contents

Symbian love child could be death of the mobile phone

Symbian has finally unveiled the platform that is staking a claim to be the dominant OS in mobile computing.

The launch at CeBIT came 18 months after Psion and leading mobile phone makers Nokia, Ericsson, Matsushita and Motorola formed the Symbian alliance. Developers had already had a sneak preview at a conference in California a few days earlier.

'It has been a wait,' Symbian managing director Colly Myers admitted at CeBIT. 'But we took the view that it was better to get the products right, rather than rush to market with something that was wrong and then have to undo it.'

He stressed: 'This is an extremely complex thing we are trying to do here.'

The first products fully exploiting the platform will not ship until early next year, though Microsoft is about to launch its Pocket PC platform and Palm dominates the handheld market.

Myers dismissed the Palm threat. 'They are not platforms. They don't have anything like the facilities we have,' he claimed.

The Symbian platform, love child of the mobile phone and the handheld computer, has been built from the bottom up for the creation and operation of what the company calls Wireless Information Devices (WIDs).

Underlying it is Psion's Epoc 32 operating system. It packs a closely integrated set of applications and provides facilities for third parties to write further software. Development environments for Java and C++ will be available within weeks.

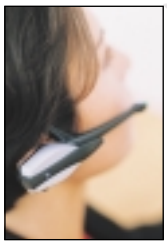
There are three versions of the platform, sharing the same basic architecture: Crystal, for keyboard-driven handhelds with half-VGA screens; Quartz, for pen-driven devices with a quarter-VGA screen; and Pearl, for small-screen phones. Quartz was demonstrated at CeBIT.

Some believe devices of the Crystal and Quartz class, coupled to a Bluetooth headset, will virtually kill off the traditional mobile phone with its tiny screen and keyboard – particularly as the 'fried brains' radiation scare is already boosting the use of hands-free headsets. However, this raises questions about the long-term importance of WAP.

All of which is beginning to leave the US behind. This was the second year running that the technological buzz (if not the razzmatazz) at Europe's CeBIT was greater than at Fall Comdex, as our five pages of reports show.

The US is still struggling to reconcile conflicting mobile phone systems. Connexant marketing manager Rick Weber said ruefully: 'You are talking features while we are still talking standards.'

Quartz unveiled – p32
Browser war – p26
WAP feature – p152



Ericsson-built prototype Quartz handheld (above) and an Ericsson Bluetooth headphone – a combination some think will see off the mobile phone

Win2K turns the heat on Sun

The other big launch since our last issue was, of course, that of Windows 2000 – the most important release from Microsoft since Windows 95.

Bill Gates demonstrated its power with a 12-server cluster processing what he said was 227,000 transactions a minute – fast enough to process all of last year's ecommerce transactions in two days. He claimed such systems offered better price-performance than any rival.

This was challenged by Sun, which also repeated a claim that Win2K was launching with 63,000 known bugs, a figure quickly refuted by Microsoft.

Web servers using Sun's Solaris OS, a flavour of Unix, are under threat from Win2K. Sun has responded by giving Solaris away for systems of fewer than eight processors.

Sun marketing manager Jonathan Mill said that he could not understand how Microsoft could claim to be cheaper. 'Also users can get an open-source licence for Solaris for free. I can't see Microsoft giving users access to its code.'

Sun has a second motive in giving away Solaris. It is trying to edge into the Linux market, claiming that Solaris will run Linux applications.

● Sun, under mounting pressure to open up the Java standard, is talking with IBM, Oracle and other key partners.

CeBIT shorts

MONITORS GO DIGITAL

Digital/analog CRT monitors will make way for cheaper all-digital models, vendors predict. Eizo, Philips, and (pictured) Viewsonic, among others, showed hybrids using the new DVI port which can carry both old VGA and digital signals.

The digital input allows manufacturers to optimise the analog conversions for their own devices – a task usually left to the graphics card, with varying results.

But monitors will eventually come out with no analog option. These will be cheaper, as they do not need the various coils required by multisync, analog monitors, according to Viewsonic CRT product line manager Aaron Fright.

They will be addressed more like LCD monitors, so they could take advantage of Microsoft's ClearType technology for making screen text easier to read. Hybrids will be around for some time as graphics cards and users have yet to catch up with the technology.

SIMPLE SERVERS

Quantum launched a 120GB Snap! Server designed to allow managers to add storage easily to a network.

It is the largest of the Snap! range, which uses its own sub-3MB operating system optimised for file serving and security. The new 120GB Snap 4000 costs around £1,900; a 10GB Snap costs £425.

Quantum claims the servers can be installed by anyone in less than five minutes.

www.quantum.com

DVD writers hit 4.7GB

Two recordable DVD technologies will be on offer later this year in an echo of the old Betamax-VHS battle for VCR market share.

First to launch will be a 4.7GB version of the DVD-RAM technology supported by Hitachi, Toshiba and Panasonic. Current DVD-RAM drives store only 2.6GB per side. Panasonic, a consumer arm of Matsushita, showed a 4.7GB LF-D201E DVD-RAM drive which is due to ship this month. But its recordings cannot be read by all DVD Video and DVD-ROM players.

Seinosuke Karaku, head of Matsushita Europe, said it was hoped that future drives will read the format as standard. DVD-RAM has the advantage of being first to the market and current 2.6GB drives cost only £299.

A rival DVD+RW technology, backed by Hewlett-Packard, Philips, Sony, Mitsubishi, Ricoh and Yamaha, claims to be compatible with existing DVD players and DVD-ROM drives; also its discs do not use protective cartridges like those of its rival.

First-generation 3GB +RW drives never reached the market, but 4.7GB versions will start to ship late this year, a CeBIT press conference was told.

Philips and Ricoh both demonstrated DVD+RW recordings playing on different makes of player, both standalone and on a PC. The Philips drive will ship late this year for around £1,250, said Robert van Eijk, vice president of strategic alliances.

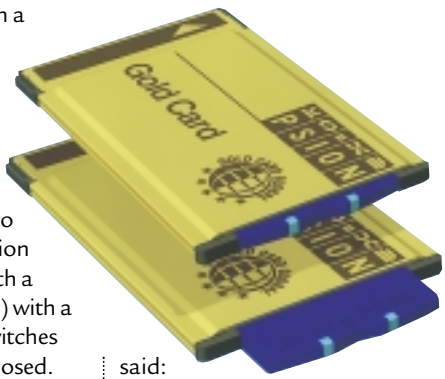
Anti-piracy measures have been a major issue in DVD development. Eijk said DVD packed enough protective measures to discourage casual illegal copying, but perhaps not the professional pirate. 'No fence is high enough for that,' he said.

Fears of too much chatter from Bluetooth

Mobile machines of early Bluetooth users could stall as they struggle with a cacophony of calls, one vendor fears. The first Bluetooth products to go on sale will be PC Cards, giving 'personal area networking' functions to legacy devices.

