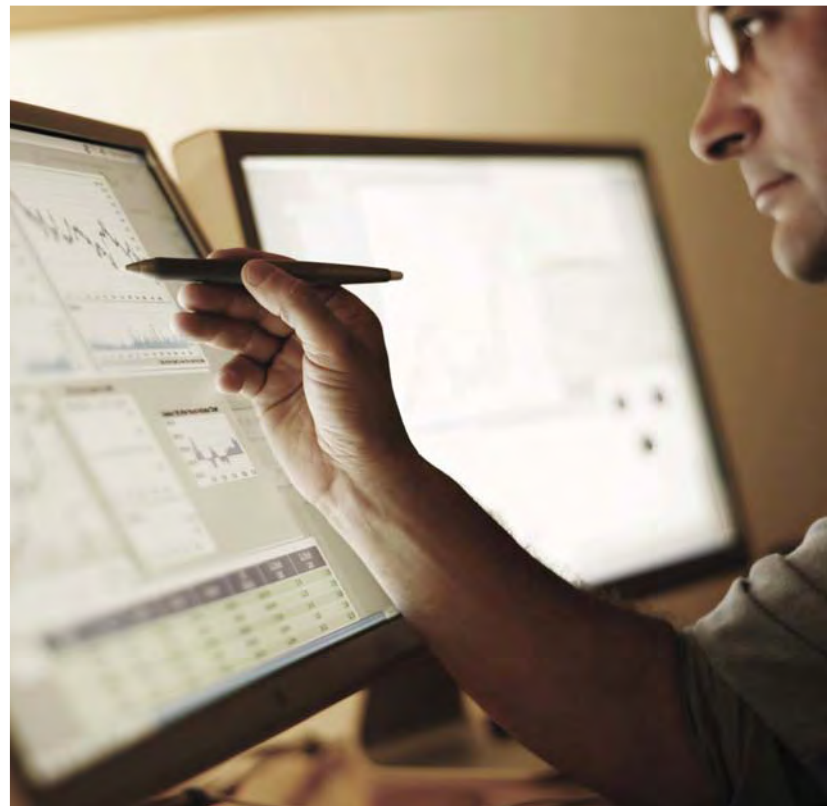


Optical Networking Services



To meet the ongoing demand of providing next-generation broadband services, you need a partner who delivers deep expertise in designing and implementing high performance transport networks.



Today's demands to deliver the next-generation of dynamic broadband services to your customers have greatly impacted the need to increase your transport capacity. Consumers now require a variety of broadband Internet services in addition to their traditional communication needs. Many of these services are related to delivering video which requires a significantly larger amount of bandwidth than anything carriers have faced in the past.

As your customer base grows and subscribers utilize more services from your portfolio, it is critical that your transport network be scalable to handle the changing traffic flows. A new, dynamic, high capacity transport network is needed to meet these challenges. With traditional networks, answering these demands would require a large amount of dedicated resources to build and refine your transport network, increasing your operating expenses and the risk for technical errors due to the additional manipulation of fibers and network components.

Dense Wave Division Multiplexing (DWDM) technology has provided an answer to the bandwidth crunch by enabling individual fiber spans to transport multiple network transmissions. This allows a way for service providers to maximize their initial network investments by utilizing their existing network fiber spans for new DWDM networks. To address the need for dynamic, scalable network design, Tellabs® leads the way with its optical networking technology solutions, allowing service providers to build transport networks in a mesh design and route a traffic-carrying wavelength from one fiber span into another, independently of the other wavelengths. Now service providers can design the most efficient transport routes without the restraints of the traditional point-to-point ring designs.

Over the last decade Tellabs has been the leader in developing and deploying DWDM technology. With deployments around the globe, Tellabs has extensive expertise in designing, deploying and supporting next generation optical networks. Most recently, Tellabs leads the way

with Reconfigurable Optical Add Drop Multiplexing (ROADM) enabling the design of optical networks in mesh configurations as opposed to traditional ring configurations. Regardless of traffic type (Ethernet, SONET/SDH), Tellabs offers 40G transmission rates per wavelength (or channel) and the ability to multiplex up to 88 channels over a single fiber span.

