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PC Advisor is published by IDG UK
IDG UK, 101 Euston Road, London NW1 2RA. Tel: 020 7756 2800
Printer: Wyndeham Press Group Ltd 01621 877 777
Distribution: Seymour Distribution Ltd 020 7429 4000

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JIM MARTIN



Stay safe

Keep your PC – and data– safe from online attacks

Welcome to the December issue of *PC Advisor*. Without wishing to open on a downer, your data – including your identity – is so valuable to criminals that they'll always come up with new ways to steal it from you. And that's why it's ever more important to make sure that you safeguard it.

One of the most worrying attacks is ransomware, which encrypts data on your computer, and even other computers on your network. Paying the ransom supposedly means you get a decryption key and get your data back, though there's no guarantee – these are criminals you're dealing with.

The best way to keep your PC safe is, of course, to run antivirus software. It's something you probably install and forget, but it's crucial you keep it up to date with the latest virus definitions and algorithms to prevent attacks before they happen. From page 66 onwards we've tested out six of the most popular free antivirus programs to find out if you can get effective protection without spending a penny. The good news is that you can, because the applications use the same scanning engines as their paid-for versions. You simply get fewer features: no advanced firewall, no spam filtering and no other extra components of an internet security suite.

But there can be a hidden cost – as plainly explained by AVG (page 17) in its new condensed privacy policy. If you want to use its free antivirus, you agree to a level of tracking (such as what you search for online) and for your non-personal data being sold to other companies. AVG isn't alone in doing this, which is why you must always read the terms and conditions of any software you install, or any service you sign up to online.

It's common now for free programs to be bundled with adware (some would call it spyware) because it earns the developers money and allows them to give the software away for nothing. In almost every case, you can prevent that extra software from being installed by reading what you're agreeing to when you click through the installation wizard.

You shouldn't drop your guard when using your phone or tablet. You can install antivirus software on Android phones, and some of the packages we've reviewed this month have companion apps available for free on Google Play. (Also check out Amazon Underground on page 114 if you have an Android phone.) Apple doesn't allow antivirus software on the App Store, but you can still protect your phone by using a passcode and logging out of apps when you're not using them.

Windows 10 has been out for two months now, and if you've only just upgraded you'll find our features (starting on page 76) very useful. Along with great tips and tricks, we'll give you a tour of the new features and explain the settings to make to give you the best privacy. On page 100 we've rounded up a selection of quick fixes to common problems we've found and explain how to get Cortana working if it's refusing (page 108).

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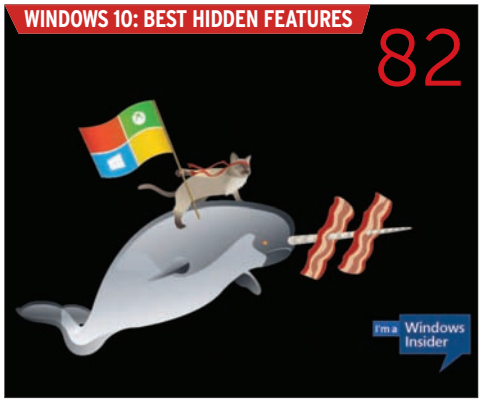
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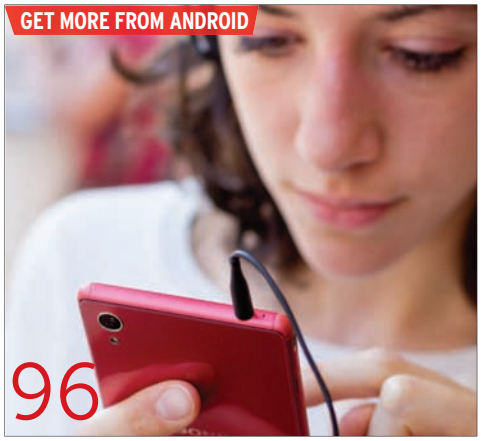
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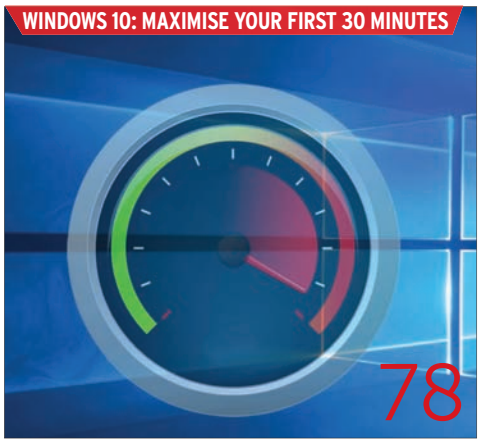


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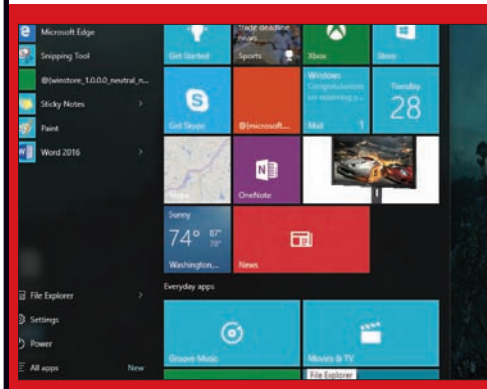
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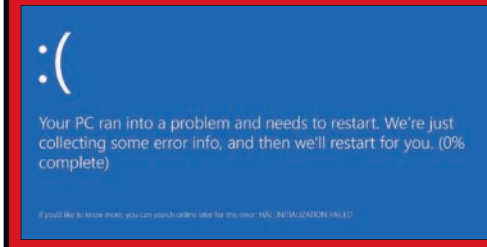
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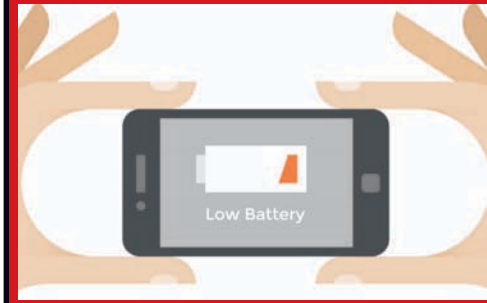
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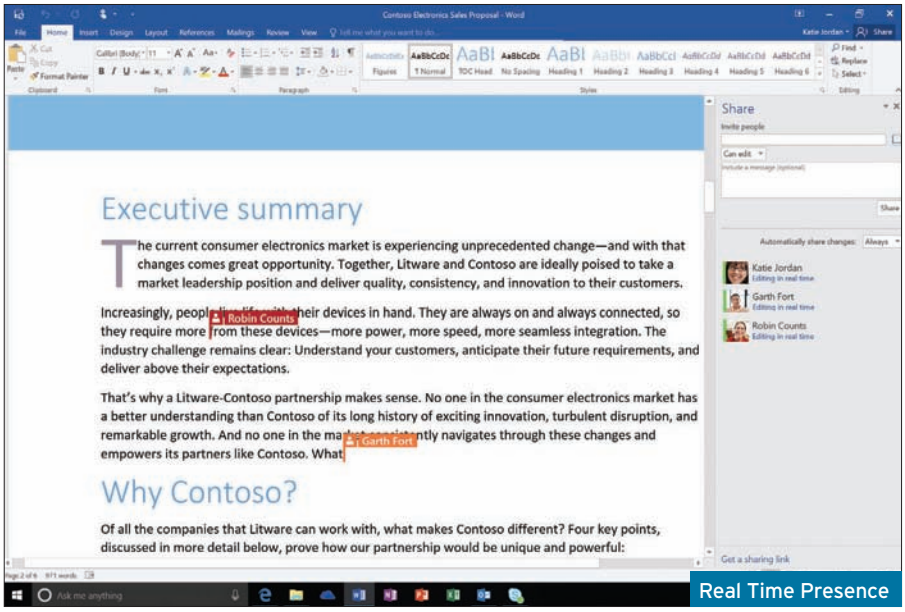
Office 2016 for Windows

Office 2016 brings a new visual design to fit in with Windows 10, while incorporating some additions

With Windows 10 clocking up a staggering 75 million installations within its first month, Microsoft can now focus on its other favourite child, as Office 2016 makes its debut. With Office 2016 for Mac, and Office Mobile versions for iOS and Android already available, Office 2016 for Windows completes the set, and brings a unified feel to the software thanks to the new visual design.

You can buy a subscription to Office 365 Personal for £5.99 per month or an annual payment of £59.99, which entitles you to use Word, Excel, PowerPoint, OneNote, Outlook, Publisher, Access, OneDrive, and Skype on one PC or Mac and one tablet. The package also comes with 1TB of OneDrive storage, 60 minutes of Skype calls per month, regular updates, and customer support.

If you have more devices, then there is also the Office 365 Home edition, which costs £7.99 per month (£79.99 per year), offers the same benefits but covers five PCs and five tablets. The advantage of the Office 365 route is that when new versions of the suite are released (as in Office 2016) users receive the updates at no additional cost.



Real Time Presence

For those who want to buy the package outright there's the Office Home and Student 2013 edition, which costs £119 and features Word, Excel, PowerPoint, and OneNote. Business users can also buy Office Home and Business 2013 for £229.99, which includes the addition of Outlook and OneDrive, or the Office Professional 2013 version for £389.99, which adds in Access and Publisher.

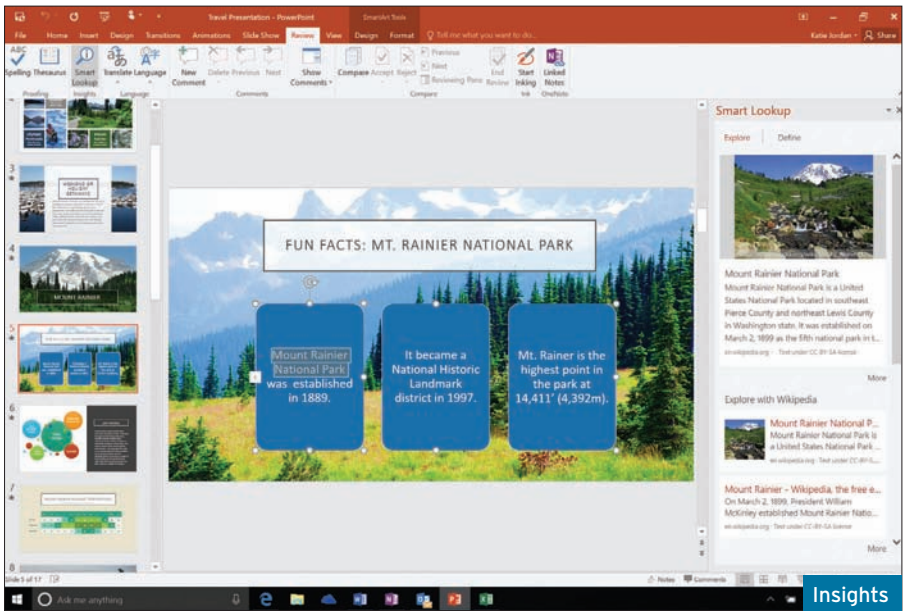
There have been little in the way of major changes to Office in the 2016 edition. There's a simpler, clutter free design which will lend itself well to tablets, smartphones, and touchscreen devices, alongside traditional Windows machines. That's not to say that Office has been dumbed down, far from it, as the suite is as powerful as ever. Microsoft has focused mainly on nip and tuck refinements, but there are a few interesting new additions.

Insights (see left), for example, is a useful feature in Word and Outlook, which can display additional, contextual information about any words or terms in your text. Simply highlight the word, right-click, select Smart Lookup, and you'll see articles, definitions, or other data pertaining to the subject. Search results are powered by Bing and link into Wikipedia among other sources.

> Real Time Presence gives you the ability to work on a document simultaneously with colleagues, and see, in real-time, edits or additions that each of you is making

There are also various improvements to sharing files through Outlook and other apps, the way version histories of documents are handled, and data security.

Perhaps the biggest addition to Office 2016 is Real Time Presence (see above). This is the ability to work on a document simultaneously with colleagues and see, in real-time, edits or additions that, each of you is making. Google Docs has had this feature for a long time now, with some people using the platform specifically for this function, so its inclusion in Microsoft Word is a potentially huge deal.



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CHRIS MARTIN



Qualcomm announces Snapdragon 820's new Hexagon DSP

Snapdragon 820's to come with Hexagon 680 DSP for always-on sensors and image processing

Smartphone CPU maker Qualcomm has announced that the Snapdragon 820's DSP, the Hexagon 680, will be its answer to always-on applications such as step tracking and improvements in low-light photography (see image below).

Qualcomm has taken an incremental approach toward disclosing details of the Snapdragon 820, one of three key chip architectures in the smartphone space alongside Samsung's Exynos line and the Apple A-series chips. Although the 820 is scheduled to launch sometime next year, Qualcomm began disclosing the chip's core functionality in March, then details of the Adreno 530, the 820's integrated GPU. Like the Adreno, the Hexagon 680 will offload specific, repetitive functions on to the more efficient DSP engine, allowing the main core to power down and preserve the phone's battery life.

Qualcomm disclosed some of the details of the Hexagon 680 works at the Hot Chips conference. It still hasn't disclosed the juicy details of any of its cores such as their speed, the power they consume, or their die size.

Why this matters: A dedicated 'sensor core' has become a standard component of most phones: Apple built a dedicated M8 co-processor for the task, and Nokia Lumia phones have used a SensorCore component to keep track of the steps users take. Qualcomm says the DSP is optimised for the applications that are selling flagship phones, such as virtual and augmented reality, camera processing, and monitoring sensors.

Purpose-built computing

Hexagon is actually a collection of three DSPs: a dedicated compute DSP for voice, image and video processing, as well as computer vision; a modem DSP; and the 'low power island' for always-on sensors.

The three flagship functions that the Hexagon DSP will offer, however, are improved low-light processing, computer vision, and support for the always-on, sensor-aware apps.

Qualcomm said that the DSP enables algorithms to intelligently brighten areas of photos that were underexposed a bit more intelligently than the high-dynamic range (HDR) photos that cameras take, as the algorithm intelligently lightens just regions of the photo. The Hexagon DSP uses what Qualcomm calls Hexagon Vector Extensions (HVX) to do this, providing better performance than the Snapdragon CPU itself. (Think of HVX as Qualcomm's version of the MMX instruction set that Intel microprocessors use.) Using HVX, Qualcomm's internal data shows that its low-light video enhancement can be done with 10 times less power than a quad-core Krait GPU, and three times faster to boot.

The same extensions can also be used to intelligently interpret video, known as computer vision, as well as improve the performance of virtual-reality or augmented-reality displays and applications powered by the phone.

Finally, Qualcomm estimates that the new DSP can cut the power required to monitor sensors by about three times compared to the previous generation Hexagon DSP. Android L support is built in.

A lot is riding on the firm's new chip after the Snapdragon 810 was dropped earlier this year by one of its biggest customers. Qualcomm never named the customer, but it was widely understood to be Samsung, which went with an in-house processor for its Galaxy S6 smartphone. It remains to be seen whether the Snapdragon 820 will end up being the 'Intel Inside' of next-gen smartphones, though.



The Hexagon 680 DSP can intelligently brighten areas of an image

BlackBerry confirms Android-powered phone

BlackBerry's Android phone now has an official name, but not much else in the way of official details

As part of its recent quarterly earnings announcement, BlackBerry confirmed that it would be releasing an Android phone in late 2015. The company did not provide any significant details such as specs, pricing or UK carrier partners, but it did say that the phone will be called Priv – as in privacy.

"Today, I am confirming our plans to launch Priv, an Android device named after BlackBerry's heritage and core mission of protecting our customers' privacy," BlackBerry CEO John Chen said in a written statement. "Priv combines the best of BlackBerry security and productivity, with the expansive mobile application ecosystem available on the Android platform."

Chen's statement makes clear that the company's Android experiment is all about combining BlackBerry's core appeal of security-focused apps and services, with the popularity of Google's consumer apps.

The company also said it will continue to "develop and enhance the BlackBerry 10 OS." The next update will be version 10.3.3, which it plans to release in March.

BlackBerry isn't offering much in the way of details, but leaks have been rampant in recent months. It's thought it will have a slide-out keyboard, a 5.4in 2560x1440 resolution display, a 1.8GHz Snapdragon 808 processor, 3GB of RAM, an 18Mp rear-facing camera, and a 5Mp camera on the front.



It's still not clear what BlackBerry plans to do with Android. Several months ago, the thinking was that the firm wanted to use Google's operating system to show how BlackBerry's enterprise servers can manage cross-platform devices. But if the appeal of combining BlackBerry security and the Android OS takes off, Priv could be the first of an entire Android line-up.

> The company's Android experiment is about combining BlackBerry's core appeal of security-focused apps and services, with the popularity of Google's consumer apps

Firefox's tracker-killing mode hits beta

Private browsing modes don't protect you from third-party tracking, but that's about to change

Mozilla's all-new 'stealth mode' for Firefox is one step closer to becoming a standard feature of the popular web browser. The latest Firefox Beta builds for PCs (Windows, Mac, and Linux) and Android come with a new featured called Tracking Protection.

True to its name, it actively blocks third-party tracking. To do this, it prevents any element of a web page from loading that may have code designed to track your browsing habits.

Let's say you regularly visit a news site that always displays an ad supplied by a third-party advertising company, and those ads always appear to the right of the news articles. With Tracking Protection enabled, you may not see the ads if they contain browser cookies designed to follow you across the web.

Tracking Protection isn't a substitute for ad blockers or add-ons such as Ghostery; the new feature works only when you're in Firefox's Private Browsing mode. Google Chrome offers a similar feature called Incognito mode, although it doesn't block third-party trackers.



If you want to try out Tracking Protection, you'll need to download and install the Firefox Beta – go to tinyurl.com/pxz2yah. Before you start, you should note that doing so will wipe your stable install of Firefox.

Once it's ready to go, click on the 'hamburger' menu icon and select New Private Window. When the private browsing window opens, you should see a full-screen message telling you that Tracking Protection is on. This shows up every time you open a new tab when browsing privately.

From now on you can carry on surfing the web as normal, without the worry of being tracked by advertisers. However, keep in mind this is beta software and it may sometimes malfunction or break.

Mozilla says that it decided to enabled Tracking Protection, because the organisation believed many already expected the feature when in private browsing mode. Currently, when you are surfing the web privately in the stable version of Firefox, you can still be tracked during your private browsing session. But all cookies, searches, and browsing history are deleted when you close the private browsing window. Tracking Protection goes one step further by ensuring that the only entity that can track you in private browsing mode is your Internet Service Provider. And for the extra privacy conscious, that issue can be solved by using a virtual private network (VPN).

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nVidia hits gaming milestone



GeForce GTX 980 promises desktop performance in a laptop, reports Gordon Mah Ung

Graphics card maker nVidia has reported that it has hit a milestone for portable gaming with its new GeForce GTX 980 laptop GPU – true 1:1 performance with its desktop counterpart.

The new GPU is in essence the same as putting a desktop GeForce GTX 980 into a laptop. It has the same 2048 CUDA cores, the same memory bandwidth, and the same 256-bit memory bus. With the laptop GeForce GTX 980, it says that a consumer can now buy a single-GPU laptop or desktop and get the same graphics performance.

Why this matters: Never before has single-GPU performance ever been at parity between laptops and desktops. That meant consumers who needed to take their gaming on the go have always had to compromise. That ends with the new GPU.

How nVidia did it

Kaustubh Sanghani, a general manager with nVidia, said to pull off such a feat, the chips are first sorted for power requirements. Known as 'binning', processors can be organised for certain characteristics.

You might think this approach means that supply is limited, nVidia said this is not the case. It's offering six laptop models from partners including Aorus, Asus, Clevo and MSI.

Besides the binning, Sanghani said cramming a desktop GPU into a laptop also took an enormous amount of engineering to shrink down the board. One issue nVidia said it had to solve was the trace routes – the path of the wires that run between the GPU and the RAM. For the peak of performance, graphics cards use wide parallel memory buses, which means cramming identical-length wires into a tiny amount of space. This can lead to interference that can kill performance, but Sanghani said the new card can hit the same exact same memory bandwidth of the desktop card.

When asked if the use of HBM memory would have been easier, nVidia officials said this new GTX 980 hit the RAM speeds it needed to with what it has. Plus, unlike HBM, you can get the GDDR5 used in the new GPU. AMD and its RAM partner SK Hynix haven't commented on the yields of the new HBM memory, but there's growing suspicion in the industry that the hard-to-get next-generation RAM could be holding back wider availability of AMD's new Fury line-up. It's mostly an academic discussion anyway, as the GeForce GTX 980 was always designed for GDDR5.

> For the peak of performance, graphics cards use wide parallel memory buses, which means cramming identical-length wires into a tiny amount of space

Overclocking

Sanghani added that the other engineering feat in the new GeForce GTX 980 is supplying enough power to run it. While the GeForce GTX 980m uses three-phase power, the GeForce GTX 980 was designed to be built with four- to eight phases.

If you think of a phase as an individual channel, adding more means each channel has to work less, which in theory increases reliability and stability. With the new design, Sanghani revealed there's 50 percent more peak current available to the GPU than there is for the GeForce GTX 980m.

Normally this wouldn't matter that much, but nVidia also intended for the GPU to be overclocker-friendly and this requires access to a clean, stable power source. Overclocking implementation can be decided by the notebook builder and will be dependent on the capabilities of the platform, but one demonstration showed the card running with about a 200MHz boost overclock.

The same design flexibility goes for thermals, although nVidia hasn't released



Overclocking is unlocked on the GeForce GTX 980 too

details of the thermal design profile of the new GPU, saying that it's dependent on the laptop design.

VR capable and surround gaming

According to nVidia, the GeForce GTX 980 is the first mobile GPU capable of running VR, and showed it working with an Oculus Rift DK2 running several games and demos.

While you might think the tiny screen in a VR headset doesn't require much graphics power, it actually needs more. Gaming on a standard 2Mp, 1920x1080 monitor at 60fps takes about 120 million pixels per second, Sanghani explained. But gaming on, for example, the HTC Vive requires the GPU to push 1680x1512 per eye and also run at 90fps. That means the GPU now has to push about 450 million pixels per second.

That's something the GeForce GTX 980m can't handle, but the new GeForce GX 980 can, the company argued. For the record, the minimum GPU for the Oculus Rift DK2 is a GeForce GTX 970.

Multimonitor gaming has been possible on a laptop for sometime, but nVidia said the GeForce GTX 980 can now push it all in a single GPU. It showed off another Clevo unit running Project CARS on three 1920x1080 monitors in surround (see below).

> The GTX 980 is the first mobile GPU capable of running VR. While you might think the tiny screen in a VR headset doesn't require much graphics power, it actually needs more

Laptops

Initially, six laptops will be introduced with the new chip. Some of which will be familiar.

The most graphically powerful of these is the refreshed MSI GT80. We can't give the final word until we test a unit, but it has a leg up over all the other laptops: it runs two GeForce GTX 980 cards in SLI. The previous version that we reviewed is among the fastest gaming laptops we've seen. We looked at MSI's new line-up, but back then there was no word on the GPU. Now we know why. The company's GT72 also gets the GeForce GTX 980 buff.

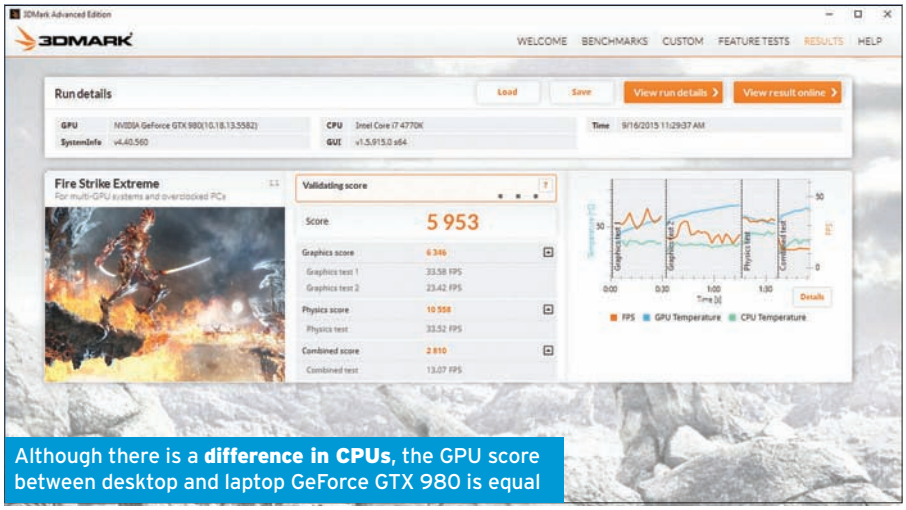
NVidia also had in hand Asus' wild laptop, the GX700, which will be the first laptop with a docking water cooling system. Asus unveiled the computer at IFA in September, but the GPU was a secret. We still have no



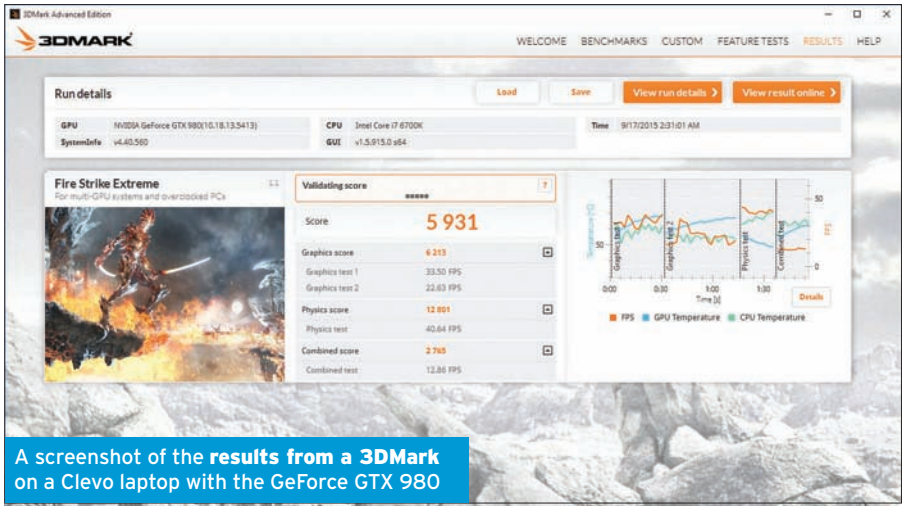
The GeForce **GTX 980** is the first GPU capable of supporting VR



A single laptop with a GeForce GTX 980 is shown here running **Project CARS** on three FHD monitors



Although there is a **difference in CPUs**, the GPU score between desktop and laptop GeForce GTX 980 is equal



A screenshot of the **results from a 3DMark** on a Clevo laptop with the GeForce GTX 980

idea how it works exactly. Asus let nVidia show the laptop, though, we weren't allowed to turn it on or undock it.

The other laptop we want to highlight is the Aorus X7 DT. This appears to be an updated version of the X7 Pro Sync. Aorus' approach with the X7 was to find a way to offer a ton of performance in a thin laptop. It's no ultrabook, but at 23mm it's not bad.

The way Aorus pumped up the performance was to use two GeForce GTX 970 cards in SLI. That put it well above the performance of a single GeForce GTX 980m, and it may be as fast as the GeForce GTX 980 in some tasks. SLI doesn't come without costs, though, and in some games, the GTX 980 will indeed be faster. Still, this is a lot of performance in a thin laptop.

G-sync

Of the six laptops nVidia showed off, five were running G-sync panels. This works best when framerates dip to the 30- to 40fps range. With a GeForce GTX 980 paired with a 1920x1080 panel, you'd have to get the framerates to dip below 60fps for it to pay big dividends. That's on today's games, of course. The strength of G-sync is that in two- to three years, when new games drag the framerates to low ranges, it'll still look good on a G-sync laptop.

Performance

To prove the GeForce GTX 980's performance credentials, nVidia showed off a Clevo laptop outfitted with a laptop GeForce GTX 980 and a desktop Intel Skylake Core i7-6700K CPU running next to small-form-factor desktop PC with a desktop GeForce GTX 980 and Core i7-4770K. The top screenshot (left) is the score from the desktop PC here after it finished. The second screenshot is of the laptop's performance.

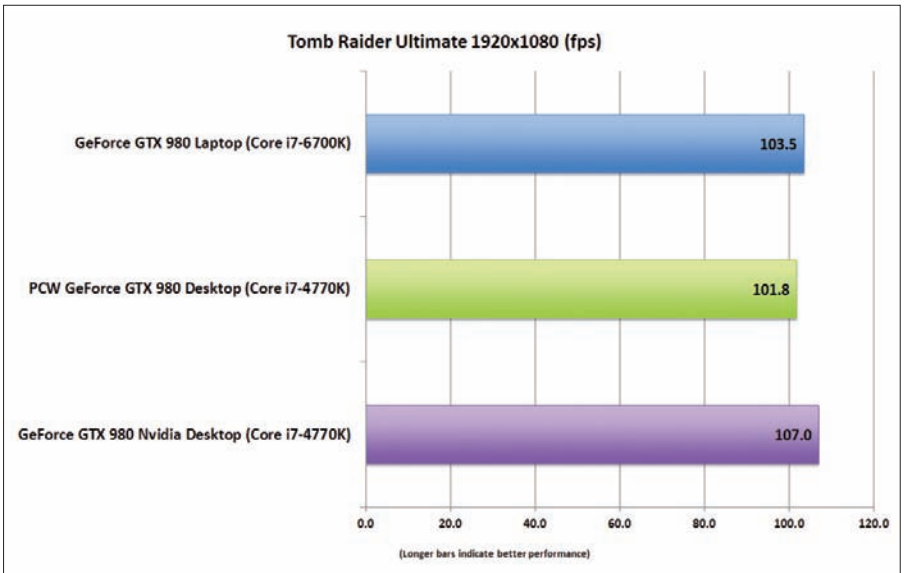
Besides 3DMark Extreme, we were also allowed to run Tomb Raider at 1920x1080 on both GeForce GTX 980 parts. We also threw in the results from our reference desktop with a Core i7-4770K (see graph, below).

Conclusion

NVidia has been working up to this day for some time. With the original launch of the GeForce GTX 980m in October 2014, the company said it had achieved mobile to within 75 percent the performance of its desktop counterpart. This was seen as quite an accomplishment when compared to the 2012-era GeForce GTX 680, which was about 60 percent the performance of its desktop counterpart, and the 2010-era GeForce GTX 480, which was 40 percent of the desktop GPU. Today, we have the laptop GPU hitting true 1:1 parity with its equivalent desktop part – albeit almost a year after the introduction of the desktop part.

Of course, cynics will point out that the GeForce GTX 980 is also far from being the top dog. That title goes to the GeForce Titan X and the GeForce GTX 980 Ti. Both of which support up to four GPUs in a desktop configuration.

Anyone who thinks this milestone is another nail in the desktop's coffin needs to check themselves. This doesn't threaten the gaming desktop in the least. But let's at least sit back and take a moment to mark the event on our calendar.



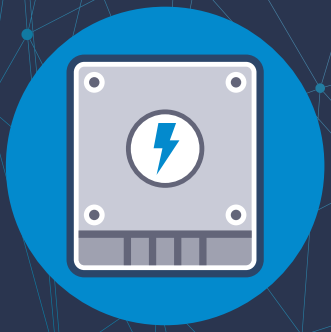
Laptop GeForce GTX 980 compared with two desktops with the desktop GeForce GTX 980

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Qualcomm follows the trend, building 8 cores into its new Snapdragon chips

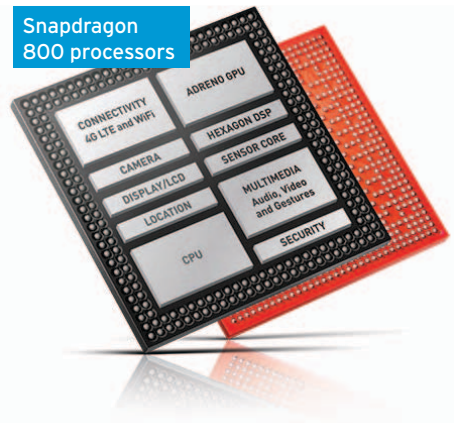


Qualcomm enters the eight-core processor market. Mark Hachman reports

Qualcomm has announced a pair of Snapdragon processors for midrange phones, with what might be a tinge of embarrassment. Both include eight cores, a strategy derided by a senior executive just two years ago as a dumb idea. The Snapdragon 617 and 430 chips will be marketed for phones that are cheaper than the flagship devices housing the Snapdragon 820.

Qualcomm has also revealed that the communications processor within the 820 will be known as the X12, and support '4G+' connectivity, with bandwidth up to 650Mb/s down and 150Mb/s up.

In 2013, Qualcomm senior vice president Anand Chandrasekher called eight-core smartphone processors "dumb". Asked whether Qualcomm would follow Mediatek into the market with an eight-core chip, he replied: "We don't do dumb things."



Chandrasekher was, however, making the point that simply adding cores was a bad idea if they couldn't be used cohesively. Now, however, the core count has become another metric of performance, and competition is forcing vendors to do things they previously thought off-limits.

Chandrasekher was making the point that adding cores was a bad idea if they couldn't be used cohesively. Now, however, the core count has become another metric of performance

The new Snapdragons will use an older ARM A53 core, and not the new Kryo core that will be featured in the 820. So far, Qualcomm has said only that Kryo chips will be quad-core, running at speeds of up to 2.2GHz, on a 14nm process.

Few details of the new Snapdragons were released, though both chips will include the Hexagon DSP for computational processing and always-on sensors. The 430 has a new Adreno 500 core, but supports only 1080p displays, rather than the higher-resolution screens used by flagship phones. Commercial devices featuring the 430 are expected to be available in the second quarter of 2016, Qualcomm said, while the 617 should be shipping in phones before the end of 2015.

Both chips also offer what Qualcomm calls QuickCharge 3.0, which halves the time it takes to apply a full charge to phones that support it, versus QuickCharge 1.0. According to Mark Shedd, director of marketing for Qualcomm, QuickCharge 3.0 can increase or decrease the voltage in 200-millivolt increments, decreasing the wear and tear on the battery, and increasing its lifespan.

Perhaps the real differentiator between the two is the modem. The 617 uses a Qualcomm X8 LTE modem, and supports 2x20MHz LTE-Advanced, with 300Mb/s up and 100Mb/s down. The 430 uses the X6 version, with 2x10MHz LTE-A, and 150Mb/s down and 75Mb/s up.

The capabilities of the modem were the last of the details Qualcomm has released concerning the 820's capabilities. The X12 supports Cat 12 download speeds up to 600Mb/s and Cat 13 upload speeds up to 150Mb/s via carrier aggregation. On the Wi-Fi side, the phone supports tri-band: 60GHz for 802.11ad, plus 2.4- and 5GHz coverage for 2x2 802.11ac. The modem will also tap into unlicensed LTE spectrum (LTE-U), and the Zeroth modem will be able to switch between Wi-Fi and LTE for voice and video calls.

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Windows 10 begins to eat into Windows 7's usage share



There may be some nay-sayers, but even Windows 7 fans are upgrading, says Gregg Keizer

Although Microsoft's latest operating system initially tempted Windows 8.1 users, it has increasingly grown its usage share at the expense of the much more widely used Windows 7, an encouraging sign for Microsoft's efforts to convince the old guard to switch.

Using data from analytics company StatCounter, our sister title *Computerworld* calculated the changes in usage share – a measurement of desktop-and-laptop-driven online activity – of the various editions of Windows since 10's debut on 29 July.

For the first four weeks after Windows 10's release, Windows 8.1 led in losses, beating Windows 7 by a wide margin. During that month-long span, Windows 8.1 accounted for 67 percent of all declines by it and Windows 7 – those two editions are the only versions of the operating system eligible for the free upgrade – while Windows 7 accounted for the remainder, or 33 percent. In each of those four weeks, Windows 8.1's losses exceeded those of Windows 7.

But that changed in the fifth week. In the next three full weeks, Windows 7's losses were larger than those of Windows 8.1. It was no contest, since Windows 8.1 gained usage share in the week ending 15 September.

Since the launch of Windows 10, losses recorded by Windows 7 accounted for 63 percent of all declines by it and Windows 8.1, with the latter responsible for the remaining 37 percent.

StatCounter's data validates expectations of how Windows 10 would be adopted: That Windows 8.1 users, who were not only running the latest operating system – upgrade installations almost always initially skew toward those starting from newer operating systems – but were presumably the least satisfied with their edition because of its bifurcated user interface (UI), would be the first to make the transition to the new operating system and its restoration of the Start menu.

It was thought that Windows 10 was going to be a harder sell to Windows 7 users because they were more set in their ways and already had a desktop-centric operating system. But convincing those customers to switch was going to be critical if Microsoft was to meet its self-imposed goal of putting Windows 10 on one billion devices by mid-2018, simply because Windows 7 was the dominant edition. According to StatCounter, Windows 7's usage share stood at 55.1 percent of all operating systems on the morning of Windows 10's release; by 15 September, it had dropped to 51.5 percent.

There are still plenty of Windows 8.1 users who have not pulled the upgrade trigger – 14.7 percent of all operating systems in usage share – but the quick change to Windows 7's dominance in losses has to be good news for Microsoft.

That's not to say it has an easy task ahead. Interestingly, the one-month period where Windows 8.1's losses dominated was also the stretch during which Windows 10 grew its usage share most rapidly. Since then, growth has slowed, perhaps because the pool of early adopters – again, primarily Windows 8.1 users – has been depleted. ☒

If you use AVG antivirus, you need to read this

AVG's new privacy policy is uncomfortably honest about tracking users, reports Jared Newman

While anti-virus firm AVG congratulates itself over a new easy-to-read privacy policy, users are up in arms over what that it spells out.

The new policy, which at the time of writing was set to take effect on 15 October, makes clear that AVG will collect non-personal data such as "Browsing and search history, including meta data." AVG says it collects this data "to make money from our free offerings so we can keep them free."

It's rare to see a privacy policy that so plainly points out a company's data collection methods and motivations, but that's the point. AVG recently put out a press release to celebrate its new document, which indeed uses lots of plain English and includes brief summaries of each section at the top. CEO Gary Kovacs even implored the rest of the tech industry to adopt similarly transparent policies.

But in making its privacy policy easier to understand, AVG has also opened itself up to a backlash. A post on Reddit pointing out its practices was top of the site's Technology section at the time of writing, with thousands of upvotes and (largely angry) comments.



Some of the practices mentioned in the post are things that AVG was already doing, such as keeping a list of installed applications, collecting the device's advertising ID, tracking search terms, and sharing that non-personal data with third-party partners.

Still, the old policy didn't draw a fine line between collecting data for malware tracking, and using it for profit. There's also no mention of collecting users' browser histories in the old document.

AVG's new policy illustrates why firms drown their data collection practices in legalese. There's no penalty for doing so, and being transparent only invites more outrage. In that sense, AVG at least deserves credit for helping users make informed decisions. Still, the idea of an anti-virus program tracking and making money from your browsing history is unnerving, and if anything AVG ought to clarify that point as it finalises its new privacy policy.

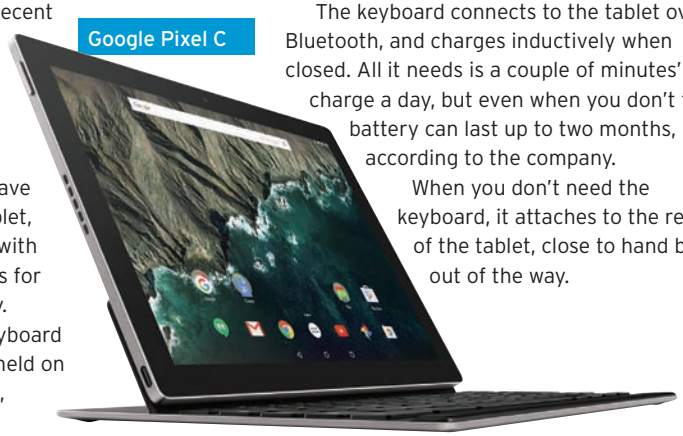
Google's surprise new Pixel C

Google is going after the Microsoft Surface and iPad Pro, says Marie Brewis

During the launch of the widely leaked new Nexus phones came something of a surprise: a new Google tablet. The Pixel C is in many ways the successor to the Nexus 9 tablet, since the keyboard is optional and it runs Android rather than Chrome OS.

Google's Pixel laptops have metal designs and very decent screens. The Pixel C follows that design ideal. The C stands for Convertible, and Google claims to have reimagined the tablet, trying to come up with a design that works for both work and play.

As such, the keyboard is detachable and held on by strong magnets, and adjustable between 100- and 135 degrees, so there's no kickstand to get in the way.



Google Pixel C

The keyboard has a very decent 18.8mm pitch, which Google says makes for a great touch-typing experience. This has been achieved by taking five less frequently used buttons from the keyboard and placing them on the screen.

The keyboard connects to the tablet over Bluetooth, and charges inductively when closed. All it needs is a couple of minutes' charge a day, but even when you don't the battery can last up to two months, according to the company.

When you don't need the keyboard, it attaches to the rear of the tablet, close to hand but out of the way.

Google's tablet will ship with the new Android 6.0 Marshmallow out of the box and will benefit from software updates every six weeks, meaning it will only get better over time.

It has a 10.2in, 308ppi screen with a bright backlight capable of up to 500 nits, and is powered by an nVidia X1 quad-core processor with 3GB of RAM and a Maxwell desktop-class GPU.

There are four mics, allowing for voice interaction from anywhere in the room – not just at close range – and it's easy to quickly check the battery life with a double-tap on the light bar.

In common with the Chromebook Pixel and new Nexus phones, the Pixel C supports USB Type-C for data transfer and charging.

There are two versions, 32GB and 64GB, priced at $499 and $599 respectively. The detachable keyboard costs $149. At the time of writing no UK prices had been announced, but it will be on sale by Christmas.

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We bring you the pick of the crop from the IFA 2015 technology show

Sony Xperia Z5

Smartphone

Following on from the disappointing Z3+, Sony has announced a trio of Xperia Z5 phones. Each model has a fingerprint scanner, located in the new-style power button, a Snapdragon 810 processor, 23Mp camera, and is available in a range of colours. The Premium model is the first phone to come with a 4K (3840x2160, 806ppi) UHD display.

Z5 Compact: £429 inc VAT
Z5: £549 inc VAT
Z5 Premium: £629 inc VAT
sonymobile.com/gb



Sony Xperia Z5 Premium



Sony Xperia Z5



Sony Xperia Z5 Compact

CHRIS MARTIN



« Acer Revo Build

Modular PC

Intimidated by the thought of upgrading your PC? Acer's Revo Build is a modular PC, meaning you can stack up the parts as you please using magnets. Components include extra hard drives, a headphone amp and a wireless power pack.

£199 inc VAT

acer.co.uk

Lenovo IdeaPad Miix 700 »

Tablet/laptop hybrid

Similar in design to Microsoft's Surface, the IdeaPad Miix 700 comes with a kick-stand and detachable keyboard cover. It features an Intel Skylake Core M processor and a 12in screen.

$699 (UK price £TBC)

lenovo.com/uk





Samsung Gear S2

Smartwatch

Wearables continue to arrive thick and fast, and Samsung's latest comes in two flavours, standard and Classic. Both are crafted from stainless steel and run the firm's own Tizen OS instead of Android Wear. Specs match rival devices on the whole, but the difference here is that you can interact with the device using the rotating bezel.

£TBC

samsung.com/uk



Asus VivoStick

Micro PC

Windows 10 machines are coming in all shapes and sizes, but you won't find any smaller than this. The VivoStick is a PC in the form of an HDMI-dongle, with 32GB of storage, 2GB of RAM and Intel HD graphics. There's also built-in Wi-Fi and two full-size USB ports.

£TBC

asus.com/uk



Huawei Mate S

Smartphone

Huawei stole some of Apple's thunder at IFA by announcing the first phone with Force Touch (called 3D Touch on the iPhone 6s). This will be available on the premium model of the Mate S. Huawei says that the pressure-sensitive screen can be used to zoom into photos, play games, and even weigh fruit. Key specs include a fingerprint scanner, which can be used for some navigation, and a 13Mp rear camera.

£469 inc VAT

huaweidevice.co.uk

Motorola Moto 360 (2nd generation)

Smartwatch »

Motorola has launched a new version of its Android Wear smartwatch – the Moto 360. It's available in three different models – two for men and one for women. It still has the 'flat tyre' part of the screen and core specs remain largely the same. You can now customise the watch at tinyurl.com/nLfzavj, including colours, straps and different bezels.

£229 inc VAT
motorola.co.uk





« Philips AmbiLux

TV

Easily the best TV tech we found at IFA 2015 was at the Philips stand inside its new AmbiLux TV. An evolution of its LED AmbiLight technology, AmbiLux uses nine pico-projectors mounted on the back to project a version of the image on the wall around the TV. This provides a more immersive experience and will be available on the 4K 8900 series model later this year.

£TBC
philips.co.uk

Toshiba Satellite Radius 12

Laptop »

There was plenty of 4K at IFA this year, but more so on TVs than laptops. The Radius 12 crams more than eight million pixels on to a 12in screen for a crisp picture. The laptop is also convertible offering five different usage modes. It has an aluminium chassis, and Toshiba has fitted an Intel Skylake processor, up to 8GB of RAM and up to 512GB SSD.

€1,449 (UK price £TBC)
toshiba.co.uk



LAPTOP

Gigabyte P55 V4

£1,150 inc VAT

Contact
■ uk.gigabyte.com

Specifications
15.6in (1920x1080, 141ppi) IPS matt anti-glare display; 2.7GHz Intel Core i7-5700HQ (3.5GHz Turbo) 4C, 8T; nVidia GeForce GTX 970M + Intel HD Graphics 5600; 8GB (1x 8GB) 1600MHz DDR3; 128GB SSD + 1TB 7200rpm SATA HDD; gigabit ethernet; 802.11ac 2x2 MIMO; Bluetooth 4.0; DVD±RW DL, tray-load; 4x USB 3.0; HDMI, VGA D-Sub; Kensington lock slot; SDXC card slot; stereo speakers; 3.5mm headphones, S/PDIF optical; UK tiled keyboard with white backlight and numberpad; buttonless multi-touch trackpad; 150W mains adaptor with IEC C5 inlet; 377x268x5.6mm; 2615g

Build: ★★★½☆
Features: ★★★★☆
Performance: ★★★★½
Value: ★★★½☆



Gigabyte is better-known for PC motherboards, but the Taiwan company is bringing gaming laptops to the UK under its own name and the upmarket sub-brand Aorus.

While the Gigabyte P55 V4 is an otherwise unremarkable 15in gaming laptop, its strong graphics abilities are supported with a powerful GTX 970M graphics processor. Move along nVidia though, because while the GPU is the beating heart of a games station, the Gigabyte P55 V4 gains a new brain with the first quad-core 14nm Broadwell chip for mobile notebooks. This gaming laptop is the first to use the new Intel Core i7-5700HQ, clocked at 2.7GHz with Turbo, to 3.5GHz.



Black plastic with a satin sheen forms the casework of this chunky laptop, 36mm thick and just over 2.6kg in weight. There's a DVD drive to the right, a useful two USB 3.0 ports each side, HDMI and VGA on the left, but no DisplayPort. A large exhaust vent whistles with warm air, turning to hot while gaming.

No access doors or removable battery are offered on the underside, and meshed air intakes here mean it's less suitable for lap or carpet parking. Overall fan noise is not terrible, though louder than the best of the current breed.

We found the keyboard clackety, and it gets warm. Backlighting has just two levels, while the Elan trackpad has no two-finger right-click option, and it didn't feel particularly precise in use.

Inside, Gigabyte missed a trick by not including faster 1866MHz memory, instead using a single 8GB module at 1600MHz. The new CPU is an Intel 'tick' upgrade, a process shrink with potential energy savings. We measured four hours seven minutes battery life from the laptop.

The 15.6in full-HD display is IPS-based, but was limited to 85 percent sRGB, and while the LG panel is specified to 300cd/m^2 our sample couldn't exceed 130cd/m^2. A viewing angle issue meant slight but noticeable colour shift with head movement, even face-on.

Storage is twofold – a 128GB boot SSD and a 1TB hard disk. For Wi-Fi, the P55 V4 uses an Intel two-stream 802.11ac wireless adaptor.

Performance

Geekbench 3 scored the P55 V4 with a healthy 13,178 points (3349 points single-core), and the PCMark 8 result reinforced this result with 3328 points (Home Accelerated).

Most Windows action games should play at native screen resolution and high or even highest available detail – Tomb Raider 2013 zipped along at 163fps average (Normal) and could still manage 5fps at Ultimate. Batman has a smaller range of adjustment, where the P55 ranged from 71fps at 1080p and Medium, to 64fps at Extreme. Metro: Last Light played at 69fps (High) and 27fps (Very High, all effects).

Verdict

We had issues with the P55 V4's display, while the keyboard and trackpad are disappointing. It is, however, fast for gaming and other applications. ☒ **Andrew Harrison**

LAPTOP

Lenovo ThinkPad Edge E500

£640 inc VAT

Contact
■ lenovo.com/uk

Specifications
15.6in (1920x1080, 141ppi) TN matt anti-glare display; Windows 7 Professional (option for 8.1); 2.4GHz Intel Core i7-5500U (3GHz Turbo) 2C, 4T; AMD Radeon R7 M265 Series with 2GB DDR3 + Intel HD Graphics 5500; 8GB 1600MHz DDR3L RAM; 1TB 5400rpm SATA HDD; gigabit ethernet; 802.11ac, 1x1 MIMO (Intel Dual Band Wireless-AC 3160); Bluetooth 4.0; DVD ± RW, tray-load, removable; 2x USB 3.0, 1x USB 2.0; HDMI, VGA; Kensington Security Slot, fingerprint sensor; SDXC card slot; stereo speakers; 0.9Mp webcam and built-in mic; 3.5mm headset jack; 48Wh lithium-ion battery, removable; 376x253x28.3-33.2mm; 2415g

Build: ★★★★☆
Features: ★★★★☆
Performance: ★★½☆☆
Value: ★★★½☆

★★★☆☆



Lenovo has an enviable reputation for dependable business laptops, and the ThinkPad Edge E500 is a budget business machine for those looking to keep down costs. There's just one size, a relatively solid-feeling 15-incher, with a fifth-generation Intel Core processor and traditional hard disk for storage. Options run from a low-resolution display and Core i5 to full-HD TN screen, with dual-core 2.4GHz Core i7 processor– we tested the latter.

The matt-black casework is plain but serviceable, weighing over 2.4kg on the scales and measuring more than 33mm thick thanks to a 48Wh battery. This is removable, letting you carry a spare to augment the circa-seven hours runtime – we recorded seven hours 11 minutes in our wireless streaming test.

Projectors or second displays can be connected to VGA or HDMI, and of the three USB ports two are 3.0. There's a tray-load DVD drive, while the top deck follows the Lenovo template of IBM trackpoint and three real buttons, supplementing a buttonless trackpad.

The keyboard has tightly sprung 'shield' tiles that are a treat to type on compared to many Windows laptops. The power inlet is Lenovo's reversible USB-style port. However, we found a fault that meant even with the power adaptor attached, the battery was not always charging. Note that this can sap performance further as the machine goes into battery-saving mode.

Performance

There's no escaping the E500's primary flaw – this laptop is glacially slow in normal use. Forget the benchmark numbers, which only give guide to program processing speeds. Daily tasks such as launching a program, saving a document, booting and rebooting, took geological time to complete.

We counted around 10 seconds to launch many programs – more than 20 seconds to open WordPad – and boot times counted in minutes rather than seconds; even after AVG was removed.

Geekbench 3 results of 2892- and 5899 points give no clue to the subjectively slow performance. PCMark Home returned a reasonable score of 2807 points, responding well to GPU acceleration (3599 points).

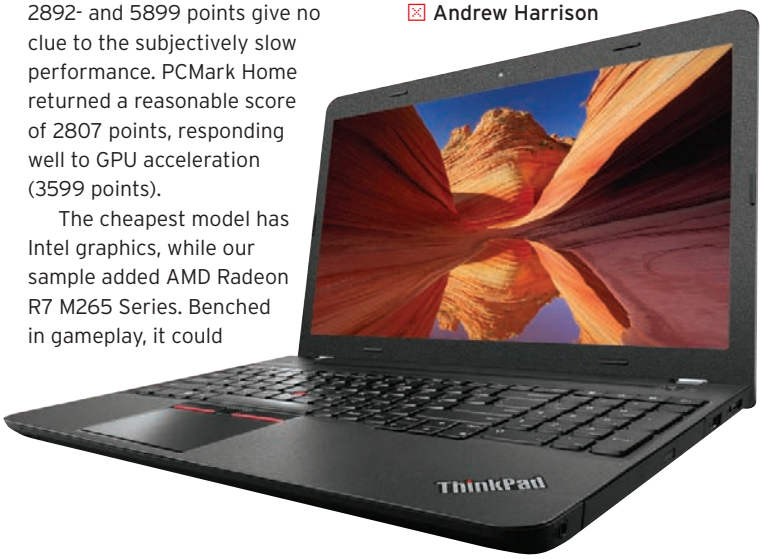
The cheapest model has Intel graphics, while our sample added AMD Radeon R7 M265 Series. Benched in gameplay, it could manage full-HD Batman: Arkham City with High detail (39fps), though Tomb Raider averaged only 2fps with Normal detail.

Lenovo has scrimped on the display, fitting a budget TN panel with poor accuracy (Delta E 10.0), low contrast (80:1) and limited colour (60 percent sRGB). It has a matt finish to reduce reflections, although that won't help its restricted off-axis visibility.

Verdict

Build quality is fine, the battery life isn't terrible, and the Intel chip looks fast and frugal. However, this finger-drummingly slow business laptop cannot be recommended for anyone that needs work done in a hurry.

☒ **Andrew Harrison**



LAPTOP

Toshiba Satellite L50D-C-12X

£430 inc VAT

Contact
■ toshiba.co.uk

Specifications
15.6in (1366x768, 100dpi) TN gloss glare display; AMD A10-8700P (4C, 4T) processor; AMD Radeon R6 graphics; Windows 8.1; 8GB 1600MHz DDR3 RAM; 1TB 5400rpm SATA HDD; gigabit ethernet; 802.11n (Realtek RTL8723BE); Bluetooth 4.0; tray-load DVD±RW; 2x USB 3.0, 1x USB 2.0; HDMI; Kensington Security Slot; SD card slot; stereo speakers; 0.9Mp webcam and mic; 3.5mm headset jack; UK tiled keyboard with numberpad; buttonless multi-touch, 106x66mm; 44Wh lithium-ion, non-removable; 65W mains adaptor with IEC C5 inlet; 380x260x24.1mm; 2.2kg

Build: ★★★☆☆
Features: ★★★½☆
Performance: ★★★½☆
Value: ★★★½☆

★★★☆☆



From Toshiba's L Series and the new collection for 2015 comes the Satellite L50D-C, a 15in budget laptop with an AMD processor. There's also an Intel-powered counterpart, the L50-C.

The A10-8700P processor continues AMD's reputation for hiding its clock speed (baseline 1.8GHz, and overclock capable to 3.2GHz in a turbo mode). Integrated into the same one-chip SoC (or accelerated processing unit, APU in AMD-speak) is a Radeon R6 graphics processor, with potential for action games at modest resolutions.

Screen quality is little better than from the cheapest possible, with the glossy display showing typical image deterioration when viewed a few degrees from head-on. Its contrast ratio is a disappointing 80:1 – worse than the £200 C50 we last tested – and colour gamut is only 61 percent sRGB. Even more disappointing is colour accuracy, with the Toshiba measuring a whopping 11.1 Delta E, where figures approaching or below 1.0 are preferred.

The keyboard has no issues. It's a standard Scrabble-tile fare with a consistent key action, though the trackpad lets down the user experience. It's a buttonless design, with mediocre steering precision and a rattle whenever tapped.

The overall build quality is so-so, comprising a thin metallic veneer over the lid back and top deck, with black plastic elsewhere. The chassis of our sample was warped, such that the L50D-C-12X couldn't sit evenly on the desk. A weight of 2.2kg is about average for the screen size, including a reasonable 44Wh lithium-ion battery fixed inside. There's also a tray-load DVD drive, unusually mounted on the left.

Of three USB ports, two are 3.0 spec, so for the best results remember not to plug modern peripherals into the remaining USB 2.0 port alongside the optical drive.

Performance

In use, we found the L50D-C-12X a little noisy, with internal cooling fans running at different speeds while sat idle on the desk. Judged subjectively, the laptop felt slow, with some frustrating moments of total lock-up – when installing software, for example.

Processor benchmarks showed usable performance, so we'll attribute these lags to the slow storage, a 2.5in SATA disk of 1TB capacity. Geekbench scored the Satellite with 2095 points, and 4790 points using all four cores.

A sub-2000 point score in PCMark 8 underlines laggardly overall performance, here 1891 points but rising to 2490 points using Radeon acceleration.

Gaming is not a given; you'll need to keep detail and expectations in check. Nevertheless, Batman: Arkham City averaged 31fps, albeit with Low detail. Drop to 720p and you may see 34fps.

Maintaining AMD's reputation for lousy battery life, the L50D-C-12X ran for just four hours 11 minutes in the wireless streaming test.

Verdict

Approaching £500 we hoped for a better screen, trackpad and build quality from the Toshiba Satellite L50D-C-12X, and battery life is below par. Light gaming is just possible from this 15in budget laptop. ☒ **Andrew Harrison**

The L50D-C's overall build quality is so-so, comprising a thin metallic veneer over the lid back and top deck, with black plastic elsewhere

LAPTOP

Toshiba Satellite C40-C-10K

£199 inc VAT

Contact
■ toshiba.co.uk

Specifications
14in (1366x768, 112ppi) TN gloss glare display; 1.6GHz Intel Celeron N3050 (2.16GHz Burst) dual-core; Intel HD Graphics; 2GB 1600MHz DDR3 RAM; 32GB eMMC (Toshiba 032GE4) SSD; 802.11n Wi-Fi (Broadcom BCM43142); Bluetooth 4.0; 1x USB 3.0, 2x USB 2.0; HDMI; Kensington Lock Slot; SD card slot; stereo speakers; 0.9Mp webcam; mic; 3.5mm headset jack; UK tiled keyboard; two-button multi-touch trackpad, 92x54mm; 32Wh lithium-ion, non-removable battery; 45Wh mains adaptor with IEC C5 inlet; 343x243x23.5mm; 1.7kg

Build: ★★★½☆
Features: ★★★☆☆
Performance: ★★★☆☆
Value: ★★★★☆



Toshiba has a most affordable laptop for you if you can't spend a penny more than £200. Like other lowest-budget laptops we've tested, the Satellite C40-C-10K is built out of the cheapest components that together just about runs Windows, with one concession to latest mod-con spec – a brand-new 14nm Intel processor.

This is no Core series chip though, but a Celeron-branded N3050 CPU, with all the horsepower of a mobile phone processor. It must rely on just 2GB of memory, further straining the user experience once a few programs are open, while the limited 32GB flash storage drive means you're left with less than 10GB of usable space. There's no easy entry inside either, so upgrade possibilities are uncertain.

The C40 has a 14in display, with a highly reflective gloss finish and the standard low resolution of 1366x768. In tests, it wasn't the worst we've measured, having a contrast ratio of 100:1 and colour gamut of 62 percent of sRGB colour space. Its colour fidelity was poor though, averaging 8.2 Delta E (where a figure of 1.0 or lower is preferred).

Build quality is serviceable enough. The black plastic chassis and lid have a grained effect, and overall little signs of creaks or flexing. A weight of just 1.7kg makes this a better proposition for your shoulder, too. There's one high-speed USB 3.0 on the right and two older USB 2.0 to the left, and you can connect a display with its HDMI port. As with most modern budget laptops, there's no CD/DVD drive.

Performance

The new dual-core Intel processor is built for power economy, and despite the small 32Wh fixed battery this Satellite was still working after six hours two minutes of film playback in our HD video-over-Wi-Fi test.

Don't expect much performance in heavier tasks than web browsing and text editing. Geekbench rated the processor and memory with 919 points, and 1671 points multi-core mode. Similarly PCMark 8 returned the lowest numbers we've seen – 1177 points (Home), and 1536 with GPU acceleration. That comes just behind the circa-1270 points we found with last year's Satellite L10W and its Intel Celeron N2840. That chip was clocked at 2.16- rather than 1.6GHz, indicative of how comparable performance is available with slower-looking chips today.

The Batman: Arkham City game warned us on startup that the machine didn't meet minimum requirements, and sure enough even our lowest-rung bench test (720p, Low detail) only averaged 16fps.

It may not have the pulling power of even a Core i3, but the C40 does have another commendable quality. There may be a cooling vent on the case side but it seems that no cooling fan is required. Even under duress, the Toshiba remained silent.

While the C40 comes with Windows 8.1 (64-bit), it's eligible for a free upgrade to Windows 10. We wouldn't recommend diving straight in, though, as you may find things run slightly more slowly.

Verdict

If you're on a budget and only want to surf and type, the Satellite C40 will do the trick. It's cheap, lightweight and quiet. Beware of the limited memory, and tiny storage drive. ☒ **Andrew Harrison**

There may be a cooling vent on the case side but it seems that no cooling fan is required. Even under duress, the Toshiba remained silent

SMARTPHONE

Marshall London

£399 inc VAT

Contact
■ marshallheadphones.com

Specifications
4.7in IPS (720x1280, 312ppi) screen; Android 5.0.2 Lollipop; Qualcomm Snapdragon 410 1.2GHz quad-core processor; 16GB of storage; 2GB of RAM; microSD card slot; 8Mp rear camera with LED flash; 2Mp front camera; dual-band Wi-Fi; Bluetooth 4.1 LE with aptX; GPS; stereo speakers; dual-mics; dual-headphone ports; M-button; brass scroll wheel; Cirrus Logic WM8281 Audio Hub; 4G LTE; 2500mAh removable battery; 70x140x9.5mm; 145g

Build:
Features:
Performance:
Value:



Marshall is a globally recognised brand, with many big-name bands using its guitar amps, plus it also has a popular range of headphones. So we were surprised when it announced it was launching a smartphone – the Marshall London.

We've not heard of any mobile networks offering the phone, so you'll have to buy it from Marshall's website. Its asking price of £399 is a lot less than flagship devices from the likes of Sony, Samsung and HTC, but it's still a lot for the specs you're getting.

Design

Image is a big deal these days, and owning the Marshall London is partly about making a statement. You'll be shunning the conventional options and instead opting for something a little different.

The phone looks the part on almost every level and has been designed from the ground up, which is clear when you look at the details involved. The company's logo is on the front and back, there's a patterned edge, a textured rear cover and white piping, which all ensure that the London fits Marshall's distinctive style.

We were disappointed to find that the rear cover is extremely thin and plasticky, making the device feel a little cheap. Brass details make up for this, and include dual-headphone ports, an 'M' button (see image below) and the impressive volume scroll wheel on the side. This also clicks if you push it in to launch the camera app, though not when the screen is off, which is a shame.

Note that the 'M' button on the top isn't the power button (that's camouflaged on the side above the scroll wheel). Instead, it's for instantly accessing your music. Press it, even with the screen off, and you're taken to the custom music player, so you can get the tunes rolling without delay.

Although the London is one of the coolest smartphones we've ever seen, things take a slightly negative turn when it comes to the hardware on offer. With many budget and mid-range phones offering astounding specs, they make the Marshall's offering look under-equipped for the price.

The device itself is large, but has only a 4.7in screen size, so there's a large bezel. We can get over this, but the resolution is just 720p whereas we would expect Full HD for this price. It is an IPS display though, so viewing angles are good and the pixel density of 312ppi is fine – the iPhone 6s is still 326ppi.

Just one 16GB option is available, though there's a microSD slot for adding more. Powering the Marshall London is a quad-core 1.2GHz Qualcomm Snapdragon 410 processor. There's also 2GB of RAM.

Performance was very smooth – partly thanks to its almost entirely vanilla version of Android. You can see how the London stacks up against its rivals in the graphs opposite. The numbers don't make for exciting reading, but the reality is a trouble-free experience.

Having a lower resolution screen means it doesn't use as much power, and this was reflected in the device's battery life. In our benchmark test, it lasted for five hours 54 minutes, which isn't bad at all – it beat the LG G4 by more than an hour.

On the front is a 2Mp camera, and there's an 8Mp offering with a single LED flash on the rear. Unusually, the London shoots in 4:3 by default (you need to drop to 6Mp to get 16:9). The phone uses the regular Android camera app.



Overall, the main camera is average. It's slow to focus and image quality isn't anything to shout about either. You can shoot video in up to 1080p and features include HDR, Panorama and Lens Blur. It's good enough for sharing the odd snap on social media, but as with other specs, there are better options out there.

Music

A quick look a Marshall's website highlights the company's main focus for its phone – it's all about the design and the music. And thus we come to the positive area of the hardware line-up.

As mentioned earlier, there are two headphone ports, so you no longer need to carry around that splitter or share an earbud each. This also negates the need to use on-board speakers, though if you want to the London is well-equipped with front-facing stereo speakers. Marshall says it "might just be the loudest mobile phone on Earth," and while we're not sure that's the case, the speakers are pretty good. And no, the phone volume doesn't go to 11, it goes all the way to 36.

Back on the headphone front and the London is supplied with decent Marshall Mode earphones worth £45. Plus, there's Bluetooth with aptX if you want to use a wireless pair of headphones. There are also dual-mics, so you can record spur of the moment ideas in stereo. To complement all this is a Cirrus Logic WM8281 Audio Hub – a separate processor just for audio. Audiophiles will also be pleased to hear that the London supports FLAC.

Preinstalled is LoopStack, a 4-channel 16-bit recorder, though we were more interested in the global graphic equaliser, so you can adjust (with presets) exactly how you want things to sound, boosting bass for dance music or stripping it back a bit to hear the detail in jazz. This is found in the Marshall Home option, accessed by the 'M' button, which lets you play any music stored on the device, and also provides access to Spotify, SoundCloud and Mixcloud. The app also provides shortcut access to LoopStack, and settings such as Wi-Fi and Bluetooth.

That's a lot of audio centric features and this is really what the Marshall London is all about – it's clearly for music rather than those bothered about pixel density and processor cores.

Software

As you would expect from a phone arriving in the second half of 2015, the London runs Android 5.0.2 Lollipop. That's not the most up-to-date version, but we're told that it will be upgraded to 6.0 Marshmallow in due course.

Although it's a stock version of the operating system, Marshall has added a few extras, including stylish wallpapers and a clock widget that displays the time in words. The Phone and Messaging apps also have custom icons. Last of all, Marshall has added a darker theme for the settings menu.

That's a nice balance of smooth performing, familiar Android, with added unique elements. As mentioned earlier there are also some apps preinstalled such as Spotify, LoopStack and SoundCloud. There's also Equalizer+ Pro and a slightly bizarre game called Rockbilly Bros where you have to manage a band. If you don't want these you can uninstall them all, with the exception of Equalizer+ Pro.