Vendors have been holding 'unplugged fests' in a bid to ensure devices from different manufacturers work together – a problem which dogged early PC Cards. But even with perfect interoperability, there could be problems, said Steve Maynard, technology strategist at Psion Dacom.

He cites the example of a conference packed with people using Bluetooth devices. 'An amount of handshaking has to go on, even to discover whether a device is one your machine wants to talk to. That takes an appreciable amount of time. With a number of people within a 10m radius, your machine could simply stop while it checks them all out.'



Bluetooth devices could also get you into trouble on planes. Psion Dacom solves this with a Bluetooth card (right) with a pop-up aerial that switches the device off when closed.

Many believe Bluetooth will need to be complemented by a networking layer. Symbian CEO Colly Myers said: 'We clearly see that interoperability will need something like [Sun's instant network technology] Jini.'

Xircom has put Bluetooth onto a thin Compact Flash I card – previously used only for memory. Fatter CF II cards are starting to replace PC Cards for uses such as LAN or GSM links; they also take IBM's 340MB Microdrive. But Xircom says a smaller format is needed for thin handhelds and cameras. Benny Van Calster, marketing director, said the new CFI devices will only work with Pocket PC (CE) models. 'Other operating systems don't yet have the right drivers.'

Free surfing hits Britain

Two companies were offering free unmetered Internet access as we went to press – and more offers were almost certainly in the pipeline.

AltaVista started the ball rolling by offering freephone access for just a £30 start-up fee. The service, which starts in three months, will be financed by advertisements.

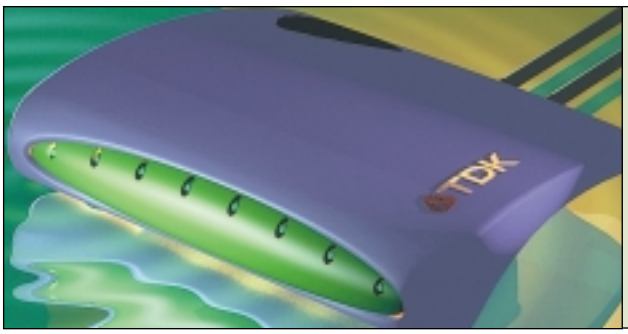
Cable company NTL countered with a completely free offer, contingent only on users spending £10 a month on voice calls with its service. They do not need to live in its franchise area. Cable company Telewest had already frozen sign-ups to its unmetered service, available only to people in its franchise area. This offers unlimited access for £10 a month, plus an undertaking to spend at least £10 a month more on voice calls at sub-BT rates.

BT Internet, the service provider owned by BT, had cut its monthly fee by nearly £1.76 to £9.99 and extended free unmetered access to include evenings – previously it covered weekends only.

This service should not be confused with BT SurfTime, which was set to charge £34.99 a month for unlimited surfing or £6.99 for off-peak access. This comes from BT itself, and would allow users to use an ISP of their choice.

SurfTime has been going through regulatory procedures. A BT spokesman hinted that prices will drop further but would give no date. 'All will be revealed very soon,' he said.

The situation was changing fast as we went to press. Updates will be posted at www.vnunet.com.



This prototype from TDK will allow Bluetooth-equipped notebooks and handhelds to gain instant access to office networks. No prices are currently available. TDK also makes Bluetooth PC Card adaptors. It will start shipping Bluetooth products this autumn. www.tdksys.com

short stories

WAP INTO VNU
VNU, the publisher of *PCW*, has set up a WAP news portal to keep you up to date with the latest technology. Just point your WAP browser at wap.vnunet.com/news.

OLD PC, NEW ROUTER
Old PCs can be transformed into Linux-based routers and firewalls, using free software available with set-up assistance from www.lrp.c0wz.com.

WHAT'S EATING BILL?
Don't know quite what is eating them down at Microsoft but this picture gives a clue. Our man Tim Anderson found it buried in what he calls a 'gamma' version of C++ Builder. We trust it has nothing to do with Bill Gates taking control of program development.

Intel lags behind AMD at 1GHz

AMD beat Intel to the market with a 1GHz version of its Athlon processor. But Intel is expected to counter shortly with a similarly clocked PIII, with further processors clocking well in excess of 1GHz due later this year.

Meanwhile eight vendors at the Intel Developers' Forum demonstrated systems using the forthcoming 64bit Itanium processor.

And Taiwan-based VIA, best-known for its motherboards and chipsets, launched a Celeron clone it calls the Cyrix III, which had been codenamed Joshua.

It is based on the Cayenne processor which was under development by Cyrix at the time the company was bought by National Semiconductor. NatSemi retained Cyrix's system-on-a-chip technology but sold its higher-end assets to VIA.

The new Cyrix III clocks 400MHz or 433MHz, but VIA rates each as equivalent to 500MHz and 533MHz Celerons. This is because they uses bus speeds of 100MHz, 124MHz or 133MHz compared with the Intel chip's 66MHz.

They will sell at around £55-£60 in volume, which is not particularly cheap. AMD has just launched a 550MHz K6-2 costing approx £120, targeted at the same budget market, but you can buy a 500MHz AMD K6-2 for about £50.

Time to wake up and smell the software

Scratch 'n' sniff CDs are expected to hit the shops soon. Sony DADC, an affiliate of Sony, has developed labels which release scents when rubbed. The smell is said to last for about a year. Sony offers several odours including strawberry, rose, hay, mint, cappuccino and pizza.

At CeBIT, NCR and Aerome showed chip-controlled cartridges that release scents in touchscreen kiosks.

JAN HOWELLS

'I wish they'd stop using those damn scented labels on the cover disc'

WAP shorts

All major phone vendors announced WAP products of one kind or another at CeBIT. Nokia showed a ruggedised 6250, and an upgraded 9110i version of its communicator platform, supporting tables, WAP and HTML browsing.

Philips won a design award at CeBIT for this icon carousel on its Xenium WAP phones.

M-SCRIPT MOBILISES INFO
A UK company has launched a software platform that lets you set up mobile information services which are independent of the wireless company delivering them.

Taskflow's M-Script version 2.0 allows data to be delivered using either WAP or the older Short Messaging Service, which is still the most used method.

Taskflow MD David Angers said the system allows you to set up services without having to do deals with individual cellphone firms. Apps can include credit-card validation, SQL database interrogation and even online auctions.

PSION WAPS UP ITS RANGE
Psion will shortly offer a WAP browser for its Series 5mx, 5mx Pro, Series 7, and Revo models.

Group seeks global sync

A standard way to synchronise data between any devices is to be developed by a group of major industry players – not including Microsoft.

The move to specify a SyncML standard is backed by IBM, Lotus, Motorola, Nokia, Palm, Psion and Starfish Software. Like XHTML (see p56), SyncML will be a sub-language of XML.

It will mean that, for instance, a Mac and a Psion could swap contacts and appointments without needing customised software. But SyncML will cover all kinds of information, including enterprise data.

