



## VTESSE GOES 100G

**Tellabs Optical Solution  
enables prompt 100G  
provisioning**

**Alan Mitchell**  
Chief Technology Officer  
Vtesse



4

### **LEADING EDGE**

Roger J. Heinz, Executive Vice President – Global Sales and Services, sees networks increasingly dominated by fiber and wireless. It's a logical response to the flood of network traffic unleashed by Internet users, he argues.

6

### **UPLOAD**

Young adults see technology-created opportunities but they're wary about security and privacy. High-speed Ethernet makes strong gains. Will smartphones make cameras and MP3 players obsolete?

11

### **VTESSE GETS SET FOR 100G**

U.K.-based fiber network operator Vtesse completes a successful trial of 100G connectivity using a ROADM approach and Tellabs 7100 Nano. The new service is now commercially available.

By Joan Engebretson

16

### **SDN NARROWS \$9.2 BILLION GAP IN MOBILE BACKHAUL**

Software defined networking (SDN) could reduce the investments operators must make in backhaul networks by almost half, says new research from Strategy Analytics. That's good news, since operators face a \$9.2 billion backhaul gap between planned spending and network needs.

By Sue Rudd, Strategy Analytics

22

### **DELTEK GOES GREEN, SAVES GREEN WITH TELLABS OPTICAL LAN**

Deltek minimized power consumption and costs by deploying Optical LAN in its new headquarters. The new LAN is also easier to manage than traditional copper-based alternatives.

By M. J. Richter

27

### **BACKHAUL DIFFERENTIATES TELEFONICA IN LATIN AMERICA**

The backhaul network is critical to mobile users' quality of experience, argues Cayetano Carbajo, technology director for Telefonica. Tellabs Mobile Backhaul Solution helps the company quickly respond to traffic shifts.

By Joan Engebretson

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## Wireless and fiber are the future



**Roger Heinz**  
Executive Vice  
President – Sales  
and Services

Everywhere you look, you see people using mobile devices to access the Internet.

By 2017, more people will use the mobile Internet than fixed broadband, according to PricewaterhouseCoopers. And ABI Research predicts 30 billion wireless devices by 2020 — 3 times more devices than today.

Just as “access” increasingly means “wireless,” “higher-speed connectivity” means fiber optics. To handle the flood of network traffic unleashed by Internet users, telecom operators recognize that fiber has significant advantages over copper.

Research company iGR predicts that by 2016, U.S. mobile operators will need 10 times more capacity in their backhaul networks. That’s why fiber will link 67% of cell sites to backhaul in 2016, up from 30% today.

So the 30 billion wireless devices will mostly connect to the cloud via fiber, not copper. Just as fiber is becoming the transport medium of choice for cell sites, enterprises will connect their WiFi, small cells and workstations with fiber — using a technology called Optical LAN.

So, why are both service providers and enterprises moving to fiber to connect mobile and fixed devices to the cloud? Because fiber offers lower capital and operating expenses, meets current and future bandwidth needs, uses much less energy, saves space — and is cheaper and easier to install.

Software developer Deltek wanted a LAN that would reduce costs and let employees move around as they work on tablets and laptops. Tellabs Optical LAN more than satisfies those requirements (p. 22). Thanks to fiber’s huge capacity, Deltek’s LAN cables will last 25 years or more.

U.K. network operator Vtesse relies heavily on fiber optics too. The company deployed the Tellabs 7100 Nano 3 years ago, in part to enable an easy upgrade to 100G. After its successful trial, Vtesse is now among the first companies to offer 100Gbps service (p. 11).

Telefonica's experience in Latin America reminds us of the importance of backhaul for mobile networks. Telefonica deployed the Tellabs 8600 Managed Edge System for backhaul so its network can be upgraded quickly and easily, as needed (p. 27).

Whether you operate a telecom or enterprise network, you need to increase bandwidth easily and maximize return on investment. We're ready to help you succeed with wireless devices connected through fiber.

Sincerely,



**Roger Heinz**

Executive Vice President – Sales and Services

## UPLOAD



**Ninety percent of young adults said technology has made them better informed about political issues.**

### **Young adults' mixed views on technology**

Young adults in the Millennial generation (ages 18 to 30) are too young to remember a time without cellphones. Many never have heard a squawking dial-up modem. Or loaded film into a camera. Or saved data on a floppy disk.

Considering the advanced technologies they've grown up with, perhaps it's not surprising that 69% of Millennials in a recent survey agreed that "technology creates more opportunities for all." The survey, conducted by Telefonica and the *Financial Times*, included 12,000 respondents from 27 countries.

Millennials, also known as Generation Y, are quite positive about their future, the survey found. More than two-thirds (68%) believe they have the opportunity to become an entrepreneur in their own country or to develop and bring an idea to the market. Nearly the same number (67%) said their country's best days are ahead.

Respondents in some countries were particularly optimistic. Ninety-three percent of Chinese and 78% of Latin American respondents see their countries' best days ahead.

Millennials see both positive and negative aspects to technology.

On the positive side, 90% said technology has made them better informed about political issues. And 80% said technology has

## UPLOAD

made it easier to overcome language barriers and get a job.

On the negative side, 62% said technology has widened the gap between rich and poor. The vast majority (91%) is concerned about the security and privacy of their online data. And 95% believe greater security measures should be implemented to protect their online identity.

The Telefonica/*Financial Times* research found 11% of global Millennials fit into a category called “Millennial Leaders.”

These respondents strongly agree they are on the cutting edge of technology. They believe they can make a difference in their local communities.

Nearly half (44%) said technology has been a key influence in their life. And 72% said they have an excellent knowledge of and comfort level with technology.

