contents

New chips ignite processor wars

Two chips from secretive startup Transmeta have redrawn the battlelines among processors set to power next-generation mobiles.

The Crusoe TM3120 and TM5400 were launched on 26 January after months of rumours. Interest was high, as Transmeta employs Linux guru Linus Torvalds.

The Crusoes use a Very Long Instruction Word core and cut their transistor count by performing in-software tasks usually hardwired into processors. On-the-fly clock and voltage switching saves further power.

Crusoes use less power than Intel's battery-saving SpeedStep technology, but their commercial viability will be unclear until system builders test them.

The 0.22micron T3120 will run a special 'mobile Linux' and is designed for palmtops and web appliances. The 0.18micron TM5400 has 256KB on-chip cache and is designed for notebooks.

Both chips pack PCI and 66/133MHz SDRAM controllers; the 5400 also has one for emerging DDR DRAM, clocking 100MHz to 167MHz. Neither includes graphics or audio support – unlike NatSemi's rival Geode chips.

S3, which is designing a multimedia chipset for the Crusoes, has built a TM3120-based web pad that it says lasts 12 hours per charge.

NatSemi questioned the claimed savings of cost and power. Jürgen Heldt, European marketing director for information appliances and networks, said: 'You have to look at the total system.'

This means factoring in the cost and power drain of graphics and audio support, the 16MB of dedicated RAM Crusoes need for software operations and the Flash ROM holding the translation code.

Heldt said processors didn't affect total system power as much as Transmeta estimates (see page 39) and claimed NatSemi's new 0.18micron Geode GX1, sampling in June, would have a 2w edge over the Crusoe TM3120.

Crusoes in detail – pp 38-39
Mobile Linux arrives – p30
SpeedStep Notebook – p86

LOW POWER *rivals*
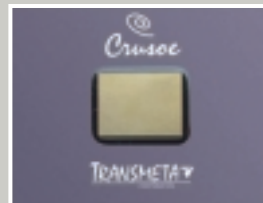
TM3120
The Crusoe T3120 pictured above will come in two speeds: a 333MHz at £41 and a 400MHz at £56. Speeds of its sibling TM5400 will range from 500MHz to 700MHz costing between £75 and £206.

StrongARM
Later this year Intel will bring out a version of StrongARM at speeds of 150MHz to 600MHz, consuming between 40mw to 450mw. Supported operating systems include Epoc 32, Java OS and CE. Intel refused to comment on Crusoe, but UK-based ARM, which designed the StrongARM core, said the chips were targeted at different markets.

NatSemi Geode
NatSemi's system-on-a-chip Geodes, costing around £25, are designed for the kind of Windows or Linux-based mobiles targeted by the Crusoes.

One Windows for all

Windows looks set to converge into a single speech-driven product as a result of changes at Microsoft, which have seen Bill Gates step down as president.

The company originally intended to merge the 9x and NT lines into Windows 2000, which would give it one code set to work on and would be less confusing for users. Also only one set of drivers would be needed, eliminating the problem of devices working with one version of Windows and not the other.

But the sheer complexity of Win2K proved too much, and a new road map was drawn that led to the release last year of Windows 98 SE. This was to be succeeded by another 9x upgrade this summer called Millennium.

Windows 2000, finally launched on 17 February, was to get a consumer version called Neptune; and an upgrade to the corporate version, codenamed Odyssey, was already being planned. Now Microsoft has confirmed US reports that these two projects have been combined into one – called Whistler.

Millennium will go ahead – as we went to press a report said it will ship on 26 May. A Microsoft spokesman said it was too early to say if Whistler would kill off the 9x line, but it was a possible outcome.

Upgrade aid – p22.
Microsoft in crisis – p40

▮▶ **EASY UPGRADE**

Companies can ease the transition to Windows 2000 with the aid of a new utility called Desktop DNA, according to developer Miramar. The utility enables desktop settings and other configuration details to be preserved in the upgrade. Each user is presented with a wizard, enabling them to choose what features they want to keep.

Network administrators can then perform multiple automated upgrades. The idea is that users can return to their desk after an upgrade, with all the important features of their setup working just as before.

Miramar CEO Neil Rabin says that DNA version 2.0 is the only system of its kind to support upgrades from Windows 95, 98 or NT.

www.miramarsys.com

▮▶ **ANGER MISMANAGEMENT**

One in two users questioned about PC rage admitted reacting to problems by either 'abusing colleagues, hitting the computer, screaming, shouting or hurling parts of the PC.' Symantec, which conducted the survey in 316 small businesses, says it shows PC rage can have 'a detrimental effect on our working lives.'

However, a study by The David Lewis Consultancy says computer use, in particular violent games, can reduce stress levels by allowing people to get rid of their pent-up tensions. Its researchers measured the blood pressure and heart rate of 12 men and found computer games reduced stress levels.

David Lewis claimed: 'It is nonsense to blame computer games for encouraging violence and aggression. Games such as Quake or ones of that genre can act as a cathartic release.'

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DIGITAL CAMERAS

Pixels hit new heights

A flurry of 3.3 megapixel digital cameras has been launched after more than a year with definitions static at 2.1 megapixels – once considered by some industry leaders to be the maximum needed by consumers.

The new models offer image sizes of 2,048 x 1,536 pixels, compared to the 1,600 x 1,200 images of 2.1 megapixel models. This allows slightly larger prints to be made, but you won't fit as many images on the same memory cards.

First to launch was Canon with its S20 compact, essentially a 3.3 megapixel version of its S10. The S20 weighs 260g, features a 2x optical zoom, USB interface and 16MB of Compact Flash memory in a CFll slot, also capable of taking an IBM Microdrive hard disk. The S20 is due in April, but the price has yet to be confirmed.

Nikon's new 3.3 megapixel CoolPIX 990 (pictured) shares the split swivel design of the CoolPIX 950, but has a gunmetal finish and a smaller screen – down from 2in to 1.8in. It boasts a new iris-style aperture diaphragm, 3x optical zoom and a USB interface. The Compact Flash slot has made the welcome move from below the camera

(where it was originally blocked by a tripod on the 950) to the side, but sadly this is not CFII-compatible.

The 990 also takes a few leaves out of the CoolPIX 800's book (reviewed last month), with the Best Shot Selector mode and improved battery life. The 990 will be available in May for less than £1,000, but will not replace the 950.

Fujifilm made the most exciting announcement with news of the first two cameras to feature its Super CCD design, using a honeycomb of interwoven octagonal pixels – which Fujifilm claims improves resolution, sensitivity and signal-to-noise ratio. The FinePix4700 Zoom has 4.3 megapixels (2,400 x 1,800), 3x optical zoom, USB interface, 16MB of SmartMedia and uses two AA batteries in a 255g package, costing £699 from April.

The FinePix S1Pro, featuring 6.1 megapixels (3,040 x 2,016), has an SLR body that can take Nikon F-mount lenses, and has SmartMedia and CFII slots, for £2,500 from July.

Sony was set to preview 3.3 megapixel models as we went to press, but no details were available.

GORDON LAING
www.canon.co.uk/products
www.nikon.co.uk/cool990.htm
www.fujifilm.co.uk/di
www.sony.co.uk

The hidden cost of cut-price cigs

People buying cut-price cigarettes from non-British sites on the Internet face hefty import charges, Customs officials warn.

Sites on the continent have been offering familiar brands at a fraction of their cost in Britain. But one man who bought 1,000 Marlborough for £100 from a Greek site, faced a bill for £180 from Customs.