With this new technology there are now more optical transport network configuration possibilities available and Tellabs Global Services provides the expertise to take full advantage of the systems features. Inherent complexities related to network design, fiber integrity, deployment and provisioning require specific skills and knowledge. Mismanagement of these challenges can diminish the value of your investment if not conducted in a highly structured and skilled approach.

During the lifecycle of your project, Tellabs experts can help you anticipate and adapt to changes in traffic demands, office prioritization and fiber performance to keep your project on time and on budget. The skillful ability to address issues in a timely and effective manner is key to keep your project from deviating from its original plan. The cost associated with pulling your project back on track can affect the overall profitability of your new network.

As you begin to plan the build of a dynamic network that increases transport capacity and is scalable, Tellabs Optical Networking Services portfolio provides the expertise needed to implement a high performance transport network. Combined with the intuitive power of our products and field tested best practices, our network consultants draw upon all of the resources necessary to create an optimized next generation optical network to meet your customers' broadband services demands. Our experience in building optical networks for our customers has enabled Tellabs to create a suite of services that effectively addresses the critical stages necessary to accelerate your time to market and ongoing performance excellence.

Tellabs Global Services – The Right Partner for Optical Networking Services

Tellabs Global Services is the right partner for next generation optical transport network. Our proven methodologies and on-board product tools enable our team to help you meet your objectives, including:

- *Mitigate Risk* — Utilize our field proven methodologies and techniques to identify and proactively plan to avoid risks to your project schedule and budget
- *Optimize Performance* — Identify performance enhancements within the network design, implementation and operations support
- *Improve Reliability* — Implement and operate a next generation optical network that provides the required functionality end-to-end on a consistent basis
- *Accelerate Time-to-Market* — Bypass the learning curve and speed your ability to generate revenue

Program Management

No matter how well an optical transport network implementation is conceived, staffed and financed, you run significant risks of not meeting the schedule, falling short on quality and exceeding budget if all aspects of the program are not expertly integrated and managed. Large, complex deployments or changes to your existing environment require management of numerous resources, vendors, interdependencies, timelines, budget management and reporting.

Tellabs Global Services Program and Project Management Services help to ensure that all projects related to your optical transport network implementation run smoothly and in a timely manner. A Tellabs Global Services program manager serves as the focal point for any project, issue or question — expertly resolving conflicts and identifying issues before they become problems. Our program managers facilitate regular meetings between your team and the Tellabs team to ensure seamless communications throughout the project. With a Tellabs Global Services expert as a single point of contact to drive implementation from the planning stage through project completion, you can be sure that network implementation will be done on time and with high standards of quality and cost-effectiveness.

Key Deliverables:

- Develop comprehensive project plans
- Document program requirements and deliverables
- Program and project schedule management, including milestone definition and tracking
- Plan and manage resources, risks and costs
- Schedule and participate in regular status meetings
- Coordinate all Tellabs or third-party resources and personnel
- Ensure smooth transition of change management processes
- Provide regular executive-level updates and detailed reporting on the status of all activities



Key Benefits:

- *Reduce Risks* — Utilizing proven best practice project management and risk mitigation methodologies
- *Reduce Project Costs* — Through streamlined project planning, tracking and reporting with strict adherence to timelines and milestone achievement
- *Improve Time-to-Market* — Proactively identifying potential issues before they affect the schedule and keeping all project activities on track

Advanced Fiber Characterization

Tellabs Optical Networking Solution allows you to deploy a transport DWDM network that carries up to 88 individual channels at speeds of 40G; traditional DWDM networks offer speeds of 10G. To overcome the technical challenges that come with supporting network speeds that are four times that of traditional networks requires the fiber optic network to provide minimal optical signal distortion, loss or corruption. As transmission speeds advance beyond 40G for future scalability, understanding the characteristics of your fiber spans during the planning phase will help you to avoid potential technical issues and delays during implementation.

Tellabs Global Services conducts four tests on each of your fiber spans that identify specific issues that may create technical troubles. It is critical that Fiber Characterization occurs early in the network planning process, as the results have a direct impact on your network design. Understanding the characteristics of the fiber network helps you to develop network designs that better support the desired network bandwidth. Using this information to deploy the proper network configurations, including amplifier power and dispersion compensation, will allow you to complete your network implementation on schedule, meet your customer commitments and avoid the cost associated with delay.

