TechNews

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TechNews is a technology, news and analysis service aimed at anyone in the education sector keen to stay informed about technology developments, trends and issues. Please navigate the newsletter by clicking on items within the table of contents below.

Networking and wireless

Analysis: Converged networks

Computer networks are about communication. Traditionally there have been two parallel networks available – circuit switched networks that partition the total network into channels of a fixed size; and packet networks where information is broken down into smaller packets and the packets of many users share the same channel. Most homes and businesses now have two networks – a circuit switched connection to the public telephone service and a packet based computer data network.

Convergence between these two types of network creates a number of challenges, but offers the opportunity for fully-converged communication networks that provide congruent interfaces (network, software and hardware) to voice, video and text communications. Converged infrastructure has two main advantages, in lowering ongoing costs and in increased functionality. Potential disadvantages include creation of a single point of failure and the significant cost of adoption/change. This analysis looks at some of the technologies being developed in this area.

Voice over IP (VOIP) has the highest profile and commercial value of these technologies. Put simply this is about implementing voice conversations over an IP-based packet network. This can happen at two places in the network – at the consumer site, or at the backbone/carrier level.

Originally each conversation on the telephone network required an end-to-end dedicated line, however many telecommunications companies (telcos) soon moved to ATM and other packet-data backbones to make better use of their networks. Since then, IP has since risen to dominance over ATM and telcos are now looking to standardise on IP based backbone networks to carry traditional voice traffic. For example see BT's 21st Century network (21CN): (http://www.btglobalservices.com/business/global/en/business/business_innovations/issue_02/century_network.html). This will mean that the copper circuits will deliver connections to the local telephone exchange and then calls will be digitised and transferred to a simple, national IP network. This has massive potential savings for operators, with little impact on consumers, assuming that the problems of using IP can be overcome. The main problem with using IP is that it does not guarantee timely delivery of data packets. Too many lost or delayed data packets can easily ruin the quality of a conversation. It is expected however that using a variety of techniques including quality of service, bandwidth management and overprovision, these can be solved.

For the individual consumer, a more visible application of VoIP involves using a fixed-cost broadband connection to transfer digital voice data. This is a cruder but similar approach to the Telco model. The simplest solutions offer one-to-one connections from internet user to internet user. An example of this is the recently launched Google Talk (http://www.google.com/talk/). Other services offer gateways between the IP networks and the traditional phone service. For example Skype offers a SkypeOut service (http://www.skype.com/products/skypeout/) that allows users to make calls using a PC to and from normal telephones at much reduced rates.

Corporate users have options when deploying VOIP. For years there has been convergence of cabling standards, with voice and data sharing the same physical infrastructure, but it is only in 2005 that the more IP PBX ports are expected to be sold than traditional types (http://www.businesssolutionsmag.com/Articles/2005_06/050612.htm). These IP PBXs are much more flexible in the clients that can be used and are easier to manage and integrate with other systems. Gartner suggests that by 2007 that suppliers will be moving out of traditional systems and concentrating solely on IP.

Voice applications, instant messaging and video conferencing, in addition to more standard web browsing and email, all use the same IP networks and often the same encoding methods. There is therefore an opportunity for these technologies to converge. This has great potential in education, where such services can all be accessed or included in learning platforms. Though the market is currently small, there already are systems on the market to integrate IP-based voice and video conference traffic. The direction is set for services that deliver truly unified messaging that can be aware of the device being used and location of the user.

For example an unanswered telephone call could be processed using speech-to-text software and delivered as an email to the correct inbox; users logging into a hot-desking workstation could have the nearest phone activated with their personal number that can follow them around the world; or a voice call between two people would automatically detect the presence of video conferencing equipment. Most of these are currently possible in isolation, but few products deliver an integrated solution backed by a robust user directory.

Moving to IP based networks for an organisation's communications is not a trivial task and involves a significant investment. There are also issues over quality of service, reliability and security. Where an organisation has many sites, like a council and already pays for a private network, analysis of call charges will indicate if and when savings are possible. Added to this can be the opportunities from further services, such as unified messaging and video conferencing. The decision to deploy converged networks should concentrate on additional features and ease of management rather than just cost savings. It is also generally better to consider converged networks when it becomes time to replace, upgrade or extend traditional telephony. IP-based systems are becoming affordable for education and are particularly useful in larger, multi-site institutions.

Microsoft/Cisco integration:
http://www.microsoft.com/technet/technetmag/issues/2005/01/UnityExchange/default.aspx
Cisco Unity Unified Messaging: http://www.cisco.com/en/US/products/sw/voicesw/ps2237/index.html
Amity Systems IP Multimedia Communication:
http://www.amitysystems.com/amity_corporate_brochure.html

Networking and wireless news

WiMAX update
WiMAX (Worldwide Interoperability for Microwave Access), a long range (up to 50km) and high speed (70Mbps) wireless broadband technology based on IEEE 802.16 standards, continues to be developed. The industry and certification body, the WiMAX Forum, expects the delayed formal testing to begin in October and to have the first products certified before the end of the year. Telabria has launched commercial WiMAX class services in Kent and Pipex are conducting a trial in the Midlands delivering their services using Airspan WiMAX equipment. The focus of this trial is the performance of services other than simply data, for example Voice-over-WiMAX'. Some vendors are investigating the use of low power indoor WiMAX equipment to provide faster wireless LAN services.
http://www.telabria.com/aboutus/downloads/telabria_uok_may05.pdf
http://www.pipex.net/investors/pressreleases/pr/press_release_page.php?id=224

