

A view into the near future

by Ben Verwaayen, CEO, Alcatel-Lucent

By 2015, Internet devices as powerful as today's laptop computers will replace all the world's mobile handsets. Subscribers will rely on documents and content stored in a cloud of servers that will be accessed through the net. The network capacity needed will be orders of magnitude higher than what we have today. Attempts to outlaw business driven network management should be discouraged so that new capacity can be financed by selling different levels of quality of service for different applications.



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Before joining BT Group, Ben Verwaayen was at Lucent Technologies where he held various positions including Vice Chairman of the Management Board, Executive Vice-President and Chief Operating Officer, and Executive Vice-President, International. Prior to joining Lucent, Ben Verwaayen worked for KPN in the Netherlands as President and Managing Director of its subsidiary PTT Telecom. Mr Verwaayen also worked at IIT in Europe.

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The period between January 1999 and January 2000 was marked by great optimism. Computers became mass-market products, professional e-mail became wide spread, and mobile phones were embraced by the consumer market. It was indeed an inspiring period, and like in all human ventures, its short-term benefits were over estimated and its long-term consequences overwhelmingly underrated. Seeing the year 2000 from today's perspective helps us understand the present and prepare for the future ahead. In the year 2000, slow, buggy and heavy computers were connected to sluggish dial-up Internet.

The euphoria generated by these new products was reflected in the phenomenal rise of stock markets, and then followed by a disappointing bubble burst. Today, another Internet tidal wave is about to hit us all, and surprisingly, very few warnings have been made visible. The telecom stock markets are rather calm, and yet one of the most formidable feats in the history of technology is both at our fingertips and relatively off the headlines.

The landscape clears up when one tries to imagine how the world would look if everybody had Internet in the pocket. It is

worth thinking about this, as in less than five years every citizen living in the 400 largest urban concentrations of the world will have an Internet device in the pocket. This, regardless of whether the country in question is developed or not. The far-reaching implications of this require some thought.

By the year 2015, 4.2 billion wireless Internet devices will be used replacing entirely all the world's mobile handsets in use today. The number of HDTVs in the world will be close to 1.5 billion in 2015, and the desktop PC as we know it will no

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longer exist. Touchscreen smartphones sold for less than US \$50 will be as powerful as today's laptop computers and subscribers will rely on documents and content stored in a cloud of servers that will be accessed through the net. Under these conditions, the network capacity needed for high speed Internet, fixed and mobile, will be orders of magnitude higher than what we have today. Applications will drive network usage, and their success will push human dependence on networks one step further.

In order to guide our thoughts, it is useful to look at the way that Internet users are concentrated in cities. The most insightful parameter to build a strategy to tackle the future of Internet is the number of Internet access devices per square kilometre. Be it in wireline or wireless networks this number is increasing dramatically. Let us analyse the particular case of mobile Internet. If we take a city with a daytime floating population composed of workers and dwellers, we can see that more often than not, the number of individuals per square kilometre in cities can be from eight to thirteen thousand. And in cities like Paris, London and Shanghai, this number could be as high as twenty thousand subscribers per square kilometre. This has been dealt with in the case of voice connectivity, but when we consider mobile Internet, and devices that connect and interact intensively with networks even when the subscriber is not aware of it, the fulfilment of the connectivity demand and the right strategy for application enablement become crucial not only for the business of service providers but for the healthy working of society as a whole.

Part of the problem at hand is that large portions of current networks were not originally dimensioned for the newer devices that are in the market today. With the constant evolution of human-to-machine interfaces and the ever-increasing processing power of handheld devices, the supply of mobile network capacity is lagging behind the demand for connectivity generated by newer smartphones, USB dongles, and laptop PCs. Also, the deflationary trend in PC prices has boosted the number of connected computers per

household; moreover the disappearance of the cumbersome box-TV set is quickly inducing major market changes. The average number of TVs per household is prone to double within few years in various segments of the world population. Added to this, the replacement of voice handsets by smart phones, the replacement of box TVs by flat TVs, and the overwhelming democratisation of laptop PCs are three domains that exert pressure on the software industry, the microelectronic industry, and the content industry.

These three industries by their very nature constantly adjust to market pressure. The telecom service industry, with a sizeable hundred-year-old voice service model requires a new way to leverage its assets, and through high-leverage networks, proceed to empower the new business models behind creative applications, the telecom industry will have to reinvent itself as the driving force of application enablement. New devices and applications using high-speed Internet, IPTV, and mobile access are pushing the world to the verge of a major capacity crisis - and this is the right time to act.

The economic variables that govern wireline and wireless networks have a linear dependency between network capacity and capital investments. Since the demand for connectivity in both wireline and wireless grows geometrically or exponentially, the only way to arbitrate between competing access services and subscribers is through the implementation of access priority policies and network management. Wireline and wireless networks will need to be much more than a dumb pipe to cope with the upcoming capacity demand. Smart network management, along with increased investment in enhanced capacity, will become a key business driver, and intelligence will be the hallmark of new networks.

Attempts to outlaw business-driven network management should be discouraged. Having applications, content, and specialized usages in mind, network management providing differentiated

services, will be part of the daily bread of the telecom industry. The capacity enhancement needed in the near future can be financed by the commercialisation of different levels of quality of service for different applications. It will be eventually understood that banning, or severely limiting, network management is equivalent to banning traffic lights and speed limits in the streets of our cities. The solution to the congestion conundrum appears to be solvable both by new investment in higher capacity networks and by service differentiation and the monetisation of priority rights for those who are ready to pay for the access to faster lanes. Like in an airplane, all passengers with a ticket ride in it, but those who can afford business class board first and have more leg room; the economy passengers are a bit tighter, and while they can lie down if the seat next to them happens to be empty, they are not allowed to grab any empty business class seats. Of course adequate balance has to be found and guaranteed by regulation to avoid any harmful discrimination to open competition.

Now that mobile broadband Internet will be readily available anytime, anywhere, handheld Internet devices will change most human activities taking efficiency to new levels. A highly connected, truly personal computer in everyone's pocket will bring people together for business, pleasure and learning. Beyond Western Europe and North America, mobile Internet will trigger financial inclusion for low-income individuals, increase social involvement where cooperation is needed and deliver remote medical assistance in places thus far unreachable. Phones will read web pages aloud for the visually impaired, will teach illiterate users to read and write, will have biometric sensors to unambiguously identify individuals and protect their privacy and will help subscribers with critical health issues to get treatment in case of emergency. One mobile broadband connection per individual will bring change to the world in heretofore unimaginable realms. The near future is exciting and the potential for each of us to be part of it has never been greater. ●