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Ranting and raving about piracy makes the problem worse, argues **Barry Collins**

Do you remember that bit at the end of every episode of *Crimewatch UK*, where Nick Ross would try to look all warm and cuddly, and reassure us that violent crime was rarer than a heat wave in Newcastle? "Don't have nightmares," Nick would sign off, having just shown us half a dozen reconstructions of people having their skulls caved in by armed nutcases. I bet you double-checked the back door was locked that night – I know I did.

Talk about crime and you'll definitely get people's attention. Along with sex and showbiz, it's a topic the old sages of Fleet Street will tell cub reporters is guaranteed to get their byline in the paper the next morning, and they're not wrong.

Recently, it's book authors who've used crime to talk their way into both broadsheets and tabloids. Like musicians and film-makers before them, writers are complaining that eBook piracy is rampant and depriving them and their peers of a living.

Yet, before Joanne Harris, Ian Rankin et al took to the pages of *The Sunday Times*, I was (perhaps naively) oblivious to eBook piracy. I know plenty of people who've downloaded knocked-off albums and movies, and I know plenty of people with a Kindle, but not one of them is stuffing their eBook reader with ripped-off titles. It's so effortless to buy and download eBooks on the Kindle, the thought of scouting out illegitimate copies had genuinely never occurred to me.

But now, thanks to such outspoken authors and *The Sunday Times*' diligent reporting, I and two million readers know exactly where to find pirated eBooks – because they've told us. And it isn't only the usual P2P sites, which most people won't have the technical nous to bother with: it's everyday websites and Twitter that are feeding this black market.

One of those authors bemoaning eBook piracy is David Hewson (*see p16*), a journalist turned crime novelist, and a former colleague. On his blog (**www.pcpro.co.uk/links/201prolog**), David explains how he keeps track of mentions of his name on Twitter, and has subsequently found a long list of sites offering links to pirated versions of his books. At first sight, the list of rip-offs is as "astonishing" as he claims.

However, each of these links uses the URL shortening service, bitly, and simply by adding a "+" symbol to the end of those bitly URLs, you can see exactly how many people have clicked on them. Of the top five links to pirated books, four had only one click (perhaps from David himself), and the fifth had no clicks whatsoever. Twitter may be stuffed with links to pirated material, but next to nobody appears to be clicking on them. At least, they weren't until the authors started moaning about piracy in the media.

The authors aren't the only ones waging an all-out media offensive on piracy. The music industry, in the guise of the BPI and various artists and labels, has been bellyaching in the press for years, and what good has it done them? According to the BPI's latest Digital Music Nation report, the number of illegal downloads has never been higher, with three-quarters of all "digital" music tracks coming from illicit sources.

The well-funded zealots at the Federation Against Software Theft (FAST) have been speaking out about the ills of software piracy for more than a decade, but the latest figures from the IDC show a 43% year-on-year rise in PC software piracy (although the Business Software Alliance claims education is driving down piracy in Western countries).

There are, of course, a gazillion factors that affect piracy rates – but is it possible that by drawing attention to how easy it is to pirate music, software and now eBooks, the rights holders are making it worse?

I'm not endorsing piracy, nor claiming that it should be left untouched. But just as the renowned atheist Christopher Hitchens argues that people don't need religion to tell right from wrong, neither do people need a preaching anti-piracy lobby to know that "stealing" music or eBooks is "bad". Perhaps the musicians, movie-makers and authors should do something that doesn't come naturally: keep quiet.

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Barry Collins is the editor of PC Pro. He's suffered at the hands of pirates – his kids made him watch Muppet Treasure Island. Email him at editor@pcpro.co.uk or read his blog at www.pcpro.co.uk/blogs/barrycollins

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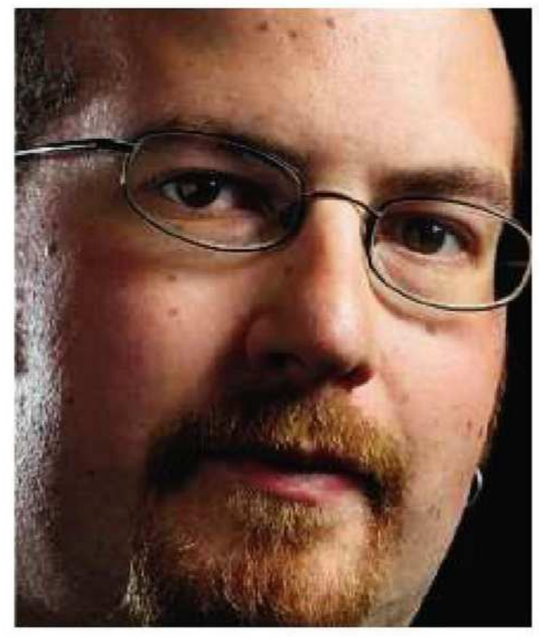
As poker sites fold, Darien Graham-Smith dreams of an internet without frontiers



At first I thought it was a joke. Instead of the familiar PokerStars homepage, I was confronted with a page of plain text. The domain had been seized by the FBI, it said, for "federal crimes" involving "unlawful internet gambling". It made no sense: PokerStars is based on the Isle of Man. It doesn't even have a US office. It had to be a hoax, I thought – a satirical swipe at American gambling laws.

And I was sympathetic. The demonisation of online poker has always seemed absurd to me – especially when you consider how much American wealth is made and lost on financial ventures that are more steeply stacked than any casino game. But as I looked up and down the page for a link to the real site, I began to realise this was no joke. Somehow, the site really had been taken offline by a foreign agency.

A little digging revealed the explanation. Though PokerStars conducts its business in Britain, its main website – like all .com sites – is administered by VeriSign in the US. If the company is deemed to have breached local laws, the American authorities can seize the site just like any other business asset. And that's just what they'd done, to PokerStars and two other poker sites, also based outside the US.

The fact that this is possible should concern any internet business. Since .com domains are nominally non-geographic, they're used by commercial sites operating all around the world. It's all but expected that any online service that wants to be taken seriously will have a .com address as its global entry point, even if (like PokerStars) it also maintains region-specific sites.

Yet, as this case illustrates, this supposedly international domain comes with some very national strings attached. The global portal is in reality controlled by a single nation – one where the business itself may not even have a legal presence.

The issue runs more deeply than one particular domain. The internet as a whole is a paradoxical construct. The power of online services lies in the way they transcend cultures and nationalities, not just in business but in social communications too. Twitter and Facebook are two obvious examples, allowing friends and associates from all around the world to meet in a virtual space that's located nowhere and everywhere.

Yet from the point of view of the site operator, operating internationally doesn't eliminate cultural boundaries – it multiplies their effects, as each country places its own peculiar strictures on the business. PokerStars and its rivals have become unfortunate poster-children for that lesson.

Is there a better way? Since the internet operates supra-nationally, perhaps we could administer content at a similar level. In fact, there's already a cross-border .eu domain, which is jointly administered by four European nations. Register your business here and you're not directly subject to the whim of any individual state – although you remain under the overall jurisdiction of the EU. Former Soviet apparatchiks, if they're feeling nostalgic, can alternatively register their sites under the still-active .su domain, but (appropriately enough) that's centrally administered in Moscow.

The dream would be to separate the internet entirely from the diverse cultures through which it flows, and give it a degree of autonomy – to make it a virtual global republic, with its own rules and standards, of which we could all be citizens in our online dealings. The benefit to businesses and individuals could be enormous. No more run-ins with local law enforcement; no more "this content is not available in your territory".

Alas, it's a fantasy. Who would enforce the laws of Internetland? Without a physical presence, its authorities would be toothless. And how many governments would willingly surrender sovereignty over their citizens' online dealings? Not China, I'm sure, nor the US – which means our brave new internet is missing a third of the online community right away.

The fact that the thought experiment falls apart so quickly points to the real problem. It's not simply that laws are inconsistent across different territories. It's the fact that they're arbitrary and uncompromising.

Online poker again provides a perfect illustration. Play from one longitude and it's wholly unobjectionable; travel 4,000 miles west and you can be sent to prison for it. Repeat with other pastimes, such as criticising the Chinese Government, and it's clear the problem isn't the internet – it's people. And there's no technical fix for that.

Yet while the internet remains a legally messy environment, it's one of the best ways we have to conduct our relationships. If we can't fix it, we can at least try to make it a more predictable place to do business. One step towards that is to stop seeing a .com domain as an expected chattel of business, and recognise it as a liability.

The dream would be to separate the internet from the cultures through which it flows

Darien Graham-Smith is PC Pro's technical editor and resident poker expert, which is to say he once knew the rules to Omaha. Email darien@pcpro.co.uk and read his blog at www.pcpro.co.uk/blogs/author/darien-graham-smith

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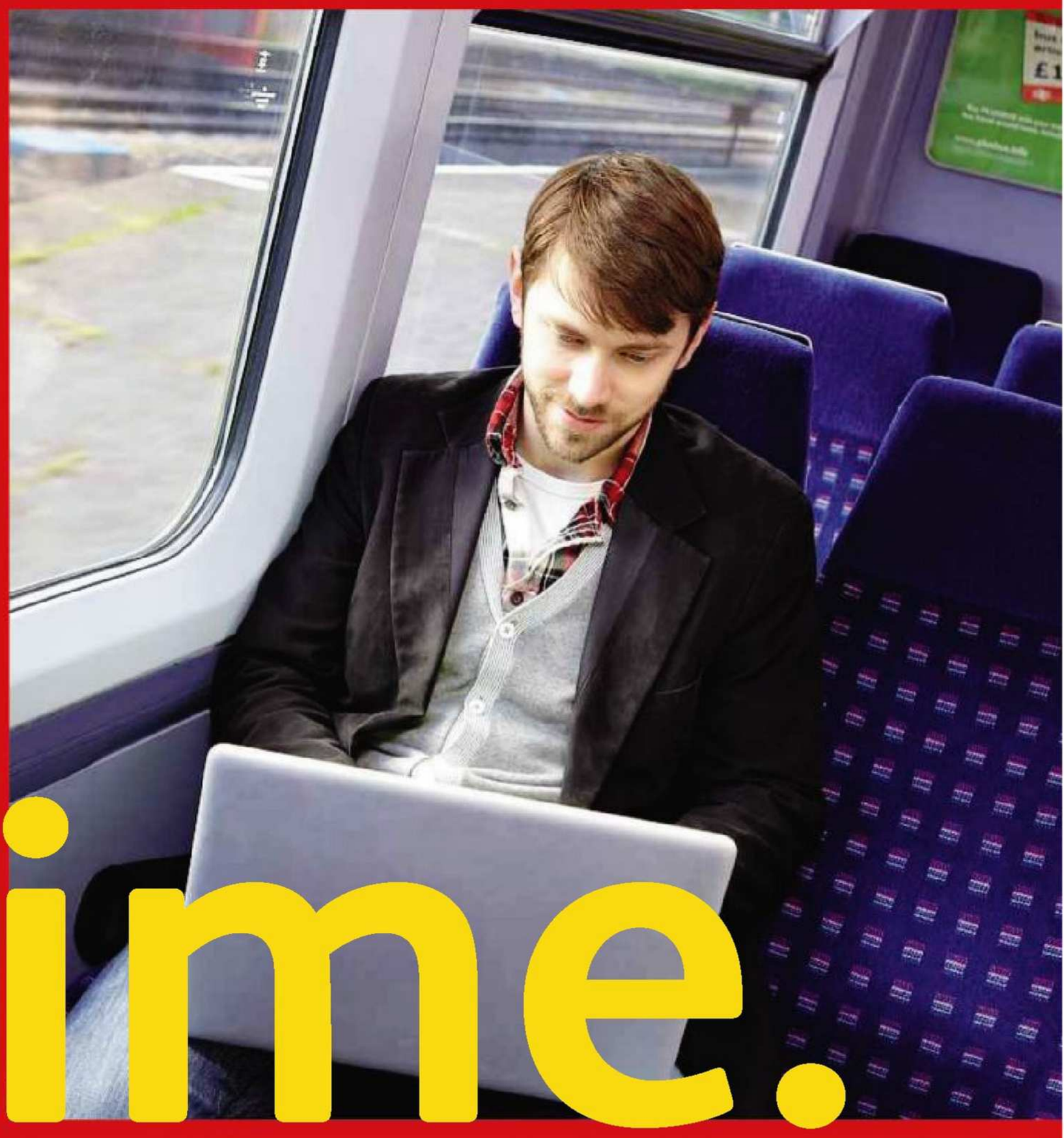

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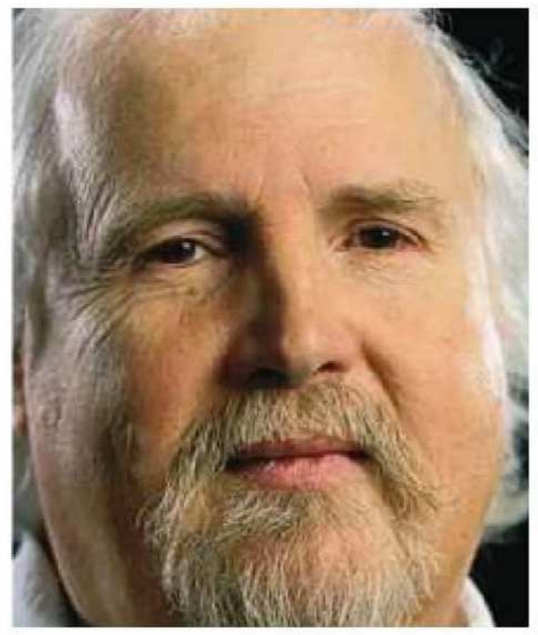
Time-saving software for small business

I'd rather pay for Spotify's selection than iTunes' set menu, argues **Dick Pountain**



Last month, I finally succumbed and took out a subscription to Spotify Premium. The steps that led me there are rather illuminating. Kevin Partner experiments with free versus paid-for web services in his *Real World Computing* column this month (*see p126*), and I believe my experience with Spotify, when contrasted with Apple's iTunes model, complements Kevin's insights rather well.

I've been using Spotify for two and a half years now, almost from its 2008 launch, although for the first two years I used only the free, ad-supported version and stoutly resisted paying. I soon became hooked on sampling different kinds of unfamiliar music that I'd never have thought of buying: when I discovered that the free service wasn't available in my part-time Italy homeland, I struggled for a while using UK proxy servers, then eventually caved in and signed up for the £5-per-month Unlimited service, which is available in Italy and has no adverts. Then, a couple of months ago, I discovered that only the £10-per-month Premium service is available for smartphones, and I was sufficiently curious to try Spotify on my Android mobile that I coughed up (thinking I could always cancel if I didn't like it). The increase in utility was so enormous that suddenly it seemed cheap at the price.

It may just be that I'm the ideal Spotify customer, and that this process of luring by degrees won't work on younger folk – users who have the iPod habit, or people with particularly fixed and narrow tastes in music. But I'm not so sure. Kevin's conclusion is that any payment at all is an enormous obstacle to new custom, and that offering free trials is more cost-effective than even the smallest compulsory subscription. You simply need to devise a premium offering that adds sufficient utility to persuade people to pay up.

I first encountered, and was captured by, a similar model with *The New York Review of Books*, whose print edition I've subscribed to for many years. As I come to spend more and more time working online, it became increasingly useful to search the magazine's archive and download previous articles, especially when abroad. The NYRB wisely charges a modest $20 annual premium for such full archive access, which I gladly pay and feel I receive value from.

It's a stark contrast to Apple's philosophy of tying closed hardware firmly to tightly regulated marketplaces. The price of individual tracks from iTunes is sufficiently modest not to deter buyers, but buy them you must – there's no free roaming around the store. This model is a phenomenal commercial success, to the point where almost the whole print publishing (and soon film) industry is grovelling to Steve Jobs to save them from digital apocalypse. The problem for me with this model is that it's brand dependent: you need to know what you want, whereupon Apple will supply it in unbeatably slick and transparent fashion. My beef is that I don't consume music (or books) that way.

I spend a lot of time reading and walking, and in neither case do I want a laptop or tablet in my hand. I've never really learned to love the iPod, although I have used MP3 players. I possess a large, eclectic music collection on vinyl and CD, which ranges from opera and classical through jazz, blues, soul and old R&B to country and bluegrass. I've ripped some of my CDs, but could never be bothered to digitise all that vinyl, nor pay thousands of pounds to those services that do it for you. My tastes are highly volatile and unpredictable, so even a few thousand tracks on an MP3 player aren't enough, and access is too clumsy.

Whole evenings on Spotify are devoted to hearing every conceivable version of These Foolish Things, or comparing half a dozen performances of The Goldbergs – or exploring a wholly new genre. Last week I went to a modern guitar recital at the Wigmore Hall and afterwards spent days exploring composers such as Brouwer, Bogdanovic and Duarte. I'd never do these things if I had to explicitly pay even 50p to download each track. The freedom to browse is worth £120 per year to me because the Android phone plugged into hi-fi or earphones has become my sole music source, replacing both CDs and downloads.

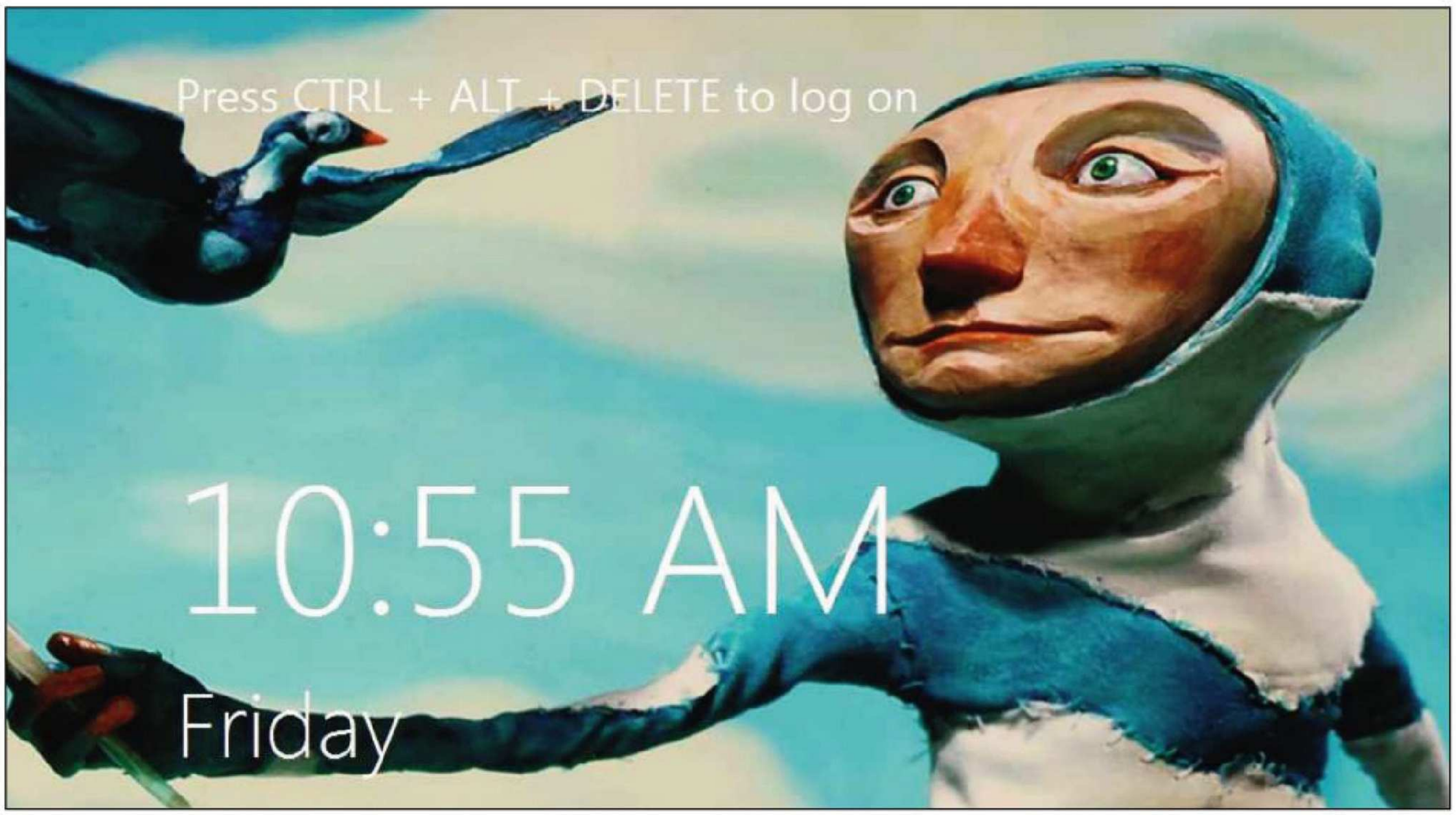
Not all record companies and artists have signed up with Spotify – notable hold-outs including Bob Dylan and The Beatles – but I have what I want of them in my collection (and if the service succeeds in the USA, I believe they'll come knocking). Such free, ad-supported services that lead you toward value-added premium services will eventually prove more effective at extracting payment than Apple's walled-garden, for books, film and TV as well as music. Encouraging people to broaden their tastes rather than reinforcing brand loyalties also spreads the proceeds to artists outside of the Top 10 – which could be why some larger companies are resisting...

Even a few thousand tracks on an MP3 player aren't enough

Dick Pountain's favourite version of These Foolish Things was recorded by Billie Holiday, since you asked. He edits PC Pro's Real World Computing Section. Visit www.dickpountain.co.uk

News

IN-DEPTH REPORTS, ANALYSIS AND OPINION



WHAT TO EXPECT FROM WINDOWS 8

NICOLE KOBIE REVEALS WHAT LEAKED PRE-BETA BUILDS SUGGEST IS COMING IN THE NEXT VERSION OF WINDOWS

PC PROBE

What will Windows 8 look like? The first Service Pack for Windows 7 has only recently landed, but leaked pre-beta builds of the next version can already be found on the web, offering a sneak peak at features ahead of their expected official unveiling at Microsoft's Professional Developers' Conference in September.

Windows 8 is widely expected to adopt a more tablet-focused design, but the leaked builds suggest more changes are afoot, with screenshots indicating a Windows Phone influence on the desktop OS and that the Ribbon interface from Office will show up in Explorer.

Another rumoured change is the inclusion of an app store – which may explain the ongoing legal battle over that term with Apple – as well as ISO mounting, a new installation system, and Windows' own PDF reader. Other screenshots show a revamped version of Task Manager, as well as cloud-based syncing of user profiles and settings.

Rafael Rivera is half of a Windows-focused blogging and authoring duo, who analysed the builds to pick out the most intriguing features. He's convinced the builds are genuine.

"Microsoft, as part of its build process, digitally signs all operating system files," he told *PC Pro*. "I haven't come across any tampered Windows 8 builds." Microsoft's only response has been the classic: "Microsoft does not comment on rumour or speculation."

The leaked Welcome screen takes design cues from Windows Phone 7.

App store and Ribbon?

Assuming the builds are indeed real, how likely are any changes to appear in the finished product? Michael Cherry, an analyst at Directions on Microsoft, said most of the rumours are plausible.

"Some of the things that people are discussing are likely to be a part of Windows 8," Cherry told *PC Pro*. "If you look at them on the surface, they all make sense. Things such as an app store, a more graphical, touch-centric user interface – they all seem reasonable and the sorts of things Microsoft could deliver."

Rivera noted the "app store" screenshots aren't from the build, but "appear to be purely conceptual in nature". However, he added: "I'm told such a feature isn't outside the scope of Windows 8."

The Ribbon looks another likely addition to Windows 8, after the interface made its debut in Office 2007. "The

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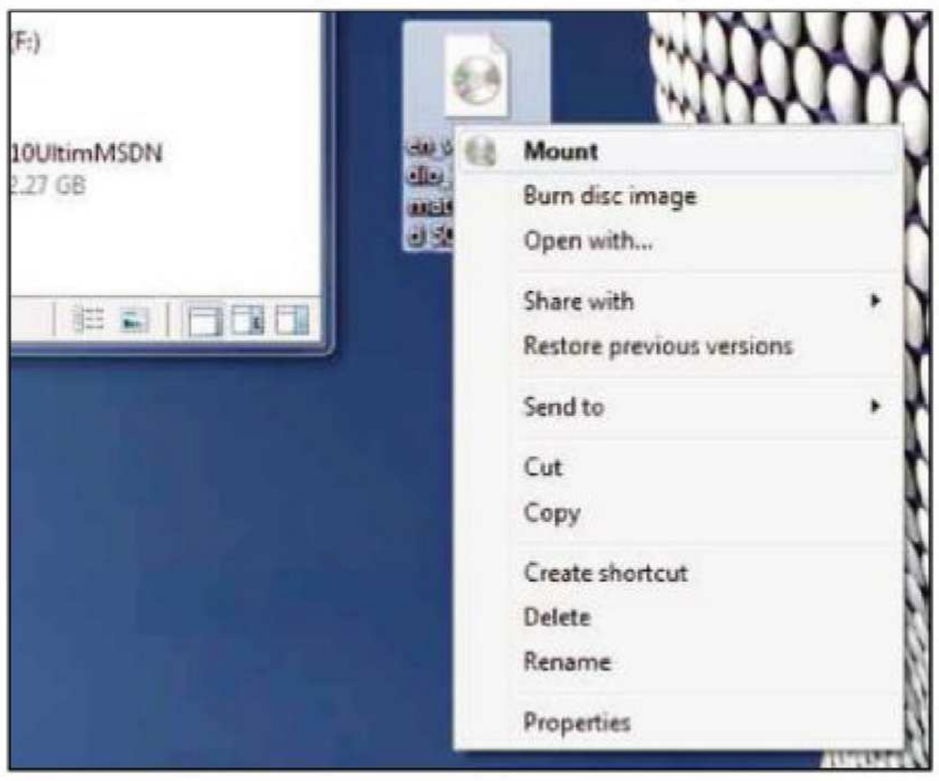
The Windows Phone 'Metro' UI has clearly been influential.

A mock-up app store hints at a new download service.

Windows Explorer is expected to move to the Ribbon interface.



The ability to mount ISO images is a welcome potential addition.

Ribbon is already in Windows 7," Cherry said. "Paint got a Ribbon last time, so other aspects of the Windows interface getting Ribbon makes sense. It's been popular with Office... so that one I think is fairly reasonable."

The Windows Phone interface, dubbed Metro, also seems a safe bet according to Cherry. "Whether the Metro UI comes across in whole or in part, people have tended to like what you can do with it on the phone, so it only makes sense to see if it can be adapted for a UI for a desktop or laptop computer."

Rivera particularly hopes the Windows Phone UI finds its way into Windows 8 for tablets. "The Metro-inspired 'Immersive' shell experience should finally make using a Windows tablet somewhat enjoyable. For those with Windows 7-based tablets, upgrading to Windows 8 (when released) should be made a priority," he noted.

Safe bets

There are features that Microsoft has already confirmed for Windows 8 – notably support for ARM processors, which was briefly on display when the software giant unveiled an early version of Internet Explorer 10 running on ARM.

With ARM support suggesting a focus on tablets, Cherry notes a better touch-system is also likely to be on the way. "The current UI is designed for very precise selection. Touch is really the reverse, the finger is a blunt selection device, and so if you were to just touch-enable some of the PCs today, people would have selection problems. To the extent that touch is becoming so key, particularly in tablets, I expect interface changes to accommodate more touch."

Trial balloons

Even if the leaked builds are as real as Rivera believes, Cherry noted that it's still early days for the next Windows operating system. "There could be a Ribbon, there could be a Metro interface, but I'm not yet ready to go so far as to say that what we're seeing now is it. What we're seeing now are some trial balloons, if those builds are in fact legitimate."

Cherry said the only people who would have their hands on a build at this stage are manufacturers that need to develop drivers and other low-level utility software to be ready for launch day – and, in fact, that's where the pre-beta code is rumoured to have leaked from. However, that doesn't mean Microsoft has handed the latest version to OEMs. "Those builds need the lower levels of the OS, the kernel, the hardware abstraction layer, the low-level guts to be solid, but they don't need a lot of the UI to be set in place," Cherry said.

Before getting too excited – or disappointed – by any of the rumoured features, Cherry warned that much was likely to change before the final release. "If you go back and think about Vista, it had all these promises made by all these people in Microsoft, and then when things changed, or were difficult to develop... people were disappointed because features were pulled back. Until we get a build that's publicly acknowledged by Microsoft, I caution people not to fall in love with a feature... it just leads to disappointment."

NEWS GRID

AMAZON MP3s GET CLOUD DRIVE

WHAT HAPPENED

Amazon unveiled Cloud Drive, online storage for MP3s that lets users upload their tracks to play from any desktop or Android device. Cloud Drive is only available in the US, and laws against format shifting could keep it from officially arriving in the UK. The news comes as Spotify halved how much music its free account users can listen to, and as many speculate Google and Apple are set to launch web-based music systems.

WHAT THEY SAID

Cloud Drive wasn't welcomed by many in the music industry, with one exec saying the launch was "somewhat stunning". "We hope that it [Amazon] will reach a new licence deal," a Sony spokeswoman said, "but we're keeping all of our legal options open."
Amazon's music team sent an open letter to record labels saying Cloud Drive is no different from apps such as Windows Media Player. "It requires a licence from content owners no more than those applications do. It really is that simple," the letter said.

WHAT WE SAID

"Clearly, Cloud Drive doesn't do anybody any harm," observed technical editor Darien Graham-Smith. "Unfortunately, that doesn't necessarily mean Amazon is in the clear – ask the directors of MP3.com, which lost a multi-million-dollar lawsuit in 2000 over a similarly innocuous service. But even if Cloud Drive turns out not to be legal, it's hard to see Amazon as the bad guy here. The entertainment industry has developed an ugly sense of entitlement, and it's good to see someone stand up to it with a common-sense rebuttal."

FUJITSU TAKES ON BT

Fujitsu revealed plans to roll out fibre broadband to five million homes in rural or otherwise under-served areas within the next five years. The 1Gbit/sec fibre-to-the-premise service will partially be rolled out via BT's ducts and telegraph poles. Ofcom forced BT to open access to such infrastructure, but rival broadband providers have claimed the company charges too much. Indeed, Fujitsu stressed its plans required "fair, reasonable and non-discriminatory terms" from BT to be successful.

"There is a unique opportunity for the UK to re-establish itself as a world leader by having the world's most advanced fibre network," said Fujitsu UK's CEO Duncan Tait.
BT said rivals were being disingenuous about why they wanted cheaper access. "BT is the only company that has installed broadband equipment in exchanges serving the last 10% of the UK, and so we'd question whether these companies are genuinely interested in serving rural Britain, given their track record," the company said.

"After years of BT saying it can't make a financial case to deliver fibre to large parts of rural Britain, how refreshing to hear of a company that thinks it can," said editor Barry Collins. "Presumably, Fujitsu will not only avoid the areas already planned to receive BT's fibre, but areas outside of Virgin Media's cable network too. If so, that's nothing but good news for Broadband Britain, and a much-needed kick up the posterior for BT."

MOBILES DITCH OPEN SOURCE?

Google was criticised for not releasing to the open-source community the code for Android 3 – the mobile OS known as Honeycomb that's running on tablets such as the Motorola Xoom. Google promised the code would be released when the smartphone version was finalised. Nokia, meanwhile, pulled Symbian out of the open-source world, changing the licence on Symbian to a "direct model" that gives access only to existing collaborators. This drew anger from developers already miffed by the company's deal with Microsoft.

Android's Andy Rubin said: "We remain firmly committed to providing Android as an open-source platform across many device types." Nokia said: "Nokia is making the Symbian platform available under an alternative, open and direct model, to enable us to continue working with [our]... small community of platform development collaborators."

"Developers aren't the only ones put out by the Symbian announcement or angered by the Android delays; open-source advocates will be dismayed too," said news editor Nicole Kobie. "The mobile market has been seen as one area where the open-source model was proving to be a success, especially with Linux-based Android. Nokia and Google may feel they have to protect their assets, but even such big firms must be careful not to turn their backs on the very communities that have made them a success."

GOOGLE ANTITRUST PROBE

Microsoft has formally – and rather ironically – added its weight to an EU antitrust investigation into Google's search dominance, as US and UK authorities debate a similar move. The EU is looking into claims Google is abusing its significant market share to block rival vertical search firms.

A British MP raised the issue in a parliamentary debate, calling on the Government to address Google's increasing power.

Microsoft's general counsel Brad Smith said "we're concerned by a broadening pattern of conduct aimed at stopping anyone else from creating a competitive alternative. We've therefore decided to join a large and growing number of companies registering their concerns about the European search market."

MP Dominic Raab agreed, saying the UK should investigate on its own, rather than wait for the "cumbersome, clumping, clumsy conclusions of the European Commission to preserve our own free market at home."

"Amusing as the idea of Microsoft playing underdog is, the decision to join other companies questioning Google's pervasiveness in several key segments is significant," said contributing editor Stewart Mitchell. "While no-one would discount the innovative, game-changing role Google has played on the web, it has become so big that questions should be asked about how it behaves. If nothing else, Microsoft's participation gives the debate credibility, which might ensure it's discussed properly rather than brushed aside under pressure from Google's lobbyists."

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WHAT YOU SAID

"The music industry needs to grow up – and so does UK law," tech3475 said on **pcpro.co.uk**. "All they should care about is that people buy their music, whether they want to stream their own personal music shouldn't matter. If they expect people to buy two copies of the same songs they are clearly insane."

"The way I see it, it's just offsite storage where you download the file – your own, already paid-for file – to your local PC in real time," added The_Scrote.

"Another major player in this industry can only be a good thing," said WhiskyFudge. "Increased competition may help to shake things up a little." Nathan_Jeremiah agreed: "This is exactly the move that the broadband market needs, a competitor to BT to support rural and small towns."

Other readers were somewhat more cautious with their praise. "As a dweller in a rural area with no hope of BT 'fast' broadband, I can only applaud this – if it happens," said wittgenfrog.

Reader zelduh offered a translation of Rubin's comments: "'We'll release Android 3.0 when we're ready' means 'we'll release Android 3.0 after our secret exclusivity agreements with some of the big boys expire, and not a moment sooner'." Others questioned whether it mattered if mobile OSes were open source. "How many developers actually need access to the OS source in any case?" asked rjp2000. "Being closed source hasn't exactly held iOS back, has it?"

"I seem to recall a huge company called Microsoft with loads of cash willing and eager to take on Google on its home turf," said Noghar. "Admittedly, it isn't making a very good job of it, but not so bad that it needs the FTC to pile in."

And Noghar wasn't convinced by the MP's claims that the UK would be a more efficient investigator. "Yes, why wait for the 'cumbersome, clumping, clumsy conclusions of the European Commission' when we can have a bunch of ill-informed publicity seekers posing in Parliament."

ON THE SPOT

The Harry Potter school of net neutrality

THE CREATOR OF THE WEB, **SIR TIM BERNERS-LEE**, SPEAKS OUT ON WEB DISCRIMINATION, OPEN DATA AND TOASTERS

If you want to know what's best for the future of the web, there's no better person to ask than its founding father – Sir Tim Berners-Lee. The inventor of the web remains passionate about his creation, holding the directorate of the W3C standards body to help shape its future.

As part of a W3C conference, journalists had a rare chance to put questions to Sir Tim, to find out his thoughts on net neutrality, archiving, standards and more.

Q You've met with the Government on net neutrality – what should the UK be doing to protect it?

A I think that net neutrality is something where – it's what that Harry Potter character is always saying – you need "constant vigilance". In an ideal world, the internet industry will be very responsible and take to heart this fundamental right people have to connect to whomever they want, without being biased for commercial reasons and only be allowed to go to one particular site.

However, if industry fails to do that, or if the country in general is sufficiently worried about the future, then it needs to look to regulation. At the moment, the press is crucial, looking out for violations and immediately jumping on them. It's possible this process of holding them up for accountability will be enough.

Q How do we archive content so we can actually read web material in the future, as we can books?

A Why don't we print it all out? (laughs) Yes, sometimes I worry about that too. Of course, when stuff has been put in libraries... a huge amount of time has been spent selecting what to collect.

In the academic field, we could have groups of universities that... hold each other's stuff. So if someone is taken off the air, whether it's by accident, by nature or by government, or because they forgot to renew their domain name licence, then the rest of the world has in fact got copies and a licence that allows them to serve things up.

We can imagine companies doing that as well, saying: "we realise that all the manuals for all the gadgets we've made, for all the toasters we've made over the years, are in fact actually a really important part of history". And if you think about it, if people want to get them working in 30 years' time, it would be kind of nice if all the PDFs for all those manuals were somewhere.

Q Many of the web's challenges are social, not technical. Why is that?

A All these protocols have their technical side and their social side. You think of HTTP as being technical, but why does the web spread?

It spreads because people make links. Why do people make links? Well they make links so that people follow links. But why do they want people to follow links? You want to increase the value of your blog, because you want more people to read it, because you want more kudos, or the thrill of seeing the number go up, or because you want more revenue from advertising. That social, economic and psychological piece is part of the web protocol.

Q What are your thoughts on the US Government closing open-data sites because of budget cuts?

A What would be a shame is if people used the clampdown on money as an excuse to be lazy and to not be transparent. If you think about it, in today's world, if you were going to store something, it's pretty much as easy to store something in the public as private.

If you store it in the public, you don't have to worry about security, so it's actually more expensive to store it somewhere private. The argument that it's more expensive to make something visible is a weak one.

TalkTalk vows to fight on after Digital Act blow

ISP WILL APPEAL AFTER JUDGE RULES IN FAVOUR OF GOVERNMENT ON DIGITAL ECONOMY ACT

TalkTalk plans to continue its fight against the Digital Economy Act (DEA) after a judicial review found little wrong with the controversial legislation.

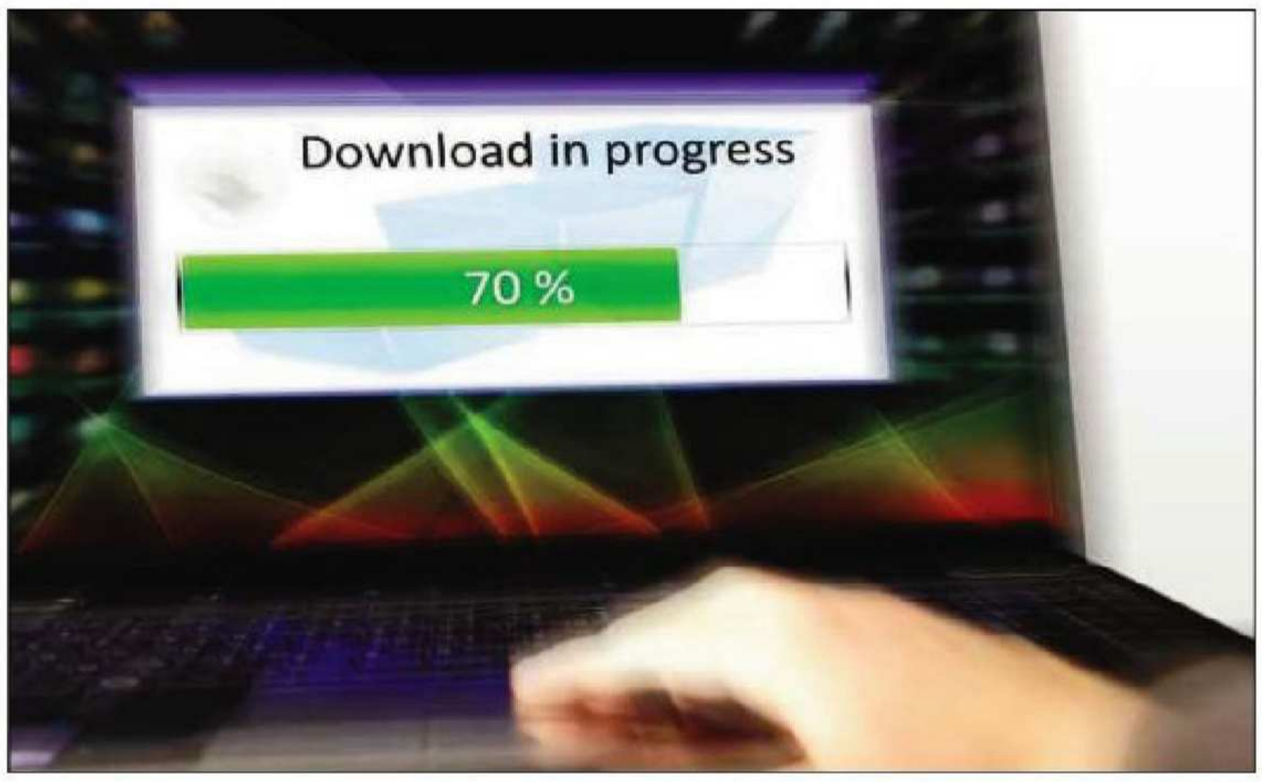
ISPs BT and TalkTalk sought a judicial review of the Act – rushed through Parliament by the last Government in an attempt to clamp down on online piracy with the infamous "three-strikes" rule – but Judge Justice Kenneth Parker ruled against their claims it was "unlawful".

The judge threw out four of the five claims completely – including arguments that the Act was disproportionate and breached data protection laws because it required ISPs to process data. The judge did rule partially in the ISPs' favour concerning administration costs for the three-strikes scheme.

TalkTalk vowed to take the issue to higher authorities, a move that will please internet freedom campaigners. "Although we may have lost this particular battle, we'll continue fighting to defend our customers' rights against this ill-judged legislation," a TalkTalk spokesperson said.

According to the ISP, the judge acknowledged issues over the DEA as a weapon to fight online piracy, but said the ISPs had failed to present sufficient evidence for him to take action. "On the question of the proportionality of the Act, we're pleased the judge identified issues, but disappointed that he felt that the evidence of the futility of the measures imposed by the Act, and the cost and harm they'll cause, isn't sufficiently definitive enough at this stage to uphold our claim," the ISP said.

TalkTalk confirmed it was considering further legal challenges, "which may include an appeal to the Court of Appeal, or a request that the Court of Appeal make a reference to the European Court of Justice."



Virgin: cable as fast as fibre

Virgin Media is trialing 1.5Gbits/sec connections over cable, hoping to prove the technology is "at least on a par" with speeds offered by fibre. The ISP said such speeds would be the fastest in the world over cable.

Virgin's fibre-to-the-cabinet (FTTC) system uses coaxial cable to deliver a connection from its fibre-enabled cabinets to homes and businesses. The system follows data-over-cable service interface specifications (DOCSIS), which allow Virgin to use channel bonding to boost capacity by combining multiple lines.

The ISP claimed its infrastructure is "future-proof", unlike that of rival BT, which uses copper phone wiring rather than coaxial cable for the last part of its FTTC connections.

eBook readers make book piracy a very real threat, authors claim.

Authors worried by eBook piracy

BOOMING EBOOK BUSINESS CAUSES CONCERNS

Rising eBook piracy will force new authors out of the business, according to an author who described the problem as "colossal".

Estimates of the scale of the problem vary, but since the beginning of the year, the Publishers Association has issued 34,000 take-down notices following 10,550 reports from publishers. The association has set up a web hotline for publishers to report pirated books.

Crime and mystery writer David Hewson said pirates were systematically copying books and making them available immediately after they were published. "It's a big and organised business," he told *PC Pro*. "One new author, unheard of, released his first book recently and within a week it had been ripped – it's so dispiriting and it costs authors their income. It isn't such a big deal for me, because I'm established, but for new authors it could stop them making a living."

A spokesperson for the association said the scale of the problem was "not growing massively", but added it remained significant.

Sales of eBooks have surged over the past year, with digital versions overtaking sales of paperbacks in several markets, but consumers remain frustrated over limitations in the format, including the inability of eBooks to be easily loaned between readers.

Amazon started a lending service last year, but publishers have been slow to sign up – and with online piracy on the increase, Hewson isn't surprised. "Websites sprung up putting complete strangers in touch with each other, which isn't in the same spirit as lending a paperback to someone, and it's made publishers wary."

DIARY

MAY

Internet World
Earls Court, London
10-12 May
www.internetworld.co.uk

ISSD Conference
Hilton Olympia, London
18-19 May
www.enabled-security.com

CIO Europe Summit
Ritz-Carlton, Berlin
24-26 May
www.ciosummit europe.com

JUNE

Cloud Computing World Forum
Olympia, London
21-22 June
www.cloudwf.com

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Activists fume at secret web-blocking deal

RIGHTS HOLDERS ASK GOVERNMENT TO FORCE ISPs TO BLOCK "ILLEGAL" CONTENT WITHOUT COURT ACTION

ISPs and consumer activists have promised to battle the Government over a behind-closed-doors deal to block sites hosting copyrighted material.

Rights holders want ISPs to block sites that provide access to "illegal" content, but such a scheme would place too much responsibility on ISPs, according to the Open Rights Group.

"We don't know what form they'll take, whether it will involve blocking or filtering, because all these discussions are taking place out of the public view," said Jim Killock, director of the ORG.

"Since they're having problems with the Digital Economy Act, it looks as though the rights holders and the Government are now trying to work out a private arrangement with the ISPs to make them police the web – but this is a debate that should be taking place in the public arena," he said.

Blocking discussions

A system for blacklisting piracy sites was included in the controversial Digital Economy Act, alongside a three-strikes rule that threatened to restrict web access for repeat offenders.

But with a judicial review brought by TalkTalk, and BT casting doubt over the three-strikes legislation, rights holders have been holding meetings with the Government to see if an arrangement with ISPs can be agreed upon without reverting to the courts.

The communications minister Ed Vaizey confirmed that meetings had taken place with rights holders "to look at industry self-regulatory measures to tackle online copyright infringement through site-blocking".

ISP concerns

ISPs are concerned about the costs of such a blocking system, and are also fearful that a voluntary system would leave them exposed to legal action.

"We're not in favour of ISPs voluntarily blocking internet access to any website, except in respect of the work we and other ISPs do in support of the Internet Watch Foundation," a spokesperson for BT said, referring to the group that takes down child-abuse sites. "Our position is shared by many consumer voices and others in our industry, and we shall make that position clear."

ISP Timico said it wasn't the job of ISPs to decide what was or wasn't legal. "Blocking is likely to be expensive, ineffective and have unintended consequences such as innocent websites being blocked; it will be seen as censorship and require huge involvement of the judiciary," said Trefor Davies, Timico CTO.

EU ruling

Site blocking in legislation could also face opposition in European courts after the EU's top legal expert said such a system would breach fundamental rights. According to advocate general Pedro Cruz Villalón, the idea of blocking sites using a filtering method would be "a restriction on the right to respect for the privacy of communications", while blocking individual sites "would restrict freedom of information".

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• Built-in SDHC/SD card slot

IC-3005Wn
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2.8GHz Intel® Dual Core CPU	2.8GHz Intel® Dual Core CPU	2.5GHz Intel® Quad Core CPU	2.8GHz Intel® Quad Core CPU	**2x** 2.5GHz Intel® Xeon® Quad Core CPUs	**2x** 2.1GHz AMD Opteron™ 12 Core CPUs
2 CPU Cores	2 CPU Cores	4 CPU Cores	4 CPU Cores	8 CPU Cores	24 CPU Cores
500GB SATA HDD	**2x** 250GB SATA HDD	**2x** 300GB SATA HDD	**2x** 2000GB SATA HDD	**2x** 300GB SAS HDD **1x** 500GB SATA HDD	**2x** 300GB SAS HDD **2x** 500GB SATA HDD
-	RAID 1	RAID 1	RAID 1	RAID 1	RAID 1
2GB RAM	4GB RAM	8GB RAM	12GB RAM	16GB RAM	32GB RAM
100Mbps connectivity	100Mbps connectivity	100Mbps connectivity	100Mbps connectivity	100Mbps connectivity	100Mbps connectivity
Unlimited bandwidth	Unlimited bandwidth	Unlimited bandwidth	Unlimited bandwidth	Unlimited bandwidth	Unlimited bandwidth
2 IPs	2 IPs	2 IPs	2 IPs	2 IPs	2 IPs

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Should Microsoft replace Ballmer as CEO?

Microsoft's Steve Ballmer is under pressure, as Apple has overtaken the tech giant in market value. But are investors, consumers and the press being too hard on the CEO? To find out, we compared the performance of five leading tech CEOs, assessing their popularity with their own employees (using figures from Glassdoor.com), their companies' market capitalisation and their profitability.

96%

Google's **Eric Schmidt** has stepped down, but staff ratings show he's going out on a high.

78%

Oracle's **Larry Ellison** is infamous for his jet-setting lifestyle and film cameos.

83%

Cisco's **John Chambers** recently admitted his company needed a new direction.

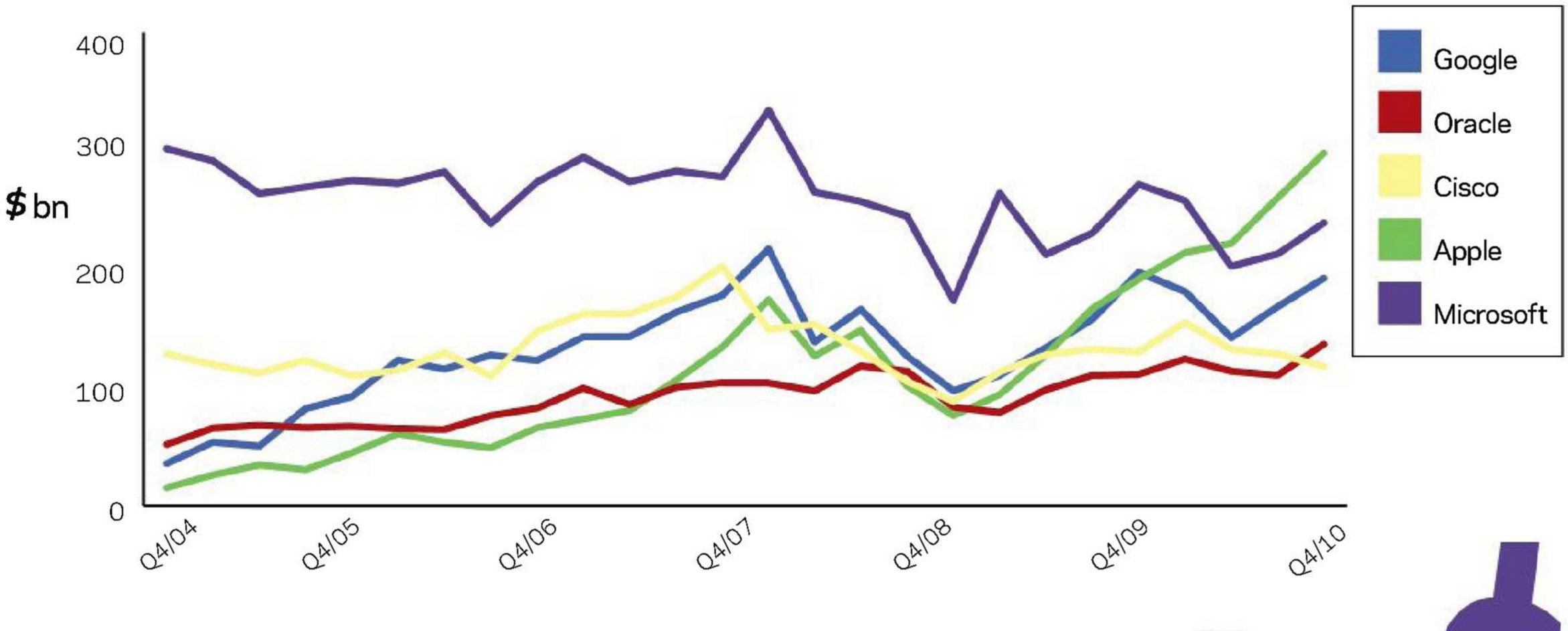
97%

Steve Jobs is an iconic, popular CEO – so it's no surprise that his staff love him too.

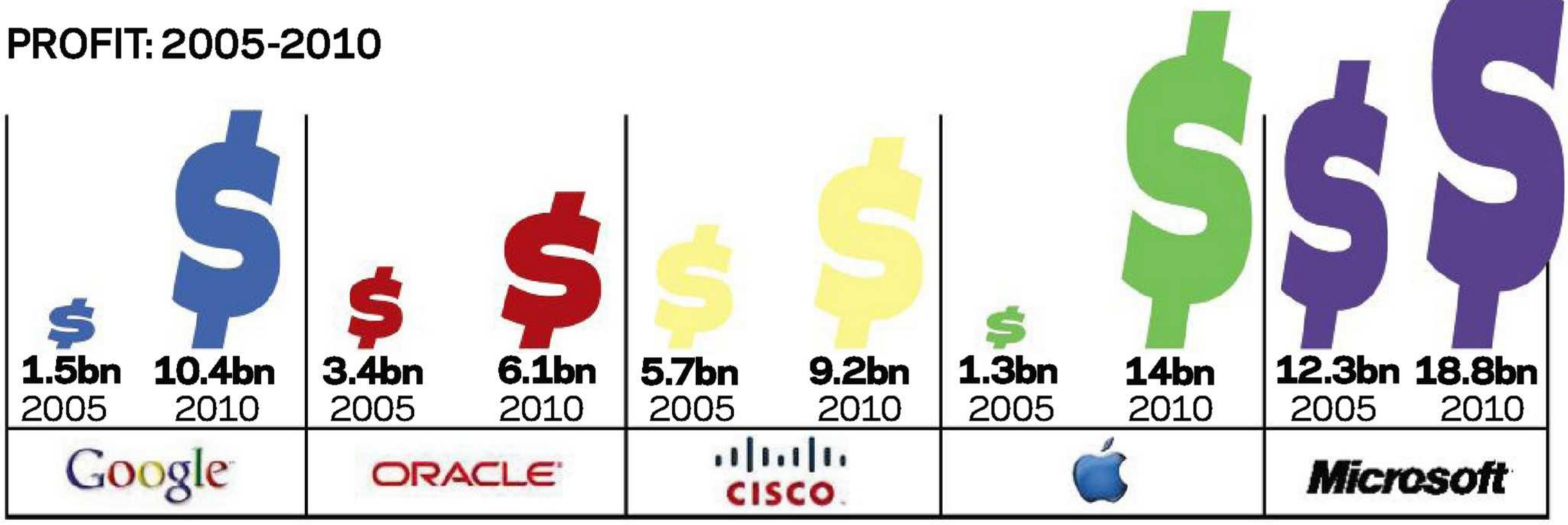
47%

Glassdoor's poll shows Microsoft staff aren't fans of **Steve Ballmer** – but is he really that bad?

MARKET CAPITALISATION: 2004-2010



PROFIT: 2005-2010



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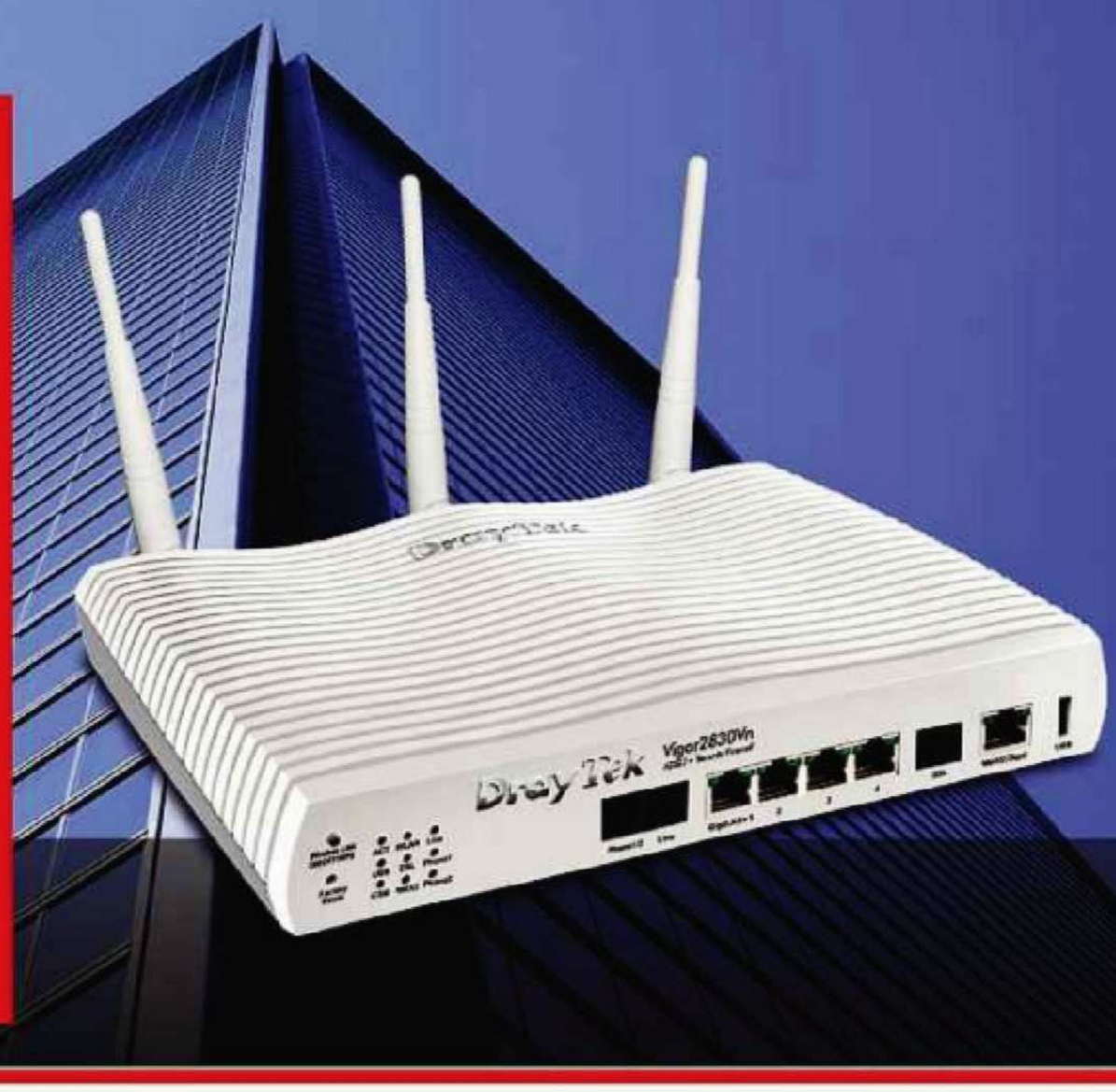

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E&OE. All specifications subject to change. Please check web site for current model specifications.

The Phorm fiasco shows data police only pick on soft targets, says Stewart Mitchell

Whether it's a playground dispute over pocket money or protection from bullying landlords, it's good to know there's an authority to defend right from wrong. However, those charged with policing web privacy and data protection seem reluctant to pick on anything but the softest of targets.

Take, for example, the recent decision not to prosecute BT or Phorm over secret trials of the latter's behavioural advertising technology. The Phorm system was trialled by BT in 2006 and 2007, using live subscriber guinea pigs who had no idea their web browsing was being monitored by deep-packet inspection. Understandably, when this invasion of privacy was revealed, there was widespread condemnation by outraged netizens – but not by the Government, the Information Commissioner nor prosecutors.

The UK authorities repeatedly avoided taking action over the data snooping, and the Crown Prosecution Service (CPS) became involved only after a privacy campaigner lodged an official complaint, accusing BT and Phorm of an illegal wiretap.

After two years of deliberation, the CPS has decided not to proceed to trial, saying a prosecution would "not be in the public interest" – an argument with which the 20,000 people who signed a Downing Street petition at the time might disagree.

So might the European Union, which has threatened to prosecute the UK Government after charging it with failing to protect the confidentiality of its citizens' electronic communications following the Phorm case. Even now, it remains unclear whether a crime was committed under UK law, but the EU was unequivocal: "The rules are quite clear. A person's information can only be used with their prior consent," said EU commissioner Viviane Reding. "We cannot give up this basic principle and have all our exchanges monitored and surveyed in exchange for a promise of 'more relevant' advertising."

The CPS' decision was all the more disappointing given the excuses it gave for dropping the case. First, that "the trial was of limited duration and limited application". Well that's all right, then – you may or may not have broken the law, but it affected only 10,000 people and didn't go on for too long.

However, more worrying was the CPS basing its decision on dubious advice given to Phorm by the Home Office:

- In 2008, the Home Office told Phorm in "informal guidance" that its technology didn't breach UK law
- Phorm helped to edit the guidance to make it more user-friendly for its customers
- The CPS says it based its decision not to prosecute partly on Phorm's Home Office guidance, which was only provided two years after the first trial

Bizarrely, the CPS decided against prosecuting Phorm or BT, not because the pair had done nothing wrong, but because the companies' legal teams and Home Office had told them it was okay. According to the CPS, the unprecedented data snooping was the "result of an honest mistake or genuine misunderstanding of the law".

You can picture the CPS' response if a drunk driver ploughed into its offices because he'd been told the legal limit was three pints instead of two. Ignorance isn't a defence for the rest of us, so why should bad advice be a defence for BT and Phorm?

That the Government's informal advice contrasts so starkly with the EU position displays disturbing technical ignorance, and an even more worrying attitude as to what constitutes illegal wire-tapping.

You don't need to be a conspiracy theorist, either, to see that Home Office officials under the previous Government were far too cosy with the businesses concerned and didn't give a thought to the victims of this private data-snooping.

The Phorm case is only one recent example of consumer rights being trampled on by a combination of corporate interests and governmental chumminess – Google's Street View is another. It seems a data breach is okay if you're a big government supplier or a brand that the politicians want to invest in the UK.

Compare that to the ICO press site (**www.pcpro.co.uk/links/201probe**), which reads like a charge list of public bodies such as schools, colleges and councils, which are made to pay hefty fines from the public purse. For example, in February, the Information Commissioner fined Ealing Council £80,000 and handed a £70,000 penalty to Hounslow Council over two lost laptops. Neither was encrypted, but both were password-protected and contained a combined 1,700 personal files.

Apparently, it isn't the size or seriousness of the breach that matters. You need expensive lawyers or the ear of a government department to trouble Britain's data watchdogs.

Ignorance isn't a defence for the rest of us, so why should bad advice be a defence for BT and Phorm?

Stewart Mitchell is a contributing editor with an old-fashioned sense of fair play. This is why he's never won a pub quiz and probably won't ever hold a position in government. Read his blog at www.pcpro.co.uk/blogs/author/stewartm

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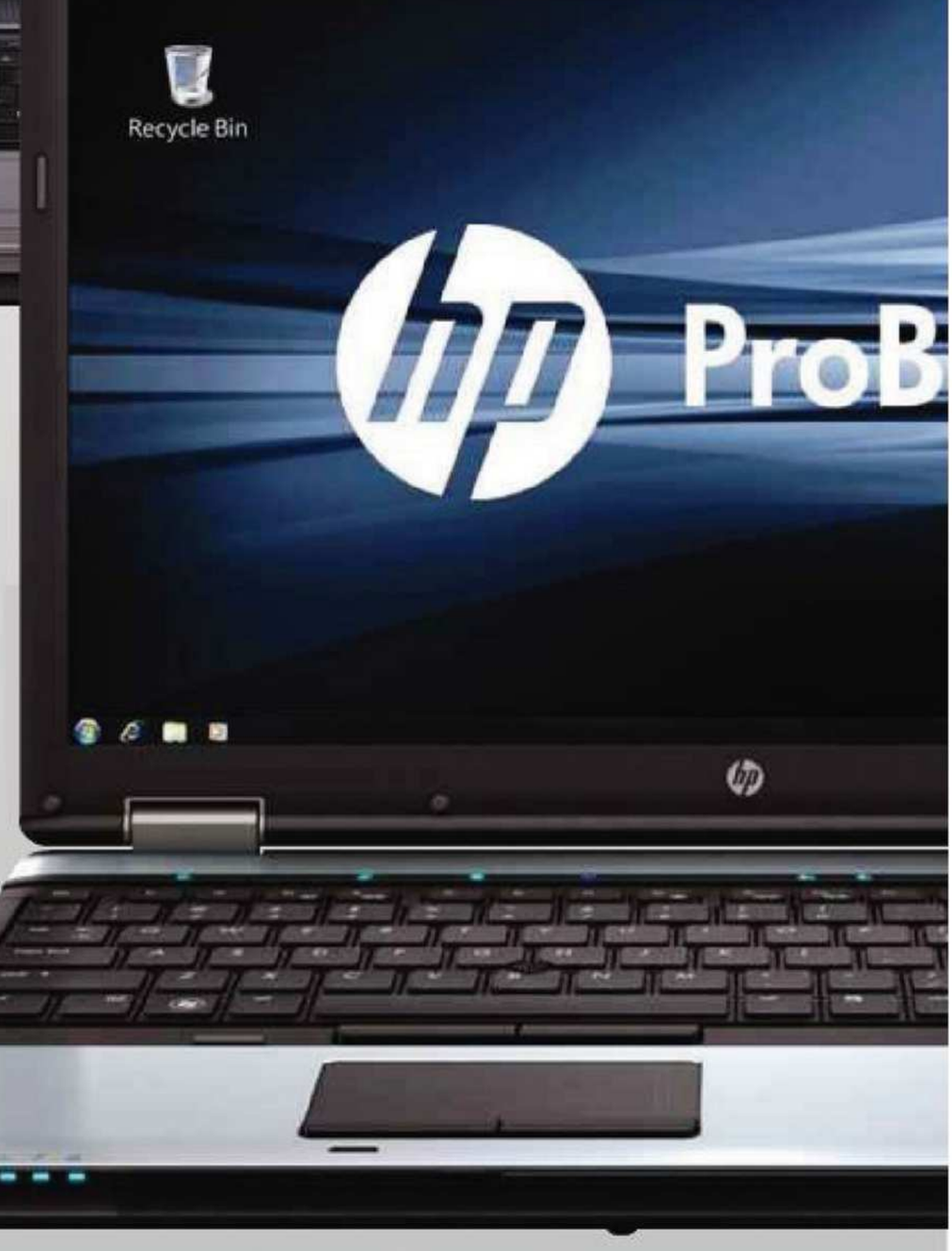

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NETBOOK

Asus Eee PC 1001P

PRICE £177 (£212) **SUPPLIER** www.saveonlaptops.co.uk
WEB ID 359920 **ISSUE** 192

The specification looks nothing special, but that isn't the point: this is the high-quality Eee PC chassis taken back to its low-cost sub-£200 roots. Buy fast, while stocks last.

1.66GHZ INTEL ATOM N450; 1GB DDR2 RAM; 160GB HARD DISK; INTEL GMA 3150 GRAPHICS; 10.1IN 1,024 X 600 TFT; 802.11BG WLAN; 10/100 ETHERNET; 3 X USB 2; D-SUB; WINDOWS XP HOME 32-BIT; 1YR C&R WARRANTY; 262 X 177 X 38MM (WDH); 1.3KG. PART CODE: 1001P-WHI011X.

ALTERNATIVE CHOICES

Toshiba NB550D

PRICE £244 (£293) **SUPPLIER** www.laptopsdirect.co.uk
WEB ID 366331 **ISSUE** 200

The first AMD Brazos netbook is a great choice for media, plus it lasts almost ten hours on one charge.

Asus Eee PC 1015PEM

PRICE £245 (£294) **SUPPLIER** www.laptopsdirect.co.uk
WEB ID 363631 **ISSUE** 197

Asus shows its pedigree with a netbook that's stylish, usable, practical and affordable.

VALUE LAPTOP

Acer Aspire TimelineX 5820T

PRICE £400 (£480) **SUPPLIER** www.saveonlaptops.co.uk
WEB ID 362494 **ISSUE** 195

A battery lasting 9hrs 30mins, a processor that's far more capable than that battery life would suggest, and a chassis that's thin, light and built with attention to detail.

2.4GHZ INTEL CORE I3-370M; 3GB DDR3 RAM; 320GB HARD DISK; DVD WRITER; INTEL HD GRAPHICS; 15.6IN 1,366 X 768 TFT; 802.11BGN WLAN; GIGABIT ETHERNET; 4 X USB 2; D-SUB; HDMI; WINDOWS 7 HOME PREMIUM 64-BIT; 1YR RTB WARRANTY; 379 X 250 X 32MM (WDH); 2.38KG. PART CODE: LX.PTG02.153.

ALTERNATIVE CHOICES

Toshiba Portégé R700

PRICE £519 (£623) **SUPPLIER** www.eclipsecomputers.com
WEB ID 365026 **ISSUE** 198

A powerful laptop that's as light as a netbook, the R700 is well suited to demanding tasks.

Toshiba Satellite C660

PRICE £329 (£395) **SUPPLIER** www.laptopsdirect.co.uk
WEB ID N/A **ISSUE** 200

It may look a bit dour, but this is a fast, long-lasting laptop at a very attractive price.

HIGH-END LAPTOP

Packard Bell EasyNote TS11

PRICE £583 (£699) **SUPPLIER** www.johnlewis.com
WEB ID 366346 **ISSUE** 200

The TS11 is fast and long-lasting in a solidly built chassis. The screen isn't perfect, but at this price we can forgive that. A bargain Sandy Bridge-based laptop.

2GHZ INTEL CORE I7-2630QM; 4GB DDR3 RAM; 640GB HARD DISK; DVD WRITER; INTEL HD GRAPHICS 3000; 15.6IN 1,366 X 768 TFT ; GIGABIT ETHERNET; 802.11BGN WLAN; USB 3; 2 X USB 2; HDMI; D-SUB; CARD READER; WINDOWS 7 HOME PREMIUM 64-BIT; 2YR RTB WARRANTY; 384 X 257 X 38MM (WDH); 2.45KG; PART CODE: TS11-HR-100UK

ALTERNATIVE CHOICES

Dell XPS 15

PRICE £774 (£929) **SUPPLIER** www.dell.co.uk
WEB ID N/A **ISSUE** 201

The Dell XPS 15 gets its Sandy Bridge update, making it a powerful and configurable laptop for under a grand.

Apple MacBook Pro 13in

PRICE £833 (£999) **SUPPLIER** www.apple.com/uk
WEB ID 365860 **ISSUE** 200

Small, sleek yet extremely powerful, the most affordable of the new MacBook Pros is also the finest.

VALUE PC

Palicomp Phoenix i5 Destiny

PRICE £542 (£650) **SUPPLIER** www.palicomp.co.uk
WEB ID N/A **ISSUE** 201

A fast and unlocked Sandy Bridge processor, a Blu-ray drive and a solid 22in Full HD monitor make up for the middling graphics and chassis. At this price it's a great low-end deal.

3.3GHZ INTEL CORE I5-2500K OVERCLOCKED TO 4.5GHZ; 4GB DDR3; ASUS P8P67 PRO-B3 MOTHERBOARD; 1TB HARD DISK; BLU-RAY READER; ATI RADEON HD 5670; 22IN AOC TFT; LOGITECH 2.1 SPEAKERS; 4 X USB 3; 8 X USB 2; GIGABIT ETHERNET; WINDOWS 7 HOME PREMIUM 64-BIT; 1YR RTB WARRANTY; 190 X 480 X 420MM (WDH).

ALTERNATIVE CHOICES

Wired2Fire Fury VX5

PRICE £506 (£607) **SUPPLIER** www.wired2fire.co.uk
WEB ID 363814 **ISSUE** 196

Blu-ray, near-silent operation and a full set of peripherals, all for a very reasonable price.

Acer Revo 100

PRICE £398 (£479) **SUPPLIER** www.saveonlaptops.co.uk
WEB ID 364636 **ISSUE** 198

This stylish media-centre PC is boosted yet further by its innovative remote keyboard/touchpad.

HIGH-END PC

Yoyotech Fi7epower 4.8

PRICE £999 (£1,199) **SUPPLIER** www.yoyotech.co.uk
WEB ID 364360 **ISSUE** 198

A Sandy Bridge CPU with a hefty overclock means a record-breaking benchmark score. It's been put together immaculately, but we'd upgrade the peripherals.

3.4GHZ INTEL CORE I7-2600K OVERCLOCKED TO 4.8GHZ; 8GB DDR3; ASUS P8P67 PRO MOTHERBOARD; 2TB HARD DISK; DVD WRITER; AMD RADEON HD 6970; 22IN IIYAMA TFT; 4 X USB 3; 8 X USB 2; 3 X ESATA; GIGABIT ETHERNET; WIRELESS KEYBOARD AND MOUSE; WINDOWS 7 HOME PREMIUM 64-BIT; 1YR RTB WARRANTY; 230 X 510 X 502MM (WDH).

ALTERNATIVE CHOICES

Tranquil ixLS

PRICE £861 (£1,033) **SUPPLIER** www.tranquilpc.co.uk
WEB ID 364582 **ISSUE** 198

The media centre with all the power gets its Sandy Bridge upgrade. Expensive, but stunning.

Palicomp Phoenix i5 Sniper

PRICE £799 (£959) **SUPPLIER** www.palicomp.co.uk
WEB ID 365506 **ISSUE** 199

Sandy Bridge power, fast graphics and a good monitor, all at an affordable price.

ENTHUSIAST PC

Chillblast Fusion Dimension

PRICE £1,699 (£2,039) **SUPPLIER** www.chillblast.com
WEB ID 363832 **ISSUE** 197

If you have the cash and want it all, this is it: awesome speed, a rock-solid chassis and with the added bonus of 3D, this is a comprehensive high-end system.

3.06GHZ INTEL CORE I7-950 OVERCLOCKED TO 4GHZ; 6GB DDR3; ASUS SABRETOOTH X58 MOTHERBOARD; 80GB SSD; 1TB HARD DISK; BLU-RAY DRIVE; NVIDIA GEFORCE GTX 580; ACER 3D MONITOR; 5.1 SPEAKERS; RAZER KEYBOARD & MOUSE; WINDOWS 7 HOME PREMIUM 64-BIT; 1YR RTB WARRANTY; 212 X 616 X 497MM (WDH).

ALTERNATIVE CHOICES

CyberPower Liquid i7 Kraken

PRICE £1,475 (£1,770) **SUPPLIER** www.cyberpowersystem.co.uk
WEB ID 364516 **ISSUE** 198

A deceptive machine that matches sensible design with blistering speed and quality throughout.

Palicomp Phoenix Hydro-X

PRICE £1,500 (£1,800) **SUPPLIER** www.palicomp.co.uk
WEB ID 365518 **ISSUE** 199

The fastest gaming PC we've tested, now with upgraded graphics, a higher overclock and more RAM.

BUSINESS LAPTOP

Sony VAIO S Series

PRICE £791 (£949) **SUPPLIER** www.sony.co.uk
WEB ID N/A **ISSUE** 201

A dramatic physical redesign and a Sandy Bridge update are the headline features, but everything about this new S Series is improved. It's faster, sturdier and has better battery life, making it a great business choice in any specification.

2.3GHZ INTEL CORE I5-2410M; 4GB DDR3; 500GB HARD DISK; DVD WRITER; 13.3IN 1,366 X 768 TFT; INTEL HD GRAPHICS/AMD RADEON HD 6470M; 802.11N WLAN; 3G; USB 3; 2 X USB 2; WINDOWS 7 PROFESSIONAL 64-BIT; 2YR RTB WARRANTY; 331 X 225 X 24MM (WDH); 1.69KG; PART CODE: VPCSB1V9E/B.

ALTERNATIVE CHOICE

Acer TravelMate 8732TG

PRICE £662 (£794) **SUPPLIER** www.saveonlaptops.co.uk
WEB ID 363889 **ISSUE** 198

It isn't exactly thin and light, but it's a powerful, durable 13in portable at a very attractive price. Part code: LX.TX303.014.

ENTHUSIAST LAPTOP

Alienware M11x R2

PRICE £1,137 (£1,364) **SUPPLIER** www.alienware.co.uk
WEB ID 359560 **ISSUE** N/A

A 12in portable that's built specifically for hard-core gamers is a rarity, but somehow this manages to pull it off. Fast, beautifully built and with cutting-edge internals, the Sandy Bridge update comes next month.

1.06GHZ INTEL CORE I5-520UM; 4GB DDR3 RAM; 256GB SSD; 12.1IN 1,366 X 768 TFT; NVIDIA GT335M GRAPHICS/INTEL HD GRAPHICS; BLUETOOTH; 802.11ABGN WLAN; GIGABIT ETHERNET; 3 X USB 2; HDMI; DISPLAYPORT; CARD READER; WINDOWS 7 HOME PREMIUM 64-BIT; 1YR C&R WARRANTY; 286 X 233 X 33MM (WDH); 2.04KG.

ALTERNATIVE CHOICE

Apple MacBook Pro 17in

PRICE £1,749 (£2,099) **SUPPLIER** www.apple.com/uk
WEB ID 365710 **ISSUE** 200

It certainly isn't cheap, but it's incredibly powerful, elegantly designed and packs the storage and ports to see you through many years of intensive use.

EXECUTIVE LAPTOP

Sony VAIO Z13

PRICE £1,286 (£1,543) **SUPPLIER** www.dabs.com
WEB ID 362017 **ISSUE** 195

Sony's flagship ultraportable is ergonomically near-perfect, has the performance to obliterate far bigger rivals, and lasts more than six hours on a single charge. No Sandy Bridge update yet, though.

2.53GHZ INTEL CORE I5-460M; 4GB DDR3 RAM; 128GB RAID0 ARRAY (2 X 64GB SSD); DVD WRITER; NVIDIA GEFORCE GT 330M/INTEL HD GRAPHICS; 13.1IN 1,600 X 900 TFT; D-SUB; HDMI; 3 X USB 2; 7.2 MBITS/SEC WWAN; 802.11ABGN WLAN; GIGABIT ETHERNET; WINDOWS 7 PROFESSIONAL 64-BIT; 314 X 210 X 24MM (WDH); 1.4KG; PART CODE: VPCZ13M9E/B.

ALTERNATIVE CHOICE

Apple MacBook Air 11in

PRICE £833 (£1,020) **SUPPLIER** www.apple.com/uk
WEB ID 362995 **ISSUE** 196

It can't match the Z13 for speed or features, but for sheer design brilliance the MacBook Air 11in is tough to top. Staggeringly thin and light.

BUSINESS PC

Dell Optiplex 980

PRICE £689 (£827) **SUPPLIER** www.dell.co.uk
WEB ID 358975 **ISSUE** N/A

Dell's ingenious design makes this Optiplex easy to work with, and its powerful specification serves up enough grunt to handle both basic and intensive business applications alike. Expensive, but well worth the investment.

3.33GHZ INTEL CORE I5-660; 4GB DDR3; 320GB HARD DISK; DVD WRITER; INTEL GMA X4500HD GRAPHICS; D-SUB; DISPLAYPORT; 10 X USB 2; 2 X PS/2; PARALLEL; SERIAL OUTPUT; GIGABIT ETHERNET; TPM; TAMPER DETECTION; WINDOWS 7 PROFESSIONAL 32-BIT; 3YR NBD ON-SITE WARRANTY; 187 X 445 X 410MM (WDH).

ALTERNATIVE CHOICE

Lenovo ThinkCentre M90

PRICE From £531 (£637) **SUPPLIER** www.lenovo.co.uk
WEB ID 359269 **ISSUE** N/A

Expensive but, thanks to superb design and power, worth the cash for demanding business users.

ALL-IN-ONE PC

Apple iMac 27in

PRICE £1,166 (£1,429) **SUPPLIER** www.apple.com/uk
WEB ID 360307 **ISSUE** 193

With a glorious 27in high-resolution panel, an upgraded processor and a powerful graphics card, we can forgive the few niggles in an otherwise stunning all-in-one PC.

3.2GHZ INTEL CORE I3-550; 4GB DDR3 RAM; 1TB HARD DISK; DVD-WRITER; ATI RADEON HD 5670 GRAPHICS; 27IN 2,560 X 1,440 TFT; 17W SPEAKERS; 4 X USB 2; MINI-DISPLAYPORT; 802.11N WLAN; GIGABIT ETHERNET; WIRELESS KEYBOARD; MAGIC MOUSE; SD CARD READER; APPLE MAC OS X SNOW LEOPARD; 1YR RTB WARRANTY; 528 X 189 X 451MM (WDH).

ALTERNATIVE CHOICE

Sony VAIO L21

PRICE £1,000 (£1,200) **SUPPLIER** www.sony.co.uk
WEB ID 365413 **ISSUE** 201

A PC with a thoughtful touch interface and innovative gesture control, it's the best touch PC we've used.

MEDIA STREAMER

WD TV Live

PRICE £63 (£76) **SUPPLIER** www.amazon.co.uk
WEB ID 353542 **ISSUE** 183

Don't be fooled by its compact dimensions, Western Digital's baby is a media player of formidable ability. Inexpensive, uncomplicated and powerful, the WD TV Live will play almost anything.

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ALTERNATIVE CHOICE

Sonos ZonePlayer S5

PRICE £291 (£349) **SUPPLIER** www.amazon.co.uk
WEB ID 355609 **ISSUE** 187

It's dear, but this all-in-one Sonos is a great entry point to multiroom audio.

UP TO 22IN TFT

BenQ G2222HDL

PRICE £83 (£100) **SUPPLIER** www.amazon.co.uk
WEB ID 355315 **ISSUE** 189

With a Full HD panel and image quality good enough to match dearer rivals, we can forgive this BenQ's slightly iffy black level and lack of features. At this price, it's a bargain.

22IN 1,920 X 1,080 TFT; 250CD/M² BRIGHTNESS; 1,000:1 CONTRAST RATIO; 5MS RESPONSE; DVI, D-SUB INPUTS; 3YR ON-SITE WARRANTY; 505 X 393 X 175MM (WDH); 5KG.

ALTERNATIVE CHOICE

NEC MultiSync EA221WM

PRICE £163 (£195) **SUPPLIER** www.dabs.com
WEB ID 358204 **ISSUE** 189

The EA221WM has the features to be a great business choice – although the price has risen recently.

23IN+ TFT

ViewSonic VP2365wb

PRICE £166 (£199) **SUPPLIER** www.morecomputers.com
WEB ID 363808 **ISSUE** 197

Despite being the cheapest IPS-based monitor we've yet seen, this 23in ViewSonic surprised us by offering stunning image quality and a decent array of features. There's nothing better at this size.

23IN 1,920 X 1,080 E-IPS TFT; 300CD/M² BRIGHTNESS; 1,000:1 CONTRAST; 14MS BTB RESPONSE TIME; D-SUB, DVI; 4-PORT USB HUB; HEIGHT-ADJUSTABLE STAND; 3YR C&R WARRANTY; 564 X 261 X 418MM (WDH); 5.1KG.

ALTERNATIVE CHOICE

Hanns.G HL231

PRICE £113 (£135) **SUPPLIER** www.play.com
WEB ID 363817 **ISSUE** 197

If money is tight, this ultra-cheap display almost makes it unnecessary to look any smaller than 23in.

SPECIALIST TFT

HP ZR30w

PRICE £890 (£1,068) **SUPPLIER** www.cclonline.com
WEB ID 361456 **ISSUE** 194

HP's flagship is a 30in monster with a 10-bit IPS panel and a 2,560 x 1,600 resolution. With simply incredible colours out-of-the-box, and even better when calibrated, it's an absolute steal at around a grand.

30IN S-IPS TFT; 2,560 X 1,600 RESOLUTION; 7MS RESPONSE TIME; 370CD/M² BRIGHTNESS; 1,000:1 CONTRAST RATIO; DVI; DISPLAYPORT; 3YR ON-SITE WARRANTY; 694 X 276 X 489-589MM (WDH); 13KG.

ALTERNATIVE CHOICE

Dell UltraSharp U2711

PRICE £573 (£688) **SUPPLIER** www.scan.co.uk
WEB ID 362749 **ISSUE** 194

A 27in 2,560 x 1,440 IPS monitor with great image quality and tons of features.

ALL PRICES CORRECT AT TIME OF GOING TO PRESS AND INCLUDE 20% VAT WHERE APPROPRIATE

www.downmagaz.com

WHAT IS THE WEB ID?

Type the web ID (eg, 128787) into the search box at www.pcpro.co.uk to read full reviews of the products

DIGITAL COMPACT CAMERA

Canon Ixus 105

PRICE £101 (£121) **SUPPLIER** www.amazon.co.uk
WEB ID 356590 **ISSUE** 188

Excels as an all-purpose snapper, is easy to use and understand, and has a tiny amount of headroom for learners, thanks to manual ISO and exposure compensation modes. It's affordable too.

12.1MP CCD; 4X OPTICAL ZOOM; 2.7IN LCD; SHUTTER SPEED 1-1/1,500 SEC; 80-1,600 ISO; +/-2EV; SD, MMC SLOT; EVALUATIVE, CENTRE-WEIGHTED, SPOT METERING; LI-ION BATTERY; 91 X 21 X 56MM (WDH); 140G.

ALTERNATIVE CHOICE

Canon PowerShot S95

PRICE £250 (£300) **SUPPLIER** www.amazon.co.uk
WEB ID 362311 **ISSUE** 195

The price pushes the PowerShot close to DSLRs and hybrids, but if you need something that will fit in your pocket and takes great photos, it won't disappoint.

DIGITAL SLR CAMERA

Nikon D3100

PRICE £354 (£425) **SUPPLIER** www.camerabox.co.uk
WEB ID 362449 **ISSUE** 195

Yet another sign of Nikon taking the challenge straight to Canon's doorstep. At this price, it's a bargain compared to the 550D and even managed to beat it for image quality. The finest affordable DSLR on the market.

14.2MP CCD; 27-82.5MM ZOOM; 3X OPTICAL ZOOM; 3IN LCD; SHUTTER SPEED 30-1/4,000 SECS; ISO 100-12,800; +/-5EV EXPOSURE COMPENSATION; LI-ION BATTERY; 1YR RTB WARRANTY; 124 X 75 X 96MM (WDH); 500G.

ALTERNATIVE CHOICE

Pentax K-x

PRICE £333 (£400) **SUPPLIER** www.jessops.com
WEB ID 362497 **ISSUE** 195

If you have little ambition to buy extra lenses, the K-x is as good as you'll find. It performs well, takes great images and the kit lens is the best we've seen.

DIGITAL VIDEO CAMERA

Panasonic HDC-TM900

PRICE £666 (£799) **SUPPLIER** www.bristolcameras.co.uk
WEB ID 365107 **ISSUE** 199

It's an incremental upgrade, but one that makes a great camera even better. Picture quality is unsurpassed, it's a dream to use, and the new screen and 3D capability are the icing on the cake.

1080/50P AVCHD FORMAT (1,920 X 1,080); 3 X 0.24IN (1/4.1IN) CMOS SENSORS; 12X OPTICAL ZOOM; HYBRID OPTICAL/ELECTRONIC IMAGE STABILISER; 14.2MP STILLS; 3.5IN 460.8K PIXEL TOUCHSCREEN; 1YR RTB WARRANTY; 66 X 146 X 70MM (WDH); 450G.

ALTERNATIVE CHOICE

Flip UltraHD (3rd gen)

PRICE £108 (£130) **SUPPLIER** www.amazon.co.uk
WEB ID 362692 **ISSUE** 196

Adds image stabilisation and 50fps video to what was already a fantastic pocket camera. The price is a touch high, but it's the best of its kind.

BUDGET SMARTPHONE

HTC Desire

PRICE Free, £15pm, 24mths **SUPPLIER** www.buymobiles.net
WEB ID 357478 **ISSUE** 197

The price keeps on falling as newer models grab all the headlines, making the old Desire more and more of a bargain. It may not have the latest and greatest features, but it has a solid enough set to last: Android 2.2, a fast processor, a nice 3.7in screen and great physical design.

1GHZ SNAPDRAGON CPU; 576MB RAM; 3.7IN 480 X 800 TFT; QUAD-BAND GSM/GPRS/EDGE/HSDPA/3G; BLUETOOTH; 802.11G WLAN; 5MP CAMERA WITH FLASH; 1YR RTB WARRANTY; 60 X 11.9 X 119MM (WDH); 135G.

ALTERNATIVE CHOICE

Motorola Defy

PRICE Free, £15pm, 24mths **SUPPLIER** www.affordablemobiles.co.uk
WEB ID 363346 **ISSUE** 197

For the same price as the HTC Desire, this phone is shockproof and waterproof.

PREMIUM SMARTPHONE

Apple iPhone 4

PRICE £69, £30pm, 24mths **SUPPLIER** www.three.co.uk
WEB ID 359026 **ISSUE** 197

The competition has multiplied and attacked, but the iPhone 4 remains the premium smartphone to beat. The superb Retina display, good-quality camera and improved battery life are topped off by the simply unparalleled UI. It's expensive, but owners would say it's worth every penny.

1GHZ APPLE A4 PROCESSOR; 16GB STORAGE; 512MB RAM; 3.5IN 640 X 960 TFT; QUAD-BAND GSM/GPRS/EDGE/3G/HSDPA; BLUETOOTH; 802.11BGN WLAN; 5MP CAMERA; 1YR RTB WARRANTY; 58.6 X 9.3 X 115.2MM (WDH); 137G.

ALTERNATIVE CHOICE

RIM BlackBerry Bold 9780

PRICE Free, £15pm, 24mths **SUPPLIER** www.affordablemobiles.co.uk
WEB ID 363739 **ISSUE** 197

The best business messaging phone, it's a superb piece of kit that makes the most of BlackBerry OS 6.

TABLET

Apple iPad 2

PRICE 16GB, £333 (£399) **SUPPLIER** www.apple.com/uk
WEB ID 366115 **ISSUE** 200

Thinner, faster and with improved battery life, Apple's second tablet takes an already superb device and makes it better. It isn't a huge revamp and the cameras could be better, but even the latest Android 3 tablets can't quite match its slick usability.

9.7IN 1,024 X 768 CAPACITIVE TABLET; IOS 4; 1GHZ DUAL-CORE A5 CPU; 512MB RAM; 16GB FLASH STORAGE; 802.11N WLAN; BLUETOOTH; FRONT & REAR CAMERAS; 3.5MM JACK; 186 X 8.8 X 241MM (WDH); 601G.

ALTERNATIVE CHOICE

Asus Eee Pad Transformer TF101

PRICE 16GB, £317 (£380) **SUPPLIER** www.amazon.co.uk
WEB ID N/A **ISSUE** 201

Android 3 is a vast improvement, and although it's not quite there yet, it's a genuine iPad alternative.

ALL-IN-ONE

Canon Pixma MG6150

PRICE £119 (£143) **SUPPLIER** www.printerland.co.uk
WEB ID 360412 **ISSUE** 193

The new semi-touch interface isn't perfect, but it adds appeal to what was already a high-quality, fast and fully featured home all-in-one. If you want the best, this is it.

6-COLOUR A4 INKJET; 9,600 X 2,400DPI PRINT; 4,800 X 4,800PPI SCAN; 3IN LCD PLUS TOUCH PANEL; 2 X 150-SHEET INPUT TRAYS; DUPLEX; USB; ETHERNET; 802.11BGN WI-FI; PICTBRIDGE; CD TRAY; MS, SD, MMC, CF, MD SLOTS; 1YR RTB WARRANTY; 470 X 368 X 173MM (WDH).

ALTERNATIVE CHOICE

Lexmark Impact S305

PRICE £62 (£74) **SUPPLIER** www.amazon.co.uk
WEB ID 360007 **ISSUE** 192

The interface is awful, but behind it hides a cheap and fast all-in-one capable of good prints.

INKJET

Canon Pixma iP4850

PRICE £56 (£67) **SUPPLIER** www.amazon.co.uk
WEB ID 360409 **ISSUE** 193

With a slight speed increase over the iP4700 and some niche software extras, it isn't only the finest A4 photo printer you can buy, but it's great for documents too.

5-COLOUR A4 INKJET; 9,600 X 2,400DPI; 2 X 150-SHEET INPUT TRAYS; DUPLEX; USB; PICTBRIDGE; CD TRAY; 1YR RTB WARRANTY; 431 X 297 X 153MM (WDH).

ALTERNATIVE CHOICE

HP Officejet Pro 8000 Wireless

PRICE £64 (£77) **SUPPLIER** www.cclonline.com
WEB ID 360088 **ISSUE** 192

Not the best for photos, but a great choice if document printing is your main criterion for an inkjet.

PERSONAL LASER

Lexmark C540N

PRICE £155 (£186) **SUPPLIER** www.printerbase.co.uk
WEB ID 353659 **ISSUE** 199

A well-built, network-capable colour laser with reasonable running costs, a huge 250-sheet paper tray and fast, top-quality document and image output – all at a competitive price.

1,200 X 1,200DPI A4 COLOUR LASER; 21PPM QUOTED PRINT SPEED; USB, ETHERNET PORTS; 250-SHEET INPUT TRAY; 100-SHEET OUTPUT TRAY; 595 X 495 X 402MM (WDH).

ALTERNATIVE CHOICE

Brother HL-2270DW

PRICE £119 (£143) **SUPPLIER** www.amazon.co.uk
WEB ID 362242 **ISSUE** 194

All the features a home office needs, with good speed and quality as well.

EXTERNAL HARD DISK

Seagate FreeAgent GoFlex Desk

PRICE 2TB, £66 (£79) **SUPPLIER** www.amazon.co.uk
WEB ID 361225 **ISSUE** 193

A good-value high-capacity USB 2 external hard disk, with decent file-transfer performance and a few distinctive tricks: most notably, the ability to add a USB 3 dock for faster performance at a later date.

2TB EXTERNAL DESKTOP HARD DISK; USB 2 CONNECTOR (USB 3 DOCK OPTIONAL); BACKUP & ENCRYPTION SOFTWARE PRE-LOADED; 2YR RTB WARRANTY; 124 X 44 X 15MM (WDH); 1.08KG.

ALTERNATIVE CHOICE

Iomega eGo Portable Hard Drive
PRICE 500GB, £52 (£63) **SUPPLIER** www.amazon.co.uk
WEB ID 361228 **ISSUE** 193
Not a fast drive by USB 3 standards, but it's still a big step up from USB 2, plus it's gorgeous to look at and cheap for a portable model.

WIRELESS ROUTER

DrayTek Vigor 2110n

PRICE £93 (£112) **SUPPLIER** www.broadbandstuff.co.uk
WEB ID 355780 **ISSUE** 187

Dual-band is missing, but the 2110n cable router is absolutely crammed with useful features where it counts, and performance is rock-solid at close range and at a distance. ADSL users needn't miss out, either – the 2710n offers similar features for a similar price.

802.11BGN CABLE ROUTER; 4 X 10/100 ETHERNET; 3 X EXTERIOR ANTENNAE; UPNP; WDS; WPS; WMM QOS; VPN DIAL-OUT; USB PORT (SUPPORTS STORAGE, PRINTERS, MOBILE BROADBAND); 2YR RTB WARRANTY; 215 X 53 X 148MM (WDH).

ALTERNATIVE CHOICE

AVM Fritz!Box Fon WLAN 7390
PRICE £173 (£208) **SUPPLIER** www.broadbandstuff.co.uk
WEB ID 365482 **ISSUE** 199
It's expensive, but packs in DECT, VoIP, an answer machine and so many more features. Plus, it's very easy to set up.

NETWORK STORAGE

Synology DiskStation DS411j

PRICE £220 (£264) **SUPPLIER** www.dabs.com
WEB ID 364480 **ISSUE** 198

The four-bay DS411j isn't cheap, but it's worth every penny. Its combination of simplicity, expandability, features and great performance make it tough to top.

CONSUMER NAS DEVICE; 1.2GHZ PROCESSOR; 128MB RAM; 4X 3.5IN HARD DISK BAYS; 1 X GIGABIT ETHERNET; 2 X USB 2; UPNP MEDIA SERVER; SYNOLOGY ASSISTANT SOFTWARE; 2YR RTB WARRANTY; 184 X 230 X 168MM (WDH).

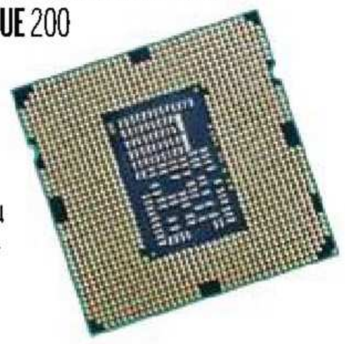
ALTERNATIVE CHOICE

Netgear Stora MS2110
PRICE £104 (£125) **SUPPLIER** www.amazon.co.uk
WEB ID 354088 **ISSUE** 185
A great choice for all but the most experienced users, the Stora simplifies complex tasks and performs very well, and does so at an affordable price too.

PROCESSOR

Intel Core i5-2500K

PRICE £134 (£161) **SUPPLIER** www.scan.co.uk
WEB ID N/A **ISSUE** 200



Intel's Sandy Bridge architecture delivers extraordinary power out of the box – and the i5-2500K is unlocked so you can ramp it up to even more incredible speeds. It's the perfect mainstream choice.

3.3GHZ (MAX 3.7GHZ TURBO BOOST) SOCKET LGA 1155 QUAD-CORE PROCESSOR; MULTIPLIER UNLOCKED; INTEL HD GRAPHICS 3000 GPU; 6MB SMART CACHE; 95W TDP; 32NM PROCESS; SUPPORTS VIRTUALISATION, 64-BIT.

ALTERNATIVE CHOICE

AMD Phenom II X4 955 BE
PRICE £82 (£98) **SUPPLIER** www.scan.co.uk
WEB ID N/A **ISSUE** 200
Not the fastest, but it has plenty of overclocking headroom and the price is very reasonable.