A spokeswoman said there were sites in Belgium, Greece

Sites such as this one in the US sell cheap cigarettes, but watch the shipping costs

and elsewhere targeted at British buyers. 'We know where these sites are and we know the kind of packing they use. People should be warned they could pay more than they think.'

But Customs officials are having a harder time trying to crack down on sales of hashish and marijuana from sites in Holland, where the drugs are tolerated, according to reports.

Trade officials admit that collecting taxes on goods bought over the web will be an increasing problem – with no easy answer.

STORAGE

IT giants agree cheap RAM

Five major memory manufacturers and Intel are thrashing out an architecture for affordable RAM that can cope with the speeds required by emerging fast processors.

Conspicuously absent from the project as announced was RAMBUS, whose fast memory modules have long been promoted by Intel as the way forward for high-end server systems.

But RAMBUS modules are far more expensive than rival technologies, and lost credibility last year, following problems with Intel's supporting 820 chipset. PCs using the 820 are now shipping, but they support a maximum of two RAMBUS modules instead of the four originally specified.

The problem seems to have stemmed from the fact that manufacturers did not keep within RAMBUS' tight tolerance levels. Memory makers, motherboard manufacturers, and PC makers have been calling for a simpler, cheaper solution – particularly one in which they don't have to pay considerable royalties to RAMBUS.

Samsung, Micron Technology, Infineon, NEC and Hyundai, who between them make seven out of 10 of the world's memory chips, have formed a committee with Intel to agree a specification for advanced DRAM technology (ADT). First products to use it won't hit the market until about 2003.

RAMBUS chips are still expected to be used in high-end servers, and emerging Double Data Rate (DDR) RAM will help cheaper systems keep up to speed.

Robert Allen, European technical support manager for memory specialist Kingston, said it was the first time Intel had joined a memory consortium of this kind.

Referring to the problems with RAMBUS he said: 'I think they are looking for something easier for people to bring to market.' But he pointed out that RAMBUS was free to join the consortium if it chose.

Holo-storage will oust hard disks

IBM is developing holographic technology in which storage will be measured in yottabytes – or two to the power of 70 megabytes. It claims hard-disk capacities will peak at 100GB within five years, creating a need for higher capacity fast storage.

Bill Cody, a senior research manager at IBM's Almaden Research Center in California, said the world needed to store 81,000 terabytes in 1995 at a cost of 21p per MB, this rose to 800,000 by 1999 at a cost of 3p per MB; by 2001, six million terabytes will be needed, costing just 0.4p per MB.

'Some 85 per cent of the world's data is currently unstructured and is not accessible using storage technology,' he said. 'But at 0.4p per MB, storage can compete with paper and film.

You have been warned… ease off on the gas pedal. This Racal Messenger number plate-spotting system uses a Fieldworks FW7000 from Rugged Systems (020 8408 8000) and software from Cambridge-based Neurodynamics.
www.neurodynamics.com

Free help for number update

Two free utilities are on offer to help computer users through the big phone number changes, which begin on 22 April.

Impreza is offering an update utility for Microsoft Outlook on its website at **www.imprezacomp.com**.

Users of Psion and Ericsson handhelds based on the Epoc operating system can get a utility called FixIt from developer Purple Software's site at **www.purplesoft.com**.

Any software that autodials numbers, including some web-access numbers, is likely to need tweaking for the changes which include new codes for Cardiff, Coventry, London, Northern Ireland, Portsmouth and Southampton.

New and old numbers have been working in parallel for some months, but from 22 April old numbers will work only if dialled with the full STD code, even from within their own area.

Other codes will be phased out over the coming months. Details are at **www.numberchange.org**. Or have a look at **www.vnu.co.uk/theconnection** for Mark Whitehorn's advice on how to update large databases.

Online DIY divorce proves a hit

A site offering legal and mediation advice for couples considering divorce attracted more than 52,000 visitors in its first eight weeks.

Solicitor Roger Bamber set up the site, designed by Strategic Thought, for less than £10,000.

'The aim of this website is to provide a self-help approach… and to encourage mediation at an early stage,' he said.

'It says we've hit an unrecoverable application error'

You can confess your sins from the comfort of your desktop at a new website opened by London-based Christian Radio. 'This is between you and God, and your privacy is totally respected,' says an introduction to the site, which contains poems, prayers and quotes from the Bible. You can type your confession in the box provided or, if you can't find the appropriate words, use a set confession.

JAN HOWELLS VNUNET.COM

➧ BATTERIES POWER ON
A miniature fuel cell burning liquid methanol to produce electricity, will last up to 10 times longer than existing rechargeable batteries, say co-developers Motorola and the Los Alamos National Laboratory. Products are not expected for three years.

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➧ LAST GASP FOR UK FIRMS
The Business Software Alliance (BSA) has declared a 30-day truce from 6 March for UK businesses using illegal software – and offers a free audit tool called GASP to help them check whether they are running any.
www.bsa.org

➧ COMPRESSED ADVERTS
A free compression utility called PowerZip 2000 Lite has followed an emerging trend and is financing itself using banner and button advertising. See www.powerzip.net.
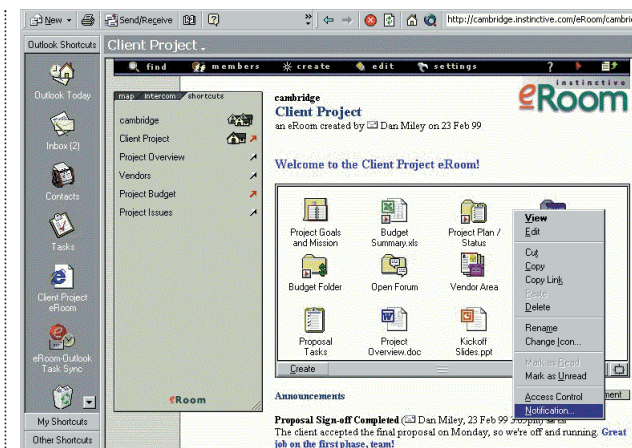
➧ CELERONS SOLD ON
Upgrade specialist Hypertec is offering a £199 kit to upgrade PII PCs with a 466MHz Celeron. The Slot 1 upgrade will be available from PC World stores. Details are available at www.hypertec.co.uk.

Virtual offices up for rent

Communications networks are redefining human relationships. You're never alone with a mobile phone, and at a networked desk you are always in a crowd. Sophisticated network software can create a virtual group of friends and colleagues with whom you can interact – and even see – throughout the day, despite the fact that they may be dispersed across the globe.

The virtual meeting room takes this idea to its limit, by creating a web space in which people can collaborate on an enterprise . This may be a project or a trade relationship, as business-to-

Applications such as Outlook can be shared within e-Rooms

PowerPoint at work in QuickPlaces

business commerce is seen as a big potential market. All documents relating to a project, and tools such as
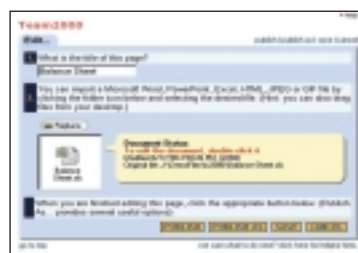
spreadsheets or project managers, can be accessed and shared – in some cases in real time.

Developers know that such systems will only work if they are very easy to set up and use. Instinctive Technology is one of the first in the field with its e-Rooms product, and company president Jeffrey Beir believes it can revolutionise the way business is conducted.

He claims his firm is two years ahead of Lotus, which launched version 2 of its rival

QuickPlace on 18 January. QuickPlace can be used alone or as part of the Raven knowledge management suite (see p52).