UK home broadband speeds up
UK cable suppliers Telewest and NTL have both announced speed increases for their domestic broadband customers. First NTL announced 10Mbps connections with increased monthly limits for all customers, then Telewest announced a phased programme that will give users between 2Mb and 10Mb connections, but without limits. Both companies believe their networks will run even faster, which will be necessary to match the 20Mbps+ speeds offered by next-generation ADSL2+ technology.
http://www.ntl.com/mediacentre/press/display.asp?id=797
http://www.telewest.co.uk/html/internet/speed_upgrade_10mb.html?WT.mc_id=nh_speedupgrade

European broadband policy debate
As customers in urban areas can look forward to more choice of broadband provider including ADSL, cable and WiMAX, the European Union has started a policy debate on connectivity for the have-nots in rural areas. The consultation asks what kinds of interventions are likely to be required to stimulate growth and opportunity in areas where the market currently fails to deliver. To date rural areas have little choice in terms of broadband provision and are forced to rely on older technology such as dial-up and ISDN.This is still an issue faced by some small schools in rural areas.
http://europa.eu.int/information_society/eeurope/i2010/digital_divide/public_consultation/index_en.htm

Wireless Bristol

Bristol City Council have partnered with Cityscape to create the UK's largest outdoor urban wireless broadband network. This network offers local information as well as 24x7 internet access to residents and visitors in a 3km wide area. The content provided is based on a combination of specific local and national e-Government content and a link to free internet access. In addition to public facing services the council intends to use a secure portion of the network for its staff, including VOIP services and CCTV. Cityscape plans a roll-out using their public information kiosks and council street furniture to site the necessary infrastructure.

http://www.cityspace.com/press/level2/releases/040722-PR-Bristol.asp
http://www.computing.co.uk/computing/features/2140226/bristol-city-hotzone

High speed mobile technology demonstrated

Vodafone Italy have demonstrated a production network using 3G HSDPA (High Speed Downlink Packet Access) running at 1.5Mbps. HSDPA services, which offer faster download speeds over 3G mobile phone networks, are expected to be rolled out from next year. Scientists in Japan have been showing off 4G technology. NTT DoCoMo has demonstrated its next generation technology delivering at 100Mbps while moving and 1Gbps when static. NTT DoCoMo hopes to have a commercial network in place by 2010. A standard for 4G has yet to be agreed and there are two main competing approaches, both based on IP.

http://www.newscientist.com/article.ns?id=dn7943
http://www.dmeurope.com/default.asp?ArticleID=9570
http://today.reuters.com/news/newsArticle.aspx?type=internetNews&storyID=2005-09-01T150823Z_01_BAU152827_RTRIDST_0_NET-TELECOMS-TMOBILE-DC.XML

First convictions for drive-by Wi-Fi

The UK has seen its first criminal conviction for unauthorised access of a wireless network. A 24 year old London man was fined £500 and given a 12 month conditional discharge under the Communications Act 2003 for using a wireless laptop outside residential premises to access networks without permission. Prosecutions for similar behaviour have also happened in the US.

http://www.techworld.com/security/news/index.cfm?NewsID=4104

New Wi-Fi enabled cameras

Nikon have launched the first consumer digital camera with integrated IEEE 802.11b/g wireless networking. Rather than appear as a normal device on a wireless network, the new COOLPIX P1 and P2 cameras use wireless to communicate with a single, specified computer. Wireless links aimed at the photojournalist market have been available as optional accessories on high-end digital SLR cameras for some time. These units offer wired and wireless network connectivity and automatic upload to the internet. It is likely that more consumer level cameras will add Wi-Fi capabilities over time.

http://www.nikon.co.uk/press_room/releases/show.aspx?rid=179

UK telecoms regulations

Draft regulations have been published by Ofcom that would exempt RFID equipment in the 865–868 MHz band from licensing. This is based on the opinion that RFID technology is unlikely to cause radio interference. RFID is a short range, low power technology using small, cheap embedded microchips to identify objects or people. These UK proposals are in line with European developments. Additionally Ofcom is preparing to auction spectrum for the use of low power GSM networks inside a building enabling the creation of small, private mobile phone networks. It should be possible for mobile phone handsets to roam between cheap private internal networks and more expensive external public networks, saving overall costs.

http://www.ofcom.org.uk/consult/condocs/wireless865_868/wireless865_868.pdf
http://www.ofcom.org.uk/media/news/2005/07/nr_20050728

Talking online

Google has announced a new instant messaging and Voice over IP (VoIP) service called Google Talk. Internet telephony is an increasingly competitive area. Microsoft recently acquired VoIP outfit

Teleo to enhance voice support in MSN Messenger, Outlook and Internet Explorer. Skype has announced its first partnership with a mobile telecoms operator and now has 52 million subscribers worldwide. Various devices are appearing to support the growth in these broadband-based telephony services, including USB phone handsets, adapters and software for mobile devices such as Series 60 mobile phones.
http://www.google.com/talk/
http://teleo.msn.com/

High Altitude Long Endurance Unmanned Aerial Vehicle (HALE UAV)

UK firm QinetiQ is to be awarded a contract to design and build an unmanned aerial vehicle designed to stay in the air for extremely long durations. In addition to military applications, these units have the potential to offer low-cost alternatives to satellites in providing broadband coverage in hard to reach areas. For example such systems might be deployed in disaster areas to support rescue efforts. The first flight trials are expected in the summer of 2006.
http://www.qinetiq.com/home/newsroom/news_releases_homepage/2005/2nd_quarter/qinetiq_awarded_contract.html

Multimedia

Analysis: Augmented Reality

Augmented Reality (AR) is a hybrid of reality and the Virtual Reality systems that have been popularised since the 1980s. Where Virtual Reality attempts to completely replace the user's senses (primarily audio and video, but some systems include touch and even smell), Augmented Reality overlays or combines computer generated information and real objects and locations. Some systems aim to deliver photo-realistic objects and environments, while others cut down the complexity by taking a representational approach.

