

# Integrated Next-Generation WDM Transport

Tellabs' next-generation WDM solution represents a cost-effective way to handle large amounts of traffic in the core, regional and metro domains of the network. By integrating WDM and SDH multiplexing capabilities, a fully fledged next-generation WDM transport platform is available and ready to meet the growing demand for high-speed data traffic.

Instead of having to build and operate both a WDM network and SDH network in parallel, interconnected via expensive transponders, this solution makes it possible to carry high volumes of traffic in a single, integrated network entity.

## Integrate Two Networks Into One and Save Money

Data services are growing and represent an increasingly large percentage of the total traffic. For capacities in excess of 10 Gbps, WDM transport has long been the only solution. Particularly for long-distance transport, optical amplification of multiple wavelengths it has proven much more economical than installing re-generators for individual channels. This has led many operators to build stand-alone DWDM solutions and to deploy many different transponder types — one for every single type of service. This solution inevitably demands a substantial investment in transponders, including an up-front capital expenditure (CapEx) requirement that prevents many networks from being built at all. And for those networks actually being established, each of these many service-specific wavelengths may not necessarily be fully utilized due to this “one-service-per-wavelength” approach.

Tellabs' alternative solution, however, ensures that next-generation WDM equipment is used in a far more service-friendly and cost-effective manner. This application is well-suited to improve utilization of wavelength bandwidth and also lowers the cost of operations by integrating two networks into one. Perhaps most important of all, this eliminates the need for expensive transponders by providing interfaces to customers in such a way that different services and customers can share the same wavelengths. In short, by merging SDH multiplexing with WDM transport in a single network entity, all services — both data and voice — can be mixed and carried together over one fully converged data and telecom services infrastructure.

Tellabs' next-generation WDM solution plays a key role in achieving capacity expansion and network growth as today's sub-wavelength services migrate towards a more genuine wavelength service scenario with multiplexing and switching in the optical domain.

## Lower Your OpEx and CapEx by Merging Your WDM and SDH Infrastructures

The merger of two separate networks into a single, integrated network helps lower operational costs. For example, the provisioning of services becomes a single operation instead of a two-step process. The introduction of a single system for monitoring and control of the network also makes daily operations work easier and thus improves the operational efficiency.

In terms of capital expenditures, there is no need for transponders any more since the Tellabs next-generation WDM solution is based on integrated coloured interfaces, shared by all services and customers.

## Serve More Customers with Multi-Wavelength OADMs

With the introduction of new and more flexible optical add/drop multiplexer (OADM) devices, it is possible to add/drop even more wavelengths in a node than before. With the ability to drop as many as 50 per cent of the wavelengths in a node, client servicing becomes significantly more cost-efficient. And, as opposed to the traditional termination of all wavelengths, the process of add/drop provides a more cost-effective design in which a wavelength is only terminated when there is a specific reason to do so.

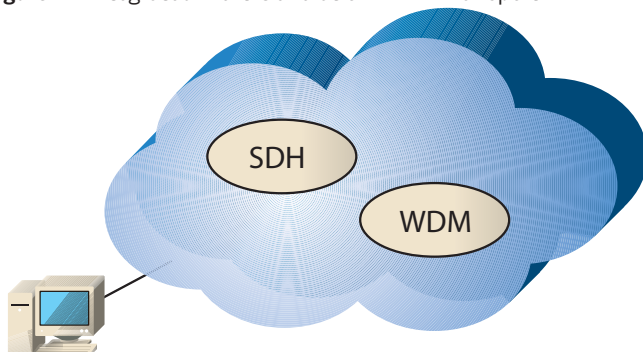
## Lower Your OpEx with Tellabs' Plug-and-Play Next-Generation WDM Solution

Plug-and-play is the key to ensuring a smooth migration path from a network with only a few wavelengths towards a situation in which many wavelengths are activated. With Tellabs' next-generation WDM solution, no manual adjustment or fine tuning in the field is required when adding wavelengths. Thus, operational expenditures are kept at a minimum.

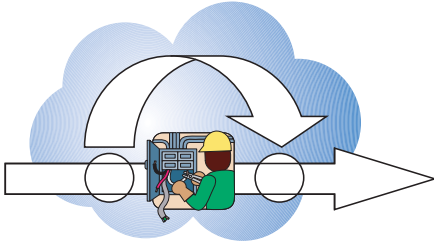
## Reconfigure Your Next-Generation WDM Network without Service Interruption

Whenever there is a need to make network changes, it is of utmost importance to be able to perform these without affecting service to

Figure 1: Integrated Next-Generation WDM Transport



**Figure 2: OpEx and CapEx Savings With Next-generation WDM Transport**



existing customers. And with the built-in service switch for in-service re-routing of traffic, for example while adding a new wavelength add/drop, such operational maneuvers now become a reality. With this option, the optical wavelength planning and optical components do not all have to be in place from day one, so additional capital investments can be postponed.