In comparison, 30% of overall respondents said technology has been a key influence. And only 30% had a strong comfort level with technology.

### Strong growth ahead for high-speed Ethernet

Higher-speed Ethernet is catching on in a big way, according to Infonetics Research. Manufacturer revenues from optical and Ethernet ports operating at 10G, 40G and 100G rose 62% in 2012, the research firm said. The data included service provider and enterprise global equipment sales.

By 2017, Infonetics forecasts high-speed Ethernet port revenues to double. Those revenues are just over \$20 billion today. But they are expected to climb to \$42 billion over the next 5 years.

**By 2017, Infonetics forecasts high-speed Ethernet port revenues to double.**

**\$20B → \$42B**

## UPLOAD

Revenue from 1G Ethernet and optical ports is declining because prices are dropping, said Infonetics. But shipments of all port speeds continue to grow — and 1G ports are no exception, the researchers said.

Infonetics forecasts total optical and Ethernet 1G, 10G, 40G and 100G port sales of nearly 450 million in 2017. That's a substantial increase from 2012, when just over 360 million ports were sold.

Sales of higher-speed ports will grow at a faster rate than lower-speed ports, according to Infonetics. More than 10% of all ports sold in 2013 will be 100G, the research firm predicts.

More than three-quarters of smartphone owners said their smartphone is their primary device for taking pictures.



### Smartphones displace cameras, GPS and MP3 devices

U.S. consumers may be increasingly unwilling to leave home without their smartphones or tablets. But they are more likely than before to leave other devices behind, according to the Consumer Electronics Association.

More than three-quarters (78%) of smartphone owners surveyed said their smartphone is their primary device for taking pictures.



## UPLOAD

Almost the same number (74%) said their smartphone is their primary video recording device.

Cameras aren't the only devices whose functionality is being usurped by smartphones.

More than two-thirds (69%) of smartphone owners said their smartphone is their primary navigation device. Almost the same amount (62%) said they read e-books mainly on their smartphone. And more than half (59%) of smartphone owners said they listen to music primarily on their smartphone.

One device that smartphones and tablets won't replace any time soon is the laptop, the CEA found. Nearly half of smartphone (43%) and tablet owners (46%) are spending less time with their laptops, research showed. But only 1% of smartphone owners and 2% of tablet owners said they have completely stopped using their laptops.

## UPLOAD

Visit Tellabs at these upcoming events:

### **Futurecom 2013**

October 21-24

Stand E10

Riocentro Exhibition Center

Rio de Janeiro

### **Carrier Ethernet World APAC**

December 3-5

Stand F1

Suntec City

Singapore

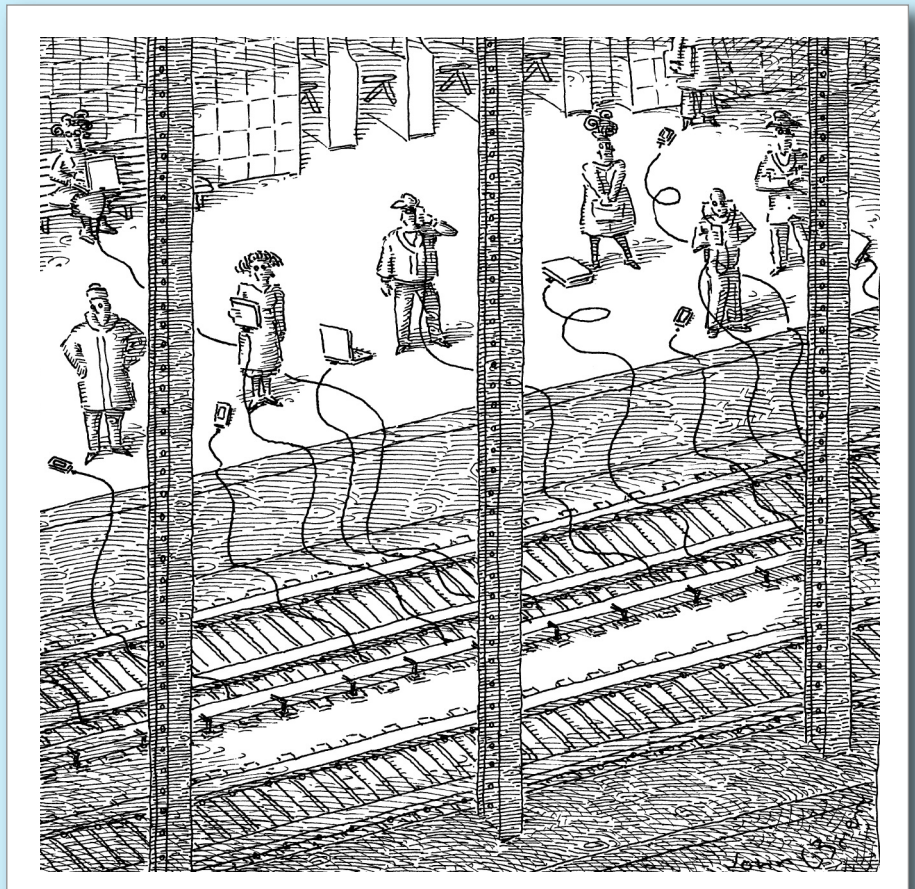
### **MiLCIS**

November 12-14

Stand ACT

National Convention Centre

Canberra, Australia



# VTESSE GOES 100G

**Tellabs 7100 Nano Optical Transport System completes successful trial, enables prompt provisioning of 100G connections**  
**By Joan Engebretson**

Alan Mitchell, Chief Technology Officer, Vtesse

*Insight* Q3 2013 11

## OPTICAL TRANSPORT

**“We wanted to have an amplified network so we could direct a wavelength straight through.”**

— Alan Mitchell,  
Chief Technology  
Officer, Vtesse

**V**tesse is a national network and data center solutions provider based in the United Kingdom. The company specializes in high-speed connectivity for large enterprises in the U.K., including leading financial institutions.

