herndon, Virginia-based provider of enterprise software and information solutions consolidated five separate facilities into a new six-story corporate headquarters building housing 700 employees. The company selected the Tellabs™ Optical LAN solution to handle their voice, video, data and other IT network infrastructure needs. The Deltek IT staff concluded that they saved 50 hours per week because of the faster MACs enabled by Tellabs™ Optical LAN and Tellabs™ Panorama™ PON Manager. Multiply those 50 hours by the Dun & Bradstreet average employee cost (\$56), and the total annual savings for Deltek because of faster MACs is \$145,600 per year (50 hours saved x \$56 employee cost x 52 weeks = \$145,600).

Automating element management tasks

Tellabs Panorama PON Manager is a major contributor to how Optical LAN speeds MACs while reducing human errors. There are three areas where the IT staff can improve operational efficiencies with Tellabs Panorama PON Manager [Figure 2]:

- Installation
- Management
- Automation

Installation — The process of installing Optical LANs starts with the creation, logging and editing of IT staff user information and the assignment of secure passwords. This also includes setting the hierarchy of roles and responsibilities for the IT staff so that senior managers are only allowed to implement the most critical of LAN configuration changes. User management is very important for high levels of security, stability and operational efficiency.

Tellabs Panorama PON Manager simplifies the installation process by using a “Commissioning Wizard” that configures optical network terminals (ONTs), sets network policy, manages end-points and creates ACL filtering. The Commission Wizard speeds the process by walking IT staff through a series of templates/profiles. Tellabs Panorama PON Manager provides default templates/profiles that satisfy 80% of customer configurations based on Tellabs' experience from many years of successful deployments.

After tasks are completed in the Commission Wizard, Tellabs Panorama PON Manager then makes available the “Add Optical Line Terminals (OLT) Wizard” for the IT staff. Once again, the IT staff is led through a series of windows that load ONT templates, alarms, uplinks, VLAN, service profiles, NAC profiles and port templates that are associated with the OLT. Default templates/profiles are already preloaded, and if changes are made, they can be saved as new defaults for the future. The key benefit of the Add OLT Wizard is that it enables the IT staff to scale the initial commissioning of an OLT across hundreds of VLANs and thousands of ONTs and subtended powered devices (PDs), such as phones, WAPs and IP cameras.

The preconfigured profiles in the Tellabs Panorama PON Manager cover PON, DSCP, PoE, RSTP, PAE (802.1x), NAC, LLDP and ACL information. Profiles can be associated with service, connection and/or port. Once profiles are saved, settings can be assigned to an ONT or port with one click.

Templates are similar to profiles and can include profile information. Templates can be designated as “default” or “golden” and assigned at the Ethernet port, ONTs and other network elements. Templates ensure that ONTs are created with the most commonly used services, therefore eliminating most data entry. Both profiles and templates ensure consistency with IT policies and procedures across all business locations.