There are a number of different potential applications for Augmented Reality systems, however all but the simplest applications are still only found in research labs. The most basic systems are already commonly found in television sport – graphics drawn by pundits over the video image to highlight players or tactic. This is a crude example, but highlights the principle of using ICT to add information to supplement reality.

However, beyond these basic examples, Augmented Reality has greatest potential when combined with personalisation and location-aware computing. These concepts, where the context of the user is an important part of the experience, in turn relate to developments in mobile and wearable computing. Location-aware computing is likely to be delivered through technologies such as GPS (Global Positioning Systems) or image-recognition software. Other possibilities include short or long-range sensors ranging from bar-code readers, RFID chips and smartcards to mobile phone cell information.

As modern computers primarily use visual outputs this is normally the approach taken by Augmented Reality systems. Typical equipment is based on a headset that projects information as an overlay on the user's normal field of view, similar to a military aircraft heads-up-display. The use of cameras and location sensitive computing defines what information the user sees, based on their location and surroundings. A simpler approach is to deliver context sensitive information to a PDA. Already some museums, such as the Tate Modern (http://www.tate.org.uk/modern/multimediatour/) use portable devices to provide additional contextual information about exhibits. Educational projects such as Mud Larking in Deptford (Nesta Futurelab) are also using this approach.

There are potential applications and research examples in many fields. The European Union funded "LIFEPLUS" is an Augmented Reality project to bring the ruins of Pompeii to life. This used many elements from the computer games industry and leading edge computing to track the direction the user was looking. More information is available at
http://www.miralab.unige.ch/subpages/lifeplus/index.html.

Leisure is an important potential application for this technology. Already enterprising university students have played Pacman on a giant scale around their campus (http://news.bbc.co.uk/1/hi/technology/4607449.stm) and the massive world market for gaming means this is a key opportunity.

There are a number of more mundane possibilities, from improved satellite navigation systems that project directions in a driver's line of sight, to medical, construction and repair applications where overlays can help fit parts accurately or guide doctors in procedures. Augmented Reality in aircraft construction was trialled by Boeing in 1997, and in 2004 Honda US deployed AR headsets (using retinal scan display technology) in its training centres (http://phx.corporate-ir.net/phoenix.zhtml?c=114723&p=irol-newsArticle&t=Regular&id=651066&).

Applications directly applicable to education are likely to grow from technical developments in industry and the military. "Mixed reality" should become more commonplace. Augmented reality will become more practical as a result of generic computing advances, better battery technology, increased portability and more location-aware applications and databases such as Google Maps (http://maps.google.com/). In education this should support enhanced and personalised learning by allowing pupils to explore problems and situations at their own pace. The BBC was involved in a research project on Augmented Reality in schools, looking at whether AR helped children engage with learning and understand complex problems, This was featured in a Becta seminar (http://www.becta.org.uk/etseminars/presentations/2004-05-01/8/slides/slides.pdf) and at the BETT Show in 2005 (http://www.nestafuturelab.org/showcase/education_ar/education_ar.htm).

Virtual Car Mechanics: - http://news.bbc.co.uk/1/hi/technology/2848097.stm
KARMA: Knowledge-based Augmented Reality for Maintenance Assistance: http://www1.cs.columbia.edu/graphics/projects/karma/karma.html
SporTVision: Enhancements for television sports broadcast. - http://www.sportvision.com/
General Information: http://www.augmented-reality.org/
http://www.eetimes.com/showArticle.jhtml;jsessionid=G2A1MWEJVKWTEQSNDBGCKHSCJUMEKJVN?articleID=165700110

Multimedia news

Flexible displays move closer
A number of prototypes of electronic paper have been demonstrated recently. Paper remains the preferred medium for many people. Normal electronic displays are unable to replicate the high-contrast, persistent, zero-power, reflective and flexible properties of paper. Both Fujitsu and Philips have announced prototypes that hope to combine the best properties of paper with the versatility of electronic displays. Fujitsu unveiled a flexible colour film that can be updated electronically and has a memory function that retains its image when the power is turned off. Philips have concentrated on a different aspect and produced the prototype of a rollable display designed for future mobile devices. These screens are currently greyscale, but can be rolled up for storage. While neither of these products is in mass production yet, they give a glimpse of display technology that could overcome the problem of small, power hungry screens on mobile devices.
http://www.polymervision.nl/New-Center/Press-Releases/Article-14693.html
http://www.fujitsu.com/global/news/pr/archives/month/2005/20050713-01.html

Free space projectors launched
IO2 Technology has revealed a new projection technology that takes a computer screen display and shows it floating in the air above the unit. Initially designed as a visualisation tool for architects, the Heliodisplay plugs into any standard video source and shows the 2D image floating in space. The system also includes motion tracking to allow a finger moving around the object to act as a mouse pointer – making a floating touch screen. It has not been made clear exactly how the system works, but it seems to involve using lasers to induce rapid change in the air temperature to create the visual image. This revolutionary system is still expensive with basic units starting from around $30,000.
http://www.io2technology.com/