Recently Vtesse became one of the first companies to offer 100Gbps service following a successful trial of 100G connectivity. This speed exceeds what most service providers use in their backbone networks.

The systems required for the 100G connection — Tellabs® 7100 Nano™ Optical Transport System, a packet-optical transport platform — are already installed as part of Vtesse’s ROADM network. The Nano includes a multi-degree Reconfigurable Optical Add/Drop Multiplexer (ROADM) and optical switching technology.

Vtesse originally began using the Tellabs optical transport system 3 years ago. An important selection criterion was that the product should be upgradeable to 100G.

### **A strong Ethernet heritage**

Vtesse was founded in 2001.

“Our business model was to provide Ethernet services on a reliable and high-availability network,” said Vtesse Chief Technology Officer Alan Mitchell. “At that time in the U.K., there was no Ethernet service available on a national scale. Our idea was to exploit the need to interconnect large data users with Ethernet services.

“Because we have access to fiber routes from multiple sources, we can design solutions for customers based on specific requirements, be it resilience, diversity or/and latency,” said Mitchell. Over the years, the Vtesse network expanded to interconnect all major U.K. population centers. The company also added dense WDM (DWDM) and Fiber Channel capability, as well as a 30,000-square foot data center. The data center houses clients’ IT and telecom equipment.

## OPTICAL TRANSPORT

**“Previously, to get from one side of London to the other included the use of multiple regeneration points.”**

— Alan Mitchell,  
Chief Technology  
Officer, Vtesse

From the start of the project Vtesse made a strategic decision to install the optical transport system that would ultimately be used in the 100G trial to future-proof the network and minimize or eliminate the need for regeneration.

Regeneration is not needed for the optical transport system that Vtesse uses because the ROADM architecture allows a wavelength to be connected optically between the endpoints without the need for electrical switching. With more than 1,500 km required before regeneration, Vtesse can reach any location on its network without the need for electrical regeneration.

“Previously, to get from one side of London to the other included the use of multiple regeneration points,” said Mitchell. “We wanted to have an amplified network so we could direct a wavelength straight through. Some of our existing hardware had this ability. But we wanted more control and flexibility than this offered; hence the move to the ROADM technology, which makes subtracting wavelengths easier.”

The cost of a 16-wavelength amplified overlay without regenerators was less than a regenerated system for just two wavelengths, Mitchell said. “The remaining 14 wavelengths effectively came free, apart from the end line cards,” he explained. Those additional wavelengths will support future demand, he said.

The ROADM-based system also offered advantages in comparison with the manually configured amplified system that Vtesse had installed on some routes. “Our previous technology needed designer expertise to add and remove wavelengths and for maintenance,” said Mitchell. “It also required visits to intermediate sites to manually patch wavelengths through.”

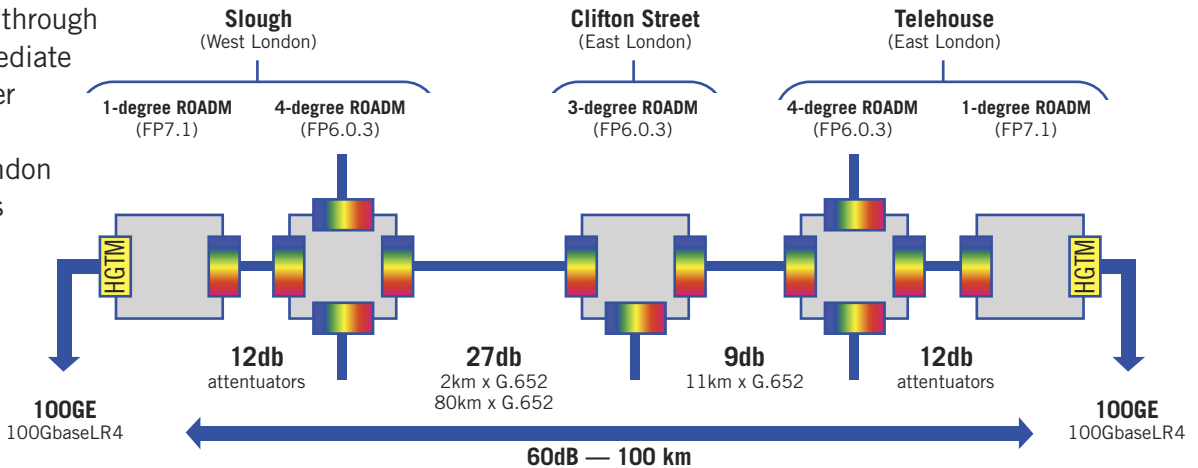
The new optical transport system eliminates these requirements. And it has lower operational costs than the manually configured amplified system. “It enables network operations center (NOC) staff to provision and maintain the system so opex is reduced,” said Mitchell.

**ROADM** Reconfigurable  
Optical Add/Drop  
Multiplexer  
**NOC** Network  
Operations Center

## OPTICAL TRANSPORT

**Vtesse Trial Network**  
Vtesse found it “incredibly easy” to add a new 100G link to its existing 10G ROADM network, linking a data center in Slough through an intermediate data center in London with a London Docklands site.

