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JIM
MARTIN



Windows 10 special

Microsoft's latest OS is packed full of new features

Will Windows 10 save Microsoft? In many ways it's the wrong question since - despite its unpopularity - Windows 8 wasn't the reason the company announced it would shed 18,000 jobs before 2015. (That was mainly to do with the acquisition of Nokia - see tinyurl.com/L26k2ng for more on that.)

Windows 10, though, still has a hugely important role to play for Microsoft. As I said last issue, it's predominantly about getting businesses on side and ensuring there's a viable upgrade path from Windows 7 and XP. But Windows 10 also needs to resonate with consumers who could otherwise jump ship to Apple's seemingly well-steered craft.

The Technical Preview arrived too late for us to give it proper coverage in the last issue, so we've devoted a good chunk of this issue to showing you its new features, explaining how to install it and comparing it to OS X Yosemite. Of course, it's crucial to remember that we're talking about a very early version of Windows 10 and a lot could change before it launches in summer (or possibly autumn) next year.

The good news is that Microsoft has already stated that it plans to make Windows 10 available to as many devices as possible, so it shouldn't need a particularly powerful PC. It should also be available on Windows RT devices, the owners of which are currently stuck with what is a pretty useless operating system. For the uninitiated, Windows RT was in essence Windows 8 but without the ability to run old Windows software. All you can install are apps from the Windows Store. But as anyone who's looked recently will tell you, there's still hardly anything worth having.

Now, ARM-based tablets such as the Surface RT will never be able to run traditional x86-based Windows software, but if Microsoft succeeds in having a single app store for smartphones, tablets, laptops, PCs and the Xbox, there's a better chance developers will jump on board.

As for the operating system itself, Windows 10 needs to be more like Yosemite, which instead of forcing a mobile-oriented interface on desktop computer users, offers useful tools and features so mobile and desk-bound devices work better together.

If Windows 10 seems too far off, then there's plenty more in this issue, including our roundup of the latest Chromebooks on page 76 and an introduction to Rainmeter on page 86. This great free tool allows you to customise your Windows desktop in ways you've probably never imagined. ☒

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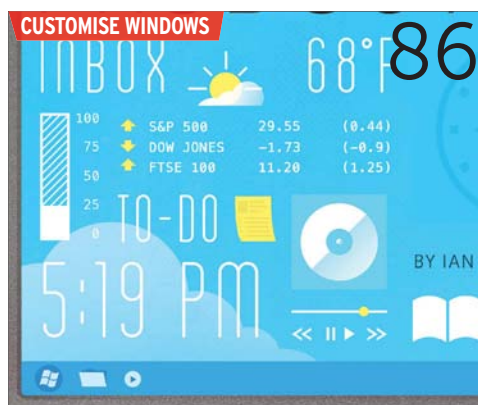
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PC shipments down slightly in third quarter, IDC says

Worldwide shipments fell 1.7 percent from a year ago, less than had been predicted

Worldwide PC shipments fell slightly in the third quarter in 2014, but the drop wasn't as big as IDC had originally projected, with expanded offerings of inexpensive laptops and a saturation of tablets in some areas helping to improve the numbers, the tech industry research firm said.

Hardware makers shipped 78.5 million desktops and laptops during the third quarter, a 1.7 percent drop from a year ago, but a 'sizable' improvement over IDC's earlier forecast of a 4.1 percent drop. Windows XP migrations, which had driven earlier PC sales have slowed, but an improved business climate in some parts of the world helped prop up the numbers, IDC said.

Sales growth in the US has offset declines in some other regions, IDC said. With 17.3 million PCs sold their in the third quarter, shipments were up by 4.3 percent from a year earlier, and up by 2.6 percent from the second quarter, IDC said. The year-over-year growth in the US lined up with IDC's earlier projections.

Shipments of Chromebooks and other entry-level PCs also helped keep the numbers higher than expected, IDC said. Chromebooks have driven the numbers upward in previous quarters as well.



The popularity of low-end systems, however, raises concern about the long-term viability of some hardware vendors to stay in the PC space, Jay Chou, senior research analyst at IDC's Worldwide PC Trackers, said in a news release.

Among PC makers, Lenovo led in worldwide shipments, increasing a slight lead over Hewlett-Packard from a year ago. In the third quarter of 2014, Lenovo shipped 15.7 million PCs, followed by HP with 14.7 million

PCs and Dell with 10.4 million PCs. Lenovo held a 20 percent worldwide market share in this year's third quarter, compared to a 17.7 percent share a year ago.

Acer Group and Apple occupied the numbers four and five spots during the past quarter. The five largest vendors all saw their market share grow year over year, with other vendors seeing a 17.9 percent decrease during that time frame.

Acer leads growth in PC shipments

Acer has posted the highest level of growth among top PC makers, recording double digit growth

The latest preliminary data from IDC for the third quarter of 2014 showed Acer has improved on its year-on-year worldwide PC shipment with growth at 11.8 percent.

This was in contrast to the overall industry decline of 1.4 percent.

Quarter-on-quarter, Acer saw a 12.6 percent rise, which also surpassed the industry average of 5.2 percent. In both YoY and quarter-on-quarter shipments, Acer was one of only two brands among the top 10 players, to accomplish double-digit growth, demonstrating the company's progress.

The third quarter preliminary data also showed that Acer has performed well in the worldwide Commercial PC market.

For Commercial Total PC shipments, Acer attained 18.2 percent growth year-on-year compared to the industry decline of 1.2 percent. Quarter-on-quarter, it achieved 16.1 percent growth.

Both rates represented the highest growth rates among the top 5 players.

Furthermore, in the Commercial Portable PC market, Acer saw 37 percent year-on-year growth compared to the industry average

of 0.2 percent; QoQ, Acer achieved 15.8 percent, exceeding the industry average of 9.4 percent. In both measurements, Acer demonstrated the fastest growth rates among the top 10 players.

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Nokia branding killed in place of 'Microsoft Lumia': Windows phone moves into new era



The Nokia brand has been ditched by Microsoft

It was in the pipeline and leaked beforehand but Microsoft has now officially killed the Nokia brand and replaced it with its own Windows Phone handsets. Going forward, the firm will instead use 'Microsoft Lumia'. All Windows Phone devices will have 'Microsoft' logos, but it will continue to launch entry-level feature phones with the Nokia logo such as the Nokia 130.

The Nokia brand has been visible on recent smartphone launches such as the Lumia 930 and Lumia 735, but Microsoft has not mentioned it in any press or marketing materials. Nokia's Windows Phone apps have been also rebranded to Lumia recently and the firm hasn't even been

referring to Windows Phone in advertising instead using just 'Windows'.

Nokia France's Facebook page has confirmed that the name will be changed to Microsoft Lumia. Microsoft says that other countries will follow the same rebranding steps.

We thought we were going to have to wait for new smartphones to learn how Microsoft would brand physical devices guessing it would use 'Lumia', 'Microsoft' or a combination of the two. "In the coming weeks and months, you'll start seeing even more brand experience come to life across different channels as we transition from Nokia Lumia to Microsoft Lumia," Microsoft



said in a blog post. "This work continues across our devices, packaging and retail, to name a few. It's all going as planned and we're excited that our integration in to Microsoft continues to be on track."

It's official: HP breaks itself in two

CEO Meg Whitman will head Hewlett-Packard Enterprise, while PC and printer business head Dion Weisler will run HP Inc



Hewlett-Packard has confirmed reports that it plans to break itself into two companies. One of the companies, comprising its enterprise hardware, software and services businesses, will be known as Hewlett-Packard Enterprise, the company announced Monday. The other, made up of its PC and printing businesses, will be called simply HP Inc, and will keep the HP logo.

Both of the new companies will be publicly traded, and HP shareholders will be given shares in both firms. HP expects to complete the break-up by the end of its 2015 fiscal year, which ends on 31 October.

President and CEO Meg Whitman, who's been fighting to get HP back on track after years of missteps under previous management, will retain those roles at Hewlett-Packard Enterprise. Dion Weisler, who heads HP's Printing and Personal

Systems business, will be president and CEO of HP Inc. In a statement, Whitman painted the move as positive for the company, even though she originally vowed to keep HP whole. "The decision to separate into two market-leading companies underscores our commitment to the turnaround plan," she explained. "It will provide each new company with the independence, focus, financial resources, and flexibility they need to adapt quickly to market and

customer dynamics, while generating long-term value for shareholders." (See page 26.)





BBC extends iPlayer catch-up window to 30 days

As promised, the BBC has extended the catch-up windows for programmes on iPlayer to 30 days.

The change comes in time for shows such as *Peaky Blinders* and *The Fall*. The increased windows also applied to BBC iPlayer Radio, so listeners can keep up to date with *The Archers*, *Once and Future King* and *Just A Minute*.

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Amazon First offers Kindle users early access to eBooks

Amazon has announced Kindle First giving its Kindle users early access to books. The new service allows bookworms to get their mitts on titles from Amazon Publishing authors before their official release date.

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EE TV set-top box rivals YouView with smartphone: Free for broadband customers

EE releases its own set-top box and TV platform

In a bid to take on the likes of BT and TalkTalk, mobile network EE has announced its own EE TV set-top box which will rival YouView. It will offer all the Freeview channels via broadcast and like YouView, offer a range of on-demand and catch-up services via the internet. BBC iPlayer, Wuaki.tv and Demand 5 will be available at launch but not Sky's Now TV, BT Sport channels, 4OD and ITV Player.

Olaf Swantee, CEO of EE, said: "Today we're announcing the most advanced TV service the UK has ever seen. How, where and when people watch TV and movies is changing, and mobile technology is driving that change."

However, the firm's trick over its rivals is the ability to continue watching live or on-demand content via their smartphone or tablet if they are at home on the same network. Mobile devices can also be used as a remote control for the box via an app - for iOS and Android.

The system will allow up to four devices to simultaneously stream four different pieces of content. MultiRecord can also record four different programmes at once thanks to four tuners and also



has a large 1TB hard drive for storing content. A feature called 'Replay' allows customers to view the last 24 hours of TV from their favourite channels.

The EE TV box, worth £300, will be free with an EE home broadband subscription so mobile customers without EE broadband will have to sign up starting at £9.95 per month. They will get a boost of up to 20 GB on their 4G plan, though. EE TV will be exclusively available in EE retail stores within the coming weeks, said the firm.

The hardware will be supposedly be provided by Netgem, a Paris-based company that already partners with Orange SA, the French multinational which owns half of EE.

BT's mobile network delayed by technical hitch: Might be worth the wait for savings

BT's plan to undercut rival networks is under threat by 4G problems

BT's plans to launch its own mobile phone network might be delayed by technical problems related to 4G. The internet, TV and home phone provider is hoping to rival the likes of EE, O2, Vodafone and Three with a mobile phone network. However, the company's plans are thought to be disrupted by issues and might be delayed.

The *Daily Telegraph* reports that the telecoms firm is struggling with technology for carrying data traffic over Wi-Fi rather than 4G LTE. This element is key to keeping the cost down and undercutting rivals. BT is partnering up with EE on the project so the more data which is transmitted over 4G, the more it will cost them in bills.

"The handover is absolutely essential for BT to do what it wants to do with mobile. It's possible the launch will slip into the second quarter of next year now," a source told the paper.

It is the handover which moves a connection from mobile to Wi-Fi and needs to be seamless so that a call is not interrupted with a delay.



BT has already said that the customer experience needs to be right before launching. The second quarter of next year will be the first quarter of BT's next financial year and miss the deadline it set itself. However, a BT spokesperson said "the plans were still on track".

A total of £186m was spent by BT's subsidiary, Niche Spectrum Ventures Ltd, in the auction for 4G spectrum last year and it plans to use this in the future to require EE's network less. It purchased multiple bands in the 2.6GHz frequency.



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Smartwatches, the smartphone anti-churn device

Smartwatches are designed to keep us loyal to our smartphones, but we aren't buying

The idea of a wrist-wearable window to your smartphone is intrinsically a good one. Those of us who rely upon our phones for communication, information and entertainment spend our lives pulling handset from pocket. The wristwatch is a brilliant form factor, and so wrist-wearable computers are here to stay. But that doesn't mean that the current crop of smartwatches, nor the model via which they are manufactured and sold, are set to succeed. And the problem relates to the way smartwatch tech currently works.

Like many – although not most – people, I wear both a traditional watch and a wearable activity tracker. The one is both practical and sentimental. I can't wear three wearables, so the next smart device would have replace one or both of these. I'm not about to ditch my dumbwatch. And the activity tracker is one of my favourite gadgets.

Currently smartwatches are extensions of smartphones. And with a handful of exceptions including the Pebble watches, they work only with certain handsets. So if you use an iPhone, you need to wait for the upcoming Apple Watch. Samsung smartphone users are largely restricted to Samsung smartwatches.

I understand why this is the case. It's an anti-churn measure. Samsung, Apple, Motorola and the rest want you to buy their smartwatches because it means you will stay loyal to their brand next time you change your smartphone.

The upgrade drain

As consumers, we have grown used to the concept of smartphones being 'upgraded' every year. Many people even change their phones yearly. Contrast this with the world of laptops, in which you will keep your PC going until it is noticeably slow. It occurs because of two things: the speed with which smaller smartphone batteries declines, and the fact that most people buy their smartphones as part of an annual or by-annual data contract.

Manufacturers love the smartphone upgrade cycle, for obvious reasons. It means that they can continue to sell us hardware even when we don't need to upgrade (smartphone development plateaued a couple of years ago). But they also fear the opportunity to jump ship that occurs every year or two. And like broadband- and TV suppliers, they are keen to put in place measures that will keep you loyal. Most people now understand that no combination

of shifting from iOS to Android to Windows Phone is all that painful.

A smartwatch speaks to all of these needs. It is an expensive consumer device that will, in the short term, generate a profit for its maker. But more than that, it's something you are going to want to keep and use for more than a year or two. And that being the case, and because you likely won't buy it at the same time as you sign up for your phone contract, it should be a major factor come phone renewal time. If you have an Apple Smart Watch that you like, you are unlikely to brick it and switch to Android. So your next phone is an iPhone.

So goes the theory. In practice, it may prove difficult to get consumers to play ball. When asked if they would consider switching smartphone brand in order to use a specific smartwatch, more than 75 percent of around 11,000 respondents to a *PC Advisor* poll said no. Only 10 percent said they would change phone to match their smartwatch. Of course, this doesn't mean they wouldn't choose a phone to fit with their current smartwatch, but right now almost no-one owns one of those. And the first challenge for phone- and watchmakers will be to convince consumers that a smartwatch is a good idea. ☒



Reasons not to buy an iPad mini 3

There's very little reason to buy Apple's latest diminutive tablet

Apple launched the iPad Air 2 and iPad mini 3 recently at a special event in Berlin. The latter of the two tablets got about 10 seconds' worth of stage time and we know why.

You should not buy the iPad mini 3 and I'm going to explain why. During the launch event, Apple spent a long time talking about things we already knew before it got on to new products. It was boring to be honest and after more than 30 minutes worth of clapping, whooping, digs at Android and 'comedy' videos, the keynote finally arrived at the iPad Air 2.

This new tablet got a fair amount of time and explanation, which is fair enough, but strangely Apple tagged the iPad mini 3 on the end in a sort of 'oh by the way, there's this one as well' way. Now that I've had a look at the new tablet's specs, I can see why it brushed over these in a matter of seconds.

Apple's iPad mini 3 is almost no different to the iPad mini with Retina display (now

renamed to the iPad mini 2) - didn't Apple learn that lesson with the iPad 3?

The firm has added the Touch ID fingerprint scanner, a new gold colour, and a 128GB storage option. Apart from the fact that the 32GB model is gone - following the lead of the iPhone 6 - everything remains the same. It has the same chassis, Retina display, A7 processor, identical front and rear cameras, wireless tech and battery life.

The iPad Air 2 has an A8X processor, fully laminated display with an anti-reflective coating, a thinner and lighter design, improved 8Mp iSight camera and barometer. However, none of this new tech love has been shown to the iPad mini 3.

Apple has kept the price the same, so the iPad mini 3 starts at £319 but the 128GB will set you back a cool £479. Upgrades might seem good at the same price point but the iPad Air 2 remains at £399, so I'm a bit confused. It's like Apple spent all the effort on the larger tablet then remembered about

its little brother but only had time to make those few additions.

The killer reason not to buy the iPad mini 3 is that the mini 2 is still available at a lower price of £239. Is the Touch ID and gold colour worth £80 extra? Most certainly not and furthermore, the original iPad mini is kept alive and costs just £199 which is a bargain. You can save even more by picking up a refurbished original for just £169.

If you're pondering whether to upgrade from an older iPad mini, it's not worth the bother and if you're thinking about getting your first iPad mini, then opt for the now cheaper iPad mini 2 or even the original if you're not too fussed about the screen resolution.

CHRIS MARTIN



Apple records

Mac users beware. The war against privacy intrusions has just begun

ANDREW
HARRISON



War is over, if you want it. Maybe that was pure optimism from John Lennon, but the same need not be true of privacy. Contrary to what people with vested interests may tell you, our new internet age does not have to mean privacy is over. It just means you have to be vigilant for the unending dirty tricks that keep rearing to pull personal information from you for whatever reason.

There is a constant battle between businesses and governments on the one side, and the private individual and his or her dignity on the other. This was brought to mind by some surprising changes in Apple's new desktop operating system.

Mac OS X, actually just OS X as Apple now styles it, has long been a safer haven for users that don't want hidden telemetry secretly sending back user data to the brand that makes it. Contrast this with Microsoft Windows that phones home with details about the OS configuration, how it's being used, which programs are installed and which removed. Whether you want it to or not.

Even Canonical made what's euphemistically termed a privacy misstep when it introduced changes to the filesystem search function in Ubuntu Linux 12.10.

The search function is, of course, used to find files and folders on your computer; nobody expected the update to Ubuntu 12.10 (Quantal Quetzal) in October 2010 to give the OS carte blanche to send every local search query to Amazon.com, Inc, with Canonical's servers as the go-between.

The move was made to raise funds for the open-source Linux business, which paid for the valuable data on Ubuntu users, paying bounties for the opportunity to advertise at them, returning Amazon shopping results related to search keywords.

There was, and currently still is, a way to switch off this data leaking in Ubuntu, hidden away in System Settings/Security & Privacy. But you have to manually opt out - no choice is or was presented to the user at any point during the install or setup process.

The location of the toggle is itself telling, indicating that the by-default harvesting of your search terms most certainly inflicts your security or your privacy. Actually both.

And it wasn't just Amazon that was getting your personal search queries - Canonical also listed Facebook, Twitter and the BBC as recipients. Make sure you read the privacy policies of every one of these partners to see what they plan to do with your collected data too.



Now the lens turns toward Apple and OS X Yosemite. OS X's system-search facility Spotlight is perhaps the inspiration - in original functionality at least - for Ubuntu's Unity search function. On the Mac you just click on the magnifying glass icon in the top-right screen corner (shortcut: Cmd-Space) and just type away to find and launch an application, find any user file or folder, even search your email by text content.

Now though by default, every letter, space and word you type is sent to Microsoft. And in return you get a search result from Bing fed among any other results.

Your location is also being transmitted to Apple, with this activity deliberately withheld from the Location Services dart icon notification in the menu bar.

Again, users find themselves opted in to this privacy leak without being asked, only this time there is an easy-to-miss warning appearing the first time you go to use Spotlight in Yosemite.

You must manually deselect it from various places around the Mac operating system. And what a journey it is. First, you go to System Preferences/Security & Privacy/Privacy, and then hidden deselect Spotlight Suggestions under System Services - after unlocking with your admin password. Then you must untick ticked options at System Preferences/Spotlight/Spotlight Suggestions and System Preferences/Spotlight/Bing Web Searches - this latter one discreetly hidden out of sight at the bottom of a long list of Spotlight functions. There's another there to disable that Apple doesn't mention - Bookmarks & History.

According to the Yosemite Phone Home Project, though, there's more. You're not out of the data-sharing woods yet, and there

are more background privacy issues listed on its page at tinyurl.com/pwmmmbkm. One we found troubling is their findings that with all possible privacy options enabled, and with analytics disabled, your Safari web browser results are still sent to Apple.

That's particularly ironic if you should choose DuckDuckGo as your default search engine, an option added in Yosemite.

While DuckDuckGo's privacy statement makes it clear that it doesn't spy on you ('DuckDuckGo does not collect or share personal information. That is our privacy policy in a nutshell') Apple's handy shortcut to DuckDuckGo within the combined URL address and search bar makes sure that your search queries are being collected and shared with another party - Apple itself.

You can try to keep your private self to your self by installing network monitoring software on your Mac - we were first alerted to these shenanigans by Little Snitch, but other software options include TCPBlock, Hands Off! and Private Eye.

Little Snitch is especially good at letting you build rules for what information you're willing to leak out of your Mac and sent to outside agents. Or you can try setting rules in your network's hardware firewall. Not much use when you're out and about on a MacBook, though.

Personally I'd rather not have to jump through these hoops in the first place. But now Apple has shown its hand, and in spite of some public hand waving recently published at apple.com/privacy, which rightly points out its business model is not based on selling your profile.

In the continuing battle against privacy intrusions, privacy itself is not over. And for OS X users, the war has just begun. ☒

Apple shows a lack of confidence

Samsung, LG, Sony and Apple may rule the mobile market, but this wasn't always the case

Very shortly after the iPhone 6 launch event came two interviews with Apple's CEO Tim Cook, one a two-hour video interview with PBS chat show host Charlie Rose, and the other a lengthy Bloomberg Businessweek interview featuring some other Apple stars.

I love getting an insight into what's going on behind the scenes at Apple, and I recommend checking out both interviews. However, I couldn't help thinking that many of the comments felt like his way of justifying some of his decisions to all of those doubters out there, and also his way of telling his critics he's not letting them get him down.

And that's fine, but it's a shame that he feels the need to do so. We love the new announcements from the company, but it almost feels like Cook isn't quite confident enough that Apple has stopped the doubters yet (he's right, of course, but I don't think they'll ever go away).

I've lost count of the number of times I've heard people say "Steve Jobs would never have allowed that," but he was confident enough in Cook to give him the role of CEO before he died, so I believe we should trust in that decision.

Plus, I think that right now is the toughest time to be part of the technology market. There are numerous companies including Samsung, LG, HTC and more that are really upping their game when it comes to smartphones and tablets, particularly throughout 2014, so it's more difficult than ever to stay ahead of the pack. We'll never know whether Jobs would have managed to trump competitors with new releases this year, but I certainly don't think Cook has done a bad job given the circumstances. And the numbers speak for themselves: four million iPhone 6 pre-orders within 24 hours is bloody impressive.

"Anybody coming out of [the 9 September media event] knows that innovation is alive and well in Cupertino," Cook told Bloomberg Businessweek. "If there were any doubts, I think that they should be put to bed," he added.

It's almost like Cook feels bullied, and honestly I don't blame him. I can only imagine the pressure you feel when you are leading the biggest tech company in the world, with both its loyal following and equally loyal haters scrutinising the company's every move.

But during the Charlie Rose interview, Cook said: "One great skill I have is blocking



noise... I think that if you get caught up in the noise as a CEO, you're going to be a terrible CEO, because there's so much noise out there in the world."

"Everybody's on the sidelines saying what you should do, shouldn't do," Cook continued. "It's sorta like the old Teddy Roosevelt quote in the arena ['It is not the critic who counts; not the man who points out how the strong man stumbles, or where the doer of deed could have done them better. The credit belongs to the man who is actually in the arena...']"

"Well, I'm the dirty one. And you have to block the noise. The question, I think, is did I have doubts, and the answer is no, and did the executive team have doubts - I think you can see in our products that we were all betting on each other in a big way."

Justification

Then there's that justification I was talking about. Apple unveiled the Apple Watch during the 9 September event, but it's not coming out until next year.

Jeff Williams, senior vice president for operations, oversaw the watch team during the development process, which included hundreds of engineers, designers and marketing people. In the Bloomberg interview, he said that he's not sorry that the Apple Watch won't be available in time for Christmas. "We want to make the best product in the world," he said. "One of our competitors is on their fourth or fifth attempt, but nobody is wearing them," he added, taking a direct stab at Samsung. "We would have done the watch much earlier, honestly, but not at the fit and finish and quality and integration of these products."

Then, during the Charlie Rose interview, Tim Cook tried his hardest to justify

the reason Apple didn't launch a bigger iPhone previously.

"We could have done a larger iPhone years ago," he said. "It's never been about just making a larger phone, it's about making a better phone in every single way."

If that isn't enough to make you feel better about Apple's decisions, Cook even mentioned that there are products in Apple's pipeline that we haven't even thought of yet.

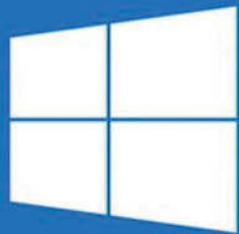
"There are products that we're working on that no one knows about," he said. "Yes, that haven't been rumoured about. Part of some of those are going to come out and be blow-away probably, and some we'll probably decide 'Y'know, that one, we're going to stop'. A lot of what leads to innovation is curiosity. It's curiosity to begin pulling a string, and you see where it takes you. And a lot of what we do isn't apparent to the public in the beginning where it's going to lead."

I'm certainly curious about what else Apple is working on (isn't there a rumour for every possible Apple product already?), and I think all of Cook's comments are relevant, informative and insightful, but I still think the decision to do these interviews so soon after the unveiling of three new products was a way for Cook and the rest of the Apple team to try and get more people on its side. Perhaps it'll work, and I still think the interviews are well worth taking a look at, but I still think it's a shame that the company thought they were necessary.

After all, no matter what Apple does, haters gonna hate. ☒

ASHLEIGH
ALLSOPP
(MACWORLD)





Windows 10

An Apple fan's perspective on the Windows 10 launch

So farewell, then, Windows 9: we hardly knew ye

In September, Microsoft surprised and - I think it's fair to say - baffled the watching tech world by skipping a version number entirely and unveiling Windows 10 as the follow-up to Windows 8.

I spend most of my time writing for *Macworld*, and my beat is therefore almost wholly Apple-based. But this time around I caught some of the Windows 9/10 fever from my *PC Advisor* colleagues and decided to see what the fuss was all about.

Here are some thoughts on Microsoft's big unveiling, through the eyes of a jaded Apple watcher who last got excited about a Microsoft product when Windows 7 came out.

1. And I thought Apple's version numbering was a mess

Let's start with the headline oddity. They straight-up skipped a version number? Is that... is that even allowed? Well, of course it's allowed. And companies mess around

with the version numbering all the time, as we've grown used to over on *Macworld*. (The iPhone 5 is Apple's sixth iPhone. The iPhone 6 is its ninth.) It's just not something companies normally draw attention to. Apple normally sticks a letter-based update - often an S-class model - in between the straight numerical refreshes to disguise the mathematical jiggery-pokery.

Mind you, what Microsoft is doing is Apple-like in its conception, even if its clumsy execution is vintage Redmond. Version numbers matter. They tell customers, even if only subliminally, how important an update is. Apple, by comparison, seems almost coy - when it launches an S-class iPhone, it's effectively telling prospective buyers that model isn't a major update.

Windows 10 is such an incredibly important refresh that it deserves to be given a version number that's two higher than its widely disliked predecessor.

Yeah, it's ridiculous. But it shows that Microsoft is starting to understand the importance of small details in moulding a product's public perception. It's just - in my opinion - terrible at putting that understanding into practice.

2. When are the rest of the journalists arriving?

One area in which Apple fans are spoiled is hype - in the sense that almost anything their favourite multinational does is hot news. When Apple lays on a press do, the press go crazy, and always turn up mob-handed. Some weirdos have even been known to scan the invites for clues about what's going to be unveiled.

Microsoft has never been in Apple's class when it comes to sheer blockbusting stagecraft and media manipulation, but for decades it's been a big draw in its own way. Which made it surprising - and

oddly poignant – to see the little queue of journalists outside the venue.

In fact (even if I for one suspect at least an element of preemptively avoiding comparisons with Apple's enthusiastically covered OS X Yosemite reveal in June last year), the tiny guest list was deliberate. While we were lucky enough to have reporters at the event, I've heard muffled screaming from plenty of Windows-focused writers who didn't make the cut. This was an extremely exclusive affair.

3. Fine, you can keep the stupid Start button

Due to popular demand, as they say, the Start button is back. And let me tell you, an Apple journalist is not used to typing the words "due to popular demand" in an article about new software. I would imagine that Microsoft-focused writers aren't much used to it either.

But Microsoft seems weirdly humble these days. As well as caving on the Start button issue – I'm editorialising a little here, if you'll forgive me; many will be pleased by the company responding so accommodatingly to its customers' wishes – Windows Group vice president Joe Belfiore went out of his way to point out elements that Windows 8 got wrong, and to pledge that they would be addressed.

Microsoft also spent much of the event repeating how keen it was to get feedback from the testers and roll their suggestions into the finished product. Which seemed completely genuine, unlike the 'Windows 7 was my idea' adverts back in the day.

By contrast, the Apple of popular stereotype would design a product in a certain way – making a mouse look like a stupid hockey puck, to take a completely random example – and then tell the naysayers to stuff it. If the antenna on your iPhone didn't work, the CEO would probably email you and say you were holding it wrong.

But – while I wouldn't expect Apple to go back to full-on skeuomorphism in iOS 9 – I'm not sure how true the stereotype is any more. Apple gave in to popular calls for a phablet, for instance, and Apple's CEO Tim Cook has shown himself rather more willing to apologise for a company error than his predecessor. I've written before about how hard Apple seemed to be trying at the iPhone 6/Apple Watch launch event.

Perhaps telling the market what it wants was a strategy that died with Steve Jobs, its most celebrated exponent. Or perhaps it's just that both Apple and Microsoft have hot young upstarts nipping at their heels. And it's harder to stick to the strictest design principles when there's a shameless populist around the corner promising people smartphones in whatever screen size they want.

4. We're going to run this beta for... one hundred and fifty seven years

The last thing that struck me was how slowly everything seemed to be moving. This was the tech world's first glimpse of Windows 10, but we'll be getting a lot more before the thing actually goes on sale.

DAVID PRICE (MACWORLD)



We're probably about a year away from a consumer launch.

Apple – and particularly Apple since Tim Cook came in and sorted out its hardware supply chain – is known for the scarcely believable speed with which it can get products from secretive unveiling to public availability. (There is, of course, one obvious exception – the Apple Watch. This hasn't even got a confirmed shipping date yet.)

Operating systems are a different matter, of course, because of the need for a thorough beta-testing process to make sure developers can get their apps to work with the new platform, but neither iOS 8 nor OS X Mavericks came anywhere close to a year. Yosemite looks likely to launch near the end of this month, which would be under five months all told.

There's something very dated-seeming about Microsoft's ocean-liner-like speed of manoeuvre: it feels like a relic of a lost age. And one is left to wonder how the development process will be affected by rival software launches between now and then, like the way the continually delayed video game Duke Nukem Forever gradually absorbed features from 12 years' worth of first-person shooters.

So that's my take on Microsoft's Windows 10 launch. Then again, I'm only an Apple journalist. ☒





RYAN MACRO

Why Sony's PS4 2.0 update is every gamer's dream

The PlayStation 4's new Share Play feature is a game changer, literally

Sony has unleashed its PS4 2.0 firmware update, bringing with it a number of new features including YouTube uploading, themes, USB music playback, improvements to voice command and library organisation, and the big one: Share Play.

This is a new feature that lets two people game together over the internet, only requiring one of those people to own the game. There are two ways to use Share Play, one offering more versatility than the other.

If you own the copy of the game, you can use Share Play to allow a friend to see exactly what you can see while playing a game on your PS4. You can even pass over the control to let that friend play the game via the internet.

The second option is to utilise the feature to play a co-op game together without needing to be in the same room, house, or country for that matter, and again without both requiring a copy of the game.

Share Play is a game changer, literally. For me, being a gaming addict, it opens up new possibilities that I've been hoping for years. I'm a twin. My brother and I spent

much of our childhood gaming together under one roof. Now, at 24 years old, we've flown the nest and live apart. While there are many things I don't miss about my brother, one thing that I have truly missed is the time we spent sat in front of the TV arguing about who's fault it was that we couldn't kill a boss in Final Fantasy.

Game on

Honestly, though, my brother was always better than me at certain things when we played games together. Now, when I'm struggling with that last trophy that I just can't get, I can pass the control over to my brother who was just that moment watching and laughing at my pain via Share Play and watch him do it for me. As long as I'm the host player, any trophies he pops while playing will be mine.

I'm also looking forward to not having to risk buying a game that I'm not going to enjoy, because there never seems to be many demos available for games nowadays. I still remember the time when you'd get discs full of demos to try out. Now, if one of my friends has a game that

I'm interested in, I can Share Play with him and test it out for myself before investing. The beauty of it is that even if that friend owns the game as a digital download, they can still let me play it in the comfort of my own home.

There are limitations, though, one of the biggest being that Share Players (if that's what we're calling them), can only play for one hour at a time. Right now though, there's no cap on how many times you can play together, so you can just launch Share Play again and continue left off. How long we'll be able to take advantage of this loophole is another matter.

The quality of the shared game is brought down to 720p, too, and you'll need a PlayStation Plus account to take advantage of Share Play, which will set you back £5.49 per month.

I hope that Share Play is just the first step towards the future I've always envisaged: We'll be beamed onto each other's couches as holograms so it's like we really are gaming together even when we can't be. Or better still we'll get zapped into the game itself. One can dream, right? ☒

IBM will continue to make processors

After selling chip-making operations to GlobalFoundries, IBM will focus on designing faster chips and Watson-like computers, says **Agam Shah**

IBM may have sold off its chip manufacturing business, but don't count it out as a hardware force to be reckoned with. It still plans to fight on, developing faster computers and cognitive computing systems such as Watson.

The tech giant will pay \$1.5 billion (£937 million) to GlobalFoundries to take over its chip-making factories, but will continue to design high-end chips, and sell servers and supercomputers. Its hardware future now rests on the Power processor architecture, which over the years has been used by Apple in some of its Macs, Sony's PlayStation 3 and IBM mainframes. The Power chip will continue to appear in supercomputers, though GlobalFoundries will make the actual processors.

The highly regarded IBM Research labs, which boasts Nobel Prize-winners among its staff, will also continue to rethink and reshape computer design. In July, IBM announced it would pour \$3bn (1.87bn) over five years into hardware research that could lead to quantum computers and cognitive systems that mimic brain functionality. A brain-like chip was announced in August, and the researchers have made progress in investigating chip materials beyond silicon.

The transfer of chip-making factories to GlobalFoundries comes on the heels of IBM selling its x86 server chip business to Lenovo for \$2.1bn (£1.3bn). Lenovo also bought IBM's PC business for \$1.75bn (£1.1bn) in 2005. IBM had a hard-drive business that was sold to Hitachi for \$2.05bn (£1.28bn) in 2002.

During IBM's earnings call on 20 October, CEO Ginni Rometty spoke of a software-heavy future focused on cloud, mobile, analytics and other technologies. "We've got to reinvent ourselves, like in prior generations," she explained.

Nonetheless, IBM is firmly committed to the hardware business, and wants to be the "smarts" behind making and building better systems, revealed Tom Rosamilia, senior vice president, IBM's Systems and Technology Group, in an interview.


By divesting manufacturing, IBM can get back to focusing on supercomputers, high-end servers and also fundamental technology research. Maintaining factories is an expensive proposition.

"We'll exit a business that was not only capital intensive, but also a drag on our [company]," Rosamilia said. "It allows us to focus on global research capabilities."

IBM is now licensing the Power architecture to third parties that want to build servers, chip variants or components. It hopes that strategy, similar to ARM's, will help it compete with Intel's x86 chips, which dominate the data centre. IBM has also formed the OpenPower Foundation - which boasts members, including Google, Samsung and nVidia - to promote hardware and software development around Power.

With chip-making operations off its back, IBM can speed up development of systems such as Watson, which is already making an impact in areas such as personal medicine.

Such cognitive computing systems rely heavily on IBM's software assets, which help process natural language and parse through swathes of unstructured data such as that created by sensors and mobile devices. Right now Watson's benefits are being seen in health care, but its usage could expand to manufacturing and retail as well, said Charles King, principal analyst at Pund-IT.

Google has also shown an interest in Power architecture, said Richard Dougherty, founder of analyst firm Envisioneering Group. While its large-scale data centres run mostly off x86-based systems, Google has also designed a Power server board. 

Apple's A8X chip points toward the future

Apple's A8X chip could be used in the next Apple TV, 4K TV, gaming devices or even Macs. Agam Shah reports

Apple's iPad Air 2 is faster than its predecessors thanks to the A8X chip, which could pave the way for the company to put its homegrown silicon in large-screen tablets, TVs, cars and laptops.

The A8X, an ARM architecture chip built by Apple, has enough horsepower for the tech giant to bring 4K screens, better cameras and advanced sensors to its tablets, industry observers said. The 64-bit chip was specially designed for the new tablet and is not simply an adaptation of its cousin, the A8, which is in the iPhone 6 and 6 Plus.

Apple doesn't share information about future devices, but there have been rumours about a larger iPad and an Apple TV set-top box for some time. The company is also chasing opportunities in the automotive and health markets. "As long as they can be competitive with their silicon development, I see no limit to where they can put their chips," explained Jim McGregor, principal analyst at Tirias Research.

The company has made chips for iPads, iPhones and the Apple TV set-top box, but has relied on Intel for chips in Mac computers. Apple combines homegrown chips with software to ensure that mobile devices deliver the best performance and battery life.

The A8X is a monster chip for a tablet - it has 3 billion transistors, compared to 2 billion in the A8, and more than two times the 1.3 billion transistors in Intel's latest Core M chip for tablets and hybrids. Transistors are the fundamental building blocks for any electronic system, and the more you have, the more you can do with one chip. With more transistors, it's possible to add larger, higher-resolution screens and better

cameras to tablets, which is what Apple aimed for with its A8X chip.

A strong visual experience is important on large-screen devices, at home or on your travels. Graphics in the iPad Air 2 are 2.5 times faster than in its predecessor. The A8 chip in iPhones - which doesn't provide the level of graphics of the A8X - is more about balancing performance and battery life.

"That is a reflection of Apple looking at the market more holistically and not only do they want to hit the high-end, but they also want to take a nuanced approach to targeting the market," argued David Kanter, analyst at The Linley Group.

Meanwhile, a new Apple TV set-top box could be on its way, and the strong graphics in A8X could add support for 4K TVs, argued Nathan Brookwood, principal analyst at Insight 64.

Apple's mobile devices and laptops don't stand out when it comes to gaming, but the A8X could lead to a separate product that enables 4K gaming on TVs, Brookwood said. And while it's not yet clear whether the tech giant will ever release a TV set, the chip lays the groundwork for the company to build a 4K TV, Brookwood said.

There's nothing to stop Apple from taking the A8X chip, packing more graphics cores and cache around it, and using it in a desktop or laptop, said Dean McCarron, principal analyst at Mercury Research, though, he added that the possibility is remote.

Apple has shown a willingness to switch architectures and has internal resources committed to ARM. In 2006, the company stopped using Motorola's PowerPC chips and transitioned to Intel chips in its Macs.


A transition to ARM in Macs, though, would require wholesale software changes since the architectures are different. Intel chips are still considered superior in handling applications such as Final Cut Pro X, which are critical to high-end users.

Tirias Research's McGregor said that the A8X could lead the way for Apple to develop custom chips for in-car entertainment systems - its CarPlay software is already compatible with hardware from Pioneer Electronics. But if the company gets deeper into this market, it most likely would want its software to be used with its chips. This could be a problem for car makers, who might be wary about relying on Apple for software and hardware.

Meanwhile, Apple has the resources to develop custom chips for a variety of devices, but also wants to make sure the products sell in volume before committing, Kanter said.

An example is the wearable market. Apple will ship the Apple Watch early next year, but it's unclear whether it developed its own chip for the smartwatch. According to industry watchers, extremely low-power chips are difficult to make, and need to blend with sensors. Apple likely acquired the chip technology from an outside vendor.

The company is still testing the market with the watch, and won't commit to making a chip until the device ships in the millions, Kanter argued, adding that even some chip technology for the first-generation iPhone was borrowed from Samsung.

"That's a sensible approach to take when doing a device when the volume is not clear," Kanter said. "When I look at the Apple watch - the jury is still out on [wearables]." 

Apple SIM has great potential, but widespread changes will take time

Apple SIM lets iPad users choose between data plans from different operators just by touching the screen, explains [Mikael Ricknäs](#)

Apple's new iPads allow users to choose between data plans offered by different cellular carriers without having to obtain a separate SIM from each. But that's only the beginning as embedded SIMs such as the new Apple SIM have the potential to change the way all devices connect to cellular networks.

The iPad Air 2 may be thinner and faster than its predecessor, but the introduction of Apple's own SIM card is the improvement users should be the happiest about. The so-called Apple SIM lets users choose from short-term plans from carriers in the US and UK right on the cellular versions of the iPad Air 2 and mini 3.

"So whenever you need it, you can choose the plan that works best for you - with no long-term commitments. And when you travel, you may also be able to choose a data plan from a local carrier for the duration of your trip," Apple states on its website.

If the SIM takes off on a larger scale, that and support for 20 LTE frequency bands will make the iPads near-perfect travel companions. The success of the Apple SIM at home and abroad will, of course, depend on the company's ability to convince operators it's a good idea. Only four operators are on board so far: AT&T, Sprint and T-Mobile in the US, and EE in the UK.

"Apple is the only company that has the gravitas to be able to pull off this kind of deal. Other manufacturers will look on in complete awe, because it just further underlines the strength of position Apple has," argued Ben Wood, director of research at CCS Insight.

That Apple started with the iPad as opposed to the much more important iPhone shows it's moving forward with caution. On paper, this is something operators would be expected to resist at almost any length. However, operators have largely failed to

get users to connect their tablets to cellular networks, which means they have little to lose, according to Wood.

"Operators see this as an opportunity to get more revenue by taking this more flexible approach. Because they have tried everything else and the reality is that it hasn't really moved the needle," he added.

While the Apple SIM is still a physical card, industry organisation GSM Association has claimed that its embedded or soft SIM spec is finally starting to take off in the M2M (machine-to-machine) sector. Operators such as AT&T, Etisalat, NTT DoCoMo, Telefónica and Vodafone have adopted it.

The same technology could be used on smartphones and tablets, allowing users to switch between different operators and data plans just like with the Apple SIM. But making that happen will be far from straightforward.


"There are major differences between a data SIM and a full voice and data SIM, where you have huge complexities in how it's managed. And equally operators remain in a

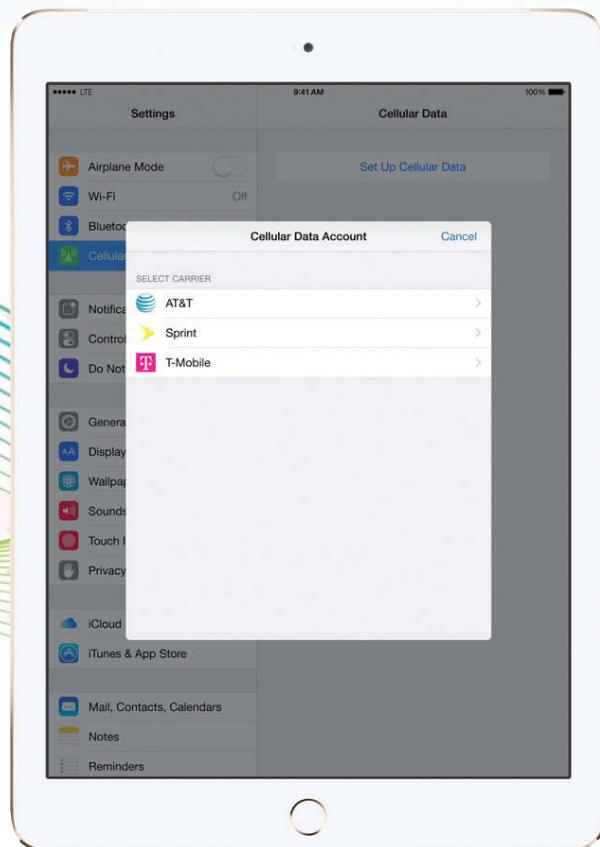
strong position because subsidies are such a key part of that offering," Wood said.

The Apple SIM may well be part of a very long journey towards embedded SIMs on smartphones, according to Wood.

The introduction of embedded SIM technology is for now about reducing M2M connection costs. The use of traditional SIMs for transportation, utility metering and other applications can be problematic, as devices are often remotely located and hermetically sealed. It also allows for over-the-air operator provisioning, which is useful when you have to manage a large fleet of vehicles, for example.

Here the operators have again had to get on board even in they see embedded SIMs as a threat.

"In order to be able to support global deployments of connected cars and consumer electronics you need this capability. It's a necessity to build a market," said Matt Hatton, director at Machina Research. 



Intel works to secure your credit card

Intel's Data Protection Technology for Transactions could make payments for secure, says **Agam Shah**

Swiping credit cards or using payment systems such as Apple Pay at stores could become much safer thanks to a new Intel system. It could also make it easier for retailers to secure data after transactions are completed.

With security breaches and customer data theft on the rise, Intel has developed Data Protection Technology for Transactions, a hardware-software bundle designed to protect credit card and personal data from hackers when transactions are being authorised.

The tech giant will market the chip technology to makers of point-of-sale (POS) systems, PCs and mobile payment terminals. NCR, the world's largest maker of payment terminals, has plans to put Data Protection Technology for Transactions on its products.

Intel's hardware and software security platform is adaptable to multiple payment systems. It will be supported on the latest Atom and Core processors.

This is how it works. Once a credit card transaction is made at a payment terminal, Intel's technology creates multiple layers of security to protect data. A POS terminal encrypts the data, which is transferred through a private tunnel to the credit-card processing company and ultimately to the bank authorising the transaction.

Bundling on multiple layers of security minimises the risk of data getting intercepted in the course of paying for products and services, said Bradley Corrión, platform solutions architect at Intel.

The technology can also be used to protect the transfer of customer information to data centres, where analytics and business intelligence applications can be used to identify buyer trends.

"We need to make sure retailers have the tools they need to collect data from the end point and hold on to it securely," Corrión explained.

Consumers are also using new forms of payment, including Google Wallet and Apple Pay, which both use NFC (near field communication). Intel's technology can protect NFC transactions, and can create a secure layer so payment data is securely transmitted.

The Intel system handles every step of a transaction, making it easier for retailers to deploy, Corrión explained. Other systems use separate payment peripherals and encryption technologies, which are difficult to manage centrally.

Intel's technology provides a level of communication and lockdown below the software level, thus providing a verification

and security level that normal human error will not have an effect on, said Greg Buzek, president of market research firm IHL Group.

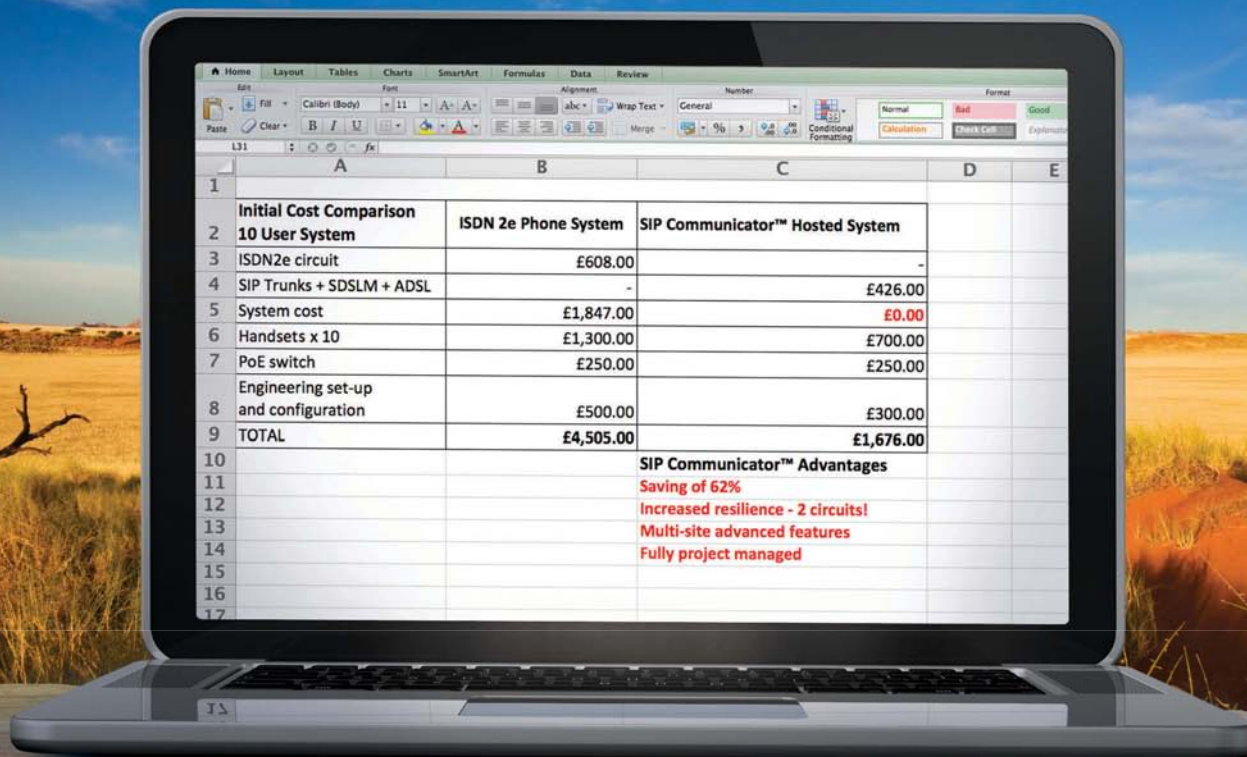
Most security today is software based and over 90 percent of retail breaches are due to password issues, Buzek argued, citing a security report from Verizon.

"This is a critical technology for retailers who have far flung stores and branches, with a myriad of devices connected," he added.

Intel's technology can accept payments only from recognised terminals with the security layer, locking out unauthorised payment systems.

"Many of the vulnerabilities that exist from our desire to plug and play go away. And as the number of devices radically expands due to kiosks, beacons, wayfinders, cameras, mobile devices and payment devices, this provides a sort of Big Brother oversight to all of your legitimate devices," Buzek explained.

The software layer on the chip can be updated with the latest firmware to keep up with the latest encryption algorithms. Intel uses a number of data encryption technologies to scramble data, including the widely used SSL (Secure Sockets Layer), SHA-256 and AES-256 and RSA cryptography technology. ☒



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Rules aim to prevent IoT devices from taking down mobile networks

Carriers are fighting back against sloppily written apps and chatty devices that threaten to overload their networks with signalling traffic. [Mikael Ricknås](#) reports

The dream of an Internet of Things (IoT) could turn into a nightmare for mobile operators, if sloppily written apps or chatty smartmeters were to overload their networks with signalling traffic. To avert such a scenario, a number of operators are backing a new set of network usage guidelines for device manufacturers and app developers.

Mobile operators don't want to be caught off guard when IoT traffic takes off on a larger scale, as many of them were when smartphones became mass-market items. So the likes of AT&T, China Mobile, Deutsche Telekom, NTT DoCoMo, Orange, Telefónica and Telenor Connexion are all backing the "IoT Device Connection Efficiency Guidelines," published on Monday by the GSM Association (GSMA).

The main goal of the first version of the guidelines is to ensure applications, devices and the cellular modules they are based on can communicate efficiently with networks. The modules are small computers with connectivity and GPS, for example.

"We want to make sure those devices don't become aggressive and overload the network with signalling traffic. Because if you have too many devices behaving too aggressively on the network, you effectively

end up with a distributed denial-of-service attack," explained Stephen Bryant, CTO at Telenor Connexion, one of the companies involved in developing the guidelines.

Signalling traffic is information that helps the network communicate with devices to set up and end calls or data sessions. If there is more signalling traffic than the network can handle, users won't be able to make calls or connect to the Internet. The bandwidth reserved for signalling traffic is typically much narrower than that reserved for data. Embedded devices sending many short messages can create far greater volumes of signalling traffic than they do chargeable data, prompting the operators' concerns.

The underlying problem is that manufacturers and developers may not have the know-how needed for building products and apps for this sector, according to Daniel Collins, CTO of Jasper Technologies, which fully supports the guidelines in its cloud-based software platform.

"The guidelines aim to help developers bring their applications and devices to market faster and do so in a way that optimizes their behaviour in a mobile network environment," Collins said.

Developers are recommended to build apps that aggregate data in as big a chunk

as possible before compressing and sending it over the network. Developers should also use an 'always-on' connectivity mechanism instead of activating and deactivating network connections. Following these rules decreases the dreaded signalling traffic.

For the module manufacturers that are experts in this field, there is now more clarity on what they need to do.

Some of them have already implemented the parts of the guidelines that concern them: "We have some modules that support this, but not all of them," said Olivier Beaujard, vice president of market development at Sierra Wireless.

At what pace and to what extent it will implement the guidelines across its portfolio depends on how many of its customers ask for it, according to Beaujard. He would like to see the guidelines expanded to include management specifications, as well.

The guidelines were developed under the leadership of the GSMA, and are only the first step in protecting the networks.

"It's all very nice to have the guidelines, but we need some tests to show compliance with them. Those test requirements will be developed by the same team over the next three four months," said Shane Rooney, executive director at GSMA. [✉](#)

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HP slices in two: good for business,

Agam Shah says that it's time to worry about the future of HP's PC and printer business without the resources of the combined enterprise



Hewlett-Packard's plan to slice itself in two is being well-received by a cross-section of customers, though questions linger around PC and printer services and support.

Confidence is especially high in HP's enterprise business, and corporate users say they will stick with servers, storage and networking hardware from that side of the company. But customers are also putting the PC and printer organisation under the microscope, reconsidering purchase decisions as the unit treads into a slowing market for personal computers and tablets.

The low-margin PC business has been a drag on HP for years now, and many customers saw the company split coming. Users are concerned that the level of service and quality of the PC and printer products may decline, given the spin-off won't have the financial resources and overall support

of a larger, integrated company. There are already worries that HP will de-emphasize low-cost tablets and PCs in favour of premium products. Some customers also want to continue to buy PCs and servers from a single entity.

The company didn't waste time trying to erase doubts from the minds of key customers. Right after it announced the breakup plan early Monday morning, Purdue University CIO Gerry McCartney got a call from his regular HP contact, who was ready to discuss the situation and answer questions. The university spends millions of dollars on HP servers, PCs and printers every year, and McCartney believes that the split is a good idea, especially if HP wants to preserve its enterprise business. But he's reserving final judgment.

"A year from now we'll know whether it was a good idea or not," McCartney said.

HP's PC and printer organisation will be known as HP Inc, and the enterprise business will be called Hewlett-Packard Enterprise. The split will be complete in 2015, and the companies are expected to work hand in hand to serve customers.

The last time HP pondered spinning off the PC unit was in 2011, when the division was foundering. The company was also struggling to absorb its acquisitions of smartphone maker Palm and enterprise software maker Autonomy. Then-CEO Leo Apotheker, who had engineered the Autonomy purchase, floated the idea of breaking up the company, and was attacked for proposing the idea without having a concrete plan to back it up.

Meg Whitman, taking the helm after Apotheker was booted out, reversed Apotheker's strategy and retained the PC unit. She is now convinced, however,

bad for PCs



HP's **COMPUTING AND PRINTER** operations are to be split into a separate business

The department has around 300 HP servers, and there were plans to switch 40 desktops in a student lab to HP, but now those purchase decisions are being reconsidered following the news of the split.

There are also worries around printers. "The printer division may not have the same level of funding after the split," Nguyen said.

Though Purdue University CIO McCartney thinks the breakup may improve the overall health of the separate HP companies, he doesn't want to deal with two separate organizations to buy products. He hopes the breakup of the company doesn't affect the relationships he has with HP's sales and support staff, who have a good understanding of Purdue's hardware requirements thanks to close bonds established over years.

"The part I don't care for is... two companies to deal with for purchases," McCartney said. "It's a nice gesture to the market, but on the buying side, depending on how they implement it, it becomes a bit complicated."

Purdue buys PCs and servers from HP and even works with the company to develop supercomputers. The close ties help Purdue get good pricing and support, and McCartney hopes that the PC and enterprise companies can effectively work together to be a one-stop shop for large customers.

"If I'm going to have different sets of people calling me, I wouldn't regard that as a good development," he explained.

McCartney says hybrids, tablets and even so-called phablets will ultimately replace PCs, and thinks he may have to turn to other vendors like Samsung for products. "In the long arc, PCs as we know them are going to go away," he added.

