PC MAGAZINE

JANUARY 2003 • VOL 12 • ISSUE 1

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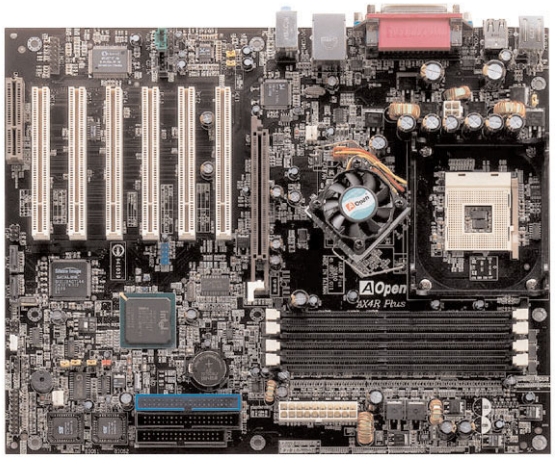
What does Intel's new chipset offer?

We find out by looking at AOpen's latest feature-packed motherboard



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FROM THE FRONT

Getting better?

New Year generally does two things. First it encourages reflection on the past year, as the post-Yuletide rash of top ten TV shows demonstrates. Then our thoughts turn to the year ahead....

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In the case of 2002, most people working in some kind of IT job are probably glad to see the back of last year. It's been a tough year where projects have been scaled back or shelved and, for most, it's been a case of making do. Companies have held on to technology for longer and made it work a bit harder—which is as it should be. But they've also slowed down the adoption of new technologies—which isn't. The only exception to this rule is probably the public sector where a series of substantial government giveaways has kept public spending on IT fluid. In fact, many IT vendors are only surviving because of it. The discovery of a shortfall in Treasury Revenue as a result of the stock market collapse of last year looks likely to put paid to that in 2003.

For the consumer, however, things have looked very different—and frankly, a lot better. Last year was when £500 became the realistic threshold for buying a perfectly good PC that would run any off-the-shelf software. That's a quarter of the price of my first PC—an Olivetti M24, circa 1985. And that's not the only difference. Now you should get at least a 1.6GHz processor, 40GB hard drive, 256MB RAM, Windows XP and a DVD or CD-RW drive in your budget box, where once an 8MHz 8086, 20MB hard drive, 320KB 5.25in floppy disk drive, 256KB of RAM and MS-DOS sufficed. Now that's what I call a bargain.

Last year was when £500 became the realistic price for buying a perfectly good PC that would run any off-the-shelf software

So PCs have got cheaper. Surprise! But what of the year ahead? If ever there was a time not to try to predict the future, this is it. Imminent war, fear of loony ricin attacks, congestion charges in London, talk of a more general recession in the UK (or not, depending on which pundit you prefer), the looming crunch of a chronic pensions shortfall, poorly performing stock markets, falling house prices, dwindling treasury revenues and the inevitable crisis in consumer confidence that results from all those trends doesn't bode especially well. It's not surprising that general business coverage in the media at the moment is very dark. On the other hand, technology was first into the recession, so maybe it will be first out as well.

Anyway, here at *PC Magazine* we've decided not to worry about any of that. Instead we'll just keep doing what we've always done—evaluating the IT technologies that matter. To prove this what we care about and to mark the passing of another year, we've asked our four top Labs brains to don their Joe 90 style brain-dump apparatus and tell us something about what we should expect in the year ahead from a technology standpoint. All will be explained on the next page.

As always, we've still been down in the Labs testing products and have come up with a veritable feast of new product: from a Dell desktop system to appeal to the tidiest office manager and Western Digital's latest 200GB monster hard drive, to a motherboard sporting Intel's latest chipset. And in our regular solutions pages, we continue our content management system development as well as revealing some of the tricks and tips that will make your Windows XP setup work more efficiently and smoothly than you thought possible.

Finally, thank you for all the feedback you've sent us on the first two issues of *PC Magazine* in its new e-book format. You'll see that we're tweaking and improving the product in response to these comments, so keep them coming in—just email us at feedback@pcmag.co.uk. And if you're reading someone else's copy, do yourself a favour and register at www.pcmag.co.uk/PCM/next.jsp to make sure you get your own copy on the first day of publication… ■

TECH TALES

One good kludge

Vendors have been fiddling with firmware and software for years to try and accommodate ever-increasing hard disk drive sizes

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There's seemingly no end to the increasing vastness of hard disk drives. If you look at this month's review section you'll find a 200GB E-IDE drive manufactured by Western Digital. That's one hundred times larger than the drive in my first PC. I have a copy here of Windows version 1.01—the whole distribution is 1.3MB. It wouldn't even know where to start with a 200GB drive (it certainly shows signs of agoraphobia on my 16GB model)—a favourite story told by a friend is of him using an ancient copy of Norton Commander to look at a large drive on a mainframe (don't worry, he revels in doing that sort of stuff). In his own words '...it went in, poked around a bit, came back and said, "I don't care what you say, as far as I'm concerned that drive's full!".'

It went in, poked around, came back and said, 'I don't care what you say, as far as I'm concerned that drive's full'

When I first heard of these new large hard drives, an alarm in my head reminded me about BIOS limitations, so I started digging around to find out how this had been overcome. First of all, let's take a short walk through some of the inglorious history of drive size, file system and BIOS kludges. First there was a 504MB limit imposed by the Int13h BIOS system. The Int13h Extensions and Logical block Addressing (LBA) kludge solved this, which gave theoretical support for drives up to 7.88GB. Unfortunately the kludge was itself kludged by some BIOS manufacturers who used 12-bit cylinder addressing, which imposed a 4,096 cylinder or 1.97GB limit. Luckily this was fairly close to the DOS/Windows FAT16 2GB limit, so no-one worried for a while.

Windows NT versions of FAT16 were kludged to use larger sector sizes, thus supporting up to 4GB. Various BIOS manufacturers also preferred to have their own bugs, leading to an assortment of drive size limitations (3.04GB was quite popular for a time) due to bad programming and DOS didn't want to be left out, with a bug that wouldn't accept more than 8,192 cylinders on a drive leading to a 3.94GB limit. Windows 95 swiftly got in on the act by refusing to acknowledge any drive larger than 32GB—this was conveniently solved by upgrading to Windows 98 (with a Hot Fix) or NT. Then Windows 98 turned out not to like drives bigger than 64GB due to a problem with the16-bit FDISK, which was again patched to give support for drives up to 137GB.

All of this would have been fine except for the fact that the ATA-5 LBA specification defines a 28-bit number for the sector addresses on a drive, so actually you're limited to 128GB. Well, you would be if you were using Windows 2000 or XP and the NTFS file system. But if you're using FAT32 under Windows 2000 or XP you can't format a volume larger than 32GB even though the operating system will quite happily recognise and mount a drive formatted elsewhere (for example, using Windows 98 boot disk and the updated FDISK utility). This is by design according to Microsoft—'real' drives should use NTFS. Fortunately Windows 'XP and 2000 are relatively immune when it comes to BIOS problems, as they totally ignore the BIOS when it comes to identifying drives—the hardware abstraction layer (HAL) queries the drive itself and cuts out the middle-man. You still need the BIOS to recognise the drive in order to allow the PC to boot, of course.

This is by no means a comprehensive listing of the bugs and limitations that have appeared over the years—BIOS manufacturers are as guilty as Microsoft when it comes to bugs or sloppy programming. But it gives you a flavour of why bells started ringing in my head. 'There's sure to be some new kludge awaiting just around the corner,' I thought. And sure enough, it's already with us. To get over the 128GB LBA ATA-5 limitation (see above, if you can stomach it again), the ATA specification has been kludged yet again to use 48-bit LBA addressing. Basically hard drives are now programmed to lie through their teeth. If a BIOS that doesn't support 48-bit LBA queries a drive larger than 137GB (using the ATA IDENTIFY command), the drive is supposed to report that it's only 137GB (the 28-bit LBA field is filled with 1s). The actual drive size is contained in the new 48-bit LBA field, accessible only to a BIOS or OS with 48-bit LBA support. Windows XP and 2000 support 48-bit addressing (but you'll still need to use NTFS unless you like 32GB partitions). For Windows 98/ME, you'll need a suitable add-in controller card if you want to access the whole drive. For Windows 95, you'll need a new operating system as well.

So how long will this latest kludge last? Hopefully forever—anyone trusting a single hard disk drive with 200GB of data is verging on the insane anyway. The new Serial ATA interface uses 48-bit addressing, so will theoretically support drives up to 144 petabytes (a petabyte is 1,024 terabytes, a terabyte is 1,024 gigabytes). Windows XP can handle up to 16 exabytes on a single partition (an exabyte is 1,024 petabytes), so for once in the history of the PC there's a reasonable bit of headroom available. Unless, of course, some other bugs raise their nasty heads. ■

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NEC takes on Tablet PC market

Japanese giant prescribes slimline version of Tablet PC

The appeal of the Tablet PC format is likely to be strengthened with the launch of a new NEC design early this year.

Devices that offer handwriting-recognition capability based on a superset version of Windows XP have appeared from several vendors, but the Japanese giant's product looks like an impressive breakthrough in terms of thinness, weight and connectivity.

New NEC design slated for 2003

At its recent iExpo show in Tokyo, NEC showed off a prototype device that is just 15mm thick and weighs less than 1kg, despite having a full feature set. Rival products from Compaq, Toshiba and others look heavyweight by comparison. The NEC device also features an LCD screen and supports both the 802.11b and the faster 54Mbit/s 802.11a wireless LAN specifications. The product is expected to be available in February or March. Retail prices have not yet been announced.

The product is one element of NEC's plan to become a more plausible rival to IBM and HP in business IT. It recently set a new fastest benchmark speed for a supercomputer (according to the Linpack benchmark, scoring a Rmax figure of 35,860G/flops). NEC is also working on fault-tolerant servers, blade servers and a voice over IP appliance.

Some buyers believe an alternative supplier to the all-rounder IT giants would be welcome. 'Hopefully it will have a more personal touch,' said Richard Adams, general manager of IT service provider Sumlock Electronics.

MARTIN VEITCH, IT WEEK

Klez tops the virus charts

Mass-mailer accounted for almost one in four infections this year

Stubborn mass-mailing worm Klez is officially named as the number one virus of 2002. Discovered in April 2003, Klez deletes files on local and network drives and overwrites files with random data, making them impossible to restore.

Anti-virus firms confirmed that Klez topped the charts for the year. Sophos said that it accounted for almost one in every four infections and McAfee said that it was easily responsible for the highest number of infected files.

'Braodband has led to increased file-sharing and that means more viruses are being shared'

But for home PC users, threats will come from online file sharing services like Kazaa, which can lead to people downloading Trojan horse files, giving hackers remote access to their PC. 'Broadband has led to increased file-sharing and that increases the number of viruses shared,' said Jack Clark, product marketing manager at McAfee.

Graham Cluley, senior technology consultant at Sophos, urged PC users to be wary of suspicious email attachments. 'Viruses aren't going away,' he said. 'If you're not expecting an email from someone don't double click on it to see if it is dangerous or not.'

Virus attacks on mobile phones and handheld PCs aren't expected to materialise next year, according to the experts. McAfee indicated that the market for these devices is not yet large enough to be attractive to attention-seeking virus authors, while Sophos pointed out that it hadn't come across a PDA virus since one written for Palm Pilots three years ago. *ANDY MCCUE*

HALLMARK SCHEME FAILS TO BOOST E-COMMERCE

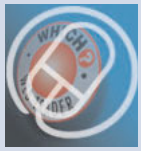
UK online spending was said top £1.7bn in December, but many consumers are still wary

Consumers are still wary about buying online, despite a number of initiatives designed to build trust in the market.

Although 2002 is set to have been a bumper Christmas for e-tailing, with shoppers in the UK expected to have spent more than £1.7bn online in December, there are still fears about service and product quality. Even trusted schemes like Which? Webtrader have failed to address the problems.

When the e-hallmark was first seriously mooted and backed by government in 1999, the aim was to give concerned consumers assurances about the safety of online shopping. E-tailers would agree to adhere to a code of practice covering issues ranging from security to fair pricing and advertising.

The long-awaited Visa Verification scheme should give consumers more confidence that their money is safe when shopping online and give e-tailers more protection. *DINAH GREEK*



The Which? Webtrader scheme failed

Apache 2.0 gains improved stability

Work on version 2.1 of the open-source Apache Web server software has begun, meaning further improvements to version 2.0 will concentrate on improving stability

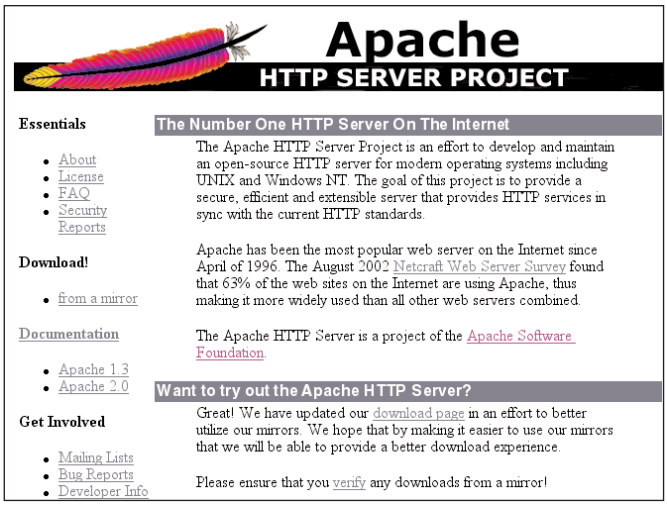
Open-source developers behind the Apache Web server, used by more than half the world's Web sites, have stopped new developments for Apache 2.0 and begun work on version 2.1. The move is intended to boost migration to version 2.0, which, nine months after its introduction, is used by less than one per cent of sites. Most users have been reluctant to upgrade due to concerns over the maturity of Apache 2.0. Frequent changes to its application-programming interface (API) have made it hard to obtain add-in modules to support advanced functions, such as Perl and PHP scripting.

In future, the Apache Software Foundation (ASF) will add new features to version 2.1. This will stabilise the APIs for version 2.0 so firms can build production Web farms with the software. The ASF will still develop bug fixes for version 2.0 and 1.3.x, but won't add new functionality.

The ASF's move also brings in a new method of numbering Apache software to make it easier for firms to distinguish between stable versions which are suitable for production Web sites and development versions to test enhancements. Odd-numbered versions from 2.1 onwards will indicate test and development versions, and even-numbered versions will indicate stable versions for use on production systems. Eventually, version 2.0 of Apache will be replaced by version 2.2, at which point new testing and development will begin on Apache version 2.3.

Apache was originally created for Linux and Unix systems. Version 2.0 was developed to improve the Web server performance under Windows. Currently, Apache version 1.3.x is used by aproximately 60 per cent of Web sites, while only about 0.5 per cent use Apache 2.0, according to www.Securityspace.com.

ROGER HOWORTH, IT WEEK



◀ Development of version 2.1 of Apache should boost migration from earlier versions

OLDER PCS CAN'T HANDLE BROADBAND

Low-power chipsets incompatible with some USB modems

People who bought their PC more than two years ago could find that it's unable to cope with broadband.

Older PCs equipped with motherboards with certain chipsets are incompatible with some broadband USB modems. This can throw up a whole host of problems. Either the broadband connection can't be made, runs at very slow speeds or is intermittent and disconnects every few minutes.

There's a known conflict with some Alcatel modems, which are very popular with UK Internet service providers (ISPs) and VIA chipsets used in a number of older motherboards. These boards may not supply the modem with the full power required to work. The modem then begins to draw power from the PC, causing the motherboard to trigger a self-protection feature, which shuts down the USB ports.

If you think the problem could affect you, it's best to run your PC through some tests, which ISPs can advise you on. Tiscali, for example, now plans to incorporate advice into its Web site FAQ section (www.tiscali.co.uk/help/broadband/).

However, Mike Galvin, BTopenworld's head of operations said that the innumerable fixes could confuse people. 'Unless you're happy about downloading patches and tweaking your BIOS, please ask your ISP for help first.'

TSolutions include downloading new 4-in-1 Via drivers (try www.usbman.com), using a powered USB hub (some people have better results without one though) or adding more USB ports. ***DINAH GREEK***

Email virus poised to strike

Yaha variants may start to spread

New variants of the Yaha worm have made it an unpleasant New Year for some IT managers, but only a few anti-virus software vendors are worried.

Yaha arrives as a double attachment with an .exe or .scr suffix. The worm has its own SMTP engine and distributes itself to all addresses in Windows Address Book, MSN Messenger and .Net and Yahoo Messenger software. The virus sends emails with fake headers and has a large variety of headings. Only Windows machines are affected.

A secondary payload attempts to use the infected computer to launch a denial of service attack against a Pakistani government domain, infopak.gov.pk.

The fast initial infection rate sent the worm straight to number four in MessageLabs' December infection survey and Symantec upgraded the worm's alert status at the end of last year.

The types causing the most trouble are the 'K' and 'E' variants. The original virus was first detected in March 2002. ***IAIN THOMPSON***

NEWS IN BRIEF

● Having languished in the doldrums for nearly two years, the downtrodden semiconductor industry is expected to see between an 11.7 and 16 per cent sales growth in 2003. The industry, which develops the multi-million-dollar equipment used by semiconductor companies, achieved slightly less than $20bn in revenue in 2002. There was a drop of 29 per cent from 2001 revenues of $28.04bn. Sales, which reached a peak of $48bn in the boom year of 2000, haven't been this low since 1994.

● Microsoft's MSN Messenger service was down for several hours at the start of this year because of a 'hardware fault'. According to Reuters, millions of users were unable to send and receive instant messages on their computers. Microsoft confirmed that this affected more than 75 million users worldwide and cited an unspecified hardware problem. Recently .Net Passport, which provides a single identity for users to log on to multiple Web sites, also suffered a temporary crash.