The new optical transport system initially was installed to create an amplified overlay network linking London, Bristol and Birmingham. Today Vtesse has more than 40 optical transport systems in its network. Moving forward, the company plans to double this number.



### The trial

In 2013, Vtesse made the decision to do a trial of a 100-kilometer 100G link interconnecting a London Docklands site to a major data center facility in Slough, with a connection in between through an intermediate London data center.

The trial conformed to ITU-T and IEEE standards. It demonstrated transmission of a 100BASE-LR4 connection across a G.709 network.

“Recently we have had interest from customers for multiple 10G services over the same link and so it now seems worthwhile to have a higher bit rate available,” said Mitchell.

Until recently, the majority of Vtesse’s customers required 10Gbps. But demand for even more bandwidth has arisen. “The need for storage capacity for archiving and retrieval has outgrown the transmission rates,” observed Mitchell.

Establishing the trial 100G link was an “incredibly easy

**IEEE** Institute of Electrical and Electronics Engineers  
**ITU-T** International Telecommunications Union – Telecommunication Standardization Sector

## OPTICAL TRANSPORT



**SEE MORE** Click to see a video of Alan Mitchell from Vtesse discussing the company's 100G trial and deployment.

process," Mitchell said. "I plugged a line card in at both ends. And it was provisioned by our NOC in a matter of minutes."

To put things in perspective, Mitchell said the biggest challenge was gaining entry to the facilities where the optical transport equipment was housed. "Security these days is so rigorous," he said.

The trial link didn't carry live traffic. But a router was connected to the link to test interoperability by proving that 100G Ethernet private line worked successfully over the connection.

The trial also showed that one wavelength on a fiber can support 100G while a different wavelength on the same fiber supports a different speed.

An Exfo FTB-85100G tester also was part of the trial. It was connected to the trial link and measured the end-to-end error ratio. It showed that the network was operating error-free and at full 100G throughput.

### Moving forward

The demand for 100G connectivity is growing at a rapid rate and Vtesse operates one of the most extensive 100G networks within the U.K. This, together with the ability for fast deployment and its extensive on-net network, makes Vtesse a leading contender in this marketplace.

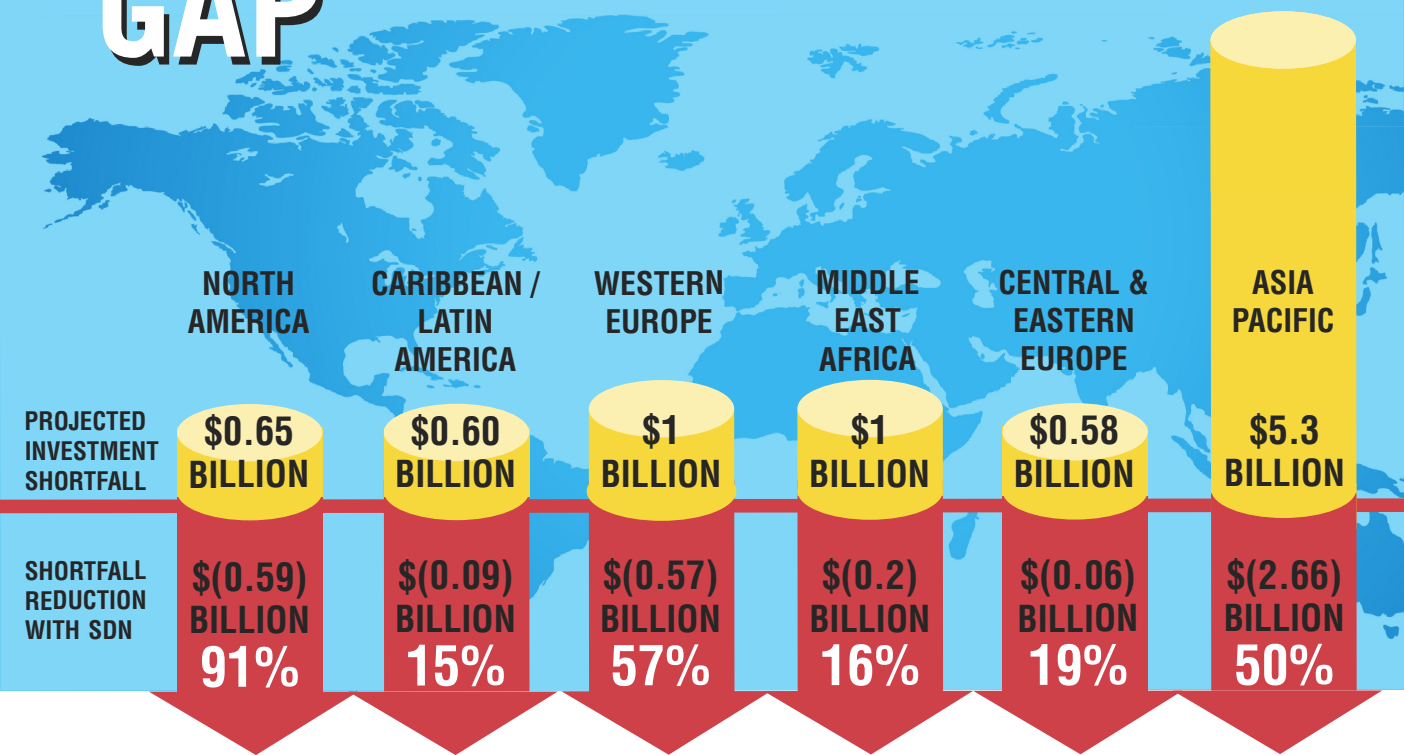
Mitchell attributed Vtesse's speedy provisioning in part to its optical transport system. As the 100G trial demonstrated, NOC staff will be able to provision 100G links.