Lack of agreement on next-generation DVD

The race between the two rival next-generation high capacity optical disc formats continues, with decreasing expectations of a unified standard emerging. Each of the formats offer a massive increase in storage capacity over current DVD standards, by using blue lasers that can read more densely stored data. Until recently it seemed that the Toshiba/NEC-developed HD DVD format would have a 12 month lead on the rival Sony led Blu-ray Disc (BD). However, while BD seems to be on target for a launch with the Playstation 3 (Q1 2006 in Japan), HD DVD now looks likely to be delayed until Q1 2006 in the US, and possibly also Japan. Blu-ray has the advantage on capacity, but HD-DVD should have lower production costs. The "winner" is unlikely to be determined quickly and consolidation of the formats is still possible, though recent talks have ended without agreement. Samsung has recently announced that it will produce a dual-format player, supporting both technologies, if a single standard cannot be agreed.
http://www.theregister.co.uk/2005/09/01/toshiba_hd-dvd_delay/

BBC plan to transform viewer choice

The BBC has announced its intentions to make its channels available for viewing on the internet for seven days after their broadcast. The plans for a new application, MyBBCPlayer, were announced by the corporation at the Edinburgh Television Festival. The service, expected to launch in 2006, follows BBC trials of making news bulletins online for seven days and the testing of the service under the name of interactive Media Player (iMP). The iMP uses peer to peer technology to share the data transfer burden across all users rather than rely on a central server. This has a potentially massive impact on the model of television programming use, reinforces convergence of PCs, set-top boxes and digital video recorders, and parallels the rise of television programmes being downloaded rather than viewed live on television – especially common with shows premiered in the US months before a UK showing. Education users will benefit from greater flexibility in using BBC material in teaching without having to resort to cumbersome VCRs.
http://www.bbc.co.uk/imp/

BBC Backstage

The BBC has launched Backstage which is designed to encourage new and innovative uses of the BBC's syndicated content. Using the information from the site, the majority of which is provided as RSS feeds, members of the public are invited to come up with ideas and write new applications. The BBC claims no rights over the ideas or prototypes developed and it is seen as a community project. This is similar to the BBC's Creative Archive which encourages non-commercial use (such as remixing) of BBC programming.
http://backstage.bbc.co.uk/
http://creativearchive.bbc.co.uk/

Narrowing the gap between Telcos and cable

As telecommunications companies around the world migrate to IP networks they find they are able to offer the same "triple play" services as cable companies – telephony, internet and video programming. New higher speed broadband technologies such as ADSL2+ mean that multi-channel and video-on-demand services become practical, irrespective of the provider's technology base. This should bring competition to a wider market and flexibility for the consumer. In the UK BT has announced its intentions to support converged services over its next generation IP network using the Microsoft TV IPTV Edition. There are other competing systems from vendors such as Alcatel and Siemens. Companies such as HomeChoice are already offering triple play services over broadband in certain regions.
http://www.wired.com/news/business/0,1367,68362,00.html?tw=rss.BIZ
http://www.microsoft.com/tv/content/Press/BT_2005.mspx

BPI sue file sharers

The British Phonographic Industry (BPI) has followed the example of the Recording Industry Association of America (RIAA) and issued High Court Claims against five file sharers who had refused to settle previous lawsuits. The BPI tracked down the individuals after obtaining a court order forcing ISPs to provide personal information. They claim that the five individuals shared almost 9000

music tracks illegally. Recent research by CacheLogic suggests that almost two-thirds more video than audio is being swapped on peer-to-peer networks. Peer to peer networking is commonly blocked in schools, but schools should be alert to copyright material being stored and distributed using their networks.
http://www.vnunet.com/vnunet/news/2140644/bpi-targets-uk-file-sharers
http://news.bbc.co.uk/1/hi/technology/4139314.stm

Dixons drop 35mm cameras

The astonishing growth of digital camera sales has encouraged Dixons to drop 35mm film cameras from general sale. Dixons say that digital cameras are outselling film by 15:1, but they will retain a small range of models at their airport stores. According to research firm IDC, 9.7 million digital cameras were sold in the US in the first half of 2005, 20 percent more than were sold during the same period last year. However in developing countries there is a still a demand for traditional film equipment.
http://www.channelregister.co.uk/2005/08/08/dixons_says_goodbye/

New CCTV technology combines video with computer generated information

A new computer system is being introduced into the UK by QinetiQ that combines maps, virtual reality models and video footage in a single view. This allows operators to easily orient themselves to the locations of cameras and track moving objects. The system, called Praetorian, is already in use in the US, but is new to the UK. In addition to tracking moving objects, the system is able to spot changed, stationary objects. For example this has applications in spotting abandoned packages on railway platforms.
http://news.bbc.co.uk/1/hi/technology/4741527.stm

Modern camera for ancient texts

Monks in the Sinai Desert have been using modern photographic techniques to get a detailed view of the oldest surviving bible in the world. Using Hyperspectral imaging (different wavelengths of light) monks have been building up 72-megapixel images of the pages of the Codex Sinaiticus and Codex Syriacus showing the history of overwriting and corrections. The main problem facing the monks now is one of time – the collection at the monastery is second only in size to that of the Vatican, comprising 3,304 manuscripts and 1,700 scrolls.
http://www.computerworld.com/softwaretopics/software/multimedia/story/0,10801,102634,00.html

Hardware

Analysis: Grid Computing

Grid computing is based on the concept that many separate computers can work together on the same problem and solve it much more efficiently than a single computer on its own. High-speed networks are important for many grid computing applications, but not essential for all. There are two broad categories of Grid Computing system. Firstly, there are computational grids, which focus on sharing processing tasks across many computers. To take advantage of such systems the software used must support multiple processors working in parallel. Secondly there are data grids which focus on distributed storage and management (archive, backup and retrieval) of massive data sets that can subsequently be accessed through a single interface.

