

# Back(haul) to the Future

Vodafone launches a revolution in backhaul as it seeks to boost network performance and rein in costs.

By Lynnette Luna



Andy Jones, head of Transport Network Strategy and Architecture, Vodafone Group

Mobile high-speed data technologies such as HSPA and the bandwidth-hungry customers they attract are beginning to create a conundrum for mobile operators: How to cost-effectively handle all of that data traffic?

That was the issue U.K.-based Vodafone Group began tackling three years ago as the company embarked on a global strategy to transform itself into a total communications provider, capable of offering a one-stop shop for fixed, mobile and Internet solutions.

Vodafone has made significant progress offering DSL to consumers in a number of key European markets, such as Germany, Italy, Spain and the United Kingdom, according to Current Analysis analyst Emma Mohr-McClune. The company is already bundling DSL with mobile services for a more compelling total communications proposition for the home.

In addition, Vodafone has positioned itself as the 3G/HSDPA leader in Europe in terms of total subscribers, and in Vodafone live!, it has developed arguably the most advanced and high-profile mobile portal in Europe, Mohr-McClune said.

All of these successes, however, will take a toll on the network. Vodafone knew early on that it had to find a way to reduce network costs across all 16 of its operating companies. It did so by launching a massive initiative called the Backhaul Evolution Program (BEP), which called for a radical change in backhaul technology that essentially would be deployed in the same manner across all of Vodafone's operating companies.

"We're seeing an explosion of data traffic," said Andy Jones, head of Transport Network Strategy and Architecture at Vodafone Group. "More and more data-centric devices such as smartphones, laptops and data cards are coming onto the network. As a result, we need to make a change in the backhaul."

## The Basics of Backhaul

Backhaul typically accounts for up to 30 percent of an operator's OpEx, said Andy Fuertes, senior research analyst with Visant Strategies.

That adds up to a robust market. According to Infonetics Research, mobile operators and backhaul transport providers spent some \$3.7 billion worldwide on mobile backhaul equipment in 2007 and are expected to increase their spending in the high double-digit percentage through at least 2011.

Until recently, many wireless operators treated backhaul costs as a tactical issue, choosing to focus instead on building out networks and adding customers. And 2G traffic hasn't been enough to justify the cost to move to alternative backhaul technologies.

However, HSPA and all-IP data services threaten to put a significant strain on capacity — potentially requiring a two- to four-fold increase in the number of expensive E1 lines that most European operators use to connect each base station, up from the current average of two lines in the voice-centric world.

"There is a strategic change that needs to happen in the network if operators want to be a low-cost provider but also react quickly to marketplace demands in terms of services," said Graham Taylor, Vodafone global account director for Tellabs. "They have to re-adjust their backhaul cost structure to manage their networks more cost effectively."

## Evolving Toward All-IP

Although many operators see the benefits of moving to more efficient backhaul technologies, most are making a gradual shift, using TDM transport for voice traffic and ATM for 3G traffic. Vodafone has opted for a bolder approach, undertaking a

strategic initiative to move to an end-to-end, IP-enabled, Ethernet-based solution in the transport network to carry both 3G and voice traffic. The operator tapped Tellabs to help bring this vision to reality.

“Deploying IP/MPLS and Pseudowires in the RAN from the cell site to the core of the network delivers an architecture that significantly increases network efficiency and enhances the ability to launch new services quickly while also providing immediate cost savings,” said Taylor.

Using the Tellabs® 8600 Managed Edge System, Vodafone has one of the most aggressive timelines and ambitious plans for backhaul evolution in the global mobile industry. The Tellabs solution involves using Pseudowires over MPLS to enable the lowest cost transport alternative to be used in every instance, while maintaining end-to-end traffic engineering and network monitoring.

Created about a decade ago, the Pseudowire standards are a building block upon which multiple types of traffic can be layered and then converged onto a single, multipurpose packet-switched network. In short, Pseudowire technology emulates the essential attributes of legacy TDM or ATM services over a packet network. In the future, Vodafone will need to support IP-based 4G traffic. And its network will be ready.

“We saw that Tellabs built a product specifically for a Pseudowire application,” Jones said. “They didn’t start with a legacy platform and try to morph it into an IP/MPLS product. They built a platform from scratch dedicated for backhaul. That was unique.”

Perhaps most important to Vodafone is realizing significant CapEx and OpEx savings by collapsing and migrating its backhaul traffic onto a converged MPLS network.

### All for One, One for All

Deploying Pseudowire technology across all 16 of its operating companies was another challenge for Vodafone. Built through acquisitions, Vodafone operated a variety of different backhaul assets, based on the maturity of the operations at the acquired carrier. Vodafone realized that it could obtain its sought-after cost efficiencies only by quickly getting all of its operating companies on the same page.

On April 7, 2008, the Vodafone Procurement Company (VPC), established in Luxembourg, began working directly with its strategic suppliers creating a single entity to deal directly with vendors for the procurement of network equipment.

“VPC came from the concept of globalizing the procurement initiatives across the various countries in which Vodafone operates,” said Dominique Rousseau, chief operating officer of the new company. “We wanted to maximize our scale. In the past, each operating company dealt with suppliers as though it was a local business, almost independently from one country to another. The technical convergence on our roadmap across Vodafone’s countries gives us a greater opportunity to leverage our purchasing scale. VPC’s main objective is to consolidate Vodafone procurement operations, especially for common technical platforms, and consistently manage the global relationship with the key supply partners of Vodafone.”