The PC industry, meanwhile, is shifting, with Sony exiting the PC business, Samsung stopping laptop sales in Europe and Toshiba shifting focus to business laptops.

HP is going in the opposite direction of its top rivals. Dell has held on to its PC unit, and Lenovo, the world's largest PC maker, recently closed a \$2.1 billion

(£1.3bn) deal to buy IBM's x86 server business. These companies maintain that computer sales act as a springboard to sell more server products. HP is the world's largest server maker, and has closely tied its hardware and software into packages sold to customers.

But for some of its customers who spend more on servers, it's business as usual. For BCDVideo, which makes security and video analysis products, about 90 percent of HP hardware purchases are for servers, with the rest mostly workstations, which will ultimately go to HP Inc.

BCDVideo president Jeff Burgess is already dealing with separate PC and server sales teams, and believes the good experience he's had with HP so far will continue with the spin-offs.

"We're confident that we're going to keep the same sales and engineering contacts on the back end," he said.

Burgess appears certain the company won't give up on workstations, which will be important moneymakers for the PC spin-off. Some HP workstations are used as low-end servers and also run server chips.

Another HP customer, big-data software company PROS, expects little change in its day-to-day engagements with the vendor, even after the breakup, and has no plans to change its course on technology purchases. The company uses HP servers and PCs, and expects a smooth transition.

"We have open communications regarding HP's strategic plans on new technologies, which is important for our long-range planning and a key component in our relationship," said John Salch, vice president of technology and platforms at PROS.

In fact, the HP breakup may place the new companies in a better position to compete in their respective sectors, Salch said.

"We're encouraged by comments we've read from CEO Meg Whitman this week, referring to how this change will enable both companies to move faster to take advantage of their customers' changing needs," Salch said. ☒

that separation will help both units grow. "Being nimble is the only path to winning. Separating into two companies will enable each management team to have a sharper focus," Whitman revealed.

News of HP's pending split won't affect Columbia University's computer science department's plan to buy servers, but purchase decisions for PCs and printers are being reevaluated.

"We're not concerned about the spin-off of the enterprise section because that appears to be the strongest part of the company," said Daisy Nguyen, executive director of IT at the university's computer science department. "We are a bit concerned about the long-term printer and desktop products and services."

Nguyen has had a positive experience with HP, and also buys products for the department from companies like Dell.

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OPERATING SYSTEM

Windows 10

Hands on with Windows 10 Technical Preview - the positive return of the Start Menu and other Desktop UI features. Matt Egan reports

What is Windows 10?

Microsoft has taken the wraps off the next version of its Windows operating system, and in doing so took everyone by surprise. We expected the next generation of OS: we just didn't expect it to be called Windows 10. None the less here it is: the next Windows OS for PCs and laptops, smartphones and tablets. And, indeed, for servers and all points in between.

Microsoft executives told us that Windows 10 would be built from the ground up for a world in which mobile- and cloud computing are key. They also explained that Microsoft was committed to making Windows 10 friendly for the enterprise, ideal for keyboard and mouse users, but also optimised for touch. Oh, and it will put the same interface on devices with displays ranging in size from 4in to 80in. "One product family, one platform, one store," says Microsoft.

Given the lukewarm reaction to compromised Windows 8, these seem like bold claims. They are probably necessary.

Also necessary is Microsoft's decision to make Windows 10 the most beta-tested product it has ever released. Windows 10 Technical Preview is available to everyone who wants to test it - go to page 36 to see how. Given that we don't expect it to launch until the middle of next year, that is a longer test period than we have previously seen. And the version of Windows that Microsoft is sharing is very far from the final code. The company has already told us to expect the Charms to change, for instance.

Critically, the Start Menu contains standard Windows software and Windows Apps - modern UI apps that you can use those from within the desktop area. Hopefully, this will remove some of the pointless division in Windows on x86 systems.

It should also help Microsoft make good on its claim that Windows 10 will feel familiar to Windows 7 users. But we are a long way from that just now.

All of which means that this article is very far from a final Windows 10 review. More of a flavour of what to expect. Some features are missing entirely. We're guessing that won't be the case come launch in 2015. Here are our thoughts on some of the operating system's new features.

Search improvements

We think that universal search in Windows 8 is a much-undervalued feature. Searching to load up apps and files is far more efficient than navigating via apps and file systems. And going by the Technical Preview, Microsoft has made great strides in this area.

Windows 10 sees the addition of a search button to the taskbar, which

moves one of the few important aspects of the Windows 8 Start page to the desktop. Search and File Explorer now display your recent files and frequently visited folders. This should make finding files you've worked on faster and easier.

Snap Assist and windowed apps

With Snap Assist every app in Windows 10 can be dynamically resized in a window. And unlike in Windows 8 - where a snapped app takes up half the screen - with Windows 10 up to four apps can be snapped per screen. This has the potential to be a killer productivity app - true multitasking in a single window.

Even better, snap a document to one side of the screen, and Snap Assist will suggest others that you may wish to open. Snap an app and Windows 10 will suggest another, similar one that you might want to snap next to it. During our tests, we were impressed with this feature. You can see that a number

of different features - Snap Assist, windowed apps, virtual desktops - all flow somewhat organically into one another. We'll be interested to see what difference they make to our own daily workflow.

New Start Menu

Now we get on to the big stuff. The Start Menu is back. But this time it's been improved, and it may even make Windows apps useful. Look to the left and you'll see a list of frequently used apps and shortcuts to PC settings. Here you will also find documents and pictures folders. At the bottom there's an 'All apps' shortcut.

Microsoft has retained the functionality of the Windows 8 Start screen over on the right, with resizable Live Tiles so you can immediately check unread mail or Calendar appointments. The Start Menu is customisable - you can resize it and rearrange the tiles. You can also revert to the Windows 8 Start page, should you want to.

We weren't as impressed with the Windows 10 Start Menu's appearance, though. It looks like someone surgically conjoined the Windows 7 and 8 experience. Move past that inelegance, however, and it's very useful.

Task View, virtual desktops and Alt-Tab

Another useful and visual productivity enhancer is the way that Task View allows you to create a kind of multi-monitor setup within a single display. As with previous versions of Windows, you can use Alt-Tab to quickly shuffle between windows. The killer difference here is the new Task View button. Third from the left in the Windows Taskbar is the Task View button. Press it - or hit Windows+Tab - and you will see an array of 'virtual desktops', virtual displays into which you can snap multiple apps. So you could keep your email and web browser on one desktop that you hide away when you are working on an Excel spreadsheet.

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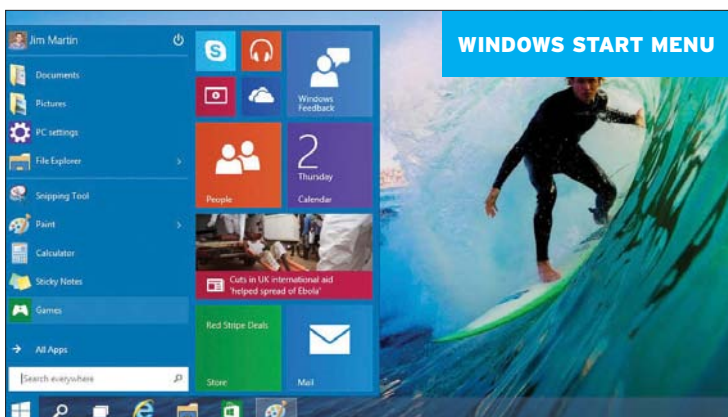
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WINDOWS 10 SCREENSHOTS:

NEW FEATURES INCLUDE TASK VIEW, MULTIPLE DESKTOPS, SNAP ASSIST

Let it be said first that this is only the first public preview of Windows 10, so plenty will change – including visually – by the time Windows 10 eventually launches next year. It's also aimed at business users without touchscreens, but that should suit plenty of enthusiasts, as a focus back on the mouse and keyboard is what we've all wanted. It does mean, however, that there's no Windows Media Player and few consumer-oriented features. Those will come next year.



First up, then, let's have a look at the most obvious feature: the return of the Start menu.

The left-hand side is a lot like Windows 7's Start menu, complete with pinned programs and jump lists, plus recently accessed apps.

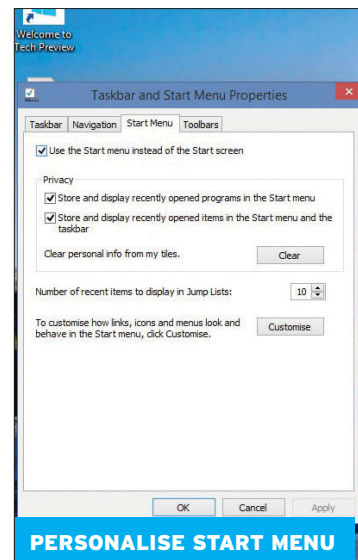
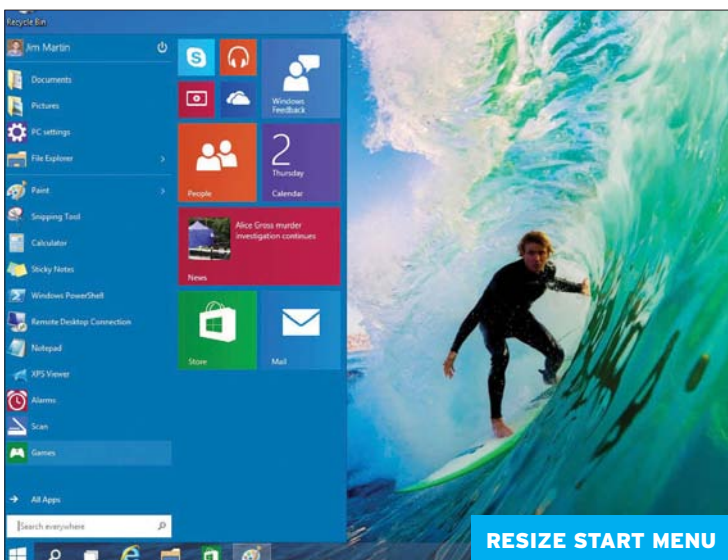
To the right is a kind of cut-down Windows 8 Start screen.

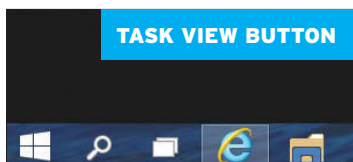
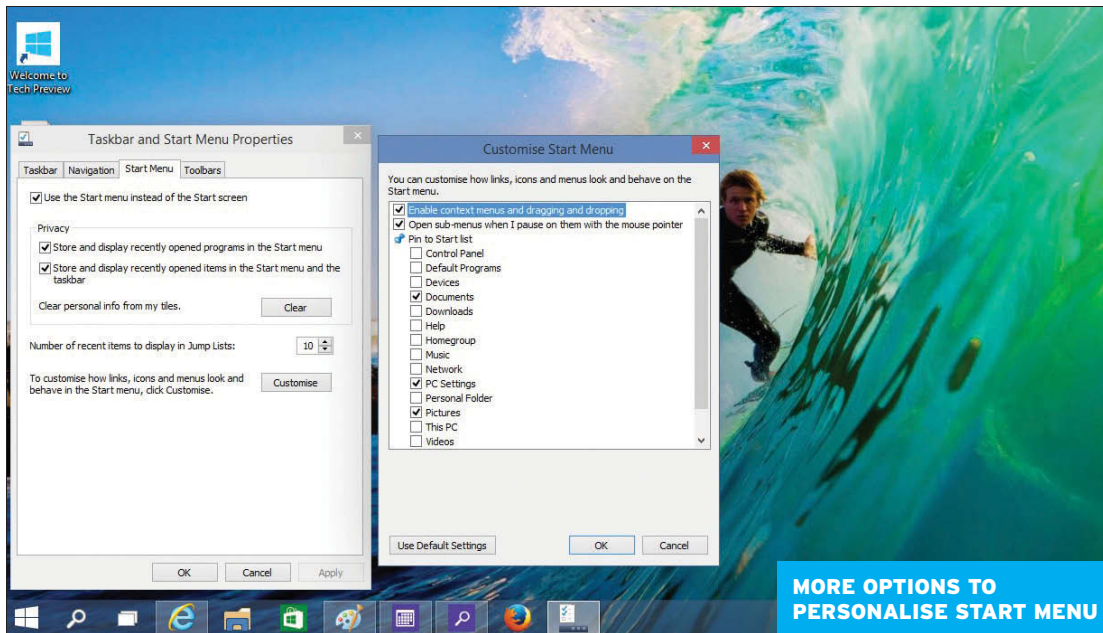
The Start menu is resizable, by dragging up and down on the top edge, so you can make it tall or, if you drag downwards enough, wide. Right-click on it and you'll be given

the option to personalise it. This simply brings up the usual Windows colour options. If you instead choose Properties, you'll see the options in the Personalise Start Menu screen below.

The top option tells the operating system to use the new menu instead of the Windows 8 Start screen. If you uncheck it, you'll get a warning to save your work as the OS will sign out and back in to switch to the old way of doing things. We suspect this is just to appease any users who liked the Start screen and would prefer to keep using it.

Other options are sparse. If you click the Customise button you'll see the options shown in the screen, top right. This list offers a quick way to set up your start menu to your liking.



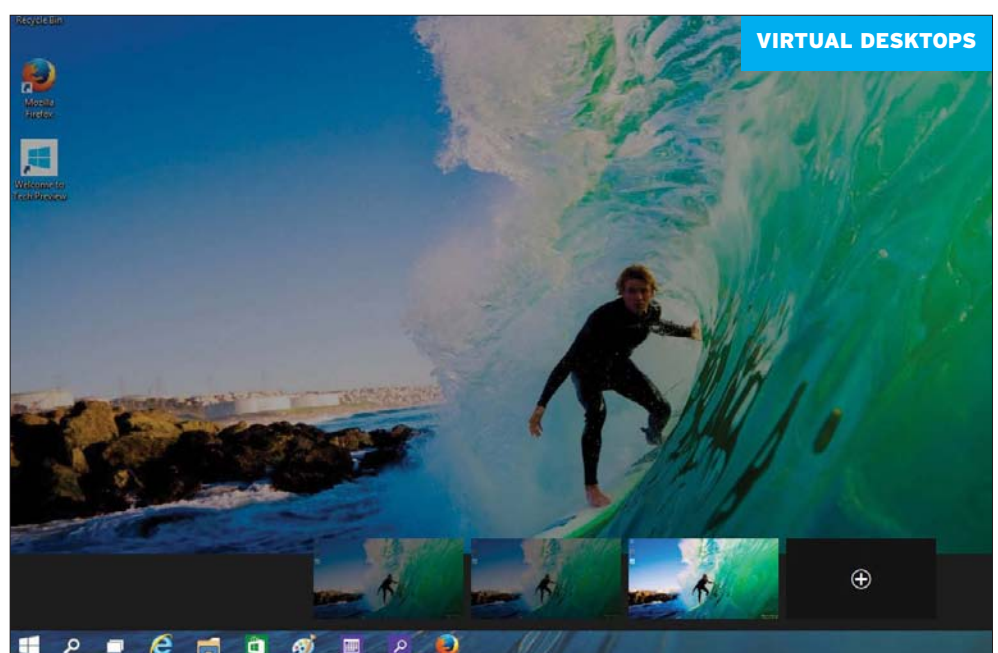
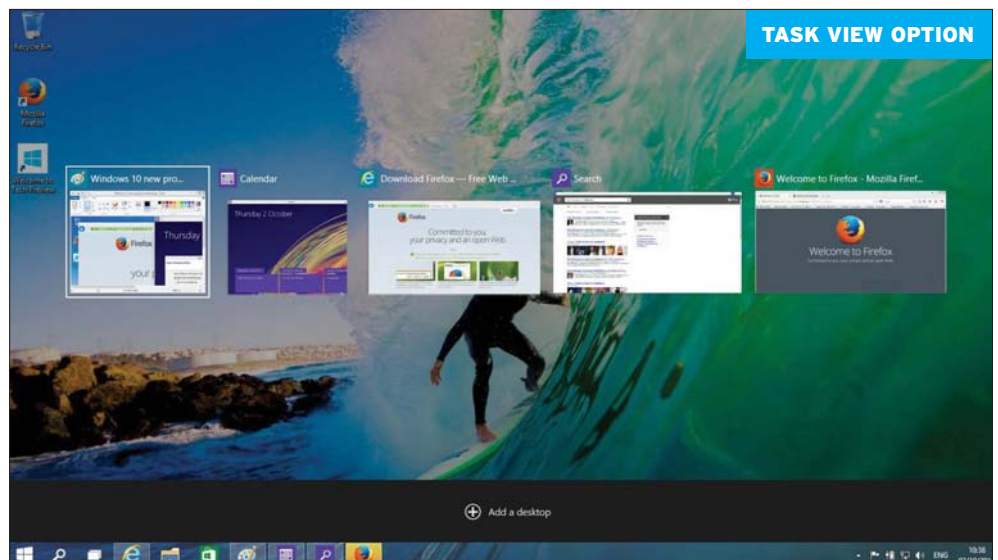


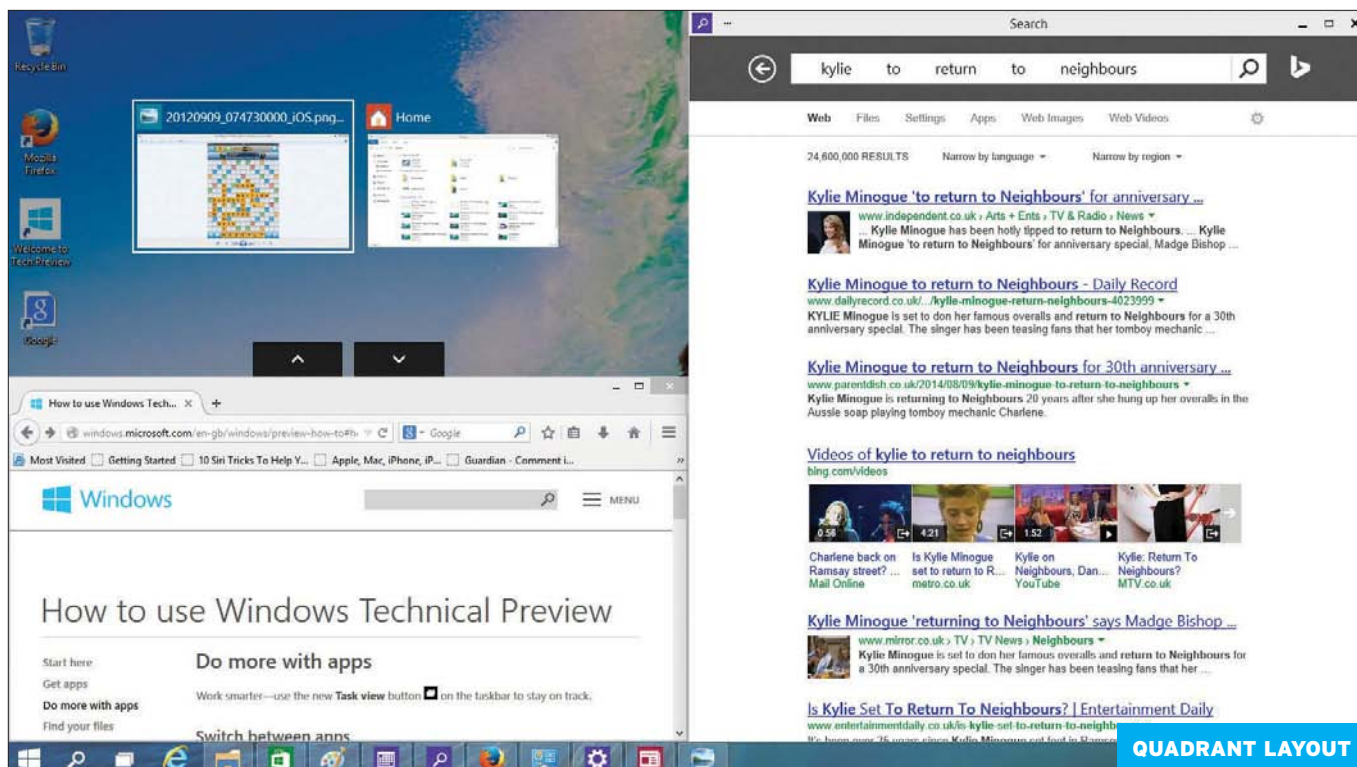
Another new feature is virtual desktops. To see the desktops you click the new Task View button (see above), which sits to the right of the new search icon - the magnifying glass, and looks like the multitasking icon in Android.

And this is the view you get - see middle-right screenshot. It isn't dissimilar to the Alt-Tab task switching view and is more like the Expose feature in Mac OS X. You can see enough detail to quickly choose which app you want to switch to.

Tip: If you hover your mouse over one of the thumbnails, a red cross appears allowing you to close the program - a feature that didn't exist in Windows before, but makes complete sense.

At the bottom of the screen is where your virtual desktops are displayed, but since there aren't any yet, you'll have to click on 'Add a desktop' - see the Virtual Desktops screen, right. Click on a desktop to go to it, and you can then open any apps you want as usual. These will then show on the thumbnail, and only those open on that particular desktop will be shown as larger images, as in the Task View mode. This is slightly different from pressing Alt-Tab, which will show all running apps. If you prefer shortcut combinations instead of





QUADRANT LAYOUT

clicking on icons you can press Win-Tab to bring up Task View.

TIP: You can switch between desktops using the shortcut Ctrl-Win-left arrow or Ctrl-Win-right arrow.

On each desktop there's a new quadrant layout for snapping apps. To snap an app, simply click on the title bar and drag it to a corner of the screen. The quadrant will darken to show you've selected it, and you can release the mouse button to snap the app into that quarter of the screen. (You can also snap left and right to make the app fill half of the screen as before)

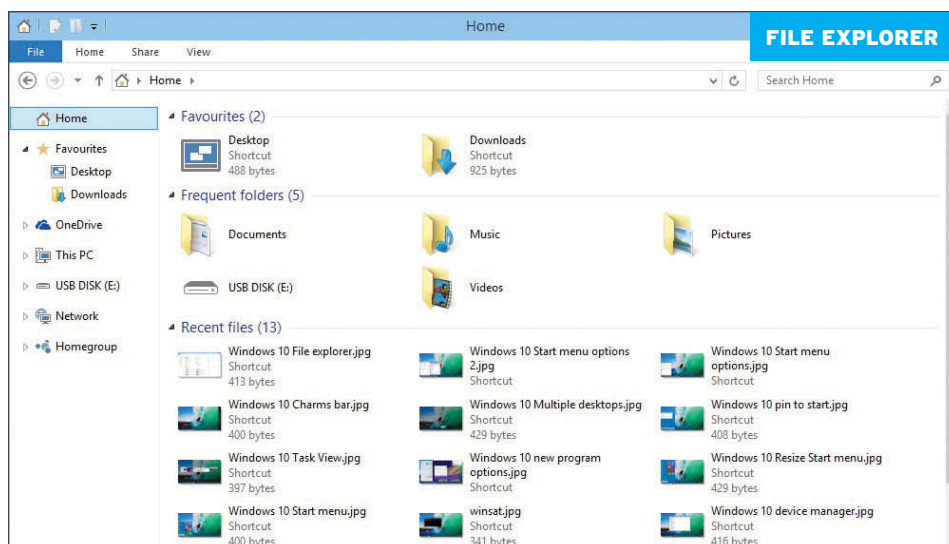
In the above screen, you can see we've snapped the Bing app to the right-hand side, and Firefox to the bottom left. In the remaining space, the Snap Assist feature offers other apps which are running that you can click on to fill it. Arrows below the thumbnails let you scroll through all the open apps. It's a neat feature that saves time when you want to have several apps in view at once.

File Explorer has been given some attention as well. Now, there's a Home icon at the top of the tree in the left pane, and this is the default view when you open an Explorer window. (You can do so by clicking

the folder icon on the task bar, or by pressing Win-E).

What's great about the Home view is that it incorporates not just your favourite folders, but frequently accessed ones and - below that - recently accessed files.

The final new feature in this build is for real geeks. At last, you can copy and paste directories in and out of the command prompt. Even if you do this infrequently, it's a real time saver. Instead of having to type each subfolder name or use the Tab key to auto-complete long folder names, you can now use Ctrl-C and Ctrl-V as if it were Notepad.



NOTEPAD

WI-FI

Finally in any room*



- ✓ Better than any Wi-Fi repeater
- ✓ Enjoy Wi-Fi in any room*
- ✓ Best reception for smartphones and tablets



dLAN® 500 WiFi Starter Kit

- Unpack, plug in, get started
- Improves Wi-Fi reception and range
- Engineered in Germany
- 3-year manufacturer's warranty

* Required: broadband Internet connection, router and active power sockets within one property.

amazon.co.uk

The electronics specialist
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currys

PC World



More information:
www.devolo.co.uk/wi-fi
Tel.: +44 (0)1865 784344
Email: sales@devolo.co.uk

devolo

The Network Innovation

TEST DRIVE WINDOWS 10 FOR FREE

How to get Windows 10 now:

Install Windows 10 Technical Preview from USB or DVD

Microsoft has made a very early build of Windows 10 available to everyone, but with some caveats. So, before you download and install it - and we'll show you how below - then heed these warnings first.

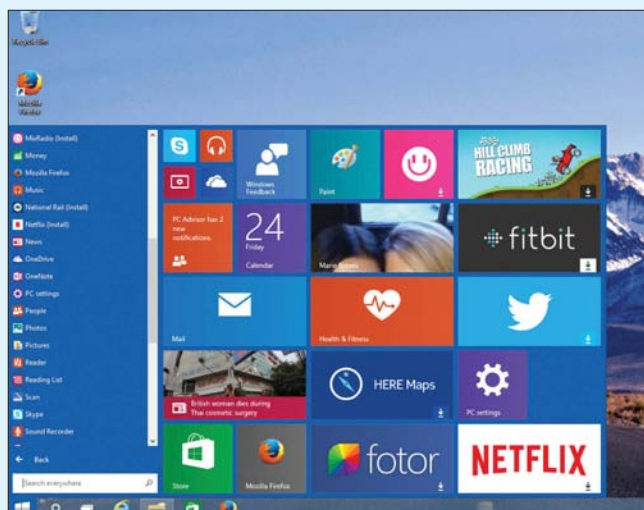


WARNING 1: This is an unfinished, unstable operating system. Do not, under any circumstances, install it on the PC or laptop you use every day and rely on. (From the short amount of time we've been using it, it's stable enough to play with.)

WARNING 2: Do not upgrade from an existing version of Windows. Although this is possible, there are no guarantees you won't lose data or programs, nor that you will be able to downgrade if you decide you don't like it.

WARNING 3: There are many missing features, particularly for consumers, such as Windows Media Player. The Technical Preview is meant for businesses and PC enthusiasts to get a feel for how the new interface will work on PCs and laptops.

With these out of the way, here's how to install the Windows 10 Technical Preview. We're assuming a level of knowledge here, so if you can't follow the instructions below, this build of Windows 10 probably isn't for you.



Windows Insider Program Before you install How-to

Download Windows Technical Preview

Follow these steps to download Technical Preview:

1. Sign up for the [Windows Insider Program](#).
2. Read the [system requirements](#).

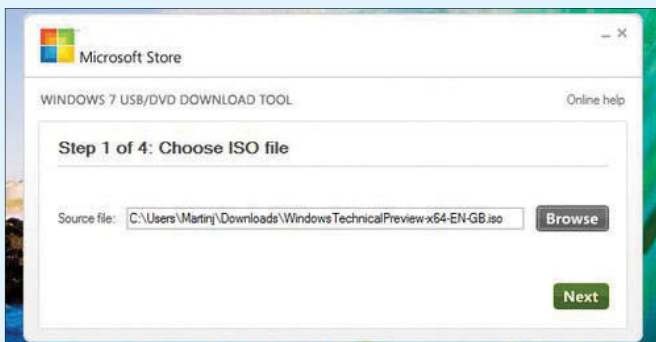
START

Head to preview.windows.com and click on the link to sign up for the Windows Insider Program. You'll need to sign in with a Microsoft ID - it's free to create one if you don't have one.

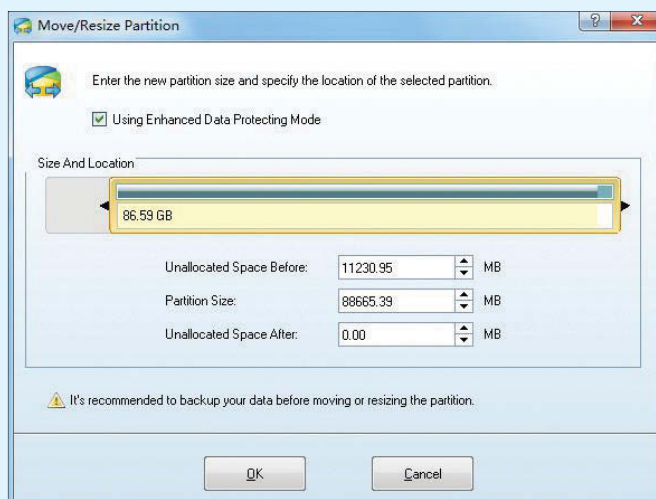
Language	Link to download
English 64-bit (x64)	Download (3.81 GB)
English 32-bit (x86)	Download (2.93 GB)
English (United Kingdom) 64-bit (x64)	Download (3.79 GB)
English (United Kingdom) 32-bit (x86)	Download (2.94 GB)

2 Return to the page in Step 1 and scroll down to see the download links. Fortunately, there's a UK English version. You can choose either the 32- or 64-bit version.

3 Download Microsoft's Windows 7 USB download tool, which will allow you to write the ISO image you saved in Step 2 to a USB flash drive. You'll need a minimum of a 4GB flash drive, and all the data on it will be erased.



4 Prepare a PC or laptop on which you're going to install Windows 10. We suggest using a spare hard drive to keep things as clean as easy as possible. If you don't have one, then use a partition tool to create a new partition on an existing hard drive.



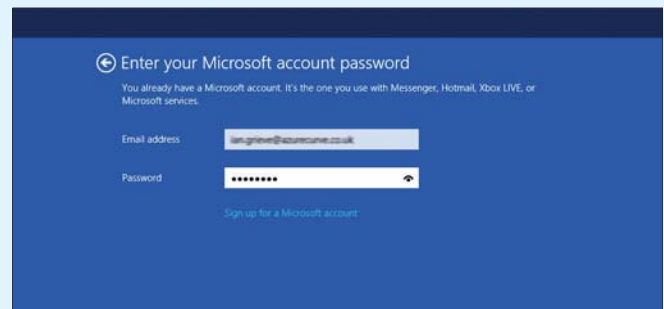
5 Reboot your computer and insert your flash drive or DVD. If it fails to boot from that device, then go into the BIOS and set the flash drive or DVD drive as the primary boot device.

6 You'll see a Windows logo, followed by a language selection – UK English should be selected. Then you'll need to choose where to install Windows. If you're using a spare hard drive, delete all partitions or simply choose an appropriate partition in which to

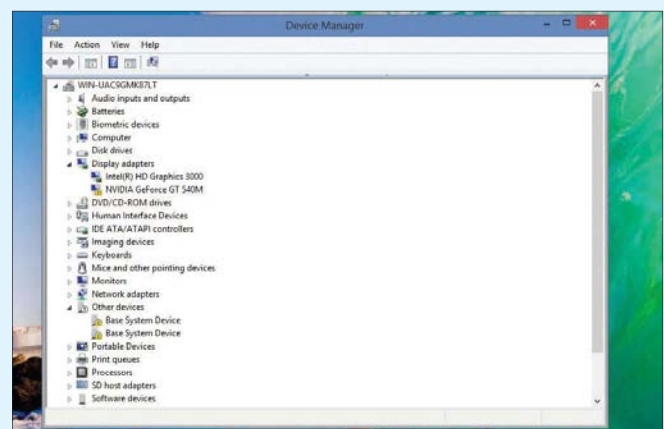
install Windows 10. It will need to be formatted as NTFS, otherwise you'll need to delete the partition and install it in the unallocated space afterwards.

7 Keep an eye on the install as it will reboot your computer and if you don't remove the DVD or flash drive it will boot from it again, and you could end up repeating Steps 5 and 6.

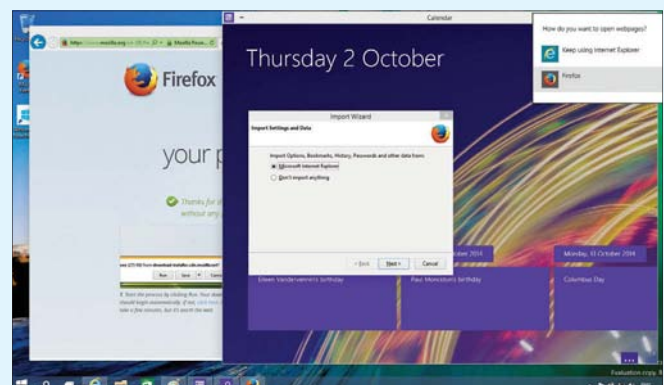
8 Windows 10 will boot, ask you a few questions and then ask you to sign in with your Microsoft ID. You won't need an activation key, but just in case you're asked, the key is NKJFK-GPHP7-G8C3J-P6JXR-HQRJR



9 When you finally get to the Windows 10 desktop, allow a bit of time for Windows 10 search for drivers for your hardware. Initially on our test laptop, it seemed as though the graphics card drivers hadn't been found and installed. However, after a few minutes this was all done in the background and the correct resolution set.



Still, it's worth heading to Device Manager and checking that all drivers are installed, especially for the system chipset. You won't find Windows 10 drivers from your motherboard manufacturer of course, but Windows 7 or 8 drivers may work.



WINDOWS 10



OS X is an exciting but solid upgrade, Windows 10 an OS for all devices - it's 10 vs 10 10.10

In our Windows 10 vs OS X 10.10 Yosemite comparison, we pit together the two upcoming operating systems from Microsoft and Apple.

Challenge for Windows 10

Microsoft faces a difficult challenge – it must replace the unloved Windows 8 with something more popular in order to stimulate a moribund PC market. At the same time, it can't afford to step back from its push to make Windows a viable choice in the burgeoning mobile space. Windows 8 was an uncomfortable compromise between touchscreen tablet OS and desktop Windows. Windows 10 must do better. That's why it's version 10 rather than 9.

Microsoft has said that Windows 10 will be the operating system that works across mobile, tablet and

desktop systems, with apps that work on all three platforms. And it has reinstated popular features such as the Start menu, as well as adding new multitasking features that further gel the old and new interfaces of Windows.

On the contrary, Apple has both a solid desktop platform in OS X, and a hugely successful mobile platform in iOS for iPhone and iPad. Two years ago observers were talking about the two being merged, but Yosemite is a separate operating system to iOS 8. It has, however, had a total visual overhaul. And many of the new features are aimed at making Macs work well also work with iPhones and iPads.

Release date

Microsoft recently revealed the first technical preview beta of Windows

10, which is currently available to all, and the company will reveal more about the OS next April, likely at the Build developer conference. And it is determined to launch the final code to multiple platforms in the middle of 2015.

Yosemite is available to download now from the Mac App Store.

Price

Despite anything you may read elsewhere, at the time of writing Microsoft has not settled on a price for Windows 10.

So how to price the operating system. This is the classic innovator's dilemma: Microsoft has existing products that make a lot of money, but it's building new and better products for which it cannot charge as much. The market has changed. Apple, for example, gives

VS OS X 10.10 (YOSEMITE)

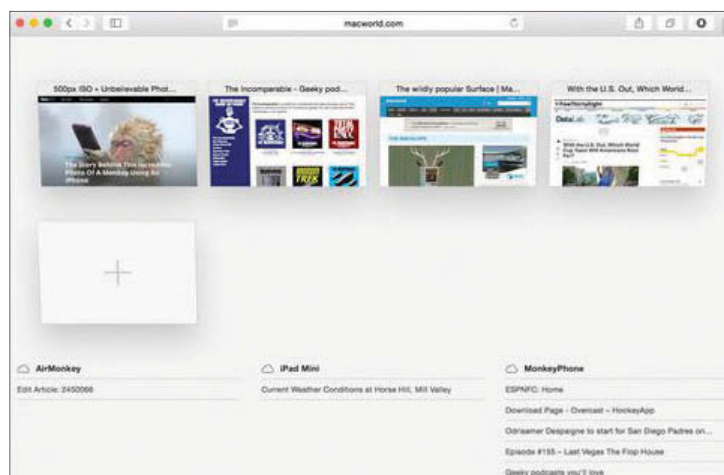


away Yosemite for free, and PC- and laptop makers are feeling the pinch as smartphones and tablets eat into their markets.

So how much will Windows 10 cost? Not a lot. Indeed, we wouldn't be surprised if it was free to consumers, although not to OEMs who purchase licences to put on PCs and laptops they sell. Even if customers have to pay to upgrade to Windows 10 they won't have to pay much. Just a few pounds.

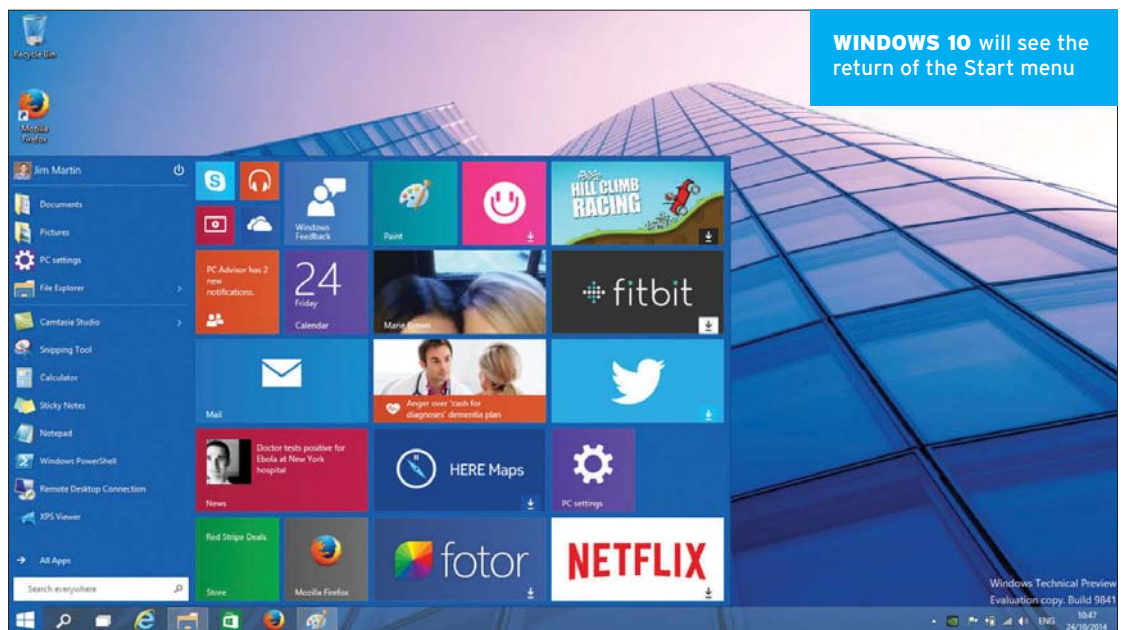
New features

It is a strange world in which we live – a world in which Apple is making sensible but conservative, iterative decisions, and Microsoft is shooting for the moon. Windows 8 was a radical step, putting a touchscreen UI into a desktop OS. It was all part of an attempt to drag the OS



into the mobile space dominated by Apple and Google. Windows 10 takes that process further, but also backtracks in some areas to shore up support.

OS X YOSEMITE has been given a visual overhaul



Meanwhile Apple simply develops OS X, without making radical changes. Yosemite links up better with iOS than any previous OS X, but unlike Windows 10 it is not an attempt to merge with its little sister in the mobile space.

Desktop and mobile

The key to Windows 10 is marrying up the two disparate elements of Windows 8 in a way that makes sense to consumers. One thing that Microsoft has to do is allow Windows Phone and Windows RT apps to run on both Windows Phone and Windows. Even Xbox apps should become cross compatible, and Microsoft has promised all of

the above. You will also be able to pin Metro apps to the taskbar and Start Menu, and open and use them from within the Desktop portion of Windows 10.

On the new Start Menu, you can see a list of recently used apps and the option to select a list of 'All apps'. 'All apps' includes both Desktop- and Metro apps, showing the move to match them up in one OS. This way Microsoft can satisfy both those users who miss the Start menu, and also make Metro apps more useful.

Microsoft even seems to suggest that the Windows Start Screen will only appear contextually - when a touchscreen is present. Also expect to see Kinect-based 3D gestures to be enabled for laptops with 3D cameras - the ability to control your computer with gestures. Meanwhile in the Technical Preview at least, the Charms are mostly absent, but universal search is more prominent.

One key - although less obvious - development is likely to be much improved power management.

The rise of mobile devices has made battery life a key battle ground for Windows. Intel has done its part, massively improving power management with its latest generation of mobile processors. But the Windows software needs to keep pace, so expect Microsoft to make great claims for

Windows 10's power management capabilities (when it is finished).

We expect that Windows 10 will be 64-bit only, although we expected that for Windows 8 and we were wrong. A lot depends - as ever with Microsoft - on what OEMs want to build, and what Intel gives them with which to build. The arrival of Core M chips means that both Intel and Microsoft will be heavily pushing powerful but portable laptops, hybrids and convertibles.

Bright new look

The first thing Mac users will notice when they install Yosemite is the visual changes. OS X has been given a visual overhaul. All of the icons have been freshened up, and the 3D design elements of old have been thrown over to be replaced by flatter, more colourful surfaces. The red, yellow and green buttons that are used to open, close and expand windows are now flat circles.

Many of Yosemite's design elements seem to suggest that Apple intends to increase the number of Macs it sells with Retina displays. We see the Thin Helvetica Neue font replacing the thicker Lucida Grande, suggesting that a sharper resolution is now desirable for clarity. And there's more overlaying transparency in general navigation.

Interaction with iOS

Apple has branded as 'Continuity' a series of features that it says will help iOS and OS X work together.





For instance: the company is working on making AirDrop work with between Macs, iPhones and iPads. Macs have for some time been able to use AirDrop to transfer files, and iOS devices got the feature in iOS 7. OS X Yosemite will allow them to talk to each other, however, so for the first time you will be able to AirDrop files from mobile to desktop and vice versa.

And then there is Handoff, via which Yosemite and iOS 8 will know what you are doing on all of your Apple devices, and therefore be able to work continuously. So if, for example, you are writing an email on your iPhone, the Mail app on your Mac will open and you can continue to compose your message using a full-size keyboard. Or any web page to which you browse on one device will be remembered for quick access on the other. You'll be able to view- and reply to text messages on your Mac, too.

Indeed, Apple has put a lot of effort into the text messaging side of things. You can already use iMessage to send web-based text messages from your Mac. With Yosemite you will be able to record voice messages and send them over IP to phone or Mac. You'll even be able to take calls on your Mac.

One other, critical, link up between iOS and OS X in Yosemite is iCloud Drive. With iCloud Drive in OS X Yosemite, all files associated with apps on either iPhone/iPad or Mac will be accessible from Finder. All the data you save to iCloud will be available from any Apple device.

You'll get 5GB per month free, upgradable for a small fee.

Other new features

The Safari web browser has been revamped, while the System Preferences have been overhauled. The Calendar app has seen some minor improvements, and there are some time saving tweaks to the Mail app: namely Markup and Mail Drop. The former is the ability to create a PDF or image file from an email, the latter lets you automatically upload attachments to iCloud. There are also some improvements to the Notification Centre. Find all your notifications in the Today tab, and

use Spotlight with a whole new look and feature set. There are also new functions for Widgets, and a range of new Widgets from which to choose.

An early verdict

Mac users will install Yosemite in their millions. Some will complain about changes, many will initially dislike, and then grow to love the design. But it will form just part of an ongoing development of the Mac, allowing greater collaboration between Mac and iPhone.

Windows 10 is also a development of past operating systems, but it will have to build on an unpopular Windows 8 without undoing some of the radical moves that Microsoft has made to bring together mobile- and desktop computing. Expect Windows 10 to cause consternation, but to bring positive change. ☒



>> iPad Air 2

Tablet

Apple has refreshed its full-size tablet with a thinner, lighter design and a new gold colour. It also has a new A8X processor, 8Mp iSight camera, barometer, Touch ID fingerprint scanner and anti-reflective coating.

£399 inc VAT

apple.com/uk



iPad mini 3 >

Tablet

The new iPad mini remains the same price as its predecessors but doesn't get half as many upgrades as the iPad Air. It comes in gold, gets the Touch ID fingerprint scanner and a 128GB model, but that's as far as it goes.

£319 inc VAT

apple.com/uk

Mac mini (2014) <<

PC

The long awaited update of the most compact Mac around leaves it looking the same, but up to 50 percent faster. It's equipped as standard with an Intel Core i5 processor, 4GB of RAM and a 500GB hard drive. Connectivity includes faster Wi-Fi and Thunderbolt 2.

£399 inc VAT

apple.com/uk



>> iMac with Retina 5K display

All-in-one PC

Apple's latest all-in-one offers an impressive 27in 5120x2880 screen that can display 14.7 million pixels. Elsewhere it has an Intel Core i5 processor, AMD Radeon M9 GPU, 8GB of RAM and a 1TB Fusion Drive but can be upgraded.

£1,999 inc VAT

apple.com/uk



CHRIS
MARTIN**Nexus 9** >>*Tablet*

Switching partner from Asus, Google has gone to HTC to build the Nexus 9, and introduces Android 5.0 Lollipop. It comes with an nVidia Tegra K1 64-bit processor, 8.9in IPS screen and an 8Mp rear camera.

£319 inc VATplay.google.com/store**Nexus 6** <<*Smartphone*

Although Google is selling the company, the Nexus 6 is made by Motorola and resembles the Moto X. The Android Lollipop device has a 5.9in screen with Quad HD resolution. There's a Qualcomm Snapdragon 805 processor and a 13Mp camera with optical image stabilisation.

Around £500 inc VATplay.google.com/store**Nexus Player** ^*Set-top box*

Asus is Google's partner for the Nexus Player set-top box. The puck-like device runs on Android TV and lets you watch movies, music and videos from your Android, iOS or Chrome device. It can also play Android games via the accompanying controller.

\$99 (UK price to be confirmed)play.google.com/store



« Tesco Hudl 2

Tablet

Following the success of its first own-brand tablet, Tesco is back with the Hudl 2, which is only £10 more. It comes with Android 4.4 KitKat, an 8.3in Full HD screen and an Intel Atom processor.

£129 inc VAT
tesco.com

>> Basis Peak

Activity tracker

Peak from Intel-owned Basis aims to provide precise exercise, heart rate and sleep monitoring around the clock. It has a touchscreen and is compatible with iOS and Android. Basis says it is water-resistant and has a four-day battery life.

\$199 (UK price to be confirmed)
mybasis.com



<< Flexson VinylPlay

Record player

Flexson's latest Sonos wireless hi-fi accessory is its most interesting yet. Moving on from stands and skins, the VinylPlay is a turntable that plugs simply into a Sonos network, letting you archive and stream your records.

£329 inc VAT
flexson.com



>> HTC Re

Camera

HTC's Re handheld camera helps capture moments better in photos and video. It has a 16Mp CMOS sensor, wide-angle lens and 8GB of storage. It switches on when picked up and content is automatically backed up.

£169 inc VAT
htc.com/uk





Kazam Tornado 348

Smartphone

The UK-based smartphone maker is claiming the world's thinnest device at just 5.15mm. The Tornado 348 has a 4.8in 720p screen, octa-core MediaTek processor, 16GB of storage and an 8Mp camera.

£249 inc VAT
kazam.mobi



EE TV Set-top box

Mobile network EE has decided to take on the likes of Sky, Virgin Media and BT with its own Freeview box. It's similar to YouView but only comes with BBC iPlayer, Wuaki.tv and Demand 5 at launch. Its special weapon is the ability to stream content to up to four devices around the house simultaneously.

£300 inc VAT (free to broadband customers)
ee.co.uk



Tokyo Flash Kisai Radioactive

Smartwatch

This USB-rechargeable watch isn't smart but it will get you noticed. The time is displayed when you press the button on the side, and a combination of hour and minute readouts gives the precise time. Charging takes 3.5 hours, and you'll need to do so around once a month.

£95 inc VAT
www.tokyoflash.com

Lenovo Yoga Tablet 2 Pro

Tablet

This year's Yoga Tablet 2 line-up also offers Windows models but the Android-powered Pro model is the most interesting. In this case, Pro stands for projector, as it has one built-in. It's designed for home use so has a 13.3in screen and a touted 15-hour battery life.

£449 inc VAT
lenovo.com/uk/en



£1,399 inc VAT

Contact

■ apple.com/uk

Read more

■ tinyurl.com/pntumpw

Specifications

13.3in (2560x1600, 227ppi)
LED-backlit display;
2.8GHz dual-core Intel
Core i5 processor (Turbo
Boost up to 3.3GHz) with
3MB shared L3 cache;
512GB PCIe-based flash
storage, configurable to
1TB flash storage; Intel
Iris graphics; 720p
FaceTime HD camera;
MagSafe 2; 2x Thunderbolt
2; 2x USB 3.0; HDMI; SDXC;
headphone socket;
1.8x31.4x21.9cm; 1.57kg

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



LAPTOP

Apple 13in MacBook Pro with Retina display (2.8GHz, 512GB, mid-2014)



As well as offering 15in models, Apple has updated its 13in MacBook Pro with Retina display, substituting a slightly faster Intel Core i5 chip, and dropping its price by £50.

When Apple last revised the 13in MacBook Pro in the autumn of 2013 with a Haswell-generation Intel CPU, it offered a choice of 2.4GHz or 2.6GHz dual-core Intel Core i5 processors.

Now, we find the same choice of chips, but bumped up by 0.2GHz – to 2.6GHz and 2.8GHz respectively for the ‘good’ and ‘best’ models.

There’s also a configure-to-order (CTO) version with Intel Core i7 processor, albeit still with two rather than four cores, running at a baseline clock frequency of 3GHz.

For this review we tested the top-of-the-range model, with a 2.8GHz Core i5 processor, the same 512GB solid-state flash drive as before and the newly standardised 8GB of memory. This chip can also overclock itself automatically when required with Intel’s Turbo Boost, up to 3.3GHz.

Processor

Geekbench 3 is a cross-platform application that can measure the raw performance of a CPU. Most processors today have two or more processing cores, and the benchmark tests both a single core working and multiple cores working on the same task at once.

Note that we used Geekbench v3.1.6 for better comparison with earlier models; Geekbench v3.2.0 has just launched, but returns slightly different results with the same hardware.

We compared the results of the mid-2014 13in model with its predecessor from late 2013. In single-core mode, scores rose from 3313 to 3307 points, indicating a speed increase of 6.2 percent. In multi mode, the result increased from 6719 to 7086 points, giving a 5.5 percent change.

In the Cinebench 11.5 benchmark test, the new 13in Retina MacBook Pro scored 1.38 points with a single processor core, and 3.15 points in multi-core mode. These numbers compare well with the ‘best’ version of the previous generation, with its 2.6GHz Intel Core i5 (i5-4288U), which scored 1.3 and 3.13 points respectively, indicating new speed increases of 6.2 percent and 7 percent respectively.

In the Cinebench 15 benchmark test there was a similar change. Last year’s model with 113 and 281 points for single and multi modes moved up to 120 and 299 points, positive increases of 6.2 percent and 6.4 percent respectively.

Graphics

Nothing has changed in the graphics specification since the late-2013 13in MacBook Pro. Both use Intel

Iris graphics, also known as Intel Iris Graphics 5100. Consequently, there’s no reason to expect any change in graphics performance.

You may also have heard of Iris Pro graphics as found in the entry-level 15in Retina MacBook Pro. The difference here is the non-Pro Iris graphics processor does not have the added video memory cache within the same die to accelerate performance. This Iris Pro graphics processor is still integrated into the same die as the main CPU, and can adjust its speed depending on dynamic requirements – between 200MHz and 1.2GHz.

The OpenGL section of Maxon’s Cinebench test showed that graphics performance between 2013’s 2.6GHz model and this year’s 2.8GHz option are in effect the same.

In Cinebench 11, we saw a result of 26 frames per second (fps) for both models; and they scored 22fps in the later Cinebench 15 test.

Turning to some action games, when we tried Batman: Arkham City, we found the almost identical just-playable framerate when set to a screen resolution of 1280x800 pixels and Medium detail, 31fps for last year’s 2.6GHz MacBook Pro and 32fps for this 2014 model.

We tried the more graphically challenging new Tomb Raider (2013) game. This proved the undoing of the Intel Iris Graphics 5100 in this laptop. Set to 1280x800 resolution,



and with Normal detail settings, it averaged only 14fps. Turning down detail level to Low nudged up the framerate to 17fps, but this is still too slow to enjoy playing the game.

There is a way to play the Mac version of Tomb Raider, though - select Legacy OpenGL from the game's Advanced settings. Exact differences in the version of OpenGL are not specified, but we found that framerates of 33fps were possible using the same resolution and a Normal level of detail.

Display

Following the chunkier pre-Retina 13in MacBook Pro, this laptop is set to a virtual resolution that matches the 1280x800 resolution appearance. It's rendered by a double-sized 2560x1800 native IPS panel, set to a HiDPI mode in OS X. If you require more working space on your screen, or you're upgrading from a recent 13in MacBook Air, you may be more comfortable selecting a higher virtual resolution from the Displays option in System Preferences. Here you'll find 1440x900 to match the Air, as well as 1680x1050 modes.

The panel on our review sample was measured with the Spyder4Elite colorimeter, which indicated 94 percent coverage of the sRGB gamut and 69 percent of Adobe RGB.

These are good results by the standards of displays fitted to the MacBook Air, for instance, if behind the marginally higher 96 percent and 72 percent results we recorded with this year's 15in model.

The contrast ratio was very good, measuring 660:1 at a nominal 75 percent brightness setting (corresponding to 154cd/m²) and 740:1 when set to a full brightness of 329cd/m².

Luminance uniformity was more consistent than the 15in model, perhaps assisted by the smaller area of panel that required lighting. The greatest deviation was only 9 percent at the 50 percent brightness setting.

Overall colour accuracy was superb, averaging 1.35 Delta E from 48 colour swatches, with a peak error of 5.98 Delta E with the 1F tone.

These quantitative results don't effectively sum up the qualitative experience of Apple's Retina display: the pin-sharp text and graphics, consistent viewing from every angle and, most importantly, consistent typography and interface elements. The combination of these Retina displays and OS X graphical interface results in an excellent desktop experience.

As the best preconfigured version of 13in MacBook Pro, this model has the largest storage capacity of 512GB from its PCIe-attached internal flash drive. If you need more space, there is a further CTO option available for a 1TB internal flash drive, which adds £400 to the price of £1,399.

In our review sample this part was sourced from Samsung (SM0512F). The measured results were very impressive, in line with the same storage component we tested in the top MacBook Pro (Retina, 15in, mid-2014) and top MacBook Pro

(Retina, 13in, late 2013). In our tests, it had phenomenal SATA-busting read speeds, peaking at 795MB/s in the QuickBench test, and averaging 791MB/s for data sized between 20MB and 100MB.

Write speeds were very close, peaking at 746MB/s, and averaging 742MB/s with the same test.

Compare this with the 128GB flash drive in the entry model, whose write speeds were only half as fast as its reads, reaching a maximum sequential figure of 322MB/s, and averaging 319MB/s. Larger SSDs typically benefit with increased performance as more data channels are available.


Small-file transfers remained speedy, averaging 201MB/s and 366MB/s for random reads and writes (4kB to 1024kB data). These results translate into an extremely responsive notebook for everyday tasks like launching applications, and opening and saving files.