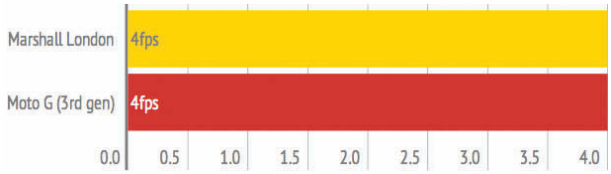
Verdict

Focusing on core specs, the Marshall London isn't a very good deal at all. You get the kind of hardware (in some cases worse) that's available on phones costing less than half the price. However, this isn't the point of this handset. Buying the London is all about the brand, the style and music, and on these fronts it delivers in amp-shaped bucket loads. Marshall has made the coolest phone we've ever seen (we just don't have a rating for that). ☒ **Chris Martin**

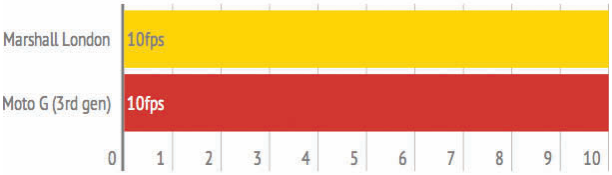
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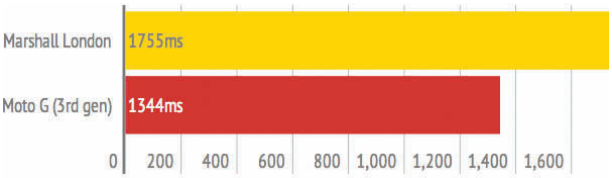
GFXBench Manhattan



GFXBench T-Rex



SunSpider*



* lower is better



SMARTPHONE

OnePlus 2

£289 inc VAT

Contact
■ oneplus.net

Specifications
5.5in IPS Full HD (1920x1080, 401ppi) display Oxygen OS 2.0 based on Android 5.1 with Android M features; 64-bit Qualcomm Snapdragon 810 processor with 1.8GHz Octa-core CPUs; GPU: Adreno 430; 3/4GB LP-DDR4; 16/64GB, available capacity varies; fingerprint, accelerometer, gyroscope, proximity and ambient light sensors; embedded rechargeable 3300mAh battery; dual-SIM connectivity; 4G/LTE support; dual-band Wi-Fi; Bluetooth 4.1; Internal GPS antenna + GLONASS; USB Type-C; rear camera: 13Mp, dual-LED flash, f/2.0; Front camera: 5Mp, distortion free; Video: 4K resolution video; 151.8x74.9x9.85mm; 175g

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

★★★★☆

Few smartphone launches get fans as excited as a OnePlus event. Ignoring for now the fact that it happened to be the world's first product launch in VR, it's not difficult to see why there's so much enthusiasm toward the growing Chinese company.

The OnePlus 2 (OP2) is a large and sturdy-feeling black slab of a phone with a 5.5in screen. It's a plastic device but with a stylish metal trim, and as is standard for Android phones, you get a volume rocker and power button on the right side, and a headphone jack at the top. Down the bottom are two speaker grilles, which make it appear that you get stereo speakers; you do not. Instead, the single speaker sits under the phone's right speaker grille, and if you're not careful you could smother it with your palm.

New to the OP2 is a physical home button with a built-in fingerprint scanner, which sits in the middle of two software buttons – recents and back – the functionality of which you can reverse in the Settings. We say physical, but it feels more like a software button with a hardware ring rather than a button you can push.

When we first began testing the OP2 we found this home button unresponsive, which led us to the impression that it was just a fingerprint scanner and not a home button at all. Over time, though, either we got used to it or it became more responsive. It remains the most laggy aspect of the OP2, taking a second or two to spring into



action, but the tactile response you get when tapping it does at least confirm you have pressed it.

Regardless of our gripes with the home button, the fingerprint scanner itself is incredibly good, and OnePlus says it can scan your fingerprint in just half a second. It accepts touch- rather than swipe-based input, which is far more accurate. Plus, the fingerprint scanner works even when the screen is switched off, meaning you're a step closer to using the phone.

Also new to the OnePlus 2 is a hardware notifications slider known as an Alert Slider. It's the first of its kind we've seen on a smartphone, and allows you to toggle between no interruptions, priority interruptions and all notifications without even taking the phone out of your pocket. This isn't a feature that appeals to us personally, but we know many Android users who would use it.

The charging port on the OnePlus 2 looks different to that of any other Android phone we've seen. It's a USB Type-C port and, although the OP2 isn't the first smartphone to include one, it is the first that we have reviewed. USB Type-C is a reversible connection, meaning you can insert the connector either way up and it will still work.

The USB Type-C cable supplied with the OnePlus 2 is also reversible at the Type-A end (that which goes into your mains adaptor or PC's USB port). It's a pretty cool-looking cable, with a flat, tangle-free design and bright red colouring. Which is good, since it's probably the only USB Type-C cable you'll own and you will therefore be carrying it around everywhere you go in order to keep the OP2 topped up.

Sadly, the USB Type-C connector implemented here works over USB 2.0 and not the faster USB 3.0 protocol. Slow connections is something of a theme for the OnePlus 2: for some absurd reason, despite the Snapdragon 810 chip inside the company has neglected to include support for Qualcomm Quick Charge 2.0, which can reduce charging time by up to 75 percent.

Something that hasn't changed from the OnePlus One is the screen, and the OP2 is as before fitted with a 5.5in IPS panel with a full-HD resolution. At 1920x1080 pixels, it has a pixel density of 401ppi. It has a 600 nits brightness rating that is higher than that of the iPhone 6, and excellent viewing angles. Colours are more vibrant with AMOLED tech, but in response IPS offers a more realistic colour palette.

It's difficult to find fault with the core hardware inside the OP2. If, as we have done, you get the 64GB version you'll get 4GB of LP-DDR4 RAM, which is a massive amount for any phone. The 16GB OP2 (£239), by comparison, has 3GB



of RAM. Neither support microSD storage expansion, so choose your model carefully.

The processor is the same Qualcomm Snapdragon 810 is a second-generation octa-core chip, clocked at 1.8GHz, which OnePlus says has been optimised both for the software and to avoid the overheating issues that allegedly led Samsung to use its own Exynos chip inside the Samsung Galaxy S6.

We ran the OP2 through our usual benchmarks and compared it to its predecessor, the OnePlus One, a close rival, the HTC One M9, and the two fastest Android phones we've seen to date, the Samsung Galaxy S6 and S6 Edge. You can see the results, right.

Connectivity

There is a growing interest in dual-SIM phones in the UK. In the vast majority of cases only one of the two slots in a dual-SIM phone will support 3G/4G mobile data, and often you'll find they mix Nano-, Micro- and full-size SIMs, making it impossible to switch them around on the fly. What's great about the OP2 is that although you must set a preference for which SIM you use for data before you go online, both are Nano SIM slots and both support 4G. For calls and texts, you can either set a preference for which SIM to use, or you can request that the OP2 asks you each time which you'd like to use. Because it's a dual-standby phone, either SIM will be able to accept calls or texts.

The connectivity specs include dual-band 802.11ac Wi-Fi, Bluetooth 4.1, GPS, but with the notable omission of NFC. This has been removed from the OPO because the company felt people weren't using it. With a new fingerprint scanner and Android Pay soon to launch in the UK, it's a bizarre move.

The OnePlus 2 is fitted with a 13Mp rear camera with a six-element lens that's capable of shooting 4K, time-lapse and slow-motion video. It has all the features you would expect for a flagship camera, including optical image stabilisation, a laser autofocus (which can focus in under 0.3 seconds), a dual-LED flash, an f/2.0 aperture and 1.3m pixels that should work more effectively in low-light environments.

The camera app itself is easy to use, letting you swipe in from the side of the screen to access camera modes and settings, while buttons to turn on or off the flash and switch to the 5Mp wide-angle selfie-camera are on screen at all times. Photos are by default shot in a 4:3 aspect at 12.4Mp, or you can choose 7.9Mp 16:9 or 9.3Mp 1:1. You can also select Beautify, HDR or Clear photo modes, with the latter stitching together several images to create one super-clear shot.

In our tests the camera worked well and produced shots worthy of a flagship camera, with lots of detail in our close-up shots. It did take a while to capture shots, though, and in our hands-on with the OnePlus 2 (see below) we weren't overly impressed by the low-light performance. Our main gripe, though is with video – no matter which mode you use the laser focus appears to make the footage jerk as it locks on to the focus. This is likely just a software issue, which will hopefully be cleared up with a future update.

Software

We really like Oxygen OS, which is a custom version of Android Lollipop. Unlike so many other mods, it simply adds to the existing Android experience rather than replacing or taking anything away.

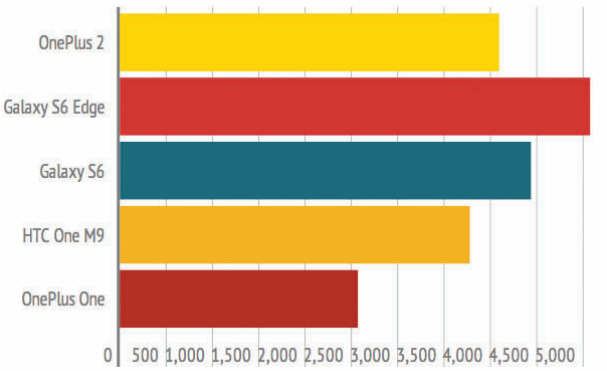
One of the first things you'll notice is some new additions in the Settings menu for Buttons and Gestures. The former lets you set the function of the home button and the two software buttons that sit to either side of it, while gestures allows you to turn on the ability to access some of the OP2's key features in a single step from screen off. You can double-tap to wake the screen, or draw an O to open the camera, a V to turn on and off the torch, and II, < and > to play, pause and skip audio tracks.

Something that's coming with Android 6.0 Marshmallow is greater control over app permissions, but it's already here with the OnePlus 2. You can access and turn on or off the individual app permissions for every app you install on the OP2.

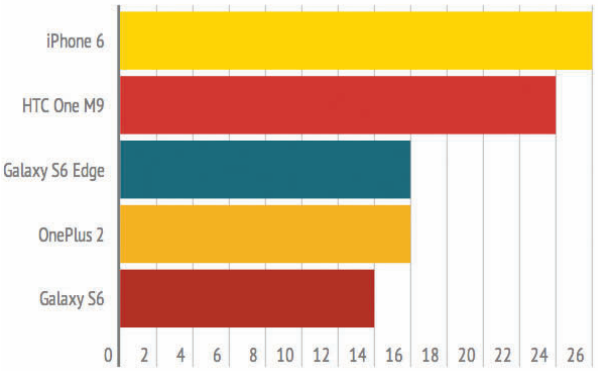
Verdict

The OnePlus 2 has some great new features, including USB Type-C, 4G dual-SIM support and some powerful hardware. At £289, it's an unrivalled deal if you can get hold of one. ☒ **Marie Brewis**

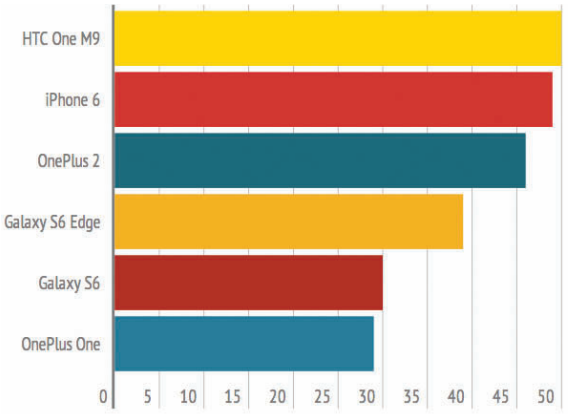
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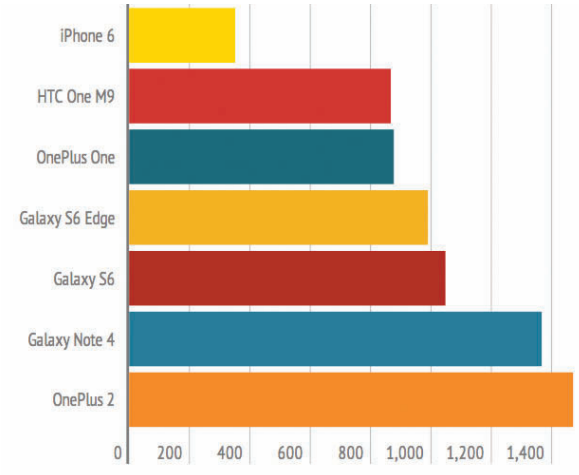
GFXBench Manhattan



GFXBench T-Rex



SunSpider*



* lower is better

SMARTPHONE

Motorola Moto X Play

£279 inc VAT

Contact
■ motorola.co.uk

Specifications
5.5in Full HD (1920x1080, 403ppi) display; Android 5.1.1 1.7GHz Snapdragon 615 (octa-core) processor; Adreno 405 GPU; 2GB RAM; 16/32GB storage, with up to 128GB via microSD; 21Mp rear-facing camera, 5Mp front; Nano-SIM Bluetooth 4.0 802.11a/g/b/n (dual band) NFC, GPS; 1080p HD, 30fps (MPEG4, H.264) video capture; 3630mAh battery; 148x75x11mm; 169g

Build: ★★★½☆
Features: ★★★★☆
Performance: ★★★½☆
Value: ★★★★☆



Motorola recently launched two new smartphones: the X Style (£359) and the X Play (£279), which we'll be looking at here.

It's a stylish handset, and we particularly like the new design of the area around the camera and Motorola logo. The rear cover pops off, which means it's easy to personalise the phone with other covers – to do so you'll need to visit the Motorola's Moto Maker website at tinyurl.com/o4Lhykz. There are 12 colours to choose from for the front, rear, camera surround on the back and the front speaker grilles. It doesn't cost any extra and you'll have a phone that looks different to everyone else's.

The handset weighs 169g and is 10.9mm at its thickest point. Its curved design means it feels comfortable in the hand, so it doesn't feel like a bulky phone.

Unlike the cheaper Moto G (£159), the Moto X Play is water repellent, rather than waterproof. This means it should cope with the odd splash, but won't survive being dropped in the bath.

When you remove the cover there's nothing to see or do: the 3630mAh battery can't be removed.

On the top edge is a centrally mounted headphone jack, plus a removable all-in-one Nano-SIM and microSD tray. For the UK model, the second Nano-SIM slot is blanked off. We think that Motorola has missed a trick here by not making it a dual-SIM phone. A Micro-USB port is found on the bottom.

Like the new Moto G, the Play does not have stereo speakers at the front. The bottom grille hides a loud speaker, which is pretty good for videos and games, but not for music.

One disappointment is the plastic volume rocker and power button. These are all on the right-hand side, but are made from plastic and lack a premium feel. The volume rocker rattles, too.

Display

The display is an impressive 5.5in 1080p Full HD screen, which is the same specs as that found on the iPhone 6 Plus. The pixel density of 403ppi can't beat the higher 520ppi of the Moto X Style's 5.7in display, but it's still impressive nonetheless and you'll enjoy using it to watch movies and play games.

Some will feel let down by the switch to IPS technology from AMOLED, which the previous Moto X used. However, the Play's screen is very good. Colours are vivid (we measured 90 percent of sRGB), and it's also bright at 678cd/m^2, which means it's easier to see what you're photographing when outside.

Adaptive brightness is turned off by default, so you'll want to change this. You can also switch from the default 'Vivid' to 'Realistic' colour – this seems to be an option added to appeal to those who prefer the more vibrant hues of AMOLED displays.

Whether you're in or out, playing games, watching videos or just sending an email, the screen is a


Image 01


Image 02

pleasure to use. It doesn't offer the power saving features of AMOLED when you're using the Moto Display feature though.

Performance

Inside the Moto X Play, you'll find Bluetooth 4.0 LE connectivity, but there's no 802.11ac Wi-Fi like there is in the Moto X Style. There is GPS and NFC, though.

A mid-range 1.7GHz Qualcomm Snapdragon 615 octa-core processor crunches the numbers, with Adreno 405 graphics and 2GB RAM. We found games such as Real Racing played smoothly on the Moto X Play, and it's no different when navigating around Android Lollipop.

We put the Moto X Play through a series of tests – the results of which you can see opposite. While you can see that Motorola's phone isn't a powerhouse, in general use you'll struggle to notice a difference.

Storage isn't generous by today's standards: there are 16- or 32GB versions. The latter model bumps up the price by £40. A microSD slot means you can add up to 128GB more, which is a welcome addition that wasn't present in the previous Moto X models.

The 3630mAh battery lasted for six hours 21 minutes in our tests, so you'll end up charging it every night rather than every other as we'd hoped. Note, too, that the Play lacks the Turbo Boost feature boasted by the Moto X Style, so takes longer to recharge.

Cameras

The Moto X Play does have one ace: a really great camera – a 21Mp offering with an aperture of f/2.0 and several handy modes including Burst Mode, Night mode, Auto HDR and Panorama. On the front is the 5Mp camera.

You get the minimal Lollipop camera app, which doesn't have a distracting interface – there isn't even a shutter button. You just tap the screen to take a shot, or hold your finger for a burst of photos.

We don't like that there's no indication of focus, so you don't know whether the picture will be sharp or not. Photos will be taken even if the subject is way too close and blurry, for example. Fortunately, focus is generally very fast and also accurate. We took a photo (Image 01, left) of a flower (roughly 60mm in size) below on a windy day and were surprised to find it so sharp.

Image 02 (left) is a 100 percent crop of the image so you can see the full amount of detail captured:

You can toggle a focus/exposure control, which lets you tap to set the focus and exposure point, and dial the exposure up and down. There's also night and panorama modes.

Frustratingly, the Play can only capture 1080p HD video, not the 4K video that's supported by the Style. It can shoot slow-motion video, but only at 540p – not even in HD. Plus, it lacks optical stabilisation. This makes video footage feel raw, though images are still sharp and colours are great. Sound quality is reasonable, too, so overall you shouldn't be disappointed.

Software

The Moto X Play comes with Android 5.1.1 Lollipop installed, and Motorola has hardly touched it. You will find Moto Assist, Moto Display and Moto Actions, but aside from that we're pleased to see that the company has gone for a vanilla user experience that's closer to what you'll find on Google's own Nexus devices.

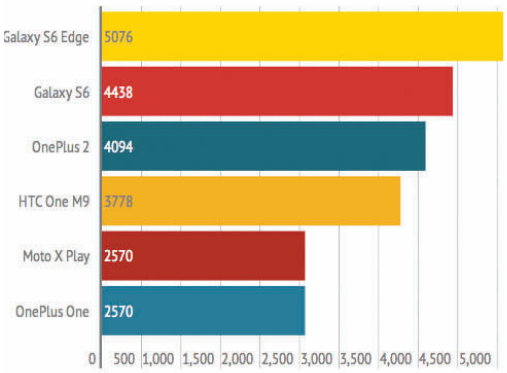
Moto Display shows the time and notifications when you pick up the phone. On the old Moto X, this meant lighting up a few pixels, but since IPS LCD displays use a backlight for the entire screen, Moto Display on the Moto X Play offers close to no power saving at all. It's merely a handy way to check the time and if you have anything important to look at without pressing the sleep/wake button.

Moto Assist reads out text messages when you're driving, and lets you dictate a reply. You can set quiet hours when notifications can't bother you, unless it's important. This also includes checking your calendar to find out when you're in meetings, and switching to silent mode automatically. Plus, you can record a custom phrase that you can say to put the Play into a hands-free mode and speak your requests.

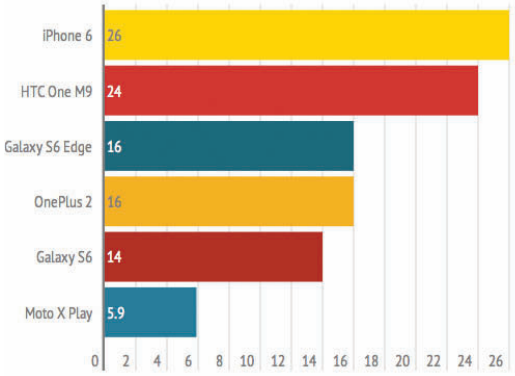
Verdict

Overall, the Moto X Play is a decent mid-range phone. But, it's not the great upgrade Moto X owners were looking for. The camera is good, as is the screen, but performance could be better. ☒ **Ashleigh Allsopp**

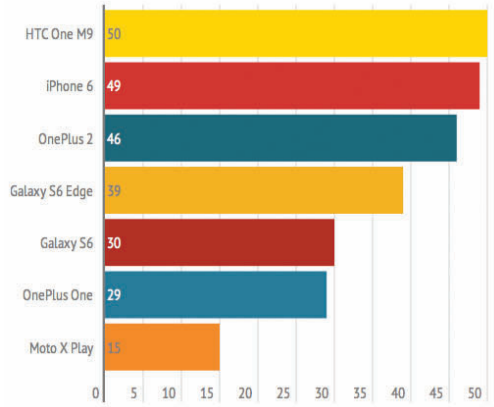
Geekbench 3



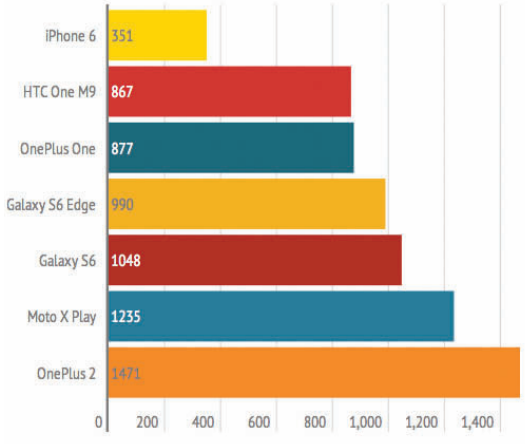
GFXBench Manhattan



GFXBench T-Rex



SunSpider*



* lower is better

SMARTPHONE

Samsung Galaxy Note 5

$699 (£456)

Contact
■ samsung.com/uk

Specifications
5.7in Quad HD super AMOLED display; Android Lollipop 5.1.1; fingerprint sensor; 802.11ac dual band Wi-Fi; Bluetooth 4.2; NFC; Series 7000 aluminium; S Pen; 4K video recording; 16Mp rear camera; optical and digital image stabilisation; Exynos 7420; Mali-T760MP8; 4GB RAM; 32/64GB storage; heart-rate monitor and an Sp02 monitor; 3000mAh non-removable battery; 153.2x76.1x7.6mm; 171g

Build: ★★★★½
Features: ★★★★½
Performance: ★★★★☆
Value: ★★★★½



The Samsung Note series has always stood out of the crowd, mainly thanks to its larger-than-life display and the inclusion of a stylus, or S Pen as it's called.

When the Note was first launched in 2011, people were shocked at the size of the 5.3in display – after all, the average screen size at the time was 2.6in, but over time people have come to adore its style and what the phablet can offer. When Samsung unveiled the Note 5, with its new premium design and improved S Pen, fans of the Note series were excited to get their hands on the device – that was until the company announced that the it had no plans to launch the device in the UK. You will, however, be able to buy it online from US-based websites or eBay.

The Galaxy Note 5 is the latest in the Note family, and we think its gorgeous. Samsung is finally moving away from plastic smartphones and towards premium aluminium and glass combinations that won't disappoint. The sleek and lightweight design of the Note 5 is beautiful, and we think it's one of the best-looking smartphones on the market right now.

It measures 153.2x76.1x7.6mm and weighs a lightweight 171g – the iPhone 6s Plus is a slightly larger-but-thinner 158.2x77.9x7.3mm. You might not think that there's much difference between the two, but Samsung's phone has a slightly larger 5.7in display – Apple's handset has a 5.5in screen. This means that while both phones are very similar in terms of dimensions, the Note 5 has 0.2in more screen real estate.

Samsung's phone is made from Series 7000 aluminium, which is the same grade of metal that Apple uses in its iPhone 6s. This is 60 percent more durable than standard aluminium and is also lightweight, making it the perfect material to use in a smartphone. Paired with the Series 7000 aluminium is Gorilla Glass 4, Corning's latest creation that aims to protect both the front and the back of the Note 5.

The slightly curved edges and back plate make holding the Note 5 a lot easier, especially with one hand and for long periods of time – an important factor to consider when thinking of buying a phablet. You're able to easily reach the other side of the screen with a finger without risking a drop due to the extra grip that the curved design provides.

S Pen

The S Pen is a feature of the Note series that fans love, and has improved in both functionality and design since the release of the original Galaxy Note. The Note 5 brings along a completely redesigned S Pen, with a sleek aluminium body that looks gorgeous compared to the S Pens of previous Note devices. It includes a push-button end, which allows for easy access when inside the Note 5 – simply press down on the stylus and it'll pop out, ready to be used.

The S Pen offers improved and more accurate pressure sensitivity compared to the stylus bundled with the Note 4, which itself was in line with top-of-the-range Wacom styluses at the time. After using the S Pen for only a few minutes, it soon became apparent that the Note 5 and stylus do a great job of interpreting angles and swoops, and although a smooth display means you may slip when writing, it's impressively accurate and enjoyable.

Using the S Pen gives you access to AirCommand on the Note 5, which fans of the Note series will know and love. It offers shortcuts to specific S Pen-related activities including Screen write, Smart Select, Action memo and S Note. It's ideal for those that are on-the-go or creative. While the apps themselves haven't changed much in terms of functionality, AirCommand has had an Android Lollipop facelift and now includes the option to add custom AirCommand shortcuts, such as 'Open Instagram', and so on.

The only issue we had with the Note 5 and the S Pen is that on occasion, the phone would think the stylus had been detached and would display a message (and play a tone). The only issue was that in the majority of these cases, the Note 5 was on a table, stationary with no one removing the S Pen. We also found that it occurred when the Note 5 was in our pocket, so much so that we had to manually disable the notification. This may be an isolated issue with our handset, but it's worth taking into consideration.

Display

The Galaxy Note 5 has a stunning 5.7in Quad HD super AMOLED screen, with a pixel density of a staggering 518ppi. The high-resolution display is bright, vibrant and offers fantastic viewing angles. The colour representation was a bit out in places, but after watching various movie trailers and playing games on the Note 5, it was clear that this comes close to being our favourite phone display ever.

Alongside 4GB of RAM is Samsung's own Exynos 7420 octa-core processor, which comprises of a quad-core 1.5GHz Cortex-A53 and a quad-core 2.1GHz Cortex-A57. In terms of graphics, the Note 5 has a Mali-T760MP8 GPU, the same GPU that's used in other high-end smartphones including the ever-popular Galaxy S6.

Performance

As you can see from our test results (shown right), the Note 5 performs pretty well against its main competitors, narrowly missing out

on the top slot in our Geekbench 3 benchmark. It also performed moderately well in our graphics tests, and came out on top in our SunSpider test, which measures the internet browser performance of the device. These results place the Galaxy Note 5 up there with other premium, flagship devices and as a result should be able to handle almost anything you throw at it.

In terms of storage, you get a choice of either 32- or 64GB, with no larger storage options available. This would usually be fine – Android users always upgrade the internal memory of their handsets, thanks to the microSD card slot that many handsets offer. Unfortunately, Samsung has made the decision to remove the removable storage option from the Note 5.

Connectivity wise, you'll find 802.11ac dual-band Wi-Fi, Bluetooth 4.2, GPS and NFC featured in the Note 5. With regards to sensors, the device has an accelerometer, a gyro, proximity sensor, compass, barometer, as well as a heart-rate monitor and an SpO2 monitor.

It also has a fingerprint reader, though in our experience we found this to yield higher error rates compared to our experience of Apple's TouchID and the fingerprint sensor used in the OnePlus 2 (page 28). It'll do the job, but it becomes slightly frustrating at times – especially as your only backup for a fingerprint lock is an eight-character minimum password, not a pin or pattern as we'd prefer.

Camera

Another great aspect of the Galaxy Note 5 are its cameras; a 16Mp sensor on the back and a 5Mp offering on the front. As with the display, long-time users of Note devices may notice that the rear-facing camera is pretty much the same as that found on the Note 4. The camera offers optical image stabilisation, autofocus, f1.9, an LED flash and 4K video recording at 30fps as well as a variety of different shooting modes. The Note 5 also displays HDR in real-time, which provides an instant preview of the effect that helps to take better shots in contrasting light.

In our tests, photos taken with the rear-facing camera were vibrant, crisp and clear, with very little blurring. We don't have an exact measurement for how long it takes for a camera to take a shot, but let us reassure you that it's faster than many smartphones on the market.

Users will also be happy to know that the front camera has been improved since the Galaxy Note 4 – it now has a 5Mp sensor, up from a 3.7Mp sensor. As well as this, it houses a 120-degree wide-angle lens that will allow you to fit more into your photos, ideal for selfies with friends or in a cinematic environment. It doesn't offer the same optical image stabilisation as the rear-facing camera, but it does offer digital image stabilisation with auto real-time HDR and f1.9.

The Galaxy Note 5 comes with Android 5.1.1 Lollipop preinstalled, and unlike in previous generations, the company has cut back on the amount of bloatware included. It offers S Health apps that help you track general health and fitness, and also the mobile Microsoft Office suite. As we mentioned earlier, users also gain access to AirCommand when using the Note 5's S Pen, the popular perk available only to users of the productivity-orientated phablet.

Battery life

The Galaxy Note 5 has a 3000mAh battery which, to the dismay of many Android users, is non-removable. To make that decision. Samsung must be confident that the battery can last a full day with standard usage – but can it?

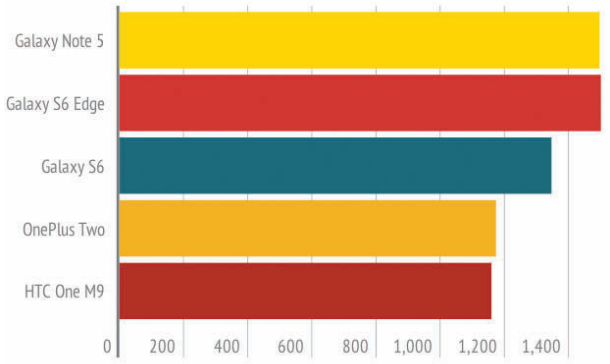
In our battery test, the phone ran for eight hours 54 minutes before its battery died. This should get the vast majority of users through the day without needing a top-up, but power users may struggle – however with the inclusion of fast charging technology, it's not an issue. In our tests, we charged the battery from around 10 percent to full in just over an hour.

The Galaxy Note 5 also offers wireless charging capabilities, which the company claims can charge a Galaxy Note 5 from dead to full in 120 minutes.

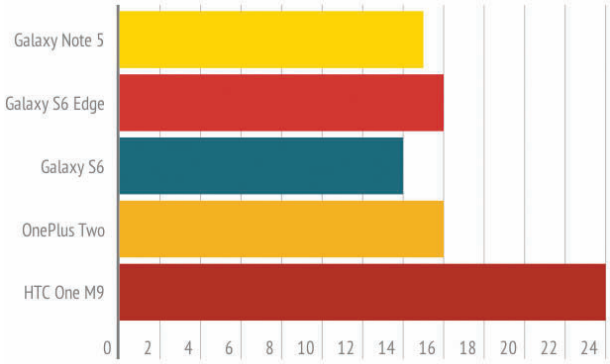
Verdict

We're very fond of just about every aspect of the Galaxy Note 5 , from its curved design to its vibrant display and high-resolution camera. It's just a shame it won't be heading to the UK. ☒ **Lewis Painter**

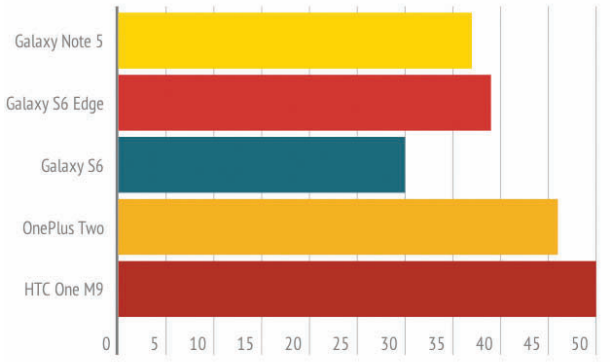
Geekbench 3



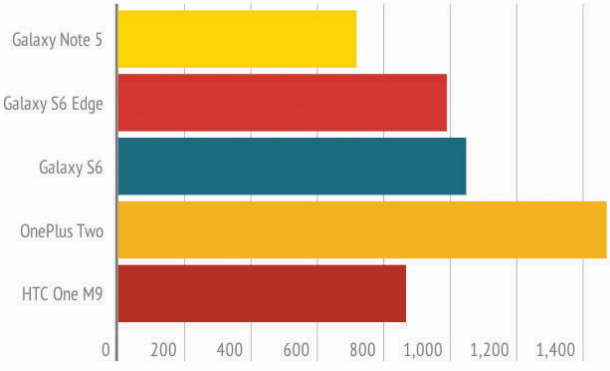
GFXBench Manhattan



GFXBench T-Rex



SunSpider*



* lower is better

SMARTPHONE

UMI Iron

£149 inc VAT

Contact
■ umiiron.com

Specifications
5.5in full-HD (1920x1080, 403ppi) LTPS display Android 5.1 Lollipop; 1.3GHz MediaTek MTK6753 64-bit octa-core processor; 3GB RAM; 16GB storage (plus microSD support up to 64GB); Mali T720 GPU; 13Mp rear- and 8Mp front cameras; dual-SIM dual-standby (both Nano-SIM); 2G: GSM 900/1800/1900MHz, 3G: WCDMA 900/1900MHz/2100MHz, 4G: FDD-LTE 1800/2100MHz/2600MHz; Bluetooth 4.0; 802.11b/g/n; Wi-Fi hotspot; GPS; A-GPS; OTG; 3350mAh battery; Micro-USB charging port; headphone jack; Texas Instruments Directpath audio; 152.3x76.5x7.9mm; 148g

Build: ★★★★☆
Features: ★★★★☆
Performance: ★★★★☆
Value: ★★★★½





The UMI Iron is the Chinese manufacturer's latest Android phone. It has some high-end specifications but, most notably, eye-scanning security that aims to make this Android smartphone almost impossible for prying eyes to infiltrate.

Design

The UMI Iron is a good-looking phone. It's something of a cross between an HTC, Samsung Galaxy and iPhone 6 Plus, with a large 5.5in screen, all metal build and a rounded slab-like design with a gently curved rear. This phablet is rather large, thanks to the 5.5in screen, but not unwieldy, just 148g and 7.9mm thick.

It feels durable, CNC milled with metal buttons, metal screws... metal everything save for the screen. This panel is a full-HD (1920x1080) LTPS panel, which is good news for battery life. It's good news for consumers, too, and its 403ppi pixel density makes for clear text and images, free from any signs of fuzziness. Colours are vivid and the screen usefully bright.

We like the pulse notification light at the base of the screen, which helps to ensure you never miss a call or text. The colour of this pulse light is customisable, too.

The only hardware buttons on the UMI Iron are a volume rocker and power switch on its left edge; on the right is a dual-SIM tray that can either support two Nano-SIMs (both connected to Vodafone's 3G network in our tests) or one SIM and a microSD card up to 64GB. The rear cover isn't removable, which means neither is the 3350mAh battery.

A headphone jack is found on the UMI Iron's top edge, and on the rear a 13Mp camera protrudes slightly. This is protected with stainless steel, and paired with a dual-LED flash. At the front of the device you'll find an 8Mp webcam, also with an LED flash, which can not only take great selfies but is critical to the UMI's eye-scanning security.

We have two main gripes with the Iron's build, although both may be down to a fault with our early handset rather than anything to cause concern. Despite checking we were running the latest software, we couldn't get the heart-rate scanner (located to the left of the selfie camera) to work. And the Micro-USB charging port at the bottom of the device is square in shape, making it difficult to connect a cable. It got our hopes up for a minute that it could be USB Type-C but, sadly, no.

Hardware and performance

The UMI Iron might have a cheap price tag, but it has some flagship-level hardware inside. Combining a 1.3GHz MediaTek MTK6753 64-bit octa-core chip with 3GB of RAM and Mali T720 graphics, performance is good – if some way off the best we've seen. In real-world use there's little sign of lag when launching apps and navigating menus, which is more important than benchmark performance, of course.

Nevertheless, we did run the UMI through our usual speed tests. First we ran Geekbench 3.0, which measures overall processing speed. With a multi-core score of 2606 points, the UMI Iron falls a little below 2014 flagships such as the Samsung Galaxy S5 (2869), Sony Xperia Z3 (2805), Nexus 5 (2800) and HTC One M8 (2761). Its brother, the UMI eMax, managed a much faster score with 4101 points.

SunSpider web-browsing performance wasn't brilliant, although we have seen worse. Measuring 1552ms the UMI Iron is in line with the OnePlus 2 (1471ms), Moto G 2014 (1504ms), Vodafone Smart Ultra 6 (1545ms) and Sony Xperia M2 (1647ms).

We also ran the UMI Iron through AnTuTu, in which it recorded 32,873 points and fell roughly in line with its other brother the UMI Hammer (32,506), although it failed to run our GFXBench graphics tests.

The 3350mAh battery inside the UMI Iron should be good for a full day's use, although we should point out that it doesn't build in support for wireless- or quick charging, nor are there any special battery-saving modes.

> The UMI's Iron Eyeverify system scans the unique vein pattern and precise positioning of your pupils to make a match

Security

The key selling point of the UMI Iron is its Eyeverify security. This is the first time we've seen it on a smartphone, and it's undeniably cool. But it's not any more secure than any other type of biometric security, such as a fingerprint scanner, given that you can bypass it and enter a four-digit PIN. So, it's as secure as that four-digit PIN.

For what it's worth, though, the eye scanner works very well – even if you're wearing contacts. It scans the unique vein pattern in your eyes and exact positioning of your pupils to make a match, and can even do so at night or in dim light by adjusting the screen brightness. Because it uses the camera rather than an infra-red or other scanner, doing so won't harm your eyes.

The UMI Iron recognised our eyes every time we tried to access it, and the same can't always be said for fingerprint scanners. It's marginally slower to unlock the phone than inputting a PIN, but we like the fact you can force it to require a blink before it will accept your 'eyeprint' – preventing anyone being able to unlock the phone with a photo of your face.

The heart-rate scanner unfortunately failed to work on our review sample. For some users, it'll prove a nice extra for helping them (or maybe just reminding them) to keep an eye on their health, but we have one on our Samsung Galaxy S6 and have to admit to very rarely using it. Still, it's a nice extra –if you can get it to work.

Another extra is the Texas Instruments Directpath audio technology, which has an industry-leading signal-to-noise ratio of 127dB. A Maxx EQ app lets you fine-tune audio settings to your taste. The Iron's speaker is found on the device's rear, but the size of the phone stops it getting muffled by your palm.

The UMI Iron is a dual-SIM phone but, in common with the UMI Zero, you must choose between dual-SIM and microSD support. If you think the device's 16GB of storage won't be enough for your needs, then you'll appreciate being able to add up to 64GB via microSD. Also see: How to add storage to Android.

In our tests both Nano-SIM slots on this dual-standby phone worked on Vodafone's 3G network (the UMI Iron is actually a 4G phone).

If you are buying the UMI Iron for use in the UK you should ensure it is supported by your mobile network operator. Supported frequencies are as follows: 2G: GSM 900/1800/1900MHz, 3G: WCDMA 900/1900MHz/2100MHz, 4G: FDD-LTE 1800/2100MHz/2600MHz.

The UMI Iron has support for HotKnot, which is MediaTek's answer to NFC. With Android Pay soon to launch we'd rather see NFC, but we get the impression that HotKnot is a bigger deal in China.

Other connectivity specs are relatively standard. There's GPS and A-GPS, support for Bluetooth 4.0 and 802.11b/g/n (neither are the latest standards), plus Wi-Fi Hotspot and OTG.

> Another extra is the Texas Instruments Directpath audio technology, which has an industry-leading signal-to-noise ratio of 127dB

Cameras

UMI says the Iron features the world's leading 13Mp camera. It's a Sony IMX214 camera with six precision lenses, a blue glass filter, f/2.0 aperture and dual-LED flash. The full 13Mp is available only in 4:3, otherwise the UMI Iron tops out at 9.5Mp in 16:9 mode.

Some detail is lacking, but we were reasonably impressed with it when faced with the proposition of a dreary, overcast central London photoshoot. All the usual modes are available, including HDR, Panorama, Live Photo and Motion-Tracking. You can also get real-time previews of various filters.

We're more impressed by the front camera, though. With 8Mp to hand this f/2.2 front camera on paper should be better than the rear camera of many phones at the same price point. Except in our tests, we couldn't see how to actually get anything more than 5Mp from it – and that was in 4:3 mode; in 16:9 we could achieve only 4Mp. You can toggle on a beauty mode and ramp up settings for wrinkle removal and, as with most Chinese phones we review, face whitening. It also supports gesture shot and voice capture.

Software

The UMI Iron runs Android 5.1 Lollipop out of the box, but support for Rootjoy means you can plug it into a PC or laptop, and relatively quickly and easily install a new operating system, including the likes of Xiaomi's MIUI. Rootjoy can also be used for backup purposes.

The software will be familiar to existing Android users, with few additions to the standard Lollipop OS. UMI has added a handful of apps, plus support for double-tap to wake and the aforementioned Pulse notification light. You can also configure a Guest user account.

Verdict

The UMI Iron is a good buy at £149, and the first we've seen to include eye-scanning security. This is a cool feature, if no more secure than the requirement for a four-digit PIN. Although the heart-rate scanner didn't work in our tests and the Micro-USB charging port seemed oddly misshaped, the Iron still offers a good set of hardware and more than acceptable performance for the money. ☒ **Marie Brewis**



SMARTPHONE

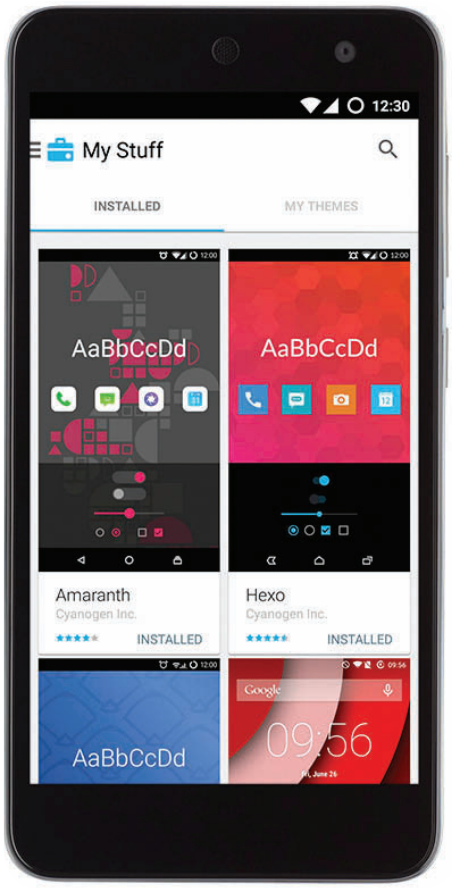
Wileyfox Swift

£129 inc VAT

Contact
■ wileyfox.com

Specifications
5in, 720p HD (1280x720, 294ppi), Corning Gorilla Glass 3 Cyanogen OS (based on Android 5.1 Lollipop); Qualcomm Snapdragon 410 (MSM8916) processor with 1.2GHz quad-core CPU; Adreno 306 with 400MHz GPU; 2GB RAM; 16GB internal storage; microSD up to 32GB; 13Mp rear camera, LED flash, auto-focus; 5Mp front camera; Micro-SIM; Micro-USB; 3.5mm headset jack; Bluetooth version 4.0 LE; Wi-Fi 802.11b/g/n (2.4GHz); A-GPS; 4G LTE; 2470mAh removable battery; 71x141x9.4mm; 135g

Build: ★★★★☆
Features: ★★★★☆
Performance: ★★★½☆
Value: ★★★★½



A number of new smartphone brands have popped up over the past year or so and Wileyfox is the latest. The British firm is launching two budget phones – the Storm and the Swift, which we'll be looking at here.

As with other new phone start-ups, the company has been formed by a former employee of a big brand. In this case, Wileyfox's CEO is Nick Muir, who was UK general manager for Motorola. The firm also has staff from Kazam, another British-based phone maker.

Wileyfox says that it exists "because people like you are tired of paying over the odds for mobile phones. Of being bound by contracts for phones that are past their best and of paying a premium for brands that spend a fortune on flagship stores and ubiquitous marketing campaigns."

Fitting in with this statement, the Wileyfox Swift is a very affordable smartphone. At £129, it easily fits into the budget category – its bigger brother, the Storm, is a more mid-range £199.

A low price is one thing, but we've seen the competition at this end of the market get a lot tougher over the past year. Motorola continues to impress with its latest Moto G, although it's more expensive at £159. However, the Moto E 4G is just £89, while the Vodafone Smart Ultra 6 is £125 and the Smart Prime 6 is just £79.



Design

From the front, the Swift is an unassuming handset, but Wileyfox has made its mark on the back. We like the embossed fox-head logo and the subtle orange accent, particularly around the camera (see left).

The rear cover, only available in Sandstone Black, has a similar look and feel to the OnePlus 2 (page 28), although the surface is smoother and feels nicer in the hand. You can also take the back cover off to access to the dual-SIM slots, microSD card slot and 2500mAh removable battery. The back is thin and flexible, but the device feels solid enough with it clipped into place.

The Wileyfox is similar in size to the Nexus 5, so smaller than a lot of big-name devices around at the moment. It's a comfortable 135g and just over 9mm thick, but doesn't feel like it thanks to the curved edges of the back.

Hardware

The Swift has a 5in screen with a 720p resolution – a common combination for a budget phone. Like the Moto G, it's fronted by Gorilla Glass 3 and uses an IPS panel. The screen is good quality, with decent contrast and colour reproduction. It's worth noting that the Vodafone Prime Ultra 6 offers Full HD for a few pounds less, though you might not want a 5.5in display.

Inside is a Qualcomm Snapdragon 410 processor, Adreno 306 GPU and 2GB of RAM. Not a bad line-up for a phone at this price – especially when you consider the Marshall London (page 26) also has this combination and costs £399.

Apart from a sluggish start when first turning on the phone, we've found the Swift to live up to its name when it comes to performance. Scrolling around the interface is smooth, switching between apps is snappy and the camera loads quickly, too. It's not a huge surprise to find the benchmark results matching its rivals – see opposite. The graphics results don't look great, but you can still play games such as Colin McRae Rally without any lag.

Where the Swift outpaces the Moto G is when it comes to storage, as Wileyfox offers 16GB as standard whereas Motorola offers 8GB for the lower price and has just 1GB of RAM. As well as dual-SIM cards slots, the Swift has a microSD card slot that's expandable up to 32GB.

As you'd expect, things are pretty basic when it comes to connectivity, so you don't get features such as wireless charging, an IR blaster or heart-rate monitor. What the Swift does have is single-band Wi-Fi, Bluetooth 4.0 LE and A-GPS. It also has all-important support for 4G LTE networks.

The Swift has two cameras: 13- and 5Mp for the rear and front respectively. The camera app is easy enough to use and while the front camera takes decent selfies, the focus is not as sharp as we'd like, which is a shame.

When it comes to the main camera, 13Mp sounds like a lot – that's more than the iPhone 6s – but it doesn't automatically mean it's better. Overall, the camera is acceptable but nothing special, and the Moto G and Prime Ultra 6 both outperform it. The Swift doesn't offer the same level of detail and

> The rear cover, only available in Sandstone Black, has a similar look and feel to the OnePlus 2, although the surface is smoother and feels nicer



crispness, and the HDR mode (see the above image) takes a long time to save each shot.

Software

The Swift runs Cyanogen 12.1, which is based on Android 5.1.1 Lollipop, so it's not a completely different experience – the biggest change is probably a vertically scrolling app menu. In fact, on the surface it looks like regular Android with a few styling additions, such as the Wileyfox logo for the app menu.

A familiar Android layout and stock elements such as recent apps cards make the Swift easy to get to grips with. However, there's a lot on offer that you don't find on most Android phones if you look for it.

For starters, you can customise the look and feel with different themes, which can be downloaded. Plus, you can choose individual components like icons, controls, fonts and even the boot animation to create the exact style you want.

You'll also notice a different drop-down notification bar in which you can rearrange the tiles and choose if you want elements, such as a weather forecast and brightness slider, on display.

The status bar that houses the clock can also be manipulated, as can the position and style of the clock, battery percentage, notification count and whether you want to be able to slide your finger across it to adjust brightness. The list of customisation options continues with a left-handed mode (navigation bar on the left when in landscape), control over the notification LED and even the pixel density of the screen.

When it comes to security, you can set the operating system to scramble the device's PIN display, so that it changes every time. Other privacy settings include a blocked caller list, which will come in handy for most people, while the Privacy Guard lets you control permissions for every app on the phone. That means you can make sure Facebook can't access your location, for example.

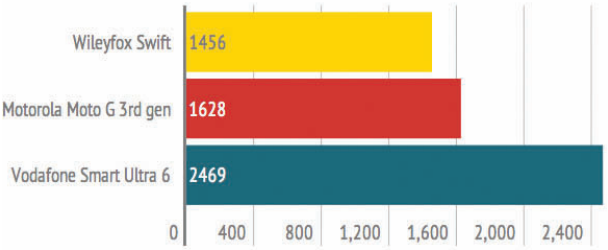
Last but not least is the Audio FX app, which provides various EQ settings such as folk and dance, plus an individual bass control.

Verdict

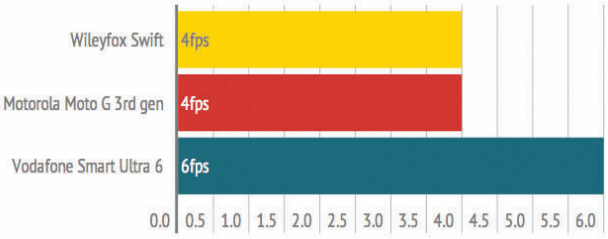
For a brand-new smartphone maker's first effort, we're impressed with the Wileyfox Swift. It's a stylish little handset that in essence offers the same specs as the Moto G for less money. We love the customisation available in Cyanogen OS, but elements such as the cameras aren't as good as its rivals. Vodafone's Smart Ultra 6 remains a better option for slightly less money – unless a 5.5in screen is too big in which case look at the Smart Prime 6 as an alternative. ☒ **Chris Martin**

> When it comes to security, you can set the operating system to scramble the device's PIN display, so that it changes every time

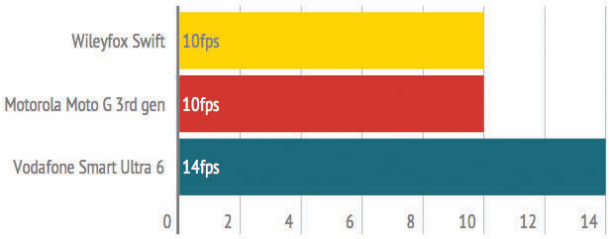
Geekbench 3



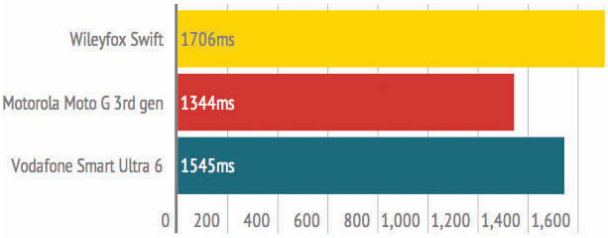
GFXBench Manhattan



GFXBench T-Rex



SunSpider*



* lower is better



SMARTPHONE

LG G Flex 2

£234 inc VAT

Contact
■ lg.com/uk

Specifications
5.5in (1920x1080, 403ppi) Full HD curved P-OLED screen; Android 5.0 Lollipop; Qualcomm Snapdragon 2GHz 64-bit octa-core processor; 2/3GB RAM; 16/32GB storage; microSD card slot (up to 128GB); 13Mp rear camera with OIS and laser auto focus; 2.1Mp front camera; 11ac Wi-Fi; Bluetooth 4.1 with aptX; IR blaster; NFC; GPS; 3000mAh battery; 75x149x.71mm; 152g

Build:
Features:
Performance:
Value:

After launching one of the first curved screen smartphones, LG is back with a second generation in the form of the G Flex 2.

The original model was an interesting idea. We had seen curved displays used in other products, such as TVs, but not a smartphone. Its convex design was ergonomic (and made far more sense than Samsung's Galaxy Curve, which curved side-to-side). However, there were various elements that let the device down, such as its size, with a huge 6in screen that was only 720p.

LG hasn't given up on the idea though, and seems to have taken the feedback on-board with this new model, which is refined and much more desirable.

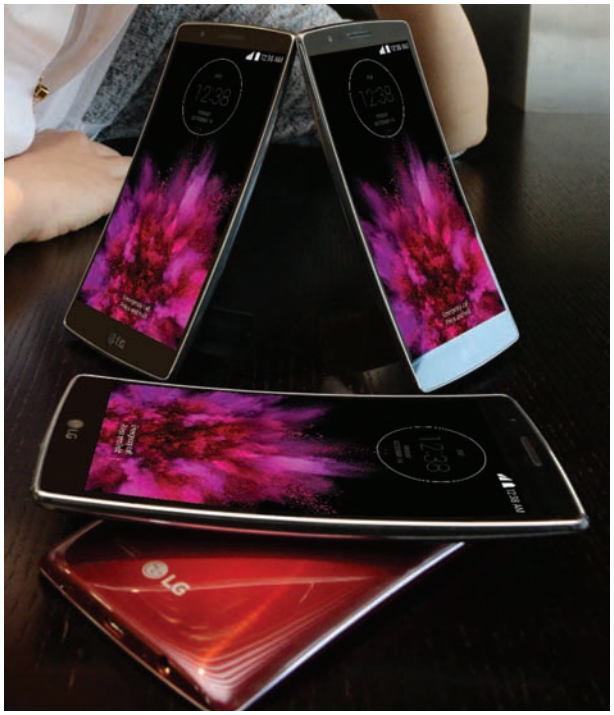


Design

In general, the phone looks the same as the original G Flex, but it's smaller and lighter, which is exactly what we hoped would be the case – it's 7.1mm at the thinnest point and 152g (down from a hefty 177g). It feels lovely in the hand and the curve of the phone matches the contour of your face like a traditional home phone. This is, of course, the main selling point of the phone, and while it's not necessary it does make some sense.

Furthermore, on the design side is an improved version of the self-healing coating that graces the rear cover. This was introduced with the original G Flex, but now takes seconds to perform its magic rather than minutes. LG's demonstration at the device's launch with wire brushes was certainly impressive, and after a number of weeks with the phone, it's remarkably scratch-free and pristine.

The G Flex 2 comes in Platinum Silver or Flamenco Red with the latter looking particularly nice.



Hardware

As we touched on earlier, the phone is smaller and uses a 5.5in screen that matches that of the LG G3 – 6in on the original G Flex was just too big in our eyes. The firm says this is the sweet spot between and decent amount of real estate and usability.

As with the G3, the G Flex 2 doesn't feel like a phone with that screen size. LG has consistently impressed in the way it offers thin bezels. The bump in resolution to Full HD is much needed and the P-OLED display is now nice and crisp, although a little way behind Quad HD. Still, the pixel density has jumped from 245- to 403ppi.

So LG has addressed two of the main problems, but has continued to make improvements on the hardware front. It was the first phone we saw to come with a Qualcomm Snapdragon 810 processor, which is 64-bit, 2GHz and octa-core, and accompanied by an Adreno 430 GPU.

Like the G3, it comes with either 2- or 3GB of RAM and 16- or 32GB of internal storage. There's also a microSD card slot, which can take up to 128GB – a nice upgrade since the original G Flex didn't have a card slot at all.

We haven't found the G Flex 2 to overheat, despite the Snapdragon 810-powered Xperia Z3+ doing exactly that which is good. However, the performance isn't as smooth

The G Flex 2 feels lovely in the hand and the curve of the phone matches the contour of your face like a traditional home phone



with a perceivable lag when using the operating system and opening apps, which is a shame. It's not all the time, but is something we've run into a number of times.

On the power front, there is a decent-sized 3000mAh battery, which LG says can be charged from 0- to 50 percent in just 40 minutes. In our battery benchmark, the G Flex 2 lasted just four hours 16 minutes – the LG G4 didn't manage much more at four hours and 44 minutes. Although the rear cover is removable, the battery is not, which is a disappointment.

We were pleased to see the same 13Mp rear camera that's found in the G3, which we know is a class act with OIS+ (optical image stabilisation), dual-tone LED flash and a laser autofocus. At the front is a more standard 2.1Mp selfie camera.

There's a strong line-up of wireless tech with 11ac Wi-Fi, Bluetooth Smart Ready (aptX) 4.1, NFC, SlimPort, GPS and 4G LTE.

Software

It's predictable but good to see Android 5.0 Lollipop preloaded out of the box. The interface is in essence the same as that of the LG G3, with the firm's own UX. A nice new feature is called Glance View, which allows you to quickly see key information such as the time and notifications when the screen is off with a downwards swipe. One of the main differences is the drop-down notification bar, which isn't stock Android at all. Quick settings are shown in a scrollable bar at the top, while sliders for screen brightness and volume sit below.

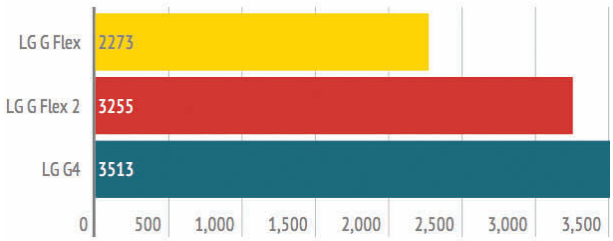
There are a few extra apps on the phone, such as LG's own SmartWorld and QuickMemo+. Swipe left from the homescreen and you're taken to LG's own news aggregator. This primarily gives you health data and Smart Tips, though you can remove it if you prefer.

Selected QSlide apps, such as Video, Internet, Phone and Messaging, can run in a pop-out window, which can be moved around the screen (while you carry on in the background) and a slider adjusts how transparent it is. We haven't found it overly useful, but you can switch it off in the drop-down bar, so it doesn't take up space.

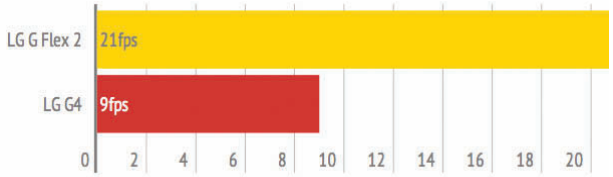
Verdict

It's good to see LG have another pop at the curved phone and on the whole we're impressed with the G Flex 2. The curve is by no means necessary, but it does feel and look good, and improvements include the higher resolution screen. It's still packed with tech, but it's a shame to see occasional laggy performance, which puts a dampener on things. ☒ **Chris Martin**

Geekbench 3

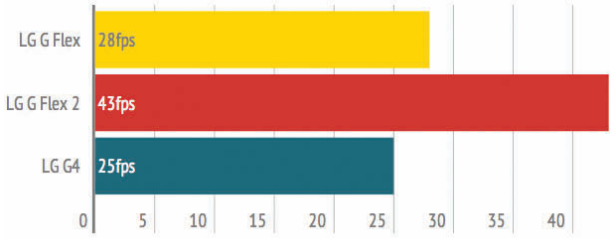


GFXBench Manhattan*

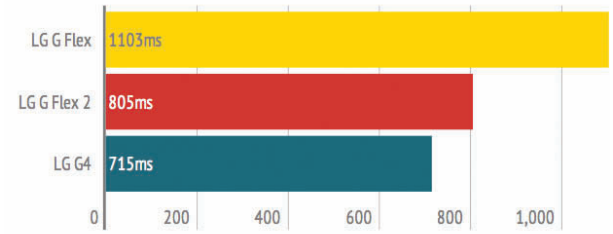


*LG G Flex could not run this test

GFXBench T-Rex



SunSpider*



* lower is better



TABLET

Asus ZenPad C 7.0

£79 inc VAT

Contact
■ asus.com/uk

Specifications
7in (1024x600, 170ppi) IPS LED display; Android 5.0 Lollipop; Intel Atom x3-C3200 processor; 1GB RAM; 16GB storage plus microSD support; Mali-450 MP4 graphics; 802.11b/g/n; Bluetooth 4.0; GPS, GLONASS, A-GPS; Micro-USB charging port; 3.5mm headphone jack; 2Mp rear-, 0.3Mp front cameras; 3450mAh battery (8- to 9 hours battery life); 108x189x9.1mm; 265g

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

★★★½☆



At £79, the ZenPad C 7.0 is one of the cheapest named-brand tablets you can buy. Twenty pounds cheaper than the Hudl 2, the Asus matches the Amazon Fire HD 6's price, but with a larger screen and full Google Play support.

Although plastic, the ZenPad is good-looking for such a cheap tablet. The glass runs almost edge to edge, with a silver chrome-effect trim, creating a stylish look. This trim is slightly raised from the screen which, paired with the slightly larger rear, makes it easier to grip your fingers.

Just 108mm wide and 265g, this tablet is comfortable to hold in a single hand in portrait mode. It does also work in landscape mode, although in this orientation you'll find the device's speaker and webcam fall under your left palm.

This easy-to-handle feeling extends to the Asus' back, where you find a raised textured panel with another metallic Asus logo, and a slightly thinner smooth edge on one side. On the opposite edge is a cheap-feeling plastic flap that conceals a microSD slot, and the device's 2Mp primary camera.

There are no hardware buttons on the front of the device, with just the speaker and webcam in the top bezel, and Asus logo below. Android back-, home- and recent software buttons sit above this bezel, while there's a volume rocker and power switch on the right edge, headphone jack at the top and Micro-USB charging port at the bottom.

Turn on the Asus' screen and it begins to lose its charm somewhat. Even at maximum brightness the screen looks dull. It has a sub-HD resolution of 1024x600 pixels and a low 170ppi pixel density. This is an IPS panel, though, which means colours are realistic and viewing angles are strong.

Asus has built in several screen technologies, including Tru2Life and TruVivid, which together form Asus VisualMaster. This aims to combine hardware and software to deliver a better and more realistic visual experience. We say aims – this isn't a terrible screen, but we were expecting something better.

The ZenPad is a fine tool for day-to-day web browsing and checking email and social media, but its quad-core Intel Atom chip, 1GB of RAM and Mali-450 MP4 graphics are not high-performance components. We found considerable lag when navigating menus and launching apps, and when playing games the ZenPad quickly became warm.

Performance

We ran our usual benchmarks on the ZenPad and, unsurprisingly, didn't see great results. In Geekbench 3.0's processing speed test we recorded 401 points single-core, and 1064 multi-core. By comparison, the Hudl 2 managed 2165 points multi-core. The Hudl 2 also outran the ZenPad in the GFXBench T-Rex graphics test, in which it recorded 17fps against the Asus' 9fps; and in SunSpider, where its web score of 768ms was considerably better than the sluggish 2102ms of the ZenPad (lower is better in this test).

The ZenPad is fitted with a 3450mAh battery, which should be good for eight- to nine hours use.

Alongside the aforementioned 16GB of built-in storage and microSD support, you get 5GB lifetime cloud storage via Asus WebStorage.

In terms of connectivity you get exactly as you'd expect from a cheap tablet: the basics. So, you do get GPS, GLONASS and A-GPS, alongside 802.11b/g/n Wi-Fi and Bluetooth 4.0. You don't get NFC, an IR blaster or cellular connectivity.

Tablets aren't the most practical devices for taking photos, but they are a useful tool for video chat through Skype and the like. The camera software itself is okay, but it's the hardware that lets it down.

The 0.3Mp webcam on this device is about as low in quality as they come, although Asus has made an attempt to improve things with several Beautification controls. During composition you can adjust elements such as skin softening, and after you've shot a selfie you get access to further editing controls.

Turning our attention to the rear camera, there is nothing to get excited about. It's another low-quality snapper, here 2Mp, and the photos themselves are dull, fuzzy and lacking in detail.

Software is one thing the ZenPad doesn't lack, but that's not necessarily a good thing, given that the huge number of preinstalled apps on this tablet leave you with just 9GB of the original 16GB storage free. A couple of these apps can be uninstalled, but most can be hidden from view if they get on your nerves.

The ZenPad runs Android 5.0 Lollipop, but with Asus' Zen user interface over the top. This is most obvious in the layout of the Settings menu and in the drop-down editable quick settings menu. It's not at all offensive once you get used to it.

Verdict

The Asus ZenPad C 7.0 is a fine tool for carrying in your bag wherever you go and using to check emails and social media and browse the WebBeyond that its functionality is limited. ☒ **Marie Brewis**

POWER BANK

Imation Link Power Drive

£49 inc VAT

Contact
■ imation.com

Specifications
3000mAh power bank; 16GB storage; requires Imation Link app on iOS 7 or later; supports iPod touch 5th-generation, iPhone 5/5c/5s/6/6 Plus and iPads with a Lightning connection; 1x 5W (1A, 5V USB input); 1x 5W (1A, 5V) Lightning output; built-in Lightning and USB cables; four-LED status system; no carry case; no passthrough charging; no auto-on/off; no LED torch; two-year limited warranty

Build: ★★★★☆
Features: ★★★★½
Performance: ★★★★☆
Value: ★★★★☆

★★★★½



The Imation Link Power Drive is one of the most useful iPhone accessories we've come across, offering extra- and secure storage for your photos, video, music, documents and more, and boosting iPhone battery life by providing a full charge away from the mains.

When Apple introduced its iPhone 6, it removed the 32GB storage option, and the same is true for the new 6s and 6s Plus. With no removable storage, the 16GB option wouldn't be sufficient for many users, so Apple offered a choice: pay for extra iCloud storage, or buy the 64GB (or 128GB) model. Both options incur extra cost, with an £80 jump from the 16GB iPhone 6/6s/6 Plus to the 64GB phone.

The Imation Link bridges that gap, offering you the opportunity to get extra iPhone storage at a cheaper price. The Power Drive is available in 16-, 32- and 64GB capacities, with the 16GB model we review here costing £49.

According to Imation, the 16GB of storage it offers is ample for 5,700-plus photos, or 4,100-plus songs, or more than 11 HD videos. You can also add documents and contacts to the Power Drive, and there's a password-protected folder offering secure storage for your most sensitive files should the Imation Link get into the wrong hands.

Setup is incredibly easy, and all you need to do is plug in the Power Drive using the built-in Lightning cable and install the app when prompted. You can then see all your files in a file browser window, and can copy and move files from iPhone to Power Drive as required. The Power Drive has other file-manager functionality too, for example allowing you to play a slideshow of your images and preview video files.

A second built-in cable, full-size USB, allows you to connect the Imation Link Power Drive to a PC or Mac to transfer files, or to recharge the device's internal battery. Provided that you have more than 10 percent battery capacity, you can flip the power switch and the device will also act as a power bank for your iPhone.

Ordinarily we like to see auto-on in power banks, which prevents you having to fiddle around with buttons, but here its absence is a good thing, meaning you can use the Power Drive only as a hard drive unless you need the extra power it provides.

With 3000mAh on offer (expect to achieve somewhere in the region of 2000mAh), you should get a full charge for any iPhone, and that will keep you going all day long.

The companion Link app for the Imation Link Power Drive requires iOS 7 or higher, but it isn't restricted to iPhone. You can use the Power Drive with any iOS device with a Lightning connection, which includes the fifth-generation iPod touch, and iPhones ranging from the 5 through 5c, 5s, 6, 6 Plus, 6s and 6s Plus.

Performance

We also tried the Power Drive with our second-generation iPad mini, and it worked flawlessly, although neither its relatively low capacity nor its 5W output are suited to iPad.

At a penny under £50, the Imation Link Power Drive is very expensive for a 3000mAh iPhone power bank, and its plastic design doesn't live up to the price tag, but the 16GB of extra storage it provides makes it well worth the outlay.

The Power Drive is a small white plastic box with a silver plastic top. The bottom of the device slides open to create a lipped stand for your iPhone. Around its rim run two built-in flat cables – Lightning and full-size USB – and where they meet in the middle you'll find the power button that enables the Power Drive to act as a power bank.

We like the fact you don't need to carry around extra cables (and Lightning cables are often in short supply given their expense), and that the cables tuck away neatly, but we're not convinced they will continue to sit flush following use over time. Neither are we particularly keen on white cables which, despite following Apple's own design ethics, don't tend to stand up well to dust and grime. (It's worth pointing out that no carry case is provided to protect the Power Drive from dirt or wear and tear.)

On top is a silver button that lies flush with the case, with four LEDs built in. This is used to check how much battery power remains, and to wake the Power Drive, which will automatically enter sleep mode following five minutes of inactivity to preserve battery power.

