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PC ADVISOR

Editor Jim Martin jim_martin@idg.co.uk
Group Managing Editor Marie Brewis marie_brewis@idg.co.uk
Art Director Mandie Johnson mandie_johnson@idg.co.uk
Production Editor Rob Woodcock rob_grant@idg.co.uk
Multimedia Editor Dominik Tomaszewski dominik_tomaszewski@idg.co.uk
Consumer Tech Editor Chris Martin chris_martin@idg.co.uk
Engagement Editor Ashleigh Macro ashleigh_macro@idg.co.uk
Senior Staff Writer Lewis Painter lewis_painter@idg.co.uk
Senior Staff Writer Henry Burrell henry_burrell@idg.co.uk
Staff Writer Miriam Harris miriam_harris@idg.co.uk
Staff Writer Dominic Preston dominic_preston@idg.co.uk
Associate Online Editor David Price david_price@idg.co.uk
Associate Editor Karen Haslam karen_haslam@idg.co.uk
Associate Editor Neil Bennett neil_bennett@idg.co.uk
Forum Editor Peter Thomas moderator@idg.co.uk
Editorial Director Matt Egan matt_egan@idg.co.uk

Contributors

Alex Campbell, Martyn Casserly, Brad Chacos, Mike Elgan, Eric Geier, Mark Hachman, Cliff Joseph, Gordon Mah Ung, Stephen Lawson, Steve May, Paul Monckton, Ben Patterson, Ian Paul, Magdalena Petrova, Jon Ribeiro, Peter Sayer, Agam Shah, Michael Simon, Derek Walter, Howard Wen, Andrew Williams

Advertising

Account Director Jonathan Busse jonathan_busse@idg.co.uk
Senior Account Manager Gemma Rollason gemma_rollason@idg.co.uk
Campaign Support Manager Chris Brown chris_brown@idg.co.uk

Marketing

Marketing Manager Ash Patel ash_patel@idg.co.uk
Head of Marketing Design James Walker james_walker@idg.co.uk
Subscriptions Customer Services pcadvisor@subscription.co.uk

Online

Online Development Manager Adrian Black webmaster@pcadvisor.co.uk
Web Developer Victor Chong
Web Developer Dominik Koscielak
Junior Developer John Copey

Accounts

Financial Director Chris Norman chris_norman@idg.co.uk
Credit Controller Dawnette Gordon dawnette_gordon@idg.co.uk
Management Accountant Parit Shah parit_shah@idg.co.uk

Publishing

Publishing Director Simon Jary sj@idg.co.uk
Managing Director Kit Gould kit_gould@idg.co.uk

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JIM
MARTIN



Creators Update

Big Windows changes coming soon - for free

Welcome to the April issue of *PC Advisor*. There's big news for Windows 10 this month as Microsoft gears up to release the Creators Update. Although a lot of the shiny new features are indeed aimed at creatives, this is a major update that has something for everyone.

If you're signed up as a Windows Insider (it's free, it just means your PC will download the latest preview builds of Windows so you can try them), then you should already have Build 15002. This includes a lot of the features coming in the big update. Assuming that you're not an Insider you can read about what's new on page 70.

As a *PC Advisor* reader, chances are that you're the go-to person for free tech support when something goes wrong. On page 84, we've put together eight of the best tips that you can give people to prevent needless phone calls and help requests. From simple rebooting to avoiding common scams, it covers all bases and - yes - you may even learn a trick or two.

Android is the world's most popular mobile operating system and for good reasons. However, some people feel as if they're trading away their privacy by using Google's services and many apps. Our complete guide on 98 explains how you can lock down any Android device and reclaim that privacy. Plus, on page 82, we examine whether Google really is spying on its users or whether it uses your data to make your life that bit more convenient.

Intel's Kaby Lake processors are now available for desktop PCs, but it's in laptops where their better efficiency is perhaps most beneficial. We've long admired Dell's XPS 13 and in the latest 9360 guise, reviewed on page 22, it gains a 7th Generation Core i7. Unlike Dell's new XPS 13 two-in-one (which is equally attractive) the 9360 employs a full-fat processor that makes it one of the very best power laptops around.

Another stunner is Xiaomi's Mi Mix phone (page 30). At an eye-watering £799 it's not attainable for everyone, but it's amazing 91.3 percent screen-to-body ratio does show that the Chinese manufacturer means business.

At a much more affordable price, we have AMD's Radeon RX 460 (page 56) and Nvidia's GeForce GTX 1050 (page 57) graphics cards. These are the entry-level models in the new ranges and are ideal upgrades for those with older PCs that want to play the latest games. For a little over £100, they should fit in smaller cases and shouldn't need a power supply upgrade, yet they'll play pretty much anything at 1920x1080 with all the detail turned up. Now that's good value.

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AMD Ryzen CPUs: 7 all-new details revealed at CES 2017

Brad Chacos reveals everything we learned about AMD's new CPU platform at CES 2017

The information about AMD's hotly anticipated Ryzen processors just keeps coming. Basic speeds, feeds and gaming performance for the high-end flagship model were revealed late in December, rounding out everything we know about Ryzen quite nicely, but that still didn't stop AMD from teasing more enthusiast-focused information at CES 2017.

We were there as AMD launched an army of Ryzen PCs and motherboards, revealed deeper Ryzen technical details, and promised long-term support for the AM4 platform, but those facts spread out across several articles as AMD drip-dropped the details at CES. Here, we're pulling it all together for your convenience, as well as filling in a few more details we didn't have an opportunity to cover before (mostly about AM4 cooling details).

You won't find release dates or prices, alas, but you will discover a whole lot more about Ryzen.

1. An army of Ryzen hardware

AMD cleared the landing for Ryzen's first-quarter launch by announcing 16 AM4 motherboards and over a dozen Ryzen PCs from boutique builders around the world, all of which will be available the same day the new chip launches.

On the motherboard front, there were models from all the big players: Asus, ASRock, MSI, Gigabyte and Biostar. While many of the AM4 boards carried the X370 chipset intended for high-end Ryzen PCs, there were also X300 motherboards intended for enthusiast-focused mini-ITX systems, A300 boards for mainstream mITX PCs, B350 boards for mainstream PCs, and A320 boards for budget rigs.

Any of AMD's new chips will drop into any of the AM4 motherboards, with the capabilities of each chipset offering various levels of features that vendors can tweak to provide truly differentiated hardware. In fact, the small form factor mITX boards don't pack any onboard I/O lanes whatsoever to allow motherboard vendors to fill the limited space with whatever specialised connections they'd like.



Some of the Ryzen-powered PCs at AMD's CES 2017 booth

2. A long life for AM4 motherboards

Intel's (almost) relentless 'tick-tock' processor updates may help its chips ride the bleeding-edge, but an unfortunate side effect is the need to also upgrade to a new motherboard every year or two. AMD doesn't plan to follow that lead - in

fact, representatives mocked it at CES.

"We're not going tick-tock," AMD CTO Mark Papermaster, revealed. "Zen is going to be tock, tock, tock."

The firm expects the unified AM4 platform to last until 2020, representatives told us. AMD's Jim Prior said that the idea is for AM4 to last until DDR5 and other



An AMD AM4 motherboard

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AMD AM4 PLATFORM FEATURE SUMMARY								
FEATURES ENABLED THROUGH OUR CHIPSETS								
Segment	Chipset	USB (3.1 G2 + 3.1 G1 + 2.0)	SATA	SATAe ¹ (SATA 6 Gb/s PCIe G3)	PCIe (GP Gen 2)	SATA RAID ²	Dual PCIe Slots	Overclocking ⁴
Enthusiast	X370	2+6+6	4	2	8 Lanes Gen 2	0,1,10	Yes	Unlocked ^{3,4}
Mainstream	B350	2+2+6	2	2	6 Lanes Gen 2	0,1,10	No	Unlocked ⁴
Mainstream & Essential	A320	1+2+6	2	2	4 Lanes Gen 2	0,1,10	No	Locked
SFF Options	X300	---	---	---	---	0,1	Yes	Unlocked
	A/B300	---	---	---	---	0,1	No	Locked

Features are preliminary and subject to change without notice. Customers should always consult the latest technical documentation for design and product specifications.
1. Each SATA Express port runs from two SATA 6.0 ports or 2 PCIe Express[®] Gen3 lanes. These 2 PCIe Express lanes can be combined with 2 general purpose PCIe Express lanes to form a 4-lane PCIe Express port.
2. SATA RAID through optimized driver. Does not include RAID for NVMe Express.
3. As of January 4, 2017, thermal solution with better than 0.389 W/mK of thermal resistance is required based on AMD Lab testing with Ryzen processor engineering samples. Minimum thermal resistance is required for production part may be different.
4. BIOS hardware. Overclocking requires motherboard support.

The capabilities baked into the various AM4 motherboard chipsets

futuristic technologies hit the streets. That's consistent with AMD's history of long-term platforms. The difference with Ryzen and AM4? As we touched on before, AMD's new chips are more like systems-on-chips than traditional CPUs, with all the basic technology support they need baked right into the processors themselves. The AM4 motherboard's various chipsets simply provide extra capabilities - a flexible approach that gives AM4 room to grow in the years to come.

3. The Ryzen family

Only a single octa-core, 16-thread Ryzen chip has been shown in AMD's public performance demonstrations, leaving people wondering whether the processor's first quarter launch would be limited to that model alone.

AMD's Prior wouldn't go into details, but said that there will be a full stack of Ryzen chips available on day one to slip into that army of AM4 motherboards and vendor PCs.

4. Overclocks, overclocks everywhere

Every Ryzen CPU will be overclockable, continuing the FX line's tradition.

5. Okay, maybe not everywhere

That said, you won't be able to overclock every Ryzen PC. That's because support for overclocking will be limited to AM4 motherboards with the high-end X370 and X300 chipsets, or the mainstream B350 chipset. If you're using an AM4 motherboard with an A-series chipset you're stuck to stock clock speeds.

6. Bring big guns to X370

AMD wasn't only showing off Ryzen at CES 2017. The company also released a long-awaited technical preview of its enthusiast-focused Radeon Vega graphics cards. If you're enthusiast enough to have more than one graphics card, however, you're going to need to pick up an X370 motherboard,

7. New coolers, old coolers

Finally, there's been a lot of talk about Ryzen and AM4 chips requiring new CPU coolers. While that's technically true, it's not entirely true. The new AM4 socket contains 1331 pins, or about 100 more than the older AM3+ socket. Beefier CPU coolers that rely on bolts

AMD cleared the landing for Ryzen's first-quarter launch by announcing 16 AM4 motherboards and over a dozen Ryzen PCs from boutique builders around the world

as it's the only AM4 chipset that supports CrossFire or SLI multi-GPU setups.

Prior said the decision was made because AMD's data shows that people who buy budget systems don't tend to rock pricey

passing through the motherboard will indeed require new brackets. That said, any existing CPU coolers that use clips rather than those bolts should transfer over to AM4 systems and work right away, Prior revealed.

AMD AM4 PLATFORM FEATURE SUMMARY							AMD
FEATURES ENABLED THROUGH OUR PROCESSORS							
Segment	Processor	Cores/Threads	Cache (L2 + L3)	PCIe®	I/O	DDR4	USB (3.1 G2 + 3.1 G1 + 2.0)
Enthusiast	Ryzen™	Up to 8C/16T	Up to 4+16MB	x16 Gen3¹	2 SATA + 1 x2 NVMe or 2 SATA + x2 PCIe or 1 x4 NVMe	2CH	0+4+0
Mainstream							
Essential							
	7 th Gen APU	4C APU	2MB	x8 Gen3	2 SATA + x2 NVMe or 2 SATA + x2 PCIe		
		4C CPU	2MB				
		2C APU	1MB				

The capabilities inherent to AMD's new Ryzen CPUs and Bristol Ridge APUs

Features are preliminary and subject to change without notice. Customers should always consult the latest technical documentation for design and product specifications.

Intel gives its low-end Kaby Lake Pentium some Hyper-Threading bling to boost sales

This performance boost just might make budget users more eager to upgrade. [Gordon Mah Ung](#) reports

Don't say Intel never gives you anything for free. Although this news flew under the radar when the company's seventh gen Kaby Lake desktop CPUs were launched at CES, the firm's latest budget Pentium CPUs have received a performance buff with Hyper-Threading. The Pentium G4600, G4620 and G4560, as well as their power-saving 'T' versions, all feature Intel's Hyper-Threading, which delegates unused portions of the CPU for other tasks. While it doesn't turn these dual-core CPUs into quad-cores, there is a real-world performance boost on most multi-threaded loads.

Hyper-Threading was introduced with the Pentium 4 in 2000 and has been a standard feature of Intel's higher-end processors since then. The budget Pentium series, however, hasn't had the feature until now.

Besides the support for Hyper-Threading, the new Kaby Lake budget chips also support



Ultra HD 4K resolution and are capable of playing back 10-bit content easily. That can't be done on Skylake, Haswell or Ivy Bridge's integrated graphics.

One issue for Intel, Tirias Research analyst Kevin Krewell noted, is the lack of

air between its pricier Core i3 CPUs and Pentiums. For example, the dual-core 3.9GHz Core i3-7100 costs £119 in volume and has Hyper-Threading and HD 630 graphics. The dual-core 3.7GHz Pentium G4620 costs £94, has Hyper-Threading and HD 630 graphics. For that roughly 25 percent increase in price, all the customer gets is about a 5 percent performance boost.

Not all are as close, though. Some Core i3 chips have larger caches and much higher clock speeds. Intel also recently unveiled an unlocked 'K' CPU with very high overclocking capability.

Company officials didn't tell us why they decided to make the change, but the move gives Intel's sub-£100 fare a performance edge compared to previous Pentium chips. Krewell said the move could signal Intel's desire to offer budget shoppers an incentive to upgrade.

Android Wear 2.0 will launch on smartwatches in early February, Google tells developers

The next version of Google's wearable OS is due to land in February, writes [Michael Simon](#)

While Android Wear 2.0 has had a rocky ride since its unveiling in May 2016, it seems that the next version of Google's smartwatch-centric operating system has finally reached the finish line. In an email sent to developers, Google has seemingly outed a targeted timeline for Android Wear 2.0's launch as it works to put the finishing touches on its wearable operating system.

In the message first published by Android Police, the firm informs developers that it is eyeing an early February launch for Android Wear 2.0 and wants app makers to be ready: "Your app... uses a legacy embedded APK mechanism that is not optimised for Android Wear 2.0," the note reads. "If you do not take action, users will not be able to search for and find your app in the on-watch Play Store."

A standalone app store is one of the key features of Android Wear 2.0, letting users download, install and run apps

on their watch without needing to have a phone nearby. Additional upgrades include third-party complications, better ways to communicate, support for Android Pay, and integration with Google Assistant.

In December, Google announced that it would be releasing a pair of watches alongside the release of Android Wear 2.0, so they could land in early February, too. In addition to the new hardware, numerous watches will be able to take advantage of the new upgrades, including the Huawei Watch, some Moto 360 models, and the LG G Watch. Additionally, Google said it would be pushing out a fifth developer preview soon. Smartwatches haven't exactly been



as successful as many thought they would be, but the launch of Android Wear 2.0 could inject some much-needed excitement. Additionally, it brings us closer to the release of Google's first watch, which has been rumoured for months.



Apple must face claims of monopoly in iPhone app market

A court ruled that Apple has to face charges as app 'distributor', reports [John Ribeiro](#)

An appeals court has ruled that Apple must face antitrust charges in a lawsuit that alleges that the company monopolised the market for iPhone apps.

The US Court for Appeals for the Ninth Circuit reversed a previous decision by a lower court and ruled that the app buyers filing the lawsuit are direct purchasers of iPhone apps from Apple, rather than from app developers, and hence have standing to sue. Apple was a distributor of iPhone apps, selling them directly to buyers through its App Store, according to the court. The proposed class-action lawsuit started in 2011 with the complaint changing several times.

The purchasers object to the 30 percent 'surcharge' that they pay to Apple. The company collects 30 percent of the revenue of third-party apps on its store, with the balance going to the developer, in a closed system - Apple controls which apps can run on an iPhone, according to court records.

Apple had argued that it does not sell apps, but "software distribution services to developers", and hence cannot simultaneously be a distributor of apps to app purchasers, Circuit Judge William Fletcher wrote for the unanimous panel. Apple's description of its role as that similar to the owner of a shopping mall that leases physical space to stores was "unconvincing", as third-party developers of iPhone apps do not have their own stores, he added.

The courts have yet to address the complaints of the app purchasers, who allege that Apple prohibits app developers from selling iPhone apps through channels other than the App Store, threatening to

cut off sales by any developer who violates this rule, according to court records. Apple is also said to discourage iPhone owners from downloading unapproved apps, threatening to make iPhone warranties void if they do so. Apple did not immediately comment on the decision.

The suit covers purchases of apps from 2007 to 2013, but Bloomberg quoted Mark Rifkin, a lawyer for the plaintiffs, as saying that he may try to extend the proposed class action suit to include purchasers who have bought apps for the iPhone up to the present. Apple is being sued for damages and the court is being asked to order the company to change its app store rules. [✉](#)

[The suit covers purchases of apps from 2007 to 2013, but Bloomberg quoted Mark Rifkin, a lawyer for the plaintiffs, as saying he may try to extend the proposed class action suit](#)

Meet Opera Neon, Opera's radical vision for the future of web browsers

Don't expect Opera Neon to replace the main Opera browser, though. [Mark Hachman](#) reports

Hardware vendors sometimes publicise their visions of the future. So do car makers. Now Opera Software is getting into the game with Neon, the company's first concept browser for Macs and Windows PCs.

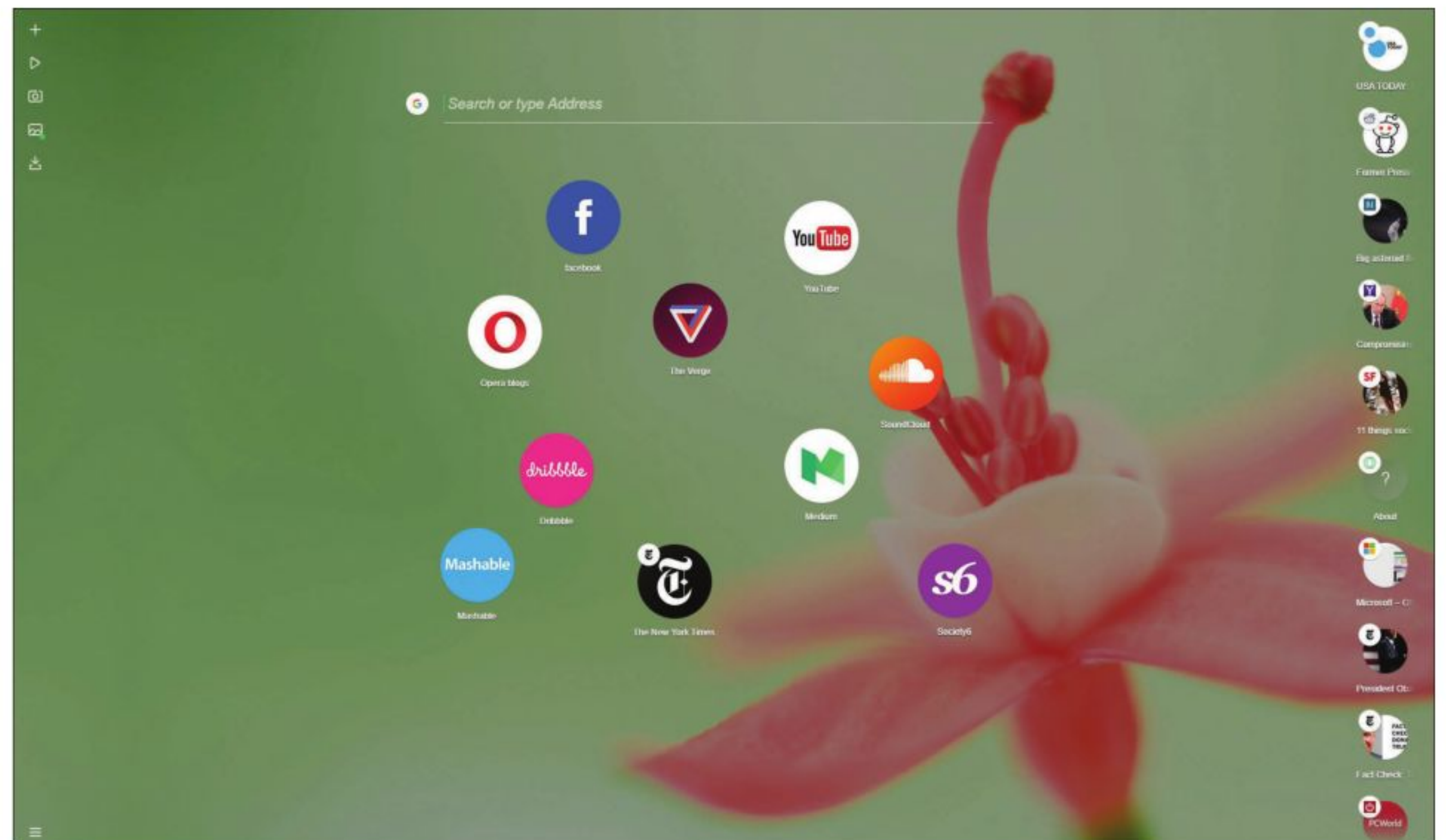
It isn't game-changing - in fact, rather than a 'concept', it feels more like applying a fresh coat of paint - but Opera also succeeds in paring down the browsing experience to a few select tasks. It's a refreshingly attractive design, as Neon's background blends into your desktop, and circular tabs consciously contradict the sea of rectangles that rival browsers employ.

With that said, Neon won't replace the existing Opera browser. In fact, it is arguably less full featured than its developer's existing browser, which includes native capabilities like ad blocking. Opera did say, however, that it plans to migrate some of Neon's new features to its mainstream browser sometime this spring.

In its current form, it is little more than a curiosity, but it's an important vehicle for showing what the web could evolve into. Personalisation options such as Opera's own themes and Firefox's comprehensive 'complete themes' only go so far. Microsoft had a chance to demonstrate the future of the web with Edge, and companies like Brave are working behind the scenes to bring their visions to market. Neon is Opera's chance to do the same thing.

A fresh, clean look and feel

Neon opens with an arty 'home page', listing your most frequently accessed pages - or, upon first launching it, the pages Opera thinks you might like to view. Rather than use



a custom background, it uses your existing desktop background to appear less obtrusive.