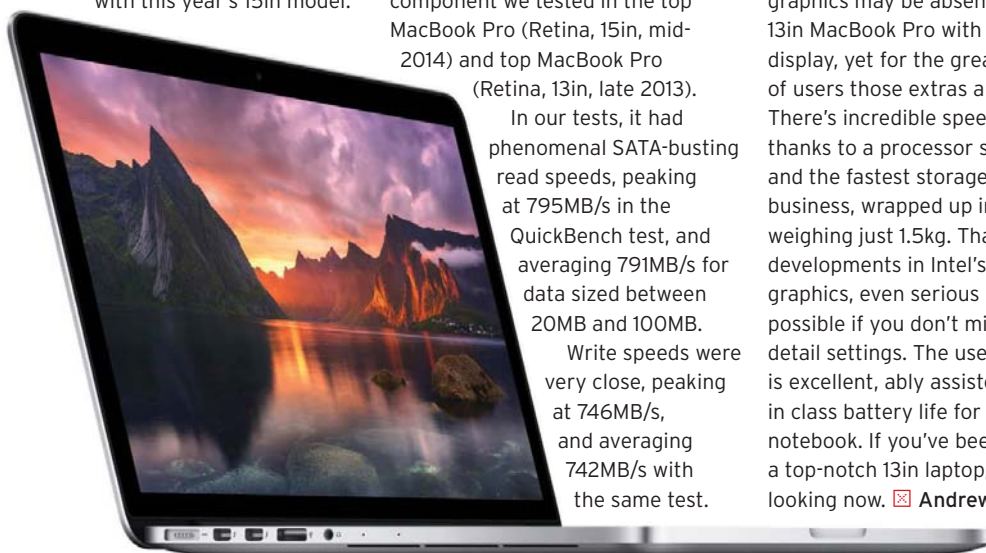
Battery

Our battery longevity test is based on playing a looped MPEG-4 video hosted on a NAS drive on the local network, connected via 802.11ac Wi-Fi to an Apple Time Capsule as router. Screen brightness is set to a calibrated level of 120cd/m², which corresponded here to an 11.25 setting in OS X.

When we tested last year's 'best' 13in model with 2.6GHz processor, we saw a battery life of nine hours, 55 minutes in this looped-video wireless test. This year, we broke the 10-hour barrier with 10 hours, seven minutes for the 'good' 2014 model. This model however with 2.8GHz Intel Core i5 ran even longer, lasting for 10 hours, 42 minutes before the system went into sleep mode.

Verdict

Quad-core processor and discrete graphics may be absent from the 13in MacBook Pro with Retina display, yet for the great majority of users those extras are overkill. There's incredible speed to spare thanks to a processor speed bump and the fastest storage in the business, wrapped up in slim laptop weighing just 1.5kg. Thanks to developments in Intel's integrated graphics, even serious gaming is possible if you don't mind lowering detail settings. The user experience is excellent, ably assisted by the best in class battery life for a professional notebook. If you've been looking for a top-notch 13in laptop, you can stop looking now.  **Andrew Harrison**



£129 inc VAT

Contact

■ tesco.com

Read more

■ tinyurl.com/nxp6m3b

Specifications

8.3in Full HD (1920x1200);
Android 4.4 KitKat; Intel
Atom quad-core
processor; 16GB storage;
microSD (up to 32GB);
5Mp rear camera; 1.2Mp
front camera; dual-band
Wi-Fi; stereo speakers;
8-hour battery life;
128x224x8.8mm; 401g

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★★



TABLET

Tesco Hudl 2



Although Tesco said at the launch that the price remains the same as the original (tinyurl.com/m52L7yz), version 2 of the Hudl 2 is in fact £10 more, at £129. We're not complaining, merely pointing it out, and the price is still extremely good value for money. The original, incidentally, remains on sale at the lower price of £79 while stocks last.

Once again, Tesco is allowing the tablet to be bought through ClubCard Boost, so every £5 worth of vouchers gives you £10 towards the tablet; accordingly it can be yours for as little as £65 worth of vouchers. As if that didn't sound good enough already, the Hudl 2 also comes with £60 worth of vouchers in the box. Some require a minimum spend but £25 of Blinkbox credit is a nice touch.

Design and build

The Hudl 2 has a similar but updated look and feel as the original. It uses the same type of plastic casing, which has a nice matt finish and a rubbery grip to it. It feels nice to hold in the hand although as Hudl 2 is larger, it is also a little heavier at 401g, up from 364g. It is, however, thinner at 9mm rather than 10.5mm.

Tesco has done a good job of making the Hudl 2 look more sleek and desirable. Its clean lines and rounded corners are pleasing to

the eye. A couple of caveats are that the holes for the rear speakers aren't neatly symmetrical, with one side getting cut off by the camera and the seam which runs around the edge.

There are more colours to choose from this time round, with a total of eight: blue, red, orange, white, pink, purple, turquoise and black. There are also four different cases ranging from £10 to £30 available in the same colours, meaning plenty of colour combinations. Handily, the website can show you combinations before you buy. If kids are going to use it, then there is a child-specific bumper case to protect the Hudl 2 in drops.

Hardware

The main upgrade for us is the screen, which is the best feature of the tablet. It's bigger and joins the increasingly popular 8in segment. At 8.3in it matches the LG G Pad 8.3 (tinyurl.com/n8obc7n) and uses an impressive Full HD resolution of 1920x1200. The display is bright, offers good viewing angles and nice colours. With a pixel density of 272ppi, everything looks nicely crisp, so we're seriously impressed given the price. And that's not where the upgrades stop.

Tesco says the Hudl 2 is three times faster than its predecessor.

This is thanks to an Intel Atom quad-core processor, which clocks up to 1.83GHz. Tesco has doubled the amount of RAM to 2GB.

Although the Hudl 2 was not three times faster in our Geekbench 3 processing test, its score of 2165 is a nice improvement on the Hudl 1's 1371. For graphics it managed 17fps in the T-Rex test, while the original scored just 5fps. Web browsing is also better than before, with a time of 768ms in SunSpider a great improvement on the not so speedy 1397ms of the Hudl 1.

Overall, we're impressed with the performance of the Hudl 2. The device is nippy and smooth the vast majority of the time and copes with web browsing and gaming very well. There are still little signs of lag when switching between user profiles and occasional jerkiness when moving between homescreens but it's nothing major.

There's just one model of the Hudl 2 available, which offers 16GB of storage. That's not bad and if you need more, you can do so via the microSD card, although this only accepts up to 32GB cards. However, it's a little disappointing that only just over half the internal storage provided is available when you use it out of the box, as a lot is taken up with the operating system and additional software.



The Hudl's rear camera has been beefed up to 5Mp but the front, strangely, drops to 1.2Mp. There's still no LED flash and realistically the performance still isn't great. The camera can take an age to focus but if you're patient, you can get some snaps good enough for sharing online. The front camera is pretty grainy, so video calls won't be the clearest but at least they're doable.

As before, there are rear-facing stereo speakers and there's Dolby sound to boot. It's a shame that they are rear-facing but nevertheless the experience is pretty good considering the price of this tablet.

As before, the Hudl 2 has dual-band Wi-Fi, GPS, a micro-HDMI port, and Tesco says that it will give eight hours of battery life, which is one hour less than the Hudl 1 but this is probably down to the new screen. Battery life was good, if nothing amazingly special. With varied usage, the Hudl 2 will last a few days before needing a charge. If you use it heavily for videos, gaming and web browsing, be prepared to have to top it up regularly.

Software

Software is up to date with Android 4.4 KitKat, and Tesco has made the wise decision of leaving the operating system mostly stock or plain vanilla (as Google made it).

We say mostly because Tesco has added a few bits and pieces including My Tesco, which is one swipe away from the main homescreen or can be summoned by a tap on the T icon. It's a hub for everything Tesco from grocery shopping to Blinkbox. The Hudl 1 also did this but the new version is vastly improved with a Google Now card-style interface which allows you to hide or remove elements.

To help newcomers, Tesco has created a curated Top Apps list to download out of the box. The Google Play store is supposedly too daunting for some. There's also a Get Started app to help users get to grips with the software including customisation, privacy and shopping.

Both these, as you would expect, encourage you to use Tesco's services but you can, of course, buy the Hudl 2 without being a regular Tesco customer and simply ignore these parts of the operating system.

Child safety

More handy in the long run, for some users anyway, are the built-in parent controls. This app displays only in landscape but it helps you keep on top of what your kids can and cannot see with a safe browser and the ability to blacklist or whitelist specific sites or content. You can also set time limits for specific users to avoid them spending too long using it. Up to seven profiles can be customised in terms of age and suitability.

The system is easy to use and

very good but not flawless.

You can't, for example, set more than one time frame, so you'll need to rely on the time limit instead; and you can't set time limits for different tasks like reading and gaming. You can allow and block access to different categories in the web browser but the child will need to request access to specific websites and you have to grant access to the entire domain – for example, bbc.co.uk rather than bbc.co.uk/cbeebies. Another small annoyance is that you have to type in the full URL so putting in 'google' and hitting Enter won't work.

Verdict

The cameras are not great, but in almost every area the Hudl 2 has been improved and it's still a bargain at £129 or even less with ClubCard Boost. The software is good but takes up storage space and non-Tesco customers won't get the most out of it. A great screen, a decent processor and a microSD card slot make this an excellent tablet.  **Chris Martin**



£400 inc VAT

Contact

■ amazon.co.uk

Read more

■ tinyurl.com/pqtrxon

Specifications

4.7in (1280x720) IPS display; Qualcomm Snapdragon 800 CPU; 2GB RAM; 32GB or 64GB storage; Adreno 330 GPU; 4G LTE; GPRS; EDGE; 802.11 a/b/g/n/ac dual-band Wi-Fi; Bluetooth 3.0; NFC; USB connectivity via a Micro-USB 2.0; 13Mp camera; 1080p video at 30fps; 2.1Mp camera; Firefly; Dynamic Perspective and gesture navigation; 139.2x66.5x8.9mm; 158g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



SMARTPHONE

Amazon Fire Phone

The Fire Phone is exclusive to O2, with a choice of pay-as-you-go or contract deals. Pay-as-you-go is £400 for the 32GB model or £480 for the 64GB. On a contract the 32GB model is free if you pay a minimum of £33 per month, or £28 per month with a £40 upfront cost for the phone; if you want the 64GB model, the minimum price is £33 with a £50 upfront fee.

Build and design

All in all, the Fire Phone is a fairly chunky device, weighing 158g and measuring 9mm thick. It's the same size as the new iPhone 6 (tinyurl.com/Lnkvjkk), with a 4.7in IPS screen. Resolution is also slightly lower at 1280x720 pixels. With flush glass front and rear panels, it looks more like the iPhone 4, and also has a top-mounted headphone socket and sleep/wake button.

There are no buttons on the right-hand side but on the left are volume and a dual-purpose camera/Firefly button. At the bottom is a Micro-USB port for easy charging and syncing, and there's a physical home button below the screen. Stereo speakers hide behind grilles on the top and bottom edges, and produce decent audio with good stereo separation. The four corner-mounted sensors, however, are very obvious, and make the phone look a little messy.

Features

That 4.7in display is an IPS LCD capacitive touchscreen. It has a resolution of 720x1280 pixels, giving it a pixel density of 312ppi. That's good, but by no means great in the current market.

Amazon pairs a quad-core Qualcomm Snapdragon 800 CPU with 2GB of RAM, so performance is well looked after. Onboard storage options are 32GB or 64GB, although there is no storage expansion slot.

An onboard Adreno 330 GPU takes care of graphics performance.

In terms of media you get stereo speakers, and a 13Mp camera that takes images at 4128x3096 and has optical image stabilisation, autofocus and LED flash. It can capture 1080p video at 30fps, and there's a front-facing 2.1Mp camera for selfies and video calls.

Although the Fire Phone runs a similar operating system to Amazon's Fire tablets, this is basically a new OS in the smartphone world. It's based on Android but you wouldn't know it: there isn't a

might see recent achievements or settings or options. You get the idea.

What's not quite as obvious is that you can swipe in from the right to display upcoming calendar appointments, a weather forecast and your VIP contacts. Swipe in from the left and you get a menu bar that lets you jump to your music, videos, photos, apps, games and documents.

Also in the list are Shop and Prime, but they're not the only way Amazon integrates its services. Tap on Books and you'll see a shopping basket icon at the top right: a quick way to jump to the Kindle bookstore.

It's the same in Apps, Games and Audiobooks.

Tap on Videos and Amazon's Prime Instant service leaps into life.

While Amazon's selection of books and music rivals the best, it's a different story with apps and games. Both big-name and more obscure apps are missing. BBC iPlayer, Whatsapp, Real Racing 3, Waze, Just Eat, Fitbit and even the Nest smart thermostat app are all there, ready to install for free, but try to match the full set of apps you have on your iPhone or Android smartphone and you'll quickly find holes.

Internet banking apps are scarce, and you won't find any official Google apps such as Maps, Gmail or YouTube.

There's still no 4 on Demand app, nor ITV Player. If you also have a few smartphone-accessed gadgets, there's a good chance there's not yet an Amazon app available.

Firefly

Firefly is the main reason Fire Phone exists, and has been described as 'Shazam for the real world'. Using Firefly you can take pictures of just about anything, and the Fire Phone will extract the useful information in a semantic style. See a product you like, take a picture, and buy it.

Firefly uses the camera app to identify music, movies, TV episodes,



single

icon, button or font that's borrowed from KitKat or Jelly Bean.

If you've used a Fire tablet, you'll be right at home with the navigation. There's a carousel of recent apps and content, and you swipe upwards to see all your apps. Swiping down from the top brings up a revised control centre and notification area.

Selecting an item from the carousel displays context-sensitive options below it. Stop the carousel on the Silk web browser, for example, and you'll see a short list of recently visited websites. Rotate it to the camera and recent photos are shown. Go to a game or app and you

books, games, DVDs and other products. It can also recognise printed text such as web addresses, email addresses and phone numbers, and let you tap to go directly to the website, send an email or call a number without typing a digit.

Dynamic Perspective

Firefly can be useful as well as a gimmicky way for Amazon to make money from Fire Phone users. Dynamic Perspective, on the other hand, could be seen as pure gimmick as there are no sales tie-ins.

Dynamic Perspective is Amazon's name for the front-facing sensors which allow the Fire Phone to create a kind of glasses-free 3D experience. From the wacky, cinematic 3D lock screens, which range from an under-sea shipwreck to a pinball machine, Amazon has tried to incorporate it just about everywhere in Fire OS 3.6.

It works by sensing the position of your head relative to the screen, so moving your head or tilting the smartphone shifts the image on screen. There's a limited amount of movement, so you can peer to the right or left, up or down to see detail and objects that were previously off screen. In some apps (or the lock screen) it's almost like there's a larger screen hidden inside, and you're looking through a smaller aperture at it, seeing only a portion at one time. It's very odd.

From volume sliders and toggle switches to app icons, 3D is order of the day. Even menu text is 3D, which is just about OK for large fonts, but makes smaller text look blurry.

Some of the preinstalled games make good use of Dynamic Perspective, but these appealed only to our child testers.

Amazon has come up with its own maps app, which looks and works much like Google and Apple maps. Dynamic Perspective lets you change the angle of the map slightly, but it doesn't offer the range you get in Apple maps, for example. If anything, it's more akin to the parallax effect introduced for the wallpaper in iOS 7.



There are 3D outlines of buildings but only a few landmarks, such as the Gherkin, BT tower and Shard with textures. You can get driving and walking directions, as well as for public transport.

We're yet to be convinced by Dynamic Perspective as a must-have feature in a smartphone, but we do like the gestures.

In virtually every app, you can swipe in from the right or left - sometimes both - to show menus and other context-sensitive information or options. These can be invoked by tilting the phone left or right, and dismissed by tilting the other way. It works reliably too.

Another feature is auto-scrolling. It doesn't try to track eye movement but requires the user to tilt the phone up or down slightly. The more you tip, the faster a web page, for example, scrolls.

If you rotate the phone left or right (the swivel gesture), the control centre appears, offering quick access to the torch, the Mayday live tech support service, and notifications.

Finally, there's Peek, which shows extra information when you very slightly tilt the handset. Amazon says you can see the date a photo was taken, but this didn't work in our testing. Peek can be used by any app which chooses to implement it.

One feature Amazon has kept quiet is the Fire Phone's unnamed digital assistant. It's clearly a work in progress, but this Siri-like butler has an English accent and can search the web, send messages and make phone calls. Those core features are useful, though, and it means you can dictate messages. Recognition

accuracy was as good as we've come to expect from today's smartphones, and it's as good as Siri in that respect, even adding punctuation if you dictate that, too.

Cameras


Camera quality is increasingly important as smartphones take over from traditional digital cameras. The Fire Phone specs are impressive: 13Mp on the rear, with optical stabilisation, and 2.1Mp at the front.

While the front snapper is nothing special - it's fine for the odd selfie and Skype chats - the rear is pretty good. Images have realistic colours and are generally sharp and detailed. It's only when you zoom in that you'll find a lot of compression and smudgy textures. Plus, the quality in low light isn't great.

The camera app is shared with Firefly, which can be confusing. A long press of the dedicated shutter button starts Firefly, while a short press wakes up the camera app. HDR is suggested automatically based on the scene, and there's a panorama mode. A strange Lenticular mode can take up to 11 photos from slightly different angles, resulting in a stilted animation which you can only view on the phone itself.

Verdict

Is there room for yet another smartphone operating system? Amazon is pinning its hopes on the Fire Phone but if it is designed to be a portal to all things Amazon, why is it so expensive? For roughly the same money, you could have a flagship Android smartphone or for a little more per month on contract, a brand new iPhone. On specs, the Fire Phone is fairly midrange. The deal is sweetened by a year of free Amazon Prime, though.

So the Fire Phone has a few things going for it, but asking people to get to grips with a new OS, deal with the limited app store and still pay top whack is a bold move indeed. Ultimately, the safe option is to plump for an Android device such as the LG G3 (tinyurl.com/mq8dhuu).  **Jim Martin**

£529 inc VAT

Contact

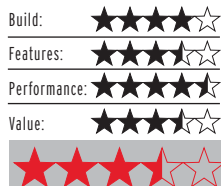
■ uk.blackberry.com

Read more

■ tinyurl.com/pauycrh

Specifications

4.5in (1440x1440) display; Qualcomm MSM8974AA Snapdragon 801 CPU; 2.26GHz; Adreno 330; 3GB RAM; 32GB onboard storage; 128GB SD card slot; non-removable lithium-ion 3450mAh battery; USB 2.0; HSDPA; HSUPA; LTE; 802.11 a/b/g/n/ac; dual-band; Wi-Fi Direct; DLNA; Wi-Fi hotspot; Bluetooth 4.0; A2DP; LE; front-facing 2Mp 720p camera; rear-facing 13Mp camera with autofocus; optical image stabilisation; LED flash; geo-tagging; face detection and HDR; 128x90.3x9.3mm; 196g



SMARTPHONE

BlackBerry Passport

Right out of the gate let us say this: the BlackBerry Passport is not for everyone. On looks alone, many will eschew its charms. It is a niche product built for what remains of BlackBerry's core userbase. It is the most BlackBerry BlackBerry we have ever used.

It is, however, an intriguing and unique device, and for that we give BlackBerry kudos.

It's not the most widely available phone in the UK. But since it is principally aimed at business users, it is entirely possible that the main mode of purchase will be via business-level contract from an enterprise supplier.

Its price puts it in the upper echelons of UK smartphone prices, but that is fair: it is a flagship phone with a very high-end spec, and you won't buy it because it's cheap.

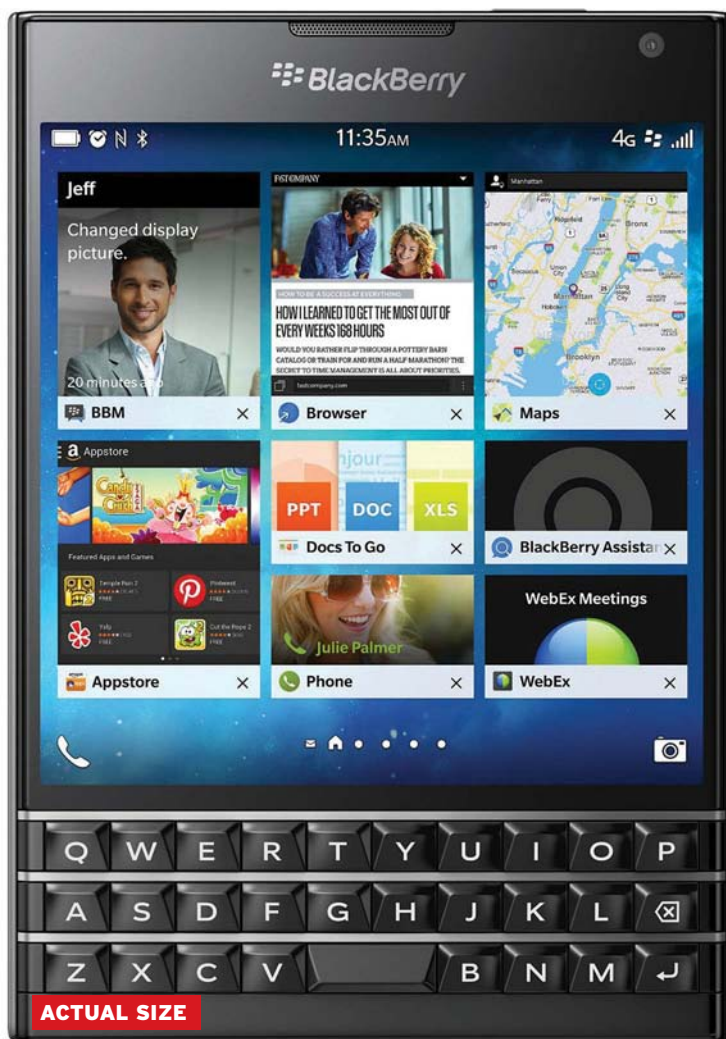
Design and build

So here's the thing: we both like and admire, and strongly dislike the BlackBerry Passport's design. Before e even started reviewing it, we flashed it round to garner first-blush reaction from non-techies. Out of every four people we showed it to, three would hate it and one would love it. That may not sound great, but most handsets are met with 'oh, one more' cold indifference. BlackBerry would be beyond delighted if one in four people love the Passport enough to purchase it.

So what about this handset is so different? In short, it is short. An almost square, thick slab of shiny black tech. Thicker than the average high-end handset at 9.3mm it is also much wider and a little shorter. The iPhone 6 is longer, but much slimmer and thinner than the Passport. Indeed, compared to all other touchscreen smartphones, the Passport really is another category of device. It is the same size and shape as a US passport (geddit).

The Passport is not just a touchscreen smartphone. Beneath its display is a hardware, qwerty keyboard. Overall the effect is weirdly old-fashioned, but not unsmart.

At 196g, it is heavy for a modern smartphone. The mega-sized iPhone 6 Plus (tinyurl.com/o9rx9un) and Samsung Galaxy Note 4 (tinyurl.com/kfqs8fk) weigh 172g and 176g



respectively. You really notice the difference when holding the Passport. Weight, however, isn't necessarily a problem, and that short fat shape fits into pockets better than more traditionally shaped smartphones. There's also a pleasing heft when you're handling it - the Passport feels like it could withstand a few drops.

Some reviewers have complained that this BlackBerry is difficult to use with one hand. Well, yes, it is, but it is a pointless complaint. The keyboard, indeed the whole device, is built for two thumbs and last time we checked that meant two hands. Let us be clear about this: the Passport is built to be used in portrait mode, with two hands. The screen doesn't autorotate. Complaining about the difficulty of using it with one hand is like moaning about not being able to type with your feet.

But it's not all good news. There's something about the way the Passport balances in two-handed use that doesn't feel entirely natural. It's perfectly usable, but feels uncomfortable - as if it's going to topple forward out of your hands.

We also have a problem with using the hardware keyboard. In our view a virtual onscreen keyboard makes much more sense as it can intelligently make letters larger to make hitting them easier. We found using the Passport keyboard a physically frustrating and error-ridden process, a bit like trying to wear skinny jeans.

Display

The shape and design of the Passport is largely dictated by its display - a 4.5in screen with 1440x1440 resolution, giving 453 pixels per inch. So far, so high-end and conventional, but wait: look

at the aspect ratio – 1:1. Yes, it is perfectly square.

Once you get over the initial surprise at seeing something different you may find it great for some things but poor for others. And those things give a clue to the whole purpose of the device.

That square screen is brilliant for reading and responding to email, amazing for browsing websites and a pretty good experience when reading and editing spreadsheets. Just don't watch movies, play games or look at photos unless you're not bothered by seeing two-thirds of the screen taken up by black borders. In terms of consumer entertainment, we live in a widescreen world.

But again that is the point: for a productivity tool, the display is brilliant. At its most banal level, if you want to read or amend a big chunk of text it is the perfect display. The term 'phablet' is generally used for any large-screen smartphone, but in all honesty the Passport is the first smartphone we have used that feels like a workable compromise between phone and tablet. Compromised is compromised, but if you want a display for work this display is eminently fit for purpose.

Software

While we are thinking with our business brains, let's look at the BlackBerry 10.3 software on which the Passport runs. The traditional review highlights the BlackBerry 10's unusual swipe navigation, lack of apps and great server-side support for system admins. The first element here is true: it takes a bit of getting used to but in time it feels intuitive to swipe from the sides, or the top and bottom, to get to the home page or the BlackBerry Hub. And BlackBerry remains the gold standard for running a fleet of devices for a business. Data can be secured and deleted, software updates pushed out remotely. Your system admin will always thank you for choosing a BlackBerry.

Apps have improved since BlackBerry started including the Amazon App Store. Spotify is there, for instance, as are native apps for all the major social networks. We could even install GeekBench and benchmark the Passport. But there

are absentees – we couldn't see a YouTube app by Google, for example.

Good things about BlackBerry 10.3 include in-window email notifications that let you read and either dismiss or click to respond to messages as they come in, regardless of what you are looking at. True multitasking is possible because of that big screen and the fact that a simple swipe lets you see all open apps in an array of nine windows. Indeed, swipe gestures that work on the touchscreen and keyboard are pretty cool, and my typing issues with the hardware keyboard are mitigated to an extent by the fact that if you attempt to move the cursor via touch you get a little circle with arrows that you can nudge to get the correct spot between two characters.

And then there is BlackBerry Blend. This is a software app you are encouraged to install on your PC or laptop, with which to interact with you BlackBerry Passport. Initially, it irritated us as we wanted simply to mount the Passport as USB storage to which we could transfer files. And, reader, it was a faff to install.

But it does allow you to pair your handset with a desktop or laptop and view and respond to emails, as well as view and edit files, from your desktop. So you could use BBM from your desktop. It also means that any PC that has BlackBerry Blend installed could immediately become a connected business terminal for any user who can physically attach their Passport. It is old school, but also controlled and scalable. The sort of thing that the CIO of an enterprise might love.

Specs

The Passport is a powerful and well-specified device. It runs on a Qualcomm MSM8974AA Snapdragon 801 CPU with a quad-core Krait 400 processor timed at 2.26GHz. This includes an Adreno 330 and is paired with 3GB of RAM. There is a nominal 32GB of onboard storage, which in my case meant 27.8GB of usable space. And you can add another 128GB of storage with an SD card.

A non-removable lithium-ion battery provides the juice. We

found we could get two or even three days on a charge, but then we weren't watching movies or playing games. The Passport charges and connects via USB 2.0.

The camera isn't much to write home about. It's not terrible, and the front-facing 2Mp, 720p camera is good for conference calls. The main rear-facing camera is a 13Mp device that can capture video at 1080p/60fps. While this is not a compact camera for shutterbugs, it is more than adequate.

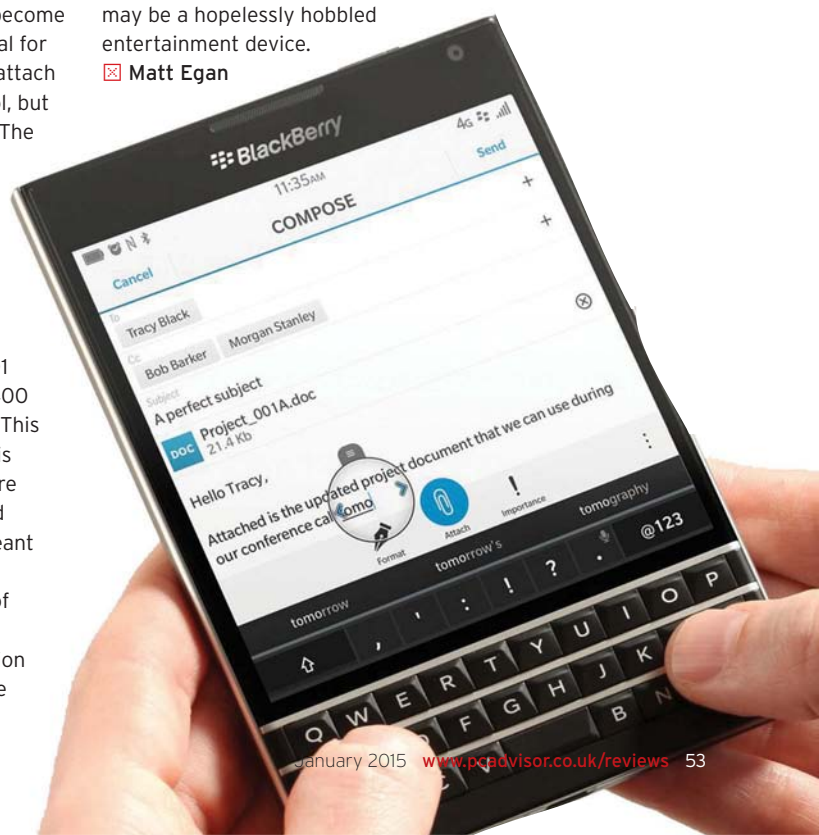
Performance

I ran the Passport through the usual battery of *PC Advisor* tests. GeekBench 3 returned very impressive average scores of single core 780 and multicore 2457. The SunSpider JavaScript benchmark was a marginally disappointing average of 1055.5ms. Both results confirm this is a very fast device, even with multiple processes and applications. It is very powerful and responsive.

Verdict

The Passport is not for everyone. It is designed to be used as a productivity tool in the workplace. As such it is powerful and versatile, and for those who want a portable productivity device with a hardware keyboard, it will be a perfect companion. For many others it may be a hopelessly hobbled entertainment device.

✉ Matt Egan



£200 inc VAT

Contact

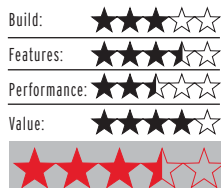
■ lenovo.com

Read more

■ tinyurl.com/oq94skb

Specifications

15.6in (1366x768 pixels)
matt TN display, 2.16GHz
Intel Celeron N2830
(dual-core with 1MB
cache), Windows 8.1 with
Bing, 4GB 1600MHz DDR3
RAM, 320GB HDD,
DVD±RW optical drive,
Intel HD graphics,
802.11b/g/n, gigabit
Ethernet, SDHC card
reader, 1xUSB 3.0, 2xUSB
2.0 ports, HDMI, VGA
video outputs, Bluetooth
4.0, webcam, 45W mains
adaptor, 380x260x32.5-
26.5mm, 2.225kg



LAPTOP

Lenovo B50-30

Two hundred pounds for a brand-new Windows laptop? That's got to grab the attention of anyone looking for a working laptop on a budget. We've been here before with netbooks, except this time there are two important differences.

The Windows netbooks of the late 2000s rarely dropped to £200 or less until they were consigned to the clear-out sale. And all those machines were hobbled by spec: tiny low-resolution screens, too little memory and a third-rate version of Windows. All were deliberate restrictions set by Microsoft and Intel so as not to lose sales of more profitable and workable laptops priced a few hundred pounds higher.

The Lenovo B50-30 is the first of a new wave of budget laptops with far more potential than a netbook to be useful and costing rather less.

The new budget laptops all come with a special version of Windows, known as Windows 8.1 with Bing. This means the laptop maker can no longer take kickback revenue from Google, Yahoo and other search engine companies in order to have their service configured as the new PC's default search engine.

By agreeing to that condition, laptop makers such as Lenovo can install Windows at no cost. There is therefore no traditional Windows tax to be passed on to the user. And it helps Microsoft claw some market share for its underloved Bing search engine.

For the laptop buyer, there should be no other difference in the capabilities of the OS. The user can change the search engine for Internet Explorer and Windows' system-wide search at any time.

The Lenovo B50-30 is a 15in laptop with a low-power Intel Celeron N2830 chip. For storage the B50-30 uses a 320GB hard disk, providing plenty of capacity compared with solid-state options but inevitably slower. And the B50-30 was laggardly in use, for example when opening programs or files.

Unusually for a modern laptop, the B50-30 also includes an optical drive, a tray-load DVD reader and writer. Of the three USB ports, one is USB 3.0.



Overall build quality is tidy. The matt-black plastic chassis does collect oily fingerprints with use, but as a way to transport and keep together the laptop's components it does the job.

The display is a 15.6in 16:9 widescreen panel using budget TN technology. Relative to the physical screen size this has a very low resolution of just 1366x768 – the widescreen equivalent of the 1024x768 XGA panels of old. It made type and interface elements appear fuzzy and defocused.

With something like a rebranded Intel Atom powering it, and an old 2.5in hard disk, the B30-50 is never going to be a workstation laptop. But testing slowly revealed just how much performance has been sacrificed in order to drop the price.

For this budget laptop Lenovo includes its own power management software, set as default in the middle of three options, economy versus performance. Used this way, it returned a Geekbench 3 score of 248 points in single-core mode, and 401 in multicore (the Intel N2830 is dual-core but with no hyperthreading technology to virtualise two cores into four). These scores are the lowest we've ever seen from this benchmark test. It normally takes around two minutes to complete; here it took over 20.

After setting the management settings to top speed, Geekbench 3 scored the B50-30 with 964 and 1674 points respectively for single- and multi-core modes.

In the PCMark 7 test, it scored an overall 1663, again a very low result. In PCMark 8 Home it scored 1199 in

the conventional test, and failed to complete the graphics-accelerated version of this benchmark.

Unfortunately the CPU and system benchmark tests took so long to run, the review machine was collected before we could try many graphics benchmarks with Windows games. It seems likely that our usual games would not have sufficient framerate to be played.

Batman: Arkham City was listed as tried at native 1366x768 resolution and Medium detail, but played at just 8fps. Tomb Raider 2013 fared worse at around 7fps.

The low-cost TN panel is of low resolution and very limited side-viewing scope. Move your head away from straight-on and the screen contents quickly deteriorate into a dark mess of images.

Our battery tests suggest you may get close to five hours' use from the Lenovo B50-30, with it left at its slow midpoint power setting. In our endurance test of playing an MPEG-4 video over Wi-Fi on loop, with screen at 120cd/m², the Lenovo lasted four hours, 51 minutes.

Verdict

The Lenovo B50-30 may have a lousy screen, a bendy keyboard and a processor so slow it's overtaken by budget Android phones of yesteryear, but as a package to compete against the Google Chromebook competition it looks feature-packed, thanks to a relatively huge hard disk and even a DVD drive. With the new zero-cost Windows OS, things have just got interesting in the budget laptop space. **Andrew Harrison**

£99 inc VAT**Contact**■ asus.com/uk**Read more**■ tinyurl.com/q8vd2bv**Specifications**

4in (480x800 pixels, 233ppi) TFT capacitive touchscreen Android 4.3 Jelly Bean 1.2GHz Intel Atom Z2520 dual-core processor 1GB RAM 8GB internal storage (plus microSD up to 64GB) 802.11 b/g/n Wi-Fi Bluetooth 4.0 3G 5Mp rear-facing camera 0.3Mp front-facing camera 1080p video at 30fps Dual SIM, micro-SIM 124x61x11mm 115g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**SMARTPHONE****Asus ZenFone 4**

The bargain price of £99 puts the Asus ZenFone 4 squarely in the budget smartphone bracket, with rivals such as the EE Kestrel (tinyurl.com/kf2Lccw) and the Motorola Moto G (tinyurl.com/moj7L7e).

The ZenFone 4 looks like a chubby cousin of the sleek and sophisticated ZenFones 5 (tinyurl.com/pyLmOL8) and 6 (tinyurl.com/n87zzfy). It's not ugly, by any means, but it certainly looks chunky despite its smaller screen. That 4in screen, though, means you can cover its entirety even when using the device with one hand. It's 11.2mm thick and weighs a nice and light 115g.

The ceramic coating of the plastic back creates a soft matt finish, which looks great aside from its tendency to pick up fingerprints and other marks. There are back cases available in charcoal black, pear white, cherry red, sky blue and solar yellow. It's quite difficult to get that back case off, and you will need to remove it even if you don't want to change the colour, as you'll find the SIM slot and the microSD card slot there, too. It's a shame the buttons at the bottom of the display don't have a backlight, as it's tricky to know which one you're hitting when you're in a dark environment.

The 4in screen is a 480x800 TFT display, making it 233ppi. It's not the worst screen we've seen on a budget smartphone, but it's nothing special. Viewing angles are acceptable, but it's far from a sharp and bright display - and it seems to be set back from the actual glass, too. Asus includes its Splendid app as one of the stock apps on the ZenFone 4 though, so you can fiddle about with the display settings to suit.

Inside the ZenFone 4 is a dual-core 1.2GHz Intel Atom Z2520 chip paired with 1GB of RAM, which is quite zippy for such a cheap phone. There was no painful lag, although it wasn't lightning quick either.

It performed surprisingly well in the GFXBench graphics test. And it scored an average of 16.5fps in the T-Rex test, which is better than its larger siblings.



help disguise the otherwise

Overall performance, though, was much less impressive, with its Geekbench 3.0 results more in line with what we'd expect from a budget smartphone. In the single-core test it scored an average of 338, and 805 in the multi-core test, which is much slower than the other ZenFones.

The single-core results are similar to the Motorola Moto G 2014 and the £99 EE Kestrel, but its multi-core results were lower than those two rivals - closer to the Motorola Moto E and HTC Desire 500.

The ZenFone 4 also scored poorly in the SunSpider web browser test. Its 1363ms is better than the Motorola Moto G 2014, but slower than the likes of the EE Kestrel and the Samsung Galaxy S5 mini.

The rest of the ZenFone 4's specs are good for the price tag. It comes with just 8GB of internal storage, which can be expanded up to 64GB thanks to the microSD slot.

It offers 802.11 b/g/n Wi-Fi and Bluetooth 4.0. There's no 4G, which is a bit of a shame as that's a huge selling point of the EE Kestrel.

The camera on the back is 5Mp, and certainly isn't anything to shout about. It's okay for taking the odd snap here and there, but if you're intending to use your smartphone as your sole camera on holiday, for example, you'll probably want to look elsewhere.

On the front is a quite terrible 0.3Mp camera, so it's unlikely that you'll want to take many photos with that one. We do really like Asus's Camera app, though. It comes with lots of filters and effects that can

undesirable quality of the photos, including HDR, depth of field, panorama, miniature and portrait.

We also love lots of other elements of Asus's ZenUI interface, which has bold colours, a flat design and simple navigation that makes it a pleasure to use. It's based on Google's Android 4.3 Jelly Bean, though, so it's not the most up-to-date version of the OS.

Asus's own preinstalled apps include What's Next for managing your schedule and Do It Later for keeping track of your to-do list, both of which we found very useful.

The ZenFone 4's battery life is good, but nowhere near as impressive as the ZenFone 5 and ZenFone 6's, which were exceptional. Expect to get a day's use out of the ZenFone 4. There is a Power Saver app that can help you get more out of the battery. We used Optimised mode and Smart Saving, which make some small changes to things such as the brightness levels to prolong battery life. An Ultra-Saving mode will disconnect the ZenFone from the network when it's locked, so you won't immediately get notifications from messaging apps that use the internet, for example.

Verdict

For £99, we're impressed by the ZenFone 4. It's nicely designed, has brilliant software features, is suitably speedy and has decent battery life, but it's not outstanding. We'd like to see a slightly better camera and the addition of 4G connectivity. **Ashleigh Allsopp**

£39 inc VAT

Contact

■ zteuk.co.uk

Read more

■ tinyurl.com/mqzw34y

Specifications

Android 4.4 KitKat OS, 4in display (480x800), 233ppi, 1.2GHz dual-core CPU, 512MB RAM, 4GB internal storage (2GB available), microSD up to 32GB, 3Mp rear camera, Wi-Fi 802.11b/g/n, Bluetooth 4.0, A-GPS, 5.2Wh (1400mAh) lithium-ion removable battery, 65x126x10.7mm, 154g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



SMARTPHONE

ZTE Kis 3

Until Motorola's Moto G set a new benchmark, any budget smartphone costing less than £100 wasn't really worth considering. However, the Moto E and Nokia Lumia 520 are now both good options.

If you have even less money, then the ZTE Kis 3 is amazingly cheap. It costs just £59, but you can get it on pay as you go from Virgin Media for £44 with £10 credit included. That's a pretty good deal, but the phone is also available at Argos for £39. When ZTE calls it 'ultra-affordable', it's really not fibbing.

The Kis 3 looks like a relatively old smartphone with a chunky and fairly unattractive bezel around the screen and an obvious hole for the microphone in the plastic frame. There are some attempts at style, though: the review unit was an attractive dark blue and the silver strips down the sides don't look bad.

Despite almost every modern Android smartphone now using on-screen buttons, ZTE has stuck to capacitive ones below the screen. It may be unorthodox but it frees up space on the display. Strangely, the menu button lives on even though the overwhelming trend is a switch to a recent apps button.

Build quality is distinctly plastic and the Kis 3 feels a bit flimsy. Although it's a chunky little customer at 10.7mm, it feels fairly nice in the hand and lighter than its 154g.

The fairly large bezels make for a small 4in screen - the same as the iPhone 5. It has a low 480x800 resolution, dull colours and poor viewing angles - you really need to be looking directly at it to get anything done. Yet it's surprisingly responsive for a display set so far back from the glass, and has a decent level of brightness.

There's 4GB of built-in memory, about half of which is available for storing apps, games, photos and so on. A microSD card slot means you can add up to 32GB more. In the storage section of the settings menu you can get the Kis 3 to save items to the card rather than the phone.

The 1.2GHz dual-core processor and 512MB of RAM delivered an unsurprising score of 599 in GeekBench 3, which is slightly lower than the Moto E. However, we were



pleasantly taken aback by the Kis 3's 12fps in the GFXBench T-Rex test - higher than the HTC One mini 2 (tinyurl.com/m6u427b).

Performance

Overall performance is perfectly usable, if you stick to the basics. There's a slight delay on most things that aren't basic like switching between apps, but we could play Despicable Me Minion Rush from the microSD smoothly (once loaded). Web browsing is normally a big downfall for cheap phones but despite the slow time of 1722ms in SunSpider, it didn't feel frustratingly slow, even for full desktop sites.

The small capacity but removable 5.2Wh (1400mAh) lithium-ion battery will get most users through the day. There's little else to talk of in terms of hardware at this price with just basic Wi-Fi, Bluetooth and A-GPS on-board. Data is limited to 3G.

Like the Moto E, the Kis 3 has only a rear-facing camera, so you can still take selfies, it's just a lot harder. The 3Mp camera has no LED flash and it's a pretty bad piece of kit. There's no auto focus and the detail on offer is poor, so you may be embarrassed to share shots from it on social networks.

One of the reasons the Kis 3's performance is so reasonable is that it runs an almost completely stock Android, and, remarkably, it's the latest version, 4.4 KitKat. That's only 'almost' because the lock screen is slightly different, with a long press to unlock and a set of app icons that can be swiped in from the side.

There are some Virgin Media-related preloaded apps which you can't delete. It's not a big deal as they don't take up much space.

The strange array of buttons make it a little tricky to use some of Android's built-in features. You'll need to long-press menu (the far right button) to access recent apps, and long-press the home button to get to Google Now.

Verdict

If you want a smartphone to do the basics at the most affordable price, the ZTE Kis 3 is for you. Forget the camera, but performance is good and it doesn't look too bad either. Those wanting something more decent should look at the Motorola Moto E (tinyurl.com/moj7L7e), Nokia Lumia 630 (tinyurl.com/Lobc7uy) and EE Kestrel (tinyurl.com/kf2Lccw). Chris Martin

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£74 inc VAT**Contact**■ landvo.com**Read more**■ tinyurl.com/kd9u3d2**Specifications**

5in (960x540, 220ppi) IPS display; Android 4.4.2 OS, MTK6582M quad-core 1.3GHz chipset; 1GB RAM; 4GB T-Flash card; max 64GB; 2Mp front camera, 5Mp rear camera, GSM 850/900/1800/1900, WCDMA 850/1900/2100, FDD-LTE 1800/2600, 2000mAh battery; 144x72x8.6mm; 155g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**SMARTPHONE****Landvo L200G**

Our review model came from Gear Best, which is offering the Landvo L200G for \$118 (£74). That's a decent price for any budget smartphone, let alone one of this quality. Gear Best has also offered a discount code for *PC Advisor* readers. Enter **L200GRX** in the shopping basket and the price will drop to around £63. While you can purchase similar Landvo models from Amazon, this handset is available only as an import.

The L200G's main competition is from budget smartphones such as the Motorola Moto E (tinyurl.com/moj7L7e), Nokia Lumia 630 (tinyurl.com/Lobc7uy) and EE Kestrel (tinyurl.com/kf2Lccw). Priced between £60 and £100, these are comparable in cost to the L200G, but are outperformed by Landvo's phone in many areas.

From a design perspective, the L200G looks exactly like the OnePlus One (tinyurl.com/kyw977u), though Landvo's handset has a slightly smaller display – 5in compared to 5.5in.

The plastic back doesn't feel especially flimsy once it's clipped in, and the silver band around the screen is a nice touch. Indeed, with the back clipped into place, the phone is relatively solid. Unfortunately, the build quality is poor. The main issue is that the screen comes away from the frame at the top. We'd be worried about its ability to survive a drop – especially on to a hard surface.

It weighs 155g, which isn't bad for a smartphone with a 5in screen, and measures 72x144x8.6mm. That's a couple of millimetres thinner than other handsets in this price bracket. The colour options are a simple choice between black and white.

One thing the eagle-eyed will have already spotted is that the touch-sensitive buttons below the screen match the OnePlus One's. That means there's no Recent Apps button. Instead, there's a menu button, so getting to the multitasking screen requires a

long press on the home screen. As previously mentioned, the L200G has a 5in IPS display. Brightness, colours and viewing angles are all surprisingly good. The resolution (540x960) is typical for a cheap handset, but there's better available if you spend a little more, with the Moto G (tinyurl.com/q5Ln5xq) offering 1280x720.

The expandable SD memory is a welcome sight, with an upper limit of 64GB, rather than the 32GB we were expecting. You'll need to budget for a microSD card as internal storage is only 4GB, the majority of which is taken up by Android. This leaves just 900MB of available internal storage.

The L200G is powered by a MediaTek MTK6582 processor. It's a 1.3GHz quad-core chip, which worked well during testing. It's backed by 1GB of RAM.

The same can't be said of the graphics chip. It managed 9fps in GFXBench 3.0 T-Rex. However, this doesn't make a vast difference in terms of real-world performance: the L200G can handle Temple Run 2 on the highest graphics setting with the barest hint of lag or stuttering.

The device showed itself to be a capable handset in our web browsing benchmark tests, scoring 1444ms in SunSpider, which is better than competitors such as the Moto E and Lumia 530. It's a decent result for a £70 phone.

Battery life is also respectable. A full charge will last around 17 hours with moderate to heavy use. The judicious management of settings could easily stretch that figure out a little, meaning you won't be constantly searching for a wall socket. You'll need to charge

it on a nightly basis, but that's pretty standard.

Cameras on budget smartphones are always a let down, and the L200G is no exception. It may have a 5Mp sensor, but in our tests the device produced images that looked as though they'd been taken on a foggy day. The camera shoots video at 720p, and the quality isn't great. The 2Mp front camera is a little better than the rear. It's fine for selfies but suffers in low-light environments.

The L200G supports 4G support, but only the 1800- and 2600MHz bands. This means only customers of certain UK networks such as Vodafone, Three and EE will be able to use the inbuilt LTE capabilities.

It also has Bluetooth 4.0 and 802.11n Wi-Fi, rather than the more advanced 802.11ac, but this is a budget device, after all.

Android KitKat 4.4.2 is the default operating system and Landvo has made hardly any changes, which is a good thing. It comes with all the usual Google apps, including the Play Store. However, one worrying discovery was that when we tried to install Barclays' mobile banking app, it told us that it couldn't be installed on rooted devices, suggesting that Landvo roots the phone itself.

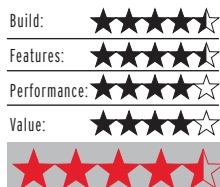
Verdict

With a price that's among the cheapest smartphones, you might expect the Landvo L200G to be awful. However, apart from the poor quality cameras and build, it's a decent device. **Adam Shepherd**



£199 inc VAT**Contact**■ motorola.co.uk**Read more**■ tinyurl.com/kf5Lq4v**Specifications**

1.56in (320x290) LCD display; Android Wear OS; 4GB internal storage; 512MB RAM; TI OMAP 3 processor; Bluetooth 4.0 LE; optical heart rate monitor; pedometer; 320mAh battery; wireless charging (dock included); IP67 dust and water-resistant; 11.9mm; 49g

**SMARTWATCH****Motorola Moto 360**

The hype surrounding the Moto 360 has mainly been to do with its design. It looks more like an ordinary wristwatch than a wearable gadget. Motorola says this maximises the display area while ensuring a comfortable fit. It's certainly more comfortable than the square smartwatches we've seen and leagues ahead in desirability.

The black stainless steel case and Horween black leather strap give it a luxurious feel which makes the price seem even better. It's also available in silver with a grey strap. There's a Gorilla Glass 3 front and the IP67 rating means it's dust and water-resistant: you can wear it in the shower, or even swim with it on for 30 minutes up to a depth of a metre.

On the side of the watch, pretending to be a traditional crown, is a button that switches the screen on and off. Tapping the screen or twisting your wrist also brings the smartwatch to life, while covering it up will switch it off.

The Moto 360 may not be heavy but it is both thick (11.9mm) and large - much bulkier than a traditional women's wristwatch.

The hardware is the largely standard componentry for Android Wear smartwatches, with Bluetooth 4.0 Low Energy, 4GB of internal storage and 512MB of RAM. However, rather than a Qualcomm Snapdragon chip, the Moto 360 has a TI OMAP 3. As well as the usual accelerometer and pedometer, there's an optical heart rate monitor.

The backlit LCD display has a diameter of 1.56in and a resolution of 320x290. Its pixel density is just 205ppi compared with 240ppi on the LG Watch and 278ppi on the Samsung Gear Live. While you'll get a crisper image elsewhere, the Moto 360's display is far from poor quality. There are a couple of downsides though.

First, a small area of the watch face is used for an ambient light sensor so the display can automatically adjust the brightness. This means the screen isn't completely circular; there's a black section at the bottom which looks like it's broken, hence the 290 vertical pixels. Whichever watch face you choose to go with will have that chunk missing at the bottom.

The bevelled edge of the Gorilla Glass front looks great but creates a moiré effect, so you see a faint jagged line of red, green and blue pixels. Some may not notice this, but others will be bugged by it.

The main down side of the Moto 360 is the battery life. At 320mAh, the battery has a smaller capacity than the LG G Watch (400mAh) and a considerably worse life span. Realistically it will require charging every night. Making the situation slightly better is the wireless charging. A docking station is included in the box and it charges pretty quickly, from 0 to 100 percent in just over an hour.

You're not going to wear the Moto 360 in bed so if you put the charging dock on your bedside table, it will be fully charged and ready to go in the morning. While in the charging dock it handily displays the time and charging status.

As it runs Android Wear, you'll need an Android smartphone running version 4.3 or later with which to pair the device. Check if your device is compatible by visiting g.co/WearCheck.

Although there are other operating systems around on smartwatches such as Samsung's Tizen, Android Wear is the best in our opinion and an obvious choice for Android users as it's essentially the same across all devices.

The Google Now card-style interface works perfectly well on the round display and you get the advantage of choosing round watch faces. The preloaded ones look sleek but you can also download more such as the 'Secret Agent' one modelled on James Bond's watch in the N64 game, Goldeneye.


The heart rate monitor means there's a

section for daily activity beyond steps. Your goal is 30 minutes of increased heart rate exercise a day. You can also check your heart rate any time you like.

Voice recognition works as on an Android smartphone for sending a text or email, so you can reply to incoming messages without typing.

Using Google Now is much like using Siri on an iPhone. You can ask it to set an alarm or reminder and pose more general questions such as 'how tall is the Shard?'. You can ask for weather forecasts in different cities, too.

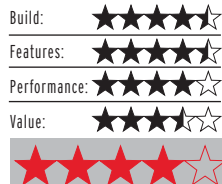
Verdict

The Moto 360 is a fantastic smartwatch with excellent build quality, luxurious design and an affordable price tag. However, it's not flawless given the one-day battery life and a low-resolution screen which is tainted by the black section at the bottom. It will also be too big for some users. Despite the flaws, it's the best smartwatch we've reviewed to date although you may want to wait for our forthcoming reviews of the LG G Watch R, Asus ZenWatch and Apple Watch before making a final decision.  **Chris Martin**



£799 inc VAT**Contact**■ heatgenius.co.uk**Read more**■ tinyurl.com/k4zy6y8**Specifications**

Genius Hub, TRVs, TRV adaptors, manual switch, smart thermostat, smartplugs, powerline adaptors

**SMART THERMOSTAT****Heat Genius**

Heat Genius is a smart, and wireless, remote heating control system for your home. Unlike the smart thermostat systems (Nest, Hive, Tado) Heat Genius creates 'zones' in your home, and then allows you to control the temperature of each zone via laptop, smartphone or tablet apps. It measures occupancy and temperature, and should reduce heating costs over time as you heat only the parts of the house that need to be warm, only when they need to be warm.

Physically, the Heat Genius system comprises a central wireless hub which communicates with smart TRVs to switch on and off your radiators, as well as wall-mounted movement sensors, and smart plugs as required for connectivity. The hub communicates wirelessly with the other composite parts of the system, and is controlled via an app or web interface. Once the hub is hooked up to the broadband network in your home you can even access the heating system from anywhere that you can get online, too. So if you want to put the heating on during your commute home, you can.

Installation

Let's start at the beginning. When you first enquire about purchasing Heat Genius the company surveys your needs, including whether a smart heating system such as Heat Genius is appropriate.

The physical installation is handled by a plumber local to you, trained and sub-contracted by Heat Genius. They turn up at an agreed time on an agreed date with a detailed plan of what is required in your home. They won't leave until an extensive checklist of tests has been carried out. By the time the fitter leaves, you will have a working smart-heating system, and you will have been instructed in its use. You also have a manual override switch on the boiler itself, so that if for some reason the system fails, you can switch on and off the heating and the hot water as before.

Using Heat Genius

I've been using a Heat Genius system in my 1950s semi-detached, brick-built home for several weeks now, as the external temperature



has dropped. We have an elderly boiler for both the central heating and the hot water, and radiators in all of the rooms. Our Heat Genius installer zoned our home into Kitchen, Bedroom, Landing, Front Room and Spare Bedroom. Each of these areas has at least one radiator, now controlled by smart TRVs. (A TRV is the dial on the end of the radiator, via which you set the level of heating.)

This setup excludes some other rooms with radiators, such as the bathroom, nursery, conservatory and various hallways. Our installer grouped those into a virtual zone called 'Whole House'. So now even though we can't exactly control the temperature in those rooms, we can remotely switch on the heating in all of those places. So we are no worse off than before, even in the spaces that aren't zoned.

Using Heat Genius is simple. You get a guide book which is useful, but not required. We now heat the bedroom and landing for only an hour or so every morning in time for the household waking up - early during the working week and a little later at the weekend. The kitchen is heated for the time we return home from work in order to cook, and eat. We set this on a timer via the app, by tapping the rooms and the time of day we wanted to be heated, and the desired temperature for those times.

It measures the ambient temperature in the room and puts the heating on only for as long as it needs to maintain the correct temperature throughout the correct time. This also makes the Heat Genius system an all-year-round set-and-forget product.

Although, of course, as well as the manual override switch on the boiler, you can always use the app to override and switch on any of the zones, as desired.

The timer is merely the simplest way of utilising Heat Genius, however. It's a good start to saving fuel and money, as we are now utilising only one or two radiators where previously we were using all the heating in the house. But there's more. Over time Heat Genius uses the chest high in-room sensors to build up a picture of your household's room occupancy. It also plugs in to local weather information to find out the external ambient temperature. Thus you can enable the Eco mode for each zone or the whole house, simply set a desired temperature for when the rooms are in use, and let Heat Genius do the rest. This is the most smart way to use the system, and the most aggressive way to save money. And any time you aren't home as usual, you can switch off the heating from your smartphone.

There are Super Eco, Eco and Comfort modes, which range from maximum money saving through to maximum comfort.

The other aspect of the Heat Genius setup is the smartplugs. These can seem incidental, although because the Heat Genius communicates through line of sight and the signal bounces of each device on the system, they do help communication. You can control the smartplugs in much the same way as you control the heating within zones. So you could set lights to come on and go off at specific times via the timer or manually from the app. You could switch off the fridge

plug for an hour or two each day, for instance, and save money (and the grid) during peak times.