Microsoft's new Pocket PC version of Windows uses proprietary Active Sync 3.0 to do the same job. But this only works between devices.

Didier Burdinat, Microsoft's CE group product manager for Europe, said the concept of SyncML was good but as far as he knew Microsoft had not been asked to join the initiative.

'We already have ways, like DCOM, for swapping information between applications. And all our products will support XML.'

He pointed out that SyncML was not yet developed. 'Active Sync is a reality. It is working now.'

But he agreed that the ideal would be to have a standard that worked across all platforms and devices. 'We will be pleased to evaluate anything they come up with,' he said.

www.syncml.org

Browser wars spill over onto handhelds

Microsoft launched a version of Internet Explorer for handhelds, in one of several pocket browser implementations.

Pocket Internet Explorer will ship pre-installed on Pocket PC (aka Windows CE) devices from Casio, Compaq, Hewlett-Packard, Siemens and Symbol Technologies.

It supports HTML 3.2, enhanced socket layer security, JavaScript and XML. Microsoft said Java applets 'may or may not be supported' depending on their complexity.

No public announcement was made on whether Pocket PC will support Wireless Application Protocol (WAP) services. Greg Levin, Windows CE marketing manager, told vnunet.com: 'We might include it as a layer.'

Pocket IE supports scrolling and zooming, allowing users to navigate pages physically bigger than the device screen size. Symbian's Quartz platform adds a third approach, by stacking frames across a page rather than at the bottom.

The fact that HTML browsing is possible on small devices has fuelled doubts about how important WAP will be and for how long (see p23).

The HTML browser on Symbian's Quartz (right) and Microsoft's Pocket Explorer

Holographic projection of 125GB storage

A breakthrough in holographic storage means removable discs holding 125GB could be on sale within two years.

The potential of the technology, which stores data in three dimensions, has long been demonstrated in the laboratory – notably by IBM. But a new polymer means it can finally be exploited commercially, Imation's European technical manager George Purio announced.

The breakthrough was made at Bell Labs, the R&D arm of Lucent. Imation is working with Lucent to create the storage media.

'We don't even know yet what shape they'll be, if they'll be spun like a disc or whether the data will be tracked in another way,' said Purio. A minimum of mechanical movement is involved.'

The new material allows data to be read and written by a fairly cheap laser, and it retains data in heats up to 55C. 'That's just the temperature we have tested it at. That doesn't mean it won't withstand even higher temperatures,' said Purio.

Early drives are likely to be expensive, and their use restricted to high-end servers.

CeBIT HANNOVER SPECIAL REPORT

Symbian's three lines of attack

The Quartz, Crystal and Pearl varieties of the Symbian platform (see p23) are, respectively, pen, keyboard and voice driven – although each may offer all three input systems. However, Symbian managing director Colly Myers refuses to speculate on which will be most successful.

'The needs of users will be many and varied, and a number of devices will be needed to meet them all. We are going to have to see which of those devices drives the market. To us, it does not matter which,' he said.

Hill believes the sky's the limit for the Symbian platform

Symbian executives genuinely seem to believe that the company is way ahead of rivals in producing an integrated Wireless Information Device platform. Myers distinguished three layers to the product:

● **The operating system layer** This comprises only five per cent of the system, but provides its robustness, said Myers. It has to be fast enough to cope with 'complex air interface protocols such as GSM and CDMA, while maintaining a reliable client operating system'.

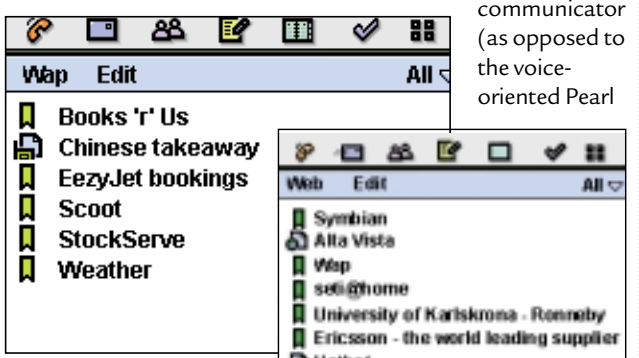
It also has to cater for three types of local link: infra-red, Bluetooth and standard serial. 'It is quite a challenge to support all that while ensuring that the user never has to wait for the system,' said Myers.

● **The middleware layer** This is by far the largest at 60 per cent. It consists of support for all the major standards such as Java, TCP/IP, IMAP4 and LDAP database access. 'This layer is where Symbian has truly integrated communications and computing. This is where the convergence is occurring,' Myers said. 'Wireless Information Devices are not simply computers with a wireless phone attached. They are truly integrating voice and computing.'

He cited the example of what he called smart messaging, where a message arriving via any link is routed automatically to the appropriate application – an appointment, for example, would go to the calendar,

● **The application layer** This makes up 35 per cent, and consists of two parts: the application engine, where the apps sit, and the user interface (UI).

It is at the UI level where the differences between Quartz, Pearl and Crystal are most evident. Different licensees will be able to add their own look and feel – but there are limits.



Vendors will be able to add their own look and feel to the user interface

Quartz product manager Martin Hill dismissed speculation that some vendors may put a Palm interface on a Symbian communicator (as opposed to the voice-oriented Pearl platform – Nokia has licensed the Palm interface).

Hill said the Quartz interface cannot be decoupled because it is too tightly bound to the way the platform works. This is task focused rather than application-focused, which means you navigate by what you want to do rather than by what application you want to use.

'With the use of the technology we have developed, called dynamic navigation linkages, the interface is moved from application to application according to the task that is selected.

'You don't even expose the user to the file system. The information is presented in such a way that its use is intuitive. You use a single tap to open anything.'

The Quartz reference design shown at CeBIT, uses CIC's Jot handwriting system, which allows you to use the whole screen. But licensees are free to choose their own.

Curiously, Psion's Basic-like OPL programming language has been dropped for Quartz, but not for Crystal. 'This was a decision we made in the early days. Obviously we are moving on into a completely new era and the decision was made to simply support C++ and Java,' Hill said.

The platforms can use either ARM or Motorola M.CORE processors.

Myers and Hill claim to have had huge interest from developers – essential if the platform is to succeed. Hill said: 'These are new and exciting platforms for third-party developers. They can take advantage of a fully integrated platform and have applications working together, and also working with the Internet, to provide – well the sky's the limit.'

Citrix and Psion have developed client software allowing Psion's mininotebook-sized NetBook to run Windows NT applications across a wireless or wired network.

CeBIT HANNOVER SPECIAL REPORT

PC CARDS

Slots herald end of PCI

A new PC Card specification called Card Bay has been drawn up in the expectation that the PC will lose both the ISA and PCI buses.

The PCMCIA association, which is responsible for the specifications, believes the buses will be replaced by USB and 1394. The five-year-old PC Card CardBus port is essentially an extension of the PCI bus, offering a transfer rate of 132Mbits/sec.