An e-Room can be accessed and used from any browser, but Instinctive provides plug-ins for extra functionality. Both products are currently priced for large or medium-sized companies but they are likely to be available from application service providers. So if you want to set up a virtual company, there will be nothing to stop you renting a virtual office.

DMA's registry service to cut spam

A scheme to curb spam email has been launched by Britain's Direct Marketing Association (DMA). The scheme is based on similar ones that protect users from junk snail-mail or faxes.

Names of users who register with the DMA's E-mail Preference Service (e-MPS) will be passed on to so-called emarketers and removed from their mailing lists. But the clean-up is voluntary for junk mailers, who have to request the list of names.

'Online marketing is at a critical stage,' said Colin Lloyd, DMA UK chief executive. 'The e-MPS will ensure that the requirements of the Distance Selling Contracts Directive in respect of email communication are met. The DMA wants to ensure that this new and viable means of marketing continues to grow and builds on our mission to maintain consumer trust and confidence.'

However, Internet watchdog EuroISPA, is

sceptical over the scheme's success.

'The email preference service won't solve the problem,' said a spokesman. 'The DMA is stuck with an inability to send commercial email, as it can't differentiate itself from the spammers. This is not the answer to its problems or consumers' problems. With this service, consumers won't know whether the mail they get is from companies who conform to the scheme.'
www.e-mps.org/en

Torvalds defends the new Linux kernel, as it misses Windows 2000 date.

Setback for Linux 2.4

The new Linux 2.4 kernel is to be delayed for around six months, the operating system's guru Linus Torvalds admitted in January. It had been set to launch on 17 February – the same day as Microsoft's Windows 2000.

The kernel has to be tested by the open-source software community and product vendors, and will be released around summer, Torvalds told the LinuxWorld conference in New York.

Version 2.4 will add high-end support, scaling to eight processors from the current two, support the USB and FireWire connectivity standards, offer improved graphics support, and introduce measures to work better with mobile devices. Version 2.2 was released last year.

Torvalds attempted to reassure delegates about the long-term stability of the Linux initiative.

He countered charges that Linux would fragment into competing and conflicting standards, as happened to Unix in the late 1980s and early 1990s, arguing that Linux's modular development allows a high degree of specialisation without dividing into incompatible approaches.

Asked whether there was a chance of facilitating Windows-to-Linux porting, Torvalds described Microsoft as a 'company I don't care for that much'.

The news came as the trade body of US software vendors declared there was little chance of Linux displacing Windows at the desktop, even if Microsoft is prevented from hindering the market development of the open-source operating system.

The Software & Information Industry Association (SIIA) made the claim in a court submission, backing the US Department of Justice claim that Microsoft has a monopoly hold over the software market.

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Drivers blockade for peripherals

Linux users are being urged to sign a petition calling on peripherals manufacturers to provide Linux drivers. The fact that the operating system cannot match the hardware support of Windows is seen as a block to its adoption by mainstream users.

The petition, on Linux desktop supplier Libranet's website at www.libranet.com, has amassed nearly 3,500 signatures, but the organisers hope to get two million.

As an alternative, it suggests device manufacturers provide specifications of their products so that Linux developers can write their own drivers. The problems

MP3 player running under Libranet's Linux… the apps are coming, but where are the drivers?

raised go beyond software – one young Norwegian faces jail after helping develop a DVD driver (see p32).

The petition states: 'We believe Linux is not a second-class operating system and that your focus on providing drivers only for the Microsoft operating system is misguided and disregards the millions of Linux users.'

It points out that the availability of drivers is likely to boost sales. Peter Lemon, an analyst for IDC, said: 'It is an issue for Linux on the desktop, but everything tends to follow volume in the market… Volume is dominated by Microsoft.'

Minolta has announced it has been working with Linux distributor SuSE on driver support. A spokesperson said: 'Linux users can now enjoy high-quality output from the Minolta Pagepro 8, 18 and 25 printers.'

ADDITIONAL REPORTING
LISA KELLY VNUNET.COM

IBM BACKS LINUX
IBM has launched a free application development kit in a bid to boost the use of Linux in ecommerce. The scheme, unveiled at LinuxWorld in New York, includes support and marketing incentives.

The kit includes Linux versions of IBM's DB2 database, Websphere application server, Lotus Domino and Visualage for Java.

Caldera will offer the kit with versions of its Openlinux operating system during a 120-day pilot programme. 'Our research shows a tremendous market need for Linux applications,' said Dick Sullivan, vice-president of integrated solutions marketing for IBM software.

'This programme will help lower development costs and bolster the supply of new ebusiness applications for Linux. It's a great opportunity for developers, especially those targeting small businesses, to get a foothold in the Linux market.'

Developers of applications for any sized business can register for the free kit through IBM and Caldera websites:
www.ibm.com/linux or www.calderasystems.com
VNUNET.COM

COREL WINS JUSTICE
The US Department of Justice (DoJ), which has spent much of the past five years claiming Microsoft is a monopoly, has ordered a new suite of office software – from a Microsoft rival.

It has signed a multi-million-pound three-year 55,000-user enterprise licence for Corel's Wordperfect Office 2000 suite. The deal includes Dragon Naturally Speaking voice-recognition software and Wordperfect Law Office 2000.

MOBILES

Dixons' dominance holds up prices

The head of Handspring, a company that produces low-cost PalmPilot-compatible PDAs, has warned that Dixons' dominance of Britain's electronics market may make it difficult for the company to transfer its US pricing model to the UK.

Donna Dubinsky, ex-head of Palm Computing and now CEO of Handspring, speaking exclusively to *PCW* while on a recent visit to London, said: 'I'd love to match the prices we offer the product at in the US, but UK distribution happens to be centralised and one major player has more control over the margins than in the US – Dixons. Because it dominates the market, it can command higher margins, which just translates as higher prices to the customer.

'It's not the manufacturer that's demanding that. The manufacturer makes no more profit on the product. I bet we can do it on the continent, I'm just not sure whether we can do it in the UK.'

Dubinsky also said that she'd like to push down the cost of the company's entry-level models even further. 'We would love to get to a $99 price point in the US, but we can't do that yet. I'd certainly like to think that we can do it in the future.'

Handspring's Palm OS-based PDA product range will be released in the UK some time between April and June this year, Dubinsky said. However, the UK range is unlikely to include the low-cost Visor Solo that sells for just £93 from Handspring's US website.

'In the US the Visor Solo is only sold over the web. We can't bring it to the public for $149 and have it in the retail channel because we can't afford the retail margin.'

Dubinsky was surprisingly supportive of the idea of a mobile version of Linux for handhelds (see Crusoe report, pages 21, 38 and 39).

'If the Linux community did do something for handhelds I would be thrilled, because if I had the option to move to a Linux, open-source environment and not have to pay Palm a royalty, that would be fabulous news,' she said.

'Of all the possible

Handspring's Dubinsky would welcome a Linux PDA

environments out there, that's the one I'm rooting for the most,' she said. 'Unfortunately, today it really isn't a good solution, but I hope it does become one.'

Dubinsky said that the company does not care what OS it uses as long as it can deliver the functionality needed to build a quality product. She equated it to the mobile phone market, where users are not concerned with what embedded OS the phone is built around, they just care that it does the job. 'If Linux can give me the value I need without having to pay a royalty, great!' she said.

Handspring is set to face hefty competition from the likes of Nokia and Sony, which have recently licensed the Palm OS, but Dubinsky said she is confident that the company can produce more than a mere PalmPilot clone. She argued that the Springboard slot on the back of the Visor product was a key differentiator, as it allows hardware manufacturers to build add-on devices such as MP3 players and digital cameras.