When viewed solely as a power bank the Imation Link lacks several features provided by other banks, yet it does the job. For a start, it can be used only with iOS, whereas rival banks will support any device that can be connected with a USB cable. Passthrough charging isn't recommended, whereby you charge both it and a connected device at once, and although it seems a minor point there's no built-in LED torch. The 5W input and 5W output don't sound impressive either, although they are adequate for filling up such a low-capacity power bank or an iPhone or iPod touch.

Verdict

It might be on the pricey side for a plastic power bank, but we can't ignore how incredibly useful is this Imation Link Power Drive. At £49 we can think of several 16GB iPhone owners who are rapidly running out of storage space (and battery life) and would find it worth every single penny. ☒ **Marie Brewis**

SMARTWATCH

TomTom Multi-Sport Cardio

£199 inc VAT

Contact
■ tomtom.com

Specifications
22x25mm (144x168) display; GPS + GLONASS, QuickGPSFix; motion sensor, compass, optical heart-rate monitor; Bluetooth; Waterproofing: up to 8 hours (GPS+HR), up to 10 hours (GPS); 5 ATM; 13.8x233mm; 63g

Build: ★★★★☆
Features: ★★★★½
Performance: ★★★★☆
Value: ★★★½☆



The TomTom Multi-Sport Cardio is a watch with a built-in heart-rate monitor. This sits neatly in the base of the watch in order to accurately measure your heart rate from your wrist, meaning you don't need one of those weird chest-strap things. A built-in GPS receiver provides real-time speed and distance information, so you can track distance, time, pace, speed and calories burnt as you run, cycle, walk or even swim. Then you can store activities on your watch, or share them via TomTom's own desktop software.

Setting up and using the Multi-Sport Cardio is not a seamless and slick experience. Far from it. You are warned on the box, and in the instructions, to always connect your watch to a computer before you start exercising, using the desk dock provided. The desk dock is a slightly clunky plastic nugget to attach, which then connects to your computer via USB. You then visit the TomTom Get Started web page at tomtom.com/123 and download the MySports Connect desktop software, and it in turn updates your watch.

This is important, because if – like us – you decide to find out what happens when you don't update the watch, you will find yourself pounding the streets running six minutes 45 seconds and being told by your watch you are crawling along at nine minutes a mile.

In line with the old-school nature of requiring a physical connection to desktop software in order to upload and download to the web, it is from the desktop software that you can update stats for your activities.

Design

Robust and waterproof up to 50m, the Multi-Sport Cardio is designed to be used when out and about, and it is built to last. It's also lightweight and comfortable to wear, and despite being rubbery and plastic, the design is sufficiently holey to allow sweat to simply drift away.

We shoved it in water to know obvious negative outcome, and for more than a month it has been either in a rucksack or in use, without coming to any ill effect.

The TomTom Multi-Sport Cardio turns heads. It is, it is fair to say, an acquired taste. It is also unlikely to sit on your wrist at the Lord Mayor's banquet. A bright plastic strap with holes punched out of it, the wrist band element of the TomTom Multi-Sport Cardio is more than 3cm wide at its thinnest point. (Compare that to your watch, it's wide.) This is a device that screams out to be noticed, which is fine when you are running, less so in civilian life.

The clasp itself works well, which is important. You don't want your watch slipping around as you, well, slip around. Those wristband holes allow you to affix the strap at multiple levels of tightness, too. Overall TomTom has done a good job of building a watch around a clunky, sensor-heavy device.

There is no touchscreen. Instead you navigate using a four-button pad that sits below the display. It is intuitive, if a little clunky at times.

The charging and connecting cradle is mildly awkward to connect and disconnect. We have been using the watch for over a month, and have still never managed to get it off- or on without a sweary struggle. Perhaps we are just clumsy.

A 1.5in backlit greyscale display (22x25mm technically), the screen has a resolution of 144x168 pixels, which makes for a pixel density of around 148ppi.

When on the move, the TomTom is clear and easy to read even when bouncing around in front of a face full of sweat. It isn't a touchscreen, but we can forgive that.

After our failure to update false start, we have been impressed by the TomTom. The GPS locks on quickly, and is very accurate. Moreover, we like the viewing options: even on the same run it is good to be able to view, at different times, speed, average speed, distance travelled, and heart rate. Throughout you can see time taken, distance travelled and heart rate on every screen. You simply choose the big figure in the middle.

We like that you can store a certain number of previous activities. We did find stopping an activity a little counter-intuitive (you have to hit back, which does have a pause sign in place), but accept that was likely our stupidity.

Battery life has been good. We usually charge it once a week, and use it several times in that period. Although it is worth checking: on more than one occasion the battery has run out while we were on a run.

Verdict

We like the Multi-Sport Cardio. It is built to last, and comfortable to wear, without being stylish. Critically, the built-in GPS and heart-rate monitors are great, and battery life is good. If you are sports mad, it is a good choice. ☒ **Matt Egan**

SMARTWATCH

Epson Runsense SF-810

£199 inc VAT

Contact
■ epson.co.uk

Specifications
Smart Stride; GPS; optical heart rate sensor; 20 hours battery life with GPS and heart-rate tracking Runsense View portal and free app; 4 customisable screens with up to 3 measurements; Bluetooth synch; strap is 44.5mm wide and 14 mm thick at the outsides; 50g

Build: ★★★★☆
Features: ★★★½☆
Performance: ★★★★☆
Value: ★★★☆☆



The Runsense SF-810 is a watch that, as the name may suggest, is built for runners. It includes GPS and a heart-rate monitor. The built-in optical heart-rate sensor is partnered with Epson's Smart Stride measurement, and the GPS sensors, so you can accurately measure how far you have run, and how quickly (or slowly). Advanced training modes are included to help the elite athlete get more from their tired limbs.

Design

The Epson wins points for actually looking like a watch, but then loses them for looking like the sort of watch you might win at a fair. It's not a fashion accessory, of course, but if you are dropping two hundred notes on a wearable device, these days we expect something more than black and grey plastic and rubber.

Which is not say that the Runsense SF-810 is ugly. Indeed, it has a certain understated charm. A circular watch fascia is surrounded by a smart silvery ring. Big chunky buttons adorn the outside, and are easy to hit even when sweating and running. And the now familiar holey strap allows for almost limitless adaptability in terms of wrist size.

To test out how waterproof the watch is, we wore it in the shower and while swimming, with no adverse effects. Plus, it is sufficiently robust to stand up to over a month in our running bag, being dragged around, without picking up scratches. We did get a bit of grime on the inside of the watch face, however. Nothing that a quick shower won't sort out.

The provided charging cable is easy to use, well put together and versatile – it charges from USB.

Weighing just 50g, the Runsense SF-810 is unlikely to slow you down, either. It is 44.5mm wide and 14mm thick at the outsides, so it is relatively slight, for a GPS watch. Overall, we have no real problems with the Epson Runsense SF-810's design, and its build quality is good.

Display

We measured the Runsense's screen at 28.2mm across. It is a circular LCD display, with a resolution of 128x128 pixels. Don't expect to have your socks knocked off. It's neither particularly bright, nor particularly sharp, but you can see the required information comfortably when on the move. And there is a light for night-time runs.

The display is perfectly acceptable, without being great. You can read it, and it tells you what you need to know. And that is good enough for us.

Performance

Let's go for the good points first. We found that the Epson offered a pretty accurate and consistent heart-rate read. And used over a period of time it showed consistent and accurate GPS tracking on runs. That easy-to-read display offers up a lot of data, and the bezel buttons are easy to use and intuitive. And, yes, we like that it can be worn in the shower. We have lost a few gadgets that way.

Another point in this watch's favour is the long battery life. We used the Runsense SF-810 several times for decent-length runs over the course of a fortnight, and we didn't need to recharge it. Epson claims up to 20 hours in use with GPS on, and we wouldn't argue with that.

And the bad? Our biggest gripe is that in our tests GPS signal acquisition was a little slow, and quite hit-and-miss. Anyone who has used a satnav knows that this is a standard thing, but the Epson was more painful to use in this respect than either the TomTom Multi-Sport of the Microsoft Band.

Potentially unfair because it is what it is (but also true) this is a limited device, really only for serious runners. There is no all-day activity tracking, so don't expect this to replace your Fitbit. And there are no non-running modes. It really is about measuring heart rate and on-foot distance only.

Verdict

A full-featured watch for runners, the Epson Runsense SF-810 will be the perfect companion for those serious about shaving times of long-distance runs. It is limited only to that function, and it isn't cheap. But battery life is great. ☒ **Matt Egan**

The Runsense is sufficiently robust to stand up to over a month in our running bag, being dragged around, without picking up scratches

SMARTWATCH

Vector Watch Luna

£299 inc VAT

Contact
■ vectorwatch.com

Specifications
Compatible with iOS, Android and Windows Phone; stainless steel case; 22mm leather strap; LCD screen; 50m waterproof; 30-day battery life



A lot of new tech brands are popping up and London-based Vector Watch is one of them, aiming to take on the likes of Android Wear smartwatches and the Apple Watch.

A key element to any smartwatch is the design – it's sitting on your wrist on constant display and is arguably more of a statement than your phone, which spends much of its time hidden away in a pocket or bag.

There are a number of designs, such as the Contemporary model (see above), which comes with a stainless steel or matt black case, and either leather or metal straps. Meanwhile the Classic models are champagne or rose gold with a padded leather strap. The lone performance model has a 'luxury' silicone strap, but isn't any cheaper.

Our review watch was well-built. It's thick – 12mm – and it has a reassuring weight to it. The Luna is fully waterproof, so much so that you can take it to depths of 50m.

The main part of the case looks sleek, but it's a shame that the bezel around the edge of the glass front feels a bit plasticky. It's also disappointing that the nicest bit of the watch is on the back with its gorgeous engraved finish.

It's not as much of a boast with the recent addition of iOS support for Android Wear, but the Vector Watch works with iPhone, Android and Windows Phone. It's great to see a firm develop for all three major mobile OSes for a change – note that we've been testing paired with Android so our comments are based on this experience alone.

Setting up the device takes no time at all – simply download the app, create a basic account, switch on Bluetooth and connect the watch. Although the watch disconnected from our Nexus 5 a few times, it was generally stable.

If you're looking for gizmos and gadgets, then the Luna is not the right choice for you. Vector Watch has sacrificed extras for good old-fashioned battery life. It touts a whopping 30-day battery life and the firm isn't lying on this front. Not having to regularly charge it is a real boon but there's no way of checking the level, which is an oversight.

In order to achieve this, the Luna has a basic monochrome LCD screen, a bit like the Pebble Steel. This is fine, if you like a retro look, but for you money you'd be forgiven for expecting something similar to the Apple Watch or high-end Android Wear watch. The Vector Watch screen won't fool anyone into thinking the hands are real.

Navigation is easy with three buttons on the side that scroll through various watch faces, which can be customised with what Vector calls 'streams'. For example, some faces have areas where you can place information such as the date, weather, and events. Alongside preloaded watch faces, you can download more from a store, though there are only a handful to choose from and none from any third-party developers. You can also download apps, but aside from preinstalled ones like a stopwatch there are just four to choose from: *The Economist*, Cnet, BBC and ESPN. They don't do a whole lot either, with the BBC app giving you three headlines to scroll through.

As alluded to, the watch can count your activity by monitoring steps, calories, distance and sleep. You access them through a particular watch face (and the app).

When linked up to a phone, you can get a range of notifications and the Luna will vibrate, plus show a ring round the edge. Twist it toward you or press the middle button and it will start up. On the most part this works well, however the notification will disappear if you don't open it.

A handy feature for people with busy schedules is a quick way to see when you're busy each day. Long-press the middle button on any watch face and the Vector Watch will show any meetings around the edge.

Verdict

It's good to see a company approaching the smartwatch differently and we like the design and style of the Vector Watch Luna. ☒ **Chris Martin**

Build: ★★★★☆
Features: ★★☆☆☆
Performance: ★★★½☆
Value: ★★★☆☆

★★★☆☆

PORTABLE MICROPHONE

iRig Mic Studio

£159 inc VAT

Contact
■ ikmultimedia.com/irig

Specifications
USB digital microphone, built-in low-noise high-definition preamp; frequency response: 20Hz - 20kHz, -3dB Gain Range: 40dB gain range. Maximum sound pressure: 133dB Sensitivity: -42 to 3dB at 1kHz, 0dB=1V/Pa; resolution and sample rate: 24-bit up to 48kHz recording; Micro-USB; 3.5mm headphone jack; powered by connected device; built-in gain and headphone volume controls; built-in multicolour LED for status and audio level indication; iRig Mic Studio microphone Lightning connection cable; protective storage bag; top stand; 45x117mm; 218g; 1.5m cable

★★★★☆



Not that long ago, recording music was only really possible in a recording studio. Now, with the help of a phone or tablet running software such as GarageBand, you can create music or record podcasts practically anywhere.

The problem is, despite great software, built-in microphones don't give the best results and can mean a lot of background noise and lower quality overall. That's where mics such as the iRig Mic Studio come in. It's a portable condenser microphone which connects to your phone or tablet (including iPhone and iPad) and is designed to capture everything from the subtle and nuanced dynamics of the human voice to the full-on bombast of an amplified electric guitar, and everything in between.

Design

It is available in black and silver and the price includes a table-top stand, which can also be used on a full-size microphone stand. It feels sturdy and well built.

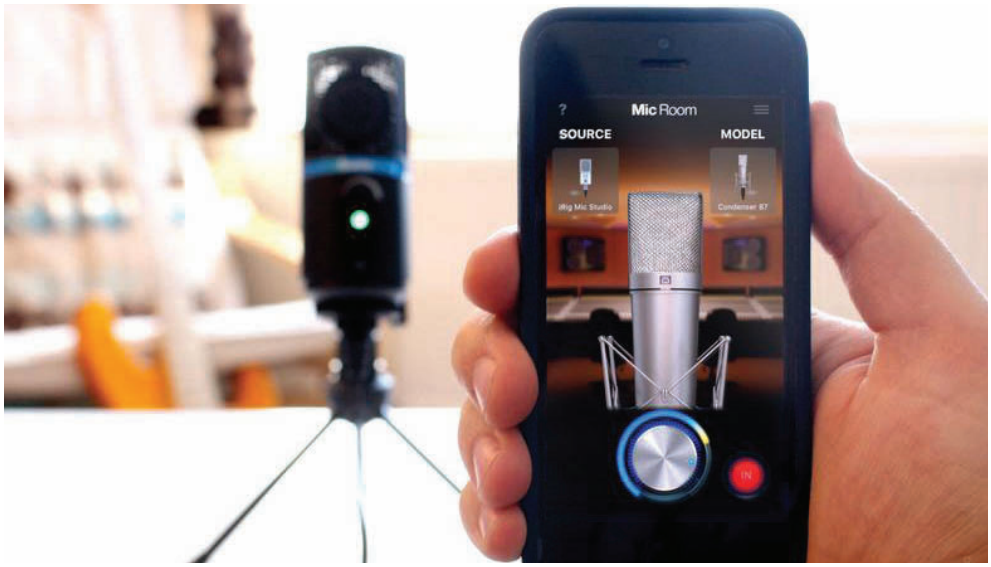
In the box is a choice of three leads to connect the microphone to your device: Lightning for iOS, Micro-USB OTG for Android devices, and USB for a computer running Windows or OS X. It doesn't come with a 30-pin cable for older iPads or iPhones but you can separately purchase one. The cables will be long enough for most people at 1.5m.

The Mic Studio is easy to set up: simply connect the cable into the iRig Mic Studio then into your device. You can also connect your headphones to the back of the microphone, so you can listen to its output. Once connected, open an app to record the audio and it will simply default to the microphone. If you are using a computer you will need to select the iRig Mic Studio as the input/output.

A free companion app called 'Mic Room' is available for iOS and Android. It emulates different microphones and you can use it to connect to other applications such as GarageBand.

The microphone itself has a gain control and headphone volume, so you can control your headphone mix. The small knobs are a bit fiddly to use and you can't adjust them while you record as a knocking sound is picked up. Fortunately, the app includes a gain control so you can adjust without the fear of knocking the microphone. Occasionally there would be a slight delay when tapping record but closing the app and starting it again fixed the problem.

It also has a multicolour LED level indicator on the mic to give you an idea if the gain is too high, so you can avoid any unwanted distortion.



Audio quality

When comparing the Mic Studio with our iPhone 5s' microphone, we noticed a big difference. The iRig has a 24-bit audiophile-grade A/D converter (with 44.1- to 48kHz sample rate) and a built-in low-noise high-definition preamp giving it a far clearer sound because it captures those high- and low frequencies missing from the phone's built-in microphone, giving the bass more of a punch and crisper treble.

One of the biggest advantages of the iRig Mic Studio is that you can be a comfortable distance away from the microphone in comparison to how closely you have to speak into the iPhone's mic to avoid any unwanted hiss when the gain is increased. This makes the Studio a better microphone for recording podcasts and doing interviews when there are a few people talking.

Verdict

If you rarely record or you are just starting out then your iPhone's built-in mic will be fine, but when you are ready to record vocals for creating music or podcasting on the go, then this is a fantastic mic. It's easy to use and the results are outstanding. ☒ **James Lumgair**

PORTABLE HARD DRIVE

Seagate Backup Plus Slim 2TB

£74 inc VAT

Contact
■ seagate.com/gb/en/

Specifications
2TB portable hard drive; PC and Mac compatible; iOS and Android backup; 12.1mm; 140g



Seagate remains one of the biggest names in storage and, even with the rise of cloud storage, there's still a call for a reliable portable hard drive. As with many hard drives, the Backup Slim is available in a range of capacities so you can choose from 500GB, 1TB, 2TB and a rather large 4TB. We tested the 2TB model.

An obvious advantage is that the Backup Plus Slim is a very portable drive that will happily travel around with you in a bag or even your pocket. It's 12.1mm thick, weighs 140g, and is available in blue, red, black or silver. We like the stylish metal cover on the top, with its brushed finish and the slightly raised logo in the corner. There's also a thin slit that houses an LED, though there are no physical buttons for backup, so you'll need to use the provided software. Our only real gripes with the design and build are that the drive could do with some feet on the bottom to stop it sliding around, and the supplied cable is short at 45cm.

Software

The Backup Plus Slim is compatible with both Windows and Mac OS X computers. You can just plug it in and leave it since the NTFS driver is preloaded on the drive.

Also preloaded on the drive is the Seagate Dashboard software, and it's here that you can back up the files on your computer. You can use the predefined 'Protect Now' button or set up your own plan to select which folders are backed up and when.

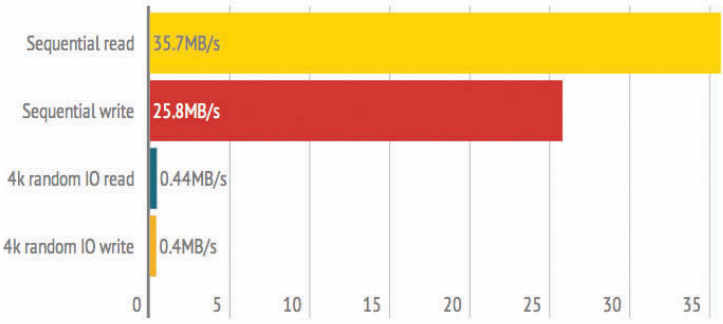
You can also back up content from your mobile device to the drive (and the cloud if you wish), provided you use the available Seagate Backup app for iOS or Android. Using the app, you can select the content you want to back up, including media, messages and contacts.

Interestingly, you can also automatically save your social photos and videos from either Facebook or Flickr. Once you've approved access, it puts everything in a folder on the drive called 'My Online Documents'.

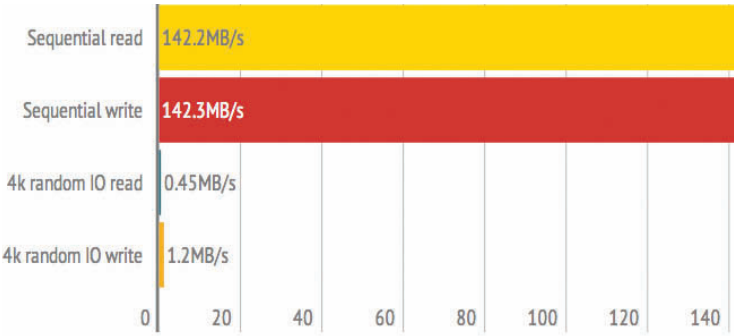
Build: ★★★★☆
Features: ★★★★½
Performance: ★★★★½
Value: ★★★★☆



USB 2.0



USB 3.0



Performance

The Backup Plus Slim isn't just a good-looking drive, with the 2.5in SATA hard disk inside providing decent speeds, while staying silent.

In our headline sequential speed tests of the near-empty disk, it could read and write at more than 142MB/s, which is faster than the impressive Transcend StoreJet 25M3. That easily surpasses the 100- to 110MB/s we usually find with 5400rpm drives.

That's all well and good for simple file transfers, but what about smaller files involved with backup? The Seagate provided a common read speed of 0.45MB/s with an impressive 1.2MB/s write.

These tests were all carried out using USB 3.0 and when you look at how much the speeds drop if you switch to USB 2.0, you'll know why you'll want this drive plugged into a blue port. Sequential read and write speeds of just over 30MB/s are significantly slower.

Verdict

The Backup Plus Slim is a well-rounded portable hard drive that offers good value for money, design and speed. PC and Mac compatibility out-of-the-box is a handy feature and the Seagate Dashboard software is easy to use. There's very little to dislike here. ☒ **Chris Martin**

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iTUNES DOWNLOAD

ZINIO DOWNLOAD

QUADCOPTER

3DR Solo

£979 inc VAT

Contact
■ 3drobotics.com

Specifications
20 minutes flight time (25 without gimbal); 14.8V, 5200mAh battery; £140 for spare battery; 7.2V, 2600mAh controller battery (4 hours' use); 0.5 miles (400ft ceiling per CAA rules) claimed range; GoPro optional (works with Hero 3, 3+, 4); stills resolution dependent on GoPro; 1.5kg (1.8kg with gimbal)

Build: ★★★★☆
Features: ★★★★½
Performance: ★★★★½
Value: ★★★½☆

★★★★☆



Compared to some quadcopters, the Solo has a more purposeful – almost military – look about it. It's roughly the same size as a DJI Phantom 3 and also has self-tightening props which are quick to unscrew for easier transport.

And like the Phantom 3 Advanced and Professional, the Solo comes with a smart controller that will accept an iPad mini, giving you a large display for composing shots. The controller takes certain cues from gamepads and has large, easy to use buttons including an obvious 'FLY' button, which launches the bird into the air when held down, and a 'return to home' button that brings the Solo back to you - handy if you lose sight of it.

The 5200mAh battery clips into the top of the craft and lasts up to 25 minutes, or 20 if you're using a gimbal and GoPro camera. The latter two components are optional extras, sadly, so if you don't already own a Hero 3, 3+ or 4, you'll have to budget for one. The gimbal costs £379 and a Hero 4 Black costs around £270, so the real price is over £1,600. Spare batteries are pricey at almost £140, too. Add a carry case and you'll not get much change from £2,000.



There's a basic carry case in the box, but it's not as protective as a hard case. You get a pair of spare props – one clockwise, one counter-clockwise. Propellers aren't yet widely available as spares in the UK, but will be soon. They cost around £10 per pair, although third-party props should pop up soon and work out cheaper.

To be clear, you don't need to buy a gimbal. The basic Solo comes with a fixed frame and an HDMI cable so you can see the view from your Hero. It's just that the footage won't be stable. Whatever you choose, you'll always see a great live view with very little latency (120ms).

The gimbal may be expensive, but it's well designed. It has a flexible, yet sturdy Micro-HDMI connector, which plugs into the side of your GoPro. And the camera clips into the gimbal without the need for tools, so it's easy to pop it out and change the battery.

3DR worked closely with GoPro to ensure full compatibility. This means that as well as being able to see a high-quality video feed on your iOS or Android device, you have full remote control over the GoPro's settings. So if you want to change the resolution, field of view or anything else while flying, you can.

The controller has a 'paddle' on the left shoulder (to the right in the image above) for adjusting the tilt angle of the camera, and two buttons on the opposite side which put the camera at two different preset angles.

There's a small LCD display in the centre of the controller that shows the precise angle along with other useful information. One small gripe is that the controller's entire front panel has a reflective glossy finish, which isn't ideal as you're already getting glare from your phone or tablet's screen, and it makes the display harder to see.

The good news is that the controller is easy and intuitive to use and offers A and B buttons, which are used primarily for 'smart shots', which we'll come to in a minute. It also has a built-in rechargeable lithium battery and an HDMI output for streaming your flight to a larger display or even the web.

There are a couple of other noteworthy design features about the Solo. One is its expansion bay, which will be used for various things in the future. It could, for example, house a parachute for safety when flying the Solo indoors, and 3DR is already working on an indoor flight system that uses optical flow sensors, which it says are better than sonar. 3DR argues that few people need to fly indoors or in areas with no GPS coverage, so it's better to have a more expensive, higher-quality positioning system for those who really need it.

According to 3DR, the Solo is also "built to evolve" and has swappable motor pods. In the future it might be possible to buy higher quality, more powerful motors, which would be

impossible to provide on a mass-produced quadcopter.

Last, but certainly not least, the Solo mitigates the possibility of flyaways by using a Pixhawk 2 flight controller in conjunction with a 1GHz Linux-based computer (and a second computer in the controller). It's the only consumer quadcopter we know of to do this. Instead of the transmitter communicating directly with the flight controller, commands are sent via the Linux computer. If there's a problem and the flight controller stops receiving information, it waits for the Linux computer to reboot and simply hovers in place. If it gets no further information, it's programmed to return to the home location.

There are, of course, no cast iron guarantees that any quadcopter will always return, but 3DR is so confident that it will replace your Solo (and even your GoPro) if it malfunctions or goes missing as long as it wasn't your fault. Every last detail of the flight is logged and recorded by the controller, so you can create a support request via the app and send all the information about the problematic flight to 3DR.



Flying and smart shots

Flying the Solo is much like flying a Phantom. Out of the box, the controls are the same and you can manually fly it whenever you like. Since there's GPS and a compass, it's extremely easy to fly. When you let go of the controls the Solo hovers and you can set height and speed restrictions in the app, which make it even easier to learn.

The killer feature, though, is 'smart shots'. Tap the button at the bottom-left corner of the app and you get a choice of Cable Cam, Orbit, Selfie and Follow.

With cable cam, you fly to a start point and press the controller's A button. Then you fly to a finish point and hit B to record that too. Then you press the play button and the Solo will fly in a straight line to the start point. It will smoothly move the camera between the direction it was facing at the start to the exact framing at the finish, including changing the tilt angle. This creates stunningly smooth footage that is in essence impossible to capture when flying manually.

Orbit mode does what you'd expect. The neat part is that you can easily set the centre of the orbit by switching to a satellite map view in the app and dragging it until the focal point is under the marker. You can change the radius of the orbit using the forward and back control, while at the same time increasing or decreasing altitude. All the while, the camera will remain fixed on the centre of the orbit and you can use the paddle to adjust the tilt angle (by default the camera will centre at ground level). Again, the footage looks great.

The Follow me feature is also self-explanatory. The Solo will remain focused on your position and move at the same speed as you move. Depending on its position relative to you, it could be following behind you, panning at the side, or even in 'push mode' when you're travelling toward it. Another mode within Follow me is Watch Me. This means the Solo will hover where it is, but turn to face you at all times. You could use this, for example, at a racetrack where you want the drone to stay in one place but keep track of you as you move around.

Last is Selfie. When you've fine-tuned the starting position in the air, you can use the sliders to adjust the speed and final height: press Play and Selfie mode sees the Solo shoot backward and upward – a camera move called a reveal in cinema terms. Once it has reached the furthest point, the Solo keeps recording and returns to the start position on the same trajectory. This move is relatively easy to do manually, but it's still nice to have an automatic option, especially as Selfie mode tilts the camera during the move to ensure you're always the centre of the frame.

For all Smart Shots, you can use the satellite map view to check for obstacles (it has no built-in obstacle avoidance), or to make it easier to position the Solo. If you don't have a cellular connection on your phone or tablet, you can use the app to cache satellite imagery of the area you'll be flying in before heading out.

Verdict

The Solo is a fantastic tool for capturing stunning aerial shots that would otherwise be impossible even for experienced quadcopter pilots. The price, though, will be a barrier for a lot of people. A Phantom 3 Advanced, for example, costs far less than the basic Solo, yet comes with a great camera and gimbal. DJI has already announced it will add orbit and follow modes in an update coming soon, meaning it will deliver similar shots on a much smaller budget. ☒ **Jim Martin**

QUADCOPTER

Flying 3D X8

£161 plus import duty

Contact
■ en.flying3d.cn

Specifications
15 minutes claimed flight time; charging time: 60- to 100-minute charging time; spare battery costs £20; claimed range of 500m; 251x251x224mm; 880g



We should start by saying the Flying 3D X8 isn't new. It's been on sale for roughly 18 months, but that's no bad thing. Successive firmware updates have ironed out some issues, while a build quality issue concerning cracks in the plastic housing beneath the motors has also been sorted – we're told.

The X8 is a distinctive quad, with its GPS receiver perched on top and a 'cockpit window' at the front. The long landing legs arc out from the body giving decent stability, as well as good height clearance if you want to install a gimbal and camera.

There are four holes for mounting a gimbal (the Walkera G-2D fits), as well as connectors for 12V power and tilt control.

In addition to GPS for holding position, the X8 also has a barometer for holding altitude and a compass so it knows in which direction it's flying. The quad will return to home if it's running low on power (if you set a return point) and it will also try to auto land.

The battery is a 2200mAh Lipo with a T-dean connector and slides into the rear of the quad in a plastic tray. It's all a bit awkward and the sharp plastic will no doubt cause you to bleed at some point.

Flying time is roughly 15 minutes, and spare batteries can be picked up easily for around £10 to £15, so it's cost-effective to increase flying time.

We're fans of the remote control with its large LCD display and lots of controls. On the LCD you can see all sorts of stats such as the quadcopter's battery voltage, heading and altitude. You can also use it to change settings through the menus. It's a basic dot-matrix mono LCD, but it's valuable.

Only the righthand control stick is sprung. The lefthand one is used for throttle and can work in two basic ways. First, it can operate as a real throttle, so moving it up from the bottom increases thrust, and returning to the bottom (and keeping it there) will cause the props to stop spinning. Secondly, it can work like a Phantom – or the V303 – and movements above half way make the X8 rise, with movement below 50 percent making it descend.

There are two potentiometers, one of which you can use to control the camera's tilt. The function of the other is something of a mystery as the manual is appalling. In fact, you'll find yourself using forums and Google to try and find out what the status LEDs mean as the manual negates to list all the different sequences, or the various beep coded emitted by the transmitter.

It takes four AA batteries (not provided) and also has a trainer port at the back. You don't get a cable (or software) in the box though. Talking of the box contents, you don't get any spare props, so order some with the drone. It takes 8045 props – 8in in length. Like the V303 they're not self-tightening so you will need a spanner (also not provided) to tighten the dome nuts.

If you try to turn on the quad without the switches and sticks in the right places it will beep and refuse to start up. When you've got it right, you're basically in non-GPS mode and can manually fly the X8. This isn't all that easy and it's better to flip the left toggle switch to the bottom to GPS mode. This is the default mode for a DJI Phantom and means the quad will hover in place if you let go of the sticks.

With the X8 you have to leave the left stick in the middle as there's no spring. But it flies stably and has decent power in its motors and props to ascend quickly. It can cope with light wind like most 350-sized quads. We found it struggled to find enough satellites to get a GPS lock unless we waited a few minutes.

It's good to have the information on the remote's display, so you can check altitude and voltage at a glance. You'll get a warning when the battery is running low and there's also a return to home function that will enable if the quad loses connection with the remote or if you flip the righthand switch.

Claimed range is 1000m but this is double what you're allowed under the current CAA regulations – the maximum allowed altitude is 400ft.

Verdict

The Flying 3D X8 is a good-value quadcopter and a reasonable alternative to a DJI Phantom if your budget can't stretch even to a Phantom 3 Standard. ☒ **Jim Martin**

Build: ★★★★☆
Features: ★★★★½
Performance: ★★★★½
Value: ★★★★☆



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POWER BANK

Sandberg Outdoor PowerBank 10400mAh

£53 inc VAT

Contact
■ sandberg.it/en-gb

Specifications
1x 5W (5V, 1A) Micro-USB input, charges in 11-12 hours with 5W adaptor; 1x 10.5W (5V, 2.1A) USB output; 1x 5W (5V, 1A) USB output; max total output 10.5W (5V, 2.1A); IP54 rain- and dustproof; four-LED status system; LED torch; Micro-USB cable supplied; no passthrough charging; no auto-on/-off; no carry case; 5-year warranty; 124x78x25mm; 279g

Build: ★★★★☆
Features: ★★★½☆
Performance: ★★★½☆
Value: ★★★★☆



The Outdoor PowerBank from Sandberg won't suit all tastes, but we love its military design. This green plastic power bank feels extremely durable, and its ribbed edges and rubberised camo vest aid grip in the hands even when wet.

Don't go dunking it in a river or anything, but the Sandberg's IP54 rating means that it's both rainproof and dustproof. With rubber flaps protecting its ports, this power bank is protected from the elements wherever you happen to be when your smartphone or tablet runs out of juice.

No carry case is supplied (not that you'll need one), but Sandberg's generous five-year warranty leaves you feeling comfortably assured that this power bank won't let you down right when you need it most.

We say phone or tablet, but you could actually charge phone and tablet, with two USB outputs rated at 5W (normal) and 10.5W (fast). The only problem here is that the Sandberg's maximum total output is only 10.5W, so the fast-charging port will operate at a reduced rate when two devices are attached.

That's not particularly uncommon, but the 5W-rated Micro-USB input is disappointing. It'll take between 11 and 12 hours to refill this power bank from a mains adaptor and, with no support for passthrough charging, you'll have to separately recharge your phone and tablet from another mains outlet.

Another feature this Sandberg lacks is auto-on/-off. When you plug in a device to charge you must press the power bank's button to begin charging, and when the battery is full it won't switch off until you unplug it. Holding down this power button activates the device's built-in LED flashlight, which could come in handy if you are stuck out in the middle of nowhere.

Performance

With a 10,400mAh capacity and an industry average efficiency of between 65- and 70 percent, you can expect the Sandberg Outdoor PowerBank to fill your phone's battery several times. We estimate you'll see around 7000- to 7300mAh usable power, which would refill our Samsung Galaxy S6 (2550mAh battery) nearly three times, or an iPhone 6 (1810mAh) four times.

The RRP is expensive at £53, but we've found the Sandberg Outdoor PowerBank at Amazon for a much more affordable £24. That makes it just a little more expensive than rival power banks at the same capacity, such as the £20 TP-Link TL-PB10400mAh Power Bank and £18 Lumsing 10400mAh Power Bank. You might prefer the Sandberg's rugged, waterproof design, but note it will take longer to refill than both of these rivals.

Compared to the other rugged power bank we've tested, the LimeFuel L150XR 15,000mAh, this Sandberg is more easily portable, affordable and obtainable in the UK, but it lacks high-end features such as passthrough charging.

Verdict

We really like the Sandberg Outdoor PowerBank's tough camo design, but we'd like to see it refill its own battery much faster, or at least allow us to charge both it and our devices from a single mains outlet. The fact it can't support both its USB outputs at full-speed is also disappointing. However, the Sandberg's waterproof design makes it one of the better options if you're camping out, and while it's not as highly specced as the rival LimeFuel it is more easily portable, affordable and obtainable in the UK. ☒ **Marie Brewis**

> With rubber flaps protecting its ports, this power bank is protected from the elements wherever you happen to be when your phone runs out of juice

POWER BANK

Sandberg PowerBank 12000mAh

£53 inc VAT

Contact
■ sandberg.it/en-gb

Specifications
12,000mAh power bank; 1x 1A (5W) Micro-USB input; 1x 1A (5W) USB output; 1x 2.1A (10.5W) USB output; max total output 3.1A (15.5W); LCD screen; LED torch; Micro-USB cable supplied; auto-on/-off; no passthrough charging; no carry case; 5-year warranty; 10x75x20mm; 236g

Build: ★★★★☆
Features: ★★★★☆
Performance: ★★★★☆
Value: ★★★½☆
★★★★☆



At 10x75x20mm and 236g, Sandberg's PowerBank 12000 is a small power bank, given the capacity on offer. With 12,000mAh inside (expect no more than 70 percent to be available to your devices) the Sandberg can charge a Samsung Galaxy S6 three times or an iPhone 6 4.5 times, yet it'll still slide into a pocket or bag.

Made entirely from plastic, a simple grey strip runs around the edge, and is sandwiched inbetween a matt black front and back. The Sandberg has a solid build, which doesn't look easy to break.

Nevertheless, a generous five-year warranty is reassuring.

Sandberg lists the PowerBank 12000 at £53, and the cheapest we could find it online was £39 from Amazon. That's expensive for a 12,000mAh power bank, but part of this expense can be explained by the device's LCD screen. This is handy for showing the exact percentage of battery remaining, and is a much preferable setup to the four-LED status system found on rival power banks. It's not easy to read from all angles, but that's a minor quibble in what is a really useful feature.

At this price, though, we would have hoped the Sandberg PowerBank 12000 would feature passthrough charging, which allows you to charge both the power bank and an attached device simultaneously. Given that the Micro-USB input on this device is rated at just 5W, you could be waiting 13- to 14 hours to fill up the power bank, and then you'll still need to charge your phone and/or tablet after (or find another plug socket). That could prove frustrating if you're in a rush.

Note that while a Micro-USB cable is supplied, as is standard for power banks, there is no mains adaptor, though you can use your phone- or tablet charger to fill it up.

The output specification is better. There are two USB ports, one a standard 5W for phones and the other a fast-charging 10.5W port for phones and tablets. The Sandberg has a max total output of 3100mAh, which means you can simultaneously charge two devices at full-speed.

Also pleasing is the Sandberg's auto-on and -off functionality, which means you don't have to fiddle around with buttons to charge your device, nor watch for when it has finished charging to prevent power wastage. The display will also switch off a few seconds after charging has completed.

Nevertheless, there is a power button on the PowerBank 12000. A double-press of this activates the built-in LED torch.

> The LCD screen shows the percentage of battery remaining, and is a preferable to the four-LED status system found on rival power banks

Verdict

Sandberg's PowerBank 12000 offers useful capacity for charging both a phone and a tablet, and a handy LCD screen. But when it comes to filling up this power bank, you'll be left hanging around, with a paltry 5W input and no support for passthrough charging. Worse, you'll pay for the privilege – with an RRP of £53 and online price of £39, this Sandberg power bank is expensive when compared to its rivals. ☒ **Mohamed Wahid**

POWER BANK

Vinsic 20,000mAh Power Bank

£29 inc VAT

Contact
■ vinsic.com

Specifications
20,000mAh power bank with LG battery cells; 1x 10W (5V, 2A) Micro-USB input; 1x 10.5W (5V, 2.1A) USB output; 1x 5W (5V, 1A) USB output; digital power display; auto-on/off; 173x12x120mm; 537g



The Vinsic 20,000mAh Power Bank is an excellent-value, high-capacity emergency charger. The ultra-slim device is very well designed, clad in dark grey aluminium alloy, with hard plastic screwed into either end. It feels reassuringly tough, and although it's heavy at 537g, you wouldn't expect to cart around on your person such a high-capacity power bank for day-to-day use. Its dimensions aren't suited to a pocket, either.

We particularly like the digital power display at one end of the device, which is activated merely by touching the area to the left of the Micro-USB input. This gives you an exact percentage readout of how much power remains in the bank, so you always know how many more charges you can expect before needing to refill the device. It's so much easier to work with than the four-LED status lights favoured by most rival power banks.

The digital display is also one of the advantages the Vinsic has over the EC Technology 18,000mAh External Battery Pack, which is the closest we've seen to this Vinsic in its approach to portable power. The two are more or less identical in size and weight, yet this Vinsic power bank crams in a little more power for charging your mobile devices at a slightly lower price, making it excellent value at £29.

Build: ★★★★½
Features: ★★★★☆
Performance: ★★★★☆
Value: ★★★★½

★★★★☆



We like the digital power display at one end of the device, which is activated by touching the area to the left of the Micro-USB input

With 20,000mAh of power to hand, and an efficiency rate of around 70 percent (some power is lost though voltage conversion and heat generated), the Vinsic will refill an iPhone 5s 9.1 times, an iPhone 6 7.4 times, iPhone 6 Plus 4.6 times and a Samsung Galaxy S5 4.8 times. Exactly how many times it will charge your phone or tablet will depend on the capacity of its own battery, but expect at least 14,000mAh to be available.

Of course, with two USB outputs you can simultaneously charge both phone and tablet from the Vinsic Power Bank. With one rated at 5W and the other 10.5W, you can plug a phone or tablet into either output, but the 5W port is better suited to smartphones than it is tablets.

Once the power bank's charge has depleted, you'll find it much faster to refill than the EC Tech, too, with a 10- rather than 5W input. It charges over Micro-USB, so just plug the supplied cable into the USB charger that came with your phone or tablet and you're good to go.

Bearing in mind that the Vinsic will take at least a full overnight charge, it's a shame it doesn't support passthrough charging – the ability to charge both your phone/tablet and itself at once. At least it supports auto-on/-off, with no fiddly buttons to press to start or stop charging, and no power wasted once the attached device's battery is full.

Unlike rival power banks, the Vinsic is not supplied with a soft carry case, although we don't think it particularly requires one. Neither does it have a built-in LED flashlight, although a device of this size will not make an ideal torch in any case.

In terms of its capacity to price ratio, the Vinsic doesn't offer as good value as the EasyAcc PowerBank PB18000. However, we prefer its design and the digital display and auto-on/off functionality win it extra Brownie points.

Verdict

An excellent-value power bank that's both well designed and sturdy, Vinsic's 20,000mAh Power Bank is an ideal companion for smartphone- and tablet owners who are to spend several days away from mains power.

☒ **Marie Brewis**

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POWER BANK

iHarbot Power Bank MS031 10,000mAh

£14.90 inc VAT

Contact
■ amazon.co.uk

Specifications
10,000mAh lithium-polymer power bank; 1x 7.5W (5V, 1.5A) Micro-USB input (cable supplied); 1x 10.5W (5V, 2.1A) USB output; 1x 5W (5V, 1A) USB output; max output 10.5W; auto-on; no passthrough charging; no carry case; four-LED status system; 133x67x16mm; 262g; 18-month warranty

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

★★★★☆



Don't assume that this iHarbot is identical to the smaller *PC Advisor* Recommended award-winning iHarbot 5000mAh power bank (opposite), but with higher capacity. Despite the fact it is necessarily larger, given the increased capacity, it also features dual-USB outputs and a chunkier design.

It's still reasonably attractive, mind, and like the smaller version is available in black, silver or gunmetal grey aluminium alloy. There's no carry case supplied in the box, but the iHarbot feels tough and durable, and comes with a generous 18-month warranty.

With dual 5W- and 10.5W outputs you can charge two devices at once, yet the power bank's maximum output matches that of its little brother at 10.5W. This means with two devices attached neither will benefit from the faster 10.5W output. iHarbot specifies the same clever device- and battery-recognition technology, which allows it to deliver the optimum charge. It also says it charges fast at first, then slows down once the battery gets increasingly full, apparently prolonging the life of your battery.

The killer difference for us, though, is the fact this iHarbot is unable to fill both its own battery and that of an attached device at once (passthrough charging). Add to that the fact its Micro-USB input is rated at just 7.5W in comparison to the 5000mAh power bank's 10W, and it'll take significantly longer to fill, too.

Exactly how long it will take to charge this power bank depends on your charger – one is not supplied in the box, which is standard practice, but you can use that which was sold with your phone or tablet. If you use a 7.5W mains adaptor you're looking at around six- to seven hours, nine- to 10 hours with a 5W charger, or 18- to 20 hours when charged over a PC's USB port (2.5W).

That's not to say this device has no merit. Compared to a power bank that currently sits in third position in our best power banks group test, it doesn't stack up so well; compared to rival-capacity power banks the iHarbot offers great value at £14.90.

At this capacity, you're typically looking at spending around £20- to £30. The only other power bank we've reviewed to come in at such a low price for 10,000mAh is the OnePlus Power Bank (although with that device you'll pay an extra fiver in shipping costs).

Whereas the OnePlus Power Bank has a very distinctive design and almost carpet-like feel to it that falls in line with the OnePlus 2 phone, the iHarbot is simply a rectangular box with rounded edges. It's a bit smaller in both length and width, but heavier. So while it will fit in your pocket, at 262g the iHarbot may well pull down your trousers.

The OnePlus Power Bank will charge faster from its 10W input (in around 5.5 hours with a 10W mains adaptor), and both its dual-USB outputs are fast-charging ports, although it is limited in the same way as is the iHarbot: the device's maximum total output is restricted to 10W.

iHarbot claims 70 percent efficiency for its power bank, which means of the 10,000mAh advertised capacity you'll see around 7000mAh. This is normal, with some energy lost through heat generated and voltage conversion, and while some power banks can offer up to 90 percent efficiency many more offer just 65 percent.

With that much power to hand we could charge our Samsung Galaxy S6 (2550mAh battery) a little under three times. An iPhone 5s fares much better, with its smaller-capacity 1560mAh battery drawing four and a half charges from the iHarbot.

In common with its little brother, the iHarbot supports auto-on and auto-off, which means you don't need to mess around with fiddly power buttons or watch it like a hawk to ensure no power is wasted when your phone has finished charging. The power button here is used only to activate the four LEDs, which show at a glance how much power remains. We prefer to see LCD screens that give a more accurate reading, but at this price that would be unreasonable.

A common feature in a power banks is to have a built-in LED torch. We're not convinced by their value, and clearly neither is iHarbot: one is not included.

Verdict

The iHarbot offers excellent value for money, but the OnePlus Power Bank has the edge. If you use an iPhone or iPad or are simply not a OnePlus fan, you may prefer this device's design, plus the fact free delivery is available from Amazon when you spend £20. Neither of these devices can match the smaller 5000mAh iHarbot, though, which is not only the cheapest power bank we've ever reviewed but far more easily portable. ☒ **Marie Brewis**

POWER BANK

iHarbot Power Bank MS024 5000mAh

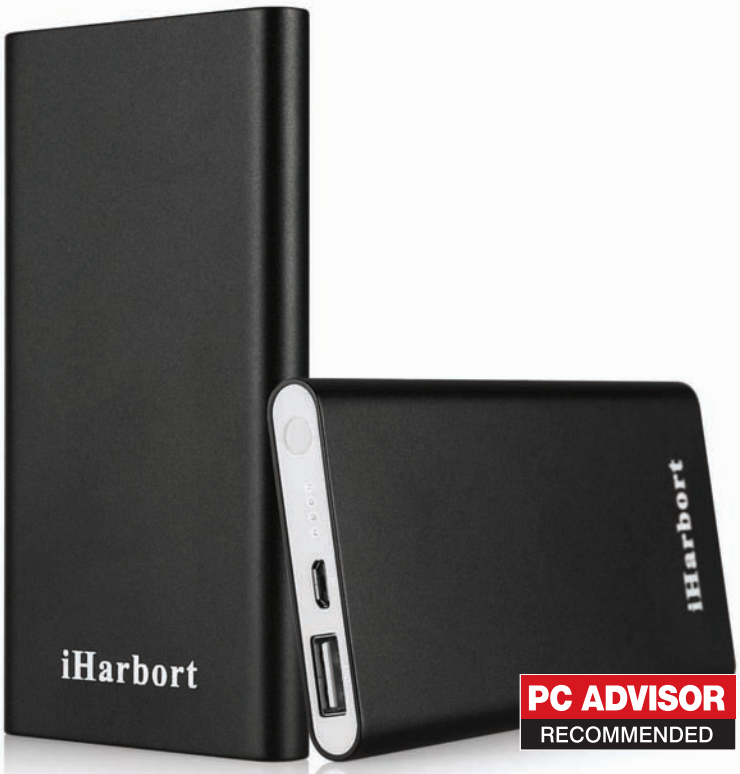
£10.90 inc VAT

Contact
■ amazon.co.uk

Specifications
5000mAh lithium-polymer power bank; 1x 10.5W (5V, 2A) USB output; 1x 10W (5V, 2A) Micro-USB input (cable supplied); auto-on/-off; passthrough charging; no carry case; no LED torch; four-LED status system; 118x11.6x63mm; 150g; 18-month warranty

Build: ★★★★½
Features: ★★★★☆
Performance: ★★★★½
Value: ★★★★★

★★★★½



PC ADVISOR RECOMMENDED

Ultra-slim and clad with stylish gunmetal grey aluminium alloy (also available in silver or black), the iHarbot power bank is perfectly proportioned for the pocket. It's very well designed with its sleek, rounded edges, and sufficient attention to detail has been paid that the power button lies flush with the casing.

The iHarbot power bank carefully balances capacity with size and weight, and with 5000mAh on offer you should get between one- and two full charges for your phone, depending on the model.

With most power banks averaging around 70 percent efficiency, expect around 3500mAh to be available to your devices. Our Samsung Galaxy S6 (2550mAh) would receive just under one and a half charges, but an iPhone 5s (1560mAh) could potentially manage two and a quarter.

Despite its budget price tag, iHarbot hasn't skimped on features. We found this little power bank would automatically begin charging our phone when we plugged it in via USB and, when it was full, it would also shut off the power without our instruction. More importantly, we could simultaneously charge both the phone and power bank (known as passthrough charging).

Given that you'll probably charge only one device with this power bank, it makes sense that there is just the one USB output. iHarbot supplies a Micro-USB cable in the box; if you want to attach an iPhone or other smartphone with a proprietary cable you simply provide your own lead.

You don't get an LCD screen, although one really isn't required at this capacity level, so you must judge how much power remains using the four LEDs on the power bank's bottom edge. We particularly like the fact these lights switch off during charging, so when the iHarbot is used at night you won't be disturbed by blinking LEDs.

There are a couple of cost-cutting measures but, thankfully, their omission didn't bother us in the slightest. Unlike many portable power banks the iHarbot is not supplied with a carry case, nor a built-in LED torch.

The iHarbot supports smart current control, which detects your device type and battery capacity, and deliver the optimum amount of power

Thankfully, this is a fast-charging port, rated at 10.5W (5V, 2.1A). That means this power bank will be just as happy to charge a tablet or other USB-powered device, although its capacity is better suited to a smartphone battery. The iHarbot also supports smart current control, which is able to detect your device type and battery capacity, and deliver the optimum amount of power.

And while the power bank is fast to give away its charge, it's also quick to claw it back. The Micro-USB input is rated at 10W (5V, 2A), so for the fastest charging you'll want to refill it using a 10W mains adaptor (although you can use any USB charger, such as that supplied with your phone or tablet).



Verdict

iHarbot's 5000mAh power bank is one of the best deals we've found, offering useful capacity in a stylish and pocketable package, support for auto-on/-off and passthrough charging, and an attractive price tag we've seen. At £10.90, you can't go wrong with the iHarbot power bank. ☒ **Marie Brewis**

POWER BANK

Imneed 3200mAh External Battery

£16 inc VAT

Contact
■ amazon.co.uk

Specifications
3200mAh lipstick-style lithium-polymer power bank; 1x 5W (5V, 1A) Micro-USB input; 1x 5W (5V, 1A) USB output; 3-LED capacity indicator; LED torch; Micro-USB cable supplied; 96x22x22mm; 77g; 12-month warranty



Many Chinese-made consumer electronics are sold by multiple retailers, who simply slap their own logo on top. It's something we've seen frequently with cheap Bluetooth speakers, and increasingly with power banks. This in itself isn't a problem, so long as you make sure you're getting the best deal at the best price.

When we opened the Imneed 3200mAh External Battery, we were caught off guard by how similar it appeared to the £9.99 Intocircuit Power Mini 3000. Both are lipstick-style chargers, with an aluminium casing, plastic end caps, a large silver power button, three blue LEDs to denote the amount of power remaining, and a single 5W output and 5W input at one end. But no matter how similar these two devices appear at a first glance, they are different.

While the Intocircuit Power Mini has 3000mAh capacity, this Imneed has 3200mAh. With roughly 30 percent of that lost through heat generated and voltage conversion, you're unlikely to notice the difference, mind. You'll still get just a single charge for your phone, and potentially not even that if your device has a large battery. We wouldn't expect to get a full charge for our Samsung Galaxy S6 (2550mAh), for example, although an approximate 90 percent charge is still handy to get us through the day. iPhones typically have smaller-capacity batteries than Android phones, so expect a full charge and then some if you have one of these.

Build: ★★★½☆
Features: ★★★½☆
Performance: ★★★½☆
Value: ★★★☆☆



These two look-alike devices also differ in their size and weight. With the Intocircuit measuring 128x80x28mm and weighing in at 118g, it's pleasing to see Imneed has packed higher capacity into a smaller package, just 96x22x22mm and 77g. Unlike the Intocircuit, no carry case is supplied here, but the Imneed is perfectly proportioned for slipping into a pocket or bag, and its tough metal exterior should keep it safe.

But while the aluminium casing looks good, available in black, blue, gold or silver, the rough edges to the plastic end caps make the Imneed External Battery seem cheap – and it isn't, some £7 more expensive than the Intocircuit. Relative to higher-capacity power banks such as those found in our group test, £16 (from Amazon) is quite an outlay for a 3200mAh power bank, although you are partly paying for the increased portability over those devices.

Performance

In functionality, though, Imneed and Intocircuit are evenly matched. The 5W input and 5W output don't translate to particularly speedy charging for either an attached phone or the power bank itself when it's time for a refill, and some devices – particularly tablets – may not play happily with it. However, it's faster than some of the 2.5W-output devices we've seen, such as the Pebble SmartStick+, and it may well match the speed of the adaptor supplied with your phone.

In common with many power banks, the Imneed features a small LED torch, which is activated with a double-press of the power button. This is small and weak, but you may find it handy in very dark conditions.

This power button is also used to check the amount of power remaining via a trio of blue LEDs, and to trigger charging once you've attached your phone. The Imneed doesn't support advanced features such as auto-on/-off or passthrough charging, though.

If you're happy to pay the extra money over the Intocircuit, then the Imneed is more portable and has slightly higher capacity. Anker's £9.99 Astro Mini is another 3200mAh charger that's very similar in size and weight, and boasts 90 percent energy efficiency and PowerIQ. On the down side, with a 4W input it'll take longer to refill its own battery, there's no way to tell how much power remains and there's no LED torch.

Verdict

Imneed's 3200mAh External Battery is a great buy, enabling your phone to keep going all day. Cheaper options are available, but Imneed has done a good job of keeping down both the size and weight. ☒ **Marie Brewis**

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POWER BANK

Intocircuit Power Castle PC13000 and PC15000

PC13000
£26 inc VAT

PC15000
£29 inc VAT

Contact
■ amazon.co.uk

Specifications
13,000mAh/15,000mAh capacity; 1x 7.5W Micro-USB input; 1x 10.5W USB output with SmartID, 1x 5W USB output; auto-on/-off; no passthrough charging; LCD display; LED flashlight; carry case; 128x71x22mm; 308g (13,000mAh), 323g (15,000mAh); 12-month warranty

Build: ★★★★☆
Features: ★★★★½
Performance: ★★★★☆
Value: ★★★★½

★★★★½

Larger-capacity, upgraded versions of the *PC Advisor* Recommended PC11200, the Intocircuit Power Castle just got even better with the PC13000 and PC15000 power banks, which are ideal emergency chargers for your phone or tablet away from the mains.

These two power banks are identical to each other in every way other than their price, capacity and weight. With one rated at 13,000mAh capacity (expect around 70 percent efficiency, so 9100mAh) and the other 15,000mAh (10,500mAh), you're talking about a difference of whether you can charge your iPhone 5s six- or seven times.

Both measuring 128x71x22mm, the upgraded Power Castles are just a couple of centimetres longer than the older PC11200, matching its width and depth. And they're not much heavier either, at 308g for the PC13000 and 323g for the PC15000 (the PC11200 weighs 280g). With just £3 between them, whether you buy the £26 PC13000 or £29 PC15000 will come down to your budget and how much emergency battery power you require.

These upgraded models are now faster to refill, with a 7.5W- rather than 5W-rated Micro-USB input. This is handy, given that the Power Castle doesn't support passthrough charging (the ability to simultaneously charge itself and an attached device). No charger is supplied in the box, as is standard for power banks, but you can just use whichever charger you're using for your phone or tablet.



The faster of the two USB outputs now supports SmartID technology, instantly recognising your specific device and ensuring maximum charging efficiency. This port is a fast-charging 10.5W output; the second is rated at 5W and better suited to charging smartphones than tablets.

If you plug in a USB device to either of these ports the Intocircuit will automatically spring to life, and once charging is complete it cuts the power supply. The on/off switch is not used for starting and ending charging but for activating the blue backlight on the LCD display, which fades after 30 seconds to save power.

In other respects the new Power Castles are the same as the older version, and that's no bad thing. We love the brushed-metal aluminium alloy design, with curved edges that feel comfortable in the hand even for a power bank of this size. Not that the pair are large for high-capacity power banks, although you won't want to carry them in a pocket. They feel sturdy, too, but the 12-month warranty is reassuring.

Our favourite feature, though, is the aforementioned LCD display. This is a rare find in the majority of cheap power banks, and incredibly useful. Whereas most such devices use a quartet of LEDs to estimate how much power remains, whereby each LED could represent a chunk as large as 6000mAh, with the Power Castle's LCD panel you know exactly how much power remains at all times.

The display will show you which output is in use. These ports have their own legends, but if you're using the power bank in the dark this may be useful. Also helpful in such a situation is the built-in LED flashlight, which you turn on and off with a double-tap of the on/off switch. Lastly, the display will tell you whether the power bank is charging itself (IN) or a connected device (OUT).

> We love the brushed-metal aluminium alloy design, with curved edges that feel comfortable in the hand even for a power bank of this size



Verdict

The new Intocircuit Power Castle PC13000 and PC15000 are nicely designed, representing excellent value and fast, easy charging for your phone and tablet away from the mains. The LCD panel is a great inclusion. ☒ **Marie Brewis**

IN-CAR USB CHARGER

Tronsmart USB Rapid Car Charger TS-CC2PC

£11 inc VAT

Contact
■ tronsmart.eu

Specifications
In-car USB charger; 2x USB outputs - 1x 12W (5V, 2.4A) output, 1x 18W (12V, 1.5A) Qualcomm-certified Quick Charge 2.0 output; max total output 30W; VoltIQ technology; over-current, over-charging, short-circuit protection; 1m USB- to Micro-USB cable supplied 32x20x60.5mm; 25g; 18-month warranty

Build: ★★★★½
Features: ★★★★½
Performance: ★★★★½
Value: ★★★★½

★★★★½



PC ADVISOR RECOMMENDED

Before you write off the Tronsmart USB Rapid Car Charger as just another in-car phone charger, know that it is probably one of the best in-car USB chargers you'll find today.

It feels well built, is no larger than it needs to be, poking out the top of our cigarette lighter port by no more than an inch, and its glossy black finish looked nice against the black interior of our car. The supplied USB- to Micro-USB cable is also a handy length at 1m, meaning it could easily reach from the Tronsmart to a windscreen-mounted phone.

The Tronsmart Rapid Car Charger comes with dual-USB outputs that offer fast-charging to any phone, tablet or other device that charges over USB, and with 30W of available power, it can simultaneously support both outputs at full-speed.

The first of these two USB outputs is specified at 12W (5V, 2.4A), and uses VoltIQ technology to recognise your device and deliver just the right amount of power for optimal charging. The second is more interesting, a Qualcomm-certified Quick Charge 2.0 output, which runs at 18W (12V, 1.5A). For devices that support it, charging time can be reduced by a staggering 75 percent.

Qualcomm Quick Charge 2.0



Qualcomm Quick Charge 2.0 is a next-generation fast-charging technology for phones and tablets running certain Snapdragon processors. In Qualcomm's own lab tests, it found a Quick Charge 2.0-enabled device with a 3300mAh battery was able to reach 60 percent capacity in 30 minutes; using a standard 5W phone charger just 12 percent charge was achieved in the same amount of time.

We tried the Tronsmart with our Samsung Galaxy S6. Although it runs one of Samsung's own Exynos- rather than Snapdragon processors, it also supports Qualcomm Quick Charge 2.0 alongside Samsung's Adaptive fast-charging feature. In a short 10-minute car journey our S6 gained a 20 percent charge – and the Tronsmart didn't get even slightly hot under the collar in enabling that impressive feat (our S6 warmed up a little, but that's to be expected, assures Qualcomm).

Our experience with in-car USB chargers in the past hasn't been particularly favourable. They keep your phone going so you can use it as a satnav, but unless you're going on a particularly long journey (or get stuck in a nasty jam) they never seem to have gained much battery when it's time to unplug them and go off on foot. Qualcomm Quick Charge 2.0-supported car chargers change all that, and you could potentially get enough power to keep your phone going all day during your commute. That's incredibly useful.

Some other devices that support Qualcomm Quick Charge 2.0 include the LG G4 and G Flex 2, HTC One M8, One M9 and Desire Eye, Nexus 6, Samsung Galaxy Note 4 and Note Edge, Sony Xperia Z3- and Z4-series phones and tablets, Asus Zenfone 2 and the new Motorola Moto X.

> Qualcomm Quick Charge 2.0 is a next-generation fast-charging technology for phones and tablets running certain Snapdragon processors

Verdict

You might say it's just a car charger, but it really isn't. Our phones are an essential part of our lives, yet few flagships are able to last a full day away from the mains with medium- to heavy usage. We've previously relied on a power bank, which we might carry in our pocket or bag, but must remember to recharge whenever it runs out of juice; the Tronsmart USB Rapid Car Charger is the ultimate power bank for the car. If you have a Samsung Galaxy S6, HTC One M9, Sony Xperia Z3+, LG G4 or other flagship device, you need one of these. ☒ **Marie Brewis**

SMART CONTROL SYSTEM

Logitech Harmony Smart Control

£79 inc VAT

Contact
■ logitech.com/en-gb

Specifications
Controls 225,000 devices; iOS and Android compatible; accessible via Mac and PC; control your home cinema system from anywhere via the cloud; multi-user support; uses RF frequencies; bounces IR signals off walls and furniture for better reach

Build:
Features:
Performance:
Value:

The Logitech Harmony Smart Control is marketed as a single hub that can control over 225,000 multimedia devices, making it the ultimate universal controller.



The hub

The heart of the system is the hub (pictured below), which is located near to the devices you wish to control. You don't, however, need to place it directly in front of these, as the hub can accept an RF signal that is reflected off a wall (and even furniture) to easily control devices over a large area.

This simplifies setups that use multiple remotes, and it means that the days of pointing a remote at a device to control it are well and truly over. During our tests, we found this worked very well, and the vast majority of our commands were instantly recognised, no matter a device's position in the room.

According to Logitech, the hub is compatible with over 225,000 multimedia devices, and can even control a Sony PlayStation and Nintendo Wii with its built-in Bluetooth adaptors. This is pretty impressive, as many other universal remote setups that use RF signals require some kind of adaptor to access Bluetooth-controlled devices.

While we couldn't test the compatibility with all 225,000 devices, we can confirm that the Harmony Smart Control successfully registered and controlled all the devices in our home apart from one – more on this later.

Initial setup

We used the Harmony Control app to set up the Control System. Android and iOS versions are available, but if you have a Windows Phone you'll need to use a PC or Mac.

Once connected, you'll be prompted to create and link an account to that hub, which allows you to log in and control devices from anywhere in the world via the cloud. While we initially thought that creating accounts for every user was tedious and unnecessary, it makes for a better overall experience. Users who have their own logins can add settings specific to them, and personalise the list of shortcuts to feature the channels they watch.



Next, Logitech allows you to add existing devices to the hub, ready for control via your smartphone – in our case an iPhone. By default, the hub will first scan your Wi-Fi network to find any smart devices – and this search method did indeed find our smart Samsung TV. Within seconds, it was set up for use with the hub. We thought this was a sign of things to come.

Next up was our Apple TV, which again was automatically recognised and added along with our TV. Two out of two was great, but could it go for three out of three devices? Sadly not. Even though the Logitech boasts compatibility with 225,000 devices, it seems our audio system, a Goodmans Base, isn't one of them.

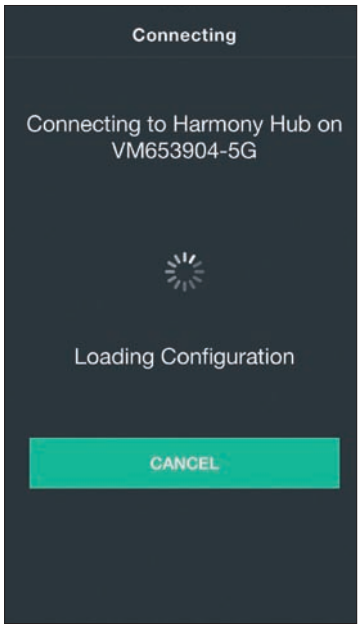
You do, however, have the option to manually add unrecognised devices to a setup, which we did. We were warned that it could take up to 15 minutes to do so, though we assumed it would take around five as we'd like to think of ourselves as technically proficient.

That wasn't the case though, as we had to manually add and label each of the remote's buttons, and then check that the hub had correctly read and stored each one. It's a handy feature to have though, as we'd prefer 15 minutes of repetition to not being able to use the Goodmans Base with the hub.

Activities

Once we'd made it through the slightly stressful initial setup process it was time to add our first 'activity' – watching TV. The idea is that you can program a number of actions in a specific order to streamline your media viewing experience. For example, you could program the hub to turn on your TV and Freeview box, and go directly to your favourite Freeview channel, or organise a set of actions to automatically navigate your smart TV's UI and access Netflix.

The idea is a lot better than the execution, though. When you first set up an activity, the Harmony will suggest certain preset activities,



such as listening to music, watching TV or (in our case) watching an Apple TV. If none of these appeal to you, you can add your own custom activity.

Once you've selected your activity, you'll be presented with a list of available devices that you'd like to include, such as an amp or Freeview box. After you've selected the devices you want to include, things start to get complicated. The app will ask you a series of poorly worded questions about your TV setup, such as which output your DVR is set to and which input your TV uses. The more devices you include, the more complex the activity becomes to set up.

Once you've completed the initial setup, things start to improve, as the Harmony is aware of any connected devices. Let's say, for example, you're watching television and have started a 'Watch Apple TV' activity that would usually turn on your TV. The Harmony won't repeat the command and accidentally turn off your television. It does, however, require you use only the Harmony smart control, as a standard remote will confuse the system.

You may need to tweak the timings of your activity, though. Our Freeview box takes longer to start up than the Harmony expects, and will try to change the channel before the box is ready. The timings can be edited in the settings menu, but it does take time and it can be a tedious process, though it's definitely worth it. It's handy being able to start an activity that merges four- or five different steps into a single action, and makes watching TV that little bit more enjoyable.

Controlling devices

Most people will interact with the system using the Harmony app. Every time you want to control your TV via your smartphone, you'll first have to open this. It'll take a few seconds to authenticate the connection (see left), and in that time most of us could've just reached for the remote and changed channel. Once you've logged in, you'll be greeted with a list of your stored Activities, and it takes a tap to activate/deactivate them.

From here, you can navigate to a separate menu where you can access the individual controls for every device you've added. Tapping on a device displays its controls. These are split across several panels, which you have to swipe between. This can become laborious if you're trying to do something more than simply change the channel or the volume on your TV.

There is a better, more intuitive way to control your devices, but it is available only after an activity has been activated. This feature took us a few days to find, and we even went as far as to think that we'd been using an outdated app. Simply tap on an activity to access a gesture control panel, along with a list of your favourite channels, and a much improved layout for traditional button controls.

