

Nokia Siemens Networks

From copper to fiber – The roadmap
towards the gigabit society

Nokia Siemens
Networks



Broadband networks are driven by consumer demand

As consumers make more use of data services, sharing videos, photos, music and other rich content across sites such as Facebook, Twitter, YouTube and many more, there is an enormous and growing demand for bandwidth.

We already see existing Web2.0 services evolving to bring consumers new experiences. In the UK, the BBC's iPlayer proved an instant hit, being used to stream or download 17 million TV programs in its first seven weeks.

Networks feel the strain

As consumers increasingly upload and share videos and other content, upstream bandwidth is quickly becoming a bottleneck, with ADSL2+ able to offer a maximum of 1 Mbit/s in practical deployments. Although 16 Mbit/s downstream seems to be enough to satisfy online users in developed European countries at the moment, many people are dissatisfied with the upload speed of their home Internet connection.

About one in five users in Italy uploads music and/or photos daily. Of those with high speed access (8 Mbit/s or more), nearly 20% would prefer a faster connection.

Choose technology wisely

To meet this growing bandwidth demand, communications service providers (CSPs) will need to control CAPEX and OPEX and choose their data handling technology wisely if they are to make profit. The increasing use of data will lead to a 100 fold increase in traffic, but there will be no corresponding 100 fold increase in revenue. Technologies that safeguard previous investments by using them for longer, while also allowing capacity to be increased gradually, will be the frontrunners.

However, the services deployed over the next few years are unlikely to mean that users will need more than 100 Mbit/s. Data rates above 100 Mbit/s will only become necessary when highly advanced technologies, such as 3D TV, become widely available.

Fiber is the key

Fiber technology is the key to providing higher bandwidth, but choices need to be made. CSPs have three options to get fiber-based services to the consumer: Fiber To The Curb, Building and Home - FTTC, FTTB and FTTH respectively.

FTTC makes maximum re-use of existing copper lines, connecting several buildings over the same device and using a street cabinet to house the DSLAM (digital subscriber line access multiplexer). FTTB puts fiber into the building using a smaller DSLAM and re-uses just in-house wiring. Both FTTC and FTTB can use VDSL2 technology for the final connection, achieving speeds up to 50 Mbit/s and 100 Mbit/s respectively, and represent the most cost-effective way to meet bandwidth demand in the near term.

Towards the gigabit society

Although these three methods bring increasingly higher bandwidths to the consumer they are also progressively more expensive, largely due to the increased amount of costly civil works needed as fiber is brought closer to the home, and in the case of FTTH, *into* the home.

In the longer term, demand for speeds above 100 Mbit/s will be met by FTTH and Next Generation Optical Access (NGOA) networks, but there's little pressure for CSPs to deploy these technologies yet.

Although all three options require new infrastructure in the form of new fiber, FTTH is particularly disruptive as it requires further technology investment to connect directly into individual user homes. While Ethernet for FTTH is a proven technology, it does require a huge amount of fiber to be deployed. The alternative of FTTH based on Passive Optical Networks or PON, offers lower OPEX but does carry all the capital costs and disruption of deploying a new technology.

Typically, 60% of the costs of an urban point-to-multipoint FTTH end-to-end deployment are consumed by passive infrastructure. In comparison, deploying fiber only to the curb or building substantially reduces infrastructure costs.

Prepare for the future today

Nokia Siemens Networks offers a number of products that allow CSPs to take advantage of existing technology and provide their customers with the broadband speeds they are demanding now. As well as hiX5630/35 DSLAMs for the central office, we also provide a number of products for both FTTC and FTTB access.

For FTTB applications over VDSL2, the SURPASS hiX5608 is a mini-DSLAM that enables CSPs to offer more than 100 Mbit/s of bandwidth.

In addition to supporting VDSL2, the SURPASS hiX5621 and hiX5622 platforms can address fiber to the curb or building applications. What sets the two platforms apart is that the hiX5621 can support 72 ADSL2+ or 72 VoIP or 48 VDSL2 ports, while the hiX5625 can support double the number of ports with a combination

of various technologies. The hiX5625 MSAN for FTTC deployments, which can be equipped with all DSL flavors (ADSL2+, VDSL2, SHDSL) as well as voice service cards, rounds up Nokia Siemens Networks' DSLAM portfolio.

Nokia Siemens Networks is also preparing for the gigabit future today with its passive WDM solution that combines the benefits of VDSL2 with the cost saving features of PON fiber architecture. This solution re-uses existing DSL investments and connects them via the future NGOA fiber infrastructure to the long distance office.

Nokia Siemens Networks believes that right now is the time to start the migration from today's networks to NGOA.

Cut costs with new technology

As well as meeting consumer demand, NGOA cuts OPEX for CSPs. Major CSPs have publicly talked about their aims to massively reduce the number of central offices in their networks.

With NGOA networks the number of offices can be reduced by a factor of ten or more, greatly reducing the network's CAPEX and OPEX, with greater than 90% reduction in energy consumption, helping operators to become even more environmentally friendly.

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