Curiously, serial links can cope better with high speeds than parallel because of timing problems with parallel – bits sent simultaneously in parallel tend to arrive at different times. 'We have got to go serial,' executive director Patrick Maher told journalists at CeBIT.

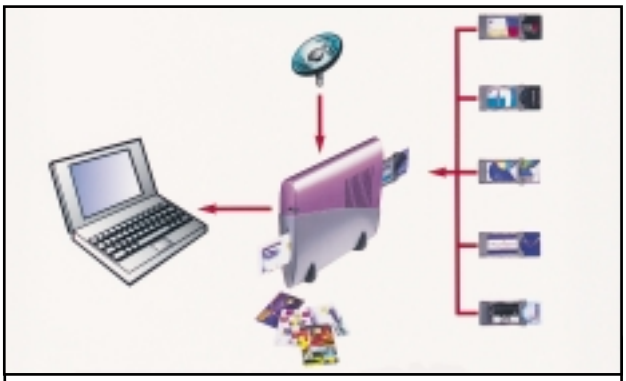
Card Bay will offer whatever data rates fast 1394 reaches – currently 800MHz. Maher said cards had been tested to 1.6GHz with no interference problems. It will also gain from the plug-and-play, hot-swappable features of the serial technologies.

Old cards will run in the new slots but not vice versa – although Card Bay cards, which will be available in each of the old Types I, II and III form factors, will not be damaged by insertion into legacy devices.

Maher agreed that the three-year-old Device Bay initiative, which also saw the PC reduced to modules linked by USB and 1394, had yet to gain momentum, but he expected Card Bay products to be on the market by late next year.

Maher also agreed that, considering the electronics of the PC Card spec was being changed so radically, there was also a case for changing the form factor into something more suitable for small devices. 'The PCMCIA has always made a priority of backwards compatibility,' he said. 'We decided to continue with that.'

However, Robert Sneider, CEO of SCM Microsystems, said: 'You are always going to need an expansion card with space to put things in... Also, if you shrink the distance between the pins too much you get crosstalk at high speeds.'



SCM showed this USB-linked St@rkey box for feeding satellite data to a PC. It is designed for companies that need to distribute information and even video streams over a wide area. At the front is a smartcard reader for identification and electronic payments; at the rear are one or two conditional access modules (CAM) that fit into PC Card slots and allow the device to access commercial services. The setup is essentially the same on set-top boxes, which by law will have to be sold on the open market like modems. The card slots allow this by catering for service-specific features. SCM says the USB link allows simple plug-and-play installation.
www.scmmicro.com

INPUT

Voice recognition within your grasp

Speech specialist Lernout and Hauspie demonstrated a prototype handheld offering continuous speech recognition.

The Linux-based handheld, using a StrongARM chip, also obeyed voice commands and read out text. It included a noise-cancelling microphone.

The colour screen on the device also supports pen input. The voice engine will search on spoken queries, such as: 'What is the weather in Moscow?'.

Lernout & Hauspie also demonstrated its L&H iTranslator Enterprise, a server-based engine for multinationals that need fast, gist-level translations of documents, email, or other text. It accepts ASCII, RTF and HTML text.

The company offers a free translation service for one-page documents at http://officeupdate.microsoft.com/services/eserviceshome.htm.

CeBIT shorts

HUSKY MERGER
UK-based, rugged notebook specialist Husky has merged with Itronix, its biggest US rival, to form what it claims is the largest company of its kind in the world.

The new company will be called Itronix, but the brand Husky will be retained on some models. The merger was announced at CeBIT, where Husky launched this rugged fex21 mini-notebook, designed to take modules which can use any RF communications technology.
www.husky.co.uk
www.itronix.com

A WIDER PERSPECTIVE
Panasonic showed off a prototype 60in plasma display with 1,366 x 768 pixels designed for high-definition TV signals.

SCOTTY BEAMS DOWN
German company Solarc showed this Scotty solar charger for mobiles. Here it is charging a Psion Series 5mx but it's suitable for other 3V devices. Details are at www.solarc.de

CeBIT HANNOVER SPECIAL REPORT

Speed increase for 56K modems

Manufacturers are preparing to ramp up the upstream speed of 56K modems from 33Kbits/sec to around 46Kbits/sec. This is a typical downstream speed for 56K modems, which rarely if ever achieve their theoretical maximum speed under the V.90 standard.

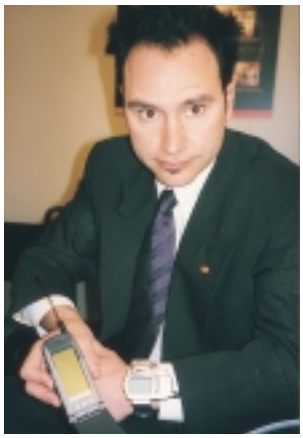
A V.92 standard specifying the new speed is being pushed by the world's top three comms manufacturers – Connexant, 3Com and Motorola. It is expected to be ratified in June, according to Connexant's regional sales manager Mourad Bedrani.

He said that existing 56K models should be Flash upgradable using downloadable software, 'but the upgrade has to be done at both ends. The service provider will have to upgrade too or it won't work. We have no idea at the moment what kind of support we will get from ISPs'.

Modems are expected to continue to be used widely for at least another five years – and longer for people who do not have easy access to broadband networks. ADSL users need to be within 10 miles of a local exchange; while cable is nowhere near matching the coverage of BT's phone network.

Connexant, a spin-off from Rockwell, claims to have taken over from 3Com as modem market leader. It announced at CeBIT a new diagnostic utility that will be bundled with modems and made available to existing users – though as yet it is unclear whether there will be a charge.

Boudrani said 90 per cent of Internet connection support calls turn out to be modem problems. 'The trouble is that most of the software people use gives little indication of what the problem is,' he said. 'Our software, which is always on, will report in detail when there is a problem.'



Rick Weber, marketing manager at Connexant, shows off a prototype communicator and wrist MP3 player, which use RF modules that support all major global standards

Cheap memory will see off mobile CDs

Three firms launched a small Flash memory format at CeBIT – and predicted that solid-state memory will replace CDs and other mechanical storage on mobile devices within five years, as prices drop to a tenth of current levels.

The new Secure Digital (SD) card format, jointly developed by Panasonic, Toshiba and SanDisk, will compete with Sony's memory stick. SanDisk. President Eli Harari predicted that Flash prices will drop by 20 to 30 per cent a year, as capacities soar to the point where entire movies can be held in memory cards. 'It will be like Moore's law [for processors],' he said

The new SD Card uses copy protection adapted from that used on DVD, and is designed to comply with current and future Secure Digital Music Initiative (SDMI) requirements.

Initial capacities, available later this year, will be 32MB and 64MB, while 256MB cards are planned for next year. Harari claimed the technology already had considerable support both from content providers and the IT industry.