The key characteristics of a Grid Computing system are:
- Distributed computing power spread across different management domains. Cluster computing is the term used for problems being shared across many computer systems, all within the same management domain.
- Good telecommunications links are essential. These do not necessarily need to be persistent or high speed, but do need to be available.

As a term, Grid Computing is often misused by vendors and there is a lack of rigour in the language. Grid and cluster computing are often used interchangeably to describe the use of a number of

commodity servers, where thousands of processors can be connected together using virtualisation software so that the individual systems appear as one. This allows tasks to be intelligently divided across the different systems, without having a single point of failure. This also means that resources can be provisioned on actual demand. True Grid computing involves connecting these distributed clusters of computers through a Wide Area Network (WAN). Grids can further be broken down into two main types: dedicated and ad-hoc. Dedicated grids are farms of computers that only run grid applications. These are used in industrial and scientific research and finance. Ad-hoc (or scavenging grids) process tasks using the spare capacity of existing systems.

The first widespread examples of Grid Computing involved the ad-hoc use of a large volume of relatively low-power computers to process data or perform computer modelling. The most well known example is SETI (Search for Extra-Terrestrial Intelligence): http://setiathome.ssl.berkeley.edu/. This uses a small software download that uses redundant processor cycles on desktop computers to process data, download new raw data from the internet and return finished results to a central server. Over 5 million people have donated their spare processing power to this project.

A number of other projects work in a similar way, with the aim of using up "spare" processor cycles, such as http://climateprediction.net/, which has worked with schools to improve understanding of climate forecasting: http://www.climateprediction.net/schools/index.php. These normally require a local software installation and the ability to communicate unimpeded across the internet. This might prove difficult in some environments.

For the commercial and academic research communities Grid Computing offers great flexibility and opportunity. Computing resources can be shared between institutions linked by very high speed networks and these fast links enable massive amounts of data to be exchanged. Distributed resources are also cost effective – many smaller computers are normally cheaper than individual supercomputers. The TeraGrid project in the US has been funded with over $150m dollars to create a massive distributed computing resource based on a shared optical network working at 40-80+Gbps. In the UK there is the National Grid Service (http://www.ngs.ac.uk/) and in Europe CERN is at the forefront of Grid Computing to meet the requirements of the Large Hadron Collider, which will generate 10 Petabytes of data a year (http://gridcafe.web.cern.ch/gridcafe/GridatCERN/gridatcern.html).

Business has not been slow in seeing the opportunities of Grid Computing. Advantages include high levels of computing resource utilisation, reliability, flexibility, scalability, parallelism and efficient provisioning. The commercial market for these services is small but growing, though the self-owned grids developed by the research community are more significant than the current commercial models. IDC estimates the Grid Computing market will be worth $12 billion by 2007, but this is a tiny amount compared to the overall IT industry ($1.1 trillion in 2003) (http://www.itjungle.com/tug/tug042904-story05.html). It is held back by lack of applications and limited awareness and understanding of the benefits of Grid Computing.

The most significant challenge facing users and suppliers has been interoperability between systems. There are de-facto standards around resource management, information services, security services and data management. These are converging in the Open Grid Services Architecture (OGSA) (http://en.wikipedia.org/wiki/Open_Grid_Services_Architecture). There are also toolkits to help set up grids such as BOINC (Berkeley Open Infrastructure for Network Computing), which is used by the SETI project. Agreed standards will increase the opportunity for commercialisation of the research grids and allow better use of commercial utility services for scientific and business applications. Standards will likely stimulate the market, as they will allow users to move easily between suppliers, who themselves will have a larger potential market for their services. Most dedicated grids are built on Linux servers to reduce costs. However, Microsoft has plans to enter this market next year.

Grid computing is still an immature technology. Currently, educational institutions outside of the university and research sectors have little need for the power of Grids. However, schools can participate in distributed computing projects. For example, the climate prediction project mentioned above, actively engages schools and offers alternative data sets and teaching resources to participants.

Further information:
Insight Research Corporation report (Executive Summary is free) http://www.insight-corp.com/reports/grid.asp
UK e-science programme: http://www.rcuk.ac.uk/escience/

Hardware news

DfES ICT in Schools funding

The DfES has announced the arrangements for funding schools in 2006-07. The funding will include a separate Connectivity & Learning Systems Grant designed to support the broadband connections and learning systems being introduced by Regional Broadband Consortia. Some of the other grants previously available to fund ICT in schools will change and some have been integrated into a more general School Development Grant. Full details on all areas of ICT funding including e-Learning Credits are expected to be announced in the autumn.
http://www.teachernet.gov.uk/management/schoolfunding/2006-07_funding_arrangements/

Intel Developer Forum

At the end of August Intel held one of its regular Developer Forums. These provide information on new products and development roadmaps. Intel continued its change in focus from increasing CPU speed to performance gains through CPUs with multiple cores –particularly better performance per Watt. Intel gave more details of its new micro-architecture (see TechNews July 05) that will replace Pentium 4/Pentium M and current dual core models. It is expected to be launched in the second half of 2006 and last until the end of the decade. Different versions of the new micro-architecture will be used across all platforms (server, desktop, mobile, entertainment).
Additional announcements included Intel and Cisco announcing a partnership to collaborate on improving enterprise wireless security, new system boards supporting multiple graphic cards, location detection services using Wi-Fi technology and plans to develop new full-function PCs in a "handtop" form factor.
http://www.intel.com/idf/
http://www.intel.com/technology/magazine/index.htm