● Internet service provider (ISP) Demon has dropped connection fees across its range of ADSL broadband products until March. The cuts could save businesses up to £250. BT Wholesale recently halved the connection costs for some of its ADSL products.

● There's a new macro virus targetting Microsoft Word, reports Symantec. The virus can overwrite the Master Boot Record (MBR) of any physical hard drives on a computer. Dubbed W97M.Killboot, the virus infects a currently active document and the Normal.dot template when an infected document is closed. Any documents will be infected when they are closed. But it also creates the file C:\Setver.exe, which the Symantec anti-virus products detect as Trojan.Killboot. If Trojan.Killboot is run, it writes the viral code into the MBR, which can then overwrite the MBR on all hard drives with zeroes.

Released as Exchange 2003 beta, Titanium promised more security

Microsoft's 'Titanium' has been released for beta testing under the name ExchangeServer 2003 and should be due for formal release by mid-2003

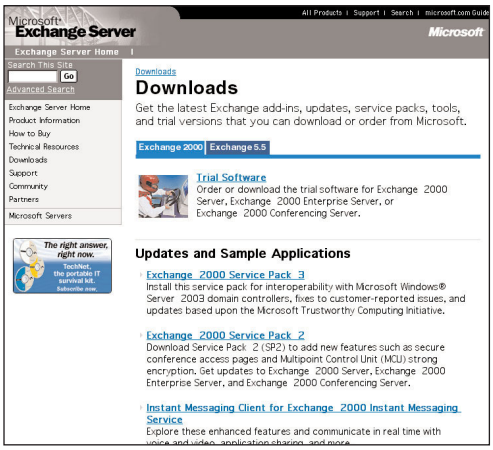
According to Microsoft Web site the test code for Exchange 2003, which is on schedule for release in the middle of this year, can be downloaded for evaluation as part of the Exchange Joint Development Program.

Exchange Server 2003 uses messaging collaboration between servers running on Windows .Net Server 2003 and Windows 2000 Server (Service Pack 3) or later. Exchange and Outlook 11 are most likely to be formally released in mid-2003, following the scheduled spring release of Windows .Net Server 2003.

According to the company, the new Exchange is an incremental upgrade to Exchange 2000 Server and has a greater emphasis on security. Features include new spam protection, support for connection filtering based on real-time black hole lists and dial-up user lists, inbound recipient filtering and Spam Beacon Blocking.

Microsoft says the product has a better virus scanning application program interface, which allows third-party anti-virus vendor products to run on Exchange servers without Exchange mailboxes, enabling the scanning of incoming messages for potentially harmful code as soon as they enter a customer's environment and should reduce the operational impact on Exchange mailbox servers.'

The new version of Exchange also has support for wireless access and mobile devices. ***NICK FARRELL***



▲ **You can download Exchange 2003 as a beta**

$100,000 Linux Xbox challenge extended

Lindows gives hackers another year to crack the Microsoft console

The man behind the Lindows operating system has extended his $100,000 competition to get Linux running on Microsoft's Xbox.

The two-part competition began in July 2002, with two $100,000 prizes: one for running Linux on the games console, and one for running Linux on an Xbox with no hardware modifications. The first of these has been completed, but Lindows.com founder Michael Robertson has extended the time limit, which originally expired at the end of 2002, by one year.

Distribution of the prize money to the hackers involved in completing the first part of the competition is due by the end of January, according to developer Web site Sourceforge.net. It added that Xbox users could now deploy a selection of free Linux applications, including home entertainment, Internet and office programs.

Xbox Linux is available as a free download at http://xbox-linux.sf.net/. ***NICK FARRELL***

◀ **Start that Penguin: it's not too late to enter the Xbox competition**

Wireless crucial for broadband

Broadband Stakeholder Group's annual report warns of barriers to rural broadband

Wireless technology will be a crucial factor for rolling out broadband access to large parts of the UK, according to the Broadband Stakeholder Group (BSG).

In its second annual report the BSG—set up to advise the government on broadband policy—said laying cable or upgrading the infrastructure of remote and rural areas wasn't commercially viable for telcoms companies.

But low-frequency wireless spectrum could be a cheap alternative, it suggested. 'Exploiting the wireless spectrum is the only way we're going to reach a lot of remote areas,' explained Antony Walker, BSG's chief executive officer.

He warned, however, that there were barriers that meant wireless deployment isn't as widespread as it could be. These barriers include spectrum limitations and regulatory barriers.

On the technical side, the frequencies allocated for broadband must have good transmission range, not need 'line of sight' and must be able to be accessed via off-the-shelf technologies. Use of some lower frequencies is currently restricted, the BSG said. 'Some of these lower frequencies are in use for other applications, so the government has to look at the situation carefully. It needs to decide what is the best use of the spectrum and allocate it accordingly,' Walker said. ***DINAH GREEK***

Experts brand FTSE 100 Web sites 'mediocre'

Web usability study slams many top UK companies' online efforts

Some of the UK's biggest companies are struggling with basic Web design concepts and should scrap their sites and start again, according to Web usability experts.

Porter Research's second annual analysis of FTSE 100 companies' Web sites said that overall design, speed of loading and cross-browser compatibility were weak and that many lack must-have content elements.

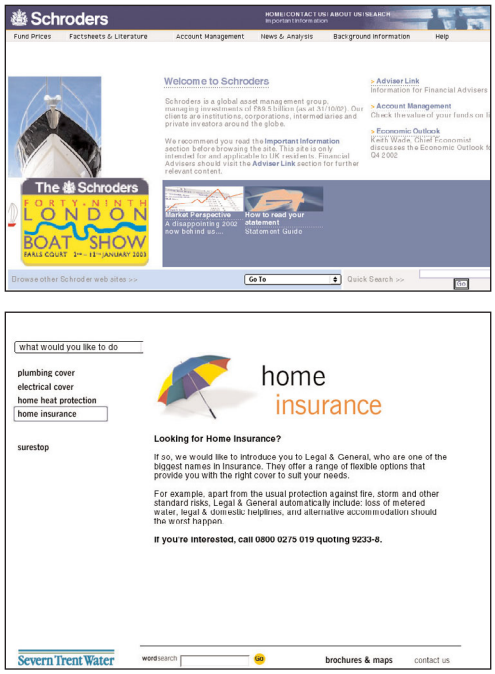
A third of these Web sites still don't give their share price, or bury it away elsewhere, and one in five don't explain on their home pages what their company actually does.

A staggering 41 per cent provide no facility to search their sites for key information.

Rodney Tyler, managing director of Web strategy and design consultancy Interactive Bureau, which commissioned the research, said that, despite improvements, Britain's top companies were still 'wallowing in mediocrity' online. While the overall standard has improved in the last 12 months, the study found that more than half of the Web sites visited still have problems.

Although a third of the home pages in question had been re-designed in the last year, rather alarmingly, eight are considered worse now than they were before. Sixteen are so bad they should be taken down and started again, the study said. Schroders and Severn Trent Water, in 98th and 97th spots respectively (compared with 26th and 37th places only a year), were singled out as particularly poor Web site revamps.

'People like Schroders and Severn Trent have missed the boat completely. We wonder how much money they've wasted in the last year, only to achieve the seemingly impossible of making matters worse,' said Tyler. Since the survey was conducted Schroders has appointed an in-house central Web management team and updated aspects of the site, including its navigation facilities. ***RACHEL FIELDING***



▲ **Schroders has now updated aspects of its Web site following Porter Research's study, although it wasn't the only FTSE 100 company to face criticism**

LINX REPORTS FESTIVE BOOM

Christmas Internet traffic hits all-time high

The UK's festive Internet traffic was double that of last year, according to figures from the London Internet Exchange (referrred to as as Linx).

Around 90 per cent of the UK's Internet traffic flows through the Linx network based in London's Canary Wharf. Data flowed through

▲ **Amazon had its busiest holiday season ever**

Linx at over 15Gbit/s during Christmas Day evening and hit a peak of 1,715Gbit/s on the evening of Boxing Day. Linx said that this was almost twice the level of traffic recorded in the same period last year.

On a normal working day, Linx handles around 2,215Gbit/s and weekend traffic rates of around 2,015Gbit/s. 'Whatever people were doing online during the holiday period, it's clear that the Internet has become a part of Christmas for an increasing number of them, providing both communication and entertainment,' explained Vanessa Evans, sales and marketing manager at Linx.

Meanwhile, online retailer Amazon.com claimed to have had its busiest holiday season ever, with more than 56 million items ordered worldwide from 1 November to 23 December. The largest sales day was Monday 9 December with 1.7 million units ordered, equivalent to 20 items per second worldwide. The second largest sales day, with 1.6 million units ordered, was Wednesday 11 December. ***STEVE RANGERS AND ANDY MCCUE***

NEWS IN BRIEF

- Chip maker Transmeta is selling Intel-x86 based processors that run at lower temperatures and consume less power, so they can be embedded in small devices without needing a fan. Transmeta's Special Embedded processors will run at speeds of 667MHz, 800MHz and 933MHz. The 667MHz version will cost $50 (£31) per chip. Salt water, greasy air and other environmental factors often require electronic devices to be sealed, which can make a fan impractical.

- The Internet has officially celebrated its 20th birthday. On 1 January 1983 the Advanced Research Projects Agency Network (Arpanet) of the US Department of Defence—the forerunner of the Internet—was switched to the TCP/IP protocol. This enabled millions of computers to go online instead of the Network Control Protocol (NCP), which limited it to just 1,000 machines. Vinton Cerf and Robert Kahn invented the TCP/IP protocol.

- Search engine company Ask Jeeves has removed banner advertisements from its main Web site. The company also recently scrapped pop-up ads. Ask Jeeves will now focus on providing Branded Response and Premier Listings, which involves pointing the user to the sites of advertisers that are relevant to the user's search.

- The Web site of the Recording Industry Association of America (RIAA) has been hacked for the sixth time in as many months. The RIAA's strong stand against music piracy makes it an obvious target for hackers. A URL allowing access to the RIAA's system for posting press releases was made accessible over the holiday season, allowing people to post messages that then appeared on the RIAA's official press release page.

Government issues safety guidelines designed to protect children online

Guidelines and campaign launched to safeguard children from Internet paedophiles

Providers of online services should offer alert systems and filtering mechanisms to protect children, according to best practice guidelines issued by the government to clamp down on Internet paedophiles.

The Models of Good Practice offer advice to providers of Internet chat, instant messaging and other Web-based services, to make them safer environments for children.

The government's Internet Taskforce on Child Protection, which includes representatives from government, the Internet industry, child welfare organisations and the police, drew up the guidelines for best practice.

In a statement, Home Office minister Hilary Benn said: 'We are aware of the potential for paedophiles to misuse modern technology to abuse the trust that children place in them by attempting to "groom" them through chat rooms.

'We want to encourage parents to help their children protect themselves so they can surf safely,' Benn added.

Nicholas Lansman, secretary general of the Internet Services Providers' Association (ISPA), said: 'Just like the offline world, the online world has its hazards. The publication of this good practice shows ISPA's and the government's commitment to making the UK the safest place for children to go online.'

The government has also launched a £1m 'safer surfing' advertising campaign to warn of the dangers of Internet paedophiles, but without demonising the Web itself. A series of television adverts will be aired throughout January. ***RACHEL FIELDING***

Intel unzips Banias

Centrino is complete mobile silicon package

After a long wait, Intel has finally taken the wraps off the much-hyped Banias mobile platform, with a recent announcement that it's offical name is to be Centrino (see Simon Crisp's column in our Labs' feature).

Although this makes it sound like an exotic sub-atomic particle, the product actually represents an unusual step for Intel in that it's a blanket platform name for several technologies. These include the new processor itself, the integrated wireless 802.11b Wi-Fi solution (Intel has now decided that it owns the English language and has invented the word 'unwired' to describe this feature) plus the Intel 855 core logic chipset.

The advantages of Centrino are said to be reduced power consumption and the ability to fit into smaller and lighter notebook PCs. Centrino will be introduced in the first half of this year, so we expect to see the first vendors knocking on our doors in the very near future. ***KELVYN TAYLOR***

Windows 95 support to end

Support for Windows 95 and Windows NT 3.5x operating systems has ceased as of 31 December 2002

Microsoft ceased offline help for the operating systems over a year ago, but had continued to offer a limited online service. Now that this has ended no more patches specifically aimed at flaws in these operating systems will be developed. This also means that users will be unable to get advice or help directly from Microsoft.

Although ending support for the operating systems is likely to affect only a few people with older or secondhand PCs, support for three other major operating systems is due to enter the extended stage, where only general online help is offered, later this year. Offline support for Windows 98, Windows 98 SE and Windows NT4 will cease in June this year. ***DINAH GREEK***

OPINION
GUY KEWNEY

2003: THE YEAR OF EXTREMES

It's going to be a year of extreme performance. The benchmark test has had little of interest to say to many of us for some while: but that's going to change this year.

I got two views of these extremes of this recently. One was at the low end, which frightened me; the other was at the high end, with the first 64-bit machine.

The first was at a picturesque spa village in Italy, where I saw HP's plans for 'imaging', In order to impress us with just how their cameras are coming on, they let us play with the 850.

Just a camera, I thought, but I asked HP's chief imaging technologist, John Meyer who is director of the Hardcopy Technologies Laboratory, what sort of processing power was hidden in this piece of kit. It's not a standard microprocessor, he told me. Rather, it's a custom logic array, capable of very fast processing for short snatches and then a shut down. It has to calculate exposure, focus and a dozen other parameters quickly enough that the picture you take isn't two or three seconds later than the one you wanted to take.

The first clue that there was something bigger than a Z80 chip inside was when the batteries ran down, with the 64MB Secure Digital card not yet full. 'Yes, it's quite a lot more powerful. We'd say that processor ranked alongside a Pentium II at 300 MHz,' confirmed Meyer.

By contrast, a couple of weeks earlier, wandering around Microsoft's IT Forum (a conference primarily aimed at MS Exchange users, but now expanding to cover mobile IT) we bumped into a relaxed looking AMD team, with a working sample of its high-end Hammer chip, in both single and dual processor configurations.

Intel, of course, was showing its Itanium box at the same show and it became rapidly apparent that while you might long for something as powerful as Itanium on your desk, that wasn't going to be an option. If you wanted a 64-bit desktop, you would have no hesitation in going for the Hammer-based product.

The most impressive bit was being able to rest my hand on the Hammer chip while it ran. I couldn't tell the clock speed, but I could ascertain from this simple test that power consumption was down, which brings us back to those benchmarks.

Benchmarking processor and PC speed is an esoteric subject. For example, I recently discovered that you can actually 'reduce' the speed of some new AMD chipsets with built-in graphics acceleration on the motherboard—by adding memory!

It seems that there are three banks of RAM: if you populate banks one and three, performance under heavy graphics acceleration is at its best; if you put bank two in, as well, it slows down. But speed isn't the only thing we should be testing using benchmarks. Heat is another—heat is directly translated into battery drain and increasingly, we expect our IT equipment to be able to run off stored power.

The concept of a 'desktop system' will become obsolete in many parts of the market, as people choose between Tablet PCs, notebooks and mini-notebooks, and smart displays. I also expect the rack-mounted system to disappear from public view. And I'm expecting power consumption, even in rack-mounted systems, to become a real issue.

I don't just mean 'you have to have a power supply for backup for servers', though you do. I mean that the sheer amount of power we're going to need is going to go up rapidly over the next two years, as new applications come online. Domestic systems with on-the-fly digitisation of video streams will heat up the MIPS indicator. Office systems with bigger and better Web server abilities will crank up the clock speed and the storage, and all this will have to fit into smaller spaces.

And the sort of ultra-reliable air-cooling you need for that is big, expensive and a nuisance. So people are going to want machinery that simply doesn't generate all those calories, or soak up all those kilowatt-hours.

So we will indeed get more and more interested in the speeds of our processors this year. But, even more, we'll start studying other characteristics and look for new benchmarks to test them against. The economy may not overheat this year, but I think the PC business may well warm up a lot.

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vnu business publications

PERSONAL COMPUTER WORLD

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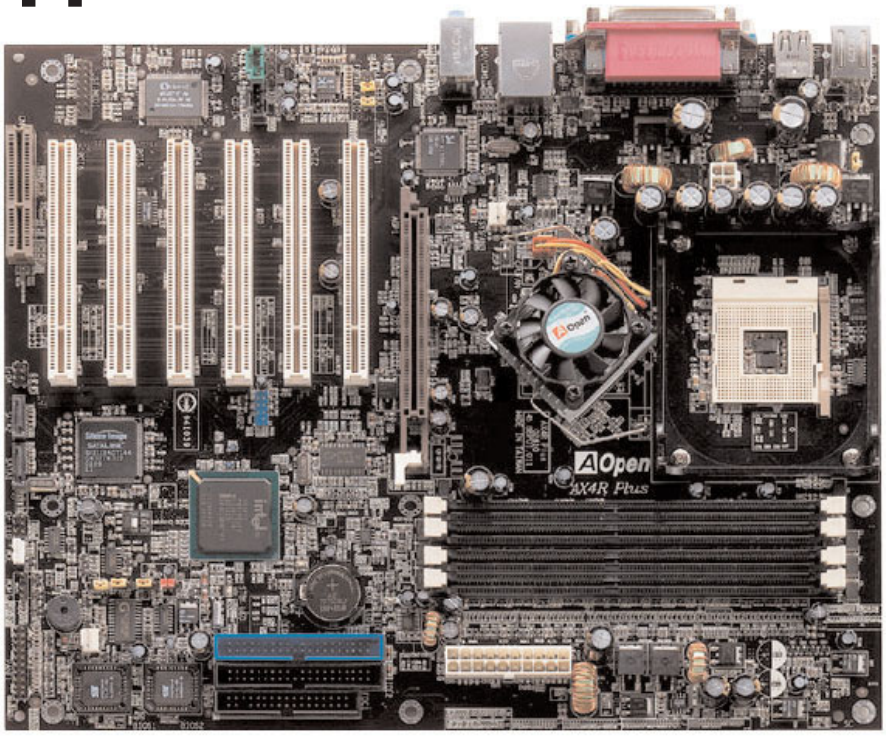
High-end motherboard with support for Intel's latest chip



◀ AOpen's latest motherboard, the AX4R Plus, features Intel's latest chipset, the E7205 (also called Granite Bay), offering dual DDR266 memory for the Pentium 4

MOTHERBOARD

Intel's latest high-end performance workstation chipset is the E7205 (also known as Granite Bay), the major feature of which is dual DDR266 memory channels, providing a memory bandwidth of up to 4.3GB/s, the same as the 533MHz FSB. It also supports AGP 8X and the ICH4 Southbridge provides support for up to six USB 2.0 ports, Ultra ATA/100 and an updated AC'97 audio controller, providing Dolby Digital 5.1 audio support. It also supports Intel's Hyper-Threading (HT).