Seinosuke Karaku, MD of Matsushita Europe, demonstrated a wristwatch that plays music held on an SD card. 'People will be able to download music onto their phones or watches. This creates completely new business models for selling music,' he said.

SanDisk and Toshiba were also jointly developing high-capacity memory chips. They expect to offer 1Gbit chips by 2002, 4Gbits by 2005 and 16Gbits by 2008.

The SD spec aims for a write speed in 2001 of 10Mbytes/sec, about the same as today's hard disks and fast enough for video, said Harari.

He expects SD to co-exist with memory sticks. 'But they are proprietary technology and will be used mostly in Sony products.'

Several other companies have welcomed the SD format. Hubertus von Janecek, marketing manager of Micronas – which claims its chip is at the heart of nine out of 10 MP3 players – said the memory would provide a standard platform for designers, simplifying the signal-processing silicon.

An SD Association has been formed to promote their use. The cards are the size of a large postage stamp (24 x 32 x 2.1mm), and are designed for small devices like cellular phones. SanDisk expects Compact Flash cards to be used on larger devices.

But Sony too has partners for its Memory Stick. It is working with Intel on interoperability between PCs and mobiles.

Sony launched this successor to the mechanical Walkman in Europe and it should be in the shops by the time you read this. It stores two hours of music on a 64MB Memory Stick. Memory vendors say solid state players like this will oust mechanical models within five years

OPERATING SYSTEMS

Tim Bajarin sees Microsoft trying to honour an old promise and spread its OS to anything digital.

World domination for Windows?

About five years ago I attended a now-famous meeting of analysts at Microsoft's headquarters in Redmond, Washington. Bill Gates had just seen the light and declared that he planned to integrate Internet Explorer into Windows and would develop Internet applications that fully utilised the power and features of his operating systems.

Gates did just that, burying Netscape in the process and finding himself in hot water with the Justice Department. Microsoft officials told me privately at that meeting about two other Windows projects: one was CE for mobiles, and the other was a Windows version for TVs and digital appliances.

Microsoft was clearly aiming to put a version of Windows on anything digital. To date, its success in this area has been minimal. CE acceptance has been weak and a rumoured consumer OS for appliances has yet to materialise.

However, it appears that a whole host of new Windows versions is in the pipeline for this year and next. The first to see the light of day was Windows 2000, which is really NT5. This is expected to be a big hit in businesses already running NT or those which are finally ready to upgrade from Windows 95.

Win2K already has a reputation for being quite stable and its battery and screen management make it an important upgrade for laptop users who do not plan to run 3D games.

Windows Millennium Edition, a successor to Windows 98, is due later this year and is also designed to boost stability.

More important is the version codenamed Whistler, which will finally unite the consumer and business desktop versions of Windows.

This stems from an effort to streamline development by combining separate projects – codenamed Neptune and Odyssey – for the next-generation consumer and business products in the NT line.

So by late 2001, a new Windows that has many of the benefits of NT yet is very consumer friendly, should hit the market.

Key features of Whistler will be its integration of technology for controlling sound, MP3, video, animation and speech. Microsoft assumes most US users will have access to a bandwidth of 384Mbits/sec, and demand for applications that take advantage of these speeds will be key to the power of Whistler.

Combining Neptune and Odyssey is no trivial matter and perhaps the 2001 delivery date is optimistic. However, these new versions should be very stable and deliver fewer conflicts between applications, dramatically reducing the number of crashes. Whistler will offer better battery and screen-management features and will be optimised for use on traditional laptops.

At the mobile level, Microsoft will soon release a new OS around its revamped PDA reference design. The name CE is dropped for this OS in favour of the Pocket PC platform (see this month's PDA group test p212). The OS is much easier to use and configure than the original CE, which was poorly received in the market.

This new OS is much more expandable through industry standard Compact Flash or MMC and allows for easy delivery of Windows Media Player and MP3 formats within this handheld PC environment. It also includes Microsoft's ClearType reader and audible integration, so that users can download written and audio books for use on PDAs.

There is another OS in the works that is focused on the company's PC/TV platforms, with a version specifically designed for its Web TV product first on the list. This OS is also based on CE code but is said to have a much easier to use interface, allowing for much more control of TV data and video content within the TV screen and interactive menus.

The new OS for use in set-top boxes and PC/TV combos will debut later this year in Web TV and through other cable partnerships by early 2001. And various versions of Windows CE designed specifically for Internet appliances, such as the one on its recently announced Web Companion, will soon find their way into web phones, web pads, refrigerators, toasters and many other devices in this category.

So, when Gates says his strategy for Microsoft is 'Windows everywhere', it is not hard to see that he is well on his way to delivering on this promise made many years ago and just now starting to take real shape.

CE you later... Compaq's Aero 1500 and 2100 running Windows CE. The CE brand has been dropped for this type of device and Microsoft is about to launch a new version called the Pocket PC OS

CONSUMER NEWS

PCW reveals web-pricing trap

Buyers are being charged different prices for the same PC at Gateway and Dell websites, depending on whether they register as a business or home user, a *PCW* investigation has shown.

In February, we were given prices on two Gateway systems: the Performance 500, aimed at the home user, and the GP7-500 aimed at business. Both featured identical components: a Pentium III 500MHz, an 8MB ATi Rage 128 graphics card, 17in monitor and a Quantum 10GB hard drive. Both used the same motherboard, case and had the same software package and warranty.

The Performance 500, at £699 ex VAT, cost £20 less than the GP7-500 – despite the fact that the cheaper home system also came with a modem, sound card and speakers. When we entered these features into Gateway's online price configurator the GP7-500 came up as £790 ex VAT, a difference of £91.

Gateway put the discrepancy down to the fact that its business and consumer divisions are run separately, with different pricing. Product manager Jason Glover said: 'We are implementing a new pricing model for the GP-7 series and you will see less of what you have identified. If the customer had called our sales representatives, they would have been directed towards the best value model.'

The objective of having online ordering, though, is that the customer does not call the sales team. Pascal Boret, PR manager for Gateway Business, claimed that we 'could go to any other manufacturer and get the same results'.

Sure enough, at rival Dell's site we found a similar discrepancy – this time in favour of the corporate user. An XPS T600 Value Multimedia System was priced in Dell's business area at £849 ex VAT. The 600MHz Pentium III system is similar to the XPS T600 in the home and small-office section. We brought this up to the spec of the multimedia system by adding a matching DVD drive, sound card and speakers, and the price worked out at £937 ex VAT – £88 more than the identical machine.

Dell claimed at first that what we had done was impossible, but recognised it could happen in certain circumstances. Annette Condon, product PR manager, said Dell tries to configure systems appropriate to customers looking at particular site areas; adding components to a basic spec could prove more costly than choosing another model. She suggested in this instance that customers 'should look at the other bundles that are available and more richly configured'.

It seems you can't trust web-configurator software to offer you the best deal and that you should compare prices, not only from different companies, but also from different departments.