Key Deliverables:

- *Fiber Continuity Test* — Ensures that a light path exists between two points and qualifies link loss between two nodes
- *Fiber Characterization Test* — Utilizes an Optical Time Domain Reflectometer (OTDR) to measure actual span length, average loss per kilometer, average splice loss, Optical Return Loss (ORL) and reflectance
- *Chromatic Dispersion (CD) Test* — Determines total dispersion and fiber type of the optical links to discover the maximum speed that currently can be supported
- *Polarization Mode Dispersion (PMD) Test* — Identifies physical disorders that impact birefringence including mechanical stress, vibrations, installation twist and torsion, bend radiuses and aggressive temperature deviations

Key Benefits:

- *Accelerate Time-to-Market* — Avoid technical delays during test and turn up of your optical transport network
- *Improve Quality of Service (QoS)* — Helps you deliver services to your customers over a reliable network
- *Reduce Risks* — By relying on experienced network consultants to deliver accurate results for current and future network planning

Network Architecture

Tellabs Global Services Network Architecture team combines theoretical design knowledge with practical implementation experience to provide a high-level network design and a plan for the physical implementation of the network. Leveraging experience in next-generation optical network design, Tellabs works interactively with your team to create an effective network architecture and recommend industry best practices to ensure a secure, scalable, reliable and resilient optical network infrastructure. Experienced senior consulting engineers perform an analysis and assessment of network status to identify system performance, security and application requirements as well as Key Performance Indicators (KPI) and other elements necessary to build a solid foundation for the network implementation.

Key Deliverables:

- Clear and comprehensive picture of network topology and traffic and capacity patterns
- Optical network modeling and design
- High-level project outline
- High-level network design including overall topology, network diagrams and project recommendations
- High-level network launch outline, including critical steps, anticipated impact to existing networks and integration recommendations
- Management reporting packages
- Bandwidth and network parameter calculations

Key Benefits:

- *Accelerate Time-to-Market* — The Tellabs architecture team has the experience and expertise necessary to quickly and effectively transform your vision into a reality
- *Maximize Resource Utilization* — Our experts will develop an architecture that will help to ensure optimal use and management of your network resources
- *Improve Return on Investment* — Tellabs delivers optimized network architectures that enable faster deployments and maximized return on investments

Network Design

Tellabs Global Services' experienced engineering staff, combined with world class tools and processes, offers end-to-end design expertise to help eliminate costly errors and redesigns. Utilizing high-level network architecture documentation and best-in-class tools, Tellabs senior engineers develop a complete, implementation-ready Engineering Design Package (EDP) documenting the configuration parameters for Tellabs equipment at specific sites. By partnering with Tellabs for your network design, you are able to take advantage of our expert resources and produce a comprehensive design solution that achieves your objectives while utilizing knowledge from past implementations and industry best practices.

Key Deliverables:

- Documentation of the final design, sufficiently detailed of the hardware and software deployment planning activities
- Captures the node degrees and the network exactly as it was installed and configured at the completion of network acceptance test
- Equipment layout and physical connections
- Redundancy and failover scheme
- Detailed configuration information
- Naming conventions for customer sites, circuits and other supporting network elements as applicable
- IP addressing scheme
- Lambda Design
- Node configuration text files (running configurations)
- Detailed Element Management System and Network Management System information if applicable
- Port listing and Lambda engineering details
- Review of EDP and customer sign off of design

Key Benefits:

- *Improve Quality of Service (QoS)* — Helps you meet service level agreements and achieve high performance levels with a well-configured network design
- *Reduce Implementation Costs* — Frees up resources and reduces costs of maintaining in-house expertise

Network Deployment Services

Tellabs Global Services delivers a seamless system implementation and helps you manage the multitude of resource, logistic, administrative and operational issues required to take your system live. Our deployment engineers assist you by first ensuring a complete understanding of your business and technical requirements, and of your predetermined project plans and designs.