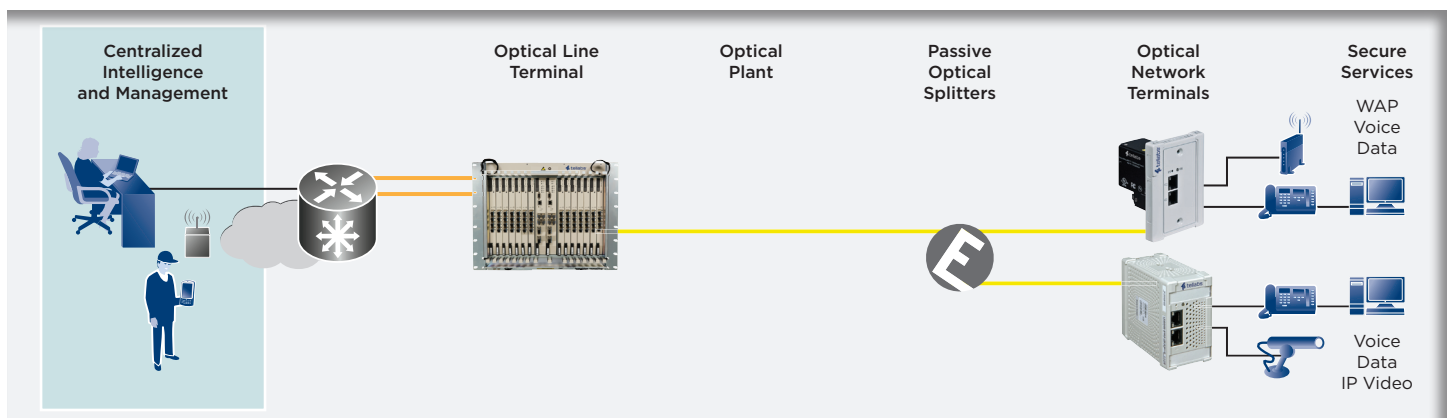


Figure 2: Tellabs Panorama PON Manager is at the heart of improving operational efficiencies for the LAN.

Management — Optical LAN management begins with proactive performance monitoring, such as real-time views of optical power levels, PON threshold alarms and CIR threshold alarms. The Tellabs Panorama PON Manager provides a four-color “Alarms and Events View,” a real-time one-screen view of alarms and events for total visibility across the entire end-to-end system. Tellabs Panorama PON Manager also supports Syslog, another good place to capture event logs.

Troubleshooting is a reality of managing any LAN. Tellabs Panorama PON Manager’s troubleshooting capabilities include quick access to alarms and events and fast drill-down from the equipment view. The Tellabs Panorama PON Manager’s Web-based interface provides fast navigation for quick views, fast isolation and easy drill-down to uncover root causes and speed resolution.

Moves, Adds and Changes (MACs) are a big part of managing an Optical LAN. For “moves,” users and devices can move freely throughout the LAN and are authenticated, authorized and configured automatically. With “adds,” auto-configuration is available once profiles/templates are established. Profiles/templates enable new users, services and devices to be added to the network with one click. “Changes” are made easy with profiles/templates since they can be modified and global changes can flow across the LAN with one click. These profiles/templates can be changed in bulk or to a select group.

Services and applications are managed at three levels:

- Network — Layer-2 VLAN provisioning
- Service Level Agreements (SLAs) — include setting QoS, bandwidth, filtering and bridging types
- Security — walking the IT staff through ACLs, security policy and port state settings

The Tellabs Optical LAN and Tellabs Panorama PON Manager also provide automation down to the PDs, such as phones, WAPs and IP cameras. The Network Access Control (NAC), IEEE 802.1x, DHCP (with option 82), RADIUS and Link Layer Discovery Protocol (LLDP) can extend controlled access to LAN



users and to PDs. These protocols enable consistent policies to be managed through Tellabs Panorama PON Manager profiles/templates and to automate PD configuration, monitoring and power management [Figure 3].

The “Equipment View” function of the Tellabs Panorama PON Manager provides a four-color graphical view of systems, including OLTs, ONTs, ports and links, just to name a few [Figure 4]. Views can be obtained at the ONT, PON card, Ethernet card, port, link and connection level. The IT staff can orchestrate speedy drill-down analysis for proactive performance monitoring or troubleshooting resolution. Inventory functions provide easy life-cycle management of the equipment and end-to-end system.

The “Inventory View” shows a list of all cards and ONTs by serial numbers and software releases. The IT staff can sort any column and access advanced search functions.

The “Downloads View” enables the control of downloads for a consistent system upgrade process that reduces the chance of human error. This is where features and functions associated with new software releases can be implemented. At any moment, the IT staff always has the option to roll back to prior software releases during the upgrade process.