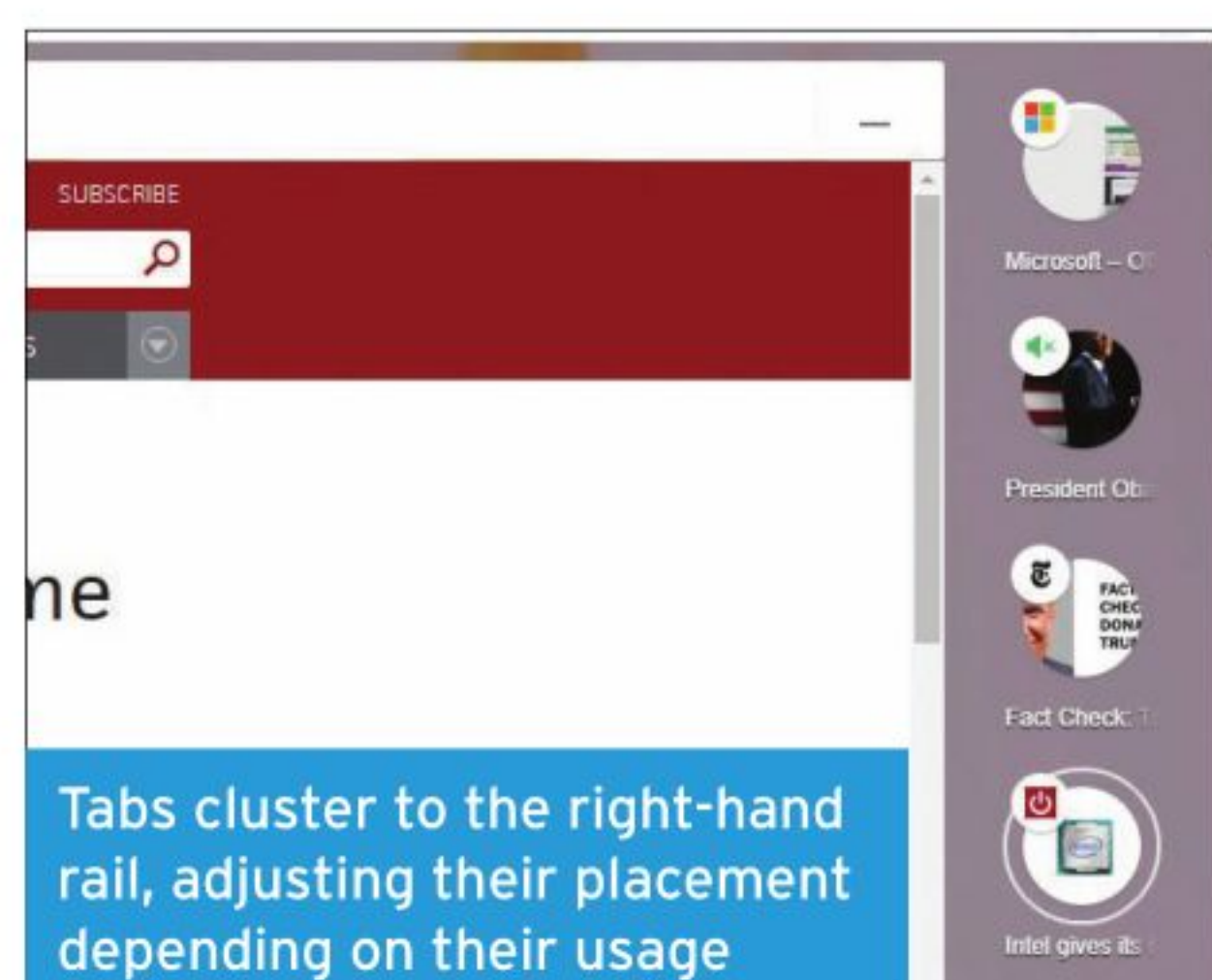
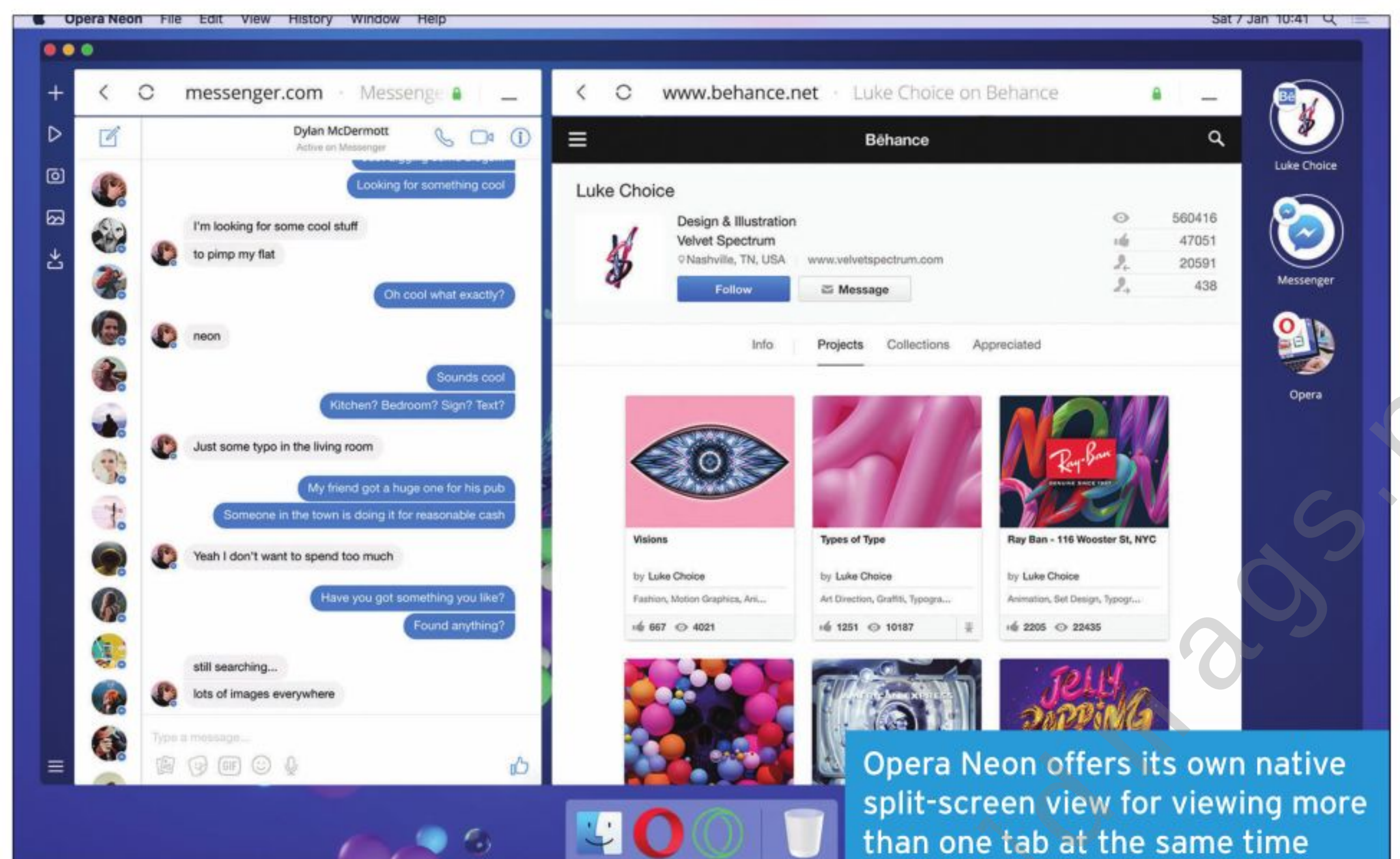
Instead of squares or rectangles, icons are circular, often highlighting either the Web page's logo - or in the case of a specific article, the primary piece of art the page is built upon. If you do have a article open, however, the 'favicon' - the small icon that a brand is based upon, such as the Twitter bluebird - hovers off to one side. There's also a tweaked 'omnibox', Opera's search box.

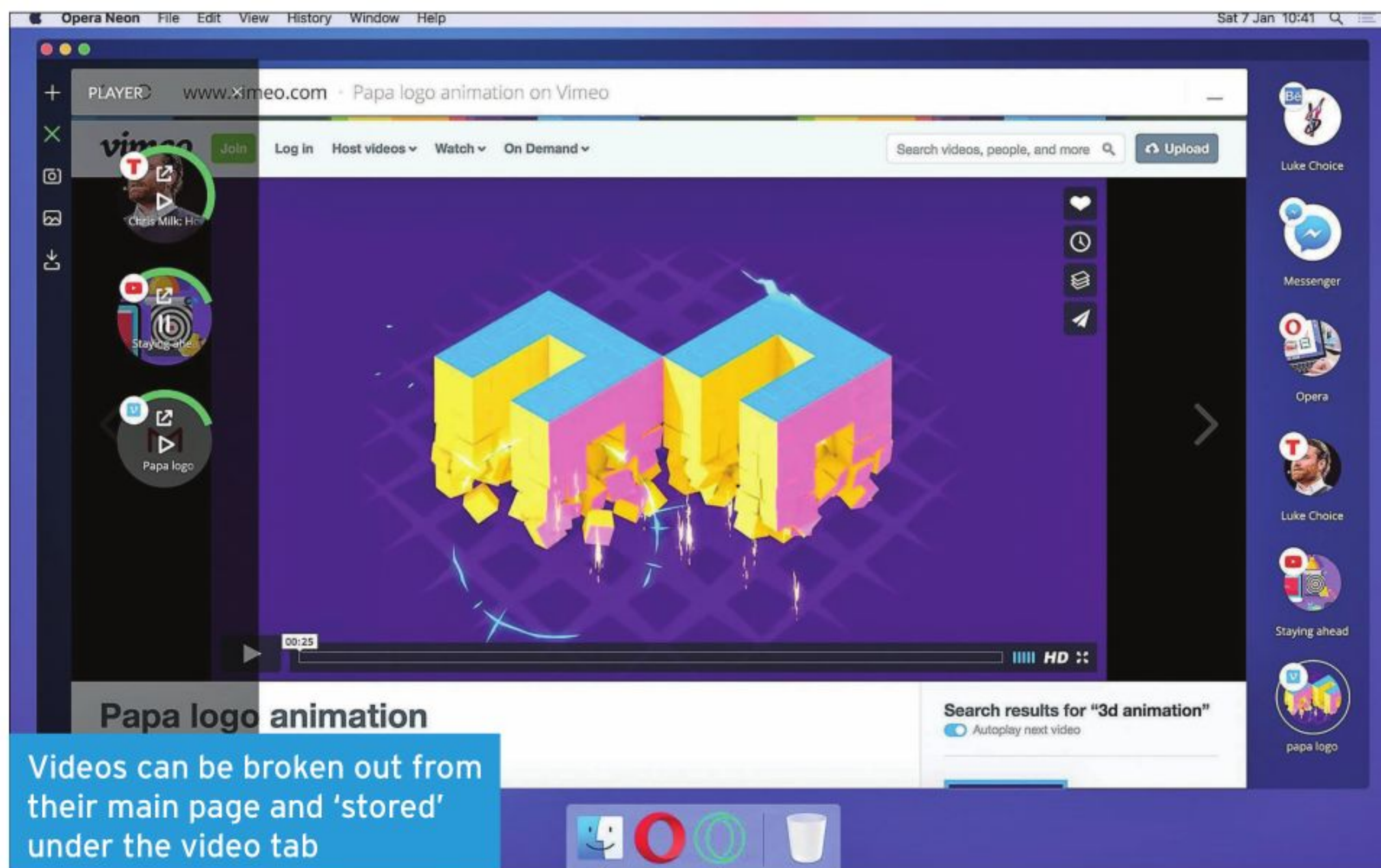
Although the traditional orientation is to keep adding tabs across the top of

the browser window, Neon adds them in a vertical column to the right of the browser window. Opera says that the tabs will operate as if affected by gravity, with frequently-used tabs rising to the top, while little-used tabs sink like a stone.

Features that you might find in other browsers though, such as previewing the tab by hovering your mouse cursor over it, simply aren't present, making Neon more a celebration of form over function.

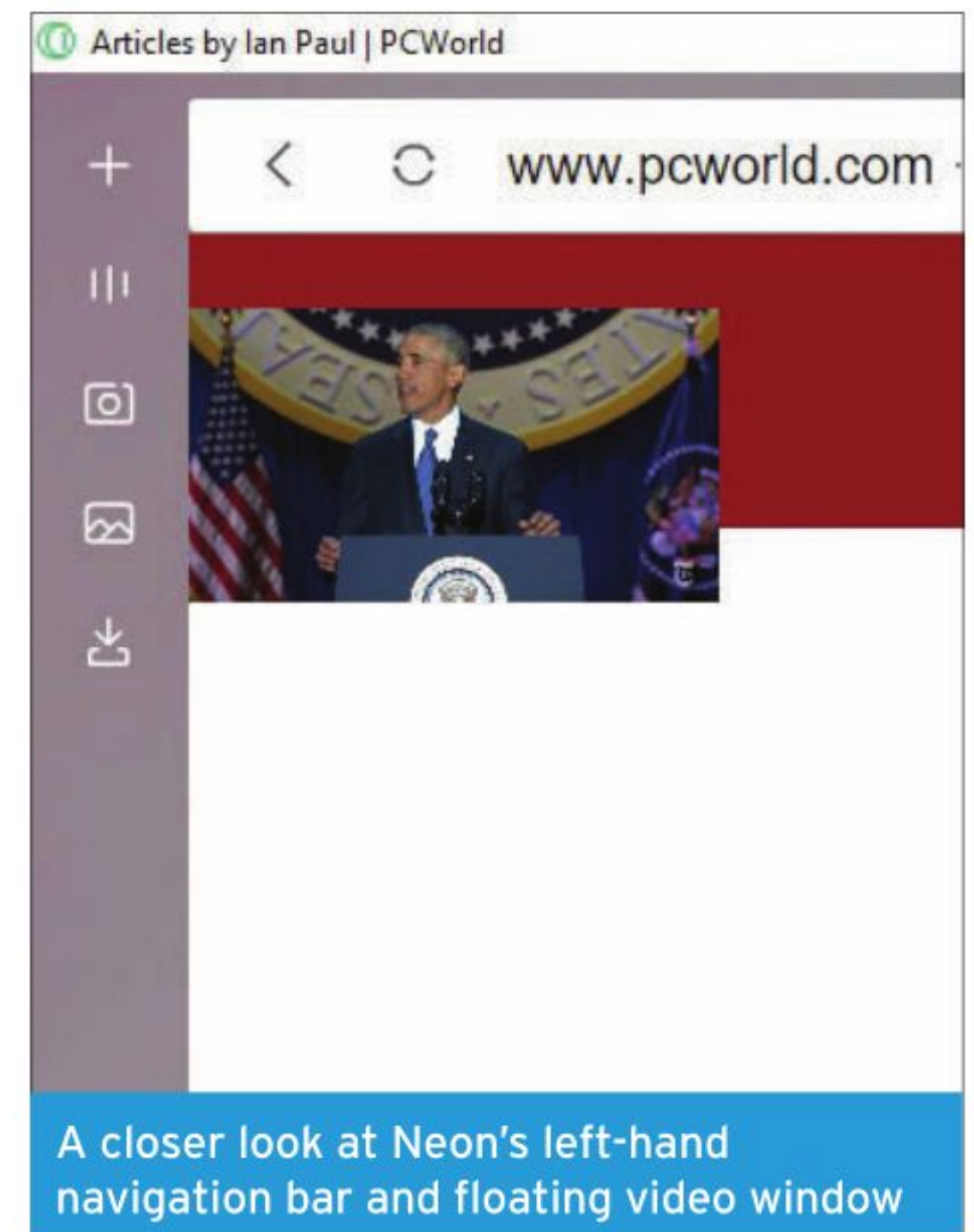
The left-hand navigation bar is reserved for five icons: a '+' to add another tab, a series of vertical lines that hide a video





player, a 'camera' icon to take screenshots with, a 'painting' icon that links to a gallery of those snippets, and a download icon at the bottom. Like Opera's mainstream browser, the 'video player' can be used to separate a video window from the rest of the tab, allowing you to watch a YouTube

video, for example, while you shop online. (If a video is playing, the icon ripples and the favicon on the source tab changes, so you can track down which tab is playing the video.) The 'camera' icon also provides a convenient way to highlight and save all or a portion of the screen.



Otherwise, though, that's about the extent of Neon. Opera's concept doesn't really justify the download, though it's attractive enough. What's more interesting is if Opera uses Neon as its proverbial garage, hacking together new concepts to see what works and what doesn't. 

Google reveals its stealthy moves to keep Android phones free from malware

Google Verify Apps feature flags more than 25,000 potentially dangerous apps, reveals [Michael Simon](#)

Way back when Android 4.2 Jelly Bean was released, Google added a feature called Verify Apps that sought to protect users who inadvertently may have downloaded a piece of malware and attempted to side-load it onto their phone. The service, which is enabled by default on all Android devices, scans apps that are installed from sources other than the Play Store, and warns the user if they may be potentially harmful.

As Google explains in a blog post at tinyurl.com/go5Lpsx, this could be the result of an app that has snuck by its gatekeeping and purposefully turned it off, opening the door for potential problems. Google calls these devices Dead or Insecure (DOI), and in turn, if an app has a high percentage of DOI devices downloading it, it will be considered a DOI app. That's where Google's security wizardry comes into play.

As software engineer Megan Ruthven explains, Google has developed a metric "to identify the security-related reasons that devices stop working and prevent it from happening in the future". If a device has

stopped using Verify Apps, Google dives into the apps that device has installed and checks their retention rate - the number of devices that have downloaded a particular app with Verify Apps switched on - to come up with a DOI score. If the app has a low score, meaning a high number of devices without Verify Apps has downloaded it in one day, Google will investigate further, and take steps to remove and block future installation if necessary.

The firm has flagged more than 25,000 DOI apps as part of the Ghost Push, Hummingbird and Gooligan malware families "because they can degrade the Android experience to such an extent that a non-negligible amount of users factory reset or abandon their devices," Ruthven writes, adding without the DOI score,

"many of them would have escaped the extra scrutiny of a manual review."

To check whether your device has Verify Apps turned on, go to the Security tab in Settings (or in the Google tab on Pixels and some other phones), and make sure the Scan device for security threats toggle under Verify apps has been turned blue.

We read a lot about malware on our Android devices, but we don't always hear what Google is doing about it. Ruthven's blog post is a fascinating look at how the firm is monitoring the Android community to find and flag potentially harmful apps. However, just as Google will keep coming up with ways to fight them, malware apps will continue to be a threat, and the best way to avoid them is to strictly download from the Play Store and other trusted sources. 

The service is enabled by default on all Android devices, scans apps that are installed from sources other than the Play Store and warns the user if they may be potentially harmful

Your car's parts could one day be made by a 3D printer



Vader Systems claims that its MK1 is faster and cheaper than conventional metal printers, writes [Magdalena Petrova](#)

A small, family-run business has come up with a metal printer that it thinks will transform manufacturing.

The MK1 metal printer works by melting aluminium into a molten form, and then using a magnetic field to eject droplets of the substance onto a moving plate, which manoeuvres around to create the desired 3D shape. That differs from other metal printers, which lay down a layer of powdered metal and melt it with a laser or electron beam. In this process, there's a chance that some particles of the powder do not get melted, creating weak spots.

Zack Vader is the CTO and co-founder of Vader Systems and says he came up with the idea of making a metal printer after he failed to find a company that was capable of printing a microturbine generator he needed for a project. So with the help of his father, Scott, and alma mater, the University at Buffalo, he set out to build his own.

On its website (vadersystems.com), Vader Systems claims the MK1 is twice as fast as conventional metal printers and can operate at 90 percent of the cost. The machine has already garnered some attention, with one automotive parts maker expressing an

interest in eventually buying at least 50 of them, according to the university. In the future, the MK1 could also be used to print out custom surgical devices for hospitals as well as a number of complex parts.

The Vaders are currently developing a new model of their metal printer, the MK2. It will have 10 printing heads and produce parts 30 times faster than the original model. The MK2 is expected to come out in 2018. [\[X\]](#)

Microsoft's Cortana assistant is heading to the Android lock screen

Microsoft set to let users access the digital personal assistant from the lock screen. [Ian Paul](#) reports

MSPowerUser recently spotted the ability to add Cortana to an Android phone's lock screen in the testing version of Cortana (beta) on Google's mobile OS. Users in the testing program are seeing a pop-up window inside the Cortana app that asks them if they want to enable the assistant on the lock screen.

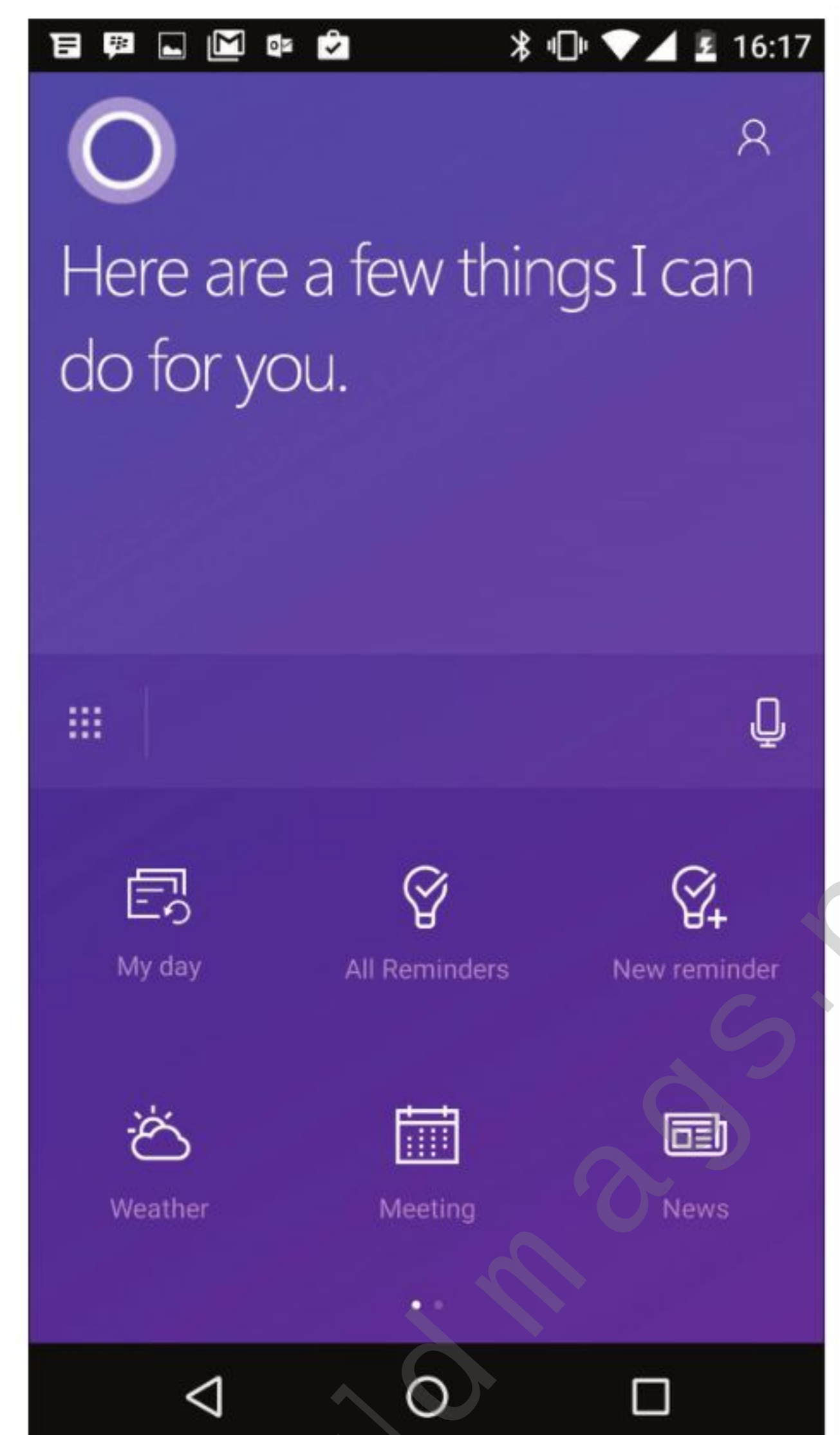
Once approved, users see a Cortana icon on the lock screen and are able to swipe it to get access to Microsoft's voice assistant without unlocking the phone. It's not clear if Cortana replaces the Google Now microphone in the lower left corner of the lock screen or adds another icon to it.

MSPowerUser says Cortana's lock screen setting is a complementary feature that will not turn off or try to replace your current lock screen setup. For most users that won't really matter, but for anyone who uses

a custom lock screen app this will be an important part of the new feature.

It's also worth noting that Cortana on the lock screen doesn't ask for your PIN before opening up, according to MSPowerUser. That means anyone with physical access to your device will be able to access Cortana, which could be a problem if your calendar is connected to the digital assistant.

Personal digital assistants work best when they're accessible from anywhere. That's why Microsoft put a lock screen option for Cortana in the Windows 10 Anniversary Update, and why Google Now offers voice activation from the lock screen on modern Android phones. Making Cortana on Android more functional also plays into Microsoft's wider goal of keeping users in the company's ecosystem even when they're not using a Windows-powered device. [\[X\]](#)



Personal digital assistants work best when they're accessible from anywhere. That's why Microsoft put a lock screen option for Cortana in the Windows 10 Anniversary Update

Android Nougat's glacial upgrade pace shows why Google's Pixel needs to succeed

Less than 1 percent of phones are running the latest version of Android, but Google's latest handset could be the first step toward changing all that, argues [Michael Simon](#)

Google has released the latest Android distribution numbers and surprise, surprise, Nougat adoption is crawling along. The latest version of the mobile operating system is installed on less than 1 percent of all phones, while the two-year-old Lollipop remains in the lead with more than 33 percent.

It's a trend Android users have come to accept. During the same period last year, Marshmallow had exactly the same 0.7 percent adoption rate as Nougat does now. On the contrary, more than 75 percent of iOS users have upgraded to iOS 10 since its launch in September, a figure higher than the past three versions of Android combined.

Now, there's no reason to think an Android release can ever reach such a lofty goal - there are just too many budget phones out there that will never see an upgrade - but it's unfortunate to see so many flagships still dragging their feet on Nougat upgrades.

Unless you've bought a Google Pixel or are eyeing a new flagship in 2017, there's a good chance you'll be waiting a while longer

for an upgrade to Nougat, if you ever see it at all. And you can likely forget about Android O. Cameras, screens, and features shouldn't matter as much as running an outdated operating system, but sadly, many phone makers don't make upgrading enough of a priority.

Pixel Power

There weren't too many Android phones to speak of at CES 2017, but many of the ones that were released had one thing in common: Marshmallow. From the Honor 6X to the ZTE ZBlade V8 Pro, several new phones are still shipping with last year's version of Android, and handset makers have yet to make Nougat a priority, despite it being available for development for the better part of six months. Even Samsung Galaxy

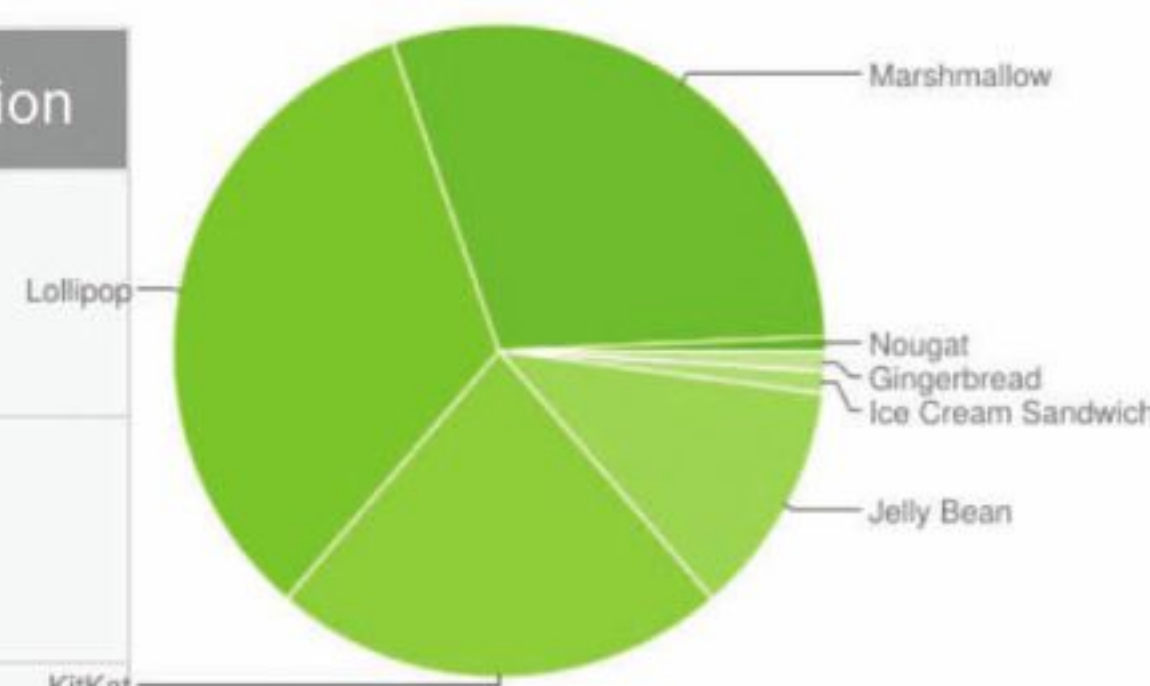


S7 users are still waiting for a upgrade. But perhaps a sea change is coming. In November of last year, Google released its Pixel phones, and for the first time, a 'pure' Android smartphone was being pushed to the masses rather than Nexus niches. It's too early to know if it will have an effect on the greater Android world - as evidenced by the distribution report (left) - but within a year or two, Google's strategy could begin to reverberate through the ranks of Samsung, LG, Moto, and others.