What is great

I'm impressed with Heat Genius. Most important is the value of zoning and flexibility. Once set up it is easy to use and adjust, and it allows you to heat only the rooms you need to heat, when you need to heat them. Because it is entirely wireless it is simple to add zones or move them around, and this level of flexibility didn't require a high-impact install process. Heat Genius is flexible and scalable. It's worth pointing out that Heat Genius offers constant support post-install, too.

Heat Genius lets you do a lot, with a relatively small amount of hardware. Between the various Eco modes, the timer, overrides and even the smart plugs this system is a true smart home system. It just needs to draw the curtains and put out the bins to have the full 'Tomorrow's World' feel.

The app interface itself may not be the most beautiful, but it is simple and easy to use. Hidden away in the Settings section is an Advance Settings that allows for more complex trouble shooting and so on. But, honestly, since the system has been set up my wife and I haven't had cause to look in there.

We like the fact that Heat Genius detects when you open a window, and then turns the heating off (you can override this). And it is fascinating to view charts of your home- and heating use. The truly savings orientated can spot inefficiencies and save money. And although we haven't yet been able to test this, Heat Genius can utilise weather forecasting to predict frosts, and keep your pipes warm to avoid bursts.

Finally, we have been impressed with the level of security baked in to Heat Genius. This is important because data about your home usage in the wrong hands could leave you vulnerable to burglary. Your account is password-protected, the data encrypted. But most important of all Heat Genius itself doesn't see that aspect of your app use. It can access the Advanced Settings page of your account in

order to remotely troubleshoot problems, but it doesn't see how hot you like it in the bedroom. When you consider that some rival products such as Google's own Nest exist principally to build up user data, this is a refreshing approach. And it means that you aren't relying on Heat Genius keeping your data safe.

What isn't so great

The benefits of a wireless system are great, in terms of flexibility and low-impact install. But we did have some connectivity issues when the system was first set up. My house is particularly bad for wireless, being full of thick brick walls and small rooms. Heat Genius did solve this but it required use of two powerline adaptors, and the hub now lives in the kitchen - closer to the boiler than where the router sits just inside the house. This isn't a massive criticism, it is an issue with wireless connectivity. And the system works fine now. But it does mean that we have another set-top box type device to accommodate in the kitchen, as well as powerline adaptors dotted around the house. It would be much neater to site the Hub under the TV with the router.

We also have occasional issues with connectivity. Sometimes, for no apparent reason, the app will show us that one or two rooms has lost contact with the hub. To date this has always resolved itself in little time, with no interaction on our part. And it is only fair to point out that when a room isn't connected its radiators act in the same way as the 'Whole House' radiators, so they would still come on when any room was set to heat. So the worst outcome is too much heat, which was the case before you had Heat Genius fitted.

The only possible barrier to you rushing out to buy Heat Genius today is the hoary old issue of price and value. And this is not entirely clear cut. It really will depend on how sophisticated are your needs.

What it costs and value

Let's be clear about this: Heat Genius is not the cheapest solution you can buy. The most famous smart home heating systems are Google's Nest and the Tado and Hive systems.




Each of these costs less than £300 installed and up and running (Hive is £199 inc VAT). The Heat Genius system in my home would cost £799 inc VAT to buy (installation is currently free, although that is not always the case). The Genius Hub itself costs £249, Hot Water controller is £49. Four zonal sensors cost £34 and the smart valves for the radiators are £59. You get the smartplugs thrown in, but you can see how the price racks up. But that is not to say that Heat Genius is bad value. Far from it. It's just not cheap.

The critical issue here is the zoning. Where Nest, Hive and Tado put a smart thermostat into one room of the house, and switch on and off all the heating in the house based on that room, Heat Genius does something similar for every room. You could replicate the Nest, Hive and Tado experience for the cost of the Genius Hub, one sensor and one valve - £344. But that would be overkill if the less-sophisticated features of Nest, Hive or Tado are what you need.

Heat Genius told us it believes its system could pay for itself in two to three years. That seems feasible in some circumstances, but not all.

Verdict

Consider Heat Genius if, for instance, you have a large house in which some rooms are used only rarely. Especially if it is an older house that is hard to heat. But if you live in a small house or flat, it would take considerably longer for the investment in Heat Genius to pay for itself.

Heat Genius is very good at a very useful thing. It is easy to use and efficient, and over time it will save you the cost of installation.  **Matt Egan**

Heat Genius lets you create **DIFFERENT ZONES** in your house

£210 inc VAT

Contact

■ wdc.com

Read more

■ tinyurl.com/nbdgm5w

Specifications

6TB hard disk; 3.5in SATA
3 HDD; 64MB cache;
IntelliPower rotation
speed; NASware 3.0
firmware; three-year
warranty; 1,000,000 MTBF
rating; 25/28dB idle/seek
acoustic noise;
147x101.6x26.1mm; 750g

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



NAS DRIVE

WD Red 6TB

As inevitable as death and taxes is the constant increase in the capacity of hard disks. Since the arrival of the first 3.5in SATA disks with 4TB of storage capacity in 2011, much has changed. Hitachi's entire disk-making division has been bought out by Western Digital, while Chinese regulators, fearing a Seagate-WD 3.5in duopoly, encouraged Toshiba to expand beyond its 2.5in comfort zone into 3.5in products.

But while solid-state storage (SSD) has encroached further into traditional disk-based products like laptops and desktop PCs, for bulk storage of the kind you'd leave at home, work or in the datacentre, the big hard disk still has a key job to do.

WD has poured its disk knowledge and manufacturing talents into two new super-sized HDDs, using its popular WD Red range as the vehicle. Now we have 5- and 6TB options added to this NAS-oriented disk series.

The WD Red 6TB is the largest commercially available hard disk in the world right now. It uses five platters that each store 1200GB of data – in other words, 600GB on either side of each mirror-like spinning circular wafer.

Besides the 50 percent increase in total capacity over the formerly largest 4TB drive, WD has honed

the firmware that runs the storage show for each disk to a new version, known as NASware 3.0. This onboard software controls the motor and read/write heads, and is said to support features like ATA Streaming Feature Set, useful for AV storage programs such as Windows Media Center. SMART Command Transport (SCT) is also supported and monitors drive health more closely, with temperature accuracy now given as to within 1°C.

Drive reliability is also billed as improved, along with optimised power usage – a crucial area for disks that already take various measures to reduce energy consumption in their typically 24/7 always-on network environment.

The firmware refinement may be one reason why WD will now certify the WD Red disk range for use in NAS boxes with up to eight bays. Hitherto a six-disk maximum was recommended, due to the vibration caused by too many disks spinning at once, which can result in the disk's read/write head mistacking so that sectors have to be reread, slowing down performance.

The rotational speed remains IntelliPower, which is WD marketing speak for 'something sub-6000rpm that we'd rather not publish'. But where our graphed performance output of the 3TB version suggests a step change in rotational speed, leading to sawtooth changes in read/write speed, the 6TB disk had a slightly more linear, consistent result across the drive's entire capacity.

In other respects, the specifications are the same as earlier WD Red disks: a 64MB memory buffer and SATA 3 (6Gb/s) interface. The warranty period remains three years, and the mean-time between failure (MTBF) rating is still 1,000,000 hours.

At around £210, the disk is not cheap, but on a cost per capacity basis it's just 3.5p per gigabyte. That makes it a little more expensive than the 3TB and 4TB versions, currently around 2.9- and 3.1p per gigabyte.

As hard-disk capacity increases, so too typically does areal density – the number of bits packed into each square unit of area. Consequently, it's not unusual for performance to increase with capacity – and that's

exactly what we found at one end of the performance chart with the WD Red 6TB.

Using the ATTO disk benchmark test, the Red 6TB reached up to 188MB/s in sequential reads, and 175MB/s in sequential writes. That's impressive for a single hard disk.

Down at the small-file level, though, that newfound capacity also brought with it a drop in performance. Take the example of 1kB files. With the WD Red 3TB we recorded reads and writes at around 32- and 23kB/s respectively. And while the 6TB disk could manage 69kB/s for its disk writes, it only delivered a meagre 104B/s (yes, bytes per second) when reading these smaller files.

With CrystalDiskMark, it was the same kind of story. At its peak, the disk could read and write at 175MB/s, which compares well with the 3TB version, which we measured with 163- and 169MB/s. With 512kB data the two capacities had a similar write speed (97MB/s for the 3TB; 92MB/s for the 6TB). But read speeds here had already diversified, to 48MB/s for the 3TB but just 23MB/s for the 6TB. And again, at the 4kB level, the larger disk had around half the read speed: 252kB/s versus 582kB/s for the 3TB disk.

HD Tune Pro also noted a shift in access times. The 3TB disk measured with 22.2- and 18.6ms latency for reads and writes respectively. The 6TB disk reordered its ranking with 18.5- and 26.4ms latencies. These are not the quickest results but neither do they suggest a dramatic loss in access time compared with most 3.5in SATA disks.

Verdict

In its new 6TB form, the WD Red is one huge disk. With the help of improved firmware, it is now smiled on for use in eight-bay NAS units, while its top speed of around 175MB/s is faster than ever. Only at the level of smallest files do we see a compromise in performance, but providing your NAS is working with larger media files, for instance, you may not notice this shortfall. For most, the inducement of 6TB in one 3.5in hard disk will ensure this drive's deserved popularity for data magpies. Andrew Harrison





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£855 inc VAT

Contact

■ lg.com/uk

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Specifications

21:9 widescreen monitor; 3440x1440 pixels, 110ppi; one DisplayPort, two Thunderbolt 2, two HDMI, one USB 3.0 and two USB 2.0 ports; 3.5mm headphone socket; Kensington lock slot; 100mm VESA mount; stereo speakers built-in; 140W external power supply; 830x83x380mm (without stand); 6.7kg

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆



WIDESCREEN MONITOR

LG 34UM95

Most PC monitors and Windows laptops come in a 16:9 widescreen ratio. That's great for watching TV, which is almost exclusively shot in this shape, but arguably less good for work, where extra height saves needless scrolling when reading text documents and web pages.

LG has taken the wide-angle idea even further with its 34UM95 super-widescreen monitor. Its 21:9 aspect ratio is designed for feature films, which are often shot in 2.39:1. Making the panel so incredibly wide also lends itself to serious work, by offering something like two 4:3 monitors placed side by side, while still preserving a decent amount of height, thanks to the enormous 34in diagonal panel size.

The 34UM95 is based on a 34in in-plane switching (IPS) LCD panel, with a reflection-reducing hard matt surface coating. The bezel around the visible screen area is just 10mm on the sides and top, and 22mm on the bottom. The lower strip is a shiny black plastic trim – a finish anathema on serious monitors where peripheral reflections can be a distraction. The overall presentation is also cheapened by the tacky chrome-effect plastic edging around the entire panel.

Floating in the air

There are ordinary 100mm VESA mount holes on the rear, but if you want just to place the monitor on your desk you could use the supplied pedestal mount. The two fixing screws offer a choice of two positions although even at its highest the 34UM95 sits only 100mm above the desk. The 11.5mm-thick clear acrylic pillar does give the monitor a great floating-in-air effect, though, when viewed from across the room.

The rear of the monitor is faux-metal plastic although it is at least a subdued satin rather than bling cod chrome.

The LCD itself is an eight-bit colour panel which the company goes out of its way to make you think is 10-bit. On its UK website it mendaciously states: "its 10-bit colour display is 64 times richer



than an 8-bit colour display, recreating colours softly and naturally without colour banding."

It's a misleading promotion based on the fact that LG's latest panel technology has been described as providing 10-bit-like performance, through a technique it calls frame rate control (FRC). FRC rapidly flashes between two alternate colours to give the illusion of a third colour, hence expanding the number of discrete colours the panel can seem to reproduce.

Hunt the switch

Adjusting, or even just switching on, the 34UM95 is not immediately easy. There is just one mechanical button on this monitor, which controls everything. And it's centrally under the bezel, out of sight.

Once you've found it, one press turns the display on. Another press of the correct duration opens a round compass on-screen display where you can select adjustments, with a full-height overlay that slides from the right-hand side of the screen. Press for too long and the panel switches off again.

You use the same button as a little joystick, steering it left, right, back and forth to highlight the required item on-screen, then pressing the button up again to select. It takes some getting used to, but in some ways is easier and quicker to use than with three or four buttons that control a range of functions and often change purpose depending on context.

LG makes available software for OS X and Windows which will snap your individual application windows into preset zones on the screen. For

example, you can select a two-screen 16:5 mode, with the division running

down the screen centre. In OS X, if you drag a Finder or application window part-way into the second half, it will snap into place.

LG allows some hardware calibration with this display, using its True Color Finder software.

For Windows users, only the DisplayPort or Thunderbolt 2 video inputs can be used; Mac users are further limited to just one model of computer, the new 2013 Mac Pro.

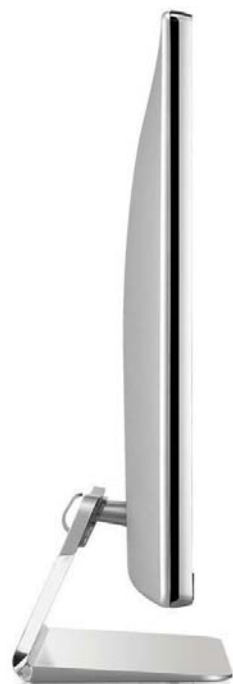
LG promises coverage of more than 99 percent of the sRGB colour gamut, and our tests with a Spyder4Elite measured 98 percent sRGB coverage, and 75 percent of Adobe RGB.

For such a huge expanse of panel, the measured luminance uniformity from one corner to the next was impressive. At full brightness its maximum deviation (top-right corner) was only 11 percent, and worst-case was still only 15 percent in the same area at 50 percent brightness (185 cd/m²).











Colour accuracy averaged over 48 colour tones gave a so-so Delta E of 6.16, and several green hues were astray by as much as 44.93 Delta E.

Verdict

It's the subjective experience of such a super-wide panel that should help to sell this panoramic monitor to anyone who gets a chance to try it. If you're used to using two or more displays anyway, the LG 34UM95 gives an even better effect from a single expansive area of screen estate. And besides its workstation and production potential, it plays Cinemascope-width films beautifully. Andrew Harrison



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£179 inc VAT

Contact

■ en-uk.sennheiser.com

Read more

■ tinyurl.com/q6pqshq

Specifications

Bluetooth headphones; A2DP; AVRCP; HSP; HFP; SBC; aptX; supra-aural 3.5mm jack; Bluetooth 2.1 + EDR; 3 hours charging time; 20 hours talktime; frequency response 100- to 10,000Hz; omnidirectional; 15- to 22,000Hz; 107dB; 105g

Build: ★★★★★
Features: ★★★★★
Performance: ★★★★★
Value: ★★★★★



BLUETOOTH HEADPHONES

Sennheiser MM 400-X

The Sennheiser MM 400-X is a pair of Bluetooth headphones that fold up to a truly portable package. They can be packed into the included soft travel case, along with a cable should the battery run down (Sennheiser claims it will keep going for 10 hours) or you want to connect to a non-Bluetooth device, such as an in-flight entertainment system. There's even a two-jack airline adaptor included, which is a nice touch.

The padded ear cushions are soft and comfortable, and as they are so light (105g) you'll soon forget your wearing headphones at all. You can control your music (volume and playlist controls) using the headphones themselves.

Pairing these headphones to your music source is easy and activated via the controls on the right earpiece. There's an integrated microphone, so you can enjoy your music and still not miss that important/nuisance phone call.

You recharge the 400-Xs with the supplied Micro-USB cable. If you're on a super-long journey between charging opportunities, you can swap out the battery for a spare; available separately for £20. The option of carrying a spare battery is another plus point for the 400-X.

Audio quality

Bluetooth is limited by a maximum available bandwidth, so it's not always suitable for

delivering high-quality audio. These headphones use the aptX codec that promises 'CD-quality' wireless connection, by significantly reducing the bitrate without affecting audio quality or introducing latency issues.

We were impressed with the MM400-Xs punchy and solid sound. Tested with the wired cable first, the headphones have a sense of bass depth, and a great kick to drums. There is some upper bass lift here to give a warmer, more exciting sound. Yet the bass is not excessively ramped up to give the urban streetphones effect of Beats, for example.

The midrange is a little opaque but in line with rest of sound top to bottom, so well balanced. Voices, male and female, are all still very intelligible and articulate. They boast a gentle and nicely smoothed treble, if a little too dulled for some people's taste. They won't reveal the air and presence of some recordings so well, so are not the last word in detail.

We found the audio over Bluetooth with aptX a slightly

grittier sound, with more top-end presence. Some music was apparent as more 'shouty'; and three-dimensionality suffers a little too, as wireless sound is more squashed up.

Overall, the Sennheiser MM 400-Xs give a well-mannered, measured presentation of music.

Used with their cable they should prove good headphones for taming the excesses of low-grade MP3 and bright digital recordings. Best of all they have a good, natural 'musical' quality that could let you listen for hours without fatigue.

Used wirelessly, you may lose that easy-going sound and instead hear a grittier, rougher effect in comparison, but that's one of the trade-offs for the benefits of wire-free headphones, and these are some of the best we've tested.

Verdict

The Sennheiser MM 400-X Bluetooth headphones offer true portability with excellent wired and wireless audio. At £179 they're not cheap, but they feel comfortable and robust and boast sound that beats other Bluetooth headphones we've tested. The two-year warranty is also appreciated. **Simon Jary**



£99 inc VAT**Contact**■ trackvue.co.uk**Read more**■ tinyurl.com/qhfvqng**Specifications**

In-car video recorder; camera CMOS sensor/2Mp; resolution HD (1920x1080) or (1280x720), Max 30fps; audio compression G.728/32kb/s; video compression H.264; view angle 120° (diagonal), 98° (horizontal), 55° (vertical); integrated 2i LCD screen; motion detection function senses whether objects are moving in the field of view when parked; memory supports up to 32GB providing and 12 hours of continuous recording; Recording Normal recording, event recording (G-Sensor); video out composite for connection to a DVD player; HDMI for connection to a DVD player; rechargeable 320mAh li-ion battery; 75x40x40mm

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★

**DASHCAM****TrackVue DV300**

Russian dashcams provide much of the amusing footage for driving fails, but they're becoming more and more popular in the UK for proof of blame in the event of an accident. We take a look at the new TrackVue DV300: a compact driving camera that costs less than £100.

TrackVue is the sister brand of BlackVue and is devoted to more affordable dashcams without the frills that most people don't need. For example, the DV300 doesn't have GPS, Wi-Fi or Bluetooth. And there's no iOS app or any computer software either.

Instead, it concentrates on the basics: recording good-quality footage while you're driving. The camera itself is very small and fits in the palm of your hand. The tiny colour screen can be used as a viewfinder so you can set the camera at the right angle, but it's also used to change settings and replay clips and photos.

On top is miniUSB port and 3.5mm minijack for composite video output (no cable is included). Underneath, you'll find a slot for the microSD card and a mini HDMI output (again, there's no cable in the box). Currently, you get a free 32GB card when purchasing, and this is the maximum the DV300 can take. It's enough for around 12 hours of continuous recording at the maximum quality.

The camera comes with a quick-release bracket that sticks to your windscreen, and has its own mini USB connector. The pins in the bracket are flimsy and one bent out of shape after removing the camera a few times.

You get a USB cable for connecting to



a PC - so you can use the camera as a memory card reader or even a webcam - and a long power cable which plugs into your car or van's 12- or 24V socket. If you want to, you can hard wire the camera to free up your 12V socket. The hard wiring kit costs £7.99, but we'd recommend getting this done professionally, not least because connecting to the wrong live feed could leave you with a flat battery.

Setting menu options is tricky until you figure out how to use the three buttons to the right of the screen in combination with the power button on the left-hand side. The instructions (which are in broken English) are helpful to some extent, but it's certainly not what you'd call intuitive.

Settings

At least there are lots of settings for those who like to play. You can choose whether or not to record audio, the resolution and frame rate (up to 1920x1080 at 30fps) and how many minutes each video clip should last. There's a built-in motion sensor and you can enable motion recording to catch incidents that happen when the car is parked. It's crucial to set the sensitivity correctly to avoid the camera recording constantly and draining your battery.

You can even change the metering and exposure compensation, but the defaults were perfectly good in our tests. Setting the time and

date is fiddly, so make sure you don't let the internal 320mAh battery run flat or you'll have to go through the

process again. Needless to say, you won't be able to record for long on the built-in battery. New recordings will automatically overwrite old ones when the SD card is full.


If you have an incident, you can replay the clip using the screen, but it's not easy. It's far better to connect the camera to a PC or Mac, and use a memory card reader to browse the files and play them using Windows Media Player, VLC or any other player which can handle MP4 files. You can copy the files to your hard drive using Windows Explorer.

Image quality is great considering the price. The angle of view is nice and wide and as long as you stick the camera mount just below your rear-view mirror, you'll get a decent view of the road.

Detail is sharp, so you'll be able to pick out number plates, road signs and similar text. Colours are accurate too: we've seen a whole lot worse than this. Exposure is also good, and the camera is quick to change when entering and exiting a tunnel, for example.

Audio quality is pretty clear when things are relatively quiet. At high speeds, or if you have a particularly noisy engine, the distorted soundtrack isn't pleasant. However, sound recording is rarely important for dash cams, since it mainly records passengers talking and music blaring from the radio.

Verdict

You may think that £99 may sound like a lot of money compared to the cheapest dash cams, but unlike those you might find on eBay or Amazon, the TrackVue DV300 won't disappoint in terms of quality.  **Jim Martin**



£24 inc VAT

Contact

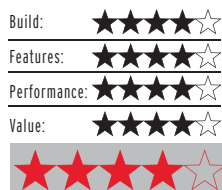
■ osomount.com

Read more

■ tinyurl.com/n3rp8me

Specifications

Built-in NFC chip;
11.3x8x12cm; 82g



SMARTPHONE CAR MOUNT

Osomount Push NFC

A smartphone car mount is normally pretty standard but the latest model from Osomount called the Push NFC comes with, you guessed it, NFC.

We'll jump straight into the most interesting element of the Push NFC mount, which is the near field communications (NFC) chip which is hidden inside. This is for use with any smartphone, tablet or other device with NFC - although the iPhone 6's chip is currently restricted so will have no effect. What you do when the smartphone and the mount meet is up to you, which is partly great but also a little confusing to get setup. You'll need to download an NFC tag app to your device, so that when you tap for the first time, you can define what you want to happen. There are various free apps to choose from, but Osomount recommends NFC Smart Q and NFC Tools.

Whichever you use, set the app to read then tap your device on the Push NFC mount (you may need to wave it around a bit, so the chips

line up). Once the two NFC chips have recognised each other, you can set up what you want to happen. We used it to open a satnav app but you can do all kinds of things like get your phone to pair to your vehicle over Bluetooth.

Osomount claims the Push NFC has the "world's quickest phone mounting mechanism" and while we don't think this is true it does work pretty well. The reason we don't agree is that you need to push a button to extend the arms before putting your phone in and it can be difficult to push it all the way in - if you don't, the arms spring back.

Once you have got the arms primed and ready, all you need do is push the button in the middle of the mount and this releases the arms and your phone is secured.

There's a classic suction cup, which has a washable sticky surface,



and the device also comes with an air vent mount variant should this suit your vehicle. Like a lot of car mounts there's a ball joint, which can be rotated 360 degrees.

Verdict

It's a little tricky to get set up, but the Push NFC is a great idea for a phone mount and is a time-saver once you get going. **Chris Martin**

£80 inc VAT

Contact

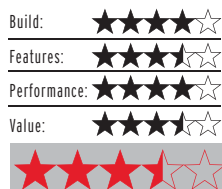
■ patriotmemory.com

Read more

■ tinyurl.com/ky8ptkj

Specifications

Compatible with iPhone 5 and 5s, Samsung Galaxy S4, S5 and Note 3;
8.1x10.4x19.6cm; 272g



SMARTPHONE CHARGING DOCK

FUEL iON

Fed up with finding your charging cable when you need to give your smartphone a battery boost? The FUEL iON Charging Case means iPhone 5/5s users can forget their Lightning cable, and owners of the Samsung Galaxy S4 can ditch the Micro-USB cord.

It's a two-part kit. First, there's a protective case for the phone, which simply snaps into place and offers robust, edge-to-edge knock and drop protection. Its bezel protects against screen scratches. Secondly, you get a power transfer dock with a pad that uses neodymium magnet technology to automatically secure your phone by simply making contact with the charge base. The dock is connected to a computer's USB or power plug via the supplied Micro-USB cable. As soon as your phone, enclosed in the FUEL iON case, is docked to the base, it begins to wirelessly charge.

The phone can snap to position in either vertical or horizontal orientation - great for watching TV

or movies, or for stable FaceTime or other video communications.

The FUEL iON differs from other wireless inductive charging technologies because the charge comes through the dock's own Lightning or Micro-USB connector, so charges as fast as a normal corded connection.

The case offers the usual easy access to buttons, ports and camera. This kit has built-in circuit protection against over voltage, over current, leakage and short circuit and comes backed by a 2-year warranty.

It's well constructed but does bulk up the phone - less so than with a smartphone battery case, but without the extra-juice-on-the-go that such cases offer. The phone protection shouldn't be forgotten, but some may balk at the bulk.

Verdict

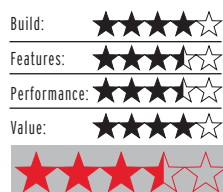
If you need a stable iPhone or Samsung Galaxy S4/S5/Note 3 stand and dock, and see the benefits of semi-wireless charging



(the dock is wired but the iPhone isn't), then the FUEL iON is a neat solution. The case adds bulk to the slimline phone but does offer robust protection. At £80 for the basic kit it's not cheap, but will certainly make charging and viewing easier, with the bonus of a robust case. **Simon Jary**

£26 inc VAT**Contact**■ inateck.com**Read more**■ tinyurl.com/o3tg927**Specifications**

3W speaker; IPX5-certified splashproof protection; Bluetooth 3.0; 3.5mm AUX; Micro-USB; 500mAh rechargeable battery; 85x85x46mm; 230g

**BLUETOOTH SPEAKER****Inateck BTSP-20**

Inateck's BTSP-20 is an IPX5-certified splashproof 3W Bluetooth speaker that's ideal for rocking out to your tunes in the bath, shower, at the beach or in the pool.

It might be only a 3W speaker inside, but it has enough of a punch to fill even the biggest bathroom with sound. A suction cup is supplied that, in our tests, secured the lightweight (230g) speaker to bathroom tiles, doors, walls and more. There is also a rubber lanyard, which might come in handy if you're carrying this highly portable speaker to the beach.

The IPX5 certification means the Inateck is splashproof, rather than fully waterproof, so don't try submerging it along with your rubber duck. The odd drop of water or a bit of steam won't harm the device, since the AUX and charging ports are concealed behind a rubber flap, and the power, volume and speakerphone buttons are also protected with rubber. However, the speaker itself is concealed behind

a black plastic mesh through which water can creep.

The speaker has a rugged appearance: a small 85mmx85mm square, just 46mm deep, with a black rubber tread and orange trim that circles the edges. Even in dripping wet hands it's easy to grip, and should the suction cup fail or you drop it we wouldn't be too worried about its safety.

It pairs with your phone, tablet, laptop or PC over Bluetooth 3.0. You can also use an AUX cable, but note that the speaker will not be splashproof in this mode. Given that many of the latest smartphones feature waterproof protection in Bluetooth mode, the Inateck will be most useful with entry-level and mid-range handsets that don't take like a duck to water. But even with high-end waterproof phones, Inateck's BTSP-20 allows you to turn up the sound louder than what is available from your device.


Given the low price, and the small 3W speaker inside, you shouldn't



expect the ultimate audio quality from the BTSP-20. At times, we found it could sound a little muffled, although plenty loud, and there's no distortion. While it won't be the best bass speaker in the world the Inateck is more than capable of pumping out the sort of relaxing music you might want to pair with some candles and a bath bomb.

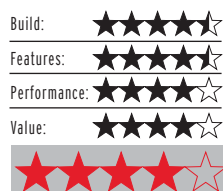
The 500mAh battery inside supports fast charging, filling up in two hours, and should last around five, depending on your usage.

Verdict

Great value, easily portable and pretty tough, the Inateck BTSP-20 is ideal for rocking out in your shower or at the beach.  **Marie Brewis**

\$99 (£62)**Contact**■ limefuel.com**Read more**■ tinyurl.com/owmqsq6**Specifications**

18000mAh (68.4Wh) power bank; 4x 2.4A USB outputs (maximum total output 4.2A); 1x 2A Micro-USB input; passthrough charging; anti-overcharge protection; LED flashlight; two-in-one Micro-USB and Lightning cable; 12-month warranty; 79x24x124mm; 369g

**PORTABLE USB CHARGER****LimeFuel Blast L180X Pro 1800mAh power**

LimeFuel's Blast L180X Pro 18000mAh power bank might be a lot more expensive than its rivals, but it ticks several boxes that other portable USB chargers don't.

Unlike many power banks, it has four 2.4A fast-charging USB outputs and supports passthrough charging, which means it can function as a four-port USB hub that'll always be powered up and ready to go when you need to take it on road. With a 18000mAh capacity, such a device could otherwise take between 11- and 18 hours to fill up.

That said, even with four 2.4A USB outputs the maximum total output is 4.2A. So, while you can plug in four USB-powered phones, tablets and other devices, they will charge faster with fewer connected.

If you are using an iPad, you'll appreciate the two-in-one Micro-USB and Lightning cable supplied in the box. A Lightning adaptor slots over the top of the Micro-USB output to allow you to charge your Apple devices as well as all manner

of Micro-USB-connected Android and Windows Phone devices.

Another plus point is the LimeFuel's ability to automatically turn itself on and off when you don't have a device connected to save power. Likewise, overcharge protection prevents damage when you're leaving it plugged in and using it as a USB hub.


Even in passthrough charging mode, the L180X Pro never became more than warm in our tests. And that's exactly as we expected, given this power bank's build quality. It feels tough and durable, and comes with a reassuring 12-month warranty.

The charger is a matt black slab with rounded corners and a smudgeproof coating, measuring 79x24x124mm and weighing 369g. Given the capacity on offer we expected it to be both larger and heavier. Nevertheless, while the Blast Pro will fit in your pocket, it's probably still too heavy to be portable in any sense other than thrown in a travel bag.



Like just about every other power bank on the market there is a built-in LED torch. Four additional green LEDs denote the LimeFuel's remaining capacity, although with each representing 25 percent (that's 4500mAh) it's impossible to get an accurate reading.

Verdict

The LimeFuel Blast L180X Pro shows the way forward for power bank tech, with support for passthrough charging and four fast USB outputs.  **Marie Brewis**

VIDEO-EDITING SOFTWARE

Adobe Premiere Elements 13 vs CyberLink PowerDirector 13 Ultra

Adobe

£80 inc VAT

Contact

■ adobe.com/uk

Ease: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



CyberLink

£80 inc VAT

Contact

■ cyberlink.com

Ease: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



Read more

■ tinyurl.com/mnwplg

Plenty of free video apps allow you to quickly shoot and edit short video clips for uploading to your favourite social media sites. However, for longer projects, it's worth investing in a proper video editor such as CyberLink's PowerDirector or Premiere Elements from Adobe.

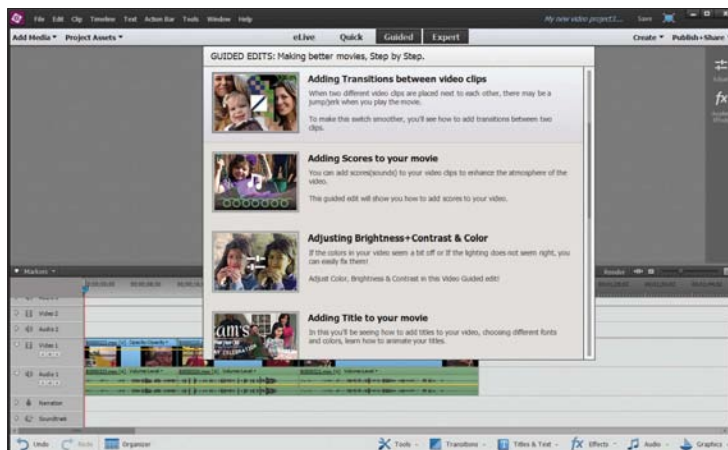
New features

Both suites have now reached the grand old age of version 13, but it's PowerDirector that seems to have more new ideas at the moment.

One smart new feature is the MultiCam Audio Sync option. If you have two or more people with cameras shooting the same event from different angles, then the video clips they record will contain different images. However, they will all still share the same audio track, so the new Audio Sync tool can analyse the audio within multiple clips and use it to align your clips at the correct points in the timeline. This makes it much quicker and easier to cut from one camera to another and to create collages with footage from multiple cameras.

In addition to its existing selection of transition effects, PowerDirector now includes a Transition Designer that lets you import an image and use it as a kind of mask through which one video clip can fade into another. The Video Stabilizer has been improved to produce clearer, sharper images from shaky video, and CyberLink has also added support for the new H.265 video format, as well as the XAVC-S format for 4K video.

Premiere Elements, in contrast, has a more modest set of new features this time around. We like the new Guided Edits that show you how to place moving video within your titles, and to use masks to highlight specific areas within a video clip, but in essence these Guided Edits are simpler ways of presenting existing tools. The same applies to the new Video Story feature, which presents you with a storyboard divided into chapters, so you can quickly compile a batch of clips into a complete movie. To be fair, Premiere Elements was already a powerful video editor, but in this round of updates it's PowerDirector that shows more ambition.



PREMIERE ELEMENTS does a great job of helping beginners get started

Getting started

Adobe's and CyberLink's applications both provide two different editing modes, which are designed to cater for beginners and more experienced users. When you launch PowerDirector, you are asked if you want to use the Easy Editor or the Full Feature Editor.

The first helps beginners by prompting you to import a batch of video clips and to select a template, and then automatically compiles them into a complete movie project for you, complete with transitions and soundtrack.

More experienced users can opt for the Full Feature Editor, which provides access to the program's multi-track timeline and its full range of editing tools. Our only complaint here is that there's a huge leap between these two editing modes, and less experienced users may struggle when they try to move from the Easy Editor into the more advanced editing mode. The program's Help files don't help much either, as they tend to simply list features rather than clearly explaining how they work.

Premiere Elements does a far better job of helping new users. If you want it to do all the work, you can select the Video Story option that we mentioned earlier and just let it compile your movie for you. If you want a little more control, then the Quick tab at the top of the editing window displays a simplified version of the timeline where you can arrange clips yourself, while the Expert tab opens

up the full multitrack timeline for more experienced users.

But Premiere Elements doesn't stop there. Click on the Guided tab and you'll see a list of Guided Edits that provide step-by-step help with many common editing tools and techniques. There's a quick-start guide that introduces the basics of editing, along with guides for using transitions, titles and special effects. These guides are well designed, too – some of them even put big yellow arrows on screen to point at the buttons you need to press.

Transitions and effects

When it comes to transitions, both PowerDirector and Premiere Elements provide a good set of basic cuts, fades and wipes. And, in our opinion, anything else – such as 3D rotations – tends to look amateurish and gimmicky, so piling on dozens extra transitions for the sake of it isn't important. And while PowerDirector's Transition Designer sounds like a good idea, it's not particularly easy to use, and isn't essential – unless you want to create a custom transition that uses a corporate logo.

Video effects are more important, as you'll often need colour adjustment tools to enhance the appearance of your video clips, as well as more eye-catching special effects that help to create drama and atmosphere. Both programs offer more than 100 different video effects of various types, but unless you're looking for one specific effect – such as PowerDirector's

rather nice split-screen Continuous Shooting effect – then neither has a real advantage here.

There are, however, differences in the way that the two programs handle effects. Both allow you to apply effects by dragging the effect from a menu and then dropping it directly onto a clip in the timeline. However, PowerDirector also includes a separate FX track on its timeline, which makes it easy to quickly adjust the duration of an effect, so that you can apply it to just one part of a clip.

Premiere Elements allows you to pile multiple effects onto your video clips, and then displays controls for all those effects on screen beside the main playback window. That gives you plenty of control, so that you can fine-tune your effects and achieve just the right look.

The ultimate control here lies in the ability to use 'keyframes' to alter the properties of video clips and effects over time. The good news is that both programs provide keyframe controls. The bad news is that they're both equally complicated, and will require a fair bit of time and effort to master, regardless of which one you choose.

Audio options

The video clips you work with will generally contain audio as well, so a good video-editing program also needs to provide at least basic controls for working with audio. Premiere Elements and PhotoDirector are pretty much level pegging here. They both display audio and video as separate tracks on the main timeline, and you can separate the audio and video tracks, so that you can cut and trim the audio track without affecting the original video.

If the audio track is poor quality, then you can delete it altogether, and both programs provide special tracks in the timeline where you can record your own voice-overs or insert a separate music soundtrack. The audio tracks display a waveform that you can click on to quickly adjust the volume level, but both programs also include mixer controls so you can balance the sound levels across multiple audio tracks.

There are a few differences between the audio tools in these programs, though.



PowerDirector scores bonus points for its MultiCam Audio Sync option, which makes it easy to work with footage from multiple cameras. It also includes a simple audio-editing program called WaveEditor.

Premiere Elements has a useful selection of sound effects that you can add to your clips, and also a number of ready-made music clips that you can use for your soundtracks. In addition to video filters and effects, it also includes a number of audio effects, such as reverb and pitch-shifting, which you can modify in the same way that you modify the program's video effects.

Text and titles


Good-looking titles can add a professional touch to your video, and both programs provide a good set of tools for adding text for titles and credits. Premiere gives you lots of help by providing a range of templates for projects such as birthday videos or sports events. Many of these templates include predefined animation effects, such as scrolling credits for the end of a movie, and all you have to do is type your text into the template. Alternatively, you can skip the templates and create your titles by hand, selecting a font and a text style, and then choosing one of the many animation effects that are available.

PowerDirector doesn't offer as much help in the form of templates and predefined animations for your titles. However, it does include a Title Designer module that

provides very fine control over text properties, such as character spacing and reflection effects. The Title Designer also provides keyframe animation controls, so you can move and resize text, or make it fade in and out. These tools provide very precise control when creating titles, though, they're not as quick and easy to use as those of Premiere Elements, so you'll need to put in a bit more work to get results.

But, in addition to the Title Designer, PowerDirector also includes an option specifically designed for creating subtitles. There's a special track for subtitles in the main timeline, so you can type in the text and then quickly move the subtitle to the required point on the timeline, or enter the time code if you know exactly when you want the subtitles to appear. You can create static text titles in Premiere Elements and use them as sub-titles, but the subtitling tool in PowerDirector is quicker and easier if you need to use lots of subtitles or captions in your video projects.

Verdict

There's little to choose between these two programs when it comes to the variety and power of their editing tools. Premiere Elements will appeal more to less experienced users as its Guided Edits do a great job of introducing important editing tools and techniques. However, PowerDirector lives up to its name, with some impressive features that may well win over more experienced users.  **Cliff Joseph**

**CYBERLINK'S
POWERDIRECTOR**
offers a wide range of
transitions and effects

IMAGE-EDITING SOFTWARE

Adobe Photoshop Elements 13 vs CyberLink PhotoDirector 6 Ultra

Adobe

£80 inc VAT

Contact

■ adobe.com/uk

Ease: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



CyberLink

£80 inc VAT

Contact

■ cyberlink.com

Ease: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



Read more

■ tinyurl.com/opsybwv

When a program gets to version 13 there's not a lot of entirely new features waiting to be added, so the emphasis with recent versions of Photoshop Elements has mostly been on refining existing features.

One of the most powerful features in Photoshop Elements is Photomerge, which helps you to combine elements from multiple photos within a single image. This has now been refined with more precise selection tools that make it even easier to select complex elements - including entire people - from one photo and then add them to another. Even basic features such as the Crop tool have been fine-tuned, now displaying previews of four different crop settings for you to choose from. But, just to show that Adobe hasn't run out of ideas, Photoshop Elements does gain one completely new feature and now provides the ability to personalise your Facebook profile by creating a custom cover photo for the main heading of your profile page.

PhotoDirector hasn't been around for quite so long, so it's still adding new features with each update. A major addition this time around is the new Panorama tool that allows you to stitch multiple landscape shots together to produce a seamless 'surround view' panorama. There's nothing original about this, of course, but the Panorama tool in PhotoDirector is easy to use and does a good job of filling in the gaps between overlapping or poorly aligned shots. We particularly like that photos can be a mixture of landscape or portrait shots, and that they don't have to be in a horizontal or vertical line. You could take a 4x2 grid, and PhotoDirector will figure out where each fits and stitch them together.

There are some under-the-bonnet improvements in this version of PhotoDirector, too. OpenCL support means that the program can use your PC's graphics card to speed up many tasks, and CyberLink also gives you 20GB of free online storage for backing up your photos.

Getting organised

Before you can start work on your photos you'll need to import them on to your PC and then organise



PHOTODIRECTOR'S adjustment tools can be confusing to the beginner

them, so that you can quickly find the ones you need. Photoshop Elements includes a separate program - the appropriately named Organizer - for this task. Its interface is similar to that of Adobe's program itself, with a set of tabs running across the top of the screen that provide access to different sets of tools. The Media tab lets you quickly scroll through your entire photo library, and includes options for creating albums, adding ratings, or keywords - such as 'holiday' - that will help you to quickly locate specific sets of photos.

The People tab allows Organizer to scan through your photos and identify your friends' faces, while the Places tab uses GPS location data to display photos alongside a map of the location where they were taken. Finally, there's the Events tab, which automatically groups together photos that were taken on the same date or time, such as a birthday party or a sports event.

PhotoDirector's organising tools aren't as extensive, but they're quick and easy to use. The program uses most of its screen space to display your photos, putting all its editing and organising tools into a panel that runs down the left-hand side of the screen. Click on the Library tab at the top of this panel and you'll see options for creating albums and adding keywords. You can also create Smart Collections, which automatically locate photos using criteria such as rating or date, and can even locate photos

that use specific camera settings, such as shutter speeds, or a flash on night-time shots. There's a face-recognition option similar to that of Photoshop Elements, but PhotoDirector doesn't have a Places option that can use GPS data to display your photos on map. However, that's probably not a make-or-break feature unless you take most of your photos on a smartphone which automatically geotags your images - few digital cameras have this capability.

Adjustments

Once you've located a photo using PhotoDirector's Library tab, the next step is to click the Adjustment tab in order to enhance the appearance of your photos. The tool panel on the left of the screen then switches modes in order to display the various adjustment tools. This long, scrolling panel looks a bit cluttered, though, and could be confusing for less experienced users. Right at the top of the tool panel there's a histogram that probably won't mean anything to newcomers, and beneath that are two sets of tools for 'regional adjustment' and 'global adjustment'.

The regional adjustment tools allow you to modify specific regions within an image, with standard features such as a crop tool and red-eye removal. However, options such as the gradient mask and radial filter soon sent us searching through the application's help files once more.

Some of the Global Adjustment tools are a little more straightforward, with simple slider controls for adjusting settings such as exposure, brightness and colour balance. There's also a useful 'adjustment brush' that provides finer control by allowing you to apply these adjustments to specific parts of an image. But scroll down the list a little and you'll come across more complex tools, such as tonal curves and HDR adjustments, that provide very little help for the everyday smartphone snapper. The tool panel does include some useful presets that allow you to apply specific effects with a single click, but PhotoDirector may still seem rather daunting to novices.

In contrast, Photoshop Elements goes out of its way to ease you into the photo-editing process. It places three tabs at the top of the screen, labelled Quick, Guided and Expert. Newcomers can click on the Quick tab to see a basic set of tools for adjusting exposure, colour and other settings, while the Guided tab gives you a step-by-step introduction to some of the program's more advanced tools. There are guides that show you how to remove scratches and blemishes, as well as for popular photographic techniques such as the hazy Orton Effect. PhotoDirector includes many of the same tools, but Photoshop Elements gets top marks for the help that it offers new users.

Filters and effects

The fashion these days is to jazz up your photos with filters and other effects. Photoshop Elements has gone to town here. In addition to standard effects such as black-and-white and sepia-tone, there are dozens of artistic effects that make your photos look like hand-drawn paintings and sketches, and distortion effects that you can use to create caricatures and funny faces. There's even a special Filter Gallery that allows you to fine-tune settings such as the thickness of brush strokes on the artistic filters.

PhotoDirector is a little untidy here, but arguably offers better presets. Its Photo Effects menu lists a mere handful of options such as sepia, tint, and black-and-white. However, if you go back to the Presets menu in Adjustment mode you'll find a number of options that



any other program would refer to as 'filters'. These include effects such as 'yesteryear' and 'retro', and the pop-art Lomo effect. However, it's not always obvious what these effects are doing - beginners won't understand terms like 'split-toning'. There's a more extensive range of filters and effects available in Photoshop Elements, but neither editor is as quick or easy as using Instagram or any of its copies, especially if you like to add borders.

Power tools

When you've got the hang of using the standard adjustment tools and filter effects, you may want to experiment with some of the more advanced editing tools found in these programs. Photoshop Elements has an unfair advantage here, as it is able to borrow a number of powerful tools from the professional version of Photoshop.

Click on the Expert tab in Photoshop Elements and you are presented with a new workspace containing an extensive tool palette. A key feature here is the Quick Selection tool that allows you to select fine details within your photos, such as a person's hair. You can also create 'layers' and copy selections into different layers in order to create multi-layered composite images. Using layers also allows you to move and edit individual elements separate from the rest of the image, perhaps enhancing the brightness of a person or object in the foreground in order to add emphasis.

PhotoDirector isn't in the same league here. It has some useful tools for working with portraits, such as a wrinkle remover and the ability to enhance skin tones. Its Photo Merge features also make it easy to combine elements from multiple photos, while the Bracket HDR option will appeal to more experienced photographers who want fine control over exposure and lighting.

One useful feature is the ability to swap faces from a selection of similar photos, ideal when you have a group of people and there's no single photo where everyone is smiling and unblinking.

However, PhotoDirector doesn't support layers, so doesn't allow you to drill down and manipulate individual elements within your photos in the same way as Photoshop Elements. Its selection tools tend to focus on specific tasks, such as removing background elements from photos, so you don't have the same degree of editing freedom as Photoshop Elements.

Verdict

PhotoDirector 6 Ultra has some powerful photo-editing tools, but it doesn't always present them in a manner that would be accessible to less experienced users. Photoshop Elements outdoes its rival with a wider range of filter effects and powerful editing tools, but its real strength lies in the fact that it goes to such great lengths to help new users get the most from all those creative tools. **✗ Cliff Joseph**

ADOBE PHOTOSHOP ELEMENTS has gone to town when it comes to filters

£712 ex VAT
£855 inc VAT

Contact

■ benq.co.uk

Read more

■ tinyurl.com/mrb4ecw

Specification

24.1in LCD screen;
1920x1080 pixels; GB-R
LED backlight; matt anti-
glare IPS panel; 91ppi
resolution; 0.27mm
pixel pitch; 6ms GtoG
specified response time;
DisplayPort; Mini
DisplayPort; HDMI; DVI
VGA; 100mm VESA mount;
2x USB 3.0; SD/MS card
reader; height-adjustable
swivel stand;
543x555x254mm

Build: ★★★★★

Features: ★★★★★

Performance: ★★★★★

Value: ★★★★★



MONITOR

BenQ PG2401PT

While most LCD panels struggle to reproduce even the most basic sRGB colour gamut, BenQ's PG2401PT targets precise print proofing. That means it must reproduce far more of the colours we can readily perceive. It claims to cover 100 percent of the CMYK space used in traditional four-colour printing and 99 percent of the Adobe RGB colour space.

It's a 24.1in monitor with 1920x1200 resolution and uses a high-grade IPS panel. Its 16:10 aspect ratio provides a much more usable working space for professionals than 16:9 screens.

An adjustable stand allows the panel to be turned 90 degrees for portrait-mode work, and it can be raised and lowered to a comfortable working height. A guillotine cucumber-slicer built into the upright pillar acts as a cable-grabbing tidy mechanism.

The chassis is matt black plastic with a thin bezel panel just 18mm wide on the sides and top, and a few millimetres deeper at the bottom.

Within the bottom bezel is a sensor window which detects user presence (optionally switching off the monitor when absent) and ambient light sensor designed to make the overall brightness level more consistent through the day.

At the rear are five inputs facing down: two DisplayPort (one of these, the Mini variety), HDMI, DVI and analogue VGA. A headphone jack serves audio from an HDMI connection. There are also two USB 3.0 ports on the left edge, fed by one upstream port underneath that connects to your PC.

The serious print-proofing design includes a monitor hood in the box, lined with black velvet to absorb light reflections. These pieces clip on in stages, and in our testing we got good results from using the side sections alone. Each unit is tested with a Konica-Minolta CA-2000 lab colour analyser, and its results included in a printed sheet with the monitor. Build quality is sturdy.

The on-screen menu system is easy to use through an array of touch-sensitive buttons. These are also proximity-sensitive, so as your fingers approach to touch them, the button areas light up with white LED dots.

Performance

BenQ points out that a 10-bit monitor can generate more than a billion colours – 64 times the number available on an 8-bit panel. However, what it omits to point out is that the PG2401PT is not a 10-bit panel. It uses an LG LM240WU9 panel, which is an AH-IPS 8-bit display enhanced with some extra frame-rate control (FRC) electronics to give 10-bit-like performance.

We measured its image quality through a standard 8-bit per pixel graphics card with a Datacolor Spyder4Elite colorimeter. It's worth noting that BenQ has worked with rival colour management brand X-Rite to develop software and hardware calibration for this monitor. With the help of an X-Rite i1 pro, i1 pro 2 or i1 Display Pro colorimeter, you should be able to optimise the 3D look-up table for best performance.

Our measurements indicated 95 percent sRGB coverage, with the PG2401PT stretching much further into the green end of the spectrum than the limited sRGB requirement, and missing just a little red and yellow. We also saw 90 percent Adobe RGB cover, a much trickier test, with a missing sliver of distant yellow denying it full coverage here.

Colour uniformity at a practical 50 percent brightness level was very good, with at worst 2.3 percent drift in the centre. Luminance uniformity was mostly within 5 percent, the largest deviation being 13 percent in top right and bottom right corners.

Colour accuracy was first class, with an overall average of just 0.56 Delta E from 48 spot swatches.


Image brightness and colour remained very good when viewed at narrow angles. The anti-glare matt film worked very well at blocking reflections and did not add much in the way of grain.

There were some colour artefacts on high-contrast edges, like chromatic aberration ('purple fringing') seen through glass optics.

Mac users may also like to adjust the default sharpness level. We turned this down from 5 to 3 to reduce the rainbow highlighting of sub-pixel rendering in OS X. Windows users are typically not troubled by over-sharpness so much due to the different screen rendering technique.

Power consumption figures were very reasonable, given the monitor's high-performance credentials. At full brightness it consumed 41W, falling to 30W at 200cd/m² output and just 22W at 120cd/m².

Verdict

The BenQ PG2401PT is a high-quality monitor with an 8-bit+FRC panel that goes some way to giving 10-bit performance. Its wide colour gamut, excellent colour accuracy and 16:10 aspect ratio recommend it as a professional computer monitor for more critical colour grading work, although some colour artefacts under certain conditions betray its technological limits.  **Andrew Harrison**



£50 ex VAT
£60 inc VAT

Contact

■ ricohpmmc.com

Read more

■ tinyurl.com/q5jzLq7

Specification

600x300dpi resolution;
12ppm rated speed for
mono/colour; 1x USB 2.0
interface; 10/100 Ethernet
port; 250-sheet input
tray; 100-sheet output
tray; paper stocks A4-
B6, 60-163gm²;
399x360x212.5mm; 9.5kg

Build: ★★★★★☆

Features: ★★★★★☆

Performance: ★★★★★☆

Value: ★★★★★☆



INKJET PRINTER

Ricoh Aficio SG 2100N

Ricoh has been using its Geljet technology for several years – *PC Advisor* reviewed an earlier Ricoh Aficio GX3000 model some seven years ago in 2007. The technology uses fast-drying gels rather than the water-based or pigmented inks used in most inkjet printers.

Previous Geljet printers were aimed squarely at corporate users, but Ricoh has now launched a range of Aficio printers that are more compact and less expensive in the hope of expanding into the home and small business markets.

According to Ricoh, the advantage of the Geljet technology is that the viscous gel-based inks don't bleed into the porous fibres of low-cost office papers as conventional inks do, and this means that they give better results for colour graphics and photos when using ordinary office paper.

Price and value

Prices for the new Aficio SG range start at £60 for the SG 2100N reviewed here, so the initial purchase price certainly falls well within the budget of home users and small businesses alike.

It's a fairly basic printer, with no built-in scanner or copying functions, and no double-sided printing. But then to be fair, there aren't many printers around that would include those sort of features for just £60.

The lack of Wi-Fi connectivity may be more of a loss, though, as it means that you're limited to wired connections via USB or the printer's Ethernet port.

The SG 2100N performed well in our speed tests. Ricoh quotes speeds of 12 pages per minute for both mono and colour printing, and our test documents came very close to that, giving speeds of 11ppm for both plain-text documents and PDF files containing colour graphics as well as text.

That's pretty good performance for a printer that costs just £60, and with its 250-sheet paper tray, 10,000-page monthly duty cycle, and

two-year on-site warranty, the SG 2100N could make a good workhorse printer for a small business.

Text quality

We were pleased to see that text quality has improved since the last time we reviewed one of the Geljet printers. Plain text wasn't quite as crisp and black as that of a laser printer, but we liked the smooth outlines, especially on italic fonts, and overall text quality was perfectly adequate for day-to-day work such as printing letters or school reports.

Printing colour graphics on plain paper was something of a mixed bag. Using the printer's default

Running costs

Unfortunately, the SG 2100N, so cheap to buy, is let down by its high running costs. The problem here is that the SG 2100N doesn't include an option to use the high-yield ink cartridges that can help to reduce running costs.

The printer's standard cyan, magenta, yellow and black cartridges all cost about £25 each, but only last for around 600 pages. That works out at almost 4.2p per page for mono printing and up to 16.7p for four-colour prints. That's above average even compared with budget inkjet models. You can buy a value pack containing all four cartridges for



about
£95, but that
only brings prices down
by 5 percent or so.


600x300dpi resolution, it took 17 seconds to produce an A4 colour photo on plain office paper. The results weren't bad; a little grainy perhaps, but it was noticeable that the photo output lacked the banding that often afflicts more conventional inkjet printers.

When we stepped up to the printer's interpolated 1,200dpi resolution, the highest-quality settings slowed it down to a full two minutes for the same A4 photo, but the image was sharper and clearer, and with brighter colours.

You're obviously not going to get lab-quality photos when using ordinary office paper, but if you need to print colour posters or fliers on plain paper, then the SG 2100N does have an edge over most of its inkjet rivals.

Verdict

The Aficio SG 2100N provides good performance for such an inexpensive printer, and the Geljet technology does work well when printing colour graphics on plain paper. Unfortunately, the high running costs of this model make it hard to recommend, even for basic mono printing.

The next model in Ricoh's Aficio range is the SG 3110DN, which costs half as much again at £90 but also offers duplex printing as well as the option to use high-yield cartridges. It may well be worth paying more up front to get hold of that model in order to keep your long-term running costs under control.  **Cliff Joseph**

CHROMEBOOKS

Fun, cool and wallet-pleasingly simple, Chromebooks make smart use of their online focus by cutting out expensive componentry without performance taking a hit. **Martyn Casserly** looks at six of the best

As the name might suggest, a Chromebook is a laptop that runs Google's Chrome operating system rather than Windows or OS X. It offers pretty much the same experience as using the popular Chrome web browser but with a few extra features added to the mix.

An internet connection is central to how a Chromebook functions, as nearly all its apps and services are online and don't run locally. There are a few exceptions to this, with Google's own Document and Spreadsheet apps capable of working offline and then seamlessly syncing any work you've done to the cloud once you're back on Wi-Fi.

This simplicity allows Chromebooks to use less powerful hardware than many Windows laptops, without it affecting the overall performance. You won't find capacious hard drives, high-end processors or large 15.6in screens on Chromebooks. Instead, Google offers 100GB of online storage with every machine, mobile processors are the order of the day (negating the need for noisy fans), and the usual screen size is around the 11.6in. One of the most notable benefits of such modest accoutrements is that prices for Chromebooks tend to be below £300, with many selling for nearer £200.

There are many similarities across the available models, with a generally standard keyboard layout and screen resolution, and fast bootup times, but customers with specific needs should still be able to find a machine to suit them.

