

Fiber-to-the-Desktop Technology for Voice, Video and Data Delivery to Government Agencies

The majority of today's access communication networks in government agency buildings and on military bases consist primarily of overlay architectures. This approach employs 3 separate networks to support the voice, data and video requirements. The result is crowded equipment rooms, complex wiring closets and extensive copper runs throughout the facilities. In many cases, the existing copper infrastructure has been in place for some time, generating ongoing maintenance and Electromagnetic Interference (EMI) security concerns. In addition, network bandwidth requirements have increased exponentially and current copper-based networks are no longer able to fully meet bandwidth needs today or in the future.

Workforce growth, IP-based voice migration and other Quality of Service (QoS)-sensitive services, and the increased use of more data-intensive applications — such as bandwidth-heavy video teleconferencing and satellite imaging — are all driving an explosive demand for sophisticated, reliable data services. To control rising operational expenses and bandwidth required to support new services and existing services, agencies must find ways to migrate to next generation solutions quickly and cost-effectively.

Based on proven and widely deployed Passive Optical Network (PON) technology, Fiber-to-the-Desktop (FTTD) can support the demand for a super high-speed, feature-rich, native end-to-end IP/Ethernet solution. Tellabs offers a solid line-up of full-featured products that provide the packet-based, high-bandwidth technology required for government's in-demand communications services.

Specifically targeted to modernize base and agency building communications, Tellabs FTTD solutions provide paths for efficient service rollouts, manageable CapEx impact and long-term OpEx benefit. Once deployed, a single FTTD facility can fully support today's high bandwidth voice, video and data requirements over one converged access network.

FTTD Deployment Architectures

There are 2 primary deployment options for an FTTD solution. The first, shown in Figure 1, is optimal for larger government buildings. Each user or workstation has a dedicated Optical Network Terminal (ONT) capable of accepting a single fiber and simultaneously delivering POTS voice or VoIP, RF or IP Video, and up to 2.4 Gbps of data to that individual user/workstation. A Passive Optical Network (PON) is deployed in the building itself, minimizing electronic equipment in the field.

Fiber is run down the building risers to the basement or equipment room, efficiently containing any number of services and aggregating all user traffic into one Optical Line Terminal (OLT) device. The OLT

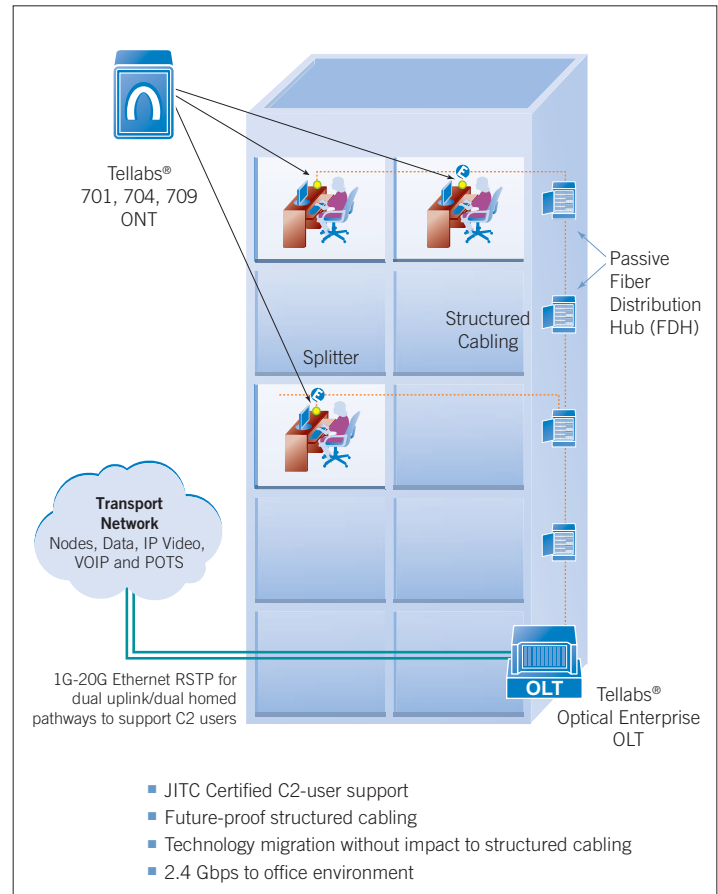


Figure 1. FTTD deployment in larger office buildings

offers 1 Gbps or 10 Gbps connections to directly communicate either to a transport network or the various voice, video and data service elements.

