



Optical LAN serves U.S. soldiers preparing for combat tours

Tellabs™ Optical LAN saves Fort Campbell CapEx dollars, physical space and electrical energy while delivering 1 Gbps of bandwidth to each user desk.



Customer's goals — select a communications infrastructure for the newly renovated building that:

- is cost effective in terms of both CapEx and total cost of ownership (TCO)
- provides military-grade security for network traffic
- complies with federal mandate to reduce energy consumption
- protects existing PBX investment
- conserves physical space

Tellabs solution — Optical LAN with Gigabit Passive Optical Network (GPON) technology

- Tellabs™ 1134 Optical Line Terminal (OLT)
- Tellabs™ 705GR Optical Network Terminal (ONT)
- Tellabs™ 1000 Voice Gateway

Business results — Tellabs Optical LAN:

- saves more than \$1.5 million over a traditional copper-based active Ethernet LAN
- comprehensive security design, including optional Tellabs™ All-Secure™ PON security
- up to 80% savings in energy consumption, compared to copper-based LAN
- bridges IP and TDM to protect existing PBX investment
- supports multiple services — voice, data and video — simultaneously over a single fiber
- saves building space by requiring only one telecommunications closet

Fort Campbell is a United States Army base, which occupies more than 105,000 acres spread across the Kentucky-Tennessee border. Through training, mobilization and deployment, its primary mission is to strengthen the combat readiness of the 101st Airborne Division, along with other units posted at the fort, including special operations aviation. Helping to support that mission is a Tellabs™ Optical LAN, the first installation of Gigabit Passive Optical Networking (GPON) technology at Fort Campbell.

Until recently, the multiple functions within the Soldier Readiness Processing (SRP) program, which focuses on readiness, deployment and redeployment activities, were

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scattered across the post. The garrison commander decided to consolidate most of those functions in a single, newly renovated building that previously served as the Fort Campbell commissary. Since the new site opened earlier this year, soldiers can go to one convenient location for all SRP functions: personnel and human resources administration; finance; legal; the chaplain's office; and medical portions of the base hospital. Everyone involved in the broad range of SRP functions now relies on the Tellabs Optical LAN for voice, data and video communications.

No legacy gear but tough requirements? Optical LAN is the obvious choice

When it came to selecting a telecommunications infrastructure for the new SRP site, planning officers within Fort Campbell's Network Enterprise Center (NEC) had a greenfield opportunity. Because the Army had gutted and completely renovated the building, NEC planning officers did not have to accommodate any previous LAN architectures or cabling systems.

Nevertheless, they had several stringent requirements for any potential LAN solution. The diversity of communications activities within all those SRP functions demanded a cost-effective, easy-to-provision military-grade secure and ultra-reliable solution that could tackle all the operations necessary to process 4,000 soldiers each month. In addition, given the 2007 federal mandate that government buildings trim energy consumption by 30% by the end of Fiscal Year 2015, planning officers wanted a sustainable, energy-efficient LAN solution.

When Network Enterprise Center planners compared costs, they discovered that the optical fiber-based GPON solution would save Fort Campbell more than \$1.5 million over a traditional copper-based active Ethernet LAN. Thanks to the solution's higher level of integration, along with the PON infrastructure's elimination of active components, the cost savings include a 30%–50% capital cost reduction from Day One and an operational cost reduction of 50%–70%, year over year.

Network simplification makes for easy service provisioning

Tellabs demonstrated that the GPON solution is a far more simple, easy-to-provision network than an active Ethernet LAN. Basically, the Optical LAN collapses the traditional architecture to reduce the amount of required equipment and cabling while also converging voice, data and video services onto a single [fiber] medium. With its central management, the Optical LAN allows NEC personnel to make adds, moves and changes more quickly and easily than they could with a traditional LAN.



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Not just a greenfield installation, but a green one too

In terms of sustainability, the Tellabs™ Optical LAN produces fewer thermals and therefore delivers energy savings of up to 80% when compared with traditional copper-based LANs. Its passive architecture requires no power within the optical distribution network, that is the physical fiber and optical devices that distribute signals to end-users. Further, the Optical LAN's need for less equipment than a copper-based LAN has a domino effect on many other power-related areas, including distribution and switching gear, conversion, backup, fire suppression and cooling.

A powerful Optical LAN with a small footprint and low TCO

Tellabs also showed the Fort Campbell planners that the Optical LAN, by reducing cabling, floor, rack and telecom closet requirements, could save a lot of physical space within the building. For example, a typical copper-based LAN serving up to 2,000 users requires 90 rack units of space. Active Ethernet LAN switches require one full rack for the switches and two additional racks for terminating the large bundles of copper cables associated with the switches — for a total of 18 seven-foot-tall equipment racks.