'I think there is going to be a multitude of devices that are, broadly speaking, handheld computers. In the end, the market is going to be far less cohesive than the PC market. The PC market settled into a standard and there's not a lot to differentiate one machine from another. That is just not going to be the case with handhelds. There is going to be a wide range of devices that focus on very different functionalities,' she said.

NIALL MAGENNIS

Return of the Apple PDA

Apple is to launch a handheld using the Palm operating system this autumn – just two years after killing off its Newton handheld, which anticipated the PalmPilot by years.

Ending the Newton project was one of the first acts of Apple co-founder Steve Jobs, when he rejoined the company and was given the task of reviving its fortunes. It had been the pet project of former Apple chief John Scully – the first person to use the term personal digital assistant (PDA).

The first Newton shipped in 1993 a good two years before the Pilot – and, many believe, before the technology was ready. Certainly the brand never recovered from the fact that the handwriting recognition on the much-hyped early models was not up to the task.

Jobs killed off Apple's Newton handheld back in 1998

The PDA market took off with the success of the PalmPilot. Microsoft may be able to claw back some market share with its new Pocket PC specification and streamlined version of CE, but the PalmPilot is king of the PDA hill.

The Pilot was originally targeted at PC users, but last summer a native Mac version was released giving Apple users a clean connection of their own. Pilots are now selling well among Mac users.

Jobs hinted in his keynote speech at MacWorld in January that Apple might launch a PDA. Now sources close to Apple say the company is licensing the Palm OS and is working with 3Com-owned Palm to create business and consumer versions of a Pilot-like device.

But a question remains over Jobs' commitment to PDAs. Rumour has it that Jobs and his team agreed to an Apple Palm reluctantly, after the Palm Computing booth at the two successive MacWorld shows was mobbed by users wanting to buy Mac-to-Pilot software.

TIM BAJARIN; ADDITIONAL REPORTING CLIVE AKASS

Savings boost for mobiles

New software can save up to 90 per cent on connect time for data calls on mobile phones, its developers claim. DN Mobile drops a connection when data is not being transmitted and reconnects when more is in the pipeline – taking into account the minimum charge of the host carrier. The process is transparent to both the application sending the data and the destination system and it is designed to cope with natural communications breaks. The system, from London-based Brown's, needs compliant hardware at the head end. www.browns.co.uk

Symbian and Palm misunderstood

Fears about deals between Symbian partners and Palm Computing stem from misunderstandings about the company's background, Psion chief executive David Levin says.

Symbian was formed by Psion, Ericsson, Matsushita, Motorola and Nokia to develop Psion's Epoc32 operating system for new mobile platforms.

Motorola and Nokia have both also licensed the user interface of Psion's arch-rival Palm Computing.

Levin pointed out that Psion itself has development agreements with Palm. He told BBC Online that the aim of Symbian was to develop software for 'communicators, phone pads and mobile phones, and its remit did not extend to the user interface.

PC SALES LAG IN Q3
PC sales to European businesses fell in the final three months of last year, though home users bought more, according to analyst IDC.

PC shipments in Europe, the Middle East and Africa rose by 14.7 per cent overall, to more than 11 million units over the quarter. However, the rate of growth dropped 1.1 per cent compared to the same period last year. But sales in Western Europe showed a 'healthy' 17 per cent growth for the year.

IDC said the pressure to cut prices is hitting profits, forcing vendors to improve their business models.

Compaq remained market leader throughout Europe and regained its number one position in the UK, which it lost to Dell in the previous quarter. Dell recorded an overall sustained growth, but the Fujitsu/Siemens merger pushed it into third spot in Europe.
VNUNET.COM

TRIO COOKS UP CHIPS
Three major chip makers are forming a partnership called Worldlogic to develop manufacturing plants which can make 0.1micron and 0.13micron processors. Current state-of-the art plants go down to 0.18micron.

The partners are IBM, Germany's Infineon and Taiwan's United Micro-electronics (UMC). All will contribute engineers to the project at IBM's US-based Semiconductor Research and Development Centre.

Jim Kupek, president of UMC USA, said 0.13micron technology should be ready late this year and 0.1micron by 2002. Worldlogic will also look at ways of embedding logic, mixed-signal circuitry and DRAM on a single chip.

➡ HOMEWORK HELPER
Channel 4 has launched a free service to help pupils aged between nine and 16 with their homework. Teachers will be available for consultation after school from Monday to Thursday and any questions posted at www.homeworkhigh. com will be answered within 24 hours.

The company plans to spend up to £15m on relaunching its site at www.channel4.com. It
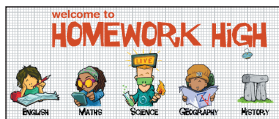
launched a gay and lesbian site in February and plans five new sites for the coming year.

➡ A QUARTER ON THE WEB
One in four Western Europeans used the Internet and one in twenty made online purchases in the last three months of 1999, says analyst IDC.

More than half of all European online sales are German or British, it says. Stefan Elmer, IDC Internet analyst, commented: 'Although many people are buying on an experimental basis... they represent a substantial customer base.'

IDC predicts that Europe's online market will match that of the US by 2003.
VNUNET.COM

➡ DOCTOR WEB
Free medical information and advice is available at a new site. Point your browser at www. netdoctor.co.uk for details.

DVD

Hollywood hits the DeCSS

Hollywood moves to block web distribution of a decryption utility raises questions about the point and effectiveness of DVD video encryption.

DeCSS, which decrypts DVD's Content Scrambling System (CSS), was written last year as part of a project to develop a DVD driver for Linux. A Windows version is now available.

Sixteen-year-old Jan Johansen, who allegedly helped code DeCSS, faces jail after being arrested by Norwegian police and charged with infringing copyright.

Anti-piracy issues were a

> **Trick question: what does DVD stand for? Digital Video Disc? Digital Versatile Disc? It has actually meant both in the past. Now it means nothing at all. And that's official. John Barker,** chairman of the DVD Summit lll, to be held in Dublin in April, said: **'DVD is now just DVD in deference to the worldwide scope of this internationally recognised standard.'**

major brake on the rollout of DVD because digital recording, unlike analog tape, maintains the quality of the original.

DVD-R disks, the only ones that currently work in all DVD players, store 4.7GB a side and require a very expensive write drive. But commercial DVD videos are laid down in two layers at the manufacturers, a process no drive can yet do.

Cheaper DVD-RAM drives, set to ship later this year, will store 4.7GB a side but are not readable by all players; low-cost 4.7GB DVD+RW drives using disks which are compatible with DVD players are not now expected until next year. But even if DVD-write capacities rise and media prices fall, DeCSS is not going to help pirates because there is nothing to

stop them copying a video, encryption and all. DVD players bundle decryption.

DeCSS has been called the MP3 of movies, but it will be a long time before bandwidths allow massive DVD files to be swapped as easily as audio files over the web.

It is hard to see how DeCSS distribution can be prevented, although it has been removed from some US sites following court action by the Hollywood lawyers. It is also hard to see why lawyers picked on Johansen and DeCSS. Decryption utilities have been around for some time.

British coder David Fawcus, who was involved in the Linux DVD driver project, said: 'CSS is more about control of the player market, as it does not prevent the copying of DVDs.'

> *French video specialist Com One is selling web-based surveillance kits that allow you to view premises remotely. Up to eight cameras can be controlled via a single VM4 IP modem. Pictures can either be triggered by an alarm or sent by remote request. www.com1.fr*

MP3s back in the dock

A new instant listening service at a leading MP3 website has sparked court action by the Recording Industry Association of America (RIAA).