To view the list of gestures, tap on the 'i' in the bottom righthand corner of the gesture menu. You'll see a full list of gestures for both one and two fingers (see above right). If you want to customise the actions of each gesture, tap the edit button to the right of any gesture to customise its action.

You can also access a menu with the icons of your favourite/most viewed TV channels. These have to be manually selected during the activity setup process, for example, tapping the E4 logo will change the channel to E4. It's a simple feature to have, but one that we found ourselves using more and more, as its a much faster way of browsing through a growing list of TV channels.



As mentioned earlier, you also get a traditional remote with the Logitech Harmony smart control. We really like the design – it's slim, light and pressing the various buttons is more enjoyable than we care to admit. It does have one major flaw, though. During testing we were never completely sure which device we were controlling. We've looked online and read through the manual to see if there's a way to manually select a particular device to control, but it looks as though this isn't possible.

When an activity is started, it'll automatically control each device, depending on the button that's pressed; volume buttons, for example, would adjust the amp. While that's fine, and once we'd worked this out it seemed to work pretty well, it can be a little confusing to begin with if you're used to controlling each device with a separate remote.

Verdict

When we first heard about the Logitech Harmony Smart Control system, we were excited about the concept of controlling our home cinema devices using an iPhone. But it seems the concept was better than the execution. While the Harmony has serious potential, the accompanying app and setup lets it down.

☒ **Lewis Painter**



WIRELESS GAMEPAD

Xiaomi Wireless Bluetooth Gamepad

£14 inc VAT

Contact
■ xiaomi-mi.co.uk

Specifications
Wireless gamepad; Bluetooth 3.0; 2x AA batteries required; 156x104x65mm; 220g

Build: ★★★★☆
Features: ★★★★☆
Performance: ★★★★☆
Value: ★★★★½

★★★★☆



There's nothing inherently wrong with using a touchscreen for gaming on an Android phone or tablet, and in most games the onscreen controls will be placed so as not to obscure the action. But when it comes to driving-, shooting- and action games, a proper controller makes it much easier to get stuck in.

Wireless controllers for Android are nothing new, but they recently caught our eye when Xiaomi decided to join the party. Its Wireless Bluetooth Gamepad is a mash-up of an Xbox One and a PS4 controller, very Xbox in its design and key button placement, but its triggers are PlayStation all over.

That's not a bad thing. The Xiaomi Wireless Bluetooth Gamepad looks good, at 220g it has a nice weight to it and, on the whole, it feels well made and durable. Run your finger across the seam between top and bottom and you will feel a slight rough edge, but it's not a major flaw. Severe pressure tests suggest the buttons will stand up to more than a million times normal use for at least five years, according to the company.

Xiaomi has carefully considered the design of each control. There are grippy rubber tops to the left- and right thumb sticks, but a smooth glossy finish below that helps them move effortlessly in any direction. The ABXY buttons and D-Pad feature this same smooth, glossy finish, and the latter uses four positioning balls for better accuracy when rotating 360 degrees. Even the triggers are designed with comfort in mind, with L2 and R2 extended and curved outward, allowing your fingers to rest comfortably when not in use, and get a good grip when required.



Dual vibration motors (light on the left and heavy on the right) and a Bosch G Sensor with three-axis gravitational acceleration lend something to gameplay you just don't get when interacting via a phone or tablet's touchscreen. We also found this plastic controller won't slip from even the sweatiest of hands mid-action, and neither will it retain a gamer's fingerprints.

A key difference to the Xbox One controller is the three buttons that sit in the centre of the Xiaomi Gamepad. You'll find Back and Menu buttons, plus a Mi button, which is used to pair the GamePad with an Android device. We also found two slots at the top and one at the rear that seem to suggest you can attach a bracket for holding your phone or tablet; however, we could find no such accessory online.

The Xiaomi GamePad connects over Bluetooth 3.0 and, although we'd prefer to see energy-saving Bluetooth 4.0 or 4.1, we found the controller worked flawlessly with our Samsung Galaxy S6. Contrary to what we've read about the Xiaomi Gamepad online, we were unable to pair it with an iPhone or iPad, but the controller works fine with Android phones and tablets, plus Android TVs and Android set-top boxes. You can pick it up on a Windows PC or laptop and Mac, too.

A flaw to the Xiaomi Gamepad is its lack of a rechargeable battery. Rather than recharging it over Micro-USB, you must use two AA batteries. We found two in the box, but of the standard- rather than rechargeable variety (rechargeable batteries are supported, but you'll need to supply your own). Even so, Xiaomi claims its Gamepad offers one-year battery life in standby mode, which the controller will enter after five minutes of inactivity.

You should note that the instructions that come with the gamepad are in Chinese, so here's what you need to know.

First, the GamePad will not work with every game installed on your Android phone or tablet, although many are available on Google Play that are compatible. We referred to Android Gamepad Games (tinyurl.com/p3cgsky) for a handy list of what might work, then loaded up Asphalt 8 and Beach Buggy Racing – both heaps more fun with a wireless gamepad.

Secondly, in order to get started using the gamepad you must insert the batteries then press the Mi button. When it blinks white you should be able to pick it up in your phone or tablet's Bluetooth settings; pair with and connect to the Xiaomi, then simply load up a compatible game to begin playing.

Thirdly, the controls will differ slightly among games. In each game we tried there was a handy tutorial that explained which buttons, sticks and triggers to use.

Verdict

If you're a keen mobile gamer the Xiaomi Wireless Gamepad will enhance your experience with driving-, shooting- and action games on an Android phone or tablet. At £14 it's great value, and on the whole well made. ☒ **Marie Brewis**

GAME

Rocket League

£14 inc VAT

Contact
■ psyonix.com

Specifications
PC; sony PlayStation 4



This year has been full of big name titles including Witcher 3: Wild Hunt, Project Cars and GTA V (for PC) but one of the best games we've played is Rocket League, a remote control car version of football.

Although Rocket League has a simple premise, it's very difficult to play at first. There are tutorials to teach you the controls and various manoeuvres, which will come in handy, but some of these can be hard to get your head round. We found the best way to learn is on the job; after completing the tutorials, simply playing matches will enable you to discover how the game works.

Pick a car and join a match and you'll be put into a huge stadium where the football is about 10 times the size of your vehicle and the pitch is encased by walls and a ceiling. Add to that pads dotted around the pitch that give you boost whenever you need it and you're in for an action-packed ride. The ball starts in the middle with cars starting on different spawn points, so you start by charging toward it hoping to get the first touch.

To begin with, just hitting the ball is something of an achievement. It spends a lot of time in the air, so you'll end up charging at it, firing your car into the air, and missing. But it's hugely satisfying when you do – especially if it's toward the correct goal.

Once you've got a good number of matches under your belt you'll have a good understanding of how the ball moves, the angles at which it will bounce off the walls and when to launch your car at it to pass, save or score.

You can choose which type of match you'd like to play with a choice of ranked or non-ranked games. Matches are then solo, doubles, 3v3 or chaos (4v4), with the middle two being our most used for a balance of action, goals and getting a touch of the ball.

Each match lasts five minutes, with overtime if the score is equal at the end. In this case it's first goal wins. That's a good length of time as it feels long enough to get into the match, and pull off a comeback if you need to, but also means you can fit a lot into a short space – your lunch break, for example.

Online play is really what Rocket League is all about, but you can also choose to play an Exhibition match if you want, or Season which is more like a traditional league to play though against AI teams.

We also found that server performance is very good – only in one or two matches did we have any problems at all over a number of weeks playing.

As you might expect there are different cars to choose from – they don't have different stats such as speed and handling, but their physical shape and size has an effect on your gameplay. You can customise each one by choosing your preferred colour for each team and that's just the start.

You can choose the paint finish, there are decals to unlock, wheels, different booster effects including bubbles and snowflakes (which also have different sound effects), antennas and there are also toppers to give your ride some personality.

A game wouldn't be complete without achievements, and you win them for scoring goals, making saves and other unsurprising things. However, some are rather more difficult, such as hitting an opponent into the ball to score.

Within matches you'll get points for different things, which adds an element of competitiveness – even within your team. Small things such as getting the first touch and clearing the ball will get you 10 or 20 points, while saving or scoring will get you 50 and 100 respectively. The player in the match with the most points is the MVP, and you'll find you unlock a new item at the end of most matches.

More points also mean levelling up – you have a rank number but players are also split into Rookie, Semi-Pro and Pro, so you'll be matched up online with similarly skilled players.

Verdict

At under £15 Rocket League is an absolute bargain. Yes, it's difficult to learn, but once you get the hang of it, it's hard to stop. ☒ **Chris Martin**



6 BEST FREE

Simon Williams looks at six free antivirus programs that will help keep your PC safe from harm

There is no excuse for not having antivirus protection on your PC. None. And don't say you don't need to bother, because you have Microsoft Security Essentials installed by default. Microsoft Security Essentials (MSE) has been shown to pay little more than lip-service to virus protection. You need a third-party service on your PC and there are lots to choose from, led by the six we look at here.

The good thing about having a free product from one of the leading Internet Security (IS) companies is that they use the same AV engine as in their commercial products. What you get is a smaller feature set. Few include spam filtering, improved firewalls or parental controls.

The free offerings from Avast, AVG, Avira, Bitdefender and Panda all fit this bill, yet all offer basic antivirus and anti-malware protection, giving you a good chance to keep your computer free of threats that could lose you data and take a lot of time to put right. Qihoo goes further and offers pretty much a full internet security suite.

With the wider range of devices we are using for computing, the increased provision of 'dashboards' that show the different products installed on your Windows, Android, Mac and iOS devices can be useful.

AVG's recent publication of its privacy policy, showing what rights it takes over your personal and non-personal information when you download and use its free product, has caused a furore. You grant it the right to send some of your information to third parties, which may include advertisers.

Some have said that this is just AVG being more upfront about its policy, so we had a look at what each company says in its privacy policy. They're not all the same: some require you to opt out to prevent sharing – and AVG says it will offer this – some ask you to opt in, but will respect your decision if you don't, and some don't share your information at all with third parties.

Best is Bitdefender, which claims not to share information with anybody outside its own company or subsidiaries. We think this is as it should be with a security product, but second-best is the assumption not to share, with an opt-in, should you want to receive 'relevant' offers. This is what Avast, Avira and Qihoo do. Panda does the same as AVG, requiring you to specifically unsubscribe to avoid security-related emails.

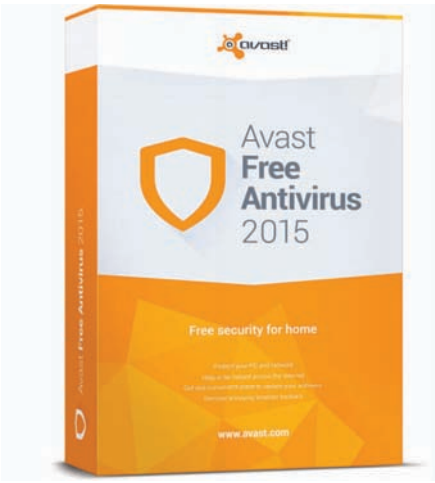
IS software is designed to prevent damaging apps from infecting your computing device. All the free products here do that. As a secondary task, though, the full commercial products should reduce the amount of unwanted advertising and offers that get through to you. Taking rights to inject still more of this spam into your computing life seems disingenuous at the very least.

So here are the leading six free antivirus applications, proving you really can get something for nothing, it appears.



ANTIVIRUS





AVAST FREE ANTIVIRUS 2015

Free • avast.com

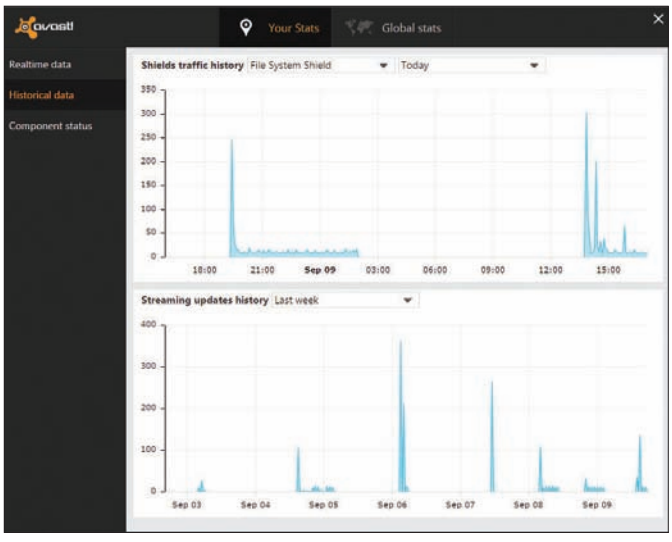
Usability	★★★★☆
Features	★★★½☆
Value	★★★½☆
Overall	★★★½☆

Avast makes quite a thing about its free antivirus offering, giving a good breakdown of its feature set and companion programs online, as well as, naturally, offering a range of upgrades to commercial products. It offers two main functions: antivirus protection and potentially unwanted application (PUA) detection, for when bad apps piggy-back themselves on legitimate downloads.

There's also a network scanner, which looks at your network settings and passwords, and suggests improvements to increase their strength. The free package doesn't include anti-spam or a firewall, and you'll need to upgrade for password protection, too.

Free protection can be extended, though, by adding Avast Browser Safety, also a free download, which prevents ad networks from tracking your movements online, blocks harmful websites and offers, slightly unexpectedly, a price comparison when shopping.

The main control screen is clearly laid out and makes wide use of tiles, demarcating all the important information. There's more info than you often get in free AV products, too, with a good statistics module covering both the work the software has done on the local computer and what it has achieved for its customers globally.



Performance

Avast took over one hour 10 minutes to scan our 50GB basket of test files, but it did look at 879,891 of them, giving a scan rate of 204 files per second, well up with some of the fastest scanners. However, there's very little difference in scan time on a second pass, just a minute less, so not much file fingerprinting going on.

The scanner doesn't put a lot of burden on the system, though, with a 1GB copy taking only six seconds longer with a scan running in the background. This represents a 14 percent increase.

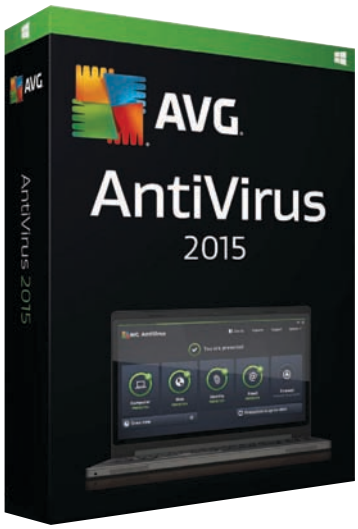
This is broadly in line with what the German test house AV-Test (av-test.org) found in its tests of the product. The Performance tests, which look at delays produced when carrying out a variety of tasks on a PC running the test AV software, saw an increase of 3 seconds, which was the industry average for this test and dropped the Performance score to 4.5/6.

The Protection rating from AV-Test was 5.5/6, which seems a little harsh when in the two months of the test it scored a perfect 100 percent on both zero day and widespread malware detection in the first month and dropped just 1 percent, still above the industry average, on the zero day testing in the second month.

The Usability category produced a perfect 6/6, with only one false detection in the whole set of samples, where the industry average is three. This gives the product an overall score of 16/18, a respectable result for a free product, though not the best in this group.

VERDICT: Avast Antivirus 2016 is good at what it does, is simple to use and offers a more than acceptable level of protection.





AVG FREE ANTIVIRUS 2015

Free • free.avg.com

Usability	★★★½☆
Features	★★★½☆
Value	★★★½☆
Overall	★★★½☆

AVG hit the IT headlines recently with the clearly stated privacy policy that it would share some personal and non-personal data about the customers of its free antivirus product with third parties – read advertisers. While lots of products do this, unless you specifically opt out, there's something particularly onerous about an Internet Security product, even a free one, taking such a liberal view of your computer privacy.

The new AVG Free includes AVG's Zen application, which can show you the status of all your devices running the software and handle installation of the software on them. AVG Free is available for PC, Mac and Android, so this management app can be a useful tool.

The control screens are all slate grey, with good, big tiles on the home window, leading off to the main modules of the suite. AVG offers manual and scheduled AV scans, LinkScanner to check against browsing to dodgy sites, identity protection – checking for apps stealing personal details – and an email scanner looking for damaging attachments.

The firewall, data safe and spam filter are left for the commercial Pro version, though AVG does supply a PC Analyser, which looks at the state of your Registry, junk files, fragmentation and broken web shortcuts. You only get one free fix, though, before having to pay.

Performance

Whether it's more efficient or just uses different algorithms, a scan of our 50GB file basket took less than some others, at 48 minutes, and looked at 236,058 files, with a repeat checking just 13,978 in under five minutes. This indicates a good level of file marking, so it doesn't waste time by rechecking unchanged files. You can set the scanner to high or low speed or leave it to dynamically allocate resources, depending on other PC activity.

Running a full scan while copying a 1GB file only increased the copy time by four seconds, a 9 percent increase, which indicates a very low resource hit to the system. This doesn't tie up with AV-Test's

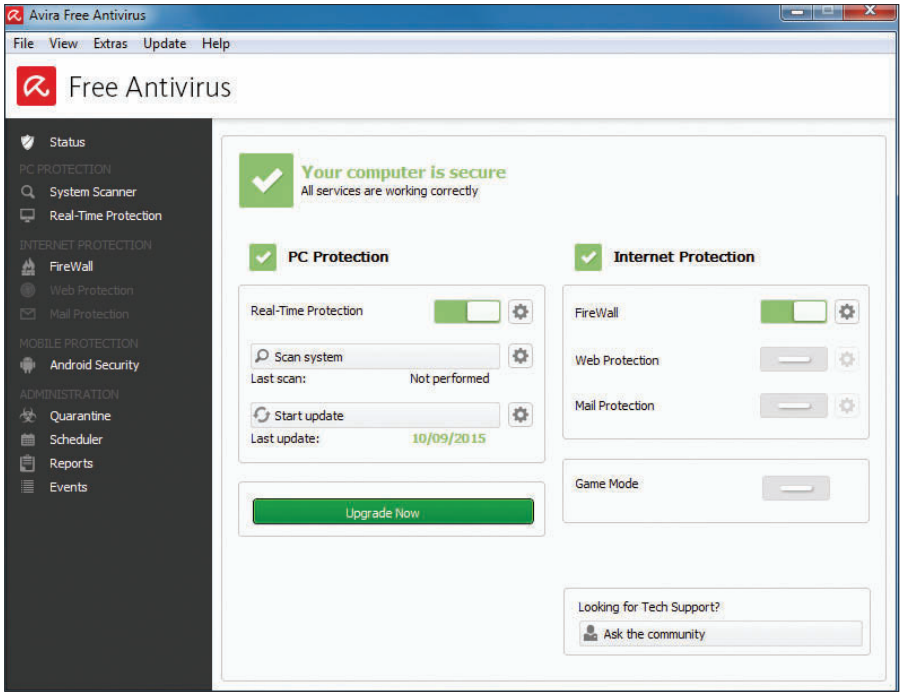


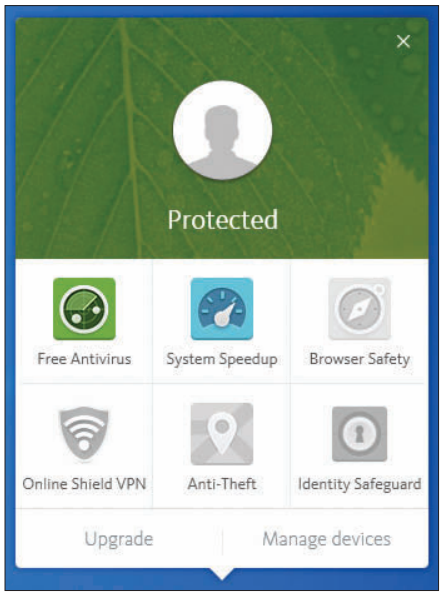
Performance result, which is a more comprehensive suite of tests. They scored AVG at 4.5/6, as it matched the industry standard performance drop of 3 seconds, behind products like Avira, where we measured a much more noticeable performance drop off.

The Protection score from AV-Test also fell back half a point, with an average of 99.5 percent in both widespread and zero day threats. This is still a pretty good level of protection, of course, but a single slip up can still cause a lot of anguish.

The Usability score was a perfect 6/6, as the software gave no false warnings or blockages of legitimate software under any of the scenarios that were tested. This gives an overall score for the product of 16/18, which is a very good result.

VERDICT: AVG Free continues to be one of the best free antivirus programs you can get. It offers a good selection of key protections, though you do have to be careful to install the right product, and be aware that you're paying for it with a reduction in privacy.





AVIRA FREE ANTIVIRUS 2015

Free • avira.com

Usability ★★★★☆
Features ★★★½☆
Value ★★★★½
Overall ★★★★½

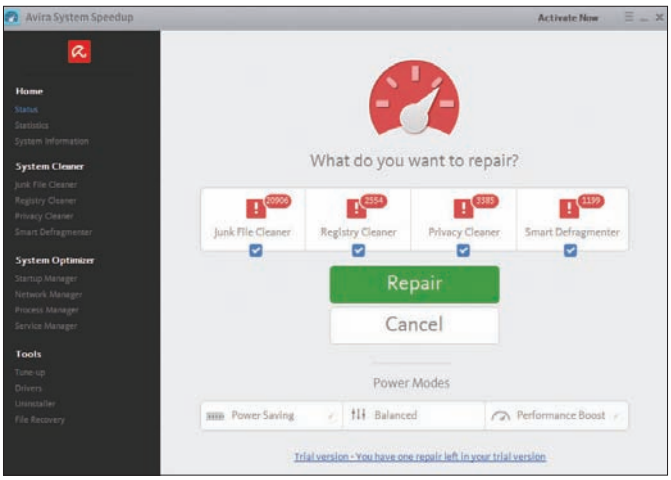
PC ADVISOR BEST BUY

Avira's free offering is a bit more conventional in its layout than Avast, its main competitor. The software uses a list of menu options down the left-hand side, with context-based settings windows in the main part of the control screen.

The firm also offers a launcher, which details which modules are installed and which available. We suggest this is of more use as a marketing tool for upgrades than an aid for customers, but it's a quick way of starting up modules.

Setting up scans is straightforward, though the selection icons are rather small, and there are many common profiles, such as full scan, quick scan and scans of specific drives, set up for you. At first sight, it appears Avira bundles a firewall with its product, but this turns out to be an integrated front-end to the Windows firewall. File scans can be scheduled and by default there's a quick scan set to repeat every 168 hours or, as we techies call it, weekly. We reckon a quick scan could benefit for being run more frequently than this.

Avira also provides a trial version of its System Speedup app, which looks at junk files, the Registry and privacy issues, but you only get one run, before you have to pay. Free Avira AV software is also available for Android, iOS and Mac devices.



Performance

Scanning our 50GB basket of files took one hour four minutes to examine 398,910 files. This equates to a scan rate of 103 files per second, sitting the program in the middle of the field. A repeat scan completed in 57 minutes, though looking at only five files fewer. This indicates that little attention is paid to ignoring unchanged files.

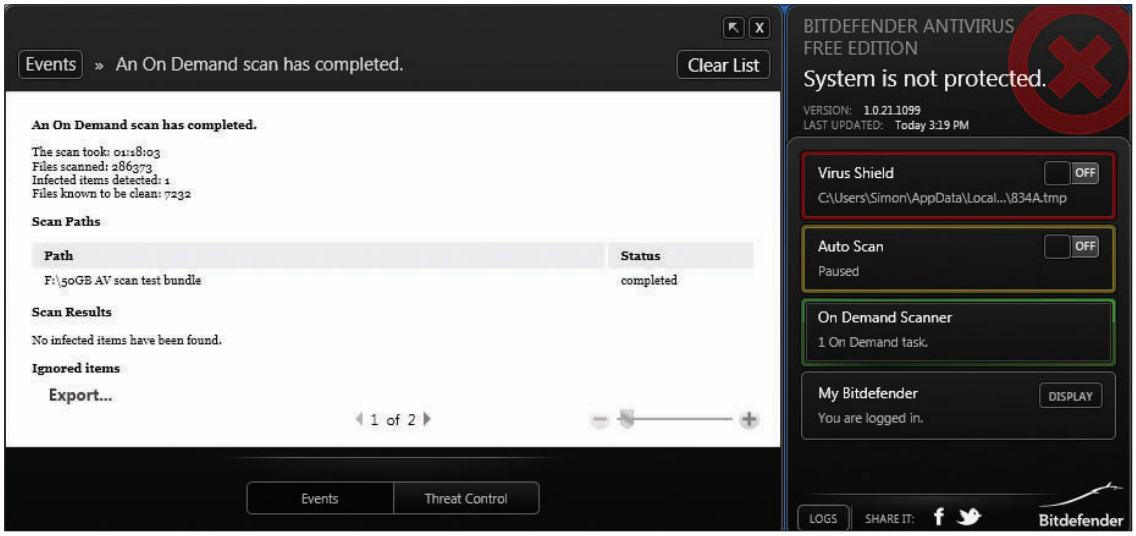
These results are broadly in line with those from AV-Test, where the same scan engine, taken from Avira's Antivirus Pro 2015, scored a perfect 18/18. This is exceptional, though the site's test results have been getting closer to the perfect score for a while, now.

Breaking down the category scores, Protection, which measures the performance of the software against established and zero-day threats, produced perfect scores against both types. While it's true to say that the industry average on these tests is a high 98 percent, and 99 percent for the two categories, Avira is one of only six products to score a double 100 percent.

Performance measures any speed hit caused by the software during typical daily use. AV-Test measured no delay at all in its tests, which doesn't tie up with our result, where we saw a noticeable increase in copy time of 41 percent, though that was when scanning.

Finally, the Usability score, which looks at false warnings or detections, showed no errors throughout the tests, including in the one million plus samples used to show up false detections.

VERDICT: Overall, Avira Free Antivirus 2015 is one of the best free antivirus applications you're going to find, with perfect scores from AV-Test, a good range of facilities for a zero-cost suite and a well-designed interface that's easy to use and direct.



BITDEFENDER ANTIVIRUS FREE EDITION 2016

Free • bitdefender.co.uk

Usability ★★★★☆
Features ★★★½☆
Value ★★★★☆
Overall ★★★★☆

PC ADVISOR RECOMMENDED

The free antivirus offered by Bitdefender is a rather different beast from most of the others reviewed here. Rather than offering a slimmed down version of its commercial product, the Free Edition operates with a smaller, more discreet interface, which pops up from the taskbar when you click the Bitdefender icon.

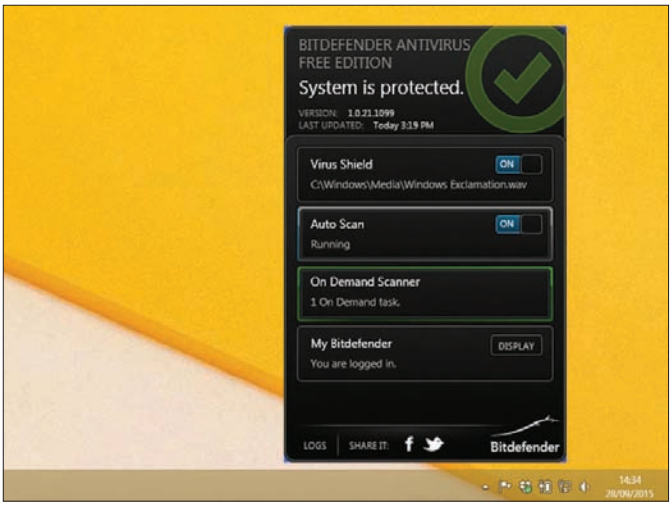
This is a small grey panel with sub-panels for the key features of Virus Shield, AutoScan and My Bitdefender. They provide only switches to turn them on or off, no parameters to set or stats to display. My Bitdefender is the company's browser-based dashboard, which provides little extra information, other than showing the status of your subscription on the various devices you might have it protecting. The company makes AV products for Android and Mac.

As far as we can see, there's no way to instigate a full or quick scan; you have to leave it to the automated protection features of the product to scan what and when it needs. You can start a scan of specific files or folders from the Bitdefender option in file menus, but again the progress of such a scan is shown only by the slowly changing border colour for the On Demand Scanner sub-panel which pops up. The flip side of this lack of settings control is that it's very easy just to load up and forget the software, and trust that it will do its work and protect your computer. There's a fair degree of justification for this trust, as it scores remarkably well when tested.

Performance

A scan of our 50GB file basket completed in one hour 18 minutes and evaluated 286,373 files, giving it a scan rate of 61 files per second, but a second scan took just 11 seconds and scanned 10,183 files, so after the initial checks, Bitdefender looks very efficient at subsequent scans. The software also puts only a light load on a PC, with our 1GB test file taking only 23 percent longer when a scan was running in the background, than without.

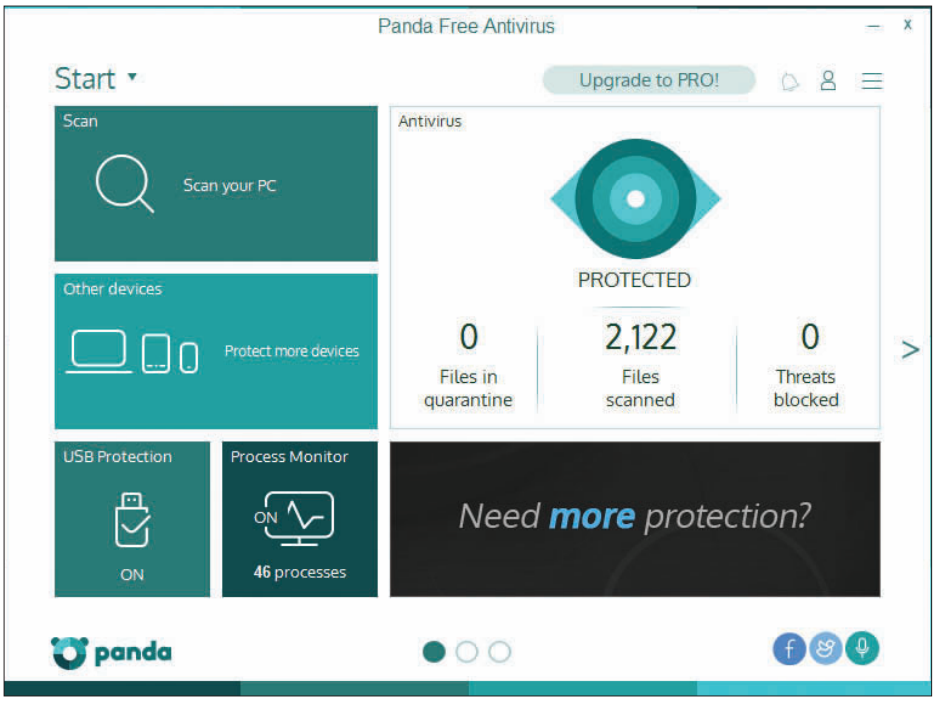
Bitdefender is the second free antivirus application to use the same engine as the equivalent commercial product, which has

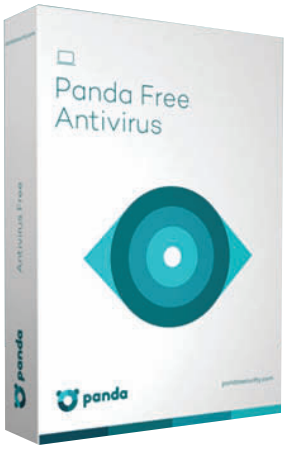


scored 18/18 in AV-Test's evaluation. Here, though, there are no drop-offs at all. Under Protection, the software scored 100 percent over each of the two months of testing, and in both the widespread and zero-day malware categories.

Under Performance, AV-Test saw no degradation of performance whatever in daily use with Bitdefender Free Edition. Finally, under Usability, there was just one false blockage of an action when using legitimate software, and this wasn't enough to drop the product below its perfect 6/6 score in this category.

VERDICT: Bitdefender Free Edition will suit a certain kind of user, one who just wants to install the software and let it do its job, without recourse to setup changes or manual scans. Since it has such a high protection score, it's safe to do this, but if you prefer to have more hands-on control, you may find this approach frustrating.





PANDA FREE ANTIVIRUS 2016

Free • pandasecurity.com

Usability	★★★½☆
Features	★★★☆☆
Value	★★★★½
Overall	★★★½☆

Panda has revamped the look of its antivirus software and this goes for the Free product as well as the commercial ones. The main screen is a modern design, with tiles for scan statistics, a link to the dashboard, USB protection and process monitoring.

These last two are unusual in an AV program. USB protection prevents apps from running automatically when you plug in a USB device and analyses file contents for malware, while process monitoring provides a simpler interface for the kind of info the Windows Task manager offers.

Panda makes considerable claims for running most of its scanning in the cloud and having a very light touch on the PC platform its run on. This is something more and more of its competitors are now copying, and we didn't notice a particularly low impact of the software in our tests.

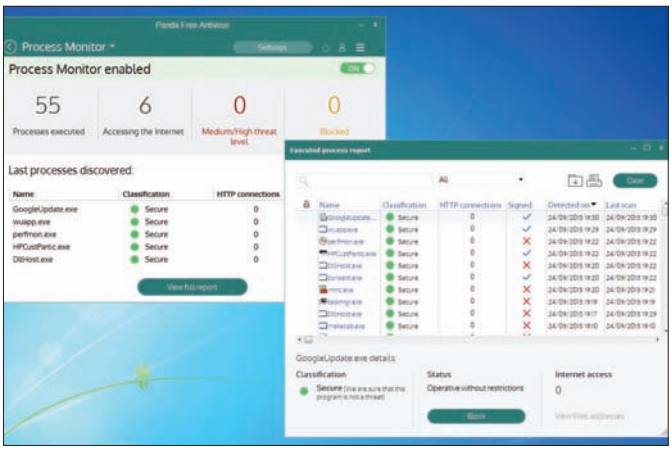
Performance

A 50GB scan took one hour 57 minutes to analyse 455,748, the second longest in the group. This is not an undue worry for a first scan, as it's during this task that most AV applications create a fingerprint of the files and know which ones not to retest unless they've undergone change between scans.

What was more surprising was that our secondary scan, of the same set of files, still took one hour 17 minutes to examine 426,178 files, so not that much fingerprinting and still a lot of files retested.

Copying a 1GB file with and without a background scan running took 51- and 41 seconds, respectively, a 24 percent increase and very close to that from Bitdefender. Most people won't notice that they have AV software running on the system, except when a scan is being run, so the results from our test should be read alongside those from AV-Test, which looks at the difference between AV software sitting idle on a PC and it not being installed.

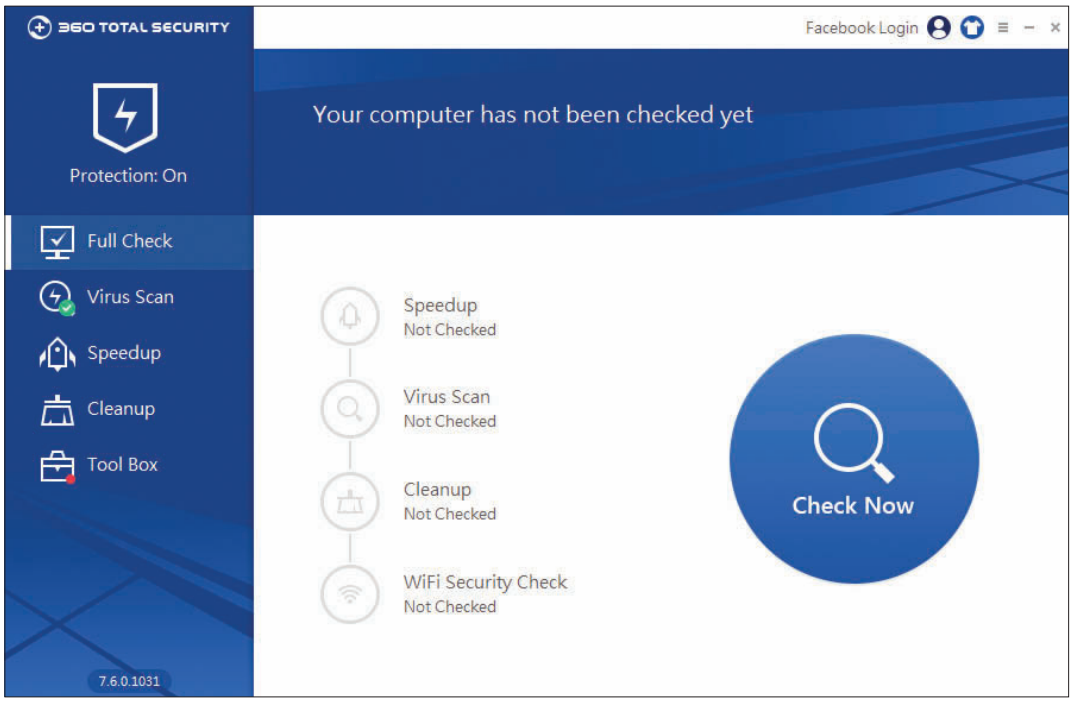
AV-Test scored Panda Free Antivirus 2016 at 17/18, an excellent score, with two of the test categories producing a perfect 6/6.



The Protection category, arguably the most important in any antivirus program, produced one of those perfect scores. When you look at the breakdown between widespread and zero day malware, you see a perfect 100 percent in both categories and for both months of the evaluation.

The Usability score, measuring false detections, warnings and blockages of legitimate software, also produced a perfect 6, though it generated three false detections out of the 1.1 million samples it checked. The product's Performance score, which looks at any performance hit, produced a slowdown of two seconds during the tests, against an industry average of three seconds. This is what prevented it reaching the full 18/18.

VERDICT: Panda is one of the leading antivirus providers and this free offering includes a couple of interesting extras. We were surprised at the time it took for both the initial and follow-up test scans, but it's protection levels are sound and it's very easy to set up and forget.



QIHOO 360 TOTAL SECURITY 2016

Free • 360totalsecurity.com

Usability ★★★★½
Features ★★★★½
Value ★★★★★
Overall ★★★★½

PC ADVISOR RECOMMENDED

Although Qihoo (pronounced Chi-hoo) provides two products under the 360 brand, Total Security and Total Security Essentials, both are free, so unless the specification of your PC is limited, there seems little reason not to install the full product.

The Hong Kong based company boasts over 500 million customers in China, so although it is relatively new to the UK market, it already has a proven track record. It's a slickly designed suite, with a modern interface that is clear and offers sufficient information and control settings to easily setup and use the software.

Qihoo 360 Total Security offers a complete suite of modules, though not perhaps the traditional ones in an internet security suite. There's no antispam or online storage, for example, but there is a sandbox for trying new applications, protection against browser scams, and against somebody hacking your webcam and applications to clean up junk on your system and select what gets loaded when you start your system.

Another novelty of the software is that it uses multiple scanners, including the Avira and Bitdefender engines, and claims the combination gives increased security. It's not the only internet security suite to use this approach, and Qihoo has managed to choose two of the highest rated antivirus engines on the market, which stands it in very good stead.

Performance

The initial scan of our 50GB file basket was very slow, taking two hours 15 minutes to examine 64,742 files. This gives it a scan time of just 8 files per second. Again, this doesn't matter much, if subsequent scans are quicker and the rerun of the test, surprisingly, scanned over 900 more files in less than half the time.

In our copy test, it took 13 seconds longer to copy a 1GB file between drives when there was a system scan running than without, an increase of 27 percent. This is in the middle of the range recorded for this group test.



The AV-Test results quoted here are from a 2014 test, as the latest group evaluation from the lab doesn't include a Qihoo product. In 2014, it scored a very healthy 16.5/18 overall, dropping just 0.5 points in each of the three test categories.

The Protection score dropped as a result of a 96 percent result on zero-day attacks in one of the two months of the test, while the Performance results showed a one-second delay in running the test tasks, against a four-second industry average. Finally, there were a total of four false detections and one false blockage during the Usability section of the test suite.

VERDICT: Qihoo 360 Total Security 2016 is a bargain. It's hard to rate a free product for value, but it's certainly true to say you get more for no money with this suite, than from the others in the group. If it were technically less able, we might be able to pull it back, but there are no real problems in that area, either.



If you're after straightforward antivirus software, there's little reason not to take one of the two top technical products, from Avira or Bitdefender

Conclusion

The idea of offering free antivirus protection may be looked on as a noble gesture. There's also a marketing angle, though, encouraging people who have successfully used the free product on a home PC to introduce it to their business, where a subscription is paid.

There's also a move to monetise free AV by sharing customer details with advertisers. This is a retrograde step, since AV software is designed, at least in part, to protect you from intrusive emails and adware.

If you're after straightforward antivirus software, there's little reason not to take one of the two top technical products, from Avira or Bitdefender. Of these two, we prefer the approach taken by Avira, as it offers the most flexibility but, for somebody who just wishes to add protection and not tweak it, Bitdefender's minimalist design may be preferable.

It's hard not to be impressed by the Qihoo approach, though, where you get the equivalent of a complete IS suite for free. While the system components might not all be what you expect, there's a lot more in here than straight antivirus protection. It represents the best value here.

	AVAST Free ★★★½☆	AVG Free ★★★½☆	AVIRA Free ★★★★½ PC ADVISOR BEST BUY
	Free Antivirus 2014	Free Antivirus 2015	Free Antivirus 2015
AV	Yes	Yes	Yes
Anti malware	Yes	Yes	Yes
Anti spam	No	No	No
Browser protection	Remove add-ons only	Link scanner	No
Firewall	No	No	No
Online storage	No	No	No
PC tuneup	No	One fix sample	One fix sample
Non PC support	Android, Mac, iOS	Android, Mac, iOS	Android, Mac, iOS
Privacy policy	Won't share unless you opt in	Will share unless you opt out	Will share with consent
Extras	Home network security check	AVG Zen dashboard	Avira launcher dashboard
PERFORMANCE			
AV scan 50GB mixed exes, zips, PDFs	1 hour, 11 minutes, 43 seconds	48 minutes, 10 seconds	1 hour, 4 minutes, 48 seconds
Number of files scanned	879,891	236,058	398,910
Average scan rate (files/s)	204.48	81.68	102.60
Second AV scan 50GB	1 hour, 10 minutes	4 minutes, 59 seconds	57 minutes, 22 seconds
Number of files scanned	879,891	13,978	398,905
1GB HD to HD copy No scan running	41 seconds	42 seconds	41 seconds
1GB HD to HD copy AV scan running	47 seconds	46 seconds	58 seconds
Increase in copy time when scanning	14	9	41

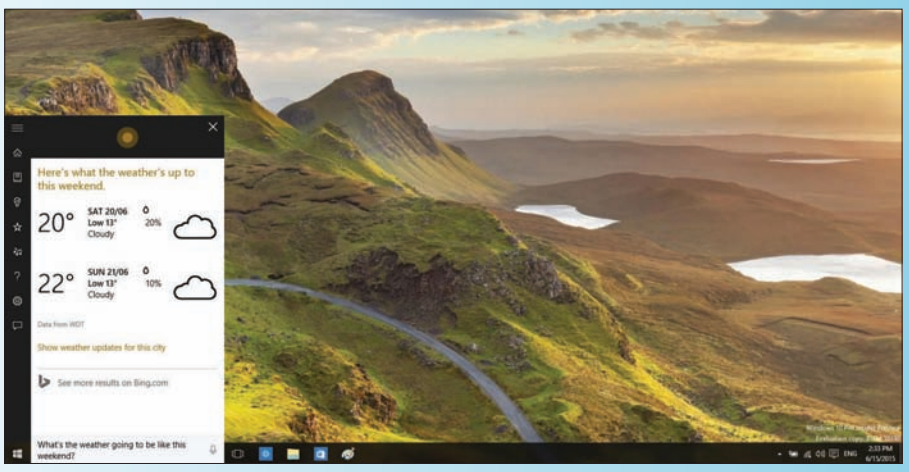


	BITDEFENDER Free ★★★★☆ PC ADVISOR RECOMMENDED	PANDA Free ★★★½☆	QIHOO Free ★★★★½ PC ADVISOR RECOMMENDED
	Antivirus Free Edition 2016	Free Antivirus 2016	360 Total Security 2016
	Yes	Yes	Yes
	Yes	Yes	Yes
	No	No	No
	No	No	Link scanner
	No	No	Yes
	No	No	No
	No	No	Yes
	Android, Mac	Android, Mac	Android, Mac
	Doesn't share customer info	Will share unless you opt out	Will share with consent
	My Bitdefender dashboard	Process Monitor, USB Protection	Sandbox, webcam protection, keylogger block, app patching, Wi-Fi check, clean up, speed up
	1 hour, 18 minutes, 3 seconds	1 minute, 57 seconds	2 hours, 15 minutes, 12 seconds
	286,373	455,748	64,742
	61.15	64.92	7.98
	11 seconds	1 hour, 17 minutes	57 minutes, 57 seconds
	10,183	426,178	65,640
	42 seconds	41 seconds	48 seconds
	52 seconds	51 seconds	1 minute, 1 second
	23	24	27

5 MUST-KNOW WINDOWS 10 TIPS AND TRICKS

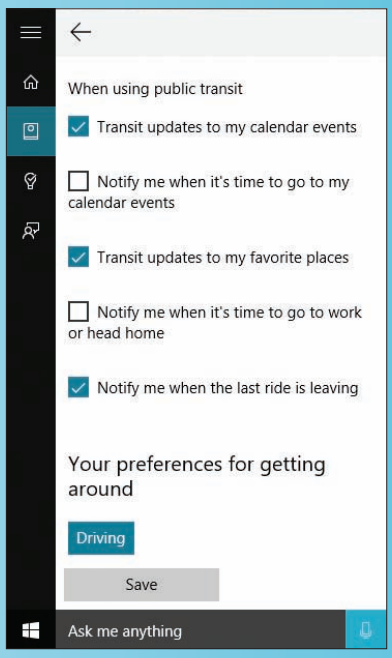
Dive right into some of Windows 10's coolest new features with Brad Chacos' tips

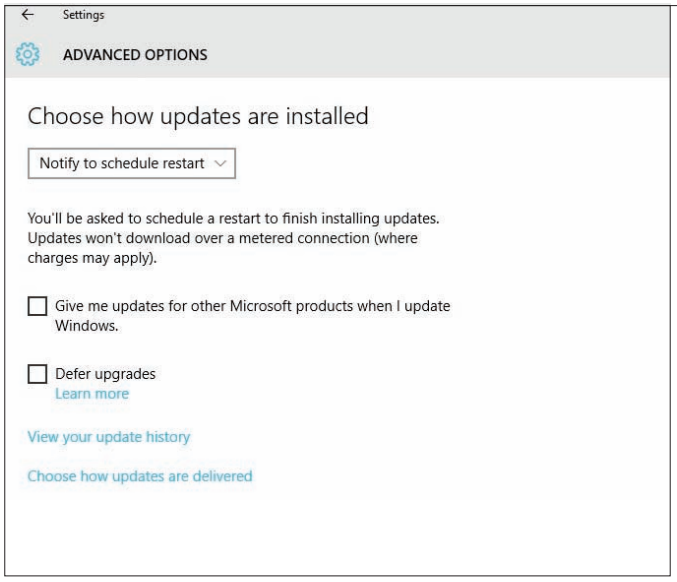
Windows 10 is finally here, and Microsoft's latest, greatest operating system is chock full of tricks and tweaks that can enhance your experience – and tailor Windows to your personal needs. Here's a look at five of the most useful.



Make Cortana more useful

The Cortana digital assistant is one of Windows 10's highlight new features, but it truly shines if you take the time to tell it your interests. Open Cortana and select the Notebook icon in the left-hand pane. From there, browse each section to tailor your preferences for specific news topics, alerts, and even the types of restaurants you like.

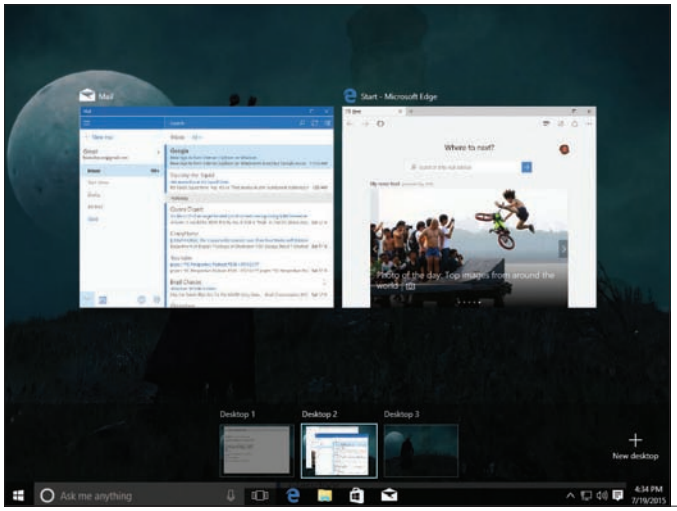




Schedule your restarts

Windows 10 won't allow you to skip updates, but it includes an option to schedule exactly when those mandatory restarts happen. Once an update's been downloaded, head into the Windows Update section of the Settings app's 'Updates & Security' section to tell your PC when it's got a green-light to reboot. If you open the advanced options, you can tell Windows to notify you to schedule a restart whenever an update's ready.

If you want to save some bandwidth, you can also download Windows Updates to a single machine in your house, then use it to spread the patch to other PCs in your network. To do so, go to the same Advanced Options menu for Updates & Security, then click on 'Choose how updates are delivered'. By default, updates are available either way – via direct download to an internet-connected PC, or via other PCs on your network. You can change it to accept Windows Updates only if delivered via your local network. Make sure you don't enable the option on the PC you'll use to download the initial update.



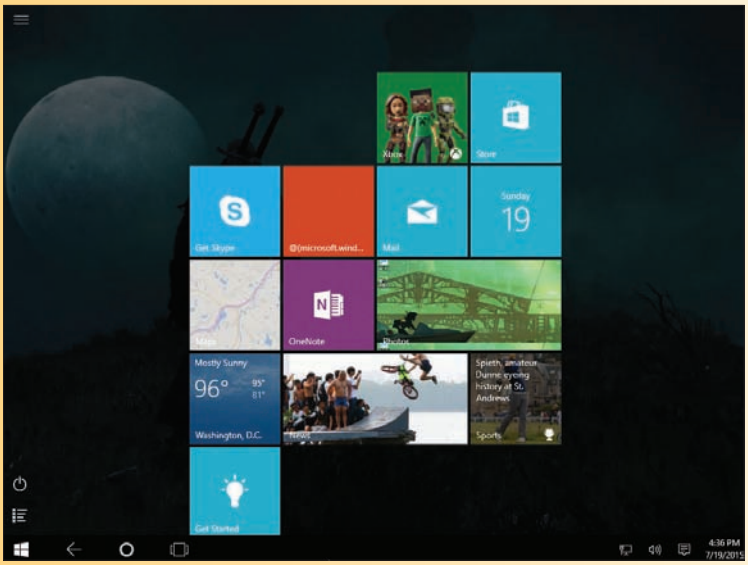
Master virtual desktops

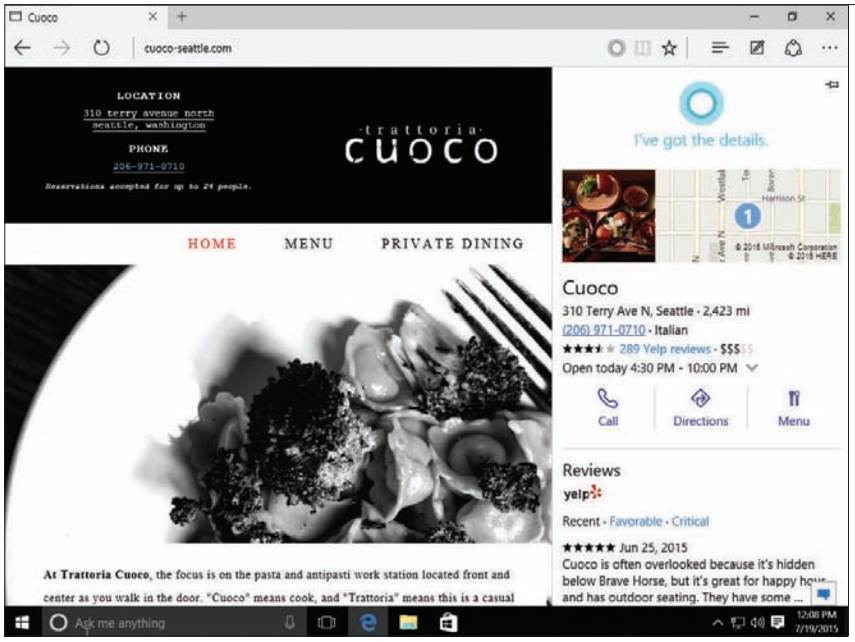
Multiple, virtual desktops have finally made their way to Windows. The Task View button in the taskbar will show all your created virtual desktops – you can seemingly summon as many as your hardware can handle – as well as windows showing the software currently open in your active desktop. You can move open windows from one desktop to another by opening Task View and dragging-and-dropping the application on to another virtual desktop. Dragging a program over to the New Desktop button will create a virtual desktop to house your open window.

Bring back Metro

Does the return of the desktop make you yearn for Windows 8's Start screen? You can force Windows 10 to use the touch-friendly interface – replete with full-screen Windows Store apps – by opening the Action Center in the lower-right corner of the taskbar, then selecting Tablet Mode.

Search for 'Tablet Mode settings' in Cortana for more options, such as the ability to enter Tablet Mode by default when Windows boots, or to shift to it when you're using a two-in-one device as a tablet. (Microsoft calls that Continuum.) If you like the Start screen-like effect but still want to use the rest of the traditional desktop, you can expand the Start menu to full-screen using the button in its upper-right corner.



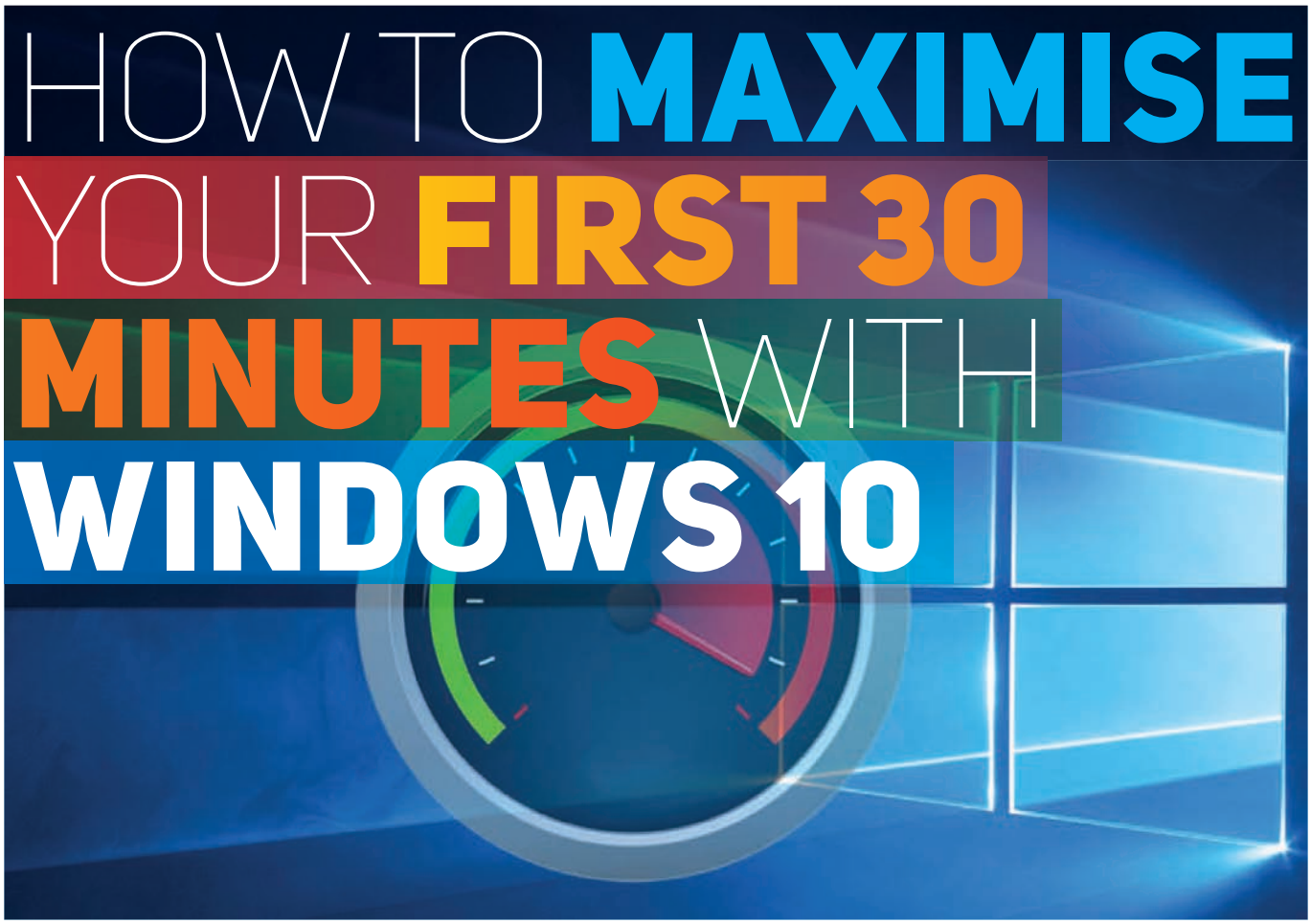


Use Cortana while surfing the web

Did you know Cortana's built into Windows 10's new Edge browser, too? You may have missed it, because the notification alert when its available is pretty subtle.

When you're surfing the web, Cortana will sometimes pipe up when it has helpful supplemental information. For instance, it may offer driving directions and Yelp review information when you're browsing a restaurant's site. Look for a blue Cortana icon with 'I've got more info' to appear in the browser bar when it's available. There's no chime or in-your-face pop-up beyond the easy-to-miss text, though, so you'll need to keep an eye out for it. ☒

HOW TO MAXIMISE YOUR FIRST 30 MINUTES WITH WINDOWS 10



So you finally have Windows 10 on your PC. What do you do with it? Join Mark Hachman's guided tour

We think that Windows 10 is one of the best operating systems Microsoft has ever produced, and it's worth downloading. If, however, you're new to the new OS, it can feel a bit daunting. Luckily, it's more familiar than you think, and we can help walk you through your first 30 minutes with the new operating system.

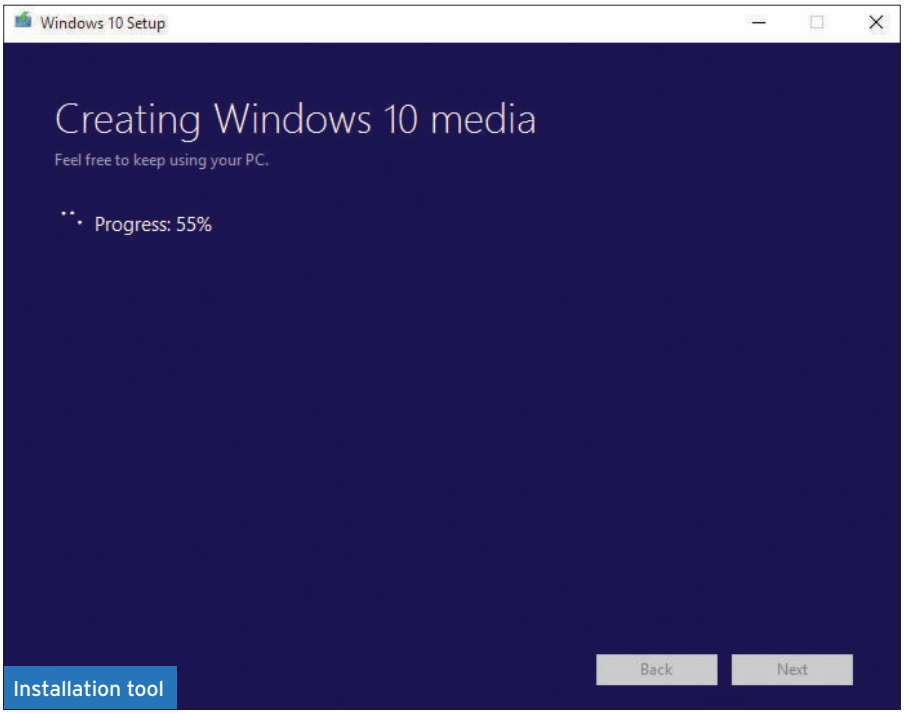
Preloading and installation

If you've purchased a new Windows 10 computer, you have the easiest road. You can skip this section. But for most of us, the OS came via an upgrade to Windows 7 or 8.1. And if you're in this camp, read on.

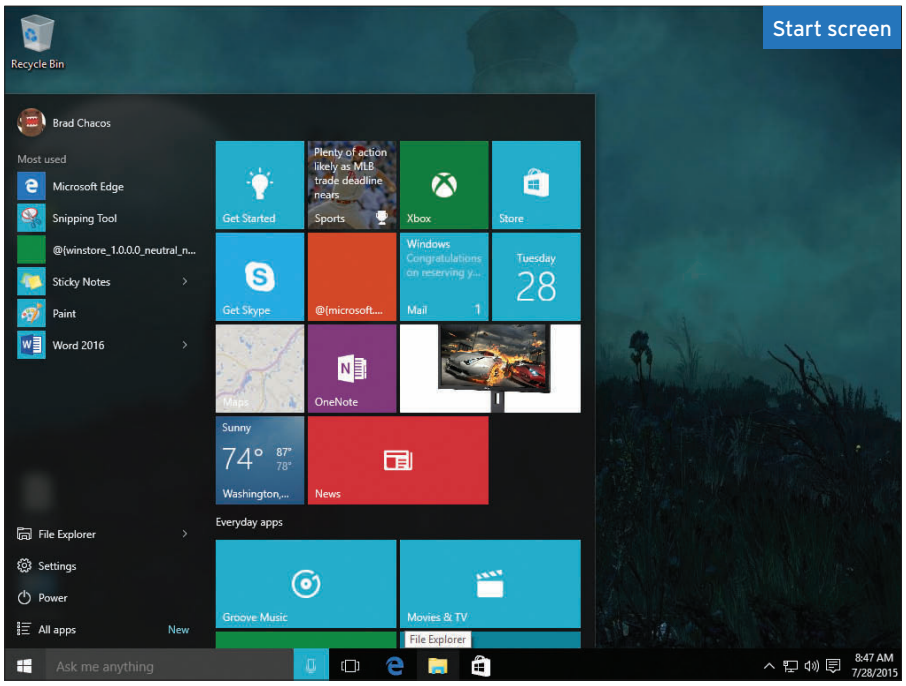
If you reserved Windows 10, you'll have it by now. If you have a piece of hardware that lacks a signed, approved driver, Microsoft won't deliver its operating system until you do. On the other hand, some of you may be surprised by how quickly Windows 10 showed up. That's because Microsoft quietly preloaded Windows 10 on to your machines, then unlocked the code (see page 146). After that, the OS began its installation.

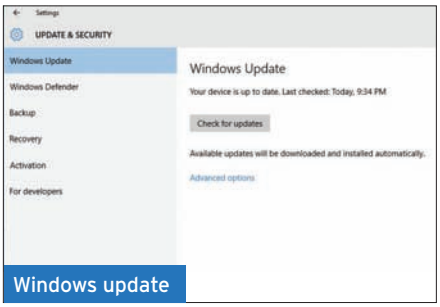
You should see the installation process begin. Your computer will install the files, ask for your Microsoft account and unlock Windows 10. Those files will be downloaded to your system, part of what's called an 'update in place'. Windows 10 will be overwritten on to your computer. But you'll also have the option to create a USB key or other installation media to do a 'clean install,' which enthusiasts prefer.

To do so, download the Windows 10 media, which will let you either create an



Installation tool





Windows update

ISO file that you can burn to a DVD, or else create a bootable flash drive. You'll have the option of installing over an existing Windows installation or starting from scratch.

Time to update

After downloading Windows 10, the first thing you'll want to do is explore the OS, but let's put that on hold for a second. We've been told to expect a pretty massive 'Day 0' patch from Microsoft, which you may have received as part of the upgrade/setup process. Let's just make sure that isn't anything more in the pipeline. Don't be disappointed, though – we can still continue with your Windows 10 orientation. We'll just have an overarching goal in mind. And fittingly, the place to start is, well, Start.

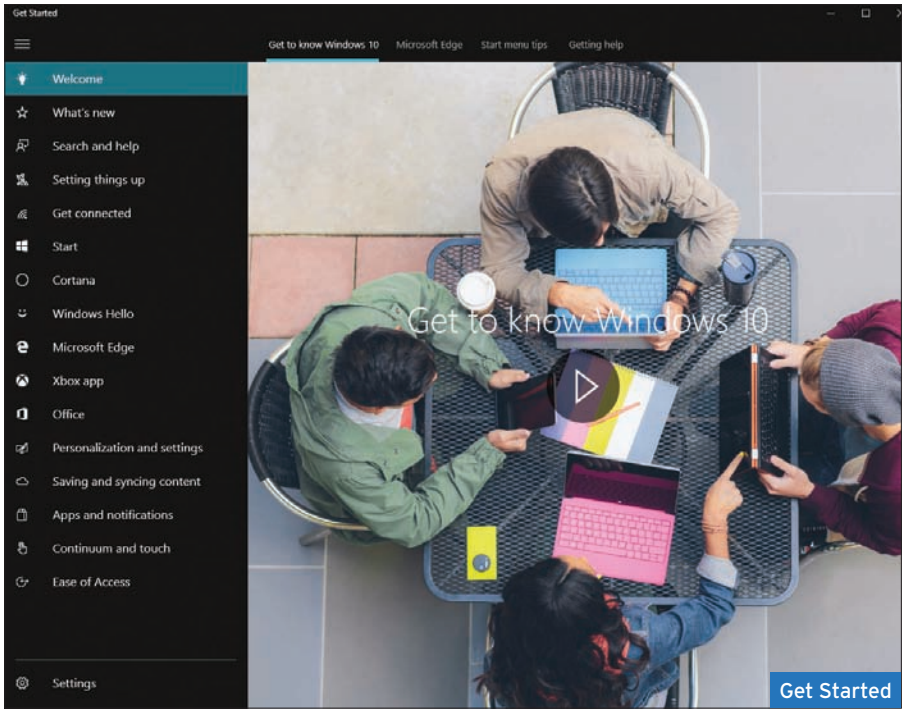
Let's Start exploring

In the left-hand corner of your screen you'll see the Windows icon. If you click on this, you'll open the Start menu. The first thing those upgrading from Windows 7 will notice is the list of apps in the left-hand navigation bar, whereas Windows 8 upgraders will see the familiar Live Tiles to the right. Some of these may already be flipping over to show you relevant information.

For now, though, let's start on the left. You'll see a list of 'frequently-used applications' that Microsoft has selected for you – these may have even carried over from a previous operating system. The list will change depending on how frequently you use them. Unfortunately, you can't pick and choose what programs appear here. You can make some adjustments, however, which we'll show you how in a second.

First, click the 'All apps' button at the bottom of the list. This should be called the 'Almost all apps' button, because Windows, inexplicably, doesn't show you program such as Paint where you might expect them. But everything else that's installed on your system should be there.