Employees may need to install new line cards at the endpoints, but they would not need to visit intermediate network locations. And that can reduce provisioning times from weeks to days.

Speedy provisioning has been responsible for much of the growth on the ROADM network, said Mitchell. "We don't need to utilize the time of our skilled designers for day-to-day provisioning," he said. "It really is plug-and-play and that's what we need going forward." ■

PLEASE NOTE: Portions of this article will appear in *OSP World* Q4 2013. For more information please visit [www.osp.com](http://www.osp.com).

# SDN TO NARROW MOBILE BACKHAUL GAP



## Five key SDN apps will reduce mobile backhaul CapEx between now and 2017

By Sue Rudd, Strategy Analytics

**SDN TO NARROW BACKHAUL INVESTMENT GAP** An earlier Strategy Analytics study sized the mobile backhaul gap at \$9.2 billion. This gap is the projected investment shortfall, or the difference between planned and required backhaul CapEx. SDN can reduce the global backhaul gap by \$4.2 billion, or almost half — with the greatest reduction in Asia Pacific.



Software defined networking (SDN) could significantly improve mobile backhaul economics, according to new research from Strategy Analytics. That's good news, considering previous Strategy Analytics research showed that service providers were facing a \$9.2 billion mobile backhaul funding gap globally by 2017. That gap is the difference between today's levels of backhaul spending and the level required to maintain customers' quality of experience (QoE) as traffic escalates.

The latest research finds that SDN could reduce that gap by almost half — to just under \$5 billion by 2017. In addition, SDN could lower backhaul operating expenses between 12% and 37%, depending on which region(s) of the world operators serve.

### 5 SDN applications

SDN is a new approach to service provider networks that separates the control plane from the data plane. The separation enables mobile backhaul infrastructure and transport options to be treated as logical or “virtual” network resources that are assigned dynamically. This approach can reduce mobile backhaul costs by dynamically managing traffic and backhaul bandwidth. SDN does this by instantaneously allocating transport resources and reassigning switching or routing nodes on the fly.

To evaluate SDN's impact on backhaul costs, Strategy Analytics considered 5 key network applications:

- *Cloud-RAN (C-RAN) with “fronthaul” connectivity.* In this application, remote radio heads (RRHs) and antennas are remotely linked to base stations over fiber or very high-speed microwave links. User and signaling traffic can burst at higher or lower speeds dynamically between multiple RRHs in the C-RAN over high-bandwidth connections to the base station radio.
- *Small cells.* Service providers can deploy small cells in logical

**C-RAN** Cloud Radio  
Access Network

**QoE** Quality of  
Experience

**RRH** Remote Radio Head

**SDN** Software Defined  
Networking

**SDN could reduce the mobile backhaul gap by almost half — to just under \$5 billion by 2017.**

clusters that are dynamically powered up and down. These small cells can be linked by backhaul over multiple access paths that vary dynamically with capacity demand.

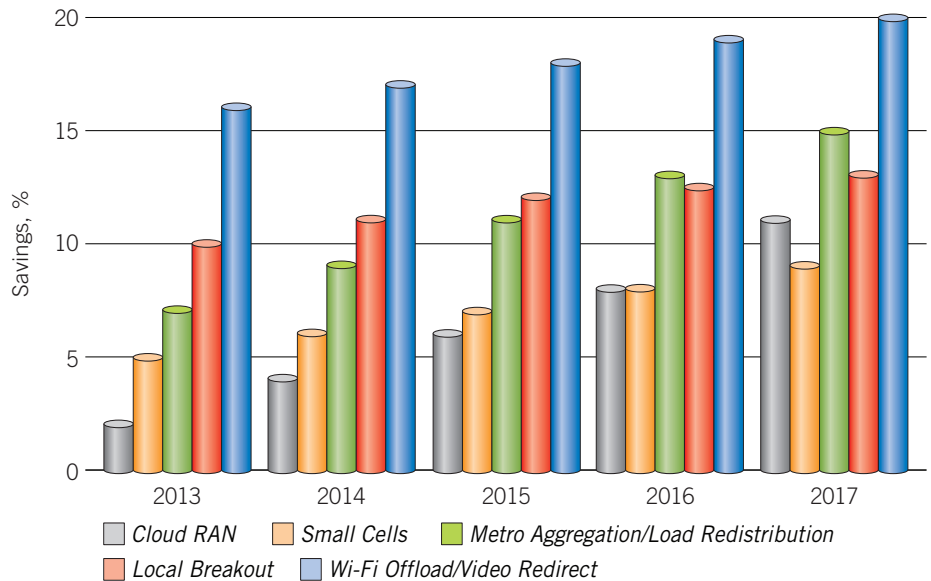
- *Metro aggregation/load redistribution.* This application exploits the partial mesh or ring connectivity of today's high-speed metro area networks. SDN redirects and aggregates mobile backhaul traffic to reduce peak loads and minimize congestion based on end-to-end delivery criteria. This approach can simultaneously improve user performance and operator bandwidth utilization.
- *Local breakout.* Here certain types of mobile traffic are directed straight to the Internet at the edge of the wireless network rather than passing through the core mobile network. This can significantly reduce the mobile network backhaul load for low-value services such as OTT streaming video.
- *Wi-Fi offload/video redirect.* This is similar to the previous app, as it minimizes traffic on core mobile backhaul networks. But with next-generation Wi-Fi roaming, mobile operators are able to maintain control and session visibility. Operators can even bring the session back to mobile broadband as the user leaves the Wi-Fi hotspot. In the next decade, significant traffic is expected to move seamlessly back and forth between Wi-Fi and mobile broadband networks.