The second FTTD deployment option, illustrated in Figure 2, highlights a campus environment solution. Here, the OLT is located in a Central Office (CO) or other distribution point. Multi-user ONTs are deployed at campus buildings or smaller offices to deliver the same services to the user. In the fiber architecture, distances between the CO and the end points can range up to 13 miles, satisfying the needs of virtually any government or military deployment. Depending on the size of the campus buildings, a combination of the 2 deployment options may be used.

Both FTTD deployment architectures offer a wide range of CapEx and OpEx savings opportunities and benefits over today's legacy and disparate networks:

- **Capital Expenditure savings** — Tellabs FTTD solution offers superior bandwidth delivery with a typical capital savings of 40%–70% compared to current Ethernet solutions. The cost savings are attributed to a higher level of integration along with elimination of active components with a Passive Optical Network (PON) infrastructure. Reduced capital expenditure means you can upgrade a greater portion of your network.
- **Power savings** — The passive nature of Tellabs' FTTD solution means up to 80% power savings when compared to current Ethernet solutions. This power savings not only results in lower thermal loading on your facilities, but also greatly reduces utility usage.
- **Space savings** — The passive optical nature of GPON technology results in up to 90% space savings. The PON splitters, typically located in the communication closet, are located in a Fiber Distribution Hub (FDH) mounted on the wall; thus recovering up to 100% of the floor space. You can now put the brooms back in the broom closet.
- **Operational Expenditure savings** — Total Cost of Ownership (TCO) is significantly reduced as a result of lower capital and operation expenditures. Long-term operational savings are a result of: significant reduction of power/utility usage; lower provisioning, maintenance and administrative costs; and reduced service agreement requirements.

Advanced security measures are paramount in government installations. The Tellabs FTTD solution offers a comprehensive security suite 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, a fiber deployment to the desktop minimizes the copper wiring between user devices and reduces EMI concerns.

The Tellabs FTTD Solution

With more than three million users in service on Tellabs Fiber-to-the-Home (FTTH) equipment commercially, Tellabs leverages its proven technology and vast experience to offer FTTD to the government market. The diverse nature of government agencies, ranging from intelligence to military to civilian, drives a need for flexible service offerings. The portfolio of products in the Tellabs solution enables the reliable delivery of a wide range of services:

- High-speed, service-aware communication services
- Native Session Initiation Protocol (SIP)-based Voice over Internet Protocol (VoIP)
- Traditional Plain Old Telephone Service (POTS)
- Tellabs Hybrid Voice Architecture — A controlled, cost-effective migration from TDM to VoIP infrastructure
- Video delivery, including Internet Protocol Television (IPTV), Radio Frequency (RF) video and Video on Demand (VoD)
- All services integrated into a single fiber infrastructure