AOpen's AX4R is one of the first motherboards that implements the new chipset and it's packed with features. There's an integrated 10/100Base-T NIC, Realtek Dolby Digital 5.1 audio, Serial ATA, Dual BIOS support plus four USB 2.0 ports

It's well laid out and has plenty of room around the components, with the exception of the memory locking latches and the AGP slot. There are four DIMM slots, which can accommodate up to 4GB of memory, which AOpen states must be non-ECC DDR-SDRAM.

The BIOS allows you to increase the FSB, AGP and PCI bus speeds in 1MHz steps. The voltages for the CPU, AGP and memory are adjustable too. The board also comes with AOpen's Watch Dog Timer, which detects boot failures and resets the BIOS speeds to the defaults before rebooting.

Both the E-IDE ports and ATX power connector are on the far right, so this area of the board needs to be braced—we'd suggest you use all the screw holes possible for this board. Some thought has been given to the placement of the various headers, which are grouped on the edge of the board and not spread all over the place.

The AOpen AX4R Plus comes with lots of utilities: AOconfig, a system detection utility; EZRestore, which restores your PC if it's attacked by a virus or bad software installation; and EzWinFlash, to help you flash the BIOS from within Windows. *SIMON CRISP*

PC Magazine Lab tests
AOpen AX4R Plus

Overall performance
Business Winstone 2002
32.5

System performance
Content Creation Winstone 2003
46.8

The AX4R Plus is the first motherboard we've tested using Ziff Davis Media's latest benchmark, Multimedia Content Creation Winstone (MCCW) 2003. We'll be using the AX4R Plus as our reference motherboard from now on. Our testbed for motherboards uses a 2.8GHz Pentium 4 CPU, 512MHz of DDR333 (PC2700) RAM, an nVidia GeForce Ti 4600 graphics card and 40GB Fujitsu MPG3409AH E-IDE hard disk drive.

AOPEN AXR4R PLUS

Verdict Feature-rich, easy-to-use and stable board, with a degree of future proofing built in

⊕ **Comprehensive features; good utility bundle**

⊖ **Memory locking latches obstructed by the AGP slot**

Fact file

Form Factor ATX
CPU Supported Pentium 4
Chipset Intel E7205
Memory slots 4
Max Memory supported 4GB
Memory type DDR200/266 (non ECC)
PCI slots 6
AGP slot 8X AGP
CNR slot Yes
I/O ports 2 x PS/2, 4 x USB 2.0, 1 x RJ45, 2 x serial, 1 x parallel, 3 x audio (line in, line out , mic)
Contact AOpen www.aopen.com
£106 (ex. VAT)

Slimline solution for the space-conscious business

COMPACT PC

As more and more businesses find desktop space at a premium, the need for compact PCs becomes even greater. Dell's Optiplex range already includes some small form factor desktops, but even these are giants compared to the new SX260, Dell's smallest desktop offering.

Based on an ultra-compact chassis, the SX260 is just 24.7cm high by 8.5cm wide with a depth of 24.2cm and has a range of mounting options: chassis stand or under-desk mounting plate (both supplied as standard), or it can be wall mounted (the bracket is an optional extra costing £20 ex. VAT). There's also an option to make it into an all-in-one unit with a special monitor mount that comes with the 15in Dell 1504FP TFT panel option reviewed here.

There's a host of processor options with the SX260, the one reviewed being powered by a 2.8GHz Pentium 4 with 512MB of PC2100 DDR-SDRAM memory, giving it creditable performance. It uses a separate power supply 'brick'—one of the few disappointments, but almost inevitable for a system of this size. The system's very quiet in operation.

There's a two-way lock system that can be used to open either the cover of the SX260 or allows access to the hard disk drive bay. On opening the cover you'll be confronted by a huge plastic duct lying over the processor, which has an equally big heat sink on it. The duct helps cool the processor with the aid of two rubber-mounted (and very quiet) Nidec fans. Moving the locking latch the other way allows access to the drive bay and the lock for the front modular bay. For storage, there's a 2.5in 40GB Hitachi DK23EB-40 hard disk (the 20GB option is £30 cheaper). The modular bay can take a number of drive options: floppy disk drive, 24X CD-ROM, 8X DVD, 24X CD-RW, Zip 250 or 24X DVD/CD-RW combo. The reviewed system came with the floppy disk drive and DVD/CD-RW combo options.

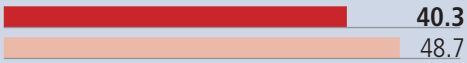
The SX260 is an IT managers dream as the only empty slots are the two DIMM memory slots, reducing the possibility of unauthorised upgrades. Physical security is well addressed—the SX260 has a lockable rear cable cover, a chassis intrusion switch and a Kensington Lock slot.

The SX260 comes with Windows XP Professional installed, but can also be specified with XP Home Edition or Windows 2000. It's backed by the normal Dell three-year Next Business Day on-site warranty. The Dell SX260's a bit of a latecomer to the micro-desktop world, but it's an attractive concept that should prove popular with space-conscious businesses. *SIMON CRISP*

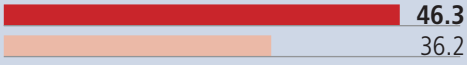
PC Magazine Lab tests
Dell Optiplex SX260

System performance
Business Winstone 2002

Multimedia performance
Multimedia Content Creation Winstone 2003



3D performance
3D Winbench 2001



Reference—2.8GHz Pentium 4, 512RAM, 120GB hard disk drive, nVidia GeForce4 Ti 4600 graphics card

The Optiplex SX260 performance lags behind the reference system, but is still more than adequate for office applications. Of more interest to potential users is its small size and security features. It lags behind the reference machine mainly due to its much smaller and slower hard drive, coupled with a slower graphics subsystem. The reason for the poor performance in relation to the reference system is down to its storage and graphics subsystems.

DELL OPTIPLEX SX260

Verdict A small, powerful and quiet desktop unit with a wide range of configuration options

⊕ **Small size; quiet; can be configured as an all-in-one unit**

⊖ **No expansion capability; separate power supply**

Fact file

Form factor Desktop
CPU 2.8GHz Pentium 4
Memory 512MB PC2100
Max. memory 2GB
Graphics 64MB Intel Integrated graphics
Monitor 15in. Dell 1504FP TFT
I/O ports Parallel, serial, VGA, RJ-45, 6 x USB 2.0 (two front four rear), 2 x PS/2, microphone, headphone (front), line in, line out (rear)
Hard Drive 2.5in 40GB Hitachi
Contact Dell (0870) 907 4156 www.dell.co.uk

Price £1,299 (ex. VAT)

◀ **Dell's Optiplex SX260 is the smallest in the range yet, with the added advantage of either desktop or tower format**

High-capacity drive

HARD DISK DRIVE

While the long-awaited Serial ATA drives are just beginning to appear on the market, some drive manufacturers are still pushing the boundaries of the existing ATA format.

Western Digital's latest high-performance drive, the Caviar 2000JB or as Western Digital prefer to call it Drivezilla, continues the trend set by the earlier WD1000JB and WD1200JB drives (100 and 120GB respectively) and packs 66GB onto three platters for a massive 200GB capacity.

With a spin speed of 7,200rpm, an Ultra ATA/100 interface and a massive 8MB buffer, the Caviar 2000JB is just the job for large file transfers. Because of the potential problem of older motherboards not having 48-bit LBA support (for recognition of drives over 137GB capacity), Western Digital packs a Promise Ultra133 controller card with the retail box version.

The Caviar 2000JB is very quiet, even when under heavy load and it also doesn't appear to generate too much heat either. The Caviar comes with a standard Western Digital three-year replacement warranty. ***SIMON CRISP***

WESTERN DIGITAL CAVIAR

Verdict As with its smaller capacity JB-series siblings, the Caviar 2000JB offers excellent performance.

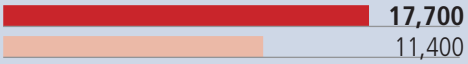
⊕ **Fast; huge capacity**
⊖ **Expensive; requires 48-bit BIOS support**

Fact file

Capacity 200GB
Platter size 66GB
No. of platters 3
Max. memory 7,200rpm
Cache size 8MB
Contact Western Digital
www.westerndigital.com
(01372) 360055
Price £241.17 (ex. VAT)

VNU Labs tests
Western Digital Caviar 2000JB

System performance
Business Disk WinMark 99



Reference—Seagate Cheetah X15 36P

The Caviar 2000JB from Western Digital uses its capacity, fast spin speed and huge 8MB cache to good effect, as it's the fastest drive we've tested in VNU Labs to date

EXCLUSIVE PREVIEW

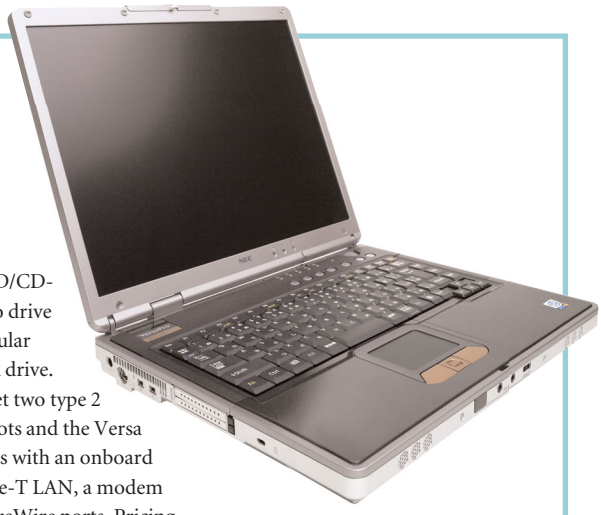
Nec Versa P700

NOTEBOOK PC

NEC kindly supplied us with a pre-production model of its latest Versa notebook PC—the P700, aimed at the desktop replacement segment of the laptop market.

The most unmissable feature of the P700 is its amazing screen. The 15in. TFT display is powered by a 64MB ATI Mobility Radeon 7500 and has an astonishing native resolution of 2,048 by 1,536 pixels. This is known as Quad XGA and is a first for a notebook PC. The P700 certainly lets you cram an awful lot of windows onto the screen, although most users will need to increase the Windows' DPI setting to make system fonts more readable.

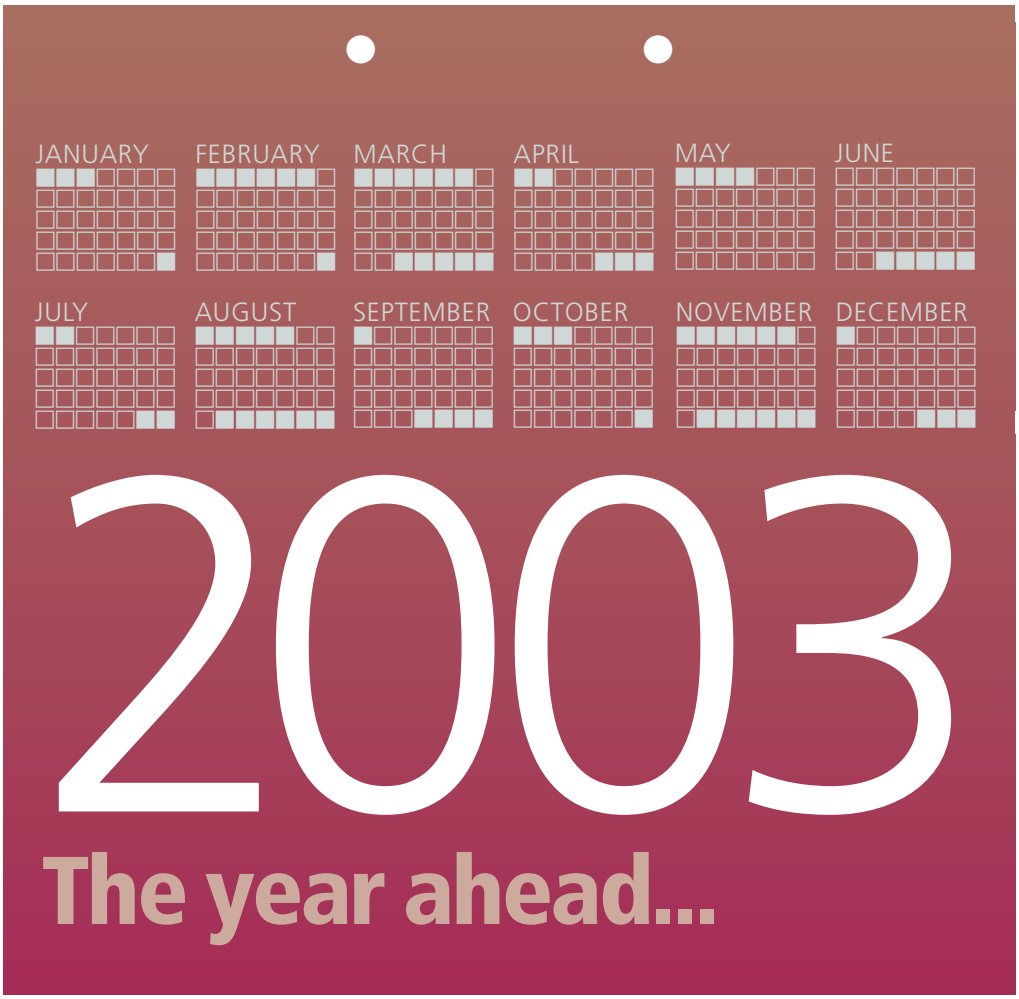
Our review model was powered by a 1.8GHz Pentium 4 with 512MB of DDR memory, so performance wise it should be fast enough for everyday office use. A Pentium 4 2.2GHz option will also be available when the product is launched in February. However, as it's an early production model we were unable to run any benchmarks. It's a three-spindle, two bay design—our sample was fitted with a 40GB Hitachi hard drive, DVD/CD-RW combo drive and a modular floppy disk drive. You also get two type 2 PC Card slots and the Versa P700 comes with an onboard 10/100BAse-T LAN, a modem and two FireWire ports. Pricing for a 1.8GHz model with 256MB RAM, 24X CD-ROM drive and 20GB hard disk drive should be around £1,538 (ex. VAT). It's an impressive machine, although at 4.5kg no lightweight, but the screen alone will be a strong attraction for many. ***SIMON CRISP***



▲ **The NEC Versa P700's screen has the largest resolution yet seen on a notebook PC**

Contact NEC
www.nec-online.co.uk
(0870) 010 6328

Windows XP
All you need to know about multimedia



We asked VNU Labs' brightest technical brains to forget the tests running on the benches and consider what the year ahead holds for us all

HIGHLIGHTS

- **Alex Arias worries about the waste products that the technology industry just keeps on generating**
- **Kelvyn Taylor investigates IBM's autonomic computing and Windows stability issues**
- **Paul Monckton examines the high-resolution world of display technology**
- **Simon Crisp prepares for the processor and chipset invasion set to hit his desk**

Contributors Kelvyn Taylor, Paul Monckton, Simon Crisp, Alex Arias

Imagine if you were lucky enough to have a job that involved tearing open brand new boxes crammed with shiny leading-edge computer products every day to find out how they tick. That you had the time and resource to determine what's good and what's bad about them and how fast they go once the accompanying marketing manager has left the building.

Granted there aren't many such plum jobs around in the UK, but VNU Labs has four of them as well as four of the very best incumbents (sorry, no vacancies), who have cut their teeth and developed their skills and knowledge in *PC Magazine*'s own PC Labs over many years, before migrating these skills across VNU's portfolio of publications.

To kick the New Year off and give our most favoured *PC Magazine* readers a real techie treat we asked each of our Labs fiends to come up with their own personal view of the year ahead and to describe the top technical issues they're expecting us to face.

It's a request that has delivered a predictably mixed bag of responses, given the diversity of the team. We've got everything from Kelvyn Taylor telling us about a generation of computers that will heal themselves, through to Paul Monkton's relentless fascination with impossibly high-resolution screen technologies (you can tell that he hasn't yet discovered the usefulness of reading glasses) and why we need them. From an invaluable round-up of what benefits the raft of new Intel and AMD processors we expect to see coming through our doors this year will bring from Simon Crisp through to Alexander Arias' recent experience of clearing our VNU Labs and why it has made him more than a little concerned about our failure to adequately recycle the lethal cocktail of chemicals that go inside every electronic product.

I hope you'll all agree that it makes a varied and fascinating technical read. As always we'd love to hear some of your predictions about the year ahead, whether they be products, technologies or IT market trends. Just drop us a line to feedback@pcmag.co.uk and tell us what you're expecting, technology wise, to see or happen this year…

200GB!
Western Digital's stormer

ALEX ARIAS

Want not, waste not

'The average PC contains at least 36 toxic chemicals, including compounds of lead, barium, boron and cobalt—leading to a toxic chemical cocktail in the ground'

After a recent clear out of VNU Labs I was astonished at the quantities of CD-ROMs, broken motherboards and other hardware odds and ends that we were about to throw out. The hardware was sent for recycling, but there's very little you can do with CDs.

A quick Web trawl leads to some novel suggestions on recycling CDs—from constructing a baby's mobile, to creating tiled mosaics from broken CDs. However, at first glance I could find little interest in recycling from either commercial companies or manufacturers—surprising considering the gold and silver deposits on some recordable CDs.