INTEL MOTHERBOARD

Gigabyte GA-H55M-UD2H

PRICE £58 (£69) **SUPPLIER** www.amazon.co.uk
WEB ID 356773 **ISSUE** 186

If you're upgrading to a Core i3 or i5 processor, you'll want an H55 motherboard. This one offers plenty of sockets, including DisplayPort and HDMI, at a decent price. Note, it doesn't support Sandy Bridge CPUs.

SOCKET LGA 1156; INTEL H55 CHIPSET; 1 X PCI EXPRESS X16, 1 X PCI EXPRESS X4, 6 X USB 3, 2 X PCI SLOTS; 4 X DDR3 DIMM SOCKETS; MAX 16GB RAM; 5 X SATA; 1 X ESATA; HDMI, DVI, DISPLAYPORT, D-SUB OUTPUTS.

ALTERNATIVE CHOICE

Gigabyte GA-X58-USB3
PRICE £108 (£130) **SUPPLIER** www.scan.co.uk
WEB ID 363343 **ISSUE** N/A
Lacks a few futureproofing ports, but at this price it's our new Intel X58 favourite.

AMD MOTHERBOARD

Asus M4A88TD-V EVO

PRICE £65 (£78) **SUPPLIER** www.ebuyer.com
WEB ID 357700 **ISSUE** 190

With the 55nm AMD 880G chipset, an integrated ATI Radeon HD 4250 graphics core, a pair of USB 3 and five SATA 6Gb/s ports – as well as a low price, this is the ideal AM3 board.

SOCKET AM3; AMD 880G CHIPSET; RADEON HD 4250 GRAPHICS; 2 X USB 3; 4 X USB 2; 5 X SATA/600; UP TO 16GB 1,333MHZ DDR3 RAM; 2 X PCI EXPRESS X16; 1 X PCI EXPRESS X1; 3 X PCI.

ALTERNATIVE CHOICE

MSI 890GXM-G65
PRICE £82 (£98) **SUPPLIER** www.dabs.com
WEB ID 360472 **ISSUE** 193
A versatile microATX board with SATA 6Gb/s and USB 3 for a reasonable price.

VALUE GRAPHICS CARD

AMD Radeon HD 6850

PRICE Typically £108 (£130) **SUPPLIER** Depends on brand
WEB ID 362152 **ISSUE** 195

AMD drops the ATI brand while dropping the price of its mid-range cards by a hefty chunk, and the result is an absolute bargain. If you want to play the latest games without breaking the bank, this is the best value choice.

PCI-E 2.0 GRAPHICS CARD; 40NM DIE; 960 STREAM PROCESSORS; 775MHZ CORE CLOCK; 1.7 BILLION TRANSISTORS; 1GB 1,000MHZ GDDR5 RAM; 256-BIT MEMORY BUS.

ALTERNATIVE CHOICE

ATI Radeon HD 5570
PRICE Typically £43 (£52) **SUPPLIER** Depends on brand
WEB ID N/A **ISSUE** 193
Between low- and mid-range, with surprising performance in a versatile media-focused package.

ENTHUSIAST GRAPHICS CARD

Nvidia GeForce GTX 570

PRICE Typically £217 (£260) **SUPPLIER** Depends on brand
WEB ID 363421 **ISSUE** 197

It isn't quite as fast as the flagship GTX 580, so hard-core gamers may prefer to stick with that, but the GTX 570 sacrifices a little of that power to hit a far more affordable price. Plus, it's cooler and quieter than the AMD alternatives.

PCI-E 2.0 GRAPHICS CARD; 40NM DIE; 480 STREAM PROCESSORS; 732MHZ CORE CLOCK; 3 BILLION TRANSISTORS; 1.25GB 3,800MHZ GDDR5 RAM; 320-BIT MEMORY BUS.

ALTERNATIVE CHOICE

Nvidia GeForce GTX 560 Ti
PRICE Typically £158 (£190) **SUPPLIER** Depends on brand
WEB ID 364639 **ISSUE** 198
All the power needed to play the latest games, but without the huge price tag of its bigger brothers.

INTERNAL HARD DISK

Samsung Spinpoint F3 1TB

PRICE £31 (£37) **SUPPLIER** www.aria.co.uk
WEB ID 359743 **ISSUE** 191

A fast hard disk that ranked near the top of the performance tables in our hard disk Labs and drew less power than many of its rivals too. It's also great value.

MODEL: HD103SJ; 3.5IN SATA/300 HARD DISK; 1TB CAPACITY; 7,200RPM SPINDLE SPEED; 32MB DATA BUFFER; 13.5MS AVERAGE SEEK TIME (MEASURED); 3YR RTB WARRANTY. PART CODE: HD103SJ.

ALTERNATIVE CHOICE

Kingston SSDNow V100
PRICE 128GB, £123 (£148) **SUPPLIER** www.amazon.co.uk
WEB ID 363043 **ISSUE** 196
A very fast 2.5in SSD, which is even more impressive given the low price per gigabyte.

ALL PRICES CORRECT AT TIME OF GOING TO PRESS AND INCLUDE 20% VAT WHERE APPROPRIATE

www.downmagaz.com

BUSINESS RECOMMENDATIONS

Turn overleaf for our guide to the best hardware and software for all sizes of business

INTERNET SECURITY

Trend Micro Titanium Internet Security 2011

PRICE £20 (£24), 1 PC, 1yr
WEB ID 364747
SUPPLIER www.amazon.co.uk
ISSUE 198

Trend Micro's Titanium security suite achieved a perfect detection score in our malware tests without raising a single false-positive. It's a simple package, with a comparatively lightweight impact on your system, and very affordable.

ALTERNATIVE CHOICE

AVG Anti-Virus Free Edition 2011

PRICE Free
WEB ID 362176
SUPPLIER http://free.avg.com
ISSUE 198

AVG's free antivirus package has a proven track record of intercepting online threats – and you get email scanning and web protection too.

BACKUP

Acronis True Image Home 2011

PRICE £23 (£27)
WEB ID 363118
SUPPLIER www.amazon.co.uk
ISSUE 196

This isn't a huge update, so existing owners needn't upgrade, but for new users it's the most comprehensive home backup suite available. Use the free trial version before you buy, though, as many readers have reported issues and the tech support is limited.

ALTERNATIVE CHOICE

Carbonite Online Backup

PRICE £42 per year
WEB ID 360349
SUPPLIER www.carbonite.com
ISSUE 193

Other services are catching up for ease of use, while outpacing it in terms of features. But for pain-free online backup, Carbonite remains the way to go.

ACCOUNTS

FreeAgent

PRICE £15 (£18) per month
WEB ID N/A
SUPPLIER www.freeagentcentral.com
ISSUE 201

NEW ENTRY

Small business owners or sole traders lacking accounting experience are the target market for the online FreeAgent. It avoids jargon, supports multiple users and time-tracking – making it ideal for freelancers – and supports plenty of invoicing templates. The days of desktop accounting are numbered.

ALTERNATIVE CHOICE

Sage Instant Accounts 2011 (v17)

PRICE £80 (£96)
WEB ID 365752
SUPPLIER www.ebuyer.com
ISSUE 200

Offers most things a small business needs, but the rise in online alternatives means it's no longer the automatic choice for novices.

OFFICE SUITE

Microsoft Office 2010

PRICE Boxed, from £72 (£87)
WEB ID 358660
SUPPLIER www.amazon.co.uk
ISSUE 190

PowerPoint and Outlook see the biggest changes, but usability boosts in all the apps should make people consider upgrading. Home and Student offers cracking value for money thanks to its three-PC licence, but businesses should examine the volume licence options.

ALTERNATIVE CHOICE

OpenOffice 3

PRICE Free
WEB ID 232614
SUPPLIER www.openoffice.org
ISSUE 171

With a high-quality word processor, spreadsheet, presenter and database in one free package, this is a functional alternative to Microsoft Office.

WEB DEVELOPMENT

Adobe Dreamweaver CS5

PRICE £357 (£428)
WEB ID 356932
SUPPLIER www.adobe.co.uk
ISSUE 188

With traditional single-page web design coming to the end of the road, Adobe's web design app has had to undergo some dramatic changes. This latest edition makes PHP and CMS its core focus, which gives it the new lease of life it so desperately needed. Once again, Dreamweaver is a must-have tool.

ALTERNATIVE CHOICE

Adobe Creative Suite 5 Web Premium

PRICE £1,429 (£1,715)
WEB ID 356977
SUPPLIER www.adobe.co.uk
ISSUE 188

Overkill for most purposes, but it's the ultimate package for creative professionals developing interactive Flash applications for the web.

GRAPHICS/DESIGN

Adobe Creative Suite 5 Design Standard

PRICE £1,032 (£1,238)
WEB ID 356977
SUPPLIER www.adobe.co.uk
ISSUE 188

Lets you take advantage of InDesign's new Flash capabilities, and use Flash Catalyst as a route to converting artwork into Flash and AIR apps. It's also a real bargain upgrade for existing Design Standard users.

ALTERNATIVE CHOICE

CorelDRAW Graphics Suite X5

PRICE £399 (£479)
WEB ID 356107
SUPPLIER www.corel.co.uk
ISSUE 188

Not worth an upgrade from X4, but if you're buying from scratch it's a very reasonable alternative to Creative Suite 5.

PHOTO EDITING

Adobe Photoshop Elements 9

PRICE £66 (£79)
WEB ID 361363
SUPPLIER www.adobe.co.uk
ISSUE 194

It borrows some powerful tricks from the full Adobe Photoshop CS5 software – most notably Content-Aware Fill – and also improves hand-holding for beginners. The end result is an affordable package that's absolutely ideal for amateur photographers.

ALTERNATIVE CHOICE

Google Picasa 3.5

PRICE Free
WEB ID 352597
SUPPLIER www.picasa.google.com
ISSUE 183

Easy-to-use tagging capabilities, including advanced and effective face recognition, add to an appealing free package for the less experienced.

VIDEO EDITING

Sony Vegas Movie Studio HD Platinum 10

PRICE £60 (£72)
WEB ID 358843
SUPPLIER www.sonycreativesoftware.com
ISSUE 191

May not boast the bells and whistles of other consumer editing tools, but Vegas' core editing facilities are more efficient, and its corrective effects are sophisticated too.

ALTERNATIVE CHOICE

Adobe Premiere Pro CS5

PRICE £675 (£810)
WEB ID 357025
SUPPLIER www.adobe.co.uk
ISSUE 189

A huge update, with the most powerful real-time playback engine of any PC video-editing app, a move to 64-bit, plus comprehensive format support.

AUDIO PRODUCTION

Steinberg Cubase 6

PRICE £388 (£465)
WEB ID 366139
SUPPLIER www.dv247.com
ISSUE 200

An ambitious update to our former A-Lister, Cubase 5, it features big improvements for editing live recordings and boosting the quality of MIDI performances, and even surpasses ProTools, the industry stalwart. There can be no higher praise than that.

ALTERNATIVE CHOICE

Ableton Live 8

PRICE £250 (£300)
WEB ID 257713
SUPPLIER www.dolphinmusic.co.uk
ISSUE 179

This is the best version of Live yet, and its rounded feature set means it's a valid alternative to Cubase 6 as an all-purpose music-production package.

PC Pro Enterprise A List

RACK SERVER

HP ProLiant DL385 G7

PRICE £3,601 exc VAT **SUPPLIER** HP 0845 270 4000
WEB ID 361807 **ISSUE** 195

HP's latest Opteron 6100 server is a great choice for virtualisation, with a high memory capacity and physical core count, plus high-quality power management and monitoring tools.

2U RACK CHASSIS; 1 X 2.4GHZ AMD OPTERON 6136; 8GB DDR3; HP EMBEDDED SMART ARRAY P410I WITH 256MB CACHE; RAID0, 1, 10, 5; 3 X 146GB HP SFF 15K 6GBPS SAS HARD DISKS IN HOT-SWAP CARRIERS; 3 X PCI-E SLOTS (MAX 6); 4 X GIGABIT; 1 X 460W HOT-PLUG SUPPLY; HP ILO3 STANDARD WITH 10/100; HP INSIGHT CONTROL EDITION 6 SOFTWARE.

ALTERNATIVE CHOICE

Dell PowerEdge R610

PRICE From £2,105 exc VAT **SUPPLIER** Dell 0844 444 3066
WEB ID 251047 **ISSUE** 177

A well-built rack server with a wealth of features. Power consumption is low, plus the software delivers comprehensive systems management.

PEDESTAL SERVER

Dell PowerEdge T710

PRICE £4,156 exc VAT **SUPPLIER** Dell 0844 444 3066
WEB ID 355762 **ISSUE** 187

Dell's mighty T710 pedestal server offers the best expansion potential in its class and combines this with good value, excellent build quality and enterprise-level remote-management facilities. Quite simply power in a box.

TOWER CHASSIS; 2 X 2.53GHZ E5540 XEON; 12GB DDR3; 1GB SD CARD; 8 X 146GB HARD DISKS IN HOT-SWAP CARRIERS; DELL PERC 6/I WITH 256MB CACHE AND BBU; SUPPORTS RAID0, 1, 10, 5, 6; 6 X PCI-E 2.0 SLOTS; 4 X GIGABIT; 1,100W ENERGY SMART HOT-PLUG SUPPLY; DELL MANAGEMENT CONSOLE SOFTWARE.

ALTERNATIVE CHOICE

HP ProLiant ML350 G6

PRICE £2,536 exc VAT **SUPPLIER** HP 0845 270 4215
WEB ID 350893 **ISSUE** 181

This server offers good value and expansion potential. It also comes with the best remote-management tools on the market, and is quiet and power efficient.

SECURITY APPLIANCE

CronLab Light 1100 Anti-Spam Appliance

PRICE £990 exc VAT **SUPPLIER** CronLab 020 8123 3826
WEB ID 365746 **ISSUE** 200

The Light 1100 takes ten minutes to deploy, requires hardly any ongoing administration and delivered excellent spam detection rates in our live tests.

DESKTOP CHASSIS; 1.6GHZ INTEL ATOM 230; 1GB 533MHZ DDR2; 320GB SATA SFF HDD; 10/100 ETHERNET; 4 X USB 2; VGA; 210 X 257 X 65MM (WDH).

ALTERNATIVE CHOICE

Cyberoam CR15wi

PRICE From £346 exc VAT **SUPPLIER** www.cyberoam.co.uk
WEB ID 361291 **ISSUE** 194

The CR15wi is the first Cyberoam appliance to sport an 802.11n wireless AP, and offers the best range of features available to SMBs at an incredibly low price.

STORAGE APPLIANCE

Synology DiskStation DS1511+

PRICE Diskless, £581 exc VAT **SUPPLIER** Span.com 020 8288 8555
WEB ID N/A **ISSUE** 201

NEW ENTRY

A very fast NAS appliance with a lot of expansion potential and new backup tools, and the DSM 3.1 firmware gives it a superb range of features.

DESKTOP CHASSIS; 1.8GHZ INTEL ATOM K525 DUAL-CORE PROCESSOR; 1GB DDR2; 5 X HOT-SWAP SATA DRIVE BAYS; SUPPORTS RAID0, 1, 5, 6, HOT-SPARE AND JBODS; 2 X USB 2; 2 X GIGABIT; 2 X ESATA; INTERNAL POWER SUPPLY; SYNOLOGY ASSISTANT, DOWNLOAD REDIRECTOR AND DATA REPLICATOR 3 SOFTWARE.

ALTERNATIVE CHOICE

IBM System Storage DS3512 Express

PRICE From £2,835 exc VAT **SUPPLIER** IBM 0800 169 1458
WEB ID 363451 **ISSUE** 196

IBM's new DS3512 Express is an affordable and flexible network storage solution with excellent performance.

BACKUP DEVICE

HP StorageWorks Ultrium 3000 SAS

PRICE £2,365 exc VAT **SUPPLIER** HP 0845 270 4000
WEB ID 357982 **ISSUE** 190

Many pundits said tape was dead. They also said that LTO was at the end of its roadmap. HP's 3000 SAS proves them wrong on both counts.

HALF-HEIGHT ULTRIUM LTO-5 TAPE DRIVE; 1.5TB; TRANSFER RATE 140MB/SEC; 256MB BUFFER; 6GB/SEC SAS; BACKWARD READ/WRITE COMPATIBLE WITH LTO-3/4; LTO-5 TAPE AND HP DATA PROTECTOR EXPRESS SINGLE SERVER SOFTWARE.

ALTERNATIVE CHOICE

Quantum LTO-4 HH

PRICE £1,490 exc VAT **SUPPLIER** Span 020 8288 8555
WEB ID 213831 **ISSUE** 168

A compact LTO-4 SAS tape drive kit for businesses with big backup requirements and a need for speed.

BUSINESS LASER

Oki C821n

PRICE £796 exc VAT **SUPPLIER** www.printerland.co.uk
WEB ID 362467 **ISSUE** 195

Colour speeds are better than Oki claims, output quality and running costs are good and brings A3 colour printing well within the budgets of smaller business. No other vendor can match the C821n for value.

1,200 X 600DPI A3; 32PPM MONO/22PPM COLOUR CLAIMED SPEEDS; 700MHZ PROCESSOR; 256MB RAM; USB 2; 10/100 ETHERNET; 300-SHEET INPUT TRAY; 100-SHEET MP TRAY.

ALTERNATIVE CHOICE

Kyocera FS-2020D

PRICE £261 exc VAT **SUPPLIER** www.printerland.co.uk
WEB ID 156378 **ISSUE** 177

Acceptable print quality, good speed and low running costs make this an excellent business choice.

UPS DEVICE

APC Smart-UPS 1000VA

PRICE £239 exc VAT **SUPPLIER** www.ebuyer.com
WEB ID 351214 **ISSUE** 179

It's by no means the cheapest UPS on the market, but it has superior management software and better features than other UPS devices we've seen.

670W OUTPUT CAPACITY; SURGE RATING 320J; DB-9 RS-232; SMARTSLOT; USB; 2YR RTB WARRANTY; 170 X 439 X 216MM (WDH); 18.9KG.

ALTERNATIVE CHOICE

MGE Evolution 1150VA

PRICE £309 exc VAT **SUPPLIER** www.ebuyer.com
WEB ID 351217 **ISSUE** 179

Looks good value, but this is offset by the smaller number of outlets and the fact that managing additional systems will cost extra.

NETWORK BACKUP

DataFort Hi-5

PRICE £250 per month exc VAT **SUPPLIER** Datafort 0800 454435
WEB ID 366088 **ISSUE** 199

A complete backup and disaster recovery solution that has every angle covered, takes all the hard work out of the process and is so transparent there's virtually nothing to see. Plus, the price includes unlimited storage.

ALTERNATIVE CHOICE

Computer Associates ARCserve Backup 12.5

PRICE From £547 exc VAT **SUPPLIER** www.ca.com/gb
WEB ID 253609 **ISSUE** 178

No other Windows backup software on the market offers backup, restore and data deduplication functions as an integrated solution at no extra cost.

NETWORK MONITORING

Ipswitch WhatsUp Gold 14.1 Premium Edition

PRICE 100 devices, £2,046 exc VAT **SUPPLIER** www.whatsupgold.com
WEB ID 355567 **ISSUE** 187

This latest version adds even more valuable features, all easily accessible from a single console. Classy network management at an affordable price.

ALTERNATIVE CHOICE

NetSupport DNA 3

PRICE £1,680 exc VAT **SUPPLIER** www.netsupportsoftware.co.uk
WEB ID 350570 **ISSUE** 180

Easy to deploy and cost effective, NetSupport's DNA has many features you won't find in other asset-management solutions.

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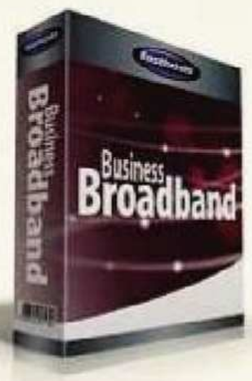

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Reviews

OUR VERDICT ON THE NEW HARDWARE AND SOFTWARE RELEASES

Why is there such crazed excitement surrounding tablets, wonders **Jonathan Bray?**

The reason most people are so excited by tablets is because they're so different from laptops

It's been an unusual month. Not only did a bug lay low both the editor and managing editor for half the issue, but yours truly found his star on the rise. Colleagues have been sending admiring glances in my direction, queuing up for a slice of my time and generally being nicer to me than normal.

I'd like to tell you this was down to my animal magnetism, captivating charisma and rugged good looks. (You've seen my photo, right?) It was only a matter of time before the tall, skinny, ginger-bearded look became fashionable again, surely.

Alas, my fame is set to be short-lived; it wasn't me they were fawning over, but the tablet I held in my hands. The Motorola Xoom (*see p34*) is the first tablet to sport Google's Android 3 operating system, or Honeycomb as it's widely known. And everyone who's anyone has been clamouring for a play.

I'm used to handling exciting new products, from smartphones to laptops, but none in recent memory has generated as much interest as the new wave of tablets. It set me wondering: why is everybody so obsessed with tablets? After all, as one of our readers has already commented, it isn't as if holding a tablet in one hand and typing with another is comfortable or practical. Asus has even gone as far as bundling its Android tablet with a keyboard dock (*see p39*) to address such concerns.

I can appreciate where they're coming from: I certainly wouldn't want to sit down at a desk and wade through the daily avalanche of email using only a cramped, onscreen keyboard. I'd have sore fingers after half an hour, not to mention a crick in my neck.

By treating tablets as standard computers, however, I think this commenter and Asus miss the point. The reason most people are so excited by tablets is precisely *because* they're so different from laptops. There's no need for a keyboard, a touchpad or a mouse, because they're designed for touch alone. People like tablets because they let you prod, poke, drag and pinch, instead of point, click, drag and drop.

They don't want to type vast tracts of text, they want to browse the web and listen to music; watch videos and play games. And that's the key. Tablets are, more than anything else, for the consumption, rather than the creation, of content. They're for reading not writing, watching not editing, listening not authoring. There's also a physicality to tablets. You can hand a tablet around at a dinner party to show off your latest holiday snaps, just as you would a photo album. Doing so with a laptop wouldn't be the same.

I won't be buying one because I prefer my technology to be more multipurpose. If I can't edit Full HD video and RAW files from my DSLR, as well as watch and browse, you've lost me. If I can't bash out a column at 50wpm on the same device, I'm going to look elsewhere. No matter how good touchscreen keyboards get, they'll never be able to replace the feel of a quality laptop keyboard.

I am, however, beginning to understand the mass-market appeal. For little more than the cost of a netbook you get a luxury media player, satnav, eBook reader, games console, remote control and communication device all rolled into one. In the long run, tablets can't keep up the job of making me popular, but as long as they stick to what they're good at, they'll be here to stay.

Jonathan Bray is reviews editor of PC Pro. He isn't going to buy a tablet, and he's sticking to his guns on that. Email Jonathan at jonb@pcpro.co.uk

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HOT PRODUCTS – REVIEW OF REVIEWS

Product	Our verdict	Other verdicts		
Motorola Xoom p34	■ We like Android 3 despite its rough edges, and the device is well built with good battery life – but the iPad 2 is still better. ★★★★☆☆	■ A real competitor for the iPad that betters Apple's device in many ways, but the Xoom is still a work-in-progress. *ENG* ★★★★☆☆	■ A stylish, powerful tablet that's instantly outclassed by the iPad 2. It's worth waiting for more Android 3 devices before buying. *CNU* ★★★★☆☆	■ It's a solid, discreetly handsome device that significantly narrows the gap between Android tablets and the iPad 2. *SG* ★★★★★☆
Sony VAIO S Series p40	■ After a dramatic redesign, the S Series emerges faster thanks to a Sandy Bridge processor and has a better battery life than before. ★★★★★☆	■ Magically combines excellent performance with strong portability – and throws in some great features elsewhere, too. *T3* ★★★★★☆	■ A highly portable laptop that still offers enough power to run almost all applications. This is a fantastic, surprisingly affordable option. *TR* ★★★★★☆	■ As an ultraportable that's light, fast and has plenty of storage, this is excellent, but frequent travellers should consider Apple first. *ITP* ★★★★★☆
Acer Iconia Tab W500 p38	■ A poorly executed and expensive attempt to create a hybrid of two popular form factors that offers the worst of both worlds. ★★★☆☆☆	■ The worst tablet we've seen so far thanks to its weight, infuriating interface, poor battery life and near-extortionate price. *ITP* ★★☆☆☆☆	■ An ideal combination on paper, it's hampered by underpowered hardware, its hefty size and Windows 7's presence. *ZD* ★★★☆☆☆	■ Windows 7 wasn't designed for tablets, and it shows – and basic design flaws, like the poor keyboard and weight distribution, grate. *TR* ★★★☆☆☆
Sony Ericsson Xperia Play p48	■ It's unremarkable and bulky as a phone, but the PlayStation controls and software give it a unique appeal to gamers. ★★★★☆☆	■ The bright, vivid screen and PlayStation software ensure gamer appeal, even if the device itself is clunky and feels a tad cheap. *PCA* ★★★★★☆	■ The best smartphone for gaming, but it feels compromised elsewhere – and it's a little pricey compared to rivals too. *ER* ★★★★★☆	■ A stylish handset with good battery life that's great for gaming, although occasionally suspect build quality takes the sheen off. *KYM* ★★★★★☆
Sony Ericsson Xperia Arc p49	■ A lovely phone with a glorious screen and excellent battery life, but poor build quality and inconsistent GPS prove annoying. ★★★★★☆	■ A superb flagship phone thanks to strong performance, a stunning screen and a great camera – a fine alternative to the Xperia Play. *WM* ★★★★★★	■ Doesn't lack when it comes to features and offers a stunning screen, although odd design choices ensure it isn't quite perfect. *ENG* ★★★★★☆	■ Great functionality and standout design, with the promise of fast OS updates, make this a worthy flagship for Sony's range. *KYM* ★★★★★☆
Dell XPS 15 p41	■ By adding Sandy Bridge power to an already superb machine, Dell has created an entertainment tour de force. ★★★★★☆	■ Not the fastest or the prettiest but, thanks to all-round quality, this is arguably the most complete desktop replacement around. *PCM* ★★★★★☆	■ Sets a new standard for quality on almost every front, with best-in-class design, screen quality, speakers and performance. *ER* ★★★★★★	■ This is a bargain considering the performance, build quality, display and audio: a superb all-round multimedia machine. *T3* ★★★★★☆

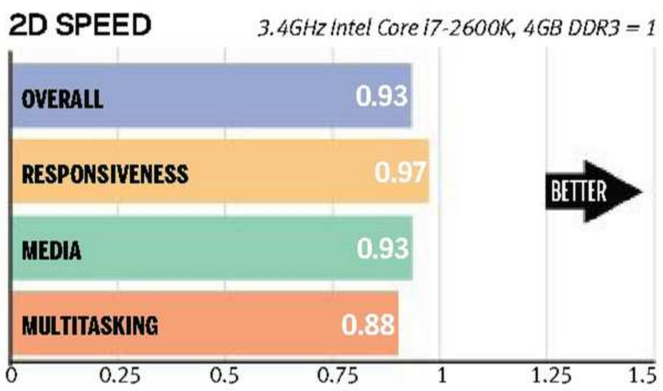
CNU CNET UK, ENG Engadget, ER Expert Reviews, ITP IT Pro, KYM Know Your Mobile, PCA PC Advisor, PCM PC Magazine, SG SlashGear, T3 T3, TR TechRadar, WM What Mobile, ZD ZDNet. Scores have been converted from the original to scores out of six or, if not available, are our own interpretation.

HOW WE TEST

2D TESTS

We test PC performance with our Real-World Benchmarks. The results divide into Responsiveness, Media and Multitasking scores, with the Overall score being an average of the three.

The Responsiveness test measures how quickly each system can open, close and switch between a range of applications, including Microsoft Office 2010 applications, a web browser and a PDF reader. The Media test times how quickly each PC can encode audio files in iTunes, process RAW photographs in Adobe Photoshop CS5 and render HD video in Sony Vegas Pro 10. Finally, the Multitasking test performs all our Media processing tasks simultaneously, then uses the multithreaded Cinebench 11.5 renderer to produce a complex 3D scene. You can find more details of our benchmarks on the cover disc. Scores are relative to the performance of a 3.4GHz Intel Core i7-2600K system with 4GB of DDR3 RAM.



You'll see a graph like this below each PC and laptop review. It shows at a glance how fast the system is overall, and breaks down its scores across our benchmarks.

3D TESTS

We test gaming performance using recorded sequences in Crysis. We use the Low, Medium and High quality settings in the resolutions of 1,366 x 768, 1,600 x 900 and 1,920 x 1,080 respectively. Where appropriate, we mix and match resolutions and quality settings to determine a system's gaming level, as well as using Very High settings to push high-end systems.

An average of more than 35fps is high enough for smooth gameplay; between 20fps and 35fps is playable, but may stutter in intensive scenes; 19fps or lower is unplayable.

LAPTOP BATTERY LIFE

Our light-use test times how long a fully-charged laptop can be used for web browsing with the screen at 70-80cd/m² brightness and power saving turned on. For heavy use, we run our Multitasking benchmark on loop until the battery runs out.

Indicating minimum and maximum battery life.

Motorola Xoom

The Xoom finally arrives, along with Google's tablet-specific Android 3 Honeycomb OS

We've seen plenty of Android tablets in the past, but nothing that's really managed to challenge the iPad. Hopes have been high, however, for the Motorola Xoom – the first tablet to pack Android 3 (aka Honeycomb), complete with a new, tablet-specific interface.

It's a handsome piece of hardware. The rear is mostly clad in grey aluminium, topped with a rubbery strip housing a 5-megapixel camera, a dual-LED flash, stereo speakers and the power button. Flip it around and the 10.1in 1,280 x 800 screen dominates, with a 2-megapixel, front-facing video camera top-centre. The volume buttons sit on the left-hand edge, with a headphone socket at the top and Micro HDMI, charging and dock contacts on the bottom along with a microSD slot. Although the whole package is 129g heavier and 4.1mm thicker than the iPad 2, it's perfectly pleasant to hold.

Inside, it's powered by a dual-core 1GHz Nvidia Tegra 2 CPU, with 1GB of RAM and 32GB of integrated storage (16GB and 64GB versions may eventually become available). It has Bluetooth 2.1 with EDR (supporting Bluetooth keyboards as well as audio devices), dual-band 802.11n Wi-Fi and A-GPS. There's a 3G version coming too, for an extra £100.

SPECIFICATIONS
1GHz dual-core Nvidia Tegra 2 CPU • 1GB RAM • 32GB storage • 10.1in 1,280 x 800 TFT • dual-band 802.11n WLAN (optional 3G) • Bluetooth • 5mp rear & 2mp front cameras • microSD slot • micro-USB port • accelerometer • gyroscope • Android 3 • 1yr RTB warranty • 168 x 13 x 249mm (WDH) • 730g

Software

Android 3 is better suited to tablets than earlier versions of the OS: its icons are the right size for larger screens, allowing you to squeeze more onto the desktop than before.

There's also now a thin toolbar along the bottom of all screens, with icons for Back, Home and Running tasks. A notifications area at the bottom-right displays battery life, Wi-Fi signal strength and a clock, with small icons indicating downloads and message alerts.

The keyboard has been changed too, although not radically: some keys have been added and others moved to more standard positions. A hidden benefit is full multitouch support (four

Photography intro: Pat Hall

www.downmagaz.com

points in the case of the Xoom), so you can hold Shift and type capitals as you would on a physical keyboard. It's at least as good as the iPad's offering.

As with Android 2, the Xoom offers multiple customisable desktops, but you can still launch apps from the traditional grid view if you prefer. The preinstalled applications have all received a tablet makeover: the email app, for example, is now split into panes, and the Calendar and Contacts app have been given a similar look and feel. The music player sports a CoverFlow-style interface for browsing through albums.

The browser has been beefed up too: you now get a toolbar and tabs along the top of the screen, and Incognito browsing. Thumb gesture shortcuts have been added and, of course, there's support for Flash – although we had to download and install it ourselves.

As far as third-party software is concerned, the Xoom comes with a bare minimum. Beyond the core apps, the most interesting preinstalled software is Film Studio, a good-looking but rather basic competitor to iMovie on the iPad 2. There's no Facebook or Twitter integration as yet in Android 3, and no default eBook reader. We weren't able to install Google Books from the Market, presumably because the Google Book Store isn't yet available in the UK, and we couldn't find an alternative that worked well with the Xoom's large screen.

In fact, we found very little tablet-specific Android software, and smartphone apps didn't always work: the standard Facebook Android app kept crashing; some games exhibited odd graphical artefacts; and the Aldiko eBook Reader fell over every time we switched to portrait mode.

We'll have to wait for developers to release HD versions of their apps, and hopefully for the Market interface to get an upgrade too – currently, there's no way to sift tablet-specific apps from smartphone ones.

Performance and battery life

First impressions of the Xoom's performance are positive. The 3D carousel animation you see when navigating between desktop screens is beautifully smooth and responsive. You'll be skipping around from app to app, to the homepage and back with just the sort of speed you'd hope for. It did well in our benchmarks too: the BBC homepage loaded in five seconds, and the SunSpider JavaScript benchmark completed in two seconds. The iPad 2, for all its buttery smoothness, can't beat these scores.

Even battery life – a problem for previous Android tablets – is perfectly satisfactory. Motorola claims the Xoom gives ten hours of Wi-Fi browsing, and we wouldn't argue: the Xoom lasted 12hrs 49mins in our video test, playing a low-resolution podcast video on loop at around one-third screen brightness until the battery died. That's a touch behind the first iPad (13hrs 44mins) and a long way behind the iPad 2's result of 16hrs 49mins, but it will give you a good day or two of casual use.

Unfortunately for the Xoom, it isn't all good news. Rotate the device from landscape to portrait and the desktop elements judder visibly as they move to their new positions. Open the main app screen and there's a hesitation as it hovers into view. Complex web pages can feel laggy and unresponsive: panning and zooming around the BBC homepage felt like wading through treacle.

The screen is a disappointment too. This isn't to say it's a bad panel: it boasts vibrant colours, good contrast and decent viewing angles, with more pixels and a wider aspect ratio than the iPad 2, making it (in theory) better suited to watching movies on the go. Sit it next to an iPad with the brightness on its IPS panel turned up, however, and the Xoom's screen is nowhere near as bright or punchy. Colours look wan, and blacks aren't as deep or dark.

Cameras

The Xoom's 5-megapixel rear camera produces larger photos than the iPad 2's, with more features on offer, including twin LEDs for use as a stills flash or a video light. It will shoot 720p video and the 2-megapixel front camera is superior to the iPad's.

TABLET

PRICE
32GB Wi-Fi, £400 (£480 inc VAT); 32GB 3G, £483 (£580 inc VAT); from £167 (£200 inc VAT) on a £25/mth, 24mth contract

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www.carphone warehouse.com

INTERNET
www.motorola.co.uk

The top edge hosts the 3.5mm headphone socket, there's a volume control on the left, and the HDMI out, USB and charger sockets are on the bottom.

In our test shots, however, we found the automatic white balance was all over the place, producing cold, bluish snaps under fluorescent office lights, while outside it tinged grey skies with a pinkish hue. The autofocus worked well and pictures looked sharp, but the unnatural colours are a problem.

With video, it's a similar story. Footage looks less grainy than with the iPad 2, and in our low-light test, noise was more controlled. Colours, however, aren't as rich or as well balanced. Overall, the Xoom's camera is, like the iPad's, distinctly mediocre.

Verdict

Despite these gripes, we like the Motorola Xoom. It's well made, the hardware is powerful and battery life is good. And, as with other Android devices, you're not tied to iTunes or any other software: music, video and document files can simply be dragged to and from the Xoom's flash memory by plugging in a USB cable (there is a microSD slot but it doesn't work as yet – Motorola plans to fix this in a future update).

Before you rush out and buy one, though, we'd urge you to pause and consider a couple of things. First, the price is a little high. In numerous areas – the screen, the apps and the slick performance – this tablet lags behind the iPad 2, yet it costs exactly the same amount.

Second, for all that's good about the Xoom, it isn't the only Android 3-enabled tablet around. Asus' 16GB Transformer *(see p39)*, for example, is cheaper, boasts a better screen and is slightly slicker in use. More are on the way.

For those reasons, even if you're desperate to buy an Android tablet, we'd advise you hold onto your cash for the time being and see what the next few months bring. The Motorola Xoom ups the ante, without a doubt, but it isn't everything that we'd wished for. **JONATHAN BRAY**

PERFORMANCE	★★★★☆
FEATURES & DESIGN	★★★★½
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

Although it looks slightly smaller from the front, the Motorola Xoom is actually a few millimetres thicker than the iPad 2.

The screen on the Eee Slate EP121 is bright and responsive, with good viewing angles.

Asus Eee Slate EP121

Not without flaws, but as a professional tablet the digitiser pen adds significant appeal

The Asus Eee Slate EP121 isn't designed to take on the iPad. It's important to get that out of the way immediately, because it's an unfair comparison made by pretty much everyone who picked it up in the Labs. This Windows 7 tablet is aimed far more at professionals than those looking for their daily hit of Angry Birds.

The internals betray that immediately. Rather than crawling along on Atom power, the Eee Slate has a 1.33GHz Core i5-470UM processor – a low-voltage part that, while not quite as full-fat as it sounds, offers vastly more power than other popular tablets. Along with 4GB of DDR3, it completed our application benchmarks with an overall score of 0.39, and managed excellent scores in our Media tests: it proved nearly three times faster than the AMD Brazos chip in the Acer Iconia Tab W500 (*see p38*).

That makes video and photo editing, along with all manner of other graphical work, a realistic option, as we proved by comfortably editing a 1080p video in Sony Vegas Pro 10. Sure, once you've finished creating it won't blitz through the encoding as fast as a workstation laptop, despite its 64GB of flash storage, but then most workstation laptops don't have the Eee Slate's touchscreen and digitiser pen.

Open a flap on the top-right edge and out it pops, allowing you to scrawl and tap your way around interfaces that a finger prod wouldn't comfortably navigate. This single addition gets you past most of the problems we have with Windows 7 on touch devices, such as the list menus and the tiny window controls. We're not going to pretend the Eee Slate turns Windows into iOS or Android, but on a screen this large it's certainly usable, particularly if you increase the DPI to 125%.

What it can do that those rival OSes can't is run full Windows applications. To this end Asus has bundled the Eee Slate with a rebranded Microsoft Bluetooth keyboard, as well as a folding leather case with two rear flaps that prop the screen at comfortable angles, in a similar fashion to an iPad 2 case.

The case keeps all four edges uncovered, leaving plenty of room to access the buttons along the top edge (when in landscape mode) for power, locking the rotation and bringing up the onscreen keyboard. On the left edge sit a volume rocker and mini-HDMI output, along with a card slot for SD and MMC formats, two USB 2 ports and a 3.5mm input and output audio socket. The whole thing is built to an extremely high quality, with Gorilla glass on the front and a solid rear that feels like it will last.

If all this sounds like a glowing review, there are some issues. The first you'll notice is the cooling fan, which whirrs at full speed all the time, even on an idle desktop. The cooling vent is along the top edge and, although it didn't feel hot at all during our testing, we're concerned at how easy it is to partially block the airflow by flipping the case closed. The case doesn't cover the USB ports but plastic flaps do, and we found plugging anything in required disconcerting force.

Then there's the screen. While it's bright, responsive and boasts excellent viewing angles, the colours are muted. We measured a 288cd/m² maximum brightness, but the uncalibrated Delta E of 6.3 is merely average, and it's a bit off in its reproduction of greens and reds. Once properly calibrated it improved, but this is no professional IPS monitor.

Finally, it lasted only 3hrs 40mins in our light-use web-browsing battery test, which is the trade-off for having the power to run full apps. If you're editing video, don't expect it to last more than an hour and a half on a single charge.

As a consumer device, it's fair to say Windows 7 still holds back the Asus from rivalling even the most average Android tablet, and the lack of an app store hurts its living room appeal. But the addition of the digitiser pen and a fast processor really do make it a viable alternative for professional uses. It certainly isn't perfect, and the price is fairly high for the performance, but it's the first Windows 7 tablet in a long while that we genuinely like. **DAVID BAYON**

TABLET

PRICE
£833
(£1,000 inc VAT)

DELIVERY
Free

SUPPLIER
www.amazon.co.uk

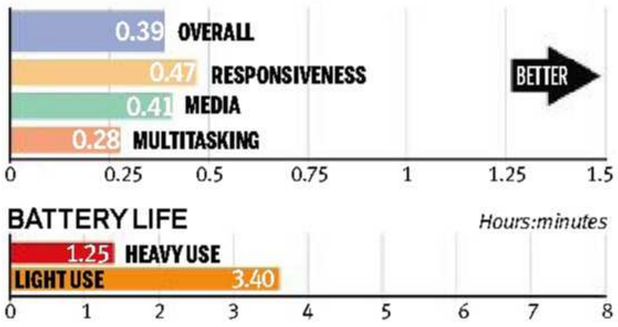
INTERNET
uk.asus.com

PART CODE
EP121-1A019M

The iPad-style folding leather case means you can prop up the screen for comfortable viewing.

SPECIFICATIONS
1.33GHz Intel Core i5-470UM • 4GB DDR3 RAM • 64GB SSD • Intel HD Graphics • 12.1in 1,280 x 800 capacitive & electromagnetic TFT • 802.11bgn WLAN • Bluetooth 3 • 2mp webcam • 2 x USB 2 • mini-HDMI • SD/MMC card reader • 2 x 3.5mm audio • digitiser pen • Bluetooth keyboard • Windows 7 Home Premium 64-bit • 312 x 17 x 207mm (WDH) • 1.17kg (1.85kg with charger and case)

BENCHMARKS



PERFORMANCE ★★★★☆☆
FEATURES & DESIGN ★★★★★☆
VALUE FOR MONEY ★★★★☆☆
OVERALL ★★★★☆☆

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Follow us on:

The W500 works best in netbook mode, but pull it from the dock and it's a 10in tablet too.

Acer Iconia Tab W500

A poorly executed and expensive attempt to create a hybrid of two popular form factors

"PC or tablet? Choose both," begins Acer's description of its Iconia Tab W500, before going on to call its dual-function design "the best of both worlds". The first of those two quotes is technically correct, but you'd have to be very new to mobile computing to come away agreeing with the second.

It isn't that the concept is bad. The W500 is made up of a 10.1in tablet and a keyboard dock, designed to fit together into the shape of a netbook when closed. A latch on the front edge of the keyboard holds the two parts together like a laptop clasp, and as a whole it feels about as thick and weighty as a netbook from a year or two ago.

Flip the latch, however, and rather than opening like a laptop, the two segments simply come apart in your hands – a surprise that caused panicked fumbles as we handed it to unwitting test subjects. Instead, you have to open the flap behind the keyboard and slot the tablet into the USB dock that emerges.

In that mode, it functions much like a netbook. The base has a USB 2 port on either edge, along with an Ethernet socket. To make room for the dock, the keyboard has shifted forward towards the user, occupying the usual wristrest area. Instead of a trackpad you get a trackpoint, along with two rather skinny mouse buttons on the front edge. We found ourselves clicking the spacebar by mistake until we became used to the cramped layout.

It also performs much like a netbook. It has 2GB of RAM and an AMD C-50 processor, which refused to install the Sony Vegas Pro 10 element of our benchmarks. Disabling that section, performance on the whole was a shade behind an average Atom netbook in everyday applications, but quicker in media tasks. It also coped with the TrackMania Nations Forever 3D benchmark relatively well, averaging 18fps at the Medium quality settings and the native 1,280 x 800 resolution. Finally, the battery gave us 5hrs 8mins of light use – distinctly average by netbook standards.

You can buy the tablet alone to save £80, but bear in mind it comes with Windows 7.

CONVERTIBLE TABLET/NETBOOK

PRICE
£375 (£450 inc VAT); £442 (£530 inc VAT) with keyboard dock

DELIVERY
Free

SUPPLIER
www.amazon.co.uk

INTERNET
www.acer.co.uk

PART CODE
LE.RK602.026

Whatever you do, when you're finished typing don't close the W500 like you would a netbook. It's an instinctive move that every one of us in the Labs tried to make, yet doing so causes the docking connector to warp and buckle, to the point where our sample – which had admittedly endured a launch day of journalists doing exactly that before it reached us – was beginning to break. Sure, you'll quickly learn not to do it, but allowing such an obvious motion to threaten the most vital part of the base is a serious design error.

Pull it from the dock and the tablet offers the usual frustrating Windows 7 experience. Acer has done its best to ease the pain with the "Acer Ring", which offers a basic touch browser, a social network aggregator, a web-clipping tool and Acer's Clear.fi media utility. It's functional for basic tasks, but hardly a replacement for an app store.

The screen is decent enough, with even brightness and good viewing angles, and there are front and rear 1.3-megapixel webcams. When held in landscape mode, the power connector sits at the bottom of the right edge; a volume rocker, the "on" switch, an HDMI port and a headphone jack sit on the left edge. The bottom edge has a second USB 2 port, along with a rotation lock.

The tablet itself feels sturdy, but the problem with the W500 is that it's unwieldy in whichever mode you use it. As a netbook, the weight imbalance between the two segments makes it top-heavy; the screen angle can't be adjusted; and the lack of robustness in the design of the keyboard dock concerns us. As a tablet, you're left irritably poking around in an unsuitable operating system, and on a device that's a good inch-and-a-half longer and 336g heavier than an iPad 2.

The final blow is the price. Acer is charging £530 inc VAT, or £450 for the tablet alone. The Asus Transformer (*see opposite*) is the same concept done better for only £430, or you could just buy a netbook for less than £300. We applaud Acer for innovating, and there is the seed of a good idea here, but the Iconia Tab W500 offers the worst, rather than the best, of both worlds. **DAVID BAYON**

SPECIFICATIONS
1GHz AMD C-50 CPU • 2GB DDR3 • 32GB storage • AMD Radeon HD 6250 graphics • 10.1in 1,280 x 800 capacitive touch TFT • 802.11bgn WLAN • 10/100 Ethernet • Bluetooth • front and rear 1.3mp webcams • optional 3G • 275 x 188 x 37mm (WDH) • tablet 946g; keyboard 610g; combined 1.56kg

PERFORMANCE	★★☆☆☆☆
FEATURES & DESIGN	★★☆☆☆☆
VALUE FOR MONEY	★★☆☆☆☆
OVERALL	★★☆☆☆☆

www.downmagaz.com

When docked the keyboard acts as a second power source to almost double battery life.

Asus Eee Pad Transformer TF101

A marginally better tablet than the Xoom, although we'd buy the keyboard dock only for its extended battery

CONVERTIBLE TABLET/NETBOOK

PRICE
£317 (£380 inc VAT); £358 (£430 inc VAT) with keyboard dock

DELIVERY
Free

SUPPLIER
www.amazon.co.uk

INTERNET
www.acer.co.uk

PART CODE
TF101-1B027A; TF101-1B028A with keyboard dock

At first glance the Asus Eee Pad Transformer TF101 looks very similar to the Acer Iconia Tab W500 (*see opposite*). Both are 10.1in tablets that come with their own netbook-style keyboard dock, so you can tap away on the move or type at your desk. In practice, however, the two hybrids couldn't be more different.

It's all in the operating system. By using Android 3, the Transformer sidesteps Windows' touch problems with the Honeycomb tablet interface that impressed us on the Motorola Xoom *(see p34)*. It sports the same 1GHz Tegra 2 chip as the Xoom, but the Transformer feels a mite slicker and more responsive, suggesting Asus has done a better job of integrating its hardware with Honeycomb.

Sure enough, the Transformer took two seconds to complete the SunSpider JavaScript test, three seconds to load the BBC homepage and scored 2,041 in the Quadrant Android benchmark. The latter two of those results beat the Xoom, although the same sticking points apply: the browser remains a tad juddery, YouTube HD clips aren't totally smooth, and we experienced a few hangs and reboots during our tests.

A variety of buttons and ports adorn the edges of the bronze chassis, including Mini HDMI and microSD, and there's a proprietary power and docking connector on the bottom. It has 802.11n Wi-Fi, but there's no 3G model available yet.

The screen is the Transformer's best feature. It's a 1,280 x 800 IPS panel that's brighter and punchier than the Xoom's display, and the resolution makes it sharp. It's slightly sunk behind the glass, which reduces viewing angles, but it's pleasant to use for long periods.

There's a 5-megapixel camera on the rear, which produced sharp images with good colours. However, with its noise and chromatic aberration, it's some way behind a good smartphone camera. The less said about video the better – our 720p clip was captured at 8fps.

The Transformer feels a mite smoother to use in Android 3 than the Motorola Xoom.

The keyboard is standard Scrabble-tile netbook fare, with the addition of an Android Home key and a row of quick controls along the top edge. It feels substantially stronger than the base of the Acer Iconia, and the docking system is infinitely more sensible. Slot the tablet into the dock and it clicks in place; you can adjust the angle, close it like a netbook, even pick it up by the screen, and it won't budge until you release the latch to separate the pieces again.

The big question is why you'd bother paying £430 inc VAT for a keyboard and tablet set when you could just buy the tablet for £380. In netbook mode it just feels wrong using a touchpad and cursor to navigate the tablet-optimised OS.

The Polaris Office suite is installed, which can edit Microsoft Word, Excel and PowerPoint files, and read PDFs and a variety of image formats. It's extremely basic, but for getting content down it does a job. Beyond this and typing emails, we generally found ourselves reaching out to prod the screen, leaving the touchpad largely superfluous.

The dock does add two USB ports and an SD card reader, but there's a bigger reason to pay the £50 premium: it's a battery extender. The tablet alone lasted 8hrs 37mins in our video run-down tests – four hours less than the Xoom – but when it dies you can dock it and the base will actively recharge the tablet's battery to give another 7hrs 6mins. That's still just short of the iPad 2's 16hrs 49mins, but it makes the full package look more appealing.

The Asus Eee Pad Transformer is undoubtedly the best hybrid we've yet seen, and doing it this way round – Android tablet with bonus keyboard – works far better than the Windows way. Purely as a tablet we prefer it to the Motorola Xoom as well: the screen is better, the price is £100 lower (albeit for only 16GB of storage) and you have the option of the dock. It still doesn't quite feel finished, and the software could do with an update or two, but it's another step up the ladder towards the all-round quality of the iPad 2. **DAVID BAYON**

SPECIFICATIONS
1GHz Nvidia Tegra 2 CPU • 1GB DDR3 • 16GB storage • Nvidia GeForce GPU 333 graphics • 10.1in 1,280 x 800 capacitive touch TFT • 802.11bgn WLAN • Bluetooth 2.1+EDR • Mini HDMI • microSD • 1.2mp front/5mp rear webcams • 271 x 171 x 13mm (WDH) • tablet 690g, keyboard dock 630g, combined 1.32kg

PERFORMANCE	★★★★½
FEATURES & DESIGN	★★★½☆
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

BUSINESS LAPTOP

PRICE
£792 (£950 inc VAT)

DELIVERY
£5 (£6 inc VAT)

SUPPLIER
www.dabs.com

WEBSITE
www.sony.co.uk

PART CODE
VPCSB1V9E/B

Sony VAIO S Series

After a drastic redesign, the VAIO S Series emerges fitter, faster and with better battery life than ever before

Striking a balance between business and pleasure was always one of the VAIO S Series' strong points. Now, after a ground-up redesign for the arrival of Sandy Bridge, the S Series is more sharply tailored than ever.

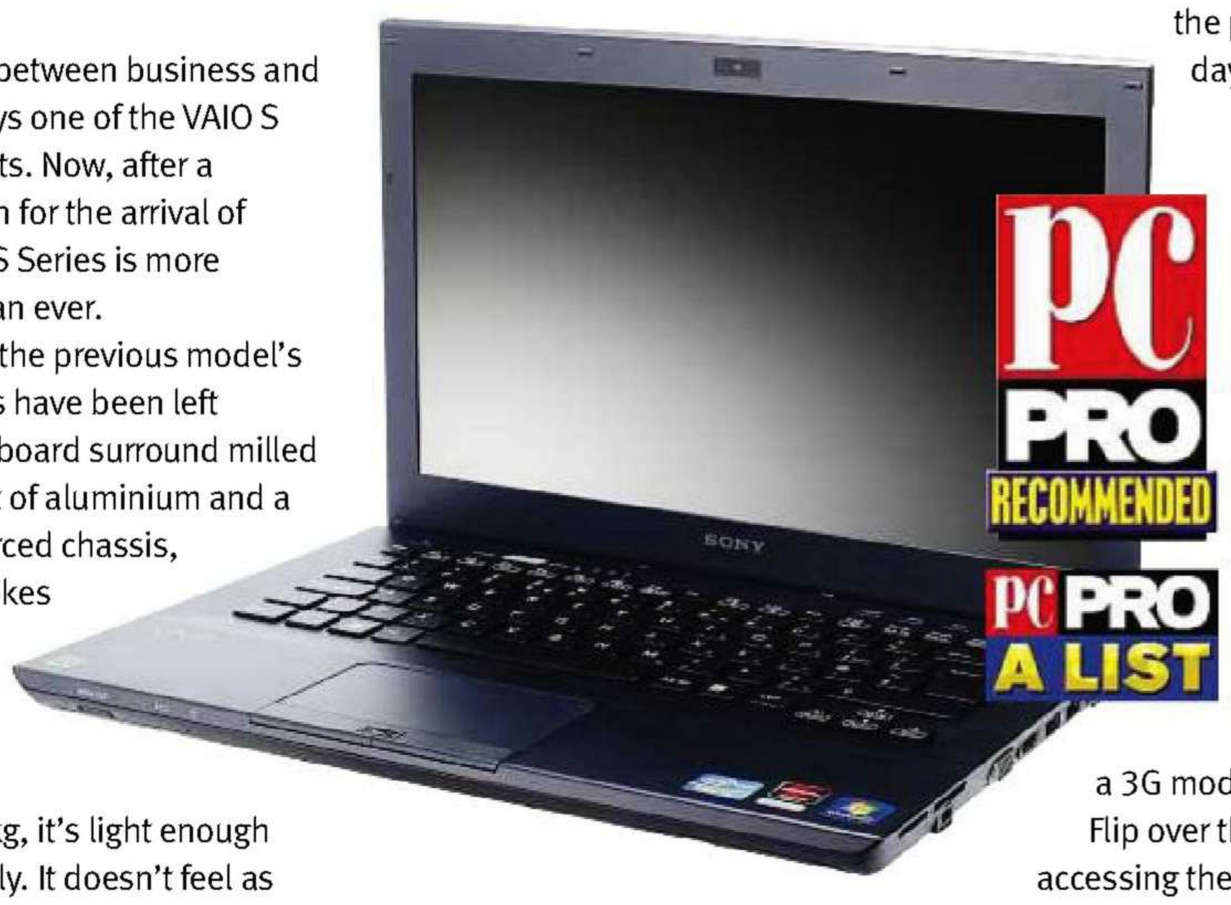
Any vestiges of the previous model's thick, curvy chassis have been left behind. With a keyboard surround milled from a single sheet of aluminium and a magnesium-reinforced chassis, the new model evokes more than a hint of Sony's money-no-object VAIO Z Series.

Weighing 1.69kg, it's light enough to carry around daily. It doesn't feel as stout as its metal-framed construction might suggest, however. There's noticeable give in the chassis, and more heavy-handed grappling causes the chassis to creak. Gorgeous though it is, the build quality is no match for Apple's MacBook Pro 13in (web ID: 365860).

Spend a little time using the Sony, however, and any qualms about its build soon dissipate. The keyboard's Scrabble-tile keys feel lovely, and the spacious layout is exceedingly comfortable. The touchpad is equally fine: a fingerprint reader nestles between the two buttons, and the wide, smooth surface makes for accurate cursor control.

The Sony has the measure of most 13in laptops when it comes to performance. It's possible to configure the VAIO S Series with a range of Core i3, i5 and i7 CPUs on Sony's website, and our retail model came with the mid-range Intel Core i5-2410M processor. It's blazingly quick, and the Sony blitzed our benchmarks with an overall score of 0.74.

Graphics switching also makes its VAIO S Series debut. Flip the switch above the keyboard from Stamina to Speed mode, or vice versa, and the screen flickers momentarily as the Intel and AMD chipsets swap places.



The Sony combines understated looks with fine performance and great battery life.

With AMD's Radeon HD 6470M chipset taking command, the Sony can manage Crysis at modest settings: at the native 1,366 x 768 resolution and Low detail, the Sony averaged a smooth 55fps. For serious gaming, Sony's website offers an upgrade to the Radeon HD 6630M for a £60 premium.

When battery life is the priority, Intel's HD Graphics step into the fray.

The metal chassis on the VAIO S Series isn't as stout as you might expect.

Where the previous generation of the VAIO S Series achieved only 3hrs 44mins in our light-use battery test, the new model manages 6hrs 49mins. With the optional £150 battery slice promising to double that figure, the VAIO S Series has the potential to last a working day on battery power alone.

Sony has squeezed a huge amount into the tiny chassis: USB 3, D-SUB, HDMI and an SD card reader line up on the laptop's right flank, while the DVD writer and a combined headphone/mic socket are on the left. The sheer range of networking options is impressive, too: there's Bluetooth, a single-band 802.11bgn wireless radio, a 3G modem and Gigabit Ethernet.

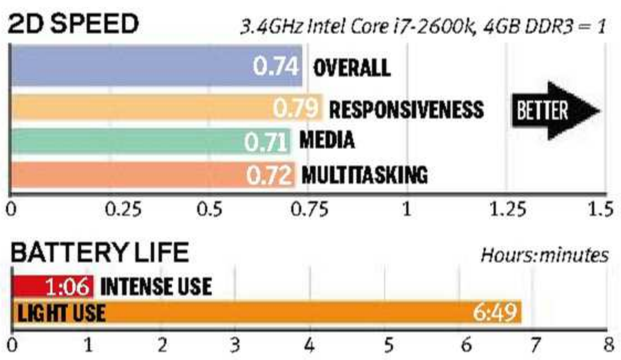
Flip over the VAIO S Series and accessing the Sony's internals is easy: remove two screws and the front panel slides off to reveal the removable battery, the single empty RAM slot (the 4GB of RAM is soldered onto the motherboard itself), a mini-PCI slot housing the Intel wireless card and the 500GB SATA hard disk.

The display is the only let-down. The matte 13.3in panel is plenty bright enough, but image quality is mediocre. Greyish blacks result in a contrast ratio of only 196:1 and, while colours look vibrant, an average Delta E of 11.1 proves colour reproduction is far from accurate. Viewing angles are narrow, too.

Given the flashes of brilliance elsewhere, it's difficult to be too hard on Sony's latest laptop. With the ability to configure your ideal model on Sony's website, the VAIO S Series is capable of masquerading as anything from a basic business model to a Blu-ray-equipped wunderkind. Our review sample sits between the two, but regardless of what specification you choose, the VAIO S is a light, powerful, feature-packed laptop that will appeal to businesses and consumers alike. **SASHA MULLER**

SPECIFICATIONS
2.3GHz Intel Core i5-2410M • 4GB DDR3 RAM • 500GB hard disk • DVD writer • Intel HD Graphics 3000 & AMD Radeon HD 6470M • 13.3in 1,366 x 768 TFT • HDMI • D-SUB • 2 x USB 2 • USB 3 • 802.11bgn WLAN • Bluetooth 2.1 • 3G • 2yr RTB warranty • 331 x 225 x 24mm (WDH) • 1.69kg (2.12kg with charger)

PC PRO TEST SCORES



3D SPEED (CRYSIS) *See p33 for details*

HIGH SETTINGS	9fps
MEDIUM SETTINGS	23fps
LOW SETTINGS	55fps

GOOD PLAYABLE UNPLAYABLE

PERFORMANCE	★★★★½
FEATURES & DESIGN	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

An explanation of our benchmarks can be found on the cover disc

www.downmagaz.com

Dell XPS 15

By adding Sandy Bridge to an already fine laptop, Dell has created an entertainment tour-de-force

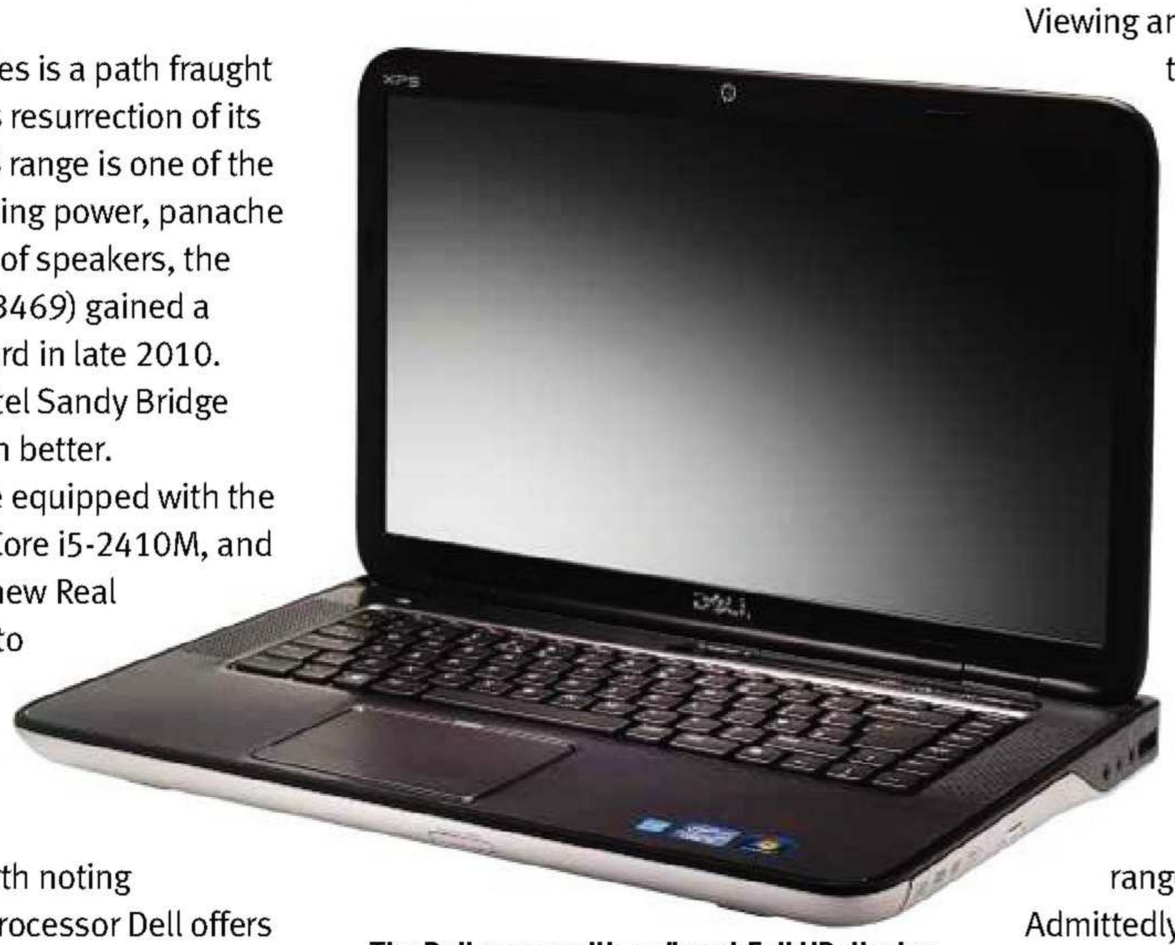
Revisiting past glories is a path fraught with peril, but Dell's resurrection of its once-legendary XPS range is one of the success stories. Fusing power, panache and a fantastic pair of speakers, the XPS 15 (web ID: 363469) gained a Recommended award in late 2010. Now, with added Intel Sandy Bridge processors, it's even better.

Our model came equipped with the mid-range 2.3GHz Core i5-2410M, and it flew through our new Real World Benchmarks to an overall score of 0.66. That's more than quick enough for most people, and it's worth noting that's the slowest processor Dell offers for the XPS 15.

Whichever CPU takes your fancy, it comes paired with Nvidia's mid-range GeForce GT 540M graphics chipset. That might sound a little underwhelming, but it's no slouch: it wasn't until we pushed our Crysis benchmark up to High settings at the screen's Full HD resolution that the action slowed to a sluggish 15fps. If you're dead set on playing Crysis at this detail level, you'll have to reduce the resolution; at 1,280 x 720 and High settings the Dell averaged 27fps.

With Nvidia's Optimus technology dynamically switching between the Nvidia and integrated Intel HD graphics chipsets and a huge battery propping up its rear, the XPS 15 boasts a enormous amount of stamina for such a powerful laptop. In our light-use battery test, it lasted for 7hrs 25mins. That huge battery also helped in our heavy-use test: with brightness set to the screen's maximum, the XPS 15 kept going flat-out for 1hr 59mins.

There are downsides to having a protruding battery – for one thing, the XPS 15's thick chassis weighs a hefty 3kg even without the 650g power supply – but it also has some rather welcome side-effects. The Scrabble-tile keyboard was already excellent, but with the battery now leaning it slightly towards the typing position, it's even more comfortable.



The Dell comes with a vibrant Full HD display, but colour reproduction isn't very accurate.

Previously, our only major disappointments with the XPS 15 were the average quality of the display and the flimsy feel of its lid. Unfortunately, the lid doesn't feel any more durable,

A chunky, high-capacity battery means that the XPS 15 weighs a hefty 3.04kg.

with even light prods resulting in ripples of showthrough. Image quality, however, is vastly improved. Dell obviously heard our complaints, and this time sent us a review unit with the superior Adobe RGB, or wide-gamut, Full HD display. Viewing angles are much wider, and the panel's ample brightness and strong black levels result in an excellent 671:1 contrast ratio.

The panel's only weakness is colour reproduction, which, while stunningly vivid, suffers from the usual issues associated with wide-gamut displays. As most applications, images and games are designed to be viewed on standard sRGB laptop panels, they can look cartoony and over-saturated when viewed on a display capable of producing a wider range, or gamut, of colours. Admittedly, many people will love the lurid colour reproduction, but those wanting colour accuracy will need to invest in a calibration tool.

Elsewhere, the XPS 15 cements its reputation as an entertainment thoroughbred. With our review unit sporting both Blu-ray and a DVB-T TV tuner, the Dell makes for a compact media centre. It also helps that the JBL speakers are among the best we've ever heard on a laptop.

There's no lack of connectivity, either. A D-SUB output is a notable absentee, but HDMI 1.4 – which means you can connect the XPS to a 3D TV – and mini-DisplayPort are arguably far more useful additions. With two USB 3 ports, a USB 2/eSATA combo port, a three-in-one card reader and an optical S/PDIF output, the XPS 15 ticks all the boxes.

We were already fans of Dell's XPS 15, but the improved performance, incredible stamina and smorgasbord of features make it more alluring than ever. We'd prefer a sturdier lid, but at £929 inc VAT the Dell is a fine example of just how much a Sandy Bridge entertainment laptop can offer. **SASHA MULLER**

PC PRO RECOMMENDED

HIGH-END LAPTOP

PRICE
£774 (£929 inc VAT)

DELIVERY
Free

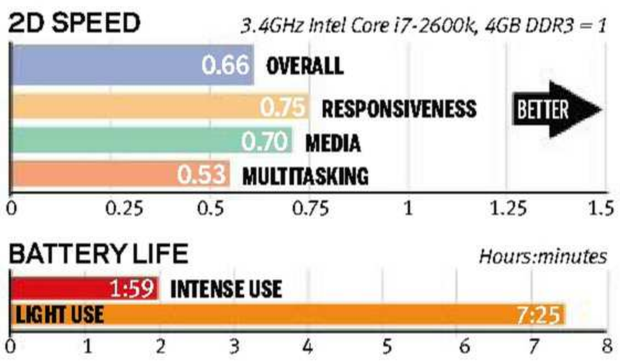
SUPPLIER
Via Dell website

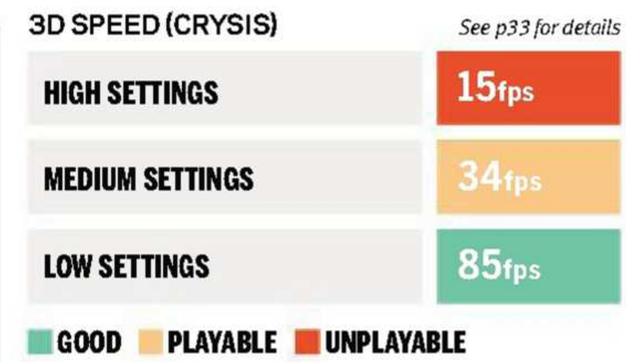
INTERNET
www.dell.co.uk

PART CODE
NOOX5M59

SPECIFICATIONS
2.3GHz Core i5-2410M • 4GB DDR3 RAM • 500GB hard disk • Blu-ray reader/DVD writer • 15.6in 1,920 x 1,080 TFT • Nvidia GeForce GT 540M graphics • HDMI • mini-DisplayPort • 2 x USB 3 • USB 2/eSATA • 802.11bgn WLAN • Gigabit Ethernet • Bluetooth • 2mp webcam • Windows 7 Home Premium 64-bit • 1yr RTB warranty • 381 x 266 x 39mm (WDH) • 3.04kg (3.69kg with charger)

PC PRO TEST SCORES





An explanation of our benchmarks can be found on the cover disc

Samsung Series 9

Samsung takes on Apple, but the Series 9's slender physique comes at a serious cost

In the world of high-end ultraportables, few Windows laptops can rival Apple's MacBook Air. It's an exclusive club: Sony's Z Series (web ID: 362017) and Dell's now defunct Adamo (web ID: 350734) have provided stiff competition in the past, but few have perfected the formula. Now, it's Samsung's turn to see if its Series 9 ultraportable is worthy of the luxury laptop crown.

If there's one area where Samsung's Series 9 really hits the mark, it's in the jaw-dropping first impression. It isn't quite as stunningly thin as the MacBook Air, but at barely 17mm thick it's as svelte as Windows laptops come. What's all the more amazing, then, is that it's a smidgen lighter than Apple's 13in MacBook Air. At 1.32kg, this is the very definition of ultraportable.

Tumble it in the hands, and the attention to detail is impressive. The chassis is hewn from duralumin – a tough alloy more commonly used in the aeronautic industry – and it feels pretty sturdy given the barely there weight. It isn't as taut as the MacBook Air, though: grapple with it and the lid and base flex a little. It might struggle to match the Apple for rigidity, but ergonomically it's right on target. The soft-feeling Scrabble-tile keys feel just as luxurious as those on the Apple, and we preferred the Samsung's more spacious layout and full-width Enter key. The multitouch touchpad also emulates Apple's glass offering. The surface acts as one giant button; two-fingered taps mimic a right-click, and four-fingered swipes in different directions swap between applications, show the desktop or activate the Flip 3D feature.

A generous selection of ports is hidden behind two dropdown flaps, one on either flank.

It's seriously quick for an ultraportable, too. With a low-voltage Intel Sandy Bridge processor allied with a 128GB SSD, the Series 9 feels far faster than you'd expect. From a cold start, the Windows desktop appears in only 20 seconds, and applications spring into life with nary a delay. With an overall score of 0.43 in our benchmarks, the Samsung is clearly no slouch.

Despite the nippy processor, there's more than enough stamina on tap. That's largely thanks to the 6,300mAh battery sealed inside the Series 9's chassis, which sees it manage 6hrs 35mins in our light-use test. Pushed flat out in our heavy-use battery test and with screen brightness set to maximum, a result of 2hrs 29mins is excellent.

Then there's the 13.3in display. With a matte finish and an eye-searing brightness of 458cd/m², the Samsung is perfectly usable in even the most sun-drenched environment. The superbly wide viewing angles, ample brightness and 715:1 contrast ratio give images plenty of depth and punch. The 1,366 x 768 resolution is disappointing, though, and its colour reproduction isn't as accurate as we'd like: the muted colour reproduction left our HD clips of *Avatar* lacking their usual colourful pizzazz.

At first glance, you might also wonder where all the ports have gone. Apart from a tiny power socket by the left-hand hinge, all the Series 9's connectivity is hidden behind two dropdown flaps, one on either flank. A single USB 2 port, a microSD slot and combination headphone and mic socket are concealed on the right-hand side, while a USB 3 port, micro HDMI and the connect for the supplied Ethernet adapter are on the left.

The svelte Series 9 is lighter than the MacBook Air, and it's fast too.

The selection of ports is generous, but Samsung has had to make notable compromises to squeeze them into such a slim-line chassis. We'd have preferred a full-sized SD card reader over the microSD slot, and although the mere presence of Gigabit Ethernet gives the Samsung one over on Apple's Air, the need to plug in a proprietary adapter cable seems a retrograde step. Plus, while Bluetooth 3 makes the cut, the Broadcom wireless chipset supports only single-band, 2.4GHz operation.

Samsung's Series 9 remains about as refined as an ultraportable can get, but at £1,299 inc VAT, that refinement comes at a considerable cost. Deep-pocketed consumers craving the latest in swish ultraportables will be pleased as punch with their purchase, but with Apple's MacBook Air due for an imminent Sandy Bridge update, the Samsung's wow-factor may be short-lived. **SASHA MULLER**

ULTRAPORTABLE LAPTOP

PRICE
£1,083 (£1,299 inc VAT)

SUPPLIER
www.anvika.com

INTERNET
www.samsung.co.uk

PART CODE
NP-900X3A-A01UK

SPECIFICATIONS
1.4GHZ Core i5-2537M • 4GB DDR3 RAM • 128GB SSD • Intel HD Graphics 3000 • 13.3in 1,366 x 768 TFT • Gigabit Ethernet • 802.11bgn WLAN • 1 x USB 3 • 1 x USB 2 • micro HDMI • microSD card reader • Windows 7 Home Premium 64-bit • 2yr C&R warranty • 329 x 227 x 17mm (WDH) • 1.32kg (1.52kg with charger)

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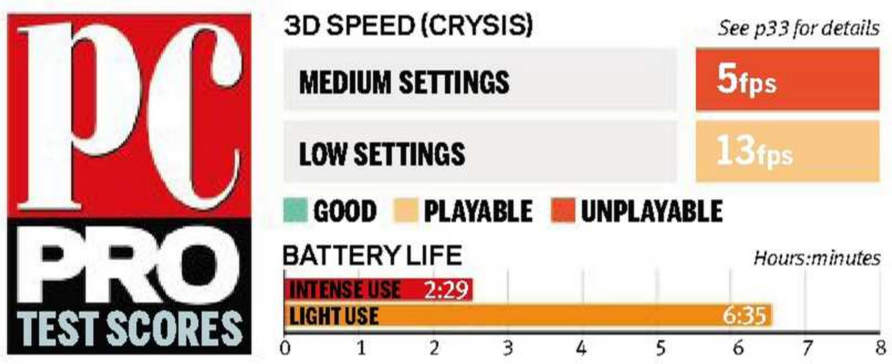

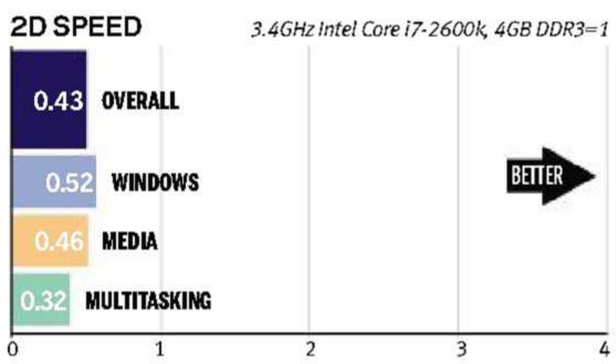

PERFORMANCE	★★★★☆
FEATURES & DESIGN	★★★★★
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

An explanation of our benchmarks can be found on the cover disc

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Palicomp Phoenix i5 Destiny

A credible mid-point between the high-end and budget PC, with solid features and performance at a good price

The Destiny comes with Intel's i5-2500K processor, which is a strong performer.

It's difficult to keep track of how many PCs are turning up these days with Intel's Core i5-2500K clamped to the motherboard, but its balance between performance and affordability makes it easy to see why this has become the go-to chip for PC manufacturers. Palicomp's Phoenix i5 Destiny is the latest to arrive.

The "K" on the end of the processor's name signifies that the chip is an unlocked edition, and Palicomp has taken advantage by boosting the 3.3GHz core clock to a healthier 4.5GHz. The effect is palpable. Aided by 4GB of DDR3 RAM, the Destiny hurtled through our new benchmarks to score 1.10 – impressive for a mid-range system.

The Phoenix i5 Destiny's graphical grunt, provided by an ATI Radeon HD 5670, is disappointing, though: it didn't quite meet the mark in our 1,920 x 1,080 High quality Crysis test with an average score of 25fps. Still, it's adept enough to handle gaming at moderate levels, thanks to a score of 46fps in our 1,600 x 900 Medium quality test.

Given the rest of the package, we're inclined to forgive the modest gaming performance. The 22in AOC monitor is a fine budget choice, partnering a Full HD resolution with solid colour reproduction, and even the cheap Logitech 2.1 speakers manage to strike a balance between acceptable quality and all-out volume. The presence of a Blu-ray reader, meanwhile, is a bonus we hadn't expected on a PC at this price. We only wish Palicomp had left enough in the budget for a less plasticky keyboard and mouse set.

Money spent on the specification has obviously been saved on the chassis. The Cooler Master Elite 330 won't win any design awards, but it's a reliable budget chassis that's easy to use once its flimsy side panels have been removed.

There's no motherboard tray, but the rainbow-coloured cables are all neatly tucked away or anchored to nearby bays, and there's a reasonable amount of upgrade room. Its spare DIMM sockets are clear, and there are two PCI Express x16 slots and two PCI sockets within easy reach. Only one of those spare PCI Express x16 slots will prove useful for graphics card installation, however, as the second runs at only x4 speed.

The range of drive bays is fine, with three spare 5.25in bays and four spare hard disk sockets, all boasting tool-free mounting clips, although we couldn't access either PCI Express x1 socket – one is obscured by the graphics card, and another is blocked by a USB 3 extension that's plugged into a PCI blanker. It's also worth noting the 550W power supply isn't modular, so you'll need to check its connections before making any upgrades.

The position of the Thermaltake ISGC-300 CPU cooler and the rear exhaust fan also surprised us a little, with the processor heatsink facing towards the rear fan – so the traditional passage of air through the chassis is interrupted, with both fans sucking air from the same small area. That might have proved disastrous for cooling, but the Destiny doesn't suffer too badly: the processor's peak temperature of 84°C isn't a cause for concern, and the GPU's peak of 67°C is even healthier.

Noise output did become an issue. When idling, the Destiny emitted a purr that's hardly noticeable unless you're in the quietest of rooms, but the decibel levels jumped when the system was stressed. It isn't an offensive level of noise, but it's conspicuous.

Overall, though, Palicomp's latest has far more hits than misses: the fine processor, Blu-ray drive, solid chassis and peripherals outweigh the middling graphics card and noise issues. If you're looking for a PC that's affordable and doesn't compromise too much on performance, you could do a lot worse than pick this one. **LUKE SAMPSON**

The budget chassis is solid enough, and there's enough room in the box for upgrades.

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MID-RANGE PC

PRICE
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DELIVERY
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Via palicomp website

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POWER RATING
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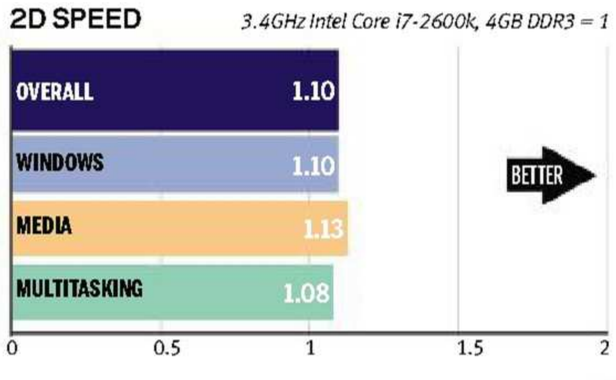
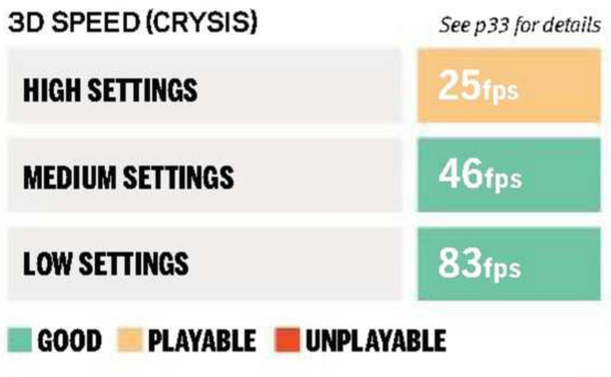
SPECIFICATIONS
3.3GHz Intel Core i5-2500K overclocked to 4.5GHz • 4GB DDR3 RAM • 1TB Samsung hard disk • Blu-ray reader • AMD Radeon HD 5670 graphics • AOC F22+ 22in 1,920 x 1,080 TFT • 4 x USB 3 • 8 x USB 2 • 2 x eSATA • FireWire • Gigabit Ethernet • wireless keyboard and mouse set • Windows 7 Home Premium 64-bit • 1yr RTB warranty • 190 x 480 x 420mm (WDH)

PC PRO TEST SCORES





PERFORMANCE	★★★★½
FEATURES & DESIGN	★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

An explanation of our benchmarks can be found on the cover disc

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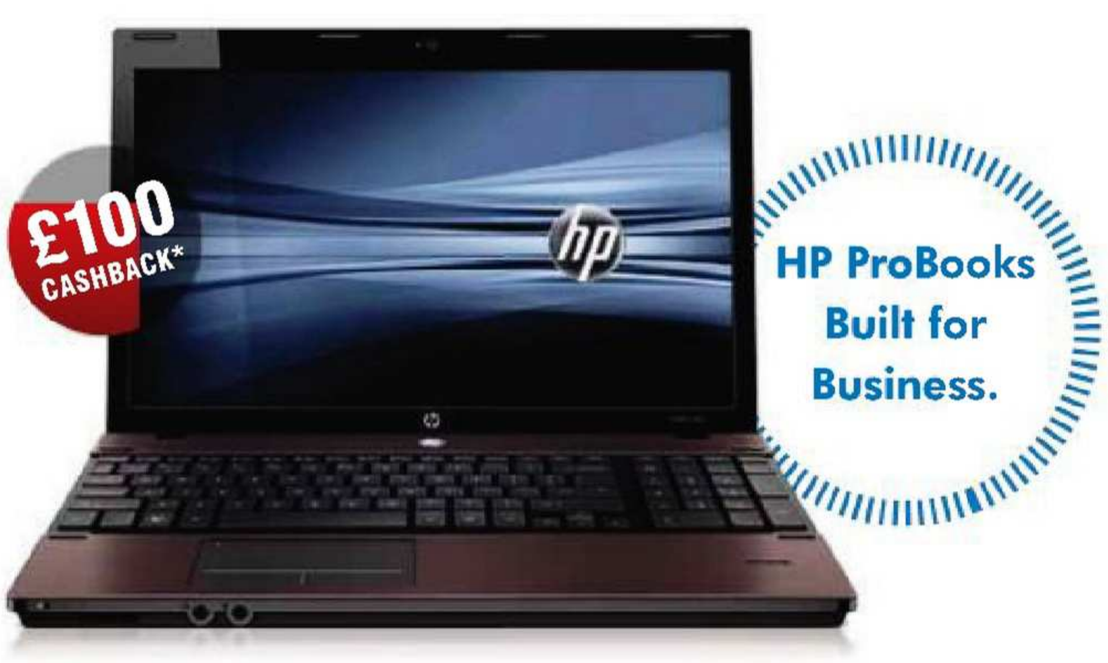

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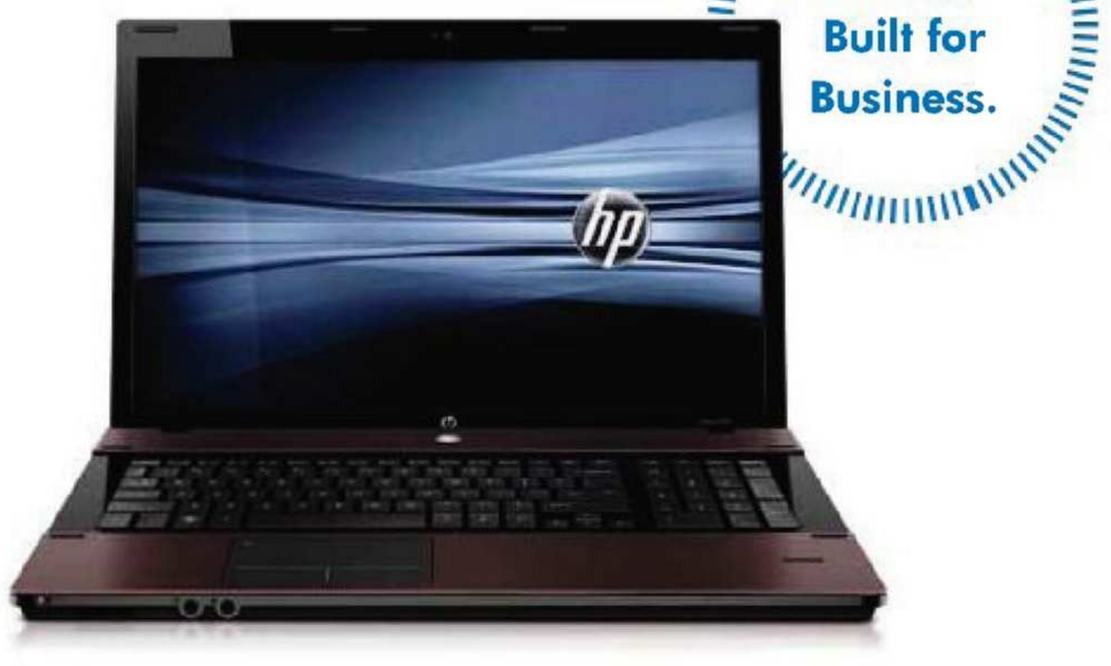

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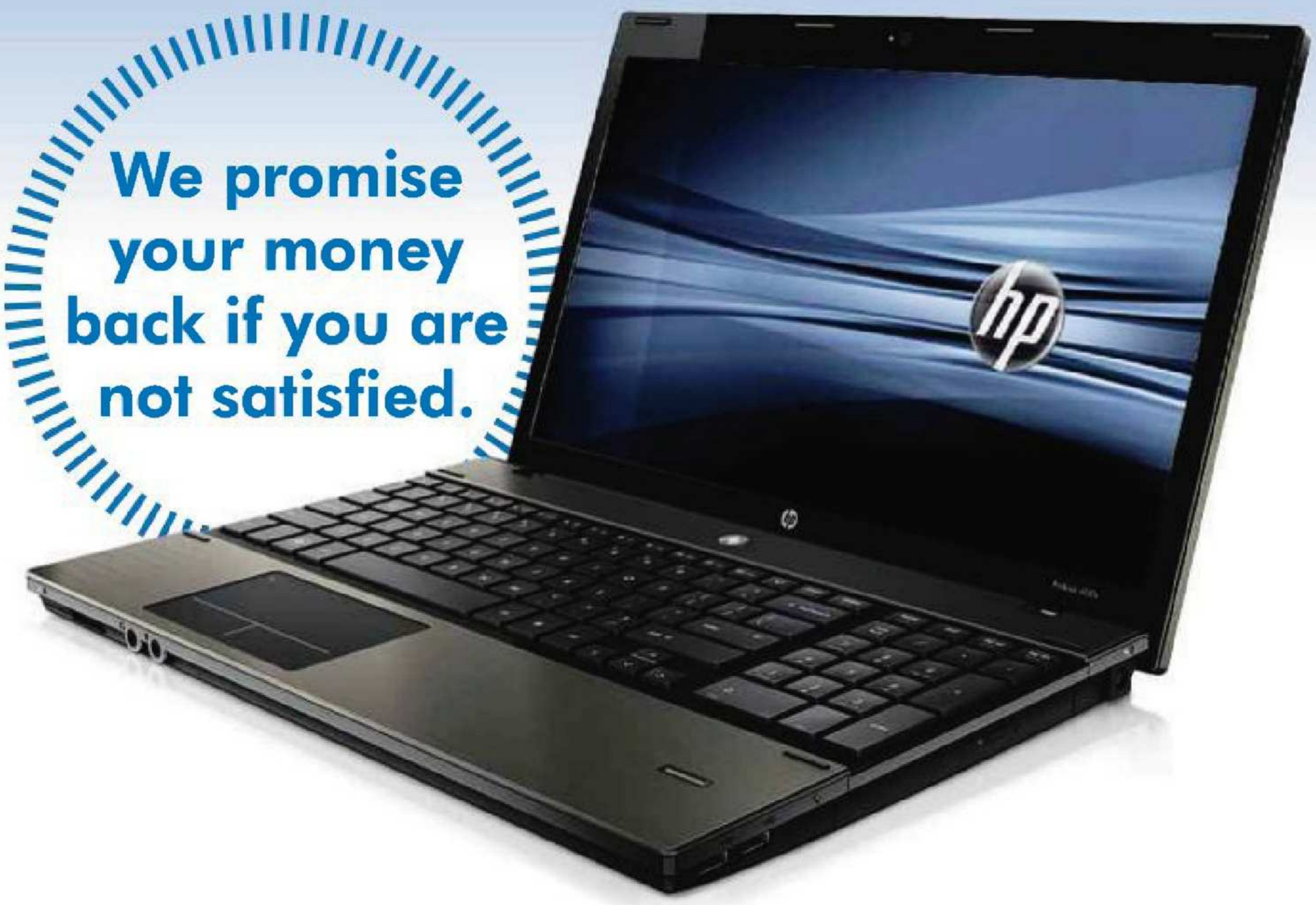

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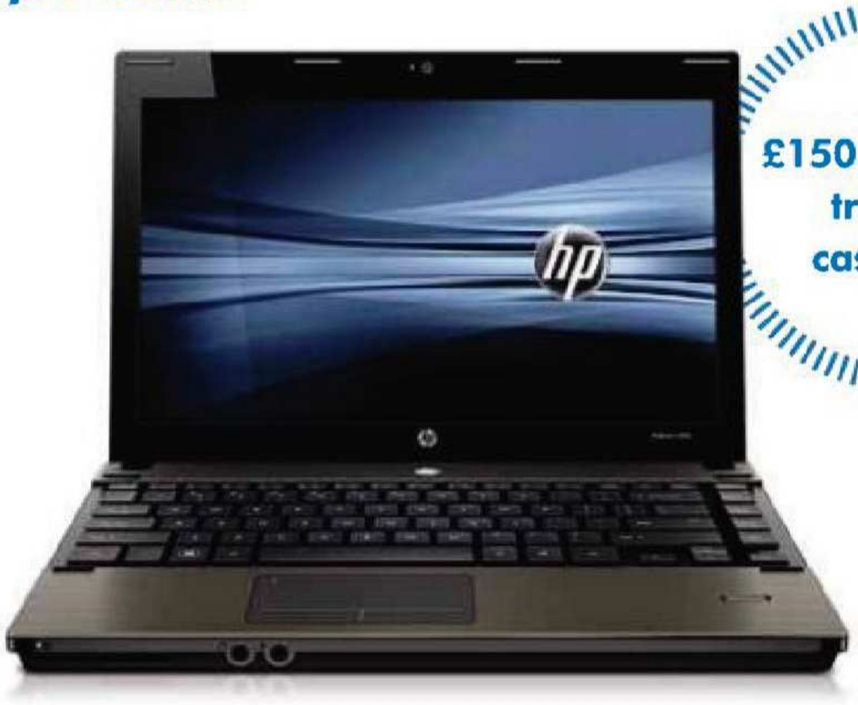

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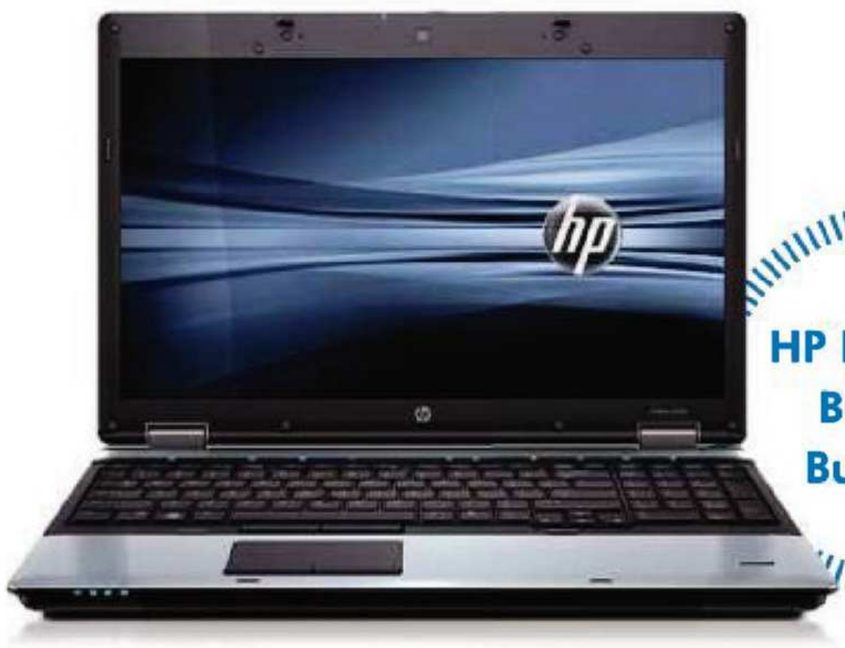

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Sony Ericsson Xperia Play

As a phone it's unremarkable, but the PlayStation controls give it unique entertainment appeal

The 4in screen slides up to reveal a PlayStation controller hidden beneath.

In these days of app stores, every smartphone offers a library of games; but the dream of a true hybrid of handheld games console and smartphone has never been fully realised (a few loyal Nokia N-Gage owners notwithstanding). The standard touchscreen interface is simply no substitute for proper joypad controls.

Now Sony Ericsson has launched the PlayStation-certified Xperia Play which, like Sony's PSP Go, hides PlayStation controls behind the screen. Slide up the large 4in display and you'll find the familiar D-pad and four action buttons, plus two circular touchpads that act as analogue thumbsticks. On the back, your fingers naturally fall onto a single pair of L and R shoulder buttons, offering something very close to a full PlayStation controller experience.

Fire up a game and the controls work brilliantly. The D-pad and action buttons are shallow but have a solid, positive action, and a small indent in the centre of each thumbstick partially compensates for the lack of any tactile feedback. It isn't going to challenge your PS3 controller for comfort, but it's perfectly usable.

Games divide into two categories: existing Android titles optimised for physical controls, and PlayStation classics converted for mobile gaming – Sony PSP games are, oddly, excluded. Sliding the phone open automatically takes you to the former – four games come preinstalled, including FIFA 10 and The Sims 3, both of which work well. Available to download are close to 100 more, at prices from free to £5. Among the tacky cash-ins are at least a few big names such as Avatar, and more are promised, but it's hardly a compelling collection just yet.

We had higher hopes for the classics, which are found in a separate PlayStation Pocket app, but here you'll find only the 15-year-old Crash Bandicoot preinstalled. Other games can be downloaded – old favourites Destruction Derby and Syphon Filter are among the titles already out, and Sony plans to keep building up the library over time. Sadly, at £3.99 a pop, you'll have to dig deep into your pocket to put together a collection to match your PlayStation roster of old.

There is a third gaming option that Sony won't be advertising. Like any other Android phone, the Xperia Play is perfectly capable of running a range of console emulators – Google banned the popular PSX4Droid app from the Market just in time for the Play's launch, but it can still be downloaded from other sites. Go via this route and the Xperia Play can support not only a huge roster of PlayStation originals but also games for the Mega Drive, SNES, GameBoy and N64. We can see it proving very popular for precisely this reason, although it's hardly the sort of success Sony will have hoped for.

As a phone, the Play unfortunately has less to distinguish it, offering a very similar experience to the Xperia Arc (*see opposite*). Sony Ericsson's modified take on Android 2.3 (aka Gingerbread) comes preinstalled, complete with the rather pointless TimeScape social networking feeds app. The 480 x 854 touchscreen is responsive, and everything feels snappy throughout, thanks to the same 1GHz Scorpion processor and Adreno 205 GPU as found in the Arc.

That impression of responsiveness was confirmed in our smartphone benchmarks: the Play loaded the BBC homepage in seven seconds, completed the SunSpider JavaScript in a reasonable 5.5 seconds, and scored 1,344 points in the Android-only Quadrant benchmark.

As well as the 5-megapixel camera, the rear houses the familiar L and R shoulder buttons.

Those scores are all up with the current pack, although they may start to look slow when the wave of dual-core smartphones breaks in the coming weeks.

The Play performed well in our battery run-down test too, the 1,500mAh battery showing 60% remaining after 24hrs of use. Gaming will drop that significantly faster, but Sony promises five and a half hours of continuous play.

