



Overview

LTE

Mobile: The broadband big bang

Mobile broadband has tapped the mass market in record time. With 186 million mobile broadband subscribers worldwide at the end of 2008, up 84% from 101 million at the end of 2007, the growth rate has been staggering.

The latest market forecasts suggest that even this growth will be dwarfed, with mobile broadband user statistics topping more than 2 billion by 2014, and corresponding annual revenue reaching \$137 billion globally.

Yet even these growth figures are only part of the story. Whatever can go digital will go digital, including a wide range of consumer, home and portable devices – from TVs and games consoles, to photo frames, media players, digital cameras, netbooks and navigation devices.

The opportunity for connecting this device universe will be unprecedented. In fact, according to Juniper, the proportion of devices connected to networks offering mobile broadband will rise from 13% in 2008 to almost 80% in 2014.



Simple truth:

The mobile data boom is driving LTE

Accelerated mainstream adoption of mobile broadband has been due, in part, to attractive tariffs, widespread High Speed Packet Access (HSPA) networks, appealing new 3G devices and low-cost USB modems.

These factors have enabled an IP data traffic explosion that the global IT industry forecasts will nearly double every two years through 2012. These increases are based on the emerging changes in

user lifestyles. For instance, with mobile broadband capabilities, we will see sharp increases in end-user time spent watching TV over broadband connections via mobile phones and netbooks.



The need to drive down costs

However substantial the growth potential, there is a caveat here. User and traffic growth will outstrip revenue growth by far, forcing Communications Service Providers (CSPs) to carry ever more data over their networks for less revenue per Mbyte.

To remain profitable, CSPs are introducing new technologies that achieve significantly lower costs per Mbyte of transmitted data.

While many of today's needs can be handled by HSPA networks, rising market demand for bandwidth and lower prices will inevitably require investment in networks supported by the right ecosystem of devices, applications and service packages, in order to improve the end-user experience.

As well as lowering costs, it is crucial CSPs focus on the end-user experience. According to a recent survey* by Amdocs, "Both consumers

and businesses are more likely to stick with a CSP based on the quality of the customer experience than on the cost of its service". Understanding and ensuring the best end-user experience is, therefore, vital for CSPs to retain business, increase ARPU and, ultimately, remain profitable.

Long Term Evolution (LTE) will cover both current and future needs. LTE addresses the need for efficiency and innovation. It can carry the huge projected growth in data traffic, while bringing an 'all IP' experience to the mobile world – one where both data and voice are carried across the same IP network and interwork smoothly with legacy networks.

Simple truth:

**LTE cuts CAPEX
and OPEX**

LTE: a step change for new services

LTE will create an enhanced broadband market where everyone and everything will be connected.

LTE will transform the end-user experience, revolutionizing the way that users receive, consume and interact with information and content distributed over mobile networks. LTE is much more than just a new air interface. It is a complete ecosystem that will meet market demands for the next decade.

With mass market deployment, LTE will create a super-fast, extremely efficient and highly reliable mobile network to support the delivery of a wide range of services to multiple devices. Not only will the user experience improve, but mobile services will enable businesses to achieve huge efficiency gains.

According to Gartner, Nokia Siemens Networks is an industry leader in the global deployment of LTE.

New applications, such as machine-to-machine (M2M) communications will be catalyzed. Social networking will become more convenient and more deeply embedded into consumer lives.

LTE will create a new broadband capability, leading to new kinds of services, innovative business models, and a shift from today's information web to the "Internet of things". It will enable fixed-to-mobile migration of Internet applications, and provide the capacity to support an explosion in demand for connectivity from a new generation of consumer devices tailored to those new mobile applications.

Consumers will have the same seamless experience across networks, regardless of the devices they are using or how they are connected. CSPs will gain a much broader base of opportunities to drive revenue and increase profitability.

In other words, LTE will provide CSPs with a way to truly differentiate themselves in the marketplace by offering the highest possible quality of end-user experience.

Nokia Siemens Networks was the first vendor to introduce flat all-IP architecture.

LTE is on the road and picking up speed

LTE is a major breakthrough in performance beyond earlier capabilities. It will coexist with both 3G and 2G systems, fitting into current CSP-owned spectrum, or in new spectrum.

To realize its full benefits, LTE requires System Architecture Evolution (SAE) as the core network architecture (defined by 3GPP).

LTE offers peak data rates of up to 173 Mbps in the downlink and 58 Mbps in the uplink, faster than today's HSPA by a factor of ten. Latency will be exceptionally low at 10–20 ms, considerably boosting the customer experience of services such as gaming and browsing, as well as the performance of true real-time applications such as VoIP.

LTE has higher spectral efficiency than HSPA, so CSPs can squeeze more data into their available spectrum. OFDM*, a very robust modulation, splits information into multiple narrowband subcarriers, allowing each of them to carry a portion of the information at a lower bit rate. Compared to HSPA, OFDM has a much better average cell throughput.

* Orthogonal frequency-division multiplexing

Nokia Siemens Networks was the first vendor to demonstrate LTE technology with data rates of up to 160 Mbps over the air, and the first vendor to complete a successful handover between LTE and HSPA.

LTE also enables the re-use of existing site infrastructure such as antennas, feeder cables, masts, hardware racks and power supply elements, as well as reducing site density. For all these reasons, LTE will support much cheaper capacity upgrades than the deployment of new base stations based on existing technologies.

In emerging markets the key drivers for LTE are to reduce CAPEX and OPEX, which is all the more important as revenues decline. In mature markets on the other hand, where more and more customers are demanding advanced services, LTE provides the necessary capacity at a comparatively low cost.

The high performance and low total cost of ownership of LTE has put the technology in the spotlight, leading to a major push from all sides of the communications industry to develop the ecosystem and introduce LTE networks rapidly. According to Informa, LTE has found unanimous global acceptance by CSPs throughout the world. They describe LTE as the overwhelming choice as the next generation access technology, with over 100 CSPs globally expressing their intention to deploy LTE and about 10 of them planning to launch in 2010.

As these rollouts gain momentum, the future of mobile broadband will increasingly be a future defined by LTE.

Simple truth:

The Flexi
Base Station is
LTE-ready.

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