Alas, my initial research on UK and US sites led me to believe that the numbers don't add up and it's simply uneconomical to recycle CDs. But this just proves that you shouldn't believe everything you read on the Internet. The Germans already have an industrial plant to do just that. In the UK, recycling IT equipment has never really been at the top of the political agenda. There are banks in supermarket car parks for practically everything else, so why not for CDs or PCs?

This could of course all change with the prospect of council tax bills increasing with the rise in land fill tax. Hitting people's wallets is always guaranteed to focus attention, even if they have no real concern for environmental issues. CDs are really just a fraction of what's thrown away. The term e-waste is often used to describe this type of junk. Within the IT Industry there has always been some degree of cannibalism—sorry, recycling—but this only addresses part of the issue.

Although current recycling methods are rudimentary, the trend to donate redundant PCs to third world countries may be a noble sentiment but there are often unforeseen consequences. Although the systems may be put to good use, once they do finally die they're often just dumped, potentially leading to a toxic chemical cocktail in the ground. The average PC contains at least 36 toxic chemicals, including compounds of lead, barium, boron and cobalt, according to a report from the Silicon Valley Toxics Coalition.

So who clears up the mess? Has the PC Industry as a whole reached maturity, acknowledging the potential environmental dangers of its products? Perhaps it's time for the PC industry to gets its house in order, just as the automotive industry was forced to in the 1990s.

This idea of manufacturer responsibility is certainly not new and many industries are currently being forced to take a closer look at their products' complete life cycles. This is certainly the way forward but, depending on the way it's handled, it could have a tremendous effect on the IT industry.

The current economic climate offers a convenient excuse to put these issues on hold and I suspect this is where the PC manufacturers would like it to remain. Passing such costs on to the consumer in a weak market would be corporate suicide.

Although there's been little visible action, recent developments from companies, such as NEC and their PowerMate Eco PC (using simple strategies like lead-free solder), shows that the problems are starting to be acknowledged. Fujitsu Siemens has also developed biodegradeable plastics for use in its notebooks, but this isn't expected to be widely implemented until 2004. The technologies that will enable environmental needs to be addressed without stifling technological progress aren't far away.

Legislation in the US and Japan has prompted most of these developments. Closer to home the European directive known as ERP (Extended Producer Responsibility) has made a significant start and within the UK, the Product Responsibility Initiative (PRI) has resulted in some amendments being made to the 1995 Environment Act to include electronic waste. The PRI, however, only commits the government to discussing with industry ways to reduce waste and recycle components.

The practicalities are considerable, particularly in the light of the abysmal recycling infrastructure in the UK. Recycling has to become part of a viable industrial base, but the lessons must be learned from the fiasco of mountains of fridges and freezers currently waiting to be decommissioned.

An integrated approach needs to be taken, with the base systems of PCs designed for recycling, plus incentives for end users to recycle equipment. Ultimately it will require tough laws to be passed to force the industry to adhere to best practices.

The computer industry should start taking environmental issues much more seriously, even though the argument may fall on deaf ears during the current economic malaise. Manufacturers facing tough times are unlikely to invest heavily in recycling or eliminate hazardous materials from IT equipment without consumer pressure or regulation. And will consumers be willing to help foot the bill? I doubt it—you've only got to look at the EU's dismal progress on enforcing its latest car recycling laws. Some countries already charge drivers extra on new car registrations to cover some of the costs of recycling. But that would certainly be a hot political potato in the UK. And guess which country's on the EU's lengthy hit-list for non-compliance fines.■

KELVYN TAYLOR

PC, heal thyself

'People moan about Microsoft being dictatorial, but if users actually want autonomic systems they'll have to accept a new level of dictatorship'

Autonomic is not a word I'd heard used in relation to PCs until a recent IBM press conference. In fact, I'd never heard the word at all, so off I went to consult the Oxford Reference Online Web site (www.oxfordreference.com). All the references there turned out to be related to biology or psychology—apparently the autonomic nervous system is the bit of our nervous system that governs involuntary things, such as breathing and digestion. Another definition is 'self-regulating or self-governing', which makes more sense in the context of IBM's briefing.

IBM's Autonomic Computing Initiative (the predecessor of which, Project eLiza, was given the task of creating autonomic servers) encompasses a broad range of software, hardware and services all supposedly intended to take the pain out of running a modern IT infrastructure. However, the bit that caught my attention was the discussion about autonomic systems. IBM identified four characteristics of a self-managing system: it should be self-configuring, self-optimising, self-protecting and self-healing. IBM talks about computing systems rather than individual PCs, but the principles should presumably apply to any part of the system.

So how far down the road are we to any of these goals in relation to the humble desktop PC and is it realistic to envisage a future where your computer looks after itself, without entering the realms of science fiction?

A surprising number of the basic technologies required are already in place—it's just that they're generally restricted at present to mission-critical enterprise servers, such as IBM's eServer z900 series. This behemoth features almost Douglas Dakota-like (or Terminator-like) abilities to trundle on when bits of it are missing or broken. A CPU fails? No problem, it's got a few spare and can easily shift the workload somewhere else. Memory bits zapped by stray cosmic rays? Child's play. Chipkill memory technology can protect against multi-bit errors or even single chip failures. And the Intelligent Resource Director software ensures that every resource is pulling its weight, moving work around to underemployed areas as necessary.

However, many similar features are starting to filter down to Intel-based server technologies, such as RAID and ECC memory protection and other fault-tolerant hardware gizmos, have been around for some time. Now we're seeing automatic installation programs, memory redundancy, advanced 'watchdog' programs that can diagnose and fix potential hardware and software problems or call a service engineer in, and so on.

Such technologies will filter down to the desktop. In fact, there's a lot already in place. ECC memory correction guards against dodgy memory bits; SMART hard disk technology can provide advance warning of hard disk failure; system health monitoring is now standard on most PCs; and thermostatically controlled variable speed fans are the norm for power supplies and CPUs.

Microsoft has done a lot over the years to make its notoriously unstable operating systems and productivity software more robust. Windows XP offers system file protection, System Restore, automatic updates and driver rollback capabilities and other useful anti-failure technologies, such as UPS support, inherited from NT 4.0 and Windows 2000.

Since starting to use Windows XP, I've had a lot fewer problems with system software stability. The problems that I've had tend to be with hardware faults in motherboards or add-on cards, such as NICs. But there's still some way to go before I could say that my PC was an autonomic system—if it was, self-protection mechanisms wouldn't have let me install the rogue bits in the first place. People moan about Microsoft being dictatorial, but if you want autonomic systems you'll have to accept a new level of dictatorship.

The day will come when it'll be impossible to install software or drivers that haven't been formally approved by Microsoft's WHQL certification process. That's certainly what happens with enterprise-level systems and, to a certain extent, high-end workstations. It'll probably add cost to the average PC system and annoy a lot of users (and shareware developers) who have to throw away their favourite old peripherals, cards and applications. But the goal of backwards compatibility must eventually come to an end if progress is to be made. Perhaps when 64-bit systems migrate to the desktop in a couple of years' time there will be an ideal opportunity to start afresh. There are, however, already signs of compromise in the fight between AMD and Intel to tout which 64-bit processor has the best legacy 32-bit compatibility. Intel would like nothing more than to ditch the whole millstone of the severely creaky x86 architecture, but currently it would be commercial suicide.

So the next time your Windows XP system prompts you that it's going to set a new System Restore point because a new driver hasn't been digitally signed, be thankful that it's giving you the choice. The dream of a self-managing PC may be a pleasant one, but it's not going to happen without some of the currently cherished notions of personal 'choice' being tested to breaking point.■

PAUL MONCKTON

New Year resolutions

For many, the electronic display of formats designed for print (such as e-books) lack one vital attribute—readability. The printed page has always offered far sharper images and clearer text. But during the coming year you'll start to see displays that potentially approach the quality of the printed page. But a lot of you don't appear to want them.

Many people have display hardware capable of resolutions far in excess of 1,024 by 768 pixels, but avoid the higher resolutions because it makes their fonts and icons 'too small'. For example, our Systems department ordered some new notebook PCs and, because they are caring individuals, opted for the latest high-resolution displays only to be confronted by the moans of users, frustrated in their attempts to drop them back to 1,024 by 768.

I prefer the other extreme. I run a four-monitor system with each display pushed to the maximum resolution—I find the prospect of performing 1,024 by 768 keyhole surgery on one of our many enormous spreadsheets all but unthinkable. I'll have as many pixels as I possibly can, thank you.

But why is this? Increasing screen resolution allows you to do two things: make things smaller without them becoming pixellated and blocky, or to keep things the same size but increase image clarity. If your goal is to display as much as possible on your screen, then you'll want to do the former. There comes a point, however, when you're going to have to do some of the latter. I'm well known among my colleagues for running perversely high-resolution displays with tiny fonts. But, even for me, the line is crossed at 170dpi.

In this issue of, we've reviewed NEC's new Versa P700 notebook PC. It has a 15in. TFT display with a native resolution of 2,048 by 1,536 pixels, which is equivalent to 170dpi. Now, no matter how sharp the display is the default fonts and icons are just too small. No, trust me—they really are. By default, Windows assumes you have a display resolution of 96dpi. The higher the actual dpi is above this figure, the smaller your fonts and icons will become. At 170dpi the difference is just too great and something needs to be done.

So, I've tweaked Windows' resolution to 170 pixels per inch and resized my icons so they're 177 per cent of their original size. And now I have a desktop that looks just like a normal 1,024 by 768 desktop with a substantial gorgeousness upgrade. Without the aid of reading glasses, I can appreciate the many benefits of this high-resolution display. You can read a full page of, say, this e-book, without having to zoom in to read even the smallest text. Display a PDF of the London Tube map and you can view it full screen with every station name clearly visible and not a hint of jaggedness.

Unfortunately, there are still problems. Many applications and a huge number of Web sites just aren't set up to properly deal with high-resolution displays. My desktop icons and fonts look great, but the toolbar in Acrobat Reader is stuck firmly in Teeny-Weeny Land with no hope of escape. Go to a Web site, such as (plucking a random sample out the air) www.pcmag.co.uk, and the same is true of every font on the page. It's not uncommon to find applications with buttons with text that's now too big to fit within them. As anyone who's had to use Windows' accessibility options to enlarge their screen fonts will tell you, these problems have been there since the Large Fonts option first became available—but now it's going to affect everybody.

These problems exist because Windows and Windows developers often assume you have a screen resolution of 96dpi and that if you haven't... well, it'll probably be close enough not to matter. By specifying image and font sizes in terms of pixels instead of point sizes they've robbed you of any control over how big these elements appear on screen. Microsoft has published information (http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dngdi/html/highdpiapp.asp) to help programmers deal with these issues, but many have yet to take notice. If an object's size is defined in terms of pixels and your pixels are tiny, then guess what happens? Your only options are to either force the developer to re-draw everything large, just for you, or to make your own pixels bigger. In the absence of applications that will allow you to draw everything double the size (big *hint* to browser developers) you're going to have to lower your screen resolution.

Luckily on the NEC Versa P700, the ATI graphics control panel has a handy quick resolution switcher applet. Because 2,048 by 1,536 is exactly double 1,024 by 768 in both directions, reducing your settings to the latter doesn't invoke the ugly expansion artefacts you usually see when running an LCD panel at less than its native resolution. Yay!, you can finally read the page—but that's really not the point, is it?

My hope for the coming years is that once the proliferation of high-resolution displays reaches a critical mass, the distinction between programming for screen and print will begin to disappear. That way, those of use who appreciate high-resolution displays can use them effectively. And those who don't probably won't even notice. ■

'I run a four-monitor system with each display pushed to the maximum resolution. On my display, I'll have as many pixels as I possibly can, thank you'

Intels latest
AOpen's motherboard uses Intel's latest chipset

SIMON CRISP

View from beyond the bench

As another New Year dawns it seems like a suitable time to mull over what hardware we can expect to see landing on the VNU Labs test benches this year. Despite the continuing slump in PC sales, component manufacturers are showing no let-up in the endless charge towards better, faster and bigger. My crystal ball, an essentail bit of testing kit, is still a bit cloudy on some of the details, but let's see what major trends we can spot.

All eyes will be on Intel in the early part of the year as the much talked about Banias (now known as Centrino, which sounds like something you'd find in a particle accelerator) platform is launched. Centrino is set to revolutionise the mobile market—it's built from the ground up as a purely mobile platform and promises fast performance with much lower power consumption. This is achieved by shutting down whole sections of the processor when they're not needed. Centrino also features integrated 802.11b wireless functionality and a thin form factor. This all adds up to some interesting times ahead for notebook PC manufacturers as lighter and slimmer mobile systems become easier to build.

Not to be outdone, AMD plans to launch its new uPGA-socketed mobile Athlon XP, which has the advantage of being thinner than the current Socket A models. This means they can finally be used in ultraportable systems, not just the huge desktop replacement slabs they're now found in. Seriously challenging Intel's grip on the mobile market isn't going to be easy, however. Later in the year we should see the launch of the mobile version of the Athlon 64-bit platform (referrred to as ClawHammer). Intel is gearing itself up for the launch of the Prescott core at the end of the year, but in the meantime the 800MHz FSB, 0.13-micron (Northwood) Pentium 4 processors should be launched before then.

On the CPU front, AMD's new processors should launch this year. These include the Opteron (SledgeHammer); the new Athlon MP (built on the Barton core) for servers and workstations; and the Athlon 64 and Athlon XP (Barton core) for desktops. Both the Opteron and Athlon 64 feature 64-bit architecture using a 0.13-micron core and are expected to have larger Level 2 cache sizes than previous AMD processors. As you might expect there's going to be a multitude of chipsets to support these new CPUs. AMD, ATI, nVidia and VIA all have chipsets planned.

Intel's Springdale chipset should also see the light of day during 2003. This is a dual-channel DDR-SDRAM solution for desktops (the current E7205, or Granite Bay, is aimed at the workstation market). Rumours are that it will support both dual-channel DDR333 and DDR400 memory, the latter being needed for the 800MHz FSB.

Early 2003 should see the launch of the next version of VIA's KT400 chipset, the 400A, which is a dual-channel DDR-SDRAM solution. Another dual-channel chipset is the SiS655, which supports dual DDR333 channels. SiS is the only non-Intel vendor with chipsets supporting Intel's Hyper-Threading (HT) Pentium 4s. The B steppings of the SiS655, SiS658, SiS648, SiS645DX, SiS651 and SiSM650 will all feature HT support. ATI is expected to develop integrated HT-enabled chipsets for the Pentium 4, as is its rival nVidia.

Graphics hardware is also going to see some fierce turf wars in 2003. February should finally see the launch of nVidia's answer to the ATI Radeon 9700—the GeForce FX (NV30) based on a 0.13-micron die and a core clock speed of around 500MHz. Further down the performance scale is the NV31 (a GeForce4 MX replacement) and its mobile sibling the NV31M. Expected to be a cut-down version of the NV30, sources on the Web have reported that the NV31 will be launched at the CeBIT trade fair in March. If that's the case, then ATI will no doubt also have products to show, such as the R350 core, which is an enhanced R300 (Radeon 9700) core allowing for higher clock speeds. And SiS, building on the success of the Xabre 600, will be launching the Xabre II, offering DirectX 9 support and 8 rendering pipelines, each with a single texture unit.

Storage, predictably, will get even bigger. As 80GB platters become the norm and 48-bit LBA BIOS support becomes widespread, 300GB plus isn't out of the question. 2003 should also be the year when the long-awaited Serial ATA interface becomes a practical option.

Also look out for more and more miniature PCs. It wasn't so long ago that these weren't much more than gimmicks, but since the launch of Shuttle's impressive 'barebones' systems based on the VIA ITX and Intel flexATX platforms, interest has surged. Now there's a multitude of mini-PC cases out there for those wanting to build their own space-saving system. And with Intel getting interested in PC gaming (it's recently launched the Intel Masters Gaming Championship) and customised cases becoming available over the counter, some of the fun that's been missing for years seems to be coming back into PCs. And there's only one response to that. Hooray! ■

'Graphics hardware is going to see some fierce turf wars in 2003. February should finally see the launch of nVidia's answer to the ATI Radeon 9700—the GeForce FX'

WINDOWS XP

HEIKO MERGARD

Multimedia with Windows XP

The first step towards problem-free use of XP's multimedia features is the correct configuration of your system and its components. These practical tips show you how to make the best use of all XP's graphics, audio and video functions

KEYPOINTS

- Sound
- Display and video
- Codec management
- Multimedia troubleshooting, add-ins and toolkits

Windows XP's standard installation includes a wide range of multimedia tools. For example, you can record short audio clips without the need for additional software. Windows Media Player 8 doesn't just play CDs, audio and video files, it also plays DVD-Video and Web Radio. A simple tool for video editing and audio dubbing is also provided in the form of Windows Movie Maker.

Well configured

The configuration of the BIOS, operating system and applications is, however, of fundamental importance. You'll find practical tips for optimising audio settings starting in Section 1 , including hardware acceleration, hidden options and sound effects. Using the right Registry keys, Windows XP can even encode MP3 files at higher bit rates than you'd expect.

Audio and video

The Windows XP graphics system and monitor settings can be improved, which Section 2, 'Display issues', covers. Playback of DVD-Videos and DivX films puts more strain on the processor and system memory than audio and graphics files. In 'Jump-free videos' in Section 3 we show you how to edit your videos efficiently and then playback smoothly.

Codecs (coder/decoder) are the basis for all playback of audio and video files. As their processes run in the background, it's easy to lose track of what's going on if particular codecs are missing. We also cover detecting, installing and managing codecs (Section 4).

Problems and solutions

Complex multimedia applications often cause difficulties. Microsoft gives some simple problem solving techniques at http://support.microsoft.com. For games, DVDs, sound and screen display see articles Q310697, Q308012, Q307960 and Q307918. We've got further tips on multimedia troubleshooting in Section 5.

