

Ubiquitous broadband, more than optical illusion

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Better access to ultra-fast broadband networks in Europe is driving development of a host of new web services, promising everything from video conferencing to internet protocol (IP) television. But “ultra-broadband” like this needs a new champion, and European researchers think they have found it: optical networks.

A champion technology needs a noble cause. In this case, the cause is better access for all Europeans to the benefits that ‘always-on’ fast internet can bring. Researchers in the European NOBEL project know this better than anyone.

Building on research in its predecessor, the NOBEL2 consortium’s ambitious goal is to provide this next-generation optical broadband network. It is paving the way to this by reducing the upfront costs and simplifying network architecture and management to cut operational costs as well.

The idea is to give every European household fast access to all that the internet has to offer, including browsing, e-commerce and e-government, services for health, and developing services such as IPTV.

“It is a big step in network evolution to supply mainly IP services more efficiently. And it must be done at an affordable cost if all Europeans are to benefit,” says Marco Schiano, NOBEL’s coordinator.

The EU-funded project has focused on the development and evolution

of long-haul, high-capacity backbone networks connecting European cities and countries. Although, as Schiano points out, its findings are equally important to the evolution of national and metropolitan networks.

“We have concentrated on pan-European networks but, while we realise different countries have different needs, the basic technologies dealing with network costs, ease of operations, flexibility, and the ability to supply [easily managed] present and future services are common to all,” Schiano says.

Three wise solutions

NOBEL2 has identified three basic innovations as the key to the development of new- generation optical networks.

First up is transparency. A transparent optical network transmits and switches signals as light rather than electricity. The signals can be between any pair of nodes on the network with no speed or distance restrictions. What this means, in practical terms, is that there is no longer any need for expensive equipment at intermediate network nodes – the network is easier to manage as a result, and extra traffic can easily be accommodated.

So, thanks to this technological breakthrough, not only are transparent optical networks cheaper to build and maintain than conventional legacy telephony networks, they are also far more efficient and flexible with much greater capacity.

NOBEL2 has also made major progress in the field of automated intelligent networks, thanks to its work with the network control plane (CP). CPs are computation and communications systems that automatically control a network’s lower-level functions which are too

complex to be controlled by human operators. As well as simplifying the management of complex networks, CPs mean new connections can be made on demand, and this means new opportunities in on-demand services.

Third, the project has been researching the use of packet transport technologies, which send separate ‘packages’ of data rather than a continuous bit-stream, as a more efficient use of network resources. It also provides a unified networking concept for all data, voice and video operations.

Packing them in

Packet transport being used on automated, transparent optical networks is NOBEL’s vision for the future, with rollout commencing in the short to medium term on pan-European and national networks, and then metropolitan networks.

The research is “pre-competitive”, which means manufacturers in the consortium are effectively competing with each other. So, NOBEL tried to future-proof its technological solutions (architecture, standards etc.) for development by any of its partners, such as Alcatel-Lucent, Ericsson and Nokia Siemens Networks.

At the “competitive stage”, he adds, the manufacturers will add their own private proprietary know-how and offer their own optical networking solutions to operators responding to customer demands of the time.

“People should also be able to access the next generation of ultra-broadband, multi-play services wherever they are using either fibre-optic or wireless technology for access,” Schiano says.

The whole question of last-mile access from homes and offices also needs to be properly examined. “When you talk about transport networks, [they number] in the tens of nodes, but for the last-mile, Europe-wide, there are hundreds of millions of access points. Incumbent operators are now using existing copper wires with improved technologies like dsl, but this will probably not be enough for the next generation of services.”

Looking ahead, Schiano says the partners in NOBEL would like to develop the research further. In particular, investigating more integrated networks, service platforms and user terminals, which work properly together.

Source: [IST Results](#)

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