The HP range features the largest screen size, with the HP 14 boasting a bright 14in display. If you want a touchscreen, then Acer and Lenovo should be the brands to look at. Those seeking ultimate quality will find Google's own Pixel (tinyurl.com/p8Lbenk) is as good as it gets, albeit at an equally premium price.

For most users, though, who just want a laptop-style computer for browsing the internet, creating documents and spreadsheets, streaming videos or giving to the kids as an inexpensive, virus-free homework device, a Chromebook is an excellent choice.

There are, of course, still very good reasons to buy a Windows machine - they

offer far more software, and don't rely so heavily on the internet, for starters - but Windows laptops at the low end of the market, especially in the price range that Chromebooks occupy, tend to be underpowered or cumbersome.

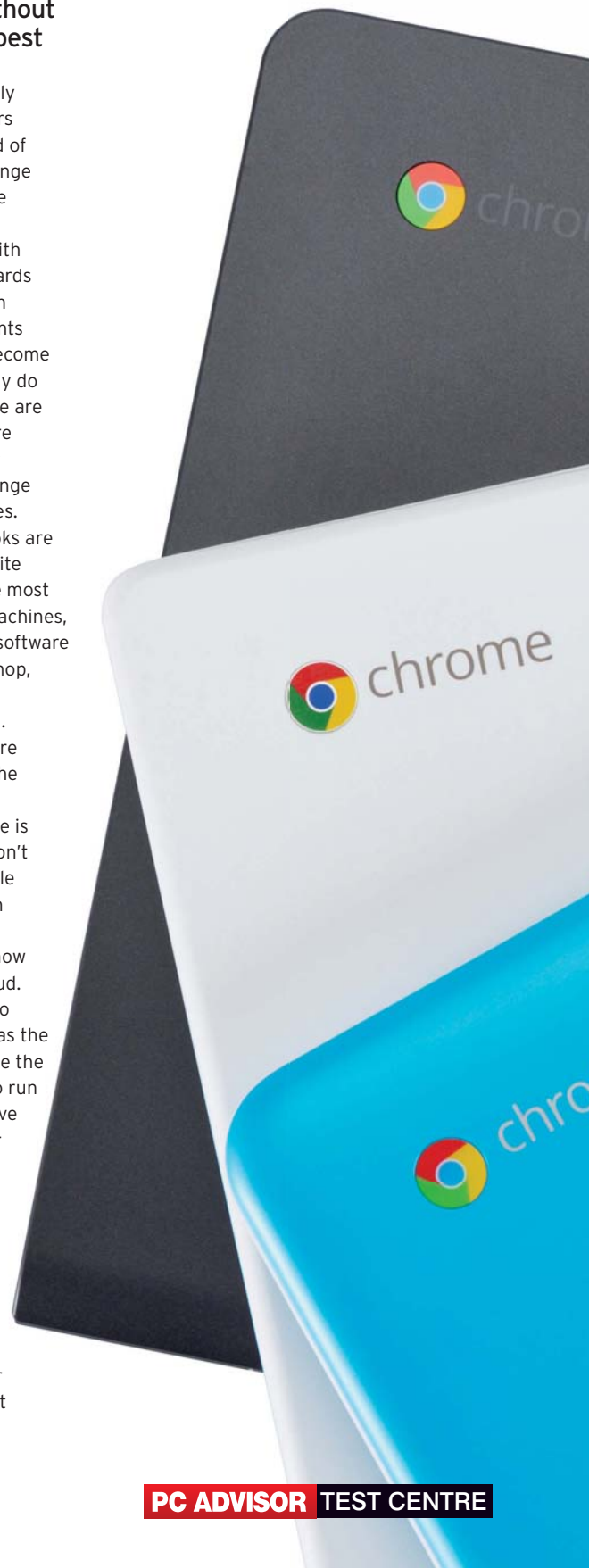
Netbooks are a prime example, with their small screens and fiddly keyboards making the user experience less than great, while their low-spec components mean that Windows will inevitably become sluggish over time. They can certainly do a decent job in many cases, and there are still bargains to be found, but as more computing moves online, low-budget Windows machines face a real challenge from the Google-powered alternatives.

That's not to say that Chromebooks are a perfect solution, as there are definite limitations you need to consider. The most significant is that, unlike Windows machines, Chromebooks can't run most of the software you might be used to. So, no Photoshop, no iTunes (and therefore no iDevice compatibility) and next to no gaming.

Full versions of Microsoft Office are also missing, although you can use the web-based suite, albeit with reduced functionality. Google's own Docs suite is also a very good alternative if you don't need Office's advanced features, while its online collaboration is better than Microsoft's offering.

The other main consideration is how far you're willing to embrace the cloud. Chromebooks generally come with no more than 16GB of internal storage, as the premise of Chrome OS is that you use the internet rather than your machine to run programs and store data. So if you live in an area with patchy broadband, or don't want to store your information on Google, Microsoft or Dropbox servers, then a Windows machine might be a better solution.

Peripheral support is also hit and miss, so if you need printers or other external devices to get your work done, then it's worth investigating whether a particular Chromebook will support those devices before you buy it.





Photography by Dominik Tomaszewski



ACER C720

£199 inc VAT • acer.co.uk • tinyurl.com/qxrgu2L

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★☆☆

Acer has recently supplanted Samsung as the number one seller of Chromebooks worldwide, mainly due to the success of the C720 range. This particular variant of the C720 sits at the entry-level point of Acer's Chromebook range, eschewing the touchscreens that adorn its more expensive cousins. As a result its price tag is just £199, for which you get a great deal of useful technology.

As you might expect, the casing is plastic, finished in a smart, bluish grey that does a fair job of simulating metal while feeling strong enough for day-to-day usage. The choice of material also has the advantage of making the C720 a lightweight 1.25kg, so throwing it in your rucksack and heading out for the day won't leave your back regretting it. For such a cheap little machine it also packs a fair amount of ports, with HDMI, an SD card reader and two USB slots, one of which is USB 3.0.

While many of the first Chromebooks on the market arrived with ARM chips at their centre, Acer has taken a different path and equipped its C720s with Intel Celerons. These particular 1.4GHz chips (2955u) are based on Haswell technology, which results in increased battery life compared with Acer's previous C7 Chromebook range. The manufacturer claims an 8.5 hours running time, which isn't too far off the seven hours we managed in testing. That Haswell magic also gives the C720 a nippy feel when running a few open tabs. Google Play music was happy to stream in the background while we browsed Amazon and Facebook, but, as with many Chromebooks, things become a bit stodgy if you get too greedy or add video into the mix. The 2GB of RAM probably doesn't help, and this is an area we'd like to see expanded as the platform develops. One thing to bear in mind is that the speed of your internet connection will significantly affect the general performance.

Something the web can't alter is how the C720 feels under the fingers. We've been very impressed by keyboards on a few

Chromebooks in the past (with the Samsung 2012 and HP 11 both having excellent typing surfaces) but the one here feels a little shallow and spongy. It's not bad, but it doesn't quite match up to the competition, and the choice Acer made to conjoin the Enter and hash keys is disappointing. The touchpad is fine, though, and handles multitouch gestures with efficiency and little drama. There are no separate buttons for left and right click, but we've grown used to the two-finger tap to open the right-click menu now, and prefer that method.

Another area where money has been saved is the display. You can't expect IPS panels or 4K resolution on such a cheap machine, and you certainly don't get them. Instead, there is an 11.6in TN LCD, which is bright and clear. Colours are a little dull, and the 1366x768 resolution leaves a few icons looking slightly jagged at times, while viewing angles are limited, but like most things on the C720 it's decent and totally usable on a daily basis. You could also happily take the device and a USB thumb drive loaded with movies to entertain yourself on a transatlantic flight.

Chrome OS itself has developed nicely over the past couple of years to the point where it feels complete enough to use on a daily basis. Offline capabilities for Google Docs also make the C720 a more robust work machine. The multitouch gestures enable smoother navigation, while the general simplicity of the operating system lets you get on with things without distraction. For a great many people, this will be more than enough.

VERDICT: The Acer C720 doesn't excel in any particular department, but it scores highly enough in most of them to make it a good all-rounder. It's lightweight, fast and cheap - and a cool-looking device. The keyboard is a little underwhelming, but for the money this is a very easy machine to recommend if your budget is under £200.



ACER C720P

£250 inc VAT • acer.co.uk • tinyurl.com/n8fp9bv

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

In almost every aspect, Acer's C720p is the same machine as its C720. It has the identical Haswell-based, 1.4GHz Intel Celeron CPU, 2GB of RAM and 16GB SSD, as well as the same diminutive size and general speedy performance. Where it differs is first hinted at when you pick both machines up, and notice a slightly heavier balance to the C720p. This extra weight is down to the touchscreen panel that turns a useful, cheap laptop into a cool, web-friendly and not quite as cheap but still very reasonable laptop.

The idea of a touchscreen Chromebook might seem odd. After all, Chrome OS is a lightweight operating system, so how would it benefit from being adapted to touch? Well, as it turns out, rather well. The secret is that almost nothing changes, except your ability to navigate the web in a fashion far closer to that of a phone or tablet.

When Microsoft released Windows 8, it did so with much ceremony and a complete redesign of the world's most used computer interface. It has by and large been considered something of a failure, with acrimonious user feedback prompting the company to get a move on with Windows 10 and reinstate many of the previous features. Chrome OS has no such learning curve to overcome, as the user interface is left intact. You can use the C720p as you would any other Chromebook and never notice the difference. But if you're on a web page and want to select a link, highlight a text box in a form or hit a dialog button, then tapping the screen will make it happen. It's hardly revolutionary, but the unintrusive inclusion of a touch option really does sit well with the web-centric way that a Chromebook works.

The panel itself is responsive and handles multitouch gestures, such as pinch to zoom, in a generally pleasing fashion. It's not quite as smooth as, say, an iPad – the C720p surface has a little more friction, making the tactile response feel like harder work. These are minor gripes, though, with the usual scrolling or tapping to select

functions working happily. A few handy controls have been added to the touch interface, including swiping in from the bezel on the left to take you back to the previously loaded web page, while swiping in from the right does the opposite. Double-tapping on text won't make it zoom to fit the page like on a smartphone or tablet, but brings up the text selection arrows. Overall, though, it's a satisfying addition to an already useful chassis.

Like the C720, the C720p is lightweight and compact. The touchscreen adds a little bulk but the whole unit still comes in at 1.35kg, which makes it backpack-friendly. Although they are presumably the same, the keyboard on the C720p had a bit more spring in it than the C720 we reviewed. It's still on the shallow side, but the typing experience is pleasant for the most part. Viewing angles on the C720p's 11.6in 1366x768 display are perhaps rather wider than its non-touch sibling, but it's still really a screen that only one person can comfortably watch at a time, as details quickly disappear when you're off-centre. The rear-mounted speakers provide a good amount of clear volume, but the bass response is the thin kind encountered on so many inexpensive laptops.

The C720p carries an impressive number of ports on its small body, with HDMI, SD card and twin USB (1x 2.0 and 1x 3.0) options on the flanks. The only real disappointment is that Acer equips it with a proprietary charger rather than the very handy USB charging that some of its rivals now use. A battery life of around six hours makes it not quite an all-day machine, but you'll still get plenty of mileage.

VERDICT: As a wallet-friendly machine for browsing the internet and getting some work done, the C720p is a great choice. The touchscreen is a nice upgrade to an already attractive package, and if you can live within the internet world of Chrome OS, then at this price you can't go wrong.



ASUS C300M

£250 inc VAT • asus.com/uk • tinyurl.com/jwLbnwg

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

If the smaller screen sizes of most Chromebooks don't give you the space you want, then the Asus C300M might be a more attractive option. Although its little brother (the C200) comes with a standard 11.6in display, the C300M expands the vista to 13in. The extra size does little to increase the heft, as the device still feels light and portable, weighing in at a very reasonable 1.4kg. As you might imagine, the feathery chassis doesn't feature high-grade metals but is of sturdy plastic construction, with this particular model looking resplendent in a light blue livery. Colours have become the vogue in Chromebooks, with HP decorating its creations in a variety of bright hues, and Asus offers variations in yellow, red and black as well as this azure beauty. It's good to see a sense of fun in PC manufacturing, and if you were thinking of buying a Chromebook for your children/teenagers, they'd probably prefer one of these to the staid white/silver/black options that dominate the market.

Inside is the usual complement of 16GB SSD, 2GB RAM, and integrated graphics, all under the guidance of an Intel Bay Trail Celeron 2.16GHz dual-core processor. For the most part this arrangement works well, with the C300M moving along at a steady clip when working on documents, browsing the internet and listening to streamed music. It did slow down occasionally, though, especially when several tabs were open at once or when attempting to buffer large HD movies. While this can be said of most Chromebooks, it did take the shine off an otherwise excellent user experience.

The display might be larger than many of its rivals, but shares the same 1366x768 resolution found on pretty much every variant except the super-deluxe Google Pixel. For everyday use it's more than enough. Sure, you won't have the crisp, almost paperlike quality of modern iPads, but you can read everything perfectly clearly, and YouTube looks fine. Viewing angles, though, are more of a problem. The TN screens that keep Chromebooks so affordable also mean that

colours are often pale, and the visual sweet spot tends to be in a very narrow range. Again, it's acceptable, and makes a lot of sense when you look at the price, but an IPS screen would really make the device come alive and cost only a bit more.

The C300M is a comfortable machine to type on thanks to a spacious keyboard with the simple, uncluttered layout we've grown to love on Chromebooks. The large multitouch trackpad is smooth and responsive, executing multifinger gestures without delay. The only real complaint concerned the large stickers plastered around the interior, which feel very 1990s. Ports are in plentiful supply, with a USB 3.0 and USB 2.0 socket on either side, plus HDMI and SD card slots. The extra girth also allows for a bigger battery, and the C300M lasted an impressive nine and a half hours in our tests.

While Chrome OS is a good fit for 11.6in displays, thanks to its minimalistic design, the extra space offered by the C300M is welcome. Changing the settings to zoom to 125 percent made text comfortable to read and websites displayed perfectly while filling the screen. If the current trend of HD displays with smaller fonts is a pain for your eyes, then this could be a fine way to avoid squinting in public. One happy surprise was the powerful speakers placed under either side of the wrist-rest areas. The usual bass compromises apply, but the C300M projects an impressive amount of clear, loud volume that avoided distortion even when we threw some death metal at it. You won't hear any deep sonorous tones, but for YouTube and movies on your lap it's a very useful addition.

VERDICT: The Asus C300M might not be as svelte or quick as many of its Chrome OS brethren, but the lightweight chassis makes it a highly portable solution for those who prefer things a little larger on-screen. The colours won't be everyone's cup of tea, but for us it's a selling point that captures the essence of a Chromebook.



PC ADVISOR
BEST BUY

DELL CHROMEBOOK 11

£239 inc VAT • dell.com/uk • tinyurl.com/m3d3qj4

Build	★★★★★
Features	★★★★★
Performance	★★★★★
Value	★★★★★
Overall	★★★★★

Another newcomer to the Chromebook shores is PC behemoth Dell. The Chromebook 11 is its first effort, and if it is anything to go by we await more additions with great enthusiasm. As the name suggests, this model has an 11.6in display in its compact frame. The glossy TN panel does a good job for the most part, with a bright, easy-to-read surface and 1366x768 resolution. Like most other panels of this type, viewing angles are a little tight, but the one here is a pleasing place for your eyes to spend some time.

While the chassis is very similar to other products in this class, such as the Acer C720 and Lenovo N20p, Dell has made good aesthetic choices that deliver an attractive machine. The company logo on the back of the screen is understated, and fits nicely with the general professional air of the device. It might not have the brightly coloured fun of an Asus, or the Apple-inspired coolness of an HP 11, but the Dell Chromebook 11 looks the part of a cool, smart device.

The design ethos wobbles a little on the inside, with a spacious keyboard adorned by a slightly unusual font but Dell is no stranger to unusual typefaces, as many laptops through the ages can attest, so whether this floats your boat or not is a personal matter; functionally the surface is responsive, easy to use and feels generally very comfortable. It's pretty much the same report for the touchpad, which offers little distraction, while completing tasks with a simple authority. Multifinger gestures, such as dragging four down to reveal all open apps, or moving three fingers left or right to cycle through open tabs, are all smooth and controlled, making navigating around Chrome OS a breeze.

As this is a Chrome device you won't find many of your normal Windows applications available, but the Chrome store is growing at an impressive rate, and the internet delivers a great many software options now. One issue worth remembering is that you won't be able to connect any of your iDevices to this machine, so if Apple is

your choice of mobile hardware, then a Chromebook might pose something of a problem. That said, as most mobile devices are cloud-centric now anyway, you can still view many of your Apple files by going to icloud.com, and the same is true for Microsoft, thanks to the company's continued expansion of its web apps for Office, OneNote and OneDrive. Add this to the already impressive suite of Google's own production apps, plus the likes of Dropbox, Evernote and Spotify, and you don't really feel like you're missing out at all by using one of these devices.

Internally the Dell Chromebook 11 squares up nicely to its rivals thanks to an almost standard complement of components. The 1.4GHz dual-core Intel Celeron processor is the same Haswell technology found in the Acer C720 and C720p, while the 16GB storage, 720p webcam, and integrated graphics are all fitted to pretty much every Chromebook at the moment. Dell has upped the ante by including 4GB of RAM, and a pair of USB 3.0 ports, giving its machine an edge in areas that users can actually see. Finishing off the hardware options are the ubiquitous HDMI and SD card reader slots. In our speed tests the Chromebook 11 bested pretty much every other machine in its class, although only just in some cases; we can't help thinking that the RAM had a lot to do with it.

Battery life was also very respectable with our looped movie test draining the power dry in just under seven and a quarter hours. This means that the Chromebook 11 should happily get you through a day's normal work before you need to pop in the proprietary charger.

VERDICT: Dell's debut offering is pretty much exactly what most people want from a Chromebook. It's fast, easily portable, smart-looking, features a great keyboard and even manages to add in a few bells and whistles like the two USB 3.0 ports. If Google's vision for a laptop fits your needs, then the Chromebook 11 will make you very happy.



PC ADVISOR
RECOMMENDED

HP CHROMEBOOK 14

£259 inc VAT • hp.com/uk • tinyurl.com/pps4f9g

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★★☆

For the most part Chromebooks have been presented as small, portable, cheap, lightweight machines designed for chucking into your bag when you head out. To fit this mould, most have been equipped with 11.6in displays. As Bob Dylan once crooned, though, the times they are a changin'. A few newer devices are beginning to emerge that shrug off the diminutive stature of the Chromebook tribe and instead proudly display themselves in a far grander fashion. The HP Chromebook 14 is one such beast, with a 14in screen that feels like a football field in comparison to the usual Chromebook fare.

This extra space is great if you make use of Google's Spreadsheet app, or indeed any of Microsoft's Office web suite, which can be slightly tortuous on smaller screens. Then there's the obvious advantage of having a larger aperture through which to explore the internet itself, with all the YouTube video goodness it contains. It's something of a shame then that the screen is no better than average in terms of quality. There are very few Chromebooks, or cheap Windows laptops, that boast decent displays, mainly because a good display cranks up the cost of a machine. So, like many others, the HP Chromebook 14 comes with a TN panel with shallow viewing angles, dull colours and a resolution of 1366x768. It's not terrible by any means, and is completely acceptable for the day-to-day tasks that Chromebooks are intended for, but it feels like a missed opportunity when it's one of the main selling points of the device.

Another deviation from the Chromebook norm is the addition is a SIM card slot, which means you can use a 3G data plan when out of Wi-Fi range. In fact, HP bundles a free two-year data plan to get you going, although as you get only 250MB per month you won't want to be visiting any graphics-heavy pages; even so, as something to keep you online in an emergency, it's a handy little feature.

Much of the rest of the device is standard Chromebook territory: there's a 16GB SSD drive, a more generous than usual 4GB of RAM,

and the whole show is run by a 1.4GHz Intel Celeron CPU based on Haswell technology. This combination is tried and tested, which is why you'll find it on several other rival models, and it works well to make the HP Chromebook 14 a nippy device that can cope with general browsing and document-based activities. The capaciousness of the chassis also allows HP to cram in two USB 3.0 ports, plus an additional USB 2.0 slot, while still retaining an SD card reader and an HDMI port. A large battery is obviously in there somewhere too, as the HP 14 managed to last the best part of a very respectable eight hours in our tests.

Bathed in a sea of turquoise, the livery for the HP 14 is fun and playful. You mightn't want to walk into any boardroom meetings with this one under your arm, but for home and school it's far more interesting than silver or black. Inside the vibrant plastic shell a silver fascia holds a spacious white keyboard in place. In classic Chromebook fashion there are few extraneous keys but the simple, friendly layout is very easy to use. At first, the typing experience is a little spongy, but after a little your fingers adjust and it's actually a decent experience, although not the best in class. The same can also be said of the wide touchpad.

One curious part of the design is that the size of the machine and its curved lower edges may draw you into leaning your elbows on the edge of the keyboard when you're not typing; if you do this, though, the machine lurches up. It's probably fair to say that good posture on the part of the user would eliminate this small issue.

VERDICT: There's a lot to like about the HP Chromebook 14. It's big, nice to use and offers something a bit different for Chromebook users. Improved screen quality – and maybe a firmer keyboard – would really make it stand out, but if you want a larger way to enjoy Chrome OS then the HP 14 is a great place to start.



LENOVO N20P

£250 inc VAT • lenovo.com/uk • tinyurl.com/qe63p2e

Build	★★★★☆
Features	★★★★☆
Performance	★★★★☆
Value	★★★★☆
Overall	★★★☆☆

In recent years Lenovo has sailed past its competitors to become the number one manufacturer of PCs in the world. It's good to see then that Chrome OS still gets some love from the Chinese giant, with its new N series. This model, the N20p, sits at the top of the range thanks to its multitouch screen and flexible hinge.

Lenovo introduced the idea of a laptop that could convert into a tablet-style device when it released its Yoga series of machines a couple of years ago. Now this technology has found its way onto a Chromebook for the first time. The idea is simple. Inside the chunky hinge is a mechanism that allows the screen to fold back 300 degrees, essentially turning it into a freestanding display held in place by the upside-down keyboard laid out behind. The keyboard is also disabled when in this mode, to avoid any random key presses. In theory this is a great way to make a laptop more tablet-like, and is presumably intended for when you want to watch videos or use the device in presentations. A few flies find their way into the ointment, though, simply because the normal laptop setting also allows the screen to sit up unaided, and, more tellingly, you're suddenly reduced to onscreen controls for volume, which on the YouTube app equates to a kind of sadistic torture.

The screen itself is bright and reasonably colourful. Touchscreen models seem to have a bit more life in them than their rather dulled counterparts, although the 1366x768 resolution remains a constant across the Chromebook range.

The touchscreen, as we found when we reviewed the Acer C720p, is a positive feature. With Chromebooks being such internet-focused machines, the user experience makes sense straight away. There are no hidden charms bars to find or new menus to contend with; instead, you just browse the internet in a normal way but tap on the screen when you want to select an option. Simple and useful. In operation the screen is responsive to finger gestures, with resizing

happening swiftly and with no noticeable lag. It might seem like a luxury on a Chromebook, but it's a really handy option, especially in the rather odd Yoga mode.

With Lenovo the power behind the excellent ThinkPad keyboards, we hoped they might bring some of that magic to the Chromebook. Well, in looks at least, the typing surface is smart and spacious, but after some use it visibly flexes on the left side of the board. In fact, the whole chassis bends worryingly under light pressure and the shallow key response means that letters are often missed when typing. It's quite frustrating to use and very disappointing, as this is truly an area where the company usually shines. By contrast the touchpad is big, fast and reliable.

Chromebooks are much of a muchness internally, and the N20p fits in with the bunch, except where the memory is concerned. Most models feature a modest 2GB of RAM, but this device packs double that. It does seem to give the system a subtle boost in terms of speed, but it's marginal and of course heavily influenced by the speed of your internet connection. Eschewing the previous trend of ARM processors, Lenovo has fitted a 2.16GHz Intel Celeron N2830, which belongs to the Bay Trail family of CPUs. These are known to be energy-efficient chips, which proves to be true with the N20p lasting for seven and half hours in our looped movie test. Storage is still small, with a 16GB SSD nestled inside, but in standard fashion Google gives you 100GB of free Google Drive space for two years when you register your new machine.

VERDICT: The Lenovo N20p is a bit of a disappointment. Visually it's a very attractive, compact and smart machine. The touchscreen is useful and the specs make for a decent experience, but it is all ruined by the poor keyboard, which proved a constant frustration. Fix that, and this would be a great device.

Conclusion

While many Chromebooks do contain very similar components, there are still reasons to prefer some over others. If portability is your primary concern, then the models with 11.6in screens are the obvious choice. The Lenovo N2Op and Acer C72Op introduce a further parameter to decide on in the form of a touchscreen, which we found more useful than we had expected. Of the two, we preferred the speedier performance of the Acer, and found the sub-par keyboard of the Lenovo a major disappointment.

The non-touch models were a much closer affair, with the Acer C720 being a good all-rounder, but just losing out to the Dell Chromebook 11, which felt more refined.

Those looking for a larger machine now have decent options open to them in the Asus C300M and HP Chromebook 14. The Asus gains marks for its lightweight chassis,

and generally pleasing user experience, but is let down slightly by slow performance when things get busy. HP's Chromebook 14 comes with a bevy of ports, including that handy SIM card slot, and goes toe to toe in the fun colour stakes with the Asus, all while managing to run in a more sprightly manner. For that reason it pips the C300M to the post and gets a Recommended award.

In the end, though, the Best Buy award goes to the lightweight, fast and compact Dell Chromebook 11. This cool little machine embodies the simplicity that makes Chromebooks so appealing and easy to use, all while still being capable of serious work.

How we test

Battery life

From a full charge we played a looped HD (720p) movie, with the screen at three-quarter brightness and volume at 50

percent, until the battery was completely depleted. Wi-Fi was on, but Bluetooth was disabled for the duration of the test.

Performance

With Chrome OS not having access to many of the benchmark applications we use on Windows machines, we switched to browser-based tests. These include Sunspider and Peacekeeper, which measure the performance of JavaScript in a browser, alongside Browsermark 2.1, a thorough benchmark that tests a browser's ability to render 2D and 3D images, resize screens, create dynamic content, WebGL performance, and various JavaScript frameworks.

Subjective assessments

Benchmarks are useful but a little abstract for rating day-to-day usability. So user experience was measured by the simple act

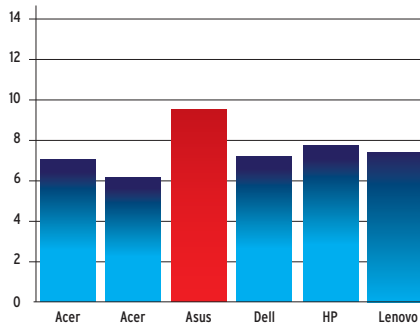
	ACER C720 £199 inc VAT ★★★★★	ACER C720P £250 inc VAT ★★★★★	ASUS C300M £250 inc VAT ★★★★★	
Screen	11.6in (1366x768) matt TN	11.6in (1366x768) glossy TN touchscreen	13.3in (1366x768) matt TN	
CPU	1.4GHz dual-core Intel Celeron 2955U	1.4GHz dual-core Intel Celeron 2955U	2.16GHz dual-core Intel Bay Trail-M Celeron N2830	
GPU	Intel HD graphics	Intel HD graphics	Intel HD graphics	
Storage	16GB SSD	16GB SSD	16GB SSD	
Memory	2GB DDR3	2GB DDR3	2GB DDR3	
USB	1x USB 2.0, 1x USB 3.0	1x USB 2.0, 1x USB 3.0	1x USB 2.0, 1x USB 3.0	
HDMI	✓	✓	✓	
SD	32GB	32GB	64GB	
Webcam	720p	720p	720p	
Bluetooth	4	4	4	
Kensington Lock slot	✓	✓	✓	
Headphones	3.5mm headphone minijack	3.5mm headphone minijack	3.5mm headphone minijack	
Dimensions	19.1x288x202mm	19.1x288x204mm	20.3x339x230mm	
Weight	1.25kg	1.35kg	1.4kg	

PERFORMANCE

Battery life	6 hours, 58 minutes	6 hours, 7 minutes	9 hours, 28 minutes	
SunSpider*	470ms	502ms	801ms	
Peacekeeper**	2419	2453	1284	
Browsermark**	3665	3698	2146	

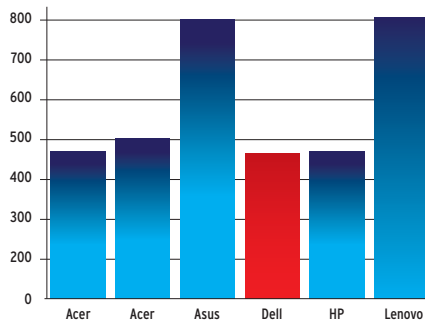
* Lower score is better ** Higher score is better

Battery life (hours)



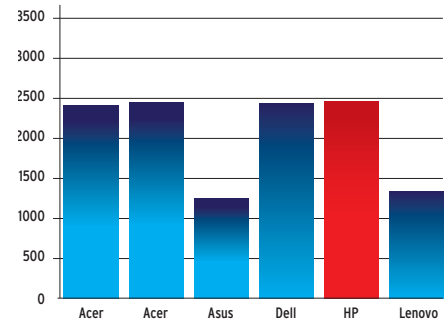
of using the machines to write the reviews. Each machine became the daily workhorse for a day or two, being used for every task normally expected from personal devices. These duties include creating


SunSpider score (lower is better)



documents and spreadsheets, browsing the internet, streaming music, consuming video content from YouTube and Netflix, and interacting with social networks. Marks were awarded for the comfort each

Peacekeeper score (points)



machine afforded while employed in these tasks, with particular attention being paid to the keyboard, touchpads and displays, as these elements have the most obvious impact on user experience. 

DELL CHROMEBOOK 11

£239 inc VAT



PC ADVISOR
BEST BUY

11.6in (1366x768) glossy TN

1.4GHz dual-core Intel Celeron 2955U

Intel HD graphics

16GB SSD

4GB DDR3

2x USB 3.0

✓

16GB

720p

4

✓

3.5mm headphone minijack

24x295x201mm

1.3kg

7 hours, 17 minutes

465ms

2468

3732

HP CHROMEBOOK 14

£259 inc VAT



PC ADVISOR
RECOMMENDED

14in (1366x768) glossy TN

1.4GHz dual-core Intel Celeron 2955U

Intel HD graphics

16GB SSD

4GB DDR3

2x USB 3.0, 1x USB 2.0

✓

16GB

720p

4

✓

3.5mm headphone minijack

20.5x345x239mm

1.7kg

7 hours, 50 minutes

470ms

2478

3643

LENOVO N20P

£250 inc VAT



11.6in (1366x768) glossy TN with multitouch

2.16GHz dual-core Intel Celeron N2830

Intel HD graphics

16GB SSD

4GB DDR3

1x USB 2.0, 1x USB 3.0

Mini

16GB

720p

4

✓

3.5mm headphone minijack

17x279x211mm

1.4kg

7 hours, 33 minutes

807ms

1318

2186

10 GREAT RAINMETER SKINS FOR PRODUCTIVITY

INBOX  68°F

	100	↑ S&P 500	29.55	(0.44)
	75	↓ DOW JONES	-1.73	(-0.9)
	50	↑ FTSE 100	11.20	(1.25)
	25			
	0	TO-DO 		

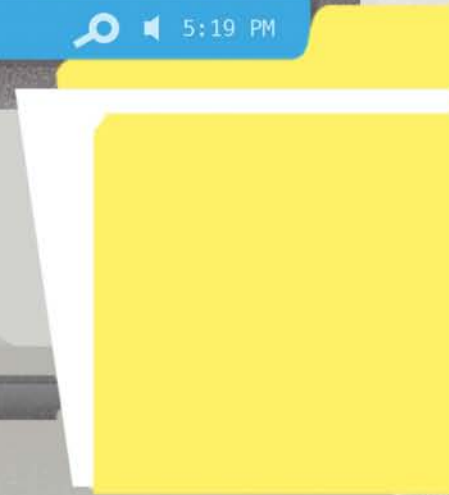
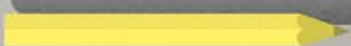
5:19 PM



BY IAN PAUL



5:19 PM





USE RAINMETER TO PUT PRACTICAL INFORMATION ON YOUR WINDOWS DESKTOP IN THE BREEZIEST OF WAYS

The free, open-source Rainmeter (rainmeter.net) desktop customisation tool doesn't just let you create the coolest-looking desktop by mixing and matching skins. It can also boost your productivity with widgets that help you keep tabs on your inbox, track the weather, monitor your PC's health, follow the news and take notes.

Thanks to a recent Rainmeter update which took it to version 3.1, these skins are

also getting smarter, as they can react to conditions such as the PC's temperature or an upcoming appointment.

If you are not familiar with this popular desktop-tweaking tool, check out our tutorial on supercharging your desktop with Rainmeter widgets (tinyurl.com/n3gy924) Once you have the basics down, the following gallery of Rainmeter delights might just inspire you to embark on your own desktop design adventure.



Honeycomb

A simple but effective app launcher

This Billy Joel-themed desktop by Reddit user I-Draw-Sometimes uses the Honeycomb Rainmeter skin (tinyurl.com/o7otLa7) to put your favourite apps front and centre. In this case, the apps are mostly games and Chrome, but you can swap in anything you want. It requires a little more setup than most other skins, and

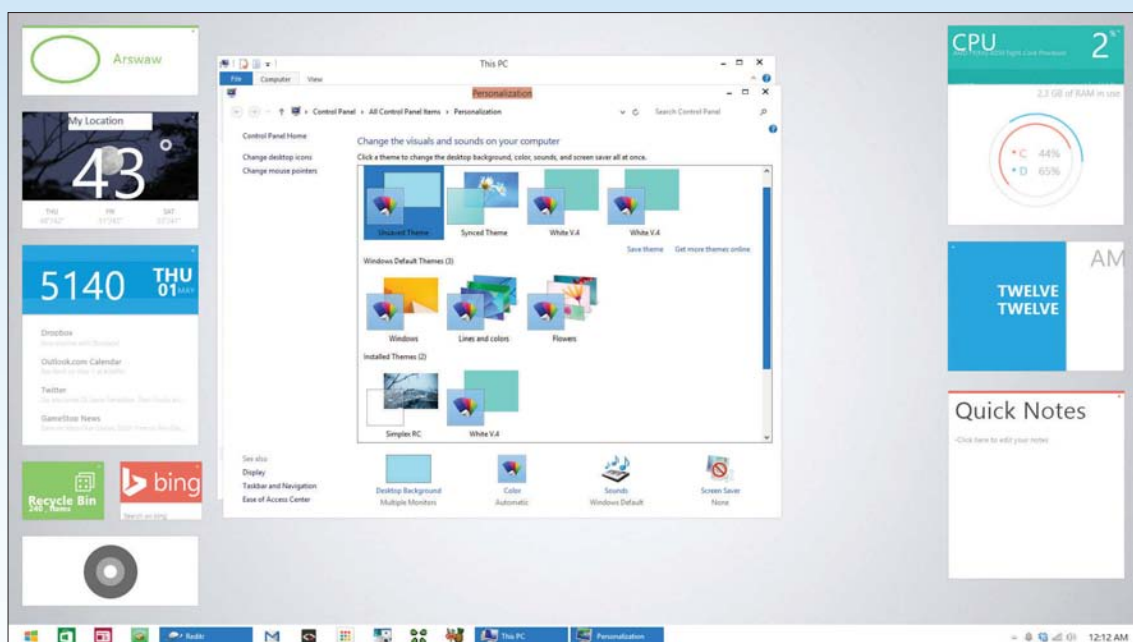
you will need to know your way around the Windows file system. A YouTube tutorial (tinyurl.com/phcxn67) will help you get started. In addition to Honeycomb, this desktop uses Muziko for the music player, Detox for weather reports, Smooth Clock for the analogue time, and the Simple Media skin for the text-based date and time.

July Flat'ish

Very flat, and very, very practical

The flat, non-glossy look is in vogue for PCs and smartphones, which makes the July Flat'ish (tinyurl.com/p8yyuts) skin a nice complement to Windows 8.1. This skin can keep you productive with its notebook,

weather widget, Bing search, CPU monitor and inbox widget. Reddit user Arswaw shows just how nice it can look with the clean desktop pictured here, which uses a white theme in Windows 8.1.





LIM!T

Text with a twist

Images and icons are great, but some people prefer text-based interfaces even in their Rainmeter widgets. If that's you, then check out Lim!t (tinyurl.com/Lwz5djs), a text-centric Rainmeter skin with a clever twist.

Lim!t can display a PC's CPU usage and temperature, along with the date, time and weather - but as the

value of each element increases, so does the size of the text that describes it. So the more CPU resources that you're using, the bigger that indicator will get; and as the morning or evening wears on, the bigger the time becomes. This skin is a great choice for getting basic information at a glance.

Webcamz

Eyes in the back of your monitor

We didn't test this interesting skin featured on Customize.org, but if it functions as advertised then it will help anyone in charge of security keep an eye on their working environment from their PC. Webcamz (tinyurl.com/m3m6g2j) turns your entire desktop into a grid of live security cameras. Put this skin on a dual-monitor setup, and you can watch for intruders even while you browse the web.



Market prices

Follow the money

As its name suggests, this skin is for stockbrokers and investors. Hooked into Yahoo Finance, Market Prices (tinyurl.com/n8xoscr) lets you monitor financial markets with two variants, tracking either five or eight stocks and indexes. The skin also allows you to sort stocks by the percentage change in price.

An alternative version (tinyurl.com/mqqmnrn8) uses data from Bloomberg.com, although this one does not allow stocks to be sorted by price.



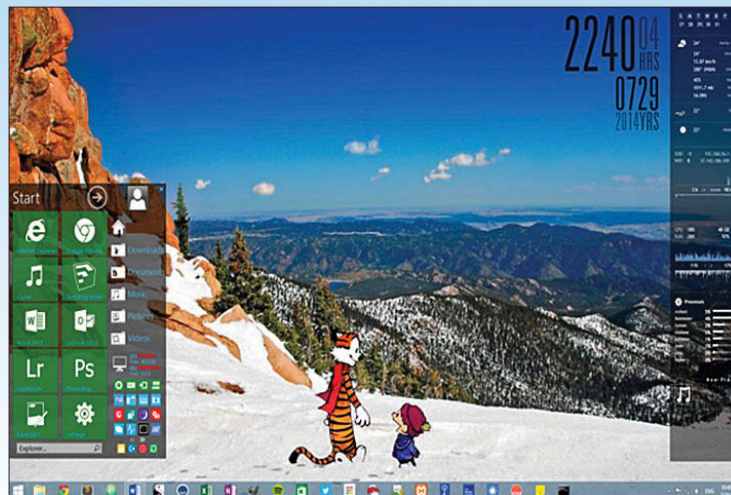
Start menu

Bring back an old favourite

Microsoft is restoring the Windows Start menu in Windows 10 after dumping it in Windows 8. But the revised Start menu probably won't arrive until 2015.

Rainmeter users don't have to wait till then, though, as they can make use of Start Menu for Rainmeter (tinyurl.com/o7fv75y), a derivative of an earlier project called Multi Start Menu.

This skin creates a modern-style Start menu for launching apps. It also has a screenshot tool, and offers quick access to your folders, Task Manager, Regedit, the command prompt and the Run window.



VClouds RSS

The dope for news junkies

Anyone wanting nothing but news should check out VClouds RSS (tinyurl.com/ms7z9as), which supplies up to four RSS feeds. This 2012 desktop by Customize.org user godanielcroz (tinyurl.com/ma22fta) combines VClouds RSS with Lexis for the calendar and the weather report, iTunes Monitor (Enigma), and 10-Foot HUD for the date and time. Lexis is no longer available, but you can find many skins that give the calendar and weather report a similar look.



WRMZ

Playful but productive

With its whimsical cartoon characters, WRMZ (tinyurl.com/L4kygq2) is kind of like the Comic Sans of Rainmeter skins. But don't be fooled: beneath its silly veneer, WRMZ has some excellent productivity tools, including an email inbox widget, a to-do list, a CPU monitor, a clock, and utilities for keeping tabs on your disk space and internet speed.

This desktop, which was created by DeviantArt user bowchikabow, uses both WRMZ and Placebo for Windows 7 (tinyurl.com/3kvsety).





Multiple themes

Maximising information and space

In this desktop, Customize.org user Darkhoarse shows how mixing and matching themes brings out the power and beauty of Rainmeter. This desktop simultaneously displays a ton of information - such as weather and news, a music player, a Gmail inbox, Recycle Bin and system status info - yet the desktop doesn't get crowded

or messy. At play here is the defunct Fade skin for the system information, plus MyHUDs for the time, date, weather and news.

Darkhoarse made this desktop in 2010, but most of the components are still available and many alternatives for the Fade skin exist.

Green bubble

For work and play

Lifehacker, which has had an ongoing love affair with desktop tweaks, recently featured this desktop by reader Matt Pollard (tinyurl.com/Lfvc2rm). It has a neat-looking rotating calendar, as well as widgets for RSS feeds, notes and social updates.

The centrepiece of the desktop is the remarkably useful Eker_lina (tinyurl.com/mLkczp4) Rainmeter suite, which includes lots of productive widgets. Pollard also used RocketDock (rocketdock.com), a Mac OS X-like application launcher for Windows, along with some RocketDock icons available on DeviantArt.







POWERFUL WEBSITES

THAT CAN REPLACE DESKTOP SOFTWARE

THESE DAYS, EVEN HEAVY-DUTY TASKS LIKE VIDEO EDITING CAN TAKE PLACE SOLELY IN YOUR BROWSER. THESE 12 SITES WILL ENHANCE YOUR PRODUCTIVITY, CREATIVITY, SECURITY AND MORE. BY BRAD CHACOS

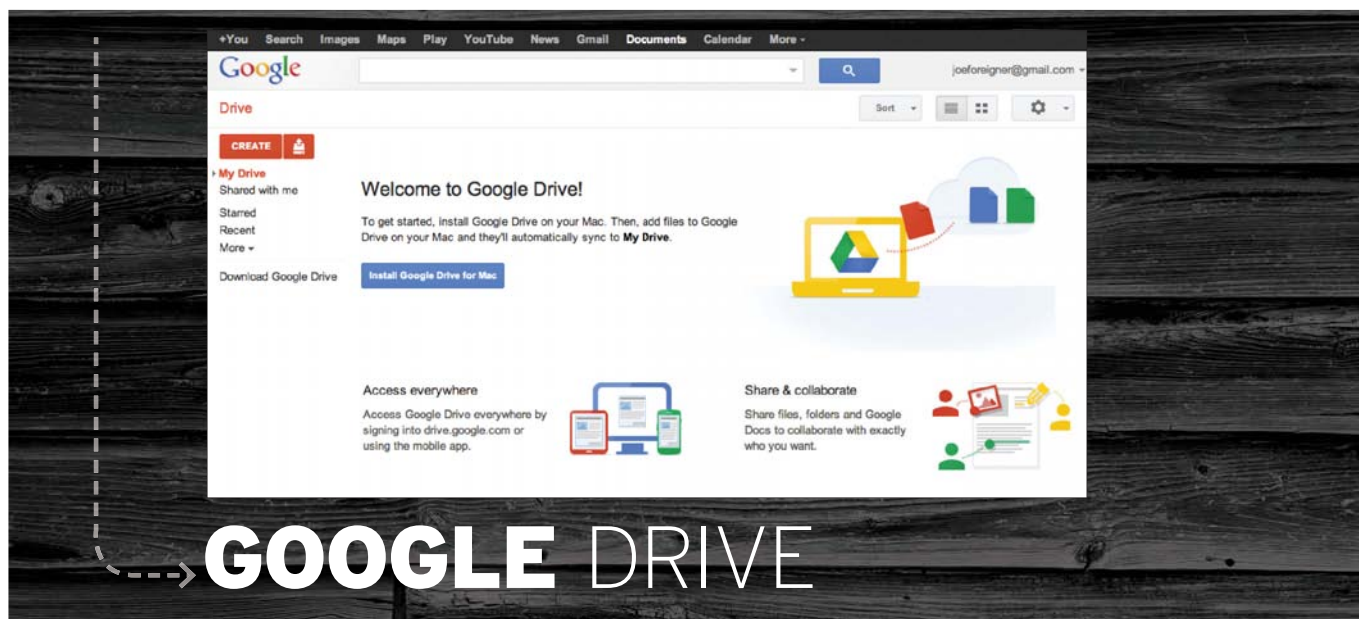
Browsers get brawny

The web isn't what it used to be, and when it comes to getting things done anywhere and everywhere, that's a good thing. Once, the idea of working in your browser was nothing more than a pipe dream. And the idea of completely replacing desktop software with online alternatives? Ridiculous!

No more. Between the rise of broadband and robust web technologies such as HTML5, modern

browsers are capable of amazing things, and shifting your workload to the cloud is a very real possibility for many people.

Whether you're using a Chromebook, looking for good occasional-use tools, or hoping to ditch the hassles associated with standalone software, the 12 sites featured here can replace your traditional desktop applications.



We might as well get this old standby out of the way early. Google's suite of Drive apps (tinyurl.com/Lhce7j8), consisting of separate tools for documents, spreadsheets, presentations, forms and drawings, isn't as full-featured as Microsoft Office. But the apps are more than powerful enough for the average user,

and Google continues to add handy features – the most recent of its additions, Suggested Edits, plays nicely with track changes in Office. Plus, Drive's collaborative features) can't be beaten.

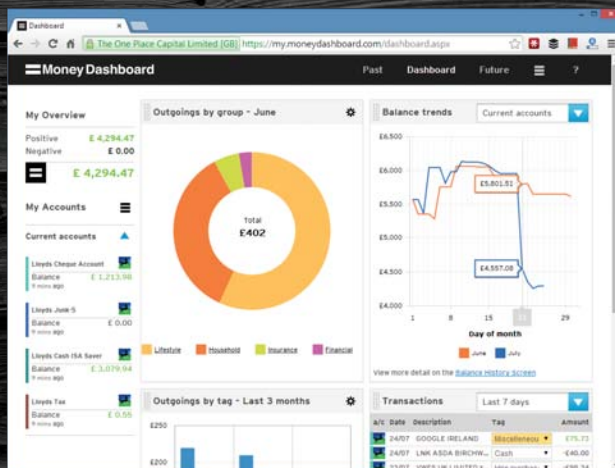
And if you can't shake your passion for the Office aesthetic, Microsoft offers Office Online, a stripped-down version of the Office suite.



Let's face it: as ubiquitous as traditional presentations are in the workplace, they're boring. Prezi (prezi.com) turns this stale state of affairs on its ear by reimagining presentations as lush, wide-open visual canvases, allowing you to zoom and pan around from point to point. It's fun to use and utterly gorgeous to see in action.

When's the last time you heard that said about a PowerPoint slide?

Check out our guide to using Prezi at tinyurl.com/qzru9vd. Prezi has a free tier, but be warned: all free-tier presentations are publicly visible and you are limited to 100MB of cloud storage.



MONEY DASHBOARD

If you're the sort of person who likes to keep track of your spending and ensure every penny is accounted for, there are lots of online money managers which can do the heavy lifting for you.

Money Dashboard is a free online service that syncs with your bank accounts - it works with all the popular accounts including HSBC,

NatWest, Barclays, Lloyds and Halifax - to help you track spending, complete with graphs to visualise just how much you spend on groceries, travel and more. Many of the transactions are automatically tagged, but it's easy to tag those it doesn't recognise.

The service also builds a calendar that shows upcoming bills for the month ahead.



SHA256: 43792552d7c604c4ba8518a0d1d9deadeeb1f2ef012deb8c22acd554306f701b
File name: chip_processor-100022200-gallery.jpg
Detection ratio: 0 / 54
Analysis date: 2014-07-30 19:18:10 UTC (0 minutes ago)



Analysis Additional information Comments Votes

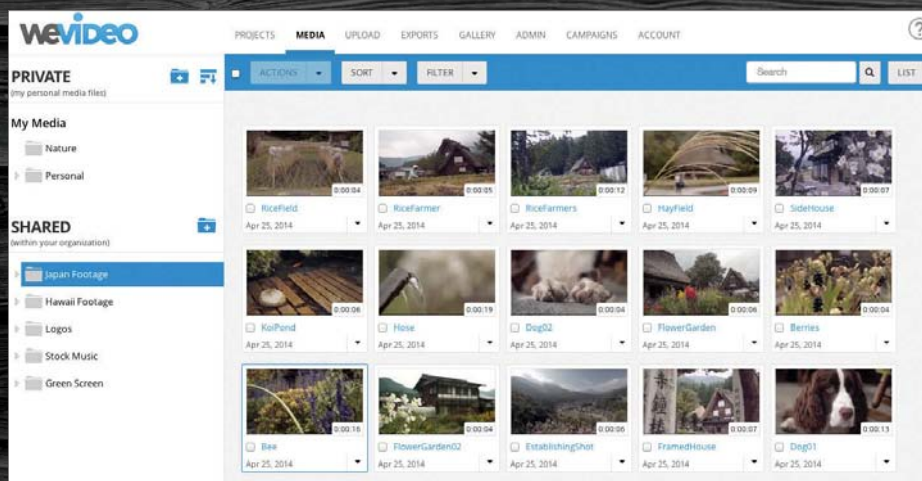
Antivirus	Result	Update
AVG	✓	20140730
AVware	✓	20140730
Ad-Aware	✓	20140730
AegisLab	✓	20140730
Agnitum	✓	20140730
AhnLab-V3	✓	20140730

VIRUS TOTAL

Virus Total (virustotal.com) can't quite replace traditional antivirus software, but it can come close, especially if you're using a Windows-free Chromebook. After you upload a file to this extremely useful site, Virus Total

scans it for viruses using dozens of antivirus engines, website scanners and other tools.

If Virus Total says a file is clean, it's clean. It can check the security of websites when you point it toward a specific URL too.

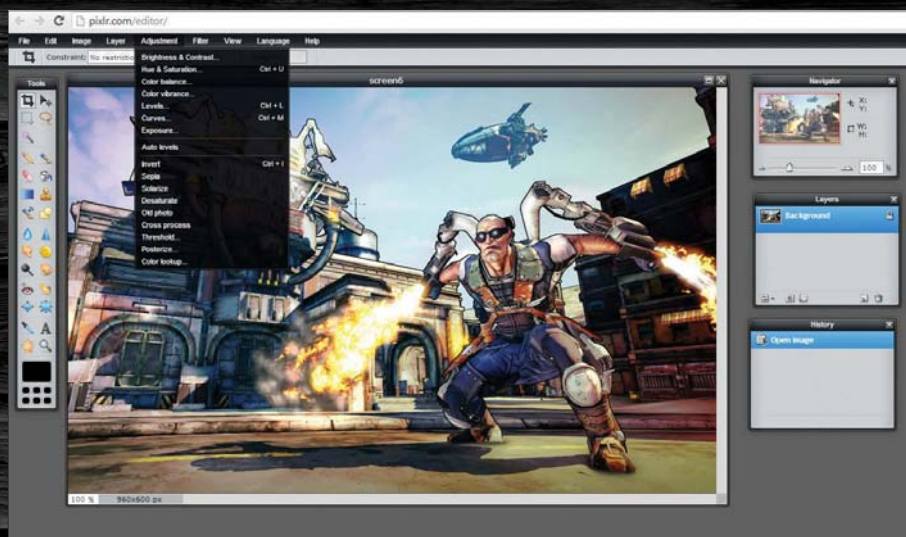


WeVIDEO

Yes, you can even edit video in your web browser now, which could come in handy if you're using a Chromebook or a friend's PC. Sure, WeVideo (wevideo.com) has some limitations – watch out for that standard-definition resolution on the free account – but all in all, it works successfully and straightforwardly given its web-based nature.

The Dropbox integration and deep collaborative features are especially nice touches that are well suited to a cloud-based video editor. If you plan to use the service fairly often, then you'll undoubtedly want to stump up for a premium subscription.

Read our review of WeVideo for more details at (tinyurl.com/ndzh9mk).



PIXLR EDITOR

If you need to tweak an image, then Pixlr Editor (tinyurl.com/LvnsocL) is the web application for you.

While this graphics editing tool may not quite be Photoshop, it's a great deal more powerful than the Paint program that comes preinstalled on PCs, offering a wide array of tools, filters, adjustment options, and even layers.

You can start from scratch with a blank canvas or tinker with images stored on your local hard drive or on a website. Images can be cropped, 'lassoed' to select an area manually, or 'magic wanded' to select specific colours in them. Plus, you can save local copies of your work.

To be honest, it's shocking that a graphics editor this powerful is this, well, free.



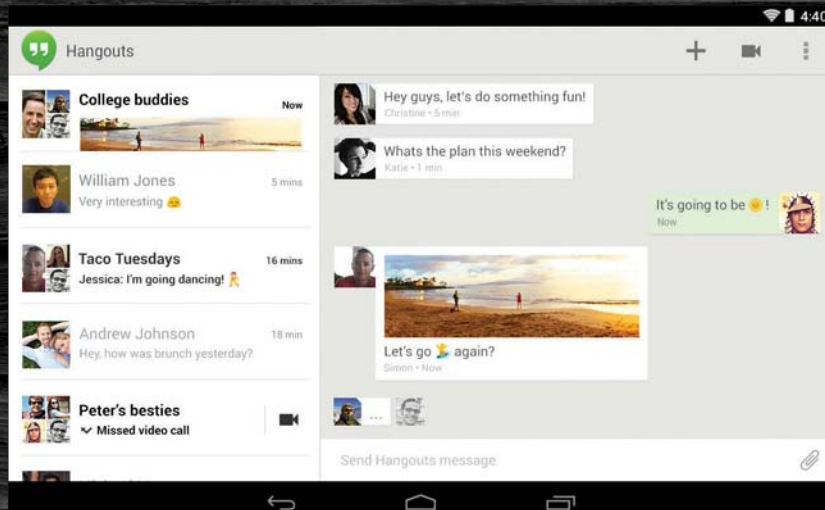
ZAMZAR OR FREEFILE CONVERT

Need a file automatically converted to another type of file? Zamzar (zamzar.com) and Free File Converter (freefileconvert.com) can each convert files into different file types and both of them support a wide range of formats.

Zamzar supports 1,200-plus file formats, although you can only convert files up to 100MB. For larger files, you need a subscription.

Free File Converter's site has more ads, but on the other hand it allows you to convert files up to 300MB in size, and, unlike Zamzar, it doesn't require you to register an email address in order to download your converted files.

Both Zamzar and Free File Converter will allow you to save files from URLs in the format of your choice.



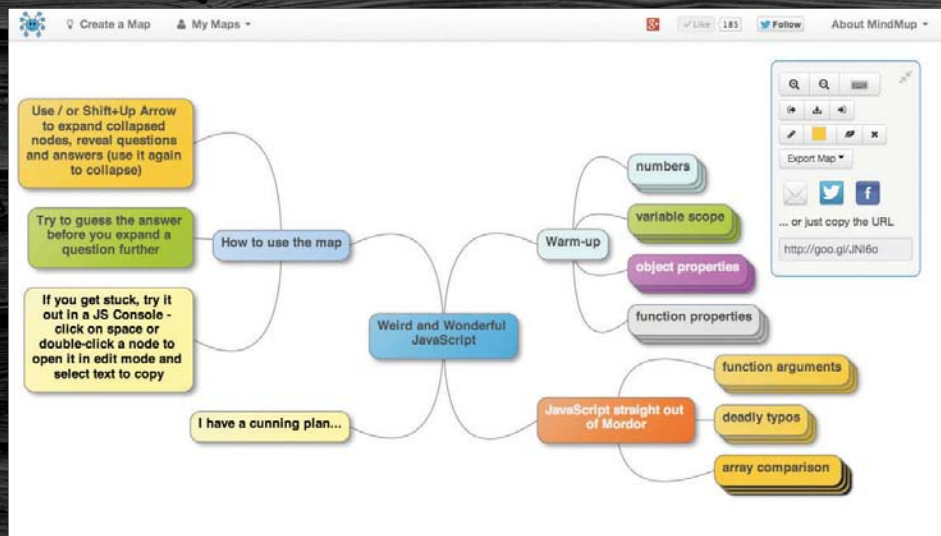
GOOGLE HANGOUTS

Google Hangouts may be best known as the proprietary Instant Messaging service built into Google+ and various other Google properties. But Hangouts also shines for web-based video chats.

It supports live video chats of up to 10 people, complete with screen sharing and silly sticker overlays, and if you don't feel like combing

your hair, you can instant-message or call your contacts. Sounds a lot like Skype, huh?