Next generation BIOS moves closer

Intel has handed over control of Extensible Firmware Interface (EFI) to a shared industry forum. EFI is being put forward as the successor to the basic input/output system (BIOS) found in PCs. EFI offers much greater control of the PC than BIOS and includes the chance for hardware drivers to be handled at this level, before an operating system is involved. This should improve security, stability and boot-up speed. The members of the industry forum include Dell, Hewlett-Packard, IBM, Microsoft and BIOS specialists Insyde Software and Phoenix Technologies.
http://news.com.com/Intel+hands+off+BIOS+successor+to+trade+group/2100-1012_3-5805069.html?tag=nefd.top
http://en.wikipedia.org/wiki/Extensible_Firmware_Interface

Uncertain future for Tablet PCs

The $100 premium for Tablet PCs and an unenthusiastic market has led some analysts to revise downward their expectations of market penetration. Microsoft announced that by February 2005 1 million units had been sold. The special features of Windows XP Tablet Edition are expected to be integrated into the next version of Windows, called Vista. Education remains a key customer of these products, but outside of niche markets the Tablet has not won many friends. In-Stat (http://www.in-stat.com) estimate the worldwide sales will rise from $1.2bn in 2004 to $5.4bn in 2009 due to falling prices and more applications attracting a wider market. However, Microsoft and Intel plans for paperback book-sized Ultra Mobile PCs could have a negative impact on Tablet PCs.
http://www.eweek.com/article2/0,1895,1853607,00.asp
http://www.techweb.com/wire/hardware/166402702
http://www.microsoft.com/presspass/press/2005/apr05/04-25WindowsThirdDecadePR.mspx

Server on a stick

The latest hardware to emerge from the Linux community is a USB server, little bigger than a common flash memory stick. The Black Dog Mobile Personal Server plugs into the USB port on a PC, boots up in a couple of seconds and then offers graphical and console access to a self-contained Debian Linux system. The unit even comes with a built in biometric security. Similar servers are sold by FingerGear. A new U3 USB standard was announced at the start of 2005 which is designed to allow applications to run direct from flash drives, however this has not achieved widespread support so far.

http://www.projectblackdog.com/site/product.html
http://www.fingergear.com/
http://www.sandisk.com/pressrelease/20050107.htm

IBM and Sony release Cell specs

Technical specifications for the Cell processor that will sit at the heart of the upcoming Playstation 3 have been released by IBM and Sony. This chip actually has eight processing units on the same chip allowing extremely high speed execution when used with optimised software. The Cell is an evolution of the Power processors recently dropped by Apple from their computers. This chip is being developed for applications across the computing spectrum from IBM blade servers running Linux, to embedded chips in HDTV sets.

http://cell.scei.co.jp/index_e.html

Apple adopts Trusted Computing

Preview versions of x86 PCs running OSX are using integrated hardware security chips to prevent the software being installed on other systems. Trusted Platform Module (TPM) chips are a small but growing market and are normally used to manage encryption or data security, but until now have not been used to control operating system installation. Apple recently announced that it was switching to Intel platforms, but does not intend allowing OSX to be installed on non-Apple PCs. It is unclear whether TPM chips will be continued in production systems.

http://www.techworld.com/security/news/index.cfm?NewsID=4167
http://www.osx86project.org/

Larger capacity, less expensive Flash expected

Several developments in the Flash market could accelerate the use of Flash memory in more devices, such as notebook computers. Samsung, the largest producer of Flash memory, will launch 2GB Flash chips in 2006, a year earlier than expected. The technology used in these chips could eventually produce 32GB versions. Samsung are also providing large amounts of discounted Flash memory to Apple for its new iPod Nano digital audio players. This is expected to put more pressure on Flash prices as competitors react. As capacities rise and prices fall, Flash can be used in a greater range of devices. Samsung has already developed Flash drives for notebooks. Hybrid drives combing Flash and hard disks are likely to become more common. Flash memory provides low power, fast, quiet and reliable performance, but low capacities and high prices have restricted its use.

http://www.tomshardware.com/hardnews/20050912_000100.html

Hitachi launch first 500GB disk drive

Hitachi has launched the first widely available 500GB hard drive. This is a traditional longitudinal five platter/ten head drive using the second-generation serial SATA-II interface. The price per GB is higher than that of lower-capacity drives, so unless space is a real premium, multiple drives are likely to be a better option. Hard Drive manufacturers are beginning to launch drives based on new perpendicular recording technology that should massively increase potential storage densities.

http://www.theregister.co.uk/2005/08/31/review_hitachi_7k500/
http://www.hitachigst.com/hdd/research/recording_head/pr/

New organic battery technology announced

Researchers at NEC in Japan have announced an alternative to the Lithium-ion batteries commonly found in devices from mobile phones to laptop computers. The new batteries use safe, organic compounds rather than environmentally unfriendly Lithium. The new batteries will have different

characteristics than current technologies, so more research is needed. Scientists hope to bring the first products to market in 2 to 3 years.
http://www.infoworld.com/article/05/08/04/HNorganicbattery_1.html

Software and internet

Analysis: Blogging
Earlier this year there was a flurry of reporting about a new blog being created every second (http://www.technorati.com/). Blogging has grown from a niche application used by early adopters to a tool used by millions. The adoption of the technology by large corporations and the news media has confirmed its place as a mainstream internet publishing method.

Blogging evolved from simple web-publishing tools that were designed to allow sites to be created and updated without the need to learn HTML or use FTP (File Transfer Protocol). The results were sites that allowed content changes using simple text entry. In turn, this led to the rise of websites that delivered short, article based, rapidly changing topical content – the web log or "blog" for short. Over time the scope and content of these blogs changed and several trends have emerged.