It's difficult to estimate the precise backhaul cost savings from using SDN because many of these applications are still in trials or have not yet been standardized. Accordingly, Strategy Analytics' estimates are based in part on preliminary estimates from vendors and early operator trials.

Two of the SDN backhaul optimization techniques —metro aggregation and Wi-Fi offload — are already in use. To be conservative, for those applications SDN was only credited with incremental savings above the level experienced in 2012.

**SDN can reduce** the mobile backhaul gap and save on capital expenses.

**CapEx Savings Driven by 5 Key SDN Apps**



### CapEx savings

In the recent analysis Wi-Fi offload/video redirect is expected to generate the greatest backhaul CapEx savings. But metro aggregation/load redistribution also will reduce CapEx significantly.

Already in 2013 Wi-Fi offload/video redirect is expected to reduce backhaul CapEx by about 16%. That could rise to 20% by 2017.

Metro aggregation/load redistribution could reduce backhaul CapEx by about 7% in 2013. And its impact would more than double by 2017, when savings are projected to be 15%.

For the other 3 applications — Cloud RAN (C-RAN), small cells and local breakout — SDN is expected to generate backhaul CapEx savings of 2% to 7% in 2013, rising to a range of 9% to 13% by 2017.

**SDN is poised to become a major weapon in mobile operators' battle to optimize capacity and protect margins in the years ahead.**

### **Backhaul gap reduced**

By making backhaul networks operate more efficiently, SDN could therefore dramatically reduce the investment needed to meet projected demand.

In 2013, we see SDN reducing required mobile backhaul investment by almost \$250 million. Accordingly the investment gap will decrease by the same amount.

By 2017, however, we believe SDN could reduce the backhaul gap by over \$4 billion — or about 45% of the total expected backhaul gap.

Strategy Analytics also looked at potential CapEx savings on a regional basis.

The greatest CapEx savings are expected in regions that deploy all-IP networks most aggressively. Those networks will be the first to support the true separation of control and data/service planes and to exploit SDN.

The Asia-Pacific region is expected to adopt all-IP networks very aggressively. This means that it should see the greatest CapEx savings from SDN — 15.4% by 2017. Central and Latin America are forecast to be slower in moving toward IP and may see the least savings — only about 4.2%.

In between, Western Europe and North America will see backhaul CapEx savings of about 11% and 12%, respectively, by 2017.

### **OpEx savings exceed CapEx savings**

As large as the CapEx savings are, in fact we expect to see the largest potential benefits from SDN backhaul on the OpEx side.

SDN will be an operational necessity as service providers deploy HetNets. Those networks mix traditional macro cellular technology with small cells and C-RANs at multiple frequencies to add capacity and user bandwidth.

## SDN

Dynamic load management is critical to both small cells and C-RANs. And these capabilities would be impossible to handle without SDN control and orchestration.

### **Toward the future**

Mobile backhaul will help drive the move to next-generation networking.

SDN is becoming an important element of next-generation networks. SDN's ability to significantly enhance performance and simplify network operations will be essential if operators are to meet the coming traffic tsunami profitably.

An intelligent and highly automated backhaul network is increasingly essential to manage traffic, improve users' QoE and significantly lower incremental cost per gigabyte.

Although the real world experience with SDN backhaul is likely to be more challenging than these initial data suggest, SDN is poised to become a major weapon in mobile operators' battle to optimize capacity and protect margins in the years ahead. ■

**MORE INFORMATION** about Strategy Analytics research on using SDN to narrow the backhaul gap can be found in Tellabs' news release. [Click here](#) to reach the release, which includes links to a video interview with report author Sue Rudd, an executive summary and an infographic highlighting key findings.

# DELTEK GOES GREEN, SAVES GREEN WITH TELLABS OPTICAL LAN



**Tellabs Optical LAN  
minimizes power  
consumption, supports  
company's "green"  
strategy**

**By M.J. Richter**

George Goforth, Vice President – IT, Deltek

## OPTICAL LAN

**D**eltek has discovered a “green” communications solution that not only helps protect the physical environment. It also enables the company to conserve financial and human resources.

Based in suburban Washington, D.C., Deltek provides enterprise software and information solutions. Clients include professional-services firms and government contractors around the world.

In late 2011, the company consolidated 5 separate facilities in a new corporate headquarters building in Herndon, Va. There, Deltek became the first private-sector enterprise to deploy the Tellabs® Optical LAN solution. Today several U.S. government agencies also rely on the Tellabs Optical LAN.

### Optical LAN supports green strategy

Deltek’s new headquarters was designed for sustainability and cost-efficiency. Late last year the company achieved Leadership in Energy and Environmental Design (LEED) certification. The U.S. Green Building Council gives LEED certification to companies with high levels of sustainability.

Building features that helped Deltek to earn a LEED certification include:

- sensors that control 75% of the company’s lights to provide illumination only on demand
- construction materials that came primarily from landfills and
- manufactured materials, 20% of which Deltek procured from sources within a 500-mile radius of the building.

Tellabs Optical LAN was a natural fit for Deltek’s green strategy. The product is based on GPON technology. It reduces LAN energy consumption as much as 80%, since it requires less power and much less cooling than a copper-based LAN. It uses fewer power drops, minimizes the types of power drops required and minimizes the number of uninterruptible power supplies required. And it

**GPON** Gigabit Passive  
Optical Network

**LAN** Local Area Network

**LEED** Leadership in  
Energy and Environ-  
mental Design

## OPTICAL LAN

**“What Deltek wanted first and foremost was dependability and performance.”**

— George Goforth,  
Vice President of IT,  
Deltek



reduces the required amount of floor, rack and closet space by up to 90%.