**Easy Capacity Expansion**

With our next-generation WDM, it is simple to mix 2.5 Gbps and 10 Gbps wavelengths without having to consider the distance. With a balanced distance reach between the two line rates, migration from 2.5 Gbps to 10 Gbps services is an easy and straightforward process maintaining both the amplifier spans and the maximum distance. Moreover, this holds true no matter if you happen to have an infrastructure based on standard single-mode, dispersion-shifted or dispersion-flattened fibres.

**Reduce Your Fibre Lease Expenses By Applying Bi-directional Transmission on a Single Fibre**

If you own your own fiber infrastructure, fibre utilisation may not be that important. But if you have to lease dark fiber, it is worth mentioning that the Tellabs' next-generation WDM can reduce the money spent on fibre leasing by almost 50 per cent if you apply bi-directional transmission on only one fiber instead of two fiber solutions.

**Next-Generation WDM Example**

Consider the case shown in figure 3. First, there are no transponders in the network since all the next-generation WDM units are based on integrated colored interfaces on the network interface side. Similarly, on the service/customer side, the next-generation WDM units accept both TDM- and Ethernet-based services directly connected to the service interfaces for full integration and convergence of services. These services are then multiplexed and mapped into SDH before entering the DWDM core. This means that next-generation WDM units are located primarily at the network edge. Once onboard and multiplexed onto the right wavelength, onward transport is all-optical throughout the network.

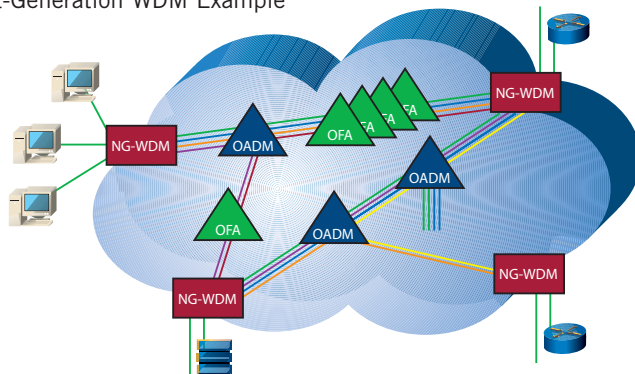
As shown, wavelengths are routed to their destination either directly or via an optical add/drop multiplexer before being terminated. Any of the wavelengths are able to carry payloads as large as 10 Gbps over hundreds of kilometers.

The procedure to add another wavelength is as simple as adding additional colored interfaces at the termination points of the new wavelength. No fine tuning or re-planning is required since any intermediate optical amplifier or add/drop will automatically detect the new wavelength and automatically adjust the gain accordingly. Site visits are only needed when a wavelength has to be added/dropped along the way, one that require local installation of the appropriate wavelength sensitive branching optics. But generally, this can be carried out in-service, without interruption of the other wavelengths. They continue through the node thanks to the optical in-service re-configuration switch that makes such network changes as simple and operator-friendly as possible.

**Products Required**

- Tellabs® 6300 Network Manager
- Tellabs® 6325 Edge Node
- Tellabs® 6340 Switch Node
- Tellabs® 6345 Switch Node
- Tellabs® 6350 Switch Node
- Tellabs® 6370 WDM Node

**Figure 3: Next-Generation WDM Example**



**How to reach us**

**North America**

Tellabs  
One Tellabs Center  
1415 West Diehl Road  
Naperville, IL 60563  
U.S.A.  
+1.630.798.8800  
Fax: +1.630.798.2000

**Asia Pacific**

Tellabs  
3 Anson Road  
#14-01 Springleaf Tower  
Singapore 079909  
Republic of Singapore  
+65.6215.6411  
Fax: +65.6215.6422

**Europe, Middle East & Africa**

Tellabs  
Abbey Place  
24-28 Easton Street  
High Wycombe, Bucks  
United Kingdom  
HP11 1NT  
+44.870.238.4700  
Fax: +44.870.238.4851

**Latin America & Caribbean**

Tellabs  
1401 NW 136th Avenue  
Suite 202  
Sunrise, FL 33323  
U.S.A.  
+1.954.839.2800  
Fax: +1.954.839.2828

*The following trademarks and service marks are owned by Tellabs Operations, Inc., or its affiliates in the United States and/or other countries: TELLABS®, TELLABS and T symbol®, and T symbol®.*

*Any other company or product names may be trademarks of their respective companies.*

© 2005 Tellabs. All rights reserved.  
74.1436E Rev. B 12/05