We found the phone's 5-megapixel camera produced detailed and even photographs, with pretty accurate colours, although video only records at a disappointing 800 x 480. It comes with an 8GB microSD card too.

The Xperia Play does have a few design weaknesses. The handset is thicker than a normal phone (thanks to the game controls), and it's heavier too at 175g. Although the screen is sharp, it's very dim: even at maximum brightness it looks limp next to the vibrancy of an iPhone 4, which is frustrating in brightly lit environments. The volume rocker works the wrong way round when you're holding the phone in game mode, and the shoulder buttons feel floaty, hindering your ability to time clicks accurately.

Sony's software isn't perfect either: the disconnect between the PlayStation Pocket and Xperia Play gaming apps is confusing, while the respective libraries and storefronts are inconsistent.

Whether the overall package is a good deal or not depends on what you're looking for. As a phone, the Sony Ericsson Xperia Play is a bulky and unremarkable Android handset. But provided Sony supports it well with new titles, those primarily interested in handheld gaming will find the sheer flexibility and enjoyment to be had from the Play's physical controls give it a unique appeal. **DAVID BAYON**

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SPECIFICATIONS
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PERFORMANCE	★★★★★☆
FEATURES & DESIGN	★★★★☆☆
VALUE FOR MONEY	★★★★☆☆
OVERALL	★★★★☆☆

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Sony Ericsson Xperia Arc

A lovely smartphone with a glorious screen and excellent battery life, but there are some flaws

The last time Sony Ericsson attempted a big-screen Android phone, we weren't particularly impressed. The Xperia X10 (web ID: 357235) boasted a large, bright, high-resolution 4in display, but it had major flaws. The Arc is the successor to that handset, and it makes a striking first impression.

As with the X10, this is mainly down to its screen, which completely steals the show. It's larger than the X10's at 4.2in, and matches its resolution at 480 x 854, but it's much brighter and punchier. In fact, at maximum brightness, and with the help of Sony's Bravia Engine picture enhancement technology, the Arc's LED-backlit screen looks stunning.

It's a fabulous screen on which to watch movies and also to view photos; if you fancy watching on a bigger screen, the HDMI output lets you go large.

Its looks are also worth dwelling on: at its thinnest, the Arc measures just 8.9mm from front to back and weighs only 116g. The rear panel curves in slightly, so it sits comfortably in your hand. Plus, that curvature means it doesn't scratch and scuff as much as others when you lay it on a flat surface.

The Arc is sleek and slim, and the rear panel is curved sensuously inwards, giving it an unusual look.

The touchscreen is more responsive than it was on the X10, with scarcely a hint of delay or shudder as you sweep from one Android desktop to another, pan around web pages and zoom in and out. That's despite a healthy selection of Sony Ericsson's own widgets, apps and OS customisations.

Of these, we hold the same mixed opinion as we did before. We like the tweaks Sony Ericsson has made to folders – they pop up in an attractive transparent overlay window – and when you create folders you're given the option to name them there and then, instead of having to edit them later. The toolbar that runs along the bottom of the screen gives permanent access to common features, and can be customised with shortcuts and folders.

We like the idea of Timescape, which amalgamates not just Facebook and Twitter feeds, but also recent phone and text activity, displaying items as cards in a 3D rolodex-style view. In practice, however, you can fit only six cards onscreen at any one time; give us a less fancy 2D list view any day.

Under the hood, the Arc is powered by the same single-core 1GHz Scorpion processor and Adreno GPU (backed up with 512MB of RAM) found in the Xperia Play (*see opposite*), the HTC Incredible S (web ID: 366229) and the HTC Desire HD (web ID: 363274). Games are dispatched with aplomb, and it's a darned sight slicker in general use than its predecessor too.

This combination of bits and bobs secures sound benchmark figures. We ran the SunSpider JavaScript test in the native browser for a score of five seconds; the BBC homepage loaded in an average of seven seconds; and the Android-specific Quadrant benchmark app returned a score of 1,378. All these compare well with the immediate competition – it's slightly quicker than the Incredible S in SunSpider, and slightly slower in Quadrant. Against the iPhone 4, it's competitive too.

More notable are the Arc's battery results. We measured 70% remaining after our 24-hour test, which is impressive for a large-screen smartphone. It's a result that suggests a couple of days of moderate use are well within the Arc's compass, and in use we found we needed to charge it only every other day.

Screen star: the Arc's display is among the most impressive we've seen on any smartphone.

The 8-megapixel camera is worthy of high praise too. The big screen makes a wonderful viewfinder, and the pictures and 720p video it produces are top-notch. There's good detail and contrast, reliable colour production both inside and out, and performance is good. The only gripe we had was with the JPEG compression, which is fairly aggressive; it isn't disastrous, but it's obvious when you zoom in that some fine detail is being lost, especially in dim lighting.

There are other niggles too, and the first concerns build quality. It may look gorgeous, but the plastic rear panel feels flimsy, and it creaks and moves a little, even when snapped in place. The three buttons below the screen feel plasticky and insubstantial, and we take objection to the positioning of the headphone jack. With a phone this large, having a plug poking out at the side doesn't make it particularly pocket friendly.

Perhaps more serious is that the GPS radio is inconsistent, sometimes locking on to satellites in a trice, while at other times taking many minutes to give a positional fix. That's a concern if you plan to rely on your phone as a satnav.

That leaves the Sony Ericsson Arc in a somewhat difficult position. In most respects it's a fabulous phone, and it's reasonably priced, too, from around £25 per month on a two-year contract. It's quick, has a sumptuous screen, good battery life and a largely excellent camera. But it has flaws, and these are serious enough to hold us back from a recommendation. **JONATHAN BRAY**

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INTERNET
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SPECIFICATIONS
Single-core 1GHz Scorpion CPU • 512MB RAM • 320MB ROM • 8GB microSD card • 4.2in 480 x 854 TFT • quad-band GSM/GPRS/EDGE/3G/HSDPA • Bluetooth 2.1 • 802.11bgn WLAN • 8mp camera • GPS • light, accelerometer and proximity sensors • 1,500mAh lithium ion battery • Android 2.3 • 2yr RTB warranty • 62.5 x 11 x 125mm (WDH) • 116g

PERFORMANCE	★★★★☆
FEATURES & DESIGN	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL	★★★★★

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PC PRO A LIST

Canon Legria HF M41

An excellent camcorder at a reasonable price, but we prefer the flexibility of the cheaper Panasonic HDC-SD90

Panasonic has ruled the enthusiast camcorder sector for some time now, and its HDC-SD90 (web ID: 365194) and HDC-TM900 (web ID: 365107) models recently reinforced that position. Now Canon aims to topple Panasonic with the Legria HF M41.

It's one of a range of three M-series camcorders with similar specifications. The HF M41 we tested is the most expensive at £648 inc VAT, with 32GB of storage; there's also the 16GB HF M46 at around £526, and the HF M406, with no memory for £487. These cheaper models have the same optics and sensor, but miss out on the viewfinder and 3.5mm mic input of the HF M41. The HF M406 would be our pick, as the HF M41's viewfinder is too small to be practical, and at that price it goes head-to-head with the Panasonic HDC-SD90.

The HF M41's specifications make impressive reading, with a large 0.33in (1/3in) CMOS sensor, dual SD card slots, hybrid optical/electronic image stabilisation, a stereo mic and an accessory shoe. It falls short of the Panasonic in some key areas, though, with a shorter 10x zoom and a significantly bulkier chassis. Plus, shooting is restricted to 1080/50i.

The Canon Legria HF M41 produces quality video, and sports a 10x optical zoom.

Performance is good. The Canon has a larger sensor than the HDC-SD90, so its low-light performance is superior, with noise kept to a minimum in our tests. Colours were more accurate and well balanced as well. Quality wasn't up with the Panasonic HDC-TM900, but that's £100 dearer.

The Canon's image stabiliser and motion capture can't match the HDC-SD90. With the Panasonic, we were able to maintain a rock-steady picture even fully zoomed at 21x; we struggled to do the same with the Canon at half the magnification. Autofocus was slower, and panning resulted in significantly less smooth footage.

That puts the Canon Legria HF M41 in an awkward position. For raw image quality it's marginally better than its main rival, but with inferior stabilisation, a shorter zoom and a bulkier chassis, it's much less flexible. It's an excellent camcorder, but on balance we'd recommend you opt for the Panasonic HDC-SD90 instead. **JONATHAN BRAY**

CAMCORDER

PRICE
£540 (£648 inc VAT)

DELIVERY
Free

SUPPLIER
http://uk.insight.com

INTERNET
www.canon.co.uk

SPECIFICATIONS
1080/50i AVCHD format • 0.33in (1/3in) CMOS sensor • 10x optical zoom • hybrid image stabilisation • 2.1mp stills • 3in 230kpixel touchscreen • 1yr RTB warranty • 69 x 136 x 69mm (WDH) • 360g

PERFORMANCE ★★★★½
FEATURES & DESIGN ★★★★½
VALUE FOR MONEY ★★★★½
OVERALL ★★★★½

Samsung SyncMaster C27A750X

Too expensive to recommend right now, but as a proof of concept the C27A750X works brilliantly

Samsung's SyncMaster C27A750X is the first of a new breed of monitors. Designed to pair with a laptop, it replaces the traditional video cable with wireless ultra-wideband (UWB) technology. Plug a tiny dongle into a spare USB port, install the drivers, and the video feed displays wirelessly.

Samsung suggests the USB receiver should be placed within 75cm of the monitor to guarantee a stable connection, but in our tests it worked up to 4m away. Full HD movies played smoothly, and there's no perceptible lag – even fast-paced games were playable.

Ingeniously, the C27A750X also functions as a wireless docking station, providing two USB 2 and two USB 3 ports, 10/100 Ethernet and a headphone output. One limitation is that the wireless connection restricts all the USB ports to USB 2 speeds – transfers from a standard USB 2 hard disk peaked at 7MB/sec. To use the USB 3 ports at full speed, you need to hook up the supplied USB 3 cable.

The SyncMaster C27A750X uses high-speed wireless technology instead of video cables.

The C27A750X's huge 27in panel offers a relatively low 1,920 x 1,080 resolution, but the image quality is high. In our tests, it exceeded its rated brightness at 343cd/m² and had a good contrast ratio of 928:1. Colour reproduction was accurate by TN panel standards, with a low average Delta E of 3.

The monitor's slim, contoured silhouette looks every inch the style icon too. The stand on our pre-production sample was a touch wobbly, and the hinge was stiff, but the slender neck provides a generous range of adjustment.

At around £150 more than most 27in TN panel monitors, the Smasung C27A750X is expensive. But as soon as you return to a traditional monitor and the rigmarole of cable-swapping you appreciate its brilliance. We wouldn't buy it at this price, but we have high hopes for the technology. **SASHA MULLER**

WIRELESS 27IN TFT

PRICE
£374 (£449 inc VAT)

SUPPLIER
Available from June

INTERNET
www.samsung.co.uk

SPECIFICATIONS
27in 1,920 x 1,080 TFT • 300cd/m² brightness • 1,000:1 contrast • 2ms response • HDMI • D-SUB • 2 x USB 2 • 2 x USB 3 • 10/100 Ethernet • headphone out • 2yr C&R warranty • 641 x 235 x 408mm (WDH)

PERFORMANCE ★★★★½
FEATURES & DESIGN ★★★★★★
VALUE FOR MONEY ★★★☆☆☆
OVERALL ★★★★½

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PC PRO RECOMMENDED

Crucial M4 SSD 256GB

PRICE £319 (£383 inc VAT)
INTERNET www.crucial.com/uk
SUPPLIER Via Crucial website
OVERALL ★★★★★☆

Crucial's latest solid-state drive uses the same Marvell 6Gbits/sec controller family Intel recently introduced in its 510 Series SSD (web ID: 366028), and it manages to deliver even better performance. In the AS SSD synthetic benchmark tests, the Crucial achieved excellent sequential read speeds of 416MB/sec, and write speeds of 257MB/sec. Random-access speeds were scorching too: AS SSD's multithreaded 4K read and write benchmarks saw the Crucial average 159MB/sec read and 204MB/sec write speeds – more than twice as fast as the Intel 510 Series. The real coup, however, is the price. Thanks to the use of 25nm NAND flash chips, the cost has been kept down to a reasonable £1.57 per usable gigabyte. For cutting-edge performance, the Crucial M4 SSD is the drive of choice. **SASHA MULLER**

Western Digital My Book Studio Edition II 6TB

PRICE £277 (£332 inc VAT)
INTERNET www.wdc.com
SUPPLIER http://uk.insight.com
OVERALL ★★★☆☆☆

The My Book Studio Edition II combines two Western Digital Caviar Green 3TB drives to give a vast 6TB of storage. Its USB 2 and eSATA connections are joined by a Mac-friendly FireWire 800 port, and the drives are formatted with Apple HFS+ – PC users will have to reformat them. The drives use RAID0 striping (RAID1 mirroring is also supported), but using the USB 2 connection limits read and write speeds to 30MB/sec. Even over eSATA, write speeds maxed out at 136MB/sec, with read speeds of 106MB/sec – merely equal to a regular internal drive. It's fairly expensive, so recommended only if you really need this much storage. **SASHA MULLER**

PC PRO RECOMMENDED

Pure One Flow

PRICE £77 (£92 inc VAT)
INTERNET www.pure.com
SUPPLIER www.amazon.co.uk
OVERALL ★★★★★☆

Pure's One Flow radio modernises the boxy design of the Evoke Flow, with curves, a dash of colour and a backlit OLED screen. Its menus are intuitive, and it's a breeze to use. The One Flow supports DAB, FM, internet radio and UPnP streaming, and there's a 3.5mm input port as well, for connecting an MP3 player. The Lounge – Pure's internet radio portal – is expertly executed, and you can also access Pure's FlowSongs service, which gives you the chance to buy tracks mid-song. Sound quality is well rounded, with plenty of bass and volume, and the £35 ChargePak battery system lets you listen on the move. The One Flow looks good, sounds good and is easy to use – and at less than £100 it's an absolute bargain. **LUKE SAMPSON**

AMD Radeon HD 6790

PRICE £87 (£105 inc VAT)
INTERNET http://game.amd.com
SUPPLIER www.ebuyer.co.uk
OVERALL ★★★★☆☆

AMD's mainstream Radeon HD 6790 is a direct rival to Nvidia's £109 GTX 550 Ti (web ID: 366226). It gets off to a good start, equalling the Nvidia card's 39fps in our High quality Crysis test before beating it by 2fps at Very High settings. It repeated the feat in both Stalker: Call of Pripyat and Just Cause 2, although it then dropped 2fps behind the GTX 550 Ti once 8x anti-aliasing was applied. The HD 6790 isn't quite as easy to live with as the Nvidia – it requires two six-pin power connectors, compared with the Nvidia card's single one, and it's also slightly louder under load. Ultimately, though, AMD's card is slightly cheaper and faster, which makes it a good choice for those who don't have the funds to stretch to the far superior HD 6850 (web ID: 362152). **MIKE JENNINGS**

www.downmagaz.com

Foxconn Nettop NT535

PRICE £117 (£141 inc VAT) **SUPPLIER** www.cclonline.com
INTERNET www.foxconnchannel.com **OVERALL** ★★★☆☆☆

A barebones PC is a great way to re-use old components, and Foxconn's NT535 comes with just a motherboard and an Atom CPU. The tiny black chassis has HDMI and VGA outputs, Ethernet and 802.11n wireless, a card reader and a generous six USB 2 slots. Benchmark performance was as we'd expect – 0.25 overall and 0.38 in the Responsiveness test – but the Intel GMA 3150 graphics are beginning to look underpowered next to the latest AMD chips. The best we could play back was 720p video, and then with some dropped frames. Even casual games at low settings proved sluggish. The NT535 is cheap at £141 and drew just 23W at idle, but for anything more than day-to-day web use, we'd spend a bit more on something with a longer shelf life. **LUKE SAMPSON**

PC PRO RECOMMENDED

BlueAnt Q2

PRICE £67 (£80 inc VAT) **SUPPLIER** www.amazon.co.uk
INTERNET www.blueant.co.uk **OVERALL** ★★★★★☆

If Bluetooth products have one characteristic in common, it's that most of them are difficult to set up, particularly if you lose the manual. The BlueAnt Q2 headset is different. The first time you switch it on, it will go into pair mode automatically. Then, with a series of voice instructions, it will run you through setting it up, step by step. This headset is by no means a one-trick pony, though. The BlueAnt's comfort and sound quality are top notch, and it features a voice command system that works remarkably well. It also allows you to connect with two phones at once, and will stream A2DP audio in addition to phone-specific sounds. All in all, the BlueAnt Q2 is an excellent headset, and well worth the slightly high price. **JONATHAN BRAY**

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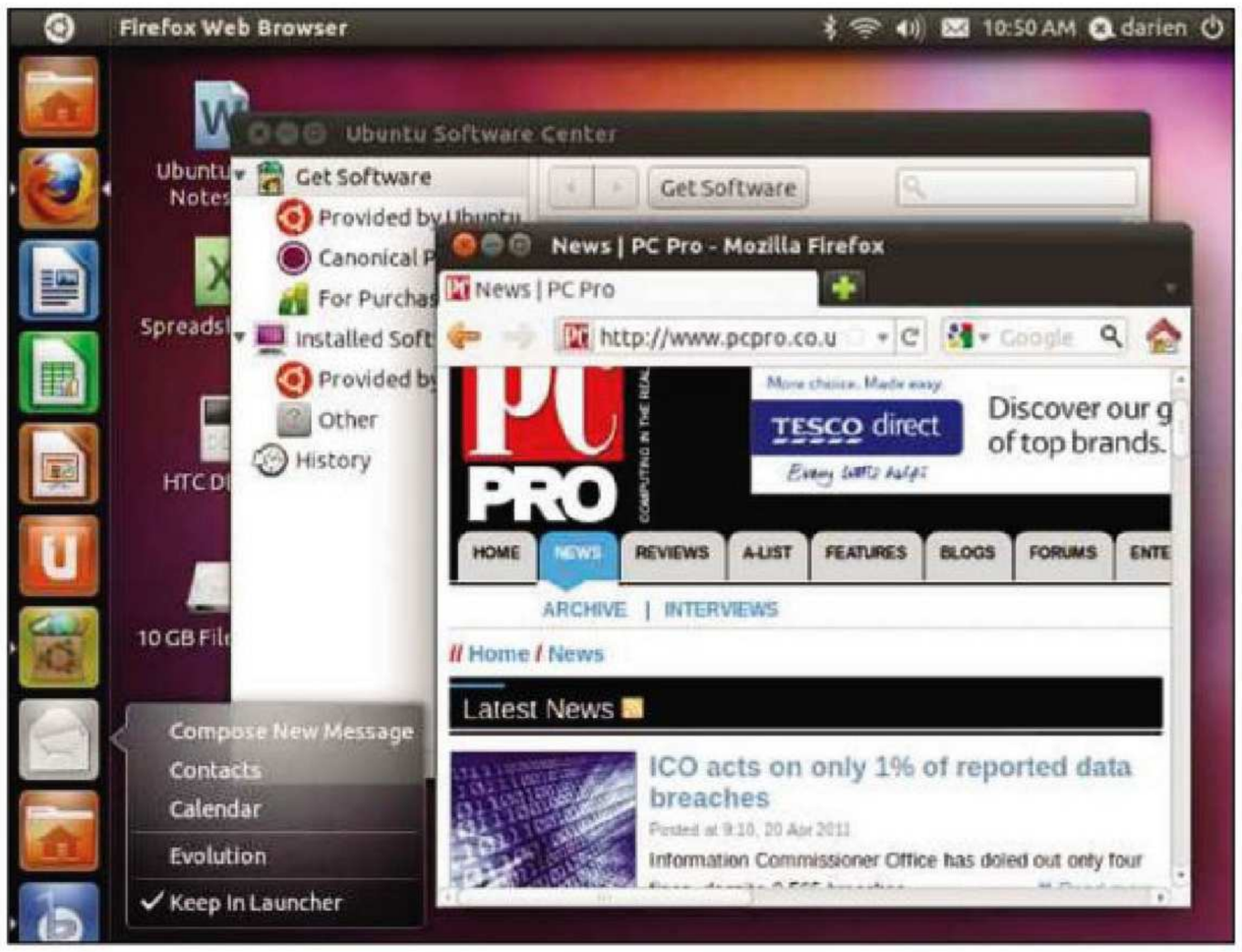


Ubuntu Linux 11.04

A new interface makes our favourite free operating system slicker and more usable than ever

A new edition of Ubuntu arrives every six months, bearing a new zoological codename. The latest is version 11.04 (reflecting its April 2011 release), known to its friends as the Natty Narwhal.

You'll notice one change before you even download the installer: the Netbook Edition has been retired, so there's now only one ISO for all home computers. It's a wise move; one standard installation makes life easier for beginners and developers alike.

Boot into Ubuntu 11.04 and you'll see another change. The Gnome desktop has been replaced by the Unity interface that made its first appearance in the 10.10 Netbook Edition. You can still install Gnome, or download the Xfce-based Xubuntu distribution, but Unity is now the default.

It's a controversial change, but we reckon it's an improvement. The Launcher at the side of the screen is far more inviting than Gnome's niggly menus, and it makes better use of a widescreen display. The way the icons work – click to launch, right-click for options – will come naturally to anyone familiar with Windows 7 or OS X. The Ubuntu button at the top-left of the screen opens a searchable index of files and applications, which will again be familiar to anyone who's used Spotlight on the Mac or the Windows search box.

Unity itself has been jazzed up since its netbook-only days. Launcher icons are more colourful and detailed than before, although the background remains a miserable grey even if you select a brightly coloured desktop theme. And the Launcher now hides when you set an application to full-screen mode, which can be done by dragging it to the top of the display, just like in Windows 7. This works on netbooks as well as full-sized PCs, and netbook users can save files to the desktop too – an option frustratingly disabled in 10.10.

The main menu bar has been updated, so application menus can now appear here, Mac-style. It's a small change, but it saves screen space and adds a welcome sense of coherence.

The last notable interface change is support for multitouch interfaces. Unity's button-driven design is already better suited than Gnome to finger-driven devices; and a feature jovially named Love Handles adds touch-friendly controls for moving and resizing windows. We couldn't get this to work, but hopefully an update will remedy that.

Synchronisation services are more accessible thanks to the new Ubuntu One Control Panel.

PC PRO RECOMMENDED

The Unity interface, now shared by both desktop and netbook installations, is simple and attractive.

OPERATING SYSTEM

PRICE
Free

INTERNET
www.ubuntu.com

REQUIREMENTS
Any x86-compatible PC, laptop or netbook

For us, the most significant update to Unity isn't a question of features, but of performance. Even on an ageing netbook, Unity felt more responsive than the 10.10 Netbook Edition. We saw particular improvement when searching for files and programs using the Ubuntu button. Before, the search window took a second or more to appear; now it pops up almost instantly, and results often appear before you've finished typing.

In terms of applications, the most interesting update here is the Ubuntu One Control Panel. Although Canonical's cloud storage system isn't new, this graphical interface at last makes its services – including synchronising files, contacts and bookmarks – easy to use. In future, Ubuntu's OneConf tool could be integrated too, allowing your entire application setup to be mirrored across PCs, but this isn't here yet.

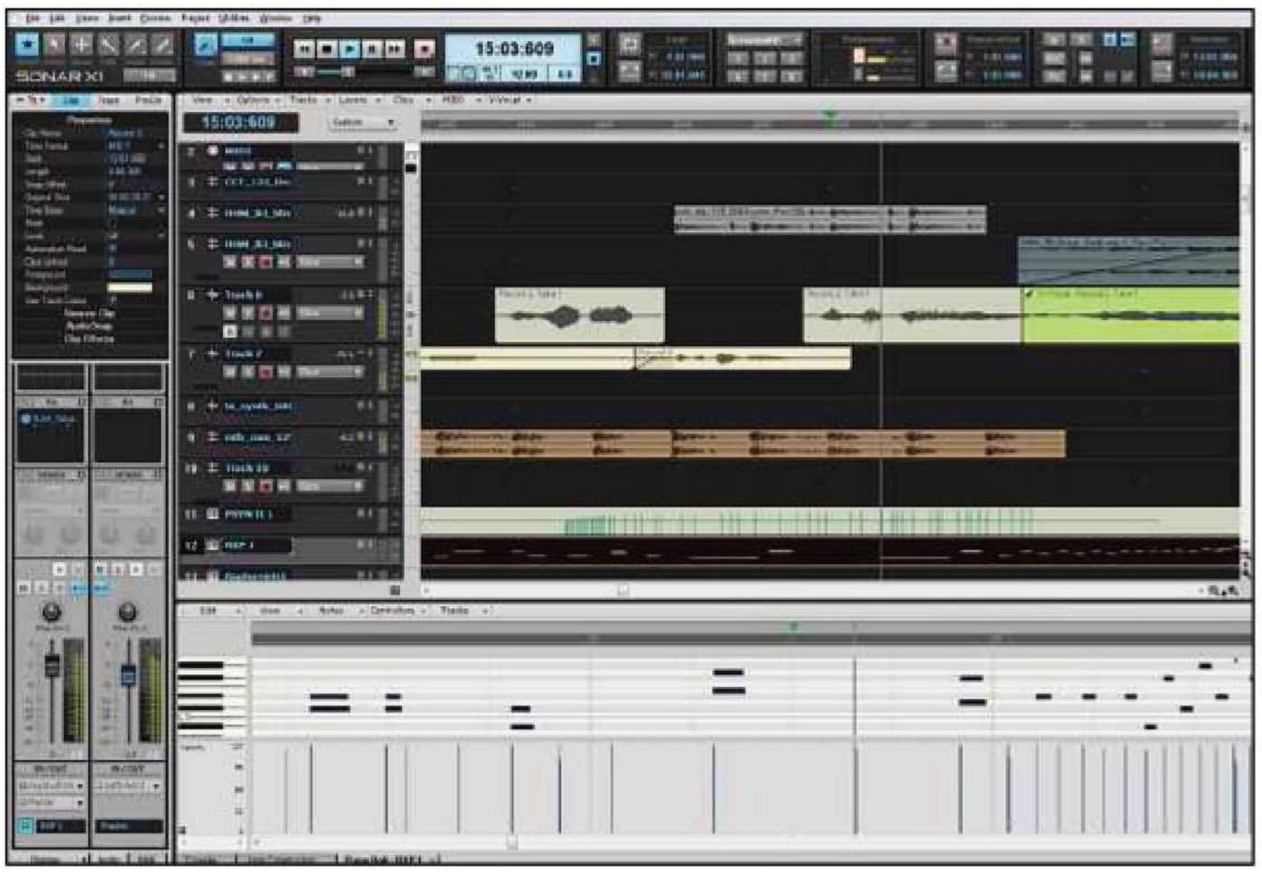
Beyond that, Canonical has merely tweaked the bundled software. OpenOffice.org has been ditched in favour of LibreOffice – but since the latter suite is a recent spin-off of the former, the differences are minor. The default music player has changed too, from Rhythmbox to Banshee, which again offers similar features but in a cleaner interface.

Of course, you can install whichever players, browsers and so forth you prefer from the Software Centre application. Here, though, you run into Ubuntu's one enduring weakness: its software library remains a bewildering hotchpotch, with minimal consistency and quality control. Factor in the lack of industry-standard tools such as Outlook, Excel, Photoshop or Final Cut, and it's clear that, for many purposes, sticking to Windows or OS X will give you an easier ride.

For those who are happy in Linux world, however, Ubuntu 11.04 is the most exciting release in ages. Unity is a breath of fresh air, and its improved performance is a godsend for netbooks. Users of older releases will want to upgrade right away – check the website for incompatible software or hardware, then enter "update-manager -d" at the Terminal to perform an in-place upgrade. And for Linux virgins, the new interface makes it more tempting than ever to take Ubuntu for a test drive. **DARIEN GRAHAM-SMITH**

EASE OF USE	★★★★½
FEATURES	★★★★½
VALUE FOR MONEY	★★★★★
OVERALL	★★★★½

www.downmagaz.com



Cakewalk Sonar X1 Producer

The redesigned interface could go further, but the volume of effects, instruments and tools can't be beaten at this price

Some software is so mature and refined that it's difficult for developers to convince users to upgrade. Not so for music production software, though. Recording musicians and engineers seem to have an insatiable desire for high-tech tools that push their productions into new territory.

Cakewalk Sonar has often risen to this challenge, but as the features have mounted, so too have the number of buttons, menus and right-click commands. The result is that Sonar has had a steeper learning curve than its rivals.

Sonar X1 aims to address this with a new interface, dubbed Skylight. Its tabbed panels make more efficient use of the screen than the floating windows of old, and much of the onscreen clutter has been reworked into a more approachable Control Bar. A new Smart Tool uses context-sensitive commands to reduce the amount of tool-switching required.

The revised Browser window is docked on the right and gives access to media, along with plugins that are available or in use. We appreciate the ability to jump directly to the various bundled media libraries, and also to audition REX loops at the project tempo. Drag and drop is more comprehensive, but it still can't match the intelligence of Ableton Live (web ID: 257713) for anticipating users' intentions.

ProChannel's trio of effects makes this the best-sounding recording application in its class.

A MultiDock window at the bottom houses the mixer and the various audio and MIDI editors. It certainly makes Sonar look tidier than before, but it's a shame these haven't been optimised to fit into a narrow strip.

The Inspector panel on the left of the screen houses another impressive new feature in Sonar X1: the ProChannel. This is essentially a combination of compression, EQ and tube saturation effects, but the quality of each one is a step up from the effects bundled with competing packages.

The compressor has two modes. One is modelled on the classic Urei 1176 hardware compressor with its distinctive presence and gutsy punch; the other is based on an SSL 4000 Series bus compressor with a smoother response that's better suited to treating submixes. The six-band EQ has three modes – Pure, Vintage and Smooth – but they share the same controls, making it easy to switch between them and assess their subtly different tones.

The new docked-panel approach is a big improvement, but individual panels can still feel cramped – even on a large monitor.

MUSIC PRODUCTION

PRICE
£264 (£317 inc VAT)

UPGRADE
£92 (£110 inc VAT)

SUPPLIER
www.dv247.com

INTERNET
www.cakewalk.com

It's not only the rich, musical sound quality of the ProChannel effects that make it so welcome. It's also the fact that it's plumbed into every channel in the mixer by default, speeding up the time it takes to get a mix up and running. Our one quibble is that it can only be positioned before or after other effects in a chain and not in the middle. Having an option to load it as a normal plugin would make it more versatile.

It's not easy reinventing a user interface without alienating existing users, but there's a lot here that should feel familiar. Despite the raft of interface changes, however, we still encountered various niggles.

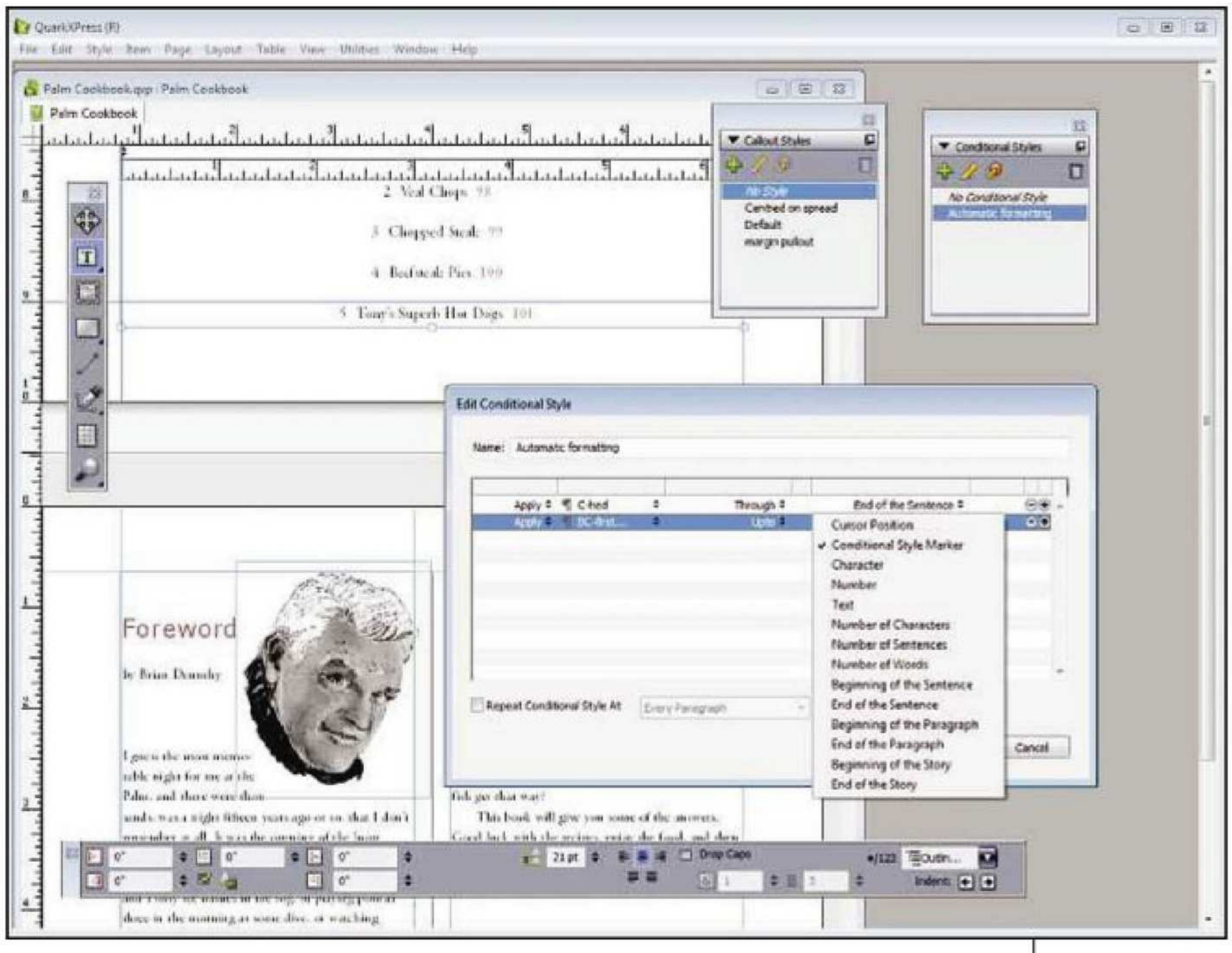
Dragging to select multiple objects sometimes produced unexpected behaviour, and adjusting their fade lengths together also caused problems. Opening a MIDI piano roll editor usually just revealed blank space, leaving us to scroll around to find the notes. Preset management for the supplied virtual instruments is untidy, with redundant controls that suggest there are no presets available at all. The metronome can also be toggled on and off only when playback is stopped. Long-standing Sonar users may be immune to these issues, but they reveal a lack of attention to detail next to Steinberg Cubase (web ID: 366139) or Ableton Live.

Where Sonar wins hands down, however, is value. The flagship X1 Producer costs around £150 less than Cubase 6, yet the quality and quantity of its bundled effects and instruments are notably superior. Ableton Live costs £300 inc VAT, but a fairer comparison is Ableton Suite with its bundled instruments, which costs £500. Those who don't need X1 Producer's extensive plugin bundle should consider Sonar X1 Studio, which costs only £169. Visit **www.pcpro.co.uk/links/X1comparison** to see the full comparison chart.

All in all, we still prefer Cubase 6 for its more elegant editing tools, but Sonar X1 Producer is a viable alternative for those who need a cost-effective package they're unlikely to grow out of. **BEN PITT**

REQUIREMENTS
Windows XP SP3 (32-bit only), Vista SP2 or 7

EASE OF USE	★★★☆☆☆
FEATURES	★★★★★★
VALUE FOR MONEY	★★★★★★
OVERALL	★★★★★☆



QuarkXPress 9

Improved styling and design automation, plus iPad output give QuarkXPress 9 a new lease of life; but there are snags

Only ten years ago, QuarkXPress dominated the professional publishing industry. However, Quark seemed more interested in electronic publishing than in print, and allowed Adobe InDesign to seize its market.

Now, with the advent of the tablet, the age of rich digital publishing has truly arrived, and Quark is determined its flagship package should reclaim its crown.

Core improvements

This time, Quark hasn't forgotten its print-based bread-and-butter. The core market for QuarkXPress has always been high-end publishing houses producing regular publications, and here the efficiency, productivity and consistency offered by style-based handling are key. In version 9 that's been improved, with much greater control over how stylesheets are applied so that, for example, you can now preserve local overrides or remove them.

More usefully, you can also automatically apply the next style in a predefined list. This option is useful for applying multiple styles – a heading followed by an introductory paragraph, followed by body text, for example.

QuarkXPress 9's new Conditional Styles let you take the idea further, offering more advanced control. You can, for example, use the tool to apply an introductory paragraph style, set its first sentence to small caps, go to the end of the story then back to the last tab, and then apply a byline character style from there to the end of the paragraph. Conditional styles are a bit of an effort to set up, but will help automate regular design workflows.

Another major boost to efficiency and consistency comes with QuarkXPress 9's style-based handling of bullets, numbering and outlines. These let you specify factors such as character formatting, the type of numbering, and distance from the following text. Outline styles are particularly powerful as they let you define up to nine indent levels, each with its own numbering style. Crucially, the new styles and indents can be applied directly, much as you'd use them in Word.

Handling of tables, which is useful for managing longer lists, has also seen an overhaul, with the old fixed-grid limitation consigned to history. Now, you can flow anchored tables across multiple pages, complete with repeating header and footer rows. You can also import tables from Excel in the latest XLSX format.

Callout Styles, meanwhile, allow you to finely control how callout boxes are aligned. This new tool allows you to align a box not just to its anchor, but to its containing paragraph, box, cell, page or spread. This allows you to create a whole host of important design effects such as graphical icons or explanatory notes that float next to the text.

↑ QuarkXPress 9 offers design-rich automation through features such as Outline, Callout and Conditional styles.

Added power

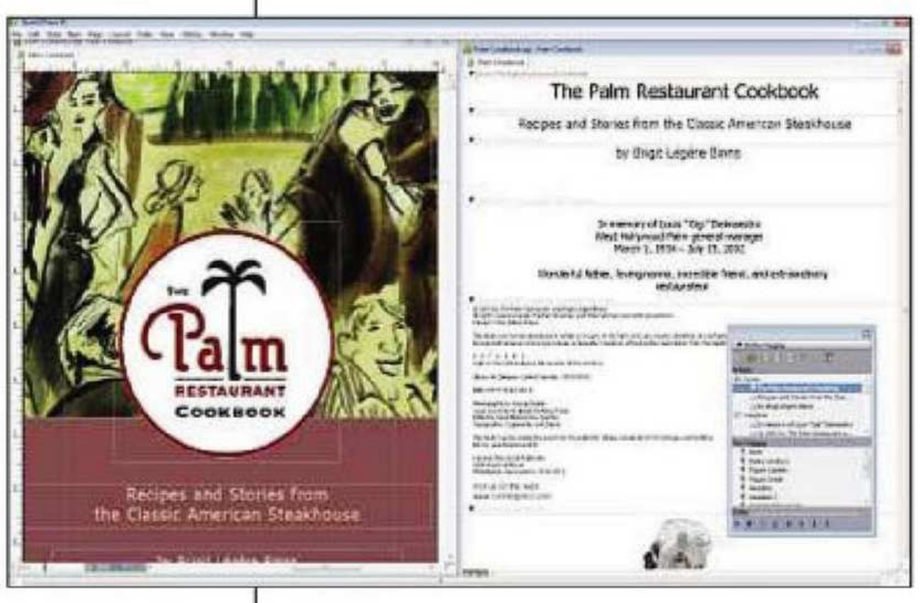
QuarkXPress plugs another significant hole with the introduction of a Story Editor. This lets you view the copy of your current story in a word-processor-like view, away from the distractions of the current layout and typographic formatting. With all overset text indicated by a red background, it's much easier to cut your copy to fit the layout, but the lack of a live word count and spell-checker are disappointing.

The Linkster XTension helps you divide text in linked boxes into separate stories. Previously this could cause reflow problems, but now you can select a box in the middle of a flow and split the story before, after or both, and even relink the two surrounding stories in the process. You can also quickly link multiple boxes to create a new story flow.

Another addition is the Cloner, which is primarily used to copy selected items or pages to new locations within the current publication. More advanced capabilities here include the ability to clone items or pages to new or existing layouts and publications.

The last two new tools include the ImageGrid dialog, which enables advanced grid-style picture layouts, and ShapeMaker. The former lets you create galleries quickly and easily: set how many rows and columns you want, how images should be sized and fitted, and whether titles should be added, then pick a folder of images to create your gallery.

↓ The key to successful eBook publishing is tagging within the new Reflow View.



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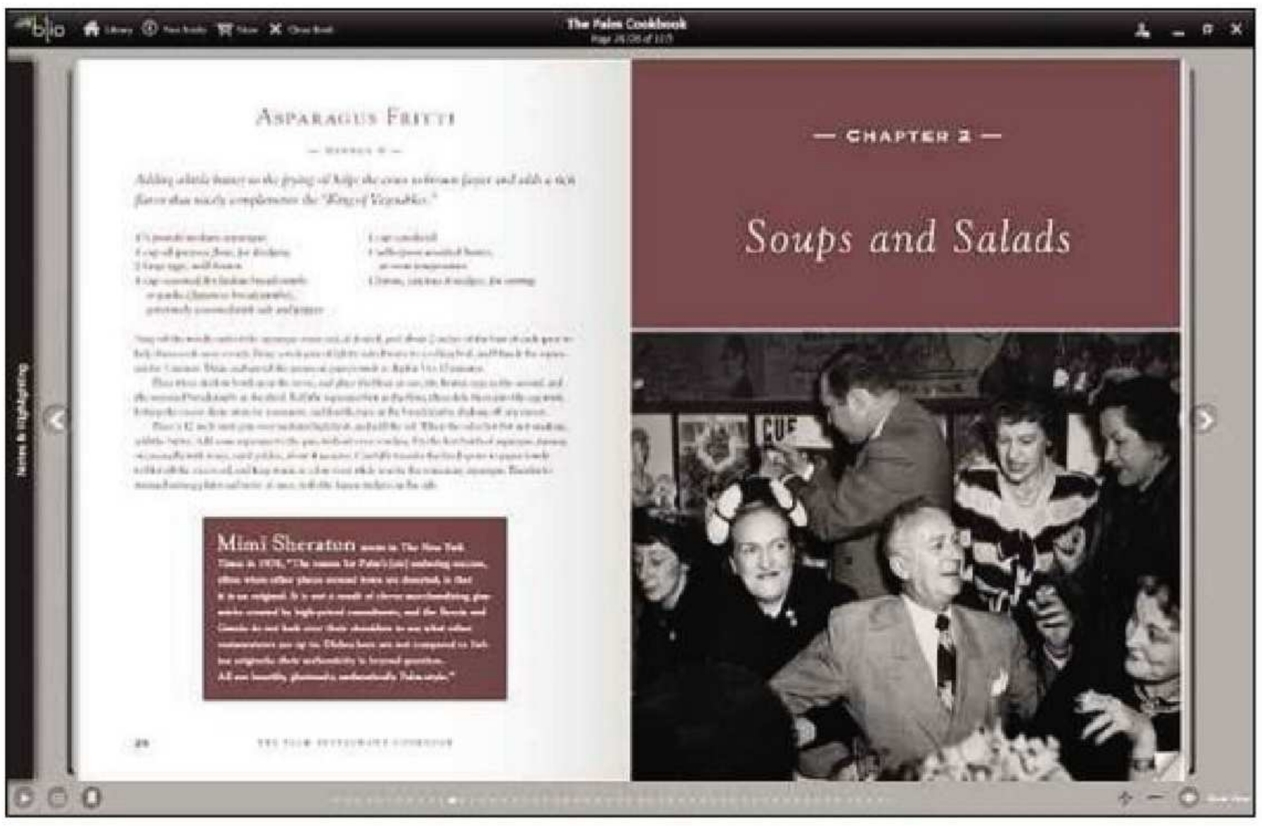

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PRICE
£779 (£935 inc VAT)

UPGRADE
£279 (£335 inc VAT)

SUPPLIER
Via Quark website

INTERNET
www.quark.com

ShapeMaker, meanwhile, quickly creates a wide range of regular and irregular shapes and saves them as reusable presets. The real power of this feature is that you're not limited to outputting your shapes as graphics, but can instead output them as rules, text paths or as text and picture boxes. The number of possible uses – star-shaped image masks, spiral text-on-a-path, undulating textboxes – is extraordinary, and should help users make their work more eye-catching.

Digital publishing

All these new capabilities are welcome, but QuarkXPress 9's main selling point is undoubtedly its ability to output for smartphones and tablets. Tablets are particularly suited to reading, and with users crying out for content, the potential is enormous. It's a watershed moment and Quark has come up with a suitable slogan: Digital Publishing 2.0.

That may sound modern and exciting, but the first of QuarkXPress 9's three new publishing options – support for the ePub format – is anything but glamorous. Essentially, you design your rich layouts as normal, then select text and picture boxes and add them to the Reflow View. Switch to this and you'll now see your content entirely stripped of all the layout and formatting that you've worked so hard to apply.

Using the new Reflow Tagging panel, you then go through your unformatted text applying a few set tags with preset formatting to indicate headings and captions, and to control the size of images. Add some metadata to describe what your eBook is about, ensure that your articles are in the right order for the optional Table of Contents, and you're ready to publish. The resulting ePub file isn't exactly design-rich, but it's fully accessible and pretty much universal. The ePub format can be viewed on smartphones, the iPad and Sony Reader devices, and you can submit it to Amazon for publishing to the Kindle.

Potentially more interesting for the professional designer is QuarkXPress 9's support for Blio – a richer eBook platform that encompasses a reader application, online store and alternative file format, and supports colour and more advanced layout features.

To set up your Blio publication you again produce your print design, then rework it using the basic tools in QuarkXPress 9's Reflow View. Unlike the ePub version, however, your rich page-based design is also exported via XPS. Readers can switch between the two views in the free Blio eBook reader.

There's also the option to take your Blio eBook beyond the traditional flat page. An interactivity panel lets you add support for simple slideshows, MP4 video and embedded HTML. The result is a more involving, dynamic publication.

iPad output

Blio promises great things but, for the moment, it's only a promise. Its all-important reader application is currently available only for Windows, with Android support due in a few months and Windows Phone 7 and iOS support at an unspecified later date.

What the core QuarkXPress userbase of major publishers is really crying out for is the ability to deliver rich, branded content to the all-important iPad, as it's here the real money lies.

This is exactly what Quark promises with App Studio. This will let users create the same mix of reflowable and rich design as they can for Blio, but with the result wrapped up in a native, standalone iPad app. Crucially, this app can hold multiple titles, each of which can contain multiple "issues", with new issues served up to the app via a web-based service hosted on the publisher's own website. In other words, App Studio will enable publishers to deliver subscription-based iPad magazines with downloads and purchases all handled directly within the app.

It sounds ideal, especially with Android support promised for later in the year. However, there's a snag: QuarkXPress 9 doesn't actually include the App Studio; instead, it's promised as a free upgrade "within 90 days". After so many years, waiting a couple of extra months to finally get your hands on a way to make real money from electronic publishing might sound a minor inconvenience. However, there's at least one good reason for Quark to put some distance between the launch of QuarkXPress 9 and its major attraction.

Previously, with its PDF, HTML and Flash-based delivery, the unspoken assumption was that rich electronic publishing would effectively be free for the publisher. In fact, this isn't going to be the case. As soon as you come to publish your app you'll have to pay Quark a fee, starting at £218 for a single issue. In addition, to access the App Store, you have to take account of Apple's 30% commission.

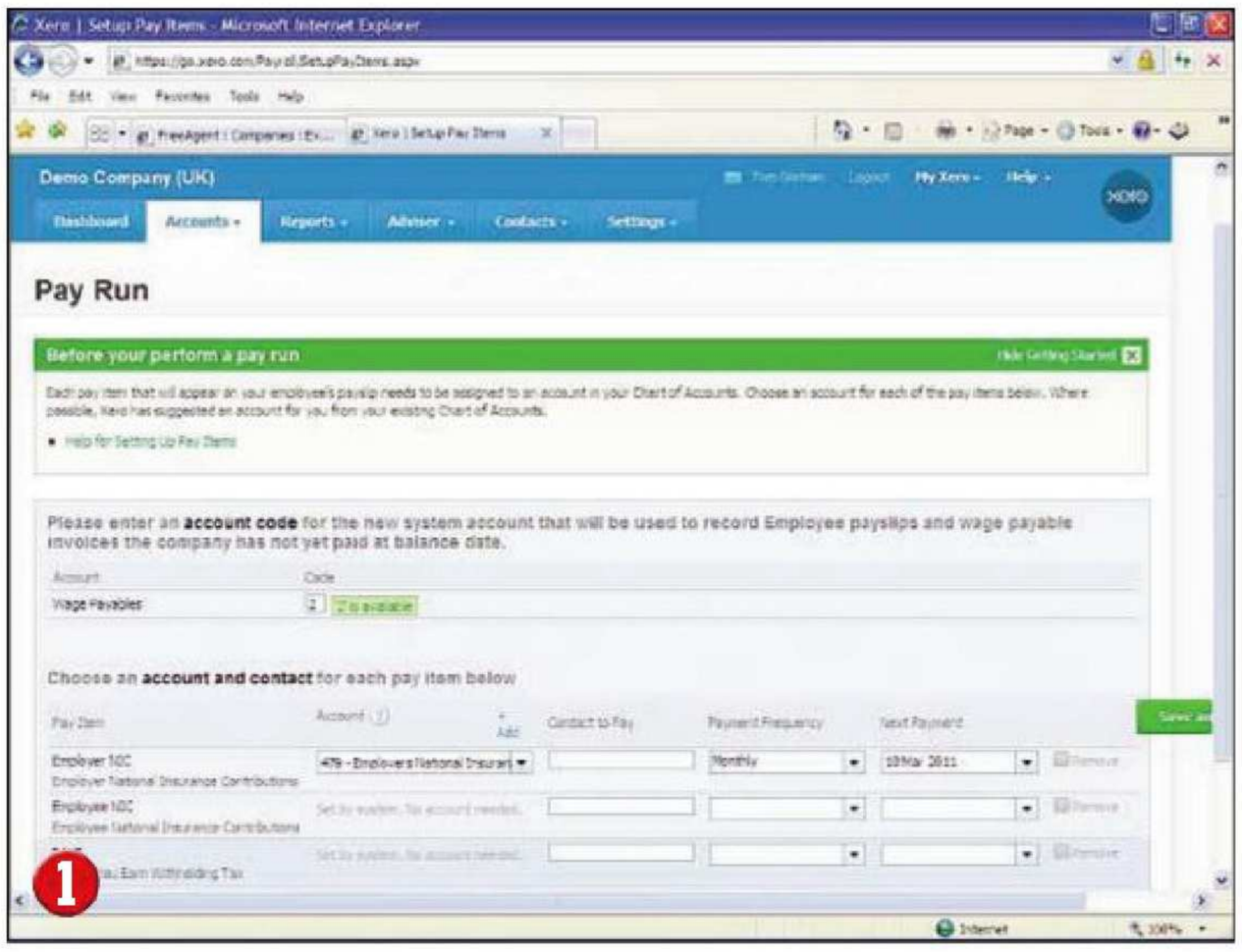
Verdict

This will certainly come as a shock but, on reflection, most publishers will accept it – after all, 70% of something is better than 100% of nothing. And since the initial £218 issue cost is relatively low (for the big publishing houses, at least), QuarkXPress 9 looks to be a key release that promises to open up a crucial new market, which may yet prove as significant as print.

If QuarkXPress 9 was the only publishing application able to break the iPad app market, this would almost certainly help restore its former dominance. However, with Adobe promising similar features for InDesign, it may be wise to wait and see how the two approaches compare before committing yourself either way. **TOM ARAH**

REQUIREMENTS
Windows 7/Vista/XP

EASE OF USE	★★★★★☆
FEATURES	★★★★★☆
VALUE FOR MONEY	★★★★☆☆
OVERALL	★★★★★☆



Web-based accounts

Online services are taking over from desktop software. We test three of the best offerings

It was once widely accepted that the choice of accounts software for a small business was simple: Sage or QuickBooks. But the hegemony of these leading desktop applications is now being challenged by a new generation of web-based software.

From the off, web-based accounting services have several advantages over their desktop counterparts. With access wherever you have a web browser, it's easier to keep on top of your numbers, you're no longer hostage to software on a single desktop PC, and it's easier to allow access to your accountant.

If a historical downside of web-based software has been a relative lack of high-end features, that too no longer holds true. Features such as online bank integration, payroll and stock control are no longer limited to desktop applications. In fact, several online tools come with APIs that enable third-party tools to provide additional features.

1 Xero

Hailing from New Zealand, Xero has made a seamless transition to these shores, with support for UK VAT, tax and now even UK payroll facilities. As is common with most online applications, its main Dashboard provides an overview of your financial position, showing bank balances, unreconciled amounts and cash flow.

Xero will quickly import downloaded bank statements, and its bank reconciliation feature does an impressive job of matching invoices you have created against entries in the bank statement. You can also create rules that automatically allocate entries to accounts based on conditions such as payee, description or amount.

Xero is also the only one of these three online applications to support automatic feeds that import data directly from your bank. Currently, only HSBC is a direct partner, but others can be linked via Yodlee, a third-party online banking solution provider. This automatically connects to your banking site and transfers statements securely to your Xero account daily. Coupled with semi-automatic reconciliation, it gives a near real-time view of your finances.

Xero's invoicing capabilities are decent. Even if it lacks KashFlow's stock control features, it does have an inventory list, where you can create items, assign a purchase and sale price to them, and add these to invoices through a dropdown menu. Oddly, you can't prepare quotes and convert them to invoices, nor can you automatically issue payment reminders to customers.

Xero has just introduced an integrated payroll module with a batch payment function. You can set up multiple users with separate permissions levels, so access to payroll functions can be limited to Payroll Admin users while still allowing others to generate invoices.

Xero lacks the sort of estimating, project management and time-billing tools that come with FreeAgent; instead, it offers an open API that allows third-party plugins to fill these gaps.

There's a lengthy list of reports, including support for all VAT accounting schemes; others track planned expenditure and income and compare them to actual results. As well as printing or emailing reports, you can store a report permanently within the application, making it easy to refer to past reports quickly.

Xero boasts similar security and backup arrangements to the others, and most data and accounts can be exported in CSV format. Xero comes in three flavours – the dearest supports multiple currencies, while the cheapest restricts the number of invoices you can post, but there isn't much functional difference between them.

Xero offers powerful payroll features.

XERO
PRICE
£12-£24 per month (£14-£29 inc VAT)
INTERNET
www.xero.com

KASHFLOW
PRICE
£16 per month (£19 inc VAT)
INTERNET
www.kashflow.com

FREEAGENT
PRICE
From £15 per month (£18 inc VAT); £150 per year (£180 inc VAT)
INTERNET
www.freeagentcentral.com

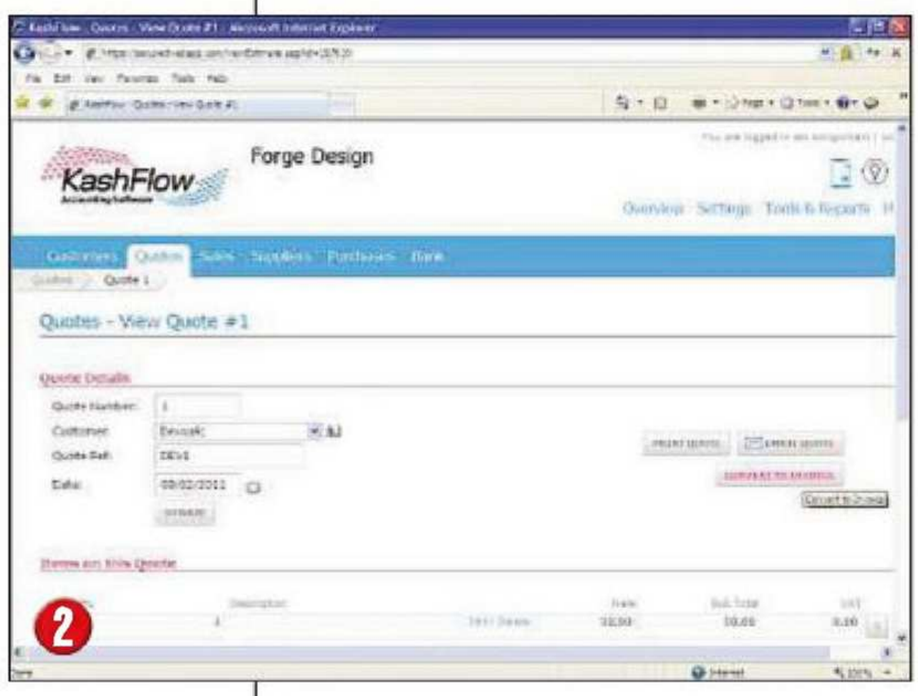
2 KashFlow

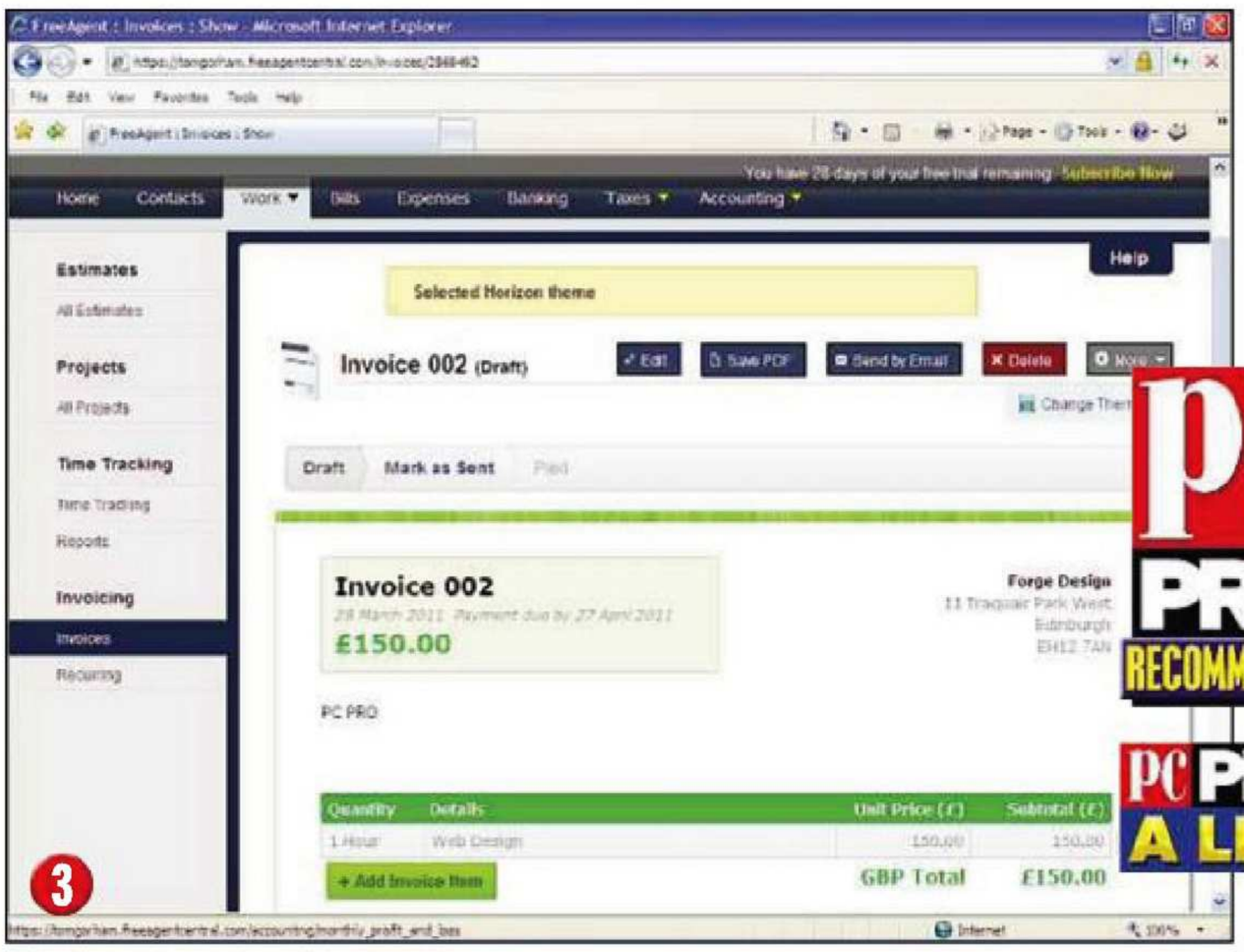
KashFlow's Dashboard may not be as polished as Xero's, but its information is presented clearly, with historical balance and sales charts as well as quick links to important sections of the business.

There's a huge list of reports and tools, some of which are displayed in the browser, while others open in a spreadsheet. There are some surprises hidden among them, including one that produces the figures needed to complete a self-assessment form, and another that generates a business "health check" score, with suggestions on how to improve.

As you'd expect, VAT is handled for both cash accounting and flat-rate schemes, but KashFlow's selling point is direct VAT filing. You run the VAT report, enter your HMRC online filing credentials and submit. Given how much of a chore

KashFlow lets you create quotes and turn them into invoices at the press of a button.





FreeAgent's good-looking invoices can be easily customised.

many small businesses find submitting returns, the ability to do so without leaving KashFlow is a major strength.

KashFlow is an impressive invoicing tool. You can quickly create quotes and turn them into invoices through a single button link. Invoices are delivered as HTML or plain text, with PDF attachments, to which you can add text tags to hold variable data.

For many users, KashFlow's most tempting feature will be its unparalleled integration with a variety of payment card processors, including SagePay and Barclaycard. These allow you to update your accounts with payment information automatically. As with Xero you can set up automatic billing and payments, but you can also schedule reminders by email when an invoice or payment is overdue.

Another feature unique to KashFlow is stock management. It's basic, but functional: you enter the number of items in stock, and that decreases when you issue an invoice containing that item. You can also set a value at which you'd like to be warned about low stock.

KashFlow doesn't provide a payroll feature directly, but it can fall back on its well-used API for plugins to address such gaps, and it does work with several third-party payroll tools.

A real drawback for some, however, will be limited support for multiple users. While KashFlow allows for multiple concurrent users, you can't allocate them different passwords or permission levels, as you can with Xero or FreeAgent.

For those worried about relying on a web-based accounting system, KashFlow – which claims its level of security is comparable to that of online banks – offers a range of import and export options. All reports can be exported to CSV format, and you can also set up a backup schedule that automatically emails all your data to you in spreadsheet format at defined intervals.

3 FreeAgent

If you fall into that broad category of small-business owner or sole trader who lacks accounting experience, you're the target market for FreeAgent. The program employs a simple interface and everyday language throughout, so rather than entering Accounts Receivable or Accounts Payable as you do in Xero, transactions in FreeAgent are gathered under more prosaic headings, such as Work and Expenses.

As with the other applications, FreeAgent's overview window gives a snapshot of important financial information, with tricks of its own – including a useful tax timeline showing upcoming deadlines. FreeAgent also lets you reorganise overview modules by dragging them around.

It's fully multi-user. As in Xero, each user can have separate logins and passwords, and one of three roles. In another nod to ease of use, permissions are adjusted with a simple slider rather than a row of checkboxes.

FreeAgent is particularly suited to freelancers or contractors. You can organise expenses or income by project, and establish a budget for each to measure their profitability. But multi-user support, together with a time tracking feature, also makes FreeAgent an excellent project management tool for remote workers. Each user can log in and manage their own timesheets, while the project manager retains an overview of the entire project.

FreeAgent offers payroll features (employees are set up as users with no permissions to view or edit financial settings), but it lacks stock control. At least it does have a basic price list feature comparable to Xero's inventory list, which lets you store items that can be added to quotes or invoices.

Nor does FreeAgent offer automatic bank feeds as Xero does, but its bank reconciliation tools are nearly as good. It makes a good job of tracking previously matched transactions and attempting to match similar transactions as they're subsequently imported.

FreeAgent's range of reports isn't as extensive as Xero's or KashFlow's, but the main ones – trial balance, VAT, profit and loss, and journal entries – are here. In another nod to the freelancer, there's a one-click report that creates a self-assessment summary for income tax purposes, the details of which you can copy to your tax return.

Invoices can be created from estimates, and can be sent by PDF and email, and you can add tags to insert variable data into the text of the latter. Of the three applications we looked at, FreeAgent provides the best-looking templates to build your invoices from, and if you're creative and have an understanding of HTML and CSS, it's easy to create your own.

A final handy extra is that you can create customisable payment reminders at set dates after invoice due dates, although, disappointingly, you can't accept electronic payments other than PayPal, which may rule it out for larger businesses.

PC PRO RECOMMENDED

PC PRO A LIST

XERO
EASE OF USE ★★★★☆
FEATURES ★★★★★☆
VALUE FOR MONEY ★★★★☆
OVERALL ★★★★☆

KASHFLOW
EASE OF USE ★★★★☆
FEATURES ★★★★★☆
VALUE FOR MONEY ★★★★☆
OVERALL ★★★★☆

FREEAGENT
EASE OF USE ★★★★★★
FEATURES ★★★★★☆
VALUE FOR MONEY ★★★★★☆
OVERALL ★★★★★☆

Which to buy?

The days of the desktop application as the default choice for accounting systems are drawing to a close. Given their relatively inexpensive running costs, we'd recommend any of these online services above a traditional budget or mid-range desktop accounting program.

The multi-user and payroll features of Xero make it a tempting choice for the larger business, while KashFlow's stock control features will be attractive to stock-based business. But of the three, we found FreeAgent the easiest to use, and at a very reasonable price. If you're a contractor or freelancer, its time-tracking and project management tools make it easy to recommend. TOM GORHAM

SATNAV SUPERTEST

STANDALONES TAKE ON SMARTPHONE APPS IN OUR HUGE 16-SATNAV SHOOTOUT. YOU'LL BE LOST WITHOUT IT

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Photography intro: Danny Bird

It's received wisdom these days that the standalone satnav is dead. With smartphone navigation now free across all Android phones and costing a few pounds on the iPhone, it's hard not to get swept up in the hype about phones rendering satnavs obsolete.

We're not convinced, though, which is why we've set up this month's Labs. We've gathered eight standalone satnavs and pitched them against eight smartphone apps to find out which works best, and we've left no stone unturned. From the most expensive connected TomToms to free options for Android and the iPhone, we've subjected each one to the same phalanx of tests and chosen our favourites across a range of platforms.

Buying a satnav is no longer the simple task it once was, so read on and let us ease the job of choosing one.

Buyer's guide

Plus, how we test

Choosing a satnav is a complex task. As well as a wide range of standalone devices, there's a whole rash of apps on a variety of platforms. You now have live, internet-based services and traffic to consider as well.

All satnavs, however cheap or lacking in features, will eventually get you to your destination. There are huge differences in how efficiently they carry out that task, however, and in the costs involved in updating maps and subscribing to the services they provide.

Map updates and live services

The cost of a satnav isn't only about the initial purchase: the price of updating the maps varies wildly. Most smartphone apps offer free lifetime updates, whereas with standalones you're charged a fee. Garmin offers lifetime European map updates for £75; TomTom charges £20 per year; and Navigon charges £80 for two years of European updates unless you subscribe in the first 30 days, in which case you get 80% off.

It's a similar story with traffic and live services. Some standalones include GPRS data connectivity, so they can use Google search, download traffic data, and look up other information such as airport arrivals and departures. This service is usually free for a certain period, after which you have to pay.

For smartphone apps, some live services are free, as you're not paying for a separate data connection. Anything you do have to pay for is usually mentioned upfront.

It's a confusing situation, so we've detailed the options in the table below and factored the prices into our Value for Money rating.

RATINGS EXPLAINED

The star ratings we award each product reflects its strengths and weaknesses relative to other products on test, and to advertised capabilities. A low score doesn't mean a product is useless, just that it doesn't fully meet our expectations. Similarly, a six-star score may not indicate perfection.

Routing

You'd think route calculation would be standard, but this isn't the case. Most satnavs operate in a similar way, working out routes according to a given profile: the fastest, most ecologically efficient and shortest routes are usually among your options (we tested using the "fast" option). The optimal route is usually calculated using estimated speeds on different types of roads.

However, not all give the same weighting to the different road types, so different satnavs deliver different route choices. The TomToms and Mios apply real-world historic road-speed data to improve decisions. The Navigons offer the user three different route choices so you can weed out any obviously bad ones at source. CoPilot 8, meanwhile, lets you tweak the weightings yourself.

Our performance ratings on each review take this into account, along with the quality and timing of voice instructions, the clarity of maps, and efficacy of traffic services to give you an overall appraisal of how well each satnav does its job.

How we test

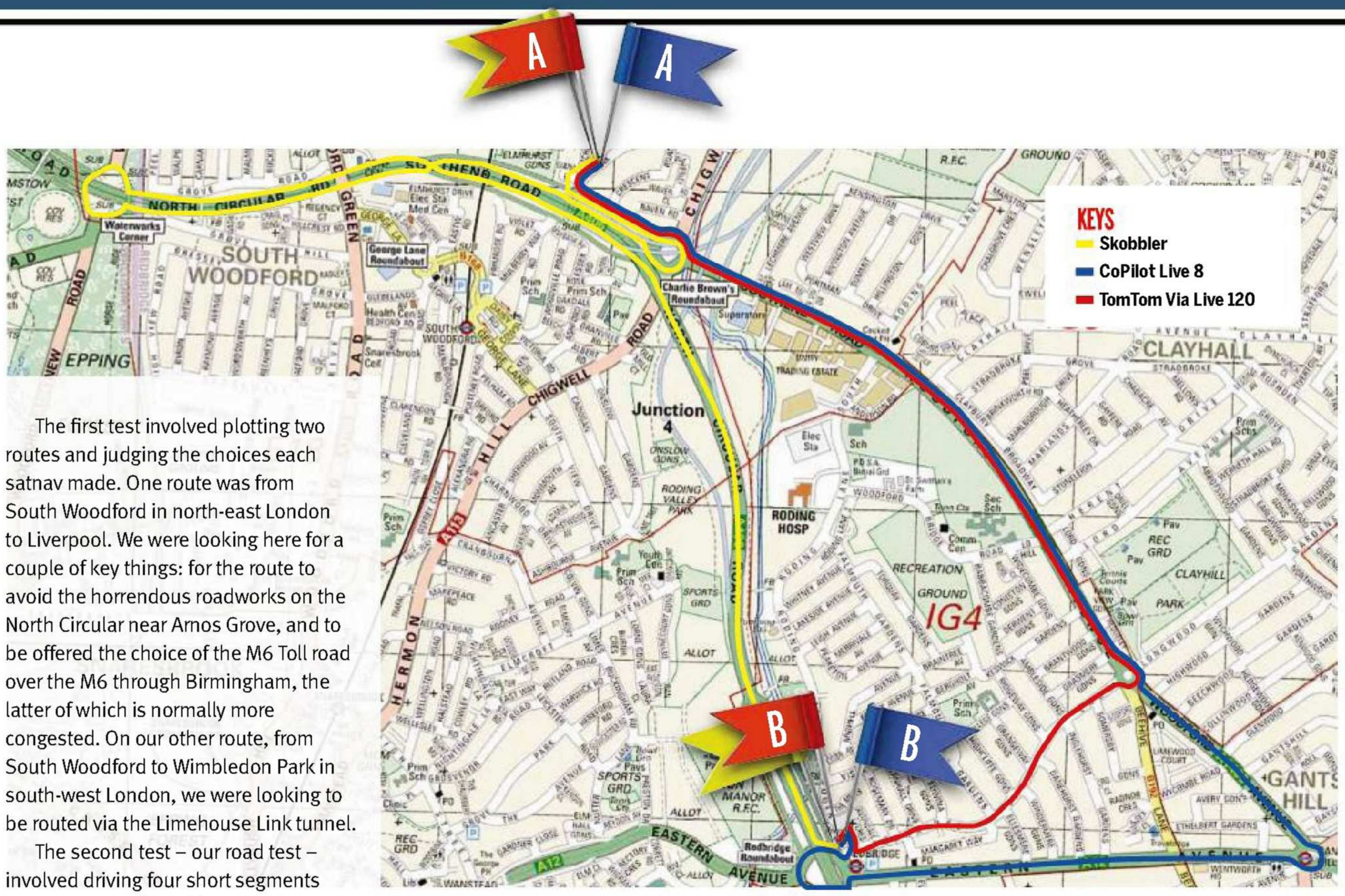
We used each satnav for as much real-world driving as time allowed, and handed them out to various members of the *PC Pro* staff to test. But we also carried out a number of set tests to see how they compared, and factored this into the Performance score.

FEATURE TABLE Standalone satnavs

	Garmin nuLink 1695	Garmin nuvi 3790T	Mio Navman Spirit 500 HF Traffic	Mio Navman Spirit V575 TV	Navigon 40 Premium	Navigon 70 Premium Live	TomTom Go Live 1005	TomTom Via Live 120
OVERALL RATING	★★★★★☆	★★★★☆☆	★★☆☆☆☆	★★★★☆☆	★★★★☆☆	★★★★☆☆	★★★★★☆	★★★★★★
Part code	010-00912-10	010-00858-31	526217300223	526217550142	B09021625	B90021875	1CQ0.002.08	1EJ4.002.04
Price (inc VAT), Western Europe maps	£173 (£208)	£188 (£226)	£71 (£85)	£165 (£198)	£83 (£100)	£200 (£240)	£191 (£229)	£146 (£175)
Price (inc VAT), UK & ROI maps	N/A	N/A	N/A	N/A	N/A	N/A	N/A	£133 (£160)
Supplier	www.amazon.co.uk	www.amazon.co.uk	www.lemon-digital.co.uk	www.pixmania.co.uk	www.halfords.com	www.expansys.com	www.dixons.co.uk	www.halfords.com
Manufacturer's website	www.garmin.co.uk	www.garmin.co.uk	www.mio.com	www.mio.com	www.navigon.com	www.navigon.com	www.tomtom.com	www.tomtom.com
Dimensions (WDH)	140 x 86 x 18mm	122 x 8.9 x 75mm	175 x 14 x 85mm	145 x 16 x 87mm	121 x 76 x 15mm	137 x 83 x 15mm	143 x 19 x 88mm	119 x 80 x 25mm
Warranty	1yr RTB	1yr RTB	1yr RTB	1yr RTB	1yr RTB	1yr RTB	1yr RTB	1yr RTB
HARDWARE								
Screen size	5in	4.3in	4.7in	4.7in	4.3in	5in	5in	4.3in
Screen resolution	480 x 272	800 x 480	480 x 272	480 x 272	480 x 272	480 x 272	480 x 272	480 x 272
GPS receiver make and model	Not stated	Not stated	SiRFstar III with InstantFix II	SiRF prima with InstantFix II	SiRF Atlas V	ST-AGPS	Not stated	Not stated
Memory card slot	●	○	●	●	●	●	○	●
Bluetooth	●	●	●	○	●	●	●	●
MAPPING, SERVICES AND SOFTWARE								
Map data provider	Navteq	Navteq	Tele Atlas	Tele Atlas	Navteq	Navteq	Tele Atlas	Tele Atlas
Map update details and price (inc VAT)	£63 (£75), lifetime European updates	£63 (£75), lifetime European updates	£42 (£50), one-time European update; £33 (£40) UK update	£42 (£50), one-time European update; £33 (£40) UK update	£13 (£16) for 2yrs European updates using 30-day voucher; otherwise £67 (£80)	£13 (£16) for 2yrs European updates using 30-day voucher; otherwise £67 (£80)	£17 (£20) for 1yr	£17 (£20) for 1yr
Internet connectivity/ live services	●	○	○	○	○	●	●	●
Live services subscription prices	1yr free, then £38 (£45) per year	N/A	N/A	N/A	N/A	15mths free, then £33 (£40) per year	1yr free, then £40 (£48) per year	1yr free, then £40 (£48) per year
Traffic information delivery method	Via GPRS	Via TMC RDS	Via TMC RDS	Via TMC RDS	Via TMC RDS	Via GPRS	Via GPRS	Via GPRS
Speed-camera warnings	●	●	●	●	●	●	●	●
Speed camera warnings, type	Stationary and mobile	Stationary and mobile	Stationary	Stationary	Stationary	Stationary	Stationary and mobile	Stationary and mobile
IQ Routes or similar	●	●	●	●	○	○	●	●
PC software	None	None	MioMore desktop 2 software	Mio Spirit V-Series	None	None	MyTomTom	MyTomTom

Key: ● Yes ○ No

www.downmagaz.com



The first test involved plotting two routes and judging the choices each satnav made. One route was from South Woodford in north-east London to Liverpool. We were looking here for a couple of key things: for the route to avoid the horrendous roadworks on the North Circular near Arnos Grove, and to be offered the choice of the M6 Toll road over the M6 through Birmingham, the latter of which is normally more congested. On our other route, from South Woodford to Wimbledon Park in south-west London, we were looking to be routed via the Limehouse Link tunnel.

The second test – our road test – involved driving four short segments between pre-selected locations in a suburb of north-east London, taking in motorways, A-roads, residential streets and country roads. We use this test to judge the quality of the routes once again, but also to evaluate each satnav's traffic system, mapping, safety camera data, and the quality and timing of audio instructions.

↑ Given the same destination in our tests, different satnavs picked different routes.

Overall

The Overall score is an average of the Performance, Features & Design and Value for Money scores.

FEATURE TABLE Satnav apps

CoPilot Live 8	Google Maps Navigation	Navigon MobileNavigator	Navmii GPS Live UK	Nokia Ovi Maps	Skobbler	Sygic Aura GPS Navigation	TomTom for iPhone
★★★★★☆	★★★★☆☆	★★★☆☆☆	★★★★☆☆	★★★★☆☆	★★☆☆☆☆	★★★☆☆☆	★★★★★☆
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
£32 (£38) iOS; £42 (£50) Android	Free	£58 (£70) iOS; £66 (£79) Android	£2.50 (£3 inc VAT) per country on iOS	Free	Free	From £29 (£35) multi-platform	£44 (£53) iOS
£17 (£20) iOS; £19 (£23) Android	Free	£29 (£35) iOS; £44 (£53) Android	£2.50 (£3 inc VAT) iOS	Free	Free	From £19 (£23) iOS; multi-platform	£42 (£50) iOS
Apple App Store; Android Market	Android Market	Android Market	Apple App Store	Ovi Store	Android Market	Android Market and others	Apple App Store
www.alk.eu.com	www.google.co.uk	www.navigon.com	www.navmii.com	www.nokia.co.uk	www.skobbler.co.uk	www.sygic.com	www.tomtom.com
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Navteq	Tele Atlas	Navteq	AND	Navteq	Open StreetMap	Tele Atlas	Tele Atlas
Free	Free	Free	Free	Free	Free	Free	Free
●	●	●	●	●	●	●	●
Traffic from £8 (£10) per year; fuel and traffic from £17 (£20)	Free	Free	Free (no traffic)	Free	Free (no traffic)	Traffic from £8 (£9)	Traffic £19 (£23)
Via phone's data connection	Via phone's data connection	Via phone's data connection	○	Via phone's data connection	Via phone's data connection	Via phone's data connection	Via phone's data connection
●	○	● (£1.79 extra)	●	●	●	●	●
Stationary	○	Stationary	Stationary	Stationary	Stationary	Stationary and mobile	Stationary and mobile
○	○	○	○	○	○	○	●
○	○	○	○	Nokia Ovi Suite	○	○	○

Garmin nuLink 1695

Very easy to use and chock-full of features, but route selection isn't as good as it could be

PC PRO RECOMMENDED

PRICE
£173 (£208 inc VAT)

SUPPLIER
www.amazon.co.uk

MAPS
Lifetime European updates, £63 (£75 inc VAT)

PERFORMANCE ★★★★☆

FEATURES ★★★★★☆

VALUE FOR MONEY ★★★★★☆

OVERALL ★★★★★☆

Garmin offers a huge range of satnav devices – but oddly, only one with live services onboard: the nuLink 1695. Like both TomTom devices in this Labs, it has a built-in GPRS radio, and offers similar features.

There's Google local search, for when a points of interest search doesn't find what you're looking for. It also provides a more reliable means of receiving traffic data than the FM-based TMC system, and its trafficTrends technology works in a similar way to TomTom's IQ Routes, gathering journey data from other Garmin users to base route choices on. In addition, the nuLink has live airport departure and arrival details, weather, and a Google Latitude-alike service that lets your friends monitor where you are.

The nuLink 1695 also supports Garmin's optional ecoRoute HD dongle *(see p72)*. This plugs into your car's onboard computer via its OBD II port

(a list of compatible vehicles can be found on Garmin's website), allowing you to monitor your fuel efficiency, carry out engine diagnostics, and even tap into real-time information such as coolant temperature and RPM (it varies depending on the vehicle), then present it onscreen in the form of graphical gauges.

In use, the nuLink is a bit hit and miss. The 5in touchscreen is responsive and bigger than many of its rivals. Onscreen buttons are large and easy to press, and navigating around the user interface is straightforward. Audio quality is outstanding, with voice instructions delivered about as loudly and clearly as you could hope for.

Once moving, however, we weren't quite as impressed. Even with the trafficTrends technology, route choices weren't brilliant, with the device directing us through the heart of East London on our cross-London jaunt rather than on the more sensible route down towards the Blackwall Tunnel and through the Limehouse Link.

The timing of voice instructions wasn't ideal, often coming too early. The maps also lack detail, a fact made worse by an odd perspective that means it's difficult to judge the distance to upcoming junctions.

Those negatives undermine what could have been a winning effort from Garmin, especially as the price and map updates are so reasonable. It's a good all-round satnav, but the nuLink 1695 is beaten to the prize by the TomToms.

TomTom Via Live 120

Not the sleekest device, but it gives excellent navigation advice at a reasonable price

PC PRO LABS WINNER

PRICE
£146 (£175 inc VAT)

SUPPLIER
www.halfords.com

MAPS
1yr European updates, £17 (£20 inc VAT)

PERFORMANCE ★★★★★★

FEATURES ★★★★★☆

VALUE FOR MONEY ★★★★★★

OVERALL ★★★★★★

TomTom refreshed its satnav range with a ground-up redesign of its software last year, and to say there were teething troubles would be an understatement. Owners weren't able to update maps until recently, and we've found updating the devices using MyTomTom to be unreliable.

The hardware has remained as strong as ever through that troubled period, though. Once we had our TomToms updated and out on the road, we found nothing else could touch them in terms of getting us to a destination as quickly as possible.

The Via Live 120 is at the bottom end of TomTom's Live range, but aside from a slightly small 4.3in 480 x 272 screen, it isn't lacking in core features. Its live services take in Google local search, so you should be able to find your destination whether or not it's in the device's points of interest database.

It also has IQ Routes, which is a huge benefit if you regularly drive on congested roads. This technology, which calculates routes based on real-world traffic speeds rather than posted speed limits, gives the TomToms (and Mio devices) a huge advantage in route selection.

As we'd hoped, on our South Woodford to Wimbledon Park drive we were directed via the Limehouse Link. On our South Woodford to Liverpool route, the Live 120 selected the M6 Toll and checked if that was okay. In our local driving tests it made sensible, direct choices, avoiding traffic hotspots.

Then there's HD Traffic, which combines information gleaned not only from Trafficmaster, but also real-time position and speed data supplied by other TomTom users, and cell-tower triangulation data from Vodafone mobile phone owners. The result is uncannily accurate traffic detection. Jams are highlighted on the 3D map view, mirroring the situation on the ground almost to the metre, while a bar displays traffic further ahead on your route. When delays mean a faster route is available, it offers to re-route you.

The TomTom Via Live 120 package is rounded off with good core navigational skills – legible maps and loud, clear and timely voice instructions – and a price of only £175 inc VAT for the full European map version. For those reasons, it's our clear Labs Winner this month.

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Garmin nuvi 3790T

It may look good, but uglier satnavs navigate better for less

PRICE £188 (£226 inc VAT)
SUPPLIER www.amazon.co.uk
MAPS Lifetime European updates, £63 (£75 inc VAT)

Garmin claims this little wonder is the thinnest satnav in the world, and we wouldn't contest that. It measures an almost impossible 8.9mm from the front bezel to the rear panel, and looks lovely in its brushed-aluminium casing.

Garmin has squeezed a lot into those tiny dimensions. The 4.3in 800 x 480 display has a glass-fronted multitouch capacitive screen and is the brightest display on test by a mile.

There's Bluetooth for hands-free speakerphone use, TMC-RDS traffic with a lifetime subscription, voice control that works, European mapping, and compatibility with Garmin's ecoRoute HD module *(see p72)*. The nuvi 3790T's speaker is a little quiet, but Garmin includes a louder one in the mount, so it's audible on the road.

As with the nuLink 1695 *(see p66)*, the nuvi 3790T is a competent satnav. It's responsive, so planning routes and finding locations was frustration-free, and we didn't have to wait long for a satellite lock. However, voice instructions were often delivered too early, and we found it tricky to judge the distance to the next turn. Garmin's nuRoute technology, supposedly a rival to TomTom's IQ Routes, seemed to have no effect on route choice; in our tests, it failed to deliver the ideal route.

There's plenty packed in, and the nuvi 3790T benefits from the same lifetime map subscription price as the nuLink 1695, but when it comes to performance out on the road, there are better devices around. The TomTom Via Live 120 is both cheaper and more effective at the core job of navigation.

PERFORMANCE ★★★★☆
FEATURES ★★★★☆
VALUE FOR MONEY ★★★☆☆
OVERALL ★★★★☆

Mio Navman Spirit 500 HF Traffic

Cheap, and comes with a large screen, but usability is very poor

PRICE £71 (£85 inc VAT)
SUPPLIER www.lemon-digital.co.uk
MAPS One-time European update, £42 (£50 inc VAT)

This is cheapest dedicated satnav device here, but from the specifications you wouldn't have guessed it. The Navman Spirit 500 HF Traffic has a large 4.7in screen, includes TMC-RDS traffic, Bluetooth for use as a hands-free phone, and full European mapping.

Mio has also licensed TomTom's IQ Routes technology, and as a result its route choices are excellent. On our test routes, it sensibly directed us via the Limehouse Link tunnel on our journey from north-east to south-west London, and consistently avoided traffic blackspots in our local driving test.

As soon as you input your first route, though, you'll realise why it's so cheap. The screen is grainy and dull, the user interface is sluggish, and the touchscreen's sensitivity is poor – we found ourselves stabbing repeatedly to register a button press. What's more, during our hour-long local road test, the Spirit spontaneously rebooted twice, requiring us to re-enter address details both times.

As with other TMC devices, the traffic data was neither particularly detailed, nor presented in a useful way. Finally, the map updates don't offer value: the only option you have is for a one-time update, which is pricey at £50 inc VAT for European Maps and £40 inc VAT for UK only.

It's a shame, because there's potential here. The maps are easy to read, the audio instructions are delivered in a timely fashion and are clear, and when it isn't rebooting it works pretty well. But for its abysmal usability, the Mio goes home with the wooden spoon this month, despite its low price.

PERFORMANCE ★☆☆☆☆
FEATURES ★★★☆☆
VALUE FOR MONEY ★★☆☆☆
OVERALL ★★☆☆☆

Mio Navman Spirit V575 TV

Includes a TV tuner, but we'd prefer more useful features

PRICE £165 (£198 inc VAT)
SUPPLIER www.pixmania.co.uk
MAPS One-time European update, £42 (£50 inc VAT)

With smartphone satnav software so affordable these days, manufacturers of dedicated devices have their work cut out setting their products apart from the crowd. Mio's Navman Spirit V575 TV is the only satnav we've seen to include a DVB-T digital TV tuner.

Obviously, it's a bad idea to watch while you're driving, and for a reliable signal you'll need to use the larger, external aerial supplied rather than the small telescopic one. But it works reasonably well as a basic TV.

As a navigation device the Spirit V575 TV fares better than the 500 HF Traffic *(see left)*. The menu system is snappy and more intuitive, and the bright 4.7in screen is easier on the eye.

As with its smaller sibling, the V575 TV boasts TomTom's IQ Routes, which bases its routes on real-world traffic speeds logged by TomTom satnav users, rather than posted speed limits. The result is route selection that makes sense, and by and large gets you to your destination faster.

We certainly found that to be the case in our tests. It directed us via the Limehouse Link on our cross-London route, and chose routes in our local test that avoided traffic hotspots. Audio was clear and instructions well timed, and the maps were simple to follow.

However, the V575 TV can't match the feature set of the Garmins or TomToms: traffic isn't a patch on TomTom's HD Traffic, there's no Google search, and we found the resistive touchscreen wasn't very responsive. Along with a high price, there isn't enough here to earn this unusual satnav our vote.

PERFORMANCE ★★★☆☆
FEATURES ★★★★★
VALUE FOR MONEY ★★★★☆
OVERALL ★★★★☆

www.downmagaz.com

Navigon 40 Premium

A reliable satnav with some great features at a reasonable price

PRICE £83 (£100 inc VAT)
SUPPLIER www.halfords.com
MAPS 2yrs European updates, £13 (£16 inc VAT) with voucher

Despite the Premium moniker, the Navigon 40 is a mid-range satnav, and has fewer features than the 70 Premium Live *(see right)*. The main thing missing is the integrated GPRS radio, so there's no Google search or other live services, but you do get rudimentary traffic data via the FM-based TMC-RDS system.

The only major physical difference is a smaller screen. The 4.3in 480 x 272 resistive touchscreen is bright and clear, though. Otherwise, the 40 Premium is very similar to its bigger brother, and that means it has the same strengths and weaknesses. We love the animated lane assistance, which is the best we've seen on any satnav. When approaching a junction on a dual carriageway, motorway or multi-lane roundabout, it pops up an animated, zoomed-in view of the road, with the correct lane highlighted.

Routing is good, too. It can't compete with the consistency of TomTom's IQ Routes, but the routes it calculates are more sensible than most. For every destination you enter, you're given three choices; that won't help if you don't know the roads, but it does give you a chance to catch obvious mistakes. Voice instructions are clear and well timed, the speaker is loud, and GPS performance was exemplary.

The 40 Premium made a couple of slip-ups in our road tests, however, once telling us to turn right at a no right-turn junction, and another time directing us down a road over private property. Despite this, we came away quietly impressed with this no-nonsense satnav – and at this price it's worth considering.

PERFORMANCE	FEATURES	VALUE FOR MONEY
★★★★☆	★★★☆☆	★★★★★☆

OVERALL ★★★★☆

Navigon 70 Premium Live

A good satnav, but the price is just a touch too high

PRICE £200 (£240 inc VAT)
SUPPLIER www.expansys.com
MAPS 2yrs European updates, £13 (£16 inc VAT) with voucher

Navigon's flagship satnav is one of three devices here with a 5in screen. That makes a real difference to ease of use, with onscreen buttons much bigger and easier to press, and maps and other elements easier to see.

The 70 Premium's live services allow it to access TMC traffic information via its integrated GPRS radio, plus a host of other services. These include Google local search, mobile safety cameras, parking, weather and local events. The first 15 months are free, after which you pay £40 per year to renew the service.

The Google search works well, but traffic isn't up to the standards of TomTom's HD Traffic system. In our tests, we found the information wasn't as accurate or detailed.

The Navigon is good at its other core tasks, though. Route calculation is fast, and route choice isn't bad. It can't match the satnavs equipped with IQ Routes, but it calculates three alternatives and includes traffic data for each one, so you can make an informed decision.

The 70 Premium Live's speaker is the clearest here. Its maps, based on Navteq data, are fantastically detailed, and in major town centres, 3D representations of buildings and landmarks appear as you drive around. More usefully, the lane assistance is the best we've seen, displaying a moving, enlarged animation of the road and where you should be on it.

The Navigon 70 Premium Live is a superb satnav, and an enjoyable one to use. However, at this price we'd expect its traffic-avoidance capabilities and route finding to match the TomTom, which unfortunately isn't the case.

PERFORMANCE	FEATURES	VALUE FOR MONEY
★★★★☆	★★★★★☆	★★★☆☆

OVERALL ★★★★☆

TomTom Go Live 1005

Luxurious, with great navigation, but the Via Live 120 costs less

PRICE £191 (£229 inc VAT)
SUPPLIER www.dixons.co.uk
MAPS 1yr European updates, £17 (£20 inc VAT)

The Go Live 1005 is TomTom's flagship satnav, and quality oozes from its every pore. From the brushed-aluminium rear to the bright 5in capacitive touchscreen and a magnetic windscreen mount system, it's a luxury device. It's no surprise that the price is high.

Is it worth paying for? We'd argue it's too similar to the cheaper Via Live 120. The extra inch of screen makes it a little easier to use and the capacitive touchscreen means entering addresses is effortless. We also found the 1005 a touch faster when calculating routes.

For core navigation duties, however, there's little difference – which is to say it's every bit as good as its sibling. The 1005's combination of IQ Routes, HD Traffic, Google local search and Map Share helped it pull clear of the pack. It consistently chose the most efficient route, whether in town or on the motorway; its traffic system worked brilliantly, providing amazingly accurate information; its maps and voice instructions threw up precious little to criticise; and we never found ourselves hanging around waiting for a satellite lock.

The one thing we would criticise TomTom for is its PC connectivity. Having dumped TomTom Home with its latest range of devices, it took several months to get map updates working. At the time of writing, we were still unable to download voices or import POIs.

With such an effective navigation engine that's clearly superior to its rivals, however, it's still the best satnav we've used. The only thing that significantly counts against the Go Live 1005 is its high price.

PERFORMANCE	FEATURES	VALUE FOR MONEY
★★★★★★	★★★★★☆	★★★★☆☆

OVERALL ★★★★★☆

High Availability Architecture Storage Solutions

Boston Igloo 3U-24 NXStor SBB

Optimised for mission-critical, enterprise-level storage applications, Boston's innovative Igloo NXStor SBB (based on industry standard SBB specifications), is a fully redundant, fault-tolerant, high-availability Storage Cluster "in-a-box".

The Igloo NXStor SBB provides 24TB of available storage with the option to expand via dual 24Gb external SAS connections. For enhanced read and write performance, the Igloo NXStor SBB incorporates multiple SSD devices for use as non-volatile cache.

Based on the revolutionary ZFS file systems, many previously exotic and proprietary features are now standardized and inherent to the Igloo NXStor range including, multi-parity RAID, data deduplication, unlimited snapshots, copy-on-write data resilience, online volume expansion and many more.

Key Features:

- Dual controller high-availability unified (NAS/SAN) storage solution
- ZFS file system with SSD acceleration
- 24TB internal storage with petabyte expandability via external SAS
- Utilising Nexenta's award winning open storage platform
- Support for NFS/SMB/iSCSI
- Based on industry leading Supermicro hardware
- Nexenta® NexentaStor™ certified

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CoPilot Live 8

Can't match TomTom's app for quality, but it's the best option for Android phone owners

ALK was specialising in smartphone navigation with its CoPilot software long before Android or even the first iPhone appeared. Back then it was the best around, but there's more competition now, and it has a fight on its hands to stay in the picture.

It starts off well. Of all the smartphone satnav apps in this Labs, CoPilot Live 8 is the most customisable. You can tweak absolutely everything, from the distance before junctions at which audio instructions are given, to the weighting of different types of roads in route calculations and their average speed. If you think it's too keen to take you on dual carriageways, for example, you can change it at a snip.

It's also packed with features, such as offline maps so you can still navigate when your data connection goes AWOL, the ability to plan and save multi-point routes and a host of live services. There's lane assistance and live online search, powered by Bing, which we found quick and effective.

Traffic data is a reasonable £15 extra for European coverage, or £10 for the UK. It isn't as good as TomTom's HD Traffic, but it spots major roadworks and incidents, and displays them clearly on a vertical bar alongside the main map.

We also admired CoPilot's alternative driving views. In addition to the usual top-down and 3D options, there's also 2D Next Turn. This displays the whole segment of your route between the current location and the next turning, gradually zooming in as you approach the junction.

In our road tests with iPhone and Android handsets, however, we found CoPilot Live to be a little hit and miss. Routing was average, although as we've mentioned this can be tweaked. Its text-to-speech instructions are timely and much clearer than Google Maps' gravelly delivery. The mapping is colourful and clear, and it seemed to cope better with the weak GPS signal from our test phone than others. However, it twice asked us to perform U-turns on major high streets.

Despite its flaws, though, for Android phone-owners in need of locally stored maps, CoPilot Live 8 is currently the best option. It's reasonably priced, has good maps and audio, and a massive number of customisable features. iPhone owners should stick with TomTom.