How to expand the multimedia functionality of Windows XP for free is explained in Section 6. Apart from Microsoft's add-ons, good tools for the conversion of DVD content, graphic and audio applications can be found on the Internet (see Section 7).

SECTION 1

Optimised sound environments

Windows XP offers audio functionality as standard. However, to get better sound you have to find the right configuration. In addition, Media Player 8 is limited when it comes to copying audio CDs

The most important starting point for comprehensive audio configuration under Windows XP can be found under Start | Control Panel | Sounds and Audio Devices. System-wide device volume and loudspeaker settings can be made on the first tab of the dialog box (the Volume tab). Under Speaker Volume there's a check box marked Move all slide indicators at the same time—a very useful option which allows you to keep the speakers in balance.

The Advanced settings on this tab are important for determining the sound quality on the hardware you're using. On the Speakers tab of the Advanced Audio Properties dialog box, you can choose presets for headphones, stereo desktop speakers or mono for notebook PCs. There are also entries for built-in monitor stereo speakers, built-in keyboard stereo speakers and high-performance quadrophonic speakers. Windows XP even supports Dolby Surround Sound formats up to 5.1 and 7.1—provided you have a suitable sound card installed.

Audio acceleration

The Performance tab of the Advanced Audio Properties dialog box allows you to adjust further settings relevant to audio playback. By default, hardware acceleration is set to maximum. This means that all acceleration functions are active, but on slower computers this may cause sound problems like crackling or dropouts. If that happens, hardware acceleration should be set to None. Windows XP will then only use software acceleration.

The same goes for sample rate conversion quality: the default is Best, which obviously gives the best sample rate conversion. If there are sound problems, it's a good idea to try a medium setting. When using modern hardware though, the maximum values are preferable, as they make sure audio processes are completed as fast as possible and make for better quality playback.

It can also be useful to make Windows display the volume controls in the Taskbar. This is done by checking the Place volume icon in the taskbar checkbox on the Volume tab of the Sound and Audio Properties dialog box. A simple click on the corresponding

icon in the taskbar allows you to alter the overall volume, while a double-click allows you to alter the detailed settings.

You can find further audio options on the Sounds, Audio, Voice and Hardware tabs of the Sounds and Audio Devices Properties dialog box. System sounds, playback devices, their volume and settings for sound recording can be specified there. The Hardware tab of this dialog box lists all devices with audio settings. Among these are drives and sound cards as well as drivers and codecs. Useful detailed information about the individual entries can be found by clicking on the Properties for an individual item.

Media Player 8 in detail

The nerve centre for media playback under Windows XP is Media Player 8. It allows playback and visualisation of various formats and the ripping of audio CDs for conversion to Microsoft's WMA format. You can also use it to burn your own CDs and download CD information, such as covers and track information, from the Internet.

You can specify in detail which file formats are associated with Media Player from the File Types tab of the Tools | Options dialog box. For example, you might choose to play WAV, WMX, ASF and ASX automatically with Media Player 8, but other file types like MP3, MID, AIF and SND using other programs, such as Winamp.

Using the supplied SRS WOW effect settings, Media Player 8 can add a surround sound effect through stereo speakers. These effects can be activated from their own tool area in the Media Player, or turned on and off using View | Now Playing Tools. However, you need to get used to the short delay between enabling the effects and hearing the results through he speakers.

The graphic equaliser in Media Player is recommended for achieving optimal sound reproduction. The sliders can be adjusted individually, or as a loose or tight group. is a There's also a pull-down menu containing 22 presets underneath the On/Off switch. These are suitable for various musical genres, such as rock, metal, jazz and opera. You can also save your own customised settings.

You can also choose to display Lyrics under the Now Playing Tools option. This function essentially turns Media Player into a karaoke machine. Before this, the lyrics must be entered into the Lyrics tab of the Properties dialog, called by right-clicking on the track name in the playlist. Unfortunately there's no way of automatically synchronising the song and the display of the lyrics.

Another interesting feature of this software is the visualisations. Media Player uses specified algorithms to convert the audio data into animated graphics. The Visualisations tab of the Tools/Options dialog box offers a list of available algorithm groups. Their properties allow the configuration of resolution and buffer size. Obviously more of your system's resources are needed for higher resolution visualisations.

Ripping audio CDs

Also accessed via Tools/Options dialogue are the Copy Music options where you can specify the settings for copying tracks from an audio CD. The only target format Windows XP offers is Windows Media Audio (WMA). If the Protect Content checkbox is enabled, then the files can only be played on the local computer and are subject to Digital Rights Management (DRM).

Audio files can be extracted using bit rates from 48Kbit/s up to 192Kbit/s. The equivalent to CD quality is supposed to be 64Kbit/s, but experienced sound professionals should be able to detect loss of quality at that rate. One advantage is that at 64Kbit/s, a whole music CD requires only about 30MB of disk space. In order to carry out the ripping, you should simply choose File | Copy From Audio CD from the drop down menu. Individual tracks can be selected using check boxes, before Media Player automatically adds them to the media library and creates the WMA file.

If Media Player only offers WMA as a target format, it almost certainly means that an MP3 codec is missing (see Section 4 for more information). Even if it is present, the Windows tool can only encode at up to 56Kbit/s by default, which is barely tolerable from a quality viewpoint. A Registry hack can make further bit rates available. This works using the key Hkey_Local_Machine/Software/Microsoft/MediaPlayer/Settings/MP3Encoding. DWORD values named LowRate, MediumRate, MediumHighRate and HighRate can be created under this key. These DWORD entries can then each be assigned one of the following hexadecimal values:

0001f400 for 128Kbit/s
00027100 for 160Kbit/s
0002ee00 for 192Kbit/s
00036b00 for 226Kbit/s
0003e800 for 256Kbit/s
0004e200 for 320Kbit/s

Burning a WMA or MP3 CD is easy using Media Player. However, copying an audio CD is another matter. It's far too complicated under Windows XP, as Media Player first converts the CD tracks to WMA format and reconverts them for burning. This not only causes a loss of quality, but also takes an unnecessarily long time. A dedicated CD ripper (see Section 7), which quickly and straightforwardly lays down WAV files to be burned, is much more suitable.

SECTION 2

Display issues

Setting up your Windows XP system for optimal display and system performance requires a little know-how. Here are some useful tips for real graphics acceleration and professional configuration of your system

A colourful desktop with large background pictures, high-resolution icons, menu animations and effects, such as fades and rollouts, as well as shadows and the ability to display the contents of dragged windows, eats up system resources. Having these visual effects turned on all the time places a strain on your CPU and RAM. So you basically have to choose between pretty desktop settings and optimal performance.

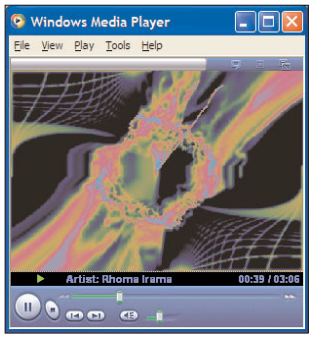
Boosting performance

The simplest way to change configuration is using the Control Panel to alter the settings under System | Advanced | Performance | Settings | Visual Effects. You can let Windows XP choose the optimal settings automatically, or choose pre-defined presets for the best appearance or performance. Custom settings allow you to choose the effects that you want.

Further performance increases in the graphics area can be achieved with little effort. On many computers with modern graphics cards with GeForce or Radeon chipsets, the AGP settings are often configured for 2X rather than 4X mode. This can be easily changed by altering the Advanced Chipset Functions in the BIOS.

Enabling Sideband Addressing and Fast Writes in the BIOS or driver speeds up the data exchange between the graphics card and the CPU if your motherboard and graphics card support these features. Something that's often overlooked, but nonetheless very advantageous, is the use of up-to-date graphics card drivers and DirectX version.

For everyday work you don't really need a colour depth of 32 bits. It's usually enough



1 **Media Player 9 offers an extended range of visualisations and a number of new skins**

to choose 16-bit colour depth, which will improve graphics performance if your graphics card is less than state-of-the-art. Windows controls this setting via the Colour Quality drop-down box in the Settings tab of Display Properties. Much more important than the colour depth is a good monitor refresh rate (if you're using a CRT monitor), which is easier on the eye. You should make sure that the rate is set to at least 85Hz (as long as your monitor supports this) in the Display Properties | Settings | Advanced | Monitor tab.

The modes that your graphics card supports can be seen from the Display Properties dialog box (Settings | Advanced | Adapter | List All Modes button). To ensure you don't choose a mode that the monitor doesn't support, which could cause damage to hardware, you can use a small trick. On the Monitor tab of the Advanced dialog box there's a check box labelled Hide modes that this monitor can't display. However, some drivers we've seen appear to grey out this box, in which case you should refer to your monitor's documentation before changing to a higher refresh rate.

Multiple monitors

Just as useful as the graphics tuning features is the way Windows XP manages multiple monitors. XP supports up to ten graphics cards and monitors simultaneously. Monitor walls remain, primarily on the grounds of cost, the preserve of specialist users, but the use of even two monitors can make many things easier. For example, tools and palettes can be pushed on to one monitor, while you have the entire a second monitor for the actual picture editing.

A precondition for this is that a PCI or AGP graphics card with the current driver for Windows 2000/XP is installed for each monitor. Many modern graphics cards already have two monitor outputs, but Windows XP only makes the dual display available when the system recognises that two monitors are attached. For this, a primary display driver that sends system messages, DVD and TV signals must be specified.

The BIOS makes the first card, the primary graphics card. By default, however, the AGP bus will be scanned after PCI slots. This isn't very useful, as an AGP card is usually better than a PCI card. Changing the AGP/PCI setup settings in the BIOS is the way to alter this. With many PCI cards it's enough to simply put the primary card in the first slot.

Virtual desktops can then be activated and sorted using the Settings tab of Display Properties. They can be moved up or down in the list by dragging and dropping. At differing resolutions, XP also displays the monitor symbols at different sizes. It's important to note that Windows XP de-activates graphic effects for all cards if there's even one card present that only supports 256 colours.

SECTION 3

Jump-free video

With the right performance tuning, Windows XP will play DivX videos and DVD-Videos smoothly, even on older PCs. Post-production and editing of your own films isn't difficult with Windows Movie Maker, but a few tricks will help

Video editing and playback are among the most resource-hungry processes for a PC. You will notice this if you want to play DivX films and DVDs using a software decoder. You need at least a Pentium III CPU running at 500MHz as well as 128MB RAM, an 8MB graphics card and a sound card that supports 16-bit/48KHz audio.

If the playback is still jumpy, the first thing to check is whether the newest graphic card drivers and version of DirectX are installed.

Fast DVD videos

A DVD-ROM drive that supports Direct Memory Access (DMA) mode is recommended—most recent drives should do. A speed advantage can also be achieved by using a reduced screen resolution, such as 800 by 600 pixels at a colour depth of 16-bit. This setting is quite sufficient for playing back most DVD-Videos.

In addition, you can increase the hardware acceleration settings for the sound and graphics cards to maximum. Windows XP allows you to configure these settings via Control Panel | Sounds and Audio Devices | Audio | Advanced/Performance. Some graphics cards, such as those from ATI, have special hardware acceleration functions for DVD playback—you'll often find settings related to these within the configuration options of your decoder software. MPEG-2 decoder software bundled with your graphics card will probably be specially coded to take advantage of such capabilities—a point to bear in mind if you decide to change to another package.

The computer and software decoder run better if the computer is rebooted before playback. Closing unwanted applications, services and processes also gives more processing power and smoother video.

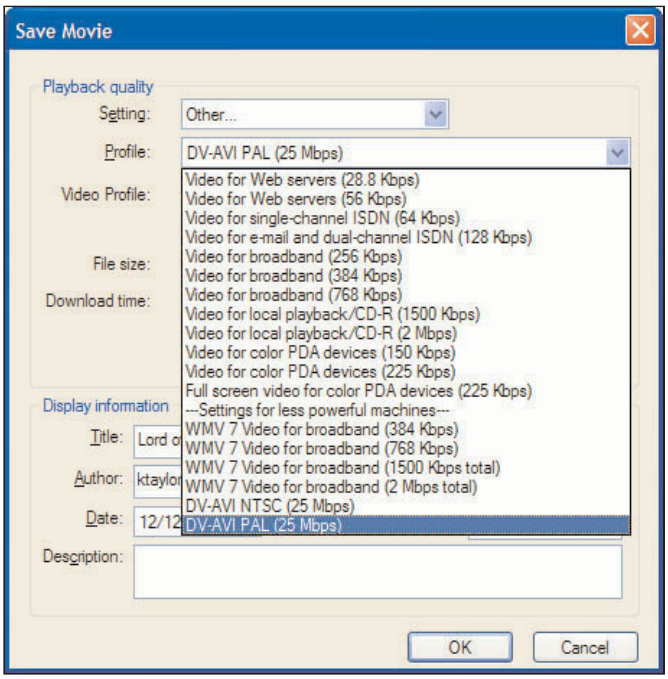
DVDs in overlay mode

Windows Media Player can be used to play back DVD-Videos, but only if a third-party MPEG-2 decoder is installed. For video play back, Windows XP allows video overlay mode, which can only be used by one program at a time. Sometimes, other programs or TV card drivers block this mode, making a restart of Windows XP necessary.

Problems can also arise if the primary graphics card doesn't support overlay. If another card that does support overlay is installed, it can be set to function temporarily as the primary display driver. This is configurable via the Display Properties settings, selecting the option to use the device as the primary display device.

Home movies with Movie Maker

For recording and managing video and audio clips, Movie Maker, which is included as standard with Windows XP, is suitable. More ambitious video users may prefer special-



1 Windows Movie Maker, bundled free with Windows XP, allows you to export video files in different qualities and file sizes suitable for various streaming applications

ised tools, such as Virtual Dub or Video Pack 5.1, which include, for example, more filters and conversion functions. Video processing with Movie Maker is limited to adding sound and simple video editing.

Movie Maker is a very practical tool for the management of video and audio clips. In the My Collections section, you can manage your files using individual directory structures. If a collection is selected, then Movie Maker will display thumbnails of the first few frames of the clip in the central window. And a symbol appears if an audio file is selected. The right-hand window is used to control media playback and has the appropriate controls. Single frame display, full screen mode and clip splitting are also possible.

You can switch between a storyboard with thumbnails of the individual clips and the audio/video time axis using the bottom window. The corresponding icon shows either a filmstrip or a red triangle with black markings. The main purpose of storyboards is for rearranging the individual video clips, whereas the timeline is used for precise video editing and sound mixing.

Audio and video mixing

Using the timeline, music and spoken commentary recorded via the line-in or microphone inputs can be mixed to fit with the moving pictures. The Record Narration icon is useful for this. Commentaries can be recorded and simultaneously synchronised to the running film. A dialog box shows what length of recording can be made on the available storage space with your current settings. At the same time, a limit on the length of the recording can be set. Proper editing is extremely important for PC-based video in post-production. Movie Maker's magnifier symbol in the timeline lets you work very precisely, by allowing the timeline to be made scaleable. However, using trim points does take practise. These mark the beginning and end of the section of film to be edited and can be positioned using the timeline. As the positioning is always relative to the edge of the clip, the functionality is severely limited.

Efficient editing

Some small tricks can speed up your work. For example, it's easy to remove a block of images from the video with the help of the preview function. Navigate to the point the unwanted images begin and click the Split Clip button. Move to the end of the block and click the button again. The block of images, which is now a clip, can easily be removed from the video by right-clicking on it and selecting Delete. The context menu also contains commands like Cut, Copy, Paste and Properties.

Using File | Save Movie or Ctrl + M, Movie Maker saves the edited collection of clips as an integrated WMV video file. In the Playback Quality area of the dialog (**see Figure 1**), you can choose the video quality and file size. The presets are related to different bandwidths for online video streaming. Using the DV-AVI PAL setting, it's also possible to save the files at a bit rate of 25Mbit/s. Movie Maker and Media Player support numerous audio and video formats, but this compatibility is limited to decompression and doesn't extend to encoding. For example, Movie Maker can import ASF, MPG, M1V, MP2, SND, AIF, ASF and MP3 files, but can only export WMV and AVI video as well as WMA audio.

SECTION 4

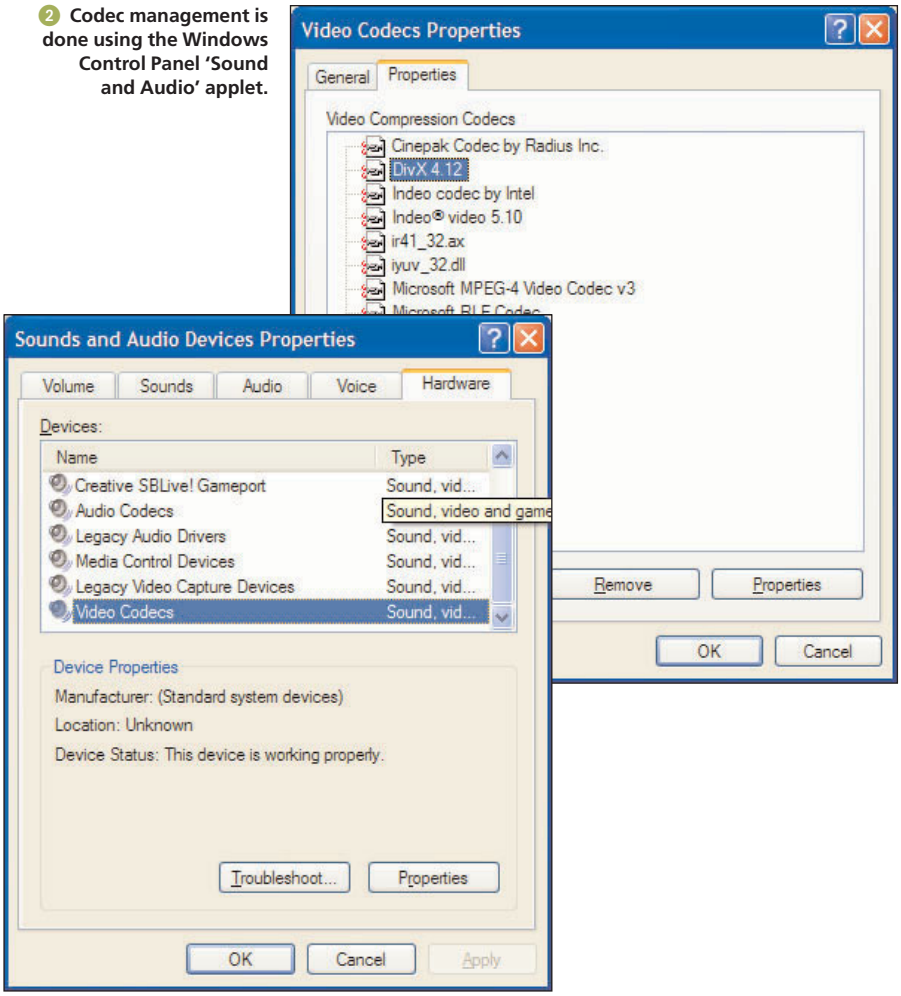
Professional codec management

Using the correct codecs is essential for the successful playback of different types of video file. Here's how to detect, administer and test codecs

If the right codecs aren't installed, many audio and video files can't be used and Media Player will give you an error message. It may be that all of the audio codecs are installed, but the right video codec isn't. The sound track will be audible, but the picture remains black. The opposite is also possible, where the video clip becomes a silent movie.