Optical LAN is the cost-effective solution

By contrast, an Optical LAN can serve up to 8,000 users and, because the optical line terminal (OLT) features 90% greater density than active Ethernet switches, an Optical LAN requires only one equipment rack, for which only 11 rack units are needed. Further, by reducing the amount of physical space required, an Optical LAN brings with it fewer UPS, fire suppression and



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HVAC requirements which, in turn, reduce overhead costs. The PON splitters, typically located in the telecom closet, are located in a fiber distribution hub (FDH) mounted on the wall, thus reducing the required floor space even more.

The Fort Campbell planners realized that when they factor in training and support expenses with the above-mentioned cost savings, the Tellabs Optical LAN offers the base a significantly lower total cost of ownership over 10 years compared to a copper-based LAN.

A technology that secures military communications

Recognizing the need for secure communications within all military and government installations, Tellabs designed the Optical LAN to provide a comprehensive set of security options, ranging from advanced end-user authentication, deep packet filtering and optical encryption to secure remote management with IPSEC, IPv4/v6, SNMPv3, role-based access and security audits.

In addition, optical fiber is not susceptible to the electromagnetic radiation concerns associated with copper wiring, and Optical LAN electronics are far more secure from intrusion than edge switches. To support future high-security requirements, Tellabs installed the infrastructure with armored interlocking fiber cabling and secure zone boxes. With the addition of the fiber alarm monitoring system to create the alarm points, the Optical LAN can support Tellabs™ All-Secure™ PON. Once enabled, this security layer of protection directly monitors, on a 24/7/365 basis, each armored single-mode fiber, and any attempt to intercept communications triggers an alarm.

A simple solution that supports a broad array of services

Working around the ongoing construction and renovation of the former commissary building, Tellabs installed the SRP Optical LAN within a few months. At the heart of the solution is the Tellabs™ 1134 Optical Line Terminal (OLT), a four-rack unit chassis, which resides in the building's only telecom closet. Capable of supporting 512 ONTs, the Tellabs 1134 OLT concurrently provides



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2,048 Ethernet ports and up to 1,024 analog POTS lines. The platform's IP/Ethernet architecture supports the scalable delivery of multiple services simultaneously, including:

- plain old telephone service (POTS)
- native Session Initiation Protocol (SIP)-based Voice over Internet Protocol (VoIP)
- high-speed Internet access
- transparent LAN data services
- video, including Internet Protocol Television (IPTV), RF video, Video on Demand (VoD), IP cameras, door access, HVAC controls and lighting controls

Connected to armored fiber that runs down the building risers, the 1134 OLT delivers a 2.4-Gbps connection to the Tellabs 705GR Optical Network Terminal (ONT) located on each desk throughout the building. The 1134 OLT also aggregates all user traffic and feeds it, via a 1-Gbps Ethernet connection, to the transport network router.

The 705GR ONT, which features four 1-Gbps Ethernet data ports, two analog ports and an RF connector, can deliver multiple services simultaneously over a single fiber to each individual desk or workstation: POTS or Voice over IP (VoIP); RF or IP Video; and 1-Gbps Ethernet data. To satisfy the requirement for 300-plus drops in the building, Network Enterprise Center planners installed 200 705GR ONTs for the first phase of the two-phase deployment and have ordered 200 additional units to round out the second phase.

Voice gateway bridges legacy and advanced gear, saves more money

To provide telephone service over the Passive Optical Network, the Tellabs Optical LAN connects the two 705GR analog ports, via the Tellabs™ 1000 Voice Gateway, to Fort Campbell's existing Class 5 PBX, which is located in another building on post. By bridging Fort Campbell's legacy TDM-based voice infrastructure to the FTTD VoIP architecture, the Voice Gateway enables the Optical LAN to deliver POTS service over the common GPON fiber infrastructure, thereby eliminating the need for any overlay network and TDM-IP-TDM conversions.

The solution's TDM-to-IP flexibility produces even more cost savings for the base. Fort Campbell can protect its existing investment in the PBX, and there is no need to purchase VoIP handsets and licenses. SRP personnel moving from other buildings into the new site keep their current telephone numbers and their familiar processes for making and transferring calls, retrieving voice-mail messages, etc.

Optical LAN flexes easily to accommodate more users

The new SRP site occupies more than 40,000 square feet of space of the 110,00-square-foot building. Fort Campbell officials plan to move the New Soldier In/Out Processing Center as well as the Military Personnel office into the remaining portions of the renovated building. The latter includes several communications-intensive sections, among them ID cards; insurance sign-ups for soldiers and their families; dental services and records; transition services; finance; and reassignments. When combined with the SRP operations, the other operations slated to move into the building are certain to generate a lot of bandwidth-intensive communications traffic.

With its scalable, Gigabit Ethernet capacity, cost-effectiveness, easy service provisioning, military-grade security, ultra-reliability and sustainable design, the Tellabs Optical LAN at Fort Campbell stands ready to serve all those who serve.

Take the next step. Contact Tellabs today.



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