PRICE
From £32 (£38 inc VAT) Europe; £17 (£20 inc VAT) UK & ROI

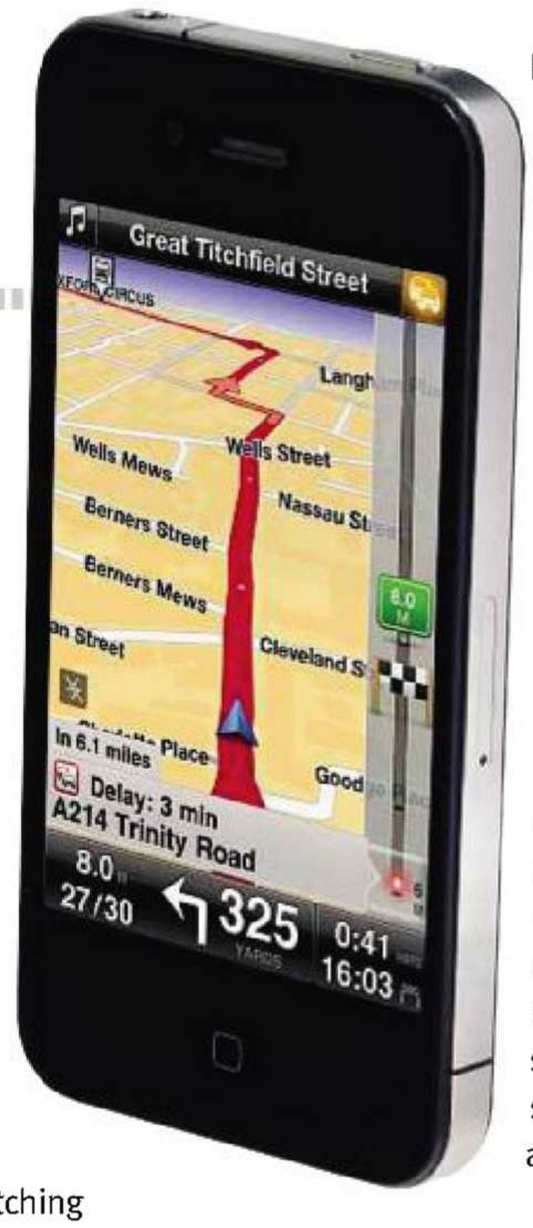
PLATFORM
Android, iOS, Windows Mobile

TRAFFIC
From £13 (£15 inc VAT) Europe; £8 (£10 inc VAT) UK & ROI per yr

PERFORMANCE ★★★★☆☆
FEATURES ★★★★★★
VALUE FOR MONEY ★★★★★☆
OVERALL ★★★★☆

TomTom for iPhone

Only on one platform, but for iPhone owners it easily rivals standalone devices at half the price



For the most reliable and comfortable navigation experience, TomTom's standalone satnavs are the best choice available. But iPhone owners have an exclusive alternative: they can save themselves the expense of a standalone device and opt for TomTom in app form.

It isn't cheap by iPhone app standards, but for less than half the cost of a standalone TomTom Via Live 120, you're getting the best of the best. Maps are local rather than online, so you have navigation (unlike Google Maps and Skobbler), and updates are free. What's more, there's the same combination of clever features on offer as with the standalone models: IQ Routes, Map Share, Google local search and HD Traffic.

That makes the TomTom app just as effective as its standalone siblings at finding the fastest routes. On our cross-London test trip, for example, it chose the Limehouse Link as the quickest way of getting through congested east London. On our trip from London to Liverpool it offered us the choice of taking the M6 Toll road; on our local driving test, all the routes it picked avoided known traffic blackspots, and we came across no map errors.

TomTom's HD Traffic service (£23 per year) is also second to none, catching minor as well as major incidents in our tests. Traffic data is presented as clearly as it is on the larger dedicated devices: simply tap a small icon in the top-right corner of the screen and up pops a vertical bar showing traffic along your route, complete with the length of delay for each incident. When that delay means there's a faster route available, the app will ask if you want to be re-routed.

In our road tests, we found the audio instructions were delivered audibly and with great timing, and maps were clear, although not the most attractive to look at. The only major weakness is a lack of multi-point route planning. It's also a shame that Android smartphone owners aren't catered for.

However, the TomTom iPhone app's all-round performance means its award is well deserved. It may be expensive, but it will get you to your destination faster than its rivals.

PC PRO RECOMMENDED

PRICE
£44 (£53 inc VAT) W.Europe; £42 (£50 inc VAT) UK & ROI

PLATFORM
iOS

TRAFFIC
£19 (£23 inc VAT) per yr

PERFORMANCE ★★★★★★
FEATURES ★★★★★☆
VALUE FOR MONEY ★★★★★☆
OVERALL ★★★★★☆

Google Maps Navigation

Free satnav for Android owners, but the feature set is limited

PRICE Free
PLATFORM Android
TRAFFIC Free

In *PC Pro*'s satnav challenge last year (web ID: 359626), Google's free Maps Navigation app won by a street, leaving rivals eating its dust. This was primarily down to superlative search facilities, which enabled our driver to get away 30 seconds or more before the competition.

This still holds true. In our tests, we found Google Maps' search and route calculation on our test Samsung Galaxy S faster than anything else. It keeps things simple, with one box for address, keyword and postcode search. And no rival can compete with StreetView: tap an icon on the screen and up pops a photo of the road or junction at your current location.

However, it remains barebones elsewhere. All maps and search indexes are online, which is a problem if you lose your data connection. It does pre-cache map tiles for your route and allows a modicum of re-routing within a narrow corridor, but that won't help if you need to stop and start from scratch. There's no multi-point route planning, no built-in speed camera alerts, and the traffic information is limited.

On-the-road performance is average. On our cross-London route it chose to send us through the congested heart of east London, and it didn't offer the M6 Toll as an option on our Liverpool route. We also found it coped less well than CoPilot Live 8 *(see p71)* with the weak GPS signal from our test phone.

For casual navigation duties, there's still nothing to beat Google Maps – it's a perfectly functional satnav that costs absolutely nothing. But if reliable, everyday navigation is what you're after, you'll need to get your wallet out.

PERFORMANCE	FEATURES	VALUE FOR MONEY
★★★★☆	★★☆☆☆	★★★★★

OVERALL ★★★★☆

GARMIN ECOROUTE HD **PRICE:** £63 (£76 INC VAT)

Garmin's satnavs might not be the best on show this month, but their "eco" features are stronger than any other. As standard, the nuLink 1695 and other Garmin devices include Garmin's ecoChallenge feature, which estimates how efficient your driving is based on acceleration and speed, even displaying a graph showing recent driving behaviour. The idea is that you'll work to improve your driving efficiency, and therefore save fuel, by trying to beat your best score.

Taking this to the next level is ecoRoute HD. This Bluetooth module (£76 inc VAT) plugs into your engine's OBD II diagnostic port and can read data directly from your car's sensors, telling you how hard you're pressing the accelerator, among other things. You can check if your vehicle is compatible at http://tinyurl.com/ecoRouteHD. Most cars made after the year 2000 should be fine, with the exception of Renaults.

Once the dongle is paired with the satnav, two new icons appear: Gauges and Diagnostics. The first provides a virtual instrument cluster, adding five extra gauges to your dashboard. You can choose what each displays from a fairly long list, including speed, revs per minute, oil pressure, coolant temperature, mass airflow, fuel flow, engine load and throttle position.

The throttle position information is what's most important here, as it enables the ecoChallenge scores to be far more accurate than using GPS alone. Without the attachment, you can get away with being heavy-footed and still appear to be driving economically. With it, you're forced to drive with a very light right foot to achieve high scores – and the resulting improvement in fuel consumption.

The system can also track fuel economy. Enter your car's details, including its fuel type, claimed fuel economy and the fuel price at the last fill-up, and the satnav will provide an estimation of how much fuel is used on each trip, how much it cost, your average miles per gallon, plus your carbon footprint. The data is automatically displayed when you switch off the engine, but it's also stored in a CSV file you can access when you connect the satnav to your computer. Cleverly, the module can store data even if the satnav isn't in the car; it will then upload the trip data next time it pairs.

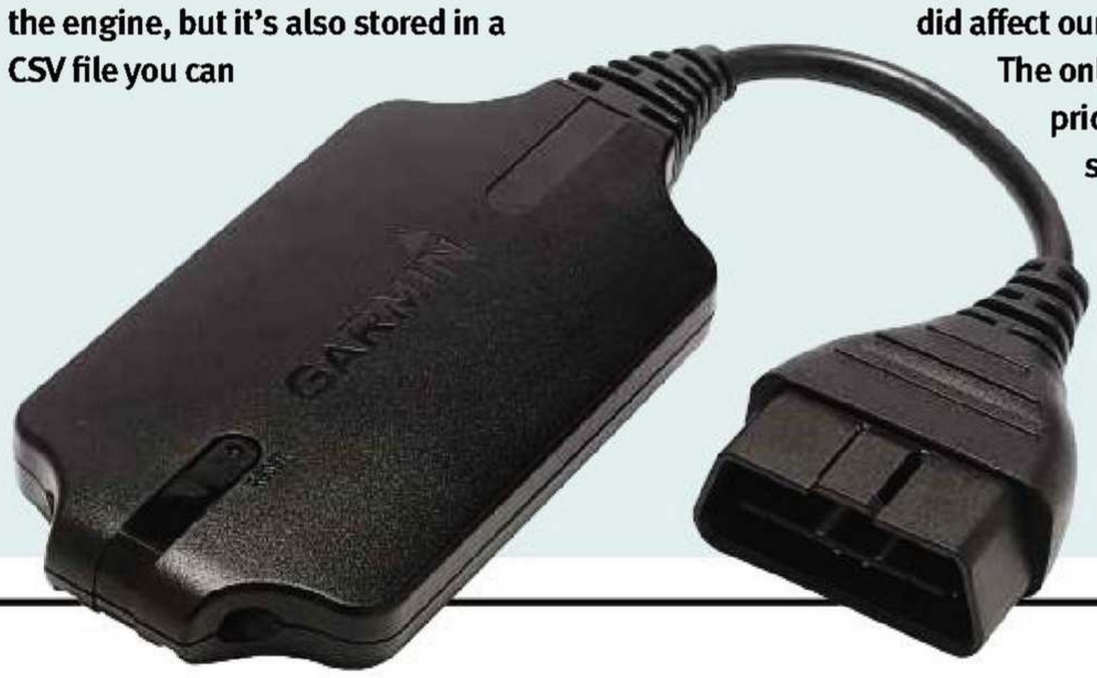
Enter your vehicle's fuel consumption and the pump price, and your satnav will estimate journey costs.

The ecoRoute HD lets you add up to five gauges to your dashboard, from oil pressure to throttle position.

The ecoRoute HD scores fuel economy, speed, braking and acceleration, and graphs driving behaviour.

The ecoRoute HD's last trick is to read engine fault codes, and explain why the warning light has appeared on your dashboard. If there's a problem, you can tap the Diagnostics menu option and the unit will show a description of the fault such as "random/multiple cylinder misfire detected". There's also an option to reset the light once the problem has been fixed.

It's an impressive piece of kit, and when driving with it plugged in we found it really did affect our driving behaviour. The only problem is the price, which initially seems high. But when you consider how much you could save on fuel costs and potential garage bills, it could be a price worth paying.



www.downmagaz.com

Navigon MobileNavigator

Does its job, but mapping isn't the clearest and it's expensive

PRICE From £58 (£70 inc VAT), Europe
PLATFORM Android, iOS, Windows Mobile
TRAFFIC Free

Most major standalone satnav manufacturers have a mobile app these days, and Navigon is no exception, with versions for iOS, Android and old-school Windows Mobile handsets.

We tested the Android version. The look and feel is similar to its standalone devices: it has big, square buttons and a simple interface. From the main screen you're given the option to search for your destination by address or POI, go home with a single click, or display the map. Smaller icons along the bottom let you navigate to contact addresses, favourites, recent addresses or shop for extras.

This simplicity is laudable, but it can make some features difficult to locate. We didn't realise there was a Google local search, for instance, until we hit Search for POI and found it at the bottom of the next screen. And features such as multi-point routing are missing entirely.

You get live traffic and lane assistance, plus text-to-speech. It started well in our tests, coping better than Sygic Aura *(see p74)* with the weak GPS signal from our phone. Audio instructions are clear and timely and, as with Navigon's standalone satnavs, MobileNavigator offers three route choices (with traffic info overlaid), giving you the opportunity to pick and choose.

The 3D map view is difficult to read, though: it's zoomed out too far, making it difficult to see and negotiate complicated junctions. And the price is too high. At between £60 and £70 inc VAT depending on the platform, Navigon MobileNavigator is more expensive than any other satnav app we've tested, and it isn't good enough to justify the premium.

PERFORMANCE ★★★☆☆☆ **FEATURES** ★★★★☆☆ **VALUE FOR MONEY** ★★☆☆☆☆

OVERALL ★★★☆☆☆

Navmii GPS Live UK

Bargain iPhone option, with clear maps and Google/Bing search

PRICE £2.50 (£3 inc VAT) per country
PLATFORM iOS
TRAFFIC N/A

There are plenty of cheap and cheerful satnav apps around, but Navmii is the best we've come across. For the paltry sum of £3 you get UK maps, and these are stored locally on your phone, so you'll still be able to navigate even when your data connection is lost *(see p74)*.

That gives it an advantage over Skobbler, which is online only, and it beats Skobbler's search abilities too. You get postcode, address and Google local search tools, plus the ability to switch to Microsoft Bing. Local map storage makes it ideal for those on pay-as-you-go tariffs, but beware taking it abroad – each additional country requires a £3 download.

Compared to TomTom and CoPilot, Navmii's feature cupboard looks pretty bare. There's no speed camera data – that's £1.79 extra – and no option to match TomTom's superlative HD Traffic. There's no lane assistance, speed limit guidance or text-to-speech, either.

On the road it was a mixed bag. It chose sensible routes in our local tests, avoiding obvious traffic hotspots, but on our north-east to south-west London route it ignored the Limehouse Link tunnel, and on the Liverpool route it didn't give us the option of travelling via the M6 Toll road. There was a map inaccuracy on our local test route, too, where Navmii tried to get us to turn right at a no-right-turn junction.

All in all, though, we can't complain too much. Its maps are clear, we found fewer errors on our routes than with the free Skobbler app, and voice instructions were generally delivered in a timely fashion. For only £3, what more can you ask for?

PERFORMANCE ★★★★☆☆ **FEATURES** ★★☆☆☆☆ **VALUE FOR MONEY** ★★★★★☆

OVERALL ★★★★☆☆

Nokia Ovi Maps

A bit fiddly, but the app and its maps are free and locally stored

PRICE Free
PLATFORM Symbian S60
TRAFFIC Free

Nokia is sidelining Symbian in favour of Windows Phone 7 on smartphones, casting doubt over the future of this free satnav app.

Ovi Maps is the only free satnav app this month to offer local storage of maps – and worldwide coverage at that. Using Nokia's Ovi Suite to transfer everything can be fiddly, but once done you can navigate anywhere regardless of internet connection.

There's nothing like the customisability of CoPilot, but you do get a one-box search, which allows you to enter keywords, addresses or postcodes, which can be carried out online or offline. There's also multi-point route planning.

On the road, our experiences were mixed. Audio instructions are delivered clearly, but maps aren't the easiest to read, with spindly road graphics and an abundance of pastel shades. There were no obvious map errors, but routing was average. It didn't choose the best way through east London, and on the Liverpool test route it failed to offer the M6 Toll road.

We're not fans of the user interface. Too much clicking is required, and buttons are tricky to tap with your arm outstretched. It needs a GPS fix to calculate a route, which is a pain, and the traffic service is pretty hopeless. You can have it updated automatically over your phone's data connection, but there's no easy way to view incidents on your route.

Nokia Ovi Maps can be frustrating, but it will get you from A to B more reliably than any of the other free apps on test thanks to its local map storage. Don't dump your Nokia just yet.

PERFORMANCE ★★★☆☆☆ **FEATURES** ★★★★☆☆ **VALUE FOR MONEY** ★★★★★★

OVERALL ★★★★☆☆

Skobbler

Map errors and poor routing make this an unreliable choice

PRICE From free
PLATFORM Android, iOS
TRAFFIC N/A

Skobbler, with maps from the open-source OpenStreetMap project, was the first free satnav app to appear on the iPhone, and it's now available on Android. You pay only if you want the speed camera data (iPhone only), and at £1.19 that's hardly going to break the bank.

It's understandably barebones, with no multi-point route-planning and no customisation. Like Google Maps Navigation *(see p72)*, the maps are online only, so you can't download data locally for offline navigation.

That wouldn't be an issue if it was good at its job; alas, it was one of the more frustrating apps on test. Not because destinations were difficult to find – Skobbler's address, postcode and local searches were accurate and fast. Nor was it because maps and audio were unclear.

It fell short simply because of poor maps and route choices. We can gloss over the odd error – it's impossible to guarantee 100% map accuracy – but Skobbler managed five different blunders in an alarmingly short space of time. Twice it tried to send us the wrong way down a one-way street, twice it asked us to perform a U-turn on a busy high street, and once it directed us down a road that didn't exist.

In our local test it seemed intent on sending us everywhere via a major roundabout, when more direct routes were available. It won't pre-cache map tiles for your route, so if you lose data connection, you're stuck; Google Maps *(see p71)* has no such weakness.

Although it's free, we can't recommend Skobbler. If you're desperate for cheap navigation on the iPhone, get Navmii; if you have an Android handset stick to Google Maps Navigation. Skobbler matches neither of them.

PERFORMANCE ★☆☆☆☆☆
FEATURES ★☆☆☆☆☆
VALUE FOR MONEY ★★★★★★
OVERALL ★★☆☆☆☆

Sygic Aura GPS Navigation

Beautiful maps at a reasonable price, but has too many quirks

PRICE £29 (£35 inc VAT), W. Europe
PLATFORM Android, iOS, Maemo, Symbian, Windows Mobile
TRAFFIC £15 (£18 inc VAT) Europe

Sygic's satnav app is available across a range of platforms. You can download it via the Android Market, and it's also available on iOS, Symbian, Maemo and Windows Mobile devices.

We were surprised by the quality of its maps. On our 4in Samsung Galaxy S, they looked colourful and were easy to read, with the added bonus of 3D buildings in major towns and cities. In our road test, audio was clear and delivered in good time. The address and POI searches worked well, too.

We have reservations, though, and the first surrounds the live traffic service. You can add this for a reasonable £9 per country (or £18 for Europe), and it's delivered via your phone's data connection. However, this doesn't provide information on how long delays are, and bringing up traffic data on your route is a laborious four-clicks from the main screen.

Route choices were mixed, too. It chose the M6 Toll on our Liverpool route, but not the Limehouse Link on our cross-London jaunt. It also made odd choices in our local tests.

Features are limited, with no live search and no way of planning multi-point routes. Neither is it very tolerant of a weak GPS signal. In our tests, Aura required a greater signal strength to gain a positional fix than either CoPilot *(see p71)* or Navigon *(see p73)*, so it's one to avoid if your phone has marginal GPS reception.

The price is reasonable and includes free updates, but in the overall analysis we'd choose CoPilot or TomTom. Both are more reliable and have extra features, and CoPilot is far more tweakable.

PERFORMANCE ★★★☆☆☆
FEATURES ★★★☆☆☆
VALUE FOR MONEY ★★★★☆☆
OVERALL ★★★☆☆☆

VIEW FROM THE LABS JONATHAN BRAY

The aim of this Labs was to find out if satnavs or smartphones are best for navigation. Our conclusion is a little unsatisfactory. Simply put, it depends on what you want, how often you drive, whether your smartphone has a decent GPS radio, and which OS it runs.

One thing was clear throughout our testing, however: the best all-round satnavs are the TomToms. If you value getting to your destination quickly, we wouldn't recommend anything else.

Interestingly, the reasons for recommending them have shifted in recent times. We haven't handed the TomTom Via Live 120 the Labs Winner award because of its range of features or its flexibility, as we may have done in the past. We've given it the award because it has a range of tools that actually get you from A to B faster than any of its rivals.

That's down to TomTom's software. Up first for praise is IQ Routes, which cleverly calculates the most effective route based on real-world traffic. We found satnavs with IQ Routes consistently chose more sensible and quicker routes than the rest.

HD Traffic takes care of other worries, and it isn't only the accuracy of the data we loved, although this is excellent. What impresses most is the clarity with which data is presented. Most satnavs struggle to give you a list of hold-ups on your route, let alone provide information on how long they might delay you.

The magic with TomTom's traffic service is that, as well as showing every incident on the traffic bar on the screen, you get an estimation of how long you might be stuck. Then, when the situation changes, you're told whether or not a faster route is available. Traffic services are as much about data presentation as the accuracy of that data, and nobody does it better than TomTom.

The fact that TomTom's products – both standalone and app – manage to couple these key skills with clear mapping, great audio and ease of use, means they're head and shoulders above the competition at the moment. Other products will get you from A to B successfully and will keep arguments over map-reading to a minimum, but they won't do it with such effortless efficiency.

EMAIL JONATHAN BRAY AT REVIEWS@PCPRO.CO.UK

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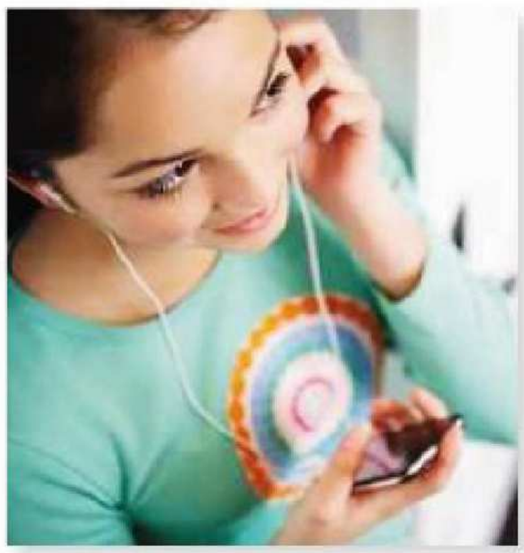

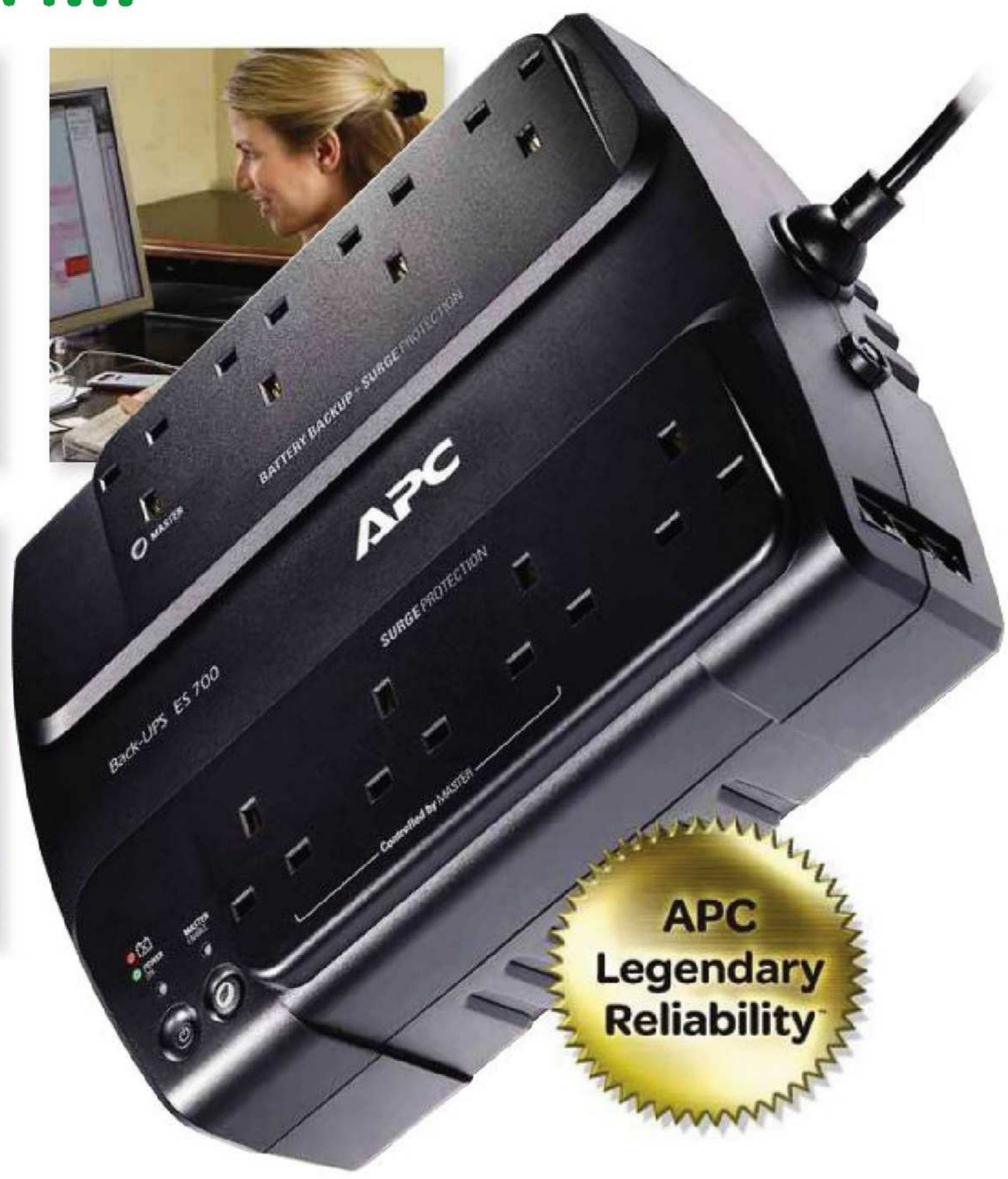

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Touchscreen PCs

SMARTPHONES, TABLETS... PCs? WE TEST EIGHT ALL-IN-ONES THAT LET YOU GET PHYSICAL

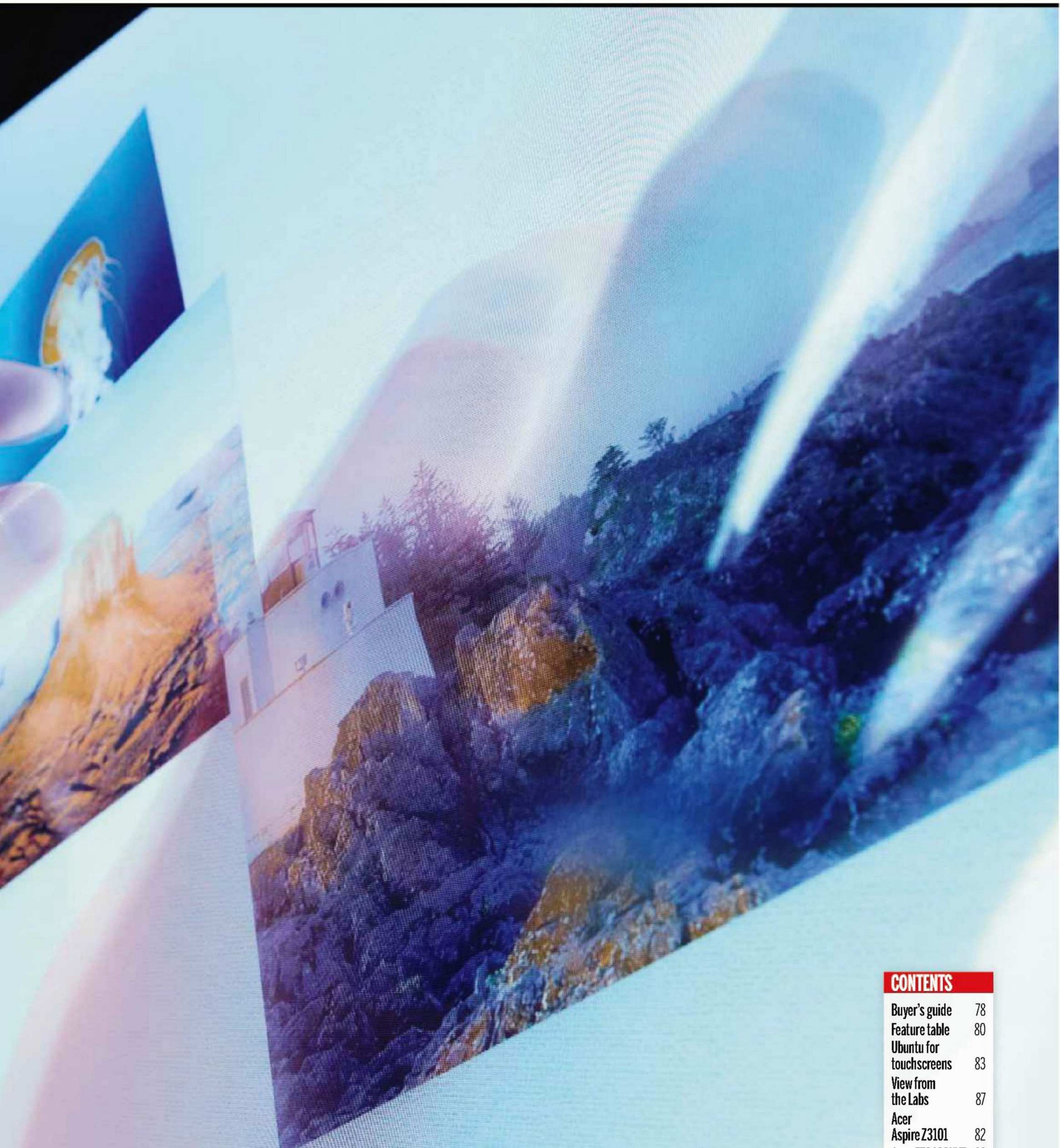
Smartphones and tablets have made touch control second nature, but PC users needn't feel left out. After all, a touch PC with dedicated software – as all eight systems in this month's Labs have – can be wonderfully intuitive for browsing the web, navigating media or playing games.

There's plenty of diversity in the touchscreen PC market. This month, we have 24in Full HD screens and Blu-ray drives for watching movies, and powerful speakers to complete the experience. One offers Nvidia's 3D Vision technology to set gamers' pulses racing, and one even uses a built-in webcam to recognise physical gestures, making touch control seem old hat!

Several include Intel's latest Sandy Bridge processors and beefy graphics chips. Some have USB 3, others SATA 6Gbits/sec hard disks, and they all come with Wi-Fi and Bluetooth so you can put them anywhere in the house. And if Windows isn't your thing, on p83 we also look at how Ubuntu is making progress with multitouch.

Whether you're after something small or large, something that's functional or extravagant, read on to find out which PCs claim our coveted awards.

Photography intro: Danny Bird



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Buyer's guide

Plus how we test

Analysing this month's eight contenders makes for a refreshing change from the usual things to look for in a PC. The primary consideration will always be the touchscreen itself. It's worth checking what sort of touchscreen is included (although all the models in this month's test use optical technology) since the different technologies vary both in cost and quality.

Optical touchscreens, for example, use image sensors built into the bezel on either side of the screen to detect when your fingers block the beam – you'll recognise them from pub quiz machines. Resistive panels, which plot the currents created when two layers of screen material are pushed together, are often found in cheaper devices – particularly budget tablets. Capacitive screens, found on most modern smartphones and dearer tablets, use the conductivity generated by your finger to detect touch.

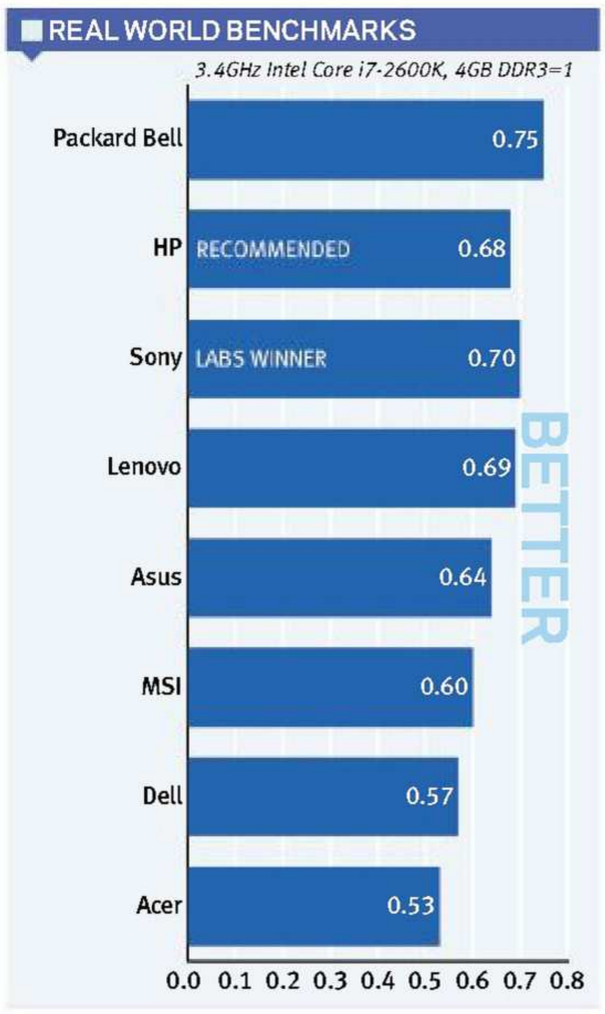
Each has its pros and cons: optical screens can have tougher glass; resistive screens are cheap but less accurate; capacitive screens are accurate but useless when the user prods the screen with anything but a naked finger. Image quality is affected by the extra layers required in some panels, and cheaper displays won't support multitouch, so you won't be able to pinch to zoom, rotate or scroll like you would on a smartphone.

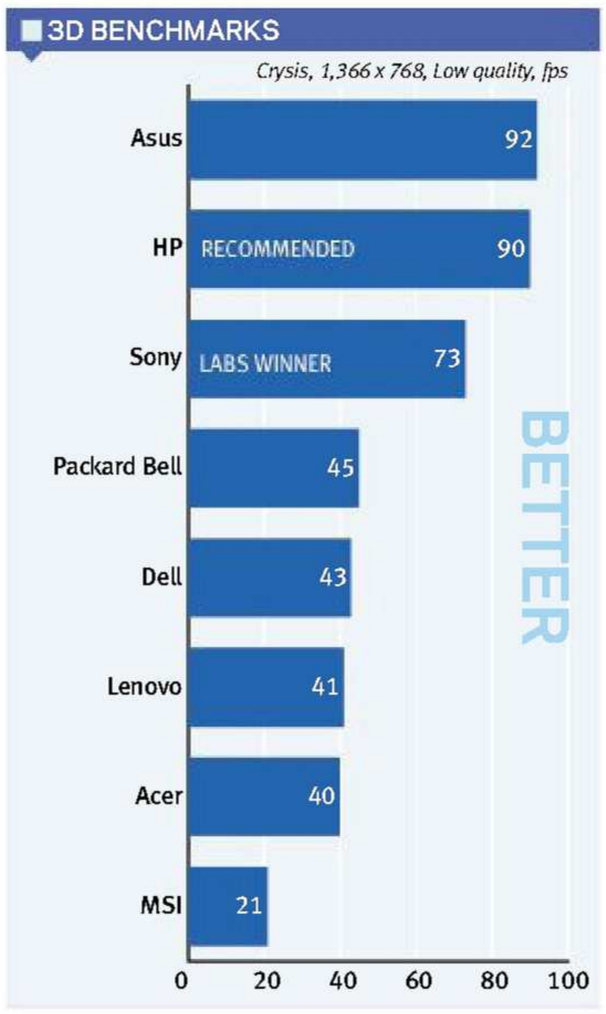
It's also important to consider the proprietary software that's included with most touchscreen PCs. Some have always-there touch docks for quick access to key applications, others have special touch browsers and the like, while the Sony has something even more outlandish – gesture controls. Not all of them are good, but they all add to Windows 7's limited touch functions.

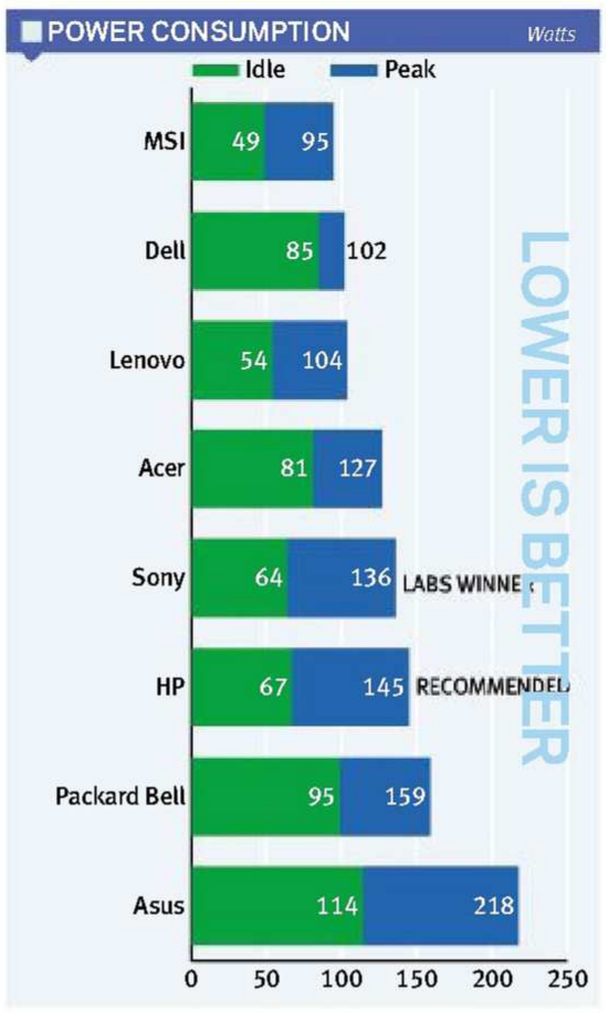
The final piece of the jigsaw is the stand, and a properly adjustable design can really ease the discomfort of prodding away at a screen for hours on end. Most touchscreens tilt back at least a little, but we expect to see more manufacturers take inspiration from this month's HP, which slides all the way back to desk level for comfortable use from above. Your arms will thank you in the long run.

RATINGS EXPLAINED

The star ratings you'll find at the bottom of each review are relative only to the products on test in this particular Labs. A low rating doesn't mean the product is the worst of its type ever to be made – merely that it's one of the poorest this month. Likewise, a six-out-of-six score isn't necessarily an indication of perfection.







Performance

Our new suite of Real World Benchmarks is divided into three categories. The Media test uses Adobe Photoshop CS5, Sony Vegas Pro 10 and iTunes to edit and encode images, audio and video into a variety of formats, and the Multitasking test runs a selection of applications designed to test today's fastest multicore and multithreaded processors.

These tests are intensive, so don't be surprised to see relatively low scores from the variety of mobile processors in most of these PCs. More telling in this case is the Responsiveness test, which opens, moves and closes multiple applications to simulate everyday Windows usage. The better the score, the livelier a PC will feel.

We've also run our Crysis tests on these machines, starting with our 1,366 x 768 Low quality benchmark and moving up the scale to determine which machines can hack demanding games.

Features & Design

This score is derived from a range of objective and subjective measurements. The touch interfaces are key, with their accuracy, responsiveness and quality all evaluated alongside the image quality of the screens themselves. We also consider each PC's ports and connectors, networking capabilities and hard disk capacity all factored in. We also take into account the design and build quality of the chassis and the quality of the keyboard, mouse and any other peripherals included.

Points are awarded for the duration and type of warranty, and we also take into account each company's performance in our annual Reliability & Service Awards.

Value for Money

The Value for Money score is based on a weighted average of the Performance and Features & Design scores; we then factor in exactly how much each all-in-one computer costs (including delivery) for a bang-per-buck result.

Overall

The Overall rating is an average of the Performance, Features & Design and Value for Money scores, although due to rounding it may be higher or lower than you'd expect.

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WHEN SECURITY MATTERS

Kensington ClickSafe Twin Laptop Lock

- Clicksafe lock head pivots 180 degrees and rotates 360 degrees for flexibility and convenience
- Feature a second lockhead allowing two items to be secured with the same cable and key
- Attaches to Kensington Security Anchor which connects to Kensington Security slots found in 99% of computers.

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Kensington

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- Make the things you do every day easier with improved desktop navigation
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Order No: CK161013 **£137.50** Ex VAT

Microsoft

HP LaserJet P3015DN Mono Printer

- Fast print speeds up to 42ppm
- Network ready for easy work team sharing
- 1200 x 1200dpi resolution for rich detail
- Duplex feature for double sided printing.

Order No: CKQ192084 **£296.75** Ex VAT

3M™ PF14.1W Widescreen Notebook Privacy Filter

- 80% of Brits admit to reading over a stranger's shoulder (3M Research, 2007)
- 3M Privacy Filters black-out the screen to all but the user
- Great for high traffic areas, mobile workers and open offices
- PF 14.1W fits 14.1" widescreen notebooks (more sizes available)

Order No: CK134834 **£27.99** Ex VAT

3M

Targus Privacy Screen 19"

- Protect the information on your screen display from unwanted viewing by restricting viewing angles.
- Protects the screen display from scratching and damage
- Easy to attach and can be detached as needed.

Order No: CK140240 **£39.99** Ex VAT

Targus

OKI MC561DN Colour Laser All-in-One Printer

- Copy and print at 26ppm colour and 30ppm
- Automatic double sided copying, scanning and printing
- 250 sheet paper tray and 100 sheet multipurpose tray
- Scan to folder and email with LDAP support
- Networking and PCL/PostScript as standard.

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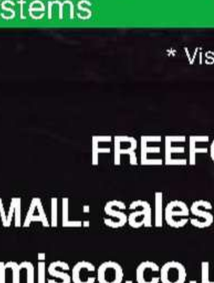
AVG Internet Security 2011 Family & Home 4 User 2 Year

- Shop and bank online safely with AVG Firewall, AVG Anti-Spam and AVG Identity Protection
- Stay safe on social networks with AVG Social Networking Protection - NEW!
- Surf and search with confidence with AVG LinkScanner's® real-time protection.



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- Secure clamp lock with 6ft steel cable and master key
- Peace of mind that your desktop PC is going nowhere
- Protects your desktop unit, keyboard, mouse, monitor and all peripherals.

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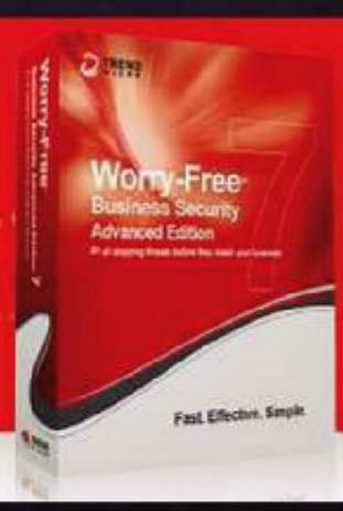

Contact the Licensing Team for more information.

* Visit product page for full detail

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FEATURE TABLE Touchscreen PCs

	Acer Aspire Z3101	Asus ET2400XVT	Dell Inspiron One 2310	HP TouchSmart 610	
OVERALL RATING	★★★☆☆	★★★★★☆	★★★★★☆	★★★★★☆	
Part code	PW.SEUE2.084	ET2400XVT	2310	610-1010uk (XT100ea)	
Price [1] (inc VAT)	£542 (£650)	£1,073 (£1,288)	£749 (£899)	£1,000 (£1,200)	
Delivery [2] (inc VAT)	£8 (£9)	£6 (£7)	Free	Free	
Supplier	www.saveonlaptops.co.uk	www.eclipsecomputers.com	www.dell.co.uk	www.hp.co.uk	
Manufacturer's reliability/ support rating [3]	★★★★☆☆/★★★★☆☆	N/A	★★☆☆☆☆/★★★★☆☆	★★☆☆☆☆/★★★★☆☆	
Warranty [4]	1yr RTB	1yr RTB	1yr C&R	1yr C&R	
DISPLAY & CHASSIS					
Screen diagonal	21.5in	24in	23in	23in	
Touchscreen type	Optical multitouch	Optical multitouch	Optical multitouch	Optical multitouch	
Native resolution	1,920 x 1,080	1,920 x 1,080	1,920 x 1,080	1,920 x 1,080	
Dimensions (WDH)	549 x 129 x 496mm	582 x 260 x 460mm	567 x 165 x 420mm	585 x 103 x 451mm	
CPU					
Processor type	2.5GHz AMD Athlon II X4 615e	1.73GHz Intel Core i7-740QM	2.4GHz Intel Core i5-450M	3.2GHz Intel Core i5-650	
Chipset (north bridge)	Nvidia nForce 720a	Intel HM55	Intel H57	Intel H57	
RAM fitted	3GB 1,333MHz DDR3	6GB 1,333MHz DDR3	6GB 1,333MHz DDR3	6GB 1,333MHz DDR3	
Upgradeable components	○	Memory	○	○	
GRAPHICS CARD					
Chipset	Nvidia GeForce 9200	Nvidia GeForce GTX 460M	ATI Mobility Radeon HD 5470	ATI Radeon HD 5570	
RAM fitted	256MB	1,536MB	1,024MB	1,024MB	
Outputs	HDMI, D-SUB	HDMI, D-SUB	HDMI, D-SUB, Composite	○	
DRIVES					
Optical drive	DVD writer: Lite-On DS8A5SH	Blu-ray reader: LG CT21N	Blu-ray reader: LG CT10N	Blu-ray reader: LG CA21N	
Hard disk capacity	1TB	1TB	1TB	1.5TB	
Hard disk model	Western Digital Caviar Green WD10EARS-22Y5B1	Seagate Barracuda 7200.12 ST31000528AS	Western Digital Caviar Black WD1001FAES	Western Digital Caviar Green WD15EARS	
Interface	SATA/300	SATA/300	SATA/600	SATA/300	
Speed	5,400rpm	7,200rpm	7,200rpm	5,400rpm	
Memory buffer	64MB	32MB	64MB	64MB	
INTERFACES					
Communications	Gigabit Ethernet, 802.11bgn, Bluetooth 2.1	Gigabit Ethernet, 802.11bgn, Bluetooth 2.1	Gigabit Ethernet, 802.11bgn	Gigabit Ethernet, 802.11bgn, Bluetooth 2.1	
Card reader (see key below, right)	SD/MMC/MS/xD	SD/SDXC	SD/MMC/MS	SD/MMC/MS/xD	
Rear ports (see key below)	4U2, 2PS/2, 1S, 1RJ45, 6A	4U2, 1RJ45	4U2, 1OSP, 1RJ45, 1A	2U2, 2A	
Front/top/side ports (see key below)	2U2, 2A	2U3, 2A	2U2, 2A	2U3, 2U2, 1RJ45, 2A	
Mouse & keyboard	Acer wireless keyboard and mouse	Asus Eee wireless keyboard	Dell wireless keyboard and mouse	HP wireless keyboard and mouse	
EXTRAS					
Speakers	Power not stated	2 x 5W	2 x 4W	Power not stated	
TV tuner	Avermedia H753 Hybrid Analog/DVB-T	○	Avermedia A336 Hybrid Analogue/DVB-T	Avermedia H323 Hybrid Analogue/DVB-T	
Webcam	1.3mp	2mp	1.3mp	2mp	
Other	Media Center Remote Control	Media Center Remote Control, Nvidia 3D Vision glasses	Media Center Remote Control	Media Center Remote Control	
SOFTWARE					
Operating system	Windows 7 Home Premium 64-bit	Windows 7 Home Premium 64-bit	Windows 7 Home Premium 64-bit	Windows 7 Home Premium 64-bit	
Recovery method(s)	Recovery partition	Recovery partition	Recovery partition	Recovery partition	
COMPANY INFORMATION					
Main location	Heathrow, Middlesex	Milton Keynes, Buckinghamshire	Bracknell, Berkshire	Bracknell, Berkshire	
Cost of telephone/technical support	National rate	National rate	National rate	National rate	
Technical support times	Mon-Fri 8.30am-6pm	Mon-Fri 9am-5pm	Mon-Fri 9am-8pm, Sat 9am-5pm	Mon-Fri 8.30-6pm, Sat 10am-4pm	

Key: ● Yes. ○ No. 1 Price correct at time of going to press. 2 Mainland UK only. 3 Out of six for PC reliability/support in PC Pro's Reliability & Service Awards 2010. 4 Warranty is parts & labour, UK mainland, unless otherwise stated.
Ports key: U2 = USB 2, U3 = USB 3, F = FireWire-compatible, ES = eSATA, RJ-45 = network socket, S = serial, PS/2 = mouse keyboard, CSP = coaxial S/PDIF, OSP = optical S/PDIF, A = 3.5mm mini-jack audio.

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	Lenovo IdeaCentre B310	MSI Wind Top AE2210	Packard Bell oneTwo DTX	Sony VAIO L21
	★★★★☆☆	★★★☆☆☆	★★★★☆☆	★★★★★★
	VBB1DUK	MS-AC71	L 1825UK	VPCL21M1E/B
	£613 (£736)	£583 (£700)	£708 (£850)	£1,000 (£1,200)
	£9 (£11)	Free	Free	£5 (£6)
	www.lambda-tek.com	www.amazon.co.uk	www.pcworld.co.uk	www.sonystyle.co.uk
	★★☆☆☆☆/ ★★★★☆☆	N/A	★★★★☆☆/ ★★★☆☆☆	N/A
	1yr RTB	1yr RTB	1yr RTB	1yr RTB
	21.5in	21.5in	23in	24in
	Optical multitouch	Optical multitouch	Optical multitouch	Optical multitouch
	1,920 x 1,080	1,920 x 1,080	1,920 x 1,080	1,920 x 1,080
	522 x 188 x 410mm	558 x 175 x 406mm	557 x 208 x 447mm	608 x 187 x 429mm
	3.2GHz Intel Core i3-550	3.1GHz Intel Core i3-2100	3.2GHz Intel Core i3-550	2.3GHz Intel Core i5-2410M
	Intel H57	Intel H61	Intel H57	Intel P67
	4GB 1,066MHz DDR3	2GB 1,333MHz DDR3	4GB 1,333MHz DDR3	4GB 1,333MHz DDR3
	Memory, optical drive	○	○	○
	ATI Radeon HD 5450	Intel HD 2000-series graphics	Nvidia GeForce 315	Nvidia GeForce GT 540M
	512MB	1,024MB	512MB	1,024MB
	○	HDMI	D-SUB	2 x HDMI, Component
	DVD writer: Lite-On DS-8A4S	DVD writer: LG GT40	DVD writer: LG GT31N	Blu-ray reader/DVD writer combo: Pioneer BDC-TD03
	1TB	1TB	1.5TB	1TB
	Hitachi Deskstar 7K1000.C HDS721010CLA332	Western Digital Caviar Green WD10EARS	Western Digital Caviar Green WD15EADS	Western Digital Caviar Black WD1001FAES
	SATA/300	SATA/300	SATA/300	SATA/300
	7,200rpm	5,400rpm	5,400rpm	7,200rpm
	32MB	65MB	32MB	32MB
	Gigabit Ethernet, 802.11bgn, Bluetooth 2.1	Gigabit Ethernet, 802.11bgn	Gigabit Ethernet, 802.11bgn	Gigabit Ethernet, 802.11bgn
	SD/MMC/MS/SDHC	SD/MMC/MS/xD	SD/ MMC/MS/xD	SD/MS
	4U2, 1PS/2, 1RJ-45, 1F	4U2, 1RJ-45, 2A	6U2, 2PS/2, 1RJ-45, 3A	3U3, 1RJ-45, 3A
	2U2, 2A	2U3	2U2, 2A	2U3, 2A, 1F
	Lenovo wireless keyboard and mouse	MSI wireless keyboard and mouse	Packard Bell wireless keyboard and mouse	Sony VAIO wireless keyboard and mouse
	Power not stated	2 x 3W	Power not stated	2 x 5.5W
	Digital DVB-T	Hybrid analog/DVB-T	Avermedia H753 Hybrid analog/DVB-T	○
	1.3mp	1.3mp	1.3mp	2mp
	Media Center Remote Control	Media Center Remote Control	Media Center Remote Control	Media Center Remote Control
	Windows 7 Home Premium 64-bit	Windows 7 Home Premium 64-bit	Windows 7 Home Premium 64-bit	Windows 7 Home Premium 64-bit
	Recovery partition	Recovery partition	Recovery disc	Recovery partition
	Hook, Hampshire	Hayes, Middlesex	Heathrow, Middlesex	Weybridge, Surrey
	National rate	National rate	National rate	National rate
	Mon-Fri 9am-6pm	Mon-Fri 8.30am-11.30am, 12pm-4pm	Mon-Fri 8.30am-11.30am, 12pm-4pm	Mon-Fri 8.30am-6pm

Memory cards key: SD = Secure Digital, MMC = MultiMedia Card, SM = SmartMedia, CF = CompactFlash, MD = Microdrive, MS = Memory Stick, xD = xD-Picture.

Acer Aspire Z3101

PRICE
£542 (£650 inc VAT)

SUPPLIER
www.saveonlaptops.co.uk

A budget all-in-one that, aside from its reasonable price and software bundle, fails to shine in this company

A glance at the top of this month's feature table reveals a couple of interesting facts about Acer's Aspire Z3101: at £650 inc VAT it's the cheapest system here; and it's the only PC on test to eschew Intel for AMD, with an Athlon II X4 615e processor inside.

It isn't a particularly good performer, with its benchmark score of 0.53 being the lowest this month. While that's still enough power to handle basic tasks with ease, the Z3101 can't handle power-hungry applications as well as the Sony or Packard Bell PCs.

There's little to shout about in the graphics department, either: the Nvidia GeForce 9200 chip built into the motherboard's nForce 720a chipset scored only 40fps in our Low quality Crysis test. That's fine for playing HD media, but you won't be able to up the quality settings in the latest mainstream games.

Other specifications include a 1TB Western Digital Caviar Green hard disk spinning at 5,400rpm, 3GB of RAM and a DVD writer. Media fans will be heartened by the inclusion of a hybrid analogue/digital TV tuner.

It's a shame, then, that the Z3101's fine media credentials are hampered by its dreadful speakers. They're among the worst we heard this month, combining tinny, indistinct high notes with a lack of bass and volume.

The 21.5in display and the touch software bundle are also worthy of note. The former has a resolution of 1,920 x 1,080 and boasts fine colours and a warm tone that's easy to get on with. The software includes a customisable launch screen, plus touch-specific apps for browsing your music, video and photo collection. This works well in combination with the Acer's generally responsive optical multitouch panel, although there were occasions when it felt a touch sluggish reacting to our prods.

Aside from the price, then, there's little that stands out here. The Acer Aspire Z3101 is neither fast, slick nor exciting enough to warrant a recommendation. Unless money is especially tight, buying the Z3101 would be a false economy.

PERFORMANCE ★★★☆☆☆
FEATURES & DESIGN ★★★☆☆☆
VALUE FOR MONEY ★★★★☆☆
OVERALL ★★★☆☆☆

Asus ET2400XVT

PRICE
£1,073 (£1,288 inc VAT)

SUPPLIER
www.eclipse computers.com

The inclusion of 3D makes for a unique and powerful gaming machine, but the price is a touch high

We've seen laptops and monitors with Nvidia 3D Vision technology before, but this is the first all-in-one we've come across with a screen capable of displaying games, movies and pictures in glorious 3D.

It isn't as elegant as we'd like: the transmitter that synchronises the images with the included active shutter glasses isn't embedded in the chassis, but has to be connected via USB. You get everything you need to get started, though, and the 3D effect works well.

We're less keen on the 24in panel. Detail is good and there's no backlight bleed, but colours are oversaturated. We prefer the Sony, Dell and HP panels.

A range of touch-specific software is packed into a dock at the top of the screen, with launch buttons for media, note-taking and painting apps, alongside access to Asus' @Vibe app store, cloud storage service and more. The software is slick, but there's little to differentiate it from the pack

The Asus has a strong specification. The Intel Core i7-740QM processor – one of Intel's most powerful 45nm chips – has a stock speed of 1.73GHz, stretched across four Turbo-Boosted, Hyper-Threaded cores. Its score of 0.64 is right in the middle of the pack.

The Nvidia GeForce GTX 460M is this month's most potent graphics chip. A score of 57fps in our Medium quality Crysis gaming test gave way to an impressive 28fps in the High quality benchmark – the only system to provide a near-playable score in this tricky test.

The rest of the machine includes 6GB of RAM, a 1TB hard disk and a Blu-ray drive. The speakers are loud and bassy, which makes for great gaming, but movie fans will be less pleased by the overblown mid-range. The only notable absence is a TV tuner.

The Sony and HP machines are better all-rounders, but as a gaming and movie system there isn't much wrong with the Asus ET2400XVT. It has raw application power and 3D performance, a 3D screen and Blu-ray. For a 24in all-in-one, though, the price should be a tad lower.

PERFORMANCE ★★★★★★
FEATURES & DESIGN ★★★★★☆
VALUE FOR MONEY ★★★★☆☆
OVERALL ★★★★★☆

www.downmagaz.com

Dell Inspiron One 2310

Not quite up there with the award winners, but it's a highly competent and cheaper alternative

PRICE
£749 (£899 inc VAT)

SUPPLIER
www.dell.co.uk

This month has seen a variety of specialist systems in the Labs, with Sony's gesture control, Asus' 3D technology and HP's tilting chassis. Dell, though, is more interested in impressing with quality throughout.

It isn't the most extravagant system on test, but its matte-grey finish and black screen bezel look classy, and subtle touches such as the metallic feet and black speaker grille ensure it won't look out of place in the most stylish of living rooms.

The 23in screen is one of the month's better offerings. Colours look slightly oversaturated compared to the cool Sony, but this isn't necessarily a bad thing. Bright whites and rich colours throughout ensure pictures are vivid without looking unpleasant.

The touchscreen is accurate and responsive, and Dell's software offering is useful. Instead of a screen-swallowing front-end, there's a range of media apps in a dock at the bottom of the screen. This works well, with preview windows and the ability to add your own shortcuts.

The specification ticks all the right boxes, too, although it doesn't excel in any one area. The 2.4GHz Intel Core i5-450M in the model we reviewed scored 0.57 in our benchmarks, but Dell is replacing this with an i5-460M, so you can expect slightly improved performance. It's unlikely to lift it out of the mid-range, however.

The ATI Mobility Radeon HD 5470 graphics lack the power to challenge this month's best, scoring 43fps in our Low quality Crysis test, but the Dell handles HD video and content streaming with ease. It's a shame this skill isn't matched with good speakers – they're marred by weak bass and a muddy mid-range.

The rest of the Dell is better, with 6GB of RAM, a Blu-ray reader and 1TB hard disk that uses the faster SATA 6Gbits/sec standard, plus a TV tuner, card reader and a wide selection of ports. Aside from the poor speakers, the Dell does little wrong, almost matching the Sony for screen quality and providing enough punch elsewhere. The VAIO and TouchSmart are our favourites but, if those are too expensive, this is a fine alternative.

PERFORMANCE
★★★★☆☆

FEATURES & DESIGN
★★★★★★

VALUE FOR MONEY
★★★★★★

OVERALL
★★★★★☆

UBUNTU FOR TOUCHSCREENS

When it comes to touchscreen control, Windows isn't your only choice. The latest version of Ubuntu Linux (version 11.04, codenamed Natty Narwhal) introduces support for multitouch input devices, using the simple Unity interface first seen in netbook editions of the free operating system. There's even a new touch-specific control, known playfully as "Love Handles", which makes it easy to move and resize windows by dragging with a finger.

Right now, though, Ubuntu suffers from a familiar problem. Although the operating system itself supports touch controls, there's a distinct shortage of applications designed to take advantage of them. Windows has this problem, too, but it's more pronounced in Ubuntu. Since touch is such a recent addition to Linux, even the applications that are bundled with the operating system aren't optimised for touch.

Ubuntu faces another challenge, too: hardware support. PC manufacturers work with Microsoft to ensure their touchscreens are fully supported by Windows 7, but with Ubuntu you're on your own. When we tried installing Ubuntu 11.04 on the Packard Bell oneTwo DTX, we received an error message saying that our graphics hardware wasn't compatible with Unity, and touch controls weren't available at all. On the Acer Aspire Z3101 we were able to use the touchscreen to press buttons and drag windows, but only at a single point at once: multitouch wasn't detected. This left us unable to use Love Handles, as it's triggered by tapping three fingers on the window you want to move or resize.

Ubuntu is constantly being updated and improved, so hopefully these issues will be quickly resolved. On the application front, we're less optimistic. Much Linux software is maintained by hobbyists in their spare time, and if we're honest, many applications already suffer from unclear or inconsistent user interfaces. It remains to be seen how much effort developers will put into adapting their software for touchscreen devices; after all, they still make up only a tiny proportion of PCs.

For now, touchscreen fans should probably stick with Windows 7. But if you fancy trying out Ubuntu, it's good to know that it doesn't necessarily mean losing the ability to use your shiny new all-in-one as a touchscreen entertainment centre.

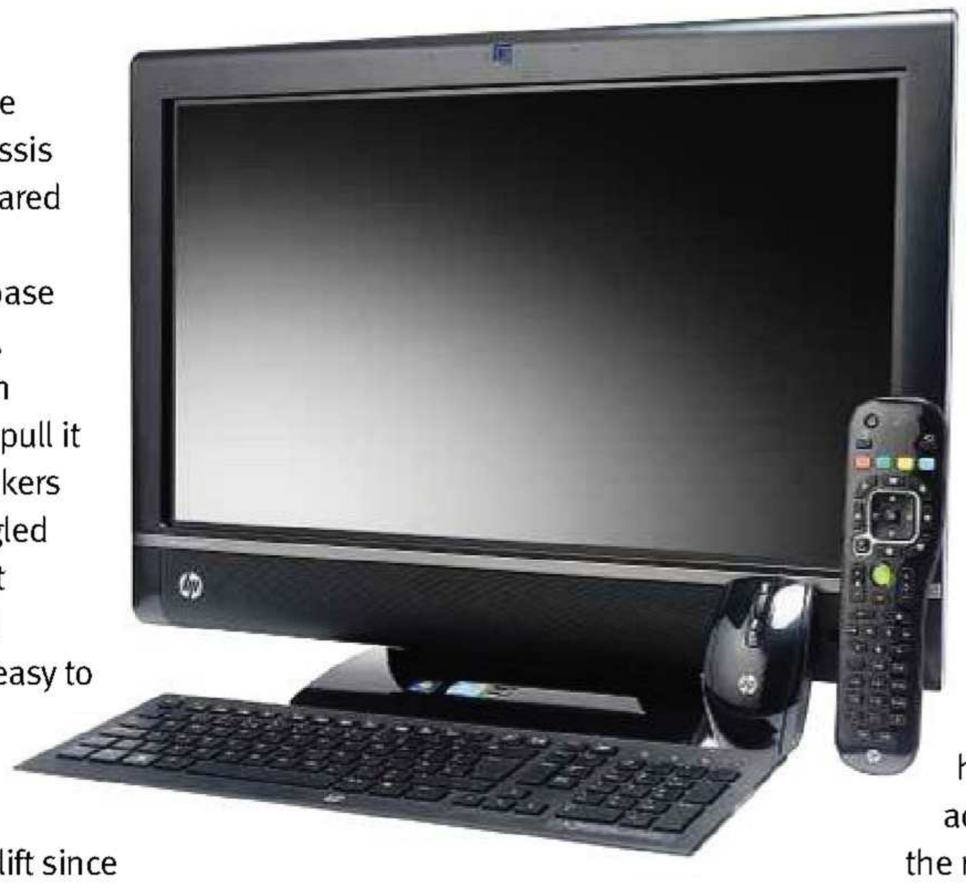
PC PRO RECOMMENDED

PRICE
£1,000
(£1,200 inc VAT)

SUPPLIER
www.hp.co.uk

HP TouchSmart 610

A stunning system that combines innovative design with excellent components



For all of Asus and Sony's technological innovation, the two systems still rely on chassis designs that are tame compared to HP's TouchSmart 610.

It's built around a solid base rather than a slanting stand, which enables its tilting 23in screen to take centre stage: pull it forward and the display hunkers down towards the desk, angled upwards; push it back and it reverts back to the standard upright pose. This makes it easy to operate from a standing or sitting position.

The software has been given a comprehensive facelift since the last generation. Gone are the huge icons, replaced by a freeform front-end with a carousel of apps running along the bottom, reminiscent of the Asus.

The TouchSmart is far more pleasant to use than the Asus, however, mainly because it's smoother and more responsive. HP's media tools are slick: albums and movies have their own carousel, and are joined by links to social-networking websites such as Facebook and Twitter. A link to HP's app store holds promise, but at the time of writing it included only nine apps.

The 610 is reasonably fast, scoring 0.68 in our benchmarks and racing through our Medium Crysis tests, and comes with a 1.5TB hard disk, Blu-ray and 6GB of RAM.

The screen is an inch smaller than the Sony's, but still has a 1,920 x 1,080 native resolution that offers sharp detail and accurate colours, with its whites brighter and blacks darker than all its rivals bar the VAIO. One minor quibble is that it appears slightly cold compared to the Sony, but it's better than the oversaturated Asus and the dull Packard Bell.

The final feather in the HP's cap is its Dr. Dre-branded Beats speakers, which are as good as anything here. They're loud and have plenty of punchy bass and rich, accurate audio reproduction across the rest of the range.

HP's TouchSmart 610 has few weaknesses. Its innovative design is paired with plenty of power, a fine screen and slick software. The Sony edges it thanks to a slightly larger, better-quality screen, but this is a worthy runner-up.

PERFORMANCE ★★★★★★
FEATURES & DESIGN ★★★★★☆
VALUE FOR MONEY ★★★★★☆
OVERALL ★★★★★☆

PRICE
£613 (£736 inc VAT)

SUPPLIER
www.lambda-tek.com

Lenovo IdeaCentre B310

A fast performer in applications, but there's little else here that stands out from the crowd

Lenovo is best known for its ThinkCentre business PCs and ThinkPad laptops. Its IdeaCentre and IdeaPad ranges, by contrast, are consumer products that blend stylish design with the hard-wearing qualities its corporate computers are famous for.

The B310's glossy black finish isn't far from the matte black of those business systems, and the keyboard and mouse combine brushed metal with red accents that echo the design of ThinkPad laptops.

The software front-end is pulled down from the top of the screen and is one of the slickest here, with touch-driven screens for music playback, movie watching and picture management easily accessible from grid or carousel views. The ThinkVantage Technology Centre, accessible from a red button on the keyboard, provides system maintenance, management and recovery options.

The B310 isn't perfect, though. The screen's dim backlight renders images darker than the bright panels of the Dell and Sony PCs, and there's backlight bleed along the bottom. The optical touch panel is sensitive and responsive, but scrolling was occasionally jerky.

Lenovo has kitted out the B310 with an Intel Core i3-550, a desktop CPU that gives it an edge over most systems based on mobile hardware. Its score of 0.69 in our application benchmarks is one of the month's best. Gaming performance is less impressive. ATI's Radeon HD 5450 pushed it to only 41fps in our Low quality test, so this all-in-one is limited to basic games and HD video.

We wouldn't mind if it was stuffed with features, but there's only 4GB of RAM and a DVD writer to keep the TV tuner and 1TB disk company. Sound quality was poor, with overblown bass and a weak mid-range. This lack of stand-out features ultimately put paid to the Lenovo B310's prospects. It isn't an awful machine, but we see little reason to recommend it over several better rounded all-in-ones this month.

PERFORMANCE ★★★★☆☆
FEATURES & DESIGN ★★★☆☆☆
VALUE FOR MONEY ★★★★☆☆
OVERALL ★★★★☆☆

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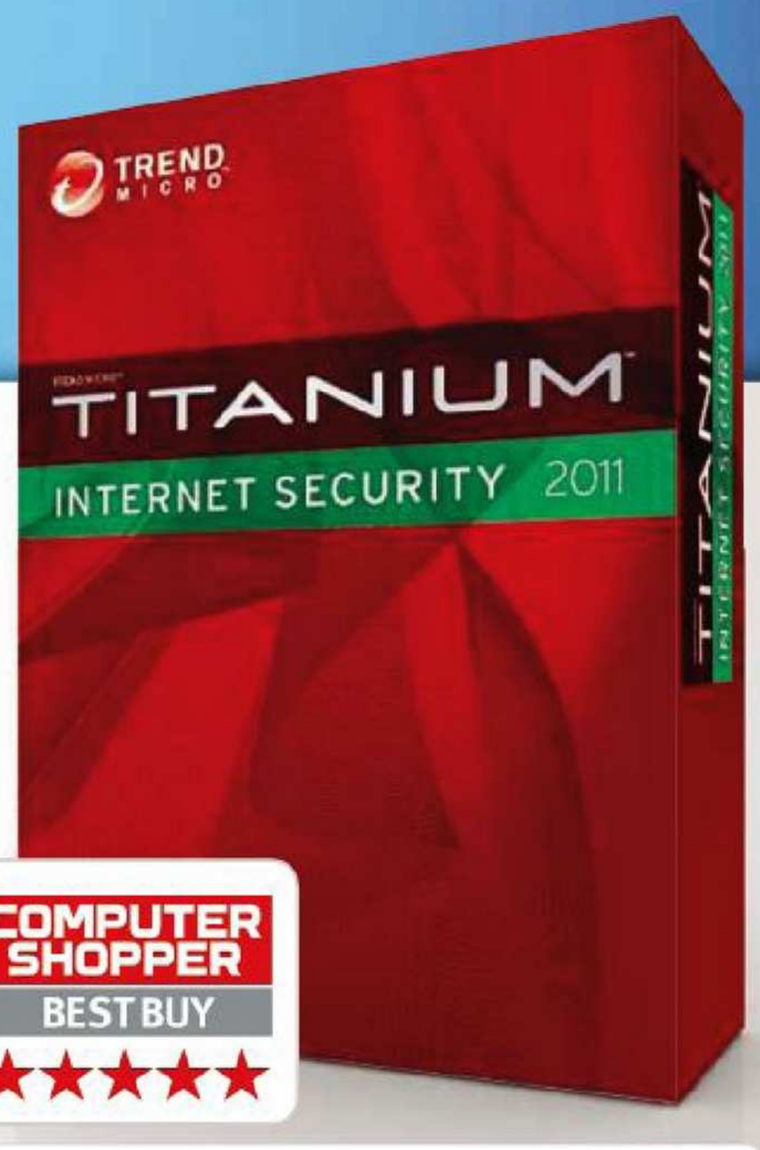

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MSI Wind Top AE2210

This month's best option for those on a tight budget, but it still has major weaknesses

PRICE
£583 (£700 inc VAT)

SUPPLIER
www.amazon.co.uk

MSI's AE2210 comes equipped with one of Intel's latest Sandy Bridge processors. The Core i3-2100 is one of the more modest models – it scored 0.6 in our tests – but it should cope with most tasks.

This isn't bad for one of the cheapest PCs in the Labs, but there are inevitable compromises. The processor's integrated Intel HD 2000 graphics core is a fine media chip – our 1080p test videos and streaming HD content played without fuss – but it's no match for the latest games, coming bottom of the pile in our Low quality Crysis test.

The rest of the MSI's specification is mediocre, with only 2GB of RAM and a DVD writer, but you do get a TV tuner and 1TB of storage. Connectivity is provided by Gigabit Ethernet and 802.11bgn Wi-Fi.

The machine's looks and peripherals are distinctly inferior. The glossy black surround is basic when compared to the sleek Sony or the striking design of the Packard Bell, and the wireless keyboard and mouse set lacks media extras. At least the speakers, which provide decent sound quality at moderate volume, are good.

It's the 22in, 1,920 x 1,080 screen where the tight budget is most obvious, however. It's grainier than most and quality is middling: high brightness can't mask the rather flat colours, and clarity is also lacking.

One highlight is MSI's revamped touch-specific software. The twitchy carousel-style interface of its older touchscreen PCs has been replaced by a more traditional front-end, with a large calendar augmented by picture-viewing and music screens, plus a dock with links to note-taking and paint applications. It's a clear improvement, and the screen's optical touch system works well in conjunction with it.

That, and the Sandy Bridge processor, just about lift the MSI above the other budget systems in this month's Labs. With a below-average screen, peripherals and rather mean-looking core specification, though, we're reluctant to recommend it.

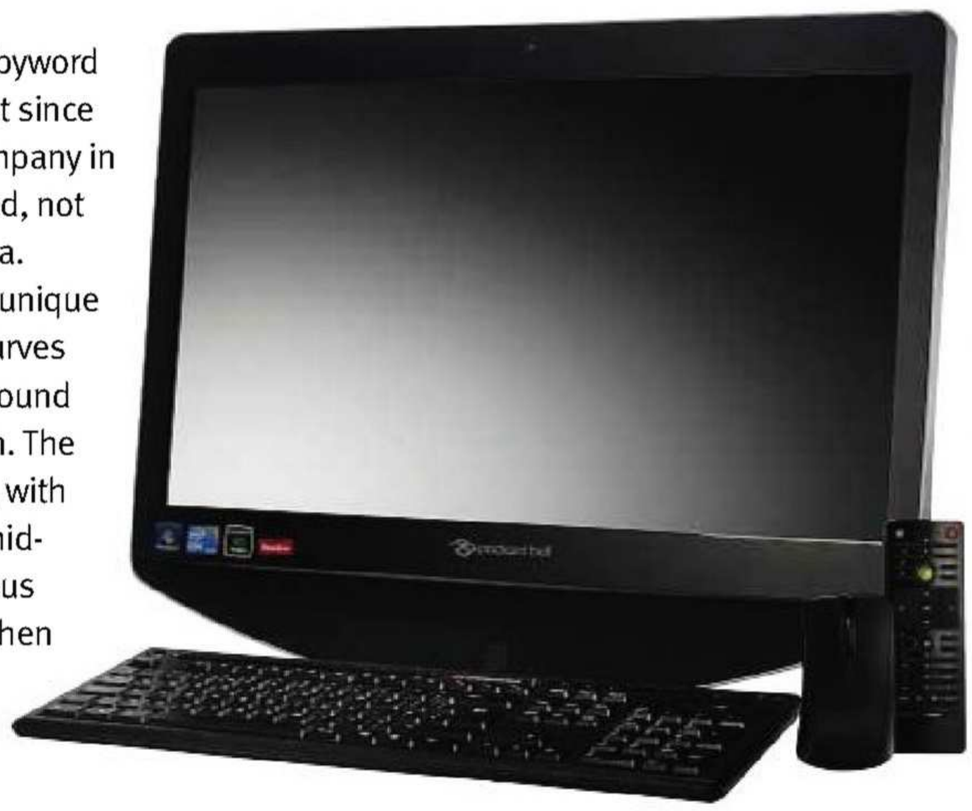
PERFORMANCE ★★★☆☆☆
FEATURES & DESIGN ★★★☆☆☆
VALUE FOR MONEY ★★★★☆☆
OVERALL ★★★☆☆☆

Packard Bell oneTwo DTX

A dim screen and ageing software put paid to the prospects of an otherwise fine machine

PRICE
£708 (£850 inc VAT)

SUPPLIER
www.pcworld.co.uk



Packard Bell used to be a byword for cheap and cheerful, but since Acer's purchase of the company in 2008, quality has improved, not least in the all-in-one arena.

The oneTwo DTX has a unique design. Its bottom edge curves up into a glossy black surround for the 23in, 1080p screen. The speakers are notable, too, with punchy bass and a clear mid-range and top-end. The Asus offers more volume but, when it comes to audio quality, the Packard Bell rivals the Labs-winning Sony and HP systems.

It's a shame, then, that the Packard Bell's styling and audio aren't matched by the screen. Its size, resolution and colour accuracy are all fine, but it's too dim for our taste, especially compared to the bright panels of the best rival screens. While it's fine as a touchscreen (it lacks a little accuracy, but it's a minor problem), the lack of brightness is a more pressing issue.

It falls behind in the software stakes too. Little has been done to update the front-end: tap the peeling page icon in the corner of the screen and shortcuts to Microsoft's Touch Pack apps appear, along with basic painting, note-taking and media playback tools. They're useful, but the overall experience doesn't compare to the Sony.

Packard Bell does manage to trump Sony when it comes to application performance, however. While the VAIO extracted a score of 0.7 from its mobile Core i5 chip, Packard Bell has loaded the oneTwo with a desktop Core i3-550, which scored 0.75 in our tests, making it this month's fastest machine.

Unfortunately, the oneTwo couldn't maintain its lead in our gaming tests. Its Nvidia GeForce 315 chip scored only 45fps in our Low quality Crysis test.

Packard Bell's system is one of this month's most divisive. While its design, speakers and specification impress, the dim screen, old software and weak graphics chip ensure that, in crucial areas, it falls behind. Last year's model might have been a revelation but it hasn't moved on much since, and that means it misses out this time around.

PERFORMANCE ★★★★★☆
FEATURES & DESIGN ★★★★☆☆
VALUE FOR MONEY ★★★★☆☆
OVERALL ★★★★☆☆

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Sony VAIO L21

A near-perfect balance of innovation and excellence makes for another winner from Sony

Sony's VAIO J Series was a clear winner in our last touchscreen group test, so the new L Series has a lot to live up to. Luckily, Sony has introduced something unique to keep its 24in machine on top of the heap: gesture control.

Load up the VAIO media suite and the L21's webcam kicks in, letting you wave your hand to play, pause and skip tracks, and navigate through photos and video.

Gimmicks aside, the software is the slickest here, with tabs giving access to your media and content suggestions from the internet. The innovation doesn't stop there; various controls are accessed via the touch-sensitive screen surround. Tap the VAIO logo and Sony's software springs into life. Tap to the left or right of the Sony logo below the screen and you'll skip between tracks or photos.

The 1,920 x 1,080 screen's 24in diagonal makes it the joint-largest on test, and quality is superb. The LED backlight provides vivid colours and razor-sharp detail without any backlight bleed or oversaturation.

There's plenty to like under the hood, too. Intel's 2.3GHz Core i5-2410M is one of the latest Sandy Bridge mobile processors and scored 0.7 in our benchmarks, second only to the Packard Bell's desktop chip and just ahead of the HP.

The Nvidia GeForce GT 540M scored a reasonable 33fps in our Medium quality Crysis test. It's also capable of playing back any HD video you care to throw at it.

The absence of a TV tuner is an odd omission, but 4GB of RAM, a 1TB hard disk and Blu-ray drive complete the specification. The Scrabble-tile keyboard and mouse are comfortable to use, and the speakers' rich, balanced sound is up there with the best.

Swipe away its gesture control and you'll find that Sony's latest all-in-one PC pairs innovation with excellence. It has a stunning screen, impressive software and powerful specification. It's expensive, but the VAIO L21 is well worth saving up for.

PC PRO LABS WINNER

PRICE
£1,000
(£1,200 inc VAT)

SUPPLIER
www.sonystyle.co.uk

PERFORMANCE ★★★★½

FEATURES & DESIGN ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL ★★★★★

VIEW FROM THE LABS MIKE JENNINGS

This month's Labs has shown that, when it comes to all-in-one systems, it isn't only about innovation or sleek, sci-fi looks. A good all-in-one needs all these things, but also requires processing grunt to accompany the sparkle.

Alas, most of this month's machines achieve one to the detriment of the other. Take HP's TouchSmart 610. It comes with one of the most innovative chassis designs we've seen in an all-in-one: rather than merely being able to adjust the angle of the stand on the rear of the system, you can tilt it back and forward on sliding rails. This means the 23in panel can be orientated at a near-horizontal level, which is handy if you're standing at the computer, navigating through songs or photos. Dip below the surface of this brand-new machine, though, and you'll find surprisingly old parts: Intel's Core i5-650 is a year old, and ATI's Radeon HD 5570 is older still.

The Asus ET2400XVT suffers a similar fate. Its headline feature – Nvidia 3D Vision – is the first time we've seen 3D technology allied with a touchscreen, and it works well. Once again, though, its specification looks outdated. The Core i7-740QM processor is almost a year old, while its Nvidia GeForce GTX 460M graphics chip is even older and struggles when confronted with the latest games.

It could be argued that the design of these systems is far more important than the hardware powering them. But this month's also-rans demonstrate exactly why it's important not to neglect the specification.

> If you're paying £1,000 for a PC, smooth operation is the least you should expect

The Asus, Acer and Dell machines might have slick software included as standard, but they're all prone to stuttering and long application load times. If you're paying close to £1,000 for a computer, smooth operation is the least you should expect.

There's little stock in manufacturers complaining that they're hobbled by their designs, with mobile and desktop parts appearing in equal measure. None of this month's contenders became too hot or unstable during our tests and, with the latest processors more efficient than ever, packing more power into these slim enclosures should be easier than it's ever been.

That's why this month's winner, the Sony VAIO L21, was so easy to single out. Its selection of modern components includes an Intel Core i5-2410M processor and Nvidia GeForce GT 540M graphics, and these ensure the clever features and slick software operate more smoothly and responsively than any other system on test.

When you're using touch to navigate through your music, movies and pictures, a seamless experience is vital – and the hardware underneath is critical to this. We're surprised most manufacturers still don't recognise this fact.

EMAIL MIKE JENNINGS AT MIKEJ@PCPRO.CO.UK

MOBILE DATA RIP-OFF

We uncover the scandalous restrictions and prices placed on mobile data – and reveal how to find the best deals

Contributors: Barry Collins, Stewart Mitchell
Photography: Danny Bird **Retouching:** Jan Cihak

Can it really be the case that delivering data to your mobile costs 90 times more than to your home broadband connection? Could mobile networks really get away with charging foreign roaming rates so extortionate that 40GB of data costs more than a family home? Would mobile firms really ban everyday smartphone apps, just because they conflict with their commercial interests? What do you think?

Mobile networks are – in the words of the EU's vice-president for the digital agenda – engaging in a widespread "rip-off". From regular data tariffs to sky-high roaming rates, the small band of mobile networks are blatantly adopting a policy of charging whatever they can get away with.

Not only are their prices fundamentally divorced from the actual cost of providing data, they also seek to control what consumers can do with their (often paltry) allocation of megabytes. Applications such as Skype are frequently banned by mobile networks, for no other reason than an anti-competitive desire to protect the operator's call revenues. Instant-messaging clients – which consume only a smattering of bytes – are outlawed if they haven't struck a commercial deal with the network.

In this feature, we expose the very worst excesses of Britain's mobile networks, and the dirty tactics they're employing to keep prices high and customer service low. On p93, our infographic reveals the unbelievable extent of the data price rip-off, while on p94-95 we try to limit the damage by revealing the best deals on offer for a variety of users.

Prepare to be shocked.

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Alarms
BeyondPod
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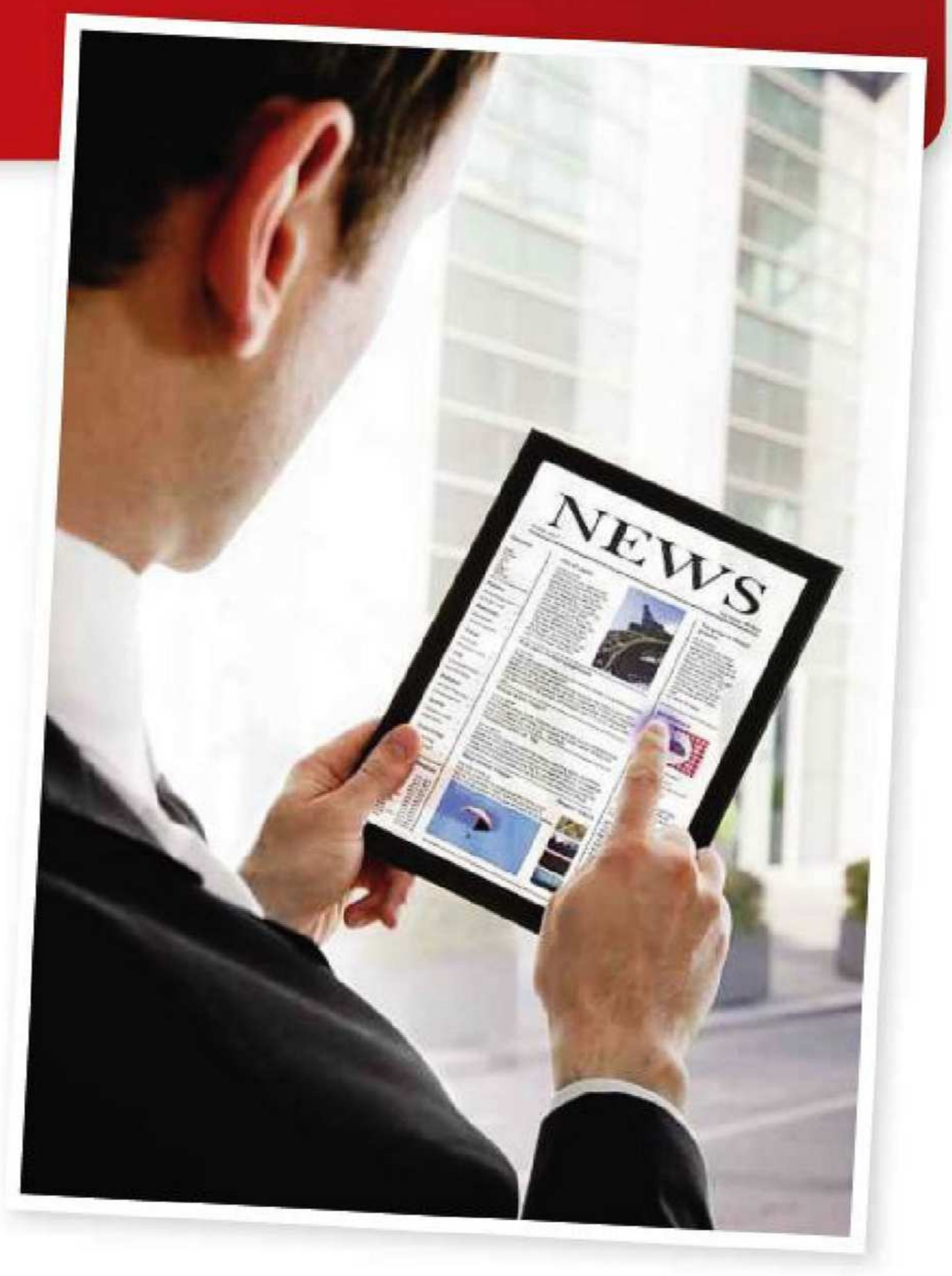
THE RIP-OFF RESTRICTIONS



"There's always one who's suicidal." That was the off-the-cuff comment made by a senior executive at one of Britain's biggest mobile networks, reacting to the news that 3 had just announced a truly unlimited data tariff.

It neatly encapsulates the attitude of Britain's big four mobile networks, which have been selling "unlimited" data tariffs for years, but not coming close to offering an unlimited service. In fact, even when mobile operators offer a fixed quantity of data for a monthly fee, you can't decide how to use it.

In this section, we reveal just how constrained the average mobile data consumer is.

The limits of "unlimited"

With the notable exception of 3, mobile tariffs offering "unlimited" data are largely coming to an end. O_2 last year scrapped unlimited smartphone tariffs, after claiming that "nearly a third of our data traffic is accounted for by just 0.1% of our customer base" – deciding to punish the other 99.9% by imposing a cap of 500MB a month on new and renewing customers.

Earlier this year, T-Mobile also decided to tweak its "fair-use policy" and limit customers to 500MB of data per month. "If you want to download, stream and watch video clips, save that stuff for your home broadband," read a stark notice on the T-Mobile website. Even customers paying £60 a month on Vodafone's most expensive tariff are limited to 1GB of data per month.

On the rare occasion the word "unlimited" creeps into a mobile tariff these days, it's applied misleadingly – the legacy of a ridiculous Advertising Standards Authority (ASA) decision that allowed Orange to advertise an "unlimited" tariff with a mere 250MB cap because "the vast majority of customers were unaffected by the data limit". Take T-Mobile's tariff for the iPad 2, which for £25 per month offers 1GB of "Anytime" data, 1GB of "Quiet Time" data and "unlimited" Wi-Fi – except it's actually limited to 10GB per month.

The ASA is reviewing the use of the term "unlimited" at the time of publication, but *PC Pro* will be naming and shaming the "unlimited liars" on our blog until the advertising watchdog finally gets its act together at **www.pcpro.co.uk/links/unlimitedliars**.

End of your tether

Even when you're sold a fixed quantity of data for a fixed price per month, there are constraints on what you can do with that bundle of bytes. If your tariff offers 1GB of data per month, you might expect to be able to hook up your laptop and download a few emails as long as you remain within your limit. Indeed, such a "personal hotspot" is a core feature of the latest iOS update for the iPhone 4, and has been available in Android handsets for years.

However, most networks will charge you extra to tether your laptop or tablet to your smartphone, even if you're nowhere near your data cap. "As soon as you tether your laptop or netbook to the internet, you'll pay £5 for 500MB that lasts for 30 days," Vodafone's iPhone tethering policy cheerfully states. Orange charges the same, while T-Mobile is slightly more generous, charging £5.10 for 1GB of tethering data for customers on a contract.

O_2 has recently introduced new "simplicity" tariffs that allow customers to use their data allowance for tethering, although customers on existing contracts will still need to buy tethering bolt-ons starting at £7.50 for 500MB. Once again 3 stands alone, allowing customers to tether their laptop to their smartphone as long as they remain within their data cap – which is genuinely unlimited if they're using the £25-per-month The One tariff.

Tethering tablets to smartphones is normally banned.

Mobile analysts believe the other networks will soon have to change their tariffs to reflect the multi-device era. Paolo Pescatore, director of operator strategy, applications and content at CCS Insight, noted that current Mi-Fi systems – where a personal hotspot serves 3G data to multiple devices – are too complex for some customers. "Some operators will say 'hey, you've got multiple devices' and you can have one tariff to serve them all."

Different device charges

Mobile networks won't only charge you extra for tethering – they'll also impose different tariffs for different devices. Take 3's tablet tariffs, for example. Apple iPad customers can get 10GB of data for £15 per month on a rolling 30-day contract; while the network's generic "Tablet plans" offer only 5GB of data for £15.99 per month on the same rolling monthly basis. How on earth can data on the iPad be cheaper than that of another tablet, when both are SIM-only deals with no hardware subsidy?

And take a look at Vodafone's international roaming charges (**www.pcpro.co.uk/links/201ripoff**).

> *"If you want to download, stream and watch video clips, save that stuff for your home broadband"*

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The standard data charges for using your smartphone abroad are £1 per megabyte for up to 5MB, then £5 per 5MB thereafter. On a laptop or iPad, it's £9.99 for up to 50MB. So 50MB of data on your laptop will cost you a tenner, or £50 on your smartphone.

> *"Perhaps the most bizarre restriction applied by mobile networks is putting an expiry date on mobile data"*

When we tackled Vodafone about this disparity, it commented that mobile handsets accessed pages that were mobile friendly, while travellers connecting from a laptop "have different usage patterns that require a different pricing model". *(See p93 for more on excess roaming charges.)*

Data time-outs

Perhaps the most bizarre restriction applied by mobile networks is putting an expiry date on mobile data. Every network now offers pre-pay mobile broadband dongles that come with a set allocation of data, say 1GB. But woe betide the user who doesn't consume all that data within the first month, because it mysteriously goes past its "use-by date" faster than the pack of bacon at the back of the fridge.

"Apart from the mobile phone cartel, what other suppliers take back a product if it isn't used within 30 days?" asked angry *PC Pro* reader Peter Turner in a letter of complaint to his network, in this case 3. "Is this any different from Tesco taking back a box of washing powder because it wasn't all used in a month? We have paid for the product and should expect it to be delivered in full. How your cartel got this past the regulator is an intriguing mystery."

The best way to avoid these time-outs – as 3 advised Mr Turner – is to buy a pre-pay deal with a bigger data cap spread over a longer period of time. For example, a 3 dongle preloaded with 1GB of data costs £21 and expires after 30 days, while one with 12GB (£82) lasts for an entire year and is three times cheaper on a per-gigabyte basis. Nevertheless, expiring data seems like a cheap means of extracting more revenue out of people who use mobile data only occasionally.

Banned applications

Even if you can find a mobile data tariff with a reasonable data cap, don't assume that you'll be able to use that data as you wish. Several of the mobile networks place restrictions or outright bans on applications that conflict with their own interests, or which they deem could place an "unfair burden" on their networks.

Mobile VoIP applications are a particular target for the mobile networks jealously guarding their call revenue. "70% of mobile consumers aren't allowed to use Skype, or have to pay extra to do so," claimed Jean-Jacques Sahel, Skype's director of government and regulatory affairs at a recent debate on net neutrality held at the House of Commons.

Videoconferencing, instant messaging and peer-to-peer sites are all frequently banned in the fine print of user contracts. For example, the terms and conditions for Orange's "Animal Packages" – which come with a daily internet allowance of only 25MB in the first place – stipulate that "mobile internet browsing is not to be used for other activities (eg, using your handset as a modem, non-Orange internet based streaming services, voice or video over the internet, instant messaging, peer-to-peer file sharing)". P2P on a 25MB limit? Chance would be a fine thing. Even if you pay the extra £5 per month for Orange's 500MB mobile internet bundle, you're hit with the same list of restrictions.

Vodafone, meanwhile, bars customers on its cheaper smartphone tariffs from using their inclusive data for VoIP services. Customers on those deals can "opt in" to "VoIP extra" for the, ahem, bargain price of £15 per month. Oh, and there's another rider. "VoIP is for your personal, non-commercial use," Vodafone's conditions state. Although quite how Vodafone would know if you're using Skype to make a business call is anyone's guess.

VoIP applications such as Skype are commonly banned, to force you to use the operator's own voice services.

Traffic management

Of course, a network doesn't have to put an outright ban on an application or service to kill it. Mobile operators also use traffic management policies to ensure we use only those services they want us to. O_2, for example, shapes P2P traffic to such an extent that maximum throughput is limited to a mere 50Kbits/sec during the afternoon and evening peak hours. According to Skype, this "would make it difficult to make an internet voice call, and would render a video call or videoconferencing impossible".

The mobile companies claim such restrictions are necessary to keep the service running smoothly for all. "Mobile operators are worried people are piggybacking off these [VoIP, video, P2P] services to damage the network," said Kip Meek, an adviser for Everything Everywhere, the parent company of Orange and T-Mobile.

Others argue that the only thing the mobile networks are protecting is their profits.

THE RIP-OFF COSTS

How much does it really cost the networks to send data to and from your phone? Are mobile operators fleecing the public with their myriad data tariffs? These are the questions at the heart of one of the biggest obstacles to a proper mobile internet experience, in which a fair price is charged for a decent quantity of data.

Sadly, the mobile networks don't want you to know the answers, and they won't tell us (anyone would think they had something to hide). But just compare the cost of a basic broadband package from BT over its copper ADSL services to the price for mobile data and you'll find the difference is staggering.

On BT Total broadband, £18 buys you 40GB of data per month, which works out at 0.045p per MB of data over a fixed line. A £3 internet bolt-on for Vodafone buys 100MB of data at 3p per MB, while Orange's £1 for 25MB works out even more expensive at 4p per MB.

Each bit of data is thus 66 times more expensive to send via Vodafone and almost 90 times more on Orange. That's before we even start looking at the ludicrous charges for using the web overseas *(see box, opposite)*.

The suspicion among consumers is that the mobile companies are profiteering – making hay before the regulators clamp down on high prices or competition forces prices down.

"Some cash cows in the mobile networks have had their throats slit, with things such as the EU regulating on mobile roaming charges," said Michael Phillips of ConsumerChoices.co.uk, which monitors data prices. "They were making huge margins on those and they've been taken away. This is a new area and they feel they can charge more, and they do. Regulators tend to be a step behind the pricing models of the mobile companies that see this as a good area for revenue."

Given free rein to set prices, phone companies are exploiting the public's ever-growing appetite for mobile data. They justify their inflated prices by comparing tariffs among themselves, even though tariffs are divorced from the actual cost of providing the data.

"The companies could create almost a monopoly in a similar way that the six main electricity companies have done," said Owen Cole, technical director at bandwidth management company F5 Networks. "They all say 'I'm the cheapest, I'm the best', but they're all far more expensive than they should be. When they make a profit, they make the banks look insignificant."

The companies certainly made huge profits last year. Vodafone, for example, reported profits of £11.5bn in the year to March 2010, with data revenue exceeding £4 billion and making up 10% of service revenue. Telefónica – which owns O_2 – managed a measly €10.5 billion (£9.2 billion). And this from companies that tell us they need more money to invest in infrastructure.

Not only do mobile companies see data as a cash cow, their high prices can also act as a tool to stave off the need to upgrade their networks to higher speed services, such as HSPA+ and LTE. The more they charge for the products currently available, the fewer people will use it, which means they can bleed their current infrastructure for maximum revenue before upgrading to faster networks.

"Charging is high – it's an expensive way of accessing data – and I suspect they're trying to control or limit access to make sure there's enough to go around," said Colin Pattinson, professor of mobile and converging technologies at Leeds Metropolitan University. "They do that partly through a fair usage process, but if it's more expensive it stops people using it too much."

> *"Not only do firms see data as a new cash cow, their high prices also stave off the need to upgrade their networks"*

Using mobile data outside of the EU can lead to enormous bills.

The true cost of data

Mobile phone companies have been reticent over the true cost of data provision, falling back on the excuse of "commercial sensitivity". They also cite the huge sums they paid for the spectrum licences to run 3G services – £22 billion in 2000 – as a reason today's data is so expensive.