Codecs decoded

Codec is an abbreviation of compressor/decompressor. Behind the differing codecs are various algorithms, which encode and compress picture and/or sound information into a particular compressed format. They're necessary to save the huge amount of space taken up by raw multimedia files, while trying to maintain an acceptable level of quality. For example, in video files, the codecs don't



2 **Codec management is done using the Windows Control Panel 'Sound and Audio' applet.**

store all the video frames, but retain a certain number of key frames and information regarding the alterations compared to the previous frame. In this way, whole films can be saved in very good quality on one or two CDs.

By reducing the number of key frames, the final file size can be reduced further. Many codecs allow additional colour and detail information, as well as certain sound frequencies in audio files, to be discarded. This reduces the quality of the video,, but also means a three hour film of watchable quality can be saved on a standard 650MB CD-R.

Codec system check

To check which codecs are installed on your PC, open the Sounds and Audio Devices icon in Control Panel and click on the Hardware tab. In the list of Devices, there are entries for Audio Codecs and Video Codecs. Clicking on the Properties button opens a new window with two tabs. The Properties tab shows a list of registered codecs (**Figure 2**).

While the video codecs don't have any options other than removal, the audio codecs can be (de)activated or have the system priority changed. And, some compressors, such as IMA ADPCM allow individual rates for maximum real-time conversion. Almost all codecs have their own installation routines.

Windows XP uses the Registry to administer codecs. The file name extensions associated with Media Player can be found under Hkey_Local_ Machine/Software/Microsoft/Multimedia/WMPlayer. How Audio CDs and DVD-Videos are opened is specified in the same key under /Devices/AudioCD and /DVD. Supported standard formats are listed under /Extensions. System audio and video codecs, for example, can be found under Hkey_Users/.default/Software/Microsoft/ActiveMovie/devenum. Inside the alphanumeric key, the individual codecs can be identified with their FriendlyName entries.

The Microsoft Knowledge Base contains lists of the default formats and codecs that Windows XP supports. Go to www.support.microsoft.com and find articles Q291948 and Q308464. In addition, article number Q316992 contains sample files that can be used to check whether codecs and formats are properly integrated with Windows.

AVI analysis

It's often the case that users receive an AVI file that can't be played. This means that the correct codec is missing. Finding out which codec has been used to encode the file isn't easy. The only solution is to use a tool that can detect the FourCC (Four Character Code). This is a code introduced by Microsoft to enable codec identification—for example, DXTC refers to the DirectX Texture Compression codec. One such tool, AVI FourCC Changer, can be found at www.divx-digest.com/software/avifourcc.html. This site also offers further utilities. It's also worth visiting www.moviecodec.com, www.codecs.nm.ru, www.divx.com and www.virtualdub.org.

SECTION 5

Multimedia troubleshooting

Troubleshooting graphics, sound and video errors requires a little background knowledge, so here are a few useful tips

Problems that Windows XP suffers from in conjunction with applications like games or video playback aren't always due to bugs in the operating system. Drivers and codecs often spoil the multimedia fun. For example, if Media Player throws up an error code beginning with 80040 when playing an AVI file, the system is missing the required version of the codec.

Videos without picture and sound

Error messages often point to invalid formats, decompressors, rendering or source filters. Some messages display the relevant FourCC, from which the required codec can be worked out. If the message reads something like VIDS:VCR2 then the ATI VCR2 codec is missing. It can be downloaded from www.support.atitech.ca/drivers/.

There's an overview of FourCC allocations at www.microsoft.com/hwdev/archive/devdes/fourcc.asp. If the actual code isn't listed here, tools like AVI FourCC Changer (see above) can help you out.

Media Player without codecs

Although Media Player can download the required Microsoft codecs automatically, you can still experience playback problems. For instance, Media Player might indicate that a required codec couldn't be downloaded. There could be many reasons for this: a failure of Internet Explorer, or too high a security setting in the Internet Access options.

After installing the codec, using reduced security settings, your PC needs to be restarted, otherwise the same error message may recur. This is also the case if errors occurred while downloading the codec and the file is damaged. If this has happened, you'll need to download the file again.

Defective display

Difficulties are also caused if the display driver doesn't load properly. Symptoms can include a switch to standard VGA mode, graphics errors or monitor crashes. Often, these events happen after new software installations, replacing important graphics system files.

To find out which display driver Windows is loading, you have to look in the following Registry key: Hkey_ Local_Machine/Hardware/DeviceMap/Video. Under /Device/Video the key that loads the standard driver is indicated, something like: Hkey_Local_Machine/System/CurrentControlSet/Control/Video/{058b58e1-cb3b-4e15-ba72-5b0a90a96605}. The InstalledDisplayDrivers value leads to the required driver, a DLL file, in the Windows/System32 folder.

This is a DLL file that must be located in the Windows/System32 folder as well as the Drivers subfolder. For example, in the case of an nVidia Riva TNT2 graphics card, you would be looking for a file called NV4.DLL. If this file isn't present, or is damaged, you should re-install the driver.

Some GDI rendering bugs in Windows XP were fixed with Service Pack 1—details of this can be found in Microsoft Knowledge Base article number 318966.

If you have an ATI Rage Pro AGP 2X and can't switch your monitor into standby mode you've had it, unfortunately there's no cure. Windows XP doesn't support power management in conjunction with this card. The good news is that installing newer drivers solves most other graphics card problems.

Sound problems

You can see which audio card drivers are supplied as standard with Windows XP in Knowledge Base article Q295318 at http://.support.microsoft.com. This can save you some nasty surprises when upgrading, but if error code 28 is shown in Device Manager, you'll still be in the dark. In this case, Windows XP states that Windows Driver Model (WDM) compatible drivers aren't installed.

If the relevant drivers were present on the system before you upgraded, Windows XP has automatically deleted them during the upgrade process. As Windows XP requires new drivers in this case, this behaviour is intentional, although Windows doesn't draw attention to the deletion process. If this happens to you, you'll need to contact the component manufacturer or scour the Web for some suitable drivers.

SECTION 6

Windows media add-ins and add-ons

Free tools are available to add functionality to the Windows Media platform. These improve configuration, productivity and preparation of your Web offerings

Microsoft's programmers in Redmond have created a dedicated portal for all questions and downloads surrounding Windows Media, www.microsoft.com/windows/windowsmedia, where you can download the new Windows Media Player 9 (**see Figure 3**), as well as find information on Digital Rights Management under Windows. There are also a large number of useful extras, such as free codecs, tools and skins.

The free add-ons can be downloaded directly from the Windows Media Download Center link. If you want to know more about the downloads you can click on the More Technologies & Tools link. For example, you'll find the newest version of the Windows Media Bonus Pack for Windows XP at www.microsoft.com/windows/windowsmedia/download/bonuspack.asp.

Media Bonus Pack for Windows XP

This pack contains the Power Toys for the Windows Media Player and they offer a whole range of useful additional functions. With a few mouse clicks you can implement a control menu for playing media in the system bar and automatically download new skins and track information from the Web.

However, only a very limited version of the MP3-to-WMA convertor is available. The full version is contained in the XP Plus Pack. The Media Library Management Wizard makes it easier to keep track of personal media collections, including title numbering, additional information and CD covers. If the library gets too big, a clean-up tool helps tidy things up. Another utility allows playlists to be exported quickly to Excel or HTML format. Web catalogues can be created in seconds.

Apart from Media Player skins, the Bonus Pack contains the Movie Maker Creativity Kit. This is a collection of sound effects, audio loops, video clips and titles as well as some pictures. This collection is intended to let home users give their own films a final polish. A Bonus Pack is also available for Media Player 7.1 users. Although it contains the Power Toys, visual effects and some utilities, its scope is more limited than the XP version.

Encoding for free

The new Windows Media Encoder (www.microsoft.com/windows/windowsmedia/wm7/encoder.asp), which now supports Windows Media 8 format, is suitable for recording, encoding and distributing videos. Audio and video data can be recorded directly and saved as WMV files or published immediately as a Web stream.

Data sources can be brought together in groups and changed during recording. There's a Wizard to help you prepare the encoding process. In addition, user profiles can be saved and copied via a profile manager. The tool's integrated monitor function informs you about file sizes and bit rates as well as encoding statistics. If you're streaming directly from the encoder to the Internet, you can offer up to 50 streams simultaneously.

Windows Media Encoder supports formats up to 640 by 480 pixels at 30fps. Videos with only 24fps can be enhanced to 30fps using Inverse-Telecine with good results. Usefully, uncompressed recordings are also possible. File sizes greater than 30GB are no problem. For automating functions and customisation of the encoder, the program has its own development tool.

WM8 from the command prompt

The WM8 Encoding Utility, on the other hand, is oriented to working from the command prompt. It also allows audio and video data to be encoded for on-demand streaming and downloads. The two-pass encoding function ensures better quality results. Batch modes allow whole collections of files to be encoded in a single pass. Variable bit rates are taken into account automatically, thanks to True VBR support.

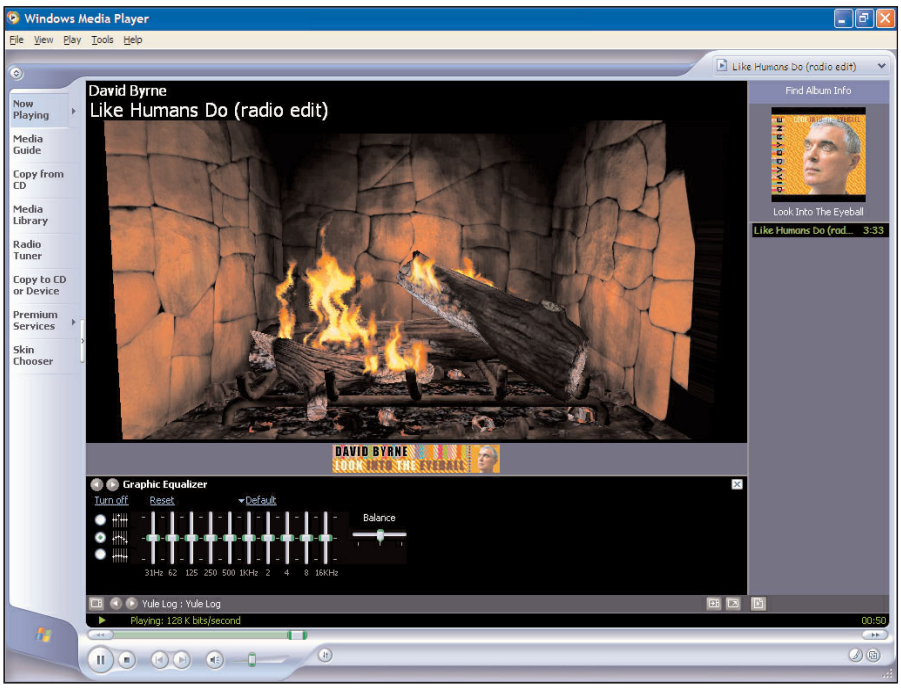
In spite of its small size of just 635KB, this is a very powerful tool. You can download it from www.microsoft.com/windows/windowsmedia/wm8/encoding.asp. If you're interested in this, a user guide with tips and tricks can be found at http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwmt/html/wmencodutil.asp. If you need up-to-date or even older codecs, you can find them at www.microsoft.com/windows/windowsmedia/format/codecdownload.asp.

Windows Media Resource Kit

At 25MB, the Windows Media Resource Kit from Microsoft is the biggest add-on available at the moment. The download, still in Beta 3, can be found at www.microsoft.com/windows/windowsmedia/technologies/resource/default.asp. A user-defined installation is also available there.

The Windows Media Resource Kit is intended mainly for professional on-line content providers, to help them in creation, distribution and controlled playback of Windows Media files. Automation functions for encoding, synchronising and consolidating multiple files into one as well as the removal of 'jumps' are really helpful for this. Digital Broadcast Manager (DBM), a program that provides a complete environment for E-Commerce with Pay-per-Stream and Pay-per-Download, is also included.

3 Microsoft has recently released version 9 of Windows Media Player that offers improved video and audio performance



SECTION 7

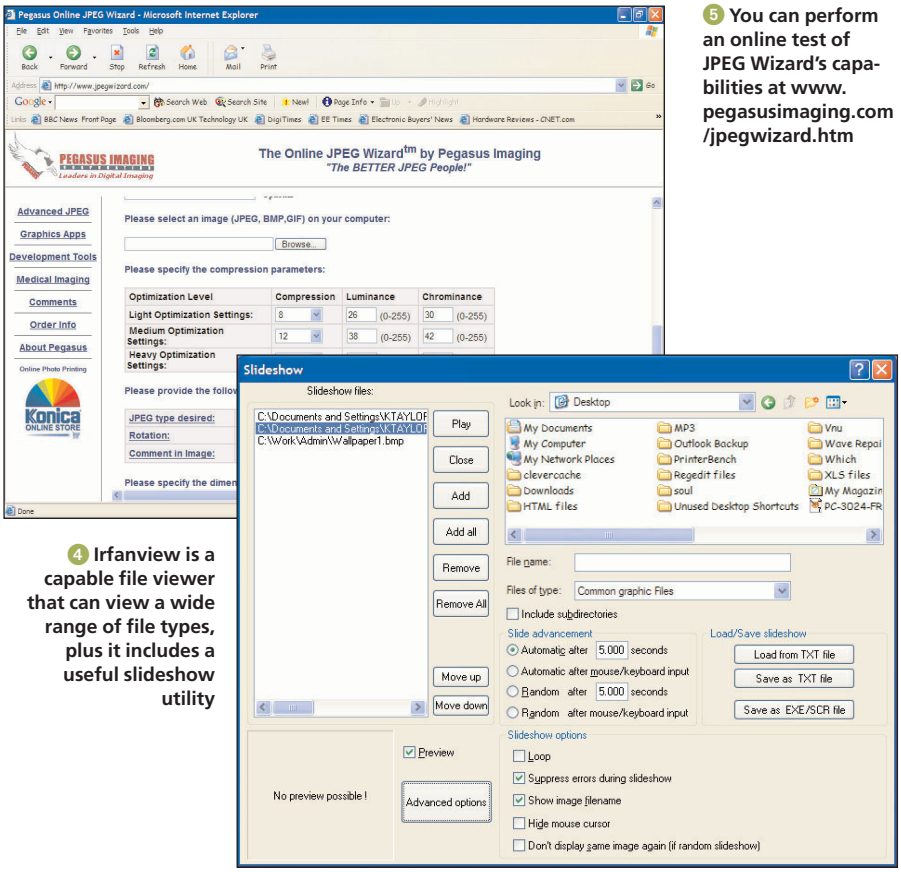
Building your multimedia toolkit

Freeware and shareware utilities can add any functions that XP lacks. Here's a a selection of audio, graphics and video tools

As well as free audio players, such as Jukebox Decoder 2.1 (www.birdcagesoft.com) and Winamp 3 (www.winamp.com), good CD rippers and encoders can be found on the Web. Among these are Cdex 1.4 (www.cdex.n3.net), which combines both functions. Also recommended are the MP3-to-WAV-Decoder and WAV-to-MP3-Encoder tools from www.mthreedev.com.

The free DivX 5.02 bundle (www.divx.com) in the video area is a real highlight. This capable codec has become a complete encoding station. The free basic bundle includes the DivX encoder and player, or you can buy the Pro version with advanced options ($30).

Irfanview 3.75 (www.irfanview.com)provides users with a good file viewer with a good slideshow function (see Figure 4). Anokee Illuminator (www.net-album.net) is a media manager with batch and preview support.



5 You can perform an online test of JPEG Wizard's capabilities at www.pegasusimaging.com/jpegwizard.htm

4 Irfanview is a capable file viewer that can view a wide range of file types, plus it includes a useful slideshow utility

Windows design made simple

You don't have to rely on Microsoft's built-in tools when creating a personalised Windows XP design. Much simpler solutions can be found on the Internet at www.tgtsoft.com. Style Builder uses a simple interface to let you produce your own themes or to import and modify existing ones.

Colours, fonts and graphics can be easily changed. Pixel errors can be located quickly using the integrated zoom function. In addition, Zip support allows the new Windows XP Themes to be posted directly on the Web. Lots of useful examples can be found on the Internet at http://ThemeXP.org.

Style XP from www.tgtsoft.com sits on top of the Windows XP skin engine and offers a range of useful extra functions. These include the import, selection, rotation and administration of logons, background pictures and desktop themes. It's planned that future versions of Style XP will also support system sounds, cursors and screensavers.