If customers begin to flock to the Pixel, it won't just be the device's Assistant and build quality that lure them in. The promise of regular and timely upgrades is easily one of the handset's best qualities, and as more users are able to enjoy the latest version of Android as soon as it's released, it could put pressure on other high-end manufacturers to do the same.

Installing the latest version of Google's operating system is like getting a new phone, and users shouldn't have to wait until their phone is over a year old before they can enjoy it. Suffering with a stale experience has become one of the unfortunate realities of living with Android, but the Pixel might be the first step toward changing it. Who knows - maybe the January 2018 report will have Android O at a full 1 percent. [\[X\]](#)

Version	Codename	API	Distribution
2.3.3 - 2.3.7	Gingerbread	10	1.0%
4.0.3 - 4.0.4	Ice Cream Sandwich	15	1.1%
4.1.x	Jelly Bean	16	4.0%
4.2.x		17	5.9%
4.3		18	1.7%
4.4	KitKat	19	22.6%
5.0	Lollipop	21	10.1%
5.1		22	23.3%
6.0	Marshmallow	23	29.6%
7.0	Nougat	24	0.5%
7.1		25	0.2%



Data collected during a 7-day period ending on January 9, 2017.
Any versions with less than 0.1% distribution are not shown.

Less than 1 percent of Android phones have been upgraded to Nougat

What's new in the latest Windows 10 Preview Build

Windows Insiders get a sneak peek of the Creators Update. [Mark Hachman reports](#)

The Windows 10 Creators Update is due early this year, and Microsoft served up what you might call a hearty appetizer: its massive Windows 10 Insider Preview Build 15002, with so many improvements that we will limit this article to a discussion of front-end changes (see our feature on page 70 for more details).

Build 15002 is being released for the PC only, as part of the Fast Ring of Insider builds. If you are thinking of installing it, be aware of a few bugs: Miracast connections won't work and the Netflix app probably won't render video (instead, use Edge).

Microsoft didn't specifically mention the Creators Update in the context of the new build, but this lorryload of features has certainly been added with that update in mind. All of this will probably arrive on non-Insider PCs later this spring.

What Insiders will see in Build 15002

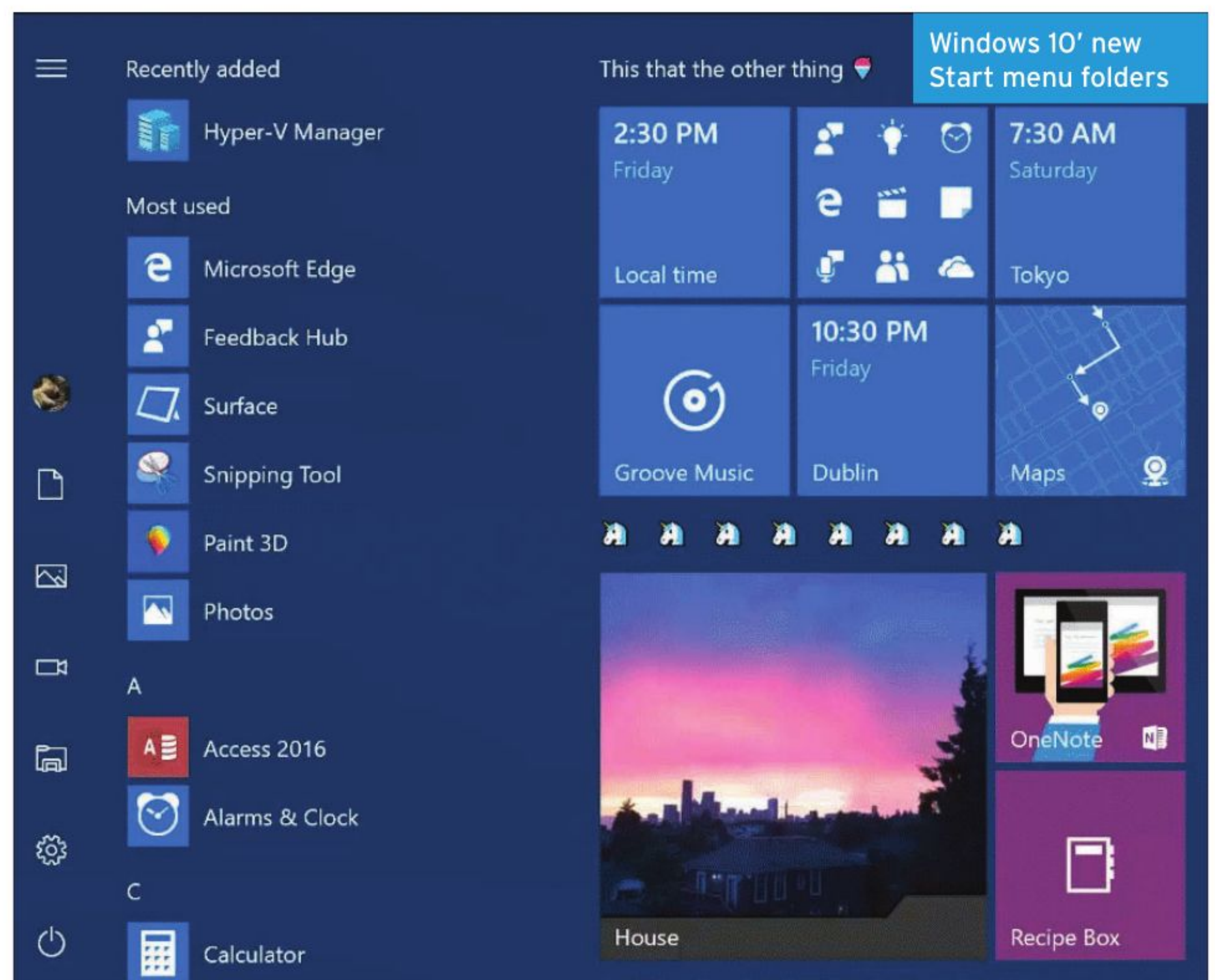
- Microsoft Edge updates, specifically with regards to tab management
- Tiles in the Start menu can now be placed into folders
- Scaling, snipping, and sharing improvements
- Suggested Cortana commands
- On-demand Windows Refresh in Windows Defender
- Blue-light controls in Settings
- Narrator upgrades
- Microsoft Edge upgrades

Microsoft Edge continues to improve

An unfortunate number of people used Microsoft Edge when it first came out, and passed on it. However, its developers haven't stopped rolling out improvements, and there are two key ones: a tab preview bar, as well as a tool to resume tabs that you've set aside.

You'll probably find the latter feature more worthwhile. Other browsers offer the ability to restore tabs when the browser crashes or you accidentally close the window. Edge calls this 'setting aside' the tabs, adding an icon in the upper lefthand corner to do so, plus another icon to restore them.

It's not officially time for spring cleaning, but Microsoft is allowing developers and users to tidy up the Start menu and notifications drawer. Windows 10 phones already enjoy this



Edge also now offers a tab preview. Some browsers, such as Opera, allow you to hover over a tab to project a small image of what the tab displays. Microsoft's browser, on the other hand, now shows a little caret symbol to nudge your attention upward. Click it, and you'll get a carousel of what each tab is currently showing.

Build 15002 offers one Edge feature everyone should like: auto-blocking Flash. Last year's Anniversary Update auto-paused the infamously insecure Flash. The new build goes a step further: it won't load Flash at all unless you explicitly tell Edge that you want to run it.

The browser has one other subtle improvement: you can now launch either a standard browser window or an InPrivate window directly from the taskbar. It's a small convenience, but a welcome one.

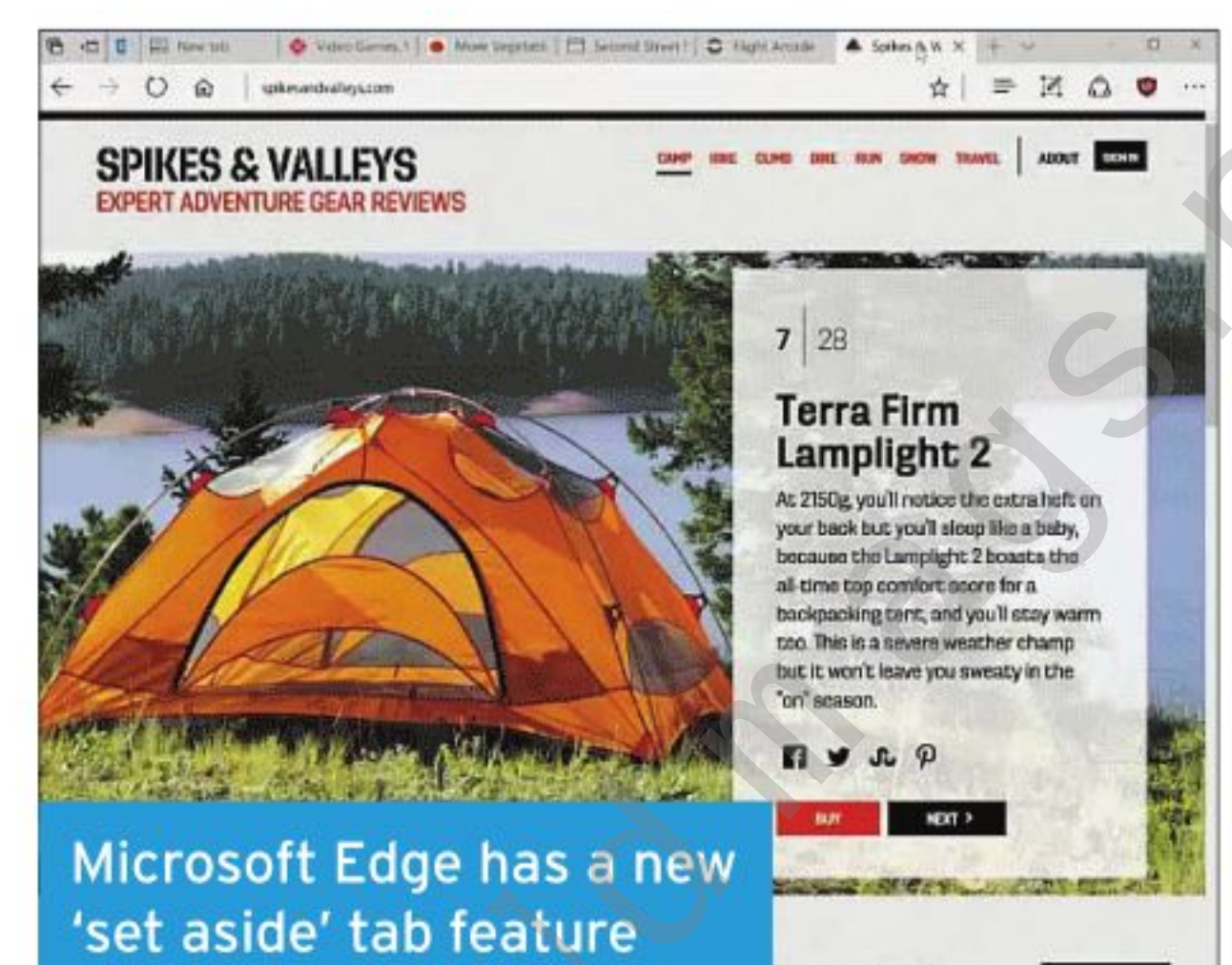
A tidier Start menu and Notifications drawer

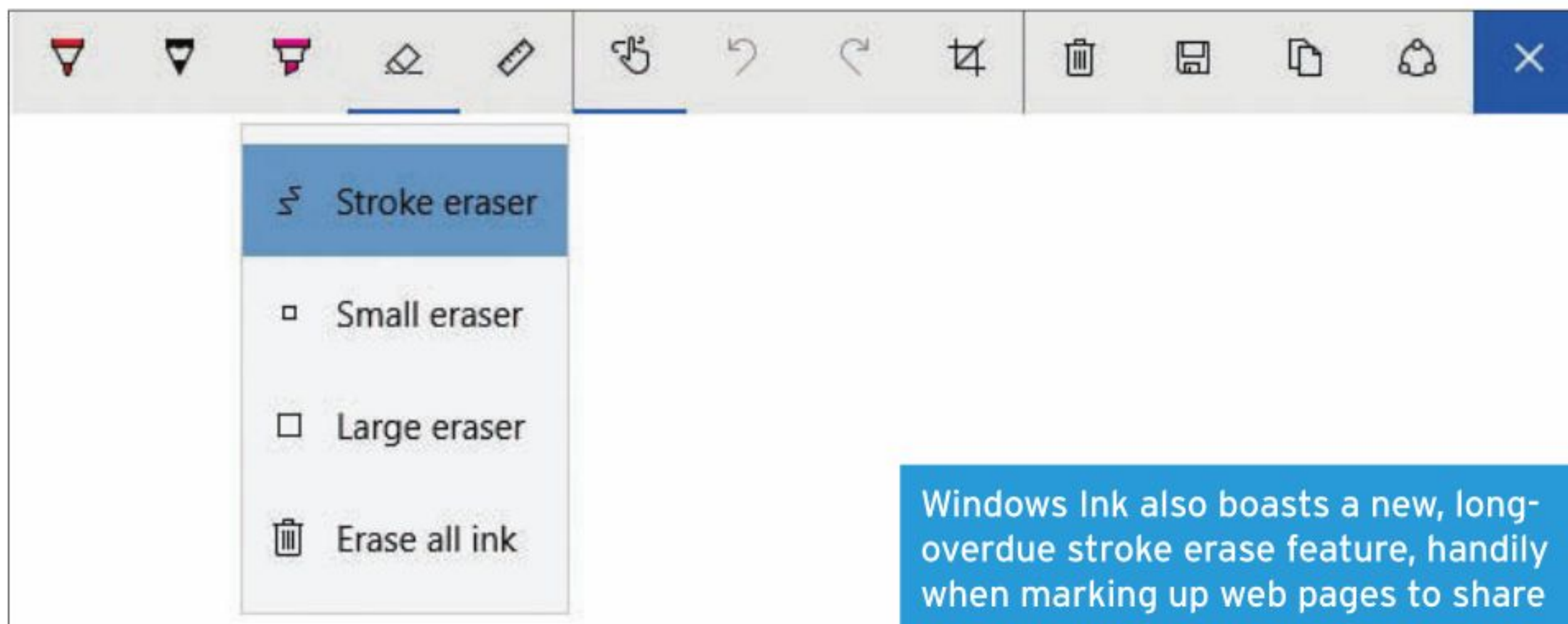
It's not officially time for spring cleaning, but Microsoft is allowing developers and users to tidy up the Start menu and notifications

drawer. Windows 10 phones already enjoy this feature: the ability to drop several tiles into a custom folder on the Start menu. Now Windows 10 Insiders will get it with Build 15002, and taking advantage of it is easy: just drop one app on top of another, and name the subsequent folder. If you do so, though, you'll lose the 'live tile' effects of a standalone tile. Microsoft has also made it easier for developers to carve out custom subgroups inside your Notifications drawer, cleaning up that clutter.

Scaling, snipping and sharing upgrades

Occasionally when you redock your laptop, you may notice your desktop icons suddenly shift position randomly or change size. Build 15002 tries to solve that problem, with an improved scaling option in Settings. Likewise,





Windows Ink also boasts a new, long-overdue stroke erase feature, handily when marking up web pages to share

Windows now offers better placement support, as well as smooth resizing of desktop applications.

Microsoft's also made changes in how you can share the content from those apps. We use Windows 10's built-in Snipping Tool to grab an image, but OneNote's Win+Shift+S command can do the same thing.

Sharing that snippet (or a web page, or some other piece of content) is more contextual, and the Win+H command has been removed.

Improved Cortana commands and reminders

Microsoft is always updating Cortana, and remembering what exactly you can do is always a challenge. The assistant's Notebook can help, as you can check out some of your available options in the various categories. Now, however, Cortana will auto-suggest commands based on what you're typing, helping you figure out what you can do next. Reminders can also be scheduled monthly for suggesting bill payments and other recurring events.

Triggering Cortana, though, has changed: gone is Win+Shift+C. Instead, the new command is a simpler Win+C, which should have been there in the first place.

Windows Defender: refresh Windows on demand

Microsoft previously allowed Windows 10's built-in antivirus, Windows Defender, to share responsibilities with a second antivirus program. This has new options to run full, quick or advanced scans, with a report on your PC's health.

The most notable change, however, is the addition of the Windows 10 Refresh Windows command within Defender itself. This is a major undertaking, as Refresh Windows removes most of your apps, though not your personal data. Still, if your PC is running slow, Refresh Windows is a good fresh start.

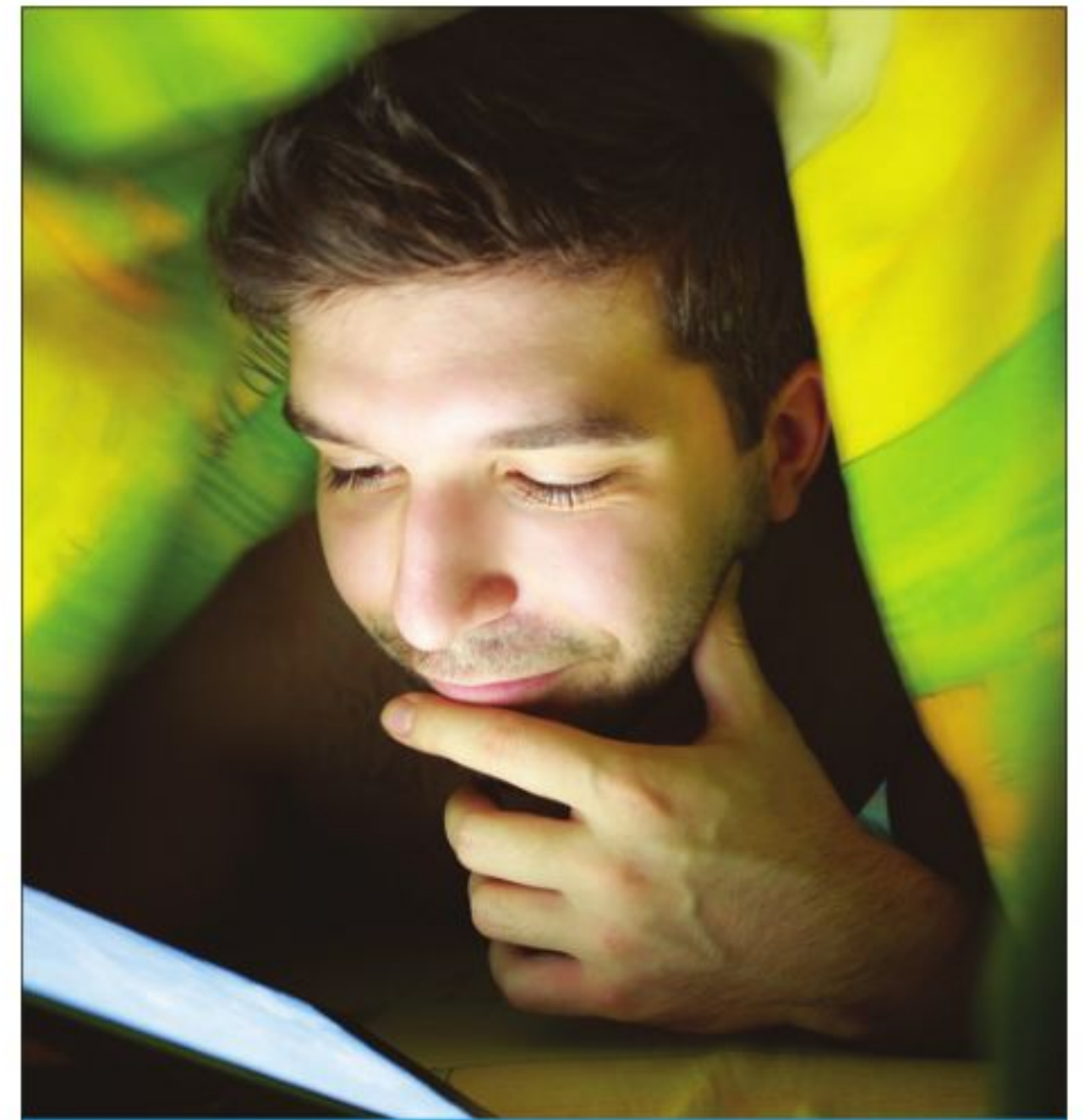
Blue-light management headlines Settings changes

The negative effects of blue light at night aren't well understood, but studies have suggested possible links to both obesity and

cancer, as well as a disruptive effect on the circadian rhythms that help us sleep. Build 15002 now allows you to automatically lower the amount of blue light your PC emits after a given time, via a new menu within Settings.

That's just one of a number of Settings pages overhauls. You'll probably be equally pleased with the updated Display Settings options page, which restores the screen resolution controls to a prominent position.

You'll also find a new settings page for the Surface Dial, better theme management, and even an option to control 'cross device'



Windows 10 can now reduce the amount of blue light your PC emits at certain times, so you'll get a good night's sleep

Changes to Narrator and accessibility

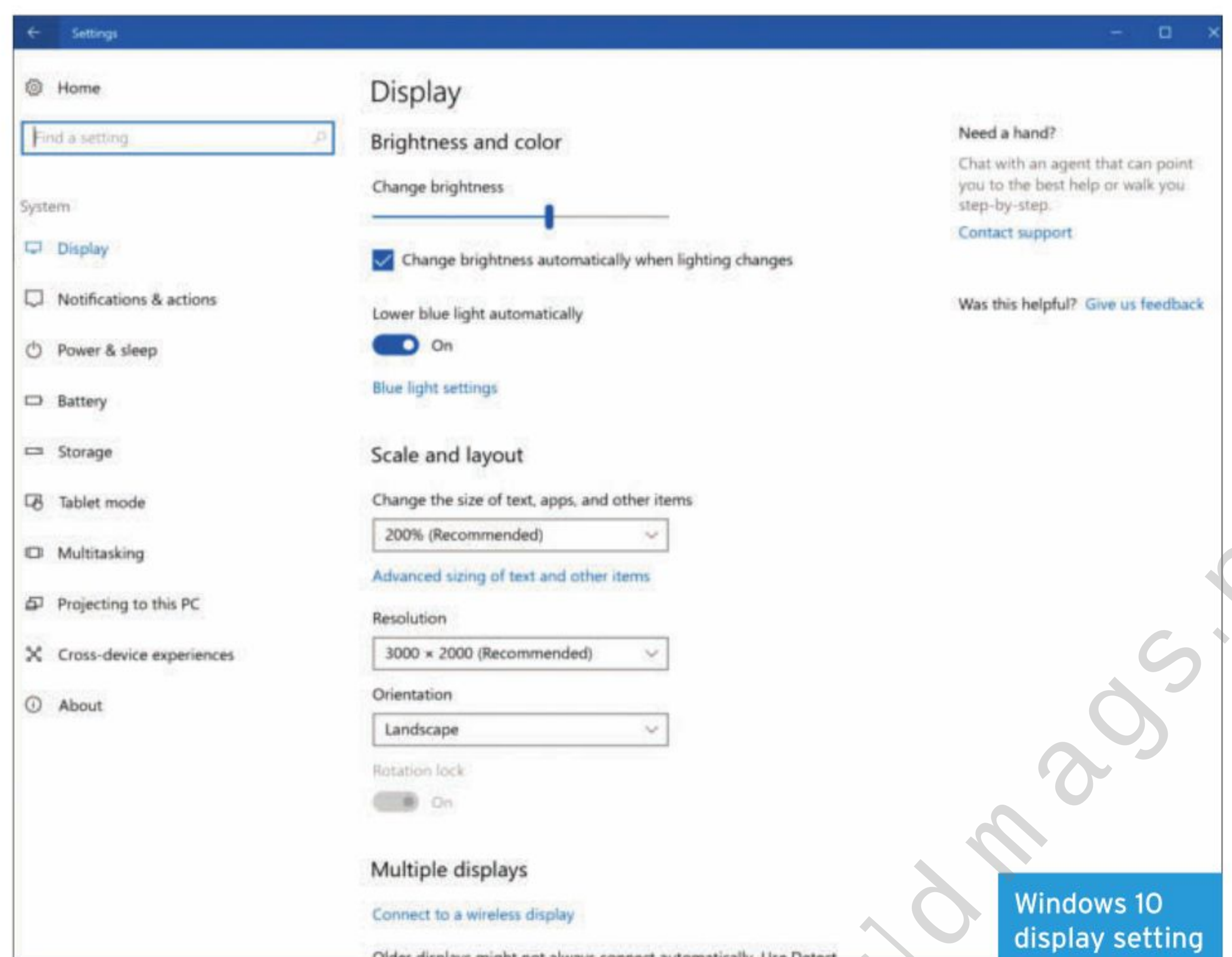
Microsoft adjusted the Narrator shortcut to make it more 'intentional' by changing it from Win+Enter to Ctrl+Win+Enter. Narrator has also been added to the WinPE Windows

Cortana will auto-suggest commands based on what you're typing, helping you work out what you can do next. Reminders can also be scheduled monthly for suggesting bill payments

experiences - letting apps on your phone, for example, talk to the comparable apps on your PC. Finally, there's a new Touchpad Settings page, where you'll be able to create new groups for three- and four-finger swipes, and discover new gestures.

setup environment, as well as the WinRE recovery environment. Braille support is en route to Windows 10, too.

There are even more changes under the hood of the new build, including a new Green Screen of Death. For more, see page 70. [X](#)



Windows 10 display setting



Is this the year IoT standards will finally make sense?

Some are coming together, but it looks like the battles will go on for a few years, writes [Stephen Lawson](#)

A few brave souls predict Internet of Things (IoT) standards will start to gel this year, but making all those connected things work together still looks like a long shot. Two years ago, some industry analysts cautiously suggested that a vast array of IoT standards would merge into just a few beginning in 2017. If the IoT in late 2014 was a cacophony of discordant musicians tuning up, it's now reached the point where a few virtuosos are playing the same tune. But there's still a lot of sheet music getting passed around.