“We lowered power requirements,” comments George Goforth, Deltek vice president of IT. “We reduced energy consumption. And we are more green as a result of Optical LAN.”

Green considerations weren’t Deltek’s only reason for choosing Tellabs, however.

### **A LAN that offers dependability plus**

What Deltek wanted first and foremost from its communications infrastructure was dependability and performance, says Goforth.

“The LAN within the building we had, prior to our move, had a poor architecture and was prone to failure,” he says. “In the new building, I wanted excellent resiliency and availability. I wanted to make sure I can support our people from the data center down to the service endpoints.”

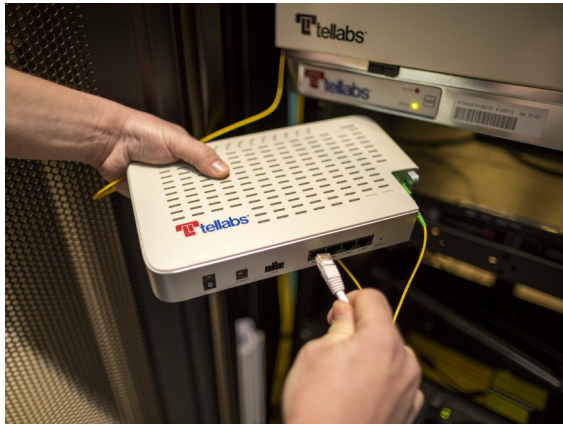
The Tellabs Optical LAN cost significantly less than a copper-based LAN that relies more heavily on active electronics throughout the premises, says Goforth. According to Tellabs, the solution has been demonstrated to reduce total costs by up to 70%.

“If you factor in its simplicity of operations, its ability to reduce operational and energy costs, and our time and resources, we



## OPTICAL LAN

**Tellabs Optical network terminal** is usually installed on or under a user's desk to provide data and voice ports.



started saving money on the building,” Goforth says.

### **Solution saves IT time**

Goforth also liked the product’s ability to deliver up to 1 Gbps to the desktop and leverage Deltek’s existing invest-

ment in VoIP, as well as supporting the service quality and dependability required for VoIP and video delivery.

“The Tellabs Optical LAN provided us greater bandwidth and higher throughput than we ever experienced before,” observes Goforth.

Legacy copper-based LAN architecture requires the periodic swapping out of Ethernet switches. But with the Optical LAN, Goforth says he “no longer has a stack of switches on every floor that I have to manage and support — and refresh every 4 to 7 years.”

The Tellabs solution also enables Goforth to make more effective use of his IT team’s skills and time. A building the size of Deltek’s headquarters typically requires the IT staff to focus a lot of attention on LAN and port management. But with the Optical LAN Goforth says, “You just don’t have to deal with that.” Goforth notes that Deltek has saved about 50 hours per week that previously would have been required to handle moves, adds and changes.

### **Installation takes only one week**

NET100 of Chantilly, Va. installed Deltek’s fiber infrastructure and Optical LAN equipment. Corning’s LANscape Passive Optical LAN solution was chosen for its flexibility and ease of use. NET100 completed the Optical LAN deployment in about one week.

## OPTICAL LAN



**SEE MORE** Click to see videos about the benefits that Deltek obtained from using Tellabs Optical LAN.

[VIDEO 1](#)

[VIDEO 2](#)

The Deltek Optical LAN uses a single Tellabs® 1150 Optical Line Terminal (OLT) with 8 GPON cards. The Tellabs 1150 uses a native Ethernet switching infrastructure with multiple 10G uplinks interfacing to Deltek's routed network.

About 700 of Deltek's 1,700 employees work throughout the building's 6 floors. To support them, a passive fiber infrastructure provides connectivity directly to 700 of Tellabs 1100-709G Desktop GPON Optical Network Terminals (ONTs).

The Tellabs 709GP Desktop GPON ONT features four 10/100/1000 Base-T Ethernet interface ports. The devices support Power-over-Ethernet plus (PoE+) and provide data, VoIP and video service.

The installation also includes 11 Tellabs® 1100-729 Multi-Desk/Multi-Dwelling Unit (MDU) GPON ONTs. The Tellabs 729GP ONT features 24 10/100/1000 Base-T Ethernet interface ports with PoE+. In addition it has 24 POTS interface ports for carrier-grade voice services.

### Positioned for tomorrow's needs

Charlie Stone, vice president of Tellabs Enterprise & Government Systems, says the Optical LAN gives Deltek a future-proof solution.

"With the Optical LAN running single-mode fiber all the way to the desktop, Deltek will never need to upgrade the company's cabling infrastructure," he says. "When they are ready to migrate to 10-Gbps service, they'll only have to get the appropriate GPON cards and ONTs."

Deltek's new headquarters was designed before the company chose the Tellabs Optical LAN. Anticipating a traditional LAN, Deltek's architect had included 12 telecommunications closets. Goforth says that now-unnecessary space has turned into "great storage. I don't have to get warehouse space anymore." ■

**MDU** Multi-Dwelling Unit

**OLT** Optical Line Terminal

**ONT** Optical Network Terminal

**PoE+** Power over Ethernet Plus

**POTS** Plain Old Telephone Service

A man with glasses and a pink sweater stands in an office hallway. The hallway has a dark carpet and white walls with glass partitions. The ceiling has recessed lighting. The man is looking directly at the camera with a neutral expression.