That £22 billion payment was considerable, but break it into chunks and it starts to sound much more manageable. Five companies won the right to offer 3G services 11 years ago, which to date equates to just over £21,000 a day per company. Break that down further, and Vodafone, with an estimated 17 million UK customers, would need to charge just over 1p a day per customer to recoup what it splashed out in the 3G auctions. What's more, the licences run until 2021, so they have another ten years to recoup that investment – so the excuse that they have to factor spectrum costs into their pricing rings hollow.

Mobile operators also use the infrastructure costs involved in running a network to justify their data prices. Although detailed information on this is hard to come by, questions remain over how much a mobile data network really costs to run – at least in comparison to

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BT or Virgin, for example, both of which have nationwide fixed networks.

The fact is that mobile companies have been running voice services over their networks for 20 years or so. Although data requires additional hardware, the operators sometimes make it sound as if they've had to start from scratch to roll out a network of masts to accommodate data.

Indubitably, running a series of masts and backhaul adds up. Even though 3's 3G network is well equipped for mobile data, for example, its costs don't end at the mast, as Guy Winterton, head of corporate communications at 3, explained. "Costs vary hugely, but bear in mind that mobile networks are only wireless from the mast to the consumer. We have considerable fixed-line infrastructure costs, as well as paying for spectrum and radio equipment."

Some modern devices also create additional costs for the operators. According to network experts, the way in which Apple's iPad and iPhone connect and interact with the network has necessitated a significant increase in network hardware to keep track of multiple "internet sessions" initiated from the same device.

"The iPad and iPhone put a lot of strain on the infrastructure – they make it work harder," said F5 Networks' Owen Cole. "Because Apple wants to conserve batteries, it doesn't keep a connection open all the time: every time the network opens a connection it says 'this is a new device'. If you have network equipment that can support a million devices and my iPad is using ten connections, you can only support 100,000. That's why Apple's devices are more challenging."

Users who have shelled out for an expensive tablet and data package may have little sympathy, however – perhaps believing that if they've invested in mobile internet, then the carriers should do the same.

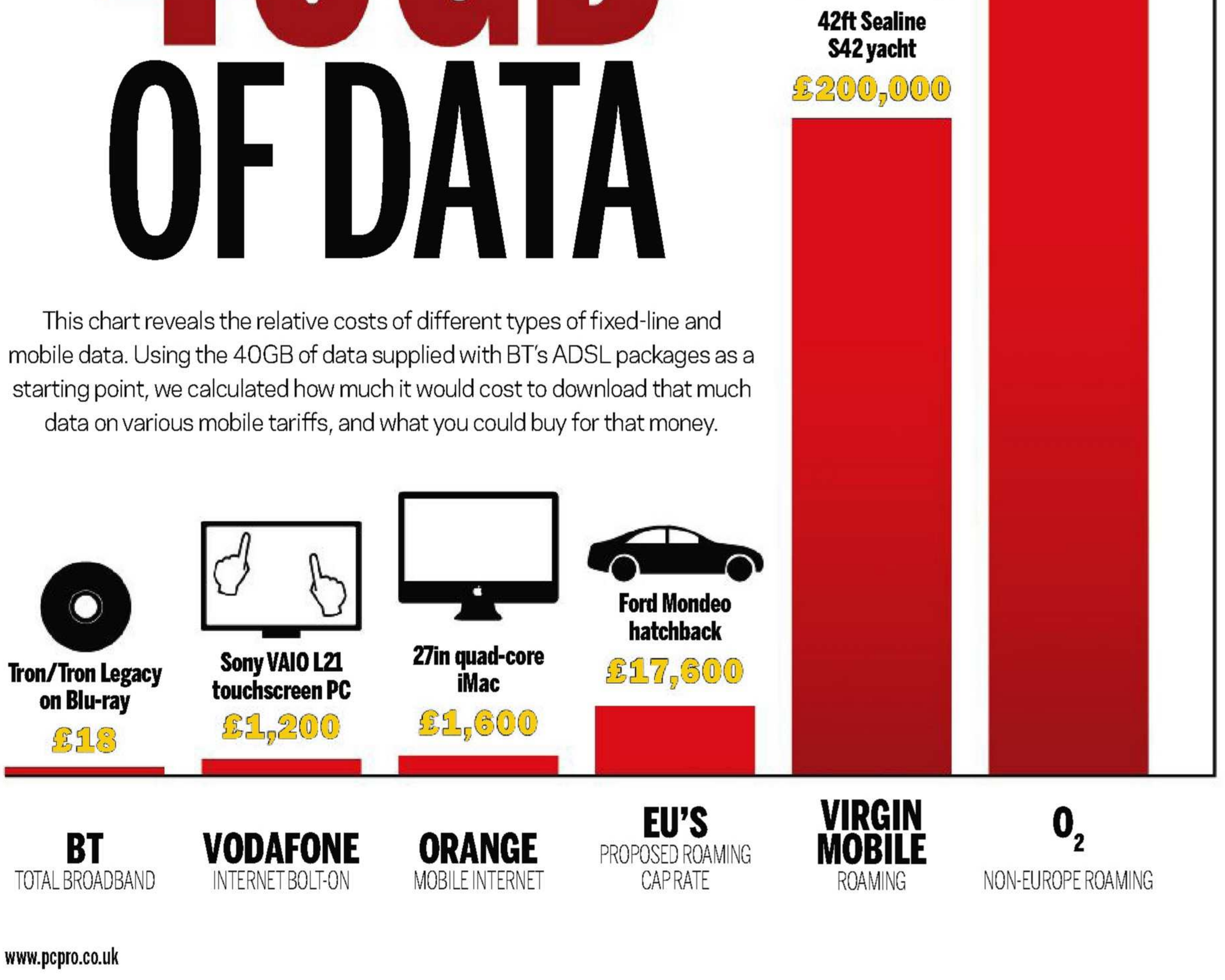
Roaming madness

If mobile charges at home seem excessive, they make Charlie Sheen look like a model of restraint compared to the fees incurred if you dare fire up a browser overseas to check emails or let your kids watch a video clip on holiday.

Stories of bill shock are legendary. Users have faced bills of thousands of pounds through unintentional 3G roaming when overseas, and it's easy to see how the charges mount up. The £3 per 100MB charge on O$_2$'s UK network looks a bargain compared to the £3 per

THE DIFFERENT COSTS OF 40GB OF DATA

This chart reveals the relative costs of different types of fixed-line and mobile data. Using the 40GB of data supplied with BT's ADSL packages as a starting point, we calculated how much it would cost to download that much data on various mobile tariffs, and what you could buy for that money.



megabyte charge in Europe, and a staggering £6 per MB in the rest of the world. Virgin's flat tariff is comparable at £5 per MB, although it also offers packages such as the one-day 10MB Travel Pass at £10. Vodafone is cheaper at £1 per MB in Europe.

The European Union has laid out plans for a maximum wholesale price of €0.50 per MB, which is still steep. "The data-roaming position is grim," declared Neelie Kroes, the EU vice-president for the digital agenda at this year's Mobile World Congress. "The consumer often pays less than €0.05 for downloading a megabyte of data at home, but this may turn into €2.60 per MB when the same consumer crosses an invisible border."

Kroes went on to highlight the greed displayed by data operators, which she said were refusing to pass wholesale price reductions on to customers. "Wholesale data roaming charges have fallen significantly. But consumers aren't seeing that matched in lower retail prices – and that's the true measure of competition," she said. "Incentives to compete on roaming prices aren't as strong as the pressures on domestic prices, but that isn't a justification for the current rip-offs."

Estimates of the cost to carriers for data vary, but wholesale prices paid in Europe are in the region of €0.03 per MB – the same MB for which users are charged up to £3 by their network. That's quite a markup.

Industry insiders have long believed that the networks have maintained this cash stream by distorting the market, hiding behind technical jargon about "interconnect costs" and a cosy closed shop. "They've been doing it for a long time," said Penny Roberts, international sales director for discount mobile calls company Go-Sim, which is currently working on a data package.

"It's been like it forever, and to get all the networks to stop it when they've got all these agreements with other networks around the world would take quite a lot of undoing. They are all 'I'll scratch your back if you scratch mine', and it's the user who ends up paying."

The price negotiations between international carriers are certainly complicated, with trade between companies depending on any number of factors. Co-location agreements, carriers' plans to move into other regions, capacity, local pricing and billing technologies all have to be taken into consideration.

THE BEST DATA DEALS FOR DIFFERENT USERS

ALL-ROUND DATA HOG

Tariff 3's The One Plan
Price From £25 per month
Data Unlimited
From www.three.co.uk

A relatively small network with large expanses of rural Britain not fully covered, 3's network was built with data in mind, and it regularly wins awards for speed and service. It's also the last "big" network offering genuinely unlimited data. The company says users could experience a maximum of 5.6Mbits/sec, although that's likely to be much less in practice, but the freedom to tether your laptop to your smartphone is another plus, and the 2,000 minutes of calls will come in handy too.

EUROPEAN TRAVELLER

Tariff Vodafone Data Traveller
Price From £2 a day
Data 25MB per day
From www.vodafone.co.uk

Although Abroadband's standalone data pricing is hard to beat, it lacks voice calls. Vodafone's Data Traveller packages are relatively keenly priced, and you can sign up on your existing contract. Make sure you register in advance, though, as non-Data Traveller traffic costs £1 per MB. The allowance drops to only 5MB in non-EU European countries, and there's no deal at all outside Europe, where data costs £3 per MB. Anyone on a Vodafone plan that costs more than £40 a month gets the Data Traveller service for free.

GLOBETROTTER

Tariff abroadband.com
Price €20, then €0.59 per MB
Data Flat rate
From www.abroadband.com

A refreshingly simple data plan for mobile roaming, abroadband charges a flat fee no matter which country you visit. There are no voice connections or a mobile number – although Skype is available – but the company offers cheap data in 128KB chunks. SIM and micro-SIM cards cost €20, after which it's €0.59 per MB. Its rivals' pricing in Europe is getting better, but abroadband really comes into its own further afield. Its charges checker claims Orange charges €9.39 per MB of data in the US, while T-Mobile charges €8.80 per MB in Malaysia.

Illustrations:
Tim Bradford
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> *They're trying to keep prices as high as they can because they already have customers. They don't need new ones*

"With roaming you require bilateral agreements, and that's a whole different ball of wax," said Mark Beccue, senior analyst for mobile technology with ABI Research. "Users can roam across three networks in, say, Spain and it's not necessarily true that you'll get a better deal with the sister network of your home carrier. O_2 is at the mercy of whatever deal it has cut with Telefónica or other local carriers."

It's difficult to understand why O_2/Telefónica – and it's by no means alone – doesn't offer a simple data-sharing tariff across its European networks, but according to the company it can't do so without making its tariffs more complicated. "If we were to move to network-dependent pricing, we could cut the prices on our 'sister' networks," a spokesperson said. "However, that would mean significantly higher costs on non-O_2/Telefónica networks. Our experience shows that customers are unlikely to select networks manually when they're travelling abroad, and many wouldn't know whether they were on the right network or not. So we create a price for the region based on the average costs within that region.

"An alternative would be to 'switch off' those non-O_2/Telefónica networks, but we don't think that would be in the customer's interests. We prefer to protect the customer from landing on more expensive networks by averaging out the costs."

Of course, these costs wouldn't have to be so high if operators collectively agreed to lower wholesale prices, and that's the reasoning behind EU plans to enforce a wholesale price cap. Although these cuts so far haven't been passed on to users, it's seen as a step in the right direction – albeit a modest one.

"The 50¢ per megabyte wholesale charge is too high," said 3's Winterton. "I'd say 5¢ at wholesale would be low enough to drive competition and allow consumers to start behaving abroad in a similar way they're used to at home, without getting hit with an enormous bill."

The fact that 3 believes such a low threshold would be workable goes to show how much we're currently overpaying, and the reluctance of legacy carriers to change with the times could come back to haunt them. A new breed of data carrier is emerging, one that isn't afraid to set prices as low as profitably possible in a bid to sign up disgruntled customers. Austrian company Abroadband, for example, has signed agreements with carriers in 50 countries, and is now offering users 1MB of broadband for €0.59 anywhere in the world. The company – a subsidiary of Telekom Austria – believes its strategy could steal consumers from the old networks.

"I'm sure they're trying to maximise the margins, but our strategy is to bring data to the mass market," explained Jerolim Filippi of abroadband.

"When you look at the players in Europe, for them offering cheap data prices would be destroying the profits they're making," he said. "They're simply trying to keep the prices as high as they can because they already have customers. They don't need new customers so they're maximising their returns. For us, we need to get the customers."

A little more fresh blood, with its confrontational attitude to the old guard, can only prove positive for users, and might end the pricing policy of operators charging what they can get away with, rather than what is fair.

TEEN TEXTERS

Tariff GiffGaff
Price From £10
Data Unlimited
From www.giffgaff.com

With kids connected at the wrist to their Facebook accounts, and hungry for data-heavy services such as streaming music and video, unwary parents could find themselves bailing out their offspring. GiffGaff, a virtual provider running over O_2's network, offers a pay-as-you-go deal that should satisfy most teens. The £10 "goody bag" includes 250 UK minutes, unlimited texts and unlimited data. You need to apply for a free SIM card, and the only significant small print seems to be a restriction on tethering and automated web use.

LAPTOP ROAD-WARRIOR

Tariff 3's Mobile Broadband
Price £15.99 (24-month contract)
Data 15GB
From www.three.co.uk

Painful as it is to include two deals from one company, 3's mobile broadband offering is so much cheaper than its rivals (20 times cheaper than Orange, according to broadbandchoices.co.uk) that anyone looking to plug a dongle into a laptop and use proper software would be spiting themselves by looking elsewhere. The 24-month contract includes a 3G dongle and SIM card and, at £15.99 for 15GB, it offers data at near-landline prices. Don't breach the 15GB cap, though: additional data costs 10.2p per MB.

WHY BRITISH PCs ARE STILL BEST

STUART ANDREWS DISCOVERS HOW BRITISH PC MAKERS ARE SURVIVING - AND EVEN THRIVING - DESPITE THE ECONOMIC DOWNTURN

In today's economic climate all businesses have it tough, but the British PC industry has it tougher than most. In fact, it's been hard going since the early noughties. Over the 16-year lifetime of *PC Pro*, we've seen a proud, fledgling industry go from boom to almost bust.

In its infancy, *PC Pro* featured dozens of British PC manufacturers, ranging from ambitious startups to established names. Now, most of them have gone, with companies as large and widely respected as Evesham, Dan Technology and Panrix dispatched to the dustbin of history. While UK PC sales have rebounded from their 2000, 2001 and 2009 low points, there's still uncertainty, as shown in lower-than-expected figures for the end of 2010.

This is a market where a brave few can still find opportunities, but it takes technical skill and business nous to grab them. In the words of Ben Miles, of British system builder Chillblast: "It's a tough market. It's a cut-throat market. It's one of the most difficult areas of retail out there, without a doubt."

This could be a troubling tale of fierce competition, downward sales trends and collapsing profit margins, but curiously, it's also one of hope. By being agile and focusing on specific areas or niche markets, our most inventive British builders aren't only staying in business, but finding ways to prosper and grow.

Here we reveal the inside story of the British PC manufacturers: what they do, how they compete, and why all of this should matter when you choose your next PC.

Illustration: Allan Sanders www.loopland.net

www.downmagaz.com

The homegrown difference

The biggest difference between the average small-to-medium British system builder and their large multinational rivals lies in how the PCs are built. While the world's largest manufacturers – Dell, HP, Apple, Acer, Lenovo – offer degrees of customisation, their systems are still manufactured on large production lines, meaning several employees will be responsible for different aspects of the selection of components and assembly.

Smaller UK system builders work differently. In companies ranging from CCL and Chillblast to CyberPower UK and Wired2Fire, each PC is hand-built by a single engineer, who's responsible for the system from start to finish.

There are two key reasons why. First, smaller manufacturers don't sell in the same volumes: the average order might consist of only one PC, configured to the needs of the individual customer. "Since the majority of our PCs are bespoke, it's rare we'd build the same PCs time and again," said David Scott, production manager at CyberPower UK. "We find it's easier to manage and control if each PC is given the personal treatment."

It's the same story at Chillblast. "If you do it as a production line, that lends itself to all having very similar builds," said Miles. "Because we do customised systems, and each system is different, it doesn't really lend itself to that style."

The one-man, one-build approach also helps with quality assurance. In some firms, the engineer who builds the system tests and beds it in, while others, such as CCL, undertake a 24-hour burn-in test combined with a visual inspection. In either case, having one system made by one engineer means it's easier to investigate should something go awry, and highlight either a hardware issue or a need for further training.

The design and specification process isn't so different. A larger manufacturer might start with a new technology or a vision of a large-scale market, then build a PC to match that target. Smaller firms go through a similar process, working with an ideal list of components, then building, testing and troubleshooting until they have a system that works. Smaller builders have to decide whether specific combinations work, and fold that data into the system configuration. It's all a question of getting the specification right for the particular customer and their specific needs. After all, if someone wants a gaming system, they don't want a basic PC with a £40 graphics card thrown in – a mistake often made by their larger competitors.

The actual components used will depend on the builder and on their relationship with key manufacturers. The more established, smaller manufacturers will cultivate relationships with suppliers such as AMD, Nvidia and Intel, but most UK manufacturers will partner with one or two component-level manufacturers, such as Asus, Gigabyte or Corsair. Wired2Fire, for example, has agreements with Asus for motherboards and Corsair for memory products. As co-founder Peter George explains: "The choice is easy. For motherboards, Asus is always first to market with new technology and it covers a range of boards. Its build quality and supply is excellent, too."

For Chillblast, it's a case of giving the customer the choice. "The only incentive to use products from manufacturers we're partnered with is a small rebate on sales," said Ben Miles. "However, this doesn't amount to a value that would put us off a competitor's product if it was superior, which is why we offer such a wide variety."

Starting out and staying in

It's hard to start a PC business, but not impossible. Chillblast began ten years ago as a specialist retailer of overclockable processors, then moved into components and eventually complete system builds as margins dwindled. Wired2Fire started with two people in a small office on a relation's plot of land, which allowed it to develop without worrying about what are usually the two biggest pressures: premises and staff. "If you have funding you can get started quickly," said Wired2Fire's Peter George. "However, as a rule of thumb, everything will take twice as long and cost twice as much as you expect." The trick, he says, is to be realistic. "As an entrepreneur, you'll have to survive on an income of next to nothing at the start, potentially for months or even longer."

Building PCs doesn't require much in terms of manufacturing equipment or space to begin with, but staffing can be tricky. "We are lucky being based near Newcastle, a city with two universities," said CyberPower UK's David Scott.

"Most of our staff are graduates, and we have years of training experience. The key part is finding the enthusiast who sees the job as an extension of their hobby. If the enthusiasm is there, it's easy to teach the finer points."

Yet system builders are now facing their biggest challenge in building and maintaining momentum. In today's PC market, margins are tight and competition fierce. "We can compete with the larger firms on any systems capable of decent performance," said Wired2Fire's Peter George, stating a typical price of £400. "Below this, economies of scale become prohibitive. The margins on the really cheap machines are so small that you have to produce thousands a month to make any headway."

One of the problems is getting components at a competitive price.

"Distribution will give you significant discounts only if you deal in bigger volumes, so for the startup this is bleak," George explained. "At the outset, manufacturers won't be interested in you. After a few years they'll come knocking on your door to sell their products, but early on the only real way to compete on price is by compromising on margin. Bear in mind that those margins have been squashed in recent years. The prospects look poor for newbies."

Chillblast's Ben Miles agrees. "One of the biggest changes that's happened in the PC industry in general is the collapse of profit margins," he said. "Back in the 1990s, you could easily sell a PC where you're making perhaps 40 or 50%, which is in line with a lot of other industries or retail products. Now it isn't unusual for companies in IT to be making margins of 2 or 3%."

The result is that system builders have to focus on minimising costs, trimming unnecessary expenditure, and working as lean as they can. "If we make £30 on a £500 system I'm delighted," Miles exclaimed.

Meanwhile, regulation raises new difficulties. Manufacturers complained to us about a number of government issues, ranging from rises in VAT to the increase in red tape affecting system builders. "European and UK initiatives for recycling, harmful materials and efficiency have all made the market tougher," said CCL's product manager, Tom Lamb. "These new regulations are welcome, as they protect the environment from a considerable risk of contamination when a system reaches the end of its useful life, but there are added costs involved that weren't there 15 years ago."

> **It isn't unusual to be making margins of two or three percent**

Luckily, help is at hand for the troubled PC makers in the form of a number of programmes run by the likes of Microsoft and Intel. Microsoft, for example, has a scheme where qualified system builders can earn rebates and obtain training and marketing assistance, provided they buy in reasonable quantities and their employees achieve certification. For most system builders, these schemes are beneficial.

"We get better support from Microsoft," said John Medley, reviews manager at PC Specialist, "and our customers can see that we're recognised." Ben Miles, meanwhile, feels that Microsoft's certification courses help build knowledge and share tricks of the trade, and the costs are hardly prohibitive. The courses can be self-taught using materials available online, and the exam costs a mere £70.

The lone voice of dissent comes from Wired2Fire's Peter George. "Most schemes run by Intel or Microsoft require sales figures that most small companies won't hit for years, so they're of little use to new businesses," he complained. "Until you're hitting significant figures, they don't seem very interested in supporting the channel."

The other key move is to build relationships that get you components cheap and early. "Gaining allocation on new products is essential for a company such as ourselves," said Miles. "It's important that we're quite agile, and that we can release a new PC with exciting new products in it as soon as possible – and also get systems out to computer magazines." This last point is crucial. "It's a far, far better way of generating interest in a product than an advert," Miles concluded.

Of course, bringing new products out too fast can have its downsides. With the recent Intel Sandy Bridge chipset recall, it was the companies that struck early that were most badly burnt, facing transport, support and administration costs when affected machines had to be returned. "We certainly weren't the most agile firm there in getting those out for review," said Miles, "mainly because we didn't have a pre-release sample of the processor. Those guys that did, and who got it out really early, would have had to recall hundreds of PCs, whereas we had to recall only ten or so."

Adapt to survive

Novatech has been in business for 24 years, and if managing director David Furby has learnt anything, it's that you have to adapt. "The industry is constantly evolving, and the good companies tend to keep ahead of the change," he said. "The ones that don't fall by the wayside."

Whereas other companies look at developments such as desktop virtualisation with fear, Furby tries to see the opportunity. "If that's the way customers want to go, we're not going to be the company saying, 'sorry, we sell boxes – that's all we do'. We're going to be the company saying, 'if you want desktop virtualisation, here is our offering,' and we'll take the server business that goes behind that."

For Furby, the key is working out where to add value. There's no point going head-to-head with the likes of Dell

THE PC PRO DESKTOP PC AWARD WINNERS

YEAR	WINNER	BRITISH?
2001	Evesham	✓
2002	Evesham	✓
2003	Evesham/IBM	✓/×
2004	Fujitsu Siemens/IBM	×/×
2005	HP	×
2006	Evesham	✓
2007	Medion	×
2008	Novatech	✓
2009	PC Specialist	✓
2010	Chillblast	✓

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WHATEVER HAPPENED TO...?

THE COMPANY	THE STORY	THE DEMISE
Evesham Technology	The Worcestershire-based manufacturer, founded in 1983, was one of the first big players in the UK PC scene. By 2007, it had more than 300 employees and had grown to sell a wide range of peripherals and home entertainment kit.	Evesham bet heavily on the Labour Government's Home Computing Initiative. Its sudden cancellation in 2007 left a £30 million hole in the company's forecasts. Evesham went into administration in August 2007, but struggled on as Geemore Technologies until February 2008.
Dan Technology	This London-based manufacturer was a respected, award-winning PC builder, noted for its high build quality and customer service.	Dan went into receivership in June 2002. The brand name was picked up by Stone Computers a month later, but is no longer used.
Watford Electronics	Founded in 1972, Watford Electronics went on to become a successful UK reseller and PC manufacturer. As Savastore it became one of the UK's first big online electronics stores in the late 1990s.	Savastore went into administration in February 2007, and the business was purchased by Globally Ltd, a company run by former Watford Logistics manager, Mahmood Jessa. Rebranded as Saverstore, it's still in business today.
Tiny Computers	Started in 1990, Tiny sold cut-price PCs through mail order while a sister company, Opus, targeted the corporate and public service markets. Tiny even opened up a chain of retail stores in the late 1990s.	Caught out by the home computing crash of 2001, Tiny went into receivership in early 2002 and had its assets bought by Time PLC.
Time PLC	Part of the Granville Technology Group, whose brands also included Colossus and MJN, Time is best remembered for its advertising and its chain of 1990s retail outlets.	Time merged its retail business with Tiny's, but went bust in 2005, owing £30 million and with a loss of 1,500 jobs.
Panrix	The system builder from Leeds created a reputation for cutting-edge, high-performance systems, and was a frequent winner in the *PC Pro* Labs.	Panrix suffered badly from the downturn in the PC market at the turn of 2000, and went into administration in May 2001. It had a brief resurrection as Panrix Technologies under founder Gulberg Panesar, but went down for good in 2002.
Dotlink	The Wembley-based manufacturer became known for aggressively priced, high-performance systems in the days when AMD and Cyrix were giving Intel a bashing.	Dotlink remains listed at Companies House, but no longer sells PCs. Head-honcho Kirit Shah is director of educational tech specialist, Go Education PLC.

on price. "If they [customers] want the deal, then they can be very, very aggressive about it," he explained. "If you can listen to what the customer wants and come up with a solution that perhaps your competitors can't be bothered to come up with, then there's a lot more opportunity there. People don't just buy boxes. They buy solutions."

Other system builders have found success in attacking specific markets or targeting a smaller, high-value niche. Viglen, for example, has prospered where contemporaries failed by focusing on public services and education – the company is number two in the UK schools market, and makes half of its sales in education.

It's a success that Novatech is keen to emulate, having just won business as part of a new £100 million college framework. However, David Furby is wary of relying on large public initiatives. After all, it was Evesham's banking on Labour's Home Computing Initiative that destroyed its finances in 2007. "History is littered with governments changing their minds on the spot," he said.

> **The good firms keep ahead of change. The ones that don't fall by the wayside**

CCL also sounds a note of caution, spotting that governmental moves to build and re-equip schools, with a corresponding investment in IT, have disappeared with the economic downturn. "IT is often viewed as requiring no investment as long as it's functioning correctly," said the company's Tom Lamb.

Some system builders, such as VeryPC and Tranquil, have abandoned the value and performance PC markets to capitalise on the interest in eco-friendly, energy-efficient computing. Meanwhile, Wired2Fire, CyberPower UK and Chillblast have found their own ways to attack the enthusiast segment, with Wired2Fire focused on pre-overclocked performance systems, and CyberPower on water-cooled machines. "The market is very competitive at the moment. There is always someone willing to undercut you and sell cheaper," said CyberPower's David Scott. "You need to differentiate and sell products that are unique."

The only danger comes when too many companies fight for a dwindling number of customers. "Providing we focus on niche markets, there are still opportunities," said PC Specialist's John Medley. "However, more companies are trying to compete in niche markets, which drives margins down further." The narrower these margins get, the tougher it becomes for our homegrown manufacturers to survive.

The British benefit

And we need them to survive. The advantage of buying from a smaller, local company is that you're more likely to get a PC that's individually tailored to your needs. "With UK manufacturers you'll get the PC you want," said David Scott, "not one that's being recommended by a larger corporation." Peter George concurs. "So many companies don't give a damn these days. Companies such as Wired2Fire can do the important but basic tasks bigger companies no longer care about, such as getting someone useful and knowledgeable on the phone or answering email. We'd take time out to look at someone's budget and needs, then specify a PC suitable for this and explain the component choices."

UK manufacturers can also move faster on cutting-edge technology than their global brethren. "US-based manufacturers tend to be more cautious in bringing new technology to market," claimed David Scott. "Our philosophy is that if it's available and it works we'll sell it. After all, it's your PC and you should have it built to your design."

Should things go wrong, you're also more likely to get someone helpful on the phone. In fact, of the last ten winners of *PC Pro*'s reader-voted desktop PC award, seven have been British. "When repairs are required, we're small enough to be able to offer a personal service, yet big enough to be able to offer a quick and efficient turnaround," said CCL's Nicola Gagg. "If you have a problem, call us and we'll talk you through it," added Wired2Fire's Peter George. "Good luck getting someone useful on the support line of one of the mass-produced PC manufacturers!"

Of course, there will always be bad, inept and even crooked small PC manufacturers, just as there are good, responsive and flexible large PC manufacturers. Yet it all comes down to the fact that, in the words of Novatech's David Furby, "value for money isn't just about price, but about getting something that works and the support you need. I think most of the customers who come back to us feel they get a better experience and better value overall."

10 TECH FIRMS THAT BLEW IT…

WE COUNT DOWN TEN TECHNOLOGY COMPANIES THAT HAD GOLDEN OPPORTUNITIES – AND THREW THEM AWAY

Contributors: Barry Collins, Darien Graham-Smith, Nicole Kobie
Illustration: Peter Mac (www.peter-mac.com)

Technology is an unforgiving business. Companies that appear to have unassailable leads in their market one minute can find themselves fearfully looking in the rear-view mirror the next.

Technology firms are always at risk of being superseded by someone faster, smarter or richer. In this feature, however, we're focusing on the companies that contributed to their own downfall, with one or a series of catastrophic decisions that wreaked irreparable damage to their business.

Our top ten spans smartphones, servers, storage and more. We also profile one firm that managed to bounce back from near-oblivion.

1 NOKIA

In early 2007, Nokia was the world's largest handset manufacturer. It had just released the N95, the first truly consumer-focused smartphone. But only a few months later, Apple revealed the iPhone, leaving the Finnish firm so far behind that it's still trying to catch up.

It didn't need to be that way. Well before Apple's innovations arrived, Nokia not only had the largest slice of market share and a reputation for building high-quality handsets, it also had the idea for touchscreen phones. Nokia showed off a prototype of a web-enabled touchscreen device as far back as 2004, but it canned the idea because of high development costs.

Nokia had even latched onto the idea of mobile apps before Apple made them a worldwide phenomenon. Dubbed WidSets – or "mini-applications", as we described them at the time – the concept made *PC Pro*'s list of top techs to watch for in 2007. Four years on, WidSets were subsumed into Nokia's Ovi Store, a pale imitation of Apple's massively successful App Store.

Imagine an alternative tech world in which Nokia released the first touchscreen smartphone and popularised the app store. That thought must bring tears of regret to Nokia's shareholders, employees and the Symbian community. Instead of dominating the mobile market, Nokia was forced to cut a deal with Microsoft to survive. The deal will reportedly be worth billions of dollars to ailing Nokia, but it could have been so much more than merely Microsoft's handset maker.

2 REAL NETWORKS

At one point, you could barely watch a video or listen to a music clip online without needing RealPlayer on your PC. It was so ubiquitous that it was bundled as an optional extra with Windows 98.

However, Real Networks ultimately managed to throw itself onto the pyre of smouldering tech failures by irritating the hell out of its own customers. RealPlayer had a habit of installing itself as your default media player for every media file type under the sun, even when you hadn't asked it to.

The player also spewed out more pop-ups than a dodgy porn site, turning the Windows System Tray into a cheap motel. And it was at the centre of a privacy storm in 1999, when the Real

Jukebox software was found to be phoning home with details of songs its users were listening to, forcing the company into a hasty patch.

With the web moving towards open, non-proprietary media formats, RealPlayer has shrunk into – frankly deserved – obscurity. In 2000, it was the most-used internet media player, according to Nielsen; last year, it was a rapidly declining fifth.

3 QUARKXPRESS

QuarkXPress was the first publishing application with the power to replace traditional layout and typesetting methods completely – and it ran on a modest desktop computer. Publishers small and large leapt at it. Within ten years of its launch in 1987, it had reportedly cemented a 90% share of the booming desktop publishing market.

Although Quark's success came quickly, however, the software itself evolved at a glacial pace. In those ten years it gained a mere handful of new features – and missed some important ones, including the ability to produce PDFs. While both the Mac OS and Windows repeatedly refined and redesigned their user interfaces, Quark stuck with exactly the same crude, chunky front-end it had always used.

Things got worse in 2001, when Apple introduced the brand-new OS X. QuarkXPress took two years to provide an update that ran natively in the new OS, angering many of its users. Worse still, rather than trying to address complaints, Quark CEO Fred Ebrahimi dismissed them, inviting those who were unhappy with Quark to "switch to something else".

Most professionals did just that. While Quark had been taking its users for granted, Adobe had been perfecting its own DTP package. Originally launched in 1999, successive versions of Adobe InDesign quickly came to offer a fuller set of features than QuarkXPress, with a more sophisticated interface and a much faster update cycle. Today, Quark's market share has plummeted to around 25%. The company still sells publishing software *(see our review of QuarkXPress 9, p58-59)*, but there's no doubt that its heyday is behind it.

4 IOMEGA

In the days before external hard disks were affordable, and online backup was as fanciful as taking Kylie home for tea, Iomega dominated the external storage scene. In 1998, the Zip drive claimed 87% of the "high-capacity" disk market, according to analyst IDC – in an era when "high capacity" meant 100MB.

Yet Iomega's grasp on the external storage market wasn't to last. The infamous "click of death" – where misaligned heads caused Zip disks to all-too-audibly fail – severely dented Iomega's reputation for reliability. However, its rigid adherence to its expensive, proprietary storage format was ultimately its undoing.

As our 2002 review of the Iomega Zip 750 noted, the device itself cost £145 and the 750MB Zip disks another £10 each. With CD-RW drives at that time costing only half as much, and blank discs only a few pennies each, Iomega was fighting a losing battle. And instead of encouraging an eco-system around its Zip products, Iomega resorted to suing companies attempting to sell "Zip-compatible" media.

"RealPlayer spewed out more pop-ups than a dodgy porn site"

In 2008, Iomega – whose share price had fallen from a high of over $100 to $3.60 – was bought by storage giant EMC. It still produces a wide range of consumer products, but its days as a household name are over.

5 PALM

A decade or so ago, Palm could do little wrong in the eyes of *PC Pro*'s reviews team. The "perfectly formed" Palm III won our December 1998 PDA Labs, while the legendary Palm V, with its metallic case and hinged leatherette cover, was a design classic. It achieved Hoover-like levels of recognition among gadget fans: you didn't buy a PDA, you bought a Palm Pilot.

Palm was therefore almost perfectly placed to make the transition from PDA to smartphone. So what went wrong? The internal turmoil at Palm HQ certainly didn't help. 3Com's takeover prompted Palm founders Jeff Hawkins and Donna Dubinsky to strike out on their own and form the ill-fated Handspring, which split the loyal fanbase and Palm's product development.

The decision to spin off Palm OS as a discrete company – separating the software side from the hardware division – was equally catastrophic, creating unnecessary upheaval at a time when more nimble rivals such as RIM's BlackBerry were emerging and defining the early smartphone market.

In the end, Palm OS was run into the ground to such an extent that the company was forced to abandon it altogether and bet the house on webOS and the Palm Pre – a move that paid off in the form of a $1 billion takeover by HP, but which currently looks unlikely to return the Palm brand to the market-leading position it once enjoyed.

6 AOL

In the early years of the web, AOL was how millions of people first got online. The company hooked users by flooding mailboxes and magazines with what felt like billions of CDs offering a few free hours of internet access, addicting people to the web like a dealer offering the first hit for free.

The tactic clearly worked, as did a deal with Microsoft in 1996 to bundle AOL's software and web access with Windows. AOL became synonymous with instant web access, solidifying its reputation as the easy way for less technically savvy people to get online.

The company was by far the biggest internet provider in the US and had more than 35 million subscribers globally, leaving it rich enough to shell out a stunning $147 billion to buy Time Warner – owner of CNN, among other media firms – in 2001. A decade on, the tables have turned. Time Warner has spun off AOL, and the firm is now a punchline for jokes about people who don't quite understand the internet. What happened?

AOL may have had access to a vast wealth of Time Warner video content, but remarkably it failed to migrate its customers to broadband to enable them to enjoy all that content. It has now refocused on selling advertising online, buying up blog properties such as The Huffington Post, but it still makes 40% of its revenue from subscribers to its web services and dial-up access.

In light of reports that as many as 75% of its dial-up subscribers also have a broadband service – which suggests they're paying purely for AOL email and other web services – a focus on content may indeed be AOL's only hope for survival.

7 YAHOO

Yahoo didn't just blow it once – the firm arguably missed a hatful of opportunities to save itself.

The one-time search leader was caught cold by Google's superior search technology – so much so that in 2000, it actually borrowed Google's engine to power its own search results. Indeed, Yahoo liked it so much it tried to buy the company, but then-CEO Terry Semel refused to improve on a $3 billion offer for Google in 2002.

Two years later, Google's IPO valued the firm at $27 billion, and today it's worth a staggering $184 billion. While doubling or even tripling the offer may not have been enough to force Google's hand, Yahoo's unwillingness to take a risk on what would become its biggest competitor spoke volumes.

Yahoo repeated the mistake with Facebook in 2006, refusing to offer more than $1 billion for the social networking firm. Today, according to Goldman Sachs, Facebook is valued at $50 billion.

Possibly the biggest Yahoo misstep – for its shareholders, at least – was turning down Microsoft. The firms had been in acquisition talks for three years when Microsoft lost patience and made

"Yahoo didn't just blow it once – it's missed a hatful of chances to save itself"

an unfriendly takeover bid – or as unfriendly as $44 billion can be. Yahoo dodged the deal, and a subsequent offer of $20 billion for its search business, but eventually signed on for a ten-year search partnership. Yahoo is now valued at half of Microsoft's buy-out offer, and is now focusing on ad sales and letting Microsoft's Bing take on the mantle of official rival to Google.

8 FRIENDS REUNITED

Friends Reunited not only pioneered social networking in Britain but, miraculously, found a way to make people pay.

Set up in 2000 by husband and wife team Steve and Julie Pankhurst, Friends Reunited was based on the premise of looking up old school friends. In the days before Facebook, the voyeuristic draw of finding out what had happened to former classmates proved irresistible, and it became the most talked-about site of the early 21st century.

The genius of Friends Reunited's business model was charging users if they wanted to contact old school chums. The prospect of millions of users handing over £5 each provoked wild valuations of the company's worth, even in the post-dotcom-boom era, finally tempting broadcaster ITV to buy the site for £120 million in 2005.

But few ever paid twice for Friends Reunited. Once you'd handed over your fiver, shared a few reminiscent emails with Steve from the school football team, made an awkward pass at a teenage crush, and worked out that Dave from 3C was still the pillock he was 15 years ago, there was no incentive to go back. No status updates, no applications, none of the things that allowed Facebook to come along and steal Friends Reunited's dinner money a few short years later.

Friends Reunited eventually dropped the fee in 2008, but by then all life had been sucked out of the site. ITV sold it last year for a reported £25 million – barely a fifth of what it had paid for it.

9 DEC ALPHA

Alpha was a revolutionary CPU architecture. Designed by DEC and launched in 1992, it was intended as a workstation and server platform that would remain stable for decades, through successive generations.

Accordingly, even though a fully loaded server at the time might have had no more than 4MB of RAM, Alpha was implemented as a fully 64-bit architecture capable of addressing 16 million gigabytes of memory.

In order for Alpha to achieve its intended long life, DEC realised that performance would need to scale up enormously over time. Alpha was therefore equipped with an extremely simple instruction set, and lacked some of the sophisticated features found on modern processors, so that massively increased clock frequencies and any number of additional cores could easily be implemented in the future.

On paper, Alpha was brilliant, and it got off to a good start: Unix and VMS distributions were ported to run on Alpha chips, and Microsoft published Windows NT for the Alpha architecture.

Unfortunately, although the product was sound, the strategy wasn't. Almost as soon as Alpha processors appeared, businesses began to move away from workstations and multi-user servers in favour of increasingly cheap and capable Windows PCs. Microsoft shifted its focus to this market and began to phase out support for Alpha, leaving the platform – and its manufacturer – to serve a shrinking niche market. DEC faltered, and ended up being bought by Compaq, which was in turn acquired by HP, which halted development of Alpha processors in 2004.

10 SUN MICROSYSTEMS

Sun's early sales success was partially responsible for its downfall. It sold oodles of its flexible systems to startups and web firms during the boom of the 1990s, leaving a glut of second-hand equipment in the market when the bust ruined everyone's fun. Sun also continued to focus on systems based on its own Sparc architecture while x86 was taking off, leaving it trailing behind in the enterprise space.

Despite the ensuing sales troubles, Sun managed to stay innovative, buying and open-sourcing the productivity suite that became known as OpenOffice, creating Java and even offering utility computing systems a year before Amazon unveiled its own cloud product.

None of that could hold off the inevitable, however, and Sun's value slid to $3 billion in 2008. A year later, after shunning IBM's offer, Sun was bought by Oracle, leading many to speculate that the classic tech firm may be dismantled for parts.

Think of what Sun has created or backed: Sparc, Java, Solaris and OpenOffice. The latter still exists, but after disputes with Oracle, key developers forked it off to create LibreOffice – now the default productivity suite for Ubuntu. And Oracle has already started using its ownership of Java to start hassling Google over Android. In other words, two of Sun's key open technologies have already been killed off or are being used as a blunt object to smack rivals. That isn't much of a legacy for such an innovative firm.

APPLE: THE COMEBACK KING

If any of the surviving companies in our top ten are short on belief that they can still turn it around, they should look no further than Apple. The company has gone from the brink of bankruptcy to the biggest tech company in the world, thanks to the success of the iPod, iPhone and iPad.

Apple came perilously close to going out of business. After Steve Jobs was ousted in 1985, the firm stumbled through a series of missteps, and its more expensive machines couldn't keep up with cheaper PCs and clones.

In 1997, however, Steve Jobs strolled onto the stage at MacWorld Expo as interim CEO, with $150 million in backing from Microsoft. Apple fans in attendance apparently booed the move, but Jobs quickly set about rebuilding the company he helped found.

While Apple has never recovered its market share on the desktop, high margins and a series of market-defining devices have seen it top the market value of its saviour Microsoft. It's a Cinderella story any struggling tech firm would hope to emulate, although it's left many worrying each and every time Steve Jobs takes medical leave.

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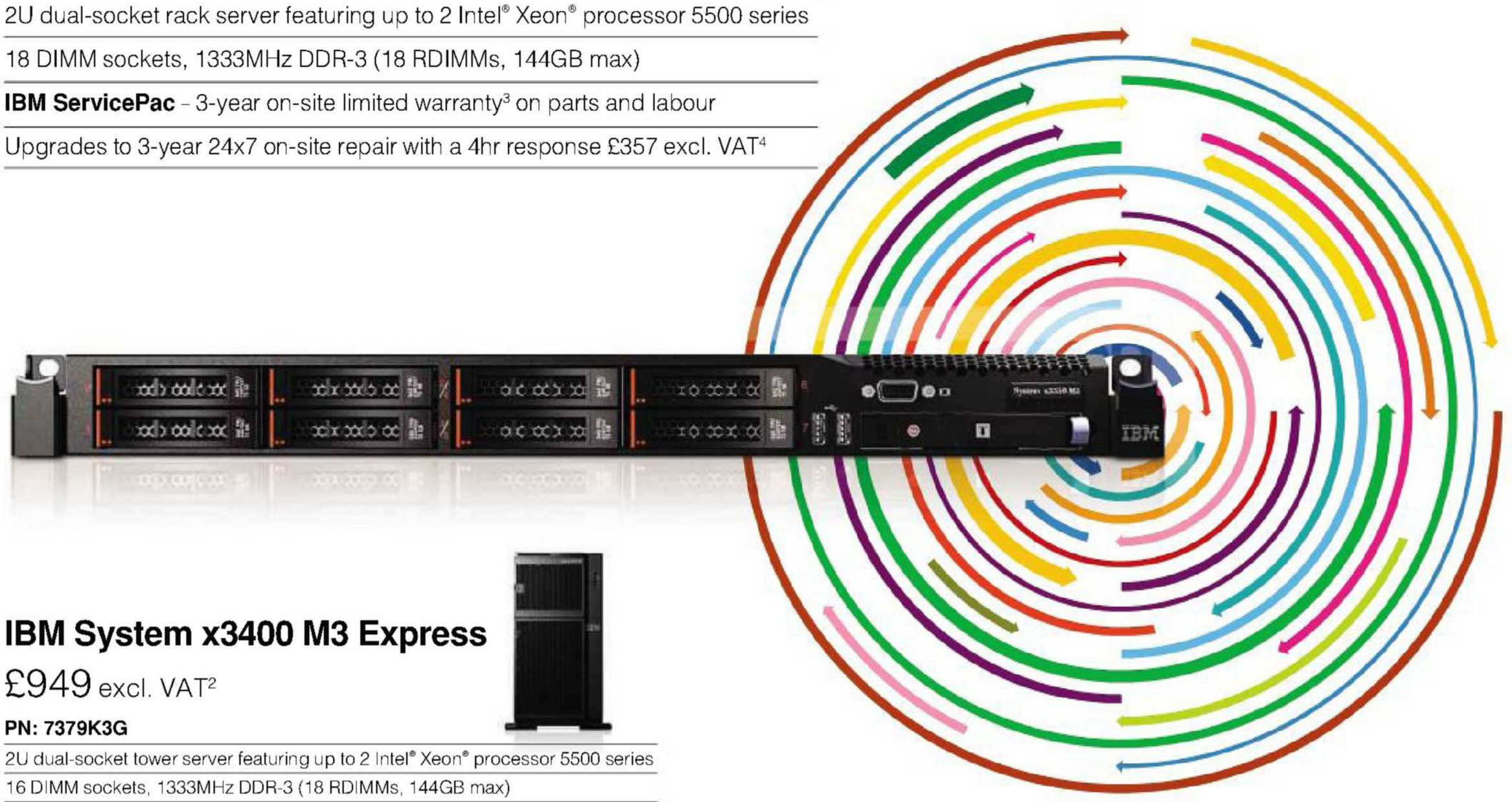

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1. TBR 3Q10 x86-based servers: Buying Behaviour and Customer Satisfaction Study, November 2010. 2. All prices stated exclude VAT and are the IBM estimated retail selling prices that were correct at the time of going to print. The rate of VAT is 20%. Prices may vary according to configuration. IBM Business Partners set their own prices and their prices to end users may vary. Products are subject to availability. 3. Standard warranty is 3-year on-site limited warranty. The ServicePac upgrades this to 3-year 7x24x4hr. 4. Service will only be provided in the country where the service has been purchased, unless stated otherwise. For more information on ServicePac warranty enhancements visit: www.ibm.com/services/europe/maintenance 5. Global Financing offerings are provided through IBM Credit LLC in the United States and other countries. IBM Global Financing terms and conditions and other restrictions may apply. All rates are for a 24-month period and based on a minimum deal size of £5,000 and a maximum of £200,000. Monthly payment provided is for planning purposes only and may vary based on customer credit and other factors. Payment is quarterly. Rates and offerings are subject to changes, extension or withdrawal without notice. IBM, the IBM logo, System Storage and System x are registered trademarks of International Business Machines Corporation registered in many jurisdictions worldwide. For a current list of IBM trademarks, see www.ibm.com/legal/copytrade.shtml Intel, the Intel logo, Xeon and Xeon Inside are trademarks of Intel Corporation in the U.S. and other countries. ©2011 IBM Corporation.

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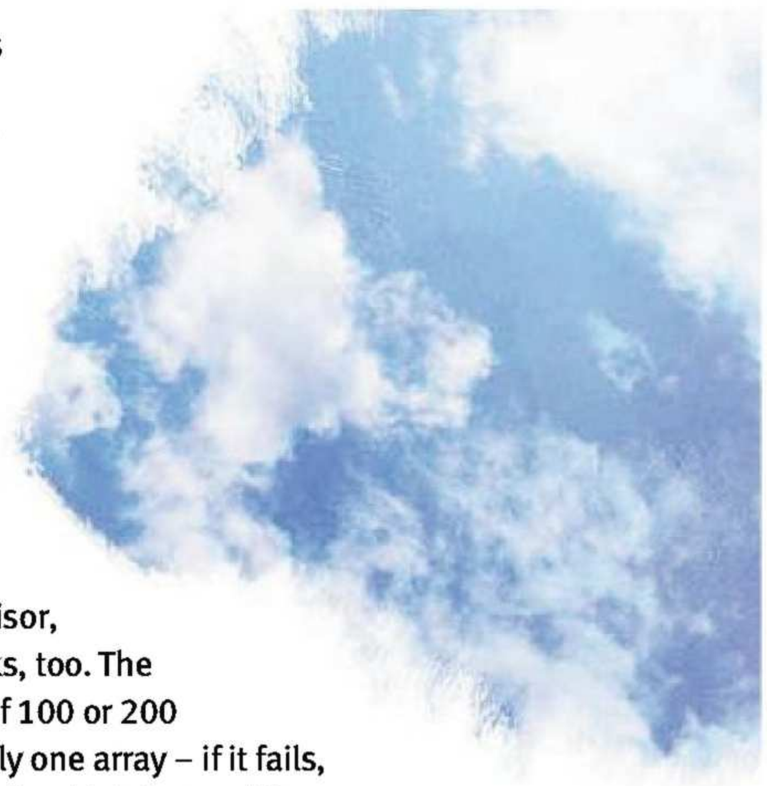
Dell pushes into the cloud



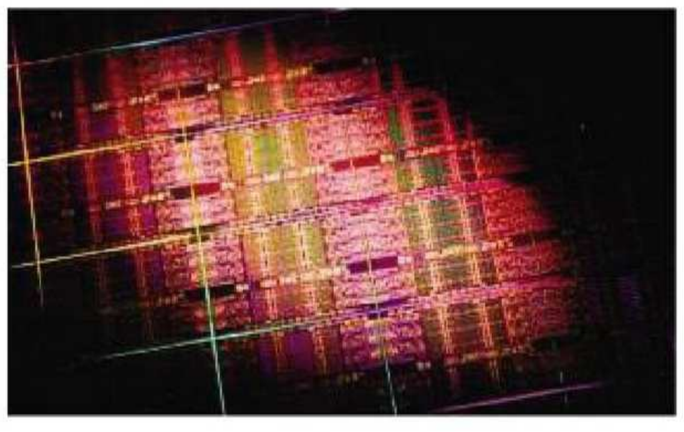
Dell has unveiled a pair of virtualisation tools to simplify the technology for businesses, after investing $1 billion into datacenters for the cloud. The vStart virtualisation-in-a-box system includes everything necessary for deployment, racked and cabled. "A virtual machine might sound simple – it's just a server carved up – but you have to add the storage, networking and management," Praveen Asthana, vice president of Dell's enterprise system's group, said at the London launch.

The system is based on VMware's hypervisor, but a Microsoft Hyper-V edition is in the works, too. The vStart system is available in configurations of 100 or 200 virtual machines, but the former supports only one array – if it fails, the whole box is taken out, so Dell warned it shouldn't be used for mission-critical operations.

The Dell Desktop Virtualisation Solution was also unveiled, letting customers host desktops in their own datacenter, in Dell's cloud, or a mix of the two. Bryan Jones, marketing director for public and large enterprise at Dell, said that desktop virtualisation is finally at the point where it makes sense for businesses – but not because of savings. "If you fixate on the cost benefits, you may be disappointed," Jones told *PC Pro*. However, as users ask to bring their own smartphones, tablets or otherwise to work, virtualisation can help sysadmins manage the variety of devices. "This is maybe one of the only ways to solve that, and keep things secure," said Jones.

Dell admitted both systems were better suited for larger enterprises, but said prices were coming down. "Right now, the watermark for us is about 500 devices; as we progress to the second generation, the cost will go down, so SMBs can benefit," he said.

Intel unveils ten-core Xeons



Intel has refreshed its business line-up, unveiling a ten-core Xeon processor for servers and workstations. At the top of the high-end E7 range is the 8870, which offers a 30MB cache over ten cores and can address up to 2TB of system RAM – double last year's Xeon 7500 chips. The E7 line-up boasts Intel's Turbo Boost and Hyper-Threading, as well as on-chip AES encryption. Prices across the E7 models range from $770 for the 1.73GHz E7-2803 to $4,616 for the top-end E7-8870.

For smaller businesses, there's the E3 series, which is intended for workstations and smaller servers. While the E7 range is based on Westmere-EX, the E3 series features the new Sandy Bridge architecture – which Intel said would boost performance by 30% over previous versions of lower-end Xeons.

Intel told *PC Pro* that Sandy Bridge would "trickle up" into the higher-end Xeons.

Dave Mitchell

Now that cloud computing is taking off in a big way, it's getting its own class of server and processor. Hot on the heels of Intel's announcement of its E3 Xeon series *(see below left)*, Dell has launched the PowerEdge C5220, which packs 12 microserver nodes into a 3U chassis.

Designed to run lightweight web applications, the C5220 will use Xeon E3-1200 processors to provide a dense, multinode system that doesn't require large amounts of memory. It also takes advantage of the low power ratings of these new processors to offer an environmentally friendly package.

To be fair to certain vendors, the microserver concept isn't new. More than a year ago, we ran exclusive reviews in *PC Pro* of HP's ProLiant SL2x170z G6 (web ID: 356776) and DL4x170h G6 (web ID: 356029) multinode servers.

And let's not forget Supermicro, which has been a pioneer in the field. It launched its Twin system two years ago, which I reviewed as Boston's 3000GP (web ID: 236172) followed by the four-node Quattro 5500GP (web ID: 250579).

An important feature of Intel's new processors is their compelling performance-to-power ratio. This makes them better suited to microserver or multinode server applications, as they're faster and a lot less power hungry.

You can see this in action: this month, we've been given exclusive access to Boston's Value Series 570, the first production Xeon E3-1200 server in the UK. It's small and fast, so read on to see if its 3.4GHz Xeon E3-1270 delivers in our power tests.

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Fujitsu Primergy BX400 S1

A quiet datacenter on wheels for SMBs; it closely matches HP's BladeSystem c3000 for features and build quality

Blade servers have always been beyond the budgets of SMBs, but Fujitsu's Primergy BX400 S1 offers these businesses a compact and affordable alternative. HP set the ball rolling with its BladeSystem c3000, codenamed Shorty (web ID: 145308); in this review, we see whether Fujitsu's version puts up a strong challenge.

The BX400 S1 is for offices looking to amalgamate IT services into a single system that's easy to deploy, manage and maintain. It has plenty of expansion potential and is designed to work without the need for extra air conditioning or cooling.

Physically, it's similar to the c3000, in that both are 6U high and built like tanks. The BX400 S1 has eight half-width server blade slots arranged horizontally and accessed from the front. The colour LCD panel and control pad on the Fujitsu's top panel are used to view the health status of the system, as well as controlling the installation wizard.

While HP offers a number of AMD server options, Fujitsu has only three Xeon-based server blades. The BX920 has two hot-swap SFF SAS/SATA disk bays at the front, with nine memory slots for up to 144GB of DDR3 memory. The BX922 has two internal cold-swap SFF SATA drives and 12 DIMM sockets. Both of these blades have embedded four-port Gigabit Ethernet controllers.

The third option is the BX924, which has a dual-port 10-Gigabit Ethernet adapter and supports up to 288GB of memory. To make room for its 18 DIMM sockets, it has two SATA SSDs fitted in cut-outs in the processor heatsinks. This blade is aimed at virtualisation duties and, along with the SSDs, supports remote booting or loading a hypervisor from an internal USB flash module.

Fujitsu offers several storage blades too. The single-slot SX940 is a four-bay, hot-swap model that uses a direct PCI Express connection via the chassis mid-plane to the server blade below it. The SX960 is a double-height, ten-drive blade, and for local backup there's the SX910 with its LTO tape drive.

The soon to be launched VSX960 blade provides storage virtualisation services, and comprises BX920 control and SX960 storage blades. The BX920 runs NetApp's Data ONTAP-v software in a VMware ESX virtual machine, and presents the SX960 storage resources as NAS shares and iSCSI targets.

Four interconnect bays are available and Fujitsu offers a good range of connection options, including Gigabit, 10-Gigabit, InfiniBand and 8Gbits/sec Fibre Channel blades. The chassis mid-plane is split into three fabrics: one connects to the embedded network ports on each blade, two and three link directly to server blade mezzanine cards.

The BX400 S1 supports up to four 1,600W hot-plug supplies, each with a cooling fan. Noise levels were low, as was power consumption: we measured the chassis with two supplies drawing 136W. With BX920, BX922, BX924 servers and one SX960 storage blade powered up, total consumption rose to only around 520W.

The base system comes with one management blade and you can add a second for redundancy. These have dedicated network ports, and provide web browser access for managing and monitoring everything in the chassis.

Remote management is easily the match of HP. Fujitsu's ServerView Dashboard provides direct web access to the chassis, servers, interconnect modules and power supplies. Graphics at the front and rear show installed components, and each one can be managed and monitored individually.

The Dashboard shows power consumption for the entire chassis as well as each server blade, and you can choose from six power schemes. Server blade power is controlled from the Dashboard; once switched on, you can fire up direct web access to the iRMC2 embedded controller for remote control.

OS deployment has been sped up: each blade can be booted in sequence from a USB stick in the shared I/O module at the top of the chassis. This loads Fujitsu's ServerStart OS installation tool; once the first blade has finished with the media module, it will be passed on to the next automatically.

Both the BX400 S1 and HP's BladeServer c3000 are well built, and prices are similar. HP offers more server blade options, but the Fujitsu is easily managed and its low noise levels make it well suited to office life. **DAVE MITCHELL**

Fujitsu's blade server offers plenty of expansion potential and is easy to manage and maintain.

Each of the BX400 S1's four 1,600W hot-plug supplies has its own integral cooling fan.

BLADE SERVER

PRICE
Two PSUs, two fans, £4,471 exc VAT

SUPPLIER
Fujitsu
0870 242 7998

INTERNET
www.uk.fujitsu.co.uk

WARRANTY
3yr on-site NBD

SPECIFICATIONS
6U enclosure with eight half-width blade slots • 2 x 1,600W hot-plug supplies (max 4) • 2 x hot-swap fans (max 4) • 4 x interconnect I/O module bays • management blade • DVD-RW/USB/Serial I/O module • Fujitsu ServerView Dashboard, ServerView Suite software. Options: BX920 S1 blade with 2.4GHz E5620 Xeon, 4GB DDR3, £1,465 • BX922 S1 blade with 2.4GHz E5620 Xeon, 4GB DDR3, £1,453 • 36/12 port Gigabit switch blade, £1,529 • 18/8 port 10-Gigabit switch blade, £4,235

PERFORMANCE	★★★★½
FEATURES & DESIGN	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

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EXCLUSIVE

Boston Value Series 570

The first Xeon E3-1200 rack server shows off the processor's power benefits in a low-cost system

Barely had Intel announced its new Sandy Bridge server processors when Boston flew through our lab doors with the first Xeon E3-1200 production server. We put its Supermicro-based Value Series 570 on test to see what benefits it offers over current Xeon server choices.

Intel has its eye on a number of applications for the Xeon E3-1200 series of processors. It has a sharp focus on the emerging microserver market, where it sees these processors providing a rack density capable of rivalling blade servers. Intel also sees them suited to common tasks such as web and email serving, dedicated hosting and SaaS provisioning. Boston has pitched the 570 firmly at these applications, but the server is also capable of providing a low-cost solution as an AD domain controller for basic file, print and general network services.

The E3 family comprises seven 32nm models, ranging in speed from 2.2GHz right up to 3.5GHz. All are quad-core except for the E3-1220L, which has two cores, a smaller 3MB L3 cache and a 20W TDP. All support Intel's Turbo Boost – the E3-1220L can rise to an impressive 3.4GHz when needed.

The E3 series also offers a superior performance-per-watt ratio to Intel's 3400 Xeons. The quad-core E3-1270 in this review system clocks in at 3.4GHz, but with a TDP of only 80W; by contrast, the X3450 in the HP ProLiant DL120 G6 (*see p108*) has a lower speed of 2.67GHz but a higher 95W TDP.

Boston has opted for Supermicro's X9SCI-LN4F motherboard, a model not blighted by the Sandy Bridge SATA controller glitch. Three Cougar Point chipsets are available, of which the 570 uses the middle C204, and the SATA controller has four 3Gb/s and two 6Gb/s embedded ports that are colour coded on the motherboard. The four 3Gb/s ports let you create stripes, mirrors or RAID5 arrays, while the 6Gb/s ports can handle mirrors or stripes.

The LGA 1155 processor socket is centralised on the motherboard, with four DIMM sockets to one side. Despite the chipset supporting 32GB of memory, Supermicro has only passed the board for 4GB UDIMM modules, so maximum expansion is currently 16GB. Only unbuffered ECC memory can be used at the maximum 1,333MHz speed; registered memory isn't supported.

For storage you have four 3.5in disk bays, with a DVD-ROM drive above them. The price includes a trio of 1TB Western Digital Enterprise 3Gb/s SATA hard disks in hot-swap carriers. Expansion is limited by the inclusion of only a single PCI Express x16 slot on the internal riser card, but there's a quartet of Gigabit Ethernet ports at the rear.

Storage in the Boston comes courtesy of four 3.5in hard disk bays.

PC PRO RECOMMENDED

With a power draw of only 129W under load, the E3-1200 Xeon processor in the Boston is an efficient choice.

RACK SERVER

PRICE
£1,559 exc VAT

SUPPLIER
Boston Limited
01727 876100

INTERNET
www.boston.co.uk

WARRANTY
3yr on-site NBD

POWER RATING
Idle: 58W
Peak: 129W

SPECIFICATIONS
1U rack chassis • Supermicro X9SCI-LN4F motherboard • 3.4GHz Intel Xeon E3-1270 • Intel C204 Standard chipset • 8GB UDIMM 1,333MHz ECC DDR3 expandable to 16GB • embedded Intel SATA controller with 4 x 3Gb/s, 2 x 6Gb/s SATA ports • supports RAID0, 1, 5, 10 • 3 x 1TB WD Enterprise SATA hard disks • PCI-E x16 slot • 4 x Gigabit Ethernet • embedded RMM with 10/100 port • Supermicro SuperO Doctor III software

The Boston uses a fixed 330W power supply, and it's in this department that the processor shows its benefits. With Windows Server 2008 R2 idling, we measured a power draw of only 58W; with SiSoft Sandra hammering all eight logical cores, this peaked at a modest 129W. By contrast, the HP ProLiant DL120 G6, with its 2.67GHz Xeon X3450, draws 79W in idle and 158W under load. Both processors have the same number of physical and logical cores, so the E3-1200 series is a far more efficient choice for a single processor server.

The compact low-profile chassis is barely 20in deep and so will fit neatly into most rack and data cabinets. The five dual-rotor fans servicing the motherboard are quiet, but we found the power supply fan to be intrusive.

Supermicro has eight motherboards supporting the Xeon E3 processors; those with an "F" at the end of their model name include an embedded RMM and dedicated network port for full remote management. The server can be accessed via a web browser, which provides a tidy interface with plenty of operational information.

For features, Supermicro's RMM is on a par with HP's Lights-Out 100i. The web interface provides sensor readouts for all critical components, and you can issue SNMP traps and email alerts using thresholds for each sensor. The power supply can also be controlled from here, so you can switch the server on and off, reset it and initiate a graceful shutdown.

Support for virtual media is a valuable inclusion, and KVM over IP remote control comes as standard. The blue-chip firms offer these only as options, with HP charging £165 to activate them on its Lights-Out 100i.

Boston's Value Series 570 is unique, as none of the blue-chip firms are likely to deliver rack servers supporting these new processors in the immediate future. Not only is it the first Xeon E3-1200 rack server to market, but it clearly shows the power benefits over the Xeon 3400 series. Boston has put together a good package for the price. **DAVE MITCHELL**

PERFORMANCE	★★★★★☆
FEATURES & DESIGN	★★★★☆☆
VALUE FOR MONEY	★★★★★☆
OVERALL	★★★★★☆

EXCLUSIVE

HP ProLiant DL120 G6

A well-specified single-socket rack server with room to grow, but Dell's PowerEdge R310 offers better value

As the entry point to HP's entire DL rack server family, the ProLiant DL120 G6 aims to provide SMBs with an affordable server that's capable of taking on a variety of roles.

It supports a single processor only, but HP offers a good range of options: you can pick from any of Intel's quad-core 3400 Xeons or save more cash with a dual-core Celeron, Pentium or Core i3. Our review system features the 2.67GHz Xeon X3450 along with 4GB of DDR3 RDIMM memory, which can be increased to 32GB, or 16GB using cheaper UDIMMs.

Storage is limited to 3.5in hard disks, while the base model's embedded six-port SATA controller offers striped or mirrored RAID only, and lacks hot-swap capabilities. Our review system gets around this with HP's Smart Array P212 PCI Express card, which adds support for 6Gbits/sec SAS hot-swap disks and comes complete with 256MB of DDR2 cache memory. This increases your array prospects to RAID5 and 50, but you'll need another upgrade key and the battery backup pack if you want dual-drive redundant RAID6 as well.

HP offers a choice of SAS, SATA and 2TB mid-line SATA hard disks. The latter – more commonly referred to as near-line SAS drives – are worth considering if you want extra storage performance over standard SATA, but can't afford the SAS price premium.

Internal expansion is quite good for a 1U rack server. The riser card at the rear of the motherboard has a PCI Express slot on each side; the one occupied by the P212 RAID card can accept a full-height, full-length card, and the other has room for a low-profile card.

Instead of HP's standard setting iLO3 controller for remote management, you get an embedded Lights-Out 100i. It provides fewer features and lacks the iLO3's power-metering tools, but you do get a dedicated network port for management access and a tidy web browser interface. You can view the status of all components, and the platform event-filtering feature allows you to select individual components and assign actions to them. If a fan fails, for instance, you can automatically switch off the server, reset it or just send an alert.

You can do all of those things remotely, too, and the price of our system includes the useful Advanced upgrade key. This costs £165 and activates virtual media services plus full KVM over IP remote control.

Initial installation is helped along by the supplied CD, which loads up HP's Easy Setup environment. A wizard assists with installing your chosen OS, and configuring the RAID controller and hard disks. It also loads HP's System Management homepage, which offers a web-based monitoring tool for keeping an eye on the server while it's running.

Physically, the server is well designed, with a tidy interior, although HP's tool-free philosophy isn't particularly evident. A Torx screwdriver is clipped to the back of the server, and you'll need it to release the lid and remove the expansion cage.

The X3450 Xeon has a mighty heatsink attached to it, with extra heat pipes linking it to a satellite cooling fan array in front of the motherboard. Four small dual-rotor fans handle general internal cooling, but their peaceful purring is spoiled by the noisy fan in the single 400W cold-swap power supply.

Alas, this server doesn't find it easy being green, consuming plenty of power under load. With Windows Server 2008 R2 idling, we clocked it drawing 79W, rising to 158W when under extreme pressure from SiSoft Sandra.

To put this into perspective, we compared these results with the *PC Pro* Recommended ProLiant DL380 G7 (web ID: 360274). That had a 2.67GHz E5640 Xeon, 6GB of DDR3 memory and three SFF hard disks; we measured 72W when idle and 145W when under load.

It's also worth comparing the Boston Value Series 570 (*see p107*), which showcases Intel's new Xeon E3-1200 series processor. It isn't as well featured as the DL120, but with its faster 3.4GHz E3-1207 it drew only 58W when idle and 129W under load.

In close competition with the DL120 G6 is Dell's more compact PowerEdge R310 (web ID: 362431), a single-socket 1U rack server. We rustled up a closely matched specification on Dell's website for just over £1,000 exc VAT, which included a three-year NBD warranty plus an iDRAC6 Express management controller. The HP ProLiant DL120 G6 may be well built and have good expansion potential, but it can't match that kind of value. **DAVE MITCHELL**

A noisy fan on the PSU mars the ProLiant DL120 G6's cooling system.

HP's ProLiant DL120 G6 1U rack server offers plenty of expansion potential.

RACK SERVER

PRICE
£1,417 exc VAT

SUPPLIER
HP 0845 270 4222

INTERNET
www.hp.co.uk

WARRANTY
3yr parts only

POWER RATING
Idle: 79W
Peak: 158W

SPECIFICATIONS
1U rack chassis • 2.67GHz Intel Xeon X3450 • 4GB RDIMM DDR3 expandable to 32GB (16GB UDIMM) • 3 x 250GB Seagate Barracuda SATA 7.2K hard disks in hot-swap carriers • Smart Array P212 6Gbits/sec SAS RAID controller with 256MB DDR2 cache • supports RAID0, 1, 10, 5, 50 • 2 x PCI-E • 2 x Gigabit Ethernet • 400W cold-swap power supply • HP Lights-Out 100i Advanced with 10/100 port • HP Easy Setup software

EASE OF USE	★★★★☆
FEATURES	★★★★☆
VALUE FOR MONEY	★★★★☆
OVERALL	★★★★☆

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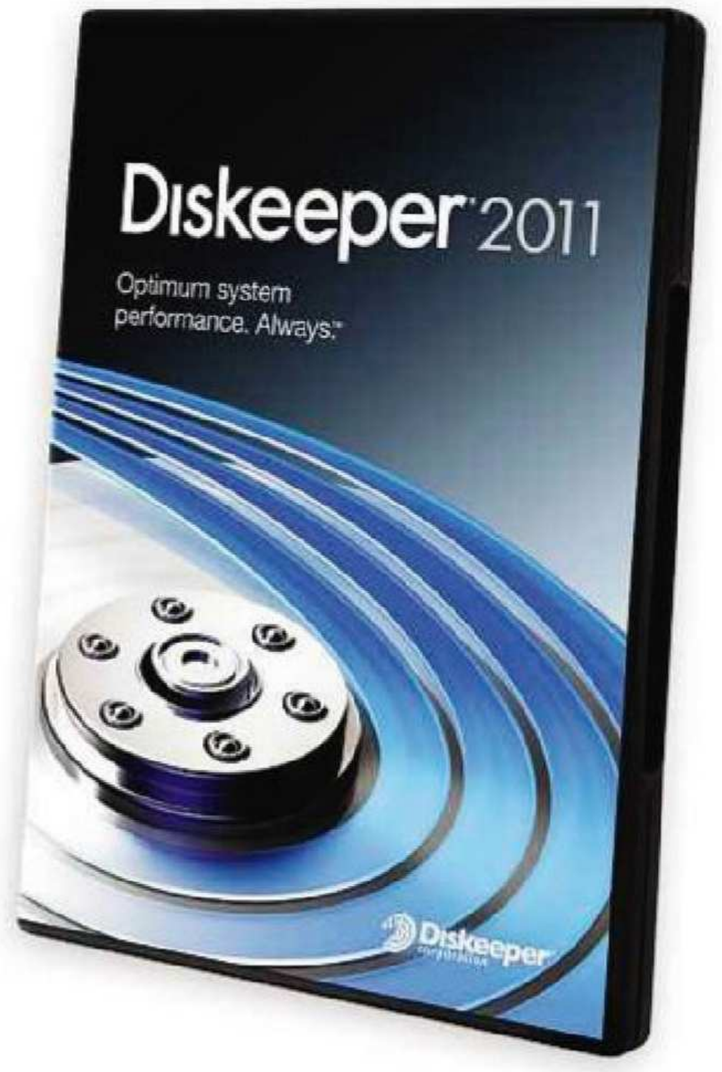

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Diskeeper corporation

A4 COLOUR LASER

PRICE
£241 exc VAT

SUPPLIER
Printerland
0800 840 1992

INTERNET
www.konica
minolta.co.uk

WARRANTY
1yr on-site

SPECIFICATIONS
600 x 600dpi A4 colour laser • 24ppm mono/colour • 200MHz processor • 32MB RAM • USB 2 • 10/100 Ethernet • duplex • 250-sheet input tray • single-sheet multipurpose tray • drivers for Windows 2000 upwards

PERFORMANCE ★★★★★☆
FEATURES & DESIGN ★★★★☆☆
VALUE FOR MONEY ★★★☆☆☆
OVERALL ★★★★☆☆

Konica Minolta magicolor 3730DN

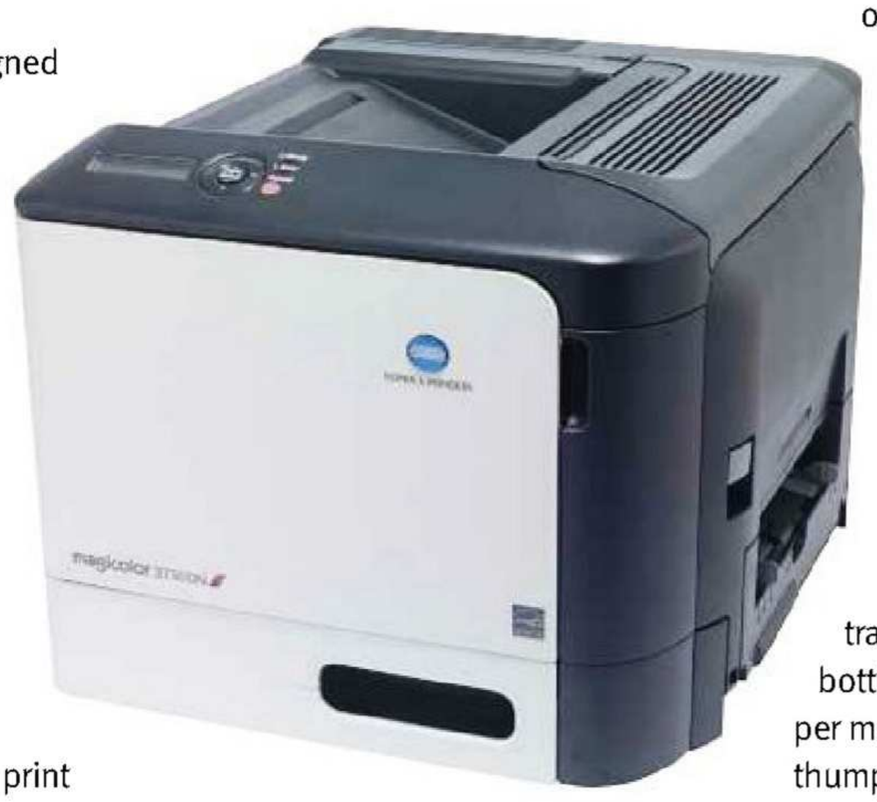
A low-cost colour laser with a good turn of speed and impressive quality, but running costs are high

Konica's magicolor 3730DN is designed to be greener than similar colour lasers in this class. It costs only £241 exc VAT, despite claiming a decent 24ppm print speed in both mono and colour modes – that looks a good deal for small workgroups.

The 3730DN uses Konica's Simitri polymerised toner, which uses less power than conventional toner by fusing at lower temperatures. The printer also comes with an integrated duplex unit to further cut your costs.

The benefits were evident in our print quality tests: text across a range of sizes was pin-sharp with no discernible smudging or dusting. Mono photographs revealed impressive levels of detail, particularly in darker areas, and banding was kept to a minimum.

For such a low-cost printer, its colour output was surprisingly good. Although not as vibrant as Oki's C610n (web ID: 358981), our test prints showed good colour balance and detail. Our colour performance chart also confirmed that the 3730DN produces better results than Konica's higher-end 4750DN (web ID: 360970). Grey shades using equal mixes of the three colours were reproduced faithfully, whereas the 4750DN was too enthusiastic with its yellow toner.



The 3730DN uses Konica's polymersied toner, which uses less power than conventional toner.

This is a GDI printer, so the host system will be expected to rasterize pages. However, we found print speeds were good, with our 24-page Word document churned out in one minute. The driver offers three resolutions, and the document was delivered at the same speed for each setting. Our 24-page DTP print fared less well, since its collection of photos and graphics slowed the speed to 14.5ppm.

Duplex printing is activated from the driver panel, but it won't let you print at the maximum resolution in this mode. However, double-sided speeds are good: our 24-page Word document completed in 1min 7secs.

The driver provides a good range of controls, with options to print multiple pages on one sheet, as well as booklets and large posters. Installation could be improved, however, as Konica's driver installation routine couldn't find the printer on our network. We had to print a configuration page to get the unit's IP address and enter it manually.

The 3730DN's printing costs are a concern. Along with the four toner cartridges you have a belt, transfer roller and fuser, plus waste bottles, and these all push the cost per mono page to 2.6p and a pocket-thumping 12.3p for colour.

You can reduce these figures by using high-yield cartridges, but this doesn't make a huge difference: it's still 2.2p for mono and 10.9p for colour. Initial costs will be even higher as the printer ships with 2,000-page mono and 1,000-page colour cartridges, while the starter belt unit lasts only 50,000 pages.

For less than £250, the magicolor 3730DN has plenty going for it: it's fast and delivers good overall print quality in both mono and colour. Unfortunately, high running costs make it a sensible choice only for those with an occasional need for colour. **DAVE MITCHELL**

NAS APPLIANCE

PRICE
Diskless,
£551 exc VAT

SUPPLIER
Span
020 8288 8555

INTERNET
www.synology.com

WARRANTY
3yr RTB

POWER RATING
(4 drives)
Idle: 47W
Peak: 54W

Synology DiskStation DS1511+

A frighteningly fast desktop NAS appliance with huge expansion potential and storage features to match

Not only does Synology's latest NAS appliance claim impressive performance, but it also looks to have the highest expansion potential we've yet seen in a desktop box. The DS1511+ borrows the sleek five-bay chassis of the DS1010+ (web ID: 356677), and doubles the eSATA expansion ports to two.

These service Synology's matching DX510 five-bay expansion units, so if you can afford a round of 3TB SATA drives, this solution can be pushed to a capacity of 45TB. Synology has also been talking up the appliance's dual Gigabit Ethernet ports and their support for link aggregation.

Placing the ports in a load-balanced link gives a top bandwidth of 2Gbits/sec, but there are some provisos – you need a managed switch that supports link aggregation control protocol (LACP), and your client systems each need two LACP-compliant Gigabit Ethernet ports.

The *PC Pro* Enterprise lab's ProCurve 2848 supports LACP, so once the appliances' ports were teamed together, it dynamically created an LACP link.

Using two Xeon 5500 rack servers running Windows Server 2008 R2 64-bit, we mapped separate shares to them from a quad-drive RAID0 stripe on the appliance, and ran Iometer on each one. We measured cumulative raw read speeds of 205MB/sec and write speeds of 169MB/sec, slightly better than Synology's quoted speeds.

Moving over to one of the test servers, we ran drag-and-drop copies of a 2.52GB video clip and measured impressive read and write speeds of 99MB/sec and

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Kyocera FS-C5250DN

A great choice for busy workgroups with a high colour output, as running costs are the lowest in town

Kyocera's laser printers have always held a big advantage over the competition thanks to their unique ceramic drum. It's claimed to be ten to 15 times harder than the more prevalent organic photo conductor drums, and is therefore capable of lasting the life of the printer.

Toner is therefore the only consumable, so Kyocera routinely has some of the lowest printing costs on the market. The FS-C5250DN typifies this: at 5% coverage it will churn out a mono page for a little over a penny and a colour page for only 6.2p.

The printer ships with half-full starter cartridges, however, so you'll be flashing the cash quicker than you might expect. But it comes with a two-year on-site warranty as standard, and Kyocera guarantees the drum and developer for three years or 200,000 pages.

Paper capacity can be boosted by augmenting the standard 500-sheet lower tray with four more 500-sheet feeders. The printer also accepts a hard disk for storing fonts and frequently used jobs, and it can print directly from USB sticks. Kyocera's memory upgrades are more sensibly priced than most, with 1GB costing £251 exc VAT.

Walk up and print operations worked well: after plugging in a USB stick, the backlit display panel offers options to print a contents list or to scroll through and select a file for printing. Kyocera supports PDF, XPS, TIFF and JPEG file formats for these operations.

The FS-C5250DN can print directly from USB sticks, and accepts a hard disk for storing jobs.

Putting the printer to work, we found the claimed 26ppm speed to be achievable across a range of print jobs, from a standard A4 Word document to our challenging 24-page DTP colour document.

The driver only has settings for the finest quality, mono mode and a draft EcoPrint mode. However, it provides a set of default print layouts so you can select booklets, posters, anything up to 25-up prints and duplexing. Double-sided print speeds were reasonable, with our 26-page test document completing at a rate of 14ppm.

Output quality is good enough for general business use, with colour graphs and charts reproduced cleanly and free from banding. Text across a range of font sizes was pin-sharp, although mono photos lacked detail in darker areas and revealed a slight blotching effect. Our performance chart showed no discernible stepping across complex colour fades, which translates to clear colour photos with good levels of detail.

Our only criticism is that on standard copy paper our photos lacked punch; this can be remedied to some degree by using heavier grade paper, which Kyocera's toner seems to prefer.

All this sounds excellent, but it pays to look at both running costs and the initial purchase price. Konica's magicolor 3730DN (*see opposite*) costs about £150 less to buy, has an integrated duplex unit and is only 2ppm slower than the FS-C5250DN. Its print quality is actually slightly better, too, but Konica's ongoing running costs are more than double that of Kyocera's FS-C5250DN.

If you have high print demands, the Kyocera FS-C5250DN is a more sensible business choice. Its low long-term running costs, plus good speed and quality, make it a fine all-rounder. **DAVE MITCHELL**

A4 COLOUR LASER

PRICE
£375 exc VAT

SUPPLIER
Printerland
0800 840 1992

INTERNET
www.kyoceramita.co.uk

WARRANTY
2yr on-site

SPECIFICATIONS
600 x 600dpi A4 colour laser • 26ppm colour/mono • 667MHz processor • 256MB RAM • 2 x USB 2 • 10/100 Ethernet • CompactFlash card slot • duplex • 50-sheet MPT • 500-sheet cassette • drivers for Windows 2000 upwards. Options: 500-sheet feeder, £215 • 1GB RAM upgrade, £251 exc VAT

PERFORMANCE ★★★★★☆
FEATURES & DESIGN ★★★★★☆
VALUE FOR MONEY ★★★★★☆
OVERALL ★★★★★☆

96MB/sec. Using the same test file with the FileZilla FTP client, we saw speeds increase to 108MB/sec and 103MB/sec respectively.

The DS1511+ offers the same storage features that impressed us in the DS1010+, but also introduces Synology's new DiskStation Manager 3.1. This is an update to the version included in Synology's RS810RP+ (web ID: 363304), which launched a redesigned web browser interface that can be customised using drag and drop.

It features Disk Groups, which are RAID arrays supporting multiple volumes instead of only one. Synology's hybrid RAID also lets you create arrays using different sized disks, and now offers dual-drive redundancy for these.

With five bays and two eSATA ports, the maximum capacity is a massive 45TB.

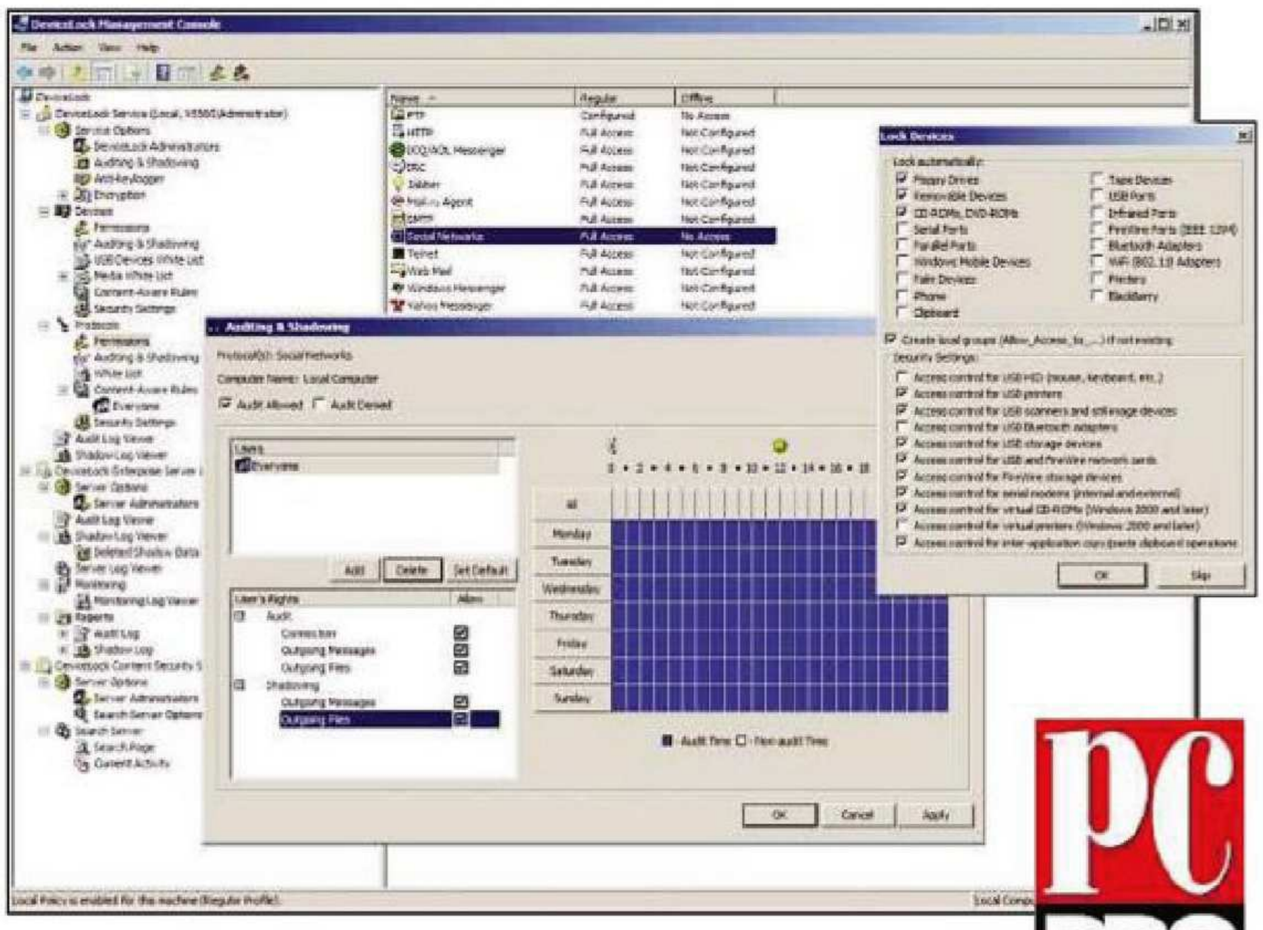
Improved backup features mean shared folders can be synchronised between two Synology appliances. We had no problem enabling the Network Backup service using an RS411 as a destination appliance, selecting source and destination folders and leaving them to keep in step in real-time.

Although still in beta, the easy-to-use Time Backup feature automates snapshots of one volume to another and lets you retain different file versions. DiskStation Manager's Disk Groups and multiple volumes make it even more flexible.

The DS1511+ impresses on many levels. It's one of the fastest NAS appliances currently available, and it looks an ideal network storage choice for small businesses. **DAVE MITCHELL**

SPECIFICATIONS
1.8GHz Intel Atom D525 • 1GB DDR2 • 5 x hot-swap SATA drive bays • supports RAID0, 1, 5,6, hot-spare and JBODs • 2 x USB 2 • 2 x Gigabit Ethernet • 2 x eSATA • Synology Assistant, Download Redirector and Data Replicator 3

PERFORMANCE ★★★★★★
FEATURES & DESIGN ★★★★★☆
VALUE FOR MONEY ★★★★★☆
OVERALL ★★★★★☆



DeviceLock 7

Provides the perfect panacea for data leakage, adding application controls and greater content awareness

Businesses with stiff perimeter security may think their data is safe, but the number of communication methods and removable storage devices available to employers makes data leakage a danger.

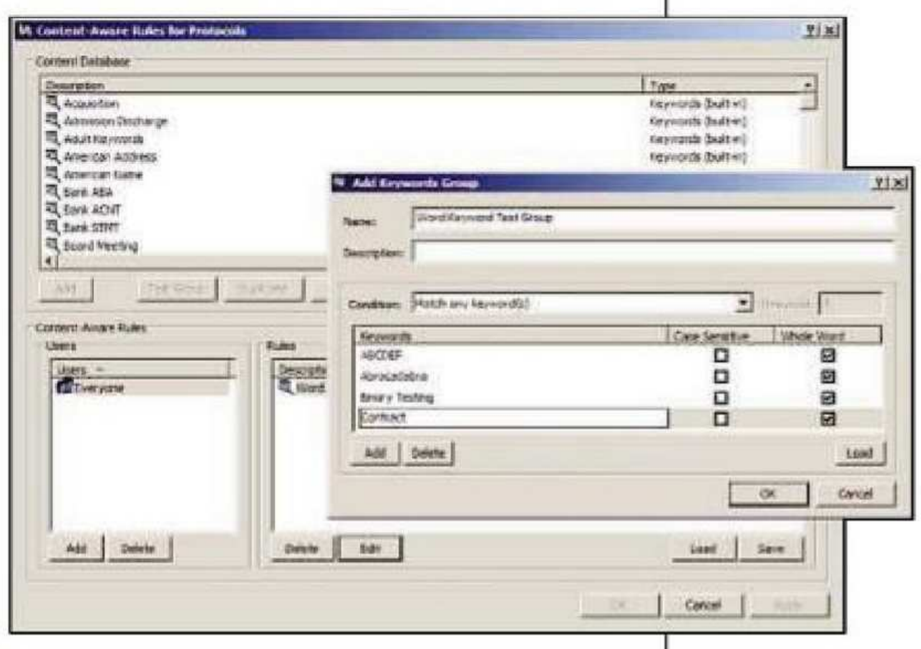
We've always been impressed by DeviceLock's solution, and this latest version adds stronger access security at the network protocol level. It also has greater content awareness, allowing it to apply access policies based on file content as well as file type.

At its foundation, DeviceLock provides controls for managing access to every workstation port and removable storage device. It can control data transfers between the latest iPads and iPhones, and manage access to calendars, contacts and email.

DeviceLock 7 introduces the optional NetworkLock component, which takes access control to the network protocol level. For SMTP, you can control connections to a mail server, sending of emails and permitting attachments.

HTTP policies determine whether you can post content to web forms, upload files to a web server, or are allowed web browser access. For social networking sites you can control basic access, permit comments and messages, and allow or deny uploading content.

Installation on a Windows Server 2008 R2 64-bit system was easy, although it's time DeviceLock used a single console. Here you have three: the standard MMC console integrates with AD, so access policies can be enforced at the user and group level; a second works with the Windows Group Policy Editor; and the Enterprise Manager console is used to deploy the agent, view the status of devices on workstations, and push policies to specific systems.



The new ContentLock feature allows transmitted files to be searched for keywords and phrases.

Agent deployment to our Windows 7 clients took minutes, and the Enterprise Manager scanned our network and provided a list of systems for selection. A global policy is provided, so you can lock down access to specific devices and ports once the agent is installed.

The MMC console lets you create new policies for selected AD users and groups, which contain device and port permissions, plus time periods for when they're active. Offline policies for mobile workers can activate when DeviceLock detects they've left the main network.

NetworkLock is accessed via the new Protocols section in the MMC console. Policy creation is the same as for ports and devices: select a protocol, then choose access levels and apply.

SMTP controls work well. We allowed some users to send emails but not add attachments, and stopped others from sending any emails. This also works over SSL, and our blocked Outlook users couldn't connect to their SMTP servers. For FTP we could allow or deny full access, and permit upload or download activities separately.

Windows Messenger has two options for controlling logins and allowing the sending of messages. However, both checkboxes can only be on or off together, so all you can do is block access completely.

In our review of DeviceLock 6.4 (web ID: 350582), we looked at the offline security policies and the content aware feature that allows you to control access for specific file types. ContentLock is an optional new extra, enhancing existing content aware features with the ability to control access based on keywords and patterns within file contents.

The ContentLock option costs extra, but it allows you to look for keywords and patterns in files being copied or transmitted, and block only those that match. After licensing, this adds options to the content-aware section in the MMC console, and DeviceLock provides predefined lists. We created our own list of patterns and keywords and tested it by sending Word documents using FTP and SMTP. It worked perfectly, blocking matched files.

You can also apply auditing and shadowing policies to NetworkLock. With this activated we could see all activities from the console, view all emails being sent, and load up any attachments for further investigation.

ContentLock adds an extra dimension to NetworkLock: instead of a wholesale application block, you could permit access but decide which files can be transmitted. ContentLock also applies to removable devices such as USB sticks.

If you're worried about your data falling into the wrong hands, DeviceLock 7 is an ideal solution. It provides some of the toughest access security on the market, and the new protocol control and content awareness modules are well worth considering. **DAVE MITCHELL**

DeviceLock can manage removable devices.

SECURITY SOFTWARE

PRICE
£15 exc VAT per seat for 100-199 seats
Options: NetworkLock, £14 exc VAT per seat; ContentLock, £28 exc VAT per seat

UPGRADE
Included in annual maintenance

SUPPLIER
DeviceLock Inc
0800 047 0969

INTERNET
www.devicelock.com

REQUIREMENTS
Windows 2000 upwards

EASE OF USE	★★★★★☆
FEATURES	★★★★★★
VALUE FOR MONEY	★★★★☆☆
OVERALL	★★★★★☆

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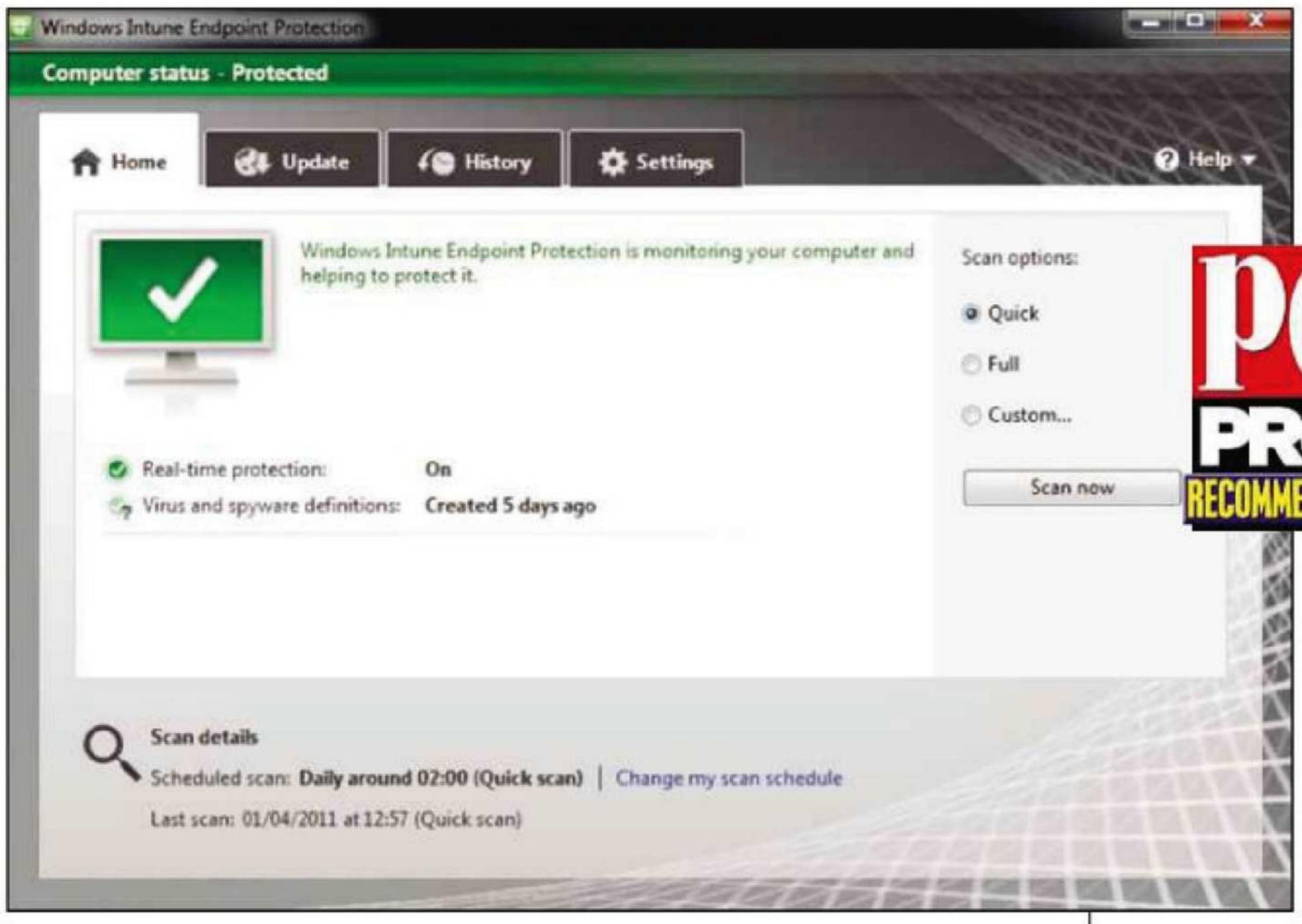

Microsoft Windows Intune

An affordable way to not only manage a fleet of desktop PCs and laptops, but also upgrade them to Windows 7

Windows Intune includes managed virus protection, which could be a boon to small businesses.