Two of the biggest rivals in IoT did find harmony in 2016. The Open Connectivity Foundation (OCF) was formed out of the AllSeen Alliance - which used the Qualcomm-developed AllJoyn - and the Intel-backed Open Interconnect Consortium. Previously, each group had been promoting its own way for devices to discover and learn about each other.

In another promising sign, the IEEE p2413 standard, which will provide a unified approach to defining IoT architectures, may be finished this year, according to Oleg Logvinov, chairman of the p2413 working group. The standard is meant to span all industries plus consumer devices. It wouldn't replace existing data formats but would reduce the amount of effort required to share data among them.

Using what's already finished

Some players are offering established technologies as common layers for interoperability. At CES 2017, the ZigBee Alliance announced Dotdot, which it calls a universal language for IoT. It's an open application layer that handles the same kinds of things as OCF, but it's based on the upper-layer protocol already implemented in many devices that use the ZigBee wireless network. Dotdot can already work with Thread networks.

Sigma Designs, the main company behind Z-Wave networks, has released the Z-Wave interoperability layer to help developers integrate those networks with applications and services using cloud-based platforms such as Apple's HomeKit.

There are, however, still too many choices, for both developers and consumers, to make IoT simple and easy, industry analysts say. That will probably still be true 12 months from now, and maybe for two or three more years, they said.

"I don't think we've gotten to the point where consolidation has made the lives of solution providers and application developers much easier," Machina Research analyst Andy Castonguay said. "You still have a tremendous array of options out there."

According to Avi Greengart at Current Analysis, that's kept consumer choices

fragmented, which is one issue holding back smart homes. Most consumers won't buy IoT gear until they see clear value, ease of installation, and ease of interoperability. "Every major computing and silicon vendor is competing in this space, and there hasn't been a consolidation around winners just yet. The market is kind of a mess right now," he added.

Enter the lawyers

Why is it so hard to agree on standards? "They're big companies, and they move slowly," explained Mike Krell of Moor Insights and Strategy. Standards tend to raise intellectual property issues that bring armies of lawyers into the picture.

Even breakthroughs in standards diplomacy aren't guarantees. Just because an impressive list of vendors, including Microsoft, Samsung, Cisco Systems, GE Digital and Haier, belong to OCF that doesn't mean they'll all adopt the organisation's standard across all their products. It's common for big vendors to join many industry groups just to engage with and influence trends.

There's too much at stake in a potentially huge market for major companies to give up the chance to dominate home IoT, argued Greengart. "I'm highly sceptical that 'co-opetition' in this regard will prevail over

competition. And given that nobody knows what layer of the stack is going to be the most valuable one, everyone is fighting for their own," he added.

The common thread that will make smart homes work may turn out to be a system from one vendor, such as HomeKit. Apple is as well-positioned as any company to make that happen. But even though many manufacturers at CES 2017 introduced products that use HomeKit, they didn't play up that capability much, he said.

Alexa, Amazon's cloud-based AI platform that made a splash at CES, at least provides a single user interface, though Greengart argued that it's not really a full IoT platform like HomeKit. At least, not yet.

There's even more work to do

Even if part of the technology stack is standardised and life gets easier for developers and buyers, there are other hurdles to mass adoption of home IoT.

Security, one of consumers' biggest worries, has to be addressed across the board instead of one component at a time, as it is now, Machina's Castonguay argued. "We still are waiting for the market to develop an approach that would allow for a full, end-to-end, consistently updated and audited security approach."

Then there's the issue of how consumers will choose to buy IoT products. While most smart homes are do-it-yourself affairs today, carriers and cable companies may become the main sales channel, though it's still too soon to say.

Some good news

While things may be murky at home, there are glimmers of hope in another part of the Internet of Things. In 2016, the 3GPP, which sets cellular standards, settled on two specifications for low-power versions of LTE. Those technologies, called Category M1 and Category NB1, will lead carriers

to roll out specialised IoT services. Both of the new technologies are slower than regular mobile data service but use less energy, so they are compatible with small, battery-powered connected objects like sensors. As part of the LTE standard, these systems are relatively easy and economical upgrades to current networks.

Another low-power, wide-area networking standard, LoRa, is gaining momentum with more national rollouts. In October, Comcast announced that it is considering a nationwide LoRa network to serve enterprises. Some carriers in other countries already use the technology. Ingenu, a US company with its own type of low-power network, is also making gains around the world, he said.

Wherever IoT does reach mass adoption, it will be thanks to one or two technologies - open or not - that have somehow caught on with users. According to Greengart, "Sometimes ubiquity is the most important part of a standard." ☒

European legislators debate robot rights for autonomous vehicles

Granting robots some form of personhood could help settle disputes, argue MEPs. [Peter Sayer](#) reports

Robots should one day have rights as 'electronic persons', members of the European Parliament recommended recently, though not until the machines are all fitted with 'kill' switches to shut them down in an emergency.

Parliament's Legal Affairs Committee wants the European Commission to propose legislation that will settle a number of ethical and liability issues in the field of robotics, including who is to blame when an autonomous vehicle is involved in a collision.

Granting the more sophisticated autonomous robots some kind of electronic personhood could settle issues of who is responsible for their actions, the committee suggested. More urgent than the question of robot rights though, is the setting up of an obligatory insurance scheme that would pay out to the victims of a self-driving car if it caused an accident in the European Union.

The MEPs also want an EU agency to advise on the technical, ethical and regulatory issues around robotics, and a voluntary ethical code of conduct for those who design and work with robots. That code should include a requirement that designers put some kind of 'kill' switch in their robots so that they can be shut down in an emergency.



"We urgently need to create a robust European legal framework," argued the committee's rapporteur, Made Delvaux.

That urgency, the MEPs said, is not so much because autonomous robots are likely to run amok any time soon, but rather that if the EU doesn't move first, it will end up having to follow rules set by other countries. Intriguingly, tax figures among the issues

the MEPs want the Commission to take into consideration. For robots wanting the same rights as people, it could be a case of no representation without taxation.

The full Parliament will vote on the committee's recommendation in February, but even if it agrees, the Commission is under no obligation to follow such a request for legislation. ☒



Inside Intel's bold plan to personalise live sports broadcasts

Viewers could carve out their own interactive live sports broadcasts, reveals [Agam Shah](#)

Viewers may soon see a big change in the way they experience the thrills of live sports events. It'll be customisable, interactive and will put them at the centre of the action. If it goes as envisioned, Intel's multi-year plan will allow viewers to tailor their own broadcasts and watch events as if they were on the pitch. They will be available for VR headsets, PCs and even televisions.

Currently, the views and angles on offer are selected by broadcasters. In the future, viewers will be able to create their own 3D show and select any type of camera angle they want. For example, they will be able to get a bird's-eye view of a goal in a football match or watch the same experience from a player's perspective.

Intel is aiming to roll out this 360-degree live broadcast technology in 2019, and it is working with broadcasters to deliver the real-time interactive experience.

Some sports, such as football, are ideal for this interactive 3D experience, though

it may be difficult to bring it to others, where the action happening over long distances: skiing, for example.

Unsurprisingly, broadcasting live interactive content is easier said than done. It will involve 38 cameras to create a full 3D video experience, so that every angle is covered, and a new media format to support the interactive experience. It also requires a powerful back end of servers to process the terabytes of data needed to create a customised experience for each viewer.

Intel is starting off modestly with interactive replays instead of live broadcasts, allowing it to test the technology. At Super Bowl LI, Fox Sports showed interactive replays based on Intel's 360-degree technology. Further down the road, users will be able to view live statistics. Intel demonstrated this at 2016's Winter X Games. Viewers were able to watch key athlete performance data, such as how high a snowboarder jumped, in real time. This was captured from sensors on the boards.

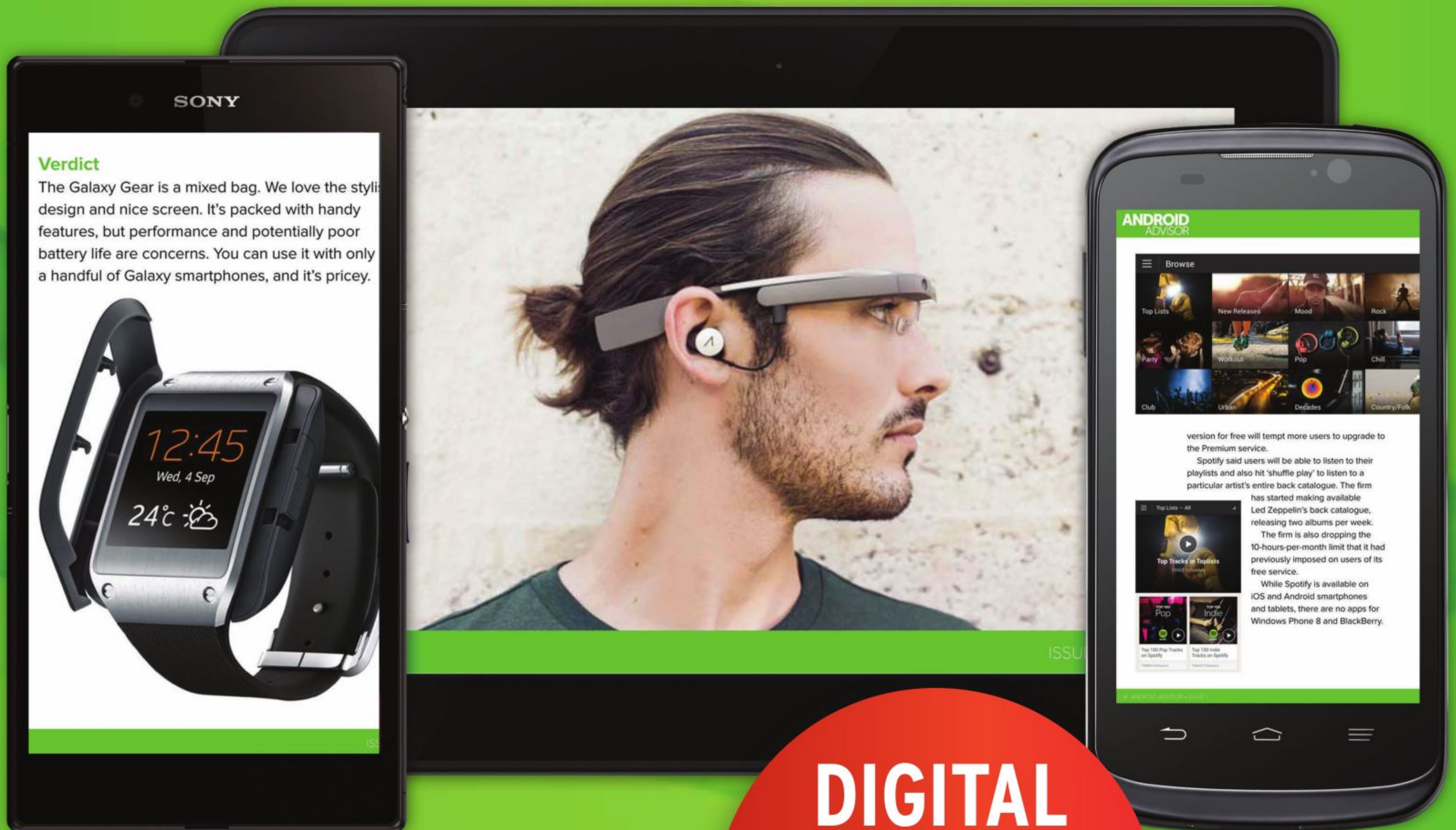
To make this happen, the chipmaker is using a media format called FreeD, which will be central to live interactive sports broadcasts. Instead of pixels, which are used in regular images and video file formats, FreeD will have voxels, which compose image content in a three-dimensional format.

Intel has targeted the TV market before, including a failed plan to launch its own television service. This is its most ambitious experience so far, and it'll require years of commitment.

The amount of data generated for an interactive live sports broadcast will also lead to bandwidth challenges, but with technologies such as 5G, which could transmit mobile data at speeds of up to 20Gb/s, coming, some of those issues could be resolved.

The technology is still not here, and Intel's plan to make it possible by 2019 seems ambitious considering the challenges. But it has a clear vision of how live sports broadcasts will look, and it's exciting. 

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



LAPTOP

Dell XPS 13 9360



Dell's range of XPS 13 laptops has been around for a few years now. The latest model comes with a seventh-generation Intel Core i7 chip, has impressive battery life and you won't need a load of adaptors just to plug in a mouse and an SD card as you will with a MacBook Pro. Plus, its InfinityEdge screen makes the footprint closer to that of a 12in laptop. And while the Dell certainly isn't cheap, it's hard to beat.

Price

In its most common configuration, the XPS 13 costs £1,099, which gets you a 1080p screen, 8GB RAM and a Core i5 CPU, plus a 256GB solid-state drive (SSD). Shop around though, and there are plenty of other options. The lowest-end version, for example, costs £999 from Dell, and has a 128GB SSD instead of a 256GB one.

There's a Core i7 version for £1,179, though the model we're reviewing has a high-resolution QHD+ touchscreen. Prices start at £1,249, which is £270 less than the comparable MacBook Pro, £470 less than the Touch Bar version, and the

same price as the HP Spectre 13. The exact specification reviewed here will set you back £1,499, with its 16GB RAM and 512GB SSD.

Design

The XPS 13 is an odd mixture of the incredible and the downright ordinary. Its most visible feature is the InfinityEdge display, which reduces the gap between the screen and the edge of the laptop to a few millimetres. This allows Dell to make the frame unusually small for a machine with a 13.3in screen.

This laptop doesn't aim for looks over practicality, though. There are, for example, chunky strips of rubber on the bottom to help avoid heat vent blockage and to increase stability. As a result, it's 15mm thick: slim but not incredibly so. Similarly, the inside is constructed of a soft carbon fibre composite rather than the more common aluminium. Dell also hasn't tried to replicate Apple's MacBook hinge, where you don't have to hold the base in place to open the lid. Instead, the XPS 13 prioritises hinge strength. This is one of the few

top-end small laptops that feels like a road warrior. Let's not paint it as too much of a gnarled old *Mad Max* extra, though. It looks great.

Connectivity

The XPS 13 comes with two standard USB 3.0 ports and a single USB-C Thunderbolt 3 socket. In a couple of years you might wish it had two USB-C slots, but with Thunderbolt 3 bandwidth of 40Gb/s, even a single port should be enough. There is also a full-size SD card slot, which is becoming a rarity in top-end laptops – baffling to us as we use one most days. You miss out on a dedicated video output, but the Thunderbolt port can be used like a HDMI with the right cable.

Keyboard and trackpad

One side effect of making the XPS 13 as small as possible is that fitting in a truly gigantic trackpad was not possible. However, we're perfectly happy with the keyboard and pad found here.

The trackpad is made of textured glass, and while there's a 50/50 left/right split to the button layout rather than relegating the right button to the right third to avoid accidental presses, we didn't have any issues thanks to the XPS 13's smaller-than-average size.

Its keyboard is good, too. It's full-size, the keys are well-spaced and

This is one of the few top-end small laptops that feels like a road warrior. Let's not paint it as a gnarled old *Mad Max* extra, though. It looks great

have well-defined travel rather than the ultra-slim style that's starting to become popular among very slim and light models. As with this system's connectivity, Dell seems to have made a concerted decision to keep certain traditional elements that long-standing laptop users like. The keyboard, for example, is backlit, as you'd expect at the price, though some may not like that Dell has relegated the Page Up/Down keys to secondary functions rather than giving them their own keys.

Display

Dell sells versions of the XPS 13 with two different screen specification, both of which have the InfinityEdge design. Our review unit was the higher-end QHD+ model, which has a 3200x1800-pixel display. That's closer to 4K than it is 1080p, the resolution of the slightly cheaper version. It's extremely sharp, and while we'd be happy to use a 1080p laptop, you don't have to be an expert to notice the difference between the two.

Screen quality is very good, but our colorimeter shows colour coverage isn't as good as that of the MacBook Pro or super-saturated Razer Blade Stealth (page 24). The XPS 13 hits 95 percent of sRGB, 75.4 of DCI P3 and 70.9 of Adobe RGB.

What this means is that the XPS 13 has a normal colour gamut display rather than a wide gamut panel. Ideally, we'd like it to nudge just a few percent closer to full sRGB coverage, though we're still happy with the display.

Colours are punchy and the contrast has a hand in this - the contrast ratio goes up to 935:1, depending on screen brightness, a very solid result. Top brightness is very good too, maxing out at 345cd/m². This is bright enough to make the Dell usable outdoors even though it has a glossy screen.

One final distinction between the 1080p and QHD+ laptops is that our review unit has a touchscreen. It adds a few grams to the weight (not so you'd notice), but there's no other obvious sacrifice. Both have a glass top and glare-reducing layer.

Performance

The main difference between this XPS 13 and the previous model is that it uses Intel's new Kaby Lake CPUs. You have a choice

of Intel Core i5-7200U and i7-7500U chipsets - our review machine has the higher-end Core i7, along with 16GB RAM and a 512GB SSD.

If you're just looking for a machine to use for general light computing work, there's little reason to buy the higher-end model, and if every little bit of performance matters, you should really consider a non-portable quad-core CPU laptop. The Intel Core i7 found here is a dual-core chipset. There's also little difference in their gaming abilities: neither is very good.

Overall, it's quick to respond thanks to the snappy 256GB SSD, and the Intel Core i7-7500U is really overkill for our day-to-day needs.

Right now, it's about as powerful a machine as you'll get in this small a frame, scoring 7993 in Geekbench 4 and 2499 in PCMark 8 (Home). These are slightly higher than the results of the similarly-specified Razer Blade Stealth.

More important than a slight benchmark bump, the XPS 13 is quiet unless it's under continued pressure. We enjoyed using it as our everyday work machine.

As we briefly touched upon earlier, however, it's (relatively) poor for gaming, just like every laptop in this class. The XPS 13 uses an Intel HD 620 integrated GPU, not even the slightly more powerful Iris type MacBooks use.

Don't expect to play recent console-grade games. At 720p with all the graphics options turned down, Thief runs at a barely-playable 20.7fps, dropping to 6.2fps at 1080p, high settings. At native resolution it'd be painful even to look at, let alone play.

Alien: Isolation fares a little better, managing a just-about bearable 32fps average at 720p, low graphics. Few would put up with the 14fps 1080p performance, though.

Of course, if you have a Steam library packed with games from the late 1990s and early 2010s you still want to play, the Dell will be able to handle most of them.

Battery life

We were impressed with this laptop's battery life. Left to

play a 720p video on loop, it lasted for almost exactly 12.5 hours, a pretty amazing result. It has a 60Wh battery, which is a higher capacity than last year's model and most of the XPS 13's rivals. The HP Spectre, for example, has a 38Wh battery.

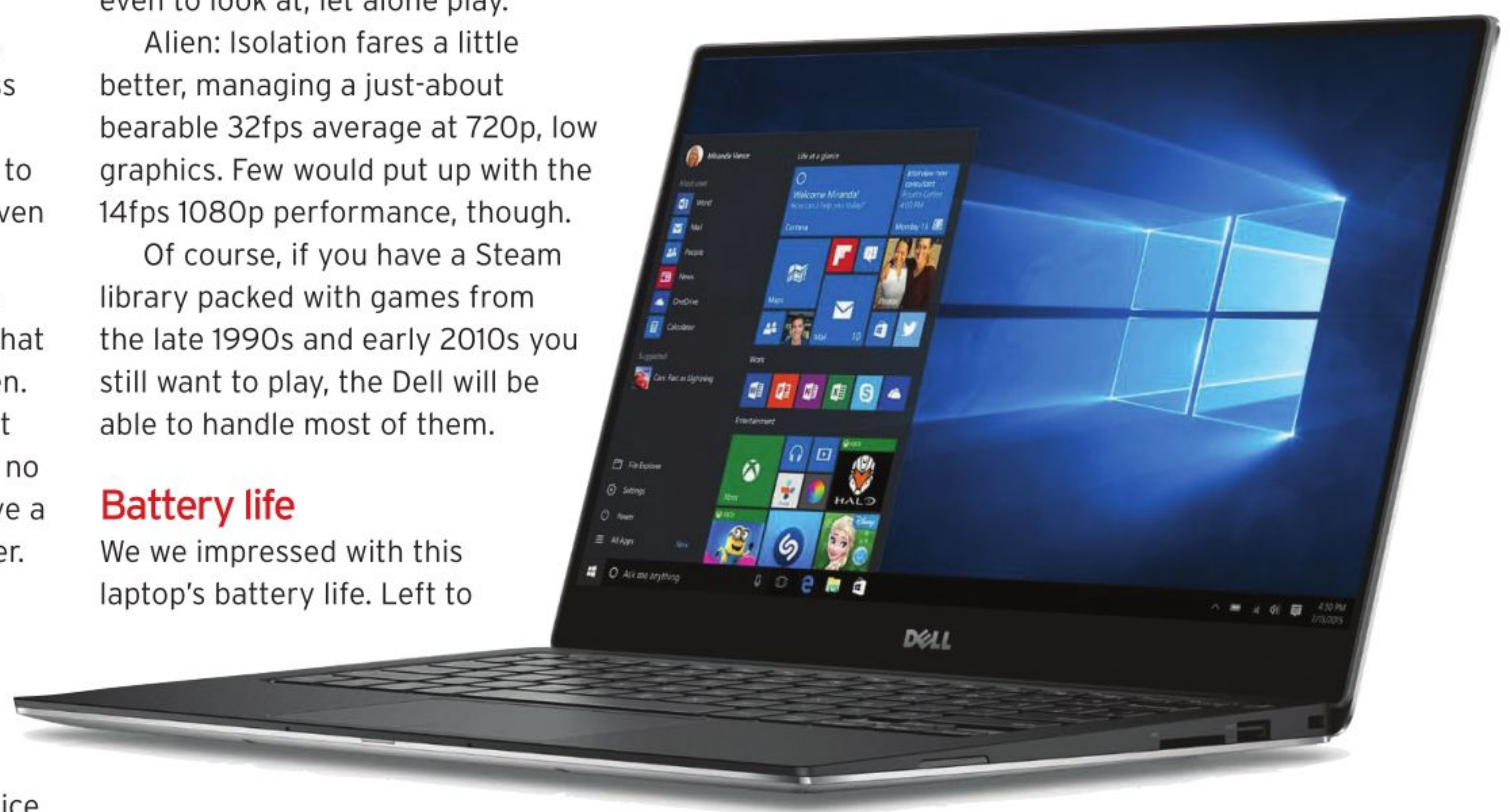
Part of this great stamina is down to Dell's clever power management, which is better than that of most of the competition. All this means is that you can expect the longevity to scale closely with your usage. Dell's optimisations are smart, but they're not magic.

Audio

The speakers are solid, if not as impressive as the battery. It uses stereo drivers that sit to each side of the laptop's underside. They're loud, but don't have the weight or composure of a MacBook Pro's at top volume. No Windows laptops we've reviewed recently does.

Verdict

The XPS 13 is an excellent ultraportable laptop, the best 13in Windows model going for many. Dell hasn't aimed for a single superlative feature, a potential gimmick. Its footprint is smaller than the competition, but it's thicker. Its screen resolution is excellent, but display colour is normal rather than super-saturated. There's also a mix of old and new connections, and a combination of a large battery and smart power management means this laptop lasts significantly longer than similarly-priced systems a lot of the time. The balance is just right and we'd spend our own money on it.  **Andrew Williams**



£1,549 inc VAT

Buy from
■ razerzone.com

Specifications

12.5in (3840x2160, 352dpi)
IGZO LCD glossy; Windows
10 (64-bit); 2.7GHz, up to
3.5GHz Turbo Intel Core
i7-7500U, two cores four
threads; Intel HD 620; 16GB
RAM DDR3-1866; 512GB SSD;
802.11b/g/n/ac 2x2 Wi-Fi;
Bluetooth 4.1; 2x USB 3.0
port; 1x USB-C 3.1 port;
HDMI; stereo speakers; HD
webcam; digital array mic;
3.5mm headset jack; UK
tiled keyboard; 52.6Wh
lithium-ion battery
non-removable;
321x206x13mm; 1.29kg

Build: ★★★★★

Features: ★★★★★

Value: ★★★★★

Performance: ★★★★★



GAMING LAPTOP

Razer Blade Stealth



The Blade Stealth is an unusual laptop. Even though it's aimed at gamers and isn't cheap, it doesn't include a high-end graphics card. Instead, this is a normal MacBook-style system, though the styling has a gamer flavour. However, it can also plug into a Razer Core module, turning it into a proper gaming PC with the sort of power most laptops can only dream of.

Price

The Razer is priced at the same level as one of the latest-generation ultra-stylish portable laptops, but is cheaper than most. The entry-level model is far less expensive than, for example, a MacBook Pro with OLED keyboard display, and also costs less than the HP Spectre 13 or Dell XPS 13 (page 22). Not bad.

Prices start at £999 for a 128GB SSD model with a QHD screen. The 256GB version costs £1,249, while the 512GB option is priced £1,349. There are also 4K editions at £1,549 (512GB) and £1,949 (1TB) Razer sent us the 512GB 4K model.

If you're just after a slim laptop and already have a gaming PC, it's rather competitive. Other than the price, the main reason to buy a Blade Stealth is that it can hook up to a Razer Core – an external

graphics card (pictured opposite). This is like a small desktop PC unit, but one that only houses a PCI-e graphics card. It costs £499 (£399 when bought with the laptop), and that price doesn't even include a graphics card, so this isn't a cheap option. For reference, you'd probably want to look at a £190 Nvidia GTX 1060 card or spend £210 on an AMD RX 480 as a good minimum spec.

Design

Most high-end portable laptops don't come in plain moody black, the idea being you want to get away from a traditional or boring-looking machine. As a gaming computer, it's no wonder the Razer Blade Stealth embraces it.

The entire shell is black apart from the writing on the keys and the tentacle-like Razer logo on the lid. To our eyes at least, it works. This laptop seems much more 'stealth bomber' than plain black box, and unlike a lot of gaming laptops, you could take it out in public without looking silly. Sure, the logo on the back looks like a sticker a teenager might put on their laptop, but otherwise it's a sharp machine.