MP3.com lets you download tracks from any

CD you have bought from its site or partner sites so you can listen to the music while the disc is on its way – giving online purchasers the instant gratification of a shop.

But RIAA claims the system, called My.MP3.Com

breaches copyright. RIAA chief Hilary Rosen said in a letter to MP3.com: 'It is not legal to compile a vast database of our members' sound recordings with no permission and no licence.'
JAN HOWELLS, VNUNET.COM

Fears surround a tool that spots randomness to pick out encrypted keys.

Hackers pose key threat

Hackers could steal highly sensitive encryption keys from ecommerce sites using a new tool developed by UK security specialist nCipher, the company claims.

Intruders would need only to load files to the server hosting the site – not unusual, as many service providers have web space for several companies on one machine.

Servers using Apache, Netscape or Microsoft software are all vulnerable to the attack, says nCipher chief executive Alex van Someren.

The tool isolates where the data is most random, which is where the key is generally hidden, but it could also be used to capture credit card information, he said, and added that 'No security clearance is required'.

Alex's brother Nicko likened the task of finding a key of a few hundred bytes on a multi-gigabyte server to finding a needle in a haystack. He and Israeli Adi Shamir (the 'S' in the RSA encryption system) presented a white paper early last year showing the theory behind the attack.

The tool converts data bits into pixel patterns and analyses their randomness, or entropy.

nCipher recommends that keys should be stored on a dedicated piece of hardware, separate from the server: it currently sells such a device. Microsoft and Netscape are both adding support for hardware-based key storage to their products. IIS 5 will support hardware key storage, while a patch is available for IIS 4 and Enterprise Server 3.5.

Jim Hurley, analyst at the Aberdeen Group, said: 'The threat of possible key-finding attacks illustrates a significant vulnerability to today's Internet economy.'

ANDREW CRAIG VNUNET.COM
WWW.NCIPHER.CO.UK

Biztalk delayed for extra features

Microsoft's Biztalk Server ecommerce software has been further delayed to allow more functions to be added.

A beta of the XML-based product, due to debut last summer did not reach testers until December.

The new features will take it 'far ahead' of rivals such as Hewlett-Packard's eSpeak.

Richard Godfrey, Biztalk Server software engineer, said: 'It was a choice between bringing a product out the same or a little better than the competition, or putting something in to make it better.'

The first beta was set to be available in March.

JO TICEHURST VNUNET.COM

Agency gets a cyber face-lift

Press Association, the news agency financed by Britain's own media industry, used to produce formula-written copy for its clients to rewrite. But times have changed.

PA has its eye on feeding the web's insatiable appetite for content, and it is picking up a style of its own. Not only has it set up a slick news site at www.pa.press.net, but it's training up this green-haired cyberchick to present it.

Ananova will use sophisticated text-to-speech technology to read the news and other items. And she will
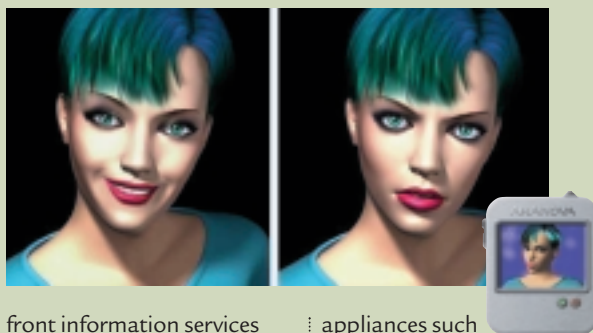
front information services due out next year targeted at

appliances such as mobile phones.

NEXT-GENERATION TECHNOLOGY

Clive Akass takes a first look at Transmeta's long-awaited low-power, configurable chips.

Crusoe chips will keep you mobile

Industry reaction to Transmeta's new Crusoe TM3120 and TM5400 chips (see page 21 and opposite) has been muted, considering the excitement that preceded January's launch.

The secrecy surrounding their development, and the involvement of Linux guru Linus Torvalds, were enough in themselves to generate interest; but it turns out that the chips *do* justify the excitement, if only because they are so different. Paradoxically, this also accounts for the cautious reaction: nobody knows how they will work in practice.

Their main selling point is low power consumption, promising as much as eight hours or roughly a full day's work from a notebook battery. As interesting, although perhaps of less commercial importance, is the fact that the Crusoes are code chameleons – they can be tailored to any instruction set and can therefore, in theory, run any software.

The basic Crusoe architecture (see diagram) is not that different from any x86 clone. BIOS, operating system and application code are fed through threshold logic which translates it into instructions that can be executed by the processor core. The major differences are as follows.

● **Code-morphing engine**
This is Transmeta's name for its translation logic and it sits outside the chip on ROM and is loaded into RAM for fast execution on boot-up. Most chips, including standard Intels, use some form of translation engine,

but it is hardwired in for extra speed.

● **The VLIW core**
Transmeta's use of Very Long Instruction Word architecture (see opposite) runs counter to the trend of recent years, which has veered from Complex Instruction Set Computer (CISC) to Reduced Instruction Set (RISC) to a mixture of the two.

The net result is to cut down the number of transistors needed in a chip by three-

quarters, drastically reducing power consumption. The TM5400 can cut power drain further by switching clock speeds and operating voltages on-the-fly to give only the performance required by the task in hand (see opposite). The soft code-morpher has the added benefit that, unlike hardwired logic, it can be upgraded to include bug fixes and extensions to an instruction set. An early TM5400 upgrade is likely to provide support for Intel's SIMD and AMD's 3Dnow extensions, which is missing in the launch version.

The morpher also provides

the chameleon factor: different morph code supports different instruction sets, so that the same chip can run, say, PC and Mac software – even, in theory, simultaneously. There is nothing new in this, in principle. The morpher resembles software emulators such as SoftPC and FX32, which run x86 code respectively on Macs and Alpha boxes.

The difference is that these are using
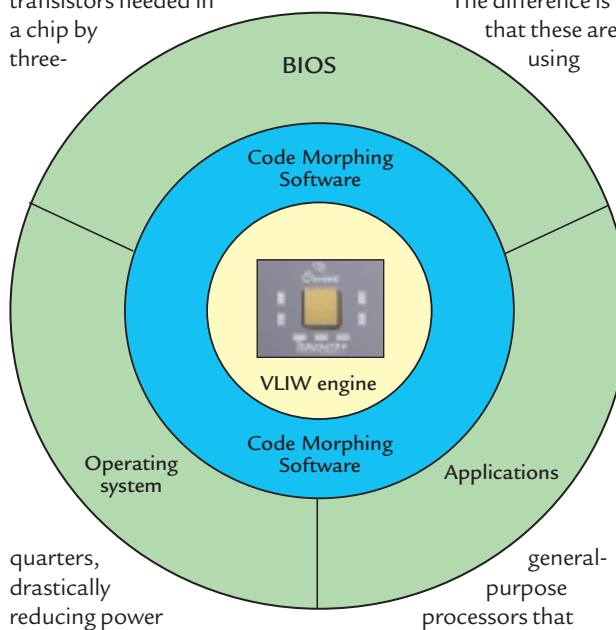
general-purpose processors that reprocess code internally before execution, whereas Crusoe chips have been optimised for specific translations and process them directly. This is why the TM3120, designed to run Linux, has a different core from the TM5400. The downside is that a Crusoe will run one instruction set more efficiently than others.

Crusoe chips optimised for other tasks are planned. Inevitably, as no code is being run native, there is a performance hit: one estimate was that a 667MHz TM5400 would be roughly

equivalent to a 500MHz PIII. But with most mobile applications, this still leaves a lot of computing power to spare. In effect, processing power is being used to save electrical power – a case of Mips conserving Watts.