## VODAFONE AT A GLANCE

- Operations in Africa, Asia-Pacific, Europe, the Middle East and the United States.
- More than 200 million subscribers worldwide.
- The world’s largest mobile operator in terms of revenue.



The backhaul project proved to be a good candidate for demonstrating the workability of the VPC concept. Vodafone is in the process of deploying Tellabs’ all-IP backhaul solution in Ireland and has deployments slated for nine more countries within the next 12 months, Jones said. These combined 10 countries were chosen for various reasons.

For instance, some countries may have a need for ATM transport now. But instead of investing in ATM, it’s more cost effective for Vodafone to deploy an all-IP backhaul solution, Rousseau said. Other Vodafone markets haven’t hit a network traffic saturation point yet to require any changes to backhaul at this point, he added.

“By building a global business case and driving the program globally with multiple operator companies, nine of the 16 companies can see the value right away,” Jones said. “We can really approach this as a ‘design-once, deploy-many’ approach. Our competitors are probably innovating in backhaul but not on a global basis like this.”

### Microwave Here, DSL There

Ireland was a logical choice for Vodafone’s initial deployment of the Tellabs 8600 system because of the operator’s high dependency on microwave, Jones said. The country’s rolling hills and sparsely populated towns made a fiber-based backhaul network unfeasible. At the same time, the physical limitations of microwave were hurting the operator’s ability to continually expand its backhaul capabilities, Jones said.

Using the Tellabs equipment, Vodafone is introducing statistical multiplexing gains, which means it can collect many small sites and multiplex them on a packet basis to obtain backhaul efficiency, Jones said. In effect, Vodafone can overbook the backhaul network and obtain much more efficient use of the capacity, he said.



**“TO ENSURE WE CONTINUE TO DELIVER UNPARALLELED SERVICE AND PERFORMANCE FOR OUR CUSTOMERS IN TERMS OF DATA, STREAMING CONTENT AND ALL OF THE OTHER SOPHISTICATED APPLICATIONS, WE NEED A HIGHLY FLEXIBLE, MANAGED BACKHAUL NETWORK.”**

Dominique Rousseau, chief operating officer, Vodafone Procurement Company

As the first market to undergo Vodafone’s BEP program, Ireland will serve as a benchmark for other deployments. “Tellabs is helping us extrapolate the details from Ireland and adapt them to our other operating companies to demonstrate the overall business case,” Jones said. “This immediately drew the attention of Vodafone’s board as it delivers solid cost efficiencies.”

Although Ireland is a story about finding an alternative for continuous microwave upgrades, each of Vodafone’s markets is unique. Some might have a need to offload data traffic to a DSL broadband access circuit, while others will see a full replacement of TDM and ATM fiber backhaul into full IP.

“Tellabs has been very proactive in providing a global solution,” Rousseau said. “In reality, we can’t apply it everywhere immediately given the legacy of systems but in principle it is a standard for every country. It fits the agenda of Vodafone aiming at maximizing the use of cost-effective solutions and preparing our network with a modern backhaul transport structure.”

In Italy, for instance, Vodafone builds its own microwave or fiber backhaul links for about 80 percent of its sites. The other 20 percent of the sites rely on leased lines from the incumbent telecom operator, which is expensive.

By using the Tellabs 8600 system, Vodafone can split its voice and data traffic, allowing voice traffic to continue over leased lines while transmitting data traffic over its own DSL or leased DSL lines, which are a fraction of the cost of E1 connections. This will give Vodafone a focused cost-saving approach as it constantly searches for alternative lower-cost backhaul sources, which might include building its own fiber and microwave links or using managed Ethernet backhaul solutions from alternative providers. In any of these scenarios, the Tellabs 8600 system ensures Vodafone that its backhaul capabilities will support any of the myriad technologies and transport connection options in its network.

“As the roll-out of HSDPA drives up the demand for bandwidth, this initiative is all about identifying another solution in the non-self-build leased-line portion of the network to manage our costs as efficiently as possible,” Jones said.

In the end, Rousseau notes that investing in backhaul comes down to this simple fact for Vodafone: “To ensure we continue to deliver unparalleled service and performance for our customers in terms of data, streaming content and all of the other sophisticated applications, we need a highly flexible, managed backhaul network, and that’s what we’re getting.”

#### Acronym

**ATM** Asynchronous Transfer Mode

**DSL** Digital Subscriber Line

**4G** Fourth Generation

**HSDPA** High-Speed Downlink Packet Access

**HSPA** High-Speed Packet Access

**IP** Internet Protocol

**MPLS** Multiprotocol Label Switching

**RAN** Radio Access Network

**2G** Second Generation

**3G** Third Generation

**TDM** Time Division Multiplexing

#### 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  
HP11 1NT  
United Kingdom  
+44 870 238 4700  
Fax: +44 870 238 4851

#### Latin America & Caribbean

Tellabs  
1401 N.W. 136th Avenue  
Suite 202  
Sunrise, FL 33323  
U.S.A.  
+1 954 839 2800  
Fax: +1 954 839 2828

Statements herein may contain projections or other forward-looking statements regarding future events, products, features, technology and resulting commercial or technological benefits and advantages. These statements are for discussion purposes only, are subject to change and are not to be construed as instructions, product specifications, guarantees or warranties. Actual results may differ materially.

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.

© 2008 Tellabs. All rights reserved.  
74.2016E Rev. A 9/2008