Weighing 1.29kg and measuring 13mm thick, it's not the slimmest or lightest laptop in the world, but

it's not far off either. This is a great laptop to take around with you 24/7.

Its frame feels solid, too. The Blade Stealth is all-aluminium: the lid, the underside and the keyboard surround. It's cool to the touch and has the solid feel you only tend to get with metal.

Connectivity

Unlike an Apple MacBook Pro or HP Spectre 13, the Razer caters for current peripherals as well as future ones. There are two full-size USB 3.0 ports, a USB-C (also used as the power socket) and a full-size HDMI port, so connecting to a TV or monitor is extremely simple.

There's no memory card slot, though, so photographers will want to get hold of a USB SD reader. Like every laptop this thin, there's no optical drive.

Keyboard and trackpad

The quality of the shell continues in the keyboard and trackpad: both of which are beyond reproach. However, those expecting chunky keys with a lot of travel will be disappointed. These are classic ultrabook slimline chiclet keys. Their action and feedback is great, but they don't depress massively. Still, this is nothing like the click eggshell feel of a MacBook. The keys do move a millimetre or so.

The gamer credentials comes instead from the neat backlight, which cycles through all the colours of the rainbow and can be set to 12 different intensity levels. Standing

This laptop seems more 'stealth bomber' than plain black box, and unlike a lot of gaming laptops, you could take it out in public without looking silly

out next to the all-black keyboard it looks great. You don't have to leave it cycling through the colours either. Using the Razer Synapse app you can set it to display a single colour, or apply a bunch of other profiles. Keys can light up as they are pressed, there's a Fire preset that mimics the tones of a bonfire, while Wave fires a swift rainbow gradient across the keyboard. There are other options, too.

There are no dedicated macro keys, as there's just no space for them, but there's no mistaking this for anything but a gamer keyboard.

Below, the trackpad is tightly hemmed-in and nowhere near the size of a MacBook's, though it feels great. A single touch tells you this is a nicely textured glass panel rather than a plastic one. It's extremely smooth, to the extent it is soft to the touch. Fresh out of the box its sensitivity was a little low, but this may have something to do with our review model having a 4K screen. There are a lot of desktop pixels to traverse.

The pad's click feels great and is relatively quiet, too. Razer has used a very sensible button layout - only a square in the bottom-right of the pad acts as a right-button press, making accidental taps a rarity. You may find your hand accidentally touching the pad on occasion for the first few days, but that's largely because there's so little spare space here. Not much is wasted.

Display

This good use of space applies only to the keyboard, though. Look at the fat bezels around the 12.5in display: compared to the Dell XPS 13, the screen to size ratio is disappointing. There's a lot of empty black space around the display.

However, aside from making us wish it stretched out a bit more, this is an excellent screen. As we mentioned earlier, we're using the higher-end 4K version of the Razer Blade Stealth, but there's also a cheaper QHD version that should still look very sharp.

Both versions sail ahead of the competition in several respects, mainly thanks to the fact they use IGZO panels rather than IPS or TN. On our test sample, the contrast was excellent at up to 1350:1 (depending on brightness), making the black parts of the screen almost

fade into the pure black of the surround at the sort of backlight level you'd use indoors.

This doesn't come at the expense of brightness either. With the backlight maxed, the Razer Blade Stealth outputs a searing 405cd/m². We're perfectly happy for a high-end laptop to have 350cd/m², but this one goes the extra mile.

Colour performance is also remarkable. Our colorimeter recorded that it covers 99.9 percent of sRGB, 98.2 percent of Adobe RGB and 87.6 percent of DCI P3 colour standards. It can also render colours outside of all three, with 147.7 percent of sRGB and 101.8 percent of Adobe RGB. This is the sort of laptop that makes us much less bothered about OLED models. Who needs one with LCDs like this?

Right out of the box, the Razer Blade Stealth looks every bit an Adobe RGB display, meaning colours appear intensely bold. We had some trouble getting the display to revert to an sRGB calibration for a more relaxed look, so it would have been handy if Razer had baked this into its own software, though.

The 3840x2160-pixel resolution appears extremely sharp, although given the QHD model will also appear sharp and is significantly cheaper, many of you may be more comfortable with that version. Still, it's hard not to be impressed by this 4K screen. It's a touchscreen display, too.

Performance

Most Razer laptops use discrete graphics cards to get you far better gaming performance than the average laptop. The Blade Stealth, however, is more conventional in this respect. It uses integrated Intel HD 620 graphics, baked into the Intel Core i7-7500U chip. This is the first laptop we've reviewed with a seventh-generation Kaby Lake processor though, so it's still cutting-edge.



The Razer Core module

This is a dual-core low voltage CPU, typical of those normally used in laptops like this, which need to maintain good stamina as well as decent performance.

One of the great aspects of this laptop is that all the models have this higher-end Core i7 CPU, where many £1,000-or-more ultrabooks still come with Core i5 CPUs.

Performance is not a huge leap ahead of Skylake's chipsets, though. The Razer Blade Stealth scored 2044 points in PCMark 8 (Home) and 7393 (3620 per core) in Geekbench 3, 7894 (4070 per core) in Geekbench 4. While this is excellent for a slim and light productivity laptop, it's different to the performance of a true gaming laptop, which would use a quad-core CPU and discrete graphics card.

The Intel 620 GPU is also only marginally better than the HD 520



used in the previous generation of laptops. In Thief, for example, it managed 21.9fps with the resolution set to 720p and graphics set to low, dipping to a painful 6.5fps at 1080p with visual effects maxed-out. That's only around 1fps and 0.5fps (respectively) better than the Skylake-powered Acer Aspire S13.

As Razer's laptops only have dual-core CPUs, it's likely they'll become a bottleneck with certain games when paired with, for example, an Nvidia GTX 1080. However, you can still create a pretty fearsome setup with a Razer Blade Stealth. It just won't be cheap.

We're also slightly disappointed by the style of fan used here. There are two to each side of the Razer Blade Stealth's underside, but their relatively small diameter means they produce an obvious high-pitch whine under pressure. More so than a Dell XPS 13, for example. If you're going to use this laptop as the brain of a home gaming setup, you might want to find a sound-insulating cupboard into which you can dump the thing.

For the first few hours of testing, the fans seemed to yo-yo all over the place in terms of their revs, sounding like they were preparing for take off with no justification. However, this seems to have settled down and the Blade Stealth is largely near-silent with normal light use.

Battery life

To see how long the Razer lasts with light use, we set it to play a 720p video on loop until the battery died. It lasted six hours 42 minutes at 120cd/m² screen brightness.

It's not mammoth stamina, but should be enough to get your through most of a work day. And is certainly better longevity



than that of a great big gaming laptop. You will likely get better battery life from the QHD version too, thanks to the sheer number of pixels our review unit has to drive in our 4K version.

Audio

You get no prizes for guessing how the speakers work. They pipe out from the grilles to the left and right of the keyboard, giving you a clear stereo effect and dispersal that doesn't depend on how the laptop sits on the table, floor or your lap.

We had a chance to listen to the Stealth alongside the new MacBook Pro, the HP Spectre 13 and Microsoft Surface Book. It's one of the loudest and beefiest-sounding of the bunch, only beaten by Apple's MacBook, which has impressively powerful speakers for its size.

The tone of the sound is rather nice too, without the clear skews some laptops suffer from when they try to sound bassier. We could happily watch a film on the Blade Stealth without wishing we had a speaker to plug in to.

Verdict

The Razer Blade Stealth is an accomplished little laptop that can sidle up to the flashiest ultraportable laptops without seeming like the weird gamer kid in the corner. It's slim, it's moody and you can tweak its personality with the multi-colour keyboard backlight: pink on black is a strong look. Its 4K screen is stunning if you don't mind ultra-energetic Adobe RGB-style colours and while battery stamina isn't amazing, it roughly matches the new MacBook with OLED touch panel. It's a shame the cost of making this a home gaming laptop with the Core attachment is so high, but the Razer Blade Stealth convinces as a pure and simple ultra-light laptop, too. Black is back for everyone tired of brushed aluminium and 'rose gold'. We'd recommend buying the cheaper version than we're reviewing unless you absolutely need loads of ultra-fast storage and a 4K display. While the Quad-HD version loses the immense colour saturation, it'll still look sharp across 12.5 inches and at £999 is a solid deal.  **Andrew Williams**



£1,499 inc VAT

Buy from
■ asus.com/uk

Specifications

12.5in (1920x1080, 176dpi)
LCD glossy; Windows 10
Home 64-bit; 2.7GHz, up to
3.5GHz Turbo Intel Core
i7-7500U, two cores four
threads; Intel HD 620 GPU;
16GB RAM DDR3-2133; 512GB
SSD; 802.11b/g/n/ac 2x2;
Bluetooth 4.1; 1 USB-C 3.1
port; quad speakers; HD
webcam; digital array mic;
3.5mm headset jack; UK
tiled keyboard; 40Wh
lithium-ion battery
non-removable;
296x191.2x11.9mm; 910g



LAPTOP

Asus ZenBook 3



The ZenBook 3 UX390UA is a top-tier ultraportable laptop. Asus makes dozens of more powerful machines, but if there's one you'd find in a glass case, on a rotating pedestal, this is it. Typical of the ZenBook range, it gets you more spec-per-pound than a lot of rivals. It's also incredibly thin and light, without compromising battery life.

Price

The entry-level Asus will set you back £1,099. That's not cheap, but a comparable MacBook Pro will cost you almost £600 more, and that's not the Touch Bar version either. What's remarkable at this price is that this laptop includes a 512GB SSD. Even Windows alternatives tend to include 256GB, with the 512GB drive an expensive upgrade. The version has 8GB RAM and an Intel Core i5 processor.

Our review unit is the more expensive option and comes with an Intel Core i7 GPU and 16GB RAM. However, at £1,499 this version isn't as compelling a purchase.

Design

The UX390UA is the sort of ultraportable that will elicit praise from everyone who picks it up: it's incredibly slim and light. Asus has tried pretty hard to nail the 'svelte' factor. It's all-aluminium, tapers down to a fine edge at the front and uses slimline rubber pads on the bottom rather than the thick

(but practical) ridges found on a Dell XPS 13 (page 22). This laptop also has a 12.5in screen rather than the 'industry standard' 13.3in size, so its footprint is small too. Plus, it weighs just 910g and is only 11.9mm thick.

Connectivity

You pay for this design when it comes to connectivity: it has just one USB-C port, also used for power, and a headphone jack. There's no memory card slot, no full-size USB and no dedicated video output. Only the 12in MacBook has connections this compromised. It makes you wonder why there's even a 'power user' Core i7, 16GB RAM version of this machine, when you'd imagine that sort of buyer might want to plug in some accessories. To do this, you'll need a USB-C dock such as the Targus Dock410, (page 59).

Keyboard and trackpad

Asus has also redesigned its usual keyboard and trackpad style, and not with great results. The UX390UA's keys are very shallow, and the pad click subtle, almost to the point of non-existence.

It's similar to the MacBook, but whereas Apple's laptop tries to make

up for the ultra-low key travel with a clicky feel, the Asus has a more conventional key response. We have issues with Apple's style, but this particular take on it doesn't work very well. Typing feels a little too vague. Of course, this is something you will get used to even if you don't like it. Most of the keys are of a good size though, with side buttons like Shift and Ctrl given plenty of space. The keyboard has a backlight too, one with three brightness levels. It's nothing like the Razer Blade Stealth (page 24), but it does the job.

The trackpad is the part we find hardest to live with. It's too spongy and vague, and a lot of the time the main click feedback fires off as you lift your finger rather than at the bottom of a press: very odd. The textured glass surface is perfect and the clicker near-silent, but for pure practicality we'd prefer one of Asus's previous pads.

There's also a fingerprint scanner, the darker grey square to the top-right of the pad. This is used as part of Windows Hello and lets you login and avoid having to type in your password in the Windows store. Unfortunately, in use it's currently much less reliable than

The UX390UA will elicit praise from everyone who picks it up: it's incredibly slim and light. Asus has tried pretty hard to nail the 'svelte' factor

the now-excellent finger scanners used in phones. Too often, it doesn't recognise a fingerprint, or takes a second- or third attempt to successfully log you in. It still feels very much like a beta feature.

Display

You might expect the highest-specification screen of any Asus ZenBook in the UX390UA, but it's relatively conservative. There's no touchscreen and resolution is only full-HD (1920x1080 pixels). Get close to the screen and you can see some pixellation.

Colour performance is good rather than fantastic: it covers 85 percent of the sRGB colour standard, 62 percent of Adobe RGB and 67 percent of DCI P3, the cinema standard. This is enough to make the UX390UA look punchy and vivid, but we'd like to see it hit 100 percent sRGB coverage at this price.

If you don't need full colour coverage for professional purposes, the screen looks good, though. A lot of this is down to the very good contrast ratio of 999:1, which has a big impact on how lively colours appear.

At 370cd/m², top brightness is excellent, too. While the UX390UA has a glossy screen rather than a matt one like some of Asus's cheaper ZenBooks, you'll be able to use the laptop outdoors. The top layer of the screen is Gorilla Glass 4, so should be pretty safe from scratches unless you really treat particularly roughly.

Performance

Our review unit has an Intel Core i7-7500U CPU, one of the higher-end dual-core models from Intel's Kaby Lake range. While a high-efficiency CPU, it's not the sort of ultra-low power Core M model we might have expected in a laptop this thin

a year ago. There are no obvious performance trade-offs in use either. The Asus scored an excellent 2899 in PCMark 8, while in Geekbench 4, it recorded 8113 points, 4155 per core. Both these scores are better than those of the Dell XPS 13 and Razer Blade Stealth even though they use same CPU.

The difference is large enough not to be simply a 'lucky run' blip, too. This machine has faster RAM than those, which may have a hand in this. Bear in mind, though, we're using the £1,499 model of the laptop rather than the £1,099 version you might be considering. For any kind of light 'everyday' use there won't be a great difference between the Core i5 and i7 options.

Don't expect to play new games, though. It uses an integrated Intel HD 620 GPU, which can handle older titles only. Alien: Isolation averaged 24fps at 720p, minimum graphics, and Thief at a dismal 15.2fps, dropping to 6.2fps at 1080p. Stick to older or casual games.

We're impressed with how the ZenBook 3 handles heat. A laptop this small with a Core i7 isn't going to be able to rely on pure passive cooling, but its fans are not annoying. Their revs scale up and down smoothly, and while they are reasonably high-pitch, there's no irritating whine here.

Audio

Asus has also put extra work into the speakers in partnership with Harman Kardon. The company's previous laptops have used branded speakers like these, but the UX390UA has a quad-driver array that provides real benefits.

There are two drivers above the keyboard and two on the underside. The ones above the keyboard are bassier, and the ZenBook 3 manages to make kick drums sound punchier

than most slim laptops. Unlike some giant gaming laptops, the sound doesn't sound muggy either.

Battery life

The UX390UA has a 40Wh battery. That's a lot smaller than the 60Wh unit of the Dell XPS 13, but longevity is still reasonably good. Playing a 720p video on loop at 120cd/m² brightness (42 percent of max), the Asus lasted for six hours 55 minutes. The firm's own claim is that it lasts up to nine hours, which you may be able to achieve by further dimming the display. There's a sacrifice here compared to the longest-lasting slim laptops in this class – the Dell XPS 13 lasts for an excellent 12.5 hours in the same test – but the UX390UA will still get you most of the way through a day's work.

As noted before, you use the USB-C port to charge the battery, and it's quick to recharge, too. Asus says that it will reach 60 percent in 49 minutes.

Verdict

The ZenBook 3 UX390UA is an extremely light laptop and one that doesn't compromise performance or kill battery life as a result. It's also more affordable than some of the alternatives, particularly in its entry-level specification. However, we're not convinced about all the choices Asus has made. A single USB-C port won't cut it for a lot of buyers, the ultra-slim keyboard isn't great for long-form typing and the trackpad's clicker mechanism has some real issues. The trackpad also seems a bit pointless when its reliability is so mediocre, even if it's down to Microsoft's software. Its portability is just about unbeatable, but some of you may prefer the more accommodating style of the Dell XPS 13 or one of Asus's cheaper ZenBook models.  **Andrew Williams**



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Specifications

6.4in full-HD (2040x1080, 362ppi, 17:9) edgeless IPS LCD; MIUI 8 (based on Android 6 Marshmallow); 2.35GHz Qualcomm Snapdragon 821 quad-core processor; Adreno 530 GPU; 6GB LPDDR4 RAM; 256GB UFS 2.0 storage; fingerprint scanner; dual-SIM dual-standby; dual-band 802.11a/b/g/n/ac Wi-Fi; Bluetooth 4.2; GPS, A-GPS, GLONASS; NFC; USB-C; 16Mp rear camera, f/2.0, EIS (gyro), phase detection autofocus, dual-LED (dual tone) flash; 5Mp front camera; video recording: 2160p at 30fps, 1080p at 30fps, 720p at 120fps; 4400mAh lithium-ion battery, non-removable, with QC3; 158.8x81.9x7.9mm; 211g

Build: ★★★★★

Features: ★★★★★

Value: ★★★★★

Performance: ★★★★★



SMARTPHONE

Xiaomi Mi Mix

Previously a concept phone, Xiaomi has put its Mi Mix into production. At its unveiling this revolutionary new Android phone entirely overshadowed the amazing Mi Note 2, with a design quite unlike anything we've seen before.

Price

Xiaomi is looking to enter the global market, and in 2017 we should see its phones begin to go on sale in the US. However, for now the UK is not on its list. Xiaomi phones are not officially sold here, which means you need to import them via Chinese grey-market sites such as GearBest, which supplied our Mi Mix for review.

This presents a number of issues, which means some UK consumers will choose to look elsewhere for their next mobile phone. The brave among you will be rewarded though, provided nothing goes wrong and your device is delivered in full working order. And this has been the case for us with every Xiaomi phone (and other Chinese phones) we've reviewed.

Chief among the risks of buying from China is the fact you are not protected by the same consumer laws as you are when buying from the UK or Europe. That's not to say you won't be able to get a refund on a faulty product, but you should know that obtaining one may require you to jump through some hoops. GearBest recommends that people take advantage of the insurance option when buying from its site.

And while delivery to the UK may be free, there will likely be import duty to pay before you can receive the item. This is calculated using whatever pricing information is given on the shipping paperwork (20 percent), plus an admin fee of £11 (via DHL). You should factor this into the total purchase price.

All these phones, including the Mi Mix, are sold SIM-free, which has both its advantages and disadvantages. You can add whatever SIM you like and won't be tied down to a 24-month contract where you pay over the odds for the phone but in more manageable monthly payments. However, it also means you must pay for the phone in full up front. And that could be an issue here.



Chinese phones are well known for undercutting their western rivals, offering similar specifications at a much lower price. Don't get your hopes up just yet, though.

Consider that you would pay £919 for the iPhone 7 Plus with 256GB of storage. That phone comes with just 2GB of RAM, no edgeless display and no gold. The Xiaomi Mi Mix does undercut the 256GB iPhone 7 Plus, but not by as much as you might have hoped. The 6GB RAM, 256GB storage model we've reviewed here costs £799.

Although you'll need to have deep pockets to purchase the Mi Mix, we must point out that right now there is no other phone like it on the market. If you want to own the type of phone where people look over your shoulder and say "Wow, that's cool", then this is absolutely it.

Design

You've already heard us gushing over the design of this phone a number of times in this review, and it truly does have a really cool,

absolutely unique look. But (and that is admittedly a little but), it's actually not all good.

The Mi Mix is big - way too big for comfortable one-handed use at all times - and heavy (256GB of storage and a huge 4400mAh battery will have that effect, unfortunately).

At 158.8x81.9x7.9mm, it's roughly the same height as the iPhone 7 Plus, but a touch wider and thicker. It's also 23g heavier at 211g, but combined with the extra width that 23g could be 230g. Okay, we're exaggerating, but this is not a phone you won't feel in your pocket, and if you have small hands you'll want to grip its slippery ceramic surface tight. (Preferably in the same place since fingerprints can be an issue, but pleasingly these are more easily wiped away from the Xiaomi's screen and ceramic rear than they are most smartphone glass.)

Of course there are silver linings, and you're unlikely to lose a phone you can feel at all times. The huge 6.4in full-HD screen is also fantastic for viewing media and playing

games, though we should point out that you don't get to enjoy all 2040x1080 pixels at all times.

Most full-HD screens have a resolution of 1920x1080 pixels, so here you have an extra 120 pixels on the height. This is roughly the amount of space that is gained by removing the top bezel, and in most cases on the Mi Mix it is used to display the bottom navigation bar. This bar is customisable and can be hidden from view, but that extra 120 pixels is not then used by all apps. When playing a game or watching an iPlayer show, for example, you get a black bar to the right of the viewable image. The visible display area in these apps is still just 1920x1080 pixels, with the Mi Mix offering a 17:9 screen ratio.

We're surprised to find the resolution of the display is just full-HD given how revolutionary is this former-concept phone. We've been seeing Quad-HD and even 4K Ultra-HD screens on rival smartphones for a couple of years now, so the Mi Mix is decidedly low-res by comparison. It seems we've longer to wait before we see a Quad-HD Xiaomi phone.

However, as many reviewers will tell you, although a difference is visible between full- and Quad-HD, for every use we can think of full-HD is an acceptable resolution for a smartphone screen. With a pixel density of 362ppi (above the 326ppi 'Retina' specification quoted by Apple, but a little below the 401ppi of its own iPhone 7 Plus), everything shown onscreen is crystal clear and entirely free from fuzz.

Using IPS tech, we found the display to offer lifelike colours and excellent viewing angles. The screen is very bright, and we like the ability to alter both contrast and colours in the display settings. The Mi Mix also has a reading mode that can prove easier on the eyes by reducing glare.

As you can imagine, even the largest hands will have difficulty reaching a thumb all the way across to the far corner of the screen. Here the one-handed mode comes into play, which is a feature of the MIUI custom operating system on all Xiaomi smartphones.

By tapping the home button and swiping across to either the back or recents button you can reduce the active screen to a more comfortable size. By default it will shrink to 4.5in, but if this is still too large you can

opt for 4- or 3.5in in the Settings menu. You then tap any area outside the visible screen to return to the normal full-size view.

Another feature of MIUI can also be useful if you're having difficulty managing the large screen, and that is the Quick Ball. On the Mi Mix you can add a toggle to the bottom navigation bar for activating Quick Ball, which makes it easier to launch when required without ploughing through the settings. In essence, this is a movable dot that you can place anywhere you like onscreen. When tapped it reveals options to go home, back, open the recents menu, lock the screen or take a screenshot.

These software features are handy in use, but they don't change the fact that the Mi Mix is a very big phone. On the bright side, it is a big and very beautiful phone.

Part of the reason for this is Philippe Starck's input in the Mi Mix's design. Starck is a French designer who first became known back in the 1980s for his interior, product, industrial and architectural designs. He quickly caught the attention of Pierre Cardin and it was while working for him that he set up his own design company, formerly Starck Product and then Ubik. He went on to design everything from hotels and restaurants to kitchens and motorbikes. It was Starck who designed Steve Jobs' yacht Venus.

None of that matters, though. What we're getting at here is the man knows his stuff – and it shows. Aside from the fact it is quite big and heavy and can attract fingerprints, it's very difficult to fault the Mi Mix's design.

This phone is a flat slab, where the cameras, fingerprint scanner and everything else sit flush to the body – a high-gloss, jet-black ceramic shell with a mirror-like surface. The corners and far edges are ever so carefully rounded, and even though there is a break between the front and back panels and centre frame, the highly polished effect means you could almost miss it. Meanwhile, the missing earpiece and sensors above the screen allow it to have a smooth, unbroken appearance that stretches nearly the entire length of the phone with an impressive 91.3 percent screen-to-body ratio. Quite simply, the Mi Mix looks as though it's worth every penny of its asking price.

Aside from the awkwardly placed selfie camera (until you turn the phone upside down) everything is exactly where you would expect to find it, with an (also ceramic) power button and volume rocker on the right side, pin-operated dual-SIM tray on the left, 3.5mm headphone jack on the top and USB-C port with speaker grilles on the bottom.

On the rear there's none of that nasty designed in wherever scrawl, simply a 'Mix designed by Mi' legend in gold, with matching 18K gold camera and fingerprint scanner surrounds. The fingerprint scanner sits down the phone just low enough that you can easily reach it with a forefinger when picking up the phone, and it works very well in use – it can even be used to wake the screen when a fingerprint lock is not in use.