Personal diaries and social trivia still form the content of most blogs. Many sites offer free blogging services and tools. For example: http://www.livejournal.com and http://www.blogger.com. These sites provide basic interfaces and servers, embedded multimedia, keyword tagging and allow shared community spaces that encourage other users to leave comments and start discussions.

A small number of writers have developed massive followings for their blogs. These range from amateur pundits to professional journalists and their blogs are often aimed at covering political issues or ethical standpoints. Examples include http://dailykos.com/, http://scripting.com/ and http://normblog.typepad.com/normblog/. Some amateur blogs have moved closer to the work of the professional journalist. Examples from UK education are Leon Cych (http://www.l4l.org.uk/@blog/) and Terry Freedman (http://terry-freedman.org.uk/myblogg/weblog.php).

Big business is starting to use blogging techniques and approaches to reach its customers. Some of these are described as "developer diaries" (for example http://weblogs.macromedia.com/mesh/). The intention is to increase involvement of customers in the products. However, there can either be a cost in losing corporate control of the message, or in timeliness if there is a formal editing or moderation process. A key characteristic of successful blogs is their timeliness and relevance, so introducing delays is undesirable.

Community blogs allow individuals with the same interests to add to a shared pool of resources. The most popular blogs tend to be run by groups rather than individuals, as the multiple contributors allow for a wide variety of perspectives and almost constant updating. There can often be blurring between online news sites and shared blogs. For example one of the highest rated blogs (according to Technorati) is boingboing (http://boingboing.net/). This is part community blog and part news feed.

Writing for a blog is similar to writing for the web. Ideally blog articles should be brief, with a single idea per paragraph and use lists where appropriate. The interactive nature of blogs is one of their key attractions. Most interfaces have a built in feedback service that encourages the wider community of users to leave comments relating to the blog entry. Open standards are being developed to allow interoperability between different blog providers for leaving comments (see OpenID http://openid.net/) and tracking references (known as trackback).

Blogs have also evolved in the media they support. The majority of content is still focussed on text, but increasingly photographs, audio and video are being used. Being web-based, it is possible to link to external resources and embed them in the blog in the same way as an image would be used in a normal web page. Some additional services involve automatic blogging of calls to a particular telephone number (as an mp3 file), or services dedicated to photographs rather than text (for example http://www.flickr.com). Audio-only blogs, downloadable to mp3 players, are similar to Podcasting. Moblogging is blogging from a mobile or portable device, such as a smartphone or PDA. Many

moblogs focus on photographs taken with cameraphones. Moblogs can work in two ways, either through specific software or services, or by using interfaces to standard blogs. Most of the popular blogging services offer upload from mobile devices by email, text or multimedia messaging. Microsoft and Nokia have both experimented with whole-life-blogging applications and devices that are designed to capture and publish information automatically throughout a user's daily life.

Starting a blog is relatively easy. In addition to the free or commercial blog providers who offer online services including hosting, there are open-source and commercial software packages available for local installation.

In the future blogs are likely to develop in two ways. Firstly blogs are already growing in relevance for the traditional media. Journalists have referenced blogs extensively as an insight into public thinking (for example http://news.bbc.co.uk/1/hi/magazine/4626001.stm). It can be argued that blogs, combined with personal technology such as cameraphones, will revolutionise news gathering. In addition to canvassing public opinion, blogs have been used as news gathering and sharing tools. During the recent hurricane in New Orleans, thousands logged into the site of a blogger giving frequent updates from inside the city:(http://www.livejournal.com/users/interdictor/).In the wake of the bombings in London LiveJournal was used to enable practical discussion of facts and establish contact between friends and colleagues: http://www.livejournal.com/community/london_070705.

Secondly the response of blogging developers to increasing information overload has been adoption of the RSS standard. RSS (Really Simple Syndication) is a common XML format for blog publication. By making blogs available in RSS format, users are able to aggregate together multiple sources in the same interface. This might be software such as Sharpreader (http://www.sharpreader.net/) or an online service like Bloglines (http://www.bloglines.com/). RSS support is integrated into the Mozilla Firefox browser and support will be included in the next version of Microsoft's Internet Explorer. There are different versions of RSS and it also forms the basis of rival specification Atom, which has been submitted to become an internet standard. It is likely that Atom will grow in popularity as RSS is replaced over the next few years. In addition to blogs, many online information providers, for example BBC News (http://news.bbc.co.uk/) provide all their content in RSS format. Syndication and interoperability, using RSS formatted XML to publish content, are likely to be increasingly relevant to use of the internet, as users build custom information streams and browsing experiences rather than rely on someone else's preferences.

Blogs are potentially powerful tools in supporting education projects. For example http://uncertainscience.blogspot.com/ is part of a project on climate change. The blog is designed to promote debate on current affairs around this issue. More generally, blogging offers a powerful means for young people to share and create knowledge through collaborative exchanges between peers. They can learn how to put across and defend their ideas and opinions with a real audience and to assess the validity of what they read. Will Richardson's site http://www.weblogg-ed.com/, which focuses on education applications, contains links to many blogs and resources. Personal blogs are generally unmoderated. Some blog server applications have a publication approval process and other restrictions that make them more suitable for a closed education community. Research on blogging in education is growing and it is generally positive about the impact of blogging on encouraging students critical thinking: http://abc.net.au/science/news/stories/s1450106.htm.

Blogging is an excellent example of a very simple approach to technology having a massive impact. They have given voices to many people who have a particular insight or unique access (for example the "milblogs" of army personnel (http://www.cbftw.blogspot.com) serving in Iraq and the "Baghdad blogger" who published updates from Baghdad during the recent war (http://dear_raed.blogspot.com/)).

