

UPGRADE is the European Journal for the Informatics Professional, published bimonthly at <http://www.upgrade-cepis.org/>

#### Publisher

UPGRADE is published on behalf of CEPIS (Council of European Professional Informatics Societies, <http://www.cepis.org/>) by Novática (<http://www.ati.es/novatica/>), journal of the Spanish CEPIS society ATI (*Asociación de Técnicos de Informática*, <http://www.ati.es/>)

UPGRADE monographs are also published in Spanish (full version printed; summary, abstracts and some articles online) by Novática

UPGRADE was created in October 2000 by CEPIS and was first published by Novática and INFORMATIK/INFORMATIQUE, bimonthly journal of SVI/FSI (Swiss Federation of Professional Informatics Societies, <http://www.svifsi.ch/>)

UPGRADE is the anchor point for UPENET (UPGRADE European NETWORK), the network of CEPIS member societies' publications, that currently includes the following ones:

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- **Mondo Digitale**, digital journal from the Italian CEPIS society AICA
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Cover page designed by Concha Arias Pérez

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UPGRADE Newsletter available at

<http://www.upgrade-cepis.org/pages/editinfo.html#newsletter>

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ISSN 1684-5285

Monograph of next issue (June 2007)

**"ICT Certifications for Informatics Professionals"**

(The full schedule of UPGRADE is available at our website)



The European Journal for the Informatics Professional  
<http://www.upgrade-cepis.org>

Vol. VIII, issue No. 2, April 2007

### Monograph: Information Technologies for Visually Impaired People (published jointly with Novática\*)

Guest Editors: *Josep Lladós-Canet, Jaime López-Krahe, and Dominique Archambault*

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\* This monograph will be also published in Spanish (full version printed; summary, abstracts, and some articles online) by Novática, journal of the Spanish CEPIS society ATI (*Asociación de Técnicos de Informática*) at <http://www.ati.es/novatica/>.



## ICT Prospective

## Inline or Online?

*Steve Kennedy*

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This paper was first published by **ITNOW** (Volume 49, issue # 3, May 2007, pp. 8-9). **ITNOW**, a **UPENET** partner, is the member magazine for the British Computer Society (**BCS**), published, in English, by Oxford University Press on behalf of the **BCS**, <<http://www.bcs.org/>>. The full May 2007 issue of **ITNOW** is available to read at <<http://itnow.oxfordjournals.org/archive/>>. (Keywords added by the Chief Editor of ITNOW.)

*It's five years in the future and more and more people are working from home. It can be cheaper for businesses as they now don't have to rent expensive offices just to seat people. Of course there can be hidden expenses that can increase costs considerably (a company basing an employee from home has to ensure that their working environment is similar to the workplace environment, including all the health and safety requirements), but, ignoring those aspects, what technologies will be at use?*

**Keywords:** Future, Homeworking, Network, Wireless.

### 21st Century Network

BT should have pretty much rolled out its 21st century network (aka 21CN), the all IP network going into the home and business.

Initially the home worker won't notice anything different, their BT phone line won't change (though in the background as soon as the analogue call goes into the local exchange it gets converted to Voice over IP).

As part of 21CN, ADSL2+ will also be introduced, allowing 24Mb/s download speeds (to urban areas at least). BT is also considering putting DSL (Digital Subscriber Line) equipment into the green boxes in the street, which will then be connected using fibre back to BT's core network and using technologies such as VDSL2 or VDSL2+ where speeds of up to 100Mb/s can be delivered.

With these kinds of bandwidths available, delivering voice as an ana-

logue service becomes irrelevant, so it's likely BT will just package a router into every house and the customer just gets an ethernet/LAN connection into which they can plug their PC, IP phone and so on.

Delivering all kinds of service over a single IP fabric means BT will need to provide quality of service (QoS) or voice calls will degrade when the user watches a video, for example. BT's 21CN core already provides this (using internet protocol/multi-protocol label switching) and end-user QoS can be provided in the DSL router.