MANAGEMENT SOFTWARE

PRICE
From £7.25 exc VAT per seat, per month

UPGRADE
N/A

SUPPLIER
www.pcpro.co.uk/links/201ent1

INTERNET
www.microsoft.co.uk

The crisp, clean interface is a pleasure to use, once you get to grips with Microsoft's choice of iconography.

Managing a collection of desktop and laptop PCs can be a nightmare. Although there are strong and fully featured tools such as Microsoft's excellent System Center available to do this task, for many companies they're a daunting prospect. Indeed, the cure can look worse than the disease for those unable to invest time and effort into such matters.

Intune is a new type of product from Microsoft's management tools division that's designed to be easy to install, deploy and run. In other words, it's aimed at smaller businesses that may not have a full set of IT skills on-site.

Unlike previous offerings from Microsoft, such as the multi-site rental model for Microsoft Operations Manager, Intune is different: all the back-end processing for it happens within the Microsoft cloud infrastructure. You don't need any servers running locally to process the data; everything is passed up the pipe to the datacenter.

Setup

First, you need to create an account with Microsoft. Intune is a subscription service where you pay per month, per machine. To add another machine, you just add it to your inventory and it appears on your monthly bill.

For each managed computer, you run a small Windows Intune Center application, which lets you see whether the PC has the latest updates. You can also run the Windows Intune Endpoint Protection antivirus and anti-malware tool manually to check that nothing is amiss, and you can schedule a remote support session from the system administrator.

The agent running on each target desktop machine collects a complete inventory of the hardware, OS and installed applications, and this is stored in the cloud. The level of detail collected is impressive, and includes application versions, a complete list of hardware (including the BIOS version, processor, graphics card and RAM), and what printers are installed.

Administration

All the Windows Intune administration is performed through a web browser, using Windows Live IDs. The software can be administered by one person or split among a group of users.

Notifications can also be routed appropriately if you want to split the workload between different members of staff.

The web-based interface is clever and comprehensive. Our one criticism – and this applies to the whole administration UI – is that it seems to value style over substance. It isn't always obvious where to click to perform an operation, and we'd prefer more onscreen buttons to make operation simple. While this wouldn't be very Web 2.0, an admin tool shouldn't be designed for looks but for efficient function.

The key to Intune is the toolbar that sits on the left-hand side of the window. System Overview sits at the top and offers a main view of system status and alerts. Here you can see whether managed machines have issues with virus protection, if updates are ready to be pushed out, or whether a user has requested a Remote Assistance session.

Next on the list is Computers, which provides an inventory of all the PCs being managed by Intune. You can create groups of computers and place machines into those groups. This could be useful for bringing together all the laptops used by salesmen, for example. Drill into this view and you can access all the details you need on an individual machine: there's a summary tab, a list of updates applied to the machine, any malware information that's been reported – together with system alerts – and the hardware and software inventories.

The Updates tab gives a comprehensive list of the different types of updates that can be applied to the computers: critical, security, definition, service packs, rollups and mandatory updates. Here you can configure how these updates will be pushed to the target machines and check that updates have worked correctly.

Malware Protection gives you a direct insight into how the Microsoft

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for details of our latest offer

You can drill down to find all the information you want about all your PCs.

antivirus/anti-malware solution is working, and informs you if anything has been detected. You can schedule scans to run at specific times and configure the agents running on the managed machines. Receiving this type of centralised antivirus solution is sure to be a particular bonus for many smaller organisations.

The Alerts tab rolls up all the alerting information from every computer on the system into one place, ensuring you don't overlook an error event on a machine by mistake.

The Software and Licenses tabs give an immediate insight into all the software installed on every machine, and a licence count of each. In addition, you can enter your Microsoft licence agreement numbers and Intune will show how your licensing is working against what you thought you had. The reporting is strong, allowing reports to be generated quickly to show what software has recently been installed and how the software purchasing is running.

The Policy tab lets you set policies across a group of computers. This doesn't require Active Directory to be in place, but allows policy templates to be created and sent down to each machine. Don't overestimate this, though – it isn't a full-blown policy-management engine, but a solution aimed at managing the policy settings for the Intune platform itself. This means you can specify how often the machine looks for updates, what happens if malware is found, whether a user can prevent a reboot after the installation of updates, and so forth.

The Reports tab lets you generate a wealth of information about what's been going on in Intune; for example, how many machines are on a particular service patch level or how much disk space is available. Finally, the Admin tab lets you set up and manage various settings related to the account.

Advanced tools

Microsoft Intune is also designed to allow the rollup of multiple sites and organisations into one managed entity. For example, a value-added reseller (VAR) could offer Intune to a number of its SME clients and install Intune on all the machines on each site. The VAR would then be able to see details of all sites, monitoring all the computers in a secure fashion. This is an extension of the multi-site licensing we saw in Microsoft Operations Manager a few years ago, where the ultimate goal was to allow the system administrator at the VAR to stay in bed all day, just monitoring the activities and issues on multiple sites as they arose.

Easy Assist is also part of this thinking. It allows a user to create a remote assistance request, and to channel this across to a helpdesk function, for example. By doing this, you could outsource the helpdesk function in your organisation to the VAR, and still allow the reseller to have secured remote access to the desktop to help the user in need. Generating an Easy Assist request is simply a matter of clicking on the icon. In the management console, the requests are queued and can be dealt with one by one.

The Windows Intune Center shows you at a glance if your PC is up to date.

Verdict

In operation, Intune ran very well. Our initial concerns about it being a little too remote were unfounded: it detected and worked with every machine we tried, and we had no problems in testing with a SonicWALL firewall between the local machines and the remote cloud service. Even a break in our internet connection couldn't trip it up: all information and updates were queued appropriately on both sides of the connection.

As a package, there's much to like here. Intune offers a wide range of capabilities, and the pay-as-you-work pricing model is attractive. The cloud-based solution means no expensive server, services or setup on the local network, and this is an excellent example of how cloud services can add real value.

The pricing is competitive, especially because the £7.25 a seat per month includes an upgrade licence to Windows 7 Enterprise. So if you have a body of machines on XP and Vista, the upgrade to Windows 7 can be done on a rolling cost basis as part of Intune, rather than having to pay outright for licences.

There's also potential for growth. While our initial impression of Intune was that this was a product solely for the small business, at the recent Microsoft Management Summit 2011 the company made it clear it sees Intune as a superset of System Center, even if the initial feature set is smaller, and that in future it believes Intune will scale up to the largest of sites.

Intune is an impressive product. The management capabilities are strong, even in this version 1 release. And, because it's hosted on a remote server, it's easy for Microsoft to add new features without disruption to your business. The inclusion of Windows 7 Enterprise licences is the icing on the cake. If you don't already have a robust system inventory and management tool in place today, give Intune your immediate attention. **JON HONEYBALL**

EASE OF USE	★★★★½
FEATURES	★★★★½
VALUE FOR MONEY	★★★★½
OVERALL	★★★★½

SMALL BUSINESS SECURITY ON A BUDGET

DAVEY WINDER EXPLORES THE WAYS A SMALL BUSINESS CAN CUT ITS EXPENDITURE WITHOUT COMPROMISING SECURITY

The bigger the economic downturn, the harder small businesses are hit. So it's little wonder that such companies are searching for imaginative ways to stretch their budgets. While the traditional "if it ain't broke, don't upgrade it" approach is one way to delay spending money on new hardware, it's also tempting to cut down on annually licensed software.

For many businesses, the biggest such spend is security. From data protection to spam filtering, the costs soon add up. But are these the right areas to target if you need to make cutbacks? We asked security experts for practical advice about how money can be saved without sacrificing data security, and whether free security can be good for your business.

Is there such a thing as free security?

We didn't expect Symantec, one of the largest security vendors, to be a fan of free security software, and it isn't. Ross Walker, the director of small business and distribution for Symantec UK, suggests that freeware vendors have created a perception of basic security, but warns the reality can be a small business left to "explain to a customer that their personal data was breached due to the fact that the free security solution didn't protect them against the latest threat".

But is that really the state of free security today? Cliff Evans from Microsoft's security, identity and management section, dismisses the notion that free equates to ineffective. "Most reliable free security software [offerings] are complete packages in their own right," Evans says. "[They're] capable of protecting businesses from viruses, spyware, rootkits, trojans and other malicious threats".

It's notable that Microsoft Security Essentials is free and the licence permits

www.downmagaz.com

Five free ways to enhance your security settings

1 The weakest link in the small-business security chain is your staff. No matter how much you spend on security software and systems, your investment can be undone by a careless click on a malicious link, the use of an insecure password or the installation of a vulnerable application. Therefore, the number one free way to improve your security is to educate your workers in good practice.

2 Don't waste money protecting data that nobody wants to steal. Perform a proper security audit for your business to determine what data needs to be protected and to what degree. Think in terms of what the potential loss, liability and inconvenience would be. Asking simple questions and providing logical and considered answers is usually enough. One size rarely fits all; knowing where (and where not) to allocate your security budget can improve your business security and save you money in return.

3 Patch, patch and patch again. Ensure that operating system and application updates are applied in a timely fashion. Patching vulnerabilities costs nothing but your time (and can be automated) and – provided you're diligent with regards to updating mission-critical systems – could save you plenty by preventing popular exploits from succeeding.

Nobody would have heard of Conficker if everyone had applied the Windows MS08-067 security patch in October 2008 (download our feature about how to install and configure Windows Server Update Services from **www.pcpro.co.uk/links/201wsus**).

4 Use strong passwords. Probably the number one complaint that any small business security consultant will have is the lax way in which passwords are treated. From banning the most common or default options (12345678 and admin) through to not sharing the same ones with the entire workforce, a proper password policy is a free way to dramatically improve the security in your business.

5 Get physical, and lock it. Your IT security is only as good as your building security, and many thieves are just as interested in stealing your data as your equipment.

small-business use. "MSE uses real-time protection to help address potential threats before they are a problem," Evans said.

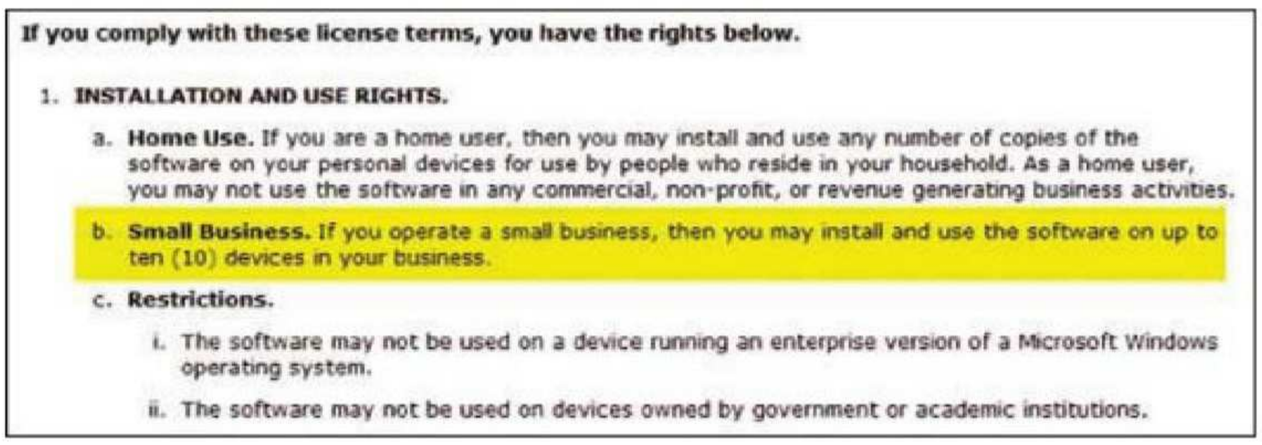
Another vendor of security software with a free product, albeit only aimed at consumers, agrees. Robert Gorby, global head of SMB propositions at AVG, reckons that "for very small businesses, consumer products can be sufficient and cost-effective", although he concedes that consumer-grade products "will not protect networks, file servers or mail servers, which are vital for the smooth running of a small business".

Sophos positions itself squarely as a business security vendor, and product marketing manager Chris Pace picks up on this last point. "For business use – even at the small end of the scale – there are certain challenges in managing antivirus across a number of machines," he said. "Primarily, these concern rolling out updates and definitions to ensure every endpoint in the business is constantly defended." Pace insists that by implementing security solutions designed for individual machines, the network as a whole can become weaker.

Not all free security solutions allow for business use anyway. The End-User Licensing Agreement for AVG's free anti-malware solution clearly states that it's provided for personal and non-commercial use only, whereas the equivalent free Microsoft Security Essentials product is licensed for commercial use for up to ten users.

It's tempting for small businesses to treat licences in much the same way as home users do – that is, not bother reading them. To do so is a huge mistake according to Ray Bryant, CEO of vulnerability assessment tool developers Idappcom. "What if I have a computer at home that I connect to the company system, and on that computer I have free protection software? Well, first the company system is now in danger, but as soon as I use my freeware licence on my personal computer for my employer, I and they have most probably broken the licence and breached copyright law, which is a criminal offence."

Cris Pikes, MD of managed service IT security provider Sysec, thinks it's a



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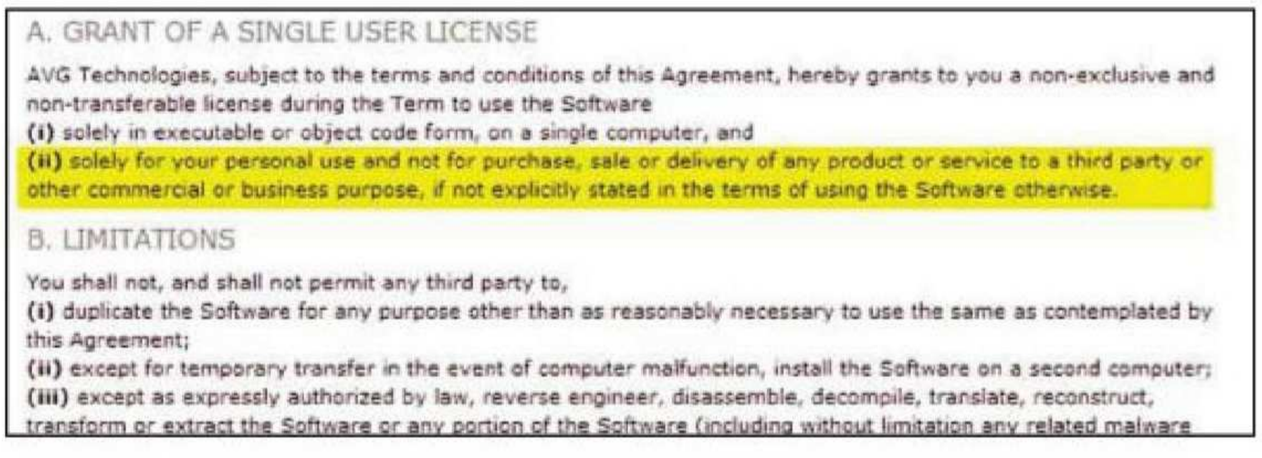
   c. **Restrictions.**
      i. The software may not be used on a device running an enterprise version of a Microsoft Windows operating system.
      ii. The software may not be used on devices owned by government or academic institutions.

The Microsoft Security Essentials licence allows free small-business use if you have ten or fewer PCs...



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... but the AVG Free licence forbids any type of commercial use.

moot point anyway, arguing that while some free security applications do allow for business use, "they don't offer any real level of service agreement".

A question of support

Which brings us to the thorny subject of support for free security solutions, which is usually offered by way of a hodge-podge of user forums rather than official, developer-funded systems. "The decision to use free security applications comes down to whether the business needs a guaranteed level of support," Pikes insists.

Rolf von Roessing, international vice president of the Information Systems Audit and Control Association, has personal experience with small business and this is reflected in his response: "When using free versions, don't expect any help. When using paid versions, particularly the small vendors will go to great lengths to help you out if something isn't working."

Bryant added: "Support is never free, even if paid through premium-rate numbers." He insists that skilled support should "not be left to next door's son who studies computers at school", as is often the case with a small business scouring web forums for help.

We'll leave the last word on paid support to AVG, with Robert Gorby warning that "having direct access to support when you need it can actually save a business money in the long run".

Comply or be damned

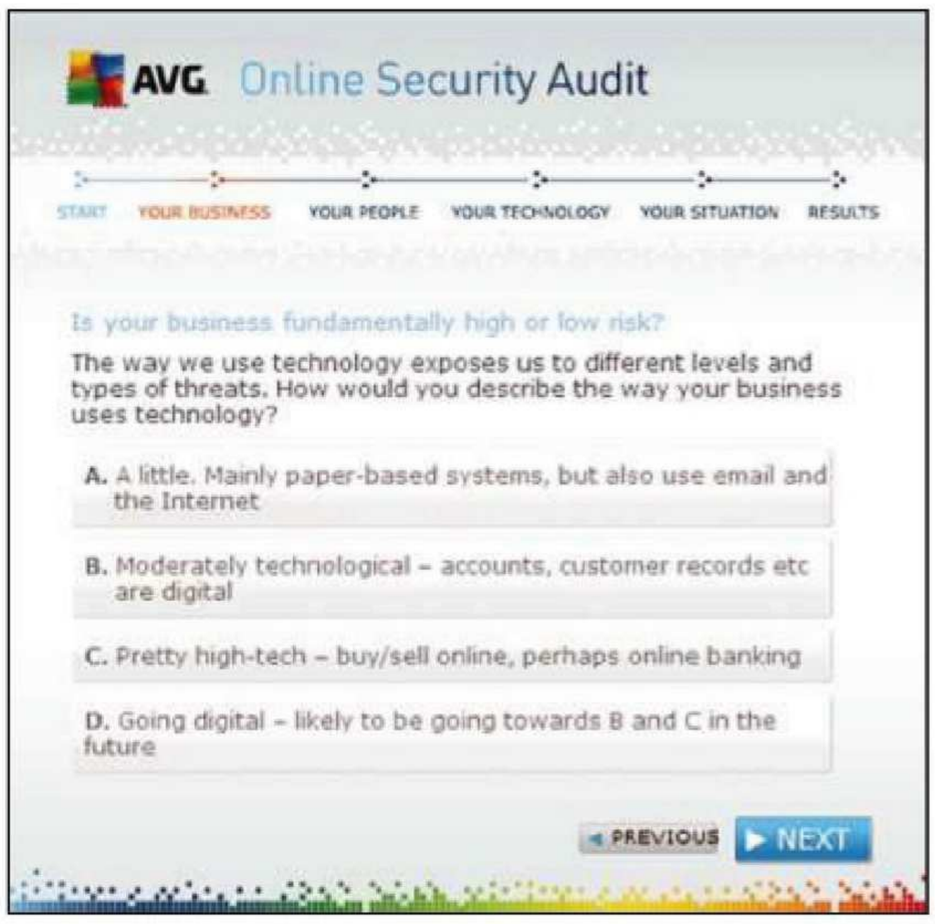
So licensing and support could prove problematic to the small business looking for free security, but what about regulatory compliance issues? Compliance can come to the fore for even the smallest business: what about online payments (PCI DSS) or the Data Protection Act?

We asked security consultant Professor John Walker from Secure Bastion, who explained that "the specifications of compliance and standards don't specify the level of solution". In other words, you're on your own: there's plenty of guidance, but you have to use your own judgement.

However, there is the "common criteria" aspect of compliance that a small business might have to consider. So, for example, if there was a regulatory need to use a firewall compliant to Evaluation Assurance Level 4, the accreditation for that would be gained and compliance maintained by the firewall vendor itself.

"More often than not, the vendors offering free security products don't invest the financial resources required to achieve product compliance in those technologies that they choose to give away," warned Cris Pikes.

Any need to comply is dependent upon the business you're working in, but Darren Argyle, security and compliance offerings leader at IBM UK, said that it isn't so much an issue of the level of security but more one of scalability and reliability. "Would an external auditor be happy to say the business is completely compliant knowing that free security software was part of that compliance framework?" The answer is likely to be no.



AVG has developed an Online Security Audit, which might help you evaluate your small-business security needs.

Saving money without sacrificing security

So if the general consensus of security expert opinion is that a free solution isn't really viable for even the smallest business, how can you save money without sacrificing security? AVG's Robert Gorby said you should always look for solutions that have been "designed specifically for small businesses, as opposed to enterprise-level solutions that may be too cumbersome or complicated to manage – as well as being too expensive for what's required".

Why pay for a whole range of enterprise-level features that your small business will never need? AVG uses the free consumer solution as a method of making people aware of the commercial solutions it offers; Gorby recommends that small businesses make use of the free trials offered by vendors before committing to any purchase. "This allows you to get one month of protection for free, while testing if the solution is right for your business."

To help small businesses assess their needs, AVG has developed an Online Security Audit (**www.pcpro.co.uk/links/201avg**) that should help you focus on your real-world security needs and prevent unnecessary expenditure.

One method that an increasing number of smaller businesses are exploiting to reduce that expenditure is to look at security as being an operational expense rather than a capital one. That means thinking in terms of outsourcing, managed services and the cloud. "Managed services allow small companies to manage their cash flow by making security and compliance an operational expenditure," Cris Pikes explained, "rather than requiring an upfront investment in software, hardware, space, power and IT expertise."

While the cloud has its financial attractions, it isn't a budget-busting silver bullet. "When using cloud services for IT security, there still needs to be an element run on the endpoint to provide effective protection," said Chris Pace from Sophos. "Outsourcing security is an option for small businesses, especially when they're outsourcing all of their IT. Security then becomes part of the service that the IT provider delivers, including support when there is a malware infection."

Outsourcing such as this also allows for an easy-to-implement and relatively cheap route to scaling the security provision as the business grows. This shouldn't be under-estimated – what seems like a cost-effective solution when there are a handful of people in the office becomes a noose around your neck when faced with even the smallest amount of growth. Suddenly, you'll need to invest in new commercial licences or, worse still, move to a totally new vendor and product with all the deployment disruption that entails.

The key is to plan not just for today but, as far as you can, for tomorrow. Whichever option you choose, make sure your security choice can scale as the company grows; don't break the law by using non-commercial software; and never assume your business is too small to be a target.

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PRACTICAL ADVICE FROM IT CONSULTANTS

Advanced Windows Jon Honeyball

How good is IE9?

NOW THAT EXPLORER 9 HAS FINALLY COME OUT IN ADULT FORM, **JON HONEYBALL** FINDS MUCH TO LIKE, BUT COULD DO WITH A BIT OF PRIVACY NOW AND AGAIN

IE9 is a rather bare-bones browser, here showing our new sister site cloudpro.co.uk.

Microsoft's latest web browser release, Internet Explorer 9, has emerged from the shadows after a rather public gestation period. I don't really mind public betas so long as their function is to ensure the quality of the final product, but public betas that exist solely to be part of the marketing ramp tend to be rather unpleasant affairs (especially when the PR people are crowing about how many millions of people have downloaded the damnable thing). When all is said and done, if it's good enough to release then bloody well release it; if it isn't then don't inflict it on millions of your most enthusiastic users.

There's no doubting that IE9 is an awful lot better than some of its predecessors, but that's a comparison that doesn't set the bar astronomically high, given that there are low points such as IE6 in the equation. There are still hundreds of businesses that are stuck with Windows XP because they need IE6. Why are they stuck with IE6? Because they were foolish enough to believe Microsoft when it told them that this was a great development platform, and here are the tools to write some rich, IE6-specific applications. Once IE6 support was dropped from subsequent browser versions, these wretched customers found themselves abandoned up a dank and dreary cul de sac.

Of course, IE9 will not run on Windows XP – that would be too helpful of the IE team, whose number one priority is to winkle customers away from XP as fast as possible. Customers who don't upgrade aren't spending money on new licences, and a powerful lever to pry them away from XP is to ensure that IE9 doesn't work on it. Job done, the team delivered faultlessly, and never mind that other companies – Google, Mozilla and Opera – have shipped browsers that work just fine on XP.

There's much to like in IE9. At first I liked its clean, minimalist design, but I'm an old-fashioned stick-in-the-mud when it comes to user interface design, and if there isn't a proper File | Edit | Insert menu bar I start to feel a little twitchy. Doubtless this is just a symptom of advancing age, but I feel that hiding everything useful behind a gear-cog symbol is a little Web 2.0, and it just doesn't feel right. I like the integrated searching within one edit box, even if the default engine is, predictably, Bing. I find the visuals of the edit box alongside the tabs annoying, first because there isn't enough visual distinction between the edit box and a tab, and second because the edit box takes up valuable column width that could be used for more tabs. The alternative would have been to devote one row to the edit box and another to the tabs, but I guess that would have spoilt the stripped-bare look and feel (although it is an option).

Under the bonnet, IE9 definitely has a quick browsing engine, but that depends upon your using the right version. You see, there are two: the 32-bit and the 64-bit versions. If you have 32-bit Windows, then you'll only get the 32-bit version, of course, but 64-bit Windows comes with both. You might think that sounds sensible, until you realise that the default version is the 32-bit one on both 32-bit and 64-bit Windows, and you have to dig deep to find the 64-bit version on 64-bit Windows.

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Why has this happened? Well, there's a perfectly sensible excuse – by focusing on the 32-bit version, the IE9 team was able to make it the best one possible, with the 64-bit version coming second. I could just about handle this grimly realistic attitude, were it not for a couple of key points.

First, 64-bit Windows 7 is the predominant version that's shipping today, if the laptops that I see being bought and deployed are anything to go by; and second, the 64-bit version of Windows 7 has the old JavaScript engine in it, which is far slower than the 32-bit version, so Microsoft prefers to hide it from public view. I can understand the pragmatism of this decision, but it still grates. We need to move over to 64-bit across the board, and we'll only have a strong 64-bit experience if people push the platform hard in a fully 64-bit way.

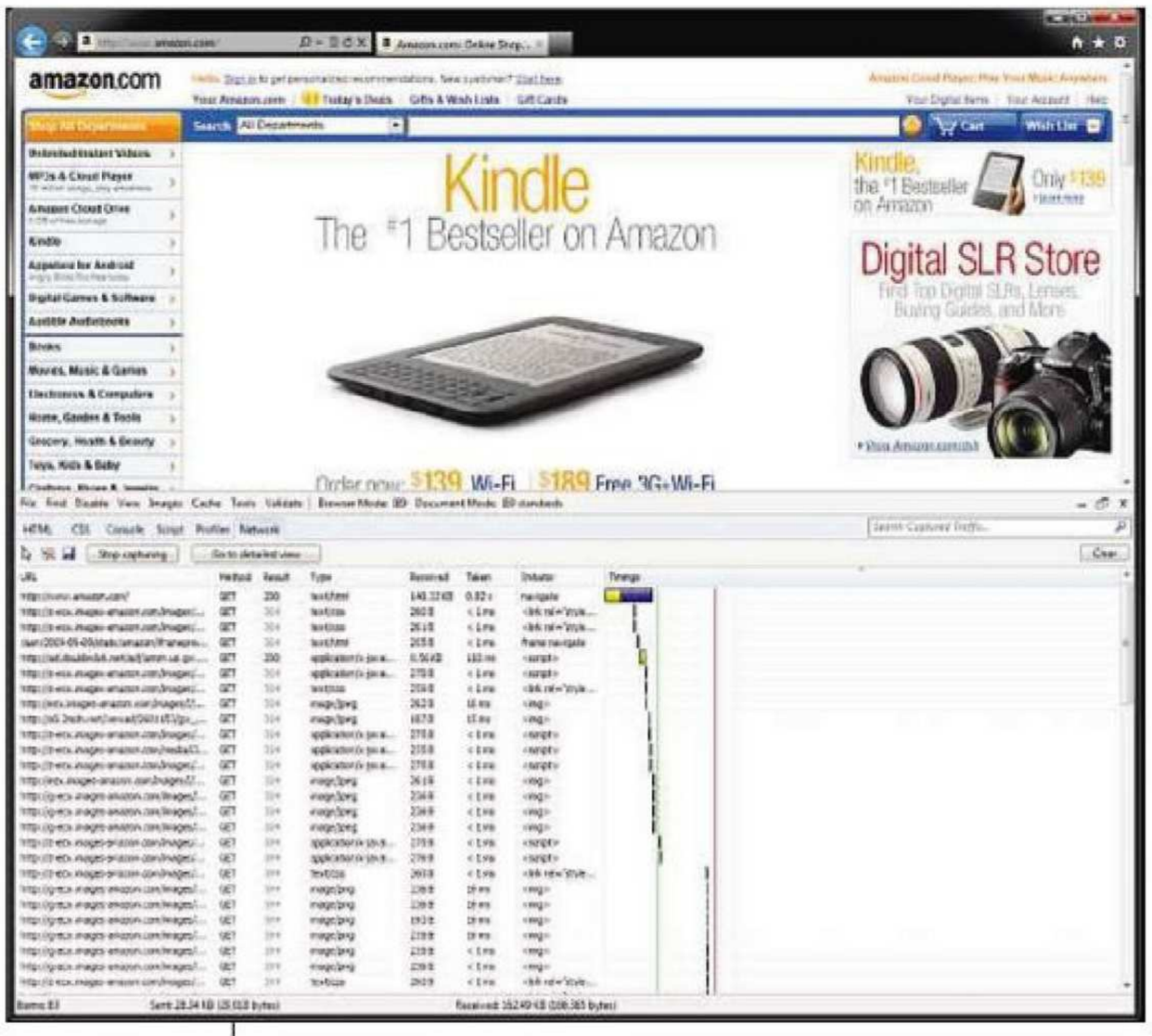
I accept that there are few web pages that require 2GB of RAM, but if the reality is that 64-bit IE9 is to be left as the runt of the litter, then Microsoft shouldn't install it by default. Make it an optional download or installer, and make it clear that it isn't as good/fast/optimised/tested as the 32-bit version. Call it a developer 64-bit pre-release version of IE9 or whatever, but sticking it on every 64-bit machine and then hiding it away just irritates me enormously.

Privacy issues

I'd quite like IE9 to offer the InPrivate browsing facility as a default option. With InPrivate you can set the browser so that it records nothing about your browsing session: no history, no cache of files, no record of clicks, no cookies and so forth. You can't make this the default mode (at least, not from the browser UI), which is rather disappointing. I'll have to have a poke around the Group Policy tools to see if I can force it from there. You might wonder why I'd like this mode turned on by default? Well, I have a particular hatred of the way some sites insist on tracking what I'm doing, and an even bigger hatred of the way that advertising engines use cookies to target me. Using InPrivate browsing mode as the default would automatically ensure that this doesn't happen, but Microsoft won't allow it.

That takes me onto the subject of Tracking Protection Lists (TPLs), a new technology in IE9 that allows you to control the way that third-party websites track what you're doing. If you go to Contoso.com and look at some items, it might be that advertising.com links are embedded within the Contoso.com website, and advertising.com stores cookies on your machine logging what you were browsing.

Now move over to happyclappy.com, which is an entirely different site, but also uses advertising.com advert management – those advertising.com links from happyclappy.com can see what you've been looking at while on other sites that use its engine, and so can present you with targeted suggestions and adverts. Naturally, the advertising industry thinks this is a really cool, whizzo feature that's a benefit to all of us (but especially the advertising industry, because a targeted advert can attract a higher click-through price than an anonymous item).



The developer and debug facilities in IE9 are the high point of the browser.

JON HONEYBALL
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Advertising people really want this sort of behavioural analysis to work in their favour, and naturally claim that it's for our good too, because we'll no longer be bothered by pesky adverts that aren't relevant to our areas of interest. What's more, we won't see the same advert several times over, because they "know" what we've seen already. If all this sounds like a desperate attempt to justify a borderline-immoral business model, then you could possibly be right. The problem here is that no user has been asked whether they want to sign up for this sort of tracking – it just happens whether you want it or not – hence the big interest in expelling these cookies and wresting back control from the advertising industry.

TPLs are a way of doing just that, so at first glance they're clearly a good thing, but dear reader you'd be quite correct if you guessed that there's a big "however" lurking around the corner. To explain this downside, let's look at how TPLs work. Each one is a simple text file, which you can view and edit using any text editor you like. A TPL is usually hosted on a web server, and the page it's referenced from will usually have a button that fires off some JavaScript to install and activate the TPL into

your E9 installation. Within the TPL is an instruction that says where the TPL came from and how long it's valid for, and when this times out, IE9 automatically goes and retrieves an updated copy.

Now, on to the body of the TPL. You might expect that a TPL is basically an exclusion list of third-party domain names that should be blocked whenever you visit a primary site. In other words, when I visit Contoso.com, I want the third-party site items to be disabled – if one of those "deny" items is analytics.microsoft.com for example, I want that blocked. However, when I go to analytics.microsoft.com itself, the blocking shouldn't happen because analytics.microsoft.com is now the primary site for the page. Clearly, a well-designed blocking list will help by nuking all references to advertising, tracking and analysis sites, and will help keep my browsing private to me.

Allow and deny

However, there's a problem here. In the hierarchy of permissions that you can apply in a TPL, "allow" beats "deny". When I read this in Microsoft's documentation, I confess that I did a double-take. Since when does "allow" ever trump "deny"? The whole principle of security rests on a clear understanding that no matter how many things you "allow", a single "deny" is enough to prevent access to them. But no, in IE9 TPLs, allow beats deny, so if you have a deny of analytics.microsoft.com in one TPL and an allow of Microsoft.com elsewhere, the allow will win.

On the Microsoft site that deals with IE9 and TPLs, there are five TPL download links. You can, of course, download multiple TPLs, and IE9 concatenates them together, on the basis that you might choose two TPLs from two trusted sources. Now take a look at the TPL from TRUSTe, which is linked from the Microsoft site. This appears to be an organisation that certifies advertising organisations as being well-behaved, which is why its TPL has a very large number of "allows" within it. But combine this TRUSTe TPL with a blocking one, and because "allow" beats "deny", you may well find more personal tracking happening than you're happy with.

I'm not at all happy with the way that IE9 handles TPLs. The UI is basic, and certainly doesn't give enough explanation to the user about what's going on. Suggesting that several TPLs might be a good thing isn't helpful either, because there will be the obvious temptation to believe that "if three are good, then ten are better". This might carry some weight if this was a deny-only feature, but when the implementation puts allow ahead of deny, multiple TPLs could be highly counterproductive.

Frankly, I'd prefer a simple pair of checkboxes in the IE9 user interface, called "enable deny" and "enable allow", along with a pair of radio buttons called "deny beats allow" and "allow beats deny". Then it would be clear what's going to happen. It's unreasonable to expect users to go digging through the TPL files to work out what's happening, and even more unreasonable to imply that several TPLs might be a good idea when one can override all the others. This goes to the heart of the question: "Who do you trust, and why?"

IE9

Another great debugging feature in IE9 enables you to swap between various rendering engines. Even better, you can see how well a page would look in IE7, IE8, IE9 or "IE9 Compatibility View".

The problem is that users want simple solutions they can set and forget. This is, after all, 2011.

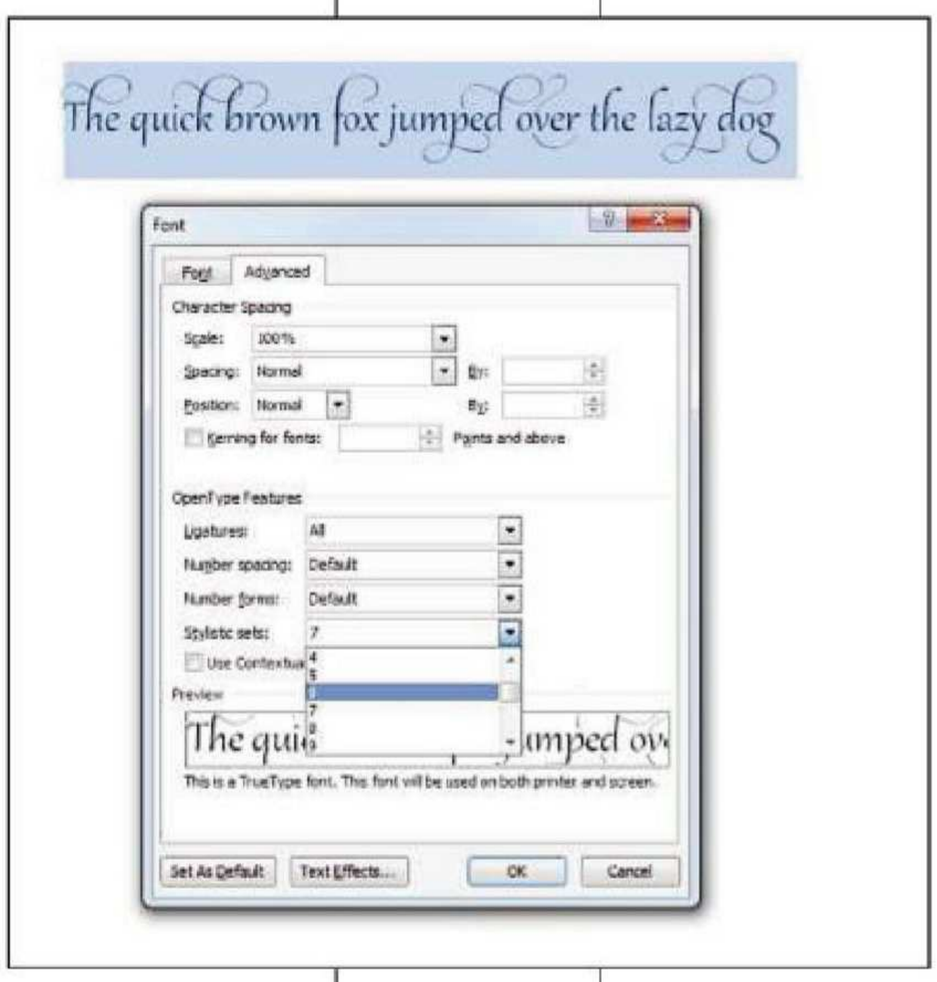
Unfortunately, few people appear to have clean hands in this area. Microsoft itself recently tweeted that "at Microsoft today we do 3B+ in ad revenue. It is the most rapidly growing part of our business." Is it any surprise, then, that Microsoft's implementation of TPLs puts "allow" before "deny", or that one of its linked lists puts a blanket "allow" on Microsoft.com? After all, you wouldn't want to jeopardise a $3bn per year revenue stream, would you? Hearing this $3bn claim left a sour taste in my mouth with regard to the whole TPL issue in IE9.

To finish on a somewhat more upbeat mood, there are some useful tools in IE9 that are worth checking out. I particularly like the F12 Developer Tools, which you can find under the Gear menu. Another window opens up at the bottom of the browser and immediately I feel at home – yes, there's a traditional menu bar! Now try clicking on the Network tab, hit the Start Capturing button, then visit a few websites. Everything that loads gets detailed, including a superb graphical view of how long each item took to load. You can click through each item in turn and it will even display what the content was. This is a big step forward for web browser debugging, and for helping users who care about this to see what's loading on the page.

Font rendering

Just a quickie to end on this month. The intersection of art and science, or analog and digital, arguably reaches its pinnacle with typography. This much-overlooked topic is crucially important to what we see onscreen, and to how things print. Today, it's trivially easy to choose a font and type style, but in the past, before the days of TrueType from Microsoft and Adobe Type Manager, we had to build all those screen and printer fonts by hand. Installing them as soft fonts into a laser printer was like an exercise in brain surgery.

Tucked away in a dusty corner of a building at Redmond is the Microsoft Typography department, whose work is rarely discussed, but here's something I found out: Office 2010 (and 2011 for Mac) supports much enhanced typography if you know where to look. Try the new Gabriola font, and dive into the advanced typography facilities in Word | Font | Advanced | Ligatures and Stylistic Sets. Check out the document at **www.pcpro.co.uk/links/201aw1** and the excellent video at **www.pcpro.co.uk/links/201aw2**.



Enhanced typography, including Stylistic Sets, is present in Office 2010 and 2011.

If you want the best control, look at Microsoft Publisher 2010, which offers live previews of the stylistic sets. I once rather stupidly used Publisher to make a website – the output was hilariously horrible and I've been put off it ever since. The 2010 edition raises the typographical stakes, and this is to be applauded. I've always loved typography – the merging of vector splines with the fine art of best placing text by eye, and introducing both into the digital world of rendering and printing. When next I visit Microsoft, I want to track down this team, whose work is sorely undervalued by being reduced to a tickbox on the ninth page of the features list for Word. They deserve better than this. Take a look at Gabriola and these other high-end fonts that Microsoft has built or commissioned, and take the opportunity to look at typography with fresh eyes.

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Advanced Office Simon Jones

LibreOffice progress

SIMON JONES LOOKS AT THE DOCUMENT FOUNDATION, WHICH WAS BORN OUT OF THE SPLIT BETWEEN OPENOFFICE AND ORACLE, AND FINDS IT IN EXTREMELY HEALTHY SHAPE

It's been six months since the OpenOffice developer community split from Oracle, renamed itself The Document Foundation (TDF) and named its product "LibreOffice". In that time it's managed three minor releases, fixed many small bugs, and added quite a few minor enhancements. Many of the fixes have been waiting on the To Do list for some time, and they can only be done now because of the hoo-ha about Oracle's apparent lack of commitment to OpenOffice and the consequent split with The Document Foundation, which generated enough publicity to attract 150 new developers to join up for the work on LibreOffice.

When the rift was first announced, The Document Foundation invited Oracle to join, but the offer was firmly declined, and the people who formed TDF were asked to resign their posts on the OpenOffice community council very quickly, due to "conflict of interest". This robbed the community of several of its most active developers, which it could ill afford to lose, as it has been struggling to find developers for some time. Perhaps 150 new ones doesn't sound like much, but for LibreOffice it represents a massive boost, and TDF hasn't been slow to capitalise on the new-found momentum. The Document Foundation has also been buoyed by fresh donations totalling more than €100,000, which enable it to have a marketing presence at trade fairs such as CeBIT, and to pay developers' travelling expenses and so on.

Most of the new money raised will, however, be spent on incorporating TDF itself in Germany. This work is taking a long time, apparently, because all the rules that used to govern the OpenOffice community have to be translated into German, adapted to comply with German law, and translated back into English to be agreed by the community. The foundation hasn't even yet decided which federal state (Bundesland) it wants to be incorporated in, and since each state in Germany has its own laws, it will have to comply with ones that have yet to be determined. Saving money by using volunteers instead of paid staff also means things can take a little longer.

One of the new developments has been LibreOffice Portable, an offshoot off the main project, which allows LibreOffice to be run from a USB flash drive without having to install anything on the PC. Another welcome addition is the ability to save files in Microsoft OOXML formats (Office 2007 and 2010), which OpenOffice still can't do (it can read OOXML files, but not yet write them). The Document Foundation claims that's because the OOXML export code is deliberately disabled in OpenOffice, and also says that it has better import and export filters for OOXML that were supplied by Novell.

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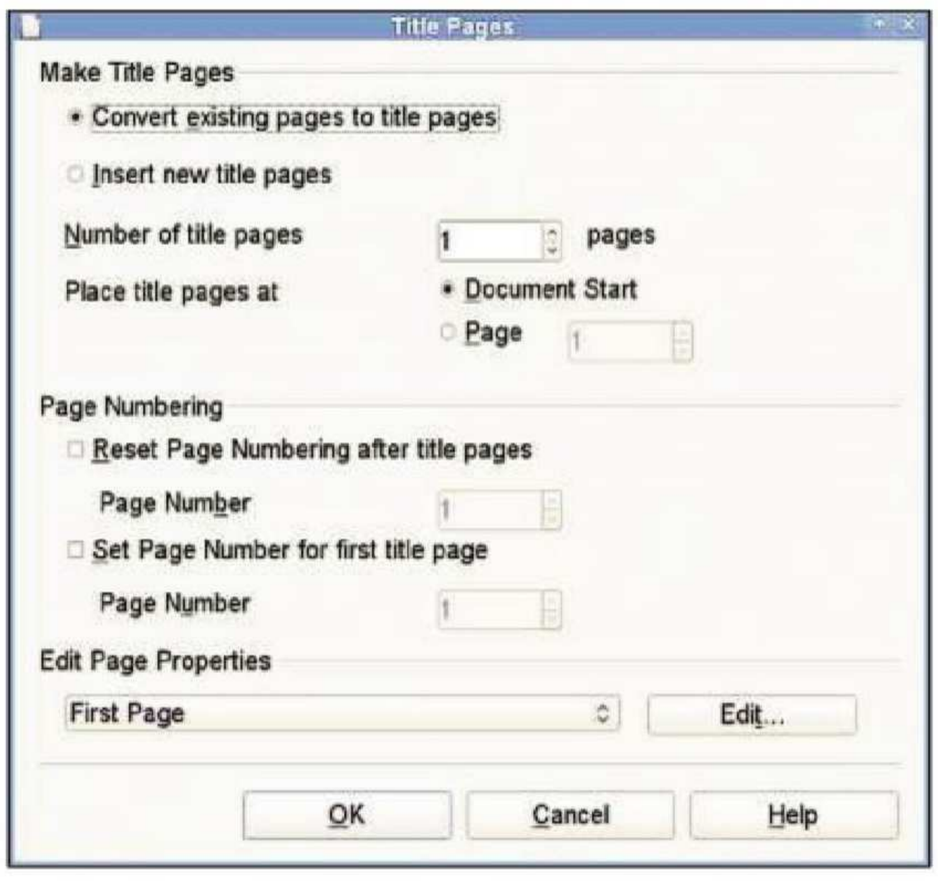


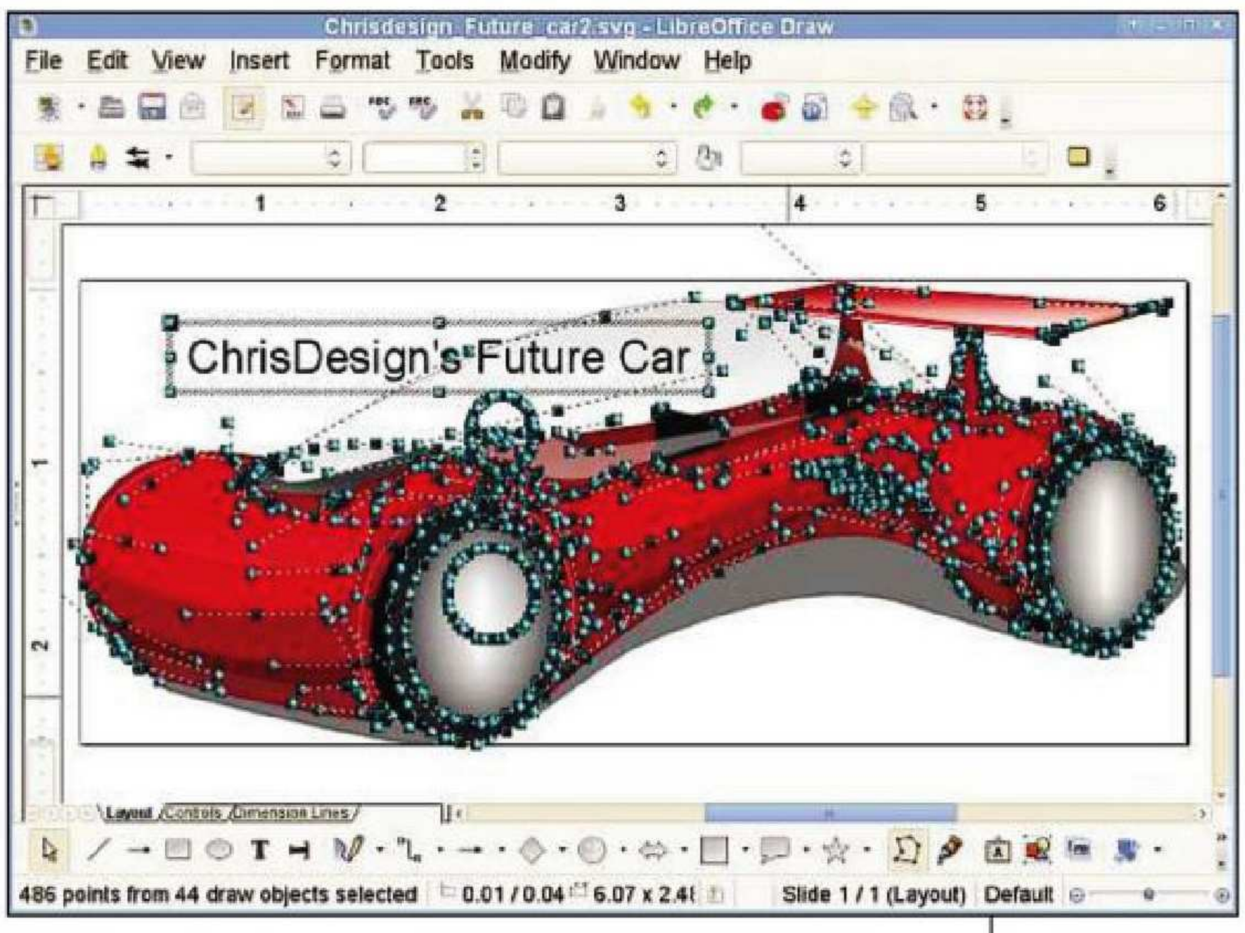
LibreOffice 3.2 Writer has a new dialog to create and manage Title Pages.

The Document Foundation aims to release a new build every month, and could soon outstrip OpenOffice

While it's nice that LibreOffice supports writing OOXML files, it still proffers weasel words in a warning dialog whenever you try, to the effect that: "This document may contain formatting or content that cannot be saved in the Office Open XML Text file format. Do you want to save the document in this format anyway? Use the latest ODF file format and (sic) be sure all formatting and content is saved correctly." You'll see this warning whether or not your document actually contains any formatting or content that can't be translated into OOXML, and the default save button is "Save in ODF format", which means that you consciously have to choose to keep your document in its original OOXML format.

The latest version of LibreOffice, 3.3.2, contains twice as many fixes and new features as OpenOffice, some of which are minor, such as new button icons and a couple of extra bundled fonts. Others, however, are significant enhancements, such as a new, more user-friendly dialog for creating and managing Title Pages in Writer. There are new import/export filters for Microsoft Works, Lotus Word Pro, WordPerfect and SVG files, and generally the applications are becoming more compatible with other formats, and a little easier to use.

It's nice to see The Document Foundation getting on with the LibreOffice project: it aims to release a new build every month, and if it maintains that pace, it will soon outstrip OpenOffice in bugs fixed and features implemented. The vision is for a complete overhaul of the existing code base, making testability



and quality assurance a priority. Calc is scheduled to be the first module that will get this overhaul, rebuilt around a new calculation engine named Ixion. Other modules – including Writer, we're told – will get much-needed conversion fidelity between different document formats. LibreOffice is already being distributed with SUSE Linux, and will be included in the new Natty Narwhal release of Ubuntu. Another six months might see the LibreOffice user-base expand sufficiently for it to overtake OpenOffice as the de facto rival to Microsoft Office, at least in terms of new installations.

Draw and Writer can now import and export SVG files.

Processing CSV files

Many applications output Comma Separated Value files, which are plain-text files containing columns of data with each value separated from the next by a comma, and each row terminated by a new line character. Double-clicking on a CSV file will, by default, open it in Excel if you have Microsoft Office installed, so that you can see, chart, analyse and edit the data. Excel can save to CSV files too, but of course it will strip them of any formatting as it does so. Since the CSV file format is so simple, it's often used to exchange data between unrelated applications, and we recently had to deal with such an instance while we were integrating a bespoke contacts database with a website that sends bulk emails.

Our client was using this service to keep its own customers up to date with company news – a narrowly targeted opt-in service. It already had the ability to design the mailshot criteria, and to export the names and email addresses of the targeted recipients, and this data was submitted to the website via a CSV file. As with any bulk email communication, a small percentage of messages in each mailshot would fail to arrive for one reason or another: for example, a recipient may have left the company, so the email address we had for them was no longer valid; their mailbox may have been full; or the sending mail server may have had some other problem when sending to that address. The website in question reports the results of sending each mailshot as a list of all the people that it should have been sent to, with their email addresses and the outcome, and they can filter that list to reveal only the failures and export those as a CSV file. We were being asked to complete this loop by employing this bounced messages list when editing the contact records in our client's database.

In the file that we exported to the website, we put a unique identifier for each individual along with their name and email address, so that when we received that bounce results file back from the website, it now also included the person's unique ID. We could then use this to locate that person in the contacts database, and decide what to do next according to the "bounce category" of the result: if the result said that their mailbox was full, we might just ignore the error and attempt to resend the message after a few days; if the result said the email address didn't exist, we might phone the person to ask for their correct address; if the result showed that communication to this address was blocked – perhaps because the recipient has marked mail from our client as unwanted spam – we might mark their record as "do not contact", so we didn't bother them again. If there was a large number of bounces from the same company, we might check whether it had gone out of business, and if so, delete all those people from the database.

In cases such as this, whatever we decide to do with the results, the first thing we need to do is read them from that CSV file, and that's easy nowadays because we don't have to worry about reading the text file a line at a time, splitting each line at every comma and parsing the data via long-winded, complicated and error-prone code – built into the latest Visual Studio is a neat way of turning a CSV file into a DataTable object with a couple of lines of code. The trick is to make use of the JET OLE DB data provider, which already understands CSV files.

If you construct the ConnectionString properly, you can make an OleDbConnection to a folder on your computer, or over the network, then treat any CSV files in that folder as though they were a table in your local database. A ConnectionString is just a piece of text that says how to connect to a database, and it consists of various parts that set properties of the Connection object, such as the Provider, the Data Source and so on. The Provider we need to use is called "Microsoft.Jet.OleDb.4.0", and the Data Source is the full pathname of the folder containing our CSV file. The magic part is contained in the Extended Properties value, which we set to:

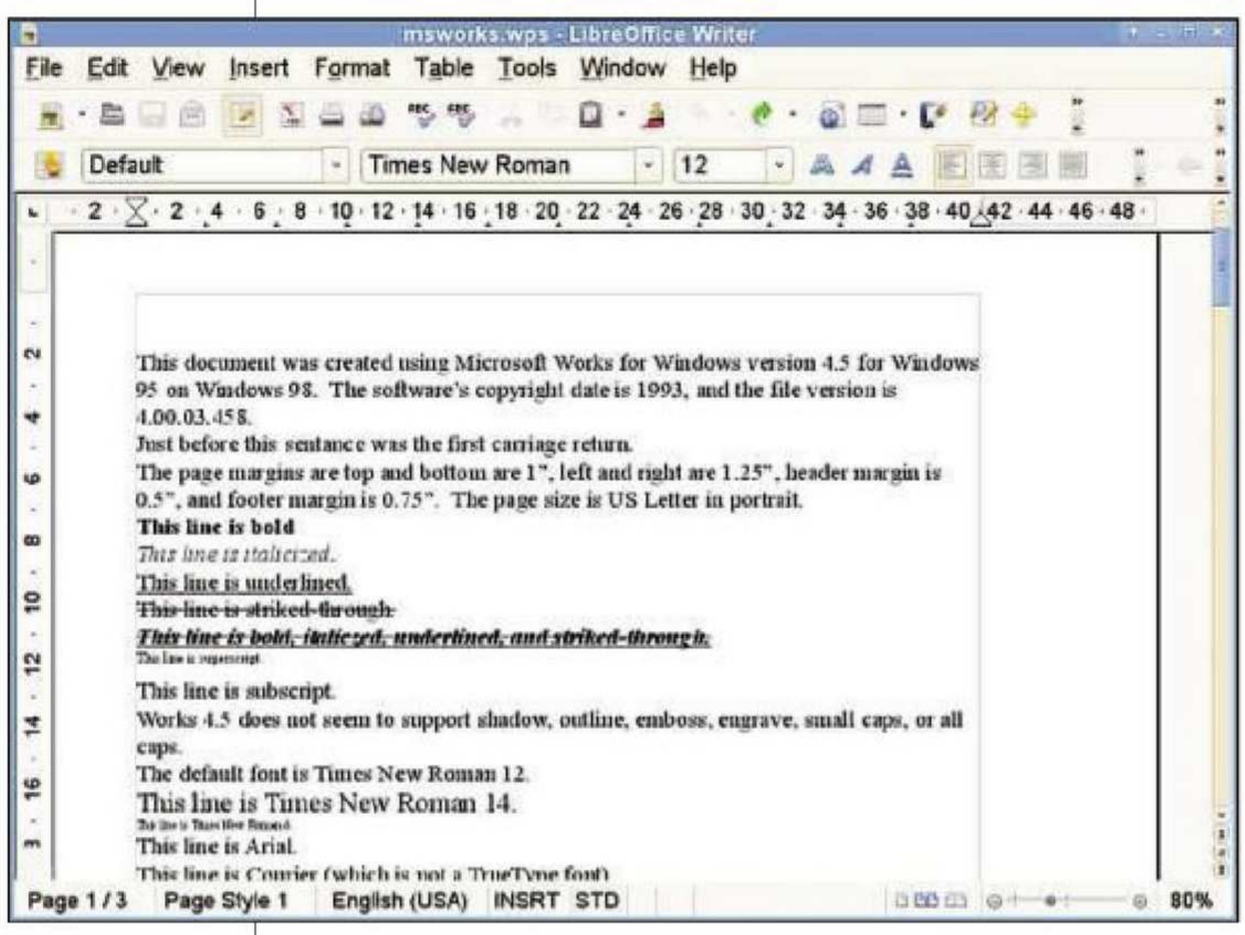
```
"Text;HDR=Yes;FMT=Delimited"
```

This tells the Provider to expect a delimited text file, and that the first line of it contains the column names. As the Extended Properties value must be a string within the connection string, you'll end up with two sets of double quotes before the word Text, and three double quotes at the end (two to terminate the Extended Properties and one to end ConnectionString.) The {0} placeholder put just after Data Source= is replaced by the folder name by the String.Format command.

LINKS

Get LibreOffice from:
http://www.libreoffice.org
http://www.libreofficeportable.org

Writer can now import Microsoft Works files, and save documents in Microsoft OOXML.



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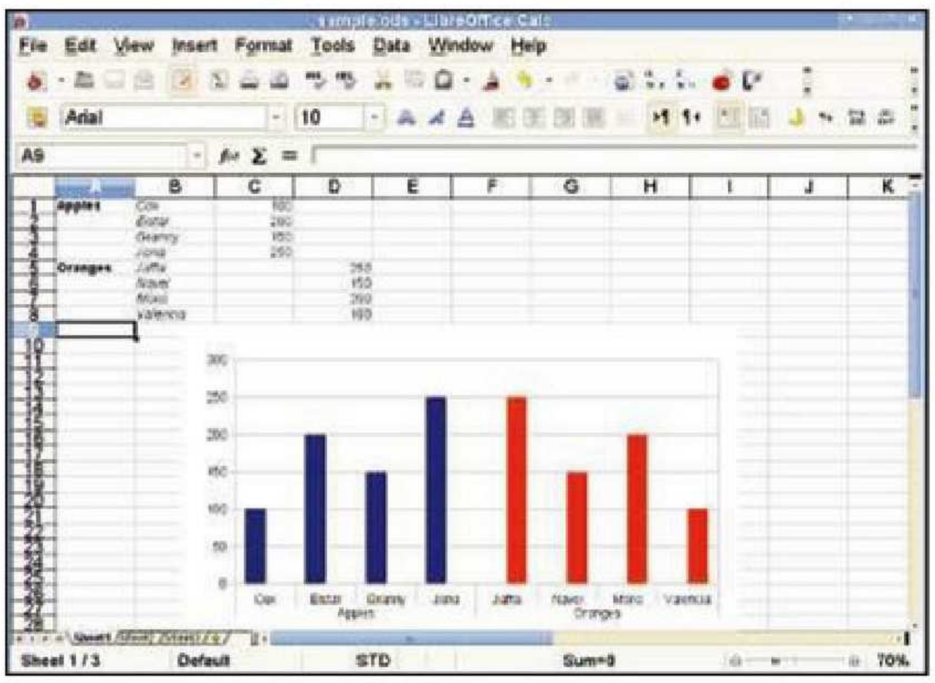


Calc can show charts with hierarchical column labels. The program is to be completely rebuilt around Ixion, a new calculation engine.

In the function GetTableFromCsv, we create the connection string, then use it to create a new OleDbConnection object. The Using ... End Using construct ensures that the connection is closed and disposed of once we've finished with it. After opening the connection we create a command string containing the SQL command "SELECT * FROM tablename", where the asterisk means return all columns, and for the tablename we use the name of the CSV file, not including the folder path. From the command string and connection object we create an OleDbDataAdapter object, again with a Using ... End Using construct to ensure that it's properly closed and disposed of later. We can then create a new DataTable object and ask the DataAdapter to fill it for us by executing that SELECT command.

That's just about all there is to it. We now have a DataTable object with rows and columns that we can use exactly as if it came directly from a SQL Server or Access database, so we can look at the DataTable's Columns collection to get the column names and their data types, and iterate through its Rows collection to process or copy the data as we want.

There are one or two caveats about using this method, however. First, the filename must end with TXT or CSV – if it doesn't, the Provider will refuse to parse it properly. Second, you have to be careful about choosing that filename. This is because it's going to be used in an SQL SELECT statement, and therefore has to conform to the rules for SELECT statements as well as those for Windows filenames – which means it mustn't contain spaces, brackets or other punctuation characters (except for one dot before the extension). Filenames such as "Import File (1).CSV" will cause an SqlException to be raised.

To get around this limitation, I recommend that you copy the CSV file to a known legal name in your TEMP folder, process that copy, then delete it (remembering to set the Overwrite flag on the CopyTo method, so it doesn't stall if a temp file of that name already exists). Copying the file adds an extra step, but it will stop the import from failing for spurious, hard-to-fathom reasons because the user had selected a perfectly valid filename that happens to have a space in it. The CopyToTempFile function, as employed right, does the job adequately.

If the files you're dealing with are very large, you might baulk at copying them to the TEMP folder, and choose instead to rename them to something permissible, import them, then replace their original names afterwards. However, you'd have to take extra care that the name you choose doesn't already exist in the current folder, that you have write permission to that folder, and that the file will be returned to its original name even in the event of an error causing premature termination. ■

IMPORTING A CSV FILE AS A DATATABLE

Don't waste time writing your own code to parse CSV files. You can use the Jet OLE DB Provider to do the job in a flash.

```
Private mdtBounces As DataTable
```

```
Dim objInputFile As FileInfo = New FileInfo(uteBounceFileName.Text)
If Not objInputFile.Exists Then
    MessageBox.Show("File does not exist!" & vbCrLf & objInputFile.FullName,
                    "Open File Error",
                    MessageBoxButtons.OK,
                    MessageBoxIcon.Exclamation)
Else
    Dim objTempFile As FileInfo = CopyToTempFile(objInputFile, "BounceFile.csv")
    mdtBounces = GetTableFromCsv(objTempFile, "Bounces")
    objTempFile.Delete()
    Dim strColumNames As String() = GetColumNames(mdtBounces)
End If
```

```
PrivateSharedFunction GetTableFromCsv(ByVal iobjTempFile As FileInfo,
                                      ByVal istrTableName As String) As DataTable
    Dim dtTable As DataTable
    Dim strConnectionString As String =
        String.Format("Provider=Microsoft.Jet.OleDb.4.0;" &
                      "Data Source={0};" &
                      "Extended Properties=""Text;HDR=Yes;FMT=Delimited""",
                      iobjTempFile.DirectoryName)
    Using objConnection As NewOleDbConnection(strConnectionString)
        objConnection.Open()
        Dim strCommand As String = "SELECT * FROM "& iobjTempFile.Name
        Using objAdapter As NewOleDbDataAdapter(strCommand, objConnection)
            dtTable = NewDataTable(istrTableName)
            objAdapter.Fill(dtTable)
        End Using
    End Using
    Return dtTable
End Function
```

```
PrivateSharedFunction CopyToTempFile(ByVal iobjInputFile As FileInfo, _
                                     ByVal istrTempFileName As String) As FileInfo
    Dim objTempFile As FileInfo
    WithMy.Computer.FileSystem
        objTempFile = NewFileInfo(.CombinePath(.SpecialDirectories.Temp, istrTempFileName))
    End With
    iobjInputFile.CopyTo(objTempFile.FullName, True)
    Return objTempFile
End Function
```

```
Private Shared Function GetColumnNames (ByVal dtTable As DataTable) As String()
    Dim astrColumnNames (dtTable.Columns.Count) As String
    For i As Integer = 0 To dtTable.Columns.Count - 1
        astrColumnNames(i) = dtTable.Columns(i).ColumnName
    Next i
    Return astrColumnNames
End Function
```

Web Applications Kevin Partner

Free lessons for web firms

KEVIN PARTNER GOES THROUGH THE LESSONS LEARNED AS HE CLOSES THE DOORS ON HIS FIRST ONLINE BUSINESS, NLIGHTN MULTIMEDIA

Four thousand, four hundred and sixty-five days after opening its doors for business, my first company NlightN Multimedia is being retired. Closing the company feels like a failure, not least because I have to dip into my own pocket to pay off its overdraft, but it isn't too difficult to find upsides to the situation. Compared with current university tuition fees, the business education it gave me looks like a bargain, and at least its winding-up is being conducted entirely voluntarily.

I set up NlightN in 1999 to develop e-learning applications for corporate customers – I'd previously worked as a product training manager for the Dixons Stores Group, developing e-learning products for Dixons, Currys, PC World and The Link. While at Dixons, I developed a good working relationship with a video production firm the company used, and so we decided to set up a company, to be run by me, which would act as a fulfilment house for all the multimedia work it was previously outsourcing. In fact, it didn't work out that way – most of our work was independently acquired, but NlightN was successful for several years. At its peak we employed more than a dozen designer/developers, along with support staff and even an in-house artist. Recent years, though, have been difficult: if you've run a company with staff you'll know what a voracious monster the wages bill can be, and I found that more and more of my time, energy and stress involved feeding it.

The 2008 recession was the last straw: typically, in bad economic times businesses slash their training budgets. The cost of developing e-learning becomes especially unattractive when cashflow is tight, so our work dried up – and so my partner and I decided to call it a day.

KEVIN PARTNER
Online businessman and PHP/ActionScript geek. Runs MakingYourOwnCandles.co.uk, PassYourTheory.co.uk, and web development firms Scribbleit.co.uk and FixedPriceWebsite.co.uk. Email: kev@fixedpricewebsite.co.uk; Twitter: @kevpartner.

There's much to learn from NlightN's demise. There's a general trend for large media companies to dominate e-learning as one factor, while the effect of recession is another, but our biggest challenge was employing enough people to do the work without having them twiddling their thumbs between projects.

However, the most important lesson of all lies in NlightN's beginning rather than its end. It may sound ludicrously naïve now, but we founding partners started the company because we guessed there was a big enough market for its services: we didn't research it, we didn't try to get projects lined up ahead of forming the company, and we didn't set a proper marketing budget to generate interest. We just hired some offices in Leighton Buzzard and I turned up on the first day to sit alone at my desk and wonder where to start...

Perhaps our biggest mistake was to set up a company that would depend upon sales skills, when not one of us could sell to save our lives. The projects we were pitching for had budgets in the tens or hundreds of thousands of pounds, and if that doesn't justify the cost of hiring a decent salesperson, I can't imagine what would. But we never did. Yet NlightN was, in many ways, a success, developing major products for blue-chip companies such as HarperCollins, Sony UK and Virgin Mobile, and we widened our scope into education, learning management systems and authoring tool development. But it wasn't enough.

From a personal perspective, I learned a lot about myself and what sort of businesses suit me. Any business that involves pitching for big projects isn't for me, because I find the entire process intensely frustrating and loathe the politics and arse-covering that seems to underlie most corporate decision-making. I've learned that I'm not a great manager, because I expect people to be self-motivated and so don't direct them actively enough. But my main problem is that I become friends with the people who work for me, and that makes it more difficult to take the tough business decisions. The most important lesson of all, though, was how dangerous it really is to keep all your eggs in one basket.

www.downmagaz.com

For the first five years NlightN was a one-market, one-product company, but in 2005 I decided to branch out. While standing in a queue at WHSmith, I noticed that the customer in front of me was buying a Driving Theory Test practice CD-ROM, so I rushed home and (for the first time) carefully researched the size of this market and the opportunity it presented. I looked at the barriers to entry, the main one of which was acquiring a licence from the Department of Transport. I worked out our development costs, and I decided that it was worth the risk. That's how to do it properly, and PassYourTheory became such a big success that a couple of years later it was spun out as a separate company, which I purchased from NlightN. I felt I'd found a type of business that actually suited me.

Since then I've launched more than half-a-dozen web businesses, some from within NlightN and some independently. More recently, my writing and Flash/PHP coding business Scribbleit launched a website development service called FixedPriceWebsite.co.uk. My favourite business, however, is MakingYourOwnCandles.co.uk, which was created during the writing of a magbook called *How to set up an online business* (available from **www.pcpro.co.uk/links/201wa**).

I'd be the first to acknowledge the role luck plays in business, but it's best left out of the equation when planning a new venture because, by definition, it's beyond your control. MakingYourOwnCandles is a good example of the way that following a logical and creative process lets you stack the odds in your favour. Finding a business idea that suits your skills and personality is crucial, and MakingYourOwnCandles is about as different from NlightN as it's possible to imagine. It's a mass-market business that targets domestic consumers, and that enables me to experiment with marketing techniques without gambling tens of thousands of pounds. Over the past 18 months I've learned a lot about the audience, what sorts of products they like and, crucially, the sort of marketing they respond to. Don't underestimate the importance of efficient order management and fulfilment, plus good, personal, customer service, but that's very definitely the cart that comes after the marketing horse. As one business is retired, another goes from strength to strength.

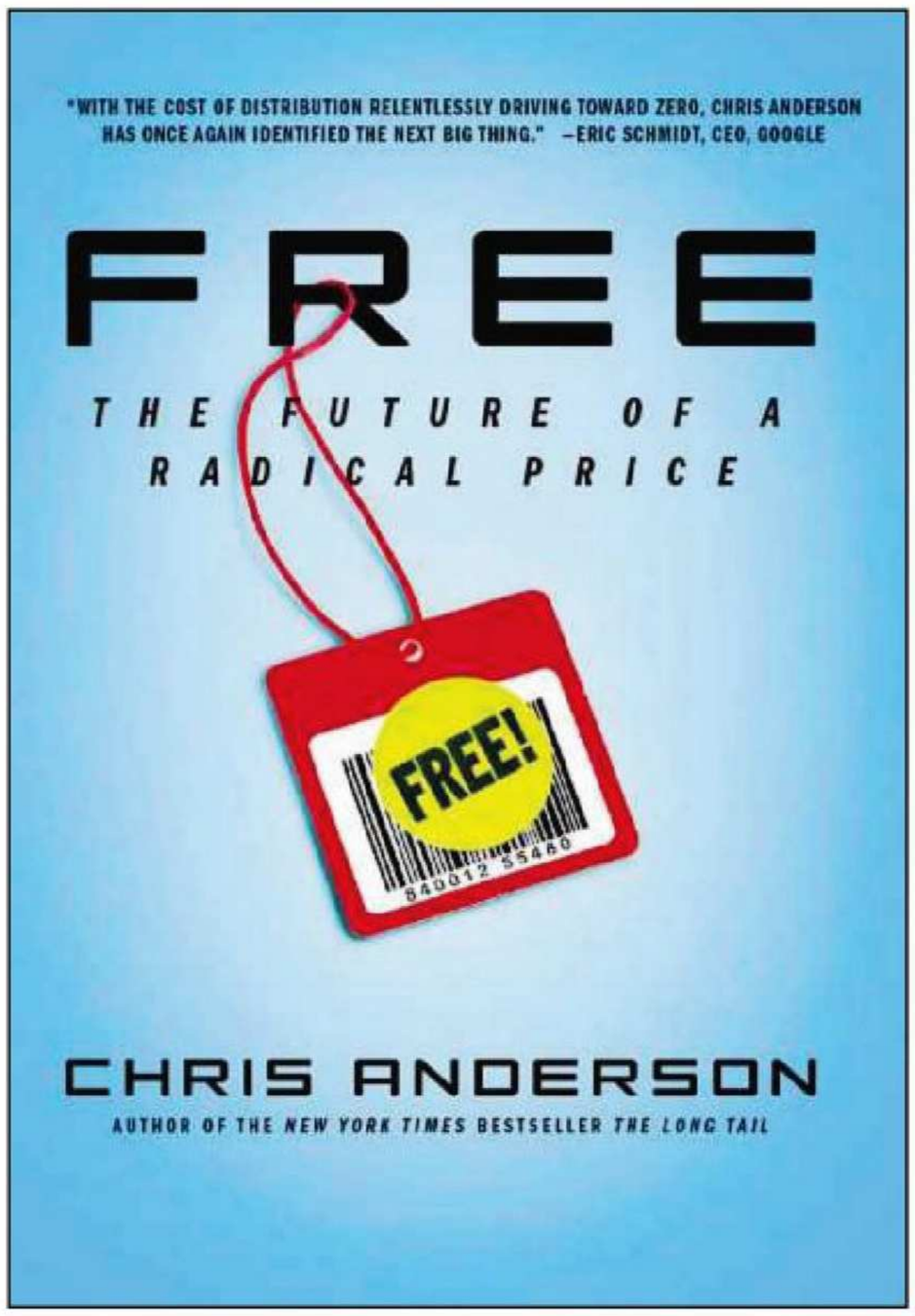
The price of conversion

PassYourTheory, on the other hand, is undergoing a rebirth and adopting a model that's quite new to me. There are various models for making money online. For example, you might sell physical products, software downloads or information products, which is the online equivalent of setting up a shop in your high street: people come in, some of them choose products, pay for them and become customers. For most web applications, however, the only way to make money is to charge for access. There's a persistent myth that you can make a fortune by hosting adverts on your site, but unless that site attracts massive, free and qualified traffic (as Facebook does, for example), such ads will generate relatively small revenues.

The problem for web application developers is that most people expect to get online information and services for free. Chris Anderson, in his book *Free: The Future of a Radical Price,* outlines these challenges and how various companies have attempted to make money despite the fact that most people don't want to pay for anything they consume online. This book is required reading for any would-be internet entrepreneur. On the plus side, web applications generally cost very little to run once developed, which means that the marginal cost to you of a visitor receiving free access is almost zero, compared to a physical product where free giveaways can be expensive.

Web Applications is written on alternate months by Mark Newton and Kevin Partner. Mark specialises in Microsoft technologies, while Kevin focuses on topics such as PHP, MySQL, Apache and Flash.

→ Free: The Future of a Radical Price is required reading for internet entrepreneurs.



Accordingly, many current web applications employ a "freemium" model, in which customers receive the opportunity to use a version of the product for free, but offer highly attractive extra features, products or functions if they pay for a premium upgrade.

In his book, Anderson contends that charging zero for the base version of a product is many times more profitable than attempting to charge for it, and even contends that it doesn't matter how little you attempt to charge, because even a price of one penny will put off people. I had a problem believing this when I first read it, because to me, offering a free version would attract vast numbers of freeloaders who have no intention of paying, which can be ruinously expensive if you're driving traffic using Google AdWords. Add the word "free" to any ad and you can guarantee to massively increase your click-through rate (and therefore the cost of the advert), but you attract people who are specifically looking for a free service and therefore unlikely to upgrade. However, this doesn't apply if you employ social media or similar sites that attract traffic at no cost – you should trumpet your free product at every opportunity through Facebook, Twitter and your organic search strategy, since even a low conversion rate is profitable when you're not paying for traffic.

For more than five years PassYourTheory did well out of paid memberships. We couldn't offer a genuinely free membership because of the terms of our licence with the Driving Standards Agency. However, towards the end of 2010, business began to tail off – due to the price of fuel, high youth unemployment and the recession in general. At the same time, the new Government announced that the theory test question banks and video clips would no longer be available for services such as ours to licence. I have to admit that I did a passable impression of Corporal Jones ("Don't Panic!") when I heard this – but, as is so often the case, in the apparent threat lies opportunity.

← The new PassYourTheory demonstrates that you can make money out of giving away your product.

The theory test is entirely based on the Highway Code, which is essentially in the public domain. Having delivered this theory test service for such a long time, I now have a good understanding of how the DSA writes its questions, so I was confident that I could write new questions that would properly prepare members for the test. That meant there would be no licensing costs, and it would also steal a march on our competitors once the right to reproduce the official question bank is withdrawn later this year. At that point all producers of websites, CD-ROMs and books will either have to close down or create their own question banks and clips – given that it took me two months to write my new question bank, I suspect that most web-based services will give up and leave the market to the survivors.

In November 2010, I decided to recreate PassYourTheory from the ground up. As I've mentioned in previous columns, I chose WordPress as the development platform, but the technology is relatively unimportant. Given that our old model of charging a subscription for access to protected materials was no longer yielding an acceptable return, I decided to exploit my freedom in escaping from the DSA licence to experiment with the ideas in Anderson's book. I couldn't afford to devote three months to developing a site if I didn't expect it to at least repay that effort, so this was far from an academic exercise but rather an opportunity to try something new.

Anderson talks about the Penny Gap, his idea being that there are only two sensible prices: free versus anything at all. In other words, if I take an identical product and attempt to sell it for one penny, my conversion rate will change less if I increase its price to £9.99 than if I decrease it to zero. My aim, whether or not my customers pay for basic membership, is to encourage enough of them to upgrade to a higher and more profitable level, so the experiment would be judged purely on profitability. It doesn't take a genius to work out that if I give away membership for nothing I will get more takers, but how does that translate into bigger profits? My theory was that if I set a price of one penny for a fully featured membership, this would mean that learners who were more committed to passing their test would join, because they'd have to make a mental commitment, however small, to the process and go through the slight hassle of paying via PayPal. I understood that charging one penny would reduce the number of sign-ups, but I hoped that these "penny members" would be more likely to upgrade. So I ran the experiment for a week, and after that made the penny membership entirely free and let that run for a week.

RULE 1

With NlightN's demise, I'm freed from the torture of making PowerPoint presentations to inscrutable clients, and am now following the number one business rule: stick to what you're good at.

Putting any monetary value on a transaction forces a potential customer to decide if the product is worth it

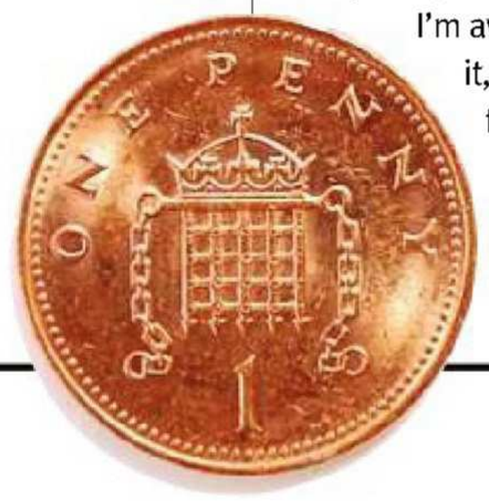
The results were startling. I was wrong. Completely wrong. In fact, I get geeky goosebumps from just telling you this, because being able to run experiments such as this and learn from them is one of the things I most love about online business.

In week one (the "penny" week) 6.5% of visitors signed up for the one penny membership, of which 8.9% purchased an upgrade leading to an overall conversion rate of 0.58%. I'm using Pay Per Click (PPC) marketing to drive traffic to the site, and simple maths will show that such a low conversion rate is ruinous – if I pay 10p per click (which isn't easy to achieve in itself), a conversion rate of 0.58% means paying more than £17 per customer, but my most expensive product costs only £9.99.

By contrast, in week two, after making basic membership free, 31.5% of visitors signed up, so reducing the cost by one penny increased my conversion rate five-fold! However, that's only half of the equation. How many of these free members upgraded? The answer was 9.46%, an almost identical conversion rate to the "penny" members, so my overall conversion rate (the number of upgrades as a percentage of site visitors) therefore also increased by a factor of five. Using the same example of paying 10p per click at this conversion rate of 3%, I'd be paying around £3 per customer and thus making £6.99 profit.

I was amazed by the difference one penny can make. Anderson believes that putting any monetary value on a transaction forces the potential customer to decide whether the product is worth it, even if that price is incredibly low. I also think that people are so used to signing up to any service for free that being asked to pay anything takes them outside their comfort zone, whereas a free service is just a case of filling in a form. On the other hand, offering a free service in an industry that has traditionally charged makes that service remarkable, and very easy for customers to recommend to others. Over time, I expect PassYourTheory's reliance on PPC to decrease and I'll be experimenting with other traffic-generation techniques over the coming months.

So if you're planning to launch your own web business, do bear in mind that we've moved beyond "free" equalling "low quality". Free online services such as Facebook, Google's web applications and *PC Pro*'s content-rich website have become the norm. It's easy enough to get visitors to sign up to a low-quality free offering, but they won't upgrade if they feel their time has been wasted on a poor product. Remember, the aim is to convince as many free members as possible to buy something, but if your free version is rubbish you can't expect customers to take a leap of faith that your paid-for product will be worthwhile. PassYourTheory's free membership is, in my opinion, a better quality product than the paid-for products of my competitors, and it took guts to offer it for nothing because I'm aware just how many hours I'd put into developing it, and how much I'd normally charge for it. But those figures speak for themselves. It remains to be seen where this business model will take PassYourTheory, but it's already rewarded the effort involved in setting it up through one priceless experiment.



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Online Security Davey Winder

How secure is email?

DAVEY WINDER PONDERS THE RISKS INVOLVED IN SENDING OUT BANK DETAILS OVER EMAIL, AND FINDS A FREE TOOL TO PROTECT YOUR FACEBOOK PROFILE

I'll kick things off this month with one of the simplest yet most thought-provoking questions I've been asked for some time: how secure is my email? Over the years, *PC Pro* has repeatedly warned readers that email can be a dangerous medium. We've warned against blindly clicking links and opening unexpected attachments; we've explained how spammers use tricks such as sending a single, transparent pixel within an email that allows them to see whether your account is live (because you have to explicitly pull that image off the server even though it's only one pixel); and we've warned against being taken in by offers that are too good to be true.

You may think your email is pretty safe if you've absorbed this advice and taken the appropriate action, but all these problems focus on the email arriving in your inbox, rather than messages you send out. That's why I was interested to receive a question from *PC Pro* reader Charles K– by email, of course – who happily admits that he's become security aware thanks to this column and *PC Pro*:

"Over the past few months, more and more people have sent me their bank account numbers and sort codes via email when they want payment for services," Charles said. "I've always preferred to inform people of my details where necessary by voice, but I'm wondering whether it's safe to send this data by email: what use can someone make of only a bank account number and sort code?" While understanding that it's better not to send such data unencrypted, Charles wonders what the risk level actually is in doing so, and what the bad guys could do if they got hold of basic account information. Let's address the "what can they do" part first, because it may surprise you.

Top Gear presenter Jeremy Clarkson was certainly surprised after he published his bank account number and sort code in his column in *The Sun*, claiming that the worst-case scenario was that someone would be able to pay money into his account. His agenda was to demonstrate that all the media fuss at the time over the loss of HMRC child-benefit claimant data, including the bank details of 25 million people, was misplaced. Within a few days he was confessing in that same column that he was wrong, not least because someone had used his account information to set up a direct debit for £500 in favour of a charity, which didn't require any further verification of identity. Bad guys often use this kind of information as yet another part of the jigsaw puzzle to build a picture for full-scale identity theft, with all the credit rating and fraud problems that accompany it.

Assuming you still write cheques, however, surely this account information is exactly that printed upon each one, so why worry about sending the same data by email? Well, while you place a certain amount of trust in those you give a cheque to, it will either be sent by post inside a sealed envelope or handed directly to its intended recipient. Sending these details by email is more like handing the cheque to a chap at the back of a shop queue and asking him to pass it along to the cashier. Unless the information has been encrypted, there's no real security when using email. You're adopting a blind trust that along every step of the way nobody is going to read the message, and that's where the question of risk comes into play.

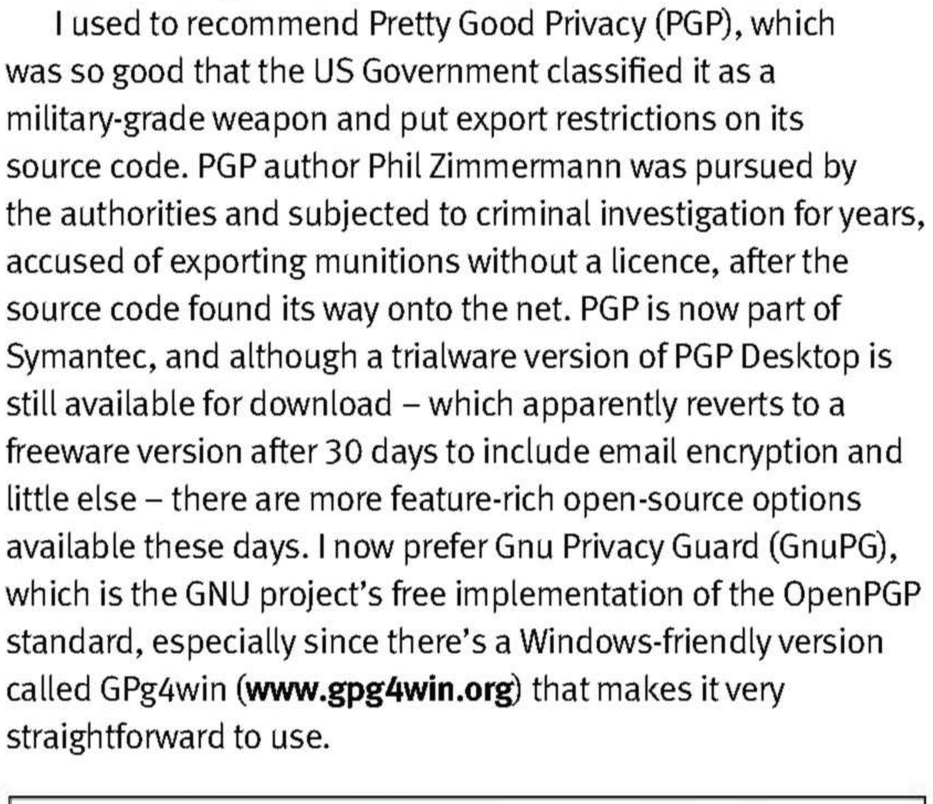
DAVEY WINDER
Award-winning journalist and small-business consultant specialising in privacy, security and usability issues. Contact davey@happygeek.com and follow Davey on Twitter: @happygeek.

Encrypting your email is the only way to ensure the security of sensitive data.

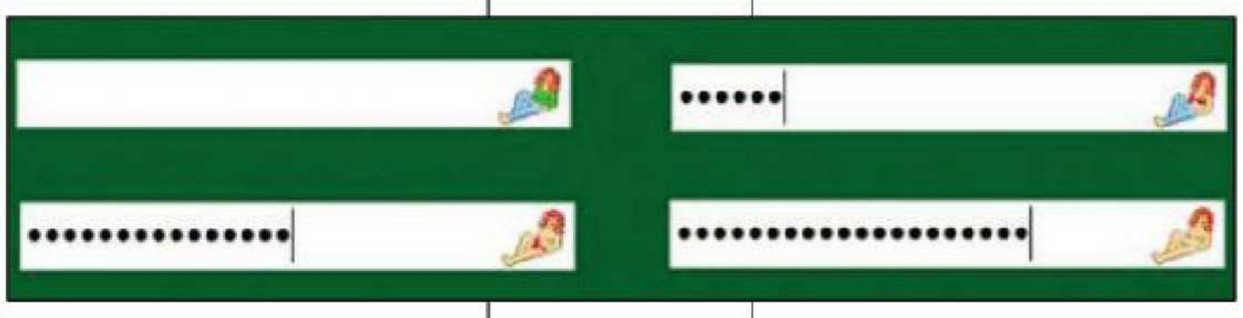
Clarkson was hoist by his own petard because publishing his account information in a national newspaper turned up his risk factor to 11. For most of us using the medium of email, the risk is far lower. As with any kind of hacking, if someone is determined to access your stuff then the chances are pretty good that they'll succeed, but just because someone could doesn't mean they will, and the actual risk is rather low.

However, it goes up again once you multiply it by each of the many servers through which your message must travel on its way to the recipient, each of which offers the potential for someone to take a peek. Personally, I'd rather not expose my financial data to any such risk, and that's why I maintain that all email is intrinsically insecure unless you proactively secure it, and that brings us back to encryption: if your email client provides an encryption option, use it; if it doesn't, use a dedicated encryption tool instead.

I used to recommend Pretty Good Privacy (PGP), which was so good that the US Government classified it as a military-grade weapon and put export restrictions on its source code. PGP author Phil Zimmermann was pursued by the authorities and subjected to criminal investigation for years, accused of exporting munitions without a licence, after the source code found its way onto the net. PGP is now part of Symantec, and although a trialware version of PGP Desktop is still available for download – which apparently reverts to a freeware version after 30 days to include email encryption and little else – there are more feature-rich open-source options available these days. I now prefer Gnu Privacy Guard (GnuPG), which is the GNU project's free implementation of the OpenPGP standard, especially since there's a Windows-friendly version called GPg4win (**www.gpg4win.org**) that makes it very straightforward to use.



An IP trace can identify your ISP, but a court order is needed to go further.



Pixellated Penny strips off as you pile on the password complexity.

How anonymous is anonymous email?

I couldn't leave the topic of email without touching upon another interesting question, this time posed by my 13-year-old son: "Can I send an anonymous email, dad", he asked, "and be confident it can't be traced?" Having got to the bottom of why he wanted to send such a message, and persuaded him that there are far more satisfying ways to vent his spleen at someone than hiding behind a cloak of faux anonymity, I got down to the technical nitty-gritty of his question.

You can send anonymous emails, and there are plenty of free and commercial services available that will offer to provide you with just that, but the effectiveness of such anonymity is another issue altogether. When you use an anonymous remailer service, it will be aware of the IP address from which you connected to it, and whether it obfuscates that IP from the ultimate recipient or not doesn't really matter, because you've already left a trail. No matter how many remailers you use to hide the original from the recipient, a determined person with the right resources and authority (a law-enforcement agency, for example) could still hop backwards through the server queue and eventually arrive at the starting point that carries your IP address.

While that originating IP address can – under court orders – be matched to your home address via your service provider, it can't categorically tie you to the act of sending the email; even so, I expect that having the police knock on your door isn't the kind of anonymity you were seeking. Being an inquisitive 13-year-old, my son continued to press the matter and I had to admit that, yes, you could circumvent many of the deficiencies of anonymous email services by simply employing a disposable webmail account, created on a PC in some back-street cybercafé. That seemed to satisfy his curiosity, and possibly slaked his desire for schoolboy revenge as well.

Benjamin Fung, Professor of Information Systems Engineering at Concordia University, takes a bit more convincing when it comes to anonymous email – so much so that he's been developing a system of email fingerprinting. This appears to be so effective that it can ascertain true authorship of any email to relatively high levels of accuracy, and could be used in court to positively tie a suspect to a particular IP address. Using his knowledge of data mining and speech-recognition technologies, Professor Fung has employed related techniques to identify language usage patterns within the content of an email message, so that given sample emails from a number of suspects, all of whom have access to the same IP address, the Fung Fingerprint technique will identify the actual author of any particular message. Exactly how accurate is his emerging method? Analysing 100 emails by ten different authors in groups of ten, Fung correctly identified the writer in 80-90% of cases. Okay, there's still some way to go before it becomes completely foolproof, but that's a pretty impressive start nonetheless. Unless (and I hate to appear to be harping on about this) those emails were encrypted, of course...

Naked passwords

Talking of interesting new twists in the world of security, here's a take on the problem of trying to get people to use string passwords. Anybody remember those pens that you could buy at the seaside in the days before political correctness – the ones that, when you tipped them upside-down, revealed a

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When you use an anonymous remailer service, it will be aware of the IP address from which you connected to it

picture of a young lady shedding all her clothes? This password security system uses the same approach (no, seriously). Instead of using a colour code to show whether the password you're entering is weak, medium or strong, the chaps – and I'm assuming they're male – at **www.nakedpassword.com** use a cartoon lady in various stages of undress. I'm calling her Pixellated Penny, and she's actually animated in the best possible taste. The stronger the password you enter, the more clothes Penny removes. It's a bit of fun with a serious payoff in the shape of a more secure password, and it's easy to apply – visit the website to download the images and attach $("input:password").nakedPassword(); to your website's password fields.

Protecting your Facebook profile

I'm not overly fussy about who looks at my Facebook profile, but I'm starting to suspect that such nonchalance puts me in the minority. The number of rogue apps and other exploits being thrown into the social networking mix that promise to reveal those who have looked at your profile this week, or since you joined – or even one that uncovers who's stalking you through Facebook – would suggest that this is a booming arena of business for the bad guys. The truth is that there's no way of determining such information, as Facebook itself admits: "Facebook doesn't provide the ability to track who's viewing your profile, or parts of your profile, such as your photos. Applications by outside developers can't provide this functionality, either. Applications that claim to give you this ability will be removed from Facebook for violating policy."

These apps basically send you on a wild goose chase of link-clicking, permission granting and contact sharing – and whatever the ultimate payload, it usually involves trying to part you of some cash. The point is that you don't want this kind of thing anywhere near your profile. Sure, once you discover that you've been caught up in a scam you can do some manual profile gardening, such as deleting the app from the apps and websites section of your Facebook privacy settings (and changing your password while you're there is always a good idea if rogue apps have been nosing around).

Far better, though, to prevent them from getting anywhere near you in the first place, since it takes only a momentary slip of concentration to click on something posted to your wall by someone you consider a trusted friend. I've been playing with one such tool recently, the Profile Protector from Barracuda Networks, which is free. You need to trust Barracuda to connect with your Facebook account, and grant the app access to your wall, friends, friend requests and so on (just the sort of things that rogue apps want to do, in fact, but Barracuda is a well-known security vendor so you shouldn't worry too much about that). Once installed, it works like an antivirus scanner for Facebook profiles by scanning the user-generated content posted to your profile and on your wall. Anything malicious or suspicious is blocked or removed. I'd recommend it to my less security-minded friends and family and have indeed done just that. At the end of the day I'm being selfish, of course, because if they're protected it prevents them from putting me at risk.

Sometimes you just have to trust security software, such as Profile Protector.

EXTRA

According to a new study, 63% of schools suffer at least two IT security-related incidents each year, with 64% experiencing significant downtime as a result. Panda Security research suggests that be it malware or unauthorised access, these breaches are indicative of school security being resource-heavy and difficult to manage. The fact that 72% point to budget constraints as part of the problem should come as no surprise, nor, sadly that 29% of IT staff admit that other duties take priority over security. On the plus side, 95% of the schools questioned do have a social media usage policy, with roughly a third blocking all access.

Google: right to reply

Having recently suggested within these very pages that you can't trust Google Alerts to keep out dodgy links, I thought it only fair to give Google the right to reply. The gist of my piece boiled down to me wondering why it was that Google doesn't appear to check if the links it passes on through the Google Alerts system are authentic or scams. This followed a *PC Pro* reader getting in touch after being sent suspect links for the alert keyword of "kaspersky".

Google Alerts are emailed updates that point you in the direction of web and news results that match your selected keywords, which is a cool idea unless those links point to a site selling rogue applications, as in the case of my reader. I was annoyed at the time, when my efforts to get a comment from Google about the matter were met with a wall of silence. That silence has now been broken, and here's what Oli Gaymond, the product manager for Google Alerts, has to say:

"I can assure you that we do take the issue of bad results very seriously. As I'm sure you're aware, Google Alerts works by notifying people of new results that match their query. We use a range of signals to indicate the quality of any given piece of content in order that we send people the most relevant information.

"We work with the search quality team alongside Matt Cutts in order to evaluate our quality and implement appropriate filters to detect and remove bad results. We also provide the option to receive 'Only the best results', which uses a higher-quality threshold for the results we send on. We're continuously working to improve Alerts and give users the best information as it becomes available. We recently implemented some new filters that have significantly improved the quality of our blog alerts (about 40% reduction in blog spam) and are looking at ways to improve web alerts.

"With any changes, we are always careful to evaluate them first to understand what the impact will be for good-quality content."

Digital Design Tom Arah

Flash on your iPhone?

TOM ARAH ARGUES THAT ADOBE HAS DONE THE BEST IT CAN UNDER THE CIRCUMSTANCES WITH WALLABY, ITS FLASH-TO-HTML5 CONVERTER

Recently, I've been making the case on the *PC Pro* blogs (**www.pcpro.co.uk/blogs**) that Apple's anti-competitive ban on Flash has stopped rich cross-platform development in its tracks. As such, I was intrigued by a video I came across recently asking: "Has Adobe figured out how to get Flash to play on your iPhone?"

First, it's important to stress that the obvious and by far the best way to get Flash content to play on your iPhone/iPad remains far off. Although it would love to, Adobe hasn't been able to announce the launch of a Flash player for Apple's iOS-based devices to match its Android player. There's no question that Apple's hardware (*see issue 200, p34*) could support it, but for reasons that I covered recently – money, and with no competition – Steve Jobs won't allow it.

So if it isn't a Flash player for the iPhone and iPad, what is it? It's a new technology preview made available on the Adobe Labs site (**http://labs.adobe.com/technologies/wallaby**) under the codename "Wallaby", and it's essentially a Flash-to-HTML5 converter: open your FLA file, hit OK and Wallaby will attempt to output all the necessary HTML, CSS, JavaScript and other standards-based files to recreate your player project within the browser.