> It doesn't appear that Microsoft is going to hold your hand through the opening minutes of Windows 10, so Get Started is the tech giant's overview to the new operating system

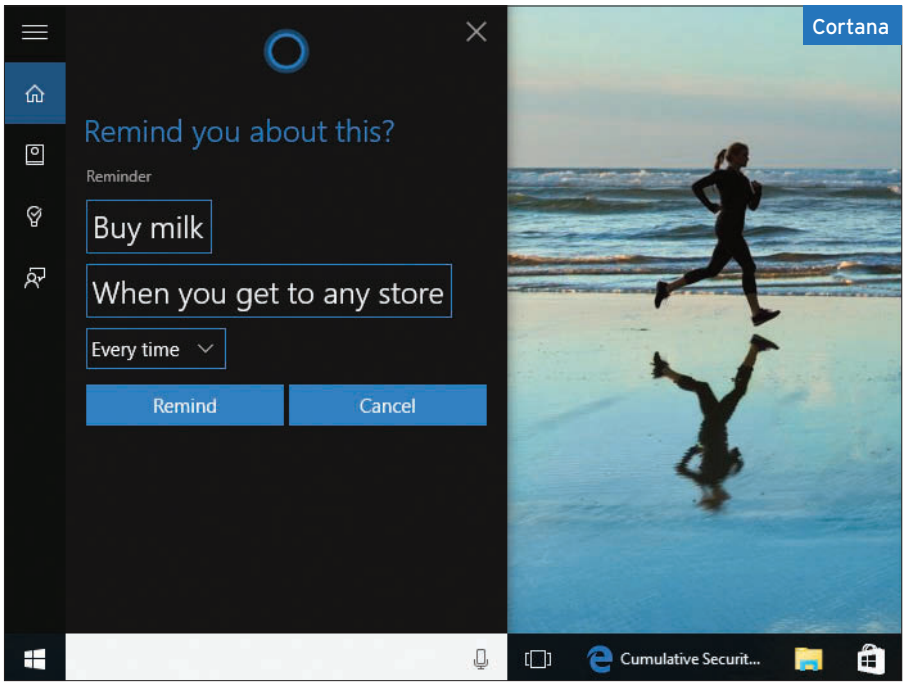


Get Started

For now, let's look to the right. The first thing you should know is that the Start menu is a window – it can be resized and reshaped to your preferences, within limits. It can even go full-screen, although that will require a change in the Settings.

You can arrange and rearrange tiles as you'd like. Try right-clicking one, and adjusting the size; if you can't enlarge it, try dragging-and-dropping it to an open space. Maybe you'd like the Mail application to be in the top left-hand corner. Or your Calendar. You should be able to pin any app to your Start menu, including those found in the left-hand nav bar. Not all will function as Live Tiles, however. That's up to the app designers.

There's one app we want you to look out for: Get Started (see left). It doesn't appear that Microsoft is going to hold your hand through the opening minutes of Windows 10, so Get Started is the tech giant's overview to the new operating system. You don't have to click it now, but be aware it's there. Now, scroll down to Settings, and click there.



A quick tour of the Settings

Some people get a little nervous about tampering with the guts of their PC. Don't worry – the real guts of it are left for the Control Panel. In Windows 10, Settings are more like your car's dashboard.

Remember, we want to find out how to check for updates. And this we can do, quickly, by going to the search box in the upper right. Just start typing 'Update' and a number of options should begin appearing. We want 'Windows Update settings'. Click this. On the following screen, click 'Check for updates'. If your system begins downloading updates, grab a cup of coffee and check back in a bit. Once that's finished, you're up to date and ready to go..

Personalisation

Click the gear icon at the top-left corner of the window until you're back at the main Settings page. Where we're headed now is the 'Personalisation' icon.

The background screen is the first setting that can be adjusted. This should be self-explanatory: pick a background screen or stick with the default. If you want to load a picture of your children, for example, you'll need to track one down from Facebook or elsewhere, or use one that's stored on a USB key or in the cloud.

Flip through the other settings on the page, using the left-hand navigation bar to tweak various elements of your PC. On the lock screen setting, for example, you'll have the opportunity for Windows to show you your next appointment if you set up Calendar to show a detailed view. By the time you're done, your Windows 10 PC should look and feel more like home.

Cortana and Notifications

If this is the case, Microsoft would like you to start thinking of Cortana as one of your friends. Right now, its located in the lower left-hand part of the screen, asking you to 'Ask me anything' (see screen, below). Let's briefly run through the basics.

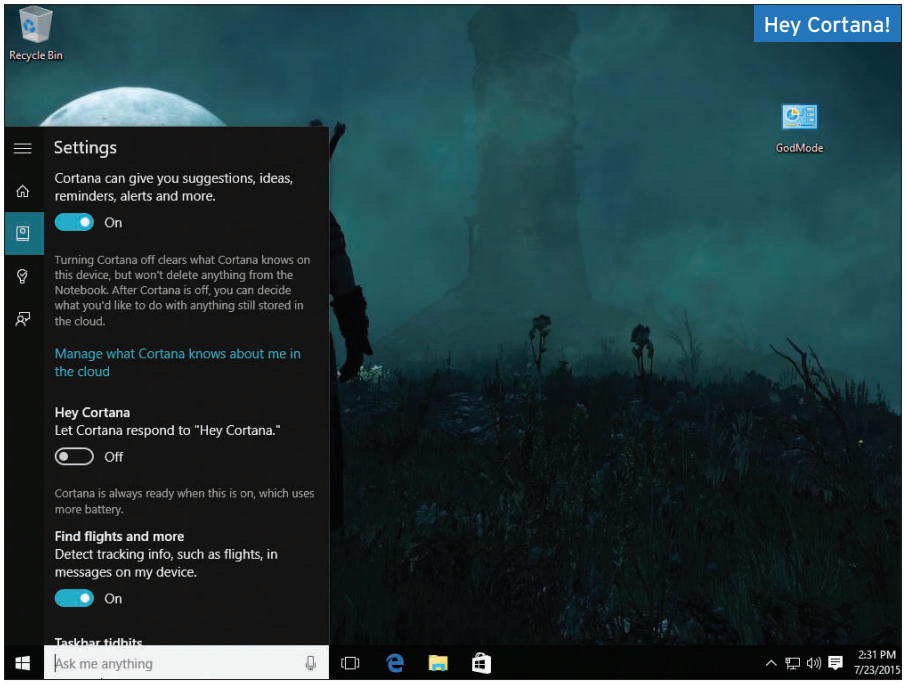
You don't need to use Cortana, although the first time you click on the search bar you'll receive a pitch to set it up. Microsoft's personal assistant wants to pry into as many corners of your digital life as you'll allow in order to work best. If you agree, it'll start working in the background to advise you, for example, of when you'll need to leave to make your dentist appointment on time.

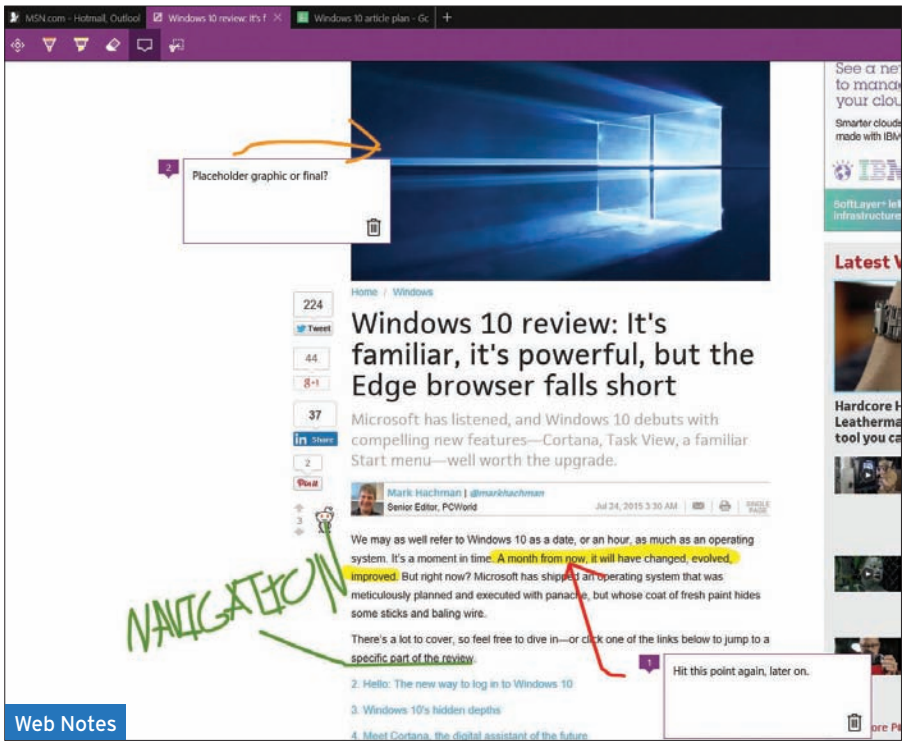
If you don't want to use it, you can opt out – in the initial stages, or later, via the Cortana settings menu. You'll need to enter the Notebook to do that: click the search button, then the third icon down from the left. Go to the Settings menu and you'll see a toggle switch to turn Cortana off.

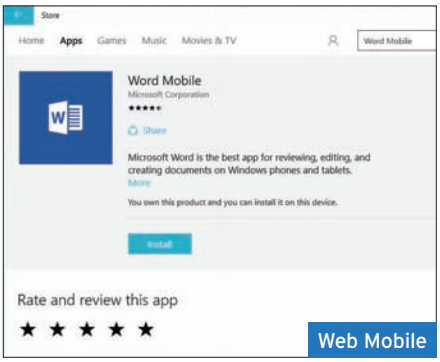
If you decide to keep it, you can also dig through various categories in the Notebook and let Cortana know your likes and dislikes.

If you do set a reminder, it will pop in from the lower right, and squat down in the corner of your screen until you dismiss it. Mail notifications work a bit differently; they'll fly in, hover for a moment, then disappear. If you miss it Windows 10 has an archive of these, called the Action Center, in the system tray portion of your taskbar, in the right-hand corner of your screen. It looks like a text bubble from a comic book. Click it, and you'll see a summary of what the operating system thought was important. Cortana can serve as a generic search bar for documents and other apps you've stored on your PC. Sometimes, the easiest way to launch an app is to start typing its name in the search bar.

If you decide to keep Cortana, you can also dig through various categories in the Notebook and let Microsoft's digital assistant know your likes and dislikes







There are three more things that you need to be familiar with before our tour is done: launching the internet browser, Microsoft Edge; setting up your email; and downloading just a few of the apps that you'll probably want from the Store.

Microsoft Edge

To access the internet, you'll need to click the Microsoft Edge icon in the toolbar at the bottom of the screen – it's similar to the old Internet Explorer logo.

Edge will launch with an array of content from across Microsoft's properties, with a search bar in the middle of it. Like most modern browsers, you can either type a web address or a search term in the field. Again, however, you'll want to explore the settings. To access these, click on the '...' menu in the upper-right corner. It's here that you can make changes, such as alter the 'theme' from light to dark.

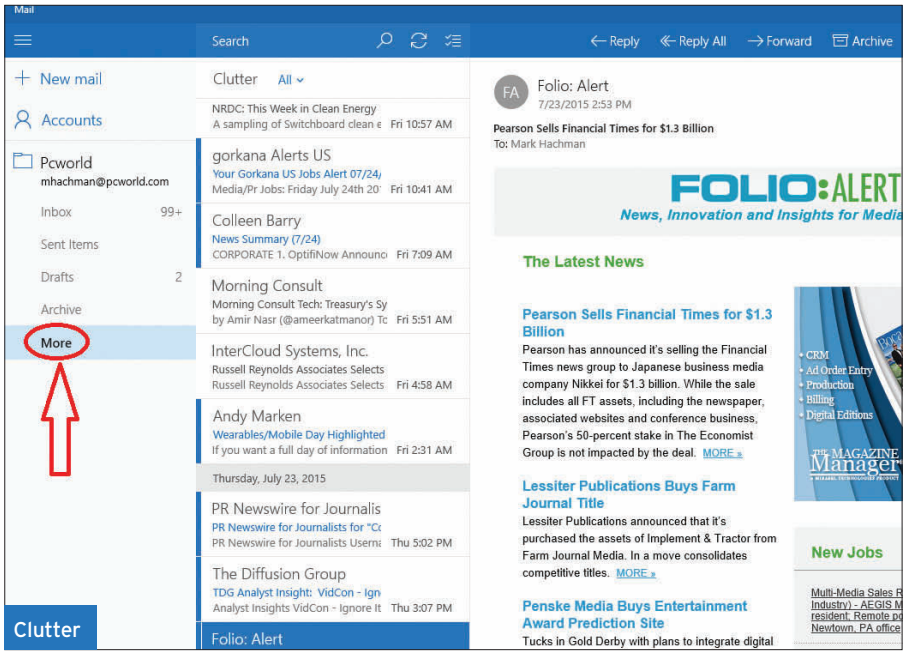
To access the internet, you'll need to click the Microsoft Edge icon in the toolbar at the bottom of the screen – it's similar to the old Internet Explorer logo

Next, you'll want to import your favourites from another browser. This can be tricky. If you're a Chrome user, you'll probably want to search for Google's browser, download it, and then decide whether or not you'll want to take your bookmarks and import them to Edge. The same goes for Mozilla and Opera. If you worked in Internet Explorer, however, your bookmarks should carry over.

Mail

Setting up email within Microsoft's Mail app is easy. Launch it (either via the Start menu or via Cortana) and then add an account. You'll need to type in your email address and password, but after that you should find Mail takes what it needs. If you'd like, you can even add multiple accounts and switch back and forth between them.

About the only tip we'd recommend is clicking the 'More' link in the left-hand list of links. This opens up a number of different folders in which to store your email, as well as the Clutter folder, which is Microsoft's modern equivalent of the Spam folder, hiding emails that aren't junk, but aren't important, either. You may also want to explore the Settings menu (in this app, it's a gear icon in the bottom-left corner).



The Store: Go get Office

Last but not least, you'll want to grab a copy of Microsoft Office. You have two options: pay for a full-fledged copy of Office 365 – which will require you to pay £59 per year for Office Personal – or the much simpler, cheaper route: Word Mobile, Excel Mobile, and PowerPoint Mobile. All three are free, and available via the Store app.

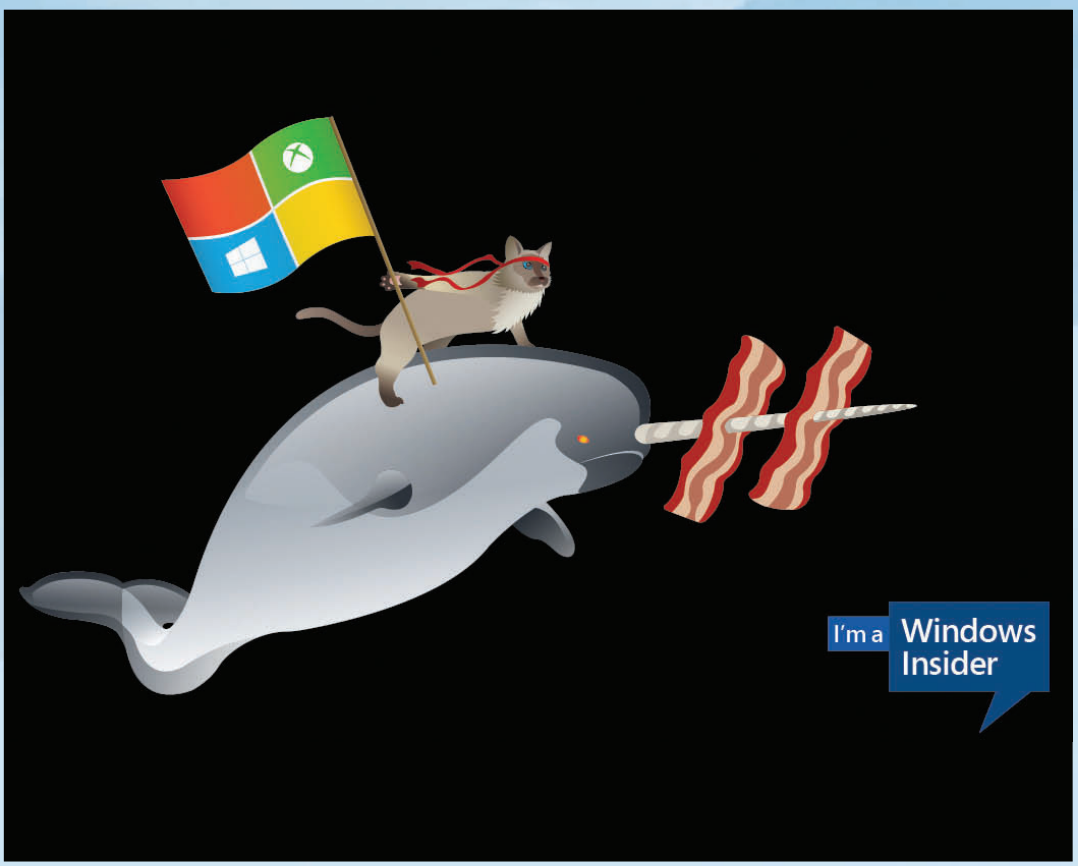
Microsoft's Store is a home for a lot of mediocre apps that you don't need. What you should do, however, is type 'Word Mobile' into the search bar, download it, an do the same for the other two apps. Word Mobile doesn't have all the features of Office 365, but it has enough to satisfy the casual user. ☒

THE 10 BEST HIDDEN

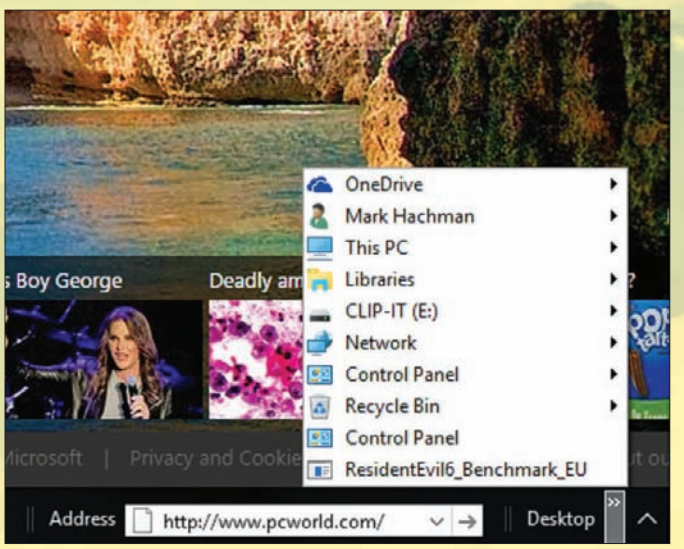
Windows 10 isn't all Cortana and the Start menu. Mark Hachman reveals the best features under the hood

Windows 10 has officially been unleashed upon the world, but Insiders have lived with the operating system for months and know things the newbies don't. Insiders have even created their own mascot, a ninjacat with a variety of trusty steeds, to symbolise their pioneering, adventuresome spirit.

We've been playing with Windows 10 for a while now. Let's follow the ninjacat deep within the bowels of Windows 10, where narwhal guides are eager to point out tasty bacon features you might otherwise miss. We think these 10 are some of the most useful, productive, hidden gems you're going to find.



FEATURES OF WINDOWS 10



1 Put the web (and desktop) in your toolbar

You can make your desktop toolbar even more powerful with a few tweaks in a configuration menu, adding a web address bar and desktop links.

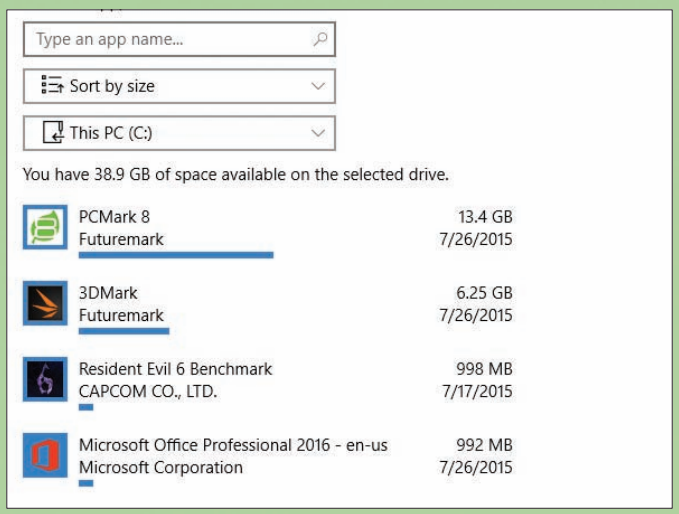
Click the toolbar, and right-click in any unused space you can find. Select the 'Toolbars' tab. Here you can check off one of three options: Address, Desktop and Links. With the address bar, you can quickly type in a website and launch your browser. Links allows you to do the same, but via saved bookmarks. Instead of launching your desktop directly, the Desktop link brings up folders and other locations on your PC.

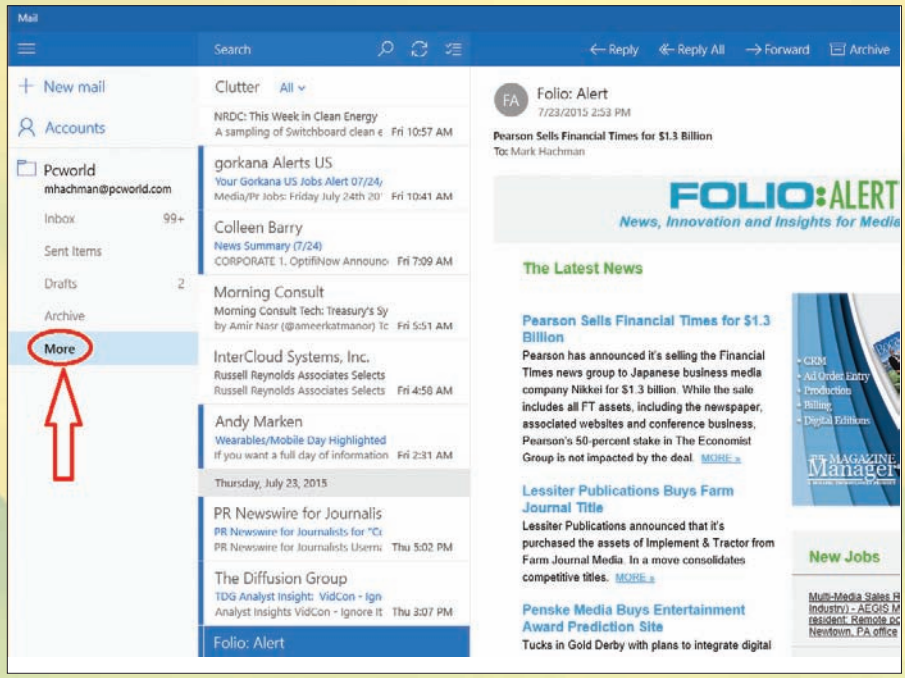
You might not want the extra clutter, but it can be pretty handy.

2 Which apps take up the most room?

Hidden away within Settings > System > Storage is a list of the drives on your PC. Click one, and you'll receive a handy breakdown of how much space apps, photos, videos, and more take up on that particular drive. Click each subcategory to get even more detail.

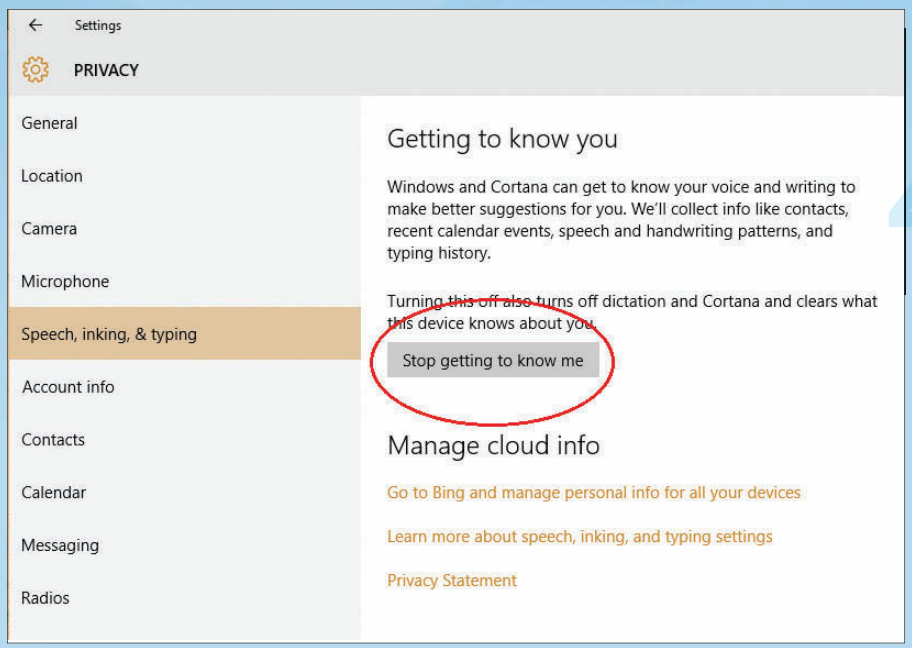
We think you'll find the list of apps the most useful of all of these. It's a great way to keep tabs on what's using up storage space, so you can quickly decide which ones to delete.





3 Mail's hidden Clutter feature

Microsoft filters out spam, but also places emails it doesn't think you'll care about in a 'Clutter' folder, a feature that is now included in the Mail app. It's found under the 'More' subheading. If an important email has mistakenly been placed in this folder, drag it into the inbox. Over time, Clutter will learn which emails are important. Microsoft will also email you periodically about what's gone into the folder.

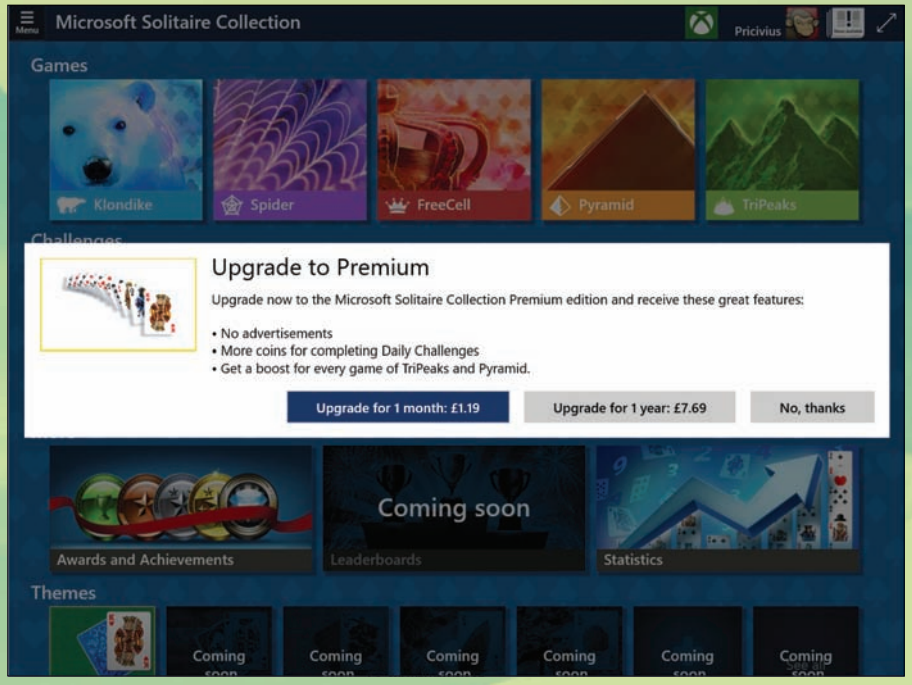


4 Go away, Cortana

Yes, there's a toggle to turn off Cortana, and you'll probably want to ensure your information is erased from the Microsoft cloud, if you decide you want Windows 10 to preserve your privacy wholesale. But if you just want to erase Cortana's memory and turn it off, go to Settings > Privacy > Speech, inking & typing, and click the 'Stop getting to know me' button.

5 Pay for Solitaire

Solitaire has long been one of those idle pursuits for anyone with a lot of time on their hands. But for some reason Microsoft now thinks that Windows 10 users will pay, monthly, for premium Solitaire. It first tried out premium Solitaire features in Windows 8, and now they're back. Plus, they still pop up only when you try to access the daily Challenges. (An M&M's video ad appeared when I tried them out.) Technically, this is a 'feature', but we've stretched the definition of the term for this one.

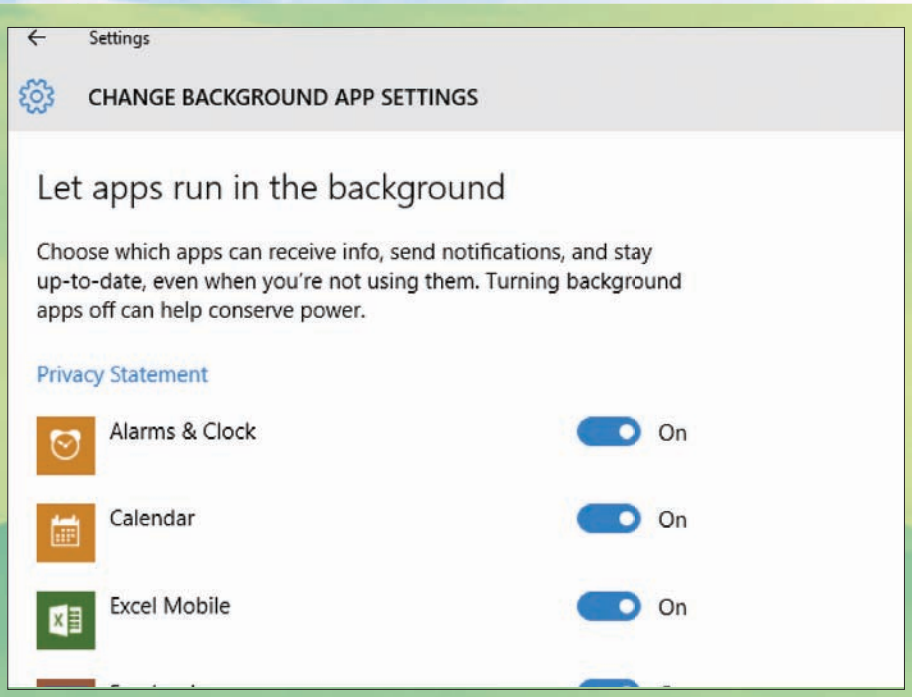




6 Solitaire challenges

If you manage to make it past the ads in Windows 10's Microsoft Solitaire Collection app, check out the Daily Challenges. This is serious business.

Not only is someone at Microsoft coming up with these things, you get special e-currency as a reward for completing them, though we're not sure what this does. And in the future, there will be leaderboards. Big things are coming, we tell you.

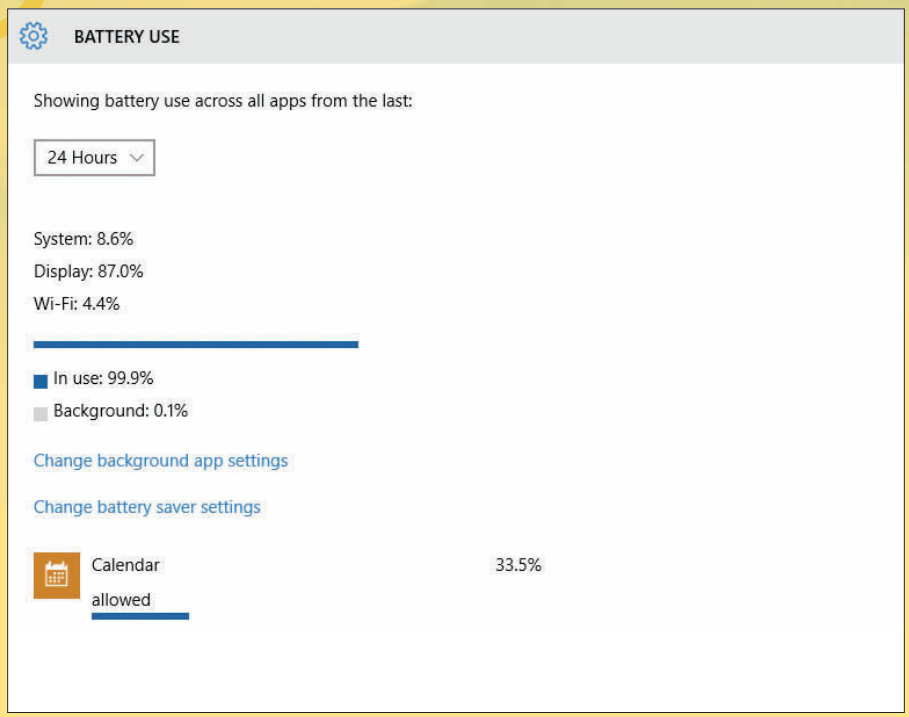


7 Background app manager

The background manager allows you to tweak the settings for apps that run in the background. After all, do you really need all the hidden ads in your web browser connecting to the internet when you're not actively using it? It's something to keep in mind.

8 Battery use

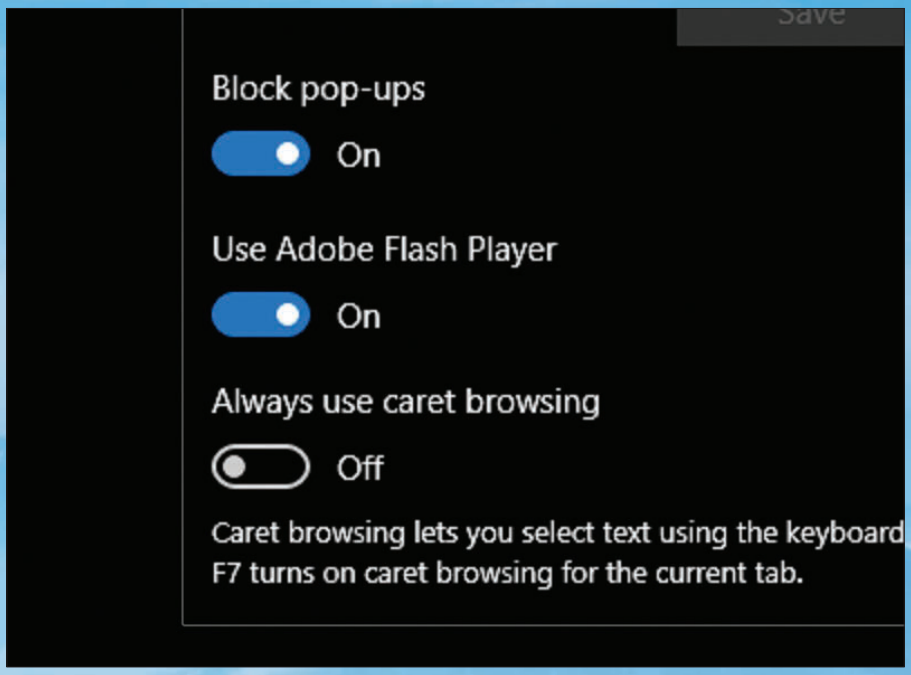
With Windows 10 running on both computers and smartphones, we're seeing a lot more 'mobile aware' applications. Case in point: the battery management applications, hidden within Settings > System > Battery saver. The battery-saver mode isn't the most useful tool here, though. You can now see a breakdown of battery use, which reveals what apps and devices are using up the most power.



9

Edge's advanced options

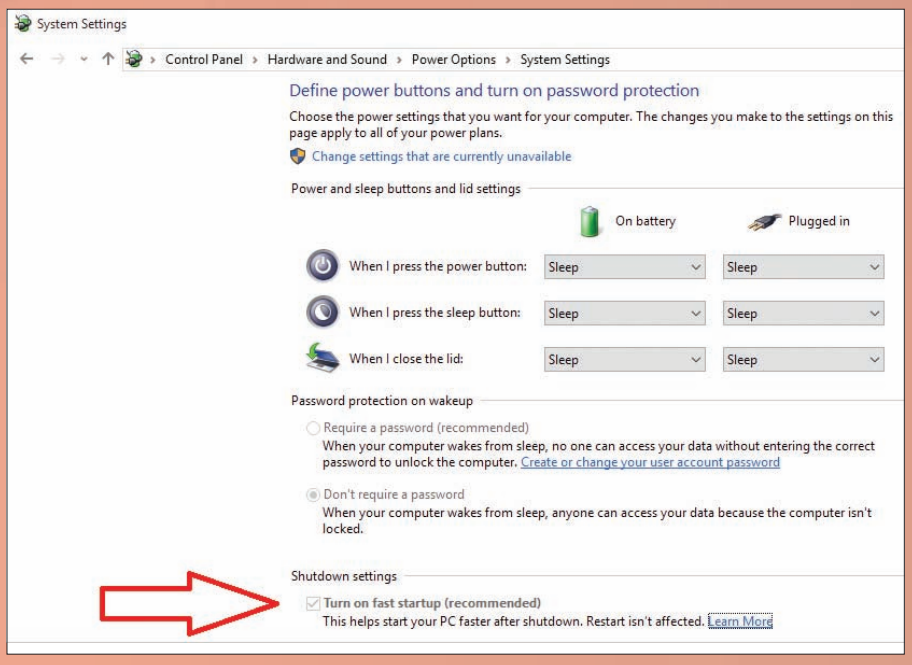
One of the best things about Edge is its settings menu, which allows you to turn on or off useful features. To access it, click on the '...' icon in the upper-right corner. Next, click Settings and scroll down to the Advanced Settings menu. You'll find these options, which you may tweak at will. (Yes, we'll be turning off Adobe Flash.)



10

Fast startup

Windows 10 should come preconfigured to enable fast startup, where certain system files are written to a master file, resuming them rather than restarting the entire system. Microsoft says this helps cut boot times to about 60 percent of what they were.



RECLAIM YOUR PRIVACY IN WINDOWS 10

Windows 10 has deep cloud hooks and shares a lot of data with Microsoft in order to create a smart, seamless experience across devices. If you prefer some privacy, Ian Paul shows how to disable all of it

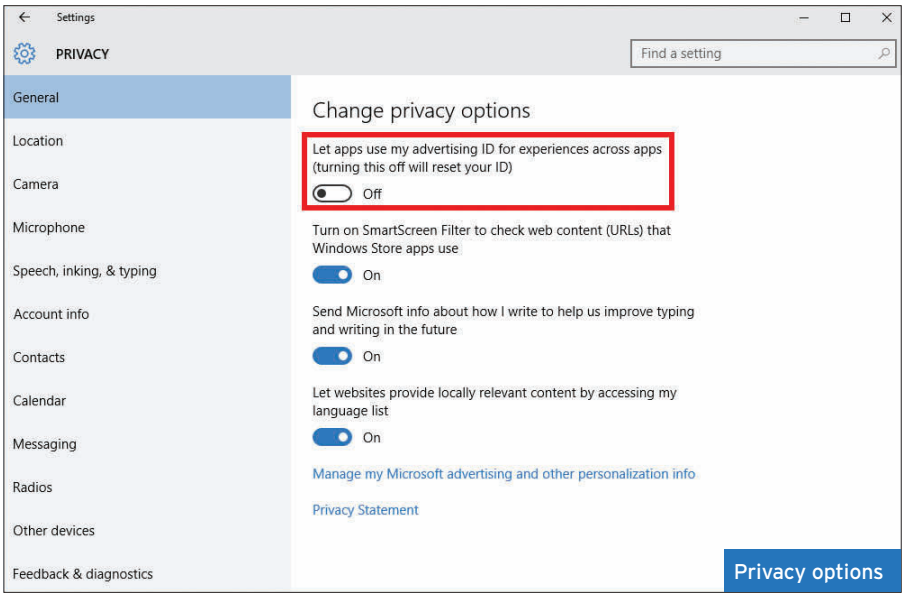
Windows 10 is infused with data-tracking elements and hooks into Microsoft's online services. Handing over all that data has some tangible benefits though, such as its OneDrive integration and the Bing-powered brains behind the Cortana digital assistant, but not everyone is thrilled with the idea of Microsoft constantly looking over their digital shoulder.

This guide will show you how to disable Windows 10's integration, as well as provide tips on what those features actually do. That way you can decide whether you want to keep any of it active or just shut the door on Microsoft's cloud altogether.

Advertising

One setting you should consider disabling is Windows 10's advertising integration. While we don't mind seeing ads on websites, since that's what pays for most of the free content we see online, we don't like is 'ad personalisation'. We don't need ads that are supposedly tailored thanks to cookies that track our travels around the web.

Turning off personalised ads in Windows 10 is a two-step process. First, go to Settings > Privacy > General and slide the 'Let apps use my advertising ID for experience across apps (turning this off will reset your ID)' option to Off. Next, open your web browser of choice and go to tinyurl.com/oxu5pky. Select Off in both 'Personalized ads in this browser' and 'Personalized ads wherever I use my Microsoft account'.



Tip: If you are using an ad blocker or an extension such as the EFF's Privacy Badger (tinyurl.com/ny4eLgj), you may

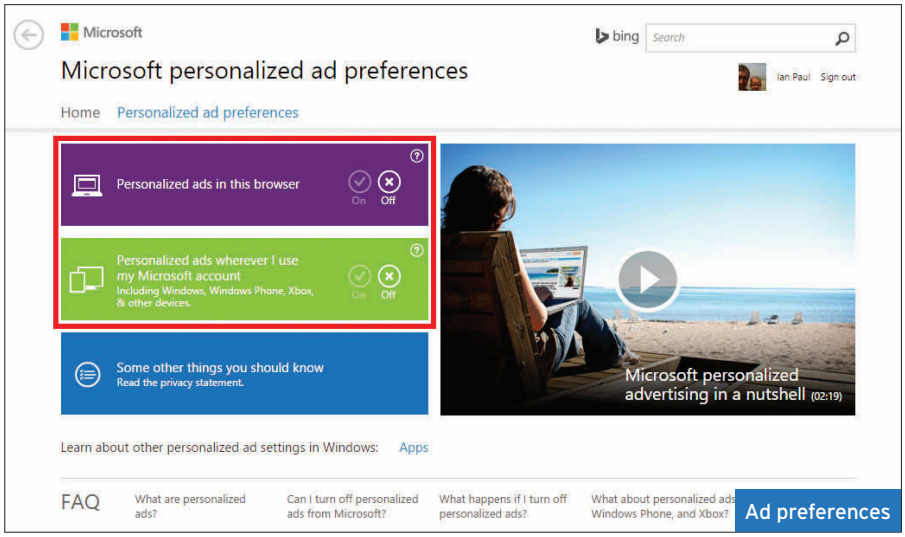


have to turn it off for this site before you'll see the option to turn off in-browser ad personalisation. The site has to set a cookie for this second option to work.

Cortana

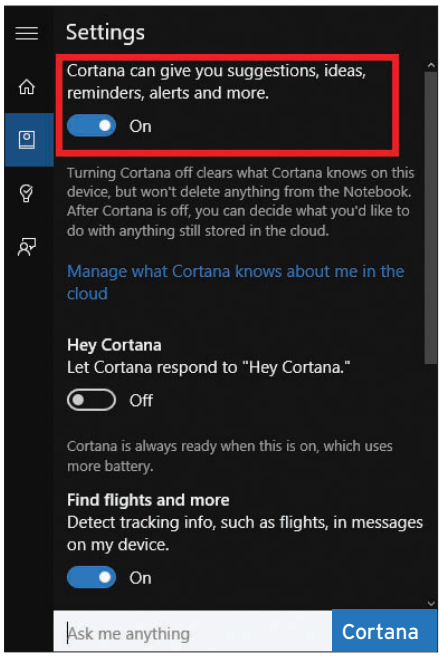
Microsoft's built-in digital assistant is useful for tasks such as quickly setting reminders. The information it collects is similar to that Google does with Google Now, which you may already be using on your Android device. If, however, you don't like Cortana, it's easy to turn off, and if you haven't used Microsoft's personal assistant, it's already off.

Click on the Cortana icon in the taskbar, and then on the notebook icon on the left-hand side of the pop-up panel. Select Settings from the list of options that appear. Slide off the 'Cortana can give you suggestions, ideas, reminders, alerts, and more' option. Once it's gone, you'll see a new option – Search online and include web results. As its title suggests, this includes Bing results when you look for things on your computer. You'll have to decide whether or not you want that enabled.



It's also a good idea to jump back into the Settings app's privacy section. Open Settings and go to Privacy › Speech, inking, and typing. This is a setting that allows Cortana to gather all kinds of information about you to deliver its services. Click the Stop getting to know me button to end that. Note that this will delete collected data stored on your PC, and also turns off dictation functionality.

Once that's done, click 'Go to Bing and manage personal info for all your devices'. This is where you can delete any data that Microsoft has collected about you from its servers. Clearing this will affect the performance of Cortana and other personalisation services across your devices and Microsoft services. You can read through



this page to understand what you're losing, or just jump to the bottom and click Clear.

Wi-Fi Sense and peer-to-peer

Now let's look at two features of Windows 10 that are innovative, though those who value their privacy may not appreciate them. The first is Wi-Fi Sense. This is turned on by default, but doesn't do anything unless you explicitly use it. It allows you to share access to password-protected Wi-Fi routers. The passwords are shared silently in the background over encrypted connections. People you share network access with don't see the passwords, and they are not in turn granted sharing permissions for their friends.

The idea is that if your friends or family come over to your house they don't have to ask for your password. Instead, anyone with a Windows 10 device and is a digital friend of yours is automatically logged in. This is more secure than sharing your password with anyone who walks through your door. Once a person knows your Wi-Fi password they could share it with others, after all.

To turn Wi-Fi Sense off, go to Settings > Network & Internet > Wi-Fi > Manage Wi-Fi Settings. You'll see two options: 'Connect to suggested open hotspots' and 'Connect to open networks shared by my contacts'. Slide these to Off.

Moving on, Windows 10 shares system files and updates downloaded to your PC with others by default. This peer-to-peer networking feature helps others get updates and system files faster. In return, your PC also receives updates via other people's PCs.

If you don't like the sound of this, go to Settings > Update & Security > Windows Update > Advanced options > Choose how updates are delivered. By default, 'Updates from more than one place' is enabled and set to both local sources and other PCs on the internet. You have two additional choices, however – you can distribute updates only to PCs on your local network, or shut off the P2P updates entirely and stick to using Microsoft's servers alone.

> Wi-Fi Sense is turned on by default, but doesn't do anything unless you explicitly use it. It allows you to share access to password-protected Wi-Fi routers

If you want to shut everything off, turn the slider on this screen to Off. If you want to share with PCs on your local network, leave the slider in the On position and select the 'PCs on my local network' button.

OneDrive

If you're not interested in storing your files on Microsoft's cloud servers, you can turn off OneDrive, so it stops bugging you to configure it. Click the upward-facing arrow in the system tray on the right-hand side of the taskbar. Next, right-click the OneDrive icon and select Settings. In the new window that opens, uncheck 'Start OneDrive automatically when I sign in to Windows'.

Settings

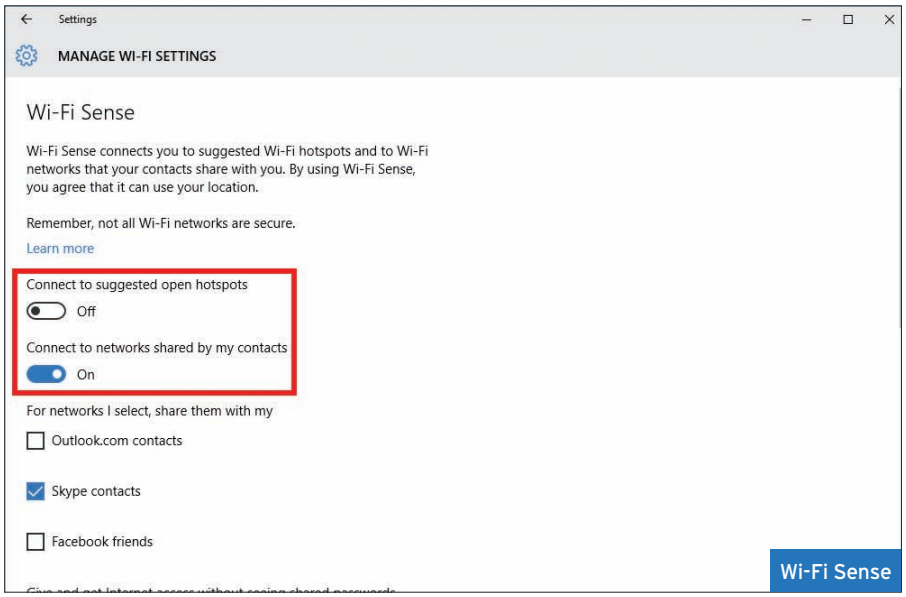
We've got the most essential parts of our privacy lockdown finished. It's now time to look at the privacy options in the Settings app by going to Settings > Privacy.

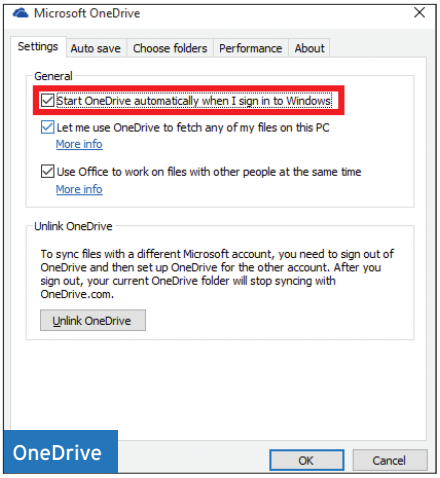
This is the core of Windows 10's privacy controls, but most are not as critical as the other items we've covered. The exceptions are the remaining items under Privacy > General. Here you'll want to turn off 'Send Microsoft info about how I write to help us improve typing and writing in the future'. You may also want to shut off 'Let websites provide locally relevant content by accessing my language list'.

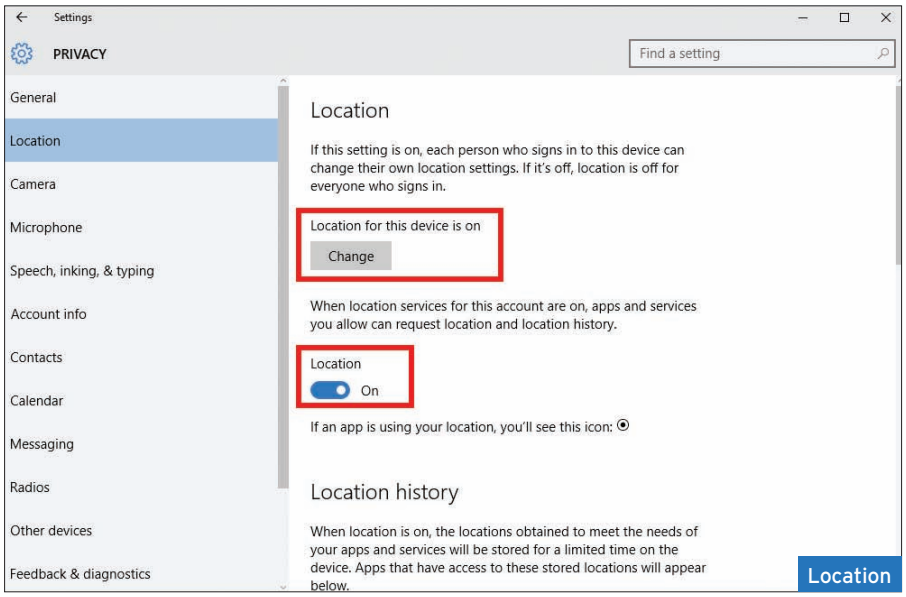
After taking care of the settings under General, what you'll mostly see in the remaining sections are methods for apps to access your data.

The Location section lets you control whether apps can use your location to deliver services such as weather forecasts and local news. Location is a little unusual since it can be set both on a per-device or per-user basis. To turn off location for the whole PC, click the Change button. To turn it off for only the logged-in user, turn the 'Location' slider to Off (see top right).

You can also control location settings on a per-app basis by scrolling down to 'Choose apps that can use your location'. After location is taken care of, the rest of







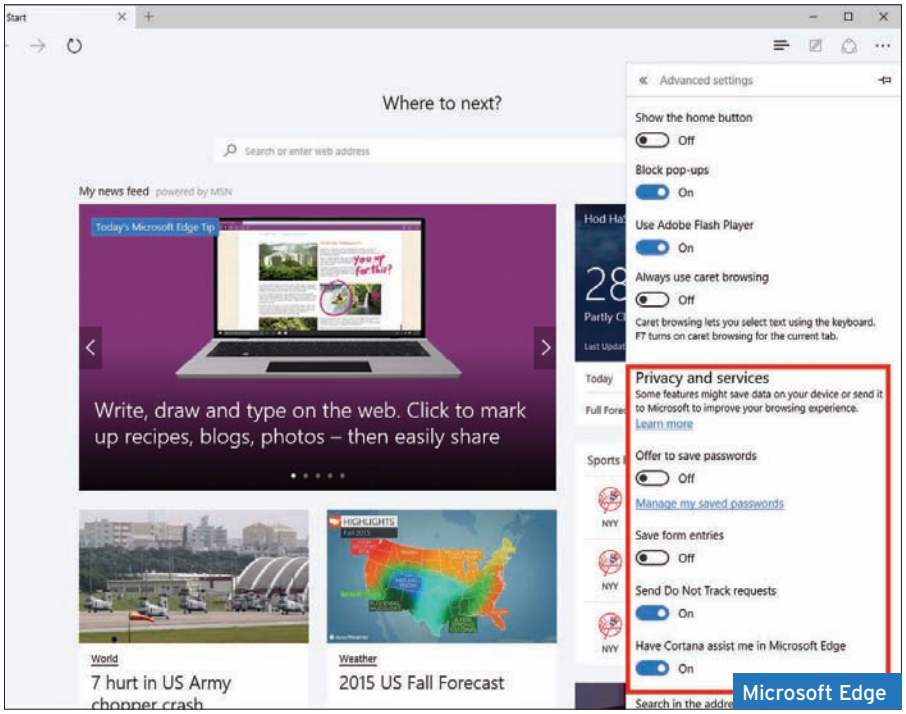
the settings follow a similar format, allowing you to turn off access to things such as your camera, microphone, contacts and calendar on a systemwide or per-app basis. Keep in mind there may be some things you want to keep on. The Mail app isn't much use if it can't access your contacts, for example.

The Location section lets you control whether apps can use your location to deliver services such as local news, and can be set both on a per-device or per-user basis

Microsoft Edge

Even if you use Microsoft's new browser, there might be features, such as Cortana integration and typing prediction, that you may want to disable if you don't want to send any data back to Microsoft.

Open Edge and click on the menu icon in the far right corner (three horizontal dots) and then go to Settings > View Advanced Settings. Here you have the option to turn off Adobe Flash (something we recommend) and then under 'Privacy and services', you can decide to switch off a number of settings. These include:



- **Offer to save passwords** and **Save form entries** are both turned on by default, which you may not want. They are handy features, though.
- **Have Cortana assist me in Microsoft Edge** lets Cortana work inside the browser. If you've already switched off Windows' personal assistant, then you definitely don't want this feature turned on.
- **Show search suggestions as I type** uses Microsoft's web-powered prediction service to try and work out what you're searching for and then fill it in automatically. Chrome and the standard version of Google search offer something similar, so you may already use this elsewhere.
- **Use page prediction to speed up browsing, improve reading and make my overall experience better** is similar to search suggestions in that it sends your browsing history to Microsoft. The company says this feature "uses aggregated browsing history data to predict which pages you're likely to browse to next, and then loads those pages in the background for a faster browsing experience". If you don't like the sound of this, you should turn it off.
- **Help protect me from malicious sites and downloads with SmartScreen filter** lets Microsoft block malicious sites and downloads from infecting your PC. This feature allows the tech giant to download a list of suspicious URLs to your PC, so Edge can block those sites. However, with SmartScreen active, whenever you land on a malicious website, you will be redirected to a Microsoft web page that will gather some PC information and the web address of the page you visited. If you ask us, the SmartScreen filter is pretty benign and well worth keeping activated.

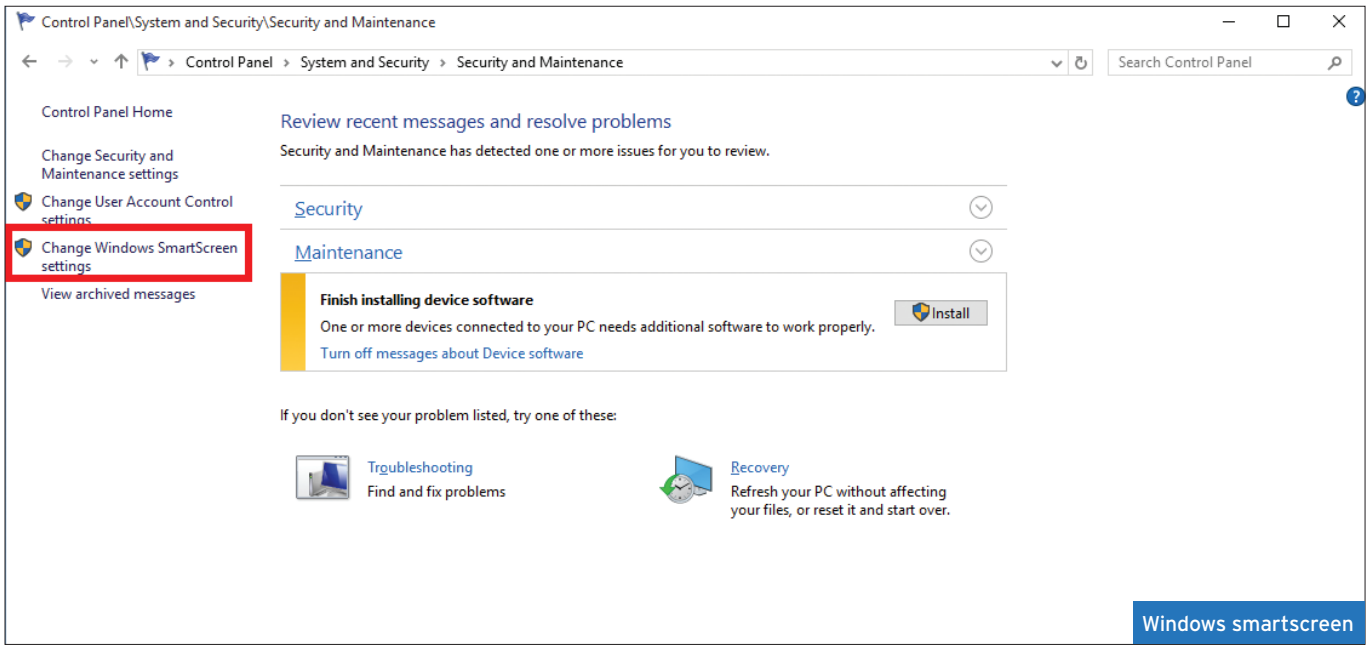
For more information, go to Microsoft's Edge privacy FAQ at tinyurl.com/pwzmcs8.

Control Panel SmartScreen

There are three SmartScreen filters in Windows 10. The second of these is in the Control Panel and stops you from installing potentially malicious desktop programs on your PC. It first appeared in Windows 8.

To offer this security feature, however, you have to share with Microsoft information about the programs you download and install, though you do so anonymously.

Advanced users may want to just disable this feature as it tends to be a nuisance. We'd strongly advise that novice and intermediate users leave SmartScreen as it is, though. To disable it, right-click the Start menu button and select Control Panel from the context



menu. Then, with the category view enabled, go to System and Security › Security and Maintenance. Select Change Windows SmartScreen settings from the left-side pane.

In the window that opens, select the button next to 'Don't do anything (turn off Windows SmartScreen)'.

The ability to sit down with any Windows 10 device, log in with your Microsoft account, and have all your settings and preferences immediately show up is incredibly handy. But if you'd rather not store all that information in Microsoft's servers, the easiest thing to do here is just turn off the 'Sync settings' option, found under Settings › Accounts › Sync your settings. If you want to take a more fine-grain approach, then you can drill down into the synced items under 'Individual sync settings'.

Finally, let's move on to the Windows Store SmartScreen Filter – go to Settings › Privacy › General. Like its Edge counterpart, it checks the URLs of Windows Store apps and makes sure they're not up to anything fishy. It's a security measure that is worth turning on. But if you'd rather not use it, go to Settings › Privacy › General and slide the 'Turn on SmartScreen Filter to check web content (URLs) that Windows Store apps use' option to Off.

Using a local account will still let you access some of Windows 10's built-in features, though you may also lose access to others that require a Microsoft account

Windows 10 and the web

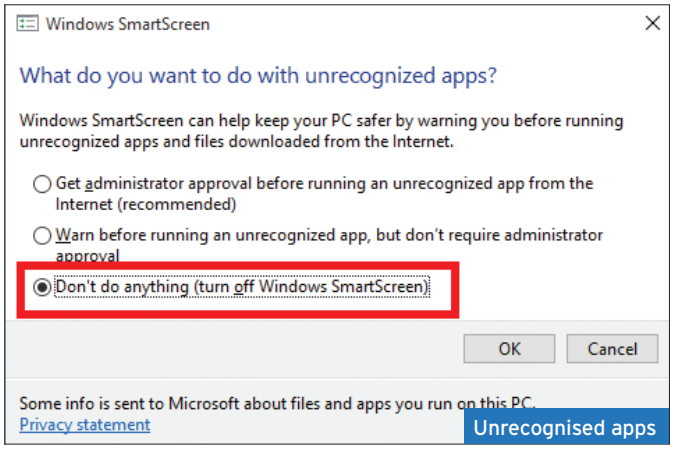
We're almost done. Just two more sections to go, although the last one is only for the hardcore privacy types. First we want to deal with some odds and ends.

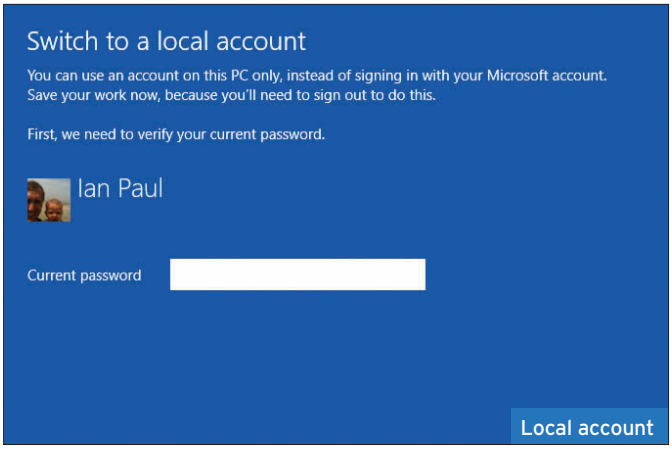
We'll start by examining the way that Windows 10 syncs your personalised settings across devices, including your desktop background, web browser settings, saved passwords, language preferences, ease of access, and other Windows settings.

Local account

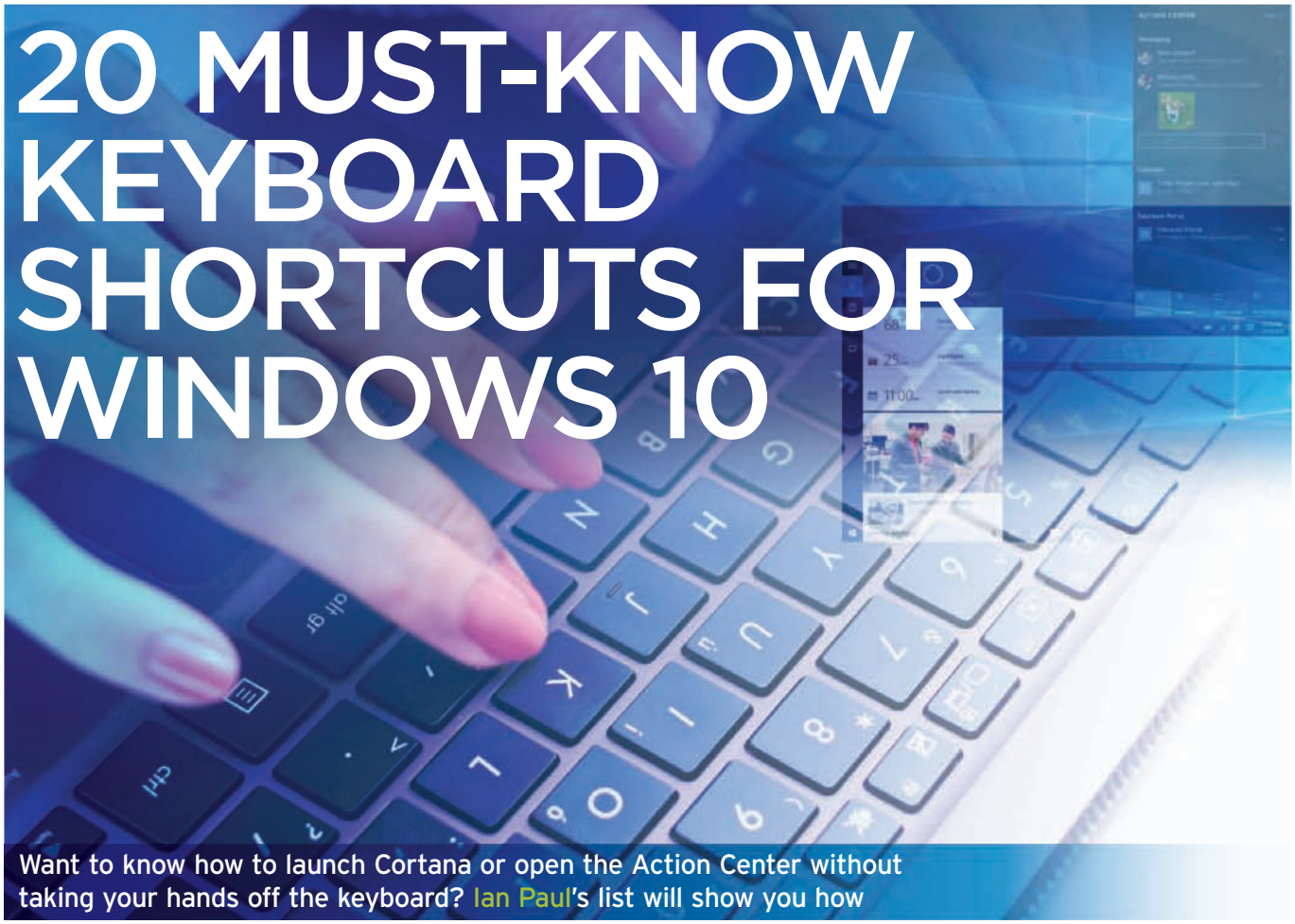
Our final tip concerns using Windows 10 with a local account. Go to Settings › Accounts › Your account and select 'Sign in with a local account instead'. Follow the wizard to start using a local account on your PC – one that isn't tied to your Microsoft account. Using a local account will still let you access some of Windows 10's built-in features, such as the Mail app, though you may also lose access to others that require a Microsoft account, such as the Windows Store. You also can't sync your settings to other Windows devices, but if privacy is your main concern, then you've probably already turned off this option.

So there you have it: all the privacy steps you need to take to keep Windows 10 firmly planted on the desktop and not the cloud. It's admittedly a lot of work, but the good news is it only takes a few minutes to stay local once you know what you need to do.