Torvalds, surprisingly, did not work on the special mobile version of Linux used by the TM3120. He was one of the team developing the code-morphing software, which, according to Transmeta, is where some of the cleverest work has been done. It fragments the code, several instructions at a time, into operations that can be fed efficiently into the VLIW core.

Translations are cached in RAM so they do not need to be repeated. Initially, the caching policy is based on the spread of instructions in real-life applications, but the software monitors hit rates to optimise caching for a particular application. In other words, it learns how to run an application better.

This raises problems when trying to assess performance, because it will improve over time. Benchmark tests that run through tasks in many different applications will give misleading results; so will any that run an application only once.

It is still unclear whether the Crusoes will find a market If nothing else they highlight the fact that faster processing speeds can bring more than just flashier graphics. They could alter the relationship between hardware and software, and herald a new class of exotically configurable processors.

A white paper is at www.transmeta.com.

Cool chips are hot stuff

You can see the marketing pitch a mile off: Crusoe chips are *cool*. Their low transistor count means they draw less power and thus generate less heat. This saves still more power as they don't need fans, which also makes them quieter. Cool chips simplify design because you can dispense with bulky heat sinks and tricky ventilation.

The TM5400 uses a technology called LongRun, similar to Intel's SpeedStep (aka Geyserville) and AMD's Gemini. All reduce power drain by dropping the voltage and clock rate, but the TM5400 does this incrementally and on-the-fly.

SpeedStep switches a notebook automatically between two power states, depending on whether it is running off a battery or mains. Crusoe's code-morphing engine works out current processing needs and switches voltage and clock rates accordingly in 0.05V and 33MHz increments.

Power varies linearly with the clock rate and by the square of the voltage, so these changes can produce cubic reductions in battery drain.
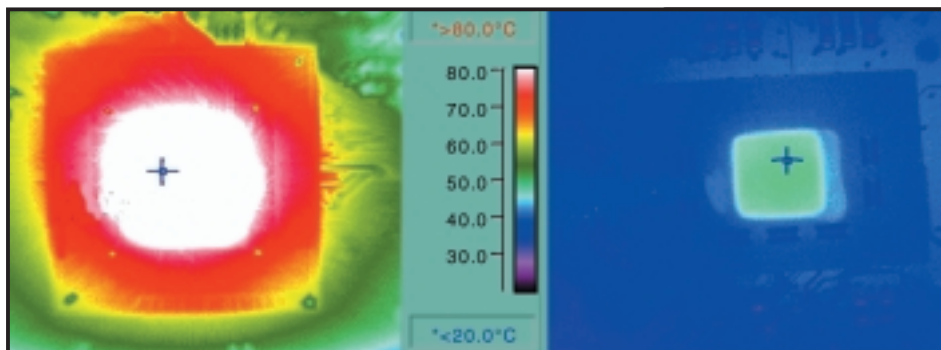
Transmeta claims the TM5400 consumes as little as 10mW running a low-demand application such as email, and up to 2W running a demanding DVD movie – and that is with PCI and memory controllers integrated. Intel says its new SpeedStep-enabled 600MHz Plll uses around 8.5W in low-power mode and 13W on high.

Transmeta cites a typical 32W-hour notebook battery and a 4W average drain from other components, figures which translate into a battery life of between 5.3 and eight hours for a Crusoe device, or 2.6 hours with the Plll.

This Transmeta picture shows temperatures around an uncooled Plll (left) and a Crusoe TM5400. Transmeta says a TM5400 (see diagram opposite) runs at 48°Celsius, whereas an uncooled Plll can hit 105°Celsius.

Transmeta's molecular approach

Very Long Instruction Word (VLIW) coding is notoriously difficult and, as its name implies, takes its instructions in chunks.

A Crusoe word can be 64 or 128bits long and contain up to four RISC-like instructions. Transmeta refers to Crusoe's words and sub-instructions as 'molecules and atoms'.

These are fed into a relatively simple VLIW engine consisting of a floating-point unit, two integer units, a memory load/store unit, and a branch unit.

Each atom in a molecule has to go to a different functional unit, so that an entire word can be processed at the same time. Processing is thus implicitly parallel.

The morph engine's job is to pack words so that this is done as efficiently as possible. Instructions are dealt with in strict running order – avoiding the out-of-order circuitry of standard x86 processors.

INDUSTRY

Microsoft must choose its next steps carefully to avoid becoming a victim of its own success.

Microsoft at the crossroads

Predictions of the death of Microsoft* may be premature but, even discounting the long-running, anti-trust case against the company, it is going through some odd times. There are parallels with the late Eighties when IBM saw its mainframe-based hegemony crumble, an event culminating in the posting of a £1.75bn loss in 1991.

The agent of that change was the networked PC, which put near-mainframe power plus a friendly graphical interface onto the desktop. The problems facing Microsoft are more various but they include the fact that, in public perception at least, the company retains the role of IT superpower that it snatched from IBM.

The result is a lot of bad feeling against Microsoft (as there had been against IBM); some of it is justified by past misdeeds and some is simply a reaction against success. The relative failure of Windows CE was partly due to the quality of the code, but it also owed a lot to a gut reaction from vendors and users against allowing Microsoft into a new market. Anti-Microsoft

New outlook on the Microsoft campus at Redmond, Washington

feelings also help energise the Linux movement.

The Internet is the major cause of the ground shifting under Microsoft. Linux and other open-source software grew up on it and its hardware-independent, open standards have encouraged the development and use of computers devoid of Microsoft software. We have seen only the beginning of these developments, but it is enough to shatter the mindset that computing equals PCs and Microsoft.

The mega-merger of service provider AOL and Time-Warner, with EMI joining as a postscript, shows

Frame up... IBM's five-ton 1944 Automatic Sequence Controlled Calculator, or Mark I, developed in co-operation with Harvard University, helped give the company an early lead in the mainframed post-war world

also that Internet profits will derive at least as much from content as from hardware and software. Microsoft may have won the browser war but its MSN is an also-ran in this market.

That Gates can lose his golden touch in unfamiliar areas is not surprising, but he is struggling to keep revenue growing on home territory. Sales of PCs, and of the Microsoft software bundled with them, continue to rise; but Windows prices look vulnerable as rival operating systems gain credibility and hardware costs plummet. Also, income from upgrades will tail off as there are only so many that Microsoft can offer, especially with users complaining of feature bloat.

Which is why Microsoft is so keen on transforming itself from a software developer to a seller of software services, providing long-term revenues. To this end, versions of Office and Exchange are available for hire from Application Service Providers (ASPs). (Lotus, beset by some similar problems, is also trying to open new service-based revenue streams – see p53).

This shift of emphasis is said to be why Gates handed

the running of Microsoft to his friend Steve Ballmer, a marketing man who is thought better able to ring the changes. Gates will remain allegedly to steer software development.

All of which makes the timing of the Department of Justice's anti-trust suit ironic, if not irrelevant. It comes when Microsoft's de facto monopoly is slipping away, and the company is having to adjust to the fact that the world no longer relies completely on Windows.

This shift is not necessarily bad for Microsoft, although its market value and revenues may be hit in the medium term. A near-monopoly held too long can become a liability: it makes you less flexible. And once you lose your status as the industry's sole perceived superpower, you cease to get blamed for everything that goes wrong. You may even retain power, but it will no longer be seen as deriving from an unfair edge.