Tellabs Engineer, Furnish and Install (EFI) Services are the result of years of experience using world-class tools and processes, and can provide the expertise necessary to simplify and speed up your deployment. Using our proven methodologies, extensive deployment experience and technology expertise, Tellabs helps you to meet your deployment objectives within specified time and cost constraints.

Tellabs Network Element Acceptance Testing (NEAT) Services provide you with the confidence that your new Tellabs equipment is operating per the published specifications and has the network reliability needed to carry live traffic. Our trained Field Service and Project Management teams execute the latest test and turn-up procedures customized for each network element.

Key Deliverables:

- *Engineering* — Perform site survey, document unique central office requirements, determine overall project scope, prepare materials list to perform installation, develop the facility cable wiring list and develop a detailed specification for installation of the project
- *Material Furnishing* — Obtain and ship required installation material to arrive at the designated installation location prior to the scheduled installation date
- *Installation* — Inventory and staging, equipment installation and deinstallation, environmental build-out, DSX/LGX installation, fiber duct installation, installation supervision and installation audits
- *Network Element Acceptance Testing Service (NEAT)* — Initialize system and configure intra-system cables. Provision test circuits, measure optical power output and test line and port side interfaces

Key Benefits:

- *Meet Aggressive Project Timelines* — Leverage Tellabs experience, tools and processes to keep your schedule on track and eliminate costly rework
- *Quicker Time-to-Revenue* — Faster deployment means revenue-generating network elements are impacting your bottom line more quickly
- *Minimize Deployment Costs* — Product expertise and proven processes reduce costly errors and delays

Management System Deployment

The increasing diversity in your network environment presents complex network management challenges. Network Management Systems (NMS) and Element Management Systems (EMS) are critical components of modern telecommunications networks. Proper

installation and configuration of your management systems are critical to support Quality of Service (QoS) from every network element. Tellabs EMS/NMS engineers have developed a detailed EMS/NMS deployment methodology designed to minimize potential issues and complete the deployment as quickly as possible.

Key Deliverables:

- Configuration site survey
- Hardware build and installation
- Operating system installation and configuration
- Database installation and configuration
- EMS/NMS software installation and database configuration
- System acceptance testing

Key Benefits:

- *Speed time-to-market* — Avoid delays by utilizing experienced Tellabs consultants and their proven methodologies to deploy your optical network's EMS/NMS per the project plan
- *Improve Reliability* — Ensure the proper installation and configuration of your EMS/NMS operating systems and databases
- *Mitigate Risk* — Reduce the impact of delays and technical errors due to technology inexperience and learning curves

Network Integration

Tellabs integration engineers have the knowledge required to shorten the interval between installation and operation of new optical network elements. Upon installation of the network elements, experienced Tellabs engineers configure the element, enable physical and logical connections, and coordinate with any third-party vendors to deliver a live, traffic-bearing system. Drawing on extensive experience, Tellabs engineers are able to make the real-time changes and adjustments necessary to expedite equipment turn up without sacrificing quality. Upon completion of network integration, Tellabs will turn over a connected, operational and fully tested network that is ready to accept and provision live traffic.

Once your Tellabs optical transport networking equipment has been properly acceptance tested and the DWDM spans have been connected, the Network Acceptance Test (NAT) Service begins. Tellabs Global Services team of Network Acceptance Testing (NAT) Engineers, Field Service Engineers and Project Management Staff executes a complete acceptance test of the intercommunication and reliability between Tellabs nodes on your new network. Upon completion of the testing, a full report is provided for your records and your network is ready to begin carrying live traffic.

Key Deliverables:

- Network Acceptance Testing Service (NAT)
 - *Project Management* — A single point of contact for project timelines, status updates and logistics coordination
 - Verify network node connectivity
 - Provision test circuits for BER testing and execute OC192 level tests

- Measure span loss and signal-to-noise ratios
- Test Embedded Operations Network
- Verify EMS/NMA alarming
- Create a customized Network Acceptance Test Report

Key Benefits:

- *Accelerate Time-to-Market* — Reduce the strain on your internal resources and shorten the amount of time needed to verify your network elements and network connectivity is ready to carry customer traffic
- *Optimize Performance* — Verify that you are employing the proper configurations by verifying individual element and network performance
- *Improve Reliability* — Identify and correct network element and network traffic inefficiencies that could cause technical issues before you begin to transport customer traffic

Support Services

Your customers demand dynamic broadband services and you have answered their needs by building a new optical transport network to carry the load of your new service portfolio. To keep your customers happy you need to assure them best-in-class network availability and minimize traffic disruptions. Tellabs Global Services offers you a portfolio of Support Agreements to meet a broad range of technical and operational requirements. Each Tellabs Support Agreement consists of a set of service elements to help lower your cost of ownership, maximize product reliability and performance, and increase your operational efficiency throughout the lifecycle of your network.