Even better, Google Hangouts is absolutely free, and the magic is all handled in your browser. Ditching Skype and its desktop software might be difficult if you have a deep contact list inside that service already, but if you don't, Hangouts is a worthy alternative.

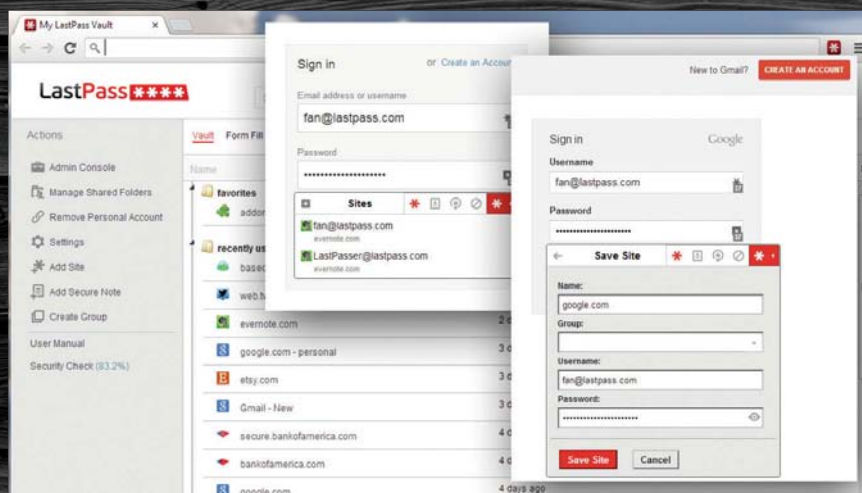


MINDMUP

Mind-mapping and flow-chart software is a pretty niche application, but when you need it, you need it.

MindMup's website (mindmup.com) delivers mind-mapping tools that are simple enough for newcomers to dive in easily, but still deep enough to satisfy power users.

The vast majority of the site's tools are free and there are keyboard shortcuts, edit history, right-click menus and toolbars. However, some of the more sophisticated features – such as the ability to export large maps or embed your MindMup map in a website – require a \$3 (around £2) per month MindMup Gold subscription.

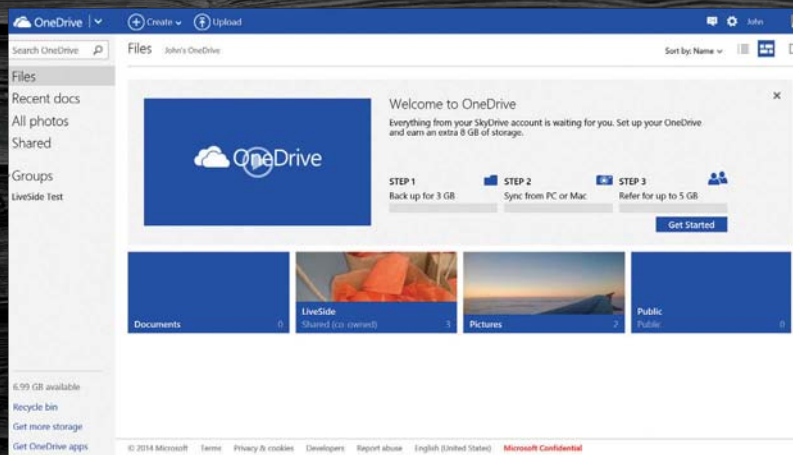


LASTPASS

If the recent flood of hack attacks have taught us anything, it's that, yes, you need strong passwords, and yes, you need a different password for each site you visit to minimise the fallout if a site you visit is breached.

That's where password managers come in. They manage your logins and can even create strong, randomised passwords for the sites you frequent.

LastPass (lastpass.com) stands out because it's web-based – unlike KeePass (tinyurl.com/cog9ous) – and built around browser extensions. Your passwords are stored in the cloud, encrypted by a master password only you know. When a password is needed, LastPass springs into action. Just be aware there's a \$12 (around £7) premium annual subscription to use the mobile apps.

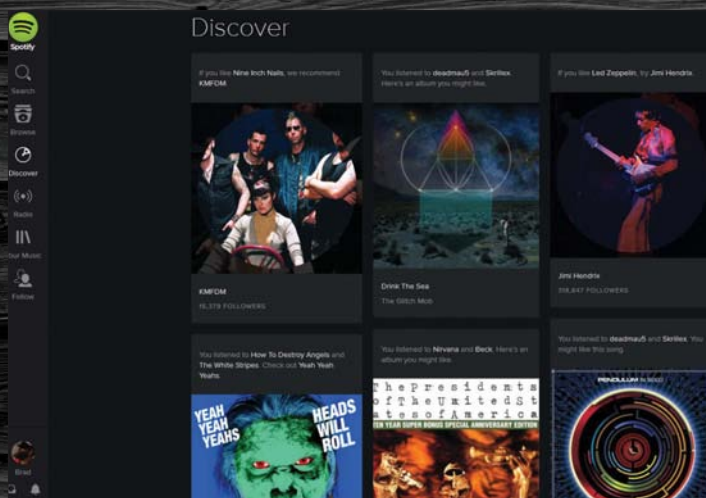


THE **CLOUD STORAGE** PROVIDER OF YOUR CHOICE

But why not forget about software for a moment and look at replacing some hardware. Cloud storage is cheap, with Google Drive and Microsoft OneDrive (tinyurl.com/Lhce7j8) doling out 100GB of data for £1.20 and £2 a month respectively. That's crazy-cheap

pricing, and your cloud-stored goodies are available anywhere a web browser is handy.

If you want more for even less, check out PCWorld's guide to supersizing free cloud storage (tinyurl.com/ky3frak). Just be sure to back up your data locally in case there's a data centre hiccup.



SPOTIFY

From Windows Media Player to iTunes to VLC, media players are some of the ugliest and least intuitive pieces of software around.

Enter the Spotify web client (play.spotify.com). This music streaming service gives full access to more than 20 million songs, free of charge, if you're willing to listen to ads.

Alternatively, if you spend £10 per month on the premium service, you can dump the ads,

unlock higher audio quality and even listen offline to any song, any time. Spotify's Discover, Browse and Radio features do great jobs of surfacing new music, as well.

If you already have a collection of music, Google Play Music (tinyurl.com/p64uxh8) lets you upload up to 20,000 songs for free and streams them to your web browser or mobile device. ☒



iOS 8 photo and camera tips

Karen Haslam reveals how to use iOS 8's new editing tools to get better-looking photos

From serious iPhoneography enthusiasts to everyday snappers, iOS 8 enhances the Camera app, offering greater control over settings previously only available via third-party apps. The new mobile OS also gives users more control over the camera's focus and exposure, and with what Apple calls "smart composition tools," you are able to, for example, automatically straighten horizons or fine-tune your edits.

Taking photos

As in iOS 7, you can open the camera in a couple of ways: tap the Camera app icon to open the camera, or slide up on Control Panel and select the Camera app icon there. Once open, you'll see the same set of controls as before, plus a few extras, including the option to make a time-lapse movie and to set a timer.

The Timer button

The new Timer button can be seen at the top of the screen, or the right if you're

taking a photo in landscape orientation. Tap it and you'll see the option to set the time for three- or 10 seconds.

After you've chosen one, you'll see the numbers flash up on the screen as it counts down. During testing our iPhone 5s automatically took a burst of 10 photos -

we were able to select our favourite and then bin the rest.

You'll probably only use this option if you are able to carefully rest your iOS device so that it doesn't fall over. With this in mind, we expect to see lots of third-party manufacturers releasing tripods.





Time-lapse mode

Apple introduced a slow-motion option in iOS 7 that's capable of taking movies and slowing parts of them down for hilarious effects. A new Time-lapse mode in iOS 8 may prove even more attractive, taking photos at what Apple calls "dynamically selected intervals" to create videos.

To use this option, tap the Camera app, then swipe left until you reach Time-Lapse. Tap the record button and the app will automatically take a still picture every few seconds. When you're finished, tap the red button again, the app will stitch all those pictures together to form a time-lapse video.

For the best results make sure that your iOS device is completely still - you may want a stand for it - and leave it recording for a minute or more. You'll find the video in Photos > Albums > Videos.

Use manual controls for autofocus and exposure on the camera

Tap to focus and exposure are now split (previously they were one control). You can still tap to focus (or long tap to lock it), but new to iOS is the ability to adjust the camera's exposure by dragging up or down on the slider that appears next to a small sun symbol. This way, you can grab a focus point without being forced to use that same area to choose the exposure.

Take Panorama shots with the iPad

The option to take panoramic photos was introduced on the iPhone until iOS 6, but iPad users have had to wait until iOS 8 for this feature. Now if you own an iPad Air



or iPad mini with Retina display, you can take panoramic images.

Swipe until you reach Pano, then move your iPad from left to right across the image you wish to capture while trying to keep the iPad as steady as possible. (If you prefer you can go from right to left, just tap on the right side first).

If you're taking a landscape image, you'll need to hold the iPad in portrait.

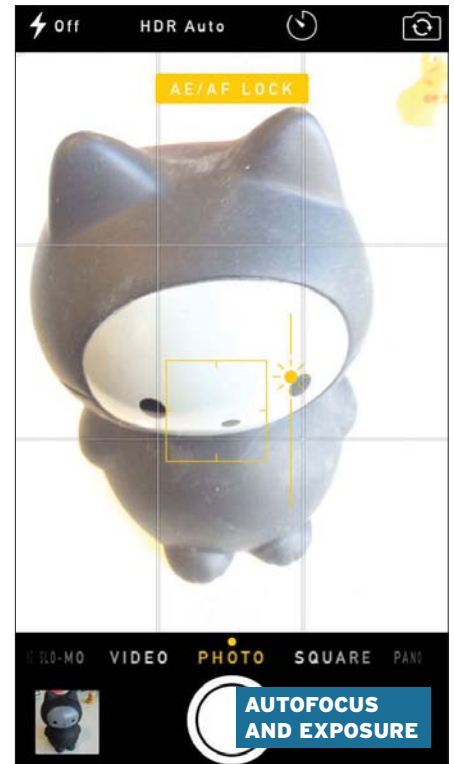
Managing photos

There are two main options for navigating around the iOS 8 Photos app: Photos and Albums. When you are in the Photos app, you'll see the link to these different views at the bottom of the screen. Photos offers various options including: Years, Collections, Moments, and a Map view (if you tap a location). Albums shows the default albums: Recently Added, Favorites, Panoramas, Videos, Hidden, Recently Deleted, and any albums you have set up on your iOS device, or shared from iPhoto on your Mac.

Find your photos

In iOS 8, your images are stored differently to before. Previously, every photo taken with your iOS device was stored in the Camera Roll folder. They were moved to Collections in iOS 8, but Apple brought back the Camera Roll in iOS 8.1. This caused some users to think that their images had been deleted, though, this wasn't the case.

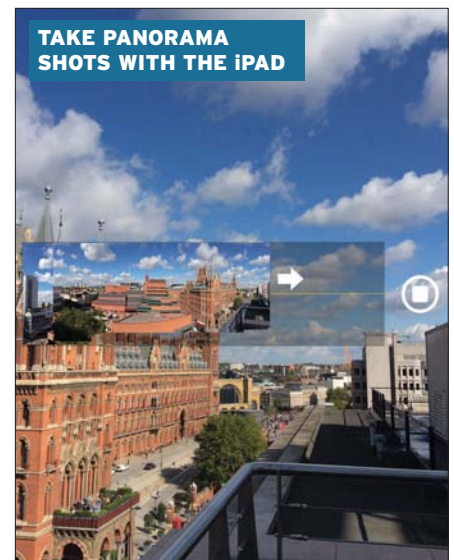
Tap the Photos app to view Collections by Months and Years; or by Moments, which organises images by location and event. This makes finding older shots a lot easier than

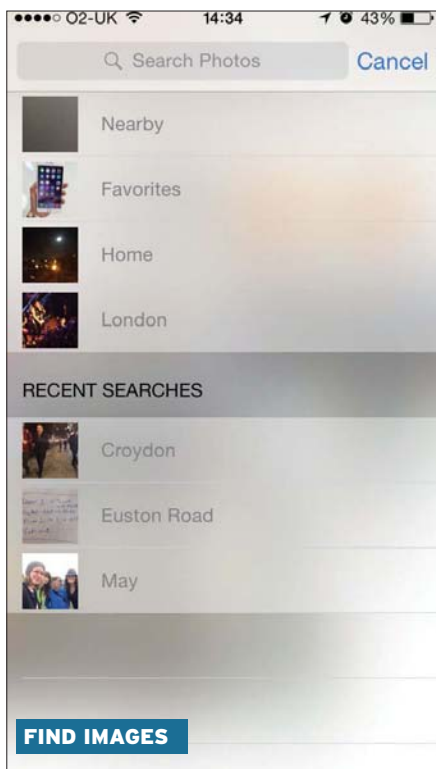


scrolling through years' worth of pictures. It will, however, mean that images taken on different devices will be mixed together.

A source of confusion is that when you try to share a photo to Facebook or similar, the album that your iOS device shows by default is called Recently Added, even though Facebook still labels it as Camera Roll. This displays the pictures you have taken with your iOS device's camera over the past 30 days. It's not surprising that people thought their photos had been deleted in iOS 8. If you want to share a photo on Facebook that's more than 30 days old, you'll need to add it to an album, tap on Camera Roll and then select the image from that album.

The new setup makes it difficult to tell which of your images are stored in the

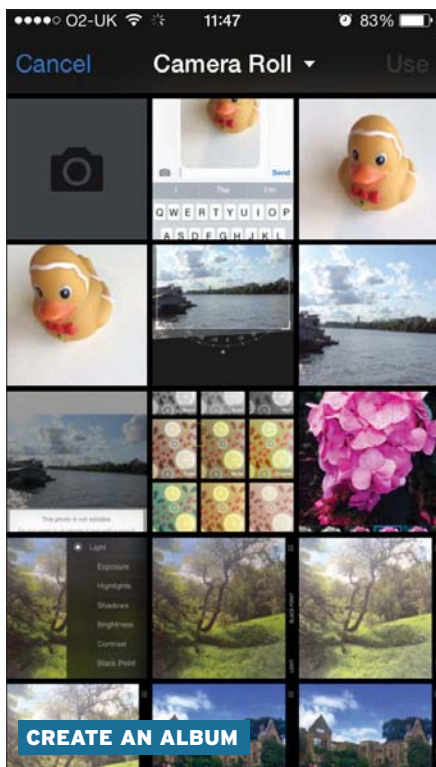




cloud, since everything is stored in one big folder - which in the light of the iCloud celebrity photo leak isn't ideal.

Create an album

The ability to create an album isn't new to iOS 8, but doing so will make images easier to find. First, go to Recently Added if the photos you want to share were taken in the past 30 days; or in the Photos section if they were taken before this.



Tap Select and pick the photos you wish to keep. At this point, it's frustrating that you see only a square thumbnail of the shot because it's hard to see the detail and determine how good an image is. We flick through, opening each picture, make a note of the ones we want as they close, then tap Select and ticking that image.

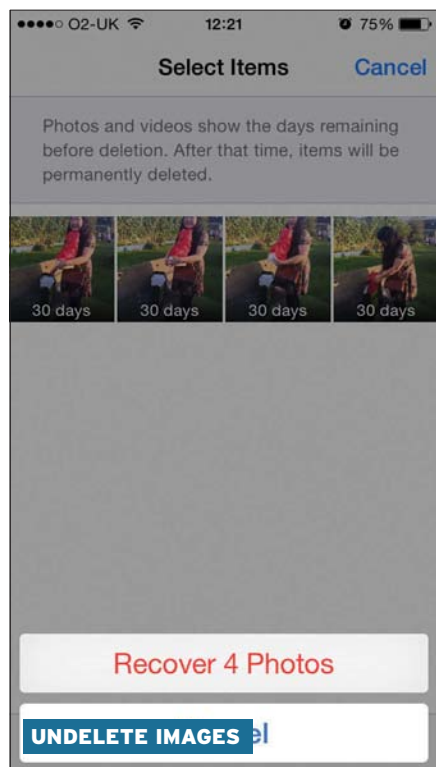
When you've chosen your photos, tap Add To and select the Album you wish to add them to, or scroll to the bottom and hit New



Album to create a new album. Now when you try and share your pictures on Facebook all you need to do is select the relevant album.

Delete photos

To delete an image, open it and tap the waste paper basket in the bottom-right corner. Choose Delete Photo. To permanently erase an image, go to Albums > Recently Deleted to find the erased picture. Annoyingly, it's not the most recent shot that appears as



the icon here, but the least recent. Once you've located your image, tap on it and you'll be given two options: Delete or Recover. Tap Delete. If you leave an image in this folder, it will be removed automatically after 30 days.

Since we have a 16GB iPhone, we frequently delete images to make space so this is an annoying extra step when we are trying to remove photos. While it might be useful to keep pictures available just in case you deleted them by accident, it used to be the case that those images remained in our Photo Stream even if we deleted them from Camera Roll.

Permanently delete images

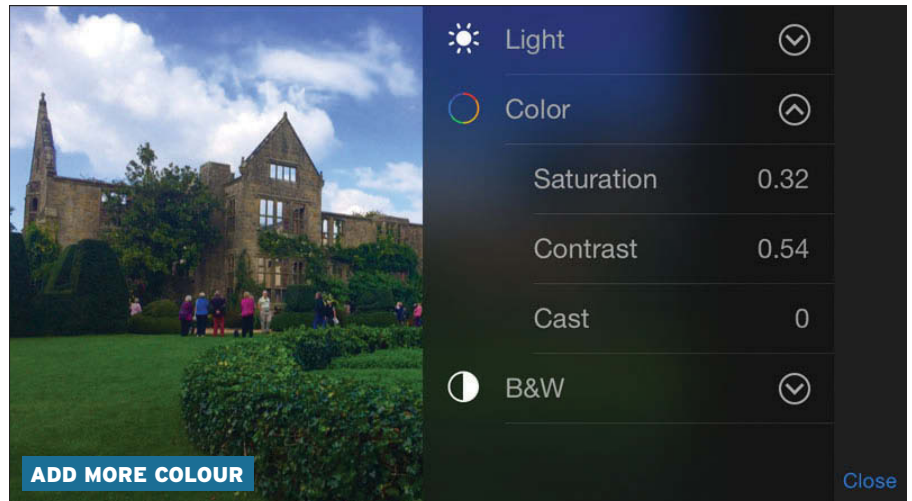
You can also permanently delete all the photos in one go by tapping Select > Delete All. If you don't want to erase all the images at once, tap the ones you want to remove and then tap Delete.

Undelete images

If you delete an image, it can be recovered, though you must do so within 30 days. Go to Albums > Recently Deleted, tap the photo and select Recover. To regain a group of pictures, tap Select, choose the shots you wish to save, then tap Recover. To save all the images, tap Select, then Recover All.

Find images

With iOS 8, Apple has added a smart search feature. Tap on the magnifying glass icon and the search field will provide you with a selection of categories such as Nearby, Favorites and Home.



You can also search your photos by date, time, location or album name. So if, for example, you know that a picture was taken in May, type May in the search field. If you type the location where you took photos and you should see the images you took there. These search criteria remain in recent searches.

Favourite photos

This is another way to make sure you can always find the photos you like the best. Under every photo in your library there is a heart icon. Tap this to add it to your Favourites album.

Hide images

You can hide images you don't want others to see from Moments, Collections and Years (although they will still appear in albums). To

conceal an image, tap and hold its thumbnail, then tap Hide. This all sounds straightforward, but that's not the case. If you tap an image in Recently Added and select Hide, the photo will still be visible in that folder. If, however, you are in Moments, it will disappear from view when you select Hide.

To recover the photo you need to visit the Hidden album and tap and hold the thumbnail and tap Unhide.

View your photos on a map

This isn't new, but it's a view that's worth mentioning. From Photos > Collections, tap on the name of a location above a group of photos to see them on a map. If you dial back to the years view, you can tap on the location for that year and see groups of images you have taken at the location you took them in. This is great if you wanted to remember



where it was you enjoyed that fantastic Sunday lunch or the beautiful gardens you visited one weekend.

New editing tools

With iOS 8, Apple has introduced a raft of editing features - previously iOS 7 offered only a selection of preset filters and a cropping tool. You'll still need to use iPhoto to do anything more advanced, but for basic edits the new operating system lets you be more creative. Apple is also allowing users to make use of third-party filters and effects without having to open and close apps.

Now you can crop, straighten, remove red eye, adjust lighting and contrast and more. Just open Photos and select the image you wish to edit. Now tap Edit, then pick the crop, filter or saturation tool.

Crop an image

Choose your image, tap Edit, then the square Crop icon - the left-hand option - which like different-shaped boxes. Now you can pick the constraints of your crop. Tap Done when you are happy.

Straighten an image

Do you have a photo that needs straightening up? To do so, tap the Crop icon - a dial will appear below the image. Turn this until the lines that it draws over your image are in line with the horizon.

Add more colour

To change the colour saturation of an image, tap the dial icon on the right and pick Color. You can drag the slide up (or to the right



depending on the orientation of your device) to add more colour.

You can do even more here. Tap the three-line icon and you'll see what the Saturation, Contrast and Cast levels are. To increase contrast, tap Contrast, then move that slide until you are happy. We selected Cast and moved the slider until we were happy with the white of the clouds in our image (see above).

Adjust the brightness

You can also adjust the Light levels. Options include Exposure, Highlights, Shadows, Brightness and Contrast.

Find the image you wish to tweak and tap Edit. Select the dial icon, tap the three-line icon and select Light. Move the slider until you get the desired look; for example, you could drag the slide up for a

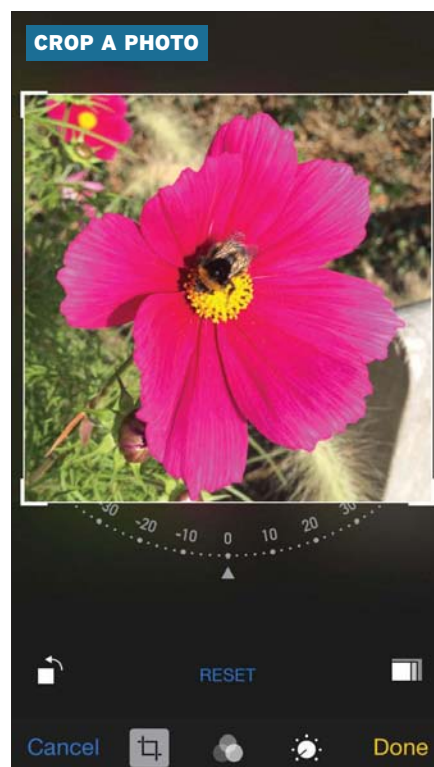
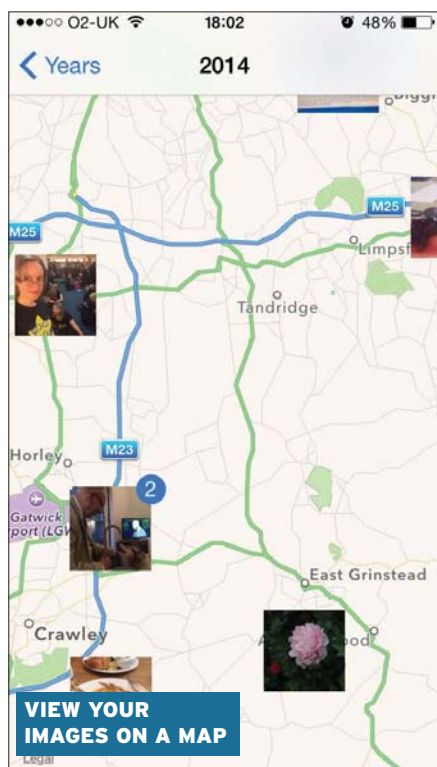
more ethereal feel to your image. Tapping the three line-icon will give you additional settings such as Exposure, Highlights, Shadows and Black Point.

Choose a filter

You don't have to use all these sliders to get the perfect image. Apple has a number of preset filters available. First, open your image and select Edit. Tap the three circles at the bottom of the screen, select the filter you like from: Mono, Tonal, Noir, Fade, Chrome, Process, Transfer, Instant. You can also add filters to the photo when taking it. Tap on the three circles in the bottom-right corner when you open the Camera app.

Undo photo edits

Find the image, tap Edit, then tap Revert to change the image back to the original. You



can do this at anytime as any edits you make are non-destructive.

Edit a photo stored in iCloud

If you are sharing images via iCloud you will see the photo, though, the phone will warn that you need to Duplicate the image before you can edit it.

Use third-party filters

At WWDC 14, Apple's senior vice-president of Software Engineering, Craig Federighi, showed off Waterlogue (£1.99, tinyurl.com/ojbhrf9), an app that turns photos into arty watercolours with some success, along with the classy VSCO Cam (free, tinyurl.com/Le8okt8), which offers authentic-looking, real film-like filters. These app extensions, or what Apple calls 'extensibility,' means apps from the App Store will be able to extend the system and offer services to other apps. They should free creativity and save time to concentrate on experimenting beyond the core tools that iOS 8 offers, encouraging developers to create new tools and features that don't duplicate Apple's own.

See photo edits on all your devices

Back in June at WWDC Apple announced that it was developing Photos for Mac and Photos for iOS to replace iPhoto on the Mac and iOS, and Aperture on the Mac.

Once this launches in 2015, you should be able to view all your photo edits on all your iOS and Mac devices.

iCloud photo library

As Apple noted at WWDC 14, users are taking, editing, organising and sharing more

New iCloud Storage Plans

Upgrade your storage straight from your iOS device.

5GB	20GB	200GB	500GB	1TB
Free	£0.79/month	£2.99/month	£6.99/month	£14.99/month

and more photos and videos. With lack of iPhone storage space always a concern and the worry of lost memories should you lose your phone without backing up, Apple is introducing iCloud Photo Library in iOS 8.1.

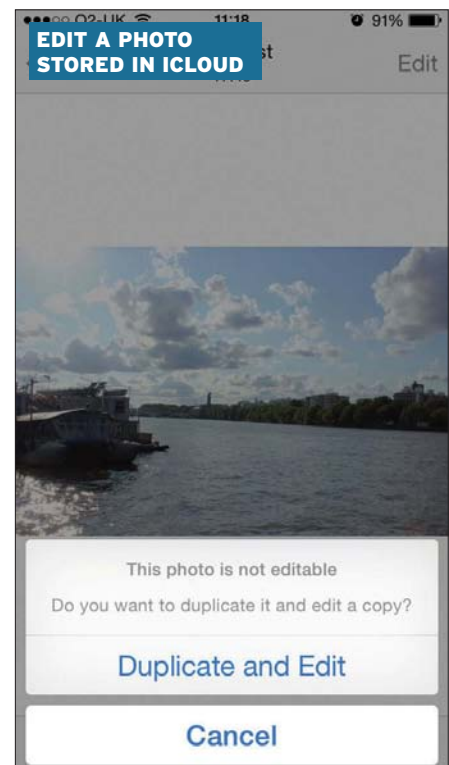
The paltry if free 1000-photo iCloud sync limit will in essence be history as Photo Stream becomes a much more attractive option, introducing a secondary paid service that will treat your photos as a whole, and not as a collection of images from different devices. Now every shot you take will be accessible from iCloud Photo Library (up to the limit of your storage option, more on that below).

Apple's new iCloud Photo Library will offer Dropbox-like storage capacity, with the ability to back up images online without loss of resolution or compromising original file formats. Crucially, these will appear on any connected iOS device and online via your browser to download.

Apple notes: 'Crop, straighten, enhance, or add filters to your pictures using Photos in iOS 8. Your changes are immediately uploaded to iCloud and visible on your other

devices. And the edits are non-destructive, so you can always revert back to your original if you change your mind.' The company will offer the opportunity to curate shared albums together on different devices, grouping, for instance, all photos taken on a particular holiday. Should you wish, you'll see an event such as a wedding or anniversary from more than one view point, seeing those behind the lens at last in other family members' photos.

For iMac and MacBook users, Apple has also announced plans for photos stored on your Mac to be shared this way thanks to a new OS X Yosemite Photo app, although you'll have to wait until 2015. With an eye to the future, Apple has announced it will no longer develop iPhoto or the pro-featured Aperture, with the new Photos serving as a replacement for both. The tighter integration between Yosemite and iOS 8 will mean photos taken on a high end camera will be easily available to edit, archive and share on your iPad. As OS X and iOS 8 will share many features, any learning curve when it comes to photo editing should be slight, once you get to grips with one or the other platform. ☒





YOUR QUESTIONS ANSWERED

Expert computing advice

We tackle readers' hardware and software conundrums

EXTERNAL GRAPHICS CARD

Q I have an HP Pavilion dv7 laptop, which is around five years old. It's running Windows 7 Service Pack 1 and has a 64-bit quad-core 2.3GHz processor with 8GB of RAM.

Unfortunately, my graphics card is playing up, though, the idea of replacing what is otherwise a very good computer simply because the graphics card is wearing out seems absurd.

In one of your articles, you mention using an external card via USB and attaching another monitor to it. How would that work when it comes to logging in? I would need to be able to see the login box on the external screen.

I'm also interested in any other ideas you have regarding my problem with the graphics card, as I have limited space in which to put new gear.

Replacing a graphics card on a laptop is generally not advisable as they are seldom designed as user-replaceable parts. It also typically requires almost completely dismantling the laptop in order to get to the faulty components.

However, in some cases it can be done if the laptop has a modular design where the graphics hardware can be swapped out without replacing the entire motherboard. Whether or not this will work depends entirely on the exact model of laptop you're trying to repair.

Searching on YouTube reveals several videos of people fixing HP Pavilion dv7s with similar-sounding video problems. Sometimes the graphics problems can be fixed by fitting a new heatsink and cooler assembly, while others show the actual graphics chip being replaced. The more basic repairs use a heat gun, while chip replacements require specialised, and expensive, equipment.

This would suggest that it is in fact possible to repair your laptop, given a repair centre with the right skills and the right equipment. However, the cost may be rather higher than you expect.

An external USB graphics adaptor isn't an option. It will work well for a second display, but isn't designed for use as the only graphics output from a PC.

Before you install Windows Technical Preview

Is it right for me?
System requirements
What can I keep?
Updates and feedback
Help and support

What you keep when you upgrade

This table shows what you can keep when you upgrade from your current version of Windows. Keep in mind that no matter which operating system you're upgrading from, you should play it safe and back up everything.

To check your version, see [Which Windows operating system am I running?](#)

If you're upgrading from	You can keep
Windows 8.1 or Windows 8	Windows settings, personal files, and most apps
Windows RT 8.1 or Windows RT	Technical Preview doesn't run on Windows RT systems
Windows 7	Windows settings, personal files, and most apps
Windows Vista	Nothing—you must boot from media and perform a clean install

Important

If you're running Windows 8.1, Windows 8, or Windows 7 and your system language isn't English, Chinese Simplified, or Brazilian Portuguese, you can only keep your personal files when you upgrade. You won't be able to keep your apps or Windows settings.

WINDOWS UPGRADE

We would therefore suggest that you look into getting an expert to install a card. Get a quote first, and then decide whether or not the cost is economical for you.

WINDOWS UPGRADE

Q I recently purchased a new laptop with Windows 8.1 installed. When Windows 10 is released, will it be easy to upgrade the operating system without a complete reinstall?

Yes, Windows always comes with an easy upgrade path for those running the previous version. Windows 10 will be installable as an in-place upgrade for anyone using version 8.1. Although the technical preview of Windows 10 will change before the final release, it currently supports in-place upgrades from as far back as Windows 7. This means that the operating system's settings, personal files and most applications can be seamlessly migrated to the new operating system.

If, however, you're running Windows Vista, you're out of luck, as you'll have to perform a clean installation from scratch.

UNSUPPORTED VIDEO DRIVER

Q I have a Dell Inspiron 9400 laptop that runs Windows 8.1. Unfortunately, I can't get any updated video drivers for the 256MB nVidia GeForce Go 7800 it came with, which means the 17in screen shows an awful, sickness-inducing blurred screen. The update to Windows meant it downgraded to the Microsoft Basic Display Adaptor, which ruined the previously clear picture. It doesn't even seem to see the nVidia processor any more. Is there a workaround or any way to replace the



EXTERNAL GRAPHICS CARD

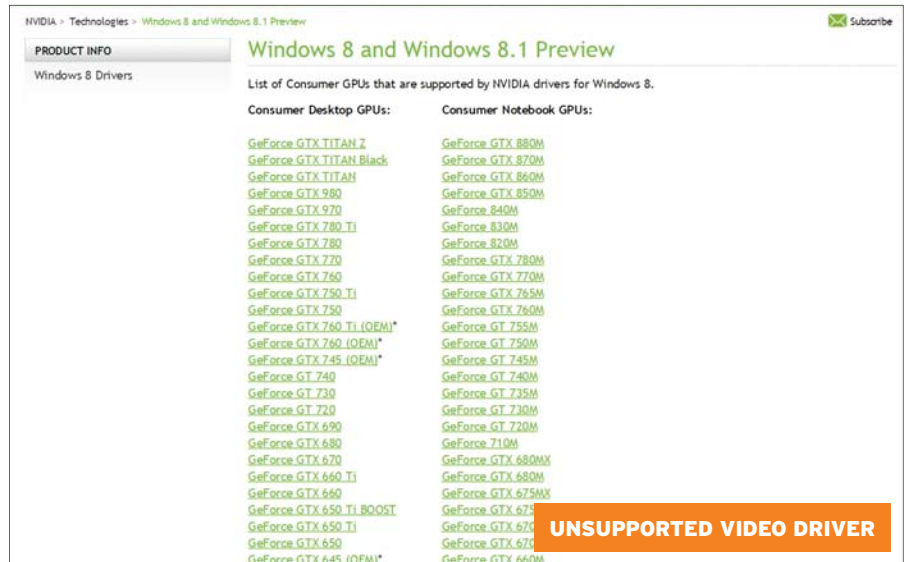


nVidia processor? The rest of the laptop still works really well.

It's an unfortunate fact that this situation often arises when a new release of Windows is released. Unlike desktop graphics cards, laptop graphics processing units are often left in the hands of the laptop vendors when it comes to driver updates. So when a model is no longer sold, there is often little incentive for the vendor to keep on producing driver updates for it. Furthermore, the GeForce Go 7800 isn't listed on nVidia's list (at tinyurl.com/berhs39) of GPUs supported under Windows 8.1.

Under certain rare circumstances it is possible to upgrade the graphics card in a laptop, but it's seldom worthwhile doing so – see our answer to the first query in this month's helproom.

However, all is not lost. As you might imagine, you're not the only person wishing to get Windows 8.1 running on an older



NVIDIA > Technologies > Windows 8 and Windows 8.1 Preview Subscribe

PRODUCT INFO
Windows 8 Drivers

Windows 8 and Windows 8.1 Preview

List of Consumer GPUs that are supported by NVIDIA drivers for Windows 8.

Consumer Desktop GPUs:	Consumer Notebook GPUs:
GeForce GTX TITAN Z	GeForce GTX 880M
GeForce GTX TITAN Black	GeForce GTX 870M
GeForce GTX TITAN	GeForce GTX 860M
GeForce GTX 980	GeForce GTX 850M
GeForce GTX 970	GeForce 840M
GeForce GTX 780 Ti	GeForce 830M
GeForce GTX 780	GeForce 820M
GeForce GTX 770	GeForce GTX 780M
GeForce GTX 760	GeForce GTX 770M
GeForce GTX 750 Ti	GeForce GTX 765M
GeForce GTX 750	GeForce GTX 760M
GeForce GTX 760 Ti (OEM)*	GeForce GT 755M
GeForce GTX 760 (OEM)*	GeForce GT 750M
GeForce GTX 745 (OEM)*	GeForce GT 745M
GeForce GT 740	GeForce GT 740M
GeForce GT 730	GeForce GT 735M
GeForce GT 720	GeForce GT 730M
GeForce GTX 690	GeForce GT 720M
GeForce GTX 680	GeForce 710M
GeForce GTX 670	GeForce GTX 680MX
GeForce GTX 660 Ti	GeForce GTX 680M
GeForce GTX 660	GeForce GTX 675MX
GeForce GTX 650 Ti BOOST	GeForce GTX 675M
GeForce GTX 650 Ti	GeForce GTX 670
GeForce GTX 650	GeForce GTX 670M
GeForce GTX 645 (OEM)*	GeForce GTX 660M

laptop and there are tricks that can be employed to fool the graphics driver installer into working on your hardware.

You could try searching the forums of a site such as forums.laptopvideo2go.com to see if anyone has found success with the

[Continues >>](#)


DELETE YOUR GOOGLE LOCATION HISTORY

You may or may not be aware that, under certain circumstances, Google can use your mobile device to track your location and will then keep a record of where you've been, along with the times and the dates. This feature can be useful for tasks such as remembering where you live and where you work while warning you of suspected delays along your frequent routes.

While you have to opt into this feature to enable it, it's easy to do so without realising while you're tapping through the initial screens on your phone when you first set it up. If you don't know that you have enabled this feature, it can come as quite a shock to see such a recording of your whereabouts stored by a third party such as Google.

To look at any location history Google may have stored, go to tinyurl.com/pure36h. Sign into Google if you haven't already done so. You will then see a map with red dots depicting your previous locations and red lines showing your journeys between them. You can select different time periods to view and export the data if you wish. If you want to get rid of all this information, click on Delete All History, otherwise you can delete the location history from specific time periods.

If you want to keep using the feature but would rather remove specific location visits from your history, you can click each point on the map and then select the Delete From History option. Deleting your history doesn't actually turn off the location history



Places you've been

Google Location History lets Google save your location to provide benefits like improved map searches and tailored commute information.

[Manage history](#)

[Pause](#)

feature; it merely erases what has been stored up until that point. To stop Google from gathering any further location information, click on the gear icon at the top right of the page and select History Settings. Now click the Pause button to prevent any further location info being gathered.

combination of your particular laptop and Windows 8.1. After a little searching, we found one user able to run Windows 8 on a GeForce Go 7800 using drivers found on Microsoft's Windows Update site at tinyurl.com/mdLfkt2.

WINDOWS 10 FOR SURFACE RT

Q I have a 32GB Win8.1 RT Surface tablet. Will it be upgradable when the new version of Windows is released.

Microsoft's vision is for Windows to run across all product types, starting with phones, and also taking in tablets and laptops. Windows 10 is therefore pretty much guaranteed to come in an RT form for products such as the slate. However, according to Microsoft's Joe Belfiore, it looks as though first preview versions won't appear until "well into late 2015".

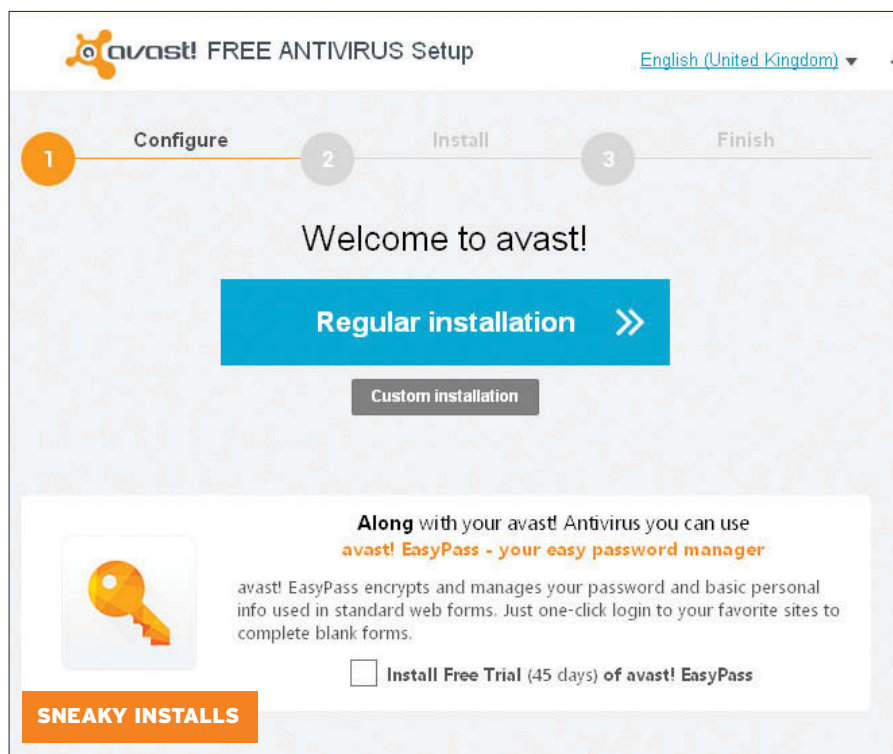
There's also no absolute guarantee that the new version of the OS will be compatible with all existing Surface tablets. Also, considering no-one has seen an RT version of Windows 10, it's too early to tell just how different your Surface tablet would be when running the new operating system.

What will possibly be more important is whether the number of available apps continues to grow, which we suspect it will.

SNEAKY INSTALLS

Q I've been using Avast Free Antivirus for some time, but recently discovered that it had installed Dropbox without my permission. I have since uninstalled it, but how can I prevent this sort of thing from happening again?

Sneaking extra software applications in through program installers is nothing new. It happens most often with free software where the author can get some revenue



from partner developers for bundling their applications into the freeware installer.

Technically, you will have always given your permission for extra software to be installed, although that condition is usually buried in the small print.

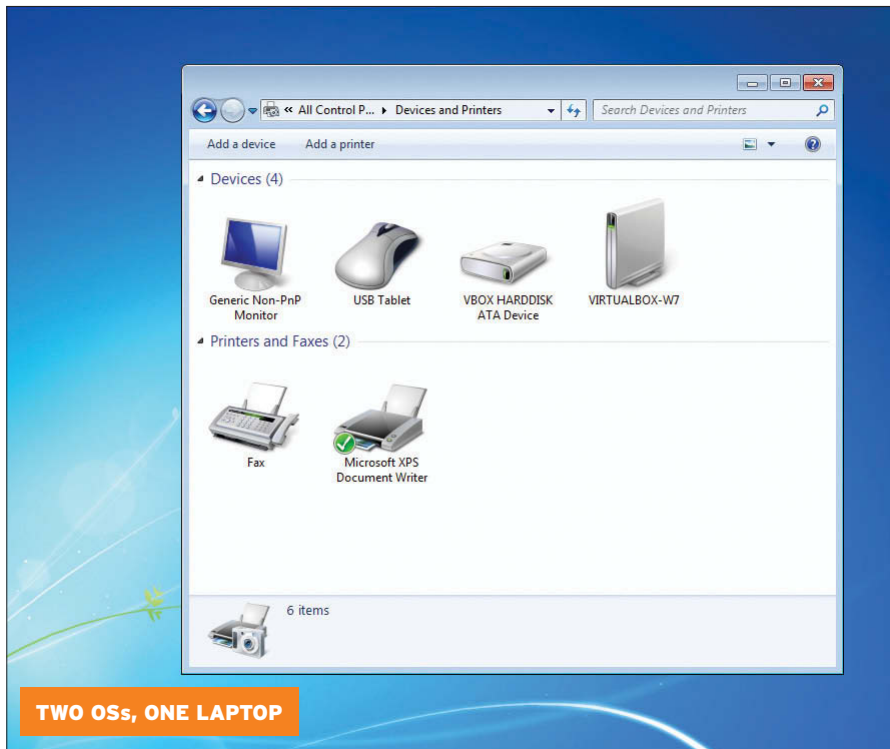
A common example of this sort of bundling is one or more toolbars appearing unexpectedly on your web browser. These can take up more and more space on the screen and turn into a major annoyance even if they aren't doing anything malicious.

Many software installers give you the option of an Express or Custom option. Most of us want an easy life, so it's tempting to pick Express. However, this is the way the installer gets to install whatever optional extras it likes.

It's a good idea to get into the habit of always clicking Custom. Don't worry, it doesn't mean the installation will be difficult. You will usually end up simply clicking through a few default options without having to enter anything complicated, but you'll also be given the option to turn off any options you don't want installed.

In the case of Avast, it's the custom install options where you get the chance to say no thanks to a Dropbox installation. Dropbox is an excellent program, but we do think it should be up to you whether or not you install it. The latest version of the free Avast installer does not appear to include a Dropbox installation. It's a similar situation with the Java updater. If you don't opt out, it also installs a free browser toolbar.





TWO OSs, ONE LAPTOP

Q I would like to know if I can install both Windows 7 and 8 on my HP laptop. Windows 8, which I am using at present, does not support my HP Deskjet series 2515 printer, so I'd like to be able to use the older OS.

Yes, it is usually possible to install Windows 7 and 8 on a single PC using a process called dual-booting. This means that when you start up the laptop, you will be able to

choose which version of Windows runs. To change versions, you would need to restart your laptop and choose again.

While you could install your printer under Windows 7 using this method, we would strongly advise against it as it will most likely involve repartitioning your hard drive and editing your boot parameters. You would also need to install a second copy of any of the applications you wanted to use under Windows 7. You can also run into difficulties with preinstalled recovery

partitions, which may stop working and, if your laptop is very new, you may find that it doesn't come with full support for Windows 7 anyway.

If you really need to run a previous version of Windows for occasional tasks, then we would recommend installing the operating system on a virtual PC using a tool such as VirtualBox, available free from Oracle. You may need to upgrade your RAM to get the best performance, but it should be fine for simple printing tasks.

You could then share the printer from your virtual PC as though it were on a network. This would mean you could print from Windows 8 without having to reinstall any applications on the virtual PC.

Thankfully, in your case there's no need to do any of this. A few days before you sent your email, HP posted a full set of Windows 8 drivers for the Deskjet 2515. These can be downloaded at tinyurl.com/jvgyLhh.

SCREEN DOES THE SPLITS

Q I would like to split one screen between two computers. For example, I would like to use the right side of the screen for one PC and the left side for another. Both PCs would be running at the same time.

Do you think it's possible?

Yes, but you'll need a monitor that supports this feature. It's a fairly common option on 21:9 format ultra-wide displays, which often allow you to assign one input to one side and a second input to another.

One example is the LG 29EA93 ultra-wide monitor. This 29in display will allow you to

Continues >>

TECH JARGON BUSTER

CLICKBAIT: This is a term used to describe online content designed to attract as many readers and gather as many clicks as possible, often through the use of teasing or sensationalised headlines. The term suggests that the content is less of a draw than the sexed up headline might initially indicate.

HTTPS: HTTPS is the abbreviation for Hypertext Transfer Protocol Secure – a secure version of the standard HTTP protocol that is used to send pages around the web. HTTPS combines standard HTTP with an encrypted protocol, called SSL/TLS, which ensures that transmissions cannot be intercepted or altered by third parties. The appearance of HTTPS in the web address of a site also signals you are connected to the website you have

requested rather than an imposter who may attempt to steal your information.

NAS: A network-attached storage (NAS) device stores files in a form which is accessible over a network. They typically consist of a specially designed computer without display or keyboard, containing one or more hard drives and running an operating system designed specifically for the management and administration of those files. In the home, NAS devices are often used to store files which are intended to be shared between a number of computers, mobile devices or media playback devices, such as connected TVs and music systems.

ROOTKIT: This is a malicious piece of software installed on a computer

system to give privileged access levels to unauthorised individuals. The name is a combination of 'root', the name given to the administrative user on most Unix-like operating systems, and 'kit' as it usually comprises a selection of ready-made tools to make the software easy to deploy. Rootkits typically employ stealth techniques to avoid detection by their victims, but can be picked up and eliminated by effective antivirus software.

WEARABLES: Functional items of technology designed to be worn about the person fall under the umbrella term 'wearables'. Popular forms of wearable technology include smartwatches such as Apple Watch or Galaxy Gear and health monitoring equipment. A more advanced example would be Google Glass.

4-SCREEN SPLIT

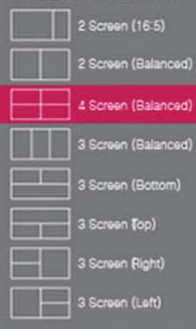


LG Premium IPS Monitor's wide screen allows up to 4 windows to be shown in 8 different screen ratios without feeling cluttered. Multitask more efficiently and comfortably with just one click.

* 4-Screen Split software requires Windows XP/Vista/7/8/ or Mac OS® Lion/Mountain Lion and DVI-D or HDMI connection with PC or DVI-D or DisplayPort connection with Mac®. May not be compatible with some applications.

[LEARN MORE](#)

SCREEN SPLIT FUNCTION



DUAL LINK-UP



For quick business meetings, the Dual Link-up feature allows two portable devices, such as a computer, camera, phone or Blu-ray player to be connected to the monitor and used on a single screen simultaneously.

* Disclaimer : To use Dual Link-up, one device must be connected to the Display Port. Check 'Details' button on the 21:9 UltraWide Mini-page



SCREEN DOES THE SPLITS

have two PCs connected simultaneously, each running at a resolution of 1280x1080 pixels. If you want to retain a more standard resolution on your PCs, then you could try the rather freaky-looking Philips 19DP6QJNS Two-in-One Monitor. This device is actually two 19in panels built into a single housing, each of which individually supports a resolution of 1280x1024.

If you're doing this to try to save space, consider buying a pair of monitors with stands that pivot. This would allow you to rotate each screen through 90 degrees into a vertical position and place them next to each other. This should take up much less space on your desk and allow for two independent displays without the need to buy a rather expensive ultra-wide or split-screen monitor.

Another space-saving idea is to use a pair of monitor arms to suspend a pair of displays above your desk, mounted either horizontally or vertically as you prefer.

PUT THE PHONE DOWN

Q On Monday my husband received a phone call from someone claiming to be from Microsoft and that an error has been detected on our PC. I recently updated my computer with antivirus and it showed no errors or viruses.

On Thursday, I received another call, also purportedly from Microsoft, saying that there was an error. Again, I told them that I had updated my antivirus and no errors had been detected and that I would prefer them to speak to my husband and he would be back from work later.

I know they are going to call back. What do I do? Something doesn't seem right as we have had a computer for years and until this year have never been contacted by Microsoft.

We get many messages similar to this every month, but it can't hurt to repeat that

this is simply a scam and most certainly not Microsoft calling.

Giving a stranger access to your computer or online passwords can have devastating consequences including theft of your identity and your money. Microsoft will never call you like this and you should never allow access to your PC or give out any passwords to anyone who calls you claiming to have detected an error on your computer. Hang up and don't talk to them.

Every few days, we receive an email detailing how a phone caller purportedly from Microsoft has locked down a reader's computer with a password - which, of course, will only be provided on payment of a fee. If this has happened to you, we recommend turning off your computer and taking it to a trusted repair technician, who will hopefully be able to back up and restore all of your data, while ensuring no back doors have been left which might allow the scammers re-entry into your system. ☒

A tribute to Julian Moss: 1953 - 2014

It is with deep sadness that *PC Advisor* recently learned of the untimely death of Julian Moss, who lost a long and bravely fought battle with cancer on Friday October 24 2014, at the age of only 61.

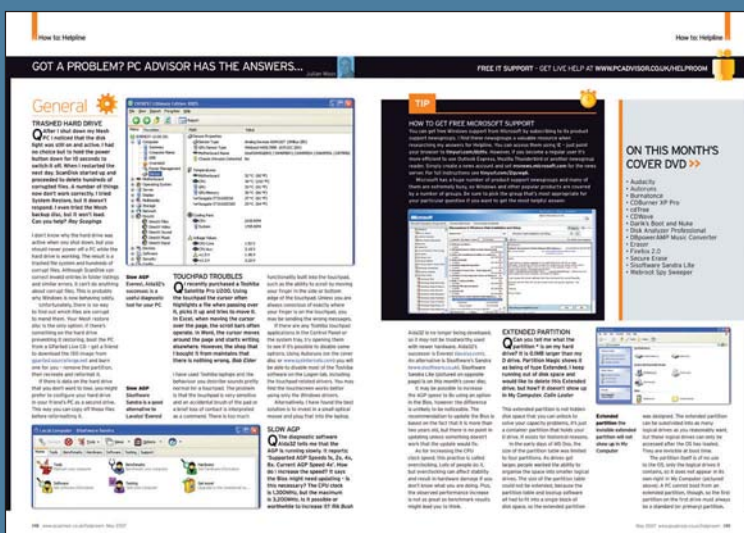
For many years Julian was a valued and hugely popular contributor to *PC Advisor*. Regular readers will remember him principally as the editor of the *Helproom* and *Helpline* sections of the magazine. In this role he offered expert advice to literally hundreds of PC users, solving real-world computing problems with his customary expertise, brevity and wit. No technical problem ever fazed Julian, and he was never anything other than helpful and polite in his dealings with *PC Advisor* readers.

Julian was a prolific writer and software developer. In addition to his role with *PC Advisor* he held editorial posts with several UK computer magazines, mainly as a technical reviews writer. He also designed- and operated many websites. Latterly his work could be found principally on his own Tech Pro website (tech-pro.net), on which he offered reader tips and marketed his own software.

After his diagnosis with a brain tumour in 2011, Julian started the One Foot in the Grave blog (onefootingrave.blogspot.co.uk) detailing his experiences during his battle with the disease.

Outside of his technology interests Julian was an enthusiastic fell walker who moved to the Lake District to further his passion. He was also a keen amateur radio ham.

Julian leaves behind Olga, his wife. He will be missed by everyone associated with *PC Advisor*. ☹

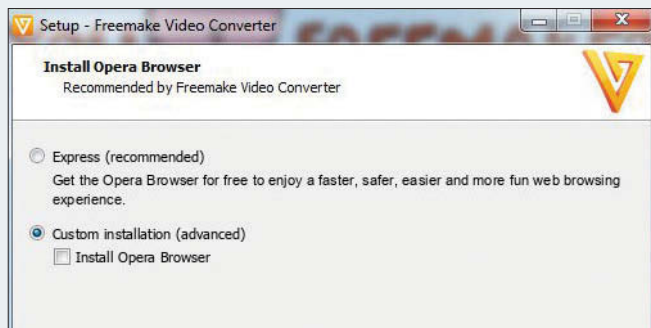


Rotate portrait videos



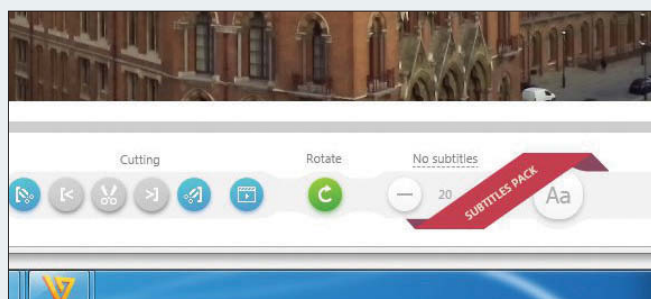
Using a smartphone to record a video is becoming increasingly common. Adam Shepherd reveals how you can use free software to rotate and export your movie

Smartphone video has meant that we can all capture precious moments on camera at the touch of a button, but sometimes when you transfer video files to PC, you can find that your videos have come out upside down or in portrait mode. Nobody wants to have to do a handstand to watch their home movies, so here's Adam Shepherd's to rotating your videos.

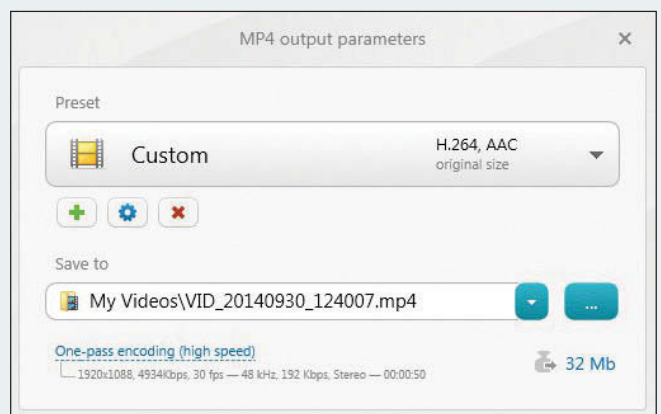


START For the purposes of this guide, we'll be using Freemake Video Converter (tinyurl.com/3aLw3yc). You should note that it contains some unwanted programs in the form of Yahoo toolbars and Opera browser installation options that come prechecked by default. Choose Custom installation and uncheck the boxes to avoid these programs.

2 Once you've installed and opened the video converter, select the option to add video in the top left. Select the video you wish to rotate, and then click the button to the left of the file with the editing icons on it.



3 Once the editing panel opens, there will be a big green rotate button. This rotates the image 90 degrees clockwise, so clicking it twice will return an upside-down video to normal. Once you're happy with your footage, click the OK button.