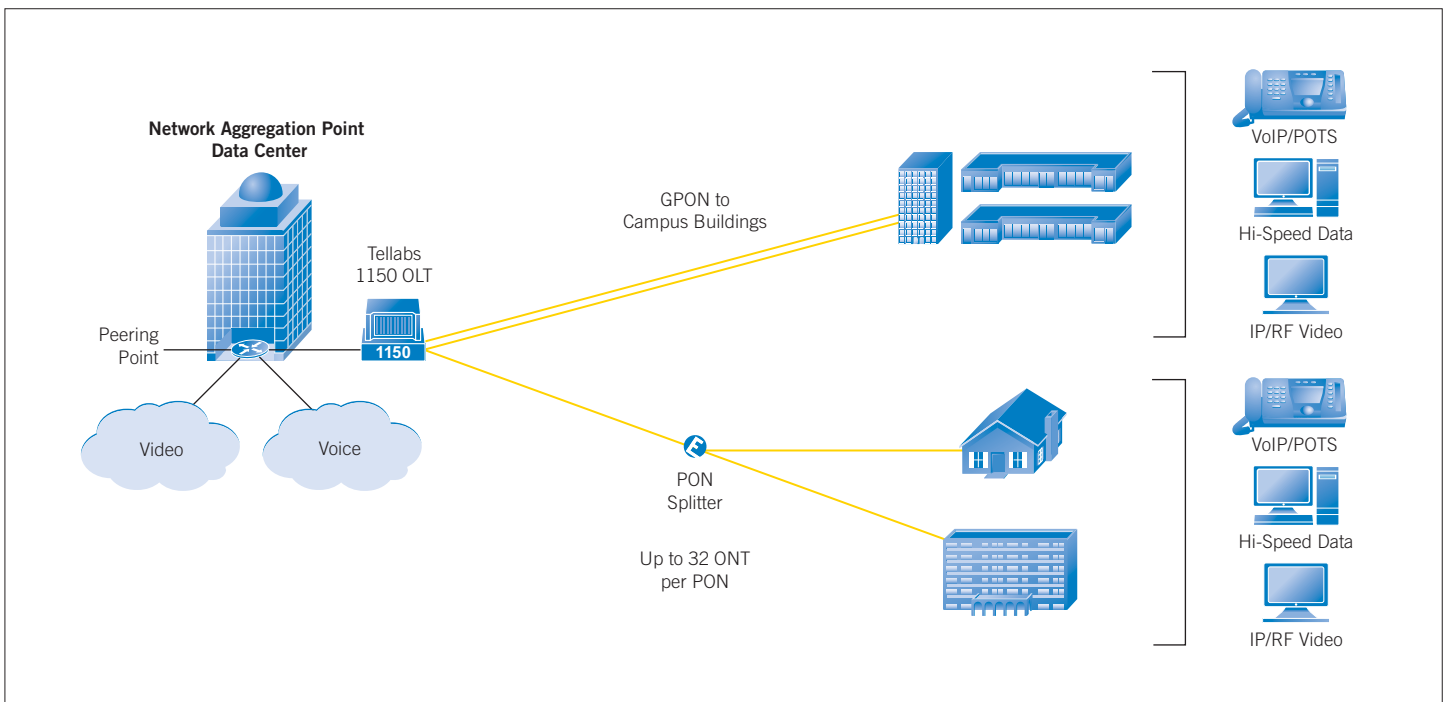


Figure 2. FTTD deployment in a campus environment

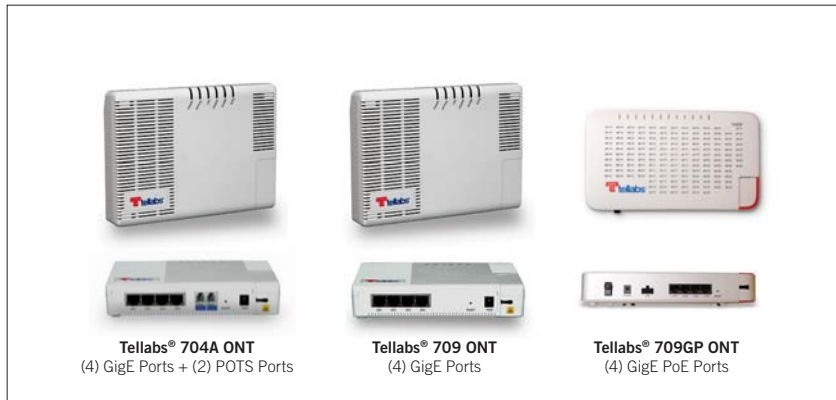


Figure 3. Tellabs 1600 Series Optical Network Terminals

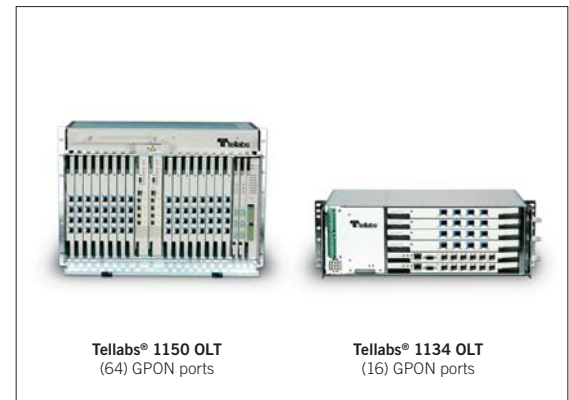


Figure 4. Tellabs 1100 Series Optical Enterprise OLT

The Tellabs FTTD solution is comprised of a broad portfolio of products designed to offer maximum network flexibility and a range of bandwidth and speed options that can be aligned to a variety of government agency needs.

Tellabs® 1000 Voice Gateway — Bridges the legacy TDM voice switch infrastructure to Tellabs FTTD native VoIP architecture. Enables simultaneous delivery of POTS service over the common GPON fiber infrastructure, eliminating overlay networks.

