

NetCom's LTE Leap

ONE OF SCANDINAVIA'S LARGEST MOBILE OPERATORS LEVERAGES TELLABS' ETHERNET SOLUTION TO KEEP 4G BACKHAUL COSTS AT 3G LEVELS.

By Lynnette Luna

It's no secret that the world's mobile operators are witnessing an insatiable demand for broadband among their subscribers. Faster 3G networks, coupled with competitive service pricing, compelling smartphones and connected laptops, have come together to create the perfect storm for the mobile broadband business.

This situation is highlighted in the Nordic region, where sophisticated users set trends that eventually play out in

the rest of the world's mobile markets. The region's mobile voice penetration exceeded 100% years ago. Now, operators in Denmark, Norway and Sweden have turned to mobile broadband services for new market-differentiation and revenue opportunities.

The race is on to develop the next wave of compelling services. Those services hinge on next-generation networks that are capable of transmitting multi-megabit speeds on the go – and doing so on a significantly lower cost-per-bit basis than today's 3G and 3.5G networks.

Nordic powerhouse TeliaSonera is in the process of building one of the world's first LTE networks in Oslo and Stockholm, targeting a commercial launch in 2010. Why those two markets? One reason is because subscribers there are demanding higher bandwidth. Another is because Norway and Sweden were among the first countries to auction 4G licenses last spring in the 2.6 GHz band, the spectrum that's being set aside worldwide for 4G networks.

TeliaSonera was the first operator to publicly award LTE pilot network contracts: one with Ericsson for the Stockholm market and one with Huawei Technologies for Oslo, where TeliaSonera's mobile arm, NetCom, with some 1.2 million subscribers, is fighting hard for market share against the incumbent operator, Telenor.

Mobile voice penetration in Norway reached 110% in early 2009, according to BuddeComm, an independent research firm. While overall subscriber growth has fallen to about 1.5%, the 3G sector has experienced robust growth, BuddeComm said. And if competition weren't stiff enough already, a new 3G provider, Mobile Norway, is set to launch commercial service.

"We are the challenger in Norway," said Torstein Aars, department manager of network development at NetCom. "It's important to be on the forefront of innovation. That is the driver for 4G. We are constantly working to come up with new services so that we can be consistently on the edge."

NEARLY FREE BANDWIDTH

Indeed, LTE promises data speeds that will make most of today's fixed-line broadband connections seem lethargic. In June 2009, NetCom showcased live LTE services that included applications such as video on demand, streaming video, file transfers, Web surfing, videoconferencing and video telephony, all under real network conditions. The network will be able to deliver download peak data rates of up to 150 Mbps in one LTE cell with multiple terminals.

"What we have learned so far from these test results is very impressive around data speeds," Aars said.

NetCom will hold an advantage in terms of understanding the real-world



Robert Halvorsen, senior transmission planner with NetCom

capabilities of LTE early on, Aars said. And most importantly, in deploying LTE, NetCom plans to see a reduction in OpEx rather than the increase that usually comes with the deployment of a new network technology.

Recognizing the unpredictable growth associated with the WCDMA/HSPA data traffic, NetCom embarked on a plan in 2009 to change its approach to the management of its 2G and 3G/3.5G networks. A major part of that change involved working with Tellabs to invest in Ethernet as a new backhaul solution – not only to manage the new world of mobile broadband but also to reduce costs associated with backhauling 2G traffic.

NetCom is rolling out Ethernet transport for its 2G and 3G networks, and preparing to run LTE over the same Ethernet infrastructure.

“This is a huge OpEx saver,” said Tore Malmo, manager of transmission networks at NetCom. “We can now move everything to the same solution and reduce the OpEx.”

Over three months in late 2009, NetCom doubled its total transmission

capacity in the radio access network by implementing capacities up to 150 Mbps at a number of sites, in preparation for LTE, Malmo said. But that capacity didn’t come at a price.

“The insignificant increase in OpEx resulting from this capacity increase is clear evidence that we have succeeded in breaking the bond between capacity and costs.

“We can’t see any effect on the OpEx,” Malmo said.

Such results are key if LTE is to reach its promise of delivering multi-megabit services at a significantly lower cost per bit than today’s 3G/3.5G technologies, said Tarcisio Ribeiro, vice president of Europe, Middle East and Africa sales at Tellabs.

“Operators simply must break that linear relationship that has always existed between bandwidth and cost and revenue per bit,” he said.

the massive data traffic that will be deluging LTE base stations. The maximum throughput of LTE will be limited by the backhaul capacity of the cell site that the user is connected to.

Analysts estimate that each LTE base station must be capable of handling bandwidth in the range of 100 Mbps to 300 Mbps. As demand skyrockets, that number could reach 1 Gbps or more.

That type of bandwidth will break the bank under the traditional network backhaul regime of E1s and T1s. Just one or two E1 lines are required to backhaul voice traffic today. By most estimates, backhaul traditionally accounts for about 30% of an operator’s OpEx.

Throw broadband traffic in the mix, and the requirement skyrockets to a dozen or more E1 lines. At hundreds of dollars per line, per month, such a deployment scenario makes no economic sense, said NetCom’s Malmo.

“Without the Tellabs solutions, we wouldn’t be able to support our 4G deployment and also increase capacity on the HSPA side without dramatically increasing OpEx,” Malmo said.