4 Finally, to save your video, click on the device or file format you'd like to save it as. You can also choose from a variety of different qualities or encoding options, or just keep to the default settings. Click Convert, and wait for your video to be saved. ☒

Create an animated GIF



It's the GIF's internet, we just live in it. GIFs are those short animations people share via email and on websites. You know the sort of thing: a flipbook for the internet age. Usually meant to be amusing, occasionally beautiful, always easy to share. GIFs are static image files that display moving images. Pretty neat, huh?



How to make a GIF without Photoshop

There are two ways to make GIFs: easy but limited, harder but more full featured. As most of the easy ones are free, however, we recommend you try them first.

A quick search online will throw up multiple online GIF-making programs. Three of our favourites are MakeAGif (makeagif.com), GIFMaker (gifmaker.me) and Imgflip (imgflip.com). They are all pretty similar - some require you to pay to remove a watermark, while others may ask you to sign up for a free account. Each service differs slightly, but the basic principle is that you upload either a video clip or a series of still images. Then you are required to do a minor amount of editing to get things as you would like them, before exporting back to your desktop a GIF you can share. It couldn't be more simple.

How to make a GIF from video with Photoshop

However, those types of service will not be enough for more adventurous GIF makers. So here is our GIF-making guide for Photoshop warriors. (Incidentally, by Photoshop in particular we mean high-end image editors in general. The GIMP is free, for instance, and will also work in a similar way.)

So, to make a GIF from video with Photoshop, you will need a video clip. Make sure it isn't too long: GIFs work best when they are short and punchy. No more than three seconds. Now, in Photoshop navigate to File > Import > Video Frames to Layers. Choose your video file, and it will be uploaded into Photoshop and transformed into a series of still images. You can import the entire video or use sliders to select a portion of the footage.

You are pretty much there, at this stage. You can now adjust settings to make your GIF work the way you wish it to. Once you are happy, go to File > Save to Web to export. Photoshop offers lots of settings that allow you to decrease the file size. You need to find the smallest file size at which your GIF looks okay - any more than 1MB and it will slow up web page load times. Any more than 500kb and your friends won't thank you for making them download your GIF in their mobile phones.

Once you have the file size you need, hit File and Save as. Congratulations, you've made a GIF.

How to make a GIF from still images with Photoshop

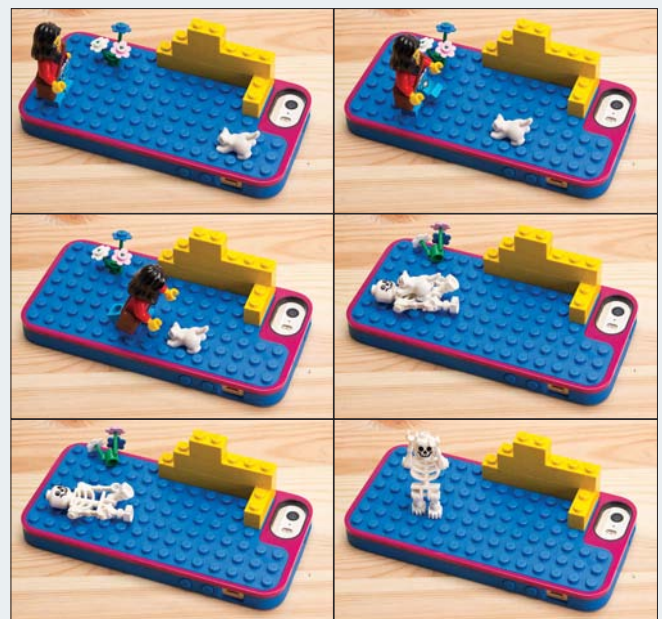
It is marginally more tricky to make a GIF from still images, but more in the preparation than in the actual Photoshop work. So before you do anything else get together all the still images you wish to sequence into a GIF. Put them together in one folder to

which you can easily navigate. The quality and linear nature of your images will dictate how well this project works out.

Open Photoshop and go to File > Scripts > Load Files into Stack. Browse to the folder you created and select the images. Once you hit OK a new composition will open, your images will be rendered as individual layers in a single image. All you have to do is arrange the layers - put the first image to the bottom, right the way through to the final image at the top of the stack. Now you can sequence those layers. In Photoshop CC and CS6 open Window Timeline. (In CC, you have to also click the drop-down menu in the middle of the Timeline window and select Create Frame Animation.) If you are using Photoshop CS5 or older, open Window and Animation.

The next step works the same way in all versions of Photoshop. Simply click the small, right-facing arrow in the upper right-hand corner of the window, and choose Make Frames From Layers. Use the menu underneath each frame to set for how long it appears. You can also use the menu in the bottom left-hand corner to set how many times the entire GIF will run. Your GIF is now created. Again, simply go to File > Save to Web to export.

Again, you'll need to reduce the file size. We would suggest you do this in increments, having first reduced the size at which your GIF appears to the smallest visual size you are happy with. ☒



Swap files fast between Windows and Android with Pushbullet



There are many ways to get files from your PC to a mobile Android device, and one of our favourites is the super-useful AirDroid for Android. But a recent feature from the free app Pushbullet for Android and iOS recently caught Ian Paul's attention



Pushbullet makes it ridiculously simple to transfer files from one device to another with just a few clicks. Because the connection between your devices is always present, you don't have to reconnect every time you want to swap a picture.

Pushbullet isn't a replacement or even a competitor to AirDroid, though, because the two apps don't work the same way.

Pushbullet doesn't give you complete access to your phone's file system, as AirDroid does. Instead, it allows you to transfer files, links, notes and messages from one device to another. If you're in front of your phone you could, for example, use Pushbullet to send a picture to your PC; once at your PC, you could send a recently downloaded song back to your phone.

So if you're already an AirDroid user, what reason would there be to use Pushbullet?

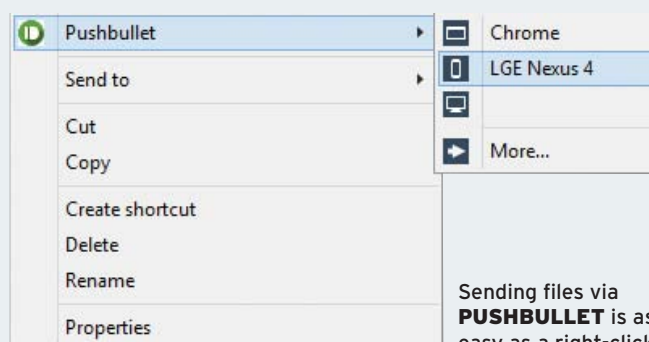
For Android users, it puts all your phone's notifications onto your desktop thanks to the way that the mobile app works in concert with a desktop companion on your PC. You can see incoming phone calls, texts, alerts from your favourite news apps, email notifications and so on. You can also disable notifications via Pushbullet on a per app basis.

Pushing files with Pushbullet

For this to work, you need to have Pushbullet on your phone (Google Play, iTunes) and the companion desktop application (pushbullet.com) running on your Windows machine. Once that's done, sign into both apps with your Google account, and your devices will be able to swap files via Pushbullet.

Let's say you want to move a music file that is stored on your computer at C:\Users\Me\Music\GroovyTune.mp3 to your phone.

First, open a File Explorer window and navigate to that location. Then, simply right-click the file, and in the context menu you should see a Pushbullet heading.



Sending files via **PUSHBULLET** is as easy as a right-click

Hover your cursor over the heading until a second menu opens up with the names of your devices. Choose your phone - the LGE Nexus 4, for example - and click.

A desktop notification will pop up to let you know you that the tune is uploading. And that's it - easy-peasy.

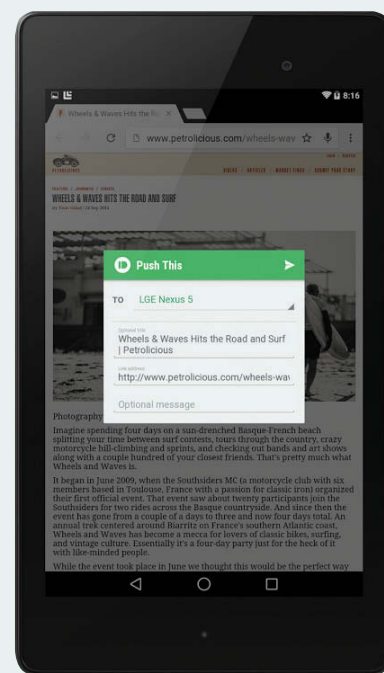
Limitations

Although Pushbullet is easy to use, the app does have limitations. For starters, you are restricted to pushing files of 25MB or smaller to your phone.

Also, you can't move multiple files at once. The only way to get a big batch of files onto your phone at one time is to create a zipped file of 25MB or less.

Any files sent to your phone via Pushbullet are placed in the Downloads folder on Android. However, Pushbullet also keeps a record of files swapped between devices, allowing you to access files and notes inside the app.

Pushbullet isn't perfect for every occasion where you want your phone talking to your PC. But if you're looking for an app that lets you swap files between devices without having to manually set up a new connection every time, give Pushbullet a try. ☒



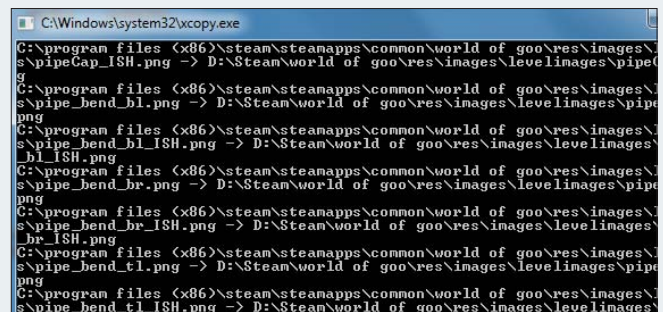
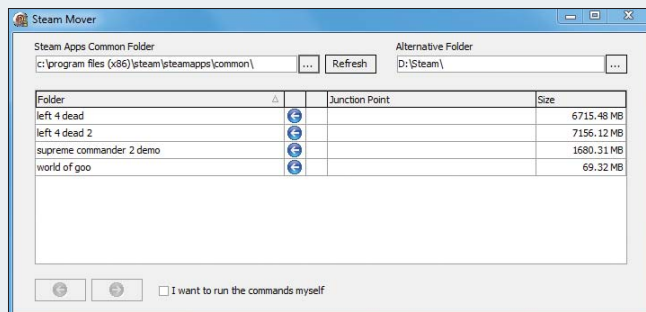
Pushbullet enables you to see your **PHONE CALLS** on your computer

Move Steam games to a different hard drive



Tired of wasting time uninstalling and reinstalling games when you run out of space? Wave goodbye to Steam hassles with Adam Shepherd's guide

Steam games can take up an awful lot of space, and one of the main problems for PC gamers can be shuffling around and deleting old games in order to make room for newer ones. Alternatively, you might upgrade to a new computer, or get a new hard disk. However, rather than having to go through the hassle of uninstalling and reinstalling whenever you want to move a game to a new hard drive, a far easier way is to use Paul Traynier's free Steam Mover tool (tinyurl.com/396j764).

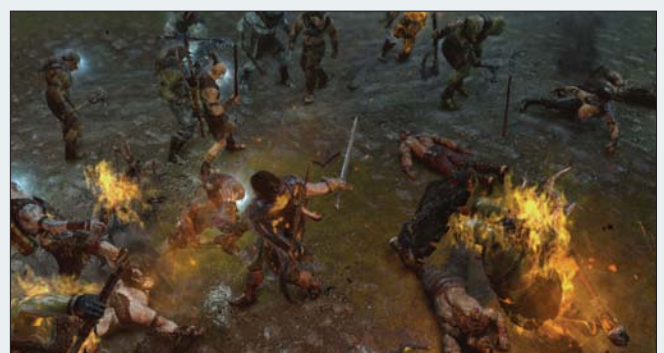
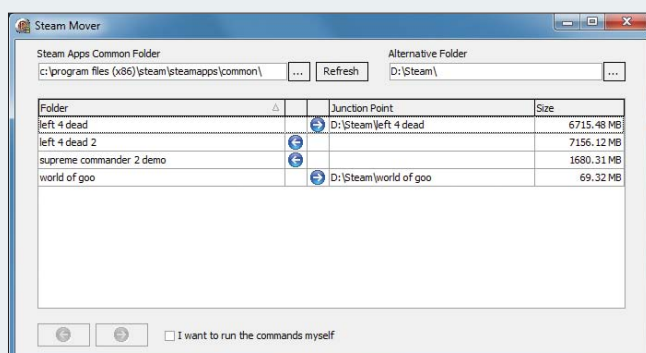


START Paul Traynier's utility will automatically find your Steam directory with all your games in, assuming it's in the default location. If not, use the drop-down menu to select it. Then, to move the games to a different disk on the same computer, simply specify the new desired location for your files on the top left-hand side of the window.

2 Select the games you wish to transfer, then click on the right-hand arrow at the bottom. This will open some command prompt windows - let them run until they're finished.

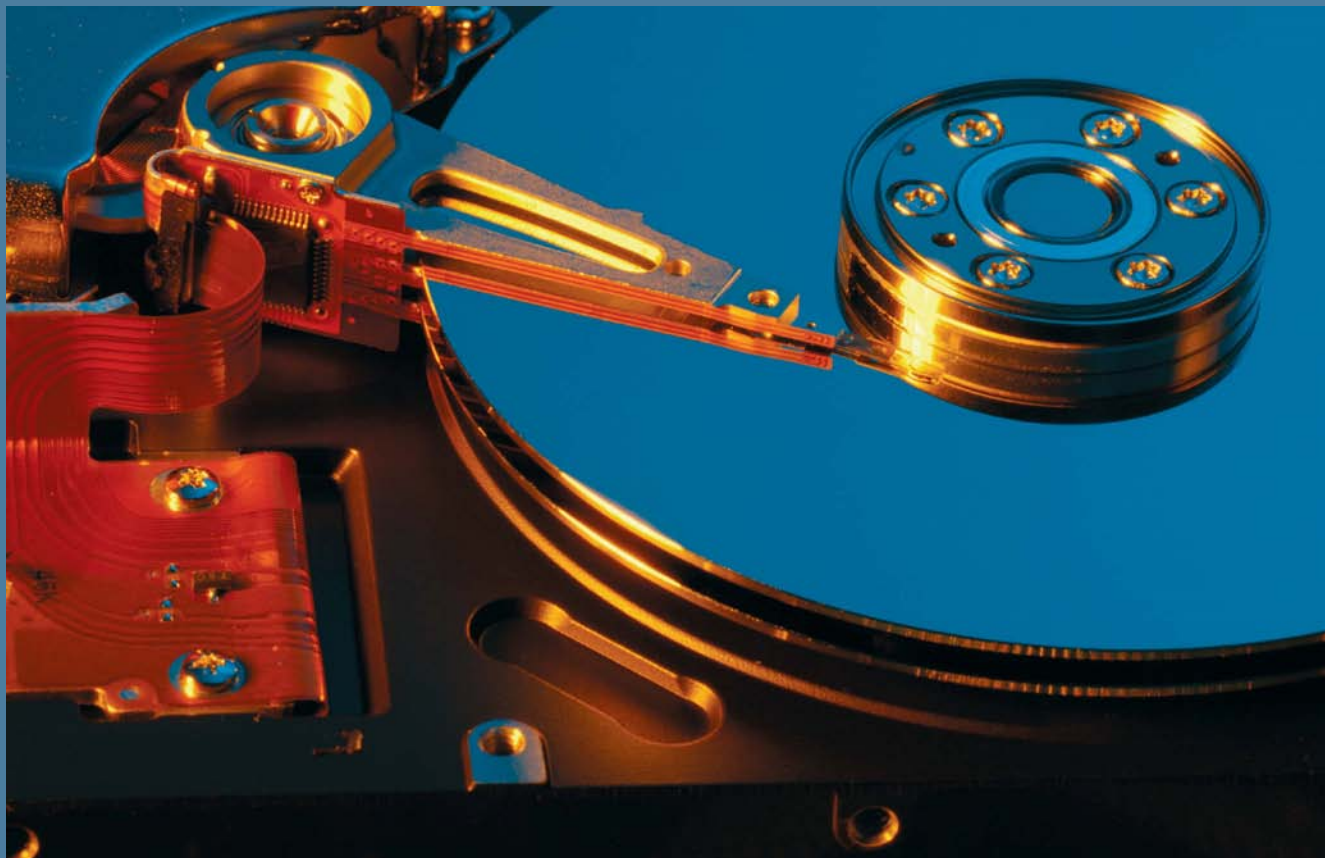
Once they're done, you'll see that the game files have transferred to the new disk. A junction point will have been created in the old location, which tells the computer where to find the files in their new home. This means that your games should all still function perfectly normally on Steam, with all your data still intact.

To move them back to their original location, simply click on the left arrow button.



3 To transfer games between separate machines, it's best to use an external hard drive as an intermediary. Select your Steam directory and copy it over to the external hard drive. Then copy it on to the target computer, making sure to recreate the file paths from the previous PC.

4 Steam will automatically register the games without having to redownload them. You'll then be able to get back to playing your favourite games. ☒



Format a hard drive in Windows Vista, 7 or 8



There are many reasons why you may want to format a hard drive. Here Jim Martin guides you through the process you'll need to follow to get the job done

Formatting is the process of deleting all the data on the hard drive, but beware of 'Quick Format' which leaves all your data in place and makes the drive appear to be empty. A quick format is ok if you have a brand new hard drive, or you want to reinstall Windows, but not if you're disposing of the disk or giving it to someone else.

A word of warning: make sure you have successfully backed up any photos, videos, music and other documents from your drive before you format it. Although files can be recovered in some situations, prevention is always better than cure.

Partitions

It's important to understand about partitions before you start. A hard drive's storage can be divided up into smaller sections, called partitions. It's possible to format one partition while leaving the others untouched. That's useful in certain situations, but if you want to format the entire hard drive and use the entire capacity in one block, you'll also need to delete the partition information.

Format a hard drive from the BIOS

If you need to format a disk and you can't do it from within Windows, you can create a bootable CD, DVD or USB flash drive and run a free third-party formatting tool.

One option is Darik's Boot and Nuke (DBAN), a free program that can be downloaded from dban.org. This program will totally erase and format your hard disk, allowing for a clean install of a new OS, but the process cannot be undone, so be warned. DBAN is supposedly only able to create a bootable CD/DVD-R, but if you don't have any blank discs or a burner, there is a workaround available in the form of a separate third-party program.

```

Darik's Boot and Nuke

Warning: This software irrecoverably destroys data.

This software is provided without any warranty; without even the implied
warranty of merchantability or fitness for a particular purpose. In no event
shall the software authors or contributors be liable for any damages arising
from the use of this software. This software is provided "as is".

http://www.dban.org/

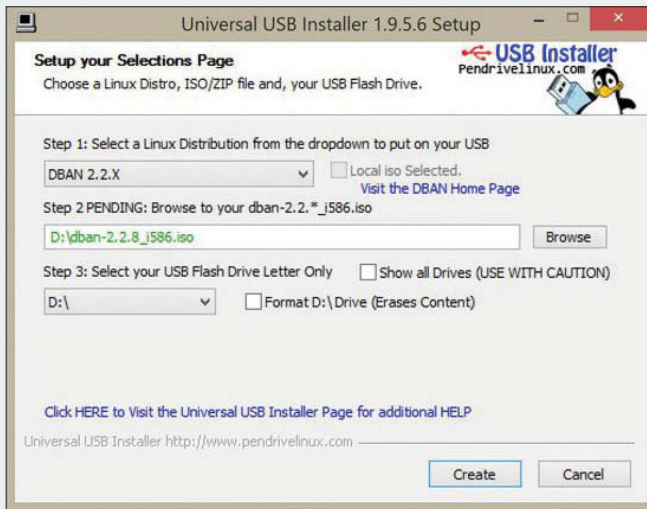
* Press the F2 key to learn about DBAN.
* Press the F3 key for a list of quick commands.
* Press the F4 key for troubleshooting hints.
* Press the ENTER key to start DBAN in interactive mode.
* Enter autonuke at this prompt to start DBAN in automatic mode.

boot: _
  
```

Universal USB Installer (tinyurl.com/y87u7aq) will quickly and easily convert the DBAN ISO image you downloaded to run from a bootable USB. Simply insert a blank USB flash drive, run the Universal USB Installer setup program, and follow the prompts.

You'll be asked to scroll through and pick the Linux Distribution you want to install to USB (in this case, the latest version of DBAN), followed by its location on your PC and the letter of the USB drive you'd like to install it to. Next, click create.

To boot from this USB drive rather than your usual boot device (in most cases, this would be the hard drive), you'll have to change some settings in the BIOS.



In the BIOS, go to the boot order settings, and change the primary boot device to the USB drive. After you've saved your settings and exited the BIOS, insert your bootable USB, restart your computer.

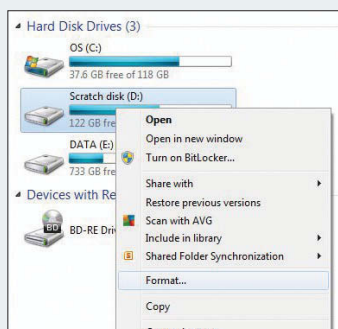


Your PC should automatically boot the DBAN software, which will guide you through the process of erasing your hard drive, with options for different levels of data-wiping. It will treat the USB as another drive so to avoid inadvertently wiping that as well, remove it after you've booted into DBAN.

Quick format a hard drive

Windows Vista, 7 and 8 have a built-in Disk Management tool, but the fastest way to format a hard drive is to click the Start button, then Computer and right-click on the hard drive you want to wipe (you can't format the drive on which Windows is installed for obvious reasons). Choose Format... from the menu and a new window will appear with a few formatting options.

By default Quick Format is checked, and you can select the file system and allocation unit size as well as changing the volume label (the drive's name). Typically, you can leave all settings unchanged and click the Start button. In under a minute your

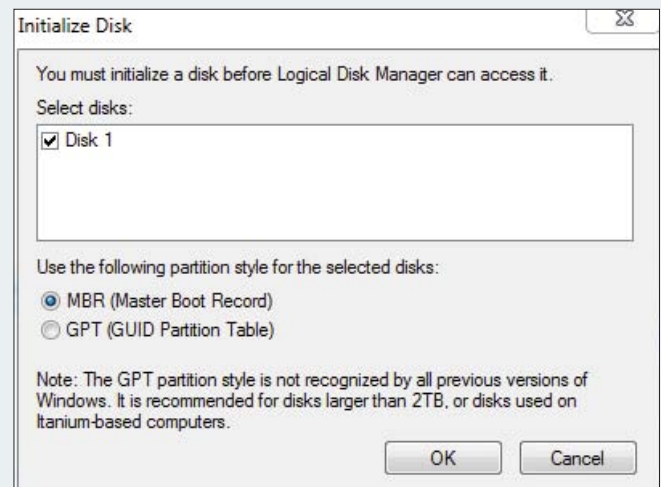


hard drive will be formatted. You should choose NTFS as the file system if it isn't already selected for Windows Vista, 7 or 8.

Using Windows' built-in Disk Management tool

Type `diskmgmt.msc` into the search box in Vista or Windows 7 and then click on only result that appears in the menu above, with the same name. This is the easiest way to launch Disk Management, but you'll also find it in the Control Panel if you search for 'disk' or look under the Administrative tools section, where it is called 'Create and format hard disk partitions'.

When you install a new hard drive in your PC, you might wonder why it doesn't appear in Windows Explorer. The reason is because it needs to be initialised and formatted - you can do this in Disk Management. When the tool loads, it will analyse all your PC's drives and will prompt you to initialise a new disk that it finds.



If your disk is larger than 2TB, you should opt for GPT (GUID Partition Table). This setting also lets you create more than four partitions. If you don't see a prompt, look in the list of drives and you should see one that says 'Not Initialized'. Right-click on it and choose Initialize Disk. Once that's done, right-click in the hatched Unallocated space and choose New Simple Volume.

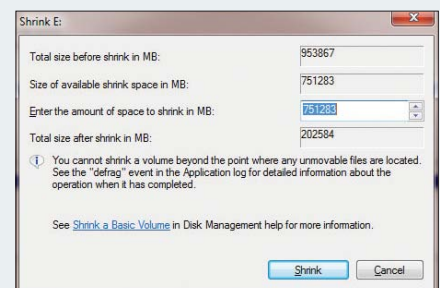
Follow the instructions, choosing how big you want the partition to be (in MB - 1024MB = 1GB), and which drive letter you want. When you come to format the partition, our advice is the same as in the Quick Format section above.

Changing a partition's size

You can use Disk Management to expand or shrink a partition. Simply right-click on one and choose the appropriate option from the menu that appears. If shrinking, the partition will be checked to find out how much empty space it contains.

It's a little confusing as the numbers are displayed in MB rather than GB, but you can adjust the amount of space to shrink and the 'Total size after shrink' will be updated. You can't shrink a partition beyond the point where files are located - you may be able to free up space by defragmenting the drive first.

Conversely, you can only expand a partition if there is unused space on the drive. If not, the option will be greyed out. ☒





Discover what's filling up your hard drive



Our hard drives have a tendency to get filled up with useless stuff that we should really get rid of. However, it can often be hard to figure out what exactly is eating

up all our digital real estate. If you need to declutter your disks and don't know where to start, Adam Shepherd has a handy guide for finding out what's taking up all that space on your hard drive

Finding large files

If you're just looking for a quick way to free up space, you can find the biggest single files on your hard drive by opening File Explorer and typing 'size:gigantic' into the search bar.

lobs.bin	Type: BIN File	Date modified: 03/10/2014 10:36
testCache	Type: BIN File	Size: 215 MB
k_s.aux	Type: AUX File	Date modified: 03/10/2014 10:36
cal/Frontier_Developmen...	Type: AUX File	Size: 226 MB
am\SteamApps\common\...	Type: ARCH05 File	Date modified: 02/10/2014 14:28
		Size: 1.81 GB
am\SteamApps\common\...	Type: ARCH05 File	Date modified: 02/10/2014 14:28
		Size: 4.97 GB
am\SteamApps\common\...	Type: ARCH05 File	Date modified: 02/10/2014 14:28
		Size: 2.70 GB

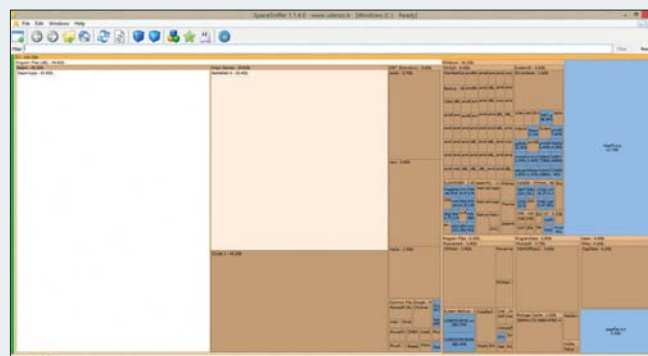
This will bring up a list of any file over 128MB in size, which you can then look through to find any large, extraneous files such as outdated drivers and ISO images. However, always be careful and make sure you know exactly what it is you're deleting, as some files could stop certain programs from running if removed.

Finding large folders

Of course, sometimes it's not large individual files that take up room, but rather folders full of lots of small files. In this case, the best option is to download a small third-party application that

scans your computer to inform you which files and folders are the biggest offenders.

Our favourite program for this task is SpaceSniffer (tinyurl.com/psqzyk4). A small application that requires no installation, download the file, run it and the software will scan your chosen HDD. It will display your disk information using rectangular boxes;

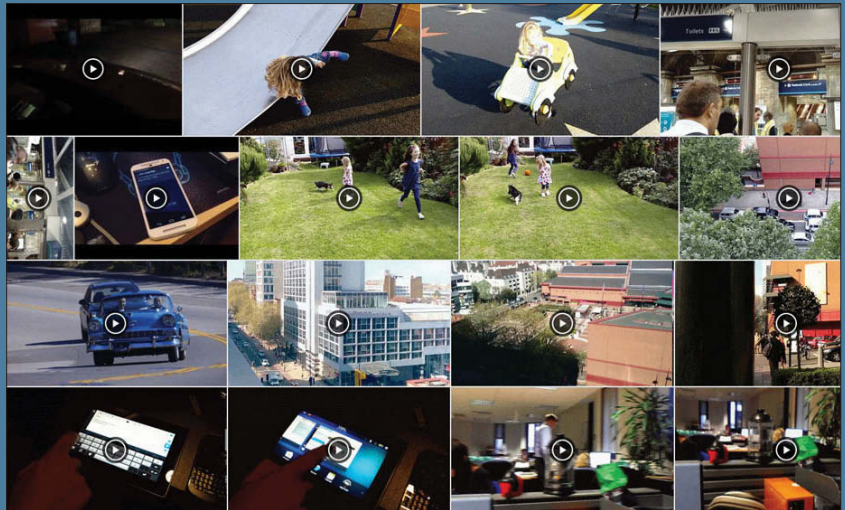


the bigger the box, the bigger the file or folder. You can also customise the view to show more detail, or double-click each box to expand it and find out which files or folders within that box are taking up the most space. Once you've ascertained which files and folders are taking up space on your disk, you can delete the ones you no longer need and enjoy the increased storage capacity. ☑

Archive videos



Aside from enormous backup files, it's a virtual certainty that the files clogging up your hard drive are videos. Here Jim Martin offers some suggestions on how to archive movie files and free up disk space. Video files are a particular problem if you've got a relatively small capacity SSD in your laptop, since there's no secondary hard drive on which to offload them



External hard drive

By far and away the best solution for storing video is on an external hard disk. With big capacities and low prices, this is the most sensible option for most people. Within there are a few different routes you can follow. The most obvious is to buy an off-the-shelf external USB drive with the largest capacity you can afford.

For less than £100 you can buy a 4TB desktop drive, which should be enough to last most people a good few years. If your PC or laptop has a USB 3.0 port, it's well worth paying a bit extra for a hard drive with a faster USB 3.0 connection.



If your video collection is bigger than this, you might want to consider a USB hard drive dock (above), again opting for a USB 3.0 version if your computer supports it. These allow you to plug in standard internal SATA hard drives, so you can simply pop in another drive when one fills up. It also means you can buy hard drives as you need them - with prices ever decreasing you'll always get more space for your money.

DVD and Blu-ray

It's possible to archive video on DVDs or Blu-ray, but this isn't as fast nor convenient as an external hard drive. Even dual-layer DVDs are rather limited in capacity, storing around 8GB.

If your computer has a Blu-ray drive, make sure it can write to these discs before buying any BD-Rs, since many drives are merely readers. A single-layer writable Blu-ray disc can store 25GB, and costs around £1. Dual-layer BD-Rs store 50GB, but cost around £4 to £5 each, so are obviously poorer value. Bear in mind that these are not rewritable, so you can't erase them and burn new videos

later. All you can do is append files if there's free space and you don't finalise the disc when you burn the first batch of files to it.

Pitfalls to avoid

Always make sure you archive your videos at the maximum quality, and don't be tempted to compress them or save them at a lower resolution to save space: you'll regret that in the future.

No archival or backup method is guaranteed. Hard drives can fail, as can DVDs and Blu-ray discs. If you want to ensure the maximum safety for your videos, make more than one copy on a separate disc or drive, and keep them physically separate to safeguard from fire, flood, theft or any other hazard.

You could alternatively opt for a NAS drive with multiple redundant hard drives, but this won't protect your backups against theft, fire or floods of course. It can be a good idea to use a mixture of local and cloud backups, but you'll have to pay a fair amount for even 1TB of cloud storage.

Also, be aware that hard drives and writable discs degrade over time, so you should plug in a hard drive at least once per year to maintain data integrity. The lifespan of optical discs varies, so you should check that the disc is readable once per year, and copy its contents to a new disc every five years.

Standards change, too, so you can't bury a hard drive and expect to be able to connect it to a computer in 25 years' time, and the same goes for optical discs. ☒



LETITIA
AUSTIN



ONLINE
REGISTRATION
REQUIRED

Panda Internet Security 2015

FULL PROGRAM (SIX-MONTH LICENCE) AVAILABLE ONLY ON THE DISC+

Installation details

Go to My Computer, right-click the DVD icon and open the disc. Next, select Files 234\Panda Internet Security 2015 and open the install file.

Online registration required: Follow the links during installation before 11 Feb 2015.

System requirements

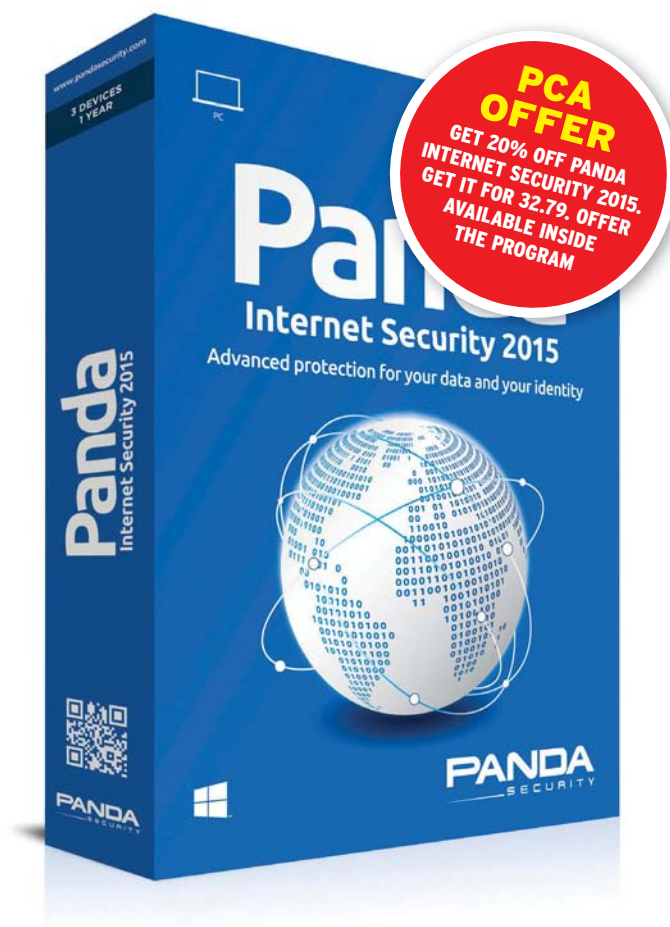
Windows 8/8.1/7/Vista (32- and 64-bit), XP (32-bit SP2 or later); 256MB RAM; 300MHz processor

Security products need to evolve to keep up with the new malware infections and threats. Panda Security 2015 has reinvented the concept of antivirus protection with its Universal Agent architecture. This new technological platform provides better protection capabilities, lighter resource use, more flexible and more stable than ever before.

The new architecture, based on Panda's Cloud, provides a greatly improved experience - faster, simpler, more regular updates, all transparent to the user. New antivirus and heuristic engines with the power and performance of the Cloud Intelligence protect your PC when online and advanced offline technologies for when you are not connected.

Panda Security 2015 does not slow your PC thanks to its lightweight footprint. Its innovative security technologies offer various layers of protection, including:

- The cloud (Collective Intelligence)
- Optimised offline signature cache
- Heuristic protection
- Behaviour analysis
- Targeted security tools, such as Data Shield (anti-ransomware), Application control (Anti-exploit), USB Vaccine ☒



Visit our website for more software special offers: pcadvisor.co.uk/special-offers

**ONLINE
REGISTRATION
REQUIRED**

Abelssoft WashAndGo 2014

FULL PROGRAM AVAILABLE ONLY ON THE DISC+

Installation details

Go to My Computer, right-click the DVD icon and open the disc. Next, select Files 234\Abelssoft Wash and Go 2014 and open the install file.

Online registration required: Follow the links during installation before 11 Feb 2015.

System requirements

Windows XP/Vista/7/8;
RAM: 512MB RAM;
1GHz processor;
50MB hard disk space

Removes garbage files

WashAndGo is a fantastic program that removes unnecessary garbage files, including old log and dump files; the content of temp folders, prefetch files and unnecessary setup cache files; unused backup files from service pack installations; and the content of your own temp folders. It also cleans your system, which significantly increases performance.

Deletes traces

It erases internet traces such as the browser cache, cookies and the history, and is compatible with the most popular browsers.

Corrects system errors

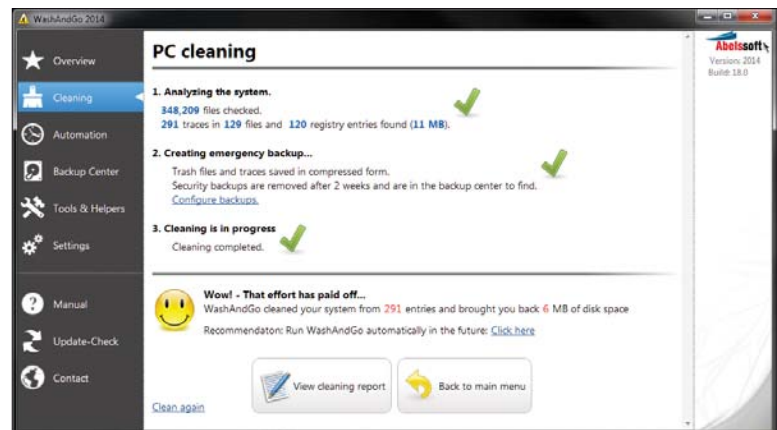
The software is able to detect system errors and correct them, therefore ensuring your PC is more stable. The following can be recognised and corrected: defective shortcuts, Windows Registry errors, orphaned entries in your Recent Files folder and incorrect uninstall entries in Windows.

Safety first

WashAndGo will only suggest you remove a file or entry if it can be almost 100 percent certain that it is unnecessary and may be safely deleted. If a problem arises, the program creates a security backup that allows you to undo any and all changes for a period of seven days after cleaning.

Automatic cleanup

It can clean your computer automatically: you can schedule when it is to clean your system in the background. ☒



**ONLINE
REGISTRATION
REQUIRED**

Ashampoo Snap 7

FULL PROGRAM AVAILABLE ONLY ON THE DISC+

Installation details

Go to My Computer. Right-click the DVD icon, and open the disc. Select Files 234\Ashampoo Snap 7 and open the install file.

Online registration

required: Follow the links during installation before 11 Feb 2015.

System requirements

Windows XP/Vista/7;
64MB RAM; 256MB RAM;
50MB hard disk space

Ashampoo Snap 7 lets you capture screenshots, add notes and annotations and share them with your friends. It uses smart background versioning, so your original image isn't lost and all modifications remain editable. If you need to start over, you can revert to the original at the click of a button. Thanks to Ashampoo, you no longer require an installed application to email your work, thanks to the integrated support for browser-based email clients. The integration with common file hosting services has also been greatly improved with integrated support for Dropbox, Google Drive and Microsoft Sky Drive. ☒


**ONLINE
REGISTRATION
REQUIRED**

east-tec Eraser 2014

FULL PROGRAM (THREE-MONTH LICENCE) AVAILABLE ONLY ON THE DISC+

Installation details

Go to My Computer. Right-click the disc icon and open the disc. Select Files 234\east-tec Eraser 2014 and open the install file.

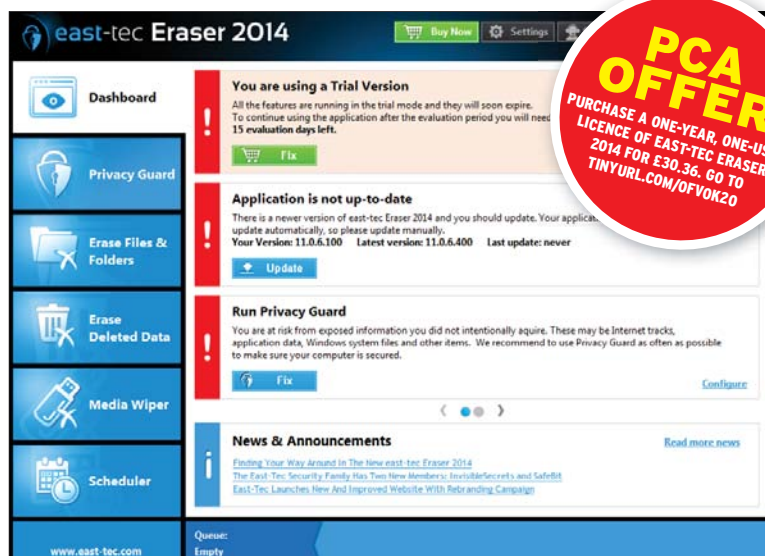
Online registration

required: Go to tinyurl.com/ofvok2o and follow the instructions before 11 Feb 2015.

System requirements

Windows server 2003
& 2008, XP/Vista/7/8;
256MB RAM

east-tec Eraser 2014 meets and exceeds government and industry standards for the permanent erasure of digital information. It will remove every trace of sensitive data from your computer, such as internet history, web pages, pictures and confidential documents. The program has 14 wiping methods, including the US DoD standard and the Russian GOST and the German VSITR methods. Its interface has been redesigned, while the program is packed full of handy features. These include automatic cleaning of your computer at specified intervals, support for custom privacy needs, built-in safety features, password protection, and more. ☒



DISC INSTRUCTIONS

Place disc in drive. Open the file 'Click here to begin.pdf' for extra information.

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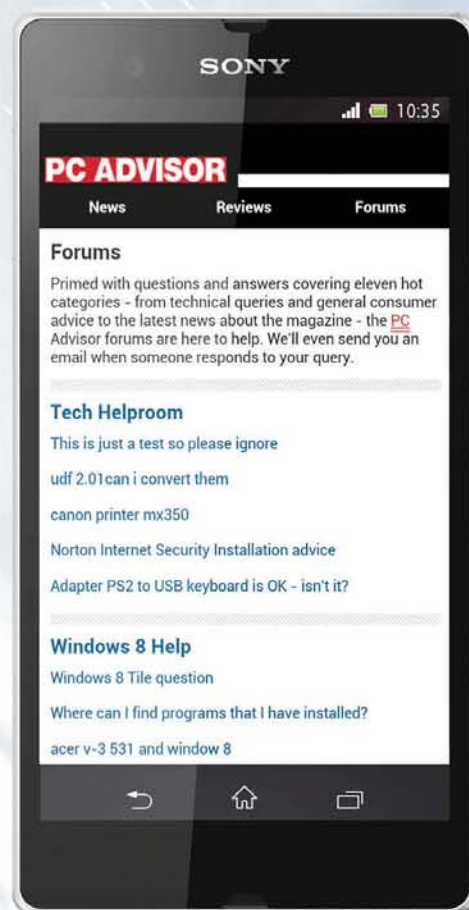
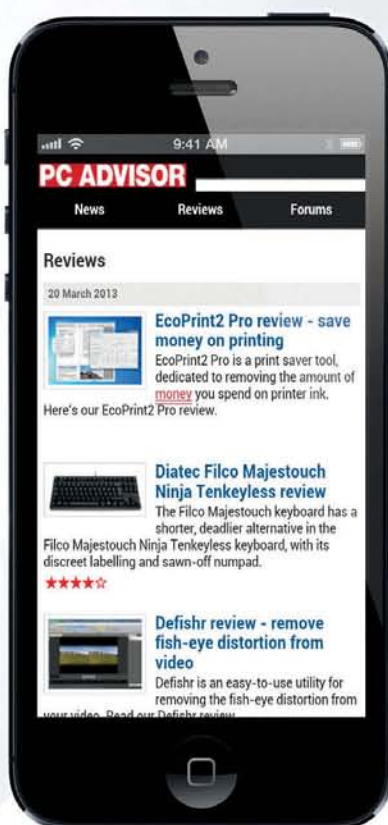
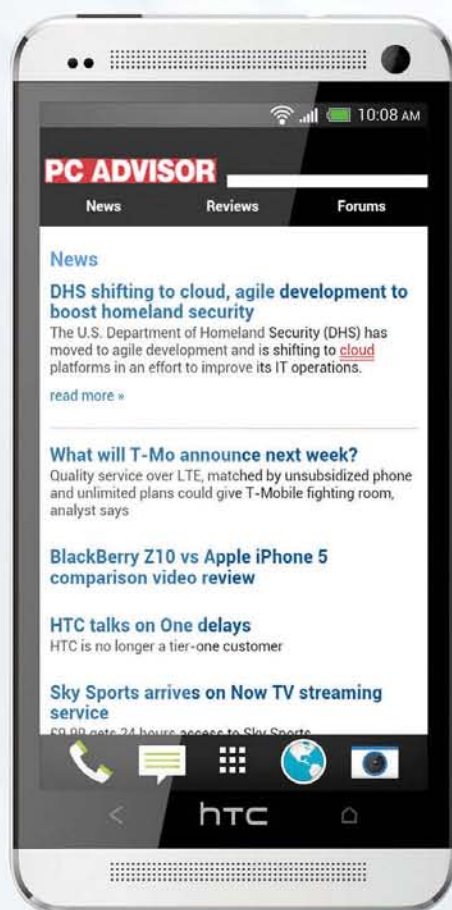
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£1,001+ laptops



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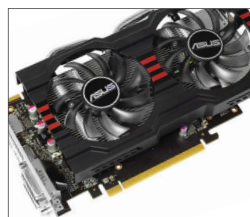
Printers



Projectors



Solid-state drives



Graphics cards



Flat-panel displays

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Ultraportable laptops	    				
	1	2	3	4	5
	Apple MacBook Pro 13in Retina	Apple MacBook Air 13in	HP Spectre 13-3010ea	Toshiba Kira-101	MSI GS60 2PE Ghost Pro
Price	£1,399 inc VAT	£849 inc VAT	£999 inc VAT	£1299 inc VAT	£1,317 inc VAT
Website	Apple.com/uk	Apple.com/uk	Hp.com/uk	toshiba.co.uk	Uk.msi.com
Launch date	Feb 14	Apr 14	Sep 14	Aug 14	Oct 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.8GHz Intel Core i5	1.4GHz Intel Core i5	1.6GHz Intel Core i5-4200U	1.8GHz Intel Core i7-4500U	2.4GHz Intel Core i7-4700HQ
RAM	8GB DDR3L	4GB DDR3L	8GB DDR3	8GB DDR3	8GB DDR3
Storage	512GB SSD	128GB SSD	256GB SSD	256GB SSD	2x 128GB SSD, 1TB HDD
Screen size	13.3in glossy (anti-glare)	13.3in glossy (anti-glare)	13.3in glossy	13.3in glossy	15.6in matt
Screen resolution	2560x1600	1440x900	1920x1080	2560x1440	1920x1080
Graphics	Intel Iris Graphics	Intel HD Graphics 5000	Intel HD Graphics 4400	Intel HD Graphics 4400	nVidia GeForce GTX 870M
Video memory	N/A	N/A	N/A	N/A	3GB
Wireless	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11b/g/n/ac	802.11a/b/g/n/ac
Ethernet	Optional	Optional	None	None	None (mini)
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0	2x USB 3.0	2x USB 3.0	3x USB 3.0	3x USB 3.0
FireWire	x	x	x	x	x
Thunderbolt	✓	✓	x	x	x
DisplayPort	x	✓	✓	x	✓ (mini)
HDMI	✓	x	✓	✓	✓
DVI	x	x	x	x	x
VGA	x	x	x	x	x
eSATA	x	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	HD webcam, multitouch trackpad, backlit keyboard	HD webcam, multitouch trackpad, backlit keyboard	1080p webcam	720p webcam	720p webcam
Operating system	Mac OS X 10.9 Mavericks	Mac OS X 10.9 Mavericks	Windows 8.1 64-bit	Windows 8.1 Pro 64-bit	Windows 8.1 64-bit
Bundled software	iLife 11	iLife 11	None	None	None
Fear (Max detail)	Not tested	Not tested	31fps in Stalker (720p)	17fps (1080p)	45fps Batman: Arkham City
Battery	71.8Wh lithium-polymer	54Wh lithium-polymer	51Wh lithium-ion	52Wh lithium-polymer	52Wh lithium-polymer
Battery life	9 hrs 55 mins	12 hrs 57 mins	7 hrs 30 mins	7 hrs 10 mins	1 hr 59 mins
PC Mark 7 score	Not tested	4602	5006	5100	5655
Dimensions	314x219x18mm	325x227x4-17.5mm	324x220x15mm	316x207x19.8mm	390x266x19mm
Weight	1.57kg	1.35kg	1.52kg	1.26kg	1.9kg
Warranty	1-year return-to-base	1-year return-to-base	2 year return-to-base	2-year onsite	2-year onsite
FULL REVIEW	TINYURL.COM/M3TNC29	TINYURL.COM/KNXWZ3	TINYURL.COM/N4CJQL9	TINYURL.COM/QHP9F9T	TINYURL.COM/JVJBU39

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Sub-£500 laptops	1	2	3	4	5
	Asus X102BA	Toshiba Satellite L50-B-1DV	Toshiba CB30-102	Toshiba Satellite C50-B-1IL	Asus X552CL
Price	£280 inc VAT	£400 inc VAT	£200 inc VAT	£330 inc VAT	£500 inc VAT
Website	Asus.com/uk	Toshiba.co.uk	Toshiba.co.uk	Toshiba.co.uk	Asus.com/uk
Launch date	May 14	Jul 14	Jun 14	Oct 14	Jun 14
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★☆☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	1GHz AMD A4-1200	1.6GHz Intel Core i5-4200U	1.4GHz Intel Celeron 2955U	1.8GHz Intel Core i3-3217U	1.8GHz Intel i5-3337U
RAM	4GB DDR3L	8GB DDR3	2GB DDR3	4GB DDR3L	6GB DDR3
Storage	500GB HDD	1TB HDD	16GB SSD	750GB HDD	750GB HDD
Screen size	10.1in glossy touchscreen	15.6in glossy	13.3in glossy	15.6in glossy	15.6in glossy
Screen resolution	1366x768	1366x768	1366x768	1366x768	1366x768
Graphics	AMD Radeon HD 8180	Intel HD Graphics 4400	Intel HD Graphics	Intel HD Graphics 4000	nVidia GeForce GT 710M
Video memory	N/A	N/A	N/A	N/A	1GB
Wireless	802.11b/g/n	802.11b/g/n	802.11a/g/n	802.11b/g/n	802.11b/g/n
Ethernet	10/100	Gigabit	Gigabit	None	Gigabit
Bluetooth	✓	✓	✓	✓	✗
USB	1x USB 3.0, 2x USB 2.0	2x USB 3.0, 1x USB 2.0	2x USB 3.0	1x USB 3.0, 2x USB 2.0	2x USB 3.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✗	✗	✗	✗	✗
DisplayPort	✗	✗	✗	✗	✗
HDMI	✓	✓	✓	✓	✓
DVI	✗	✗	✗	✗	✗
VGA	✓	✓	✗	✓	✓
eSATA	✗	✗	✗	✗	✗
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	None	N/A	None	8x DVD ± RW	8x DVD ± RW
Extras	Webcam	Webcam	Webcam	Webcam	Webcam
Operating system	Windows 8 64-bit	Windows 8.1 64-bit	Google Chrome OS	Windows 8.1 64-bit	Windows 8 64-bit
Bundled software	MS Office Home & Student	None	None	None	None
Battery	33Wh lithium-ion	52Wh lithium-ion	Lithium-polymer	45Wh lithium-ion	37Wh lithium-ion
Battery life	4 hrs 20 mins	4 hrs 15 mins	7 hrs 25 mins	5 hrs 33 mins	3 hrs 20 mins
PC Mark 7 score	1100	2500	N/A	2160	2700
Stalker (Low/High)	N/A	23fps (720p)	N/A	21fps (768)	50fps (720p)
Dimensions	266x185x29mm	380x260x24mm	454x268x56mm	380x260x27mm	380x251x34mm
Weight	1.1kg	2.2kg	1.5kg	2.2kg	2.4kg
Warranty	1-year return-to-base	2-year return-to-base	1-year return-to-base	1-year return-to-base	1-year return-to-base
FULL REVIEW	TINYURL.COM/PLAUQCG	TINYURL.COM/L76JXUV	TINYURL.COM/LQEBYPA	TINYURL.COM/LB2XHLZ	TINYURL.COM/JWFOQJL






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£501-£1,000 laptops					
	1 PC ADVISOR RECOMMENDED	2	3	4 PC ADVISOR RECOMMENDED	5
	Scan 3XS Graphite LG156	Dell Inspiron 17-7737	Chillblast Defiant 2 Mini	HP Pavilion TouchSmart 15	Chillblast Helium
Price	£899 inc VAT	£800 inc VAT	£899 inc VAT	£550 inc VAT	£899 inc VAT
Website	3xs.scan.co.uk	Dell.co.uk	Chillblast.com	Hp.com/uk	Chillblast.com
Launch date	Jul 14	Jul 14	Jul 14	May 14	Jul 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.5GHz Intel Core i7-4710MQ	2GHz Intel Core i7-4510U	2.5GHz Intel Core i7-4710MQ	1.6GHz Intel Core i5-4200U	1.8GHz Intel Core i7-4500U
RAM	8GB DDR3	16GB DDR3	8GB DDR3	8GB DDR3	16GB DDR3
Storage	1TB SSHD	500GB HDD + 8GB NAND	1TB SSHD	750GB HDD	500GB HDD + 120GB SSD
Screen size	15.6in matt	17.3in glossy	13.3in non-reflective	15.6in glossy touchscreen	14in
Screen resolution	1920x1080	1920x1080	1920x1080	1366x768	1600x900
Graphics	GTX 860M/Intel HD 4600	GT 750M/Intel HD 4400	GTX 860M/Intel HD 4600	GT 740M/Intel HD 4400	Intel HD Graphics 4400
Video memory	2GB	2GB	2GB	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	10/100	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 3.0, 1x USB 2.0	4x USB 3.0	2x USB 3.0	2x USB 3.0, 1x USB 2.0	2x USB 3.0
FireWire	x	x	x	x	x
Thunderbolt	x	x	x	x	x
DisplayPort	x	x	x	x	x
HDMI	✓	✓	✓	✓	✓
DVI	x	x	x	x	x
VGA	✓	✓	✓	✓	✓
eSATA	✓ (shared USB 3.0)	x	x	x	x
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	8x DVD ± RW	N/A
Extras	1080p webcam	720p webcam	1080p webcam	Webcam	720p webcam
Operating system	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8 64-bit	Windows 8.1 64-bit
Bundled software	None	None	None	None	None
Stalker (720p/1080p)	178/102fps	104/63fps	180/100fps	60fps (720)	29fps (720p)
Battery	77Wh lithium-ion	58Wh lithium-ion	62.2Wh lithium-ion	41Wh lithium-ion	44.6Wh lithium-ion
Battery life	4 hours	5 hrs	5 hrs 33 mins	5 hrs 45 mins	5 hrs 20 mins
PCMark 7 score	4846	4260	4456	2860	5100
Dimensions	374x250x43mm	412x269x28mm	330x227x32mm	386x258x25mm	337x236x21mm
Weight	2.7kg	3.3kg	2.1kg	2.6kg	2.1kg
Warranty	2-year return-to-base	1-year NBD	2-year collect-and-return	1-year return-to-base	1-year return-to-base
FULL REVIEW	TINYURL.COM/MYTG9X5	TINYURL.COM/N6828JG	TINYURL.COM/NNDFZRR	TINYURL.COM/L2JAXH7	TINYURL.COM/P7U28WQ