Just look at IBM, a decade after the business world ceased to rely so heavily on its mainframes; it is richer and perhaps as powerful as ever, with revenues regularly more than twice those of Microsoft. But it is Microsoft, not IBM, that gets cursed from desktops all over the world each time a PC (what used to be called an 'IBM compatible') throws a wobbly.

Microsoft could yet be broken up as a settlement of the anti-trust suit, although Ballmer and Gates both say they will fight to keep it intact. Multi-billionaires both, perhaps the biggest question is why either of them bother.

* See Eric Raymond interview on p120

Tim Bajarin charts the future of a market that continues to grow, despite fears to the contrary.

PC sales defy the voices of doom

Doomsayers who predicted a slowdown in both PC sales and Internet commerce have been confounded. PC sales grew at a solid 23 per cent worldwide last year, while eight per cent of the 50 million people in the US who have access to the web bought products online at Christmas, up from two per cent the year before.

Internet stocks, far from crashing, ended the year on a high note. Old timers like Amazon and Yahoo achieved market valuations in the billions, though neither has shown any significant profits. More than 450 new Internet firms went to market for the first time and some, such as Red Hat, Freemarket and Akamai rose to blistering heights.

Talk of a 'post-PC' era soon gave way to that of a 'PC plus' era, as the predicted explosion of new Internet appliances failed.

But we have turned a very important corner and 2000 will be seen as a time when the IT groundwork for the next 10 years was laid. This embraces three technologies:

■ Broadband
In the US, cable modems and the various forms of Digital Subscriber Line (DSL) are being deployed. By the end of 2000, at least 65 per cent of the US will have web links of between 128Kbits/sec and 1.5Mbits/sec, allowing sites to offer much richer content.

■ Client-server apps
Applications will shift to the Internet. Leading the charge will be Microsoft, with its Office suite being deployed completely online by mid-year. Firms like Intuit, Lotus,

Fast fibre, such as this from an Alcatel plant, is reaching more and more homes

Corel and others are making online apps a high priority.

■ Processor speeds
Intel, AMD and Motorola will all have chips that process data at 1GHz by autumn. This won't impact traditional applications, but will enable the deployment of a new generation of facilities like voice recognition, voice navigation, 3D imaging and video, which will change the nature of user interfaces.

Vendors will be able to take advantage of this processing power by sending – over relatively slow links – highly-compressed data streams. The PC can then unpack these to enable real-time video, animation and 3D.

At the same time, we will see an even greater demand for MP3 players, handhelds and larger portables, digital cameras and WAP phones, while Sony's PlayStation 2 should revive the games market. We don't expect web appliances to take off until 2001 and beyond.

All of these things should cause continued growth in the technology sector. The

one important speed bump will be a consolidation within the Internet sector. More and more people will be surfing and shopping online – but not enough to support the current plethora of sites chasing the same customers. Some time soon we expect a serious shakeout.

Key backbone providers – such as Cisco, Intel, Nortel and 3Com – should not be impacted much. But sites that came in late and provide a

third, fourth or even fifth option within a category will go broke, or will be bought up by some of the bigger players. Yahoo, AOL and MSN are the clear leaders among the portals but others, like Lycos and Infoseek, could end up losing to the big guys.

One sector that should weather this storm for the time being is ecommerce sites going after the business-to-business market. This is a relatively new category within Internet offerings and while many will pop up in 2000, we don't expect a shakeout in this area until 2001.

Most things point to a very robust year in the world of technology. By this time next year, we should see PC growth continue at around 23 per cent worldwide.

Mobile spy in the sky

Cellular specialist Qualcomm has scored a coup with its acquisition of SnapTrack, which has developed a chip that can locate cellphone callers to within 50ft.

The deal came prior to a Federal Communications Commission order requiring wireless-phone companies to be able to locate the origin of emergency calls in the US by October 2001.

The FCC ruling has been

controversial, however, because some say it is an invasion of privacy. FCC says the idea is to save lives – but it could also be used to track drug dealers and other criminals who commonly use cellphones.

All cellphones will have to carry the chip, which uses GPS, by the 2001 date. The 65 staff at Qualcomm are each likely to be millionaires when the deal closes later this year.

Clive Akass reports from

Lotus blossoms using its IBM links

There is no telling who is going to make a success of a marriage. When Lotus wed IBM in 1995 it looked like a case of a woman past her prime settling for a rich and powerful old man. Time had put paid to Lotus' young and trendy image. Its products were being crushed by the Microsoft Office juggernaut, and even the popular cc:Mail was looking dated.

Lotus' flagship Notes, a co-operative working environment based around data stores and messaging, had 2.2 million users, and there was nothing else quite like it. But it was beginning to look like a loser, as the world moved to web protocols. And it retained a snag of the first release back in 1989: Notes was one environment sitting on top of another. The case is still the same today, as Windows uses one file system and Notes uses another – and this can be confusing even for power users.

Yet Notes now has 56 million users, according to Lotus' departing president Jeff Papows. Even allowing for some massaging of statistics, that's a huge figure for a product that has racked up almost no sales outside the corporate market.

One reason for the success is that Lotus managed to adjust to the web. Its Domino server, released in 1996, was designed to open Notes to browsers and matured last year with the much-delayed Release 5.0. Also, the match with IBM turned out to be well-nigh perfect. IBM had more corporate customers than anyone in the world and, having lost the OS market to Microsoft, it needed software

to sell to them. It knew what customers wanted and told Lotus, and sales soared.

You can do everything with Microsoft software that Notes does. But as analyst Clive Longbottom, of Strategy Partners, points out, you have to pull a lot of bits and pieces together. 'With Domino, you get all that functionality straight out of the box. It just works.'

Mobile Notes, which allows PalmPilots to access Notes data, will be released later this year. Support for other devices will follow

It has to be said that the Notes environment does not always work better: Microsoft knows a thing or two about usability, for a start.

But like everyone else in the business, Lotus sees a horizon beyond Windows. It has wedded Domino to IBM's WebSphere for transaction processing to create an ecommerce system. This year it will roll out a set of plug-ins called iNotes, which give

browsers some of the functions of the full-blown Notes R5 client. These features include database replication, allowing data to be synchronised with notebooks.

Coming out in parallel is another feature set called Mobile Notes, that gives WAP phones browser access to Notes data and uses XML to provide further Notes

functionality to handhelds – the first supported being the market-leading PalmPilot.

Lotus began last year to tout a couple of new buzzwords – Knowledge Management (inevitably shortened to KM), which it has finally unveiled as a technology codenamed Raven. KM sees the assets of an organisation in terms of the total of its knowledge and skills, and its efficiency in

terms of how well it uses them. Central to this style of management is the idea that the most potent savvy is in people's heads.
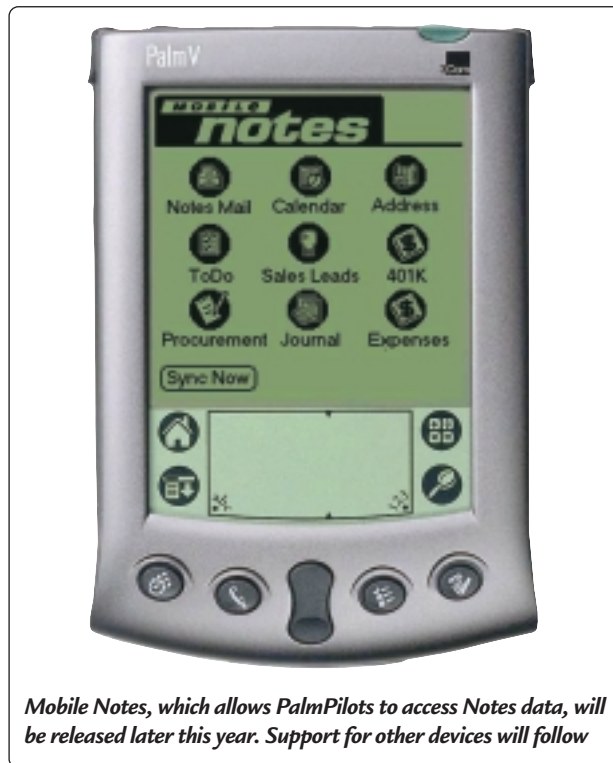
Raven is, at its simplest level, a front-end to a variety of information sources that you can set up yourself. It also maps 'affinities' within an organisation, flagging the skills and knowledge of members. And it provides ways in which assets can be marshalled and used; these include a virtual meeting place called Quickplace (see also p24).