20 MUST-KNOW KEYBOARD SHORTCUTS FOR WINDOWS 10



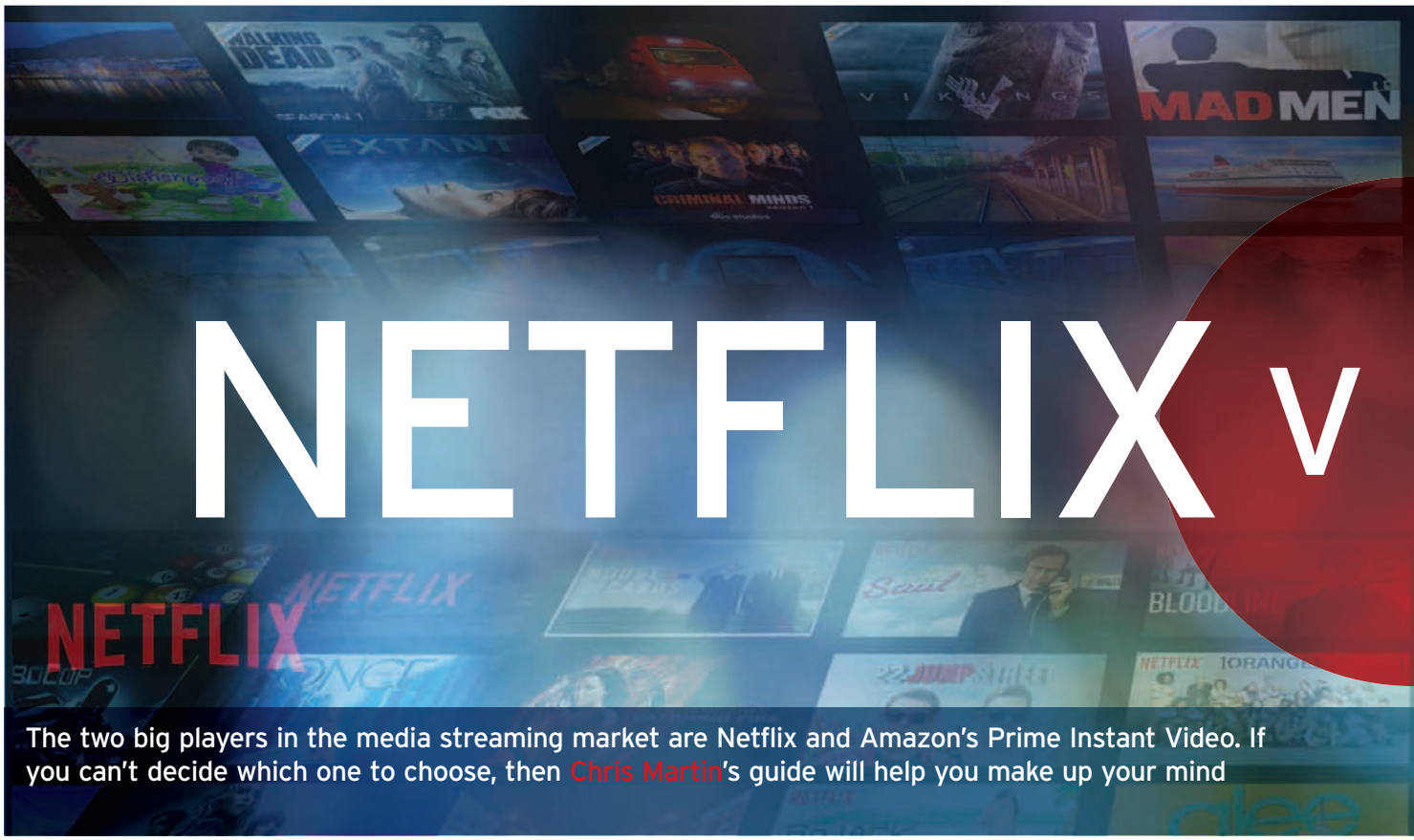
Want to know how to launch Cortana or open the Action Center without taking your hands off the keyboard? Ian Paul's list will show you how

With Windows 10, Microsoft has added a ton of new keyboard shortcuts to give you easier access to the new Action Center, Cortana, Task View, and virtual desktops. So much so, in fact, that the tech giant has released a Word document with its new operating system's key shortcuts to aid in your study.

If you're new to keyboard shortcuts, however, one glance at that list can be overwhelming. With this in mind, we've put together a list of 20 must-know shortcuts.

This isn't just a list for Windows 10, though. Many of these shortcuts work with older versions of the OS, and you'll find a few standard browser shortcuts, too. If you're on Windows 7 or 8.1 but new to shortcuts, the list will also help you take control of your PC and lessen your dependence on a mouse.

Windows 10's newest features
Windows key + A: Open the Action Center
Windows key + C: Launch Cortana in listening mode (for voice commands)
Windows key + I: Open the Settings app
Windows key + S: Launch Cortana
Windows key + Tab: Open Task View
Windows key + Ctrl + D: Create a new virtual desktop
Windows key + Ctrl + F4: Close the current desktop
Windows key + Ctrl + left or right arrow: Switch between virtual desktops
Standard Windows shortcuts
Windows key (Windows 7 and up): Open/close the Start menu
Windows key + X (Windows 8.1 and 10): Open/close the Start button's right-click context menu
Windows key + left or right arrow (Windows 7 and up): snap current window to right or left of screen
Windows key + E (Windows 7 and up): Launch File Explorer
Windows key + L (Windows 7 and up): Lock the desktop
Alt + Print Screen (Windows 7 and up): Take a screenshot of current window and copy it to your clipboard
Windows key + Print Screen (Windows 8.1 and 10): Take a screenshot of display and save to Computer > Pictures > Screenshots
Browser shortcuts (works in Edge and most other browsers)
Ctrl + T: Open new tab
Ctrl + D: Bookmark page
Ctrl + L: Highlight current URL (good for typing a new address or copying the current one)
Ctrl + Tab: Cycle through your open tabs
Ctrl + Enter: Add '.com' to the end of a web address – for example, type 'google', then Ctrl + Enter to get google.co.uk



The two big players in the media streaming market are Netflix and Amazon's Prime Instant Video. If you can't decide which one to choose, then Chris Martin's guide will help you make up your mind

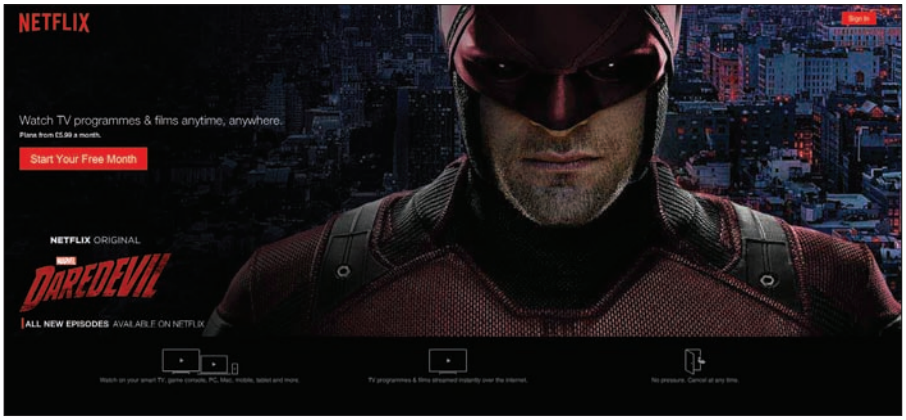
For many people, video streaming is a part of their daily life, but if you're trying to decide between Netflix and Amazon's service, we're on hand to help. Our Netflix versus Prime Instant Video comparison review looks at their price, the devices they are available on, content, and more.

Price

Both streaming services offer a free 30-day trial, so we strongly suggest that you start with these as a way of seeing which one you prefer. If your pockets are deep enough you can, of course, sign up to both as content varies between the two.

Although Netflix is still available at £5.99 per month, this is now the basic package – hobbled by allowing only standard-definition resolution and usable on only one device at a time. You'll need to pay £7.49 for the standard package (existing customers get this for £5.99 for two years from July 2015) and £8.99 for premium. Standard gives you access to HD streaming and you can watch on two devices at once. Premium subscribers get 4K – Ultra HD – quality where available, and the use of four devices at once.

Amazon includes Prime Instant Video within its Prime subscription, which costs £79 per year. This also gives you free one-day delivery on many of Amazon's physical items and also access to its music streaming service. This works out at £6.58 per month, and is better value than Netflix if you order from Amazon on a regular basis and are happy with the video and music libraries on offer. There are no different levels of subscription, and you can stream two separate videos to two devices at the same time from one Amazon account. 4K support is coming soon.



Amazon has also started allowing videos to be downloaded on to iPhones, iPad and Android devices for watching offline. It had previously allowed downloading on Fire tablets, but the new iOS and Android support is a major bonus for commuters, holidaymakers and kids on car journeys. It will be interesting to see if Netflix follows suit.

A key difference between the two services is that everything you see on Netflix is available to stream. However, only Prime Instant Video content with a 'Prime' banner can be watched as part of the subscription, and it can be a little confusing working out what is included and what's not on certain devices. Videos that aren't included are available to buy or rent via Amazon Instant Video (the absence of the word Prime is key here, and confusing).

Devices

To access streaming services, you're going to need a device such as a phone, tablet, laptop, games console or set-top box.

We've put together a table (see opposite) to illustrate the compatibility of each service (support may be limited to certain models,



S AMAZON

	Netflix	Amazon Prime Instant Video
Smart TV	Sony, Samsung, Sharp, LG, Philips, Panasonic	Sony, Samsung, LG, Panasonic
Games Console	Xbox 360, Xbox One, PS3, PS4, Wii, Wii U	Xbox 360, Xbox One, PS3, PS4, Wii, Wii U
Tablet	Android, iPad	iPad, Android, Amazon Fire
Smartphone	Android, iPhone, Windows Phone	Amazon Fire Phone, Android, iPhone
Blu-ray player	Sony, Samsung, LG, Philips, Panasonic	LG, Samsung, Sony
Home cinema system	LG, Sony	LG, Samsung, Sony
Set-top box	Sony, YouView	Samsung, Sony
Media streamer	Apple TV, Philips, Roku, Western Digital, Virgin Media, Google Chromecast	Amazon Fire TV, Fire TV Stick, Apple TV (via AirPlay from iPad or iPhone)

especially for TVs and Blu-ray players). Aside from the devices listed, both Netflix and Amazon Prime Instant Video can be used via a web browser on a PC or laptop, whether or not they are connected to an external display like a monitor or TV. Netflix used to be the obvious choice because of the breadth of devices, but it's now too close to call.

Movies and TV show content

Price and device compatibility is all well and good, but they mean nothing if there's nothing you want to watch. Both services offer a wide selection of films and TV programmes, plus exclusive original content that you won't find on rival services. Which is better depends on your personal taste.

Examples of original series on Netflix include *Better Call Saul*, *Orange Is The New Black*, *House of Cards*, *Bloodline* and *Daredevil*. Amazon Prime Instant Video offers original series, including *Ripper Street*, *Black Sails*, *Bosch*, *Constantine* and *Extant*.

The content available on Netflix is ever-changing with new titles being added, though shows are taken away, too. Content is good across the board, but you will have to wait a little while before new releases are added.

It's easier to browse Amazon's current library without having a subscription – you can just search Amazon's website in a browser. For Netflix, it's virtually impossible but there are unofficial sites that claim to have up-to-date listings such as NowonNetflix

Amazon touts 50,000 titles in its store but only 15,000 'films and TV episodes' (note that individual episodes are being counted) are available for the monthly subscription.

	Netflix	Amazon Prime Instant Video
Film titles	2178	1701
TV titles	570	977

Content such as *Game of Thrones*, *Hunger Games: Catching Fire and Boardwalk Empire* require you to buy or rent them via Instant Video (note that *Game of Thrones* doesn't have the Prime banner but *Sherlock* does). In essence, newer content isn't accessible for your monthly fee.

Verdict

We think Amazon is the best option thanks to the extra benefits you get with a Prime subscription: one-day delivery and a music streaming service. Plus, despite the extras, it's cheaper than Netflix. For many, it should be the obvious choice. It will, however, depend on whether you like the content on offer. We're fans of the exclusive content on both services and have found plenty of good – and bad – movies and TV shows in both libraries. One thing you won't find on either service is the latest blockbusters. If you can afford to subscribe to both, you will get the best of both worlds but if you can't then your decision should come down to what device(s) you want to watch on and what content you want to watch. Make use of the free trials to discover which you prefer. ☒

GET MORE FROM ANDROID

Your Android phone can do a lot more than you think, but only if you root it. Martyn Casserly explains how to root any Android phone or tablet to open up new features, update to the latest version of Android, and even install a custom ROM such as the popular CyanogenMod



Android phones are, on the whole, hugely powerful devices. Whether it's the Sony Z5, Samsung Galaxy S6 or LG G4, these phones have the capability to be customised and tailored to their owner's will. What they often lack is the opportunity. Bloatware, heavy UI skins, and other limitations can stop you from using them to their true potential. There is a solution though, and here we'll explain how to root your Android phone or tablet. Rooting will give you back control over the look, feel, and behaviour of your device.

You don't have to be a geek, a hacker or a tech expert: this guide is for beginners, and it's not (that) difficult. You just need to be aware of the potential risks and consequences. We'll get to those shortly, but there's nothing to worry about. We'll show how to keep safe, make good use of the new freedom, and even put things back as they were in the first place. Just in case.

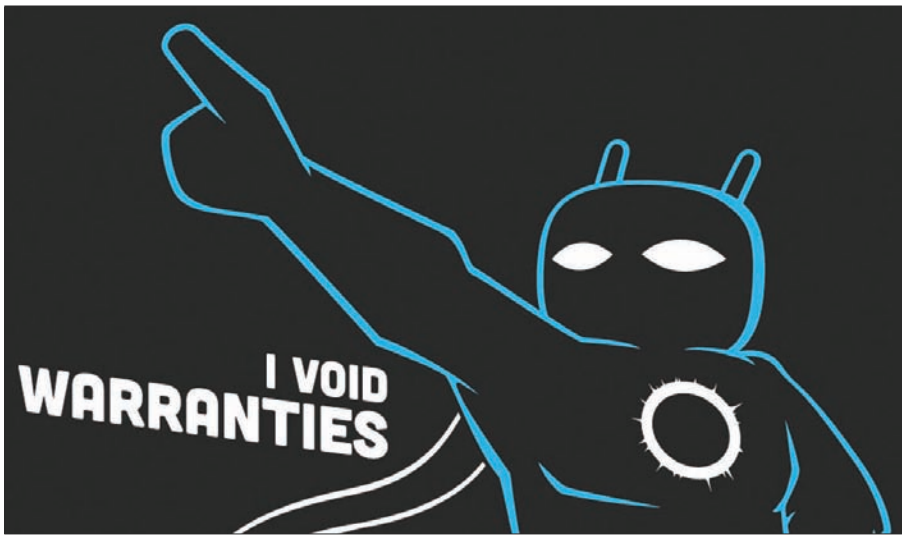
What is rooting?

Rooting an Android device is the process of gaining privileged or full control of the operating system, and even the software that runs the OS. The idea is to get root access, hence why it is known as 'rooting'. It's a bit like having a VIP pass at a gig, you can go anywhere you like and do anything you want (within reason). Rooting an Android smartphone or tablet is in effect the same as 'jailbreaking' an iPhone.

Why root a smartphone or tablet?

Android is a mature platform now, and the arguments for rooting that made sense a couple of years ago hold a little less water these days. Google has worked hard to refine the user experience, and the current iteration – 5.1.1 Lollipop – is a clutter-free work of art that feels a long way from the dark days of Froyo and Gingerbread. (We've largely blanked those from our collective memory.)

The problems occur when phone manufacturers lay their own interfaces on top of it. Far from improving Android, they often make things slower, uglier and more confusing. Then there's the mortal sin of preloaded apps, often duplicating the



functionality of stock Google versions, and being impossible to remove.

Not only does this take valuable storage space away from the user, but it seems to suggest that this expensive device you've paid for doesn't belong to you. If you want that kind of experience, then a trip to the Apple Store is a good idea, and at least you'll be able to sell the device for a decent amount of money when you decide to upgrade.

into problems... and you are likely to run into problems. The worst case scenario is you will brick your phone.

This doesn't mean you grow so frustrated that you'll throw it against the wall – it simply describes the technological abilities your phone will possess if rooting goes wrong. Which is nothing at all. Hence, a brick.

Security becomes a more serious concern. Many of the reports you read about

Rooting an Android smartphone or tablet is the process of gaining privileged or full control of the operating system, and even the software that runs the OS

The good news is it doesn't have to be this way. If you want to control every aspect of your device, choosing the access apps have to the web and the very interface itself, then rooting remains a solid option. The process is free, shouldn't take too long, and in many cases is reversible.

Of course, if you don't want cumbersome preloaded software suites, then there is the more capitalistic approach of not buying a phone from a manufacturer that employs such tactics. Instead, you can pick up one of the Nexus range from Google, or a Moto G, Moto X Play, or Moto X Style from Motorola, all of which arrive with a minimum of bloat.

But if you already have a different Android phone, or have your eye on one in particular, and just don't aren't keen on the software, then rooting could let you build the device of your dreams.

What are the risks?

Rooting isn't a five-minute job. The decision needs a bit of thought. First, rooting your phone will absolutely void your warranty. Manufacturers don't want you to do it, Google doesn't want you to do it, and you won't get any customer support if you run

malicious attacks on Android users will most likely involve rooted devices, or certainly those running software not found on the Google Play Store. So it's more risky than a standard setup.

But, and this is very important, if you do your research, are not afraid to learn how things work, and don't mind spending time fixing software problems, rooting can be hugely liberating and give you a device that is truly your own. Just remember, backup anything important before you begin, preferably to a PC or cloud service.

Who should root?

Considering the risks involved with rooting our advice is that you should only do it on your device if you can survive if something goes wrong. If you already have doubts, then it's probably best to leave things well alone. We said this was a beginner's guide – which it is – but that doesn't mean rooting is suitable for everyone.

If you're keen to learn about rooting, use – or buy – an old, cheap phone to practice on before moving up to your main device.

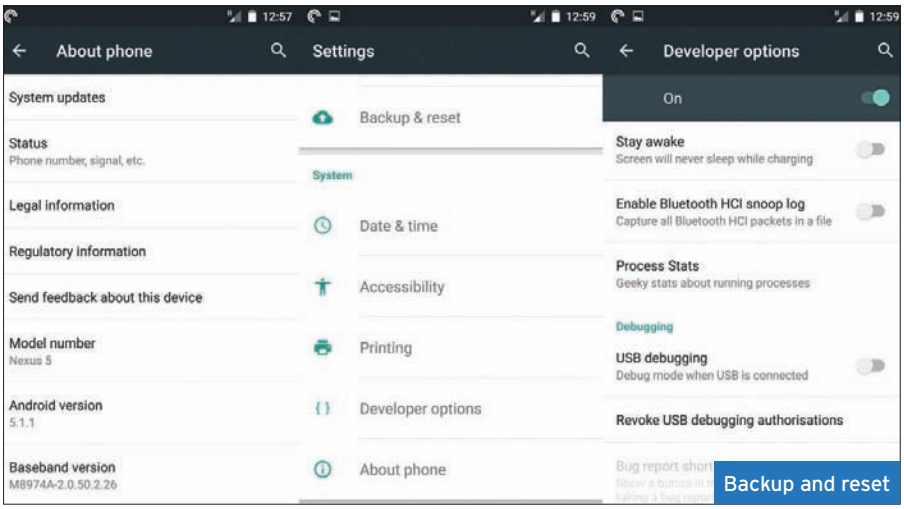
How do I do it?

The first thing to know is that there isn't a 'root my phone' button on your device. It's also not entirely clear whether your particular handset can be rooted easily. So before you begin thinking about custom ROMs or root-enabled apps, you'll need to research your Android phone or tablet.

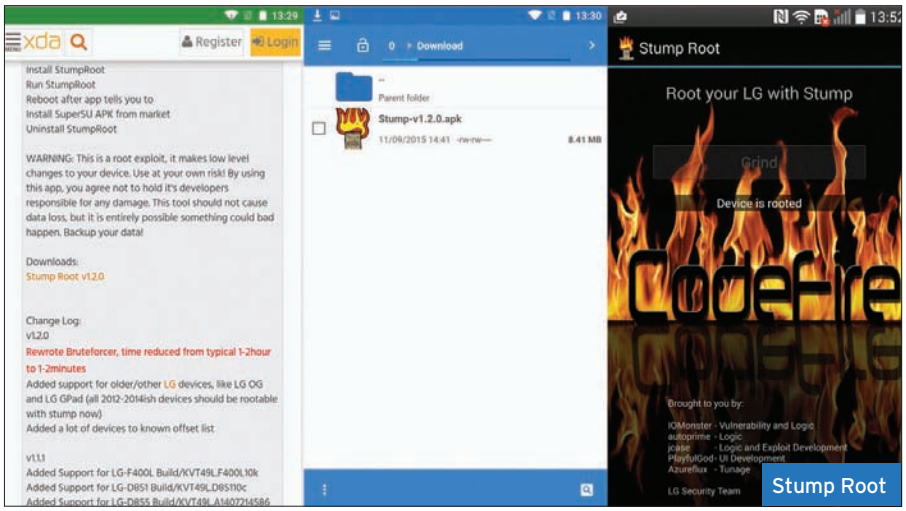
A good search term is '[model name] how to root'. More often than not you'll probably find a link to a website called XDA Developers (xda-developers.com), which is undoubtedly the best resource for this sort of thing. Here you may well discover that there are many variants of your handset, each with different identifying numbers and codes. European models tend to vary from their North American cousins, as do the ones from other parts of the world.

To find your exact unit, go to Settings on your phone and navigate through General > About Phone, then check the Model number. On some Android variants you might find this in the Hardware Information option on the About Phone menu.

You'll also want to know which flavour of Android you're running, so visit Settings > General > About Phone, and check the Android version. Again some phone will have this under Software Information.



Backup and reset



Another thing you'll need to do before you can root your phone, no matter which method you use, is to turn on Developer mode. To do this, go to Settings > General > About Phone, then tap on the Build number several times until you see a message saying that you are now a developer. Then when you return to Settings > General you'll see that Developer Options has appeared on your menu. Tap this and ensure that USB debugging is turned on.

Armed with your handset model information, you should be able to track down the method that exists to root your phone. While we were writing this guide we used an LG G3 that we had in the office, and found a couple of different tools that were recommended. The most appealing was OneClickRoot (oneclickroot.com), which is a website that promises a simple process for rooting a number of Android phones. You visit the site, find your phone, download the free software, then connect your phone to your PC and run the root process. There are a number of other downloadable Root tools to choose from, such as SuperOneClick, Unlock Root, and Universal AndRoot, but you'll need to check if your device is supported.

The potential hazards of trying to root a phone showed up straightaway for us, as the OneClickRoot method didn't work. Our phone appeared on the list, it matched the model number, but when we tried to root a message appeared saying our device wasn't eligible yet, but would hopefully be added in the future. There was a chat option, but we decided to carry on our search. We tried another piece of software that was recommended on several sites, but this time the program wouldn't actually run on our PC, even after several attempts and multiple copies being downloaded.

We mention this because the path to rootedness can be filled with this sort of frustration. It's very much a community effort, run by enthusiasts, and therefore you can expect to spend lots of time on forums if things don't turn out as you'd hoped. Of course, you might try any of the above and find it works first time, which would have been our experience if we'd started with Stump Root.

Stump Root

This clever piece of software allows you to root your phone without the need of a computer. First, you need to go to stumproot.org where you tap on the option to Download Stump Root V1.2.0. Once this is done, open the app drawer on your phone, find the File Manager and navigate to your downloads folder. You'll see the Stump-v1.2.0 apk, which you tap to install. Google presents a very scary 'don't use this app as it bypasses security' message, but this is normal for rooting a device. Install the app, then on the main screen hit tap the Grind button and Stump Root will automatically root your phone. Now all that needs to be done is to reboot and you're good to go.

Is my phone rooted?

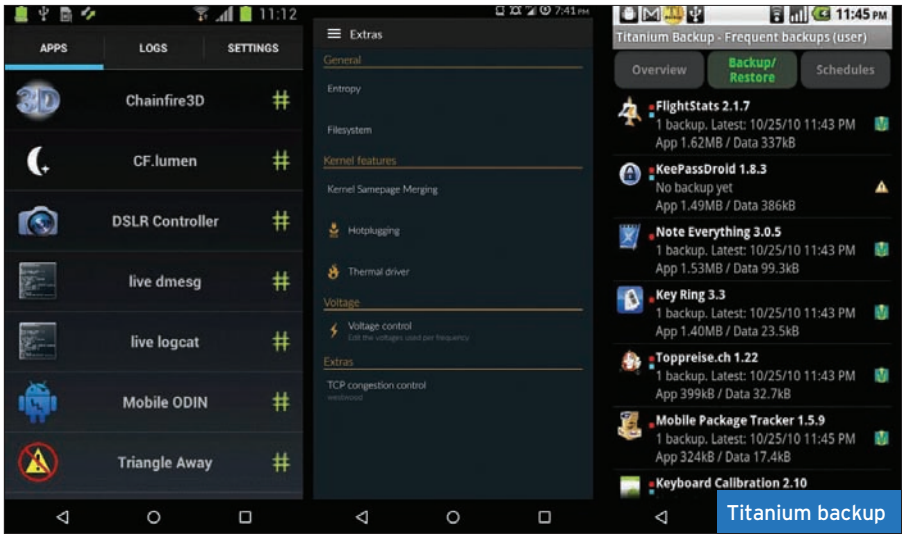
When you first turn on a rooted phone there isn't much to differentiate it from an unrooted one. A quick way to make sure is to download the free Root Checker app from the Google Play Store. Just tap the Check button in the top right hand corner of the installed app, and it will do a short scan of your system and confirm whether you have Root Access or not. Many Chinese phones come pre-rooted, for example.

The benefits

One of the first apps to download from the Google Play Store is SuperSU, which allows you to control the permissions that root apps have, alongside a variety of other settings. Depending on how you rooted your device, SuperSU might already have been installed, or you might find an alternative called KingRoot on your system which does many of the same things.

There are some very useful apps that require root access, and now you can use any of these on your phone. If you really want to gain complete governance over your system then Device Control is an excellent app that has options for a whole manner of deep settings such as speed limits on your CPU, internal temperature controls, and the Tasker which allows you to create rules for how your phone behaves in different circumstances. This last one is incredibly useful, but can be intimidating to make sense of at first. We recommend searching for a few tutorials online, and before you know it you'll be whizzing around the interface. Device Control requires another app, Busybox, to work properly, but you'll be taken to the right place to install it when needed.

Backing up your phone is another very handy feature, and this can be achieved by downloading Titanium Backup app from the Google Play Store. Once installed you can use Titanium to make backups of your user data, applications, or both. To do your first full backup tap on the Backup/Restore tab at the top of the app, then tap Menu > Batch action > Backup all user apps + system data, then tap the green tick.



If you want to fine-tune your system and customise its behaviour even further, but don't fancy heading down the more nuclear Custom ROM route, then the Xposed Framework offers many of the advantages of custom ROMs, but without the hassle. It's not a standard app you'll find in the Google Play Store, so you'll need to search for it online – just go to the XDA Developers site – then install it, and download some of the many tweak packs that actually do the adjusting. Popular options include Tweakbox, and the MoDaCo Toolkit.

Install custom ROMs

One of the main reasons many people root their phones is to install custom ROMs. These are replacements for the operating system on the devices, and are often updated versions of Android that the manufacturers haven't made available. The most famous ROMs are Cyanogenmod (cyanogenmod.org) and Paranoid Android (paranoidandroid.co), both of which offer excellent alternatives to the bloat heavy offerings of many mainstream Android flavours. Installing a custom ROM is another risky venture, which should again only be undertaken with the knowledge that problems could occur. Non-optimised ROMs could cause hardware issues, drain the battery quicker, and mean some apps don't work properly anymore. Then, of course, there's that old 'brick' issue.

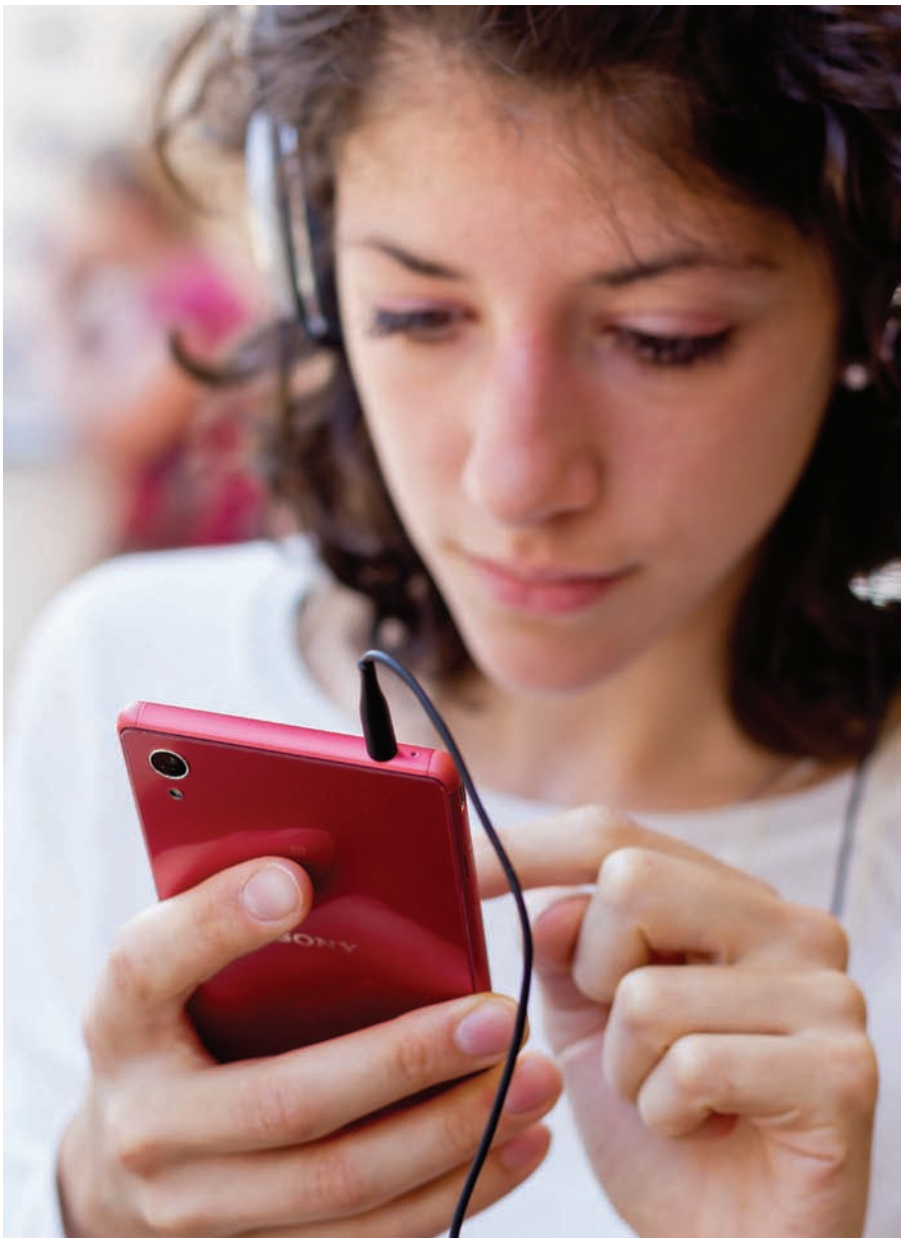
Usually before you install a custom ROM you'll need to create a Custom Recovery. This will allow the device to make a backup of your system, install ROMs, and provide a way to get going again if things go wrong. The most common types are Standard Recovery (this is a part of every Android phone), ClockworkMod (CWM) and Team Win Recovery Project (TWRP).

Apps such as TWRP Manager, ROM Installer and ROM Manager have the ability to create these Custom Recovery features, and they also provide a way of downloading ROMs and installing them on your device. As flashing a custom ROM can be a tricky business, you will certainly need to visit sites such as XDA Developers or the excellent Cyanogenmod, where you can search for the detailed steps that you will need to follow in order to flash the Custom ROM. It's extremely important that you follow the steps to the letter, and read them several times before you begin. Otherwise you can quickly end up with an expensive paperweight on your desk.

We used TWRP Manager to install a dedicated ROM on our LG G3 that we downloaded from the CyanogenMod site.

The sequence for installing custom ROMs is in essence this:

- Root your phone
- Find the version of the ROM for your specific device and download it to your smartphone
- Download TWRP Manager or another ROM manager app
- Use the ROM manager to create a Custom Recovery
- Backup your existing ROM and data
- Use the ROM manager to boot into recovery mode
- Wipe the existing ROM
- Flash the new ROM
- Reboot your device



Creating a backup of your existing ROM means that if you don't like the new one you install, or you want to put your phone back to its original state, you can use a ROM manager to restore the backup.

One thing to consider is that CyanogenMod and other ROMs don't come with the Google Play Store as standard, and you'll need to visit the CyanogenMod or relevant ROM builder's site to find instructions for installing the service. It isn't difficult, certainly not now that you've gotten this far, but it still involves downloading software and using the Recovery mode to install it on your system.

Return to factory settings

If you've finished experimenting with ROMs and Root access, then there is a simple way to take your phone back to the way it was when you began. Open up the SuperSU app, go to Settings and then select the Full Unroot option. Hopefully now your device will return to its unrooted status.

If this doesn't work, then you can still unroot your phone, but it will involve researching your particular handset and maybe asking a few questions on the XDA Developers forums (tinyurl.com/o87jgka). They're a friendly bunch though, so it's not a bad way to spend some time. ☒

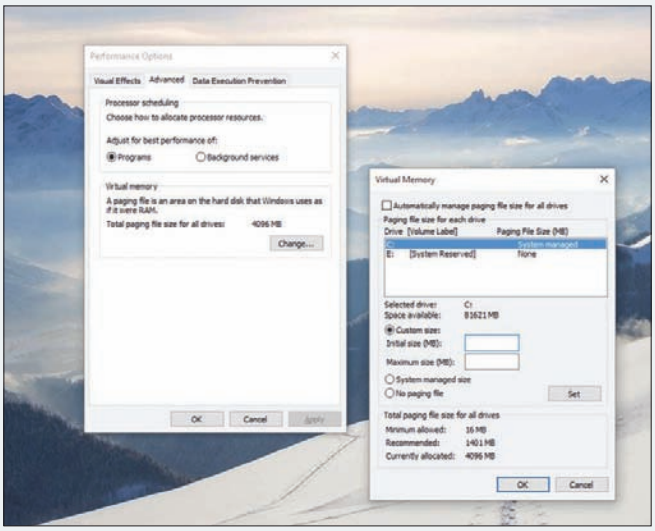
Fix common Windows 10 problems

Martyn Casserly's quick tips will help solve any minor niggles in Microsoft's new operating system

Adjust the amount of Virtual Memory your PC uses

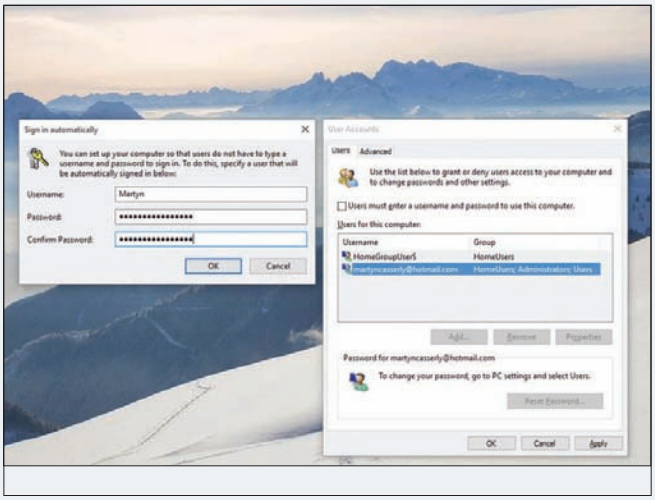
The virtual memory settings in Windows 10 are a little on the frugal side. This is fine is you have plenty of RAM in your machine, but for others this can become something of a bottleneck and affect performance. Thankfully fixing it is easy.

Open the Start Menu, select Settings, then type **Performance**. Now choose Adjust the appearance and performance of Windows > Advanced > Change. Check at the bottom of the Window what the Recommended value is and how it compares to Currently allocated. If the recommended is less, click Automatically manage paging file size for all drives > Custom Size, then enter the Recommended value into the Initial Size box, and a larger figure in the Maximum box. Click OK and you're good to go.



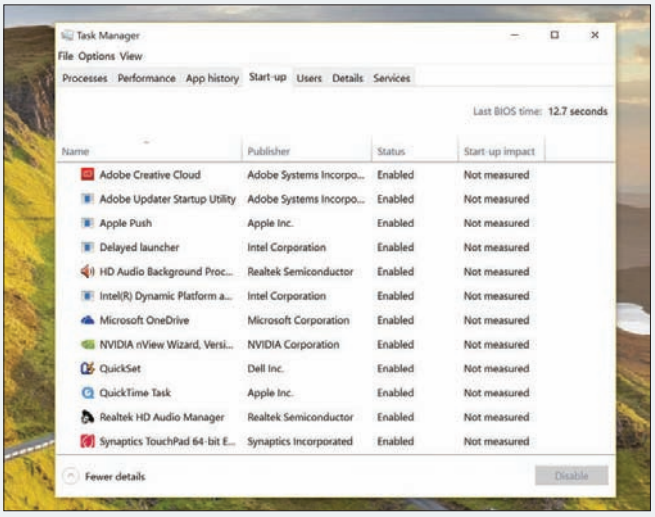
Log in automatically, even with a Microsoft account

If you don't want to be fiddling around with passwords and prompts when you turn on your PC, then you automate the process. To do this press Win+R, then at the prompt type **netplwiz** and press Enter. In the User Accounts dialog box, click the account you want to automatically log on to. If it is available, clear the 'Users must enter a user name and password to use this computer' check box. Click OK. Then in the Automatically Log On dialog box, enter the user's password twice and click OK.



Change startup programs in Windows 10

When Windows 10 was first installed on your PC, it may well have been as sprightly as a gazelle, but after a short while your start up times became akin to a heavily laden tortoise with motivation issues. One potential source of this is too many programs automatically loading when you reboot your machine.



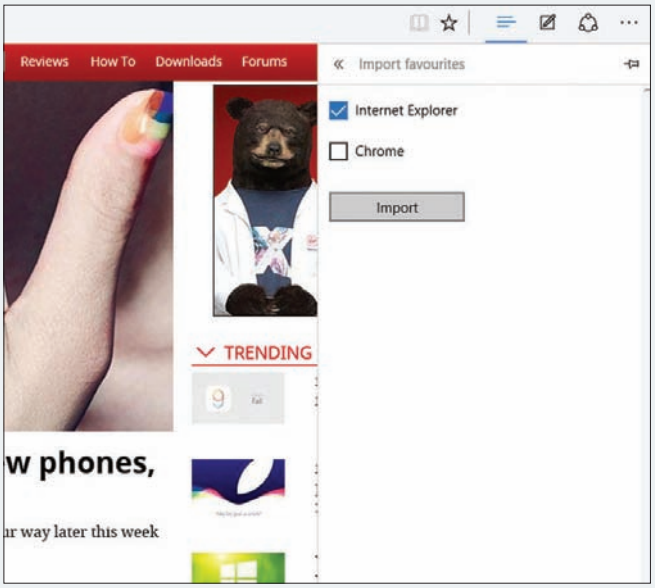
Reinstall printer drivers

A common complaint is that the printer won't print after upgrading to Windows 10. To fix it, right-click on your printer in the Devices and Printers section of the Control Panel and remove it. Now download the latest drivers from your printer manufacturer (they can be Windows 7 or 8.1 drivers – don't have to be Windows 10) and install them, remembering to set this printer as your default if its the main printer.



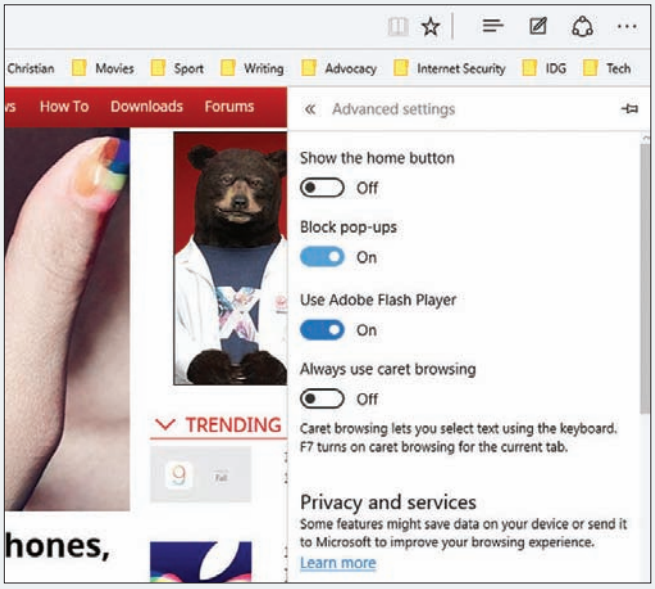
Import your Favourites into the Edge Browser

In Windows 10 Microsoft has introduced the Edge browser, which has many handy new features. One common problem with changing to a new browser we've heard about is that of bringing your bookmarks with you. Thankfully this is an easy fix. To do so, open the Edge browser, click on the three lines in the upper right-hand corner, then select Import Contacts. You'll see a list of browsers that you have installed, each with a tick box next to them. Select the ones you want to include, then click Import.



Stop pop-up ads in the Edge browser

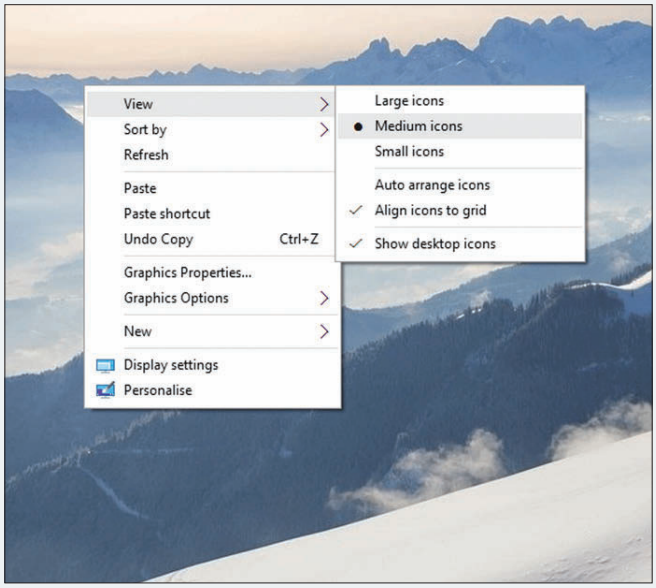
Pop-up ads can be incredibly annoying, therefore getting your browser to prevent them appearing is an almost essential function. To do this in the Edge browser you need to click on the three dots in the top right-hand corner, then scroll down and select Advanced Settings. You'll see a slider switch for Block pop-ups. Make sure it's turned on and you should be safe from intrusive ads.



Fix icon sizes in Windows 10

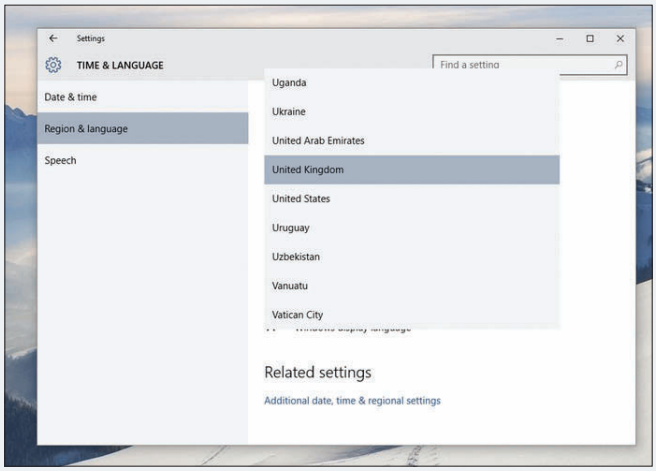
There is reportedly a bug that some users are encountering, which makes icon sizes on the desktop enormous. Resetting the size is very easy. Press Win+D to go to the desktop, then right-click on a clear space to bring up the context menu. In here, select View, then choose the icon size you prefer.

One cause of the issue can be new features enabled by the Windows 10 touchpad driver. In Control Panel, go to mouse settings and disable any gestures, such as pinch-to-zoom.



The Windows Store is unavailable

We've heard some complaints about the Windows Store not being accessible after upgrading to Windows 10. One important thing to check, as it can certainly cause this problem, is if you have the correct time and region selected on your PC. To do so, go to the Start Menu > Settings > Time & language, and ensure that your device is set to the country you live in. ☒





Fix Windows 10's Start Menu when it locks up

Martyn Casserly explains what to do when the Start Menu locks up and becomes unusable

Restart your computer

There's a reason that Roy in *The IT Crowd* is famous for his catchphrase: "Have you tried turning it off and on again?" In a large number of cases this is all you need to do in order to fix problems with your laptop or PC. It's also by far the easiest method. Try restarting your PC, maybe even a couple of times, and see if that cures the problem. Obviously you don't want to do this regularly, but if it works, then you'll be off and running within a few minutes.

Create a new user profile

Another temporary workaround that has worked for some people is creating a new user account. Again this isn't ideal, but if you don't want to mess around with the command line, then it could get things going. To do this you'll need to press Win+R, then type in control panel. Now select User Accounts > Change Account Type > Add New User in PC Settings. You'll see a couple of options that allow you to add users to either your Family or just General use. Set one of these up and see if that solves the problem. Don't delete your original ID though, as you'll want that once the bug has been patched.

Use the Command Line

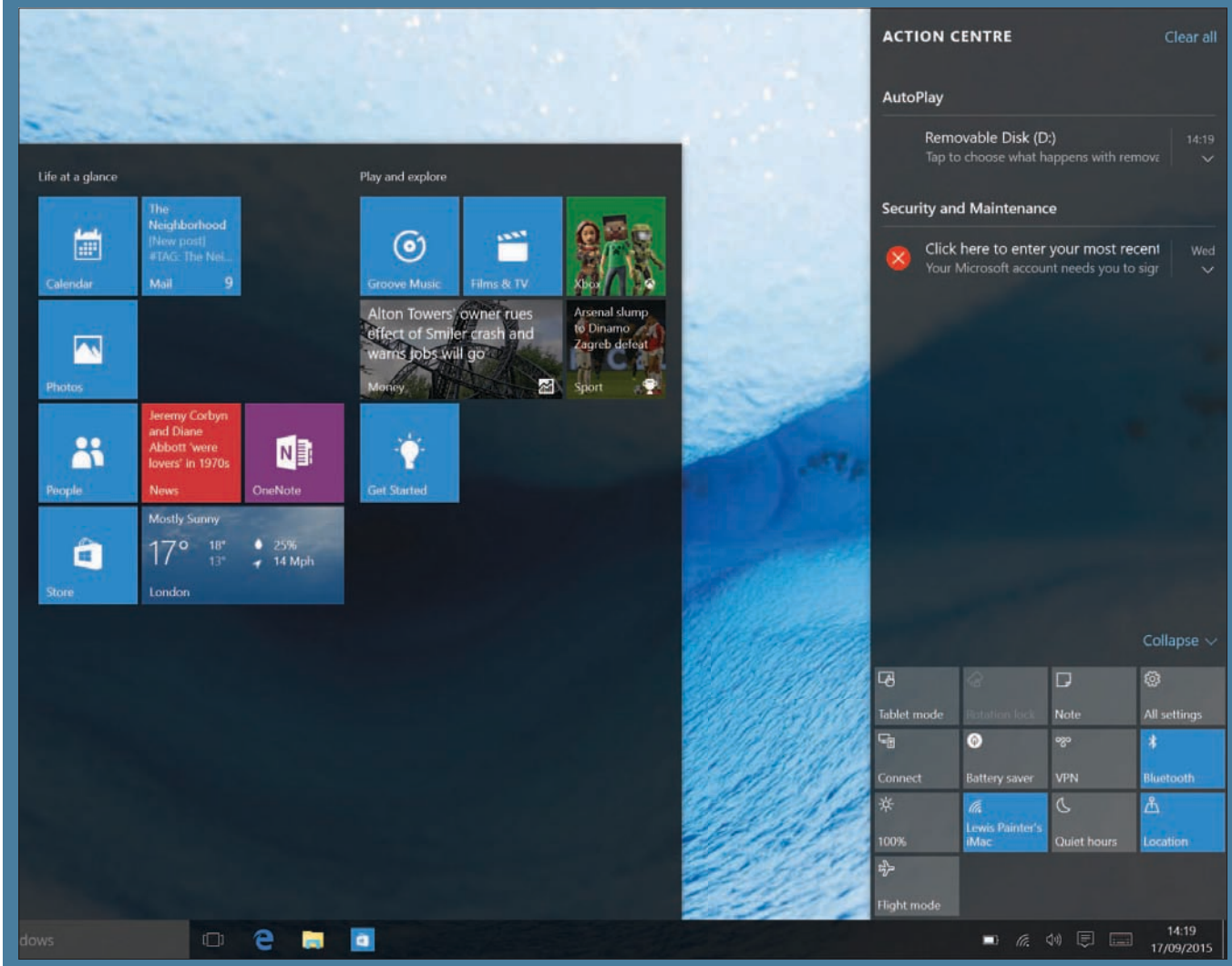
If the thought of tinkering with code doesn't chill you to the bone, then there is a straightforward method of addressing the Start Menu problem. Go to the Start menu button and right-click to open the contextual menu.

Here you'll see a long list of options, one of which is Command Prompt (Admin). Select this and you'll see the Terminal window appear. Enter the word **powershell**, press Enter and then type in the following command:

Get-AppXPackage -AllUsers | Foreach {Add-AppxPackage -DisableDevelopmentMode -Register "$($_.InstallLocation)\AppXManifest.xml"}

Press Enter and the process will run. Don't be put off by the red error messages that might appear.

This is normal, if a little terrifying, but when the process has finished you'll see the prompt appear at the bottom of the panel. Close the window and hopefully your Start menu will be fully operational once more. ☒



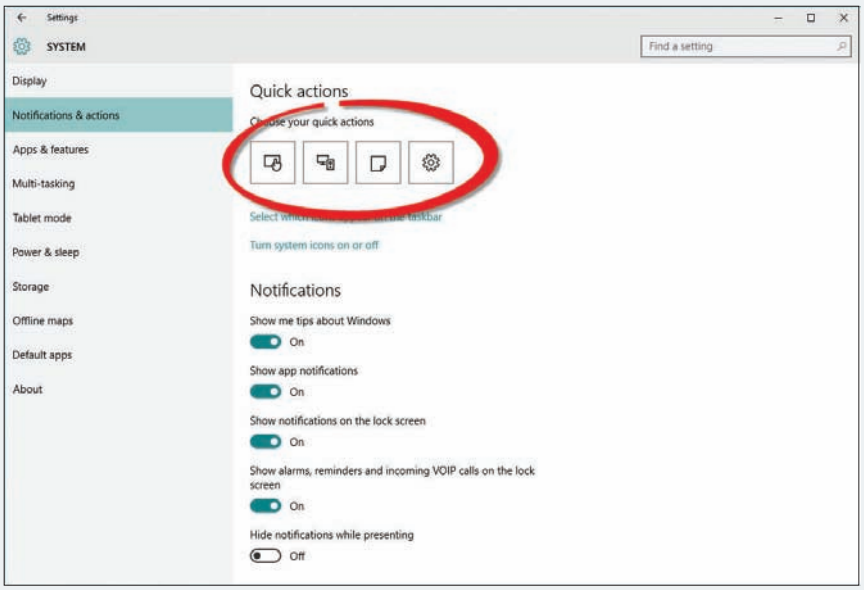
Customise Windows 10's Action Center

New to Windows 10 is the Action Center. Nick Mediati gives an overview of your different options

Customise quick actions

Quick actions are the most useful feature of the Action Center. Thanks to these, you can quickly and easily adjust your screen brightness, turn Wi-Fi on or off, switch on Quiet Hours (Windows 10's notification-silencing feature), and more. You can collapse this pane, and when you do, only four quick actions will be visible, but you can choose which four appear here.

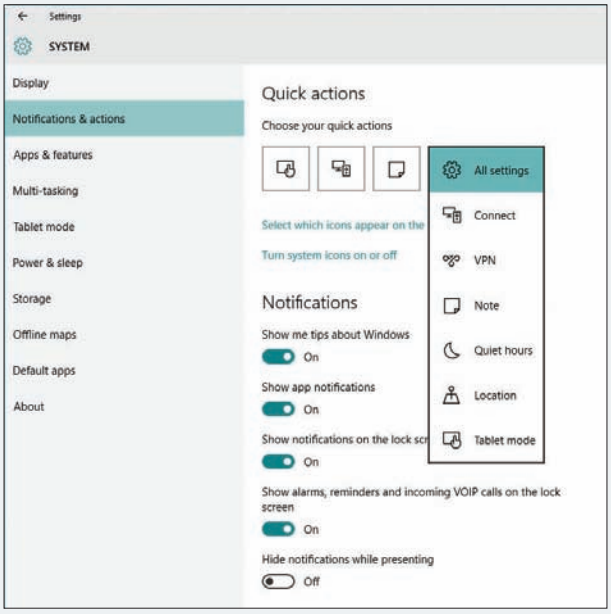
Open the Settings app, click System, and then Notifications & actions. Under the Quick actions heading, you'll notice four boxes, each representing one of the four actions that remain visible at all times. Click the boxes to get a menu that lets you pick and choose which actions will get one of the coveted four slots.



Toggle notification options

Under the Notifications subheading on the same Settings page, you'll find a handful of options that you can toggle on and off:

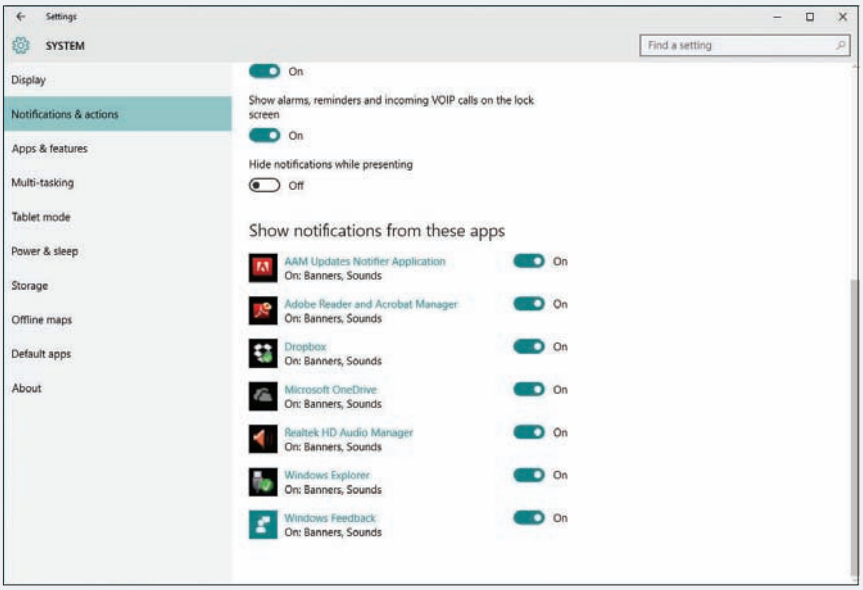
- **Show me tips about Windows:** When this is switched on, Windows 10 will occasionally serve up tips through its notifications feature.
- **Show app notifications:** When turned on, you'll receive notifications from apps installed on your PC.
- **Show notifications on the lock screen:** This one is pretty self-explanatory, but if you would rather not have prying eyes see that you've received notifications while you were away from your desk, you'll want to turn this one off.
- **Show alarms, reminders, and incoming VoIP calls on the lock screen:** If you're concerned about privacy, turn this off, though you may also find it convenient to see your appointment reminders at a glance.
- **Hide notifications while presenting:** When turned on, Windows 10 will prevent notifications from appearing onscreen while you're giving a PowerPoint presentation.



Silence overzealous apps

Would you rather not get an alert every time you get an email message? You'll be happy to know that you can switch off notifications on a per-app basis. While at Settings > System > Notifications & actions, scroll down to the 'Show notifications from these apps' subheading.

To silence all notifications from a particular app, toggle the switch for that app to the 'off' position. If you would like to receive some kinds of notifications from an app, click the name of the app in question. Next, toggle the settings on the resulting screen as you please. It's here that you can disable or enable notification banners and sounds.

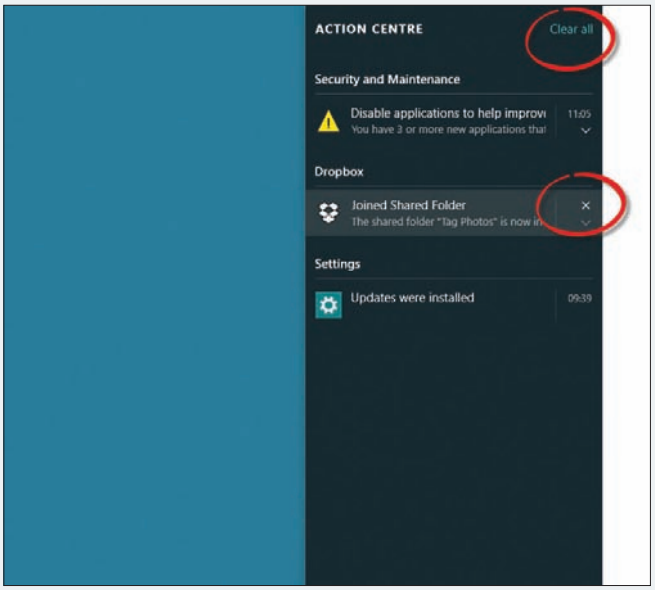


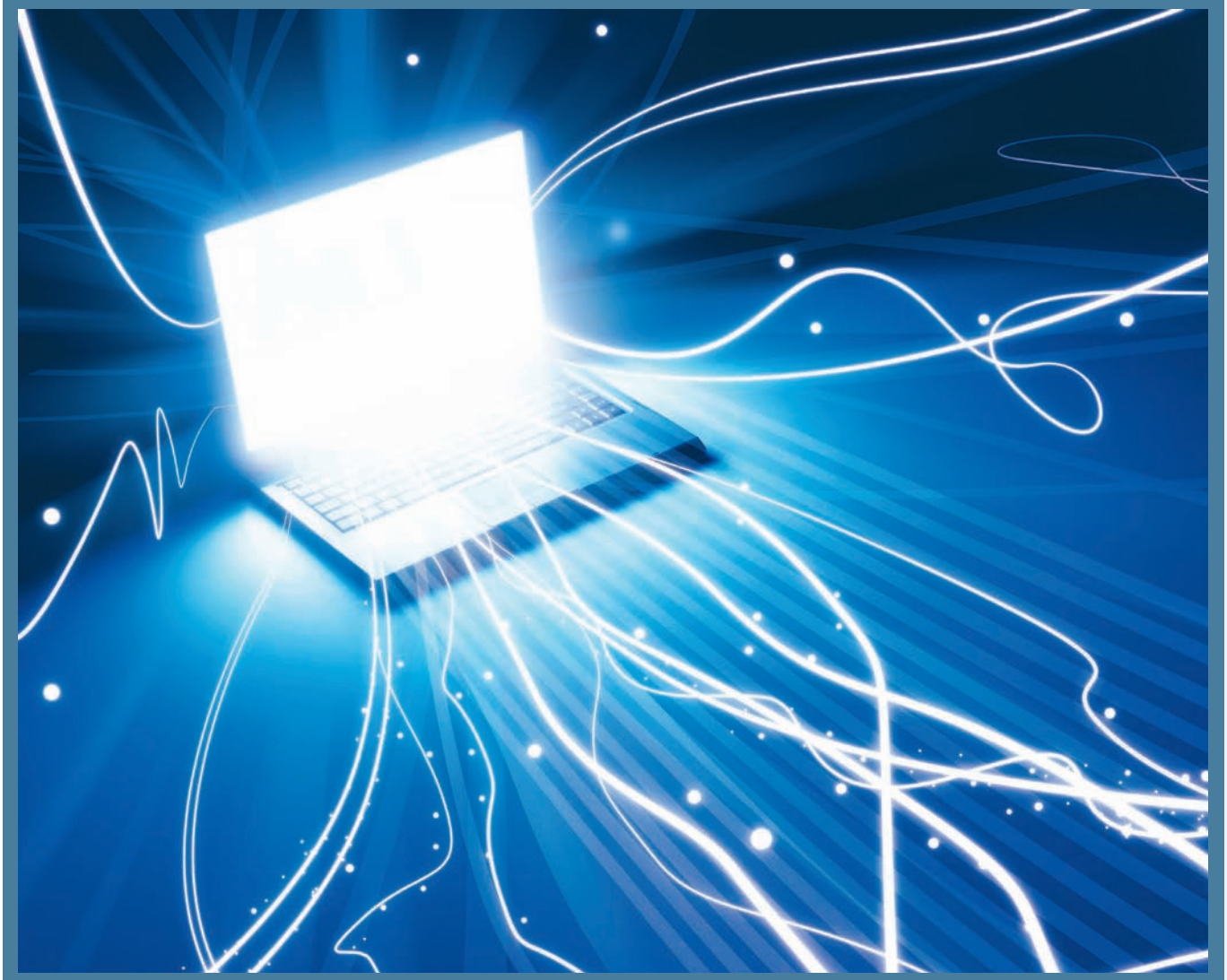
Clear out notifications

After a while, you might accumulate a large number of notifications in your PC's Action Center. Clearing them out is straightforward, though. Open Action Center by clicking the Action Center icon in the system tray – it resembles a speech bubble. From here, you can delete individual notifications, clear out an entire section, or clear the whole thing.

To delete individual notifications, hover the cursor over the notification you want to remove, and click the 'X' button that appears. If you would like to clear out an entire section, hover the cursor over the section heading, then click the 'X' button.

Finally, if you want to delete all notifications, click Clear all in the upper right corner of the Action Center pane. ☒





Fix blue screen crashes Windows 10

Martyn Casserly explains what to do when faced with Windows 10's blue screen of death

Windows 10 is software just like its predecessors, so from time to time a few things will go wrong. This is not unexpected for such a complex piece of software, so we've put together this short guide to help you get back up and running if you ever see the infamous Blue Screen of Death (BSOD) in Windows 10.

There's no magic bullet solution that fixes all ills, but if you work through the following guidelines you should be able to diagnose, and hopefully fix, your particular issue. We think that Windows 10 is an excellent version of the operating system, with a lot to offer and it will just take a little time for all the kinks to be worked out.

Make a backup

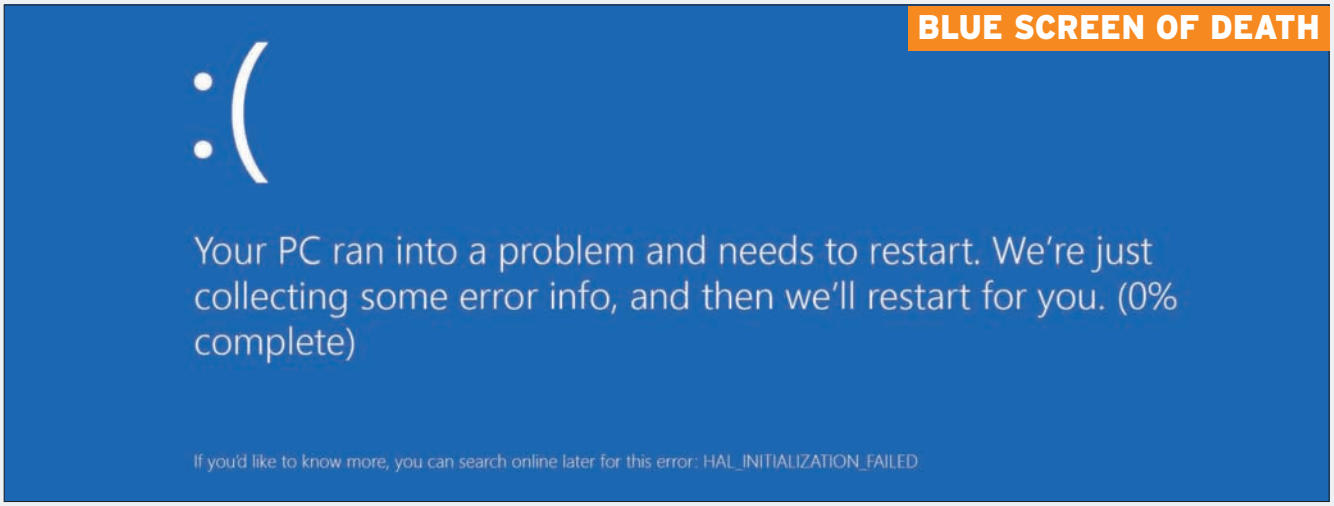
We store many important files on our computers – from family pictures and videos, to important business documents – and all of this can be lost very easily if you don't create regular backups. While you should be doing this all the time anyway, if you're beginning to experience problems with your PC then creating a backup needs to become an immediate priority. It's frustrating to lose data needlessly, and the whole process can be completed in a very short time. You can either use dedicated backups solutions or take advantage of the many free offerings in the cloud.

Recreating the problem

It can be incredibly helpful to make a note of what you were doing and which programs were running when you experienced the blue screen. If you're able to replicate the process and end up with the crash, then there's a good chance that one of the pieces of software you are using could be causing the problem. In any case, knowing that the crashes are not random, but instead caused by certain actions, can narrow down the suspects. For example, if you notice that whenever you connect a printer via USB and try to print from Word you get a BSOD, but if you print to PDF you don't, then it's reasonable to assume the printer is involved.

Checking the code

With a BSOD there will sometimes be an error code displayed at the bottom of the message. Write this down, then search for it on Google to see what it represents. Knowing what you're looking



for will certainly make things a little clearer when it comes to diagnosing the problem.

What did you change?

One of the first things to investigate is whether you made any changes to your system. Usually this will be a new piece of software or hardware installed or possibly updating existing programs. If the BSOD happens while you're using a program, or loading one up, then it might be worth uninstalling the software and then reinstalling it again. You could also try using Google to see if there are others having issues with that version of the software, and what solutions they've discovered.

Updating drivers

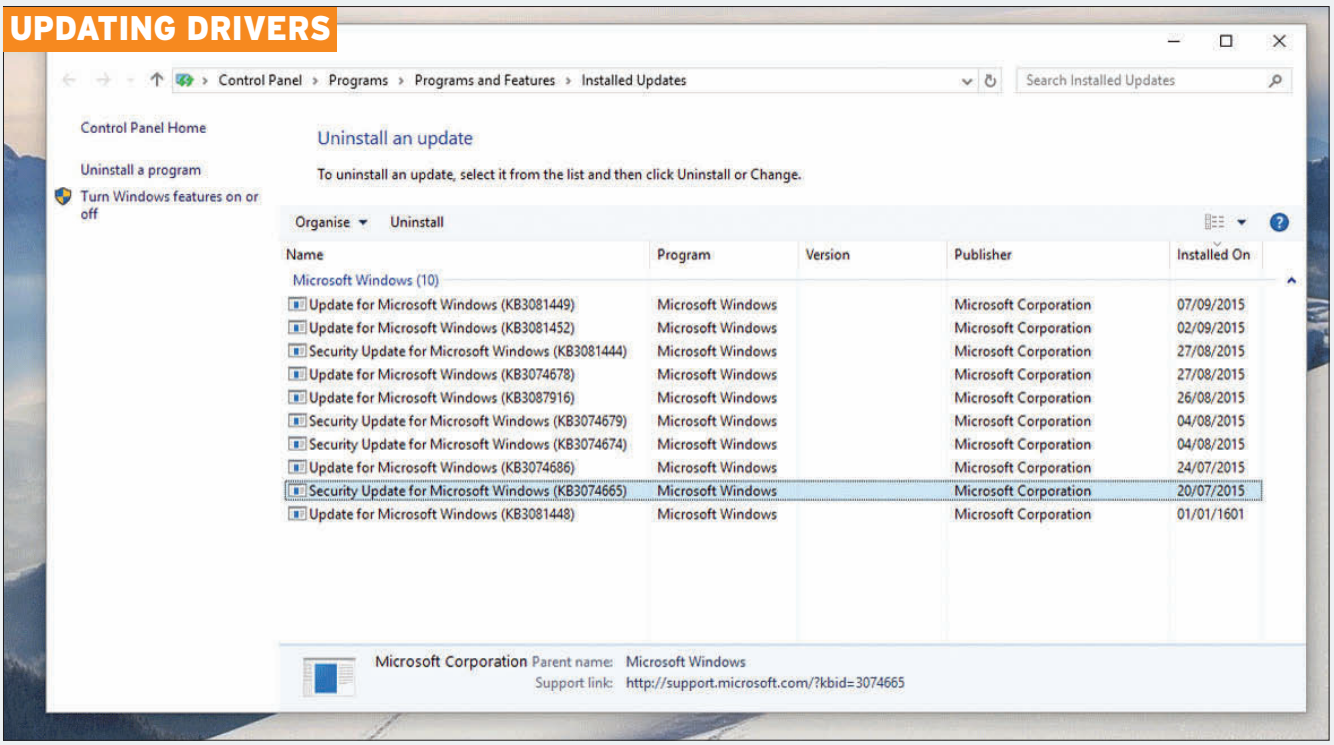
We've seen several cases in the past where dodgy graphics card drivers have wreaked havoc on a PC. If you've upgraded yours recently, and since experienced crashes, then it might be worth going back to the previous version, or at least heading to the forums on the manufacturer's site to see if there are known problems with the update. To uninstall a program or driver you'll need to click on the search area in the taskbar, then type view installed updates and select the option that appears with that name. You'll be taken to the Control Panel where you can check the dates of the drivers and uninstall the ones that might be causing the problem.