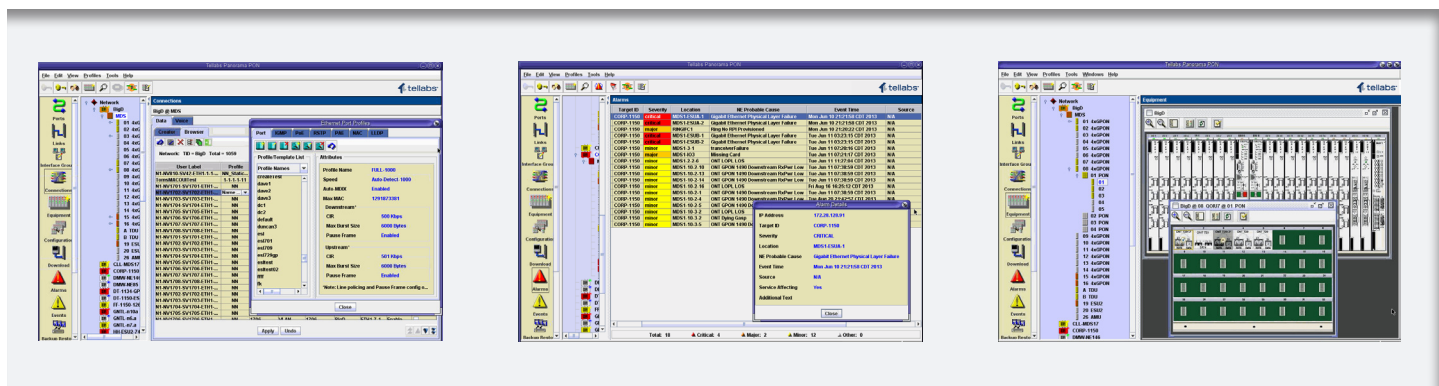


Figure 4: Tellabs Panorama PON Manager provides graphical views of Performance Monitoring, Alarms & Events and Equipment.

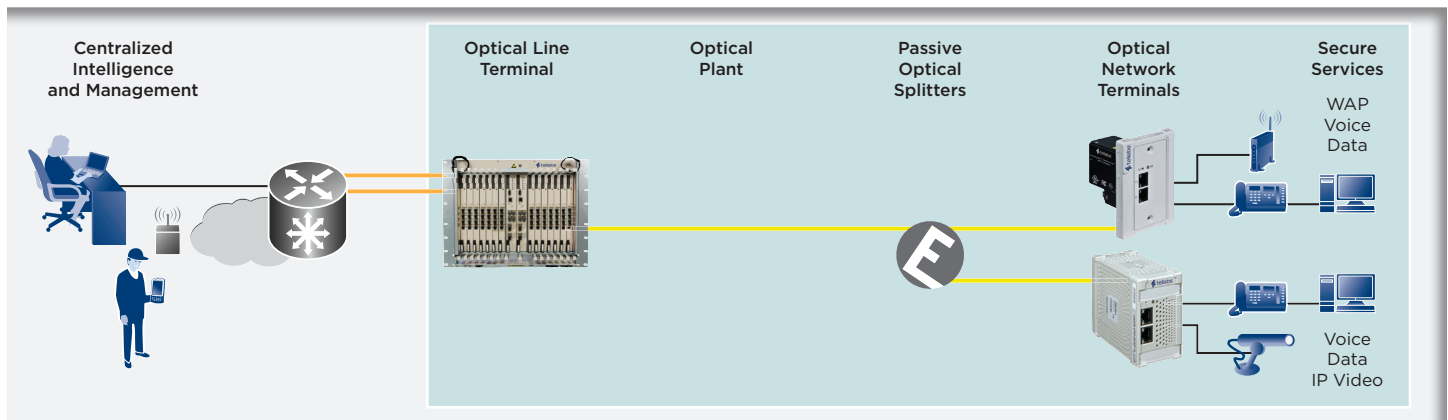


Figure 5: Tellabs Optical LAN's centralized intelligence, control and management extend end-to-end across the entire system.

The Tellabs Panorama PON Manager's Web browser user interface is a valuable tool for the IT staff. Web browser management is a subset of Tellabs Panorama PON Manager features and functions that streamlines daily operations of performance monitoring, diagnostics and MACs. The Tellabs Panorama PON Manager Web client supports advanced search, service management and troubleshooting.

Whether working from Tellabs Panorama PON Manager desktop client or laptop/tablet client, "Online Help" provides hot link access to technical documentation, which is useful for both junior- and senior-level IT staff.

Automation — The "Backup and Restore View" function captures configurations and database information. It can provide full system-wide backup and archive, and can be scheduled to run during off-hours. The "Reports and Analytics View" function is where the IT staff creates and edits reports. Reports can be scheduled to run during off-hours. The Tellabs Panorama PON Manager can also integrate OLT/ONT features/functions into higher-level network management or back-office software with SNMP and MIBs. By automating backup/restoration, reports/analytics and leveraging higher-level network management, CIOs and IT pros can effectively reduce mission-critical repetitive tasks to zero dollars.

Enabling systemwide management controls

Since the intelligence, control and management of the Optical LAN are centralized, the Tellabs Panorama PON Manager does most of the heavy lifting. However, there are some underlying inherent systemwide qualities of the Optical LAN technology that positively impact operational efficiencies [Figure 5].