Performance

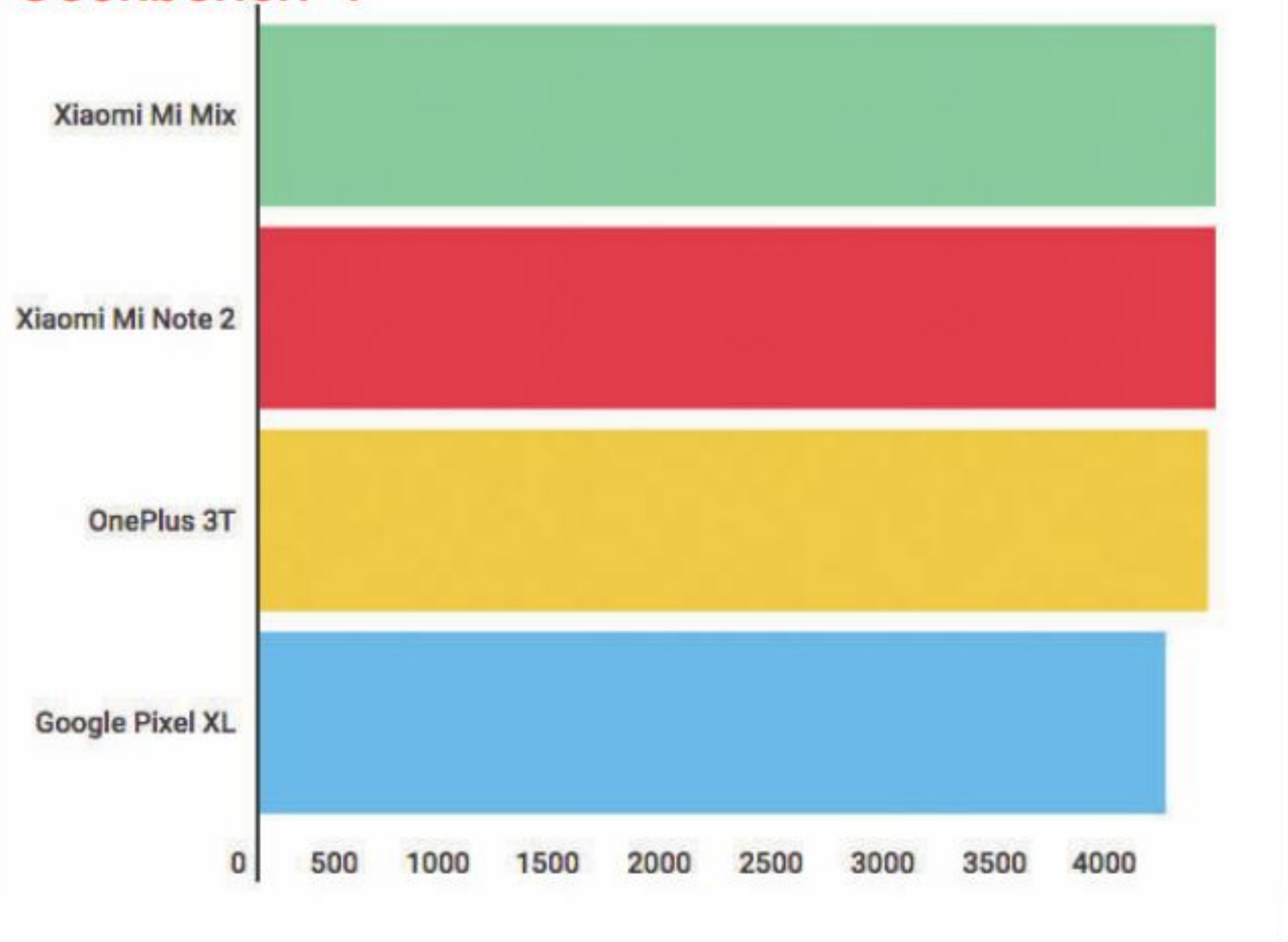
Until the next batch of annual flagship smartphone upgrades arrive at MWC at the end of February 2017, the Mi Mix has a hardware specification to match any rival. There's the powerful Qualcomm Snapdragon 821 quad-core processor running at 2.35GHz, with integrated Adreno 530 graphics and 6GB of LPDDR4 RAM. This matches the specification of the OnePlus 3T, with very similar performance.

In real-world use the Mi Mix is a speed demon in everything it does. Nothing seems to tax it, and it doesn't get even warm in use. You simply can't fault the Mi Mix on performance. No user will pick up the Xiaomi and think it's slow when navigating menus, launching apps or multitasking and, thanks to the full-HD screen, its gaming performance is also very good.

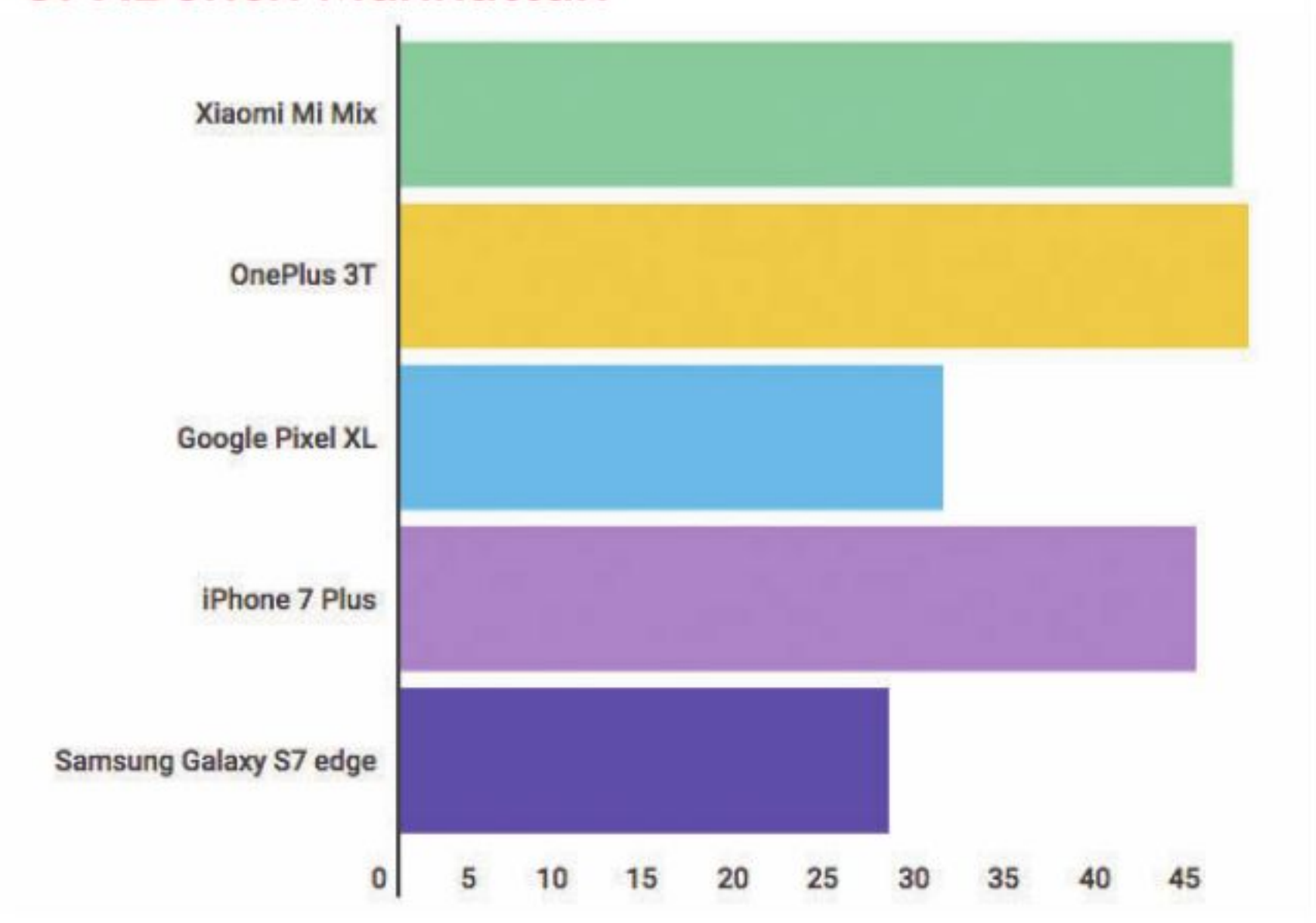
We use Geekbench 4 and AnTuTu to measure overall processing performance, and in the former test the Mi Mix gave the best result we've seen yet with its 4301-point score a touch higher than the OnePlus 3T's 4257. It also gave



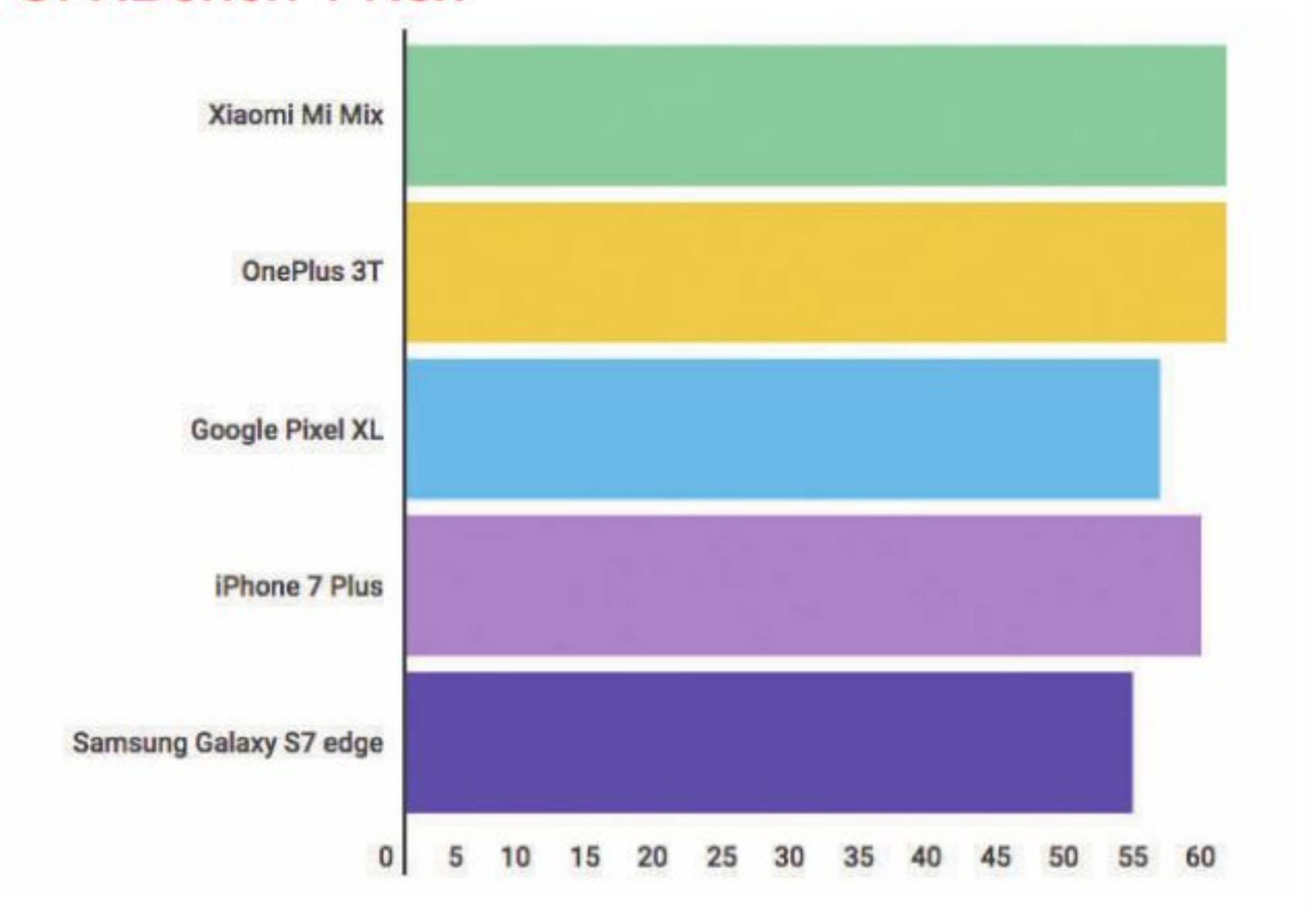
Geekbench 4



GFXBench Manhattan



GFXBench T-Rex



the highest result we've ever seen in AnTuTu 3D, with 144,430 points (unfortunately we don't have results for the OnePlus 3T here).

GFXBench is used to test graphics, and the Mi Mix didn't let us down here. With scores of 60fps in T-Rex, 46fps in Manhattan, 32fps in Manhattan 3.1 and 20fps in Car Chase its gaming performance is incredible, and right up there with all the other 2016 flagships.

Our final benchmark is the JetStream JavaScript benchmark, and here the Mi Mix turned in

scores in line with its rivals with an average of 53.787.

A highlight of the Mi Mix is its 256GB of fast UFS 2.0 storage. There's no microSD support on this phone, but with such a huge amount as standard plus the flexibility of cloud-storage services such as Google Drive and even Xiaomi's own MiCloud, running out isn't going to be an issue.

Battery life is incredible, and way beyond that of the Mi Mix's closest rivals. Even with heavy usage we can get two days of life from this phone thanks to its 4400mAh battery, and with lighter use you could potentially get longer. There's Quick Charge 3.0 support too, which when paired with a compatible charger can power the battery four times faster than a standard charger. Combine the two, and the vast number of power banks we've collected over the years is here largely redundant. If we had to complain, there's no support for wireless charging and the battery is not removable.

Connectivity

The Mi Mix supports UK 4G bands 3 and 7, but not 20 (also known as 800MHz). According to GearBest its cellular connectivity is as follows: GSM, B2/B3/B5/B8; CDMA, 1X/EVDO BCO; WCDMA, B1/B2/B5/B8; TD-SCDMA, B34/39; FDD-LTE, B1/B2/B3/B4/B5/B7/B8; and TD-LTE, B38/B39/B40/B41.

All the main UK mobile operators own bandwidth in the 800MHz frequency, but only O2 uses it exclusively for 4G. What this means is that all users might find they are unable to connect to 4G in some places it was previously available to them, and 4G won't be available at anyone on the O2 network. This also applies to customers of virtual mobile operators that piggyback O2's network, such as GiffGaff and Sky Mobile.

Using a Vodafone account we haven't found connectivity to be an issue with the Mi Mix. It seems as though we are able to access 4G less often than we were with a previous phone that supported the 800MHz band, though it's impossible to tell for sure without running the two side by side. We have always been able to access 3G or a nearby Wi-Fi connection in any case, so calls, texts and mobile data usage haven't been a problem.

While you probably wouldn't want one of them to be an O2 SIM for obvious reasons, the Mi Mix is a dual-SIM dual-standby phone, which means you can add and operate two SIMs (both are Nano-SIMs). Only one can be used for mobile data, but you can choose which you want to use for calls and texts and accept them in return on either SIM. This is ideal for business users who want separate phone numbers for work and home, and also for those venturing abroad and wish to take advantage of a local SIM.

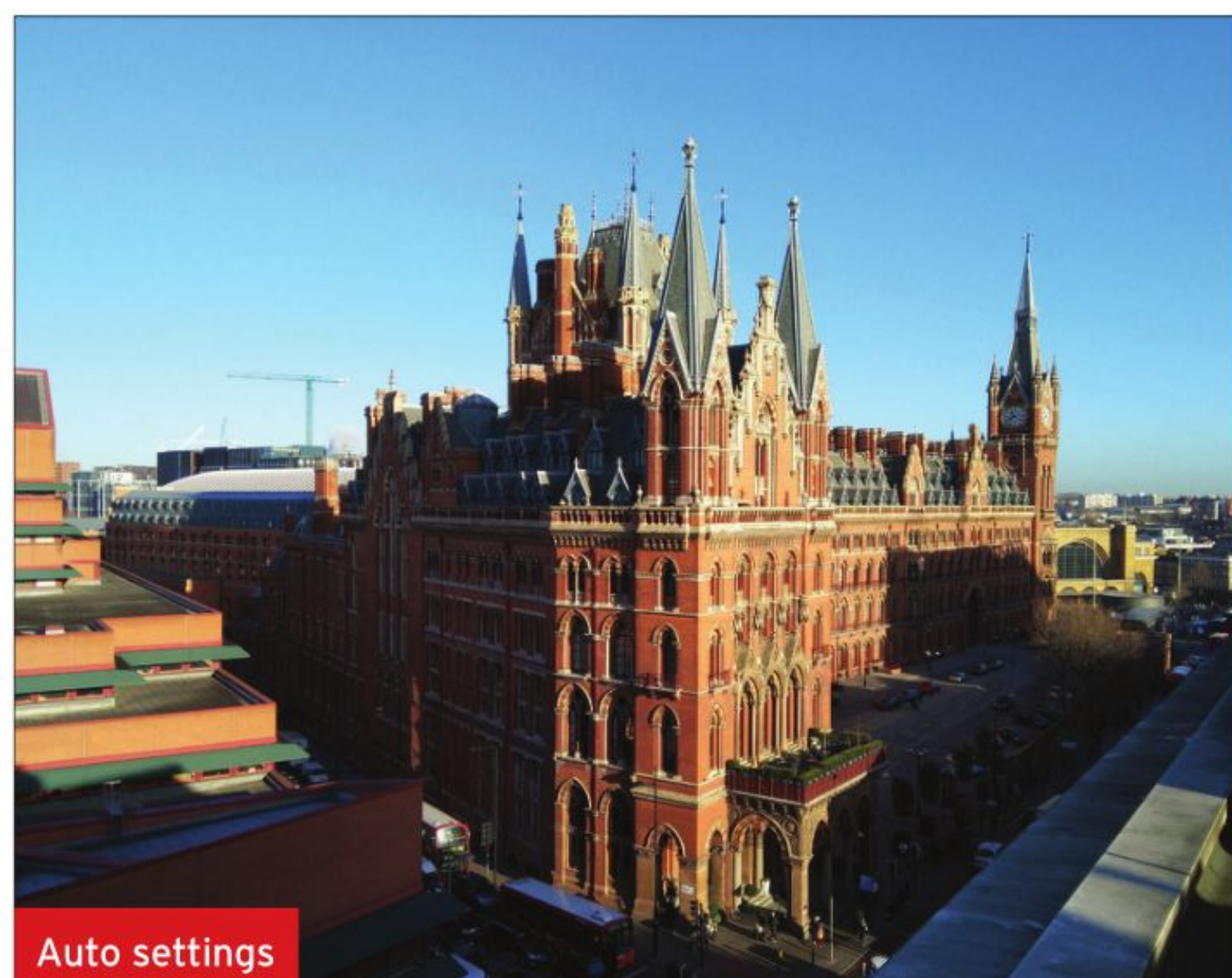
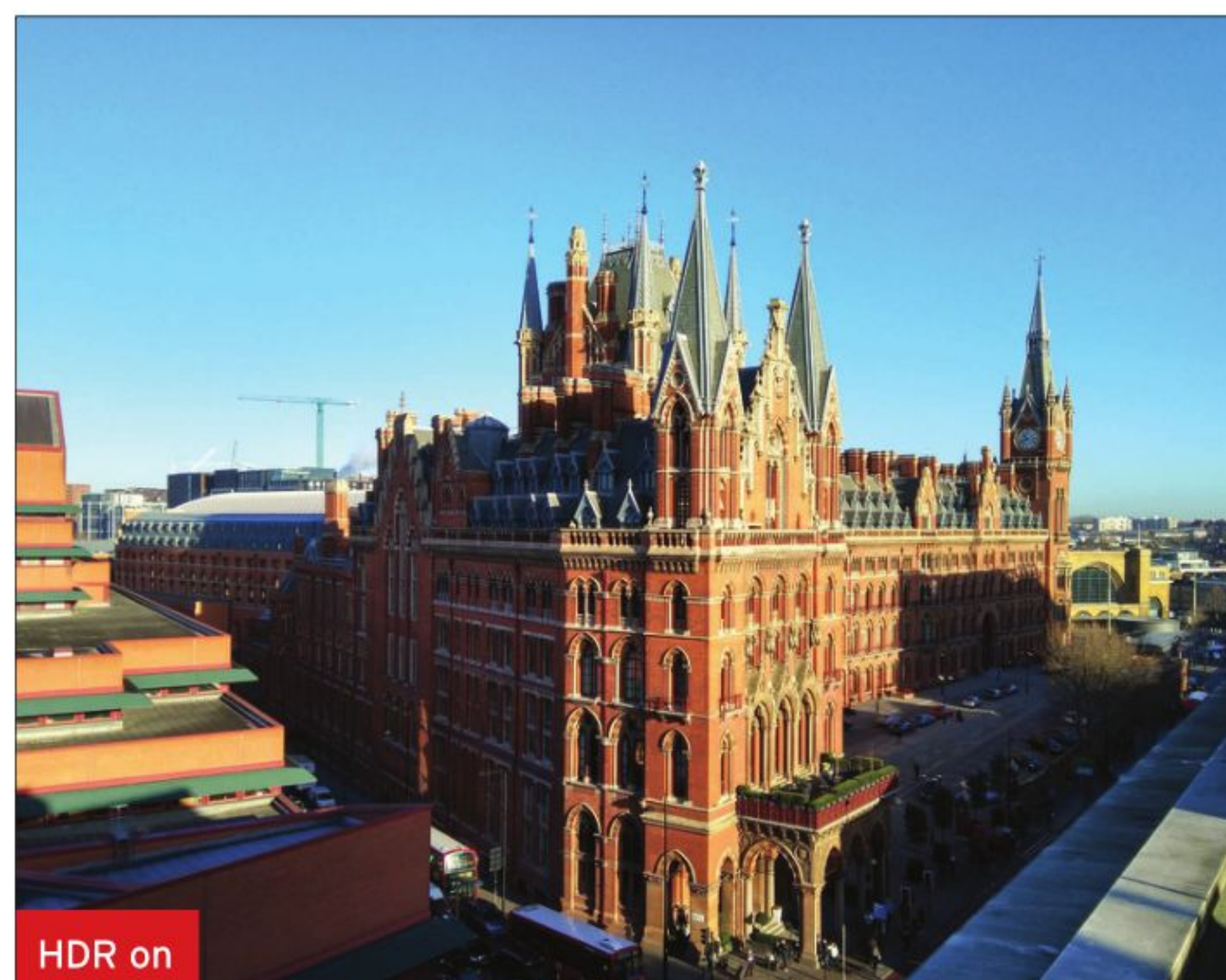
MIUI 8 supports dual apps, which means you can run two instances of the same app with both icons displayed on the home screen. For apps that require a phone number to sign in - for example, WhatsApp - this can be handy and would allow you to have separate accounts for each of your SIMs. In other respects all connectivity bases are covered, with dual-band 802.11ac Wi-Fi, Bluetooth 4.2, NFC, USB-C, GPS and GLONASS. Although Google Maps isn't preinstalled on the phone, it's very easy to quickly download and install from Google Play.

Cameras

The camera setup on the Mi Mix is a little different than it is on most phones, given that we've lost the top bezel of the phone. Instead, the selfie camera is located at the bottom right corner of the phone, which is, to be honest, plain weird.

When you launch the selfie camera the focus is completely wrong, capturing you from the chin (or chins - it's not a flattering angle) up and with you appearing to look into the sky. The only way around this is to turn around the phone, which places the camera at the top left of the phone. It's annoying, but we don't see a better solution.

The selfie camera itself is as good as any, rated at 5Mp and with many of the same features as the main camera app. You can access real-time previews that allow you to apply Lomo, Color pop, Rustic, Icy, Vivid, Analog, Matte, Mono and B&W filters, as well as a handful of fun effects including Sketch, Spread, Squeeze, Stretch, Fisheye, Mosaic, Mirror and Tunnel. There's a countdown timer, an audio mode that will pick up when you say "Cheese" (or whatever comes to mind) and countdown from three,



and a GroupShot mode. By default a Smart Beauty filter is set to Medium, and you can alternatively set it to Low, High or off. If you want more control the Pro mode offers a sliding scale for skin smoothing, face slimming and eye widening.

All these options are also available for the Mi Mix's primary camera, plus you get modes for Panorama, Manual, Straighten, Square, HHT and Tilt-Shift. Both HDR and the Flash can be on, off or set to auto, and are available from the top of the screen. Meanwhile, pressing and holding the shutter button triggers a burst mode and in the settings you'll find options for adjusting contrast, saturation, sharpness and exposure.

This camera is unsurprisingly better specified, and as well as 16Mp stills (by default at 4:3) it can capture 4K video at 30fps. It supports EIS, phase-detection autofocus and is paired with a dual-tone flash but, to be frank, at a time when others are offering phones with fancy features such as dual-cameras on paper at least it's nothing special.

What really counts, though, is the quality of the photography. As you'll see from our standard test shots of the St Pancras International Renaissance Hotel above, in auto mode and with HDR engaged, photos are dripping with colour. Detail is very good, even capturing ground-level road names when shot from our seventh-floor roof terrace, though there is some blurring.

Software

Many readers will be unfamiliar with the MIUI 8 operating system running

on the Mi Mix. It's a custom version of Android Marshmallow, but one of the largest departures from it.

The most obvious difference between MIUI and vanilla Marshmallow is the lack of Google apps. With most Xiaomi phones we review, we would be talking about a complete lack of Google apps and Google services. Fortunately, the Mi Mix we received from GearBest is running the International ROM, so although we still had to add our own apps such as Maps and Drive and set up their permissions to allow them to run smoothly it did at least come with the Google Play Store and the ability to add a Google account out of the box.

In another nice surprise, the Mi Mix came with no bloatware preinstalled, and we saw no Chinese-language apps and notifications. Although we'd like to have the ability to uninstall some of the original apps that now duplicate functionality for our preferred Google apps, we can hardly say they are junk. The difference between MIUI and Android is that you don't need a Google account as long as you have a Mi account - everything you need is here.

Another big change from Marshmallow is the removal of the apps tray. As it is in iOS, everything installed on the phone is displayed on the home screen. We used to strongly dislike this approach and the resulting mess of apps cluttering the display, but then we found folders - the virtual equivalent of chucking everything in a cupboard and tidying it another day. We're still not entirely convinced, but it does make it easier to find things which

may otherwise have lost their home screen shortcut following an update.

Finding things can be an issue with MIUI 8, simply because the Settings menu is so different to that of standard Android. Not everything is where you might expect to find it, so it's great that there's a search bar at the top of the Settings menu: type in what you're looking for and you never need know in which Settings option it is actually located.

One of the new features in MIUI 8 is the circular quick-access toggles for frequently used features (mobile data, Wi-Fi, Bluetooth and so on) when you pull down the notification bar at the top of the screen. You'll also find new features such as double-tap to wake, Second Space (which creates a separate space on your phone), individual App Lock and support for Mi Wallet, plus all the other handy features we've mentioned throughout this review.