Updating Windows

Another obvious thing to check is that Windows itself is up to date. To achieve this, click on the search area of the taskbar and type **windows update**, then select the matching option and when the Update panel appears click on Check for Updates.

Check your hardware

If you're on a desktop PC, then it could well be worth opening up your computer and ensuring that the hardware is all seated correctly. For example, if a card isn't fully pushed into its slot, then there is the outside chance that it might cause a BSOD. Of course, if you've replaced a graphics card, or maybe your RAM, recently then this would again be a thing to investigate, as the new hardware could be causing the problem. ☒





Get Cortana to work on a Windows 10 PC

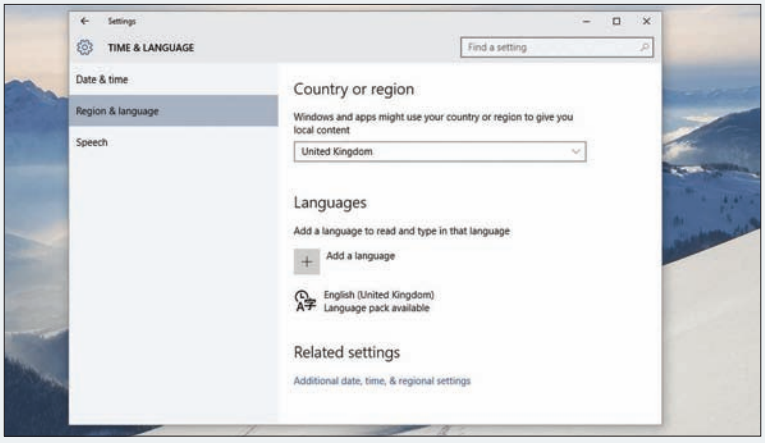
Martyn Casserly reveals how to get Cortana up and running on your Windows 10 computer

Windows 10 has brought with it some impressive new features, including Cortana, Microsoft's virtual assistant. Using this service you can control your PC via voice commands, search the web, and even have your life organised by the handy digital PA. But what if Cortana isn't springing into life on in Windows 10?

The digital assistant can be activated by saying "Hey Cortana" or clicking on the search section of the task bar, but if you're in the UK, you may find the message 'Cortana is not available in your region' keeps popping up. This isn't true, but you need to ensure that a few settings are correct before it will appear on your PC.

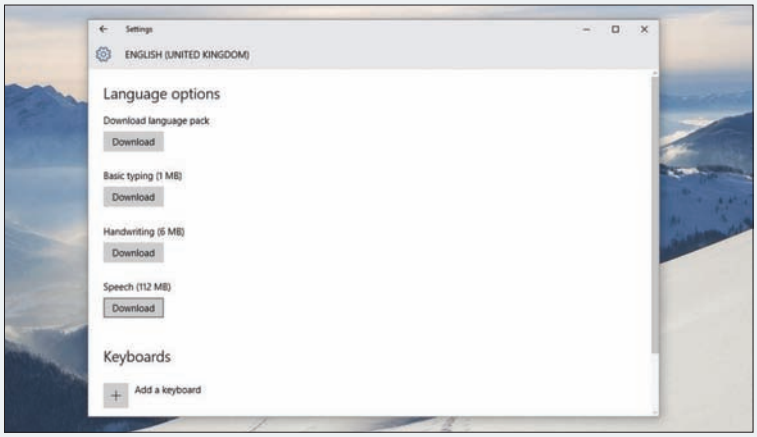
Mind your language

As Cortana utilises complicated language recognition processes to communicate with users and PCs, it needs to know what it's listening out for so it can work. The first thing to check is the language that your device is currently set up to use. To do this, go to the Start Menu > Settings > Time and Language > Region and Language, then ensure the Country and Region is set to the UK.



Below this setting you'll see the Language section. For Cortana to work in the UK your PC needs to have the English (United Kingdom) language pack downloaded. If you can't see it, click on the Add a language option, locate the pack in the list and click to install. If English (United Kingdom) is already the default setting, that doesn't mean it will work with Cortana. To do that, you'll need to click on it, then select Options.

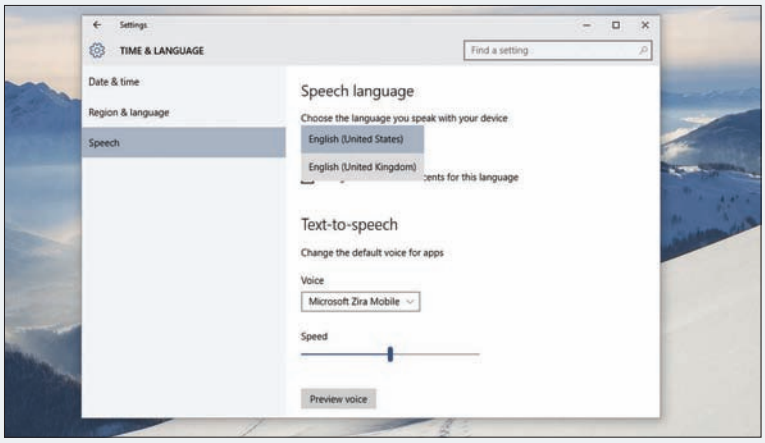
In here you'll find several boxes offering download options. Click the Download Language Pack one at the top, and Windows will install it on your system. Make sure that you also select the Speech download option.



Check the Speech settings

When the language pack and Speech module have been installed, you'll need to select the new language as the one Cortana will use. To do this, you'll have to stay in the Time & Language panel, and select the option in the left hand column labelled Speech.

In here there's a new panel where you can select the Speech Language used by your PC. The default is usually English (United States), but clicking on it should bring up the English (United Kingdom) option. Select this and then tick the Recognise non-native accents for this language box.

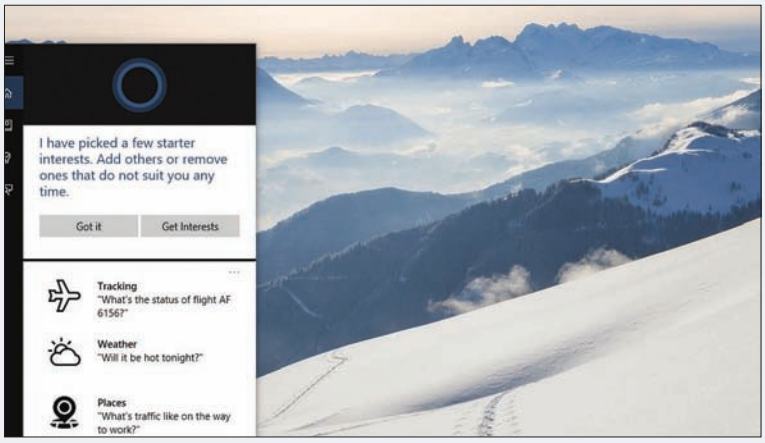


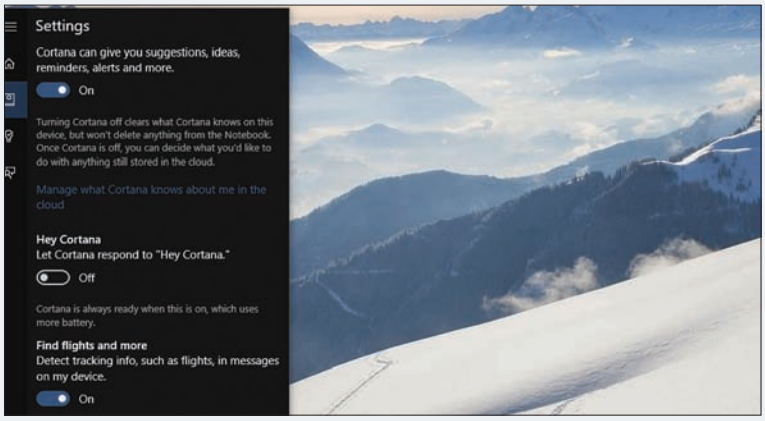
Reboot and start talking

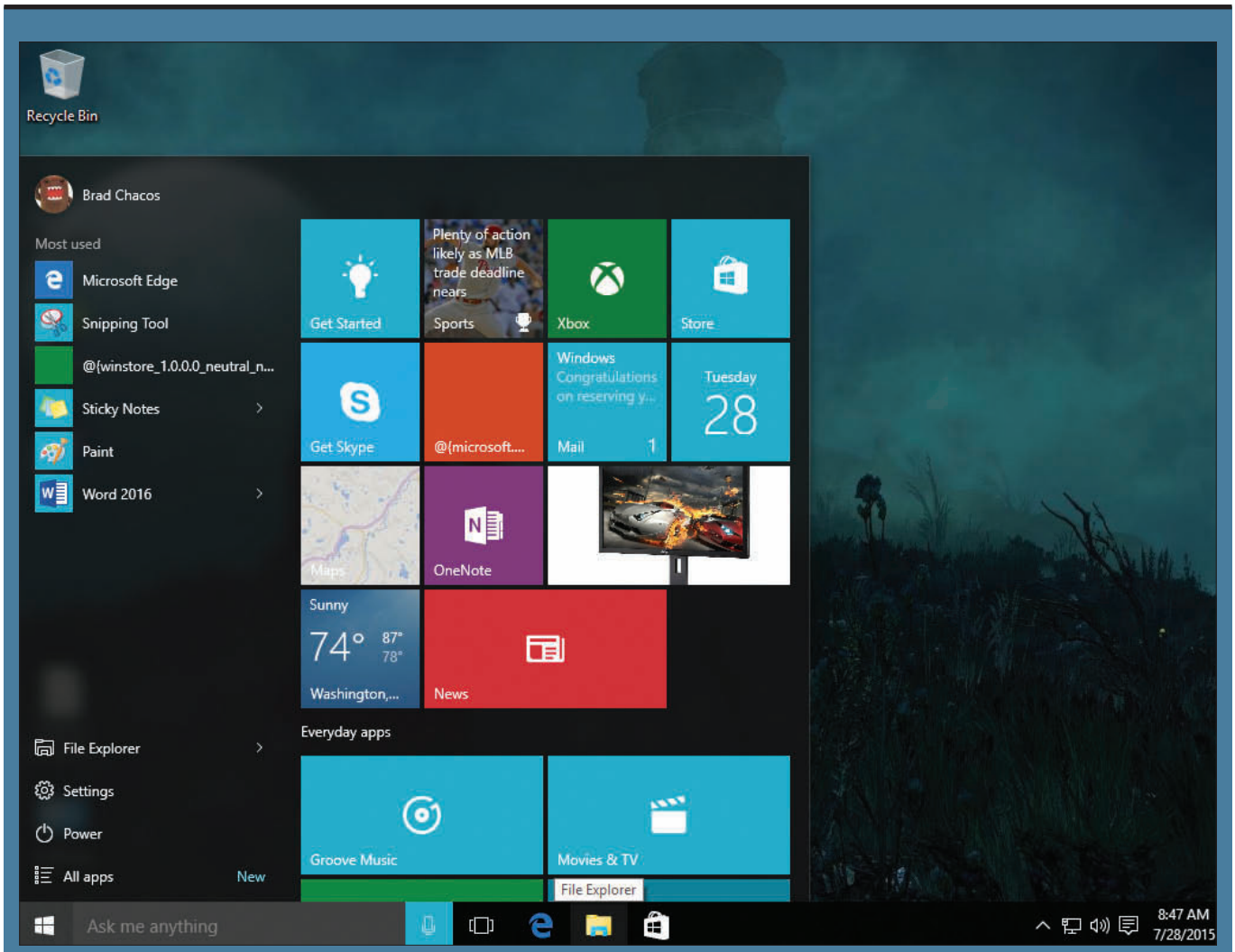
Now with the settings all matching up to the UK, and the language packs installed, reboot your PC. Use the search area in the task bar to look for Cortana settings, then select it. Turn Cortana on and it will begin taking you through the various tasks she can accomplish.

One final setting you'll need to enable is that of the voice command 'Hey, Cortana'. To do this, click on the search area of the task bar, select the Notebook icon just below the Home icon, then click on the toggle icon labelled Let Cortana respond to "Hey, Cortana".

So long as your microphone is compatible you'll now be able to use Cortana whenever you want, just by speaking that command. ☒







Customise left side of Windows 10 Start Menu

Ian Paul reveals how to get Windows 10's Start menu looking exactly how you want

We've heard from a number of readers who love having the Start menu back, but don't like how the left side is filled up with the 'most used' apps that are anything but, or the 'recently added' section. If you feel the same way, you can turn all that off and fill it up with items you actually might use.

To begin, hit Start and open the Settings app. Go to Personalization > Start and slide to Off the options for Show most used apps and Show recently added apps.

Once you've done this you'll see there's a big empty hole on the left side of the Start menu. While you can't fill it up with anything you want, you do have a few options. In the Settings app, go to Personalization > Start > Choose which folders appear on Start. This screen is a set of sliders to make specific folders appear in Start.

There are also some system settings you can add in this list that aren't folders, such as quick access to Homegroup and network settings. We went with a bunch of folders including Documents, Downloads, Music, Pictures, Videos, and Personal folder, which is just a fancy name for the root of your Windows user folder.

As you can see in the above image, that does a pretty good job of filling up the dead space. Perhaps we'll turn on the Recently added section again, but for now we're content with it as it is. ☒





Play DRM games in Windows 10

Martyn Casserly reveals how to get around the security changes in Windows 10 to play older games

The release of Windows 10 has brought with it some exciting new features for gamers, such as GameDVR, Direct X12, and the soon to be available ability to stream games from your Xbox One to your PC. One surprise addition though, is that any older games you have that use SecuROM or SafeDisc DRM will struggle to run on the new operating system.

SecuROM and SafeDisc are both forms of Digital Rights Management (DRM) designed to prevent the piracy of software. They were used on a number of games, some high profile, mainly during the 2003 to 2008 period.

SafeDisc was involved in something of a scandal in 2007 when it was discovered that the DRM could be used as an attack vector for hackers. This enabled them to remotely take control of a user's PC, with full access to the victim's data. Microsoft did patch the vulnerability shortly afterwards.

SecuROM, which was developed by Sony, also came under fire when Electronic Arts was sued in 2008 after it was discovered that the DRM didn't uninstall when the game Spore was removed from a PC. Gamers quickly grew to hate the SecuROM DRM, as it often required the periodic reactivation of games, limited the number of installs, and generally made life miserable. Both forms of DRM are now defunct, and have been for some time.

The latest version of Windows has made some changes to the way it handles security, and the upshot of this is that deep-level programs such as DRM are denied the access they need to function. In many ways this is a much safer way for the OS to work, but it does mean that games using SecuROM or SafeDisc just won't run. As the DRM technology is no longer used or supported, we don't expect to see patches that fix this problem any time soon, if at all.

The list of games that are affected could be large, as the software was in widespread use, but the main casualties we've seen reported are Grand Theft Auto 3, Bioshock, Mass Effect, The Sims, Crimson Skies, and Microsoft Flight Simulator 2004. It should be noted though that only the disc-based versions of the games are troublesome, as the DRM was included on the medium itself to prevent duplication by naughty people.

Unfortunately, there isn't a whole lot you can do to make disc-based copies of these games work on Windows 10, but that's not to say you can't play the games themselves. If you're desperate to help Commander Shepard save the galaxy one more time, you could buy the game again on Steam or from Good Old Games (GOG), especially if you keep an eye out for the sales that regularly run on both sites. Alternatively, you could run your PC as a dual-boot system, as Windows 7 will still allow the games to work. ☒

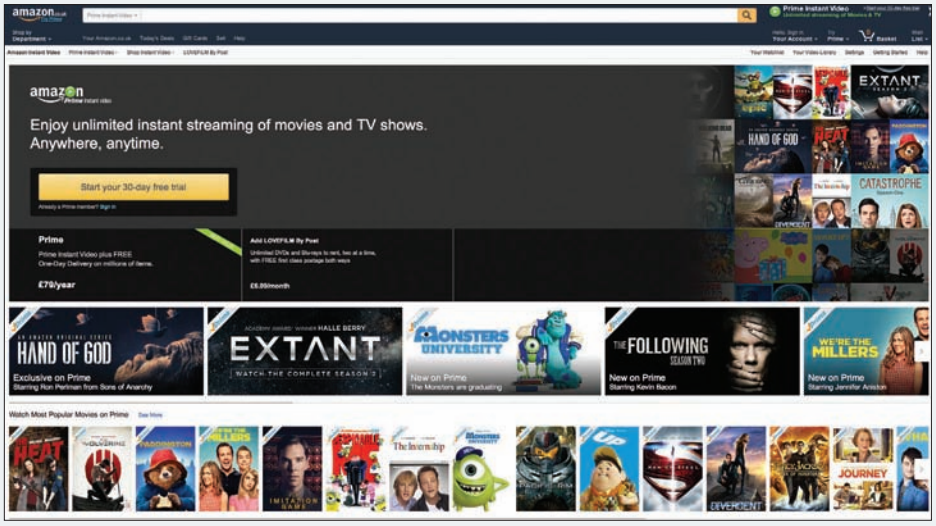


Download Amazon Prime films and TV shows

Jim Martin reveals how to download Amazon Prime videos on to a smartphone or tablet

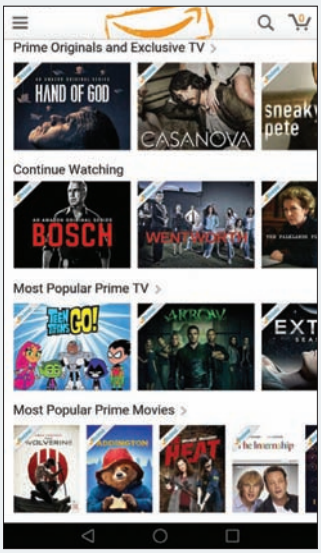
START Amazon Prime Instant Video is a rival to Netflix and now lets you download videos to watch offline – something no other streaming service allows, unless you're counting catch-up TV such as iPlayer and All 4 (which we're not). It makes an Amazon Prime subscription all the more tempting as you also get music streaming thrown in (typically £10 per month elsewhere) and fast delivery when you order physical products from Amazon.

You'll need a subscription to Prime Instant Video (you can sign up for the free 30-day trial), plus a tablet or phone to download videos. Supported devices include Amazon's own Fire hardware, all Android devices and an iPhone or iPad.

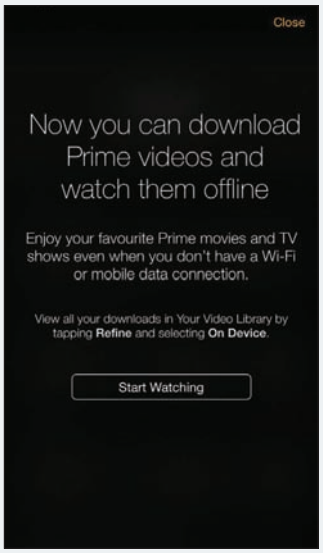


2 It's confusing trying to figure out how to watch Prime Instant Video on Android because Amazon's website is out of date and tells you it's part of the Amazon shopping app. But no more: you have to download Amazon Underground (see page 114) if you want to get video. On your device, go to amazon.co.uk/androidapp and it will automatically download the Underground app.

Then, once installed, launch it and tap the menu icon (top left) and choose Amazon Instant Video from the menu. When you choose a title you'll be prompted to download the new version of the Amazon Video app.

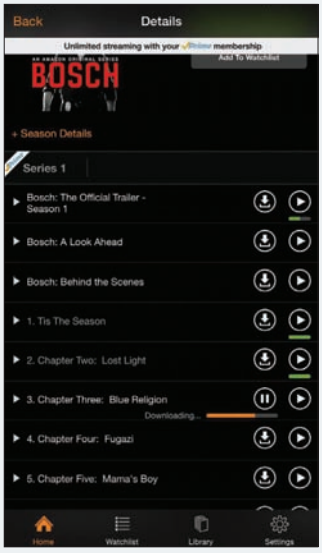


3 When you first launch the Amazon Video app after the update which adds support for downloads, you'll see this screen telling you all about it.

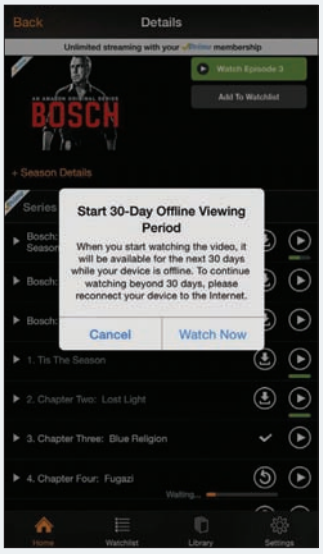


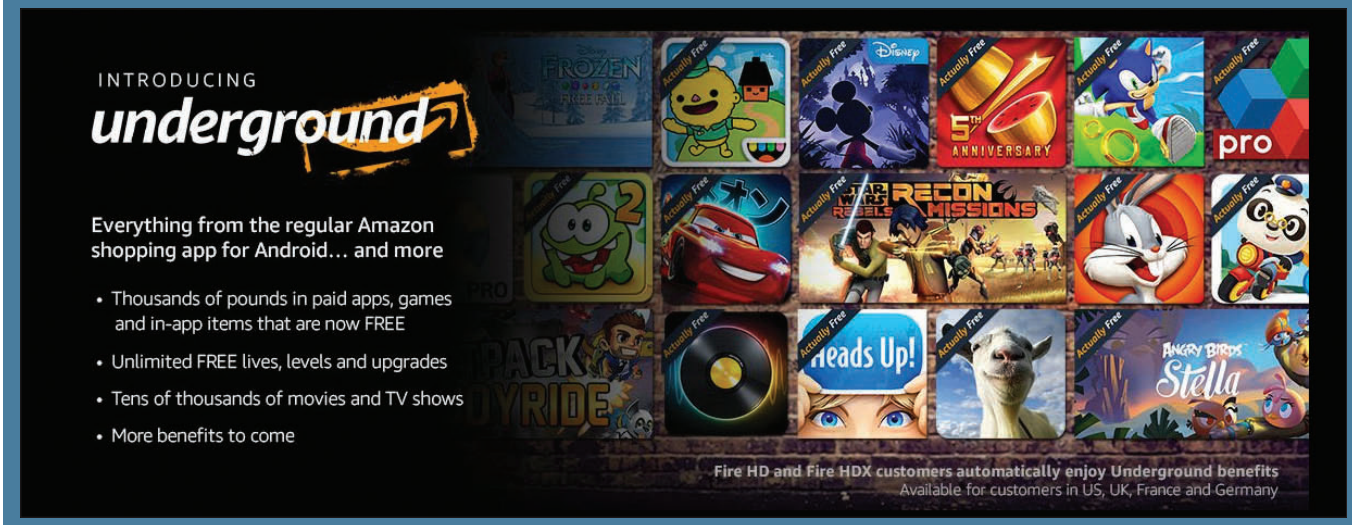
4 To download a movie or TV episode, first search or navigate to the title you want. Right now, you're more likely to have success with Amazon's own content, such as *Extant*, *Transparent*, *Bosch* and others. If you just see a play icon, you won't be able to download it.

You can see here we're downloading an episode of Bosch on an iPhone. If you allow push notifications, you'll see a message on your lock screen when each video has completed downloading (you can put your device in sleep mode).



5 When you see a tick next to the play button, you know the video is ready to play offline. The first time you play a video, you'll get a message saying you have 30 days to watch it. After that you have to reconnect your device to the internet to keep watching it. ☒





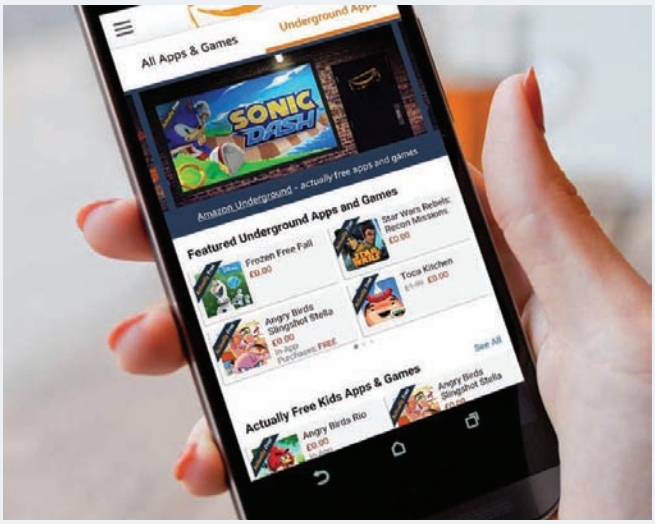
Stop hidden costs with Amazon Underground

Marie Brewis explains how to use Amazon Underground to get free Android apps and games

Amazon Underground is an Android app that is in essence a third-party app store that can complement Google Play on your device. It's the regular Amazon shopping app with extras, and having installed it on your device you'll be able to access a new Amazon Underground apps and games menu that lists for download a selection of genuinely free premium apps and games.

Developers of free apps make their money through in-app purchases and in-app advertising, so what's changed? The difference here is that Amazon is paying those developers to waive their fees, so you can benefit from free premium apps such as OfficeSuite Professional 8, Star Wars Rebels: Recon Missions, Frozen Freefall, and more. You can download these apps and games from Google Play, but by downloading them through Amazon instead you'll get full access without additional charges.

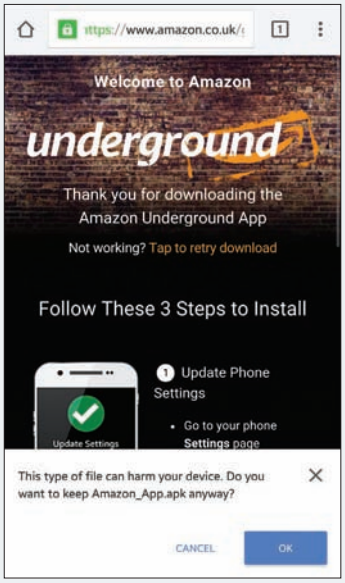
As a third-party app store Amazon Underground is in competition with Google Play, so you can't download it through Google Play itself. Here we explain how to download the app and start downloading premium apps and games for free.



START On your phone or tablet launch the web browser and head to amazon.co.uk/underground. Tap the button to Download Amazon Underground and the app will begin downloading to your device.

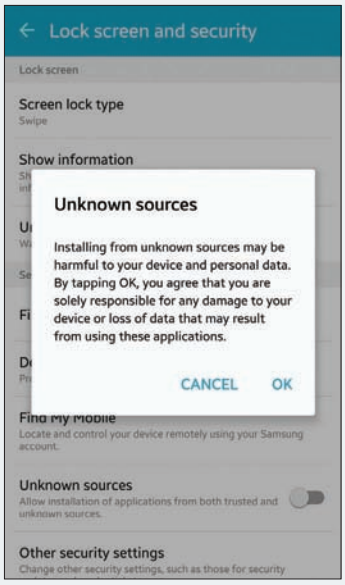


2 A pop-up will appear at the bottom of your screen that says: 'This type of file can harm your device. Do you want to keep Amazon_App.apk anyway?' Tap OK, and the app will begin downloading to your device.

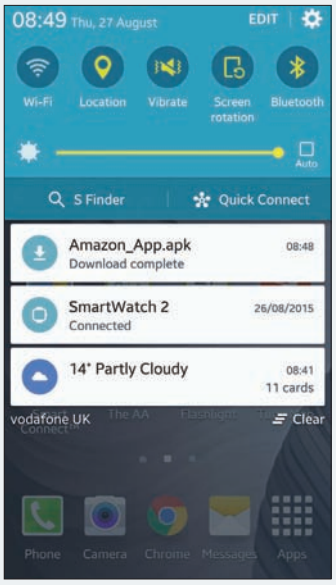


3 Because you aren't downloading the Amazon Underground app through Google Play, you first need to instruct your phone or tablet to allow you to install software from unknown sources. You'll find this setting in Settings > Security > Unknown sources, and by default, it will be disabled. Toggle on the setting, then accept the warning that third-party apps may harm your device.

It's a good idea to return to this setting once you have completed this walkthrough and disable it, thereby protecting yourself from any future dubious downloads.

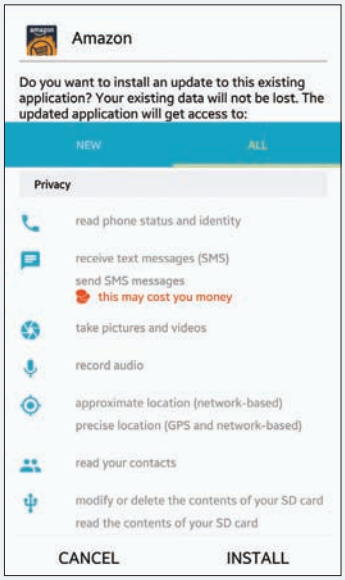


4 Once the app has finished downloading on to your device, either drag down the notification bar at the top of the screen and tap on the download, or find and tap on the .apk file in your Downloads folder.



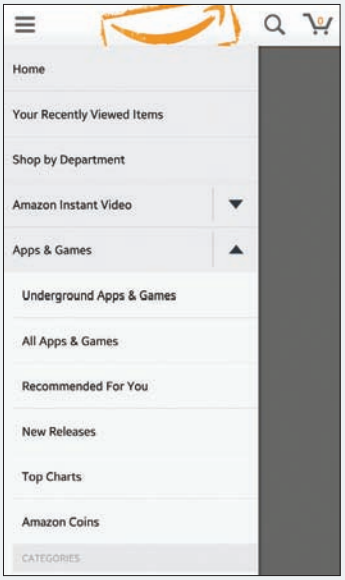
5 As with any other app you download to your phone or tablet, you'll be asked to accept certain permissions before the app is installed. If you already have the Amazon shopping app on your device (which Amazon Underground replaces), the New permissions tab will be empty. Amazon Underground requires no extra permissions over the original Android app, and you can see which permissions that requested by selecting the All tab.

If you're happy to continue, tap Install at the bottom right of the screen. Once the app has installed, click Open.

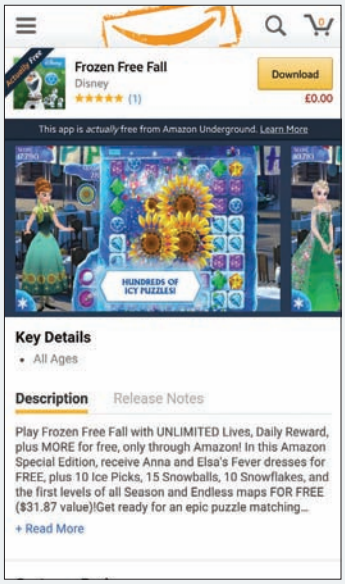


6 Amazon Underground looks just like the usual Amazon shopping app for Android, but there's a new item in the menu. Having signed into your Amazon account, tap on the three vertical lines icon at the top left of the screen and hit the down arrow next to Apps & Games. Now choose Underground Apps & Games.

Any apps and games listed in this section are completely free, with no hidden in-app purchases. You can also spot these apps by their 'Actually free' banners.

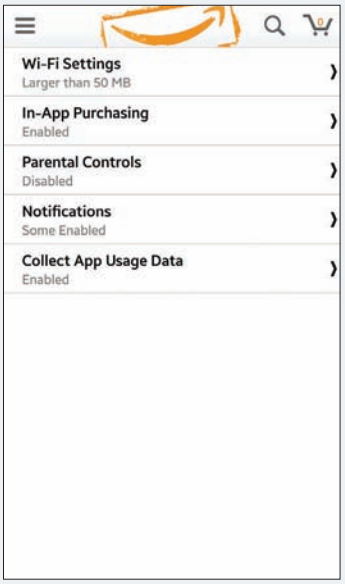


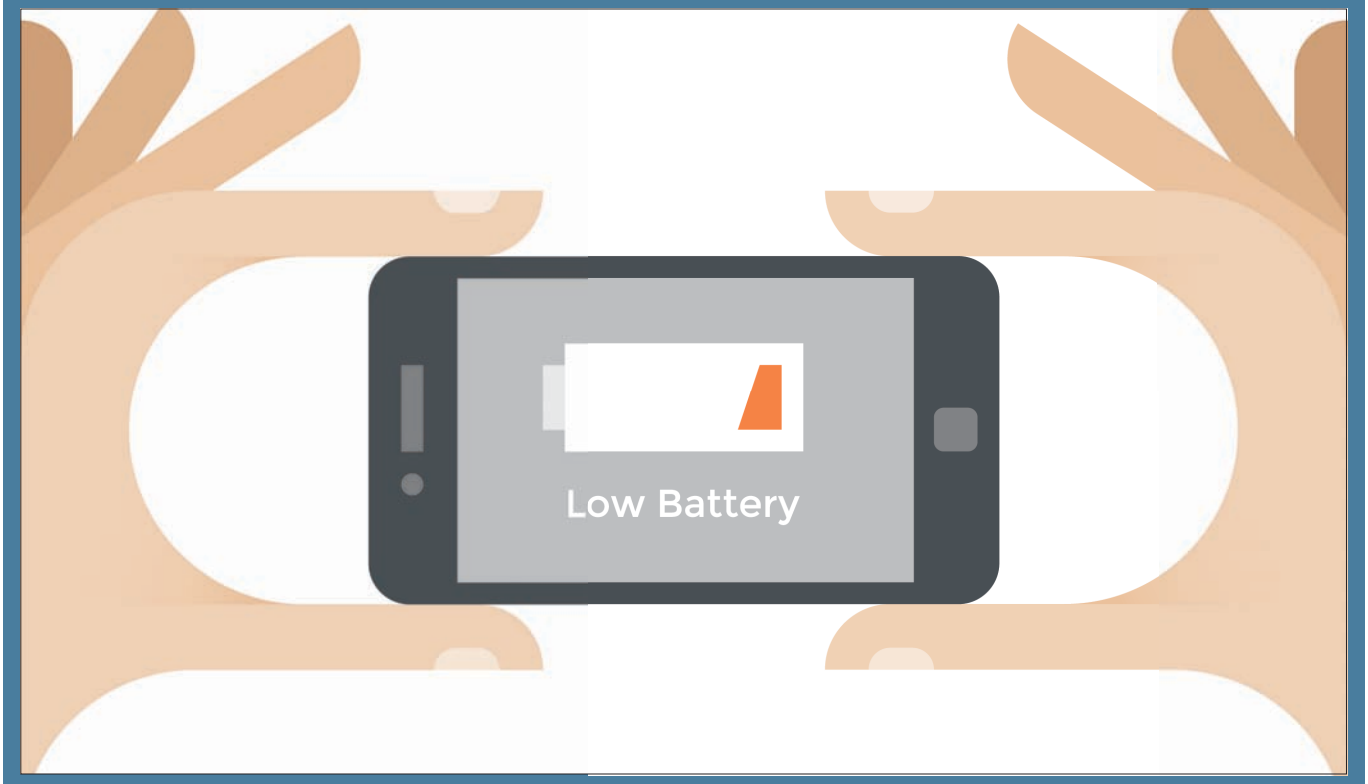
7 Browse Amazon Underground for an app or game that takes your fancy. We chose to download Frozen Free Fall, which includes free items and levels that would otherwise incur a $31.87 charge. The installation process is similar to that of Google Play, so should feel familiar. By default, Amazon Underground won't allow app downloads bigger than 50MB unless you're connected to Wi-Fi (you can change this in the settings). If your Wi-Fi is on or the app is less than 50MB, tap Install, accept the permissions and the app will download to your device.



8 It's worth taking a quick detour to the Settings menu even if your Wi-Fi is on, since Amazon Underground won't by default have the same safeguards in place as Google Play might on your device.

Open the main menu (tap the three horizontal lines icon) and this time choose Apps & Games Settings. Here you'll find settings to disable in-app purchases (apps downloaded through Amazon Underground won't have these, but other non-Underground apps downloaded from Amazon likely will) and to engage parental controls. ☒





Charge your smartphone or tablet faster

Marie Brewis shows how to how to ensure your mobile device's charger reaches its full potential

First off, it's important to understand how the tech works, since not all chargers are created equal. You've probably noticed that your phone or tablet will charge much slower when it's connected to a PC or laptop's USB port than when it is to a mains power adaptor. And you may have seen that your phone charges faster when connected to the charger that came with your tablet. That's because different chargers have different power outputs.

While a PC's USB port is specified at 2.5W for USB 1.0 and 2.0 and 4.5W for USB 3.0 (so always use a USB 3.0 port in preference to USB 1.0 or 2.0 when available), a phone charger might be rated at 5W and a tablet charger 10W, for example.

We calculate the wattage by multiplying the current (the number of amps) and the voltage. So, if your charger is specified at 5V, 1A, it can supply 5W. If it is specified at 5V, 2A it can supply 10W.

You can use any USB charger with any phone or tablet, with the only caveat that if there isn't sufficient power available, you may find your device won't charge. Note that your device will draw only the power it requires. If you plug a 10W charger into a phone that accepts only 5W, it will still draw just 5W and won't charge any faster than it would with a lower-specified charger.

However, many phones and most tablets will accept a higher input. Check the spec of your phone and your charger now to see whether you could be benefitting from faster charging.

Qualcomm Quick Charge 2.0 and 3.0

Qualcomm Quick Charge 2.0 is a next-gen fast-charging technology for phones and tablets running certain Snapdragon processors. In Qualcomm's own lab tests, it found a Quick Charge 2.0-enabled device with a 3300mAh battery was able to reach 60 percent capacity in 30 minutes; using a standard 5W phone charger just 12 percent charge was achieved in the same amount of time. Qualcomm recently announced Quick Charge 3.0, which will begin appearing in its chips in 2016. That means devices running the Snapdragon 820, 620, 618, 617 and 430 processors will benefit. Quick Charge 3.0 improves charging efficiency and reduces charging time so that 80 percent is possible in just 35 minutes.

In order to use Qualcomm Quick Charge, you must use an adaptor that has built-in support for it. That may be the charger that came with your device; we've also tried a couple of Quick Charge car chargers and a Quick Charge power bank.

Devices that support Qualcomm Quick Charge 2.0 include the LG G4 and G Flex 2, HTC One M8, One M9 and Desire Eye, Nexus 6, Samsung Galaxy S6 and S6 Edge, Sony Xperia Z3- and Z4-series phones and tablets, Asus Zenfone 2 and the new Motorola Moto X.

The alternative to faster charging is to provide batteries that last longer, and hydrogen could be a possible solution. We've already seen the Upp Fuel Cell power bank, but found it very expensive, big and impractical; now innovators are looking to place that tech inside phones.

For example, Intelligent Energy has shown how it is possible to add a hydrogen battery to an iPhone 6 that could enable the battery to last up to a week. Geek.com reports that the company has been able to add the complementary battery without modifying the iPhone, but it does require a series of vents in the rear of the case to allow heat and water vapour to escape.

Of course, it's unlikely you'll be seeing this technology added to your iPhone any time soon: not only are hydrogen cells expensive to replace for consumers, but the battery requires a new slot to inject hydrogen fuel cartridges and you'll need vents on the rear of the phone. ☒

PC ADVISOR DOWNLOADS ZONE

Welcome to the *PC Advisor* Software Downloads Zone

You've probably noticed that there's no cover disc with this month's issue. We've taken the hard decision to remove the disc and move to online downloads.

Most software developers distribute their programs online rather than on CDs or DVDs. And more often than not in the past, developers required *PC Advisor* readers to use online registration, and increasingly demanded that software be downloaded rather than allowing them to be included on the cover disc. So despite there being a disc taped to the cover, there would often be little more than a link to download the software.

For these reasons, we've created a new Downloads Zone on our website. And to make things as easy as possible, we have removed the need for individual codes to download or register each program.

The only code you'll need is **DOWNLOAD1215**, which you can enter at the following page:

pcadvisor.co.uk/magazine/download

Once logged in, you'll be able to browse the software on offer or search for something specific using the search box, or click the Downloads link at the top of each page and browse by category.

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Every issue of *PC Advisor* is packed with the latest news, reviews and features, plus comprehensive, impartial buying advice and easy-to-understand tutorials to help you to get the most from your laptop, PC and tech gadgets.

Every subscriber will also have access to the Subscriber Download Zone. Here you will find programs in a wide variety of software categories and on platforms such as Windows, Linux, Mac OS X and mobile.

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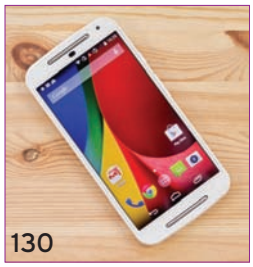

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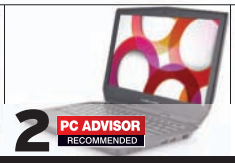
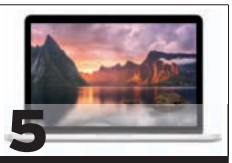
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Star ratings and Gold, Recommended and Best Buy badges are awarded at the time of the original review and given in relation to the market competition at that time.

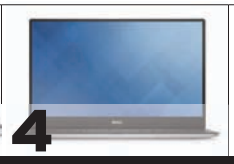
Best laptops

	1 PC ADVISOR BEST BUY	2 PC ADVISOR RECOMMENDED	3	4	5
					
	Aorus X7 v2	**Alienware 13**	**Apple MacBook Pro Retina 15in**	**HP EliteBook Folio 1040 G1**	**Apple MacBook Pro Retina 13in**
Price	**£1,720 inc VAT**	**£1,100 inc VAT**	**£1,599 inc VAT**	**£2,116 inc VAT**	**£999 inc VAT**
Website	Aorus.com	Alienware.co.uk	Apple.com/uk	Hp.com/uk	Apple.com/uk
Build rating	★★★★☆	★★★★½	★★★★½	★★★★½	★★★★½
Features rating	★★★★½	★★★★☆	★★★★½	★★★★½	★★★½☆
Performance rating	★★★★½	★★★★☆	★★★★☆	★★★★½	★★★★☆
Value rating	★★★½☆	★★★★☆	★★★★☆	★★★☆☆	★★★★☆
Overall rating	★★★★½	★★★★½	★★★★½	★★★★☆	★★★★½
Processor	2.4GHz Intel Core i7-4860HQ	2.4GHz Intel Core i7-5500U	2.2GHz Intel Core i7	2.1GHz Intel Core i5-4600U	2.7GHz dual-core Intel Core i5
RAM	16GB DDR3	8GB (2x 4GB) DDR3	16GB DDR3L	8GB DDR3L	8GB LPDDR3
Storage	1TB HDD, 3x 128GB SSD	256GB SSD	256GB SSD	256GB SSD	128GB SSD
Screen size	17.3in matt	13.3in matt	15.4in matt	14in matt	13.3in matt
Screen resolution	1920x1080	1920x1080	2880x1800	1920x1080	2560x1600
Graphics	2x nVidia GeForce GTX 860M	nVidia GeForce GTX 860M	Intel Iris Pro Graphics	Intel HD Graphics 4400	Intel Iris Graphics 6100
Video memory	8GB	2GB	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11ac	802.11a/b/g/n/ac	802.11a/b/g/ac	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 3.0, 2x USB 2.0	3x USB 3.0	2x USB 3.0	2x USB 3.0	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	N/A	N/A	N/A	N/A	N/A
Extras	HD webcam	2Mp webcam	720p FaceTime	0.9Mp webcam	720p FaceTime
Operating system	Windows 8.1 64-bit	Windows 8.1	OS X Yosemite	Windows 7 Professional	OS X Yosemite
Bundled software	None	None	None	None	None
Gaming scores	189/157fps in Tomb Raider	89/64fps in Tomb Raider	Not tested	49/33fps in Tomb Raider	Not tested
Battery	74.7Wh lithium-polymer	52Wh lithium-polymer	74.9Wh lithium-ion	42Wh lithium-polymer	74.9Wh lithium-ion
Battery life	1 hr 48 mins	10 hrs 20 mins	8 hrs 58 mins	5 hrs 41 mins	17 hrs 5 mins
PCMark7 score	6304	5429	Not tested	4783	Not tested
Dimensions	425x303x24.5mm	328x235x26.7mm	358.9x247.1x18mm	338x232x17.3mm	314x219x18mm
Weight	3.2kg	2kg	2kg	1.6kg	1.6kg
Warranty	2-year return-to-base	1-year collect-and-return	1-year return-to-base	2-year return-to-base	1-year return-to-base
FULL REVIEW	TINYURL.COM/KLUXLGE	TINYURL.COM/O8VXAGL	TINYURL.COM/O6U4NCR	TINYURL.COM/OWV2FRR	TINYURL.COM/NG98LD4

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Best budget laptops	1 	2 PC ADVISOR RECOMMENDED 	3 PC ADVISOR RECOMMENDED 	4 	5 
	Asus X555LA-XX290H	**Toshiba Chromebook 2**	**Dell Vostro 15**	**Toshiba Satellite CL10-B-100**	**Acer Chromebook 13**
Price	**£300 inc VAT**	**£269 inc VAT**	**£442 inc VAT**	**£200 inc VAT**	**£219 inc VAT**
Website	Asus.com/uk	Toshiba.co.uk	Dell.co.uk	Toshiba.co.uk	Acer.co.uk
Build rating	★★★½☆	★★★★☆	★★★½☆	★★★★☆	★★★★☆
Features rating	★★★½☆	★★★★☆	★★★★☆	★★★½☆	★★★★☆
Performance rating	★★★½☆	★★★★½	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★½	★★★★☆	★★½☆☆	★★★★☆
Overall rating	★★★★☆	★★★★½	★★★★☆	★★★★☆	★★★★☆
Processor	1.9GHz Intel Core i3-4030U	Intel Celeron	2.2GHz Intel Core i5-5200U	100	2.1GHz nVidia Tegra K1
RAM	4GB DDR3	4GB DDR3	4GB DDR3	2GB DDR3	4GB DDR3
Storage	1TB HDD	16GB SSD	500GB SSD	32GB eMMC	32GB SSD
Screen size	15.6in glossy	13.3in IPS	15.3in matt	11.6in glossy	13.3in
Screen resolution	1366x768	1920x1080	1366x768	1366x768	1920x1080
Graphics	Intel HD Graphics 4400	Intel HD Graphics	Intel HD Graphics 5000	Intel HD Graphics	nVidia Kepler
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11b/g/n	802.11a/b/g/n/ac	802.11b/g/n/ac	802.11b/g/n	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 1x USB 2.0	2x USB 3.0
FireWire	×	×	×	×	×
Thunderbolt	×	×	×	×	×
DisplayPort	×	×	×	×	×
HDMI	✓	✓	✓	✓	✓
DVI	×	×	×	×	×
VGA	✓	×	×	×	×
eSATA	×	×	×	×	×
Media card slot	×	✓	✓	×	✓
Audio	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack
Optical drive	DVD writer	None	None	None	None
Extras	Kensington lock slot, webcam	Webcam	Kensington lock slot, webcam	Kensington lock slot, webcam	Webcam
Operating system	Windows 8.1	Google Chrome OS	Windows 8.1	Windows 8.1 with Bing	Google Chrome OS
Bundled software	None	None	None	None	None
Battery	37Wh Lithium-ion	Not stated	40Wh Lithium-polymer	26Wh Lithium-ion	Not stated
Battery life	5 hrs 17 mins	9 hrs	5 hrs 17 mins	6 hrs	9 hrs 20 mins
PCMark 8 Home score	1985	Not tested	2296	Not tested	Not tested
Batman (Low/High)	30fps/Not tested	Not tested	29fps/Not tested	Not tested	Not tested
Dimensions	381x257x26.3mm	320x214x19.3mm	1378x259x24.5mm	315x216x20.3mm	18x327x227.5mm
Weight	2.1kg	1.4kg	2.4kg	1.1kg	1.5kg
Warranty	1-year return-to-base	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OMYZQJ3	TINYURL.COM/OP9NQAY	TINYURL.COM/NDAX6WT	TINYURL.COM/OQC4PUO	TINYURL.COM/Q2YT5AD

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Best ultraportable laptops	 1	 2	 3	 4	 5
	Apple MacBook Pro Retina 13in	HP EliteBook Folio 1040 G1	Apple MacBook Air 13in	Dell XPS 13 9343	Microsoft Surface Pro 3
Price	**£999 inc VAT**	**£2,116 inc VAT**	**£849 inc VAT**	**£1,099 inc VAT**	**£639 inc VAT**
Website	Apple.com/uk	Hp.com/uk	Apple.com/uk	Dell.co.uk	Microsoft.com/en-gb
Build rating	★★★★½	★★★★½	★★★★☆	★★★★½	★★★★½
Features rating	★★★½☆	★★★★½	★★★★☆	★★★★☆	★★★★½
Performance rating	★★★★☆	★★★★½	★★★★☆	★★★★½	★★★★☆
Value rating	★★★★☆	★★★☆☆	★★★★☆	★★★★½	★★★½☆
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	2.7GHz Intel Core i5	2.1GHz Intel Core i5-4600U	1.6GHz Intel Core i5	2.4GHz Intel Core i7-5500U	Intel Haswell Core i3
RAM	8GB LPDDR3	8GB DDR3L	4GB LPDDR3	8GB DDR3	4GB DDR3
Storage	128GB SSD	256GB SSD	128GB SSD	256GB SSD	64GB SSD
Screen size	13.3in matt	14in matt	13.3in glossy	13.3in IPS	12in ClearType
Screen resolution	2560x1600	1920x1080	1440x900	3200x2000	2160x1440
Graphics	Intel Iris Graphics 6100	Intel HD Graphics 4400	Intel HD Graphics 6000	Intel HD Graphics 5500	Intel HD Graphics 4400
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11a/b/g/ac	802.11a/b/g/n/ac	802.11ac	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	None	Gigabit	None
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0	2x USB 3.0	2x USB 3.0	2x USB 3.0	1x 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	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	720p FaceTime	0.9Mp webcam	720p FaceTime	720p webcam	5Mp webcam
Operating system	OS X Yosemite	Windows 7 Professional	OS X Yosemite	Windows 8.1 64-bit	Windows 8.1 Pro
Bundled software	None	None	None	Microsoft Office 2013 Trial	None
Gaming scores	Not tested	49/33fps in Tomb Raider	Not tested	40fps Batman: Arkham City	Not tested
Battery	74.9Wh lithium-ion	42Wh lithium-polymer	38Wh lithium-ion	52Wh lithium-polymer	8000mAh lithium-ion
Battery life	17 hrs 5 mins	5 hrs 41 mins	12 hrs 49 mins	6 hrs 12 mins	9 hrs
PCMark 7 score	Not tested	4783	Not tested	Not tested	Not tested
Dimensions	314x219x18mm	338x232x17.3mm	300x192x17mm	304x200x15mm	292x201.3x9.1mm
Weight	1.6kg	1.6kg	1.4kg	1.3kg	0.8kg
Warranty	1-year return-to-base	2-year return-to-base	1-year return-to-base	1-year next business day	1-year return-to-base
FULL REVIEW	TINYURL.COM/NG98LD4	TINYURL.COM/OWV2FRR	TINYURL.COM/PH3YN5K	TINYURL.COM/PPD3BYW	TINYURL.COM/OLDJ9KK

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Best Chromebooks











	Toshiba Chromebook 2	Acer Chromebook 13	Dell Chromebook 11	HP Chromebook 14	Acer C720p Chromebook
Price	**£269 inc VAT**	**£219 inc VAT**	**£239 inc VAT**	**£259 inc VAT**	**£249 inc VAT**
Website	Toshiba.co.uk	Acer.co.uk	Dell.co.uk	Hp.com/uk	Uk.asus.com
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	Intel Celeron	2.1GHz nVidia Tegra K1	1.4GHz Intel Celeron 2955U	1.4GHz Intel Celeron 2955U	1.4GHz Intel Celeron 2955U
RAM	4GB DDR3	4GB DDR3	4GB DDR3	4GB DDR3	2GB DDR3
Storage	16GB SSD	32GB SSD	16GB SSD	16GB SSD	16GB SSD
Screen size	13.3in IPS	13.3in	11.6in glossy	14in glossy	11.6in glossy
Screen resolution	1920x1080	1920x1080	1366x768	1366x768	1366x768
Graphics	Intel HD graphics	nVidia Kepler	Intel HD Graphics	Intel HD graphics	Intel HD graphics
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n	802.11a/b/g/n
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 1x USB 2.0	2x USB 3.0	2x USB 3.0	2x USB 3.0, 1x USB 2.0	1x USB 3.0, 1x USB 2.0
FireWire	×	×	×	×	×
Thunderbolt	×	×	×	×	×
DisplayPort	×	×	×	×	×
HDMI	✓	✓	✓	✓	✓
DVI	×	×	×	×	×
VGA	×	×	×	×	×
eSATA	×	×	×	×	×
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack	Headphone minijack
Optical drive	None	None	None	None	None
Extras	Webcam	Webcam	Webcam	Webcam	Webcam
Operating system	Google Chrome OS	Google Chrome OS	Google Chrome OS	Google Chrome OS	Google Chrome OS
Bundled software	None	None	None	None	None
Battery life	9 hrs	9 hrs 20 mins	7 hrs 17 mins	7 hrs 50 mins	6 hrs 7 mins
SunSpider score	Not tested	660ms	465ms	470ms	502ms
Peacekeeper score	Not tested	Not tested	2468	2478	2453
Browsermark score	Not tested	Not tested	3732	3643	3698
Dimensions	320x214x19.3mm	18x327x227.5mm	295x201x24mm	20.5x345x239mm	19.1x288x204mm
Weight	1.4kg	1.5kg	1.3kg	1.7kg	1.4kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OP9NQAY	TINYURL.COM/Q2YT5AD	TINYURL.COM/M3D3QJ4	TINYURL.COM/OCU7FTY	TINYURL.COM/O9KFZMA

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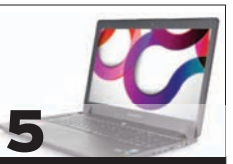
Best gaming laptops







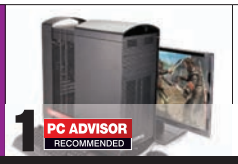
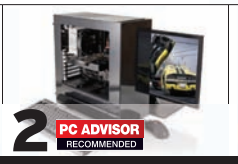
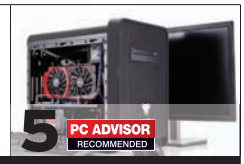




	Aorus X7 v2	Alienware 13	MSI GS60 2QD-470UK	MSI GE62 2QD Apache Pro	Gigabyte P37X
Price	**£1,720 inc VAT**	**£1,100 inc VAT**	**£1,299 inc VAT**	**£999 inc VAT**	**£1,750 inc VAT**
Website	Aorus.com	Alienware.co.uk	UK.msi.com	UK.msi.com	Uk.gigabyte.com
Build rating	★★★★☆	★★★★½	★★★★☆	★★★★☆	★★★½☆
Features rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★½☆
Value rating	★★★½☆	★★★★☆	★★★★☆	★★★★☆	★★★★½
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★★☆
Processor	2.4GHz Intel Core i7-4860HQ	2.4GHz Intel Core i7-5500U	2.6GHz Intel Core i7-4720HQ	2.6GHz Intel Core i7-4720HQ	2.6GHz Intel Core i7-4720HQ
RAM	16GB DDR3	8GB (2x 4GB) DDR3	16GB (2x 8BG) DDR3	8GB DDR3	16GB DDR3
Storage	1TB HDD, 3x 128GB SSD	256GB SSD	1TB HDD, 128GB SSD	128GB SSD, 1TB HDD	2x 128GB SSD, 1TB HDD
Screen size	17.3in matt	13.3in matt	15.6in matt	15.6in matt	17.3in matt
Screen resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Graphics	2x nVidia GeForce GTX 860M	nVidia GeForce GTX 860M	nVidia GeForce GTX 965M	nVidia GeForce GTX 960M	nVidia GeForce GTX 980M
Video memory	8GB	2GB	3GB	8GB	8GB
Wireless	802.11a/b/g/n/ac	802.11ac	802.11ac	802.11ac	802.11ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	3x USB 3.0, 2x USB 2.0	3x USB 3.0	3x USB 3.0	3x USB 3.0, 1x USB 2.0	2x USB 3.0, 2x 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	N/A	N/A
Extras	HD webcam	2Mp webcam	2.1Mp webcam	720p webcam	0.9Mp webcam
Operating system	Windows 8.1 64-bit	Windows 8.1	Windows 8.1	Windows 8.1	Windows 8.1
Bundled software	None	None	None	None	None
Gaming scores	189/157fps in Tomb Raider	89/64fps in Tomb Raider	123/82fps in Tomb Raider	51/33fps in Tomb Raider	221/153fps in Tomb Raider
Battery	74.7Wh lithium-polymer	52Wh lithium-polymer	48Wh lithium-ion	50Wh lithium-polymer	78Wh lithium-polymer
Battery life	1 hr 48 mins	10 hrs 20 mins	2 hrs 49 mins	2 hrs 58 mins	4 hrs 2 mins
PCMark 7 score	6304	5429	6241	2895 (PCMark 8)	6305
Dimensions	425x303x24.5mm	328x235x26.7mm	389x265x20.3mm	387x258x27.8mm	415x286x23.2mm
Weight	3.2kg	2kg	2kg	2.4kg	2.9kg
Warranty	2-year return-to-base	1-year collect-and-return	2-year return-to-base	2-year return-to-base	2 years
FULL REVIEW	TINYURL.COM/KLUXLGE	TINYURL.COM/O8VXAGL	TINYURL.COM/O6Q3JJD	TINYURL.COM/NHTD2TW	TINYURL.COM/NDPC6P6

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Best gaming PCs

	1 PC ADVISOR RECOMMENDED	2 PC ADVISOR RECOMMENDED	3	4	5 PC ADVISOR RECOMMENDED
	 Eclipse SuperNova i5r285oc	 Dino PC Dark Spark GTX 960	 Cyberpower Infinity Achilles	 Chillblast Fusion Mantis	 Yoyotech Warbird Gam3r
Price	**£999 inc VAT**	**£999 inc VAT**	**£999 inc VAT**	**£749 inc VAT**	**£999 inc VAT**
Website	Eclipsecomputers.com	Dinopc.com	Cyberpowersystem.co.uk	Chillblast.com	Yoyotech.co.uk
Build rating	★★★★★	★★★★½	★★★★½	★★★★½	★★★★★
Features rating	★★★★★	★★★★★	★★★★½	★★★☆☆	★★★★½
Performance rating	★★★★☆	★★★★☆	★★★★½	★★★½☆	★★★★½
Value rating	★★★★☆	★★★★☆	★★★½☆	★★★★★	★★★½☆
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Processor	3.5GHz Intel Core i5-4690K (OC 4.4GHz)	3.5GHz Intel i5-4670K (OC 4.6GHz)	3.5GHz Intel Core i5-4690K	3.5GHz Intel Core i5-4690K (OC 4.2GHz)	3.5GHz Intel Core i5 4690K (4.2GHz OC)
CPU cooler	Zalman CNPS11X Extreme	Be Quiet Pure Rock BK009	Cooler Master Seidon 120mm RL-S12M-FLNN-S1	Corsair H55 Water Cooler	SilentiumPC Fera 2 Heatpipe Cooler
Memory	16GB HyperX Savage	8GB DDR3	8GB DDR3	8GB DDR3	8GB DDR3
Storage	2TB HDD + 250GB SSD	1TB HDD + 120GB SSD	1TG HDD + 120GB SSD	1TB SSHD	2TB HDD + 240GB SSD
Power supply	550W XFX Core Edition	450W Corsair	600W Cooler Master	600W Corsair	600W Aerocool Integrator
Motherboard	Asus Z97-K	Gigabyte Z97X-Gaming 3	Gigabyte H81M-S2H	Gigabyte Z97-HD3	MSI Z97M-G43
Operating system	Windows 8.1	Windows 8.1	Windows 8.1	Windows 8.1 64-bit	Windows 8.1
Screen	26in HKC 2615	24in Iiyama GE2488HS-B1	24in AOC E2470SWDA	None supplied	23.6in AOC I2476VWM
Graphics	XFX AMD Radeon R9 285 DD Edition	Palit nVidia GeForce GTX 690	MSI nVidia GeForce GTX 970	MSI GeForce GTX 960	MSI nVidia GTX970 4GB
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Connectivity	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet
Ports	6x USB 3.0, 4x USB 2.0	6x USB 3.0, 4x USB 2.0, 2x PS/2, D-Sub, DVI-D, 6x SATA	6x USB 3.0, 3x USB 2.0, 2x DVI, HDMI, DP	6x USB 3.0, 2x USB 2.0, 2x DVI, HDMI, DP, PS/2	6x USB 3.0, 2x USB 2.0
Optical drive	Samsung DVD±RW	None	None	None	DVD±RW
Case	XFX Type 1 Bravo	NZXT Source 340	NZXT Source 340 Black	NZXT Source 340	CIT Kube Case
Keyboard & mouse	Cooler Master Storm Devastator Set	Corsair	Cooler Master Devastator Keyboard and Mouse	None	Gamdias Ares Keyboard and Mouse
Other	None	Corsair Raptor Bundle	None	Chillblast Family Software pack (optional)	None
PCMark 7 score	7931	7090	5945	5823	6244
Alien vs Predator score (720p/1080p)	111.4/59.8fps	103.4/54.7	167.8/89fps	104.2/55.2fps	1169.2/89.6fps
Final Fantasy XIV (Maximum)	91fps	86fps	120fps	86fps	137fps
Sniper Elite V2 (Low/Medium/Ultra)	292.1/106.8/26.5fps	285.6/123.6/28.9fps	281.1/192.9/48.1fpsfps	289.3/123.8/29fps	429.4/204.3/49.1fps
Power Consumption	76/432W	77/310W	48/261W	50/277W	72/369W
Warranty	3-year return-to-base	3-year PromoCare	2-year parts, 3-year return-to-base, 30-day C&R	5-year labour (2-year collect-and-return)	1-year RTB (3-year labour only), 90-day C&R
FULL REVIEW	TINYURL.COM/K5AJLBO	TINYURL.COM/MVBK6KX	TINYURL.COM/KKKRXAD	TINYURL.COM/L5H9ZDR	TINYURL.COM/NWZZZBM

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Cooler Master Nepton 240M Cooler
Asus Z170 PRO GAMER Motherboard
NVIDIA GeForce GTX 980 4GB
16GB 3000MHz DDR4 Memory
512GB Samsung M.2 PCIe SSD
2000GB Seagate SSHD Hybrid Drive
Cooler Master VS Series V 750W Power Supply
Onboard High Definition Audio
Windows 10 64bit OEM

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The Chillblast Fusion Master is our flagship Skylake gaming PC and is underpinned throughout by the most cutting-edge technology available. At its heart beats the brand new Core i7 6700K Skylake processor which we've overclocked to 4.6GHz via the exceptional ASUS Z170 Pro Gaming motherboard. The Master ships with 16GB of fast 3000MHz DDR4 memory and has the quickest storage available thanks to a 512GB Samsung SM951 SSD plus a Seagate SSHD secondary hybrid drive to accelerate your Steam collection. Add to this brand new connectivity like USB 3.1, M.2. and SATA Express and you can see that the Master has everything you could possibly want from a contemporary high performance computer.