At its core, Optical LAN enables software-defined resources to be dynamically allocated based on real-time needs. When services and applications (e.g., data, voice, video, WAP, IP cameras, building automation, security) traverse the Optical LAN, bandwidth, quality of service (QoS), authentication/authorization and PD management happen automatically. Bandwidth is assigned on a per service, per port, per end-device and per user basis as part of the provisioned SLA attributes.

Optical LAN also supports dynamic bandwidth allocation in an upstream direction, since centralized intelligence allows for the ability to see all super users and where extra bandwidth is needed. Strict QoS provides for proper service segmentation, rate limiting/shaping, queue management/buffering, scheduling/policing. Authentication and authorization provides controlled access on a per user and per device basis because Optical LANs support Network Access Control (NAC), IEEE 802.1x and RADIUS protocols. PD management can extend to subtended end-devices for configuration, monitoring and power management. Much of the PD automation is provided through the Link Layer Discovery Protocol (LLDP).

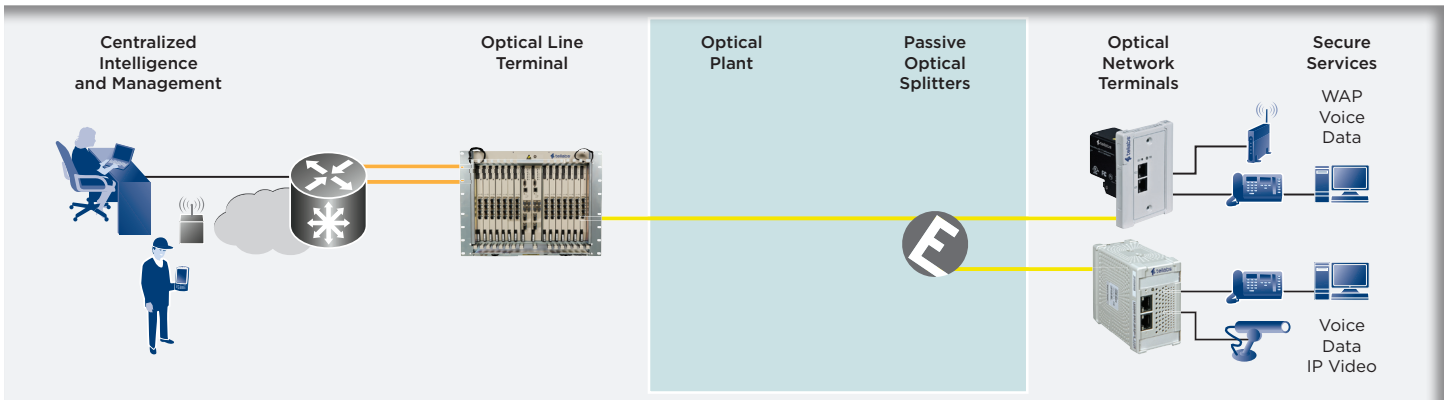


Figure 6: A new breed of fiber provides operational efficiencies during installation.

Taking advantage of advancements in fiber

A new breed of single-mode fiber (SMF) is bend insensitive, crush resistant and has excellent tensile strength. It speeds installation and completely eliminates historical durability concerns [Figure 6]. Fiber management is now purpose-built for enterprise, building, zone and campus deployments because it provides wide-open flexibility on positioning and breaks down traditional demarcations within an enterprise cable plant. Fiber connectors can be preterminated solutions and field crimpable by hand, thus removing the need for fusion splicing. These new connector options help lower the skill-set requirements and pay scale of installers, resulting in faster installations and lowered costs. Fiber testing has also advanced and only requires a light source and power meter. Consequently, there is less testing required for fiber cabling than for copper cabling, thus speeds test and turn-up.

Utilizing the inherent efficiencies of ONTs

Optical LAN ONTs are designed with no local management access because there is little need for human touch. The ONTs are basically simple optical-to-electrical terminals. They are capable of delivering all the connections, services and applications required for an Optical LAN. And they are highly reliable and secure, which ultimately helps improve operational efficiencies [Figure 7].