Verdict

It might sound expensive, but the £799 Mi Mix offers very good value when you consider its meaty core hardware and generous 256GB of storage. This isn't a phone you buy with budget in mind, however: the Xiaomi is the phone you buy when you want onlookers to say "Oh my gosh, what is that? It's amazing - I want one of those." It's a revolutionary phone that we hope is a sign of things to come, with that gorgeous bezel-less display, beautiful ceramic body, fantastic performance, long battery life and the other fancy tech we can't even pronounce, let alone understand. No matter - it works. Highly recommended.  **Marie Brewis**

£177 inc VAT

Buy from
■ tomtop.com

Specifications

5.5in full-HD (1920x1080)
JDI fully laminated in-cell display; Android 6.0 Marshmallow; 2GHz Helio X20 (MediaTek MT6797M) deca-core processor; Mali-T880 GPU; 4GB RAM (also available with 2- or 3GB); 64GB storage (also available with 16- or 32GB); microSD support up to 128GB; dual-SIM dual-standby (2x Nano-SIM); 4G FDD-LTE 800/1800/2100/2600MHz; 802.11a/b/g/n Wi-Fi; Bluetooth 4.0; GPS; OTG; fingerprint reader; 13Mp, f/2.2 rear camera with LED flash; 5Mp front camera; 3.5mm audio jack; 3000mAh non-removable lithium-polymer battery; Micro-USB; 150.4x73.2x7.6mm; 175g

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



SMARTPHONE

Elephone S7

Elephone's S7 is a sub-£200 phone with a lot going for it – not least its gorgeous design – and in some respects it even bests its namesake Samsung Galaxy S7. But this is a decent mid-range phone in its own right, and not just a copycat.

Price

It's available in several versions, so you'll have to double-check which you are buying before you go ahead. We reviewed the blue model with a Helio X20 processor, 4GB of RAM and 64GB of storage, which ships free from TomTop's Chinese warehouse for £177 at the time of writing. Because you are buying from China you may be asked to pay import duty upon its arrival to the UK, which you will need to factor into the total cost.

Packages usually come via DHL, which charges 20 percent of the value written on the shipping paperwork, plus an £11 admin fee. In this case then, assuming the full value is on the paperwork, that would work out around £46 and take the total cost up to around £222. That's still fantastic value for a phone with such a pleasing design and decent specifications.

Alternatively, if you're happy to buy the black version instead, you can get it shipped from the EU warehouse. Assuming you will pay import duty on the full value of the phone when bought from China, then buying from Europe will work out cheaper, at £192. You won't have the hassle of paying any fees before you can receive your item, but you do miss out on the opportunity to own the blue model, which is a real looker.

The S7 also comes in green and gold colour options, and in variations with 2GB of RAM and 16GB of storage or 3GB of RAM and 32GB of storage. We're told there is also a version of the Elephone S7 with a 5.2- rather than 5.5in screen.

Finally, a top end option has 4GB of RAM and 64GB of storage, but an upgraded processor in the form of the Helio X25. It is similar to the X20 but runs at a higher clock speed. This model is available for £188 from TomTop at the time of writing.

With every version available under £200, you would likely be on



a tight budget to opt for anything other than the top model. That said, those who aren't too bothered by performance might be happy with one of the lower models, and as all support microSD up to 128GB you needn't worry too much about the storage differences.

Design

One of the best things about this phone is its design. To be honest, knowing there were 5.2- and 5.5in versions we had to get out a ruler to check we were actually holding the 5.5in model. This is a large-screen phablet, yet it feels much smaller with its minimal bezels to the left and right, curved edges on the front and rear, and ultra-thin 7.6mm chassis.

At 175g, it has the weight of a standard phablet, but its petite dimensions make the S7 one of few phones of this size we can comfortably use in a single hand.

That's not even the best bit, though. With its mirror finish light bounces off this phone like a jewel, with what looks like beams of light running right across its surface. It is absolutely stunning – particularly in blue – and that is

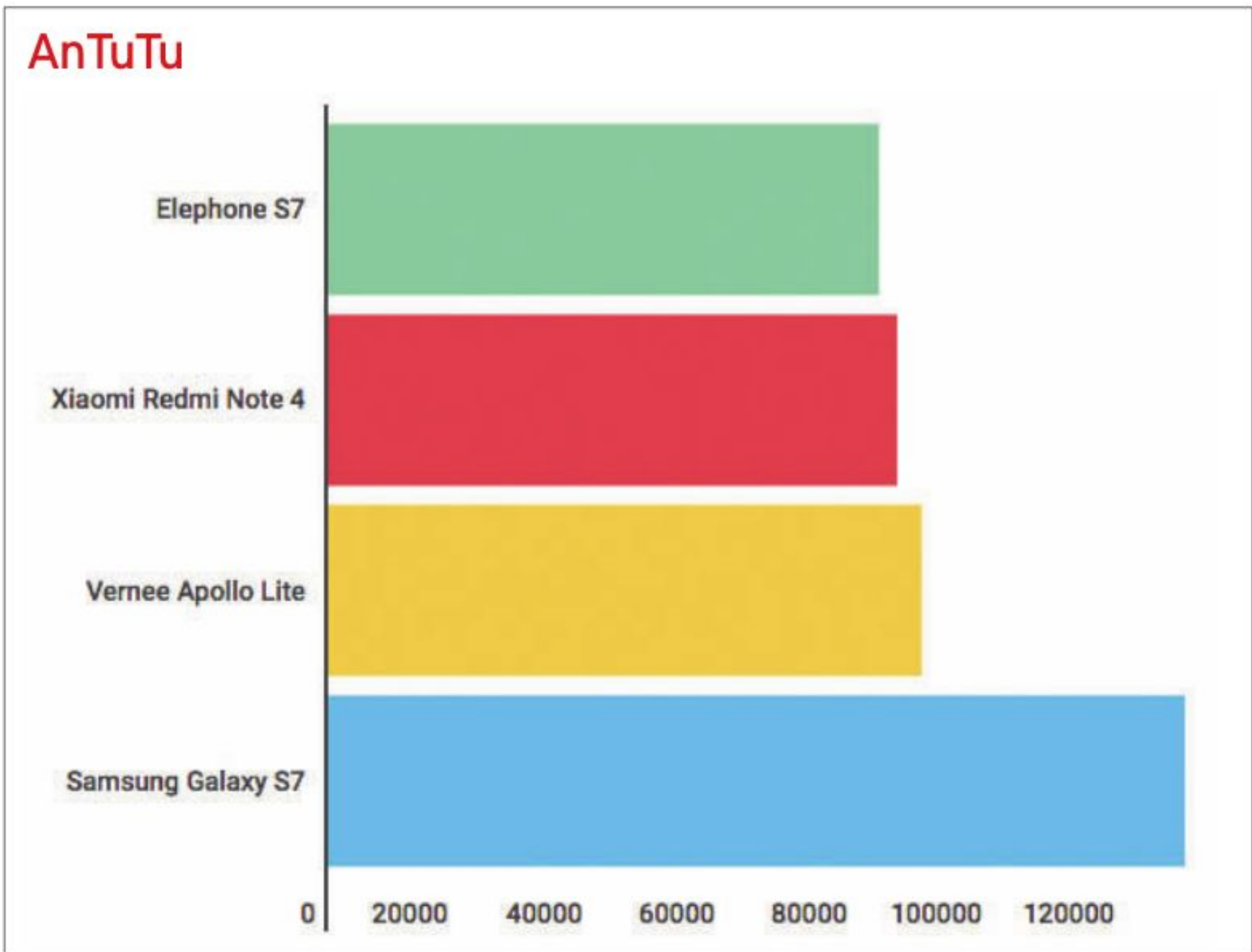
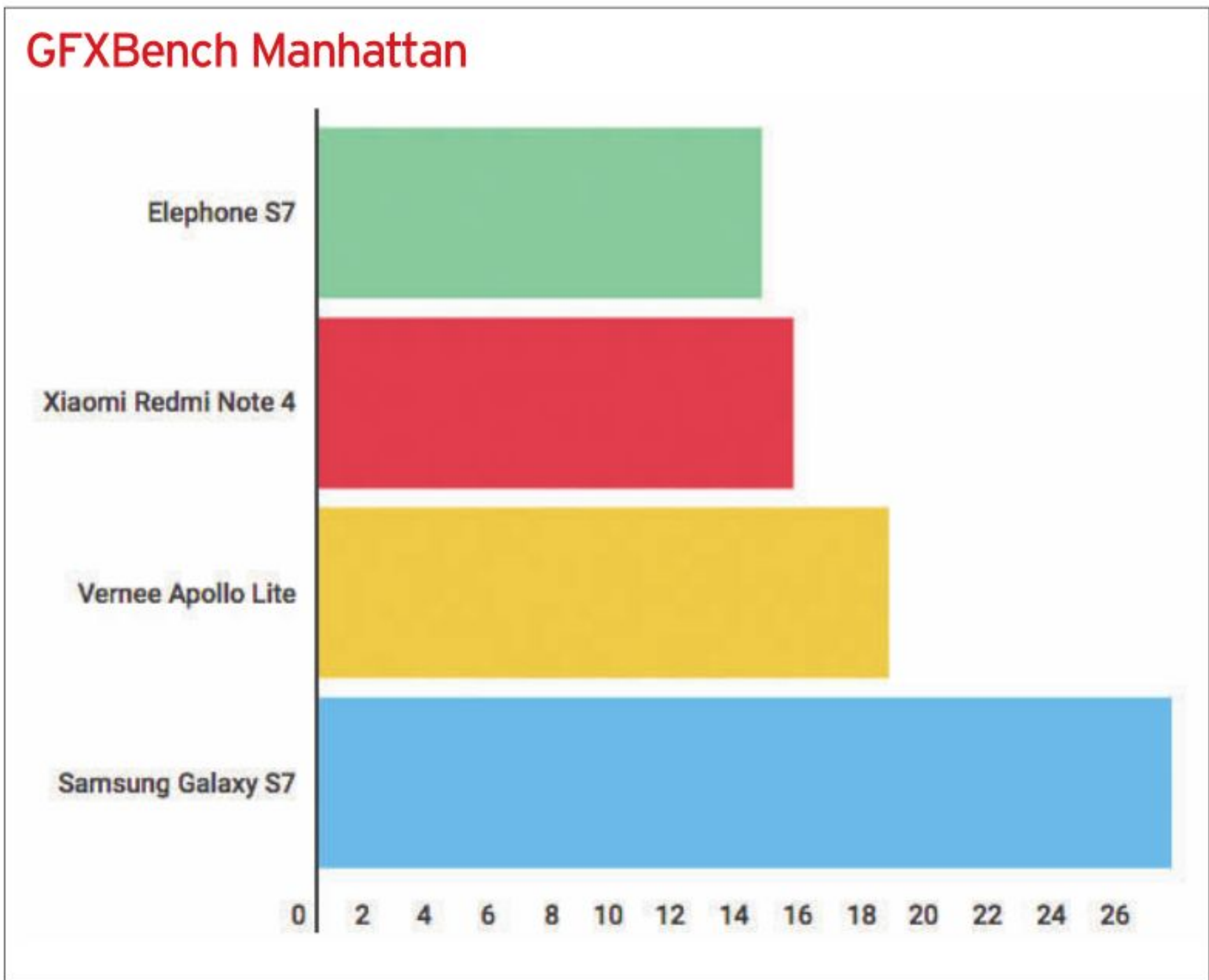
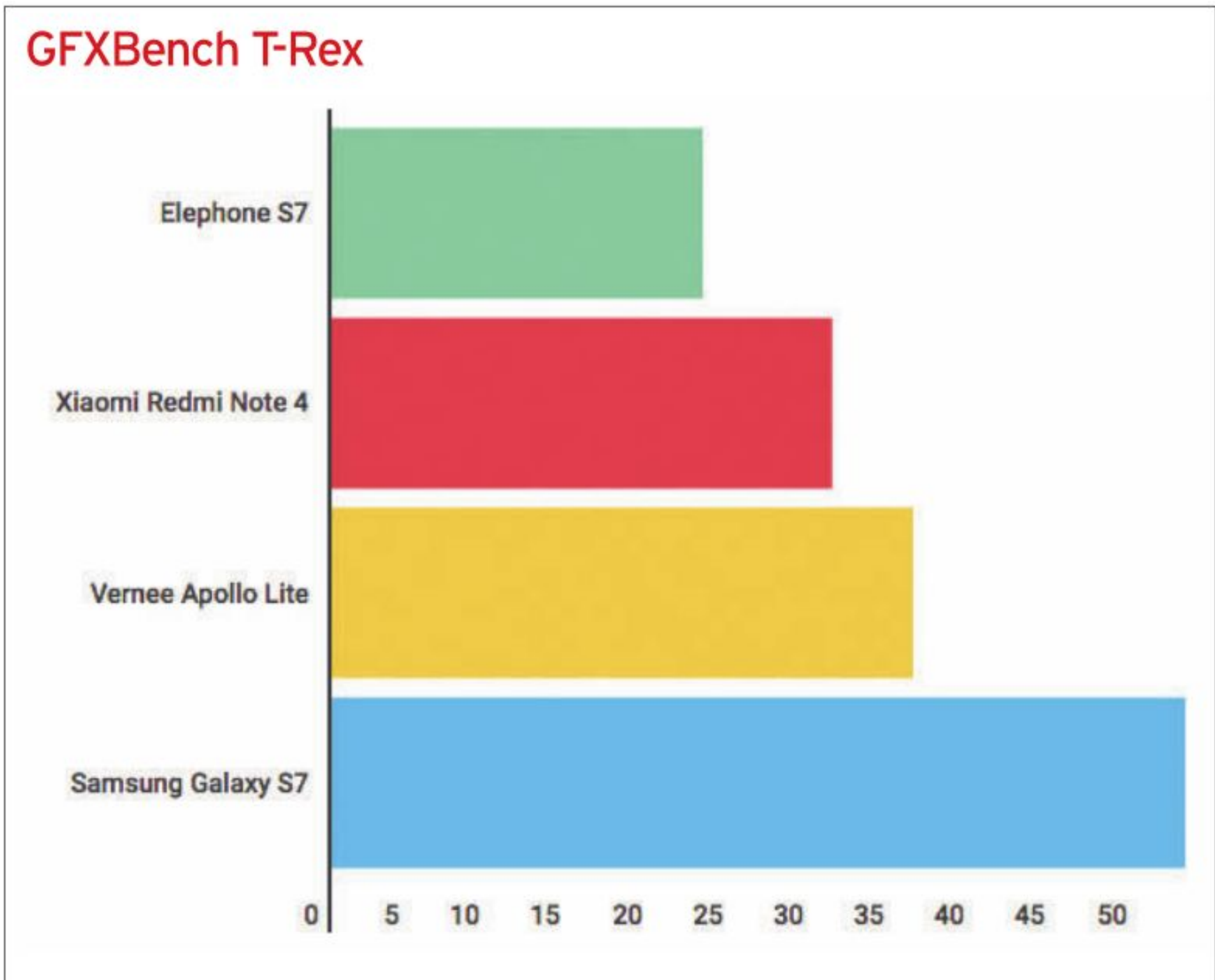
something we never thought we'd say about a plastic phone.

Though its rear panel is designed to look like the glass panel on the back of the Galaxy S7, it's actually a glass front and plastic rear, which meet in the middle around a thin metal frame.

In the hand, the plastic rear makes it feel a little cheaper than what we've come to expect from mid-range Chinese phones, where metal is now the norm, but we like the smooth, albeit slippery, surface. Our only real concern is that it seems to scratch easily, even just sitting on our desk. Meanwhile, the age-old problem of fingerprints isn't overly noticeable.

The 5.5in JDI fully laminated in-cell display is jet black in standby, creating a gorgeous contrast against the blue frame. When switched on it's equally appealing, with a sharp full-HD resolution of 1920x1080 pixels. Colours are good, as are viewing angles.

Usually when we look at phone screens we comment on their brightness, but with the Elephone S7 it's not how bright it can go that impresses, but how dull it can go. You can reduce the brightness all



the way down to 1 nit to eliminate night-time glare; there's also a blue-light filter to protect your eyes.

The layout is standard, with volume and power buttons on the right side, a SIM tray on the left,

headphone jack up top and Micro-USB port and speaker grilles below. Although there are two, it appears to be a mono speaker inside.

Below the screen is a Home button that builds in a fast fingerprint scanner, which uses a self-learning mechanism to operate in just 0.1 seconds. We're not so keen on the fact it is the only button here, though you can activate an onscreen navigation bar in the Settings. As standard you tap the Home button to go back, press it to go home, long-press it to open the Recents menu, or press it twice to access a shortcut key. By default this will open the Settings menu.

We were intrigued to see the Elephone S7 advertised with an iris scanner as an alternative to the fingerprint scanner for security. The preinstalled software includes Smart Lock, which can be activated once you have set up a screen lock and allows you to add trusted devices and places, and set up face-, voice- or body detection. Whenever the Elephone detects any of these things, the phone stays unlocked.

Performance

The Elephone S7 is a deca-core smartphone with the Helio X20 processor inside, also known as the MediaTek MT6797M. This processor is paired with 4GB of LPDDR3 RAM and 64GB - at least in this instance, plus the Mali-T880 GPU.

Performance is very good for a mid-range phone, but in line with other smartphones using the same processor, such as the Xiaomi Redmi Note 4 and Vernee Apollo Lite.

The Elephone S7 recorded a very high 4237 points in the Geekbench 4 multi-core general processing benchmark (and 1597 points single-core), but its results weren't as spectacular elsewhere. We recorded 82,836 points in AnTuTu 3D, 23-, 14-, 10- and 6fps in the T-Rex, Manhattan 3.1, Manhattan and Car Chase components of the GFXBench graphics benchmark, and 25.493 in the JetStream JavaScript benchmark.

On paper, given the specs, you might think it would be a rival to flagships such as the Galaxy S7, but in reality the deca-core processor might have more cores but it isn't as powerful as Samsung's Exynos chip, and though it matches that phone's RAM in capacity it's of the slower



LPDDR3 variety. Nevertheless, it's difficult to argue with performance at this price point, and the Elephone S7 is more than capable of pretty much anything you can throw at it. Even gaming graphics, although not flagship-level, are easily playable and videos look good. Navigation and the launching of apps isn't as instantaneous as on a flagship, but neither is it slow.

Storage is a highlight of the S7, and not only does it (in this version) come with 64GB built-in but there's also a microSD slot that lets you add up to 128GB. Combine this with cloud storage and you'll never run out. A downside of that microSD card slot is that it occupies the same space as the second SIM slot - you can't have both at once.

Fast charging over Micro-USB is possible with a suitable charger, and the S7 can reach 50 percent in 30 minutes or 90 percent in 60 minutes (as with all phones, charging slows as the battery gets increasingly full). This is a 3000mAh non-removable battery, but in our experience it drains fairly rapidly even on standby. Depending on your usage you'll likely get a day, but no more - heavy users should be prepared to carry a power bank. Wireless charging and USB-C would be welcome, but their absence is not going to raise any eyebrows at under £200.

Connectivity

Even now, if you want a dual-SIM phone your best option is to buy a Chinese phone. While smartphone manufacturers seem to think no-one in the Western world has a need for two SIMs, in China it would be more of a surprise to find a phone that didn't support the functionality.

The Elephone S7 is no exception, a dual-SIM dual-standby smartphone with a hybrid SIM slot much like those found on Xiaomi phones. It can accept either two Nano-SIMs, which are both functional for calls and texts at all times, but only one for data, or it can accept one Nano-SIM and one microSD card up to 128GB in capacity.

A key difference between this and Mi phones, however, is that this one supports all UK 4G bands, not leaving O2 customers on the 800MHz band out in the cold with only 3G connectivity to get online.

There's no NFC on this smartphone, which is necessary for Android Pay; nor is there an IR blaster, though these are becoming increasingly rare. Other connectivity bases are covered with dual-band 802.11a/b/g/n Wi-Fi, Bluetooth 4.0, GPS and OTG.

Cameras

Cameras are acceptable but basic on the Elephone S7, which isn't entirely

unexpected. The main camera is a 13Mp, f/2.2 snapper with a single-LED flash, which means it isn't going to be much good in low light, while there's a 5Mp selfie camera at the front. The Camera app is disappointing, with support for real-time filters, but very little else. There's a Picture-in-picture mode and Panorama, and some options can be tweaked in the settings, but we couldn't find even an HDR mode.

The test image (left) was taken on an admittedly grey, rainy day, but even so the results make it look more like the world is about to end. Significant blurring is visible toward the edges, while the central part of the image is over-sharp.

Software

The Elephone S7 runs a vanilla version of Android Marshmallow, so there are no nasty surprises in store. Google's own apps are preinstalled (including Google Play), with very few additions. Those that are here include an Elephone Service helper app, a Search app (that is not Google Search and cannot be uninstalled), a Sound Recorder and a TaskManager. You also get a Turbodownload mode that combines cellular and Wi-Fi data to speed downloads.

The one thing we struggled to get used to was the lack of a navigation bar - the single Home button is used in place of the usual three (Home, Back and Recents), with various patterns of taps and presses doing different things. As we mentioned earlier, pressing the Home button twice acts as a shortcut to an app of your choice. By default, it opens the Settings menu, but you can choose any app you like on the phone.

Fortunately, you can switch on the navigation bar from the Settings menu. Once activated you swipe up from the bottom of the screen to display it, and click the triangle icon to hide it.

Gestures are supported only so far as three-finger screenshots and two-finger volume adjustments.

Verdict

The S7 is a very good-looking phone at an affordable price, with decent performance and a generous helping of storage. On the downside, the cameras are disappointing and the rear panel is plastic. Even at this price you don't need to compromise so heavily.  **Marie Brewis**

£224 inc VATBuy from
■ vmall.eu/uk**Specifications**

5.5in (1920x1080p, 403ppi) full HD display; Android Marshmallow 6.0; Huawei Kirin 655 octa-core processor (4x 2.1GHz and 4x 1.7GHz); Mali-T830MP2 GPU; 3GB or 4GB RAM; 32GB or 64GB storage with microSD up to 128GB; 12Mp/2Mp rear facing dual cameras with LED flash, support for 1080p video at 30fps; 8Mp front-facing camera; 802.11b/g/n Wi-Fi; Bluetooth 4.1; Nano-SIM; GPS; NFC; 3340mAh non-removable battery; 150.9x76.2x8.2mm; 162g

Build: ★★★★★

Features: ★★★★★

Value: ★★★★★

Performance: ★★★★★

**SMARTPHONE****Honor 6X**

In 2016 Huawei took big, confident strides into the Western market. It's continuing to do so right at the start of 2017 at CES, announcing the US availability of its flagship Mate 9 and this, the Honor 6X. Honor is Huawei's not-so-secret sub-brand, its phones largely similar to its parent brand with lower specifications. That's not to say Honor smartphones are inferior. You may be considering the 6X if you are on a budget and aren't concerned with the highest specs possible. Here we see how it compares to other similarly-priced Android phones.

Price

After it was announced at CES in January 2017, the Honor 6X was made available immediately in the UK. You can pick one up for just £224 from vMall UK. That's outstanding value for the amount of smartphone you're getting. It's also good to see it so easily available in the UK, unlike some Huawei phones.

Just be aware that, as we will explain further, the specs differ for each region. In the UK, the Honor 6X is available with 3GB RAM and 32GB internal storage.

Design

The Honor 6X looks better than its price tag suggests. It's available in gold with a white front, silver with white, and grey with black as modern smartphone trends dictates. It has a generous 5.5in screen with thin bezels on the sides meaning the device isn't overly huge in small hands. The overall dimensions are 150.9x76.2x8.2mm and the weight of 162g is about right for a phone of this size; it's certainly not too heavy.

The rear casing has a pleasant curve to it so that the phone is comfortable to hold in one or both hands, and the texture of the rear is akin to an iPhone's metallic sheen - again, great to see at this price. Also packed into the phone are dual rear-facing cameras (more on those in a bit) that sit above a fingerprint sensor, a front camera, power/lock button, volume keys, headphone jack, SIM/microSD slot, Micro-USB port and speakers on the bottom edge.

Out the box, the 6X also comes with a handy pre-applied screen



protector that you can of course discard if you want.

Without banging on about the price, this is a good-looking phone with higher-end materials to back it up. It doesn't compromise on the look, and for that it is commendable.

Performance

So it's an attractive Android handset at a good price. Where does it cut corners we hear you ask? Well, it does, but not to the extent you might expect. The 6X still has enough tricks - tricks, not gimmicks - up its sleeve to warrant praise. The 5.5in screen is a full HD display with a resolution of 1920x1080p and a pixel density of 403ppi.

The 6X is powered by a Huawei Kirin 655 octa-core processor that is firmly in mid range territory, but it had no real trouble browsing the web, shooting off texts from various apps, playing games or videos or anything else we threw at it.

The phone is heavily marketed on its appeal to millennials, hence the dual rear cameras and photo-editing software that may appeal Instagram and Snapchat addicts. One camera is 12Mp and the other 2Mp with a wide aperture range from f/0.95 - f/16, and they're able to produce surprisingly decent effects. More on that in the software section further into this review. It is also capable of full HD recording, plus there's a decent 8Mp front-facing camera.

Honor is releasing this phone to several markets with different specifications depending where you are. In the UK, the 6X is available with 3GB RAM and 32GB storage, but our review model is the 4GB RAM and 64GB storage version. This will mean that ours is capable of ever so slightly more multitasking, but 3GB is still excellent for a smartphone (and, again, a steal at the asking price). So don't worry. You can expand the internal memory up to 128GB with a microSD card.