Critics say KM is no more than a set of old ideas wrapped up in new jargon to sell more software. But it got a lot of positive reaction at Lotusphere.

Raven raises some thorny issues, as Lotus is first to admit. A head of department who knows how to fix the copier is not going to relish a flood of Raven-inspired support calls. So people have to be given the choice of having their skills itemised or called upon. There is also the question of whether a company owns all an employee's skills: should someone hired as a singer also be expected to dance?

And Ovum analyst Eric Woods points out that Raven could cause havoc by 'opening up a new metric which shows where the real expertise lies' – and this may not correspond to an organisation's existing heirarchy.

But Scott Smith, managing principal within IBM Global Services, said: 'Think of the cultural change if you really start to reward people on the basis of their expertise.'

Lotusphere in Orlando, Florida

Outlook given the keys to Notes

Lotus is to allow Outlook freer access to Notes data, as part of a new policy of working with Microsoft products. And it is to stop supporting its own cc:Mail email client – despite the fact that it gained 160,000 users in the last three months of 1999.

Outlook provides email, calendaring and contact-management facilities within Microsoft Office, duplicating some of the functions of Notes. Poor integration has been a constant irritation for people who use both Notes and Office. You cannot, as standard, use Outlook to read Notes mail.

Neither, without using a third-party product, can you do something so apparently simple as saving a Word file straight into a Notes document store. In reality, this process is not that simple, as a Word file has a

single address – whereas a Notes file may appear in several relevant folders. Still, Lotus executives say this feature 'should be available' this year.

The Outlook link is expected within a similar timeframe, though some functionality – such as room booking – will be lost when using Notes data. Analyst Clive Longbottom, of Strategy Partners, thinks this is a big mistake: 'The problem is that the bits you can't do will be the bits people want, and they will blame Lotus rather than Microsoft, even though it may not be Lotus' fault. Lotus would have done better to provide a Notes client for Office, that included all of Outlook's functions and more.'

Lotus does plan to ship a product later this year that will allow users of Exchange, Microsoft's messaging server,

to acces the collaborative features of Notes.

Longbottom also thinks Lotus is wrong to turn its back on cc:Mail, which still has 11 million users. While Ian White, a senior consultant at Lotus reseller Lloyd McKenzie, said the company was getting 'money for old rope' from cc:Mail.

But Lotus' apparent strategy is to convince existing cc:Mail users to upgrade to Notes. In the meantime, telephone support for cc:Mail will continue this year, but president Jeff Papows said: 'There is no commitment beyond that.'

ADDITIONAL REPORTING BY ANDREW CRAIG, VNUNET.COM

Pay-as-you-go is on the cards

The connected world is producing byzantine new pricing structures. Users of the new Outlook link will have to pay a client access licence (CAL) to Lotus for accessing its Domino server.

Other CALs are due, in theory, from anyone who uses a browser to access Notes, though Lotus admits privately that there is no

foolproof way to police the payments.

Users of Mobile Notes platforms, like the Palm V, will have to buy a CAL but this will include Lotus client software.

Lotus proposes to take a fee for each access of Notes-based WAP services. It will be paid by the service provider, and so this will be transparent to the user.

Papows bows out but denies he was pushed

Lotusphere was a particularly trying experience for departing president Jeff Papows, who had been hit by a series of scandals.

He was sued by a female colleague, who claimed workplace bias that stemmed from a long-standing 'intimate relationship' between Papows and his secretary.

Only weeks previously *The Wall Street Journal* had accused him of garnishing the truth about his life. The paper said he had claimed variously to be an orphan, a Marine Corps captain who saved a friend's life by throwing a grenade to safety, and an F4 pilot who once had to eject to

Zollar (left) replaces Papows as president of Lotus, although the latter denies that stories about his private life forced him to leave

escape a crash that killed his co-pilot.

In fact, said the paper, his parents were alive and well, he was a lieutenant, and the nearest he had ever been to

any military drama, flying or otherwise, was a job in air-traffic control.

He resigned on 6 January saying that he plans to run his own company. 'This has

certainly been a period of a ridiculous degree of attention to everything from my relationship with my parents to the veracity of my hobbies [sic],' he told a Lotusphere press conference. 'But I tell you point blank that this had absolutely nothing to do with my decision to leave.'

He is succeeded as president by Al Zollar, an IBM man. John Thompson, head of IBM Software, stressed that this did not herald a tighter IBM rein. 'I think what is important here is that Lotus and its people and customers take advantage of the synergy with IBM without becoming smothered by it,' he said.

Cambridge, aka Gamesville

Many games branded under big US and Japanese names were developed around Cambridge. Sony has a games team working south of the city, and just to the north is Frontier Developments whose founder, David Braben, has been producing games and development tools since he co-authored its most famous product, Elite, in the 1980s.

Now the six-year-old company employs 16 people working on three multi-platform games, including the version 4.0 of Elite and development tools for Windows, PlayStation, PlayStation 2, Dreamcast and other platforms. A typical game project takes 18 months to two years and can cost more than £1m – a lot to a company that turns over less than £10m year. But it has always made a profit.

UK developers create nearly 30 per cent of all games published across the globe, with sales of around £1bn this year, which makes them bigger than Britain's film industry. So the perception that the hugely profitable games industry is

Frontier's V2000 game proves it's a jungle out there in Cambridge

overshadowing the film business is perhaps the case, says Braben. 'It has got Hollywood worried and rattled... games are cheaper to develop than films.'

However, a lot of US investors have had their fingers burned putting money into new, inexperienced games companies. 'The mature view is to back people with track records,' Braben said.

Games developers too are having to face changes as the mobile phone becomes the Walkman, Game Boy and web browser rolled into one.

And the migration of games from the PC to the TV, helped by devices such as the PlayStation 2, could open a new market among the kind of people who have always regarded computer games as 'horrible bleepy things'.

Cyberlife, just down the road, has rebranded itself as Creature Labs and is focusing its artificial-life technologies and Creatures products for the entertainment markets.

New projects include a

large-scale virtual world – a Creatures docking station, due to ship later this year, which will let users around the globe talk to each other and exchange Creatures and objects without needing to exit their virtual world.

Product development director Ian Saunter said an artificial-life approach can produce more interesting behaviour from characters in games. 'We can borrow ideas from mother nature to create and simulate behaviours using biological metaphors .'

Creature Labs is investing heavily in multi-player, online gaming, which it believes will become increasingly popular.

Saunter points out that one in four UK homes has a PlayStation. 'Gaming is a huge part of the public consciousness. We are going to see a convergence with other entertainments and a demand by users for more lifelike responses from computer-hosted agents.'

www.frontier.co.uk
www.creaturelabs.com

Caroline Swift *reports from Silicon Fen*