Key Deliverables:

- Technical support services offer remote, online or on-site technical support
- Hardware maintenance services provide hardware repair or advance replacement
- Upgrade and update maintenance services
- Proactive services include upgrade and update planning and installation, system audit and designated support manager
- Spares management

Key Benefits:

- *Minimize Costs* — Lower, more predictable total cost of ownership
- *Improve Customer Satisfaction and Reduce Churn* — Increase network reliability by maximizing network uptime, availability and performance
- *Reduce Complexity* — Simplify support processes and support delivery
- *Reduce Time-to-Market* — Prevent and reduce potential technical issues



Optical Circuit Provisioning

In today's competitive marketplace, you need to bring services to the market quickly, cost-effectively and efficiently. When facing aggressive deployment deadlines and a scarce supply of skilled resources, outsourcing element provisioning requirements to an experienced partner may help to alleviate the staffing crunch. The Tellabs Optical Provisioning Service provides a network ready for live traffic in the most rapid and reliable manner.

Key Deliverables:

- *Planning* — Document circuit layout requirements, step-by-step plan created and determine steps to enable remote connection to the network management system
- *Circuit Provisioning* — Remotely access your network, implement the step-by-step plan and provision each circuit as required
- *Circuit Testing* — Design and implement a test plan and work collaboratively to determine the cause of any failed test

Key Benefits:

- *Network Readiness* — Once the Tellabs Optical Circuit Provisioning Service has been completed, your network is ready to carry live traffic and begin generating revenue
- *Speed Time-to-Market* — With their extensive knowledge of the Tellabs® 7100 Optical Transport System (OTS), Tellabs engineers can provision circuits quickly and accurately
- *Improve Reliability* — Testing performed as part of the Tellabs Optical Circuit Provisioning Service gives you confidence that the circuits have been properly provisioned and are ready to support live traffic

Migration Services

Tellabs Engineers create custom solutions to help you transfer your traffic in support of a wide range of strategic initiatives such as fiber capacity recovery, new technology introduction and network optimization. Tellabs Migration Services help you maintain network quality during the transition from existing network architectures and technologies to new technologies

The implementation of Dense Wavelength Division Multiplexing (DWDM) technology allows you to increase the amount of traffic supported by your fiber optic infrastructure. Tellabs Migration Services transfers traffic from existing non-DWDM equipment to new DWDM equipment, often without traffic disruption, in order to increase fiber capacity and reduce floor space and power requirements.

Key Deliverables:

- *Existing Network Auditing* — Complete physical and logical survey of the existing network including; traffic patterns, future growth/traffic demand projections and SLAs (if applicable)
- *Migration Planning* — Defines project requirements and identifies efficiency improvement opportunities as well as design a customized plan with site-specific procedures, cutout steps and contingency plans
- *Migration Execution* — Actual migration of the existing traffic. Once completed the DWDM network will carry the transport service traffic

Key Benefits:

- *Speed time-to-market* — Our proprietary tools and processes can save up to 50 percent of the time normally required for cutover execution
- *Improve Accuracy* — Reduce or eliminate errors introduced by manual entry of complex provisioning and configuration commands to reduce rework time associated with error correction by nearly 100 percent
- *Optimize Performance* — Consolidation of multiple network traffic onto a single fiber span to increase the capacity of existing network entities and create a more efficient network design

Optical Network Operations Services

As you address the growth of network traffic over the course of your network's lifecycle, conversion, expansion and performance of your Tellabs Optical Transport System elements need to be completed regularly and correctly. These services utilize best practices from worldwide deployments and are designed to efficiently ensure maximum ROI throughout the networks life cycle. Project Management provides a single point of contact for shipment coordination, resource scheduling, project tracking and acceptance.