Tellabs® 1100 Optical Enterprise OLT Platform — Comprised of the high-density Tellabs 1150 OLT and medium-density Tellabs 1134 OLT. A carrier-class GPON solution delivering up to 2.4 Gbps of data, voice and video to the end-user. Interface(s) to the network include 1G and 10G Ethernet uplinks. The Tellabs 1150 Optical Enterprise OLT supports over 8,192 end-user Ethernet ports in a 9-rack unit chassis.

Tellabs® 1600 Series Optical Network Terminals — An entire series of cost-effective end-user devices in desktop, single family and small office formats, for the delivery of integrated high-speed services. The Tellabs® 1600 Series ONTs provide interfaces for multiple densities of POTS, Gigabit Ethernet and both IPTV and RF video. The ONTs also possess integrated Analog Terminal Adapters (ATA) so that both SIP-based and traditional analog phones can be used at the desktop in a VoIP environment. Models with Power over Ethernet (PoE) capabilities on all ports comply with IEEE 802.3af and 802.3at. PoE parameters can be provisioned on a per port basis. Once provisioned, the port auto-senses the need for sourcing.

Tellabs® Panorama™ Integrated Network Manager (INM) — An important component for operational efficiency, the Tellabs Panorama INM provides a rich, secure, graphical user interface for ease of provisioning, administration and overall end-to-end management of the Tellabs FTTD solution.

The Tellabs Advantage: Experience and Expertise

In conjunction with the inherent advantages of the FTTD architecture as well as the deployment flexibility provided by the portfolio, the Tellabs FTTD solution offers additional benefits to the network administrator and the user. As the leading North American PON provider, with more than one million ONTs deployed, Tellabs offers proven expertise and a unique value-add to fiber solutions.

Tellabs has a long history of providing highly reliable products to service provider networks around the world. Tellabs OLTs are carrier-class platforms designed with redundant architectures to ensure maximum system availability. Additionally, all data can be transferred with a variety of QoS levels, ranging from “best effort” to Committed Information Rate (CIR) prioritization. Regardless of priority, data can be segregated into numerous private networks. Maximum system uptime, the ability to guarantee information delivery and the security options afforded by the Tellabs solution are all integral to mission-critical communications.

The Tellabs FTTD solution also features multiple attributes that support a positive user experience and earn high marks for quality and customer satisfaction. In addition to typical voice, video and data options and interfaces, the Tellabs portfolio can provide special services to meet the service delivery needs of most customers. Additionally, though often taken for granted, it is vital that the system work with the existing Customer Premise Equipment (CPE). Tellabs extensive development efforts help ensure that the solution integrates with all standard VoIP switches, most Class 5 TDM switches, IP surveillance networks and other CPE found in office and residential environments.

FIBER-TO-THE-DESKTOP TECHNOLOGY FOR VOICE, VIDEO AND DATA DELIVERY TO GOVERNMENT AGENCIES

Network Engineering and Integration Services for Voice, Video and Data

Tellabs® Global Services offers expert consulting services for a full turnkey solution. Rapid and effective network engineering and integration are essential for mission-critical applications. Tellabs service consultants have the skills and experience required to help implement and deploy the full range of FTTD network services, including the voice system, video headend/video content, servers, middleware and PON network.

Reliable High-bandwidth Services for Advanced Communications

The growth in bandwidth demand, the increasing complexity of services and the rising operational costs of existing networks all drive the need for new access communication solutions in government agency facilities. FTTD offers a modernized architecture that meets the capacity, reliability and security requirements of today while reducing operational cost and providing investment protection for tomorrow. Tellabs brings its deployment experience and a portfolio of products and services designed for the reliable, flexible and efficient delivery of voice, video and data services in a single building or campus environment.

About Tellabs® Government Systems

Tellabs Government Systems enables ultra-reliable telecommunications to meet the mission-critical needs of government. Financially solid, with more than \$1 billion in cash reserves and 1,500 employees engaged in research and development, Tellabs has committed numerous resources to serving government needs.

Tellabs carrier-class equipment handles most Internet sessions and phone calls in the United States — with superior reliability and the highest quality of service. Tellabs equipment is deployed in more than 300 networks worldwide, enabling IP/MPLS convergence with ATM-grade service delivery, optical transport, high-bandwidth fiber-based access delivery and mobile network solutions. In addition, Tellabs offers a full suite of services to help plan, build and operate the right network solution.

For more information about how Tellabs Government Systems can support and enhance the mission-critical telecommunications needs of government, please contact us at +1.703.448.2301 or visit our website at www.tellabs.com/gov.

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