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FUSION CENTURION

Zalman Z3 Case in Black
Intel® Core™ i5-6600K Processor
Akasa Nero 3 CPU Cooler
Asus Z170-K Motherboard
NVidia GeForce GTX 750 1GB
8GB 2133MHz DDR4 Memory
128GB Samsung M.2 PCIe SSD
1000GB Hard Disk Drive
Aerocool 600W Power Supply
Onboard High Definition Audio
Windows 10 64bit OEM

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FUSION NEO

Zalman Z11 Neo Case
Intel® Core™ i5-6600K Processor
Corsair H55 Liquid Cooler
Asus Z170-K Motherboard
NVidia GeForce GTX 960 2GB
16GB 2133MHz DDR4 Memory
128GB Samsung M.2 PCIe SSD
1000GB Seagate SSHD Hybrid Drive
Aerocool 600W Power Supply
Onboard High Definition Audio
Windows 10 64bit OEM

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FUSION CORE

Thermaltake Core V51 Case
Intel® Core™ i5-6600K Processor
Corsair H55 Liquid Cooler
Asus Z170 PRO GAMER Motherboard
NVIDIA GeForce GTX 970 4GB
16GB 2133MHz DDR4 Memory
256GB Samsung M.2 PCIe SSD
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Aerocool 700W Power Supply
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Fractal Design Kelvin S36 Liquid Cooler
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All-in-one PCs

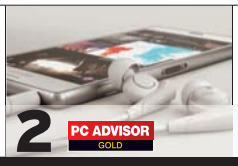
	1 PC ADVISOR RECOMMENDED	2	3	4	5
	Apple iMac with 5K display	Acer Aspire AZ3-615	Chillblast Volante AIO	Asus Eee Top	HP Envy Beats 23-n001na
Price	£1,999 inc VAT	£799 inc VAT	£1,299 inc VAT	£799 inc VAT	£900 inc VAT
Website	Apple.com/uk	Acer.co.uk	Chillblast.com	Asus.com/uk	Hp.com/uk
Build rating	★★★★★	★★★½☆	★★★☆☆	★★★½☆	★★★★☆
Features rating	★★★★★	★★½☆☆	★★★★☆	★★★★☆	★★½☆☆
Performance rating	★★★★☆	★★★½☆	★★★★★	★★½☆☆	★★½☆☆
Value rating	★★★★½	★★★★☆	★★★★☆	★★★☆☆	★★★½☆
Overall rating	★★★★★	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	3.9GHz Intel Core i5-4690	2.7GHz Intel Core i5-4460T	4GHz Intel Core i7-4790S	2.6GHz Intel Core i5-4200U	3.2GHz Intel Core i7-4785T
RAM	8GB DDR3	8GB DDR3	16GB DDR3	6GB DDR3	8GB DDR3
Storage	1TB Fusion Drive	1TB HDD	1TB SSD	1TB HDD	1TB HDD
Screen	27in	23in touchscreen	24in	23in touchscreen	23in touchscreen
Screen resolution	5120x2880	1920x1080	1920x1080	1920x1080	1920x1080
Graphics card	AMD Radeon M9 M290X	nVidia GeForce GT 840M	nVidia GeForce GT 750M	Intel HD Graphics 4400	Intel HD Graphics 4600
Video memory	2GB	2GB	2GB	N/A	N/A
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	4x USB 3.0	2x USB 3.0, 3x USB 2.0	4x USB 3.0, 2x USB 2.0	3x USB 3.0, 3x USB 2.0	2x USB 3.0, 4x USB 2.0
FireWire	×	×	×	×	×
Thunderbolt	✓	×	×	×	×
HDMI	×	×	✓	✓	✓
Media card slot	✓	✓	✓	✓	✓
Optical drive	None	DVD Writer	Blu-Ray Combo	DVD Writer	DVD Writer
Other	Final Cut Pro X, Logic Pro X, Aperture	1Mp webcam, wireless keyboard and mouse	Logitech MK520 wireless keyboard and mouse	2Mp webcam, Freeview TV, wireless keyboard and mouse	Wireless keyboard and mouse, Beats Audio stereo speaker system (8x 12W)
Operating system	OS X Yosemite	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit	Windows 8.1 64-bit
Power consumption (idle/max)	46/215W	46/91W	35/177W	33/69W	43/81W
Sniper V2 Elite (Low/High/Ultra)	Not tested	47.7/18.7/5.1fps	91.5/41.2/10.5fps	31.4/7.8/5fps	27.7/7.4/5fps
PCMark 8 Home score	Not tested	2906	3776	2828	2702
Dimensions	650x203x516mm	540x489x579mm	585x200x450mm	571x359x50-214mm	563x143x413mm
Weight	9.54kg	8.8kg	14.6kg	9kg	8.4kg
Warranty	1-year return-to-base	Not stated	5-year labour (2-year collect-and-return)	1-year return-to-base	1-year limited parts, labour, and pickup-and-return service
FULL REVIEW	TINYURL.COM/NWJUJSF	TINYURL.COM/QEY8FOE	TINYURL.COM/LO8A5MC	TINYURL.COM/PRPHC7L	TINYURL.COM/O6M4BCN

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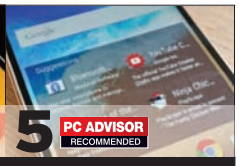
1 PC ADVISOR RECOMMENDED


2 PC ADVISOR GOLD



3 PC ADVISOR RECOMMENDED


4 PC ADVISOR GOLD


5 PC ADVISOR RECOMMENDED

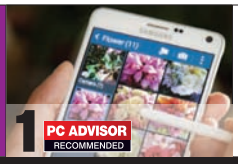
	Samsung Galaxy S6	Sony Xperia Z3 Compact	LG G4	LG G3	HTC One M9
Price	**£349 inc VAT**	**£349 inc VAT**	**£500 inc VAT**	**£479 inc VAT**	**£579 inc VAT**
Website	Samsung.com/uk	Sony.co.uk	Lg.com/uk	Lg.com/uk	HTC.com/uk
Build rating	★★★★½	★★★★½	★★★★☆	★★★★½	★★★★½
Features rating	★★★★½	★★★★☆	★★★★☆	★★★★½	★★★★☆
Performance rating	★★★★½	★★★★½	★★★★☆	★★★★½	★★★★☆
Value rating	★★★★☆	★★★★★	★★★★½	★★★★½	★★★½☆
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★½	★★★★☆
OS (out of box)	Android 5.0 Lollipop	Android 4.4 KitKat	Android 5.1 Lollipop	Android 4.4 KitKat	Android 5.0 Lollipop
Processor	2.1GHz Exynos 7420	2.5GHz Snapdragon 801	Snapdragon 808 six-core	2.5GHz Snapdragon 801	Snapdragon 810 octa-core
RAM	3GB	2GB	3GB	2GB/3GB	3GB
Storage	32/64GB	16GB	32GB	16GB/32GB	32GB
MicroSD support	No	Up to 128GB	Up to 128GB	No	Up to 128GB
Graphics	Mali-T760 GPU	Adreno 330	Adreno 418	Adreno 330	Adreno 430
Screen size	5.1in	4.6in	4.5in	5.5in	5in
Screen resolution	1440x2560	720x1280	1440x2560	1440x2560	1080x1920
Pixel density	577ppi	319ppi	538ppi	534ppi	441ppi
Screen technology	Super AMOLED	IPS	IPS	IPS	IPS
Front camera	5Mp	2.2Mp	8Mp	2Mp	4Mp (UltraPixel)
Rear camera	16Mp, LED flash	20.7Mp, LED flash	16Mp	13Mp, LED flash	20Mp
Video recording	4K	4K	4K	4K	4K
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Nano-SIM	Nano-SIM	Micro-SIM	Micro-SIM	Nano-SIM
Dual-SIM as standard	No	No	No	No	No
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band
Bluetooth	Bluetooth 4.1	Bluetooth 4.0	Bluetooth 4.1	Bluetooth 4.0 (aptX)	Bluetooth 4.1 (aptX)
GPS	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC	Yes	Yes	Yes	Yes	Yes
USB OTG	Yes	Yes	Yes	Yes	Yes
Extra features	Heart-rate sensor, fingerprint scanner	Waterproof, PS4 Remote Play	24-bit/192kHz audio, rear key	24-bit/192kHz audio, rear key	BoomSound speakers
Geekbench 3.0 (single)	1347	Not tested	Not tested	Not tested	1160
Geekbench 3.0 (multi)	4438	2800	3513	2465	3378
SunSpider	1048ms	944ms	715ms	959ms	867ms
GFXBench: T-Rex	30fps	41fps	25fps	20fps	50fps
GFXBench: Manhattan	14fps	26fps	9fps	Not tested	24fps
Battery	2550mAh, non-removable	2600mAh, non-removable	3000mAh removable	3000mAh, removable, Qi	2840mAh, non-removable
Dimensions	143.4x70.5x6.8mm	64.9x127x8.6mm	64.9x127x8.6mm	75x146x8.9mm	70x145x9.7mm
Weight	138g	129g	155g	149g	157g
Warranty	1 year	2 years	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PC2KOYQ	TINYURL.COM/NBBUY82	TINYURL.COM/NBBUY82	TINYURL.COM/OA76T73	TINYURL.COM/PUS2XEJ

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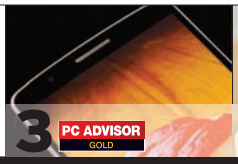
Best budget smartphones	1 PC ADVISOR RECOMMENDED	2 PC ADVISOR RECOMMENDED	3	4	5 PC ADVISOR RECOMMENDED
	Vodafone Smart Ultra 6	Motorola Moto E 4G 2015	Vodafone Smart Prime 6	EE Harrier Mini	Motorola Moto G 3G 2014
Price	£125 inc VAT	£109 inc VAT	£79 inc VAT	£99 inc VAT	£140 inc VAT
Website	Vodafone.co.uk	Motorola.co.uk	Vodafone.co.uk	EE.co.uk	Motorola.co.uk
Build rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★★☆
Features rating	★★★★½	★★★★☆	★★★★☆	★★★½☆	★★★★☆
Performance rating	★★★★½	★★★★☆	★★★★★	★★★½☆	★★★★☆
Value rating	★★★★★	★★★★★	★★★★☆	★★★★½	★★★★☆
Overall rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★★☆
OS (out of box)	Android 5.0.2 Lollipop	Android 5.0 Lollipop	Android 5.0.2 Lollipop	Android 5.0 Lollipop	Android 4.4 KitKat
Processor	2.5GHz Snapdragon 615	1.2GHz Snapdragon 410	1.2GHz Snapdragon 410	1.2GHz	1.2GHz Snapdragon 400
RAM	2GB	1GB	1GB	1GB	1GB
Storage	16GB	8GB	8GB	8GB	8GB
MicroSD support	Up to 128GB	Up to 32GB	Up to 64GB	Not stated	Up to 32GB
Graphics	Adreno 405	Adreno 306	Adreno 306	Not stated	Adreno 305
Screen size	5.5in	4.5in	5in	4.7in	5in
Screen resolution	1920x1080	540x960	720x1280	720x1280	720x1280
Pixel density	401ppi	245ppi	294ppi	312ppi	294ppi
Screen technology	IPS	IPS	IPS	IPS	IPS
Front camera	5Mp	0.3Mp	2Mp	2Mp	2Mp
Rear camera	13Mp	5Mp	8Mp	8Mp, LED flash	8Mp, LED flash
Video recording	1080p	720p	1080p	720p	720p
Cellular connectivity	4G	4G	4G	4G	3G
SIM type	Nano-SIM	Micro-SIM	Micro-SIM	Micro-SIM	Micro-SIM
Dual-SIM as standard	No	No	No	No	Yes
Wi-Fi	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0
GPS	GPS, A-GPS	GPS, A-GPS, Glonass	A-GPS	A-GPS, Glonass	A-GPS, Glonass
NFC	Yes	No	No	No	No
USB OTG	No	No	Yes	Yes	Yes
Extra features	FM radio	Double-twist launches camera, lockscreen alerts	FM radio	Wi-Fi calling	Stereo speakers
Geekbench 3.0 (single)	649	464	464	Not tested	340
Geekbench 3.0 (multi)	2469	1463	1401	1549	1144
SunSpider	1545ms	1301ms	1301ms	1880ms	1526ms
GFXBench: T-Rex	14fps	13fps	9.4fps	10fps	11fps
GFXBench: Manhattan	5.7fps	6fps	3.8fps	4fps	4fps
Battery	3000mAh, non-removable	2390mAh, non-removable	N/S, non-removable	2000mAh, non-removable	2390mAh, non-removable
Dimensions	154x77x9mm	66.8x5.2-12.3x129.9mm	141.65x71.89x9mm	138x67.9x9.5mm	71x142x11mm
Weight	159g	145g	155g	124g	155g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/Q7Q9NXR	TINYURL.COM/Q7Q9NXR	TINYURL.COM/Q5DSNHE	TINYURL.COM/PXTROH4	TINYURL.COM/OAE6AH5

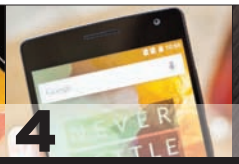
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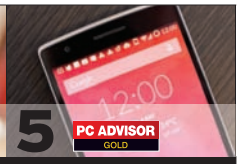
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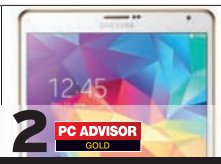


	Samsung Galaxy Note 4	LG G4	LG G3	OnePlus 2	OnePlus One
Price	**£599 inc VAT**	**£500 inc VAT**	**£479 inc VAT**	**£239 inc VAT**	**£229 inc VAT**
Website	Samsung.com/uk	Lg.com/uk	Lg.com/uk	Oneplus.net	Oneplus.net
Build rating	★★★★☆	★★★★☆	★★★★½	★★★★☆	★★★★☆
Features rating	★★★★½	★★★★☆	★★★★½	★★★★☆	★★★½☆
Performance rating	★★★★☆	★★★★☆	★★★★½	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★½	★★★★½	★★★★★	★★★★★
Overall rating	★★★★☆	★★★★☆	★★★★½	★★★★☆	★★★★½
OS (out of box)	Android 4.4 KitKat	Android 5.1 Lollipop	Android 4.4 KitKat	OxygenOS 2.0 (Android 5.1)	Cyanogen 11S (Android 4.4)
Processor	2.7GHz Snapdragon 805	1.82GHz Snapdragon 808	2.5GHz Snapdragon 801	1.8GHz Snapdragon 801	2.5GHz Snapdragon 801
RAM	3GB	3GB	2GB/3GB	3/4GB	3GB
Storage	32GB	32GB	16GB/32GB	16GB/64GB	16GB/64GB
MicroSD support	Up to 128GB	Up to 128GB	No	No	No
Graphics	Adreno 420	Adreno 418	Adreno 330	Adreno 430	Adreno 330
Screen size	5.7in	5.5in	5.5in	5.5in	5.5in
Screen resolution	1440x2560	1440x2560	1440x2560	1920x1080	1920x1080
Pixel density	515ppi	538ppi	534ppi	401ppi	401ppi
Screen technology	Super AMOLED	IPS	IPS	IPS	IPS
Front camera	3.7Mp	8Mp	2Mp	5Mp	5Mp
Rear camera	16Mp, LED flash	16Mp, LED flash	13Mp, LED flash	13Mp, Dual-LED flash	13Mp, LED flash
Video recording	4K	4K	4K	4K	4K
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Micro-SIM	Micro-SIM	Micro-SIM	Dual-SIM	Micro-SIM
Dual-SIM as standard	No	No	No	Yes	No
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11ac, dual-band	802.11b/g/n/ac, dual-band
Bluetooth	Bluetooth 4.1	Bluetooth 4.0	Bluetooth 4.0 (aptX)	Bluetooth 4.0	Bluetooth 4.0
GPS	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	GPS, Glonass	GPS, Glonass
NFC	Yes	Yes	Yes	No	Yes
USB OTG	Yes	Yes	Yes	Yes	Yes
Extra features	Fingerprint, UV, heart-rate sensors, S Pen stylus	24bit/192kHz audio, rear key, IR blaster	24bit/192kHz audio, rear key	None	None
Geekbench 3.0 (single)	Not tested	Not tested	Not tested	Not tested	969
Geekbench 3.0 (multi)	3272	3513	2465	4094	2570
SunSpider	1367ms	715ms	959ms	1471ms	877ms
GFXBench: T-Rex	27fps	25fps	20fps	46fps	29fps
GFXBench: Manhattan	11fps	9fps	Not tested	16fps	Not tested
Battery	3220mAh, removable	3000mAh, removable, Qi	3000mAh, removable, Qi	3300mAh, non-removable	3100mAh, non-removable
Dimensions	78.6x153.5x8.5mm	76x149x6.3-9.8mm	75x146x8.9mm	151.8x74.9x9.9mm	75.9x152.9x8.9mm
Weight	176g	155g	149g	175g	162g
Warranty	2 years	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PNHJCZ4	TINYURL.COM/QDGU48T	TINYURL.COM/OA76T73	TINYURL.COM/NSGEV3U	TINYURL.COM/PK3S5CP

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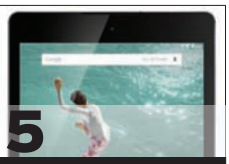
Best 7- & 8in tablets







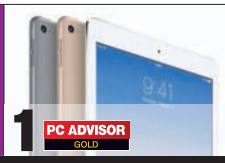


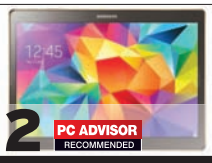


	Google Nexus 7	Samsung Galaxy Tab S 8.4	Sony Xperia Z3 Tablet Compact	Apple iPad mini 2	Google Nexus 9
Price	**£199 inc VAT**	**£319 inc VAT**	**£299 inc VAT**	**£239 inc VAT**	**£319 inc VAT**
Website	Play.google.com	Samsung.com/uk	Sony.co.uk	Apple.com/uk	Play.google.com
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★½	★★★½☆
Features rating	★★★★½	★★★★½	★★★★½	★★★★☆	★★★★☆
Performance rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Value rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★★☆
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★☆
OS (out of box)	Android 4.3 Jelly Bean	Android 4.4 KitKat	Android 4.4 KitKat	iOS 8.2	Android 5.0 Lollipop
Processor	1.5GHz Snapdragon S4 Pro	Exynos 5420, octa-core	2.5GHz Snapdragon 801	Apple A7, Apple M7	2.3GHz nVidia Tegra K1
RAM	2GB	3GB	3GB	1GB	2GB
Storage	16GB/32GB	16GB/32GB	16GB/32GB	16GB/32GB	16GB/32GB
MicroSD support	No	Up to 128GB	Up to 128GB	No	No
Graphics	Adreno 320	ARM Mali-T628 MP6	Adreno 330	Apple A7	192-core Kepler
Screen size	7in	8.4in	8in	7.9in	8.9in
Screen resolution	1920x1200	2560x1440	1920x1200	2048x1536	2048x1536
Pixel density	323ppi	359ppi	283ppi	326ppi	287ppi
Screen technology	IPS	Super AMOLED	IPS	IPS	IPS
Front camera	1.2Mp	2.1Mp	2.2Mp	1.2Mp	1.6Mp
Rear camera	5Mp	8Mp, LED flash	8.1Mp	5Mp	8Mp, LED flash
Video recording	1080p	1080p	1080p	1080p	1080p
Cellular connectivity	4G version available	4G version available	4G version available	4G version available	4G version available
Wi-Fi	802.11b/g/n, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n, dual-band	802.11a/b/g/n/ac, dual-band
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.1
GPS	GPS, Glonass	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC	Yes	No	Yes	No	Yes
USB OTG	Yes	Yes	Yes	No	Yes
Fingerprint scanner	No	Yes	No	No	No
Waterproof	No	No	Yes	No	No
Extra features	None	Stereo speakers	PS4 Remote Play, stereo speakers	None	BoomSound speakers
Geekbench 3.0 (single)	Not tested	Not tested	Not tested	Not tested	1904
Geekbench 3.0 (multi)	Not tested	2765	2708	Not tested	3352
SunSpider	1136ms	1089ms	1017ms	397ms	955ms
GFXBench: T-Rex	Not tested	14fps	28fps	Not tested	48fps
GFXBench: Manhattan	Not tested	3fps	11fps	Not tested	22fps
Battery	3950mAh, non-removable, Qi	4900mAh, non-removable	4500mAh, non-removable	6470mAh, non-removable	6700mAh, non-removable
Dimensions	200x114x8.65mm	126x213x6.6mm	213x124x6.4mm	134.7x7.5x200mm	153.7x228.3x8mm
Weight	299g	294g	270g	331g	425g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PUJDJBY	TINYURL.COM/OUEM64Z	TINYURL.COM/NJ6VHEO	TINYURL.COM/PCJPB5L	TINYURL.COM/NQ6K77Y

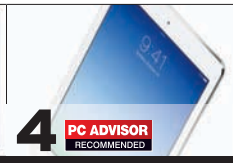
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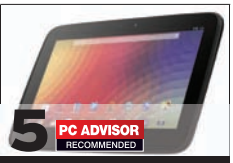
Best 9- & 10in tablets











	Apple iPad Air 2	Samsung Galaxy Tab S 10.5	Sony Xperia Z2 Tablet	Apple iPad Air	Google Nexus 10
Price	**£399 inc VAT**	**£399 inc VAT**	**£369 inc VAT**	**£319 inc VAT**	**£389 inc VAT**
Website	Apple.com/uk	Samsung.com/uk	Sony.co.uk	Apple.com/uk	Play.google.com
Build rating	★★★★★	★★★★☆	★★★★½	★★★★☆	★★★★½
Features rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Performance rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★½
Overall rating	★★★★½	★★★★½	★★★★½	★★★★☆	★★★★½
OS (out of box)	iOS 8.2	Android 4.4 KitKat	Android 4.4 KitKat	iOS 8.2	Android 4.2 Jelly Bean
Processor	Apple A8X, Apple M8	Exynos 5420, octa-core	2.3GHz Snapdragon 801	Apple A7, Apple M7	1.7GHz Exynos 5250
RAM	2GB	3GB	3GB	1GB	2GB
Storage	16GB/64GB/128GB	16GB/32GB	16GB	16GB/32GB	16GB/32GB
MicroSD support	No	Up to 128GB	Up to 64GB	No	No
Graphics	Apple A8X	ARM Mali-T628 MP6	Adreno 330	Apple A7	ARM Mali T604
Screen size	9.7in	10.5in	10.1in	9.7in	10.1in
Screen resolution	2048x1536	2560x1600	1920x1200	2048x1536	2560x1600
Pixel density	264ppi	288ppi	224ppi	264ppi	300ppi
Screen technology	IPS	Super AMOLED	IPS	IPS	IPS
Front camera	1.2Mp	2.1Mp	2.2Mp	1.2Mp	1.9Mp
Rear camera	8Mp	8Mp, LED flash	8.1Mp	5Mp	5Mp, LED flash
Video recording	1080p	1080p	1080p	1080p	1080p
Cellular connectivity	4G version available	4G version available	4G version available	4G version available	No
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n, dual-band	802.11b/g/n, dual-band
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0	Bluetooth 4.0
GPS	A-GPS, Glonass	GPS, Glonass	GPS, Glonass	A-GPS, Glonass	GPS, Glonass
NFC	Yes (for Apple Pay)	No	Yes	No	Yes
USB OTG	No	Yes	Yes	No	Yes
Fingerprint scanner	Yes	Yes	No	No	No
Waterproof	No	No	Yes	No	No
Extra features	None	Stereo speakers	PlayStation certified	None	None
Geekbench 3.0 (single)	1816	Not tested	967	1487	Not tested
Geekbench 3.0 (multi)	4523	2769	2719	2703	Not tested
SunSpider	Not tested	1079ms	1099ms	400ms	1329ms
GFXBench: T-Rex	48fps	14fps	27fps	23fps	Not tested
GFXBench: Manhattan	Not tested	3fps	Not tested	Not tested	Not tested
Battery	7340mAh, non-removable	7900mAh, non-removable	6000mAh, non-removable	8600mAh, non-removable	9000mAh, non-removable
Dimensions	240x169.5x6.1mm	247x177x6.6mm	266x172x6.4mm	240x169x7.5mm	264x178x8.9mm
Weight	437g	465g	439g	469g	603g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PLQXWSZ	TINYURL.COM/OESDFZQ	TINYURL.COM/M8BZZUN	TINYURL.COM/NVOOF6H	TINYURL.COM/PUAG9RN

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Best smartwatches











	LG G Watch R	Motorola Moto 360	Sony Smartwatch 3	LG Watch Urbane	Asus ZenWatch
Price	**£195 inc VAT**	**£199 inc VAT**	**£189 inc VAT**	**£259 inc VAT**	**£199 inc VAT**
Website	Lg.com/uk	Motorola.co.uk	Sony.co.uk	Lg.com/uk	Uk.asus.com
Overall rating	★★★★½	★★★★½	★★★½☆	★★★★☆	★★★½☆
Operating system	Android Wear	Android Wear	Android Wear	Android Wear	Android Wear
Compatibility	Android	Android	Android	Android	Android
Display	1.3in 320x320 P-OLED	1.56in 290x320 LCD	1.6in 320x320 LCD	1.3in 320x320 P-OLED	1.6in 320x320 AMOLED
Processor	1.2GHz Snapdrgon 400	TI OMAP 3	1.2GHz ARM V7	1.2GHz Snapdragon 400	1.2GHz Snapdragon 400
RAM	512MB	512MB	512MB	512MB	512MB
Storage	4GB	4GB	4GB	4GB	4GB
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery	410mAh	320mAh	420mAh	410mAh	1.4Wh
Dimensions	46.4x53.6x9.7mm	46x11.5mm	36x51x10mm	46x52x10.9mm	51x39.9x7.9-9.4mm
Weight	62g	49g (leather band model)	45g	67g	75g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/QATY8FT	TINYURL.COM/O9C69K6	TINYURL.COM/OQVZ3PN	TINYURL.COM/Q3VK7ES	TINYURL.COM/NN7GA7W

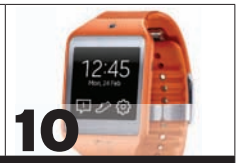
Best smartwatches











	Apple Watch	Pebble Steel	LG G Watch	Sony Smartwatch 2	Samsung Gear 2 Neo
Price	**£299 inc VAT**	**£179 inc VAT**	**£159 inc VAT**	**£125 inc VAT**	**£169 inc VAT**
Website	Apple.com/uk	Getpebble.com	Lg.com/uk	Sony.co.uk	Samsung.com/uk
Overall rating	★★★☆☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Operating system	watchOS	Proprietary	Android Wear	Proprietary	Tizen
Compatibility	iOS	iOS, Android	Android	Android	Samsung phones
Display	1.32in 340x312 Ion-X Glass	1.26in 144x168 E-Paper	1.65in 280x280 IPS	1.6in 220x176 LCD	1.6in 320x320 Super AMOLED
Processor	Apple S1	Not specified	1.2GHz Snapdragon 400	Not specified	Dual-core
RAM	512MB	512MB	512MB	Not specified	512MB
Storage	8GB	Not specified	4GB	Not specified	4GB
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery	Not specified	130mAh	400mAh	Not specified	300mAh
Dimensions	38.6x33.3x10.5mm	46x34x10.5mm	37.9x46.5x9.95mm	42x41x9mm	58.8x37.9x10mm
Weight	72g	156g	63g	123g	55g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OUTH9XK	TINYURL.COM/PPBXV7J	TINYURL.COM/Q84WL6L	TINYURL.COM/P4X7AZM	TINYURL.COM/Q68FS5U

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Best activity trackers	1 PC ADVISOR RECOMMENDED	2	3	4 PC ADVISOR RECOMMENDED	5 PC ADVISOR RECOMMENDED
	Fitbit Charge HR	Fitbit Surge	Fitbit One	Microsoft Band	Fitbit Charge
Price	£119 inc VAT	£199 inc VAT	£79 inc VAT	£169 inc VAT	£99 inc VAT
Website	Fitbit.com/uk	Fitbit.com/uk	Fitbit.com/uk	Microsoft.com/en-gb	Fitbit.com/uk
Overall rating	★★★★½	★★★★½	★★★★½	★★★½☆	★★★★☆
Compatibility	iOS, Android, Windows	iOS, Android, Windows	iOS, Android	iOS, Android, Windows	iOS, Android, Windows
Display	OLED	Touchscreen	OLED	TFT	OLED
Pedometer	Yes	Yes	Yes	Yes	Yes
Heart-rate monitor	Yes	Yes	No	Yes	No
Sleep tracking	Yes	Yes	Yes	Yes	Yes
Alarm	Yes	Yes	Yes	Yes	Yes
Third-party app synching	Yes	Yes	Yes	Yes	Yes
Call notifications	Yes	Yes	No	Yes	Yes
Waterproof	Yes	Yes	No	Yes	Yes
Battery life	5+ days	5 days	10-14 days	2 days	7-10 days
Dimensions, weight	21.1mm, 26g	34mm, 51g	35.5x28x9.65mm, 8g	11x33mm, 60g	21.1mm, 24g
FULL REVIEW	TINYURL.COM/PCKV4SU	TINYURL.COM/O83DR47	TINYURL.COM/PT2TC6F	TINYURL.COM/LHMQ2AC	TINYURL.COM/PFMQ9KH

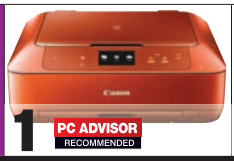
Best activity trackers	6	7 PC ADVISOR RECOMMENDED	8	9 PC ADVISOR RECOMMENDED	10
	Basis Peak	Xiaomi Mi Band	Jawbone Up 2	Jawbone Up Move	Jawbone Up24
Price	£169 inc VAT	£29 inc VAT	£89 inc VAT	£39 inc VAT	£99 inc VAT
Website	En-gb.mybasis.com	Mobilefun.co.uk	Jawbone.com	Jawbone.com	Jawbone.com
Overall rating	★★★½☆	★★★★½	★★★★☆	★★★★☆	★★★½☆
Compatibility	iOS, Android	iOS, Android	iOS, Android	iOS, Android	iOS, Android
Display	E-Ink	No	No	No	No
Pedometer	Yes	Yes	Yes	Yes	Yes
Heart-rate monitor	Yes	No	No	No	No
Sleep tracking	Yes	Yes	Yes	Yes	Yes
Alarm	No	Yes	Yes	No	Yes
Third-party app synching	No	No	Yes	Yes	Yes
Call notifications	Yes	Yes	No	No	No
Waterproof	Yes	Yes	Splashproof	Splashproof	Splashproof
Battery life	4 days	30 days	7 days	Six months, non-rechargable	7 days
Dimensions, weight	33x43x10mm, 51g	157-205mm, 13g	220x11.5x3-8.5mm, 25g	27.6x27.6x9.8mm, 6.8g	S: 19g, M: 22g, L: 23g
FULL REVIEW	TINYURL.COM/LHMQ2AC	TINYURL.COM/QZ3YVCR	TINYURL.COM/PHT98ZK	TINYURL.COM/PFXQFNE	TINYURL.COM/ND8YMB8

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Best budget printers

	1	2	3	4	5
					 PC ADVISOR GOLD
	HP OfficeJet 3830	**Samsung Xpress M2022W**	**Brother HL-1110**	**Canon Pixma MX535**	**Canon i-Sensys LBP6230dw**
Price	**£60 inc VAT**	**£179 inc VAT**	**£59 inc VAT**	**£70 inc VAT**	**£91 inc VAT**
Website	Hp.com/uk	Samsung.com/uk	Brother.co.uk	Canon.co.uk	Canon.co.uk
Overall rating	★★★★☆	★★★★½	★★★★☆	★★★★☆	★★★★½
Technology	Colour inkjet	Mono laser	Mono laser	Colour inkjet	Mono laser
Max print resolution	1200x1200dpi	1200x1200dpi	600x600dpi	4800x1200dpi	1200x1200dpi
Actual print speed	B=11ppm C=4ppm	B=20ppm	B=16.4ppm	B=9.7ppm C=3.8ppm	B=22.2ppm
Scan/fax facilities	None	1200x1200 scans	None	1200x2400 scans/fax	None
Supported interfaces	USB 2.0, 802.11b/g/n, AirPrint	USB 2.0, 802.11b/g/n	USB 2.0	USB 2.0, 802.11b/g/n, AirPrint	USB 2.0, 802.11b/g/n
Cost per page	B=6p C=7p	B=2p	B=2.7p	B=2.7p C=4.8p	B=2p
Media card/auto duplex	×✓	××	××	×✓	×✓
Input capacity	60 sheets	150 sheets	150 sheets	100 sheets + 30-sheet ADF	250 sheets
Dimensions	222x454x362mm	332x215x178mm	340x238x189mm	458x385x200mm	379x293x243mm
Weight	5.8kg	4kg	4.5kg	8.5kg	7kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PJ4K9D7	TINYURL.COM/PQ9JUDN	TINYURL.COM/OQE9LGJ	TINYURL.COM/N9LXVN7	TINYURL.COM/KZW8VU3

Best printers

	1	2	3	4	5
	 PC ADVISOR RECOMMENDED			 PC ADVISOR GOLD	
	Canon Pixma MG7550	**Samsung Xpress M2835DW**	**Canon i-Sensys MF6180dw**	**Epson WorkForce Pro**	**Brother HL-L9200CDWT**
Price	**£130 inc VAT**	**£143 inc VAT**	**£320 inc VAT**	**£200 inc VAT**	**£548 inc VAT**
Website	Canon.co.uk	Samsung.com/uk	Canon.co.uk	Epson.co.uk	Brother.co.uk
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Technology	Colour inkjet	Mono laser	Mono laser	Colour inkjet	Colour laser
Max print resolution	9600x2400dpi	4800x600dpi	1200x600dpi	4800x1200dpi	2400x600dpi
Actual print speed	B=14.3ppm	B=22.7ppm	B=24ppm	B=18.9ppm	B=30ppm C=30ppm
Scan/fax facilities	2400x4800dpi scanner	None	600dpi scanner, 33.6Kb/s fax	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, ethernet, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n
Cost per page	B=2.4p C=8.1p	B=1.5p	B=1.5p	B=1.1p	B=1p C=5.9p
Media card/auto duplex	×✓	×✓	×✓	×✓	×✓
Input capacity	125 sheets	250 sheets	250 + 50 sheet + 50 ADF	250 + 80 sheet	750 sheets + 50 sheet
Dimensions	435x370x148mm	368x335x202mm	390x473x431mm	3461x442x284mm	410x495x445mm
Weight	7.9kg	7.4kg	19.1kg	11.4kg	28.3kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PZ3SVH7	TINYURL.COM/QECOF7V	TINYURL.COM/LE9WA5N	TINYURL.COM/OC7FUJ3	TINYURL.COM/PT52MH6

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Best wireless routers











	Apple AirPort Extreme	Netgear Nighthawk R7000	D-Link DIR 880L	TP-Link Archer C7	Asus RT-AC68U AC1900
Price	**£169 inc VAT**	**£150 inc VAT**	**£108 inc VAT**	**£90 inc VAT**	**£160 inc VAT**
Website	Apple.com/uk	Netgear.co.uk	Dlink.com	Tp-link.com	Uk.asus.com
Overall rating	★★★★☆	★★★★½	★★★★☆	★★★★☆	★★★★☆
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	×	×	×	×	×
Manufacturer's rating	1300/450Mb/s	1300/600Mb/s	1300/600Mb/s	1300/450Mb/s	1300/600Mb/s
WPS	×	✓	✓	✓	✓
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/Q2NRQ8Q	TINYURL.COM/OZ5G7KG	TINYURL.COM/KKJMPCE	TINYURL.COM/K4ZATKV

Best powerline adaptors









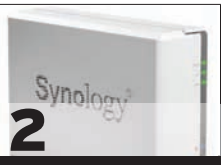


	Solwise SmartLink 1200AV2	TrendNet Powerline 500 AV2	TP-Link AV1200	Devolo dLan 1200+	Devolo dLAN 500AV
Price	**£43 inc VAT**	**£41 inc VAT**	**£88 inc VAT**	**£119 inc VAT**	**£129 inc VAT**
Website	Solwise.com	Trendnet.com	Uk.tp-link.com	Devolo.com/uk	Devolo.com/uk
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★½	★★★★☆
No of adaptors in kit	1 (2 required)	2	2	2	2
Max throughput	1200Mb/s	600Mb/s	1200Mb/s	1200Mb/s	500Mb/s
Near test result	410Mb/s	146Mb/s	500Mb/s	357Mb/s	96Mb/s
Far test result	107Mb/s	71Mb/s	200Mb/s	126Mb/s	47Mb/s
Ethernet ports	2x gigabit	1x gigabit	1x gigabit	1x gigabit	3x gigabit
Passthrough socket	Yes	No	Yes	Yes	Yes
Wireless hotspot	No	No	No	No	Yes
Encryption	128-bit	128-bit	128-bit	128-bit	128-bit
Dimensions	62x122x41mm	55x87x58mm	230x190x100mm	130x66x42mm	152x76x40mm
Weight	Not specified	90g	898g	Not specified	Not specified
Warranty	2 years	3 years	1 year	3 years	3 years
FULL REVIEW	TINYURL.COM/NZ4EJW8	TINYURL.COM/QYEPJQ7	TINYURL.COM/NVONCWT	TINYURL.COM/Q4EOO4M	TINYURL.COM/OVNPPQ7

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Best NAS drives







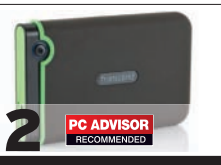




	Qnap TS-421	Synology DS115j	Qnap HS-210	WD My Cloud EX2100	Synology DS414j
Price	**£320 inc VAT (diskless)**	**£83 inc VAT (diskless)**	**£190 inc VAT (diskless)**	**£205 inc VAT (diskless)**	**£270 inc VAT (diskless)**
Website	Qnap.com	Synology.com	Qnap.com	Wd.com	Synology.com
Overall rating	★★★★☆	★★★★☆	★★★★½	★★★★☆	★★★★☆
Drive bays	4	1	2	2	4
Processor	2GHz Marvell single-core	800MHz Marvell Armada 370	1.6GHz Marvell single-core	1.3 GHz Marvel Armada 385	1.2GHz Mindspeed Concerto
Memory	1GB DDR3	256MB DDR3	512MB DDR3	1GB DDR3	512MB DDR3
Remote access	✓	✓	✓	✓	✓
eSATA	2x	×	×	×	1x
USB port	2x USB 3.0, 2x USB 2.0	2x USB 2.0	2x USB 3.0, 2x USB 2.0	2x USB 3.0	1x USB 3.0, 1x USB 2.0
Raid options	0/1/5/6/10/JBOD	None	0/1/JBOD	00/1/JBOD	0/1/5/6/10/JBOD
Software	Backup Station	DSM 5.1	HD Station	My Cloud	DSM 5.0
Dimensions	177x180x235mm	71x161x224mm	302x220x41mm	216x109x148mm	184x168x230mm
Weight	3kg	700g	1.5kg	3.5kg	2.2kg
Warranty	2 years	1 year	2 years	3 years	3 years
FULL REVIEW	TINYURL.COM/MCYWUB8	TINYURL.COM/MNEYVNK	TINYURL.COM/OEXRYNY	TINYURL.COM/M643BSG	TINYURL.COM/M643BSG

Best external hard drives











	Seagate Backup Plus Slim	Transcend StoreJet 25M3	WD My Passport Ultra Metal	Toshiba Canvio Basics	Seagate Seven mm
Price	**£74 inc VAT**	**£70 inc VAT**	**£90 inc VAT**	**£76 inc VAT**	**£99 inc VAT**
Website	Seagate.com/gb/en	Uk.transcend-info.com	Wdc.com/en	Toshiba.co.uk	Seagate.com/gb/en
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★☆	★★★★☆
Capacity tested	2TB	2TB	2TB	2TB	500GB
Capacity range	500GB, 1TB, 2TB	500GB, 1TB, 2TB	1TB, 2TB	500GB, 1TB, 2TB	500GB
Disk size	2.5in	2.5in	2.5in	2.5in	2.5in
Spin speed	N/A	5400rpm	N/A	5400rpm	5400rpm
Transfer speed	142MB/s	135MB/s	114MB/s	117MB/s	49MB/s
Encryption	N/A	256-bit AES	256-bit AES	256-bit AES	N/A
Other interfaces	USB 3.0	USB 3.0	USB 3.0	USB 3.0	USB 3.0
Software	Seagate Dashboard	Transcend Elite	WD Drive Utilities	None	Seagate Dashboard
Dimensions	113.5x76x12.1mm	130x82x19mm	110x80x19mm	111x79x21mm	123x82x7mm
Weight	159g	234g	241g	207g	178g
Warranty	2 years	3 years	3 years	2 years	2 years
FULL REVIEW	TINYURL.COM/OABWL4B	TINYURL.COM/M72D3EP	TINYURL.COM/L2B7V3B	TINYURL.COM/JWHHACB	TINYURL.COM/O6KZFDM

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Best SSDs











	OCZ Arc 100	Samsung 850 Pro	SanDisk Extreme Pro	Crucial MX200	Kingston HyperX Savage
Price	**£69 inc VAT**	**£365 inc VAT**	**£172 inc VAT**	**£301 inc VAT**	**£185 inc VAT**
Website	Ocz.com	Samsung.com/uk	Sandisk.co.uk	Uk.crucial.com	Kingston.com/en
Overall rating	★★★★½	★★★★½	★★★★½	★★★½☆	★★★½☆
Capacity tested	240GB	1TB	480GB	1TB	480GB
Price per GB	28.8p	36.5p	35.8p	30.1p	38.5p
Memory cache	512MB DDR3	1GB LPDDR2	1GB	1GB DDR3	256MB
Controller	Indilinx Barefoot 3 M10	Samsung MCX	Marvell 88SS9187	Marvell 88SS9189	Phison PS3110 S10
Encryption	AES 256-bit	AES 256-bit	AES 256-bit	AES 256-bit	Unknown
Flash	Toshiba 19nm MLC	Samsung 40nm V-AND MLC	SanDisk 19nm MLC	Micron 16nm MLC	Toshiba 19nm A19 MLC
Firmware updated via	OCZ SSD Guru	Samsung SSD Magician	SandDisk SSD Dashboard	Crucial Storage Executive	None
ATTO peak sequential	489-/447MB/s	564-/534MB/s	556-/525MB/s	533-/514MB/s	564-/543MB/s
CDM peak IOPS	79.2-/90.3MB/s	103.2-/93.7MB/s	102.7/91.4MB/s	26.1/90.1MB/s	91.6-/94.8MB/s
CDM 4kB rnd	27-/127MB/s	36-/89MB/s	32-/88MB/s	29-/131MB/s	26-59MB/s
Warranty	3 years	10 years	10 years	3 years	3 years
FULL REVIEW	TINYURL.COM/QZQLYY4	TINYURL.COM/OVHDALD	TINYURL.COM/NMSJU25	TINYURL.COM/P3YX2KE	TINYURL.COM/ON54VUC

Best projectors











	ViewSonic PLED-W800	BenQ W1300	Optoma W316	InFocus IN126STa	NEC M352WS
Price	**£512 inc VAT**	**£730 inc VAT**	**£458 inc VAT**	**£525 inc VAT**	**£778 inc VAT**
Website	Viewsoniceurope.com/uk	Benq.co.uk	Optoma.co.uk	Infocus.com	Nec-display-solutions.com
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Projection technology	DLP	DLP	DLP	DLP	DLP
Resolution (pixels)	1280x800	1920x1080	1280x800	1280x800	1280x800
Brightness, Contrast	800, 120,000:1	2000, 10,000:1	3400, 15,000:1	3300, 15,000:1	3500, 10,000:1
Image size	100in	300in	300in	300in	150in
Supported aspect ratios	16:10 native	16:9 native	16:10, 16:9, 4:3	16:10, 16:9, 4:3	16:10
Noise levels (dB)	34 (32 eco)	33 (30 eco)	29db	32db (30 eco)	33 (39 bright mode)
Connections	VGA, HDMI, USB	VGA, 2x HDMI, USB, 3D	VGA, HDMI, Mini-USB, 3D	2x VGA, HDMI, USB, ethernet	2x VGA, 2x HDMI, USB
Lamp/lamp life	90W/30000 hrs	240W/6000 hrs	190W/10000 hrs	278W/3500 hrs	278W/8000 hrs
Dimensions	175x52x138mm	330x257x128mm	315x223x102mm	292x220x108mm	368x268x97mm
Weight	0.83kg	3.4kg	2.5kg	3.7kg	3.6kg
Warranty	3 years	3 years	2 years	1 year	3 years
FULL REVIEW	TINYURL.COM/K83X8LA	TINYURL.COM/K4FA89Q	TINYURL.COM/OCWTHGW	TINYURL.COM/NHH3QPB	TINYURL.COM/Q6J2N6W

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Best budget graphics cards



	Sapphire Radeon R7 250X	MSI R7 260X OC	EVGA GeForce GTX 750	Asus GeForce GT 740 OC	MSI GeForce GT 730
Price	**£65 inc VAT**	**£91 inc VAT**	**£90 inc VAT**	**£65 inc VAT**	**£48 inc VAT**
Website	Sapphiretech.com	Uk.msi.com	Eu.evga.com	Asus.com/uk	Uk.msi.com
Overall rating	★★★★½	★★★½☆	★★★½☆	★★★½☆	★★★½☆
Graphics processor	AMD Radeon R7 250X	AMD Radeon R7 260X	nVidia GeForce GTX 750	nVidia GeForce GT 740	nVidia GeForce GT730
Installed RAM	1GB GDDR5	2GB GDDR5	1GB GDDR5	1GB GDDR5	2GB GDDR3
Memory interface	128-bit	128-bit	128-bit	128-bit	128-bit
Core clock	950MHz	1175MHz	1294MHz	1033MHz	780MHz
Memory clock/Effective	1125/4500MHz	1625MHz/6.5GHz	1253/5012MHz	1.25/5GHz	900/1800MHzHz
Stream processors	640	896	512	384	320
Texture units	40	56	32	32	20
Power connectors	1x 6-pin	1x 6-pin	None	1x 6-pin	1x 6-pin
DirectX	12	11.1	Unknown	Unknown	Unknown
Digital interface	1x DVI, HDMI, DisplayPort	2x DVI, HDMI, Mini-DP	1x DVI, HDMI, DisplayPort	1x DVI, HDMI, VGA	1x DVI, HDMI, VGA
Warranty	2 years	3 years	3 years	3 years	2 years
FULL REVIEW	TINYURL.COM/OLJ83SQ	TINYURL.COM/OZ6WUYT	TINYURL.COM/PB3F6EN	TINYURL.COM/PAH5VMJ	TINYURL.COM/P8J4C2R

Best graphics cards



	Gigabyte GeForce GTX 770 2GB	HIS Radeon R9 280X	Zotac Geforce GTX 960	XFX Radeon R9 290X	MSI R7 260X OC
Price	**£200 inc VAT**	**£246 inc VAT**	**£285 inc VAT**	**£280 inc VAT**	**£91 inc VAT**
Website	Uk.gigabyte.com	Hisdigital.com	Zotac.com	Xfxforce.com	Uk.msi.com
Overall rating	★★★★½	★★★★½	★★★★☆	★★★★½	★★★½☆
Graphics processor	nVidia GeForce GTX 770	AMD Radeon R9 280X	nVidia GeForce GTX 960	AMD Radeon R9 290X	AMD Radeon R7 260X
Installed RAM	2GB GDDR5	3GB GDDR5	2GB GDDR5	4GB GDDR5	2GB GDDR5
Memory interface	256-bit	384-bit	128-bit	512-bit	128-bit
Core clock/boost	950/1020MHz	850MHz/1GHz	1266/1329MHz	1/1GHz	1175MHz
Memory clock/Effective	1.5GHz/6GHz	1.5GHz/6GHz	1752MHz/7.1GHz	1.25GHz/5GHz	1625MHz/6.5GHz
Stream processors	1536	2048	1024	2816	896
Texture units	128	128	64	176	56
Power connectors	1x 6-pin, 1x 8-pin	2x 8-pin	1x 6-pin	8-pin, 6-pin	1x 6-pin
DirectX	11	11	12	11	11.1
Digital interface	2x DVI, HDMI, DisplayPort	DVI, HDMI, 2x Mini-DisplayPort	DVI, HDMI, 3x DisplayPort	2x DVI, HDMI, DisplayPort	2x DVI, HDMI, Mini-DP
Warranty	3 years	2 years	5 years	3 years	3 years
FULL REVIEW	TINYURL.COM/OAG6277	TINYURL.COM/PR5O3GT	TINYURL.COM/MWBC036	TINYURL.COM/NPET8ER	TINYURL.COM/OZ6WUYT

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Best budget flat-panel displays







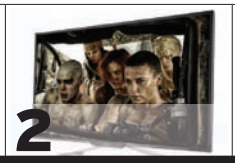


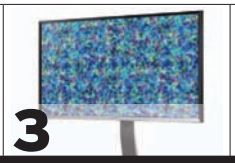


	AOC i2369Vm	Philips 234E5QHAW	NEC MultiSync E243WMi	BenQ EW2740L	BenQ GL2450
Price	**£130 inc VAT**	**£130 inc VAT**	**£194 inc VAT**	**£175 inc VAT**	**£108 inc VAT**
Website	Aoc-europe.com/en	Philips.co.uk	Nec-display-solutions.com	Benq.co.uk	Benq.co.uk
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Screen size	23in	23in	23.8in	27in	24in
Panel type	IPS matt	IPS matt	IPS matt	VA semi-matt	TN matt
Native resolution	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Pixel density	96ppi	96ppi	93ppi	82ppi	92ppi
Brightness	220cd/m²	187cd/m²	250cd/m²	300cd/m²	261cd/m²
Static contrast ratio	630:1	210:1	650:1	280:1	610:1
Response time	6ms	5ms	6ms	4ms	5ms
Ports	HDMI, HDMI/MHL, DP, VGA	2x HDMI (QHAB) or 1x HDMI (QDAB), VGA	DP, DVI-D, VGA	2x HDMI, VGA	DVI-D, VGA
Dimensions	531x204x398mm	532x213x414mm	558x214x380-490mm	623x191x451mm	579x179x436mm
Weight	3.75kg	3.5kg	6.3kg	4.2kg	4.1kg
Warranty	3 years	2 years	3 years	2 years	2 years
FULL REVIEW	TINYURL.COM/OOEFYPR	TINYURL.COM/KLYLW4V	TINYURL.COM/KNCGVOU	TINYURL.COM/OO6EC5L	TINYURL.COM/OOUPFUE

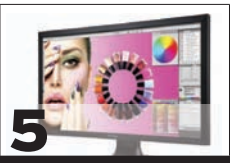
Best flat-panel displays











	BenQ BL3201PT	Philips BDM4065UC	Samsung UD970	Acer S277HK	ViewSonic VP2780-4K
Price	**£699 inc VAT**	**£600 inc VAT**	**£1,400 inc VAT**	**£499 inc VAT**	**£699 inc VAT**
Website	Benq.co.uk	Philips.co.uk	Samsung.com/uk	Acer.co.uk	Viewsoniceurope.com/uk
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Screen size	32in	40in	31.5in	27in	27in
Panel type	IPS	VA	PLS	IPS	IPS
Native resolution	3840x2160	3840x2160	3840x2160	3840x2160	3840x2160
Pixel density	157ppi	110ppi	140ppi	163ppi	163ppi
Brightness	350cd/m²	120cd/m²	350cd/m²	300cd/m²	350cd/m²
Static contrast ratio	1000:1	5000:1	1000:1	530:1	1000:1
Response time	4ms	8.5ms	8ms	4ms	5ms
Ports	DVI-DL, HDMI, DP, mDP	HDMI, DP, mDP, VGA	HDMI, DVI, 4x USB 3.0	DVI, HDMI, DP, mDP, 4x USB 3.0	HDMI, DP, 4x USB 3.0
Dimensions	490.2x740.3x213.4mm	904x512x88mm	728x427x62mm	614x406x113mm	642.7x469.7x347.8mm
Weight	12.5kg	8.5kg	10.3kg	4.9kg	11.7kg
Warranty	3 years	2 years	Not stated	Not stated	3 years
FULL REVIEW	TINYURL.COM/NPA62QL	TINYURL.COM/Q2W3VZY	TINYURL.COM/OBWBBYN	TINYURL.COM/NTV4EVD	TINYURL.COM/069CMTB

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Best e-book readers

	1	2	3 PC ADVISOR RECOMMENDED	4	5
					
	Amazon Kindle Voyage	**Amazon Kindle (7th gen)**	**Amazon Kindle Paperwhite**	**Nook GlowLight**	**Kobo Aura H2O**
Price	**£169 inc VAT**	**£59 inc VAT**	**£109 inc VAT**	**£89 inc VAT**	**£139 inc VAT**
Website	Amazon.co.uk	Amazon.co.uk	Amazon.co.uk	Nook.com/gb	Kobo.com
Overall rating	★★★★☆	★★★½☆	★★★★☆	★★★★☆	★★★☆☆
Screen size	6in touchscreen	6in touchscreen	6in touchscreen	6in touchscreen	6.8in touchscreen
Screen technology	E Ink	E Ink	E Ink	E Ink	E Ink
Screen resolution	1440x1080	600x800	768x1024	758x1024	1430x1080
Built-in light	Yes	No	Yes	Yes	Yes
Storage	4GB	4GB	2GB	4GB	4GB, microSD up to 32GB
Book store	Amazon Kindle	Amazon Kindle	Amazon Kindle	Nook	Kobo
Cellular connectivity	Optional extra	No	Optional extra	No	No
Battery life	Six weeks	Four weeks	Eight weeks	Eight weeks	Two months
Dimensions	162x115x7.6mm	169x119x10.2mm	117x169x9.1mm	127x166x10.7mm	179x129x9.7mm
Weight	180g	191g	206g	175g	233g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NXAAU3Q	TINYURL.COM/NSFORJE	TINYURL.COM/PREZPRK	TINYURL.COM/OZ5WMPO	TINYURL.COM/MJVR4M9

Best media streamers

	1 PC ADVISOR RECOMMENDED	2 PC ADVISOR RECOMMENDED	3 PC ADVISOR RECOMMENDED	4	5
					
	Roku Streaming Stick	**Roku 3**	**Google Chromecast**	**Amazon Fire TV Stick**	**Apple TV**
Price	**£49 inc VAT**	**£99 inc VAT**	**£30 inc VAT**	**£35 inc VAT**	**£59 inc VAT**
Website	Roku.com	Roku.com	Play.google.com	Apple.com/uk	Apple.com/uk
Overall rating	★★★★½	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Type	Dongle	Set-top box	Dongle	Dongle	Set-top box
Ports	HDMI, Micro-USB	HDMI, USB, ethernet	HDMI, Micro-USB	HDMI, Micro-USB	HDMI, ethernet, Micro-USB
Processor	600MHz single-core	900MHzsingle-core	Single-core	Dual-core	Apple A5 single-core
RAM	512MB	512MB	512MB	1GB	512MB
Graphics	Not specified	Not specified	Not specified	Not specified	Not specified
Storage	None	512MB plus microSD slot	None	8GB (not user-accessible)	8GB (not user-accessible)
Voice search	No	Yes	No	No	No
Remote control	Yes	Yes	No	Yes	Yes
Dimensions	78.7x27.9x12.7mm	89x89x25mm	72x35x12mm	84.9x25x11.5mm	98x98x23mm
Weight	18g	170g	34g	25g	270g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OAP9QF9	TINYURL.COM/PT7MGUL	TINYURL.COM/QBGTCS2	TINYURL.COM/NAQRNOC	TINYURL.COM/OLCJRC3

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Best games consoles



	Sony PlayStation 4	Microsoft Xbox One	Nintendo Wii U Premium	Sony PlayStation 3 Super Slim	Microsoft Xbox 360
Price	**£349 inc VAT**	**£349 inc VAT**	**£249 inc VAT**	**£249 inc VAT**	**£199 inc VAT**
Website	Playstation.com	Xbox.com	Nintendo.co.uk	Playstation .com	Xbox.com
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★½	★★★★★
Processor	Octa-core AMD x86	1.75GHz octa-core AMD x86	IBM Power multicore CPU	IBM CPU	IBM Xenon CPU
Graphics	1.84TFlops AMD Radeon GPU	1.31TFlops AMD Radeon GPU	AMD Radeon GPU	256MB nVidia RSX	512MB ATI Xenos
RAM	8GB GDDR5	8GB DDR3	Not specified	Not specified	512MB GDDR3
Storage	500GB	500GB	32GB, plus SD card support	500GB	500GB
Optical drive	Blu-ray, DVD, game discs	Blu-ray, DVD, game discs	Wii U, Wii discs only	Blu-ray, DVD, game discs	DVD, game discs
Ports	2x USB 3.0, AUX, HDMI	USB 3.0, HDMI	4x USB 2.0, HDMI	2x USB 2.0, HDMI	5x USB, HDMI
Connectivity	Ethernet, 802.11b/g/n, Bluetooth	Ethernet, 802.11b/g/n	802.11b/g/n	Ethernet, 802.11b/g/n, Bluetooth	Ethernet, 802.11b/g/n
Other	1 controller	1 controller, 4K, Kinect option	1 controller	1 controller	1 controller
Dimensions	275x53x305mm	333x274x79mm	46x269x171mm	290x230x60mm	269x75x264mm
Weight	2.8kg	3.2kg	1.6kg	2.1kg	2.9kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NBFLQK2	TINYURL.COM/M6J4KHS	TINYURL.COM/6J49LHL	TINYURL.COM/QDJP56O	TINYURL.COM/PFP9CCK

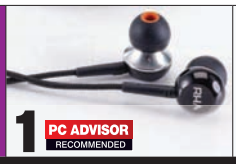
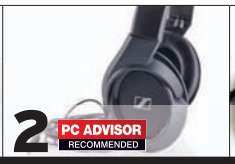
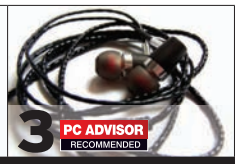
Best budget portable speakers



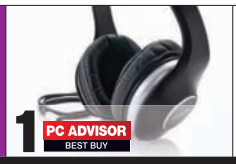
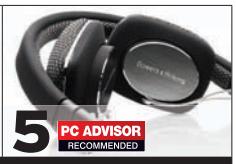
	Denon Envaya Mini	UE Roll	Lumsing B9	i-box Twist	Lava BrightSounds
Price	**£99 inc VAT**	**£99 inc VAT**	**£23 inc VAT**	**£41 inc VAT**	**£39 inc VAT**
Website	Denon.com	Ultimateears.com	Lumsing.com	Iboxstyle.com	Lavaaccessories.co.uk
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Speaker(s)	Not specified	Not specified	Not specified	2x 3W	1x 5W
Bluetooth	Bluetooth 4.0	Bluetooth	Bluetooth 3.0 + EDR	Bluetooth 2.1	Not specified
Handsfree calls	Yes	No	Yes	Yes	Yes
NFC	Yes	Yes	Yes	No	No
Frequency response	Not specified	108Hz to 20kHz	20Hz to 20kHz	Not specified	Not specified
Impedence	Not specified	Not specified	4 ohms	Not specified	Not specified
Extra features	IPX4 splashproof	IPX7 splashproof	MicroSD slot, lanyard	None	IPX4 splashproof, LED lamp
Claimed battery life	10 hours	9 hours	25 hours	5 hours	8 hours
Dimensions	209x54x51mmmm	134x39x40mm	177x50x70mm	246x59x56mm	190x95x103mm
Weight	558g	330g	300g	380g	821g
Warranty	1 year	2 years	1 year	5 years	1 year
FULL REVIEW	TINYURL.COM/QDRNP3P	TINYURL.COM/O7T7ZUU	TINYURL.COM/P623MK8	TINYURL.COM/LET9RDF	TINYURL.COM/KOM2ZT3

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Best budget headphones

	1 PC ADVISOR RECOMMENDED	2 PC ADVISOR RECOMMENDED	3 PC ADVISOR RECOMMENDED	4 PC ADVISOR RECOMMENDED	5
					
	RHA MA450i	**Sennheiser HD 429**	**Rock Jaw Alpha Genus**	**AKG K77**	**Creative Sound Blaster Jam**
Price	**£39 inc VAT**	**£45 inc VAT**	**£41 inc VAT**	**£25 inc VAT**	**£39 inc VAT**
Website	Rha-audio.com/uk	En-uk.sennheiser.com	Rockjawaudio.com	Uk.akg.com	Uk.creative.com
Overall rating	★★★★½	★★★★½	★★★★½	★★★★☆	★★★★☆
Type	In-ear	Circumaural over-ear	In-ear	Circumaural over-ear	Circumaural over-ear
Frequency response	16Hz to 22kHz	18Hz to 22kHz	20Hz to 20kHz	18Hz to 20.5kHz	20Hz to 20kHz
Nominal impedence	16 ohms	32 ohms	16 ohms	32 ohms	Not specified
Sensitivity	103dB	110dB	108dB	112dB	Not specified
In-line remote	Yes (3 button)	No	No	No	No
Mic	Yes	No	No	No	Yes
Extra grommets	Yes	N/A	Yes, and filters	N/A	N/A
Carry case	Yes	No	Yes	No	No
Cable length	1.5m (braided)	3m	1.2m (twisted)	2.5m	N/A
Weight	14g	218g	11g	190g	109g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/P7W7RVL	TINYURL.COM/ND8TD8O	TINYURL.COM/NNYUFBF	TINYURL.COM/PA8FOX4	TINYURL.COM/NLD8ZS2

Best headphones

	1 PC ADVISOR BEST BUY	2	3 PC ADVISOR RECOMMENDED	4	5 PC ADVISOR RECOMMENDED
					
	Denon AH-D600	**Audio-Technica ATH-WS99**	**Bose QC20**	**Denon AH-W150**	**Bowers & Wilkins P3**
Price	**£229 inc VAT**	**£79 inc VAT**	**£259 inc VAT**	**£59 inc VAT**	**£169 inc VAT**
Website	Denon.co.uk	Eu.audio-technica.com/en	Bose.co.uk	Denon.co.uk	Bowers-wilkins.co.uk
Overall rating	★★★★½	★★★★☆	★★★★½	★★★★½	★★★★½
Type	Circumaural over-ear	Over-ear	In-ear	Over-ear wireless buds	On-ear, foldable
Frequency response	8Hz to 25kHz	8Hz to 25kHz	20-21kHz	5Hz to 25kHz	10Hz to 20kHz
Nominal impedence	37 ohms	37 ohms	32 ohms	16 ohms	34 ohms
Sensitivity	120dB	120dB	105dB	102dB	111dB
In-line remote	Yes	Yes	Yes	Yes	Yes
Mic	No	Yes	Yes	Yes	Yes
Extra grommets	N/A	N/A	Yes	Yes	N/A
Carry case	Yes	No	Yes	Yes	Yes
Cable length	3m	0.8m	1.3m	N/A	1.2m
Weight	250g	250g	44g	23g	132g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NBCFJW6	TINYURL.COM/QDRCCAT	TINYURL.COM/OEAGFOF	TINYURL.COM/O2CJV3R	TINYURL.COM/PZO7PON

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Best power banks











	Zendure A2 (2nd gen)	Xiaomi 10,000mAh	iHarbot Power Bank MS024	Anker Astro Mini	Intocircuit Power Castle
Price	**£25 inc VAT**	**£11 inc VAT**	**£7.50 inc VAT**	**£13 inc VAT**	**£22 inc VAT**
Website	Zendure.com	Mi.com/en	Amazon.co.uk	Ianker.com	Hisgadget.com
Overall rating	★★★★½	★★★★½	★★★★½	★★★★½	★★★★½
Capacity	6700mAh	10,000mAh	5000mAh	3200mAh	11200mAh
Input	1x 7.5W Micro-USB	1x 10W Micro-USB	1x 10.5W Micro-USB	1x 4W Micro-USB	1x 5W Micro-USB
Outputs	1x 10.5W USB	1x 10.5W USB	1x 10W USB	1x 5W USB	1x 10.5W USB, 1x 5W USB
Auto-on/-off	Yes	Yes	Auto-on	No	Auto-on
Passthrough charging	Yes	Yes	Yes	No	Yes
Status indicator	4 LEDs	4 LEDs	4 LEDs	No	LCD screen
LED flashlight	No	No	No	No	Yes
Carry case	Yes	No	No	Yes	Yes
Dimensions	93x48x23mm	91x60.4x22mm	118x11.6x63mm	92x23x23mm	110x71x22mm
Weight	137g	207g	150g	80g	280g
Warranty	1 year	1 year	18 months	18 months	1 year
FULL REVIEW	TINYURL.COM/NGCNO5F	TINYURL.COM/NFQZOCB	TINYURL.COM/PVO2LEC	TINYURL.COM/PZHUHJO	TINYURL.COM/P5M9NKE

Best desktop chargers











	iClever USB Travel Charger	Zendure Turbo Charger	Olixar Smart IC Charger	Inateck USB Charger	Lumsing 5-Port Charger
Price	**£20 inc VAT**	**£25 inc VAT**	**£34 inc VAT**	**£15 inc VAT**	**£8 inc VAT**
Website	Hisgadget.com	Zendure.com	Mobilefun.co.uk	Inateck.com	Lumsing.com
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★☆☆
Max output	50W	40W	50W	35W	30W
Outputs: USB 1	12W USB	12W USB	12.5W USB	10.5W USB	10W USB
USB 2	12W USB	12W USB	12.5W USB	10.5W USB	10W USB
USB 3	12W USB	12W USB	12.5W USB	5W USB	10W USB
USB 4	12W USB	12W USB	12.5W USB	5W USB	5W USB
USB 5	12W USB	12W USB	12.5W USB	5W USB	5W USB
USB 6	12W USB	N/A	12.5W USB	N/A	N/A
Colours available	Black	Black, white	White	Black	Black
Dimensions	100x69x27mm	97x60x27mm	100x69x26mm	100x55x20mm	136x68x30mm
Weight	180g	166g	189g	340g	422g
Warranty	1 year	1 year	2 years	1 year	1 year
FULL REVIEW	TINYURL.COM/MPA4DWC	TINYURL.COM/NKYNJ7P	TINYURL.COM/OCZXK93	TINYURL.COM/KBXUHDF	TINYURL.COM/LK22OGY

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STEVEN J VAUGHAN-NICHOLS



Windows 10, the stealth OS

To think that a couple of months ago we were worried that the internet might not be able to hold up against the pent-up demand for Windows 10. The internet did just fine, as it turns out – even better than we knew. Because we have recently discovered that all along, Microsoft has been sending Windows 10 bits to those of us who have Windows 7 or 8.x on our PCs, whether we asked for them or not. Did I say sending? That's a bit mild. What Microsoft has been doing is force-feeding us Windows 10, sneaking it past our perimeter, planting it on our hard drives with no notice, shoving it through our internet connections, no matter how narrow our broadband.

Yes, I'm a bit incensed.

It all started when an Inquirer reader found, hiding in the hidden directory $Windows.~BT on his PC, all of the Windows 10 installation files, even though he had not 'reserved' a copy. Up to 6GB worth of them. Some people were a mite upset about this. Especially people with small solid-state drives and slow internet speeds.

I have seen Microsoft do a lot of sketchy things over the years, but when I first heard this story, I thought: "Microsoft wouldn't do this." Pitch Windows 10 right on my Windows desktop? Sure, I could believe that. But to actually sneak the bytes on to my computer? Surely not. Some things just aren't done. It's as if a colleague started living in your basement without ever telling you. You feel as if your space has been violated, but in a way you never even imagined might happen.

The thing is, big tech companies should have a clue that this kind of thing is not welcome. I mean, just look at what happened to Apple when it gave away the U2 album *Songs of Innocence* to everyone with an iCloud account. It was a PR disaster unmitigated by whatever goodwill lay behind the gesture.

After the news about the stealth Windows 10 downloads broke, I checked my Windows machines, and sure enough, Microsoft had sent me unwanted freebies. My first thought: "Well, that's not so bad." I have a 120Mb/s internet connection, and the smallest Windows hard drive in the house comes in at 500GB. I can handle it okay. Also, unlike people who have been having serious stability problems with Windows 10, it has worked well for me. Well, it runs remarkably well for what's really a beta. Talk to me after the upcoming update before asking me if I'd recommend it for real use.

And, of course, I don't use Windows 10's built-in apps. Mail, in particular, tends to blow up with messy results for Outlook.com or Office 365 users. And let's not even talk about Windows Store, which seems to spend more time frozen than working. Oh, and come to think of it, Windows 10 still seems remarkably snoopy to me.

You know what? On second thought, I really, really don't want Microsoft shoving Windows 10 on to my computers until I'm good and ready.

I also don't like Microsoft telling me that automatically downloading a new, radically different operating system "is an industry practice that reduces time for installation and ensures device readiness." Because it's not.

I've been working in IT for close on 30 years now, and writing about it for almost as long, and never once has any company pushed a new operating system on me in the normal course of business. Yes, programs do that sometimes. Chrome and Firefox spring to mind, but operating systems are a lot bigger deal than web browsers.

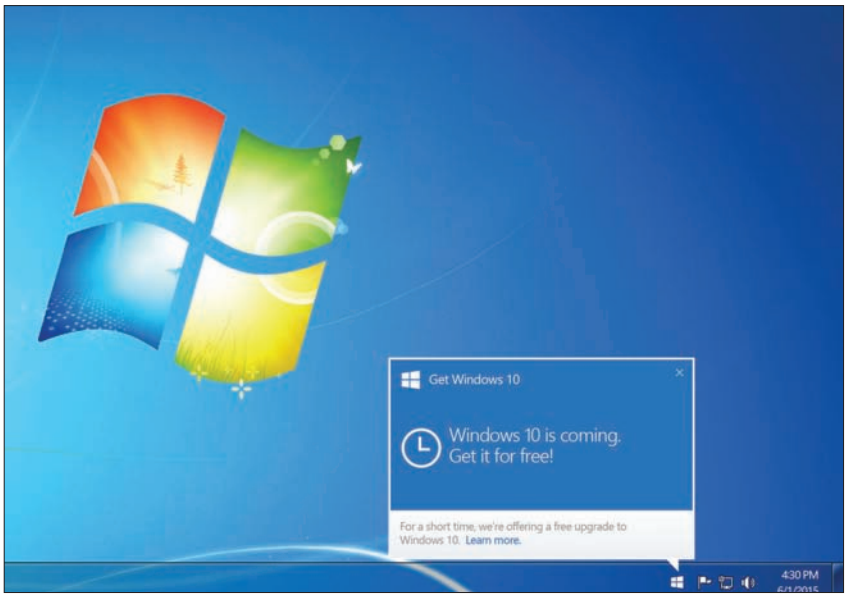
Microsoft has since retracted its "industry practice" line, but it still rankles, and I'm annoyed at having Windows 10 forced into my machines.

Let's say I was a system administrator. Would I want my users having Windows 10 appearing on their PCs? No, I wouldn't. I'd have enough trouble keeping viruses off their boxes without contending with a brand-new Windows OS.

Even at home, though, when I enable Windows Update automatic updates, I just want the top security patches for the operating system I already have, not a whole OS.

Let me make this simple for you, Microsoft. The next time you want to promote your next-generation operating system, in 2020 or so, do not shove it down my throat.

> **"After the news about the stealth Windows 10 downloads broke, I checked my Windows machines, and sure enough, Microsoft had sent me unwanted freebies"**



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