Key Deliverables:

- *On-going Network Architecture and Design* — Concentrates on the continued growth and optimization of your optical network. Integration planning of new devices through the use of a consistent structure and set of methodologies. Provide hardware and software recommendations to optimize system and network performance.
 - Updated Engineering Design Packages
 - Updated Network Architecture Plans
 - Network Optimization Recommendations
- *Expansion and Conversion Services* — Focuses on the scalability of your optical network for both Line side and Port side traffic by assisting you in the execution of growth or modification of your Tellabs 7100® OTS network equipment.
 - Amplifier & Degree upgrade
 - DCM add/change
 - OLA to OLT conversion
 - Module expansions
 - Universal shelf add, Node insertion & OLA bay deployment
- *Network Auditing Services* — Subscription services that can be executed individually or as a combination of services; they are performed on a consistent, periodic basis to help maintain the health of the network and provide you with intelligent, actionable data.
 - Capacity Reporting
 - Provisioning Audit
 - Performance Management

Key Benefits:

- *Speed Time-to-Market* — Avoid delays in deploying new technology due to learning curves and/or lack of internal resources
- *Improve Reliability* — Utilizing Tellabs Global Services consultants' experience and best practices to ensure your network is operating at peak performance
- *Optimize Performance* — As your network expands ensure that it is configured by an optimized network design

Training

Tellabs Technical Training Centers have developed courses to quickly and effectively provide the understanding and hands-on skills you need to operate, maintain and provision Tellabs equipment in your network. Tellabs helps you better understand your new optical networking equipment, the technology and mission-critical role in today's changing telecommunications environment.

With Tellabs, you have access to the training you need whenever and wherever you need it. Tellabs offers a unique training program designed to help you increase productivity while learning how to operate, maintain and troubleshoot Tellabs products in your network.

Key Deliverables:

- *Classroom-based Training* — Includes lectures and hands-on lab activities delivered by product and technical experts. Courses are held in our headquarters location or regional training centers throughout the world. Many of our courses can be delivered on site at the location of your choice.
- *Web-based Training* — Provide access to Tellabs training at your own pace from your desktop
- *Premium Training* — Includes On-the-Job Mentoring, Quick Start and customized classes. On-the-Job Mentoring provides a smaller student-to-instructor ratio. It is conducted at the student's location and is designed to reinforce classroom learning. Quick Start provides an abbreviated version of standard training — just enough to get you going until you can schedule standard classes. Customized classes put the expertise of our development staff at your disposal, tailoring material to meet your specific needs.

Key Benefits:

- *Improved System Operation* — Training helps you leverage Tellabs products as effectively as possible in your network, improving efficiency and reducing costs
- *Improved Productivity* — Tellabs training combines lectures, demonstrations, hands-on lab exercises and assessments to facilitate the fast and effective acquisition of new skills
- *Faster Time to Revenue* — Tellabs training helps you better leverage your resources and maximize the value of your Tellabs solutions

**Tellabs Global Services —
The Right Partner, The Right Solutions.**

As you continue to strive to meet your customers' bandwidth demands and optimize your existing transport network, turn to Tellabs when you need a partner with proven experience and expertise. Our industry leading Tellabs 7100 Optical Transport System coupled with our Optical Networking Services provide you with the latest transport networking technology and service experience necessary to create a next generation optical transport network that is scalable and resilient.

About Tellabs

Tellabs helps customers succeed through innovation. That's why 41 of the top 50 global telecom service providers chose our mobile backhaul, optical networking and business services solutions. We help telecom service providers, independent operating companies, MSO/cable TV companies, enterprises and government agencies get ahead by adding revenue, reducing expenses and optimizing networks. With wireless and wireline networks in more than 90 countries, we enrich people's lives by innovating the way the world connects.™ Tellabs (Nasdaq: TLAB) is part of the NASDAQ Global Select Market, Ocean Tomo 300™ Patent Index, the S&P 500 and several corporate responsibility indexes, including FTSE4Good and eight KLD indexes.

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