JASON JENKINS

16bit cards top sales

People are buying 16bit rather than 32bit PC Card devices by a ratio of about six to four – even though they are slower and drain batteries faster, according to the new head of Portable Add-ons.

Managing director Steve Muttram said: 'This may be because there were problems with 32bit cards when they first came out, but these have long been cleared up.'

Muttram was launching a TruePort range of Type III PC Cards which use standard, low-cost sockets and cables, rather than fragile, expensive proprietary connectors.

They are RealPort designs licensed from his previous company Xircom.
www.portable.co.uk

HACKING

DDoS attacks have succeeded the virus as the biggest threat to Internet life, reports David Rae.

In a state of denial

While the majority of us were celebrating the new millennium with too much champagne and the odd cigar, intruders were busy installing Distributed Denial of Service (DDoS) agents on hundreds of compromised hosts.

It turns out that these agents were used to launch simultaneous devastating, and ultimately crippling, attacks on large mainstream websites.

Research suggests that the DDoS attack has reached such heights that it is even beginning to surpass the virus as the Internet's most deadly force. A study carried out by the Yankee Group (www.yankeegroup.com) claims that DDoS attacks were responsible for £750,000 worth of damage during a single week in February this year.

There are a multitude of DDoS techniques, all of which work in a similar way. They take over the resources of what can, conceivably, be thousands of host computers, in order to flood the available bandwidth of a target system or network. The more sophisticated programs also include corrupted packets, in an attempt to crash computers as well.

The Smurf attack is undoubtedly the most frequently used DDoS technique. A simple program scans the Internet to locate routers that will allow access to broadcast pings (a simple DOS command). These routers can then be attacked using any number of already hacked hosts – a surprising fact is that even your home PC is likely to have been attacked at some point, unless you have a security policy in place.

This is the general way in which all DDoS attacks work. But the program that brought companies such as Yahoo! and Amazon.com to their knees recently is an entirely different beast.

Tribal Flood Network (TFN) is a program written by a cracker known only as Mixter. It uses Unix-type computers to carry out an ICMP (Internet Control Message Protocol) flood, a SYN flood, a UDP flood, as well as Smurf attacks against an unsuspecting target. Worryingly, it also creates a back door with root (full administrator) permissions on the attacking computers as well.

Other DDoS attacks that are widely available, and widely in use, include Trin00 and Stacheldraht. In one instance more than 100 Stacheldraht hosts were connected to a targeted computer at one time, which would bring any network to a standstill.

Coding for DDoS attacks is complex, but worryingly the writers will more often than not post their programs on the Internet for free and easy download. This means that people with little or no hacking skill can easily launch devastating attacks.

We are all collectively responsible for the security of the Internet, and it is therefore up to us to ensure that our own systems are immune to the threat of being used as a host. There are a number of measures that you can take:

- Ensure that you keep up to date with all the security advisories and patches which are relevant to your network or PC, as most DDoS attacks use vulnerabilities that are well known. You can do this by subscribing to a number of security mailing lists, including the SANS Institute (www.sans.org) and CERT (www.cert.org).
- Make sure that you implement ingress filtering on routers. This will check whether incoming packets are from a legitimate, global IP address – if not they will be discarded.
- There are a number of tools available on the Internet which can help you detect, analyse and eliminate distributed DDoS components that may be installed on your network. To detect trin00, Stacheldraht and TFN attacks – as well as a number of other DDoS intrusions – visit www.fbi.gov/nipc/trinoo.htm. Another, called RID, can be found at www.theorygroup.com/Software/RID.
- Ensure that you have contingency plans for system outage. DDoS attacks depend on the security of the whole Internet, rather than that of just your network, or system.

One thing to remember is that if your computer is being used to launch one of the more dangerous DDoS attacks, the person responsible has full access to your system. They will be able to read your email, and any correspondence you may have when reporting an incident. Use a different system, otherwise they will always be one step ahead.

The best case scenario is that your system will be sufficiently secure so that no-one will be able to gain access in order to install remote DDoS agents. However, the next best case scenario is to be able to detect these tools on your system before the perpetrator is able to use them to any effect.

Ensuring that your systems are secure and immune to the DDoS attack will greatly reduce the number of options available to the growing number of what can only be described as cyber-vandals.

See also our feature about teenage hackers on p144.

The Firebox Soho from WatchGuard won't prevent a DDoS attack on a router, but it will stop your computer being used as a launch pad, according to the company – see story opposite

Time was when kids collected cigarette cards with pictures of football stars, which was as good a way as any to introduce them to a drug that has killed more people than Ghengis Khan. Now a company called Max is trying to update the tradition (the collecting, not the killing) by offering mini-CDs featuring leading players and clubs. Details at www.maxmm.com

SECURITY

Firewall products boost

The distributed denial of service (DDoS) attacks which shut down several major websites recently were a godsend for two firms that launched security products at the height of the scare.

Symantec and WatchGuard both claim they can prevent your PC being used as a launchpad for an attack (see opposite). More to the point, at a personal level, is that they are designed to stop hackers getting the run of your hard disk.

The issue was likely to become increasingly important, even discounting the DDoS scare, as always-on connections become more common, because without some form of firewall, these can leave your electronic front door always open.

Symantec's Norton Internet Security 2000 sets up a software-only firewall, as well as providing parental control of surfing, and virus protection. It costs £49 ex VAT.

WatchGuard, which normally specialises in large-scale corporate security, launched the Firebox Soho (from £325) for offices and the Firebox Telecommuter (from £465) for people working from home. Both can cope with DSL, cable or ISDN links and consist essentially of a hub and firmware, that can be updated automatically to cope with new threats as they develop.

Both products offer virtual private networking and Internet sharing.

www.symantec.co.uk
Wick Hill (Watch Guard distributor): 01482 466500
www.wickhill.com

Cookies crumble under new law

A new UK law will allow you to sue companies that drop 'cookies' into your PC to track your surfing activities without telling you.

Dai Davis, head of the IT Group at law firm Nabarro Nathanson, said the updated Data Protection Act means cookies must make clear what information has been collected and how it is likely to be used.

He believes this will put UK etraders at a disadvantage to those in countries such as the US, where cookies are legal – but increasingly controversial.

James Roper, chief executive of the Interactive Media Retail Group, agreed. 'Serious companies... cannot break the law, so they will try to do it properly at a great cost.'

He claimed: 'Demanding transparent use of cookies is like forcing Ford to state how its carburettor works each time it sells a car.'

But Keith Mitchell, chairman of Internet hub the London Internet Exchange (Linx), said: 'Privacy protection in the US is inadequate. There has been abusive cookie use and transparent use of cookies will promote users' confidence in ecommerce.'

The updated Data Protection Act 1998 could cause other problems. It imposes penalties, for instance, on businesses that send personal data to organisations exempt from EU standards.

A survey by security specialists Content Technologies and CenturyCom showed nearly eight in 10 blue chip companies were unaware of the issues.