So is this a bridge from the old days of Flash and player-based development to the promised land of HTML5 and truly rich browser-based development? If anything, it looks more interesting. After all, when Steve Jobs announced that iOS wouldn't be supporting Flash, the case he made against it was that Flash was no longer necessary and that it should be replaced by HTML5 (a blanket term covering all the W3C standards such as CSS, DOM, SVG and so on). The sign-off line to his thoughts on Flash was: "Perhaps Adobe should focus more on creating great HTML5 tools for the future, and less on criticising Apple for leaving the past behind."

At first sight it looks like Adobe has done just that and that Steve Jobs has won the argument. After all, if you can deliver Flash functionality in the browser via HTML5, why shouldn't you? Especially now, when there's one overwhelming reason you need to: if you want to access the full web audience, including the crucial iPhone/iPad demographic walled up in Steve Jobs' closed kingdom, there simply is no alternative. The browser is the only way to go. I'm sure this is exactly how it will be seen and presented by many: "don't worry that the iPad doesn't support Flash, you just don't need it nowadays, everyone's agreed that it's much better to do it in the browser rather than the player – in fact, even Adobe has given up on it now and has built its own Flash-to-HTML5 converter".

Any such talk is misguided, misleading and dangerous. To understand why, you need to dig deeper and see what Flash-to-HTML5 conversion involves in practice.

TOM ARAH
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Unsupported features

In fact, you don't need to dig far before a different picture emerges. Read the introduction to Wallaby and it's clear that Flash-to-HTML5 conversion isn't simple. This initial version has several unsupported features due to the complexity of FLA files and the inability to represent some Flash Professional features in HTML5. The major ones include no conversion of ActionScript, Movies or Sound, and some design elements such as Filters aren't supported. For a detailed list of supported and unsupported features see: **www.pcpro.co.uk/links/201dd1**.

Try to convert a typical sample FLA and you'll see that the unsupported features certainly aren't insignificant. My first "successful conversion" came back with 291 warnings. Many of these limitations are important, particularly when it comes to text – line-break differences, glyph spacing/positioning, no support for links, selectable or vertical text, and so on.

However, it's the lack of ActionScript support that's the real show-stopper. It means that you won't be able to take your

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NOTE FROM THE EDITOR

I'm sorry to report that Paul Ockenden was recently taken ill and unable to write his Mobile & Wireless column this month. We hope to welcome him back next month. Into the breach steps a familiar face for long-term readers of *PC Pro*, Tom Arah.

advanced Flash-based Rich Internet Application (RIA) – say, your online word processor, XML-based news reader, live messenger widget or videoconferencing portal – and suddenly make them available for iOS. In fact, you won't be able to convert the simplest game if it depends on ActionScript. So what can you convert? Again, the introduction is clear: "Wallaby does a good job of converting graphical content along with complex, timeline-based animation to HTML5." In particular: "The focus for this initial version of Wallaby is to do the best job possible of converting typical banner ads to HTML5."

Workflow complexity

Wallaby's conversion capabilities are clearly limited, but that's not all. Don't expect the end results to be ready-to-go. Again, as the introduction states:

"Wallaby's design goal was not to produce final form HTML ready for deployment to web pages. Instead it focuses on converting the rich animated graphical content into a form that can easily be imported into other web pages in development with web page design tools like Dreamweaver. The web page designer will likely want to add interactivity and design elements such as video and sound before deployment."

In practice, this means loading up your Wallaby output as a complex HTML file, built up of multiple SVG text blocks and PNG image files that are then absolutely positioned via CSS (including each animation frame). Certainly, as things stand, you can forget about usability features such as LiveView and easy editability. You're then expected to add back any video, audio and interactivity within Dreamweaver.

Browser incompatibilities

Assuming the original Flash project was simple and that you're up to the complexities of recreating it within Dreamweaver, you're finally ready to deploy. And here you come across another important caveat: "At this time, the Wallaby HTML5 output uses WebKit specific CSS3 tags and therefore is not compatible with Firefox, IE9, or other HTML5 browsers."

In other words, the whole enterprise is focused on only one browser engine, WebKit, as used in only two browsers: Chrome and – the only one that really matters since it's the only one that doesn't support the Flash player – Safari on the iPhone and iPad. All this for iPad banner ads?

We've arrived at a very different place. It turns out that Wallaby's Flash-to-HTML5 conversion has absolutely nothing to do with replacing Flash with a truly universal, browser-based HTML5 equivalent. Instead it's a complex, targeted workaround designed to enable Flash users to overcome Steve Jobs' player ban by enabling a small subset of projects to be recreated within the WebKit-based iOS browser runtime. All in all, it's a huge amount of effort for what at first sight looks like very little gain. Again, though, it's important to dig deeper.

First, it's important to recognise that eye-catching banner ads might be irritating, but they're also incredibly important.

Wallaby's conversion capabilities are clearly limited; don't expect the end results to be ready-to-go

They're helping to pay for much of the high-quality content on the web, including the *PC Pro* website. Apple's unilateral ban on Flash threatened to remove the most highly sought-after demographic (affluent early adopters) from the equation – and, coincidentally, open them up to Jobs' own iAds system.

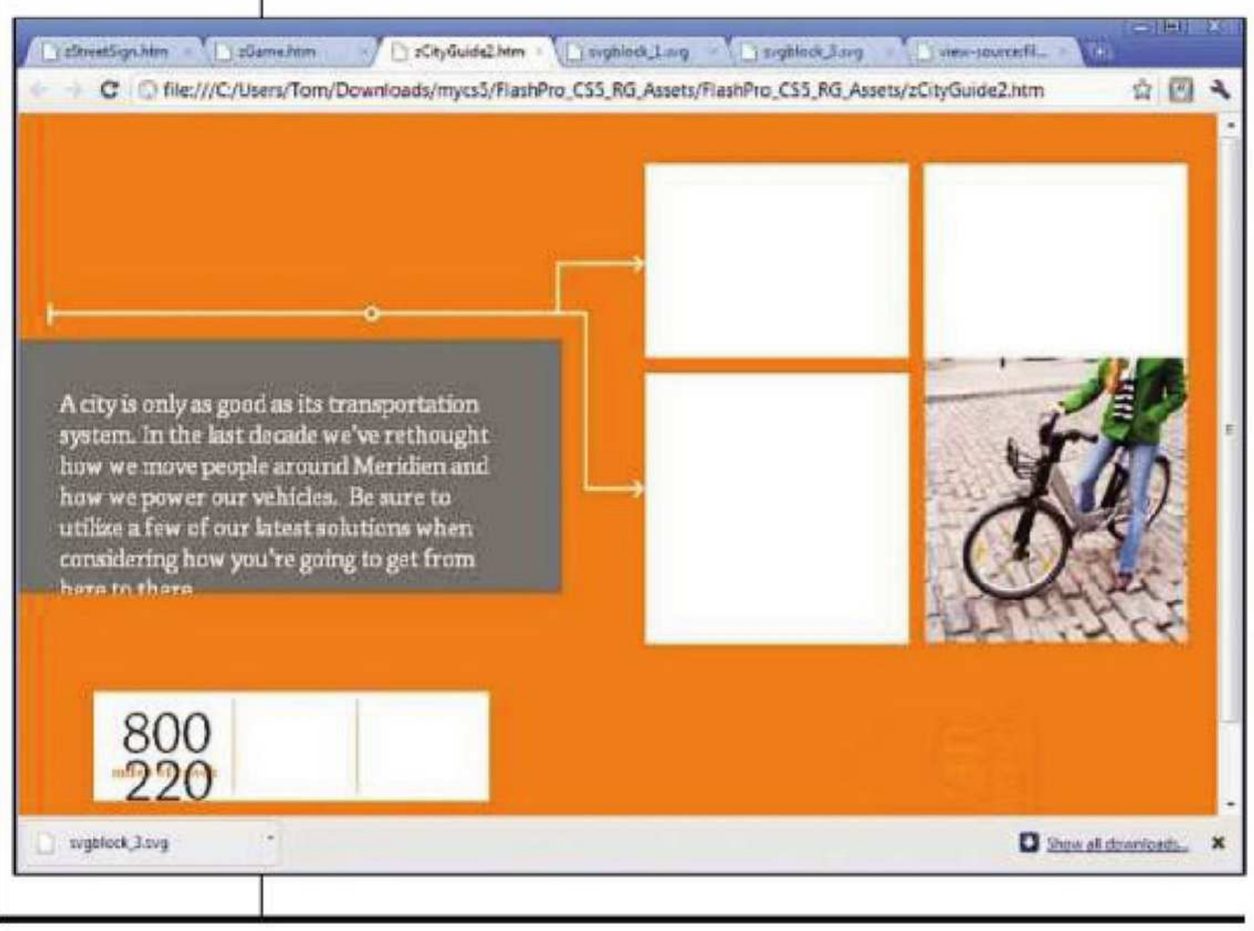
It certainly won't be welcomed in all quarters, but by enabling rich Flash ads to be delivered to a truly universal web audience, including iPhone and iPad owners, Adobe is doing the web economy a major service. And if it goes some way to breaking the knee-jerk association of irritating ads with Flash, that's a good thing too. Who knows, maybe the legion of Apple-based ad haters who supported Jobs' ban so strongly when it was first announced will now be as vociferous in their support for Flash. After all, you can block Flash, but you can't block HTML5.

Yes, banner ads are central, but I also think that Adobe has bigger fish to fry. Recently, I wrote about Adobe's Digital Publishing system, and was astonished to find that the early trial release seemed to depend on bitmaps to enable InDesign users to recreate their typographically rich layouts for iPad delivery. Clearly, recreating rich designs via more efficient, scalable SVGs and CSS is a far superior solution (although still nowhere near as simple, efficient or elegant as using Flash).

Universal access

Crucially, recreating publications via WebKit provides a way for designers and publishers to ensure that their rich content can be viewed by all users, including those who would otherwise be off-limits in Steve Jobs' walled kingdom. It's this determination to provide the richest possible experience, whether inside the browser or inside the player, that cross-platform web development is all about. It also demonstrates Adobe's determination to be seen as the leading HTML5 force, as well as the company behind Flash.

But if you've shown that you can deliver rich content universally within the browser via HTML5 rather than the player, isn't this the right thing to do? If you've proved that you can do it without Flash then why not just drop it entirely?



Wallaby's Flash-to-HTML5 conversion is far from perfect.

Why not extend the system to the other browsers and develop dedicated HTML5 tools as Jobs suggested? In fact, isn't this proof that Jobs was right all along? Well according to its recent AdobeMAX event, Adobe is indeed working on dedicated HTML5 tools. However, it's important to understand that even these won't replace Flash – for the same reasons we've already seen in practice.

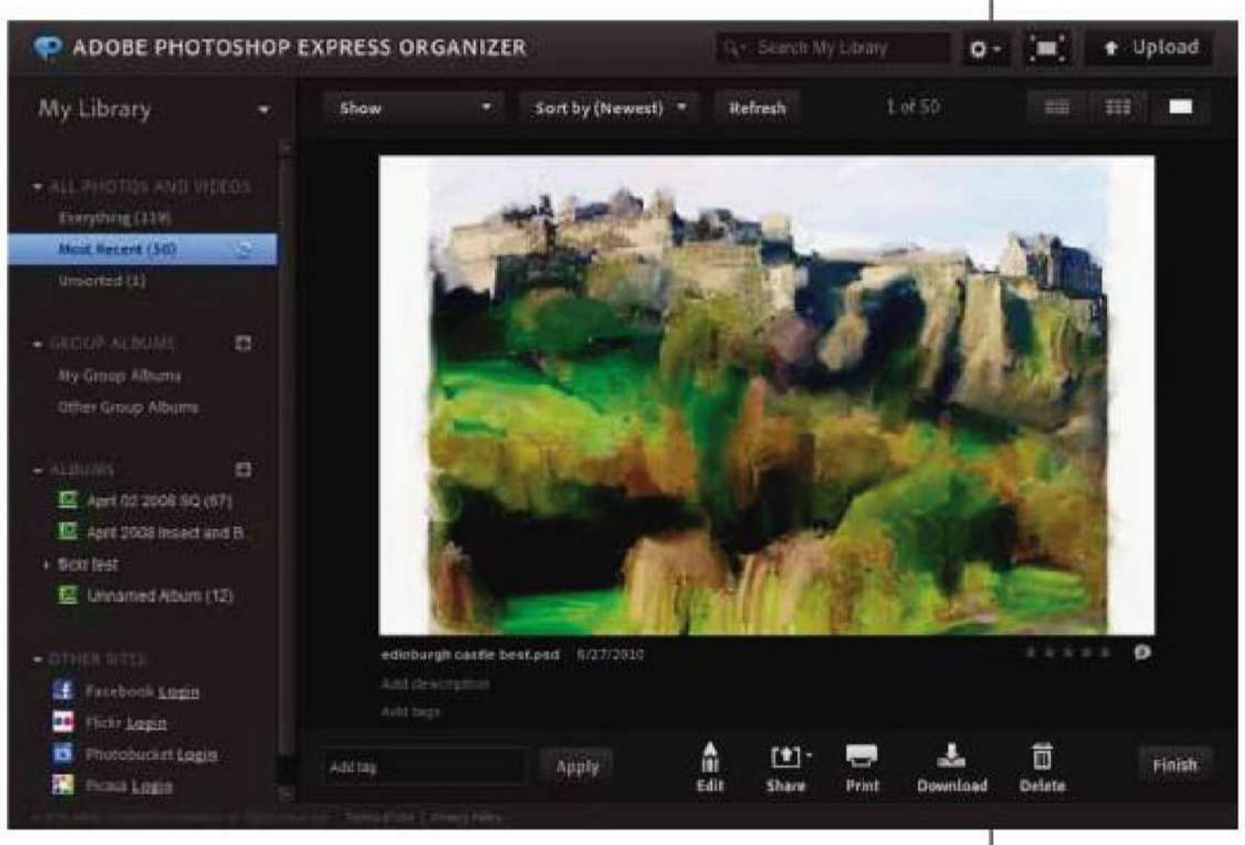
Unsupported capabilities

The assumption that the browser can somehow "do Flash" is fundamentally a mistake. Yes, Wallaby is a preview and its HTML5 power can grow, but it will never replace Flash. This isn't because Adobe is holding back; rather it's because the inability to represent some Flash Professional features in HTML5 is inherent. In particular, Flash has come a long way from its animation and banner-ad origins; nowadays, the rich functionality of powerful, modern Flash-based RIAs are based on ActionScript's rich APIs. These APIs are enabled by the Flash runtime, and while the HTML5 browser runtime will be better than it was and can already take over Flash's animated advert duties, it can't possibly be expected to replace the dedicated players. After all, Flash and Silverlight are modern, intensively developed technologies representing thousands of hours of development from the world's two major software forces, both of whom are effectively betting the company on the success of their cross-platform web platforms.

By contrast, the vector-based SVG 1.1 specification, which is absolutely central to any hopes of delivering resolution-independent, scalable, Flash and Silverlight-style rich design in the browser, was developed by an ad hoc, part-time committee of volunteers with very different plans in mind (think rollover buttons) and hasn't been updated since January 2003.

Yes, working with Wallaby is complicated – but again, this is inherent. Standards such as CSS, SVG, DOM and JavaScript have evolved independently and erratically trying to yoke them together isn't simple. Flash Professional or Builder certainly aren't models of simplicity (Expression Blend is far superior), but clearly ground-up, integrated, wysiwyg design-orientated solutions have a major advantage here. Not least of targeting a single, reasonably robust and reliable cross-platform, cross-browser runtime. For Wallaby to extend its HTML5 output to other browsers, Adobe would have to work out the constantly moving targets of their capabilities and foibles, come up with the necessary workarounds and, assuming delivery is even possible, implement browser-sniffing to serve up the desired targeted code.

Modern web apps, such as Photoshop Express, aren't easy to convert to HTML5.



Jobs could lift this artificial ban and by doing so deliver his users what he promised: "the best web experience"

Thankfully, this whole nightmare is unnecessary because every other browser on every major platform (mobile as well as desktop) apart from Safari on the iPhone and iPad supports the Flash player. Crucially, this includes older browsers too. After all, as Microsoft has only now added support for SVG to IE9, any truly universal HTML5 solution would otherwise have to wait not only for IE6 to be purged from the system, but IE7 and IE8 too.

This universal cross-browser compatibility is overlooked, but is perhaps the web players' greatest strength. It ensures the web platforms that the players enable are automatically immune to the foibles, foot-dragging, incompetence and occasional sabotage of the various browser developers.

As any web designer who has lived through the previous browser wars knows, trying to ensure consistent delivery across all browsers while being forced to travel at the speed of the slowest isn't fun.

The fact that Wallaby targets only iOS Safari isn't a failing. There's a good reason for it: every other browser, including IE6, already has a far better, more efficient, more robust, more reliable, more independent, more powerful delivery mechanism in place. It's called Flash.

HTML5, Flash or Silverlight?

This isn't to say that Flash is in any way a replacement for HTML. Of course, the future of the web belongs to HTML5 (bearing in mind the reality checks above). If you can deliver content and functionality successfully in the browser then this is what you should do. Flash isn't an alternative to HTML and never has been; it's a rich wysiwyg extension. As far as web pages go, 99.9% of them can and should live without Flash.

However, when HTML5 can't deliver the goods as simply, as efficiently, as reliably, as universally, or as well as Flash or Silverlight, or any other web technology that comes along, then all designers, developers and end users should be able to take advantage of what the cross-platform extensions have to offer. It's a matter of freedom of choice. Cross-platform web players aren't somehow a problem that needs to be overcome to enable truly universal, truly rich, browser-based delivery; they're the solution that makes it possible. Steve Jobs realised this and the threat that rich, device-independent development poses to his native apps and his ugly business model, and that's why he decided to kill it.

Steve Jobs isn't championing HTML5 to make the browser as rich as possible, he's championing HTML5 as cover for his attempt to kill player development to ensure that the browser never becomes a truly rich, robust and open platform. The real problem here isn't Flash; it's Steve Jobs. At any time Steve Jobs could simply lift his entirely artificial ban, save everyone all this unnecessary pain and, by doing so, deliver his users what he promised them: "the best web experience".

Until that happens, the best we can hope for is a partial, awkward, undesirable workaround to try to restore some sort of unity and universality to the rich web. It's in this context that Adobe's Flash-to-HTML5 conversion should be understood and appreciated. A shaky bridge into Apple's walled kingdom is better than nothing.

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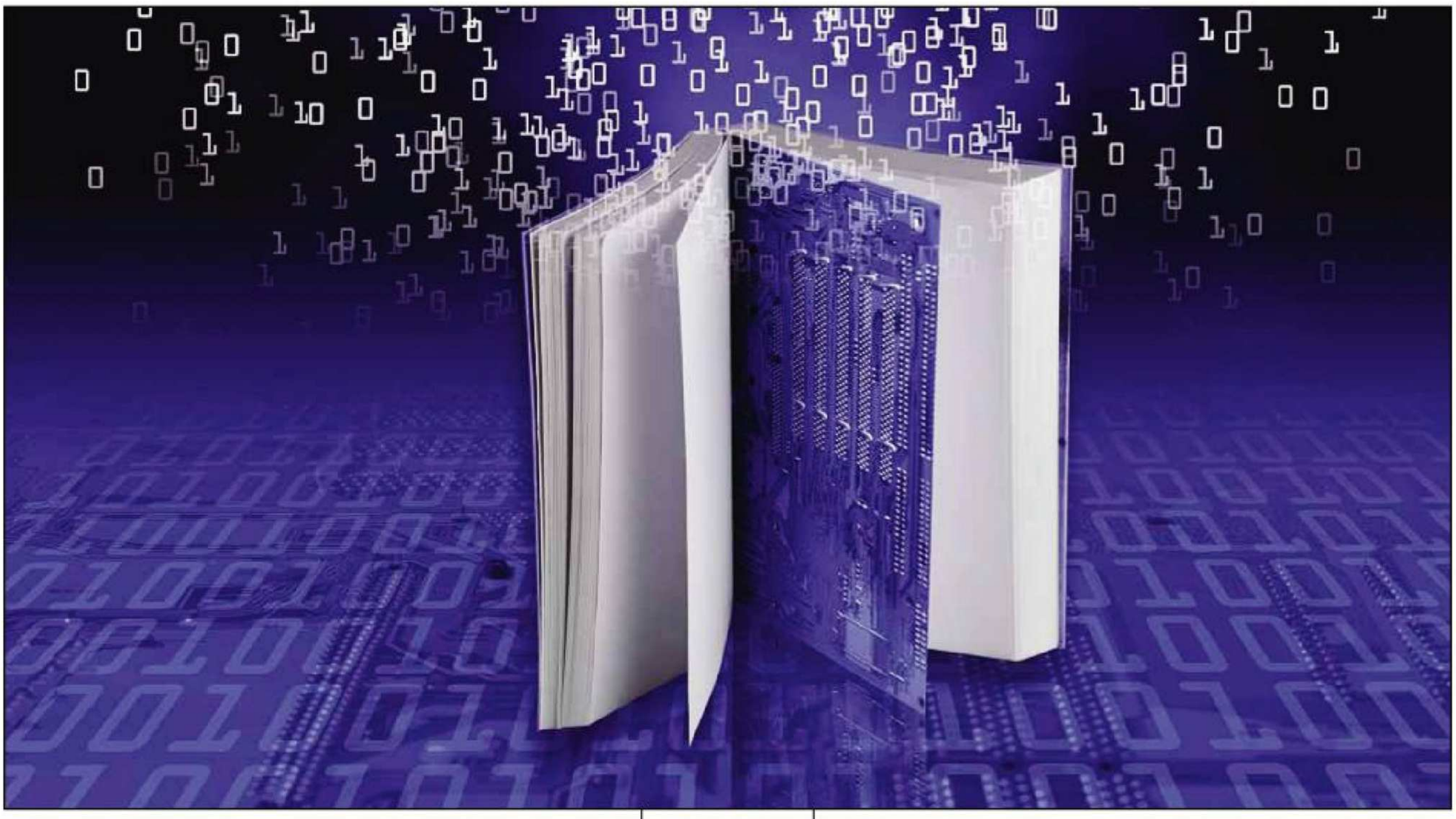
Open Source Simon Brock

Open-source eBooks

SIMON BROCK EXAMINES VARIOUS WAYS TO CREATE CONTENT FOR ELECTRONIC READERS, AND EXPLAINS HOW TO PROTECT YOUR OFFICE AGAINST DISASTERS



Over the past year or so, I've been developing for handheld platforms such as the iPhone, iPad, Android and Kindle, so I've accumulated a great deal of knowledge about how these gizmos work and how to get the best out of them.

Over the next few months, I'll be writing about some of these projects in this column, starting right here with the topic of eBooks. You might consider these to be the duller end of handheld software, since "apps" get all the attention nowadays, while eBooks are, well, just books.

From my viewpoint, however, eBooks present two sets of interesting problems that need solving: how do I get content into the right format (and hence to the reader); and, once I have it in eBook form, what else can I do with it?

This last point is crucial, because many current eBooks are merely pale imitations of their paper versions – for example, a cookery book that I sampled by a well-known celebrity chef was actually devoid of pictures! Images are the one thing you can add to an eBook for almost zero cost, compared with a paper book in which they enormously increase the printing and paper costs. Most eBook readers can present far more than just text, and even ones with limited displays still offer various possibilities for interactivity (iBooks offer much, much more).

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What is an eBook?

Regrettably, creating eBooks is currently nowhere near as easy as it should be. However, there are a few open-source tools that can help, and over the next year or so they'll get far better. An eBook is a book, formatted so that it can be read on some form of electronic reader device. The most widely accepted format is "ePub", which is supported directly by most devices other than the Kindle – but even if you're publishing for Kindle, you'll normally first create an ePub file, then convert that into Kindle format.

At its simplest, an ePub file is nothing more than a zip file. If you take any ePub file and change its extension to ZIP, your favourite unzipping program will show what's inside it. In most cases, you'll discover a collection of HTML files, some media-like images, audio or video, and then a bunch of other files, which are important since they define the metadata for the book – such as its title and ISBN, its chapter structure and files that are included in it. (This metadata must be present and correct for the book to be accepted by some publishers.) Since an ePub book is essentially a collection of web pages, if you're familiar with modern HTML and CSS techniques, you're already halfway to being able to produce and improve on eBooks. However, don't be fooled into thinking you can just take your

website and convert it straight into an eBook – you need to understand how an eBook works once it's installed on a reader.

Different eBook readers have different HTML rendering abilities: at one end of the spectrum is the Kindle and its converter program, which have limited support for current web standards, while at the other end, iBooks for iPad and iPhone employ the full WebKit rendering engine used by the Safari and Chrome web browsers. Even so, the iBook's version of WebKit has its oddities, and to understand them you need to understand how an eBook reader displays content.

The trouble with basing eBooks on HTML is that their pages don't behave like typical web pages. The latter are rendered in a window that can scroll up and down vertically without limit, while an eBook reader wants to render each page of a book as a static image. You can't scroll down this – you can only flip to the next page. Typically, each chapter of an eBook is contained in a single HTML file that's presented as a collection of pages, which, if opened in your web browser, would look like a single web page.

So the first thing you have to remember is that some program is going to take your content and chop it up into fixed-length pages. This introduces complexities. The pages may vary in size, as may the font they're rendered in. For example, I can view an iBook on an iPad in portrait mode, one page at a time, or in landscape mode two pages at a time – which will require paginating the book in two totally different ways. Worse still, the reader may vary the font size and face, both of which again affect the pagination. Another major pagination problem arises when you have pictures in your text: when the reader is rendering HTML into pages, it must decide whether each image will fit on to the current page. Generally, the guidelines for creating eBooks tell you not to put fixed sizes on your images. When embedding an image in an HTML page for the web, you'd typically write something like:

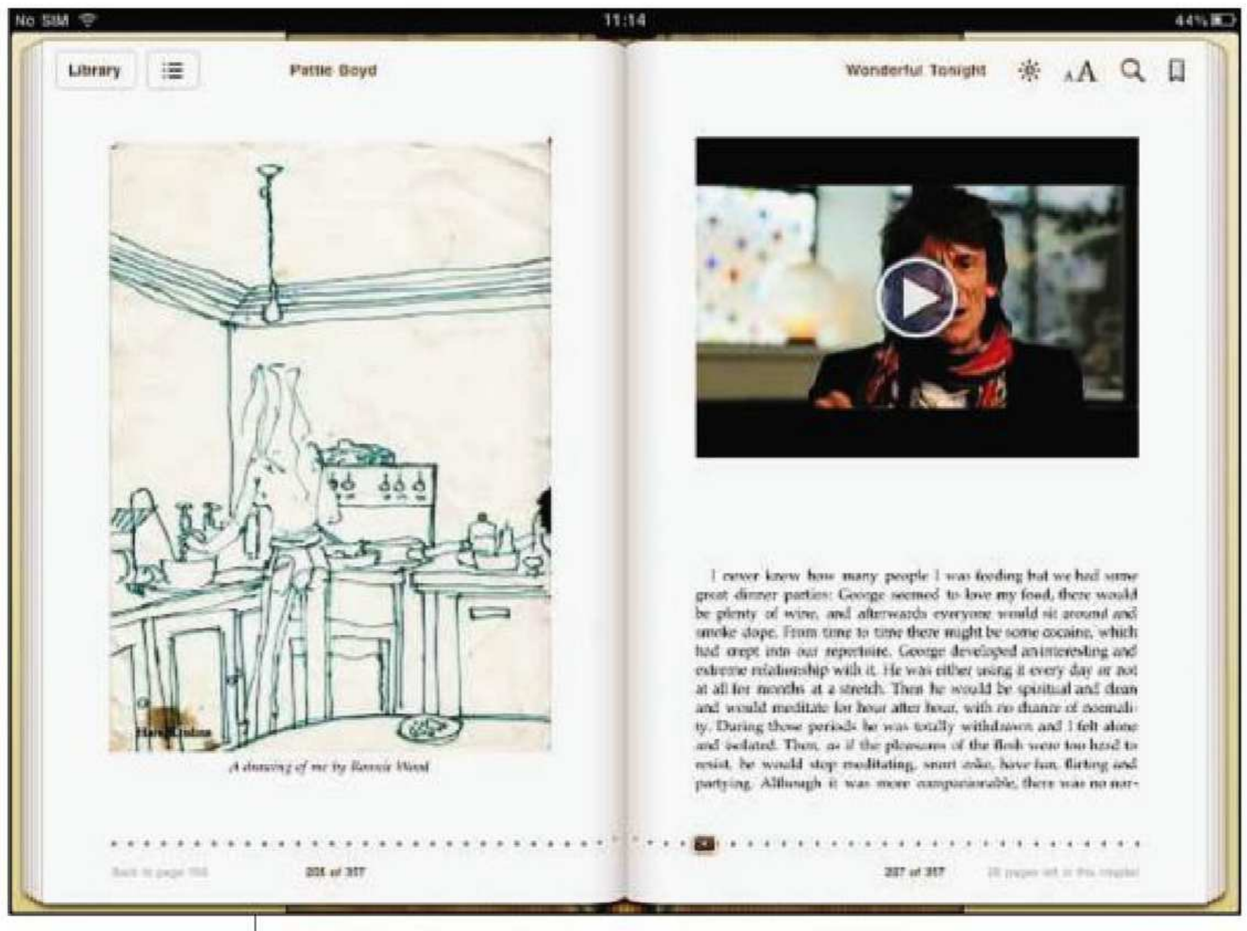
```
<img src="Images/MyPicture.jpg" width="400" height="600" />
```

This tells the browser to display the picture in a box 400 pixels wide by 600 pixels high. I'd supply the image in that size, and always make such image declarations as explicit as possible, so the browser knows how to present the page the way I want it. For an eBook, on the other hand, I'm encouraged to declare images like this:

```
<img src="Images/MyPicture.jpg" />
```

I should also include an image file that's as large as possible, rather than one tailored to the device's screen.

The reason for this is that when the reader paginates my book, it will look at that image's size, and how much space is left on the current page. The software has to decide how much to scale the image to fit into the available space, which means tricky arbitration between available space on the current page, the size of the page, the maximum size of the image, and how the image scales when its size is reduced. This can get quite complex, particularly for portrait format images that have a different aspect ratio to the page itself. At this point, some eBook readers get it wrong and split your image across two pages. This is a bug in the reader software, and you just have to work around it – either by inserting explicit page breaks into your HTML (using the page-break-before CSS element) or by fiddling with the image size. If your image has a caption, your life will become even more complicated, because you'll want that image to stay with its caption.



One of my finished eBooks – Ronnie Wood talking about how he drew the picture of Pattie Boyd in her kitchen.

This illustrates a big problem with eBook readers and their HTML rendering. If you think they should look the same as classic paperback novels – collections of chapters without any pictures – then everything is fine. However, HTML rendering dictates that all images be placed inline in the text, so that a paragraph ends before an image, and the next paragraph starts after it. There's no way provided in HTML/CSS to break this order, nor enable me – if I want the text to continue unbroken – to float an image that doesn't fit to the top of the next page, or even put it onto a page by itself.

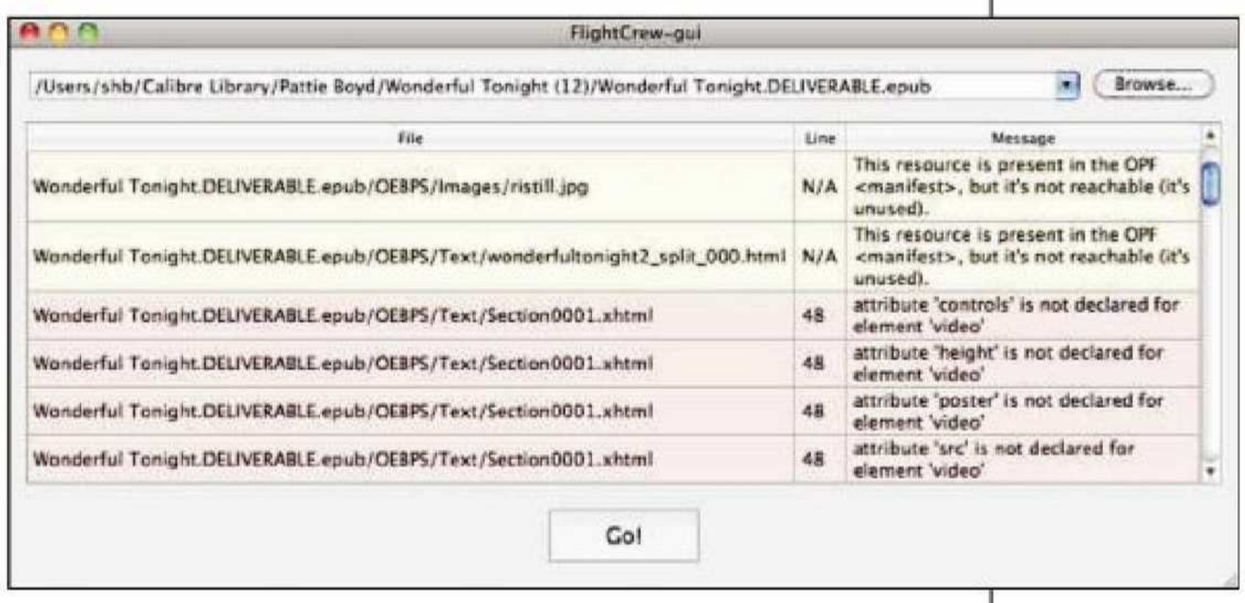
Such facilities do exist in most word processors, although few of us actually use them. Turn back the clock to the 1980s, and the typesetting systems of that era, such as LaTeX, had the ability to say this with a statement something like:

```
\begin{figure}{t}
... figure contents ...
\end{figure}
```

Here, {t} means: "Float this image to the top of a page." That way, text fills up pages, and images stay close to their associated content.

Such rendering issues have other side-effects. Since iBooks are based on WebKit, you might expect to be able to use all the cool HTML5/CSS3 animations that are supported in Safari, but this mostly isn't the case. For example, if you set an image as hidden, it will stay hidden even if you try to set its display attribute via JavaScript. Similarly, z-index doesn't work. The reason is fairly obvious: iBooks need to paginate the book, and can't cope with the possibility that pagination will be changed afterwards.

The FlightCrew GUI is a great way to check your ePubs and can help you solve problems.



Open-source tools

When creating an eBook, there are three types of tools you might need. First, many people will want a wysiwyg eBook editor that inputs and outputs ePub files – such as Sigil (**http//:code.google.com/p/sigil**), which I'll look at below.

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A SMALL DISASTER

A very wet conference room table, with the soaked server in the background, turns out not to be a disaster zone, thanks to a good alarm and effective backup system.

This story has nothing directly to do with open source, but it's definitely a real-world problem. A couple of weekends ago, my company's offices were flooded from above, which, as you can see, created a whole bunch of problems. In particular, I had to write off my original plan for this column because the server was waterlogged (it's never good when you tilt a 2U server and water pours out). But we got through the recovery process pretty well, and it's worth a few words here about why and how.

The first thing that helped us was having a good burglar alarm – we have double-sensor coverage and a proper monitoring service via Redcare GSM. This means that our alarm system can call out using a phone line or its own GSM modem. We also employ a key-holding service, which means that if the alarm does go off, someone will attend the premises immediately. When the water came in, it set off the alarm – which, despite having no mains power, was able to inform our monitoring station – and we had someone to the office by 4:30am on a Sunday morning. When I was called at 5am, the first thing that went through my mind wasn't the advantage of knowing something was wrong on the Sunday rather than the Monday morning, but that most other people in our building might arrive at work to be faced with no power and extensive water damage.

Second, we'd outsourced both our main communication channels: our email goes via Google Apps and our phone system is via a VoIP company. Probably more important still, all our disaster recovery plans and contact lists were kept on Google Docs, so we could contact all staff on the Sunday to start recovery planning, and could then communicate our intentions to all our clients before they arrived at work on the Monday. We decided that we'd all work from home, but thanks to our phone system being outsourced, we could still answer the company phones. Yes, we had a problem, but we could let everyone know about it, and if they needed to, they had a way to contact us.

As a web company, all our work is carried out on hosted servers so, once again, everyone was able to carry on with their jobs. Our office was closed for only one day, but the damage is substantial, and our conference room, which took most of the water, will have to be gutted and rebuilt. Not everyone will be able to do what we did, because not everyone can off-site their phones; but anyone can set up a standby email system on Google (Gmail Small Business gives you 50 mailboxes).

Or, rather than native editing you might wish to create your eBook in a familiar editor such as Word, then convert it into ePub and other formats: the open-source tool for that is Calibre (**http//:calibre-ebook.com**). Finally, if you're tweaking existing ePub format files directly, you'll need to check that what you've done is correct, since it's very easy to break the HTML and the special files. There are a couple of applications to help with that too.

Sigil is an open-source application that runs on most platforms, and lets you read and edit ePub files in an almost wysiwyg fashion. You can set paragraph and character styles in the text, and there's a split-window mode in which you can fiddle with the underlying HTML while seeing what the result looks like. I used Sigil when I first started to create eBooks, but eventually gave it up – it works very well if you only need to create a very simple eBook with text and a few images, but I needed to do more than that. On the other hand, it's a great application for getting an eBook project off the ground.

At first sight, Calibre looks less useful than Sigil, but I find myself using it frequently. It's really a conversion application for ePub files rather than an editor per se – it can read ANSI text, RTF, PDF and other file formats, which it will then convert into ePub, and also other formats such as Mobi for Kindle.

This really is a Swiss Army knife for ePub production, and it lets you perform complex tasks, including targeting particular types of reader devices. It can also read newsfeeds and create eBooks. A feature that I find particularly useful is its ability to tweak ePub files, then send them to a device: whenever you do this, Calibre expands the tweaked file into constituent folders so that you can edit the HTML directly. I've found this invaluable when inserting videos and animations into ePub files.

When you've made your changes, Calibre will rebuild the ePub file and you can send it off to a device – in my case an iPad, which it transfers via iTunes in fairly simply. There's a great community around Calibre, and barely a week goes by without an update. If you're producing eBooks, you should take a look at Calibre.

HAVE A PLAN

Whatever else you do, copy your staff contact list and disaster recovery plans to somewhere outside your office, *right now*. A personal, shared Google account is ideal and free. Remember that failing to plan is planning to fail!

ePub checkers

As I mentioned earlier, an ePub file is a collection of files zipped up together, and for an eBook reader to understand those files they must be consistent, complete (they must all be listed), and structured properly. All eBook readers are terribly fussy about the HTML code they'll render, which must be structured according to the strict rules of the standard. The main application used for checking ePub files is EpubCheck (**http://code.google.com/p/epubcheck**), which is a command-line Java application that checks the file for the properties mentioned, plus many others. (There's also a forked version of the program called FlightCrew, which comes with a rudimentary GUI). It's very important that you use EpubCheck if you're submitting a book to Apple – the corporation has embedded a version of EpubCheck into its submission service, so if a book can't pass it, Apple won't even see, let alone accept it.

Having now produced books for both iBooks and Kindle, my overwhelming feeling is that the market for eBooks is really only just starting. Without doubt, many paper books will go into oblivion, in the way that celluloid film has. My personal metric to judge the adoption of a new technology is based on what I observe on public transport in London – and on my bus this morning, I saw one person reading a book on an iPad and someone else using a Kindle. However, the real breakthrough won't come until we learn to enable eBooks to exploit the fact that the device we read them on is more than just passive electronic paper. We've barely scratched the surface of applying audio, video and animation content, but much more is bound to follow as the market matures.

Networks Steve Cassidy

Core rules of networking

STEVE CASSIDY HEAPS PRAISE ON A BELGIAN WRITER WHO'S DEMYSTIFIED THE CONFUSING WORLD OF NETWORK PROTOCOLS – WHILE SPARING HIM A MIGRAINE TOO

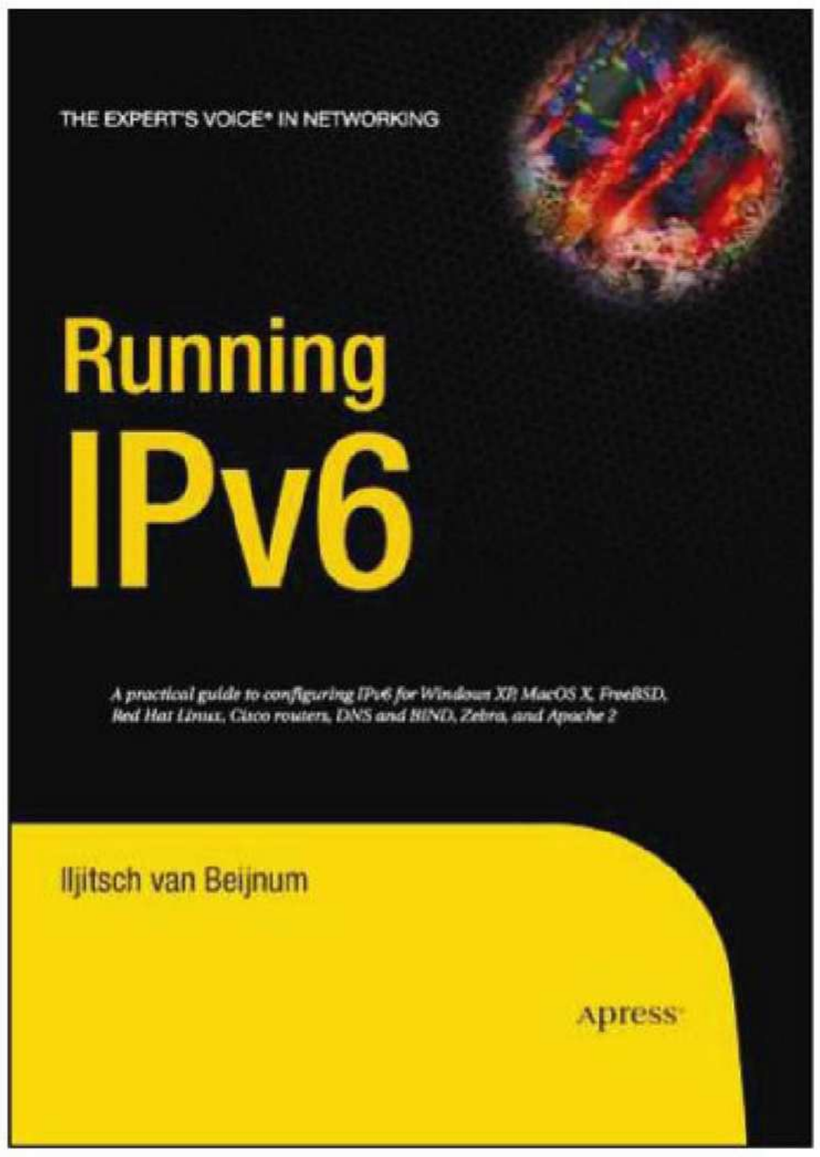
I have to take my hat off to Iljitsch van Beijnum. No, really, I do – he's authored a very useful book called *Running IPv6* (**www.pcpro.co.uk/links/201networks**). A multilingual Belgian, he's highly skilled in the confusing world of network protocols (note that plural: these days, most of us only have to deal with one!). He carries out router configurations, too, and even knows how to write about this rapidly changing field in a way that gives me a migraine if I try to digest more than a few pages at a time.

My respect for him is actually multiplied two-fold, because he grapples with stuff that underpins nothing less than our entire planet's data communications network, and explains it in a language that isn't his mother tongue. For any writer – even allowing for the assistance of sub-editors and professional translators – that takes some doing.

Don't worry, I'm not going to try to distil a couple of hundred pages of his well-written book into three pages of this column, then claim that the entirety of IPv6 has thereby been demystified. No, what attracted my attention to the magnitude of this chap's talent is the more general problem of misleading ideas that can hide behind simple statements. Or, if you prefer, the way that words can be strung together in such a way that they completely trap the reader into a tangle of incomprehension. They aren't strictly tongue-twisters – more like brain-teasers.

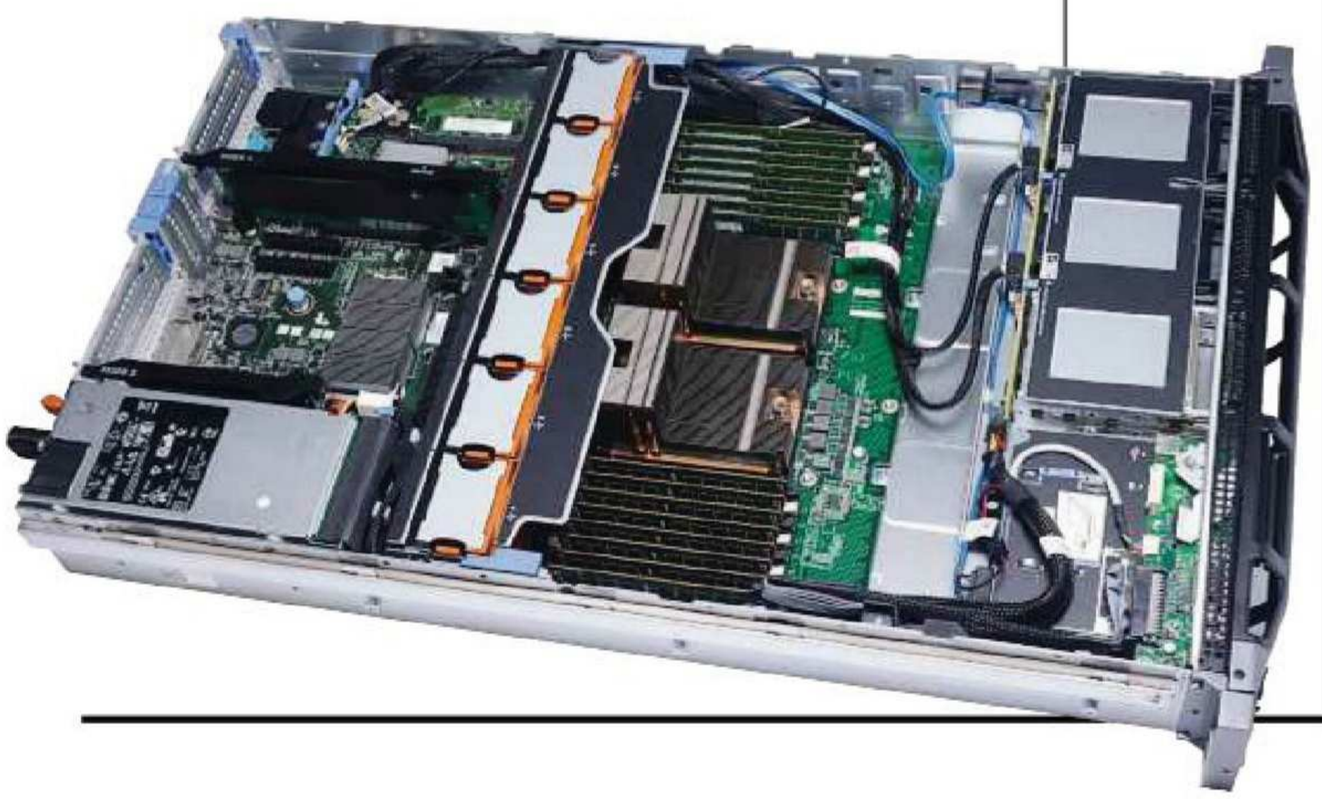
For example (a snap answer, please): how many cores are you allowed in your virtual server before you must buy the Enterprise – that is, the more expensive – version of Windows Server? No Googling, and please try this question on your colleagues too. How many of you said "eight"? And what did your Software Licensing salesman say? It seems this is one of those neat little tricks that the licensing sales fraternity has cottoned on to, which can be sprung on customers without having a negative impact on their technical environment. After all, the Enterprise version runs as well on kit with fewer cores as it does on monstrous corporate servers, and there's no "this computer is too small for me" error message to inform you that you could have managed just as well with the cheaper, standard version.

STEVE CASSIDY
Mixes network technologies, particularly wide-area communications and thin-client computing, with human resources consultancy. Email cassidys@cix.compulink.co.uk or read his blog at www.pcpro.co.uk/blogs/stevecassidy



Iljitsch van Beijnum's latest book clears up the confusion over networking jargon.

Windows Server licences are based on sockets, not cores.



The correct answer is that it isn't only about cores, but also about sockets – standard versions of Windows Server 2008 R2 can't use more than four sockets on a motherboard. Those four sockets can have any type of CPU fitted in them, and since at present the maximum affordable CPU size for smaller businesses gives you six cores per socket, it's actually rather easy to have 12 cores running inside a twin-socket server that the sales organisations would probably like to call "basic for small business". (Don't get me started on the vast gulf that separates home server specifiers from the catalogue-mania of the small-to-medium business hardware sales sector!) My guess is that back around 2008, when many people with relatively little experience of multicore servers suddenly had to bone up on the limits of the possible, this concept of "two sockets with a max of four cores per socket" took root, and that was the end of most people's research phase.

The current situation will become clearer if you actually refrain from searching the web, where you'll find no end of forums filled with threads full of people who just repeat one of a number of canards without ever looking at an

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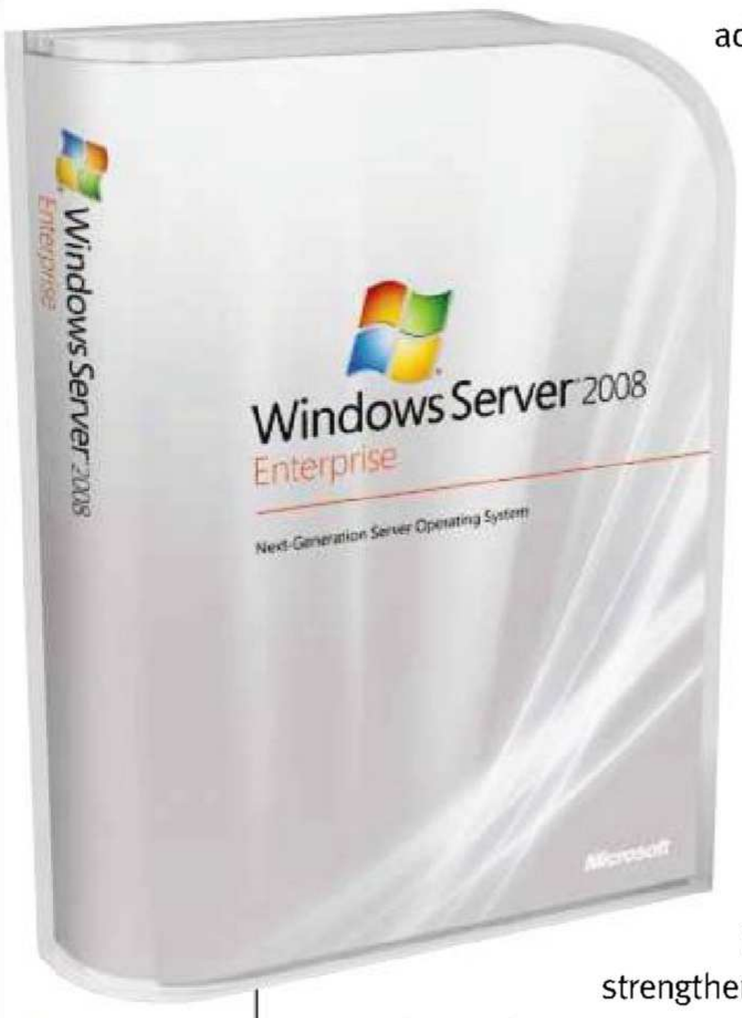
authoritative source. Instead, go to Microsoft's feature list at **www.pcpro.co.uk/links/201networks1** – which, if you open on your laptop, might lead you, as it did me, to the niggling reason behind why this whole socket/core issue has become such a thorn in the side: all the important information is at the bottom of a long table that scrolls off your screen. And I've just realised that I committed exactly the same kind of error I'm complaining about by tarting up my argument with the French term "canard", when what I really meant was "red herring", a different order of zoological reference.

Hyper-V for free?

Second brain-teaser. We all know that it costs nothing to install Microsoft's Virtual Server hypervisor, right? Hyper-V is a free add-on for Windows Server 2008. Well, yes and no. Let's clear away some of the chaff that's obscuring the truth here, by listing the Yes's and No's of this matter:

- Yes, Hyper-V is indeed free to add on to any existing Server 2008 R2 installation.
- Yes, it's free to set up a guest, too, assuming that guest is properly licensed.
- No, that isn't the end of the matter. There's another product that's free called Microsoft Hyper-V Server. In this case, the free download isn't simply an add-on to the paid-for server you're setting up already, but is an entire, bootable, free virtual machine host OS.
- No, this isn't a way of getting a "cheap copy of Windows Server" because Hyper-V Server has had almost all of the front-end GUI chopped off. Once it finishes installing, there are a couple of command line windows that open up for final configuration – and that's it. Further management will be possible, but only by using the RSAT (Remote Server Administration Tools) and/or the appallingly named System Center Virtual Machine Manager (hereinafter referred to as SCVMM).
- No, RSAT and SCVMM aren't even subsets of one another, let alone synonyms. They do perform some of the same jobs, but not all. SCVMM, in particular, is the smart bit that helps you once your VM count rises above a pretty small number.

Now, be honest: had you realised that Hyper-V Server existed and was free to download? Again, I think that an early adopter problem lies behind the scenes here. Almost all the IT research people within an organisation of any size have an MSDN or Technet subscription, which allows them to download enough copies of full-fat versions of all Microsoft's products to take care of any need they may have for demos of a particular technology. What are the odds that your pub mate who knows a bit has had a quick look through the Hyper-V role in Server 2008, but hasn't looked for a matching free download outside the bountiful world of Technet, so his advice stops there?



↑ Windows Server licensing is a complicated beast.

The chances that this is the dominant factor are strengthened by the disreputable history of abuse of MSDN versions of operating systems. It's only fairly recently that Microsoft has limited the number of installs permitted per MSDN account, per product. I say "permitted" here because that isn't quite the same as "possible".

Many MSDNers tell me that they reuse their apparently single-use COAs over and over again – although, to be honest, I'm not sure this fully represents the complexity of the situation. At the very simplest level, Pub Advice Rules include the concept of Winding Up Your Mates. Imagine that your technology planning is being done by Al Murray's Pub Landlord character, where every so often he slips in a complete fib just for the sake of wickedness, and to check that you're actually in need of his advice. If you don't implement his suggestion and find out that it's a fake, then he'll know that actually it's you who are winding him up. And people wonder why I stick to official sources!

It's important to discover whether you've been saddled with an unusual licence by way of the Pub Advice system, whether it's for servers or workstations. When it comes to servers, MSDN versions may not accept all the available updates, or could end up simply refusing to run.

CORE DECISIONS FOR SMALL BUSINESSES

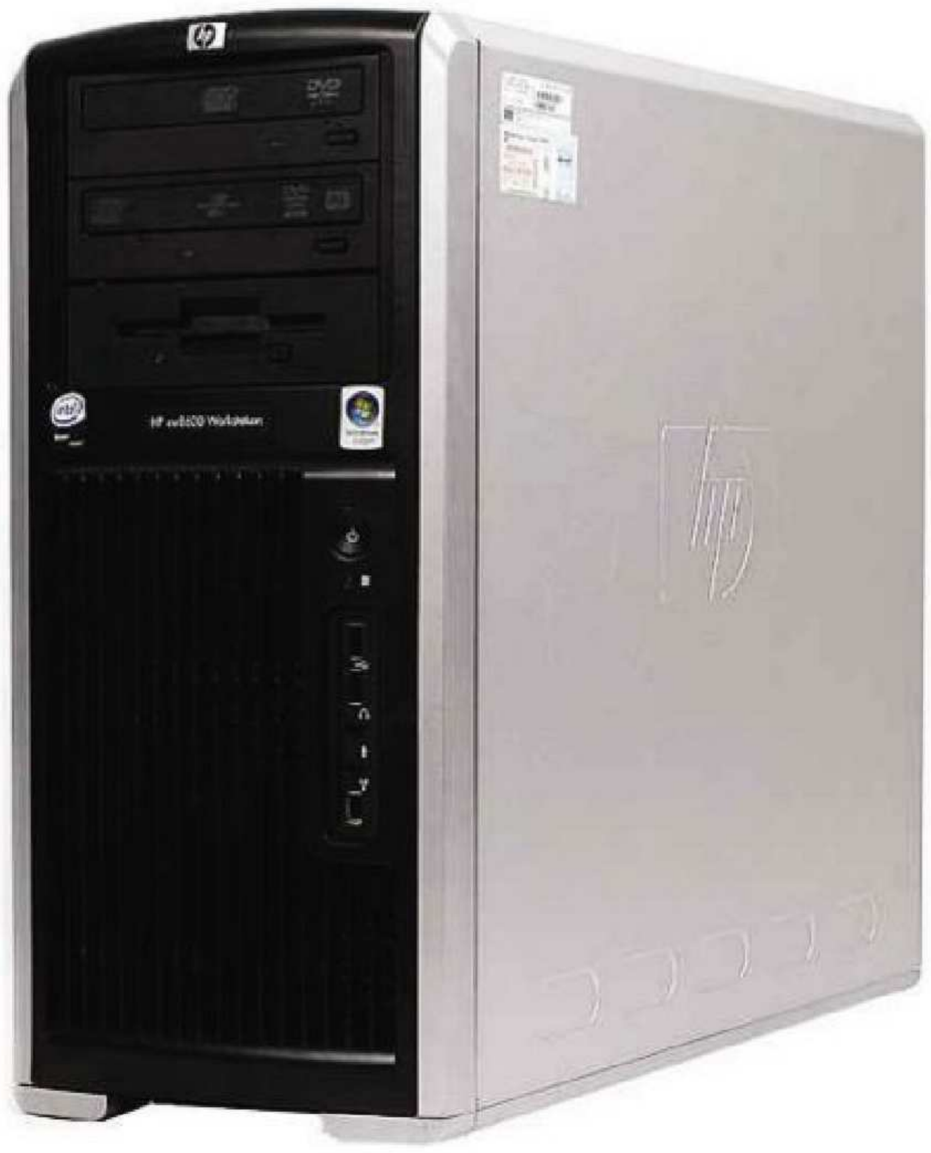
Before hitmen from *PC Pro*'s Labs and hardware news teams descend on me like a flock of angry ravens – yes, I do know that the issue of multiple cores per socket is undergoing a bit of a revolution at the moment. AMD has a 12-core platform out, and the web seems to be overflowing with excited comments about future multicore roadmaps. Even sober bloggers inside the Microsoft Server architecture team are coming out with "gosh-wow" summaries about support for processor features such as core parking when idle, shutting down RAM refresh and so on.

Now I don't want to perpetrate my own kind of brain-teaser by producing a single, incredibly long, clause-ridden sentence when discussing core counts from a licensing perspective, so here's a quick rule of thumb on what's on offer to smaller businesses at the moment.

For many different reasons, it appears that a two-socket motherboard is becoming a de facto standard departure point from which smaller companies begin their specifications. It used to be so easy when it was just a matter of dialling in the fastest Pentium 4 and then forgetting to put in enough RAM. These days, however, emerging from your specification exercise without getting your mind completely twisted by cores, caches, FSBs and logical CPUs is every bit as challenging as working out which products will run on top of the kit you're slobbering over.

Choosing only two sockets narrows the scope a fair amount, and in a handy (although entirely coincidental) quirk of the manufacturer's art, it appears that the previous pressure to squeeze everything down into a pizza-box form-factor – to minimise rack rental cost at your web host – has at long last eased.

So it isn't only two sockets, but also 2U, which is how tall a server has to be to fit in a strip of 2.5in disks if they're sat up on their thin edge. Once you realise that tall, fat servers are hugely heavier and more expensive, and that thin ones are noisy and don't take kindly to uncooled environments, then the current focus on 2U becomes understandable. Take the lid off one, if you can, and look at how much room the CPUs take up – could you imagine four processors fitted in a space such as that? No? That's why 2U with two-sockets has become the sweet spot.



HP's xw8600 rescued the 10TB backup system.

I've been assured by Microsoft's Licensing Support department that Vista and Windows 7 machine licences obtained via MSDN last longer than the underlying subscription. On the other hand, I've also seen surprising licence messages that nobody was expecting, such as an English ex-pat in Switzerland who, after several months in his new job, turned on his IBM laptop running Vista to be greeted with the message that "You are running a regionally activated copy of Windows and have moved outside your region". (Don't try Googling for that exact message because I paraphrase – it left him in such a de-activated mental state that he couldn't capture the exact wording for me). But be honest, did you have any idea that anyone – whether company, private individual, MSDN subscriber, demo or any other possible category – would ever be asked for a "regionally activated licence"?

Note that in this incident there was no need for anyone involved in the chain of ownership and configuration of that laptop to be maliciously minded: it would never occur to the traditional Pub Advisor that this laptop was intending to commit a breach of Microsoft's intellectual property rights further down the track – just as the various problems common to long-term use of MSDN server licences aren't apparent at the time of installation or commissioning.

NAMES

I can't tell that story (right) without naming names – the loser in my 10TB torture-test was a Dell Precision T7400, while the winner was an HP xw8600. And yes, I did upgrade the Dell's machine BIOS, before anyone enquires as to the source of the problem...

AM I MSDN?

In my opinion, MSDN licences cast an unreasonably long shadow. A simple user can't tell whether their computer is using an MSDN-licensed product, and the web resources that pop up if you search for "what kind of Windows do I have?" are remarkable, only for their low reading-age and more so for their frequently rampant inaccuracy. Microsoft's own effort, which can be found at www.pcpro.co.uk/links/201networks2, restricts its reply to the XP and Windows 98 family and informs the reader that "this does not apply to Apple Macintosh computers" (a rider so bizarre that I'm not entirely sure whose intelligence is being insulted more – the intended audience, the unintended audience or the writer).

MY TAPE BACKUP TRAUMA

I was cornered into doing something I try to avoid in the normal course of events – namely, building a machine for tape backup. I like people to feel that they own their data, which to my mind means they own the process of backing it up and restoring it, so I try to get them to take care of their backups wherever possible. On this occasion, though, many of my normal rules had to go by the board, so the scenario was to deliver a 10TB pool of disk space in a single box, with a 1.6TB tape drive included. Ideally, this should be presentable outside the datacenter, because although that beastly huge lump of disk space was going to be used only to hold short-term snapshots, with the tape as the long-term definitive store, this system also had to provide enough room and power to deal with the traditional small-scale nightmare scenario of a fire in the building with the servers in it.

There looked to be an ideal candidate machine already on-site, one modern enough to be all-PCI Express, with eight cores and 12GB of memory (even if its OEM OS was only a 32-bit version). And miracle of miracles, it had four internal hard disk slots, and both SAS and SATA on its motherboard. I calculated that I could easily deliver the 10TB snapshot store by using four 3TB drives, and since this didn't need to be fault-tolerant itself, they could be a simple striped set. Some of the newer 3TB disks would fit the storage slots perfectly, so I drew up my order accordingly. All the parts arrived within 48 hours, and within another 48 hours I was ready to boot the whole thing – not into Windows, but off a bridge into the river...

No matter what I tried, I wasn't being shown a lovely 12TB continuous disk array. Each shiny 3TB drive came with an unannounced PCI Express daughtercard containing two SATA connectors, because there's another semi-hidden disk size limit on most SATA controllers, so that when these drives are plugged into the motherboard they show only 750GB available for partitioning. Of course, you say, put a couple of those add-on daughterboard controllers into PCI Express slots on the motherboard. Well yes, I did, only to find that the OS could see only one at a time – never two.

This looked a lot like game-over. But almost idly – I'd had my suspicions right from the start – I took all the bits I'd ordered and put them into another PC that I considered almost directly equivalent. The memory was swappable, and I could have swapped the processors over, too, if I'd needed to; on paper (or in one of our Labs tests tables), these two machines would have come out just about level-pegging. Except that when I tried the multiple daughterboard setup in the second machine, it immediately saw all four slots on both cards, correctly represented the 3TB drives as being the size that they were, and made a striped set using Disk Management in Windows 7 out of them almost instantly.

Of course, it then took almost 18 hours to slow-format the resulting, truly immense Windows volume, whose drive letter is "E" and volume label is "EEEeeee" (like the fading echo of my screams inside some vast and dripping cavern). On the other hand, this new and well-behaved prospective D2D2T (disk-to-disk-to-tape) machine can shovel bytes across my LAN at more than 90MB/sec – and not just in little bursts, but for up to an hour at a stretch.

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Server Room Jon Honeyball & David Moss

Tarnished images

JON HONEYBALL IS EXASPERATED BY THE BUGGY NONSENSE PRODUCED BY ANTIVIRUS DEVELOPERS, WHILE **DAVID MOSS** ROAMS FREE WITH THREE VERSIONS OF WINDOWS

If you're a global PC manufacturer, there are several things that might keep you awake at night. Anything related to safety, especially relating to mains power supplies, will keep sleep at bay, as will laptop batteries that catch fire. However, you can counter those threats by testing to international standards, using well-understood methodologies, in an electrical safety lab. No, the one that will really keep you awake is malware infiltrating your master install image. This is the image you use to burn the OS to all the hard disks of a particular model range, so when each customer powers up their shiny new machine, it boots into the final stages of registration and setup. The nightmare scenario is for some villain to slip a trojan into this image, which you'll discover only once you've shipped thousands of units and the complaints are flooding in.

Exactly this scenario struck Samsung recently, when a computer consultant claimed his brand-new Samsung laptop had come with nasty keylogging software installed. And it wasn't just one machine; he took it back to the shop and changed it for a second model, which was also infected. The reaction in Seoul must have been utter panic – consequential damages, PR disaster, cost of recovery and replacement of each machine, the list of pain goes on and on. After investigation, though, it transpired there was nothing wrong with Samsung's laptops: it was a "false-positive" error raised by Sunbelt Software's antivirus software VIPRE, which wrongly identified a software module on the Samsung as a nasty keylogger.

Samsung issued a terse statement, including a screenshot to show VIPRE's error, while Sunbelt hung its head in shame and confessed to the error. Why am I telling you this story? It's a timely reminder that tiny errors in your business processes can have wholly disproportionate outcomes. If Samsung really had allowed malware into its master image, the damage to its reputation would have been colossal (remember the hot water Sony was plunged into for deploying a rootkit as copy protection some years back?). And don't dismiss it by saying "Samsung is a reputable company, it would never allow that to happen", because the best of processes can go wrong for any company. It might as easily have been Dell, Toshiba or Sony.

VIPRE had identified a subdirectory name in the Windows directory tree as malware. That's all it took, a single directory name. No files were found, just an innocuous directory name. Since Samsung is now shipping Windows Live tools on all machines in all languages, it happens to be a temp directory used by Windows Live in one of its language setups.

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I raise this issue about false-positives because we keep receiving reports of security software screwing up people's business desktops. Every few months, it seems, there's a report that some major vendor's enterprise antivirus product has destroyed a bunch of desktops or server setups. You may ask: "Where was the staging server, the checking of patches before going live, the immediate rollback and disaster recovery on the machines affected?" Fair criticism, but we all have machines on our networks that aren't as well managed as we'd like.

In the field of antivirus, we're constantly being told that rapid or real-time updating is the way to go, because so many nasties are being released every day that you need constant updates and patches. Any break in the flow and your machines are exposed and may be compromised. Some vendors, such as Norton, even put stopwatches on their products telling you how many minutes have elapsed since they were last updated. So it isn't surprising if a network manager just presses the "auto update" button and steps back three paces.

We often hear about disasters where someone's desktop won't boot or their servers have their key OS files "quarantined", rendering the whole installation toast. Yet vendors continue to make it difficult to run multiple security products. Whether by accident or design, it's clear that many antivirus vendors are incapable of writing stable and clean file system filters, a topic I'll be returning to next month when I have the full picture of a particular upset that recently befell a client's network.

The perpetrator of the Samsung mess should have checked using another antivirus product – and frankly, he was reckless not to do so. He had plenty of time: several weeks, according to the reports. Trusting one product so far that you're prepared to point a public finger against a global corporation shows an imprudent degree of faith.

I confess I'm coming to the end of my tether with antivirus products. In the hierarchy of system management tools, they're right down there in the gutter. When I think of the capabilities demonstrated recently at the Microsoft Management Summit 2011 and then compare the insular, low-rent, buggy nonsense we get from antivirus companies, I despair. I'm tempted to say you're better off substituting a rock-solid disaster recovery solution, so any server or service can be restored in seconds, regardless of whether it was a hardware, software or OS failure. We need locked-down OS installations, especially for laptops, that are specifically hardened. There's also much to be said for walled-garden installation of remote services, delivered via a managed and filtered VPN or a cloud service acting in proxy. We can't disconnect our internal networks from the outside world, but we can deploy strong proxy tools to scrub all content coming in and out.

I'd like to point at Sunbelt and say: "Your VIPRE product is rubbish, try harder". But the fact is we've had this sort of nonsense from many (perhaps most) other antivirus vendors in recent years, and I see no sign of things getting better while everyone adopts the same solutions rather than redefining the problem. Maybe 2011 is the time to move on and consider how to better apply today's massive CPU power to the task of more cleverly monitoring networks and services.

Microsoft Management Summit 2011

Having mentioned MMS 2011, I should add that it was an excellent conference. I have huge regard for Microsoft's reliable and robust management tools, which provide a great platform for third parties to add extra capabilities (I always keep an eye on what Quest is doing, for example).

This year brought nothing spectacular except for the announcement of an entirely new range of products for 2012, a few of which I'm previewing in beta builds – but I'll save those for another month. System management tools take time to settle in and to learn, and some of these tools will take a lot of learning if you want to do advanced stuff such as deploying server applications on demand into VM'd operating systems that have themselves been installed on demand.

It's clear the skillsets that will be required in the next five years are changing too. For example, many people kept jobs throughout the noughties by being experts in Exchange Server, but as that product becomes commoditised into a cloud service, the era of local Exchange Server fiddling may be over. People who tweak SQL Server are being similarly marginalised, now focusing on tuning for absolute maximum performance on critical installations rather than day-to-day maintenance tasks. It might be wise to get familiar with Hyper-V and its Virtual Machine Manager Self-Service Portal 2 system. **JON HONEYBALL**

The joy of three

"Roaming, roaming, roaming, keep those log-ins roaming, Rawhide!" I hummed quietly to myself, as I stared askance at the Group Policy Management Console snap-in. Like those cowboys I had a mission: theirs was to keep the cattle moving; mine to keep network traffic moving. It ought to be simple. You have a fully functioning network that all your users log in to on a daily basis; they do their work and go home. Everyone is happy,

↑ Roaming profiles enable pupils to use any of the school systems at any time.

and your star shines in the admin firmament. That indeed was my situation in the school where I provide support, give or take the occasional half-expected hardware failure.

The problem was that the time had come to introduce a new operating system at the pupil level. Until recently, I'd been able to keep them on a mix of Windows XP Professional workstations and Windows Server 2003 Terminal Server clients, but now a hardware upgrade was needed for the workstations, and finding new systems with XP drivers isn't easy. I also wanted to take a step forward in computing power, not a step back to find hardware that could run an OS Microsoft doesn't even support any longer. I had a few laptop users running Vista and Windows 7, and none of us was in any doubt that Windows 7 was what we wanted. The fast solution would have been to buy some Windows 7 workstations and introduce them via a phased upgrade that would eventually see everyone on the latest OS.

The problem was that Windows XP creates roaming profiles in a completely different way to Windows 7 and Vista, and profiles are essential to the smooth operation of any networked operating system environment. They provide a folder and Registry structure that, in the case of the roaming profiles I employ, follow each user to wherever they happen to log in from. If you're only using one OS this isn't an issue, but if you have different operating systems with incompatible profile structures it becomes a major headache.

I use roaming profiles because my pupils need to be able to use any of the available school systems at any time. With a roaming profile, each user's data is stored on the server but is copied across to whichever workstation they log in to. This is extremely useful for them, but it can be problematic for the administrator if there's limited disk space. Unless you control the amount of data users are allowed to keep in their profiles, you can suddenly run out of space as more and more data moves across the network.

You can set things up so that user data is removed from workstations after the user logs out, but I think it's easier, and more backup-friendly, to set quotas for your users. Some companies get round this problem by insisting that each user always uses the same workstation, but hot-desking makes that impossible. It certainly isn't possible in a school, since our resource-room systems are open to anyone at any time.

While I only had one operating system to deal with, all went swimmingly, but I now needed to make sure users could log on not only to different PCs, but to PCs running different

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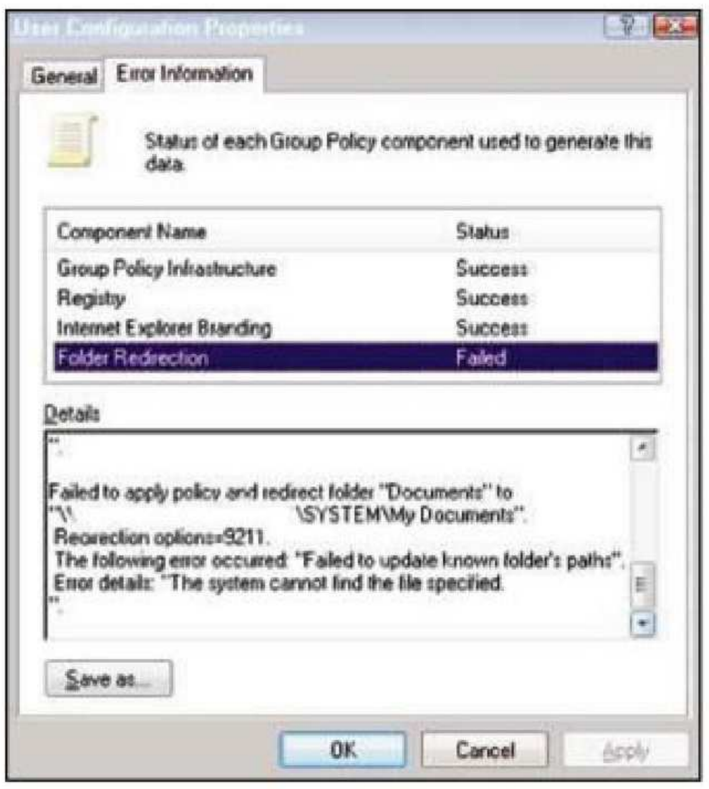
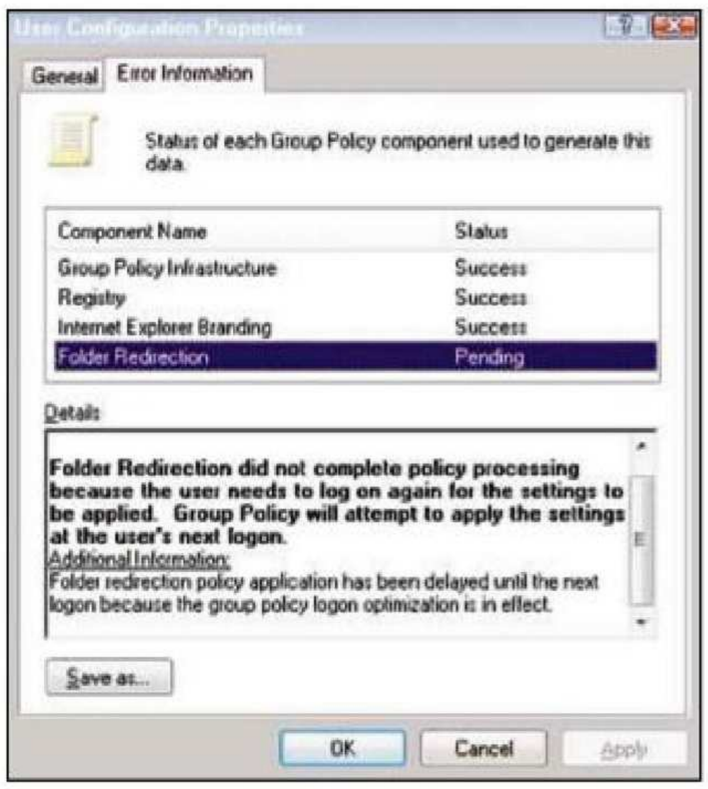


This isn't what you want to see after completing your redirection policies. In this case, the error was down to ownership permissions on the users' folders.



You need to log out and log in twice to apply changes to your redirection policies that occur when you add Windows Vista and Windows 7 into the mix.

Having reassigned the permissions and twice logged out and logged in again, this was the final result. Success all round!

operating systems and still be able to see their data. The solution I chose was folder redirection, whereby you point all users' folders to a central point, so that in theory it doesn't matter which OS they're using. My Documents in XP and Documents in Windows 7 and Vista would, as far as the users were concerned, become one and the same place.

When you have more than one operating system, you need to do this in a series of steps, the first of which is to get folder redirection working with the oldest operating system – in this case, Windows XP. For this OS, the only folders available for redirection are Application Data, Desktop, My Documents and Start Menu. To set up folder redirection, you use the Group Policy Management Console (GPMC.MSC). I set mine up on my Windows 2003 Server. As I happened to have the Active Directory Users and Computers console open, I right-clicked on the domain name, selected Properties from the pop-up menu and then clicked on the Group Policy tab, from where I could create a new policy or modify an existing one. I set all my profiles to use the Basic setting, which redirects all folders to the same location, as I find that the easiest to manage.

I created a "root" folder called "Redirection" and pointed the policy at that folder, then ticked the entry that creates a folder for each user under this root path. So if I had a user called f.red, that would appear as a folder name under the Redirection folder.

There are several settings to choose from, including "Grant the user exclusive rights to My Documents", which prevents anyone other than the user from accessing that folder – including administrators. You have to take ownership of the folder to be able to look at its contents. This is an important point, as you'll see.

Once folder redirection is working under XP, you then have to get it working under Windows 7 and Vista, and to do that you need to be logged into a Windows 7 or Vista computer. Go to Start and run GPMC.MSC from a Windows 7 or Vista system (changes in the profiles can only be seen from one of these later operating systems). Bear in mind that once you've set a Group Policy from one of these operating systems, you subsequently have to manage it from the later operating systems, because Windows XP can't see the new elements.

To tick, or not to tick? I went for the tick in the end, but wasn't sure if I'd done the right thing thanks to inconsistent documentation.

With the GPMC running, you'll then need to go through the same process you did when setting up redirection under XP. At least, that's the theory. I did all this, forced a Group Policy update on the server using ‹gpupdate /force›, then logged out and in again – then out and in again. You must do this because changing policies is a two-stage process, but I found it still didn't work for me. It was only when I picked a folder redirection element that wasn't present under XP (I chose Favorites) and added that to the redirection policy that I got it to work. At that point, after doing the dual logout/login loop, my users could see their documents under Windows XP, Vista and 7.

Perhaps I should say "most of my users", because anyone with admin status still couldn't see their documents. In fact, they couldn't see their documents at all under Windows 7 or Vista, even though previously they'd been able to do so. After a lot of head-scratching, it turned out that the problem lay with permissions. While regular users were owners of their own folders, anyone in the administrators group wasn't – the administrators group was the owner. It wasn't until I manually changed ownership to the individual users that they were able to see their documents again.

I'm still not sure whether this was down to an error I made when setting up folder redirection in the first place or if the fault lies elsewhere. The Microsoft documentation that's regarded as essential reading on this matter offers conflicting advice in this area. The "Managing Roaming User Data Deployment Guide" can be found at **www.pcpro.co.uk/links/201server**.

This guide recommends clearing the tickbox that applies the redirection policy to previous OSes when you're trying to redirect Application Data. Under that entry it says: "This policy setting should apply only to clients running Windows Vista and not to earlier versions of Windows." Remember this is when you're sorting out redirection under Windows 7 or Vista.

Fair enough, but in the very next section on "Documents" it says you have to click to apply the redirection policy to the previous operating systems – then confusingly says immediately below: "This policy setting should apply only to clients running Windows Vista and not to earlier versions of Windows." I left that checkbox ticked and my users can see files from all operating systems, so I have to presume that ticking the box was the right thing to do, but I do dislike inconsistent documentation. DAVID MOSS

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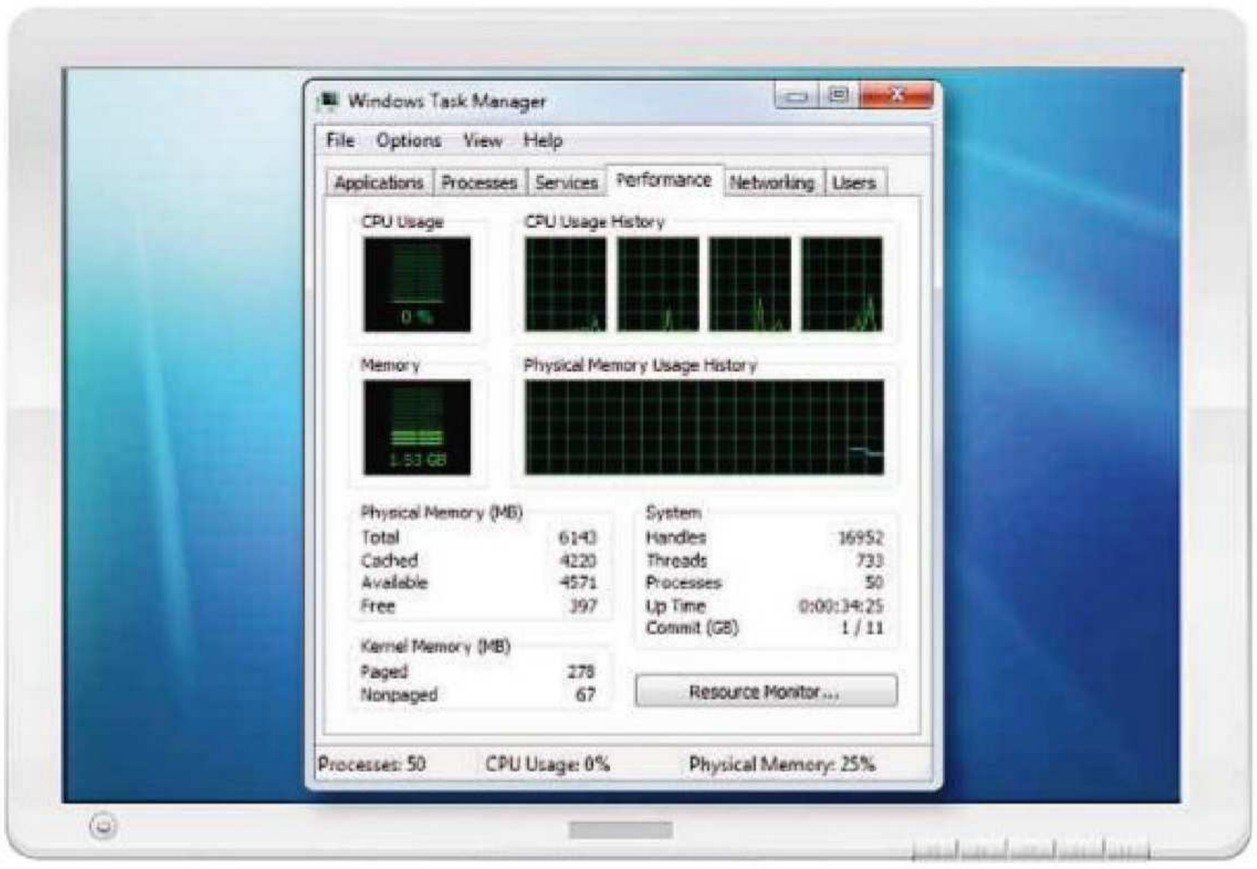

Windows Vista loves to use memory, but this isn't necessarily a bad thing.

High memory usage

Q My wife's Vista laptop seems to be using lots of memory – about 1.1GB, compared with 400-500MB on our Windows XP desktop, measured via the Task Manager. Any suggestions for reducing the usage?
Tbgjlb, via the PC Pro forums

A Next time you're in the Task Manager, click the Processes tab and you'll see a list of all running programs, along with details of how much memory each one occupies. This should reveal if there's a particular application eating up your RAM.

Click Show Processes from All Users and you'll also see system components such as SVCHOST.EXE, the program that manages Windows' background services. It's probably these system processes that are consuming most of your memory.

That isn't necessarily a bad thing. One of Vista's most memory-hungry services is SuperFetch, which pre-emptively caches program data. This helps programs and data load more quickly when you need them; it's a much better use of memory than leaving it empty, as XP does.

If you have Vista's Aero graphical effects turned on, those will also be taking up memory – typically, about 100MB of your system RAM.

If you want to reclaim the memory used by Aero, select a non-Aero theme for your computer. To do this, right-click on the desktop, select Personalize, then click on Window Color and Appearance. Click the link at the bottom of the window that says Open Classic Appearance Properties for More Color Options, then, from the window that appears, select either the Windows Vista Basic or Windows Classic theme. Click OK when you're happy.

You can disable SuperFetch, too, but we doubt this will do you much good. SuperFetch is designed to use only memory that would otherwise be unallocated, and without its assistance you may find that your PC's performance is actually worse. Still, if you want to try turning it off, you can do so by opening the Start menu and entering SERVICES.MSC to bring up the Services console. Scroll down the list of services until you see SuperFetch, then double-click on its name to open the Properties pane. Click the Stop button to halt the service; if you want to disable it permanently, change its startup type from Automatic to Disabled.

If you still crave more free memory, take a look at what startup items are running on the Vista laptop. The easiest way to do this is to open the Start menu and enter MSConfig to open the Microsoft System Configuration Utility.

YOUR QUESTIONS ANSWERED

Every month in these pages we take an in-depth look at readers' technical problems, discuss the underlying technologies, and suggest possible solutions. If you have such a problem, send it to us at ask@pcpro.co.uk, along with your full name. We're also happy to receive quick tips or follow-ups to our advice, although sadly we can print and respond to only a selection of the mail we receive.

We're also now running live Ask *PC Pro* sessions on our website every few weeks. All questions submitted to ask@pcpro.co.uk will be considered for this, so check our website for details of our next session.

Finally, don't forget the *PC Pro* forums (www.pcpro.co.uk/forum), which can be a great source of advice from other readers and allow you to engage in follow-up conversations and feedback.

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In our experience, a totally clean installation of Windows Vista still takes up at least 550MB of RAM

Click on the Startup tab to see all the programs that run automatically when you start up the PC: if there's anything here you don't need, you can disable it and save the memory it uses by removing the tick next to its name. It won't start the next time you boot the laptop. If you later decide you need it, you can always bring it back by re-opening MSConfig and ticking it again.

Sadly, no matter what you do, we doubt you'll get Vista's memory usage as low as XP's. In our experience, a completely clean installation – with no applications or peripherals installed – takes up at least 550MB. If you want to get the best from your laptop, I can only suggest you upgrade to Windows 7, which isn't only a fundamentally less memory-hungry operating system than Vista, but also more responsive and user-friendly in the bargain

Converting XML to text

Q I wish to move from a web-based application to on-premises software. Data from the web-based software is exported as an XML file, but to import the file into the on-premises software, I have to convert it to a text file. There seems to be very little software available to perform this type of conversion, and I'm beginning to conclude that the developer is attempting to limit data importing to its preferred sources. I don't wish to spend money unnecessarily for software, especially for a likely one-off event. Can you recommend a suitable conversion utility (preferably freeware), or suggest how otherwise to cheaply overcome this problem?
Elius

A The developers probably aren't trying to restrict your imports – XML and plain text are two of the most open formats out there! Unfortunately, that doesn't necessarily mean it's going to be easy to convert between them. XML stands for eXtensible Markup Language, which basically means that anyone can tailor the format to suit the data being stored. If you're looking for an XML conversion program, you'll need to find one that's specifically designed to read the XML files produced by this particular web application.

Similarly, when it comes to importing the file, it isn't enough to know that it needs to be a text file. Your on-premises software will need the information within that file to be structured and presented in a certain way. So again, if you want a program to convert your data file into text format, you'll need to find one that's tailored to this particular job.

Since you haven't said which applications you're using, I can't give you any specific pointers, but the situation is more hopeful than it may sound. XML files are text files too – just ones that are organised in a particular way. If you open your exported file in Notepad or Word, you may well be able to see how the information you want is stored.

Then, open up a sample text file from the on-premises software and it may be obvious how to translate between the two. Depending on how much data you have to convert, you might be able to do it by hand, or by using the find and replace function in a text editor. If you're feeling more technically inclined, you could write your own program to perform the conversion, or if it's a big task you could even outsource the job using a service such as Amazon's Mechanical Turk (**www.mturk.com**). Of course, it may turn out that the most efficient way to do the job is to pay for a piece of software after all. C'est la vie.

books.xml - Notepad

File Edit Format View Help

```
<?xml version="1.0"?>
<catalog>
   <book id="bk101">
      <author>Gambardella, Matthew</author>
      <title>XML Developer's Guide</title>
      <genre>Computer</genre>
      <price>44.95</price>
      <publish_date>2000-10-01</publish_date>
      <description>An in-depth look at creating applications
      with XML.</description>
   </book>
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      <author>Ralls, Kim</author>
      <title>Midnight Rain</title>
      <genre>Fantasy</genre>
      <price>5.95</price>
      <publish_date>2000-12-16</publish_date>
      <description>A former architect battles corporate zombies,
      an evil sorceress, and her own childhood to become queen
      of the world.</description>
   </book>
   <book id="bk103">
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      <title>Maeve Ascendant</title>
      <genre>Fantasy</genre>
      <price>5.95</price>
      <publish_date>2000-11-17</publish_date>
      <description>After the collapse of a nanotechnology
      society in England, the young survivors lay the
      foundation for a new society.</description>
```

← XML is eminently legible, so it can be easy to extract the data you need from a file in this format.

Accents in email addresses

Q I'm trying to correspond via email with a German company named Löwe. Every time I try to send an email via AOL or Windows Mail it

bounces back without being delivered, probably because the umlaut character "ö" isn't being recognised in the email address. This is proving to be quite a headache – do you know of a solution?
Chris Saunders

A Accented characters aren't permitted in email addresses, so you've clearly been given the wrong information. Try replacing the word "Löwe" with "Loewe" – that's the normal way in German to transliterate an umlaut. Failing that, you'll just have to contact the company and ask for the correct email address.

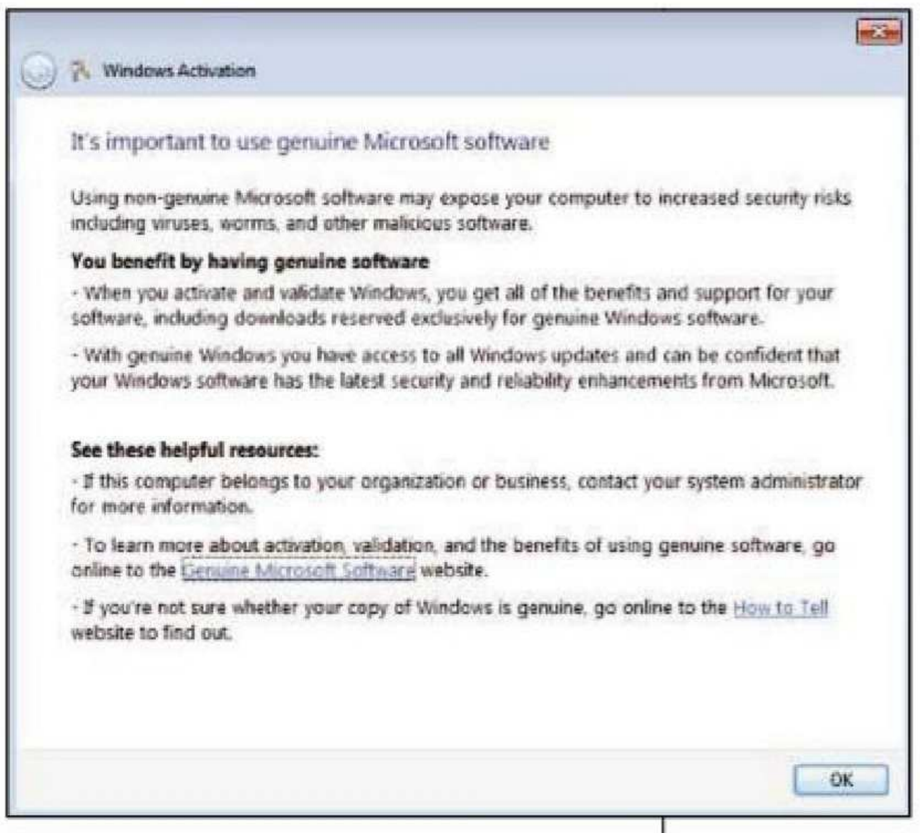
For the record, email addresses can contain only unaccented letters, numbers and a selection of common punctuation marks, although some systems impose their own stricter rules. For example, Hotmail won't allow you to create a mailbox called #$*!?@hotmail.com, even though the address is technically permissable.

It's also worth noting that email addresses are case-sensitive, so mailbox@test.org is different to Mailbox@test.org. To avoid confusion, most mail systems treat the two addresses as one, but if you're having trouble with emails mysteriously not reaching their destination, a rogue capital letter could be the culprit.

The same restrictions apply broadly to internet domain names; but it is possible to host a website that uses foreign characters in its address, using a system called International Domain Names. It's a system designed to allow people around the world to access online resources in their own language. However, the servers that power the internet don't really understand such exotic scripts. When you access an address like that, your web browser encodes the foreign text into a string of western characters – such as "xn--4gbrim.xn----ymcbaaajlc6dj7bxne2c.xn--wgbh1c" – which can be processed like a regular web address.

Windows 7 as a 30-day trial

Q I've just installed Windows 7 Ultimate on my desktop as a 30-day trial. What will happen after the 30-day trial expires? Will it roll back to the previous OS that I used (Windows XP)?
Elmer 1007, via the PC Pro forums



If you don't activate Windows 7, the software starts trying to coerce you into doing the right thing.

A The 30-day period isn't officially intended as a trial. If you're installing Windows 7, it's presumed that you've already paid for a licence. Accordingly, there's no provision for returning to your previous operating system if you decide not to stick with Windows 7.

That isn't to say it's necessarily impossible. Those who have installed Windows 7 as an in-place upgrade from Windows Vista are out of luck. But if you performed a clean installation (as is necessary when moving from XP), the system folders from your previous version of Windows can still be found in a directory called WINDOWS.OLD. In theory, you can return to your old OS by simply moving those folders back into place, replacing the Windows 7 ones.

In practice, though, there are some hurdles to overcome. You can't move system folders around within Windows, so you'll need to get at them some other way, such as via the CD-based BartPE environment (**www.nu2.nu/pebuilder**).

You may need to repair the boot information on your hard disk, to tell it which OS to boot. This should be possible from the Recovery Console on your Windows XP installation disc, or within "Repair my Computer" on the Vista DVD if you've come from that OS.

If you decide to keep running your unactivated Windows 7 installation, you'll find that requesters pop up more and more frequently, reminding you to activate as the 30-day mark approaches.

Once the deadline passes, you'll have to click through a patronising anti-piracy warning every time you boot. Your wallpaper will be set to a sombre black, and Aero transparency effects will be disabled. You'll also receive regular pop-ups complaining about software counterfeiting, and lose access to non-critical updates from Windows Update. You can run all your applications and continue to get work done in this environment, but it isn't a pleasant experience.

If you find the 30-day limit too pressing, there's a Microsoft-sanctioned trick you can use to buy yourself more time. Open the Start menu, type CMD, then right-click on the icon that appears and select Run as Administrator. When the command prompt window appears, enter the following:

```
SLMGR -REARM
```

and restart Windows 7. This will give you an additional 30 days' grace, and you can do it up to three times to gain a maximum of 120 days' usage before you must activate.

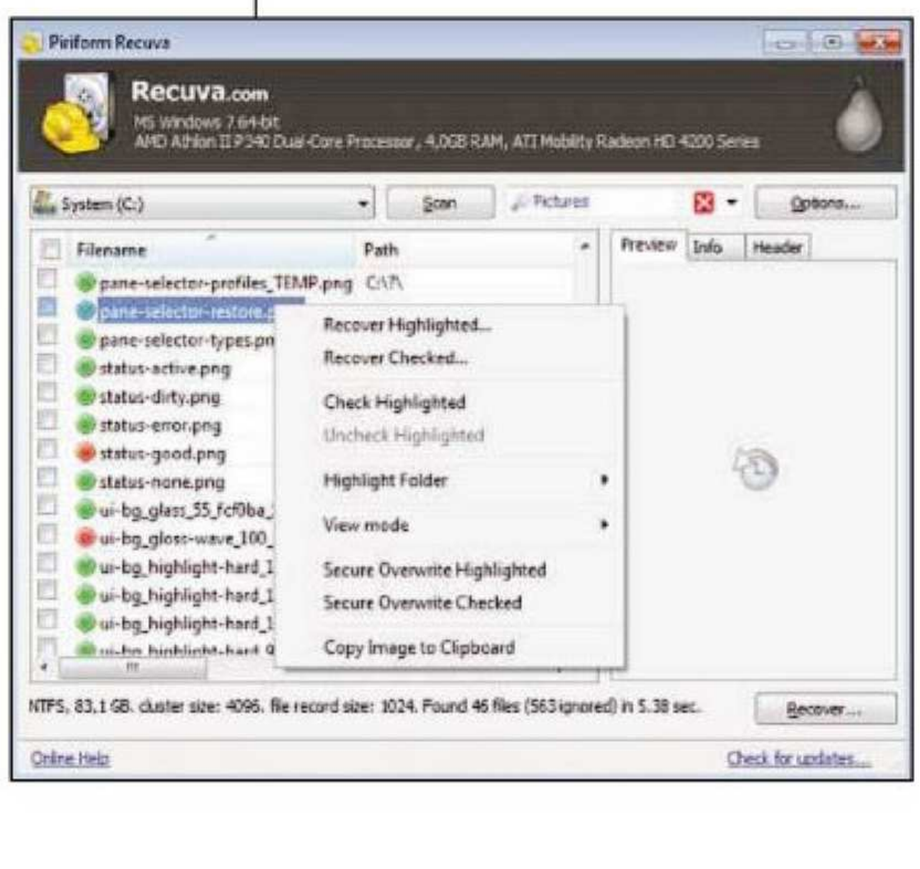
Ultimately, though, you're just putting off the inevitable. Sooner or later, you'll have to either ditch Windows 7 or buy a product key and activate it.