DVDx 1.8a

Just like the well-known encoding tool TMPGenc, which has now reached version 2.59 (www.tmpgenc.net), DVDx 1.8a also creates files in MPEG-1 format. This means that DVD-Videos can only be burned in a single pass as VCD 2.0 or SVCD 1.0. However, advanced users can choose their own settings for source and target video and get the best picture quality for the smallest file size.

You can use the new DivX-5 codec with DVDX to further reduce the size of the target file. When encoding the video, it's important to ensure that the audio/video synchro function is active. Adobe Premier-compatible Video Plug-ins can be used by simply copying them to the DVXD folder.

If you have a system with an Intel Pentium 4 processor then it's a good idea to use the version of the program optimised for that processor. This freeware utility can be downloaded from www.digital-digest.com/dvd/downloads/dvdx.html.

The program itself takes up almost 3MB. The source code, another 2MB, can be downloaded from the Internet if you're interested. There is, however, a charge for downloading it from www.labdv.com.

JPEG Wizard

Repeated editing and re-saving of JPEG files results in continually deteriorating picture quality. This is caused by the graphic being continually compressed and recompressed. For simple editing functions, the JPEG-Wizard utility can be used. Other programs first decompress and then recompress data, but JPEG Wizard keeps the loss of quality within limits because it handles the file like an original. Usefully you can increase compression in some areas, but decrease it in others. This can save file size, without negatively affecting picture quality.You can also remove red-eye.

As well as functions like slicing, rotating, stitching and filtering, JPEG-Wizard lets you insert text and supports an unlimited number of undo levels. An online test is available at www.jpegwizard.com (see Figure 5) and the trial software can be downloaded from www.pegasusimaging.com/jpegwizard.htm.

JPEG Cleaner 2.5

JPEG Cleaner is also a very handy utility. This tool doesn't work at picture level and so it can reduce JPG file sizes without reducing quality. This works because JPEG Cleaner removes data that doesn't belong to the actual picture. For example, Photoshop stores additional data like text, previews and colour management information alongside the picture.

Because most other programs don't even read this data, you can easily do without it. JPEG Cleaner is just as easy to use as a command line utility as in its GUI version. The shell command format is JPEGCLEAN.EXE FILENAME.JPG and wildcards are supported. The graphical user interface version, which has its own file browser, is easier to use. It can be downloaded from www.pppr.sk/rainbow or direct via FTP from ftp://ftp.sac.sk/mirrors/sac/sk_made/jpgcln25.zip. ■

MASTERCLASS

ALEX CRUICKSHANK

Securing your Web site

Our penultimate instalment showing you how to build your own Web site concentrates on security matters this time

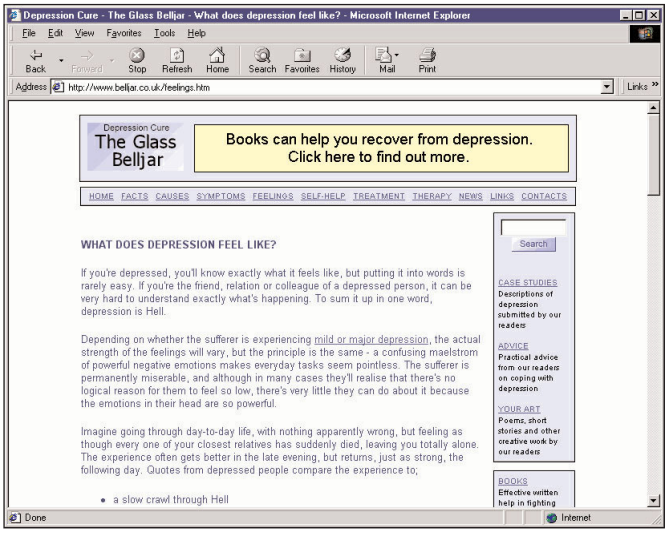
KEYPOINTS

- File layouts
- Site security
- Targeted threats
- Why you need Perl

Over the last six months or so, we've gone through the development of a browser-based content management system for Web site management. Content management systems form the backbone of all the major sites on the Web. The important point is to separate content from design, so that anyone—even those with limited or non-existent knowledge of HTML—can update the content of the site and add new pages. The front-end of a CMS gives a user-friendly screen where users can create and edit page text, add links to other pages, define the publication date and page category and so on. The CMS then takes this information, adds HTML formatting, embeds the result in an HTML template and serves it on the site.

It's possible to build content management systems in Access, ASP, PHP, C++, Java and just about any other programming language or Web-enabled database system. All have their advantages and disadvantages. The one we've been building uses CGI and is written in Perl, which has several advantages for our particular requirements. It's free, so the implementation of the entire CMS won't take a penny from the Web site development budget. It's also flexible in that particular conditions can be set up so that, for example, 'special offer' pages can be dynamically flagged to use a different HTML template to the rest of the site. Most important of all, though, Perl's text manipulation engine is currently one of the most powerful available. Its ability to search and replace, pattern search and extract text from strings will enable you to convert existing sites to CMS delivery without having to edit too much by hand.

The CMS, which is now essentially complete, is included on the our Web site (www.pcmag.co.uk/PCM/solutions.jsp) along with all the necessary support files, as described over the previous months' issues. There's also one more Perl script called convert.pl, which we'll be investigating in a future issue. The Perl scripts can be opened and edited in any text editor, although a programmer's text editor is best because you'll then have colour-coded statements, variables and so on, which makes the whole thing easier to read and edit.



This not-for-profit Web site is powered by the CMS described in this article

Make sure you use the existing directory layout for the script and data files, unless you plan to change the relevant variables in the script itself. This is best left until you've at least tested the default configuration to check that everything's working properly. Put simply, the editor.cgi script lets you create and edit text documents, while the content.cgi script displays them as HTML pages.

The layout of the files on your server should be similar to that shown in **Figure 1**. Note that the current script only allows you to edit the files in one directory. If you want to store your pages in several different directories, you have two choices. You can either make duplicates of the scripts and change their path variables, or you can modify the main script to handle the directory structure as part of the query string. This latter option is a relatively straightforward one and is left as an exercise for the reader.

WWW Root

/cgi-bin/
editor.cgi
content.cgi
upload.pl
password.pl (temporary, just to create passwords)

/data/
users.db
HTML template file
[text files generated by the CMS will also go here]

/images/
[uploaded images will go here]

Figure 1 File/directory tree

Last issue we went through the implementation of the CMS on a live or development site, showing how existing static URLs could be redirected to the new addresses, so as to cause the minimum of disruption to the Web developer and the site's visitors. This month, we're going to concentrate on some security aspects of using the CMS, explaining where there are potential vulnerabilities and what can be done to minimise the chance of someone hacking into your site.

First, we'll begin with the basics of site security. The vast majority of hacking attacks that are carried out on the Internet are automated, with hackers using port-sniffing tools and known attack queries to probe any potential vulnerabilities of Web servers. If you've looked at your server logs recently, you'll probably have noticed some of these attacks as failed pages, recording HTTP 400 errors. Some of these requests might include files, such as, "/_vti_bin/owssvr.dll" or "/msoffice/cltreq.asp", which may offer backdoors into some unpatched servers.

If you're running a site on your own server, you'll be aware of the need to keep an eye on the availability of security patches, whether for IIS or Apache or any other server, in order to ensure that you're not vulnerable to this sort of attack. And if you're not running your own site, your hosting company should be doing this for you. It's worth asking them to see what their policy is on security patches; that is, how often they're applied, who has responsibility for applying them and so on. This ongoing security problem is by far the greatest single cause of maliciously caused site downtime across the Internet.

Targeted threats

Assuming that your Web site's server is secure at this level, the next threats to consider are more targeted operations. In this situation a hacker may specifically target your site for some reason. They may be a disgruntled customer, an ex-employee or just someone who disagrees with your organisation's activities for some reason. Whatever the reason, they too have several powerful tools at their disposal. Arguably the most effective of these is to simply phone up a member of staff and ask for access to the CMS so that they can carry out some 'routine maintenance'. For this reason, it's vital that any members of staff with access to the CMS are trained to reject such requests and pass on the details to you or whoever is in charge of the site.

The next stage for the determined hacker may be to mount a Denial of Service (DoS) attack against you. This involves bombarding your server with thousands of simultaneous requests in an attempt to cause it to grind to a halt through sheer over-work. Again, there are procedures that can be put in place to protect the server—some firewalls feature anti-DoS capabilities, for example—but it's here that the CMS scripts themselves can also play a part. Both the editor.cgi and content.cgi scripts have a sub-routine that's designed to help minimise the effects of a DoS attack, as shown in **Listing 1**.

1 Sub-routine to help minimise the effect of a DoS attack

```
sub init_security {
    # handles basic security

    use CGI;
    use CGI::Carp 'fatalsToBrowser';
    $CGI::POST_MAX=5*1024; # maximum of 5k length posts accepted - helps prevent DoS attacks
    $CGI::DISABLE_UPLOADS=1; # no uploads permitted - helps prevent DoS attacks
}
```

2 Creating a .htpasswd file to protect the online editor

```
# contents of .htpasswd file
user1:7aa6b6e69f16a93101bc51832f331b1f
```

3 Creating a .htaccess security file

```
AuthName "CMS User Authentication"
AuthType Basic
AuthUserFile /home/username/.htpasswd
require valid-user
```

As you can see from viewing either of the two scripts, we've called the security routine right at the start of each script, before any data is sent to the browser. This means that attacks are likely to be fended off before the rest of the script has had a chance to be overwhelmed. This sub-routine won't stop a determined attack, but it will help to reduce the load on the server by rejecting any over-sized data posts and uploads to the scripts.

In its current form, the editor.cgi script can be used by anybody; there's no security at all, so anyone who knows the URL could simply type it into a browser and then edit the pages on your site. So this is obviously an important security issue that should be dealt with immediately. There's a simple way to do this and there's also a more complicated way. The simplified way is only practical if your site's pages remain unchanged most of the time, with just an occasional change once a month or so. In this case, the editor.cgi script will be unused for much of the time and the most effective security precaution is to just remove it from the live site. Hardly a technical solution, but it's impossible to hack in to something that isn't actually there, so it's certainly effective. When you do need to change the site, you can simply upload the script via FTP, use it, then delete it again.

Even here, though, there's the potential for harm to occur. The FTP process is not inherently secure. User names and passwords are sent to the server as plain text, so they could potentially be intercepted and read. If you have local access to the Web server, copy the editor.cgi file that way and you shouldn't have any problems. Otherwise, it might be worth investing in some kind of secure FTP solution, one that encrypts the data connection before the username and password are transmitted.

As noted above, though, this drastic solution is only practical for a site that's not updated very often. If you're site's changing every day, as most are, then you need a more intelligent security mechanism. One way to handle this is to set an .htaccess password. We discussed .htaccess files last month, as a means of redirecting static URLs to the new dynamic ones. They can do other things, though, including password protecting directories.

Separate directories

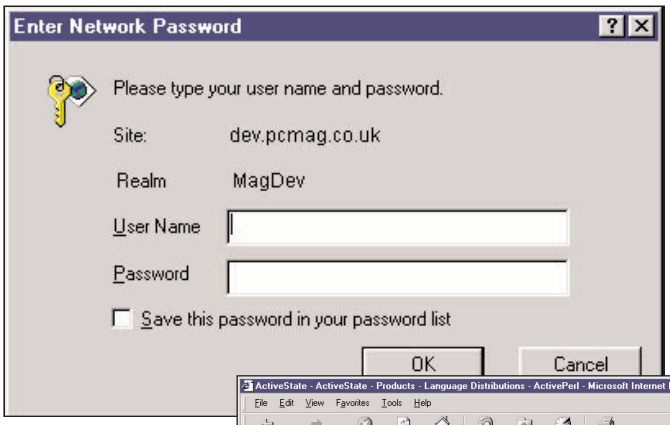
If you want to keep the editor.cgi script in a separate directory to that of the content.cgi script, so that only you can access the content editor via a login screen, the first thing to do is to set a password. Use the password.pl file from www.pcmag.co.uk/PCM/solutions.jsp to do this, by editing the password variable with a text editor and then running the script via your Web browser. This will generate an encrypted version of your password, which can be placed in a password file. To do this, cut and paste the encrypted password from within the browser and create a file called .htpasswd in the directory to be protected. Edit this using a text editor and store your chosen user name and encrypted password in it, separated by a colon, as shown in **Listing 2**. If you want to read more about .htaccess

and .htpasswd files before attempting this, search the Web for either of these words and you'll find plenty of information.

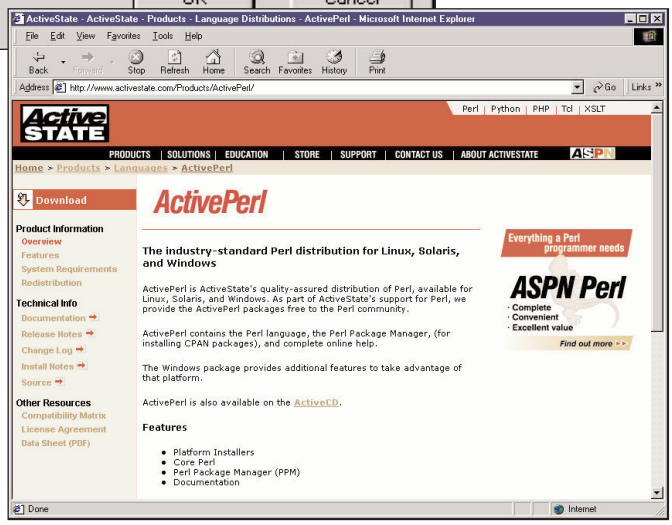
You now need an .htaccess file that will be stored in the directory from which you're running the editor.cgi script. If you already have such a file, you should add the contents of **Listing 2** to it; otherwise, create a new file with the contents of **Listing 3**. Note that the /home/username section is an absolute path to the relevant password file. Upload this to the appropriate directory and you'll be prompted for a username and password when you access the editor part of the CMS.

Having now moved the editor.cgi file to its own separate directory, the paths that point to the data and image directories and the associated scripts will now have to be changed. Edit these in a text editor so that they point to the correct directories and then upload the script again. Since you haven't moved or changed the content.cgi file, that won't need to be edited. Be careful not to restrict access to the content.cgi script in any way. This must be accessible via the Web to anyone and so shouldn't be affected by a .htaccess file. The only exception is if you want to block a specific domain from accessing your site, in which case a quick Web search for '.htaccess deny' will give you a few ideas.

The CMS may all seem a bit overwhelming now, but if you have the last six issues of the magazine, plus this one, take your time to read through them again and look through the CMS code in a text editor. Have a play with it to get a feel for how it works and avoid testing it on your live server until you understand what it does. It may take you a while to get to grips with everything, as this is quite a complex system, but once it's up and running you'll be able to quickly and easily edit your site without resorting to HTML coding and FTP. And best of all, since you have the source code, you can edit it to suit your purposes. Please let the author know of any improvements, modifications, bug fixes and so on, so these can be passed on to other users.



An example of .htaccess-based user authentication



The most important part of the CMS is a Perl interpreter

Next month, in the final instalment of the CMS tutorial, we'll be looking at ways in which you can convert all your existing HTML pages into text that can be used by the CMS editor, stripping out all unwanted HTML tags. This will help to smooth the transition from your old static site to your fabulous new dynamic one. ■

What you need

The most important requirement of the content management system we've developed is a Perl interpreter. If your server's running on a Unix box (including Linux), then you'll find it's almost impossible to install Apache or Zeus without installing Perl as well. The same is not true of Windows servers running IIS, but a free port of Perl for 32-bit Windows machines is available from www.activestate.com. This comes with all documentation and is simple to install. The only caveat is that file paths may be slightly different compared with a Unix box. If in doubt, use absolute rather than relative paths (for example, /site/www/data rather than ../data)

Perl scripts need to be set to 'executable' in order to run. Using your FTP client, you should be able to right-click on a script once you've uploaded it to your server and select 'File properties' or 'File attributes' or 'chmod'. Once you've done that, you'll be asked to define the file's attributes. The shortcut for this is to type '755' into the 'chmod/manual' box if your FTP client allows it. If your client doesn't allow it, you need to set the permissions as we've shown below:

owner: read, write and execute
group: read and execute
public: read and execute

Generally this is only necessary with Unix servers. With Windows servers you probably won't need to change any permissions. But you may have to tweak IIS to ensure that .pl and .cgi files in the cgi-bin or cgi-local folder are executable.

The scripts also use some additional Perl modules that may or may not be included as part of your standard configuration. The two main ones are "Time::Local" and "Image::Size". If these aren't already installed on your server, you can download them from www.cpan.org. See your Perl documentation for notes on installing new modules, but usually it requires nothing more than a single 'install' command.

OFFICE TUTOR

GEOFF EINON

Managing data with Excel

If you're creating flat file databases, you'll find that Excel has all the tools you need to manage and sort all your data

KEYPOINTS

- Creating your database
- Filtering data sets
- Using SubTotal procedures
- PivotTable analysis

One of Microsoft Excel's many strengths is its capability as a database management system (DBMS). When you need to keep track of 'flat-file' data—such as tracking sales of widgets (**see Figure 1**)—Excel will do the job without any fuss or the overhead of learning a complicated new program. This month, Tutor explores the tools that Excel 97/2000/XP provides for the routine database housekeeping chores of sorting and counting.

At various stages in its evolution as a database management system, new sets of tools have been added to Excel. The three we're exploring are the Filter, SubTotals and PivotTable procedures. These tools are available in Excel 97 and all subsequent versions, although the precise implementations may differ slightly from one version to another. In keeping with the philosophy of Tutor—that is, the best way to learn to use software is to do it—we'll illustrate the way the three tools work using a simple database.