So everything will come into the home over a single IP connection with QoS enabled. You'll be able to have multiple lines, watch video and do video conferencing all using the same connection.

Of course if you want QoS, BT currently want you to use BT's services to guarantee that QoS. You'll be able to use anybody else's VoIP or IPTV service too, it's just unlikely to have QoS over BT's network.

### Author

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### WiMAX is just around the corner

Though wired broadband allows high speeds, they're only possible if you're near an exchange, which is alright for densely populated urban areas, but not for rural areas.

Unfortunately WiMAX requires licensed spectrum to work well, and (in the UK at least) spectrum is a valuable commodity as there isn't very much available. There are currently two networks offering WiMAX services on licensed spectrum: PCCW (UK Broadband) at 3.4GHz and Pipex Wireless on 3.5/3.6GHz. These services are only available in limited areas.

Ofcom is planning to make more spectrum available and there'll be an auction for 2.5GHz in the near future. Although originally designated a 3G band, Ofcom are going to make it available for any kind of use, including WiMAX. There's certainly going to be a lot of interest in that spectrum and BT have already stated it is interested in it.

WiMAX will allow speeds of about 100Mb/s to end-users, which is certainly good enough to deliver BT's 21CN requirements (and any other network operator's) which is good news for people who don't live in city centres

### Wireless

Wireless will permeate the home: you've got 802.11/a/b/g and now 802.11n (well draft 2.0 now, but in five years' time they'll have settled their arguments and the actual specification will have been released, by then it will be 802.11n+ or turbo). This will allow speeds of up to a couple of hundred megabits per second between devices. Since it uses MIMO (multiple in, multiple out) the beams can be steered, allowing higher transmission speeds and distances with less interference between devices.

A new wireless standard will also be available called UWB (ultra wideband). UWB devices are already

starting to appear in the US. Unfortunately the FCC has adopted a slightly different specification to that in Europe (which has just been approved), so it will be a while before European-approved UWB devices appear.

UWB works by sending data over large amounts of spectrum, by splitting data into chunks that are sent over different frequencies. The data is also duplicated so if various frequencies are interfered with, the original data can be resurrected (i.e. there's error correction). UWB uses extremely low transmission levels which means if it interferes with something else using some of the frequencies they just 'hear' background noise and can generally ignore it, and if UWB is interfered with (frequency wise) it just uses its error correction techniques to put the data back together again.

UWB will offer short-range transmission rates of hundreds of megabits per second – the US equipment coming out now is designed for wired USB 2.0 replacement, which operates at 480MB/s.

Why do people need these high speeds? It's all about replacing wires.

802.11n for longer range in-home connectivity and UWB for very short range. Many vendors are looking at in-home video distribution, so your Sky box will sit in one room, but can deliver a high-definition video stream to any TV in the building (using 802.11n). UWB will also be used to replace cables out of the PC, meaning you can sit your PC under your desk and the monitor, keyboard, mouse, printer, scanner etc will all connect wirelessly.

### Femto Cells

Femto cells are low power GSM or 3G cells that use broadband to connect back to an operator. As both GSM and 3G use licensed spectrum only the operators will be able to offer in-building services, but on the GSM side 12 new licenses were awarded last year and they are starting to offer services.

Femto cells should cost around \$100 (probably including a broadband router) which means they should be affordable for home use. When in range of the cell, your phone will use that instead of the normal network cell

and as it uses broadband for connectivity call pricing should be reduced, it's likely that mobile calls when in range of a local femto cell could be as cheap as current landline calls. It also allows news services to be offered, like your phone becoming part of your office phone system. So no more deskphone, just your mobile.

### The Future and Beyond

Wireless is definitely going to play a major part of any new technologies in the future and that future is going to be all IP.

Now I think I'll go and jack myself into my virtual world (3rd life?) but must remember to eat. Being in-line doesn't mean my real body stops working.

The future's bright, the future's IP and wireless.