There is no information stored at the ONT because Optical LANs have centralized intelligence and management. ONTs are like a thin client; user and provisioning policies are managed solely at the OLTs. Thus, control and automation can be easily implemented at the OLT from the Tellabs Panorama PON Manager.

Whether deploying hundreds or thousands of ONTs, the Tellabs Panorama PON Manager streamlines the initial installation and on-going management of ONTs.

- Manual, bulk import and CLI scripting
- Unexpected ONT bulk assignment (i.e., logic for handling unexpected ONTs)
- Auto-configuration (i.e., ONT is automatically provisioned)
- Auto-conversion (i.e., automatically aligns services if ONT types are different)

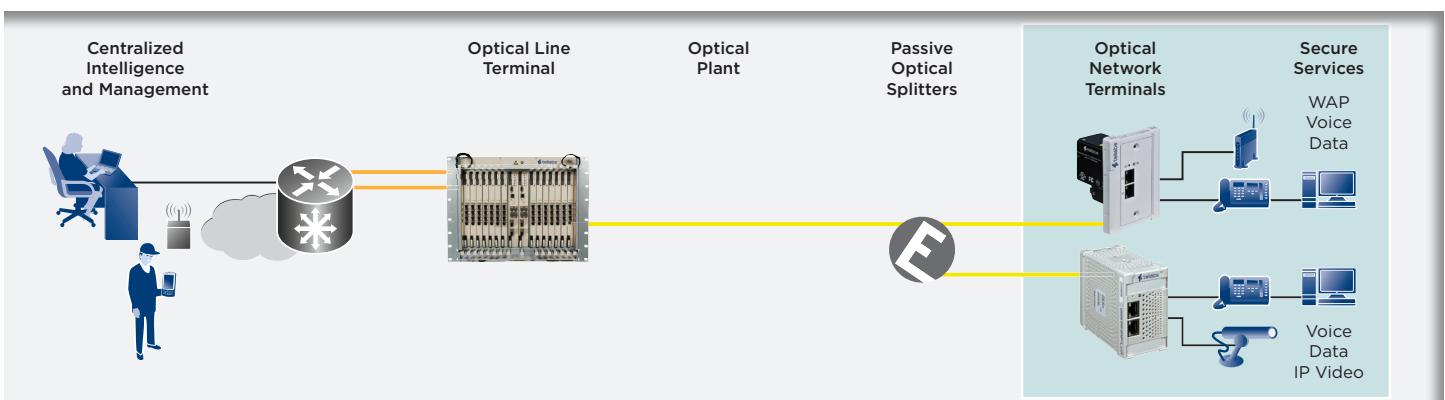


Figure 7: ONTs are basically simple optical-to-electrical terminals capable of delivering all needed connections, services and applications.

IT workforce stability

Another top 10 CIO priority is attracting and retaining a workforce.¹¹ Legacy copper-based LANs have equipment on every floor of every building that requires physical monitoring, provisioning and maintenance. The IT staff needs weeks of training to be comfortable with the programming of MACs and other network modifications. Optical LAN simplifies aggregation, distribution and access with less equipment and less cabling, thus requiring fewer IT staff touches.

The passive portions of this network require zero attention from the IT staff. Tellabs™ Optical LAN MACs can be executed at the centrally located Tellabs Panorama PON Manager with preexisting global profiles/templates, or the MACs can happen dynamically with the aid of higher-level network access control protocols.

With this simplified network architecture, the IT staff needs less training and no annual certification is required to support Optical LANs. Training usually requires five days compared to copper-based LAN training, which can take weeks or even months. Expensive and time-consuming formal certification programs that take up IT staff time are unnecessary, keeping the staff on the job instead. In the end, Optical LANs help CIOs, IT managers and IT staff compensate for today's lean IT workforce, keep pace with evolutionary innovations, manage regular heavy workloads and assist with the retention of quality IT employees.

¹¹ Gartner — http://www.gartnerinfo.com/sym23/evtm_219_CIOtop10%5B3%5D.pdf

Summary

Tellabs Optical LAN and Tellabs Panorama PON Manager can improve IT efficiencies by increasing the speed of LAN configurations, monitoring, troubleshooting and MACs while reducing human error and security risks. This is possible through centralized intelligence and management that make automated M2M action possible, all of which can positively impact CIOs' and IT pros' priorities and key performance indicators.

Take the next step. Contact Tellabs today.