'Email is where companies are most likely to get caught out... it is essential everyone is made aware of what their responsibilities are with regards to data security,' said Clive McCafferty, managing director at CenturyCom.

VNUNET.COM

MILIA 2000

Tim Nott reports on the latest attractions and winners from this year's multimedia film festival.

The film's in the Cannes

It takes guts to say no, but your correspondent sadly had to miss the launch of Windows 2000 at Earls Court, London because of a prior engagement in Cannes. Milia 2000 is the multimedia equivalent of the film festival, and star turns included the French Minister of Culture and Communication, Catherine Trautman, soccer star Ronaldo and a rather bemused camel called Chocolate. All these were somewhat upstaged by a radio-controlled iMac-on-wheels that trotted doggily at the heels of a group of enterprising Hungarian journalists.

Milia is three events in one – there's a think-tank for the great and good; a trade show bringing distributors and content providers together; and the Milia d'Or awards. However, three things really stood out at this year's show. First, there are even more games, with console makers – regarded as upstarts a few years ago – showing a heavy presence, and the French giants such as Infogrames and Ubisoft well in evidence. The former announced a move into in-flight and mobile phone games. The latter announced a deal with Disney for a multi-platform release based on the forthcoming *Dinosaur* film in which 'you play the role of an iguanodon with a destiny'. Eat your heart out Lara.

Second was a lot of broadband content – video, games, interactive TV – looking for an infrastructure. Limited availability of ADSL in the UK and Europe, means this will be staying on the wishlist of those who don't live in one of the privileged trial cities.

Above: Silvertek's Ekids – a safe place for children online, where the jigsaw pieces can't be swallowed Right: Close, but no cigar: Inspector Morse teaches English on DVD

Security was the third big issue, with a plethora of exhibitors offering copy-protection techniques for all media, and basking in the words of the president of the Motion Picture Association of America, Jack Valenti, who recently told the US Congress that 'the television industry is braced for an avalanche of net piracy'. Again, not at 56Kbits/sec, we think. Others were more sanguine, with music producer Martin van der Schagt suggesting that 'prices must drop to an acceptable level so that it is not worth copying or buying illegal products'.

With a strong paranoid streak already established, capitalising on the terrors of the Internet was a sure-fire winner. Silvertek, which makes 'private internet networks' (sic) came up with schlock-horror stories such as that of the woman who 'lost her identity on the Internet'. Quite how she achieved this (or what it meant) we weren't told, but it got us all in the right mood to 'worry about the children', which was the point of the exercise. Ekids provides a subscription-based 'walled garden' where children can play, learn and communicate online in safety.

As ever, the New Talent section offered the most interest, with Hakari Bee offering a CD-ROM of 'Instant Social Life' where a choice of five characters take turns to cajole, harangue, seduce, lay guilt on, and be frightened of the user. Bee is a student of the Pratt Institute of New York – and I am not making this up.

Rather more exciting – and superbly elegant – was Lo, a handheld device developed for students by students at Carnegie Mellon University. The circular core provides display and writing input, and serves as a docking station for other wireless modules that include camera, phone headset and GPS. All interact in an intelligent way, so if visiting the library is on your 'to do' list the GPS module will squawk as you near the building.

Everybody, it seems, wants to learn English and a package which helps you do this with the help of Inspector Morse narrowly missed an award in the DVD-ROM category. The winner in this rather uninspiring race was a German World Atlas, and in DVD video, *Taxi Driver* – Collectors' Edition. The UK clothing store Ted Baker and the French media and electronics retailer FNAC both won ecommerce awards, and the Australian National Institute of Dramatic Art took the education award with StageStruck – a CD-ROM for aspiring actors and directors. Staying within the field of culture, the US won the interactive television award with Frank Lloyd Wright (narrowly beating the Pantene ITV Personalised Hair Consultation) and the Dutch company, Softmachine, took the reference award with a beautifully crafted CD-ROM of the Anne Frank house.

The biggest surprise was the Grand Prize for best home software going to Sigmund Freud – Archaeology of the Unconscious, from the Austrian company, Nofrontiere. On more familiar ground, Havas Interactive took three awards with its Half Life action shoot-fest. One wonders what Freud would have said about charging around in an imaginary world looking out from behind a large gun.

HANDWRITING RECOGNITION

Clive Akass investigates the three 'R's of pen-input systems – read, write and recognise.

The write kind of recognition

My millennium prediction (*News*, February) that handwriting will sooner or later need to be reinvented to suit computers is already being challenged by a British product. NScript will enable handheld organisers, mobile phones and other devices to read normal handwriting, according to its Cambridge-based developer NeuraScript.

The product currently runs on Windows, but a Java version is imminent and other ports are planned. It is being offered to device makers for use in products, but a standalone version may also be sold.

Graffiti, used on the market-leading, pen-driven Palms, is the only general-purpose, handwriting-recognition system to gain mass acceptance so far. It uses a script that is very close to the standard alphabet and you have to write it in a particular part of the screen.

CalliGrapher, as used on Philips' discontinued Nino, attempts, like NScript, to read normal handwriting and has some users, but is far from accurate (certainly with my challenging scrawl). Both products recognise whole words rather than individual letters.

NeuraScript's previous products in this line used form-based handwriting recognition, where responses lie within a predictable range. The company is a spin-off from NeuraDynamics, which specialises in pattern-recognition techniques, including neural nets.

NScript uses an arsenal of techniques, including an analysis of how characters are written. 'We note how they are formed, where the stroke was started and where it went,' said technical director George Harpur.

NScript uses the redundancy within written words (ie the words actually contain more information than you need in order to recognise them) to read them even when parts are indecipherable. Humans do this too, which means, ironically, that redundancy is also part of the problem. 'People write shoddily because they can get away with writing shoddily,' said Harpur.

However, we can also misread our own writing, so no software is going to be 100 per cent accurate. This means that correction facilities are crucial for making a product usable. Arguably, Apple's pen-driven Newton would have hit the runaway success of the later Palms if its designers had realised this: users of early models drove themselves mad trying to correct mistakes.

'You need some kind of fallback,' said Harpur. 'You can offer users a choice of words if the software is uncertain about a word. You can also use a soft keyboard.'

Harpur believes that redundancy would make the creation of a machine-readable shorthand very difficult. 'The trouble is that shorthand reduces redundancy to make writing quicker. You can make sense of most sentences by leaving out the vowels. But software needs that redundancy to help it recognise words.'

To me, this argues for starting from scratch with an unambiguous script. I suggested that it would be very easy to create one that could be read by the simplest of software. Harpur believed that it would be slow to write and difficult to popularise. 'If you get to the point where you are 99.5 per cent accurate at recognising normal handwriting, you don't need another script,' he said.