Creating the database

Open up a new Excel workbook and rename the Sheet1 worksheet as RawData. Our database will consist, quite simply of two columns of data. The first column will consist of names of categories of Items—these are widgets, sprockets, ratchets and grommets. The second column contains numbers. Each row in our database then contains a 'record' consisting of an item name and a number. In a 'real-life' database a number might represent specific information such as the number sold or a number that uniquely represents the record, which you could call its ID.

Begin this exercise by entering the label Items in RawData's A1 cell. This is the column title for the set of items that will be the focus for our sorting and counting activities. Enter the label ItemNo in cell B1. This is the heading for the numeric column.

In cells A2 to A5 in the worksheet enter the labels Widget (A2), Ratchet (A3), Grommet (A4) and Sprocket (A5). Now continue down the A column 'randomly' adding instances of each of the four items—add about 20 entries. Excel's IntelliSense makes this less of a chore by completing each entry for you once the first letter is typed. Complete the database by entering the value 1 in cell B2, 2 in cell B3 and then continue down the column numbering each item in sequence. Save the workbook as HoDbms.XLS.

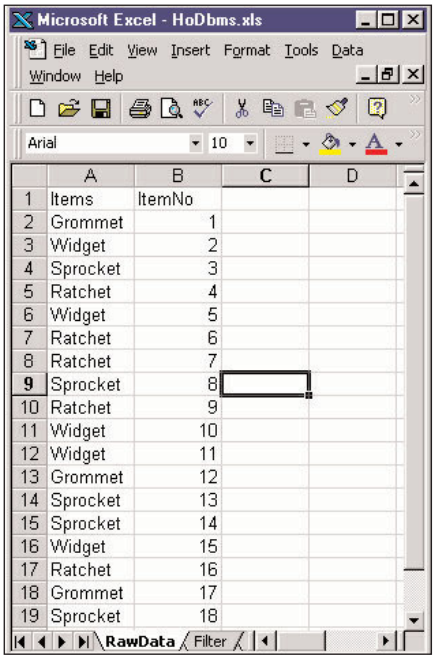
Filtering a data set

One of the tools provided by Excel to work with databases is the Filter item found in Excel's Data pull-down menu. Rather than explain what Filter does, let's try it out.

First of all, rename the Sheet2 worksheet as Filter. Copy the A and B columns from the RawData worksheet and paste them into the A and B columns respectively in the Filter worksheet you've just created.

The you should place the mouse cursor in a cell in the data region in Column A and left-click with the mouse to select the cell. From the Data menu, select the Filter item followed by the AutoFilter item from the subsidiary pull-out menu. The AutoFilter item then adds a drop-down Filter button to the A1 cell containing the Items label and also to the ItemNo label in the B column (**see Figure 2**). When you press the Items Filter button, you'll see the menu shown in **Figure 3**.

Let's start our investigation of the Items' Filter menu by pressing the Ratchet entry. When you do this, you'll see that the list has been filtered leaving only the Ratchet entries plus their corresponding ItemNo entries visible on screen (**see Figure 4**). Next press the



1 The Filter procedure adds drop-down selectors to each of the database column headings

buttons for the other three Item categories in turn. In each case the database is filtered to show only those Items and their ItemNos corresponding to the button pressed.

To restore the full data set, press the All button from the Items' Filter menu. Notice that the database remains in its original sort order—as can be seen from the ItemNo column. To sort the database, from the Items' Filter menu, select either the Sort Ascending or Sort Descending item. Notice that the entire data set, including the ItemNo column is sorted. To return the database to its original state, we can use the ItemNo column—from the ItemNo's Filter menu press the Sort Ascending button.

For relatively small databases, the Filter procedure offers an economical way of viewing each of the categories in the database and of sorting the entire database. By filtering each sub-category to display only its constituents you can count the number of entries in each category. Any manual procedure is, however, liable to error. One way of avoiding such errors is provided by the Excel's SubTotals procedure, which we will look at next.

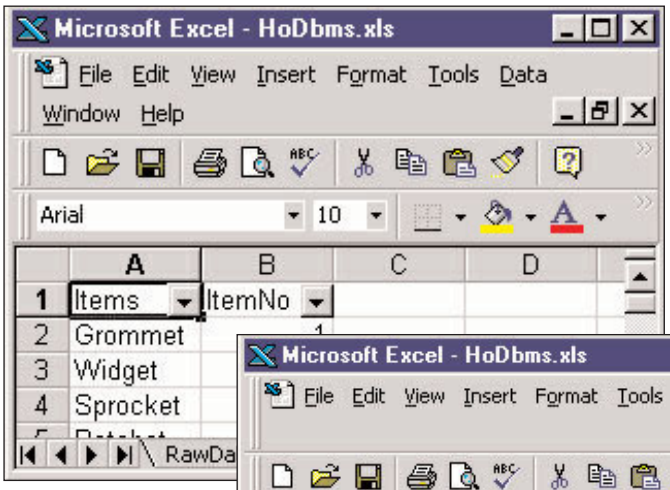
Excel's SubTotal procedure

Rename the Sheet3 worksheet as SubTotals. Copy the data columns from the RawData worksheet and paste them into the same position in the SubTotals worksheet. Select the SubTotals item from the Data menu to run Excel's SubTotals procedure. When this is done, the SubTotal Dialog box (**see Figure 5**) appears. In the SubTotal Dialog box, three drop-down boxes let you select the column to be subtotalled, the nature of the calculation (sum, count, average, maximum, minimum, average and so on) and the column into which the calculations are to be placed.

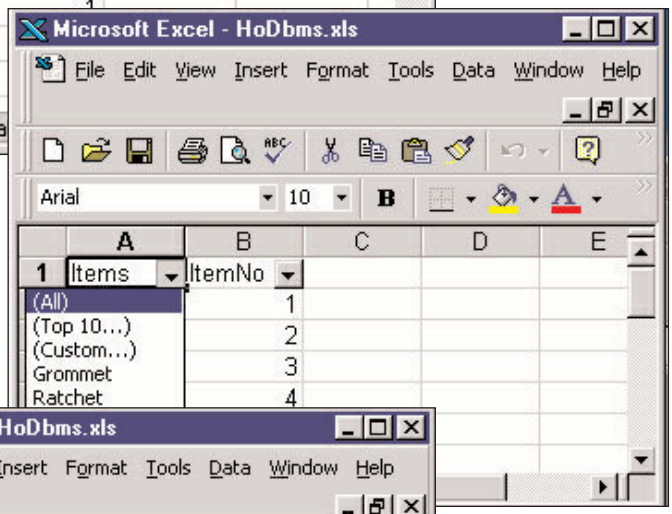
The SubTotal procedure requires that the data set is sorted—it doesn't matter whether it's in ascending or descending order—the important feature is that all items in the same category appear consecutively in the column so that they can be counted. This is necessary because the procedure tracks down a column by looking for changes in the contents of cells and counts the number of cells with identical contents that occur above the change.

As a preliminary step to creating SubTotals for our data set, sort it by using the Filter procedure that we have just investigated. Alternatively you could use the Sort Ascending or Sort Descending buttons from the Standard toolbar. If you use a Sort button from the Standard toolbar, take care that you have selected the No Header Row option—that is, you should take care *not* to include the Items and ItemNo column labels in the selection that you want to be sorted.

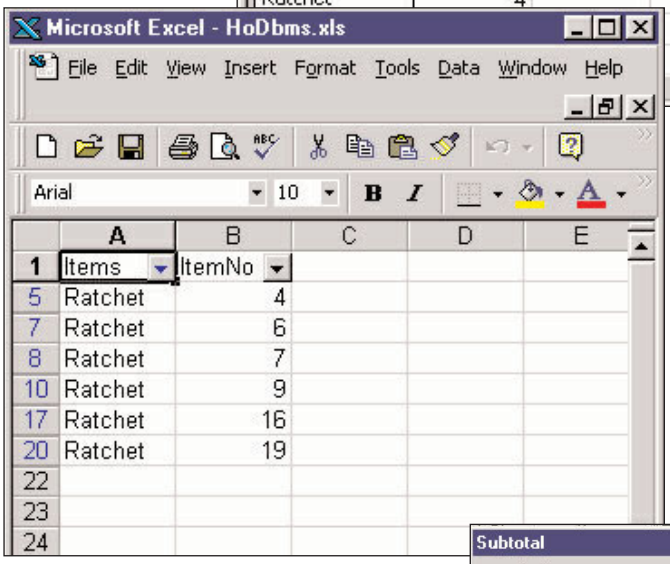
To create the SubTotals for the database, click anywhere within the data set and then select the SubTotals item from Excel's pull-down Data menu. In the SubTotal Dialog box, make sure that Items appears in the 'At each change in' section. Select the Count item in the 'Use function' section. Make sure that only the Items entry is checked in the 'Add subtotal to' section. Finally press the Dialog box's OK button to add subtotals to the data. Use the '–' tags located at the left of the subtotal range to collapse individual categories and display just their subtotals. **Figure 6** shows the subtotalled database with the Grommet and Sprocket categories collapsed. Notice that a subtotal has been inserted for each of the categories and a Grand Count total added which is the sum of the individual subtotals.



2 The database used to explore Excel's tools for sorting and counting

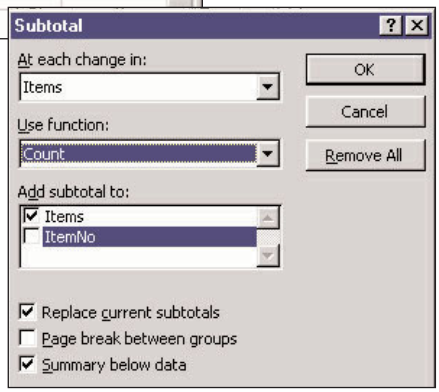


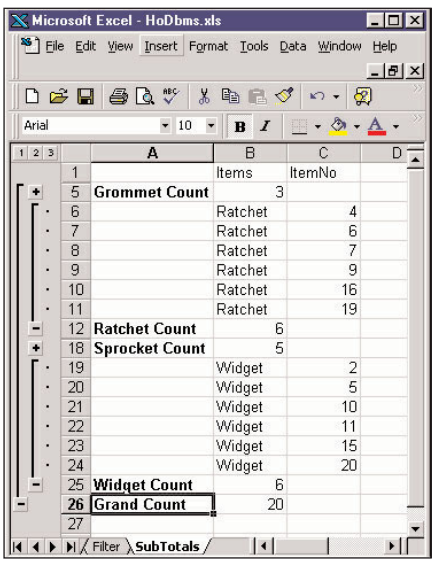
3 The Filter drop-down offers the categories on which the database can be filtered



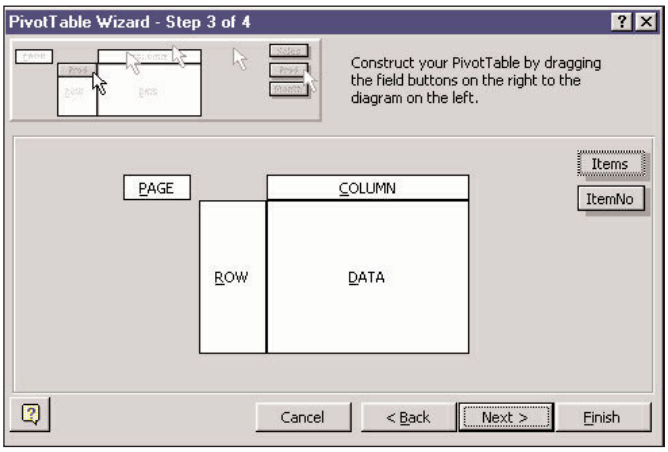
4 With the Ratchet Filter item selected you can manually count the number of Ratchet items in the database

5 The SubTotal Dialog box is used to specify that the Item categories are counted





6 The SubTotals' display lets you collapse selected categories for more convenient viewing



7 A wizard dialog box allows you to construct your Excel Pivot table

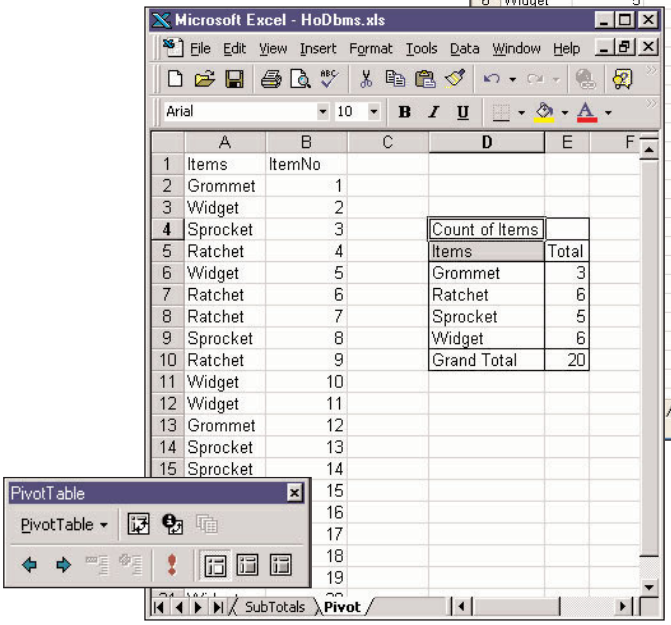
Counting using Excel's PivotTable analysis

The PivotTable analysis is the most recent tools to be added to Excel's already extensive repertoire—and is the most impressive of them all. To start our PivotTable analysis exploration, insert a new worksheet into the workbook and rename it as Pivot. Copy the test database from the RawData worksheet into columns A and B in Pivot. Click anywhere within this Pivot database and from Excel's pull-down Data menu, select the PivotTable item to pop up the PivotTable Wizard Step 1 Dialog box shown in **Figure 7**. Before you select the Next button in this Dialog box, make sure that under the 'Where is the data…' section, that the Microsoft Excel list or database Radio button is selected. Under the 'What kind of report…' section, make sure that the PivotTable item is selected. When the PivotTable Wizard Step 2 Dialog box opens, the entire database should be selected. If not, use your mouse to select the database starting from cell A1.

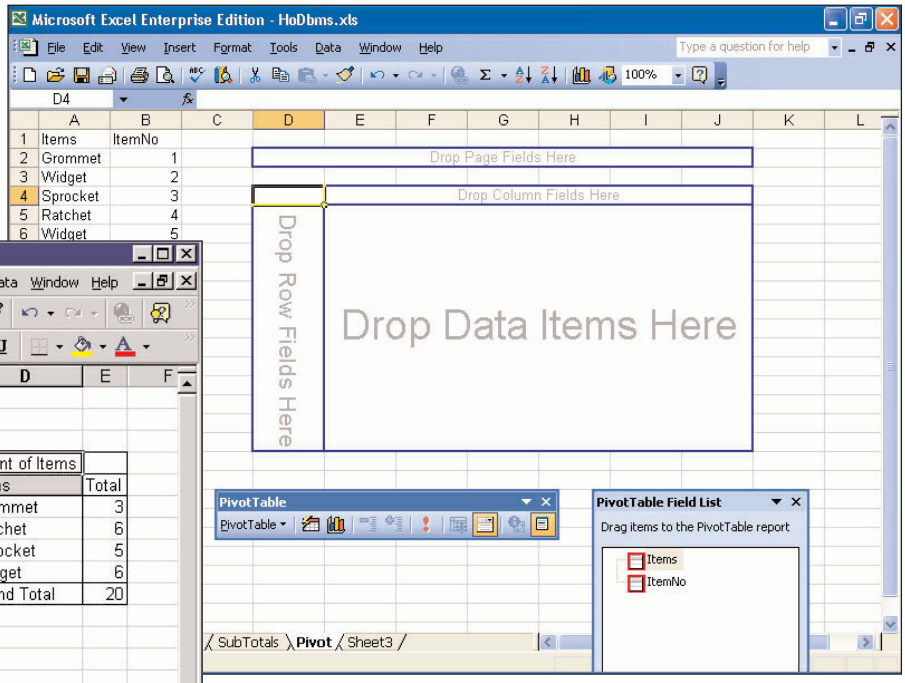
The order in which the remaining two steps are presented by the wizard differ between Excel 97 and later versions. For Excel 97, the Step 3 dialog box is shown in **Figure 7**, which presents four pivot table elements—Row, Column, Data and Page plus two 'Field buttons', which correspond to the Items and ItemNo columns in the database. To create a PivotTable analysis that displays the subtotals for each of the database Column A categories in Excel 97, first drag the Items button into the Row area in the Step 3 Dialog box. Then drag the Items button again—but this time into the Data area. When this is done, press the Next button to take you to Step 4 where you first select the 'Existing worksheet' Radio button and then click in the D4 cell in the Pivot worksheet to identify it as the location for the Pivot table. Click the Finish button to display the Pivot table—which will look like **Figure 8**.

In Excel 2000 and XP the order of Steps 3 and 4 is changed. In Step 3 you select the location for the PivotTable and, when this is done, an 'embryonic' pivot Table is added to the worksheet—as shown in **Figure 9**—which has the same four areas as the Excel 97 implementation: Data Items, Row Fields and Column Fields areas plus a Page field area. Also visible on screen are the PivotTable Dialog box (2000) or PivotTable Field List Dialog box (XP). To create the sub-totals in these implementations, first drag the Items button from the PivotTable/PivotTable Field List Dialog box into the Row area of the embryonic Pivot table. To complete the operation, drag the Items token from the dialog box into the Data area. Now the Pivot table is complete and shows the counts of each of the category items as shown in **Figure 8**.

We've explored the ways that Excel lets you sort and count its databases. The most powerful of these procedures is Excel's PivotTable analysis. To get a better impression of the PivotTable analysis, add another column to the database labelled SalesPerson. In this column, 'randomly' add SP1, SP2 and SP3 entries. Carry out the PivotTable analysis and in Step 4, drag 'Items' into the Row area, SalesPerson into the Column area and ItemNo into the Data area. The resulting analysis will count the ItemNos attributed to each sales person for each of the Items—try it. ■



8 The completed Pivot table showing the counts of the database categories



9 The Excel 2000/XP PivotTable implementation places an embryonic pivot table onto the worksheet