# **BACKHAUL DIFFERENTIATES TELEFONICA LATIN AMERICA MOBILE SERVICES**

**Tellabs 8600 system  
enables Telefonica to meet  
unpredictable demand for  
bandwidth**

**By Joan Engebretson**

Cayetano Carbajo, Technology Director, Telefonica

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**“Having the right backhaul capacity allows you to have the right customer experience.”**

— Cayetano Carbajo,  
Technology Director,  
Telefonica

One of Telefonica’s key differentiators in the competitive Latin American mobile market is something users rarely think about. Yet it’s critical to the quality of their experience. It’s the mobile backhaul network.

Telefonica has been the national telephone company in Spain for decades. The company now offers mobile service in Europe and Latin America. In Latin America the company operates in 14 countries — Mexico, Costa Rica, Nicaragua, Guatemala, El Salvador, Panama, Venezuela, Colombia, Ecuador, Peru, Brazil, Argentina, Uruguay and Chile.

The company has deployed 3G throughout its Latin America footprint. It has rolled out 4G LTE in Brazil and soon will launch LTE in Chile. It also will add other countries this year.

“We have intense competition depending on the country,” said Cayetano Carbajo, technology director for Telefonica. “A lot of our differentiation from the technology point of view comes from two things. These include coverage and the quality of our access network.”

The backhaul network is a critical component of the access network, Carbajo said. “Having the right backhaul capacity allows you to have the right customer experience,” he said. “If there is not enough capacity in the backhaul network, the customer won’t receive enough bandwidth. Our customers have excellent quality of experience.”

Ensuring sufficient backhaul capacity isn’t easy because traffic patterns can be difficult to predict. Carbajo noted that a heavy user can generate 90% of the traffic at a single base station. But as more users switch from dongles to smartphones, average cellular data traffic per user often decreases. That’s because smartphone users rely heavily on home Wi-Fi networks that offload traffic from mobile networks.

Overall the trend is for mobile traffic to increase substantially from one year to the next. But there can be huge variations from one cellsite to another. That means planning backhaul capacity

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for individual cellsites can be challenging.

The dilemma is this: If a carrier provisions its backhaul network for huge bandwidth requirements that do not materialize, profitability can suffer. But if the carrier does not provision sufficient bandwidth, the customer's quality of experience suffers.

The best solution is to design a mobile backhaul network that can be quickly and easily upgraded to provide higher bandwidth in response to changing network demands, said Carbajo. That is the approach he said Telefonica has taken.

"We try to upgrade on a pay-as-you-grow basis," he said.

### The managed edge system

A key component of the mobile backhaul network is the edge router. The edge router directs traffic between multiple cellsites and the aggregation network.

In several of its properties Telefonica chose the Tellabs 8600 Managed Edge System — a multiservice platform that supports both TDM and Ethernet connectivity. Controlling Telefonica's managed edge systems is a Tellabs 8000 Intelligent Network Manager.

Multiservice capability was important to Telefonica because its network technology varies from market to market. In some markets, both voice and data still use ATM. In others, voice is on ATM but data is on Ethernet. Before long, however, the plan is to migrate all traffic to Ethernet.

Carbajo sees Ethernet as the long-term solution. In part, this is because Ethernet's cost per bit is considerably lower than for TDM-based alternatives such as ATM. In addition, Ethernet offers more flexibility when bandwidth upgrades are required.

ATM services are limited to specific bandwidth levels established through the Sonet OC-x hierarchy, but Ethernet connections can be upgraded in small increments. And Ethernet upgrades may not require a change in equipment interfaces.

For Ethernet to carry voice traffic, an important requirement that

**ATM** Asynchronous Transfer Mode

**TDM** Time Division Multiplexing



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must be addressed is timing and synchronization. (This is not a requirement with voice over ATM because TDM networks have built-in synchronization and timing.) Telefonica will be able to meet Ethernet timing and synchronization requirements through functionality built into its managed edge system.

Another important capability of the managed edge system in Telefonica’s mobile backhaul network is the ability to prioritize traffic by

traffic type. That capability is important because voice and video are delay-sensitive. Even a fraction of a second delay can hurt voice sound quality. But such a slight delay does not affect most data traffic — so voice traffic gets priority.

In Telefonica’s implementation, IP-MPLS carries both Ethernet and ATM traffic. IP-MPLS can handle both traffic types, eliminating the need to operate separate physical networks.

The intelligent network manager that controls Telefonica’s managed edge systems keeps track of traffic patterns. Tracking traffic patterns enables it to give technicians advance notice when broadband speeds should be upgraded.

### **Moving forward**

In some markets, Telefonica has its own landline infrastructure. In other markets, the company leases capacity from other network operators. Where the company leases infrastructure from other carriers, it makes a point of negotiating agreements that do not entail a price increase when traffic increases. Instead pricing is distance-based.

“Leased lines are expensive,” said Carbajo. “We try to implement our own as much as we can.”

In markets where Telefonica offers landline services, the company is beginning to use a converged aggregation network. The converged network supports landline services, as well as the com-

**IP-MPLS** Internet  
Protocol – Multi-Protocol  
Label Switching

## MOBILE

pany's mobile backhaul needs.

For example, backhaul traffic and Ethernet traffic from enterprise customers might share the same physical network facilities. But enterprise traffic is isolated from backhaul traffic using virtual circuit capabilities.

Moving forward, Telefonica expects to further converge mobile and landline traffic. As that occurs, Carbajo believes Telefonica has created a mobile backhaul network that will serve the company's needs for the foreseeable future. ■

PLEASE NOTE: Portions of this article appeared in *OSP World* Q3 2013. For more information please visit [www.osp.com](http://www.osp.com).

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