Harpur was not claiming anything like that kind of accuracy for NScript, but you will soon be able to judge for yourself. Products using it should start to ship next year.
www.neurascript.com

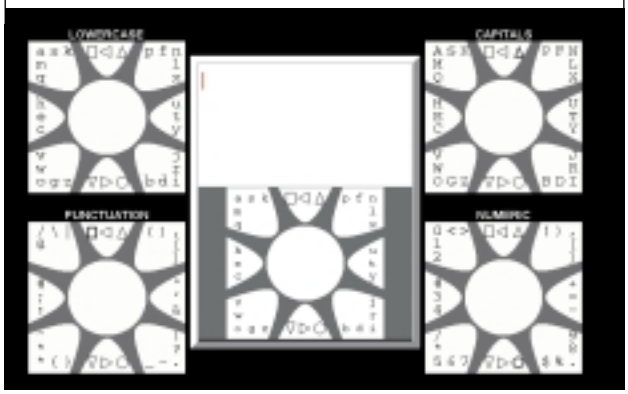
Zonal writing: an alternative to recognition software

Reader Chris Mear told me about an interesting input system called Quickwrite, developed by Ken Perlin, associate professor at New York University's computer science department. It allows you to write without taking your pen from the touch-screen.

A Palm version is downloadable from his site at http://mrl.nyu.edu/perlin/, where you can also try out the Java demo pictured below. You 'write' using the lower centre screen, which splits the alphabet into six zones of three or five letters. The upper and lower central zones provide access to capitals, numerals and other special characters that are drawn on the surrounding screens.

The basic rule is simple: you access the central letter of each zone simply by taking the cursor from the centre into the zone and back; you get letters immediately to the right and left of the central one by taking the cursor into the respective adjacent zone before returning to the centre; similarly, the outer two letters in five-letter zones are drawn by crossing to the respective second adjacent zone before returning to the centre.

It's actually less complicated than it sounds when you do it, although I've only tried the Java demo and haven't tried it in practise. I'd be happy to hear from anyone who is using this or any other alternative pen-input system in earnest.



UK users ignore British dotcoms

British companies that register their sites as a .com domain could be losing out in the home market, says a new study.

More than four in 10 UK users avoid visiting .com sites on the assumption that they are based in the US, with possible delivery and currency problems, says the study of 140 users by the consultancy Usability by Design.

Director Graham Bunker warned: 'Many companies based in the UK are taking on a .com address because they feel it gives them a global appearance, but they could potentially be losing out.'

The domain has become so well known that 'dotcom' has entered the vernacular as a word meaning a web-based company.

Play the banja

The French company CHmaN has set up an international adventure gaming site at www.banja.com, in which players can navigate through a 3D world. New zones will be created each month.

WEB

HTML successor released

A new web standard looks set to ease out HTML, the simple page description language that transformed the daunting text-based Internet of old into friendly graphical browser territory.

The proposed new XHTML 1.0, just published by the World Wide Web Consortium (W3C), defines the most recent HTML version 4.0 as an Extended Markup Language (XML) sub-language.

HTML cannot cope with the demands now being placed on it, particularly by ecommerce, because it has no natural affinity with the databases that feed information into sites.

XML, which includes metadata (data about data), is designed for exchanging structured information. It also facilitates searches, because it can distinguish types of information: 'used-car prices' can be a data set as opposed to a search string.

An XML application (one that uses XML information) can set its own style for displaying data types: the same data may be displayed as, for example, a simple table, a card-index or a map.

XML allows you to develop specialist sub-languages, usually by means of what are called Document Type Definitions (DTD). An example is WML, part of the WAP protocol, which feeds information to mobile applications for display on small screens. XML is thus a way of disseminating the same data to a variety of devices.

This versatility means XML will eventually replace HTML. The W3C sees XHTML as a bridge between the two, allowing big content owners to move towards XML without having to trash their investment in HTML.

XHTML defines three DTDs for HTML 4.0, and more are likely to follow, to prevent a proliferation of proprietary definitions.

HTML browsers and XML applications will both be able to interpret XHTML. But XHTML is less forgiving than HTML, with the kind of strict syntax demanded by programming languages. For instance, XHTML insists on both opening and closing tags – whereas an HTML browser will tolerate, say, paragraphing that uses only opening tags but not closing tags. XHTML is also case sensitive.

Janet Daly of the W3C, said HTML can cope with the presentation but not the structure of data. XHTML would help to create a 'universal information space in which all devices can be equal'.

The specification for XHTML is available at www.w3.org/TR/xhtml1.

Magnetic chips pack super-PC power

A new generation of magnetic microchips will fit 250,000 million transistors into a square centimetre, compared with a maximum 6.6 million in current chips, researchers say. Professor Mark Welland, of the University of Cambridge's Engineering Department, believes the magnetic chip he developed with research fellow Russell Cowburn will be up to 40,000 times more efficient than today's chips. Size and energy consumption are the two major areas of difference.

The researchers have already demonstrated a device that can fit 5,500 million transistors per square centimetre. The new chip uses magnetic fields to represent and process information and future applications will power a completely new type of computer, making redundant any bulky desktops or the heavy laptops we carry around now.

'People will laugh at what we use today when they view them in the Science Museum in a few years' time,' said Welland, who teaches nanotechnology. 'Instead we'll have a computer that does everything and handles anything, from being our mobile phone to holding currency units. It will have a high-quality screen and be an effective way of communicating.'

Development will be costly and chips may not be available commercially for some years. 'To get this out into mainstream silicon we are looking at a billion-dollar enterprise,' said Welland. But he does expect to find niche markets for the chip in the next year or two. Talks have already started with some leading manufacturers.

Welland points out that it took 65 years for the first transistors to develop into today's Pentiums. 'This is a completely new way of processing information that hadn't been thought of before. Current technology is getting smaller, but by smaller and smaller jumps and we are reaching a limit.

'This [new] chip uses the interaction between tiny magnets to represent the digital ones and zeros. If you imagine a tiny magnet like in a compass, which can either point up or down going to north or south – it doesn't rotate. It's the magnetic properties which rotate.'

It is this lack of physical movement at the nanometre scale that enables the chips to be so small. Also the fact that the chips operate on magnetic fields rather than current flow means that they will draw much less power.

Welland believes in a future where chips will use magnetic processing for specific tasks such as pattern processing. A magnetic chip in the washing machine could read bar codes on clothes to see how much detergent is needed for a washload.

'Things we take now to be dumb, we will make intelligent,' said Welland. 'It will make everything easier to use – by incorporating intelligence into even the simplest thing.'

Caroline Swift  ***reports from Silicon Fen***

High-end mobile specialist Tadpole Technology says its fastest-yet UltraBookII has 'four billion times the capacity of Windows'. It turns out that by this the company means roughly the difference between the address space of the 64bit Solaris operating system and 32bit Windows. Considering that it has 'just' 1GB of memory, this seems to be stretching a point (especially as we will shortly be seeing a 64bit version of Win2K). But weighing 3.4kg and powered by a 440MHz UltraSPARC-II processor, it still looks a desirable machine.
www.tadpole.com