Recovered files can't be opened

Q I decided to delete a file from my Flip Ultra II HD camcorder – and in a mad moment I accidentally deleted all files! It was the worst moment in IT history for me for quite some time, but I thought there was no need to panic as I hadn't written any other data to the device. The free Recuva tool (www.piriform.com) happily found the deleted video files on my Flip and claimed they were recoverable.

Unfortunately, many of the recovered files won't open in Windows Media Player, VLC or other media players. The files are all different sizes, so there

Software such as Recuva finds the data that remains behind on disk after a file has been deleted.



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must be data in there. Do you know of any tools that can help, or is this a lost cause?
Steve Platt

A Normally when you delete a file, the data isn't immediately wiped from your disk (or, in this case, from your flash media). The file is flagged as deleted, and the space it occupies is de-allocated. The data remains intact – until it's overwritten by another file – and a disk utility such as Recuva can locate it and recreate the deleted file.

The fact that Recuva managed to successfully rescue some of your files indicates that the Flip Ultra II HD is amenable to this recovery process. But if that's so, why don't all of your recovered files work? It's possible that Recuva isn't perfectly compatible with the Flip's internal file system, and has been confused by some files that aren't stored in the way it expects.

It's worth trying to re-copy the files with a different tool, such as FreeUndelete, available from **www.officerecovery.com**. You could also try the demo of DiskInternals Flash Recovery, which is designed for precisely this type of situation: you can find it on our cover DVD or download it from **www.diskinternals.com**.

> Normally when you delete a file, the data isn't wiped but remains intact until overwritten by another file

If neither of these tools can do any better than Recuva, I'd have to guess that the data on your Flip's internal storage has been corrupted. You mention that you didn't write any files to the device, but it could be that a process on your PC – or on the camera itself – has been accessing it.

If you can't retrieve your original data from the device, you can always try to repair the corrupted files by hand. This isn't as crazy as it may sound: if you're lucky, and the corruption is minimal, you may only need to restore the first few bytes of a file to get it to open. It's a long shot, but it could save your bacon.

To try this, you'll need a hex editor. My personal favourite is the fully featured Free Hex Editor Neo (**www.hhdsoftware.com**), but there are plenty of free alternatives out there. Open up the non-working file in your hex editor and you'll see its contents displayed in a two-pane hexadecimal and text format.

Now open up a working file of the same type, such as another file from your Flip, and compare it to the damaged one. You may be able to spot if, for example, your file is missing part of its header, or if it has a few bogus bytes appended to the start. Try correcting the error, either by manually editing the data or by the judicious use of copy and paste. Save the file (under a different name, so you can keep working from the original if this attempt doesn't solve the problem) and see if your applications can now open the file.

Sadly, I've used this process to inspect the sample file you sent with your email, and it doesn't look good. An MP4 movie file should normally start with a standard header and end with a recognisable footer – but your file is one long unpunctuated string of impenetrable binary, suggesting that it's been entirely overwritten or seriously corrupted. With a lot of time and effort you could perhaps comb through the numbers to see if anything there can be decoded into salvageable video data – but I don't hold out much hope.

READERS' TIPS: MYSTERIOUS CRASHES REDUX

Recently, we published a question from Richard Carter who was suffering from mysterious crashes while using and reinstalling Windows (*see issue 199, p144*). We suggested that when the cause of such problems seems inconsistent, it's usually the memory that's at fault – but several of you have written in to share your own experiences and suggestions.

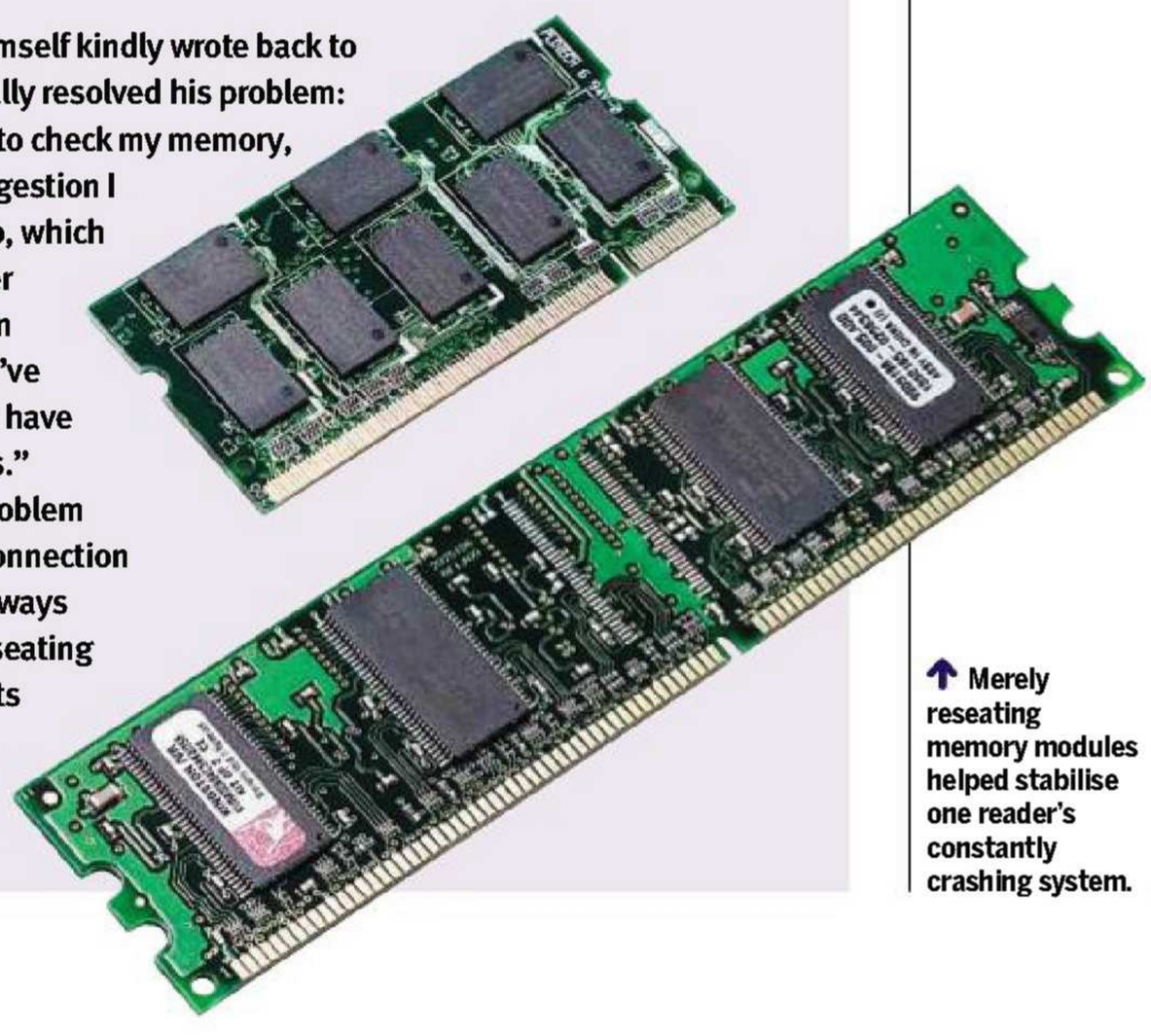
"Your letter about mysterious crashes reminded me of a similar experience," writes Alan Douglas. "I once had a Hi-Grade PC on which I attempted to load Windows XP about 40 times. When it didn't crash during installation, it did soon afterwards. I then tried to load Linux and saw an error message that suggested a fault on the motherboard. I eventually bought a new motherboard, which worked perfectly with the same Windows XP disc."

Graham Lambert cured his crashes with a different approach: "I experienced similar issues with a PC. I started to reinstall the OS, but the PC crashed part-way through, and at various stages on subsequent reinstalls. The RAM tested fine, and the hard disk passed tests with no bad sectors or issues. I was beginning to suspect the CPU of overheating when I decided on a hunch to swap out the PSU with a spare, as I'd done this previously on a test rig that had been crashing at random intervals and it cured the problem. Hey presto – the PC installed Windows and never crashed again."

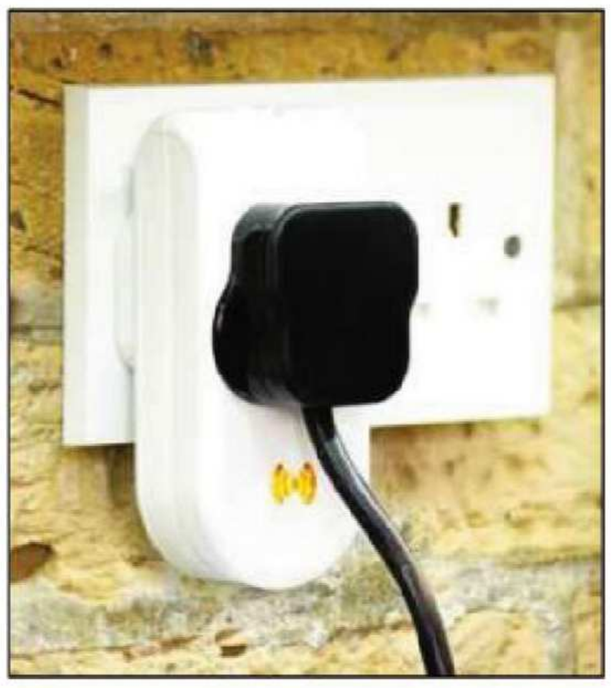
George Hart found his problems were memory-related, even though the modules appeared to work perfectly. "I had many mystery crashes on a brand-new PC Specialist desktop PC," he reports. "It would crash with only Windows installed, with no other software and no hardware other than the keyboard, mouse and screen. Numerous reinstallations of Windows, two different sets of Crucial RAM and two returns to PC Specialist for a rebuild didn't solve the problem. Eventually, we tried replacing the memory with unbranded RAM modules. This solved the problem, but we never found out why my PC didn't like the Crucial RAM."

Finally, Mr Carter himself kindly wrote back to let us know how he finally resolved his problem: "Following your advice to check my memory, I recalled an online suggestion I caught a few weeks ago, which was simply to swap over the memory modules on the motherboard. This I've done, and to date there have been no further crashes."

It sounds like the problem was down to a dodgy connection – a reminder that it's always worth removing and reseating any suspect components before you start trying to sniff out more serious problems.



↑ Merely reseating memory modules helped stabilise one reader's constantly crashing system.



Individual appliance monitors can help you get the measure of a device's power consumption.

CUTTING THE **POWER**

DARIEN GRAHAM-SMITH SHOWS HOW A SIMPLE DEVICE CAN HELP YOU MANAGE YOUR HOME ELECTRICITY CONSUMPTION

How much electrical power do your various computing devices consume? Very few of us can answer that question with any confidence, as we normally come into contact with our energy consumption only in the form of bills – and those give only a total consumption figure for all of a household's appliances, across a period of months. It's impossible to tell anything about any particular device.

In fact, your PC probably isn't the most energy-hungry device in your home – if you have a fridge-freezer or a washer-dryer, that's likely to cost you more. But it's certainly a contributor to your bills, and you could save a good few quid each month by managing your overall power usage. Even if the financial incentives don't move you, it's simply good citizenship not to waste energy.

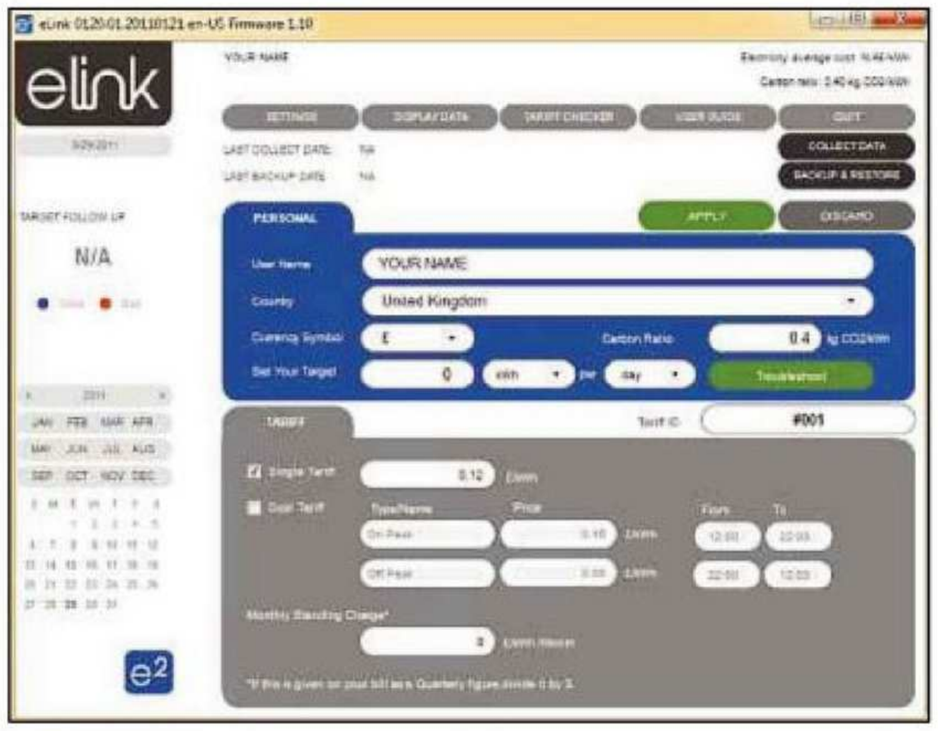
Measuring your consumption

The first step is to find out how much power you're actually using. As we've mentioned, power bills are a very crude source of information. You can keep much closer tabs on your consumption by investing in a whole-house monitor – an electronic gadget that's able to track and analyse your power consumption automatically. Look online and you'll find plenty such devices on offer from less than £30.

You don't have to be a qualified electrician to install a whole-house monitor. The device comes with a clamp, which you simply fit around your main electricity cable (either at the fuse box or at your electricity meter). The current flowing through the mains cable induces a secondary current in the clamp, which can then be measured to find out how much power is flowing into your home.

With a whole-house monitor you can program in the amount you pay for electricity and track your consumption in pounds and pence. Many monitors can also track historical usage – so, for example, you can compare your power consumption this weekend with your average over the past year.

Advanced monitors – such as the AlertMe Energy Monitoring Starter Kit (**www.alertme.com**) and the Current Cost Envi (**www.currentcost.com**) – can transfer detailed usage information to



→ Many power meters come with software that can analyse your bills as well as your usage.

www.downmagaz.com

By connecting a power meter to your PC, you can track your power consumption over time.

your PC, so you can analyse the data yourself. For example, you could import the figures into Excel and look for spikes, so you can work out what's caused your power consumption to rocket.

You can also calculate how much your usage would cost if you moved to a different electricity provider or tariff – a possible way to reduce your electricity bill without lifting a finger.

Online monitoring with Google

With the right software, it's possible to upload your power usage data to online services, where it can be tracked and analysed for you. A few companies offer such services on a commercial basis, but the most attractive choice is Google's free PowerMeter service (**www.google.com/powermeter**).

Launched in 2009, Google PowerMeter isn't as well known or ubiquitous as the company's Gmail or Maps services. That isn't really a surprise, as it's useful only to people who are in a position to provide power usage statistics. But if you shop around you can find a PowerMeter-compatible monitor online for less than £40.

And it's growing in popularity. In the US, there are now nine different manufacturers of home power meters that are compatible with Google PowerMeter. It's even possible to have your usage details automatically uploaded by your electricity supplier, so there's no need to install any hardware at all. So far in the UK, only the independent first:utility offers this service (**www.first-utility.com**), but other suppliers in Germany and the US have also signed up.

Google PowerMeter automatically breaks down your energy usage, and displays an easy-to-read graph of recent usage along with all sorts of automatic analysis. You can see how much energy is consumed by always-on appliances, and see spikes at different times of day.

If you give PowerMeter details of your electricity tariff, it can also predict your next electricity bill, which should help prevent nasty surprises. If that number is too high, you can set yourself an energy budget – for example, a plan to use 5% less power at weekends – and use PowerMeter to track your success in sticking to it.

These are all tasks that you could achieve in Excel, but delegating the processing to Google PowerMeter makes it effortless. It also enables you to compare your usage to that of other homes – something you could otherwise only guess at.

Interestingly, Google offers an API for PowerMeter. According to the company this is still in the early stages of development, but it opens up creative possibilities for the future. For example, you could make an Android-based application that actively warns you when your home power consumption exceeds a defined threshold.

Monitoring individual appliances

So far we've focused on monitoring energy consumption across your whole household, but when it comes to reducing your bill you need to identify which particular appliances are wasting energy, and focus on those.

The most straightforward way to do this is with a basic power meter, available online for less than £15.

Just hook it up to a mains socket and plug your appliance into the meter: the digital display will then indicate the device's power usage in watts.

Such devices don't typically record or analyse the data – they only give a live snapshot of energy usage. And they can't put the figure in the context of whole household consumption. That demands a smarter system. Current Cost sells individual appliance monitors (IAMs) that monitor individual devices and transmit their readings to a whole-house monitor. Up to nine IAMs can be used within one household, but at £15 each (or £30 for a pack of three) they may take a while to pay for themselves.

Most devices in the home have pretty stable power demands anyway. Take two minutes to test your television with a basic power meter and you can assume that it will draw a similar amount of power whenever it's turned on, making an IAM unnecessary.

There are a few appliances that can't be tested so simply. Washing machines draw different amounts of power at different points in their cycle, while

ELECTRICAL CHARGES

Your electricity bill normally details your energy consumption in kilowatt hours (sometimes referred to as units of electricity). If you check your own electricity meter, the number you'll see shows how many kilowatt hours have been consumed since the meter was installed.

The kilowatt hour may sound like a confusing unit, but it's easy enough to understand. Watts are a measurement of how quickly energy is being consumed: when running at maximum power, a heater rated at 1,000W gobbles up energy ten times as quickly as a light bulb rated at 100W.

A kilowatt hour simply refers to the amount of energy consumed when a 1,000W device runs for one hour. You could expend it by running a kilowatt heater for an hour, or by running two such heaters for half an hour – the total energy used is the same. Turn off everything but a single 100W light bulb and it will take you ten hours to rack up a kilowatt hour.

The actual price of a kilowatt hour varies by region and between different electrical suppliers. Some suppliers charge a certain rate for a certain number of kilowatt hours, then switch to a discounted rate for additional usage. Others charge differently for electricity consumed during the day and at night. On average, in the UK you're likely to be paying between 10p and 20p per kilowatt hour.

If you're looking to reduce your electricity bills, it's well worth investigating whether you can switch to a more cost-effective tariff or a different electricity supplier. This can produce much greater savings than simply reducing your energy consumption, and it won't affect your lifestyle at all.

electric ovens and freezers behave differently according to their contents. Appliances made in the past few years should have a standard EU energy label giving a guideline consumption figure in kWh per cycle, along with a comparative grade from A++ to G.

PC power consumption

Sadly, there's no equivalent system of labelling for computing devices – and these can fluctuate just as much as home appliances. As laptop users know, if you turn down the brightness of the screen and reduce the processor speed, you can use your computer for longer on the same battery charge.

The same principle applies when your laptop is plugged into the mains. A machine sitting idle at the Windows desktop might be rated at 15W, but that can easily double or triple when the system's running flat out.

Admittedly, the total is still small. Battery life is a huge concern for the manufacturers of mobile devices, so laptops are designed to be as energy efficient as possible, no matter how hard they're working.

Yet all the small consumers of energy in your household probably add up to a significant proportion of your electricity consumption. If you ignore them, you're missing an opportunity to make significant cumulative savings.

Desktops and devices

Where laptop PCs strive for low energy consumption, desktop PCs enjoy a theoretically limitless supply of power, which they indulge in fully loaded CPUs, uncompromising graphics hardware and high-speed hard disks.

By using the Windows Power Saver plan, you can cut idle power consumption in half

Like laptops, however, desktop computers draw their maximum power only when they're driven to the maximum. When they're merely ticking over, their demands are comparatively low. In our last Labs roundup of desktop systems, we saw several that hit more than 400W in our most demanding tests, but when idle their power ratings typically hovered around 70W.

It's important to understand that if a desktop power supply is rated at 650W, for example, that doesn't mean it provides that much power all the time. The rating is a maximum figure, and it's common to see desktop systems supplied with power supplies rated far in excess of the amount of power actually required. Power efficiency drops off as the supply approaches its maximum rating, so using a highly rated supply for a modest load actually saves energy.

Since your PC draws wildly different amounts of power under different circumstances, you should measure its power consumption under each of those circumstances – while gaming, web browsing and so forth.

Don't forget to include the monitor, too: a small, low-power screen may be rated at only around 15W, but a sumptuous 27in model might demand more than ten times as much power.

While you're at it, test any games consoles as well. The original Sony PlayStation 3 consumes nearly 200W all the time it's powered on, so if you keep absent-mindedly leaving it on, it could be a significant contributor to your household bills.

Cutting your consumption

Once you've identified where your power is going, it's time to make your cuts. The simplest approach is just to keep all your appliances and devices switched off whenever possible – paying particular attention to the high-power ones.

This isn't always convenient, though, nor is it entirely necessary: many devices can manage their own power. For example, you may find the Windows

ELECTRICAL SIGNATURES

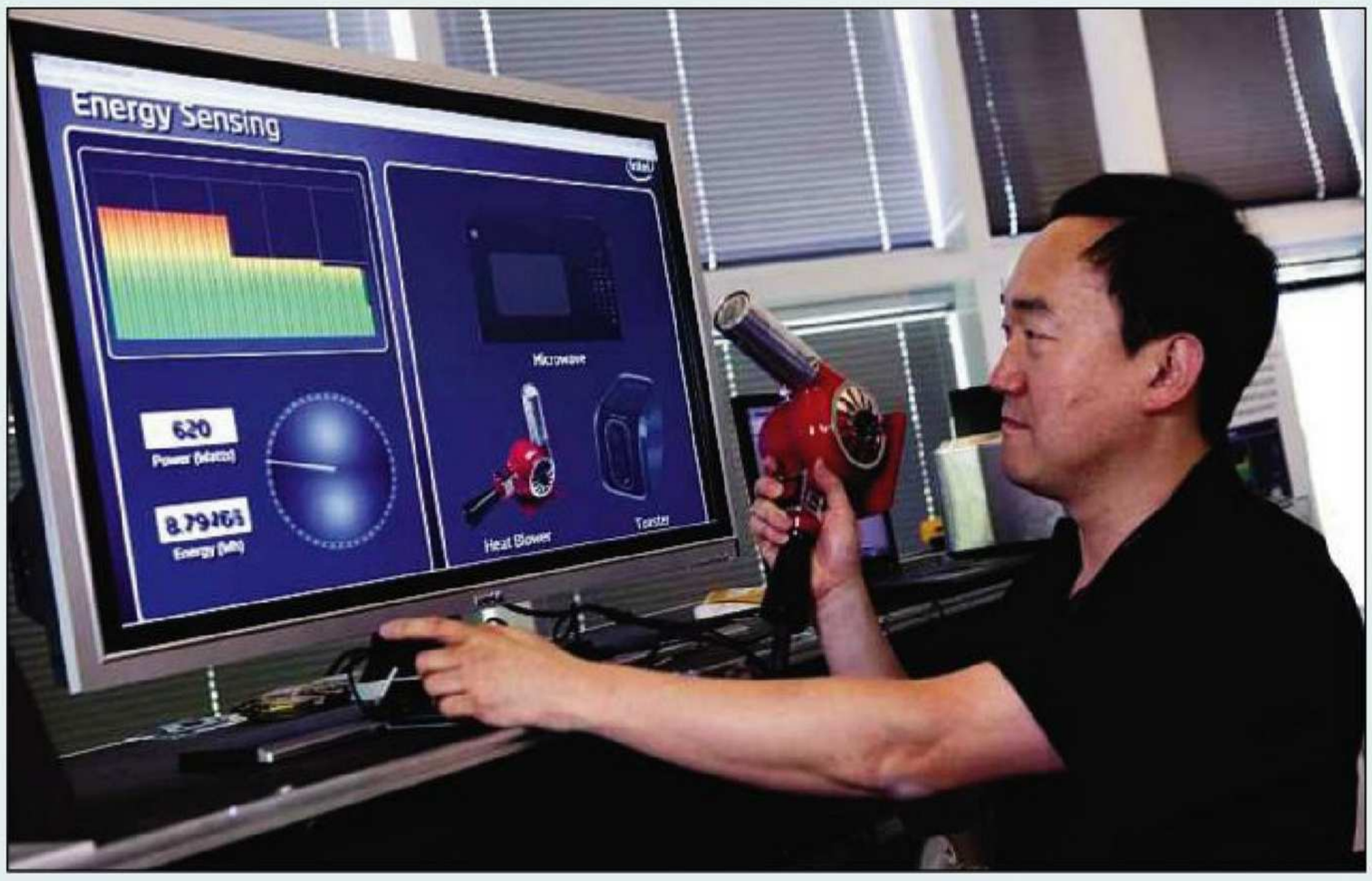
There are two approaches to measuring your energy usage. You can measure consumption for the whole house, or you can track individual appliances. The ideal would be to do both, so you could break down your overall electricity bill to its lowest terms and see exactly where your money is going. But it isn't practical to equip every appliance in your home with its own sensor.

Enter Intel, with an innovative research project unveiled at its 2010 Research Day in Santa Clara. Intel's Simple Energy Sensing monitor works on the same basic principle as a regular whole-house monitor: it connects to the main electricity cable and measures the flow.

However, the Simple Energy Sensing box watches the signal far more minutely than current domestic monitors. It's so precise it can register the tiny sequence of electrical spikes that ramps up whenever a particular appliance is turned on, and recognise the distinctive drop-off as it powers down. Intel calls this an electrical signature, and by learning signatures for all your different electrical devices, the Simple Energy Sensing device can track when they're turned on or off without having to be directly connected to them. At a stroke, you have a comprehensive power report for every appliance in your home.

Despite its name, the system isn't as simple as a regular monitor – it needs much more advanced hardware, so if it ever makes it into the shops it's likely to be a lot more expensive.

But we live in a world where energy is increasingly precious, while computing power becomes ever cheaper. Don't be surprised if you find a system like Intel's in your next home, or perhaps the one after that.



An Intel engineer demonstrates a prototype energy sensor that identifies appliances by their electrical signatures.

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WALKTHROUGH Getting started with Google PowerMeter

1

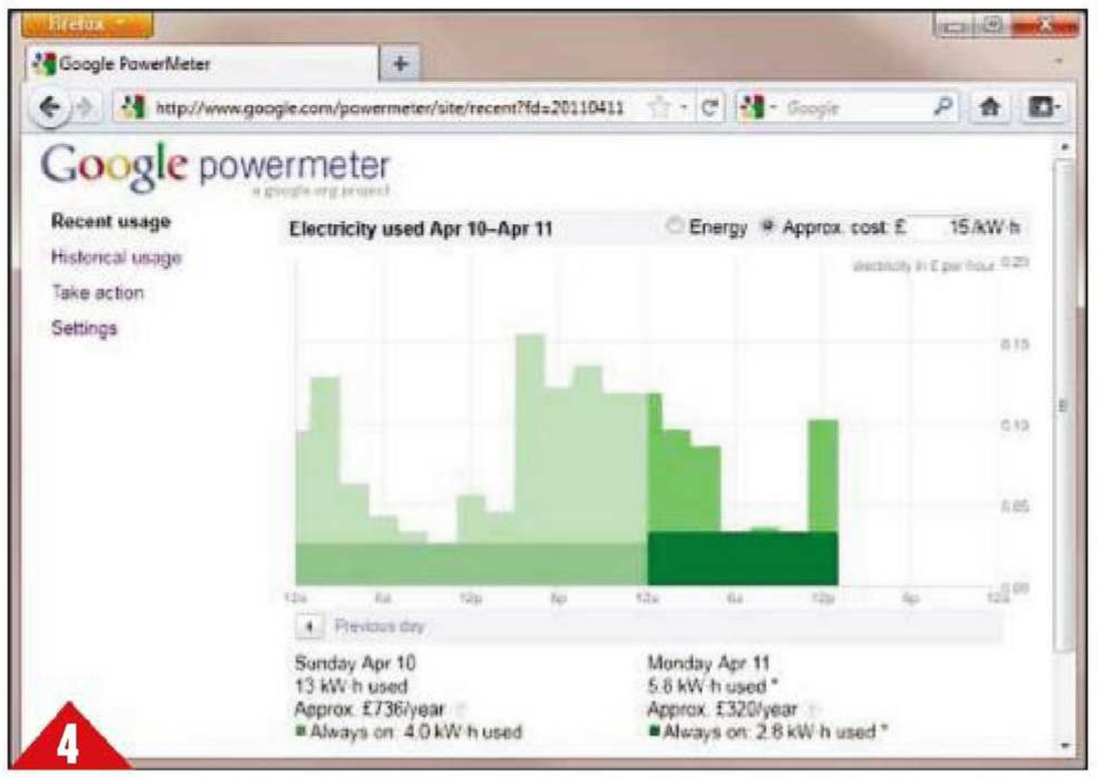
The first thing to do is set up your monitor. In this walkthrough we're using a Current Cost Envi monitor, but AlertMe monitors work in a similar way. Attach the clamp to your meter or fuse box, and place the main monitor unit in a convenient place. You'll need to connect your monitor to a PC via a cable in order to transfer your usage data to Google, so don't put it anywhere too inaccessible.

2

Download the PowerMeter connector software from the Current Cost website to your PC. Once installed, the software will prompt you to connect to Google and register for a PowerMeter account. Google will then give you an authorisation code, which you must enter into the software to allow it to connect to your account. Then specify a name and save location for the database file containing your usage data.

3

The software will connect to your monitor and display a real-time readout showing how much power your household is consuming at that moment, along with a temperature display and other details. While the connector software is running, your statistics will be uploaded to Google PowerMeter every ten minutes. You can also upload historical data, so you don't need to keep it permanently attached to your PC.



4

Click on the PowerMeter link in the software and you'll be taken to Google's website, where you can see a graph of your recent power consumption, expressed in either watts or pounds. To use Google PowerMeter's advanced analysis features, you'll need to collect at least a week of usage data. You can also add a PowerMeter graph to your iGoogle homepage, so you can easily keep an eye on energy usage.

Power Saver power plan is perfectly satisfactory for your everyday use, and in our experience it can cut idle power consumption in half.

You can also customise the power settings that determine when the monitor is turned off and when the system goes to sleep – turning the default sleep time down from 30 minutes to 15 minutes could make a big difference over weeks and months.

If you have a network server, there may be a Wake-on-LAN option in the BIOS that would allow it to spend most of its time asleep and power up only when needed. Similar logic applies to a media-centre PC – Windows Media Center will wake up from sleep to record TV programmes, or whenever you press a button on the remote.

Another option is to invest in devices such as the IntelliPlug and IntelliPanel multi-socket mains adapters, manufactured by the British company OneClick (**www.oneclickpower.com**). These detect when your computer (plugged into the primary socket) is powered down and automatically cut the power to the other sockets, ensuring your printer, monitor and speakers aren't continuing to draw energy from the mains when not required.

Before buying into such eco-devices, though, consider the cost, both to yourself and the environment. At around £10, the IntelliPlug will have to save a fair bit of power before it pays for itself – and when you consider how much energy is expended in manufacturing and shipping such a device, you're hardly doing the planet a favour in buying one.

Similarly, if your current desktop or laptop has given up the ghost, it makes sense to move to a newer, more energy-efficient model – but it's no way to save money, or be kind to the environment.

Cutting your electricity usage is a laudable goal and can be financially worthwhile, but both the planet and your pocket will benefit most if you focus on making the most efficient use of the devices you already own.

The ins and outs of SSDs

DAVID FEARON EXPLAINS HOW SOLID-STATE DISKS WORK, AND HOW THEIR PERFORMANCE STACKS UP TO CONVENTIONAL DISKS

Pundits have been predicting the demise of the mechanical hard disk for years, but so far there's been no revolution. Slowly, though, the first truly credible rival to the conventional hard disk – the flash-based solid-state disk – is creeping up on the old guard.

What's the big idea?

Conventional hard disk drives store data by encoding it onto spinning metal disks, but solid-state disks store it in memory chips. That's an approach with plenty going for it. Spinning a weighty set of magnetic platters at high speed takes a fair bit of power, even on the advanced, low-friction fluid bearings modern hard disks use. An average 3.5in desktop hard disk might typically be rated to an idle power consumption of 8W.

An SSD, by comparison, merely needs to push some electrons around – and electrons weigh next to nothing, making SSDs enormously power-frugal. Intel's 510 series SSDs are rated for an idle power consumption of 100mW – that's 0.1W, or 80 times less power than many mechanical drives – and even when active they consume only 0.38W.

An even more interesting benefit is speed. When a mechanical disk wants to read a file, the read/write heads must be physically moved to the correct position. Then they need to wait for the platter to rotate to the correct point. Once that happens, the rate at which they can stream data off the platter is limited by the drive's rotational speed.

With an SSD, there are no limits imposed by the physical momentum of mechanical components. Electronic signals move at a significant fraction of the speed of light, so SSDs are capable of finding data almost instantly, and transferring it at vastly greater transfer speeds than conventional disks. Not only do electrons move quickly, they do it silently: SSDs make no sound.

www.downmagaz.com

A final advantage is durability. Hard disks are physically fragile: they can be killed with a simple, relatively light mechanical shock. SSDs, with no delicate moving parts, are largely immune to being knocked or mishandled.

It isn't all good news

That's not to say an SSD can't ever fail or wear out. In fact, one of the fundaments of SSD engineering is a system known as wear levelling. It's the first of a few areas blighting the theoretical utopia of the SSD, and one reason why they're still some way off winning the mass-storage war.

Wear levelling is required because the flash memory cells used by SSDs don't last forever. You can read their contents as many times as you like without worrying, but each cell can have its contents changed on only a finite number of occasions before it wears out – typically, around 100,000 times.

For a USB flash drive or SD card, this limited lifetime isn't a problem, because these devices simply aren't used that much. But if flash technology is used to replace a PC hard disk, the situation changes. Even a PC sitting idle tends to access the hard disk a great deal. The Windows swap file can be written to thousands of times in a session. Things quickly approach the point at which flash life can have an impact on reliability.

Wear levelling tries to mitigate this by distributing data evenly throughout the SSD's cells, and avoiding concentrated rewriting of any particular area of the disk. If a certain physical area of an SSD's flash memory is being accessed and rewritten a great deal, the system will reallocate the data to a different area of the drive. But doing this while maintaining the structural integrity of the filing system, and continuing to service other read and write operations, has performance implications.

All solid-state memory isn't equal

Even when running at maximum efficiency, SSDs aren't as fast as you might think. There's a pervasive tendency to imagine that the flash memory chips in an SSD are as fast as the chips in your PC's main system RAM. Even Windows Vista and Windows 7 fall into this trap with their ReadyBoost feature. It purports to use a USB flash drive as a faster-than-hard-disk cache, to speed up disk operations. But it doesn't work in practice, because the flash memory in commercial USB flash drives is usually slower than accessing a regular hard disk.

The truth is that the NAND flash memory you'll find in a SSD works differently to the DRAM that makes up the system memory in your PC.

DRAM cells are very simple, and very fast. They consist of a single transistor and a single, small capacitor. The charge on the capacitor (or lack thereof) stores one binary digit: no charge indicates a binary 0; fully charged equals a binary 1. Since DRAM capacitors are so small, they hold only a small amount of energy, meaning they can be charged and drained quickly. This is the fundamental design aspect that gives DRAM its extreme speed.

A NAND flash memory cell isn't such a simple device. For reading sequential data, it can be nearly as fast as DRAM, but when it comes to writing, a much more complicated (and hence slower) electrical process is required. What's more, there's more than one type of write operation that the controller must choose from, depending on the usage history of the device. This brings us to the major limiting factor of SSD performance.

SSDs' Achilles heel

It would be great if the controller could directly address the individual bytes stored in the NAND flash cells. Unfortunately, engineering constraints mean the data must be divided into "pages" and "blocks". A single SSD page is the smallest chunk of data that can be accessed and written to; if you have a drive with a page size of 4KB (which is the norm for modern NTFS-formatted disks), even a 1KB file will take up 4KB on the disk. A block is a large group of pages – there are 128 pages per block in a standard SSD architecture.

While it's straightforward to write a new 4KB page to disk, it isn't possible to delete or overwrite data with the same degree of precision. The physics of flash mean that in order to change the contents of a single page, you must erase its entire block, and then write back all the data you wish to keep. This means all block-level operations need to manipulate a fair chunk of data – half a megabyte, in fact.

The upshot is that overwriting only one byte of data on an SSD means reading and caching all half-million bytes in the relevant block of data, resetting

TRIMMING PROBLEMS DOWN TO SIZE

Thanks to write amplification, there's a big performance difference between writing to a fresh area of the solid-state drive and writing to one that already contains data. As a SSD drive fills up, you'd therefore expect the drive's average write performance to degrade. Eventually, when the whole of the disk has been written to at least once, performance should bottom out. Indeed, this is just what used to happen with the first generation of SSDs.

Happily, it's now possible to avoid this problem using the TRIM command. TRIM isn't a command you use yourself: it's invoked by the operating system whenever you delete a file. It tells the SSD that the unwanted data should be erased when the controller next has an idle moment. The drive can then work in the background to restore its pages and blocks to the best condition possible, without interfering with immediate performance.

TRIM is supported by all modern SSDs, and it's built into Windows 7 and Windows Server 2008 R2. Those still using Vista and XP need a third-party utility such as Intel's SSD Toolbox (available from http://downloadcenter.intel.com) to take advantage.

each cell in the block, modifying the block's data to reflect the new state, and writing the half-million bytes back into the block. Not only does this slow down performance due to the length of the process, it also greatly increases the overall wear of the drive. In our example, a write operation of one byte causes 511,999 unnecessary bytes to be erased and rewritten. This is known as write amplification.

Real-world performance

Despite these technical hurdles, new engineering techniques and systems such as TRIM (*see Trimming problems down to size, p153*) have brought SSD technology to the point where a SSD can now be a viable replacement for a mechanical drive. Indeed, in some cases it can be faster. Intel's 510 Series SSD, in its 120GB guise (web ID: 366028), gave sustained sequential read speeds of a scarcely believable 390MB/sec in our Labs tests. Even Kingston's "value" 128GB SSDNow 100V (web ID: 363043) achieved 239MB/sec – way beyond the 100-140MB/sec that most modern mechanical drives can manage.

But, thanks to the page-level and block-level limitations, SSDs still fall behind when it comes to non-sequential operations on small files. At least one whole 4KB page must be read into cache and then back out (or vice-versa) for the smallest read or write operation.

This means small, random-access operations often take far longer on an SSD than they do on a conventional spinning-platter drive. Our A-Listed mechanical drive, for instance, the Samsung Spinpoint F3 (*see p28*), can hit over 80MB/sec with random reads, whereas the 120GB Intel 510 drops to a paltry 20MB/sec. Unfortunately, such operations are the bread-and-butter of Windows operation: both the operating system itself and the applications running on it continually read and write small chunks of housekeeping, configuration and user data.

If you're considering using an SSD as your system drive in Windows, you should also bear in mind that hard disk speed is a fairly minor factor when it comes to real-world productivity. To be sure, the latest and greatest solid-state drive will enable programs and files to open more quickly, and your computer will feel smoother and more responsive. But every time we've pitted an SSD against a mechanical drive in our real-world benchmarks, we've seen no difference in results. Unless your work is heavily focused on loading and saving large files, an SSD won't make you more productive.

So do I really need one?

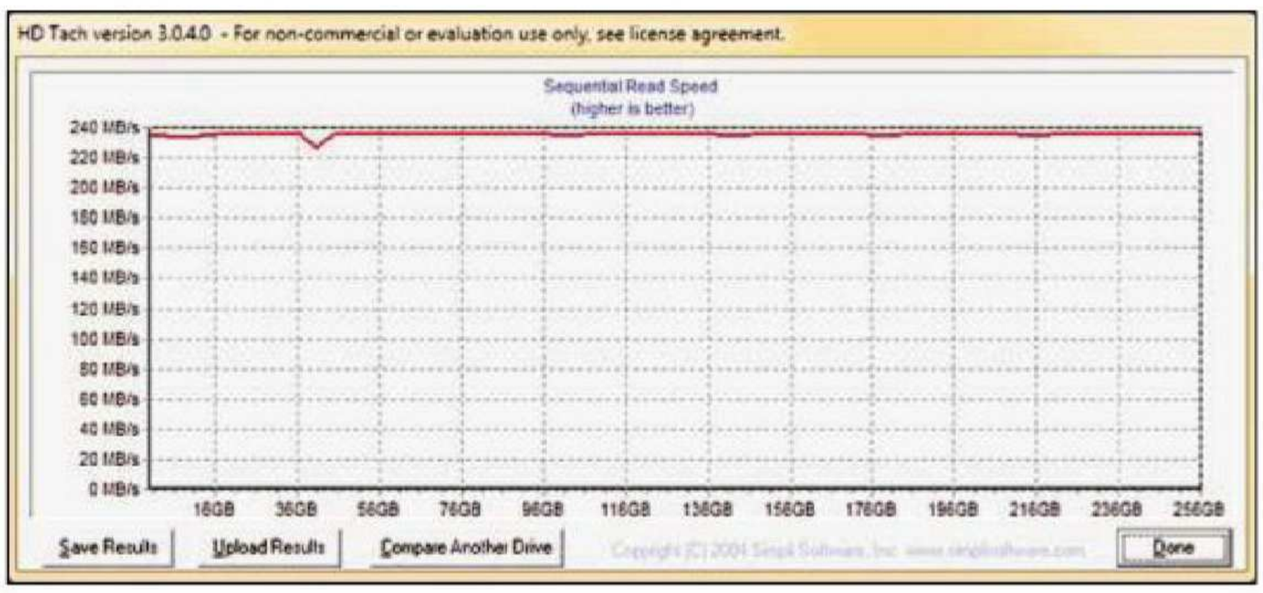
For regular desktop use, SSDs are still a long way from being a no-brainer. Not only is the performance benefit equivocal, they're much more expensive than conventional drives. The 120GB Intel 510 works out at £1.83 per gigabyte, making it around 40 times as expensive as the conventional Samsung Spinpoint F3, which costs only 4.5p per gigabyte.

Yet, given SSDs' low power usage, reduced weight, ruggedness and silent operation, they're becoming popular in laptops – particularly in luxury and business-class ultraportables.

In addition, when it comes to specialist desktop applications involving big files, SSDs can repay their cost in short order. HD video work with multiple streams can be transformed by the speed advantages of an SSD, and anyone editing multilayer Photoshop images all day will appreciate the performance boost every time they browse a folder full of huge images or hit Ctrl-S to save their work.

For general Windows performance, though, the argument is far from won. In a few years' time, SSDs will probably be a realistic alternative to a mechanical drive. For now, however, unless you need the particular qualities of a solid-state disk, we'd recommend that you stick with a conventional hard disk.

↑ A punishing cost per gigabyte remains a major disadvantage of SSDs



← The conventional Samsung Spinpoint F3 (top) can't match the consistent speed of the solid-state Kingston 100V (bottom).

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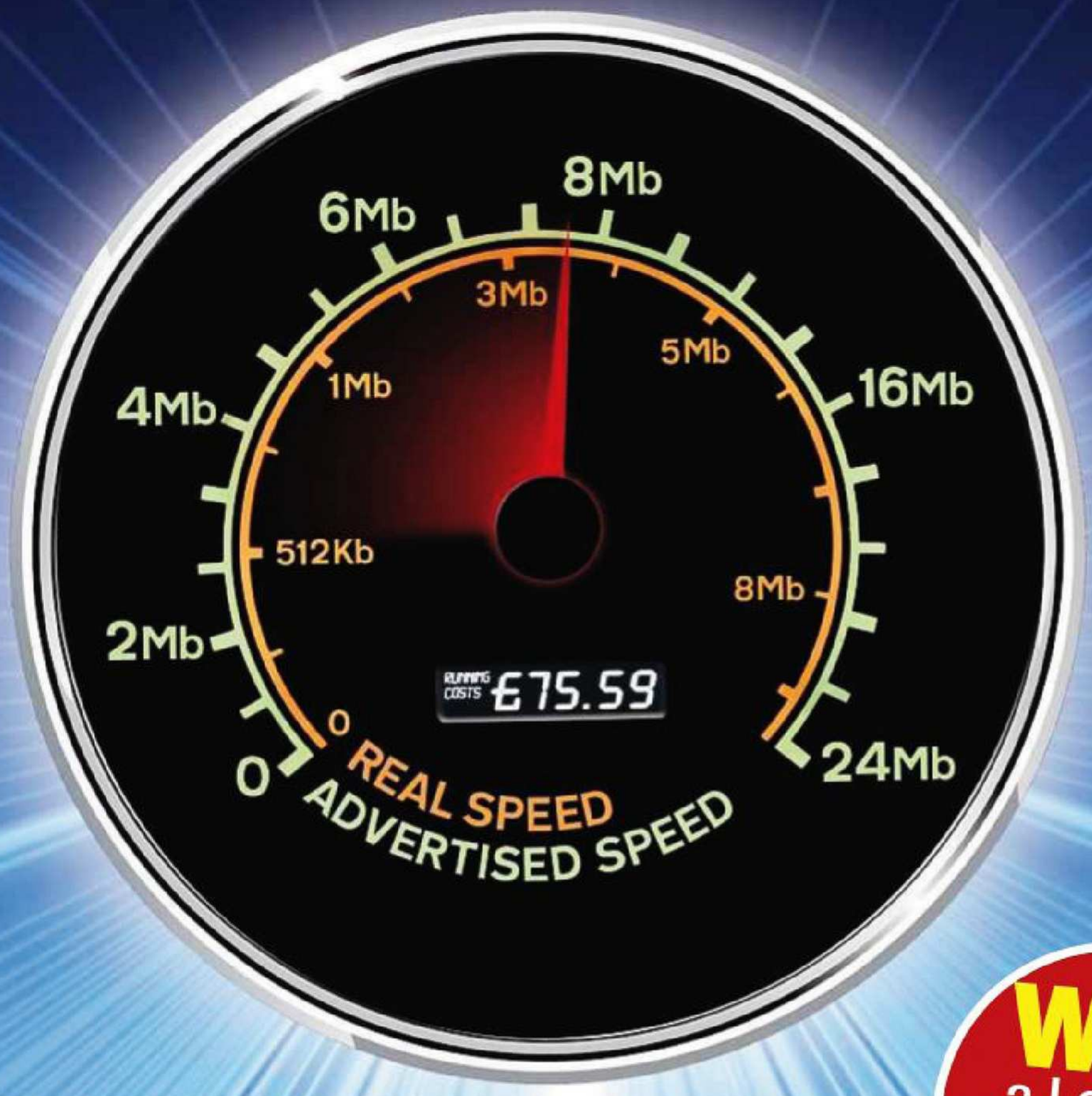

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Cover disc

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Reallusion CrazyTalk 6.2 SE

Transform your photographs into animations – and use the audio script to voice the characters you create

Snuko 2.4 Anti-Theft & Data Recovery

This anti-theft agent will lock your system down if it falls into the wrong hands – and its tracker will help you get it back

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ExifPro 1.0.12

Get on top of that jumble of pics on your hard drive with this easy-to-use photo management software

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COVER DISC JULY 2011

Installation

All the programs on this month's cover disc can be accessed from the *PC Pro* browser. If Autorun is disabled, insert the disc into your drive, use the Windows Run option and type d:\pcpro.exe where d: is the letter of your optical drive.

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Technical problems with programs

If you have difficulties, check the cover disc forum at **www.pcpro.co.uk**

ESSENTIALS

ESSENTIAL APPS
- Adobe Reader X 10*
- CDBurnerXP 4.3 **UPDATED**
- dBpoweramp Music Converter 14
- EASEUS Partition Master Professional Edition 6.0.1*
- East-Tec Eraser 2011 9.9
- FinePrint 6.20*
- Foxit Reader 4.3*
- iSpy 2 **UPDATED**
- John's Background Switcher 4.3*
- OpenOffice.org 3.3*
- OutBack Plus 7
- pdfFactory Professional 4.10
- Songbird 1.9*
- VirtualDub 1.9*
- WinRAR 4

ESSENTIAL BUSINESS
- AB & BA Invoicing 10.3* **UPDATED**
- ABBYY FineReader 10 Professional Edition*
- ABBYY Lingvo x3*
- ABBYY PDF Transformer 3*
- Accounts & Budget 6.0.1*
- Alarm++ 8.0.7*
- EssentialPIM 4.02*
- Grisbi 0.6*
- SmartDraw VP* **UPDATED**
- Xobni for Outlook 2* **UPDATED**
- Zoot 5.3*

ESSENTIAL DESKTOP
- DesktopOK 2.37 Free **UPDATED**
- HashTab 4*
- KeePass Password Safe 2.14
- Link Shell Extension 3.6 **UPDATED**
- Network Activity Indicator 1.6*
- ObjectDock 2*
- TreeSize Professional 5.4
- Vista Start Menu 3.86 **UPDATED**
- WinCDEmu 3.4
- WindowBlinds 7.2*

ESSENTIAL GRAPHICS
- GeoSetter 3.4 **NEW**
- GIMP 2.6*
- HDRsoft Photomatix Pro 4.0.2
- HyperSnap 6.90 **UPDATED**
- IrfanView 4.28
- jAlbum 9.1*
- PanoramaStudio 2.1 Pro
- RAWTherapee 2.4
- SnagIt 10*
- XnView 1.97*

ESSENTIAL INTERNET
- Chromium 11.0.686
- COMODO Internet Security Premium 5.3* **UPDATED**
- Maxthon 3.21 **UPDATED**
- Mozilla Firefox 4 **UPDATED**
- NetWorx 5.1
- Simple Port Forwarding 3.1 **UPDATED**
- WinSCP 4.3
- WirelessNetView 1.36
- Wireshark 1.4* **UPDATED**

ESSENTIAL SYSTEM
- AVG Anti-Virus Free 2011*
- CCleaner 3.04*
- CleanMyPC - Registry Cleaner 4.26
- Core Temp 0.99*
- CrystalDiskInfo 3.10
- Disk Pulse 2.7 **UPDATED**
- ImgBurn 2.5
- IsoBuster 2.8
- Malwarebytes' Anti-Malware 1.50*
- PC Pitstop Exterminate 2*
- PC Pitstop Optimize 3*
- Recuva 1.39*
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Trend Micro Titanium Internet Security 2011

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DESCRIPTION
Internet security

REQUIRES
Windows 7/Vista SP1/XP SP2

INTERNET
www.trendmicro.co.uk

INFORMATION
Six-month subscription; requires email registration

Trend Micro Titanium Internet Security is our A List favourite security suite. With excellent protection against malicious software, frequent updates and instant online analysis using Trend Micro's Smart Protection Network, it's a system you can trust to keep you safe.

It's also easy to use. While other suites are festooned with buttons and menus, Trend Micro keeps it simple, with clear information and controls.

Trend Micro's Titanium suite includes a spam filter and email scanner, so you're safe from unwanted messages. Innovative data-theft protection tools prevent sensitive information such as banking details from being sent anywhere online without your say-so.

The software also protects your children when they're browsing the internet. The parental control panel allows you to discreetly monitor their web usage, block access to inappropriate sites and restrict web access hours.

In our Labs, Trend Micro achieved a 100% score in malware detection and removal tests.

PC Pro readers can use this great security suite for six months without paying a penny. To activate your free subscription, follow the installation instructions on the cover disc.

Reallusion CrazyTalk 6.2 SE

BRING PICTURES TO LIFE WITH THIS ANIMATION APP

DESCRIPTION
Real-time animation

REQUIRES
Windows 7/Vista/XP

INTERNET
www.reallusion.com

INFORMATION
Special edition; requires online registration

Reallusion CrazyTalk 6.2 SE turns any photograph or picture into a virtual animated character, which you can use in presentations or as a standalone animation. It's easy to use too – just upload an image, or choose from one of the pre-loaded templates. You can then tweak separate points on the face to give your character a range of expressions, or apply preset moods.

It's simple to get your character in sync with audio too. After loading an audio script into CrazyTalk, you can easily program your character's facial movements and expressions to match the audio.

And that's not all – there's a huge range of options for customisation included in the software. Once you've created your character you can apply background colours, or mask any areas you don't want to animate. When you've finished creating your animation, you can save the final product in a variety of formats including AVI and WMV, so it's easy to distribute your animation or integrate it into a larger production.

Transform your pics into animated characters – and make them talk too.

To register for free, visit **www.reallusion.com** and enjoy all the great features of Reallusion CrazyTalk 6.2 SE.

Snuko 2.4 Anti-Theft & Data Recovery

SAFEGUARD YOUR DATA WITH THIS ANTI-THEFT AGENT

DESCRIPTION
Anti-theft software

REQUIRES
Windows 7/Vista/XP, Java

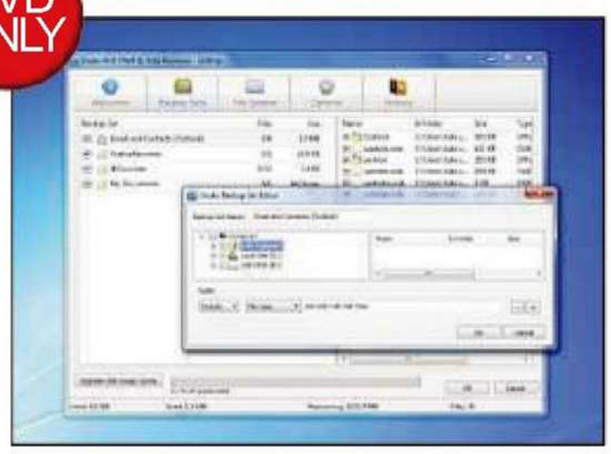
INTERNET
www.snuko.com

INFORMATION
90-day licence; requires online registration

It's a sad fact that laptops are stolen every day. What's more, many computers contain sensitive data, such as banking information, which you don't want to share. If the worst should happen, Snuko Anti-Theft & Data Recovery helps to keep your personal files safe, and to track down and recover your property.

Snuko's anti-theft agent sits silently on your PC, periodically checking in with the Snuko server to verify that the system hasn't been reported as stolen. If it has, it generates geolocation and detailed IP log-tracking reports, and can even take discreet pictures of unauthorised users if the device has a webcam. The software then locks down the device, while encrypting and backing up your most important files.

Snuko acts as an online backup solution too, so you can securely store your most important information on remote servers. You can restore this data to another computer at any time. This version includes 1GB of online backup.



This security software encrypts personal data remotely, and can track down a stolen laptop.

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SPRING CLEAN YOUR PC WITH THIS SMART SOFTWARE

If your PC isn't running smoothly, it can be difficult to find the cause. TuneUp Utilities 2010 makes it easy to identify and rectify problems, making sure your PC is running at its optimum performance for work and gaming.

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There's also a Turbo Mode feature that disables non-essential background programs and processes. This leaves your PC free from interference so applications can run unhindered. A Live Optimisation mode monitors background processes and automatically gives the most important processes top priority.

DVD ONLY

The straightforward interface enables you to correct performance issues with minimum fuss.

If you find TuneUp Utilities 2010 useful but want more features, our special offer will allow you to upgrade to TuneUp Utilities 2011 for only £17.99 inc VAT (RRP £29.99). New additions include the ability to restore deleted data and modify more than 400 Windows settings.

DESCRIPTION
System optimisation

REQUIRES
Windows 7/Vista/XP SP2

INTERNET
www.tuneup-software.co.uk

INFORMATION
Full product; requires online registration before 31 December 2011

Artensoft Photo Mosaic Wizard 1.3

TRANSFORM YOUR PHOTOS WITH THIS MOSAIC CREATOR

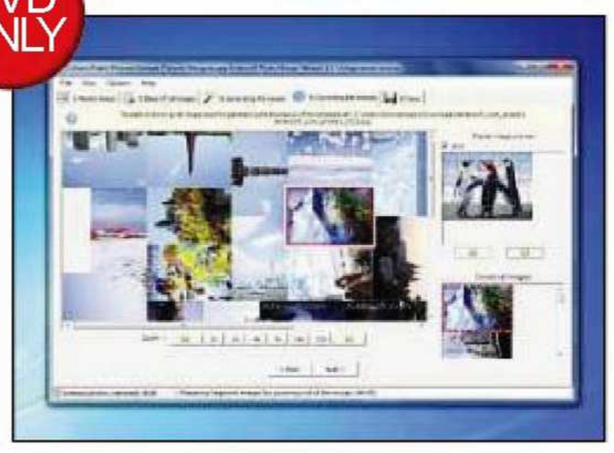
Artensoft Photo Mosaic Wizard is a simple tool that turns images into optical illusions. The results look professional, yet it's quick and easy to use.

To make a mosaic, select the image you want to transform, then select a folder of images to be used as the individual cells of the final picture. The process requires 1,500 images – if you haven't got enough photos in your collection, you can access an extensive downloadable image archive.

First the software gets to work dividing your original image into individual cells. It then colour-matches and orders the constituent images to give you the most impressive effect. You can tweak the mosaic by changing cells to improve appearance, or to add a more personal touch. Striking photo effects can be created with minimum fuss.

Visit **www.artensoft.com/purchase.php** and enter the coupon code ARTENSOFT30DCUK before the end of November to receive a 30% discount on the latest version of Photo Mosaic Wizard, Photo Collage Maker or Photo Editor. Alternatively, you can click on the 45% discount offer banner to purchase all three products at a discounted price of only £62.26 inc VAT, rather than the RRP of £88.95.

DVD ONLY



Create stunning visual effects and striking optical illusions at the touch of a button.

DESCRIPTION
Photo editing

REQUIRES
Windows 7/Vista/XP/2000 with .NET Framework 2.0

INTERNET
www.artensoft.com

INFORMATION
Full product originally sold for £45 inc VAT; requires online registration

ExifPro 1.0.12

THE IDEAL TOOL FOR MANAGING YOUR PHOTOGRAPHS

Photographs are a great way to document memories, but a library can quickly get out of control, leaving you with an ever-growing jumble of files. ExifPro lets you view and edit your photos while keeping them in order.

You can organise pictures simply by adding tags or descriptions, so you can easily find the images you're looking for. The software can also read the EXIF data embedded in photographs, describing the parameters used by the digital camera when the photo was taken – so, for example, you can find pictures taken with a certain exposure setting, or with a fast shutter speed.

How you view your photos is up to you. The photo viewer allows you to browse through thumbnails, previews or image details. Once you've selected your image, it's easy to perform a wide array of customisations. The viewer window lets you zoom and pan around the image, as well as correcting the image's colour and aspect.

You can view several images simultaneously in up to four panes, making it easy to compare images side by side. You can even create slideshows and HTML albums.

ExifPro is a great tool to manage, edit and view all your photos, and it's free on this month's cover disc. Simply visit **www.exifpro.com** and register online to access all these great features.

DVD ONLY

Take control of your photographs – organise and edit your collection using this free software.

DESCRIPTION
Photo management

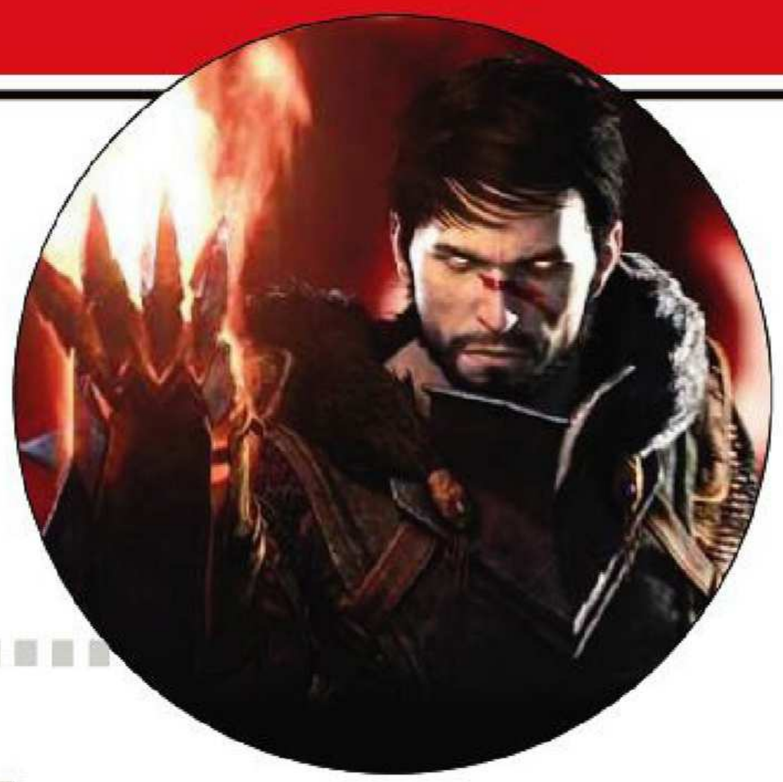
REQUIRES
Windows 7/Vista/XP/2000

INTERNET
www.exifpro.com

INFORMATION
Full product originally sold for £12.99 inc VAT; requires online registration

Games

THE LATEST TITLES PLAYED AND RATED



ROLE-PLAYING GAME

PRICE
£28 inc VAT

SUPPLIER
www.play.com

INTERNET
http://dragonage.bioware.com

Dragon Age 2

Dull, downsized and disappointing, this sequel pales in comparison to its huge predecessor

Every great RPG has its great world. The Elder Scrolls series plays out in the sprawling, diverse continent of Tamriel; Fallout has post-apocalyptic America; and the first Dragon Age game saw BioWare introduce the gritty fantasy realm of Ferelden.

It was a huge and memorable setting, reeling from a Darkspawn invasion and roiling with political clashes, ideologies and ramifications. Dragon Age 2 begins in the same land, as you flee your burning village for the relative safety of the capital city, Kirkwall.

Alas, where the first game allowed you to roam all over the land, that sense of scale doesn't roll over to the sequel. Kirkwall is said to be full to bursting, but this patently isn't the case: you'll fight in empty squares that should be packed with refugees, and even during those battles the handful of non-player characters scattered around each area either stand on the spot or cycle through the same basic animations without acknowledging your presence.

Compared with the vibrant worlds of The Elder Scrolls, Fallout and Fable, most of Kirkwall looks the same. Few buildings can be explored, and there's little to do aside from trade at market stalls and accept quests that follow familiar blueprints: kill entrenched enemies, explore new areas, talk to people.

You'll occasionally venture outside the city, but there's little exciting beyond its walls. Quests either lead you to sterile coastal areas or tedious mountain zones, and you'll tramp through the same areas – be prepared to see the same cave four or five times. BioWare has taken what was a huge and exciting world and – by reducing its scope, style and verve – made it into something of a letdown.

Some of the characters are poor too. In the first Dragon Age you were given the chance to design your character and create a story. Here, you have no choice but to control Hawke, the future Champion of Kirkwall: a big lug in the typical action hero mould, with a family too dull to drum up any sort of emotional investment.

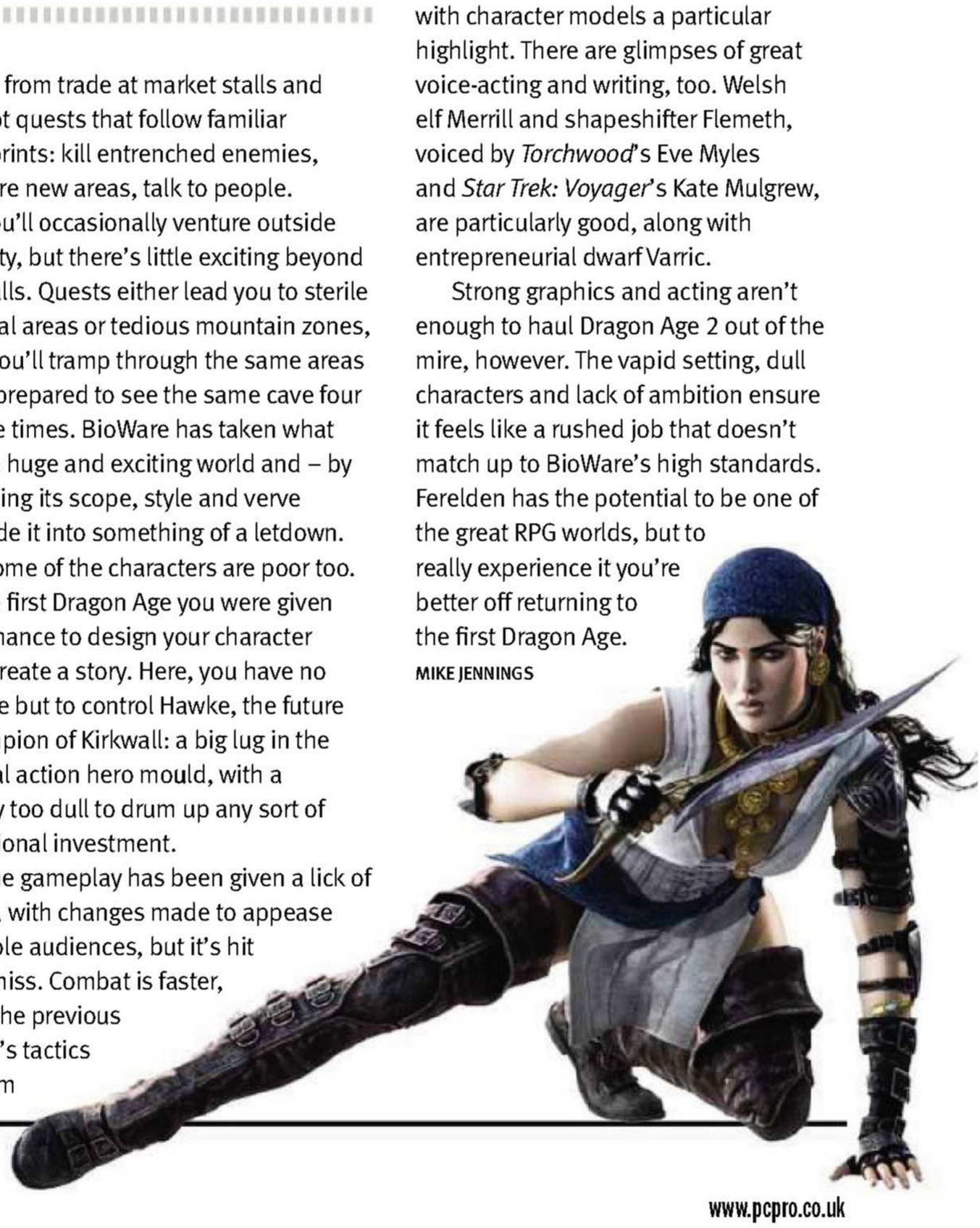
The gameplay has been given a lick of paint, with changes made to appease console audiences, but it's hit and miss. Combat is faster, with the previous game's tactics system taking a back seat to furious sword-waving and satisfying spell-casting, but battles suffer from the repetition that afflicts the game throughout. Every battle is appended with a predictable wave of enemies appearing from thin air, and you'll spend much of the game fighting the same foes.

The interface has been streamlined, with relevant items highlighted and given star ratings to indicate their effectiveness, but there's much less customisation available. Fewer items are available for your character to use, there's less loot to collect throughout the world, and little opportunity to drastically change your companions.

It's a shame, because in among the mediocrity, Dragon Age 2 occasionally sparkles. Repetition aside, the graphics are brighter and more detailed than in the first game, with character models a particular highlight. There are glimpses of great voice-acting and writing, too. Welsh elf Merrill and shapeshifter Flemeth, voiced by *Torchwood*'s Eve Myles and *Star Trek: Voyager*'s Kate Mulgrew, are particularly good, along with entrepreneurial dwarf Varric.

Strong graphics and acting aren't enough to haul Dragon Age 2 out of the mire, however. The vapid setting, dull characters and lack of ambition ensure it feels like a rushed job that doesn't match up to BioWare's high standards. Ferelden has the potential to be one of the great RPG worlds, but to really experience it you're better off returning to the first Dragon Age.

MIKE JENNINGS



REQUIREMENTS
1.8GHz Intel Core 2 Duo or equivalent • 1.5GB RAM • 7GB hard disk space • Nvidia GeForce 7900 GS/ATI Radeon HD 2600 Pro or equivalent • Windows 7/Vista SP1/XP SP2

OVERALL
★★★☆☆☆

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Assassin's Creed: Brotherhood

Deep, rich and rewarding, Brotherhood continues Assassin's Creed's renaissance with panache

Assassin's Creed first arrived in 2007 to much cooing over the visuals, but not much love for the empty gameplay. Lesson learnt, Ubisoft Montreal left the Crusades for Renaissance Italy in Assassin's Creed 2, with the likeable Ezio Auditore as leading man, helping the sequel to achieve 6.5 million sales worldwide upon its console release.

Now it hits the PC, and it's easy to see why we're still in Rome. It's one of the liveliest and most atmospheric game cities we've roamed: packed market districts, wide-open spaces and high-class residential neighbourhoods bustle with pedestrians, and the variety on offer keeps things fresh throughout.

The main plot this time revolves around the Borgia clan – a prominent Templar family headed by the Pope – and its control over some of Rome's choicest territories. Whether you follow it or do your own thing, there's plenty to keep you busy: destroy their strongholds to reduce their influence; hire your own band of apprentice assassins; or befriend Leonardo da Vinci to use gadgets such as parachutes, poison darts and crossbows.

As well as these main tasks, you can fight Roman corruption by buying and improving shops and facilities, delve into the puzzle-filled underground layers of the Followers of Romulus cult, or simply take your time to explore. It's in the latter that Assassin's Creed's party piece, its parkour movement, really excels.

Take the Colosseum, for example, which towers over much of the city. Point Ezio towards its iconic arches and he'll haul himself over ledges, clamber up its tricky facade and shimmy along windowsills until you're looking out over the entire city. As if that wasn't reward enough, it's key to the way you progress: you'll collect map markers and bonuses by reaching viewpoints.

While free-running around Rome sounds tricky, in practice it feels simple. Fluid and slick, you'll rarely come unstuck, although we'd definitely recommend using a control pad; mouse and keyboard controls are just too awkward for this type of game.

Combat can also be cumbersome. While Ezio regularly finds himself surrounded by Borgia troops, they'll often wait politely while you dispatch their colleagues, and you'll likely end up button-bashing. Still, this slight disappointment is offset by the satisfaction of deploying a squad of your own troops to silently assassinate a particularly difficult foe.

The city is the star, but it's joined by an able cast of supporting characters. Ezio himself is a charismatic protagonist, and the supporting cast is engaging throughout: the Borgia clan is as slimy as you'd expect, and Machiavelli, the current assassin leader, is an enigmatic choice.

That's not forgetting the modern-day cast, headed up by the real protagonist of Assassin's Creed, Desmond Miles – a descendant of Ezio who travels through his memories using a device called an Animus. While you'll spend most of your time in Italy, the modern segments serve to change the pace and break up the different chapters of the game.

The voice work is superb throughout, Ezio's animation is fluid and believable, and the city itself has the most marvellous attention to detail and lush lighting effects.

In fact, the combat is the only iffy part of this thrilling, absorbing and deftly told story. Brotherhood has taken five months to make the journey from consoles to PC, but it's been worth the wait – this is one of the best action games around. **MIKE JENNINGS**

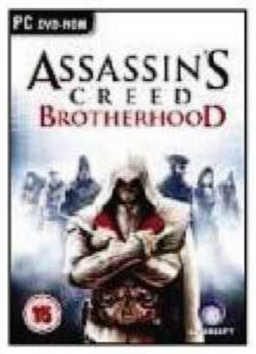
PC PRO RECOMMENDED

ACTION

PRICE
£24 inc VAT

SUPPLIER
www.zavvi.com

INTERNET
http://assassinscreed.uk.ubi.com



REQUIREMENTS
1.8GHz Intel Core 2 Duo or equivalent • 2GB RAM • 8GB hard disk space • Nvidia GeForce 7000 series/ATI Radeon HD 2000 series or equivalent • Windows 7/Vista SP1/XP SP2

OVERALL
★★★★★☆

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Edit photos and home videos, play all-action games, and explore HD on one of the most powerful Sony VAIOs around. The VAIO F Series includes a Full HD screen and a Blu-ray player for enjoying high-definition movies wherever you go. Fast-moving action is smooth thanks to the Motion Reality HD and Nvidia graphics, plus you can enjoy cinema-style surround sound with Dolby Home Theater 3. The VAIO F Series is also energy efficient, with a light sensor that adjusts screen brightness in lighter environments, and a Display Off button to save battery life when listening to music.

- We have one to give away, worth £900
- www.sony.co.uk/vaio

Nofen IcePipe Core i5-2500K Silent PC

Where PCs are concerned, processing power usually means noise. Nofen's CR-100A IcePipe processor coolers are capable of cooling CPUs with a TDP of up to 100W in absolute silence. Combined with a 128GB solid-state disk for lightning performance, Nofen's new technology offers the ideal PC experience – fanless, dust-free computing with no need to compromise on performance. Even the 400W power supply doesn't require any active cooling. This particular system comes with an Intel Core i5-2500k processor and 4GB of RAM.

- We have one to give away, worth £880
- www.quietpc.com/nofen

Samsung NX100 camera

The NX100 brings a splash of creativity to compact cameras. It's equipped with the world's first i-Function lens – a proactive lens that communicates with the camera body and delivers total image control, with fast manual settings to ensure quick image capture. The NX100 also has fast and precise autofocus to ensure you never miss a moment. This prize bundle features a range of innovative lenses and accessories including a compact zoom 20-50mm lens. Its lightweight, compact and modern design makes the NX100 extremely portable, allowing photographers to take it with them anywhere.

- We have one to give away, worth £500
- www.samsung.com/uk

Lexmark Genesis & Stinkyink bundle

The Lexmark Genesis is the most innovate all-in-one we've seen. The inkjet photo printer boasts Lexmark's innovative Flash Scan technology, delivering ultra-fast, full-page scans in three seconds. The space-saving, upright design is complemented by the glossy black casing and a 4.3in colour touchscreen display. The Genesis also includes 802.11n wireless printing, more than 60 SmartSolutions printer apps, and Full PictBridge and card reader support. As part of this prize, Stinkyink is also providing a multipack of Lexmark high-quality ink, Premium A4 paper and Premium photo-grade 6 x 4in paper.

- We have one bundle to give away, worth £500
- www.stinkyink.com

* All prices include VAT

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Arcam rCube iPod speaker system

The result of more than three years of research and development, the rCube features a unique acoustic structure driven by state-of-the-art electronics, all inside a stylish exterior. The built-in lithium ion battery gives it the power to deliver music no matter what the location. The rCube features an integral iPod dock and, using KLEER technology, a direct music streaming system from any iPod/iPad/iPhone, PC or Mac. In short, it offers serious sound quality in a unit that's smaller in size than a football.

- We have one to give away, worth £500
- www.arcam.co.uk

Zalman ZM-M215W 21.5in 3D monitor

Zalman's Full HD Trimon 2D/3D monitors will change the way you play games and watch movies. They use passive polarising glasses for a comfortable and convincing 3D effect. The glasses are lightweight and cheap to replace or buy extra pairs for your friends, and there are no batteries to go flat. Virtually all recent games can be run in 3D mode, and more and more films are being released in this format too.

- We have two to give away, worth £315 each
- www.quietpc.com/zalman

Corsair Gaming Audio Series Bundle

This bundle not only offers outstanding gaming performance, but detailed audio reproduction no matter what you're watching or listening to. The speakers and headsets provide thumping bass, sparkling highs, and everything in between, making them great for games, movies and music. The package includes the SP2500 and SP2200 2.1 speaker systems, and HS1A and HS1 analogue and USB headsets.

- We have one bundle to give away, worth £400
- www.corsair.com/audio.html

IDAPT i4 Universal Charger

The IDAPT i4 is a brilliantly simple wireless charger that uses interchangeable power tips to charge more than 4,000 devices directly, and many more through the USB port. It's different from most chargers, in that it will charge AA batteries, PSPs, iPads, Nintendos, satnavs and more, as well as almost every phone and MP3 player on the planet. What's more, the iDAPT makes highly efficient use of power, space and wall sockets.

- We have ten to give away, worth £40 each
- www.idaptweb.com/uk

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Closing date: 1 August 2011

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Letters

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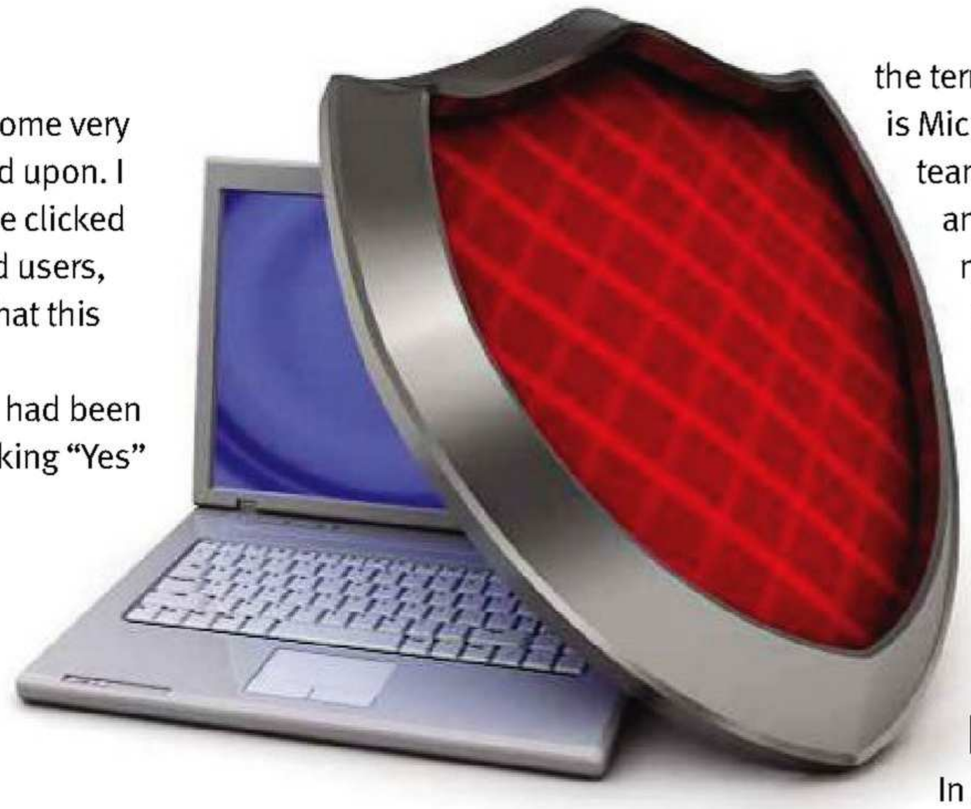
Sick of AV software

I want to warn readers about some very destructive code that I chanced upon. I know now that I shouldn't have clicked the "Yes" install button (stupid users, eh?), but I thought I wanted what this software was offering.

My XP Professional system had been extremely stable, but after clicking "Yes" it became a total basket case. Windows Explorer crashed regularly, Microsoft Office Premium 2000 software crashed; in fact, I was unable to produce anything. My email client stopped working, my ATI Catalyst graphics drivers became unstable, the WAB Notification crashed on exit, and Kaspersky Internet Security 2011 kept crashing. In the end, my PC died completely with an invalid boot.ini message.

I managed to isolate this highly destructive code (a virus writer would have glowed with pride at its power) – it was Kaspersky Internet Security 2011 (version 11.0.2.556). It appears that it's incompatible with everything on my system including, probably, the Acronis dual-boot software I use.

Kaspersky initially said that the problem was my backup software, Norton Ghost, which should be removed, but later went on to blame incompatibility with other "unsupported" software (like everything else that I use). All Kaspersky could offer me were polite platitudes from a telephone group support manager.



I've obviously now restored my system to its fully functioning state using Norton Ghost, and have dubbed this software the "anti antivirus software". I think that we as IT consumers tolerate much too much stuff that doesn't work. The list of fails is endless and grows alarmingly. **CHRISTOPHER WALLER**

Kaspersky responds: "We're very sorry that this customer has experienced problems. Of course, no software is flawless (although we take exception to the term 'destructive code' – the product is Microsoft certified). But our support team is known for its professionalism and is always willing to 'go the extra mile' to resolve any customer problem. Unfortunately, it's not always possible to give a 'snap' response that fixes everything; and sometimes we need to ask our customers to work with us to diagnose a problem, determine its cause and resolve the issue."

Keeping in contacts

In the beginning, it was simple. I had Outlook Express on a desktop, with a list of about 100 phone and email contacts. Then I moved to Pegasus Mail, and entered all contacts again by hand. A few years later, I was working on a laptop as well as the desktop, and was trying to keep the contacts lists synchronised across two copies of Pegasus.

Then came Google Mail. At least its contacts list was accessible from both systems without synchronisation problems, but for various reasons I

BLOG BITES

Follow the musings of *PC Pro* at www.pcpro.co.uk/blogs

Barry Collins was incandescent when the ads watchdog ruled an advert for the Brennan JB7 – "a CD player with a hard disk that stores up to 5,000 CDs" – incited "consumers to break the law, because it was illegal to copy music without permission from the copyright owner" (see www.pcpro.co.uk/links/201blogs). The ruling sparked a lively debate on the blogs.

> "I'd better tie myself to a tree and flog myself with stinging nettles. I have been "backing up" music for 30 years."
>
> **Miles**

> "It is the law on format-shifting that's the problem, not the Advertising Standards Authority."
>
> **Chris H**

> "Now I've read the bad publicity on this device, I want one! Congrats to the ASA for publicising this device."
>
> **Alastair**

> "The ASA could do with targeting misleading web adverts designed to look like a page's interface, so you click on them."
>
> **Richard**

> "There are 100s of devices that promote themselves as being able to store your music in a similar fashion."
>
> **Harry Boom**

> "Sky+ and video recorders are different – they're for time-shifting, which is allowed in the Copyright Designs and Patents Act 1988."
>
> **Pete**

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decided to move from Pegasus to Mozilla Thunderbird. Another contacts list started to grow, and with it more synchronisation problems.

Then a BlackBerry phone. It came with some software that offered to synchronise between Microsoft Outlook and the BlackBerry list, but had never heard of Mozilla.

Most recently, I've switched to an Android phone. It's very clever at synchronising with Google Mail, but fails to pick up my Outlook addresses, as the sync program says Outlook isn't my default mail client (it's right, but why should that matter?).

So it goes on. What's surely needed is an open-source contacts system, preferably with XML data that could be trusted as a master system, prepared to convert to BlackBerry, Android, Mozilla, Outlook, or whatever comes across next.

JOHN BRAGA

STAR LETTER ELECTRICITY SHOCK

In reference to your printer roundup (see issue 199, p80), I was amazed by the differences in power consumption on standby, which varied from 8W to 63W. What's the big deal? Well, it makes a huge difference to the total cost of ownership. Take a typical cost per unit for electricity (10.626p/kWH in my case), and note the resulting yearly cost of only having the printer on standby. At one end of the scale, the Brother from the test works out at less than £7.44 a year, while the Dell at £58.64 stands at the other – that's £51.20 more in terms of total cost of ownership before anything is even printed.

You can extend this to other popular consumer items. My old Sony flat-screen TV (one of those CRT TVs with a back) was rated for standby power at 1W. Compare that with a recently bought 26in shiny LCD from the same manufacturer, which works out at 45W – that's £45 a year more before I even turn it on.

As a ready reckoner, the cost of leaving something on all year round (like a DAB alarm clock, satellite TV box, maybe a printer, and so on) is near enough a pound per watt, per year. It pays to look at anything that's likely to be left running (or on standby), and build that into the total cost of ownership during its lifetime. Even a simple low-power, save-the-planet compact fluorescent 8W light bulb would work out at £7.44 if you left it on all year! CHRIS HOBSON

If you have a good story, an amusing anecdote or a tale of woe, contact us and you could win our Star Letter prize, sponsored by Brother. This month's star letter wins a Brother MFC-J6510DW printer, worth £250.

Visit www.brother.uk.com

brother

Benchmark bitterness

You spoke previously about how you were going to make your benchmarks more relevant to the tasks we do, but there's still one important thing missing.

Where is the reference to the Windows Experience Index scores for each computer you test? While this score itself isn't an accurate or realistic benchmark to work from, it's at least something that people can compare to their own PCs. Now that people are less likely to buy a new PC because they need extra performance, including this information would help readers to see how new hardware compares to their own kit, and that's what I call "real world". MIKE HALSEY

Technical editor Darien Graham-Smith responds: The trouble with the Windows Experience Index is that it tells you very little about how a computer will perform in actual use. The components in your PC contribute in different ways to different workloads, and since plenty of current hardware already achieves the maximum score of 7.9, there's no headroom to compare more powerful systems.

For those reasons, we prefer to use our own benchmarks, which give a direct indication of the performance you'll actually see in various applications. It's true that you can't run them at home, but last month's CPU megatest should give a rough idea of how your PC compares to the latest machines under review. If you still want to compare WEI scores across different systems, there's a website for doing just that at **www.weishare.net** – although since the fastest system in the database is currently an Intel Atom, I'd suggest you take the uploaded scores with a pinch of salt.

Bargain broadband backup

Recently, my Virgin Media cable service went down – someone had tripped over a cable somewhere, cutting off a swathe of south London – but I had planned for this eventuality and wanted to share the solution.

My house and home office are hard-wired with CAT-5 with a couple of Wi-Fi points. Dumb switches feed each floor. When the Virgin modem went belly-up, I isolated the old Netgear RP114 router and went to the attic to find 3G. Seconds later, I'd connected my Netgear 3G Broadband router and, courtesy of Vodafone, all our PC systems were back online, albeit with about a third of the bandwidth – still more than sufficient for basic browsing and email.

The trick here is to realise that dumb switches can be run backwards. For obvious reasons it's unwise to have two DHCP servers on the same subnet, hence cutting off the old RP114.

Once the PCs had rebooted, a perfectly acceptable standby was operating that even handled the Vodafone 3G Sure Signal box and our BlackBerrys. IAN MURRAY

Phone of contention

At school, a teacher announced that she could now search students' mobile phones. My first reaction was total disbelief; how could teachers have so much power?

There was instant uproar, as people started to protest: "You're not going through my phone!" and "You don't want to look at a boy's phone, they have all sorts of things on there!" The fuss calmed down, but listening to your podcast (149), I realised she wasn't making it up. Teachers were actually going to get this new power. How the Government could approve such an action is beyond me. I know it could help reduce cyber-bullying, but most teachers aren't aware that a student is being bullied in any way other than verbally. HENRY O'KEEFFE

LOUD AND CLEAR

After reading your feature explaining what was stealing my Wi-Fi (see issue 200, p88), I downloaded inSSIDer 2 and discovered my router was sat on the same channel as several of my neighbours. I logged into the router manager and moved myself from channel 1 to channel 11, which I currently have to myself (shhh!). The difference has been remarkable, internet traffic is much faster – especially when my smartphone is connected. Until now, I thought that's just how it was.

MIKE DYER

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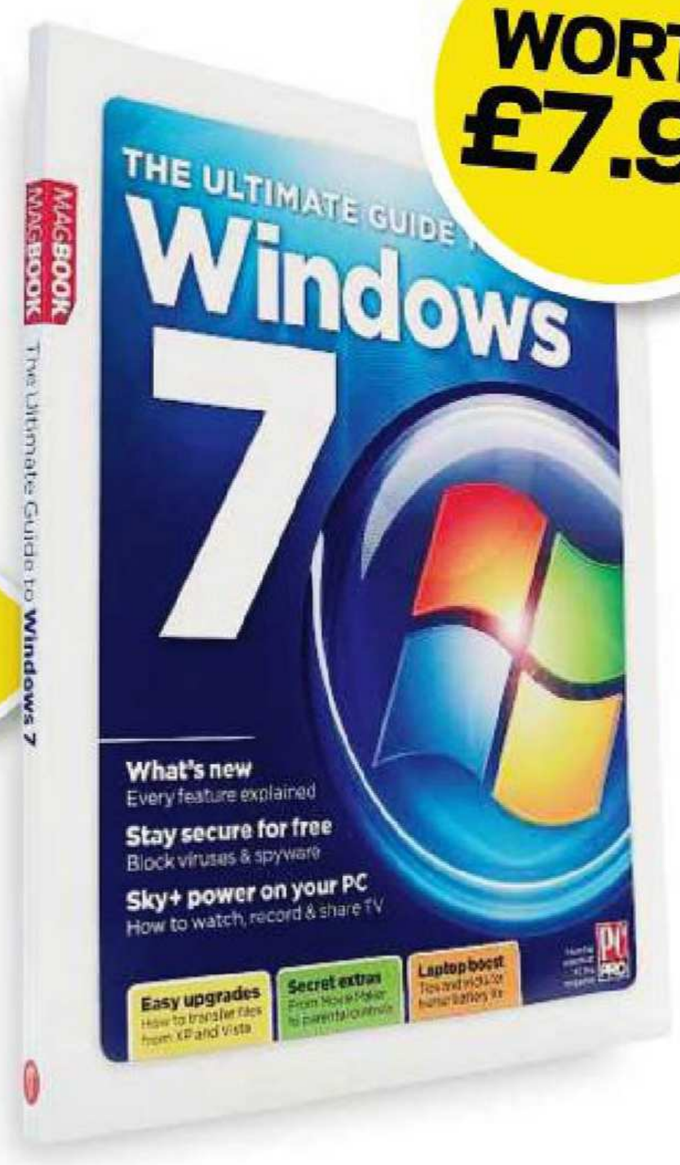

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PRODUCTION & DISTRIBUTION
Printed by BGP. Distributed by Seymour Distribution, 2 East Poultry Avenue, London EC1A 9PT. Tel: 020 7429 4000

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SUBSCRIPTIONS
Price: UK £49.99; Europe £70; Rest of World £90

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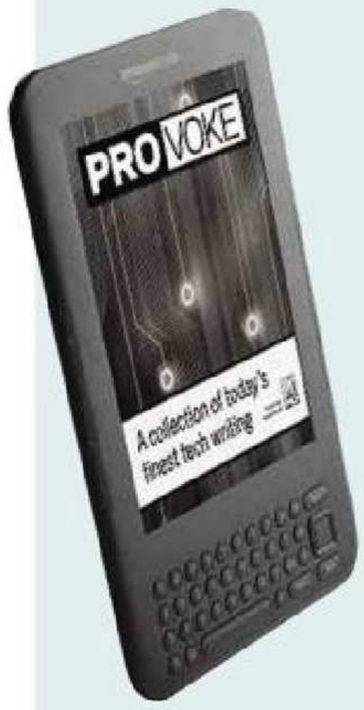
Next month

COMING SOON IN ISSUE 202

IN FEATURES

■ 100 technologies that changed the world

What are the innovations that have made a dramatic impact on the world of computing and beyond? In next month's magazine, we count down the 100 top game-changers, ranging from the ones you'll have heard of (lithium ion batteries) to ones you almost certainly haven't (Quadrature Amplitude Modulation).



■ How to publish a Kindle eBook

Want to share your novel, biography or textbook with an audience of millions of Amazon Kindle owners? Nik Rawlinson shows you how to format, publish and publicise your own eBook.

■ Smartphone CSI

It isn't only fingerprints and DNA samples police take from suspected criminals nowadays – more often than not, it's their smartphones too. Find out how smartphone forensics can help put a suspect in the clear, or confirm their guilt.

On sale in WHSmith and newsagents from 16 June

IN LABS

■ Netbooks

Intel and its Atom chips have dominated netbooks for years, but AMD Fusion is finally here to put up a fight. We gather the best netbooks from both camps, including some packing Nvidia graphics chips, to show you why the netbook craze won't be fading any time soon.

■ Superzoom cameras

Compact or DSLR? If you can't decide, why not get the best of both worlds? These superzoom cameras feature larger lenses and finer controls than compacts, plus incredibly long zooms. We round up ten models and pitch the best against a budget DSLR to find out which is best.

Please note that Labs and features are subject to change.

What's the future of radio: DAB or FM? Switch them both off, says **Jon Honeyball**

Making DAB ubiquitous enough for FM to be shut down will require a huge sum of money

So the argument about DAB and the future of FM radio has come to a head again. The Government wants to shut down FM because it's a terrible waste of bandwidth, but it's faced with the unfortunate reality that DAB is a disaster.

The country-wide coverage isn't as good as FM, and there are precious few DAB radios out there, especially in cars. The prospect of turning off FM and leaving car drivers listening to a broad hiss is the sort of nightmare that loses elections. The only thing that stops the average sales rep or trucker from rioting when stationary, stuck on the M25 or M6 yet again, are the soothing tones of Ken Bruce et al. Keeping said driver under control is a matter of national security.

However, the DAB brigade wants a large cheque to sort out the transmitter mess. This shouldn't happen, and here's why.

FM is actually very good. The arrival of RDS-EON allowed FM tuners to search for the strongest transmission of a given station, and it let them display digital content – such as the current song and artist. It was a beautiful, elegant overlay of a digital subcarrier on to an analogue radio transmission. And frankly, it was too good – all the functionality improvements that users should have got from DAB were delivered 20-something years ago on FM.

The reality is that DAB simply isn't good enough. No matter how much its supporters may pay well-known names to spout about its glories in Orwellian brainwashing adverts, the reality is that making DAB ubiquitous enough for FM to be shut down will require a huge sum of money. This is utter madness.

Here's what I'd do. Announce today that DAB is being put on notice, and that it will be terminated on 1 January 2020. On the same day, FM will be shut down too. The Government can't keep changing the FM deadline day, waffling on about "it will be turned off when there is a good enough alternative". This is political double-speak – it must stop.

So now we have a clear deadline: both DAB and FM to go by 2020. By then, there will be a digital radio satellite transmission system in place, similar to Sirius in the USA. It works great there, and is a far more sensible solution for car reception in the UK than DAB. If you draw a line in the sand, car vendors can start work on delivering a Sirius-like solution to existing cars, even if the back-end and charging infrastructure is yet to come.

Spending money installing a fixed-function digital transmission network in 2011 is lunacy, and a terrestrial transmission infrastructure to cope with moving cars is equally stupid. Beam it from orbit, and coverage is no longer an issue.

Any money that would have been poured into yet more useless DAB nonsense should be put into improving the architecture of IP delivery to the home. Internet streaming is the only way forward for "internet radio". Get high-quality, high-speed broadband into every home, and the whole streaming question simply goes away.

But what about granny with her tabletop Roberts radio, I hear you mutter? Well, the answer is simple. Surely by 2020, Roberts can engineer a simple Wi-Fi box that plugs into the IP feed and provides a connection to the internet radio box that she keeps by the tea cosy in the kitchen? Problem solved, and we aren't even half-way through 2011. Remember, the grannies in 2020 will be you and me.

There are, of course, several obstacles in the path of my elegant solution. First, there are too many entrenched, self-motivated interest groups. Second, the redistribution of funding as I describe it means power will move from one government department to another, and the Sir Humphreys won't be amused. Finally, it requires someone to actually make an informed and grown-up decision, and then to make it happen. Politicians are incapable of taking a 20-year view on anything. That's why we used to have BBC Engineering to make the decisions for them, before the bean-counters shut it down.

There's one other fly in the ointment. I don't listen to live radio any more, and nor, I suspect, do most of the early adopters among the *PC Pro* readership. We prefer to listen to our iPods, playing music and podcasts we've chosen to put on the device. We're doing the same with TV, in the shape of the iPlayer. Live transmission is relevant only for sports events and Royal Weddings. Everything else is streamed, cached and consumed on demand. And what the *PC Pro* reader is doing in 2011 will become mainstream behaviour by 2020 or 2030.

Now, which of our august political leaders is prepared to put their neck on the line and speak the truth on this matter?

Jon Honeyball has been a contributing editor to PC Pro since issue 1 – not long after he gave up fiddling with his crystal radio sets. Read his blog at www.pcpro.co.uk/blogs/jonhoneyball

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