As with much of the World Wide Web, the challenge to the reader is separating fact from inaccuracy or opinion. For this, technology cannot provide a solution.

Software and internet news

Open Source developments

A consortium of open source supporters has announced a new scheme to help organisations assess the maturity of open source projects. The aim is to help potential adopters find the right software and assess whether projects are ready for deployment, or still in a rapidly changing development cycle. The Business Readiness Rating model, developed by Carnegie Mellon University West's Center for Open Source Investigation (COSI), Intel and open source testing and certification company SpikeSource, is currently open for consultation.

The next version of the GNU General Public License (GNU GPL) is due for release in 2007, according to Eben Moglen who is developing the license with Richard Stallman. Key issues that may be addressed in the license include web services, digital rights management (DRM) and software patents. The GNU GPL is the most popular license for free software and gives access to the source code for all. It allows modification and redistribution, but with the caveat that all derivative works must also be distributed under the same license.

http://www.openbrr.org/
http://www.computerworld.com/softwaretopics/software/appdev/story/0,10801,103859,00.html

New research on computer games in education

The international games company Electronic Arts have partnered with NESTA Futurelab to research the educational potential of games in four schools in London. Many schools already mix mainstream "simulation" games such as the SimCity series with specifically designed educational games. The project will look at the role of educational support material for games and is due to report in August 2006.

http://news.bbc.co.uk/1/hi/technology/4134530.stm
http://www.becta.org.uk/research/research.cfm?section=1&id=2847

Planning for the future of the internet

The US National Science Foundation has proposed a new project to look at the future of the internet. Rather than focus on speed improvement, research is planned into the architectures, applications and security models that might be needed fifteen years in the future. Already suggested areas of work include mobile, wireless and sensor networks, personal and pervasive technologies. Funding for the project has yet to be confirmed.

http://www.nsf.gov/cise/geni/

Windows Vista and other Microsoft releases

The upcoming Microsoft release schedule has been clarified in a number of announcements. Microsoft has published Beta versions of Vista, its next desktop operating system, due to be launched in late 2006. Windows Vista Beta 1 was released in July and Beta 2 is expected in Q4 2005. Internet Explorer 7 is scheduled for Beta 2 in autumn 2005 and the final version at the end of 2005. The new Windows file system (WinFS) for Windows Vista and possibly Windows XP, is not expected to be launched until 2007. WinFS will sit on top of NTFS and provide programmable and extensible database-like indexing, cataloguing and search.

http://www.infoworld.com/article/05/08/29/Hnmsfilebeta_1.html
http://www.vnunet.com/vnunet/news/2141649/microsoft-france-slips-vista
http://msdn.microsoft.com/data/WinFS/default.aspx

Online mapping and imaging

Microsoft and Google have launched rival free mapping software that use satellite and aerial images. Microsoft's Virtual Earth is competing with Google Earth. The Google service is differentiated by offering a programming interface that allows custom applications to be written. Following the devastation of New Orleans an enterprising programmer built a community site based on the Google service and created a shared layer where flags giving information on survivors can be placed and

read by the community. Delivering location aware searches, map information and driving directions is driving the developments of these sites.

http://www.scipionus.com/
http://virtualearth.msn.com/
http://maps.google.com/

Government launches IT security site

The UK Government has announced a new website to raise awareness of IT security issues. Aimed at small businesses and individuals, the "Get Safe Online" site will be launched in October and is intended to cover topics such as firewalls, viruses, spyware and how personal data can be protected.
http://www.vnunet.com/vnunet/news/2140888/safe-online-october-launch

Impact of virtualisation on licensing

Traditionally, much software licensing has been based on a per-processor model. However, developments in multi-core processors and new business models around distributed or grid computing, create a need for flexibility. Different approaches have been taken by vendors to date. Some simply count a multiple-core processor as a single unit, others count each core as a different processor or a middle way is taken. Analysts from IDC have challenged the industry to think about their licensing practices and models.
http://www.vnunet.com/vnunet/news/2140904/licence-models-review
http://www.eweek.com/article2/0,1895,1839671,00.asp

Paper fingerprints

Scientists at Imperial College have discovered that paper, as well as the plastic used in credit cards, possesses unique fingerprints. By analysing the surface of the material with a laser and PC, it is possible to validate and trace an individual sheet or item – even when the paper is crunched, soaked and baked. There are many potential applications for a database of these "fingerprints". For example passports might be checked for forgery and documents could be validated without the use of embedded RFID tags.
http://www.wired.com/news/privacy/0,1848,68352,00.html?tw=rss.TOP

China limits online gaming

Prompted by fears about disaffected youth becoming addicted to online games, the Chinese government has asked games designers to prevent long play in one sitting. Designers have been asked to make game characters begin to lose their powers after three hours and after five hours play flash up warnings on screen every fifteen minutes. The majority of Chinese publishers have agreed to the rules, but many games are operated by US companies. The value of gaming has been the subject of contradictory evidence and research is ongoing.
http://www.vnunet.com/vnunet/news/2141570/china-cuts-gamers

Internet Explorer continues to lose market share

According to research from NetApplications, Internet Explorer is continuing to lose market share. Mozilla Firefox, Safari and Netscape are the main beneficiaries. Growth of alternative browsers had slowed recently, but this latest research suggests IE is not recovering. However, IE still represents 86.31% of the market, down from over 92% a year ago. Mozilla Firefox has launched a beta of version 1.5 of the browser, with the full version expected in November. IE 7 is also expected before the end of the year and should include many security and functionality improvements. It was originally intended to be shipped with the next version of Windows, but will now be made available to Windows XP users.
http://www.internetweek.com/showArticle.jhtml?articleID=170702563

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