NetCom is using the Tellabs® 8600

“THIS IS A HUGE OPEX SAVER. WE CAN NOW MOVE EVERYTHING TO THE SAME SOLUTION AND REDUCE THE OPEX.”

Tore Malmo, manager of transmission networks at NetCom

1 GBPS PER BASE STATION

On the air interface side, LTE holds significant cost-savings promise because of a more efficient network architecture, said Pyramid Research analyst Daniel Locke.

“LTE promises to change the dynamics, by lowering operating costs not only because of a simpler network architecture with fewer network controllers to manage but also because of enhanced spectral efficiency, reduced OpEx and a concerted push to lower intellectual property costs to a single-digit percentage of the value of handset sales,” he said.

Equally important, however, is an operator’s ability to efficiently backhaul

Managed Edge System (MES), part of Tellabs’ Mobile Solutions suite of products, which uses Pseudowire over MPLS as a cost-effective alternative to buying more E1s. NetCom is replacing its E1s by using the Tellabs equipment to produce its own bandwidth on top of leased Ethernet capacity, said Robert Halvorsen, senior transmission planner with NetCom.

Ethernet is a much less expensive and more flexible technology than TDM technology, which is the basis of E1 lines. Ethernet also supports high-bandwidth scalability that can be used on an incremental basis, with carriers paying only for what they use.

2G: Second-Generation **3G:** Third-Generation **ATM:** Asynchronous Transfer Mode **CapEx:** Capital Expenses **HSPA:** High-Speed Packet Access **IP:** Internet Protocol **LTE:** Long Term Evolution **MPLS:** Multiprotocol Label Switching **OpEx:** Operating Expenses **TDM:** Time Division Multiplexing **WCDMA:** Wideband Code Division Multiple Access



Anders Grand (left),
Robert Halvorsen

**“WE ARE THE CHALLENGER
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Torstein Aars, department manager of
network development at NetCom

Photo by Jørn Tomter / Getty Images

“For NetCom, that translates into simplicity,” said Anders Grand, Tellabs account manager for NetCom. “Instead of leasing capacity for each mobile service – 2G, 3G/3.5G and 4G – NetCom can use one single installation and the 2G, 3G and HSPA travels at no additional cost to them.”

Indeed, Halvorsen noted that the average capacity NetCom supports today in its 3G base stations can be expanded fivefold without increasing the operator’s OpEx. That capability is especially important as traffic on the HSPA network continues to grow at the same time NetCom rolls out LTE, and NetCom won’t be exposed to the escalating costs associated with the demand for bandwidth on its HSPA network.

BRAVE NEW WORLD

Analysts predict that as early as next year, data traffic will surpass voice traffic on mobile networks. One reason is because

bandwidth-hogging services such as video are eating up capacity.

YouTube, for example, says that mobile video is an “exponentially” growing part of its site’s usage. In June 2009, it reported that over a six-month period, uploads from mobile phones to YouTube increased 1700%, thanks to the proliferation of video-enabled mobile devices.

But for NetCom, those trends are opportunities to drive additional revenue, instead of just reasons to shell out more money for backhaul. With the Tellabs® 8600 MES, NetCom also can dynamically allocate bandwidth from base station to base station remotely, as demand dictates, without having to deploy field personnel – another significant OpEx saver.

NetCom’s backhaul capacity freedom also puts it in enviable position of being able to experiment with LTE services, Aars said. NetCom doesn’t have to worry about the skyrocketing backhaul costs LTE is placing on the network as it rolls out a

rather pervasive footprint with increased capacity yet relatively few customers.

“We need to gain experiences for LTE and understand how data services will be adopted across all of the networks,” Aars said. “But it will really take a while before we have the same coverage that we see for 2G. In a country like Norway, it’s difficult and expensive. What we are doing is making sure we can produce an affordable OpEx while pushing new high-bandwidth services.

“We are moving from the good stable telco world to a more broadband-based world. LTE is a big shift in technology, but then again, that is the way everyone is moving. You have to do it sooner or later.” ■



Tarcisio Ribeiro

\$876 MILLION IN OPEX SAVINGS

To address one of Ethernet’s perceived weaknesses – the inability to carry TDM-based voice traffic – the Tellabs® 8600 MES uses Pseudowire technology.

Created more than a decade ago, the Pseudowire standard is 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 service over a packet network. The technology is necessary because leaping directly from TDM to IP and from ATM to Ethernet

isn’t an investment that some operators want to make right away.

A recent survey of packet backhaul vendors by the analyst firm Heavy Reading supports that trend. At the end of April 2009, fewer than 55,000 2G or 3G cell sites were in live service with packet backhaul worldwide, out of a global total of 2.4 million sites.

The Tellabs® 8600 Managed Edge System (MES) uses Pseudowire over MPLS as a cost-effective alternative to buying more E1s or T1s. Based on feedback from the more than 120 operators that have deployed the

Tellabs® 8600 MES, it’s realistic to expect a potential savings of 60% to 93% in the evolution from 3G to 4G.

For example, in a 30,000-cell-site network employing Tellabs’ Ethernet backhaul solution, an operator can save up to \$78 million in CapEx and \$876 million in OpEx over five years, said Tarcisio Ribeiro, vice president-Europe Middle East Africa sales at Tellabs.