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£1,001+ laptops	1	2	3	4	5
	 PC ADVISOR BEST BUY	 PC ADVISOR RECOMMENDED			
	Aorus X7 v2	Chillblast Helix	MSI GE70 2PE Apache Pro	Schenker XMG P304	Dell XPS 15
Price	£1,739 inc VAT	£1,250 inc VAT	£1,160 inc VAT	£1,100 inc VAT	£1,449 inc VAT
Website	Aorus.com	Chillblast.com	UK.msi.com	Mysn.co.uk	Dell.co.uk
Launch date	Sep 14	Sep 14	Sep 14	Jul 14	Sep 14
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	2.4GHz Intel Core i7-4860HQ	2.5GHz Intel Core i7-4710HQ	2.5GHz Intel Core i7-4710HQ	2.2GHz Intel Core i7-4702MQ	2.3GHz Intel Core i7-4712HQ
RAM	16GB DDR3	4GB DDR3	16GB DDR3	8GB DDR3	16GB DDR3
Storage	1TB HDD, 3x 128GB SSD	1TB HDD, 120GB SSD	1TB HDD, 2x 128GB SSD	250GB SSD	512GB SSD
Screen size	17.3in matt	17.3in matt	17.3in matt	13.3in matt	15.6in gloss
Screen resolution	1920x1080	1920x1080	1920x1080	1920x1080	3200x1800
Graphics	2x nVidia GeForce GTX 860M	nVidia GeForce GTX 870M	nVidia GeForce GTX 860M	nVidia GeForce GTX 860M	nVidia GeForce GT 750M
Video memory	8GB	2GB	2GB	2GB	2GB
Wireless	802.11a/b/g/n/ac	802.11b/g/n/ac	802.11b/g/n/ac	802.11b/g/n/ac	802.11b/g/n/ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	*
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 3.0, 2x USB 2.0	4x USB 3.0	2x USB 3.0, 2x USB 2.0	3x USB 3.0, 1x USB 2.0	3x USB 3.0, 1x USB 2.0
FireWire	*	*	*	*	*
Thunderbolt	*	*	*	*	*
DisplayPort	✓	✓	*	*	✓
HDMI	✓	✓	✓	✓	✓
DVI	*	*	*	*	*
VGA	✓	*	✓	*	✓
eSATA	*	*	*	✓	*
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	None	N/A
Extras	HD webcam	HD webcam	HD webcam	720p webcam	720p webcam
Operating system	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit
Bundled software	None	None	None	None	None
Stalker (720p/1080p)	189 /157fps in Tomb Raider	142fps in Batman (1080p)	120fps in Batman (1080p)	115fps (1080p)	68fps (1080)
Battery	74.7Wh lithium-polymer	60Wh lithium-ion	49Wh lithium-ion	62Wh lithium-ion	91Wh lithium-ion
Battery life	1 hr 48 mins	3 hrs 45 mins	2 hrs	5 hrs 5 mins	5 hrs
PCMark7 score	6304	5710	6241	5500	5833
Dimensions	425x303x24.5mm	419x287x21.8mm	418x269x39mm	374x250x37mm	372x254x18mm
Weight	3.24kg	2.66kg	3kg	2kg	2kg
Warranty	2-year return-to-base	2-year collect-and-return	2-year return-to-base	2-year collect-and-return	1-year next day in-home
FULL REVIEW	TINYURL.COM/KLUXLGE	TINYURL.COM/Q8U7CUP	TINYURL.COM/PU5L5GK	TINYURL.COM/Q4JWVSM	TINYURL.COM/N9GRT4U






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Tablets					
					
	1	2	3	4	5
	PC ADVISOR GOLD	PC ADVISOR GOLD	PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED
	Google Nexus 7 (2013)	Samsung Galaxy Tab S 8.4	Apple iPad Air	Samsung Galaxy Tab S 10.5	Sony Xperia Z2 Tablet
Price	£199 inc VAT	£319 inc VAT	£399 inc VAT	£399 inc VAT	£399 inc VAT
Website	Play.google.com	Samsung.com/uk	Apple.com/uk	Samsung.com/uk	Sony.co.uk
Launch date	Jul 13	Aug 14	Oct 13	Aug 14	Apr 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Android 4.3 Jelly Bean	Android 4.4.2 KitKat	Apple iOS 7	Android 4.4.2 KitKat	Android 4.4.2 KitKat
Screen size/resolution	7in/1280x800	8.4in/2560x1600	9.7in/2048x1536	10.5in/2560x1600	10.1in/1920x1200
Storage/media card slot	16GB/none	16GB/32GB	16GB/none	16GB/32GB	16GB/none
Connectivity	802.11b/g/n, Bluetooth 4	802.11a/b/g/n/ac, Bluetooth 4	802.11a/b/g/n, Bluetooth 4	802.11b/g/n/ac, Bluetooth 4	802.11b/g/n/ac, Bluetooth 4
Processor	1.5GHz Snapdragon S4 Pro	Exynos 5	Apple A7	Exynos 5420	2.3GHz Snapdragon 801
RAM	2GB	3GB	1GB	3GB	3GB
Claimed battery life	9 hrs	12 hrs	10 hrs	Not specified	Not specified
Cameras (front/rear)	1.2/5Mp	2.1/8Mp	1.2/5Mp	2.1/8Mp	2.2/8.1Mp
Dimensions	114x200x8.7mm	126x213x6.6mm	169x240x7.5mm	247x177x6.6mm	266x172x6.4mm
Weight	299g	294g	469g	465g	439g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/QYUDY5C	TINYURL.COM/KL6G9FJ	TINYURL.COM/LSB84EE	TINYURL.COM/OESDFZQ	TINYURL.COM/M8BZZUN

Tablets					
					
	6	7	8	9	10
	PC ADVISOR GOLD	PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED	PC ADVISOR RECOMMENDED
	Apple iPad mini (1st gen)	Google Nexus 10 by Samsung	Sony Xperia Tablet Z	LG G Pad 8.3	Advent Vega Tegra Note 7
Price	£249 inc VAT	£319 inc VAT	£339 inc VAT	£199 inc VAT	£129 inc VAT
Website	Apple.com/uk	Play.google.com	Sony.co.uk	Lg.com/uk	Currrys.co.uk
Launch date	Nov 12	Nov 12	May 13	Feb 14	Nov 13
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Apple iOS 7	Android 4.4 KitKat	Android 4.1 Jelly Bean	Android 4.2 Jelly Bean	Android 4.3 Jelly Bean
Screen size/resolution	7.9in/1024x768	10.1in/2560x1600	10.1in/1920x1200	8.3in/1920x1200	7in/1280x800
Storage/media card slot	16GB/none	16GB/none	16GB/microSDXC	16GB/microSDHC	16GB/microSDHC
Connectivity	802.11b/g/n, Bluetooth 4	802.11b/g/n, Bluetooth 4, NFC	802.11a/b/g/n, Bluetooth 4	802.11a/b/g/n, Bluetooth 4	802.11b/g/n, Bluetooth 4
Processor	1GHz Apple A5	1.7GHz Cortex A-15	1.5GHz SnapDragon S4 Pro	1.5GHz Snapdragon 600	1.9GHz nVidia Tegra 4
RAM	512MB	2GB	2GB	2GB	1GB
Claimed battery life	10 hrs	9 hrs	10 hrs	8.5 hrs (actual)	10 hrs
Cameras (front/rear)	1.2/5Mp	1.9/5Mp	2.2/8.1Mp	1.3/5Mp	0.3/5Mp
Dimensions	135x200x7.2mm	178x264x8.9mm	172x266x6.9mm	127x217x8.3mm	120x190x10mm
Weight	308g	603g	495g	338g	320g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/CLJWUVS	TINYURL.COM/ARL2KDG	TINYURL.COM/ODTP6B8	TINYURL.COM/N80BC7N	TINYURL.COM/PMC04H4

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Smartphones	    				
	1	2	3	4	5
	LG G3	LG G2	HTC One (M8)	Google Nexus 5	OnePlus One
Price	£499 inc VAT	£279 inc VAT	£550 inc VAT	£299 inc VAT	£229 inc VAT
Website	Lg.com/uk	Lg.com/uk	Htc.com/uk	Play.google.com	Oneplus.net/uk
Launch date	Jun 14	Sep 13	Apr 14	Oct 13	Jul 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Android 4.4.2 KitKat	Android 4.2 Jelly Bean	Android 4.4 KitKat	Android 4.4 KitKat	CyanogenMod 11S
Processor	2.5GHz Snapdragon 801	2.26GHz Snapdragon 800	2.3GHz Snapdragon 801	2.3GHz Snapdragon 800	2.5GHz Qualcomm
Storage/media card slot	16GB/none	16GB/none	16GB/microSD	16GB/none	16GB/none
Screen size/resolution	5.2in/1440x2560	5.2in/1920x1080	5in/1920x1080	4.95in/1920x1080	5.5in/1920x1080
Screen type	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch
Connectivity	4G, HSPA+, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi	Bluetooth, NFC, Wi-Fi ac	HSPA+, Bluetooth, Wi-Fi ac	4G, NFC, Bluetooth, Wi-Fi
Claimed battery life	Not specified	Not specified	Not specified	17 hrs/300 hrs	Not specified
Cameras (front/rear)	13Mp, 1080p video	13Mp, 1080p video	5Mp, 1080p video	8Mp, 1080p video	13Mp, 720p video
GPS	A-GPS	A-GPS	A-GPS, Glonass	A-GPS	Glonass
Dimensions, weight	75x146x8.9mm, 149g	71x139x9.4mm, 143g	146.4x70.6x9.4mm, 160g	69x138x8.9mm, 130g	152.9x75.9x8.9mm, 162g
Warranty	1 year	1 year	2 years	1 year	Not specified
FULL REVIEW	TINYURL.COM/MQ8DHUU	TINYURL.COM/PAFK4SZ	TINYURL.COM/NGBWX9	TINYURL.COM/PAFK4SZ	TINYURL.COM/KYW977U

Smartphones	    				
	6	7	8	9	10
	Sony Xperia Z2	Sony Xperia Z1 Compact	Apple iPhone 6	Apple iPhone 6 Plus	HTC One mini 2
Price	£599 inc VAT	£401 inc VAT	£539 inc VAT	£619 inc VAT	£359 inc VAT
Website	Sonymobile.com	Sonymobile.com	Apple.com/uk	Apple.com/uk	Htc.com/uk
Launch date	May 14	Jan 14	Sep 14	Sep 14	Jul 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Platform	Android 4.4 KitKat	Android 4.3 Jelly Bean	iOS 8	iOS 8	Android 4.4 KitKat
Processor	2.3GHz Qualcomm	2.2GHz Snapdragon 800	1.2GHz Apple A8	1.2GHz Apple A8	1.2GHz Qualcomm
Storage/media card slot	16GB/microSDXC	16GB/microSDXC	16GB/none	16GB/none	16GB/microSD
Screen size/resolution	5.2in/1920x1080	4.3in/1280x720	4.7in/1334x750	5.5in/1920x1080	4.5in/1280x720
Screen type	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch	Capacitive multitouch
Connectivity	4G, NFC, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi	4G, HSPA+, Bluetooth, Wi-Fi
Claimed battery life	17 hrs/740 hrs	18 hrs/670 hrs	14 hrs/250 hrs	24 hrs/384 hrs	Not specified
Cameras (front/rear)	20.7Mp, 1080p video	20.7Mp, 1080p video	8Mp, 1080p video	8Mp, 1080p video	13Mp, 1080p video
GPS	A-GPS	A-GPS	A-GPS	A-GPS	A-GPS
Dimensions, weight	146.8x73.3x8.2mm, 163g	127x64.9x9.5mm, 137g	138.1x67x6.9mm, 129g	158.1x77.8x7.1mm, 172g	137x65x10.6mm, 137g
Warranty	1 year	1 year	1 year	1 year	2 years
FULL REVIEW	TINYURL.COM/NXB5SVV	TINYURL.COM/KAU7DYR	TINYURL.COM/K2ELJ77	TINYURL.COM/KF9VU5C	TINYURL.COM/M6U427B

HEAD TO TINYURL.COM/OTU6XA9 FOR OUR SMARTPHONE BUYING ADVICE

Gaming PCs	 1 	 2	 3	 4 	 5
	Chillblast Fusion Probe	Chillblast Fusion Ranger	Gladiator Firestorm OC	CyberPower Infinity Perseus XT	Computer Planet GX 760
Price	£1,299 inc VAT	£1,249 inc VAT	£695 inc VAT	£1,499 inc VAT	£983 inc VAT
Website	Chillblast.com	Chillblast.com	Gladiatorpc.co.uk	Cyberpowersystem.co.uk	Computerplanet.co.uk
Launch date	Feb 14	Jul 14	Mar 14	Feb 14	Mar 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.4GHz Intel Core i5-4670K (OC 4.4GHz)	3.4GHz Intel Core i5-4670K (OC 4.2GHz)	3.4GHz Intel Core i5-4670K (OC 4.2GHz)	3.4GHz Intel Core i5-4670K (OC 4.4GHz)	3.4GHz Intel Core i5-4670K
CPU cooler	Corsair H55 Liquid Cooler	Corsair H60 Liquid Cooler	Be Quiet Dark Rock 3	Cooler Master Seldon 120mm	Corsair H60 Hydro
Memory	16GB DDR3	16GB DDR3	8GB DDR3	16GB DDR3	8GB DDR3
Storage	120GB SSD + 2TB HDD	120GB SSD + 2TB HDD	2TB HDD	256GB SSD + 2TB HDD	120GB SSD + 2TB HDD
Power supply	750W Corsair	750W Corsair	500W Corsair	750W Corsair	450W Corsair
Motherboard	Gigabyte GA-Z87N-Wi-Fi	Asus Maximus VII Ranger	MSI Z87M Gaming	Gigabyte GA-Z87-HD3	Gigabyte GA-Z87N-Wi-Fi
Operating system	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit
Screen	23.6in Iiyama X2377HDS	None supplied	None supplied	23in AOC i2367fh	None supplied
Graphics	Palit Jetstream GeForce GTX 780, 3GB VRAM	PowerColor AMD Radeon R9 290 OC, 4GB VRAM	MSI nVidia GeForce GTX 750 Ti Gaming, 2GB VRAM	Powercolor AMD R9 290, 4GB VRAM	Zotac GeForce GTX 760, 2GB VRAM
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Connectivity	Gigabit ethernet, 802.11n	Gigabit ethernet	Low-lag ethernet	Gigabit ethernet	2x gigabit ethernet, 802.11n
Ports	6x USB 3.0, 4x USB 2.0	6x USB 3.0, 2x USB 2.0, 2x DVI, HDMI, DP	8x USB 3.0, 4x USB 2.0, 2x eSATA	6x USB 3.0, 4x USB 2.0	6x USB 3.0, 2x USB 2.0
Optical drive	DVD±RW (Blu-ray optional)	24x DVD±RW	24x DVD±RW	DVD±RW, BD-ROM	None supplied
Case	Aerocool Dead Silence Gaming Cube	Corsair Graphite 230T	Aerocool Dead Silence Cube Window Red	Cooler Master Dominator 690 III	Fractal Design Node 304
Keyboard & mouse	Gigabyte M6800 mouse, Force K3 keyboard	None	None	Gigabyte M6900 mouse, Force K3 keyboard	None
Other	Optional family pack	None	None	None	None
PC Mark 7 score	6965	6852	5124	6731	5508
Alien vs Predator score (720p/1080p)	169/93fps	173/97	103/54fps	172/96fps	103/54fps
Final Fantasy XIV (720p/1080p)	218/96fps	N/A	N/A	167/87fps	N/A
Sniper Elite V2 (Low/High/Ultra)	308/187/49fps	321/164/42	194/81.6/18.6fps	352/155/39fps	261/119/29fps
Power Consumption	52/407W	67W/386W	70W/166W	68/484W	53W/271W
Warranty	2-year collect-and-return	2-year collect-and-return	4-year return-to-base	3-year RTB (2 years parts, 3 years labour)	3-year return-to-base
FULL REVIEW	TINYURL.COM/OWQ24QQ	TINYURL.COM/MEGK909	TINYURL.COM/PKDV2NG	TINYURL.COM/NKWN7V4	TINYURL.COM/MJZKS7G

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Mini PCs	 1 PC ADVISOR BEST BUY	 2 PC ADVISOR RECOMMENDED	 3	 4	 5
	Yoyotech Warbird RS4.0	Chillblast Fusion Xcalibur	Mesh Elite Mini Gaming OC	Dino PC Microraptor GTX 770	Quiet PC Serenity Nano
Price	£999 inc VAT	£849 inc VAT	£1,499 inc VAT	£999 inc VAT	£1,238 inc VAT
Website	yoyotech.co.uk	chillblast.com	meshcomputers.com	dinopc.com	quietpc.co.uk
Launch date	Mar 14	Mar 14	Mar 14	Mar 14	Mar 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.4GHz Intel Core i5-4670K	3.2GHz Intel Core i5-4570	3.5GHz Intel Core i7-4770K (4.3GHz OC)	3.4GHz Intel Core i5-4670K (4.3GHz OC)	3.4GHz Intel Core i5-4670K (3.8GHz OC)
CPU cooler	Noctua L9i low-profile cooler	Scythe Shuriken low-profile cooler	Corsair Hydro Series H60 liquid cooler	Corsair Hydro Series H80 liquid cooler	Noctua L9i low-profile cooler
RAM	8GB DDR3 1600MHz	8GB DDR3 1600MHz	16GB DDR3 2133MHz	16GB DDR3 1600MHz	16GB DDR3 1600MHz
Storage	128GB SSD, 2TB HDD	120GB SSD, 1TB HDD	240GB SSD, 2TB HDD	128GB SSD, 1TB HDD	120GB SSD, 2TB HDD
Power supply	Seasonic Evo 520W Bronze-rated	450W Silverstone SFX	750W Cooler Master GX RS-750	600W Corsair Builder Series CX600	FSP Aurum 750W modular PSU
Motherboard	Asus Z87I-Pro	Asus H81I-PLUS	MSI Z87I Gaming AC	Gigabyte GA-Z87N-WIFI	Gigabyte H87N-WIFI
Operating system	Windows 8.1	Windows 8.1/7 Home Premium	Windows 8.1	Windows 8.1	Windows 8.1
Graphics	Asus GTX 770 (2GB)	EVGA GTX 760 (2GB)	AMD Radeon R9 290X (4GB)	Zotac nVidia GeForce GTX 770 (2GB)	Palit GTX 770 Jetstream (2GB)
Networking	Gigabit ethernet, 802.11n Wi-Fi	Gigabit ethernet, 802.11n Wi-Fi	Gigabit ethernet, 802.11n Wi-Fi	2x gigabit ethernet, 802.11n Wi-Fi	Gigabit ethernet, 802.11n Wi-Fi
USB ports	6x USB 3.0, 4x USB 2.0	4x USB 3.0, 4x USB 2.0	6x USB 3.0, 2x USB 2.0	6x USB 3.0, 3x USB 2.0	5x USB 3.0, 4x USB 2.0
Other ports	3x DVI (2x DVI-I), 2x HDMI, 2x DisplayPort	2x DVI, HDMI, DisplayPort	3x DVI, 2x HDMI, 2x DisplayPort, eSATA	1x DVI, 2x HDMI, 1x PS/2	2x DVI, HDMI, DisplayPort
Optical drive	Pioneer BDR-S07XLT Blu-ray writer	Optional	External Blu-ray drive	LiteOn iHAS122 DVD writer	Optional
Case	Cooler Master Elite 130	Silverstone RVZ01	Fractal Design Node 304	Cooler Master Elite 130	Cooler Master Elite 130
Keyboard & mouse	None	Logitech MK520	None	None	None
PCMark 8 score	6403	6334	6678	6861	6403
Alien vs Predator score (720p/1080p)	127/68	104/56	186/104	121/65	127/68
Sniper V2 Elite score (Low/High/Ultra)	303/161/40	263/124/31	387/169/43	313/150/38	303/161/40
Games score (Final Fantasy XIV)	200/76	155/63	183/94	220/81	200/76
Power consumption (idle/max)	49/330W	39/278W	54/548W	71/384W	49/330W
Warranty	3-year Silver (1-year parts, 3-year labour)	2-year collect-and-return (5-year labour)	3-year collect-and-return (2-year parts, 3-year labour)	3-year return-to-base (1-year parts, 3-year labour)	2-year collect-and-return
FULL REVIEW	TINYURL.COM/MQ8POPOQ	TINYURL.COM/NFQ6EGO	TINYURL.COM/PWCACV2	TINYURL.COM/MXMJ6QT	TINYURL.COM/O4QDHTY

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All-in-one PCs	1 	2 	3 	4 	5 
	Dell XPS 2720	Apple iMac 27in (Late 2012)	Medion Akoya P2002	Chillblast Fusion AIO Ultima	MSI Wind Top AE2712G
Price	£1,749 inc VAT	£1,699 inc VAT	£449 inc VAT	£1,199 inc VAT	£1,199 inc VAT
Website	Dell.co.uk	Apple.com/uk	Medion.com/gb	Chillblast.com	Uk.msi.com
Launch date	Sep 13	Sep 13	Sep 13	Sep 13	Sep 13
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.1GHz Intel Core i7-4770S	3.2GHz Intel Core i5-3470	3.3GHz Intel Core i3-3220	3.1GHz Intel Core i7-3770S	2.9GHz Intel Core i5-3470S
RAM	16GB DDR3	8GB DDR3	4GB DDR3	16GB DDR3	4GB DDR3
Storage	2TB HDD + 32GB SSD	1TB HDD	1TB HDD	1TB HDD + 120GB SSD	1TB HDD
Screen	27in IPS touchscreen	27in IPS	23.6in TN	21.5in IPS touchscreen	27in TN touchscreen
Screen resolution	2560x1440	2560x1440	1920x1080	1920x1080	1920x1080
Graphics card	nVidia GeForce GT 750M	nVidia GeForce GTX 675MX	Intel HD Graphics 2500	Intel HD Graphics 4000	nVidia GeForce GT 630M
Video memory	2GB	1GB	N/A	N/A	2GB
Wireless	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✗	✓	✓
USB	6x USB 3.0	4x USB 3.0	2x USB 3.0, 4x USB 2.0	4x USB 3.0, 2x USB 2.0	2x USB 3.0, 4x USB 2.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✓	✓	✗	✗	✗
HDMI	✓	✗	✓	✓	✓
Media card slot	✓	✓	✓	✓	✓
Optical drive	Blu-ray combo drive	None	DVD drive	Blu-ray combo drive	Blu-ray combo drive
Other	2.1Mp webcam, wireless keyboard and mouse, dual digital microphone array	1.3Mp webcam, wireless keyboard and mouse	Wireless keyboard and mouse, CyberLink software, Kaspersky Internet Security	Webcam, Microsoft Wireless Desktop 3000	2Mp webcam, DVB-T TV tuner, wireless keyboard and mouse, CyberLink software
Operating system	Windows 8	Mac OS X 10.9 Mavericks	Windows 8	Windows 8	Windows 8
Power consumption (idle/max)	54/84/220W	53/84/243W	34/42/92W	32/40/119W	44/53/110W
Sniper V2 Elite (Low/High/Ultra)	6/25/94fps	12/54/197fps	5/5/16fps	5/7/28fps	5/6/17fps
PCMark 7 score	6091	4141	3298	5195	3138
Dimensions	492x664x72mm	650x203x516mm	580x196x430-460mm	338x541x61mm	672x483x66mm
Weight	16kg	9.5kg	10.3kg	9kg	13kg
Warranty	1-year next-day in-home	1-year return-to-base	1-year return-to-base	2-year collect-and-return	2-year collect-and-return
FULL REVIEW	TINYURL.COM/KWZ4KLL	TINYURL.COM/A95Q9VY	TINYURL.COM/MEVSJ9D	TINYURL.COM/LQ4U8FW	TINYURL.COM/MUGFKQ7

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Business PCs					
	Aria Gladiator Logic N200-3220M	Chillblast Fusion Opal	Wired2Fire Business Accelerate	Dino PC Synergy 4430	Eclipse Precision A856F85
Price	£509 inc VAT	£549 inc VAT	£689 inc VAT	£569 inc VAT	£519 inc VAT
Website	Aria.co.uk	Chillblast.com	Wired2fire.co.uk	Dinopc.com	Eclipsecomputers.com
Launch date	Aug 13	Aug 13	Aug 13	Aug 13	Aug 13
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.3GHz Intel Core i3-3220 (dual-core)	3.2GHz Intel Core i5-4570 (quad-core)	3.4GHz Intel Core i5-4670 (quad-core)	3GHz Intel Core i5-4430 (quad-core)	3.6GHz AMD Trinity A8-5600K (quad-core)
RAM	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3
Storage	500GB HDD + 80GB SSD	1TB HDD	120GB SSD	1TB HDD	1TB HDD
Motherboard	Gigabyte GA-B75M-D3H	Asus B85M-G	ASRock B85M-HDS	Gigabyte GA-H87M-HD3	Asus F2A85-M LE
CPU cooler	Arctic Cooling Alpine 11 GT Quiet	Standard Intel cooler	Standard Intel cooler	Standard Intel cooler	Standard AMD cooler
Power supply	Corsair 430W	CiT 500W	Xigmatek 400W	CiT 500W	Alpine 600W
Screen	21.5in AOC E2260SWDA	23.6in Iiyama X2377	2x 21.5in AOC E2260SWDA	23in Iiyama XB2380HS-B1	23in AOC i2369Vm
Screen resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Graphics	Intel HD Graphics 2500	Intel HD Graphics 4600	Intel HD Graphics 4600	Intel HD Graphics 4600	Integrated
Video memory	N/A	N/A	N/A	N/A	N/A
USB	2x USB 3.0, 4x USB 2.0	3x USB 3.0, 6x USB 2.0	2x USB 3.0, 8x USB 2.0	4x USB 3.0, 4x USB 2.0	4x USB 3.0, 4x USB 2.0
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Speakers	Not specified	Not specified	Not specified	Not specified	Not specified
Case	Cooler Master N200	CiT Fortress	In-Win Em040	CiT Templar	K2 Gamer
Keyboard	Microsoft Desktop 400 keyboard and mouse (wired)	Cherry J82-16001 keyboard, M-5450 mouse (wired)	Gigabyte K6800 keyboard, M6800 mouse (wired)	Logitech K120 keyboard, B110 mouse (wired)	Microsoft Optical Desktop 800 (wired)
Optical drive	24x DVD±RW	24x DVD±RW	DVD±RW	Samsung DVD±RW	Samsung DVD±RW
Operating system	Windows 7 Home Premium 64-bit	Windows 8 Professional	Windows 7 Professional 64-bit	Windows 7 Home Premium 64-bit	Windows 8 Professional
Bundled software	None	None	None	None	None
PCMark 7 overall score	3524	4257	5667	3458	2349
PCMark 7 Productivity score	4056	2685	5929	2529	1883
PCMark 7 Computational score	3321	21490	13651	9377	3899
Power consumption (idle/max)	27/69W	47/124W	37/135W	37/115W	34/145W
Warranty	1-year return-to-base, phone support	2-year collect-and-return, phone support	2-year return-to-base, phone support	3-year return-to-base, phone support	1-year return-to-base, phone support
FULL REVIEW	TINYURL.COM/OSW55A8	TINYURL.COM/KGGE98T	TINYURL.COM/PCSKWVS	TINYURL.COM/PF8LUXD	TINYURL.COM/MQFWJ3R

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Family PCs					
	1	2	3	4	5
	Chillblast Fusion Commando	Wired2Fire Diablo Reactor	Mesh Elite 4670-PCA	Dino PC Raging Lizard V2	Arbico Family i3 4185
Price	£799 inc VAT	£668 inc VAT	£799 inc VAT	£780 inc VAT	£675 inc VAT
Website	Chillblast.com	Wired2fire.co.uk	Meshcomputers.com	Dinopc.com	Arbico.co.uk
Launch date	Jul 13	May 14	May 14	May 14	May 14
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	3.2GHz Intel Core i5-4570	3.4GHz Intel Core i5-4670	3.4GHz Intel Core i5-4670	3.5GHz Intel Core i5-4690	3.4GHz Intel Core i3-4130
RAM	16GB DDR3	8GB DDR3 1600MHz	16GB DDR3 1600MHz	8GB DDR3 1600MHz	8GB DDR3 1600MHz
Storage	1TB HDD + 120GB SSD	1TB HDD	2TB HDD + 120GB SSD	1TB HDD + 128GB SSD	1TB HDD + 120GB SSD
Motherboard	Asus B85M-G	Asus B85M-G	MSI B85M-E45	Gigabyte H97M-D3H	MSI B85M-E45
CPU cooler	Arctic Cooling Freezer 7 Pro	Standard Intel Cooler	Standard Intel Cooler	Standard Intel Cooler	Arctic Cooling Freezer 7 Pro
Power supply	600W CiT	500W FSP	500W FSP	500W CIT	650W Arctic Red
Screen	23in Iiyama X2377	24in AOC E2495Sh	24in Iiyama E2483HS-B1	24in Iiyama E2483HS-B1	23.6in AOC E2470SWHE
Screen resolution	1920x1080	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels
Graphics	Zotac nVidia GeForce GTX 650 Ti	AMD Radeon R7 265	nVidia GeForce GTX 750 Ti	nVidia GeForce GTX 750 Ti	MSI AMD Radeon R7 250
Video memory	N/A	2GB	2GB	2GB	2GB
Connectivity	802.11b/g/n, gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet, 802.11b/g/n	Gigabit ethernet
USB	3x USB 3.0, 6x USB 2.0	3x USB 3.0, 6x USB 2.0, 2x HDMI, VGA	4x USB 3.0, 8x USB 2.0, HDMI, VGA, DVI-D, DVI, DP	5x USB 3.0, 3x USB 2.0, 2x HDMI (1x e-Mini), VGA, 2x DVI	2x USB 3.0, 6x USB 2.0, HDMI, VGA, DVI-D
Media card slot	None	None	None	None	None
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Speakers	2x Logitech LS220	None	None	None	None
Case	Cooler Master Force 500	Zalman Z3 Plus	Zalman Z3 Plus	Fractal Design Core 1000 USB3	CIT Templar
Keyboard	Logitech MK260	Octigen Wireless combo	Logitech MK270 (wireless combo)	Gigabyte KM6150 (wired combo)	Logitech MK120
Optical drive	LG BD-ROM/DVD±RW	LiteOn DVD RW	24x DVD RW	None	Samsung DVD RW
Operating system	Windows 8 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit
Bundled software	None	None	None	None	Ahead Nero, CyberLink PowerDVD
Sniper V2 Elite score (Low/High/Ultra)	147/59/14fps	240/76/18fps	195/68/16fps	196/83/20fps	62/22/5fps
Alien vs Predator score (720p/1080p)	52/27fps	83/44fps	71/37fps	102/53fps	22/11fps
PCMark 7 score	6177	3938	7304	6431	4800
Warranty	2-year collect-and-return	2-year return-to-base	3-years labour (2-year parts, 3-months free C&R)	3-year labour (2-year parts)	2-year return-to-base
FULL REVIEW	TINYURL.COM/KF6G3T7	TINYURL.COM/OA8UKDP	TINYURL.COM/OZCSHYU	TINYURL.COM/PFA55F7	TINYURL.COM/NU7FSGB






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Sub-£150 printers					
	1	2	3	4	5
	Samsung Xpress M2070W	Canon Pixma MG5550	Samsung Xpress M2022W	Canon Pixma MX535	Brother MFC-J870DW
Price	£99 inc VAT	£57 inc VAT	£59 inc VAT	£70 inc VAT	£137 inc VAT
Website	Samsung.com/uk	Canon.co.uk	Samsung.com/uk	Canon.co.uk	Brother.co.uk
Launch date	Mar 14	Apr 14	Aug 14	Jul 14	Jul 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Mono laser	Colour inkjet	Mono laser	Colour inkjet	Colour inkjet
Max print resolution	1200x1200	4800x1200dpi	1200x1200dpi	4800x1200dpi	6000x1200dpi
Actual print speed	B=17.1ppm	B=11.8ppm C=8.7ppm	B=18ppm	B=9.7ppm C=3.8ppm	B=18ppm C=11ppm
Scan/fax facilities	1200x1200 scans	1200x2400 scans	None	1200x2400 scans/fax	1200x2400 scans
Supported interfaces	USB 2.0, 802.11b/g/n, NFC	USB 2.0, 802.11b/g/n	USB 2.0, 802.11b/g/n	USB 2.0, 802.11b/g/n, AirPrint	USB 2.0, 802.11b/g/n, NFC
Cost per page	B=3.8p	B=2.4p C=4.8p	B=5p	B=2.7p C=4.8p	B=3.9p C=2.5p
Media card/auto duplex	xx	x✓	xx	x✓	✓✓
Input capacity	150 sheets	100 sheets	150 sheets	100 sheets + 30-sheet ADF	150 sheets + 20 ADF
Dimensions	406x360x253mm	455x369x148mm	332x215x178mm	458x385x200mm	410x374x180mm
Weight	7.4kg	6.3kg	4kg	8.5kg	9.5kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OYZKJKE	TINYURL.COM/LKWLJDE	TINYURL.COM/NFJHDOR	TINYURL.COM/N9LXVNZ	TINYURL.COM/M52V29R

£151+ printers					
	1	2	3	4	5
	Canon i-Sensys MF6180dw	Brother HL-L9200CDWT	HP OfficeJet Pro X551dw	Kyocera Ecosys P6030cdn	Lexmark CS410dn
Price	£280 inc VAT	£572 inc VAT	£410 inc VAT	£546 inc VAT	£195 inc VAT
Website	Canon.co.uk	Brother.co.uk	Hp.com/uk	Kyoceradocumentsolutions.co.uk	Lexmark.co.uk
Launch date	May 14	Aug 14	Aug 13	Jul 14	Jul 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Mono laser	Colour laser	Colour inkjet	Colour laser	Colour laser
Max print resolution	1200x600dpi	2400x600dpi	2400x2400	9600x600dpi	1200x1200dpi
Actual print speed	B=24ppm	B=30ppm C=30ppm	B=42.9ppm C=15.8ppm	B=27ppm C=27ppm	B=23.1ppm C=13.6ppm
Scan/fax facilities	600dpi scanner, 33.6Kbps fax	None	None	None	None
Supported interfaces	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n	USB 2.0	USB 2.0, ethernet
Cost per page	B=1.5p	B=1p C=5.9p	B=1p C=4.3p	B=1.2p C=1.7p	B=1.8p C=9.5p
Media card/auto duplex	x✓	x✓	x✓	x✓	x✓
Input capacity	250 + 50 sheet + 50 ADF	750 sheets + 50 sheet	500 + 50 sheet	500 sheets + 150 (2150 max)	250 + 1 sheets
Dimensions	390x473x431mm	410x495x445mm	517x399x414mm	345x518x480mm	291x442x407mm
Weight	19.1kg	28.3kg	17.1kg	29.5kg	20.5kg
Warranty	1 year	1 year	1 year	2 years	1 year
FULL REVIEW	TINYURL.COM/LE9WA5N	TINYURL.COM/PT52MH6	TINYURL.COM/CZ05P65	TINYURL.COM/N4MCLYF	TINYURL.COM/MJG33UL

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Blu-ray drives	    				
	1	2	3	4	5
	Pioneer BDR-209EBK Retail	Pioneer BDR-209DBK OEM	LG LN48919	LG BP40NS20	Lite-On IHES112-115
Price	£59 inc VAT	£54 inc VAT	£60 inc VAT	£90 inc VAT	£54 inc VAT
Website	Pioneer.eu/uk	Pioneer.eu/uk	Uk.lge.com	Uk.lge.com	Liteonit.eu
Launch date	Nov 13	Nov 13	May 12	Jan 13	Oct 12
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Blu-ray speeds	16x -R, 14x -R DL, 2x -RE, 12x -ROM	16x -R, 14x -R DL, 2x -RE, 12x -ROM	16x -R, 12x -R DL, 12x -RE, 12x -ROM	6x -R, 6x -R DL, 2x -RE, 6x -ROM	12x -ROM
DVD speeds	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 16x -ROM	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 16x -ROM	16x ±R, 8x ±R DL, 6x -RW, 8x +RW, 12x -RAM, 16x -ROM	8x ±R, 6x ±R DL, 6x -RW, 8x +RW, 5x -RAM, 8x -ROM	8x ±R, 8x ±R DL, 6x -RW, 8x +RW, 8x -ROM
Max storage	128GB	50GB	50GB	100GB	8.5GB
Interface type	SATA (internal)	SATA (internal)	SATA (internal)	USB 2.0 (external)	SATA (internal)
Label technology	None	None	LightScribe	None	None
Software	ArcSoft TotalMedia Extreme	None	CyberLink Blu-ray Suite	PowerDVD, PowerProducer	None
Dimensions	148x180x42mm	148x180x42mm	146x170x41mm	160x153x22mm	158x145x22mm
Weight	740g	740g	749g	380g	700g
Warranty	1 year	1 year	1 year	1 year	2 years
FULL REVIEW	TINYURL.COM/LD47X7K	TINYURL.COM/LD47X7K	TINYURL.COM/8YTUJEF	TINYURL.COM/BS8UAF	TINYURL.COM/8SYECMW

Wireless routers	    				
	1	2	3	4	5
	Apple AirPort Extreme	Netgear Nighthawk R7000	D-Link DIR 880L	TP-Link Archer C7	Asus RT-AC68U AC1900
Price	£169 inc VAT	£200 inc VAT	£120 inc VAT	£90 inc VAT	£160 inc VAT
Website	Apple.com/uk	Netgear.co.uk	Dlink.com	Tp-link.com	Uk.asus.com
Launch date	Jan 14	Sep 14	Sep 14	Jan 14	Jan 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Standards supported	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac
Frequency modes	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)
Antennas	6x internal	3x external	3x external	3x external, 3x internal	3x external, 3x internal
Built-in modem	x	x	x	x	x
Manufacturer's rating	1300/450Mb/s	1300/600Mb/s	1300/600Mb/s	1300/450Mb/s	1300/600Mb/s
WPS	x	✓	✓	✓	✓
Ports	Gigabit WAN, 3x gigabit LAN, USB	Gigabit WAN, 1x USB 3.0, 1x USB 2.0	Gigabit WAN, 1x USB 3.0, 1x USB 2.0	Gigabit WAN, 4x gigabit LAN, 2x USB 2.0	Gigabit WAN, 4x gigabit LAN, 2x USB 2.0
Average power use	8W	9W	10W	N/A	N/A
Max speed (11n/11ac)	171/572Mb/s	171/592Mb/s	171/625Mb/s	110/505Mb/s	98/610Mb/s
Dimensions, weight	98x168x98mm, 945g	285x186x45mm, 750g	247x190x47mm, 745g	32.5x243x160mm, 508g	160x83x220mm, 640g
Warranty	1 year	N/S	N/S	3 years	2 years
FULL REVIEW	TINYURL.COM/MFDLLSC	TINYURL.COM/Q2NR8Q	TINYURL.COM/OZ5G7KG	TINYURL.COM/KKJMPCE	TINYURL.COM/K4ZATKV

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NAS drives	1	2	3	4	5
	Synology DS413j	Qnap HS-210	Qnap TS-421	Synology DS1813+	Asustor AS-604T
Price	£260 inc VAT (diskless)	£240 inc VAT (diskless)	£366 inc VAT (diskless)	£760 inc VAT (diskless)	£435 inc VAT (diskless)
Website	Synology.com	Qnap.com	Qnap.com	Synology.com	Asustor.com
Launch date	Oct 13	Oct 14	Mar 14	Jan 14	May 14
Overall rating	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★☆
Drive bays	4	2	4	8	4
Processor	1.6GHz Marvell mv6282	1.6GHz Marvell single-core	2GHz Marvell single-core ARM	2.13GHz Intel Atom D2700 dc	2.13GHz Intel Atom
Memory	512MB DDR3	512MB DDR3	1GB DDR3	2GB DDR3	1GB DDR3
Remote access	✓	✓	✓	✓	✓
eSATA	✗	✗	✓	✓	✓
USB port	2x USB 2.0	2x USB 3.0, 2x USB 2.0	2x USB 3.0, 2x USB 2.0	2x USB 3.0, 4x USB 2.0	2x USB 3.0, 4x USB 2.0
Raid options	0/1/5/6/10/JBOD	0/1/JBOD	0/1/5/6/10/JBOD	0/1/5/6/10/JBOD	0/1/5/6/10/JBOD
Software	DSM 4.1	HD Station	Backup Station	DSM 4.3	Asustor utilities, App Central
Dimensions	184x168x230mm	302x220x41mm	177x180x235mm	175x340x233mm	230x170x185mm
Weight	2kg	1.5kg	3kg	5.2kg	3.5kg
Warranty	2 years	2 years	2 years	3 years	2 years
FULL REVIEW	TINYURL.COM/PL8XM8S	TINYURL.COM/OEXRYNY	TINYURL.COM/MCYWUB8	TINYURL.COM/PWO4M6J	TINYURL.COM/NX5Q08M

USB drives	1	2	3	4	5
	G-Technology Professional	WD My Passport Pro 4TB	LaCie Little Big Disk	G-Technology Thunderbolt	Toshiba Stor.E Basics
Price	£250 inc VAT	£350 inc VAT	£770 inc VAT	£599 inc VAT	£80 inc VAT
Website	G-technology.com	Wdc.com/en	Lacie.com/uk	G-technology.com	Toshiba.co.uk
Launch date	Sep 13	Aug 14	Feb 14	Aug 12	Nov 13
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★★	★★★★☆
Capacity tested	4TB	4- to 8TB	1TB	8TB	2TB
Capacity range	2TB to 4TB	2- to 4TB	512GB to 2TB	4TB to 8TB	320GB to 2TB
Disk size	3.5in	2.5in	2.5in	3.5in	2.5in
Spin speed	7200rpm	7200rpm	5400rpm	7200rpm	5400rpm
Transfer speed	N/A	230MB/s	635MB/s	329MB/s	94MB/s (USB 3.0)
Encryption	None	None	None	None	None
Other interfaces	FireWire 800	None	None	None	None
Software	None	None	LaCie Backup Assistant	None	None
Dimensions	235x130x46mm	88x143x44mm	40x140x85mm	235x130x85mm	119x79x21mm
Weight	1.35kg	700g	650g	2.3kg	215g
Warranty	3 years	3 years	1 year	3 years	1 year
FULL REVIEW	TINYURL.COM/NV7F32F	TINYURL.COM/QAQGEUG	TINYURL.COM//KRCL3VZ	TINYURL.COM/CXEF6MH	TINYURL.COM/LBHC8EL






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SSDs					
	1	2	3	4	5
	Crucial M550	OCZ Vector 150	Crucial M500	Samsung 840 EVO	Seagate 600 SSD
Price	£334 inc VAT	£131 inc VAT	£169 inc VAT	£320 inc VAT	£202 inc VAT
Website	Crucial.com/uk	Ocz.com	Crucial.com/uk	Samsung.com/uk	Seagate.com/gb
Launch date	May 14	May 14	Aug 13	Nov 13	May 14
Overall rating	★★★★★	★★★★☆	★★★★★	★★★★★	★★★★☆
Capacity tested	1TB	240GB	480GB	750GB	480GB
Price per GB	33p	55p	35p	43p	43p
Memory cache	1GB LP DDR2	512MB	512MB DDR3	1GB LPDDR2	N/A
Controller	Marvell 88SS9189	Indilinx Barefoot 3 M00	Marvell 88SS9187	Samsung MEX (3-core ARM)	Link A Media Device
Encryption	AES 256-bit	AES 256-bit	AES 256-bit	AES 256-bit	None
Flash	Micron 20nm MLC NAND	Toshiba 19nm MLC	Micron 20nm MLC NAND	Samsung 19nm Toggle NAND	Toshiba 19nm MLC
Firmware updated via	Bootable CD	OCZ Toolbox, bootable	ISO boot disc	SSD Magician for Windows	Seagate Firmware, bootable
ATTO peak sequential	R: 563MB/s; W: 514MB/s	R: 557MB/s; W: 534MB/s	R: 539MB/s; W: 433MB/s	R: 554MB/s; W: 537MB/s	R: 555MB/s; W: 474MB/s
CDM peak IOPS	100 / 91.7	92.9 / 94.7	89.8k (read)	104K (read)	96.8 / 88.6
CDM 4kB rnd	30/99	25/97	N/A	N/A	28/78
Warranty	3 years	5 years or 91TB writes	3 years	5 years	3 years
FULL REVIEW	TINYURL.COM/MSWD98Z	TINYURL.COM/KBED2W6	TINYURL.COM/M2NCSMJ	TINYURL.COM/L5EDQOY	TINYURL.COM/N58RB8G






Projectors					
	1	2	3	4	5
	BenQ W1300	Optoma W316	InFocus IN126STa	NEC M352WS	Optoma ML1500
Price	£767 inc VAT	£463 inc VAT	£540 inc VAT	£780 inc VAT	£650 inc VAT
Website	Benq.co.uk	Optoma.co.uk	Infocus.com	Nec-display-solutions.com	Optoma.co.uk
Launch date	Jun 14	Jul 14	Sep 14	Jul 14	Jul 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Projection technology	DLP	DLP	DLP	DLP	DLP
Resolution (pixels)	1920x1080	1280x800	1280x800	1280x800	1280x800
Brightness, Contrast	2000, 10,000:1	3400, 15,000:1	3300, 15,000:1	3500, 10,000:1	1500, 15000:1
Image size	300in	300in	300in	150in	100in
Supported aspect ratios	16:9 native	16:10, 16:9, 4:3	16:10, 16:9, 4:3	16:10	16:10, 16:9, 4:3
Noise levels (dB)	33 (30 eco)	29db	32db (30 eco)	33 (39 bright mode)	30db
Connections	VGA, 2x HDMI, USB, 3D	VGA, HDMI, Mini-USB, 3D	2x VGA, HDMI, USB, ethernet	2x VGA, 2x HDMI, USB	HDMI, 2x USB-A, SD
Lamp/lamp life	240W/6000 hrs	190W/10000 hrs	278W/3500 hrs	278W/8000 hrs	LED/20,000 hrs
Dimensions	330x257x128mm	315x223x102mm	292x220x108mm	368x268x97mm	270x170x48mm
Weight	3.4kg	2.5kg	3.7kg	3.6kg	1.4kg
Warranty	3 years	2 years	1 year	3 years	2 years
FULL REVIEW	TINYURL.COM/K4FA89Q	TINYURL.COM/OCWTHGW	TINYURL.COM/NHH3QPB	TINYURL.COM/Q6J2N6W	TINYURL.COM/QBFRYR7






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Sub-£150 graphics cards	    				
	1	2	3	4	5
	MSI Radeon R9 270	MSI HD 7770	MSI R7 260X OC	XFX Radeon R7 265	Gigabyte GTX 750 Ti WindForce
Price	£123 inc VAT	£60 inc VAT	£88 inc VAT	£116 inc VAT	£115 inc VAT
Website	Uk.msi.com	Uk.msi.com	Uk.msi.com	Xfxforce.com	Uk.gigabyte.com
Launch date	Jul 14	Sep 12	May 14	Jul 14	May 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	AMD Radeon R9 270	AMD Radeon HD 7770	AMD Radeon R7 260X	AMD Radeon R7 265	nVidia GeForce GTX 750 Ti
Installed RAM	2GB GDDR5	1GB GDDR5	2GB GDDR5	2GB GDDR5	2GB GDDR5
Memory interface	256-bit	128-bit	128-bit	256-bit	128-bit
Core clock/Boost	900MHz/975MHz	1GHz/none	1175MHz/none	900MHz/925MHz	1033MHz/1111MHz
Memory clock/Effective	1.4GHz/5.6GHz	1125MHz/4.5GHz	1625MHz/6.5GHz	1.4GHz/5.6GHz	1.35GHz/5.4GHz
Stream processors	1280	640	896	Varies	640
Texture units	80	40	56	64	40
Power connectors	1x 6-pin	1x 6-pin	1x 6-pin	1x 6-pin	N/A
DirectX	11.2	11.1	11.1	11	11.2
Digital interface	2x DVI, HDMI, DP	DVI, HDMI, Mini-DP	2x DVI, HDMI, MiniDisplayPort	2x DVI, 1x HDMI, 1x DP	2x DVI, 2x HDMI
Warranty	3 years	3 years	3 years	2 years	3 years
FULL REVIEW	TINYURL.COM/MCE7353	TINYURL.COM/BWJ7BL9	TINYURL.COM/OZ6WUYT	TINYURL.COM/LV69BEM	TINYURL.COM/Q7K4ESV

£151+ graphics cards	    				
	1	2	3	4	5
	Gigabyte GeForce GTX 770 2GB	Sapphire Radeon R9 280X	XFX Radeon R9 290X	MSI Radeon R9 270X	MSI Radeon R9 295 X2
Price	£200 inc VAT	£226 inc VAT	£300 inc VAT	£150 inc VAT	£700 inc VAT
Website	Uk.gigabyte.com	Sapphiretech.com	Xfxforce.com	Uk.msi.com	Uk.msi.com
Launch date	Aug 13	Mar 14	Apr 14	Dec 13	May 14
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	nVidia GeForce GTX 770	AMD Radeon R9 280X	AMD Radeon R9 290X	AMD Radeon R9 270X	AMD Radeon R9 295 X2
Installed RAM	2GB GDDR5	3GB GDDR5	4GB GDDR5	2GB GDDR5	8GB GDDR5
Memory interface	256-bit	384-bit	512-bit	256-bit	2x 512-bit
Core clock/boost	950MHz/1020MHz	950MHz/1070MHz	1GHz/1GHz	1030MHz/1120MHz	1018MHz/N/A
Memory clock/Effective	1.5GHz/6GHz	1.55GHz/6.2GHz	1.25GHz/5GHz	1.4GHz/5.6GHz	1.25GHz/5GHz
Stream processors	1536	2048	2816	1280	2x 2816
Texture units	128	128	176	80	2x 176
Power connectors	1x 6-pin, 1x 8-pin	2x 8-pin	8-pin, 6-pin	2x 6-pin	2x 8-pin
DirectX	11	11	11	11	11
Digital interface	2x DVI, HDMI, DisplayPort	DVI, HDMI, 2x Mini-DisplayPort	2x DVI, HDMI, DisplayPort	2x DVI, HDMI, DisplayPort	DVI, 4x Mini-DP
Warranty	3 years	2 years	3 years	2 years	3 years
FULL REVIEW	TINYURL.COM/OAG6277	TINYURL.COM/OWVAP37	TINYURL.COM/NPET8ER	TINYURL.COM/OYA2DFJ	TINYURL.COM/POTAOGZ

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Sub-£200 flat-panel displays					
	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3 PC ADVISOR RECOMMENDED	4	5
	AOC i2369V	BenQ GW2760HS	Philips 234E5QHAW	NEC MultiSync E243WMI	BenQ EW2740L
Price	£130 inc VAT	£187 inc VAT	£130 inc VAT	£185 inc VAT	£178 inc VAT
Website	Aoc-europe.com/en	Benq.co.uk	Philips.co.uk	Nec-display-solutions.com	Benq.co.uk
Launch date	Jul 14	Dec 13	Jul 14	Jun 14	Aug 14
Overall rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Screen size	23in	27in	23in	23.8in	27in
Panel type	IPS matt	A-MCA	IPS matt	IPS matt	VA semi-matt
Native resolution	1920x1080 pixels	1920x1080 (82ppi)	1920x1080 pixels	1920x1080 pixels	1920x1080 pixels
Pixel density	96ppi	82ppi	96ppi	93ppi	82ppi
Brightness	220cd/m ²	300cd/m ²	187cd/m ²	250cd/m ²	300cd/m ²
Static contrast ratio	630:1	950:1	210:1	650:1	280:1
Response time	6ms	4ms	5ms	6ms	4ms
Ports	HDMI, HDMI/MHL, DP, VGA	HDMI, DVI, VGA	2x HDMI (QHAB) or 1x HDMI (QDAB), VGA	DP, DVI-D, VGA	2x HDMI, VGA
Dimensions	531x204x398mm	472x191x623mm	532x213x414mm	558x214x380-490mm	623x191x451mm
Weight	3.75kg	4.5kg	3.5kg	6.3kg	4.2kg
Warranty	3 years	2 years	2 years	3 years	2 years
FULL REVIEW	TINYURL.COM/OOEFYPR	TINYURL.COM/NF3WVFY	TINYURL.COM/KLYLW4V	TINYURL.COM/KNCGVOU	TINYURL.COM/OO6EC5L

£201+ flat-panel displays					
	1	2	3	4	5
	Asus ProArt PA279Q	AOC Q2963PM	BenQ PG2401PT	Dell UltraSharp 32 Ultra	ViewSonic VP2772
Price	£668 inc VAT	£285 inc VAT	£845 inc VAT	£1,480 inc VAT	£540 inc VAT
Website	Asus.com/uk	Aoc-europe.com/en	Benq.co.uk	Dell.co.uk	Viewsoniceurope.com/uk
Launch date	Jul 14	Mar 14	Oct 14	Jun 14	Jun 14
Overall rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Screen size	27in	29in	24.1in	31.5in	27in
Panel type	IPS matt	AH-IPS	IPS	IGZO	AH-IPS
Native resolution	2560x1440	2560x1080 (96ppi)	1920x1200 pixels	3840x2160 pixels	2560x1440 pixels
Pixel density	108ppi	96ppi	94ppi	140ppi	109ppi
Brightness	350cd/m ²	240cd/m ²	317cd/m ²	350cd/m ²	350cd/m ²
Static contrast ratio	640:1	530:1	540:1	550:1	560:1
Response time	6ms	5ms	5ms	8ms	6ms
Ports	DVI, HDMI, 2x DP, 6x USB 3.0	HDMI, DVI, DP, VGA	DVI, DP, HDMI, VGA, 3x USB 3.0	HDMI, DP, Mini-DP, 4x USB 3.0	HDMI, DVI, Mini-DP, 4x USB 3.0
Dimensions	641x560x240mm	714x214x388mm	543x254x555mm	750x214x483-572mm	643x348x470mm
Weight	10kg	6.9kg	7kg	9.2kg	8.5kg
Warranty	3 years	3 years	1 year	3 years	3 years
FULL REVIEW	TINYURL.COM/NR8RDQ6	TINYURL.COM/NXDAGMK	TINYURL.COM/PMV5L5V	TINYURL.COM/O4CTO3S	TINYURL.COM/LLQRWTX

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The iPhone question

Apple's quarterly earnings calls have become events in their own right. It's fiscal compliance turned into a massive PR- and marketing opportunity. My favourite part of the process is the post-call analysis, where the pro- and anti-Apple lobbies (you have to be one or the other) opine that Apple is set for world dominance/destruction. Delete as appropriate.

This is especially tricky for those of us who work for the *PC Advisor*, *Tech Advisor* and *Macworld UK* stable of publications. For one thing we pride ourselves on independent and impartial tech coverage. And for another we write *Macworld* for Apple fans, and the other publications for everyone else. Our lack of an organisational bias makes it tough to know who to believe. So let's follow the money and come to our own conclusions.

In October, we heard what is on the face of it a strong story from Apple. With my pro-Apple *Macworld* head on, I am delighted to reveal that in its 2014 Q3 call Apple announced a record quarter. We heard that the company had sold 39.2 million iPhones and taken \$42.1bn in revenue. Given that even the most optimistic analysts were forecasting 40 million iPhone sales in a quarter that included only 10 days when the new iPhones were on sale, that seems outstanding stuff. Consider also that the new iPhones weren't yet available in China when those figures were generated.

There is not a single consumer tech company on the planet that wouldn't swap places with Apple right now. Not one. Not Microsoft, Google, Dell, Lenovo. Apple is hugely profitable, and enjoys a very gentle ride from both consumers and critics. It is high and rising.

But not as fast as it used to. As ever, the devil is in the detail here, and Apple's call did reveal some interesting trends. Let's focus on the iPhone.

Chasing the dragon

Apple's call revealed that the year-on-year iPhone figures were better in the first quarter of 2014 than in the recently closed third quarter. This is simply explained, and broadly positive for Apple. At the end of 2013 Apple started selling iPhones in China for the first time. They proved hugely popular, and those new Chinese users represent a huge growth opportunity for Apple and the iPhone.

However, those Chinese early adopters were mostly buying iPhone 5s or iPhone 5c handsets. It is unlikely that the majority of them will jump straight to the iPhone 6, so we may not see the expected bump in iPhone figures in China when the Q4 figures come out. Or then again, we might. I've heard a figure of 10 million pre-orders being

banded around in reference to China and the iPhone 6 and 6 Plus launch, so let's wait and see.

It matters. The bump in global iPhone sales that is generated by each successive iPhone launch is getting smaller. Or - to put it another way - the growth in iPhone adoption is slowing. Still growing, but growing more slowly than ever.

This is only natural. In the territories in which Apple is strong, most people who want smartphones have smartphones. You rarely need a new smartphone within two to three years. And when you have been on top as long as Apple has, growth is inevitably going to slow down. Rivals copy and undercut, and markets get crowded.

China is the last great unconquered territory for the Apple smartphone. It's a country with billions of people, many of whom are newly affluent. It's also a country in which Apple phones have next to no market share. If Apple wants the iPhone to continue to grow, then it needs China.

Meanwhile back in the US the largest group of iPhone users are still on the iPhone 4 and iPhone 4s. After such an encouraging start for its new smartphone, Apple will hope to convert them to the iPhone 6 and 6 Plus. Which is why the relatively flat figures for iOS 8 adoption make very interesting reading.

Neither Apple nor the iPhone is doomed, no matter what you read. Far from it. Both the company and the product line look to be set fair for a uniquely profitable short and medium-term future.

But these are interesting times for Apple watchers, and the Q4 figures will make for very interesting reading. US upgrades and China sales will tell us whether Apple is set for another iPhone surge. And whatever you might think about the big beast of Cupertino, you wouldn't bet against it. ☒

“ There is not a single consumer tech company on the planet that wouldn't swap places with Apple right now ”





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