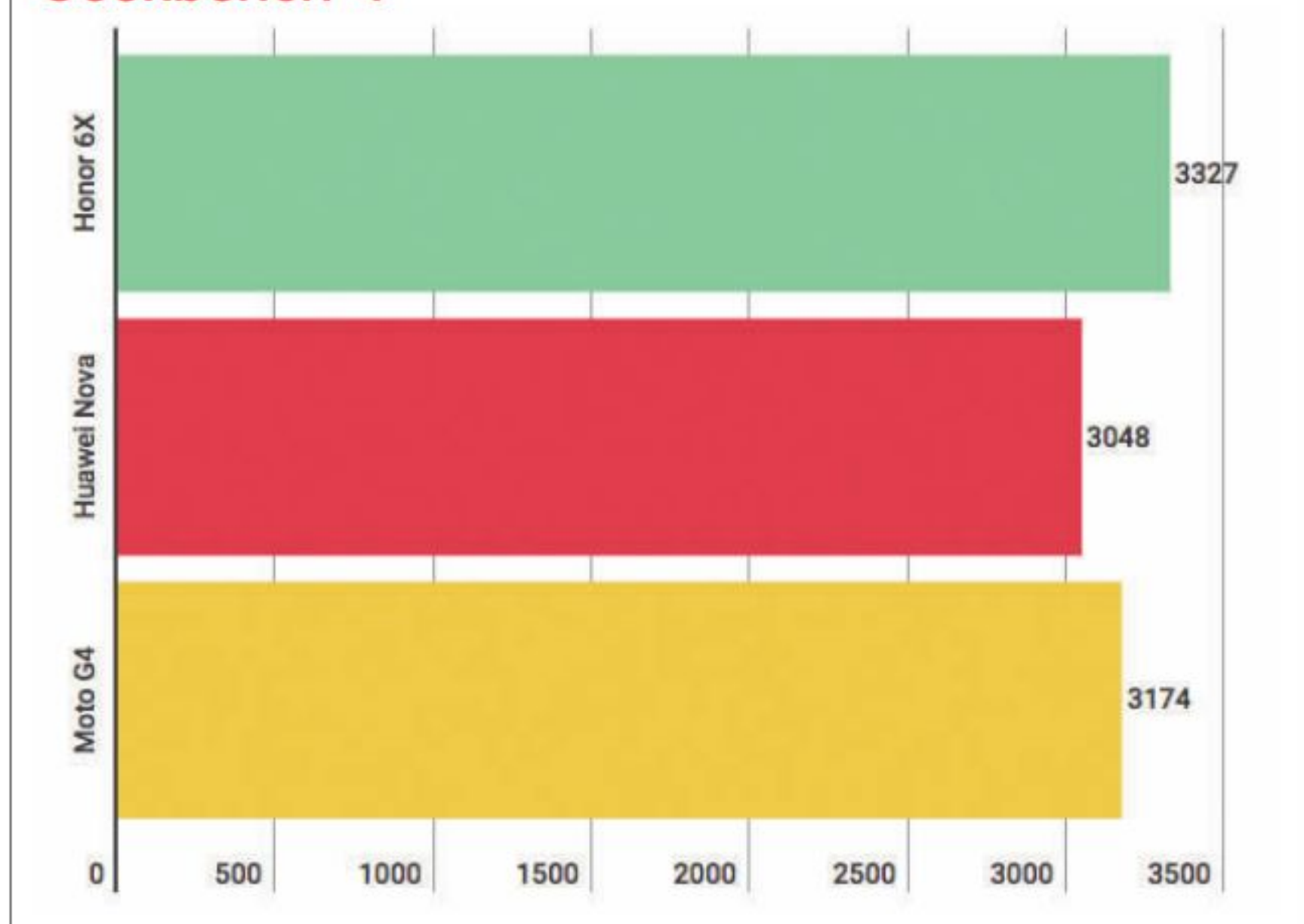
You even get NFC at this price, and full compatibility with Android Pay, which is impressive. It's also great to see a huge 3340mAh battery onboard. Honor claims this will last two days on moderate use and 1.5 days on heavy use. We found this to be pretty much bang on - the 6X didn't let us down for nigh on two days using it for all our smartphone needs. Very impressive.

In our benchmark test, the 6X performed as expected, with a decent score for its onboard specs. It even compared surprisingly well against its parent company's Huawei Nova that retails for over £100 more. It also came out very similar to our usual budget phone of choice, the Moto G4 (over £50 less at £159).

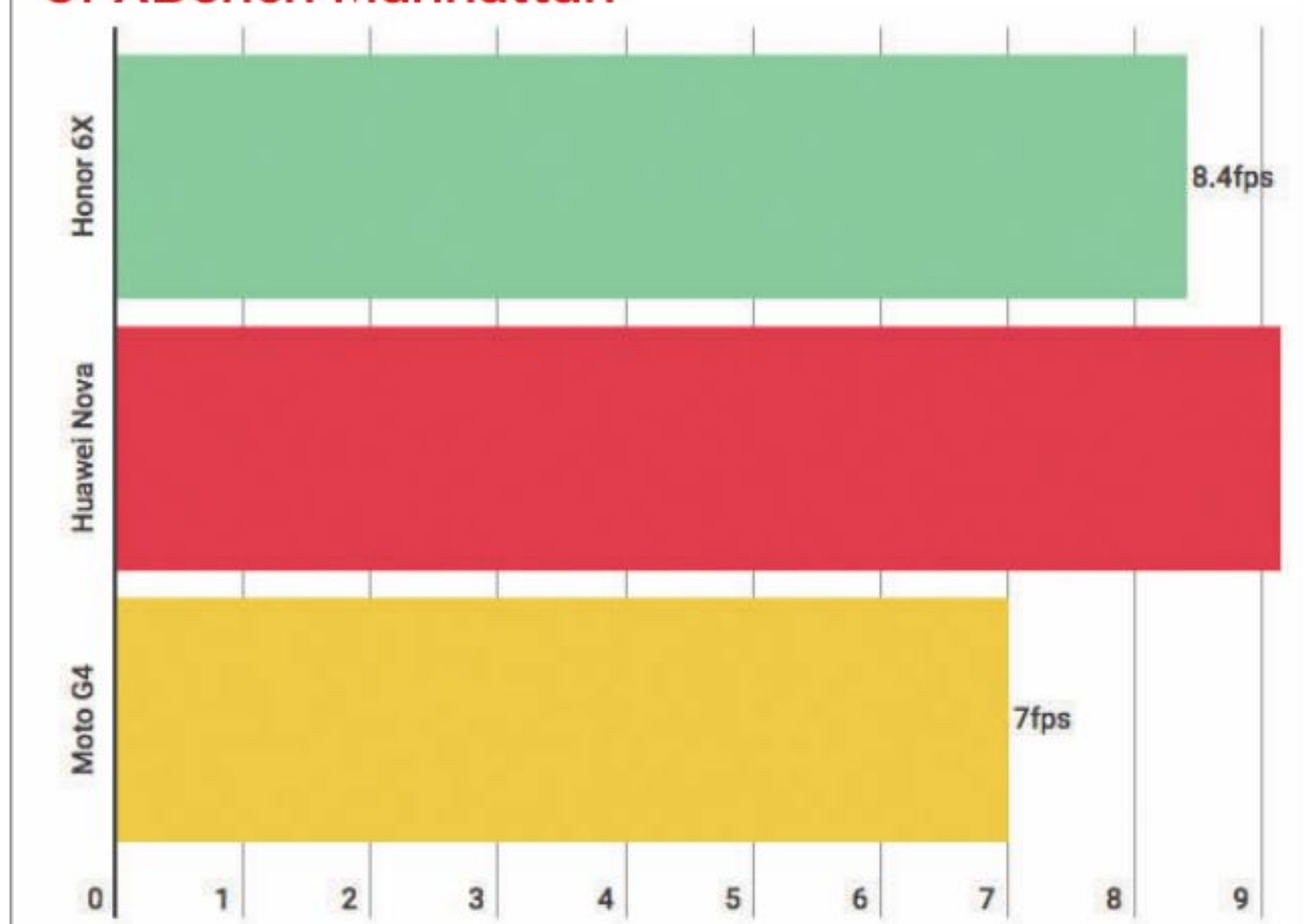
Software

Software is unfortunately where this phone is let down slightly, but bear with us on this. The Honor 6X

Geekbench 4



GFXBench Manhattan



ships with Android Marshmallow 6.0 with Honor's (read Huawei's) skin Emotion UI 4.1. Considering Android is now into 7 and above and the Huawei Mate 9 comes with EMUI 5, it's quite behind. However, at CES the company stated in a presentation that the 6X will receive an update to Android Nougat and EMUI 5 at some point in Q2. So,

fingers crossed, if you buy the Honor 6X, it'll have the latest software updates by July 2017.

This is not something to get overly upset about considering it's a tad over £200. Many Android phones don't get such upgrades for months. What's more annoying is the software itself, which is one of the most modified versions of Android on the market.

Little things such as not being able to pull down the notification panel on the lock screen or there being no app tray (so that apps display as an iOS style grid) may well be minor things, but ones we missed when using the device. The joys of Android are hidden in its quirks and customisations, but EMUI decides to give a little fewer to you than other manufacturers.

One cool thing you can do is use the rear fingerprint sensor to pull down and retract the notification panel or scroll left to right through pictures in the Gallery, while you can turn on a function so when you uninstall apps you can physically shake your phone to realign them.

Other little things you might only expect in higher end phone are here too, like the ability to view the homescreen in an attractive landscape angle. Having said all this, the EMUI 5 update will bring an app tray option, so all is not lost. Plus, we are nitpicking.

The notification pull-down panel on the Honor 6X with EMUI 4.1

Cameras

The camera software leads the marketing for the 6X front and

centre. The bottom line is while it is capable of cool shooting effects, the results will never be as good as other dual camera phones with better parts such as the iPhone 7 Plus or Huawei's own P9.

The rear cameras definitely perform best on near shot subjects and macro style photos. There's a cool wide aperture mode that allows you to background blur images on a sliding scale before capture, a 'splash' mode to isolate one particular colour of an image with the rest in monochrome, or a long exposure mode to capture streams of car lights at night, for example. There's also the usual Honor addition of beauty mode for selfies, which remains plain weird.

All the usual apps we use, from Facebook and Instagram to Skype, National Rail and Words with Friends opened pleasingly quickly, with multitasking speeds more than acceptable. As with all Android phones you can expect a decline in speed over time, but as tested, the Honor 6X actually made us feel more positive about the whole experience of using it daily because it's just so cheap but its hardware and software just don't feel it.

However we can say with confidence that the Honor 6X will please what is clearly its target market - teenagers and young adults on a budget who want to take decent pictures all day without the battery dying. In this respect, the phone succeeds admirably.

Verdict

The Honor 6X manages to be a budget phone but not remotely feel like one. This is high praise, and while it could never hold a candle to the performance of phones three times the price, that's not the point - the Android experience you get is still high-on top drawer.

As long as you can get on with Huawei's still-not-there EMUI skin, the Honor 6X is one of the best, most affordable mid-range Android handsets going - and it's easy to pick one up in the UK. Henry Burrell



The Honor 6X's Splash mode lets you isolate a particular colour

£599 inc VAT

Buy from
■ tinyurl.com/z5oxy43

Specifications

5.9in Full HD IPS display;
Android 7.0 with EMUI 5.0;
Kirin 960 CPU; Mali G71
GPU; 4GB RAM; 64GB
storage; Single-SIM with
microSD card slot; Dual 20
+ 12Mp rear-facing
cameras; Optical Image
Stabilisation; 2x zoom;
dual-LED flash; front-facing
8Mp camera with flash; 4K
video recording; 802.11 a/b/
g/n/ac, dual-band Wi-Fi,
Bluetooth 4.2; NFC; Infrared
Port; 4x microphones;
USB-C; 4000mAh battery;
156.9x78.9x7.9mm; 190g



SMARTPHONE

Huawei Mate 9

Huawei has a growing fan base in the UK after launching a series of top-quality smartphones in 2016, including the Nova and the Nova Plus. The firm's latest offering is the impressive-looking Mate 9.

Design

The first thing you'll notice about this phone is the 5.9in display. While many will read this and instantly write off the phablet for having a larger-than-life screen, Huawei has done what it does best and managed to fit a large panel into a small body with incredibly tiny bezels. In fact, the screen-to-body ratio is an impressive 77.5 percent and during our time with the device, we could reach from one side of the display to the other with our thumb comfortably and easily.

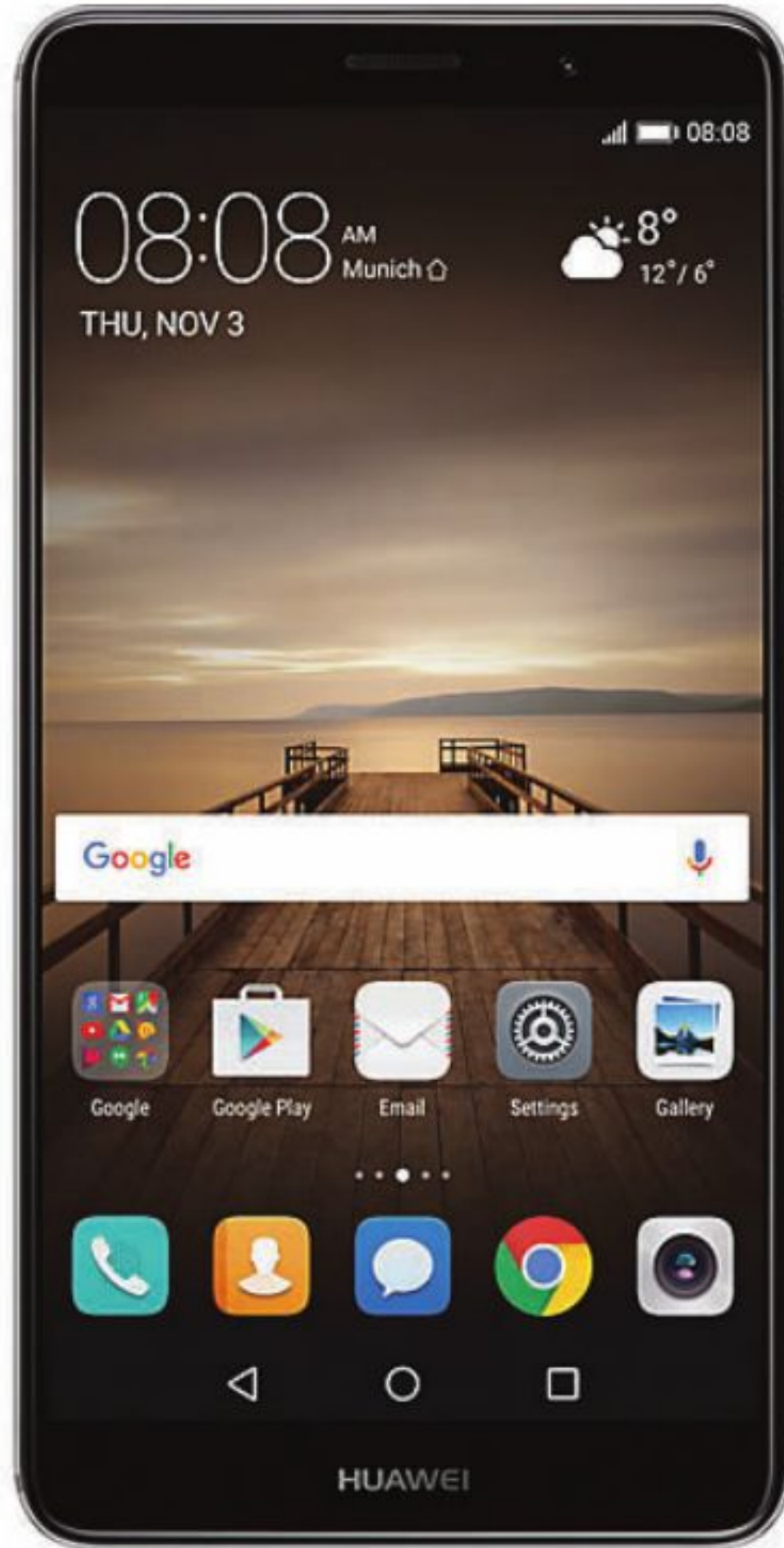
Surrounding that large display is an aluminium body that has a high-end feel about it. From the slightly curved design that allows the smartphone to sit more comfortably in the hand to the subtle chamfers that run along the edges this is a beautiful device. It's available in two colours: Space Grey and Moonlight Silver.

The Huawei Mate 9 has four microphones: two at the bottom, one on top of the camera on the rear and one inside the earpiece. These allow for active noise cancellation when calling, as well as directional sound recording. There are three modes to choose from - meeting, interview and normal - with users able to play back audio from a specific direction or microphone once the recording has finished.

Along with directional sound recording there's an IR blaster to control your TV and other devices and, as specifically pointed out by Huawei, a 3.5mm headphone jack.

Features

The 5.9in Full HD (1920x1080) IPS display may seem low resolution when compared to the likes of the Samsung Galaxy S7, which has



a 2560x1440 resolution, but we found it bright, crisp and gorgeous without the extra pixels.

The Mate 9 comes with the brand-new Kirin 960 octa-core processor, with four A73 2.3GHz cores and four A53 1.8GHz cores, and is Huawei's fastest processor to date. There's also 4GB of RAM and the new Mali G71 GPU, which the Chinese firm claims enhances mobile graphics by a whopping 400 percent - we'll come to this in more detail in our benchmark section.

Other features include a rear-facing fingerprint scanner, which offers a four-level security system to make sure it's blisteringly fast and accurate. There's also a whopping 64GB of built-in storage with the potential to be boosted to an incredible 2TB thanks to the Hybrid SIM slot, which offers a SIM tray and a microSD card slot.

Performance

During our time with the Mate 9, we found it to be blisteringly fast in general use. We've not seen this kind of responsiveness and speed from any Huawei smartphone in

the past - even from the flagship P9 - so we're very impressed with the firm's latest offering. Apps open instantly, as does the camera, and we couldn't produce the slightest bit lag - even when trying.

We ran three benchmark tests; Geekbench 4, GFXBench and JetStream, which tests CPU, GPU and browser performance respectively, with a higher score reflecting a better result.

The Mate 9 has the highest Geekbench 4 scores we've found since we've been using the updated software, recording a single-core score of 1924 and a multi-core result of 5986. This beats the likes of the Google Pixel XL (1581 and 4067), Sony's Xperia XZ (1582 and 3807) and the OnePlus 3T (1875 and 4257) in processing power, and this is evident in the everyday performance of the phone.

The GFXBench test is split into four different sequences, each with varying resolution, textures, particle effects, and so on, to test the graphical performance of the phone. Here, the Huawei scored 60fps in T-Rex, 31fps in Manhattan 3.1 and 16fps in Car Chase.

While the Mate 9 managed to best the Google Pixel XL (55-, 17- and 11fps), the Sony Xperia XZ (60-, 33- and 20fps) and the OnePlus 3T (60-, 32- and 20fps) performed slightly better. In real-world use,

We found the Mate 9 to be blisteringly fast. We've not seen this kind of responsiveness and speed from any Huawei smartphone

though, you won't notice much of a difference when gaming on any of these devices.

Finally, we ran the JetStream benchmark, which tests the speed and general performance of the phone's default mobile browser. In the case of the Mate 9 that's Google Chrome, and again, it was top when compared to other Android devices.

Cameras

Along with the impressive internals, the Mate 9 is the second Huawei smartphone to feature a dual-camera setup, and like the P9 this has been developed in conjunction with high-end camera manufacturer Leica. Huawei has, however, made a few changes to the setup, including an increase in resolution of the monochrome sensor, up from 12Mp to 20Mp, and the introduction of optical image stabilisation, although the colour sensor remains the same at 12Mp.

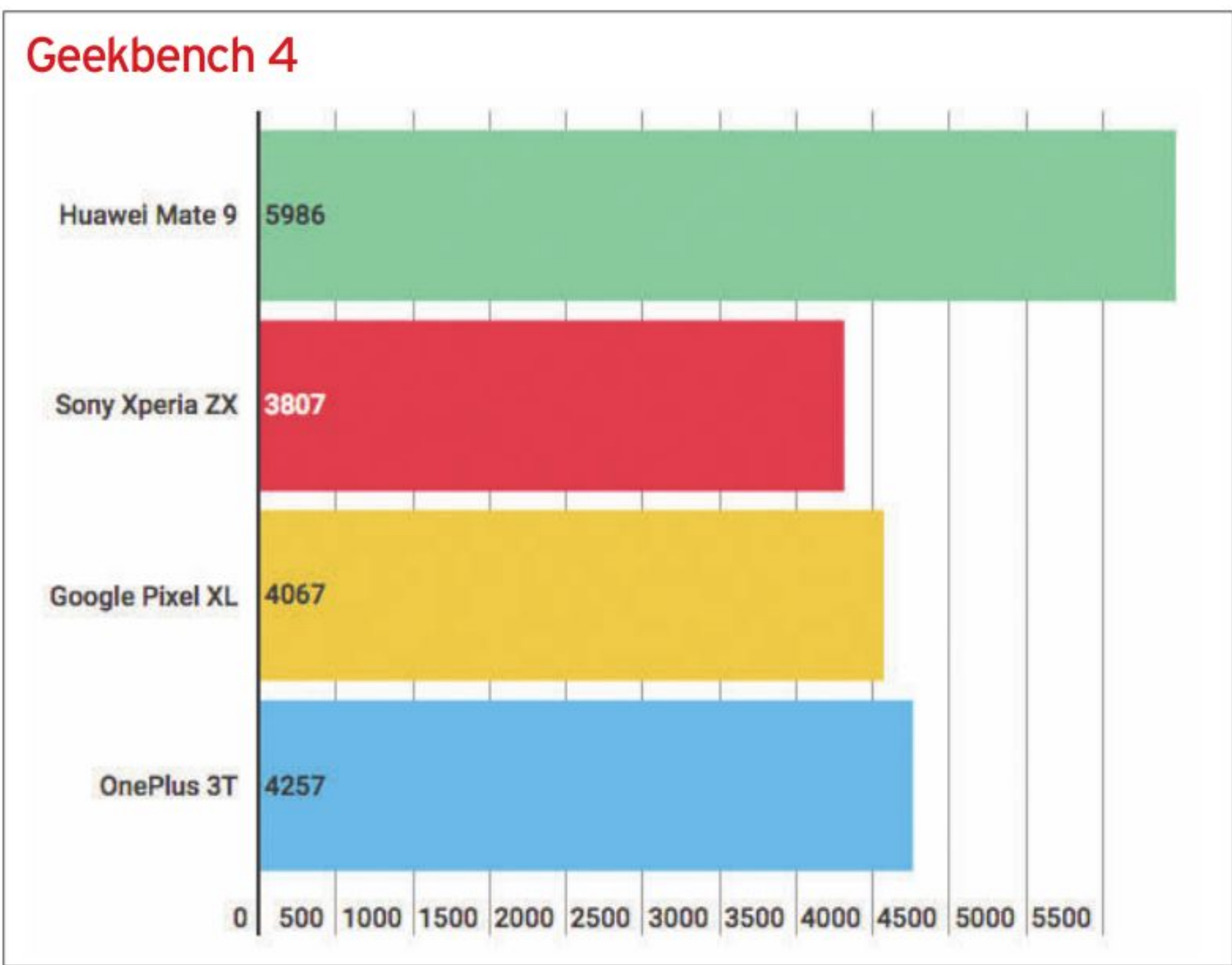
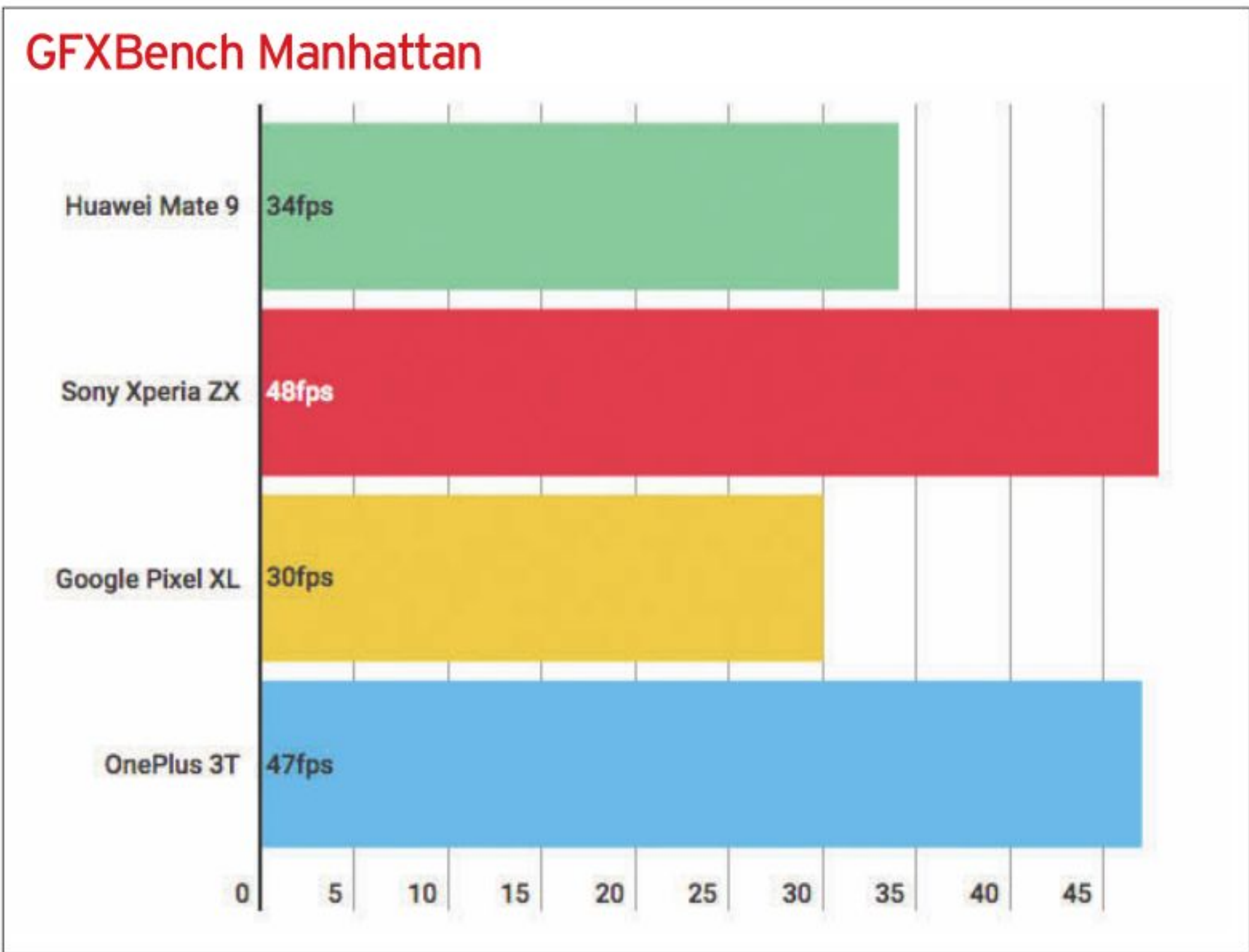
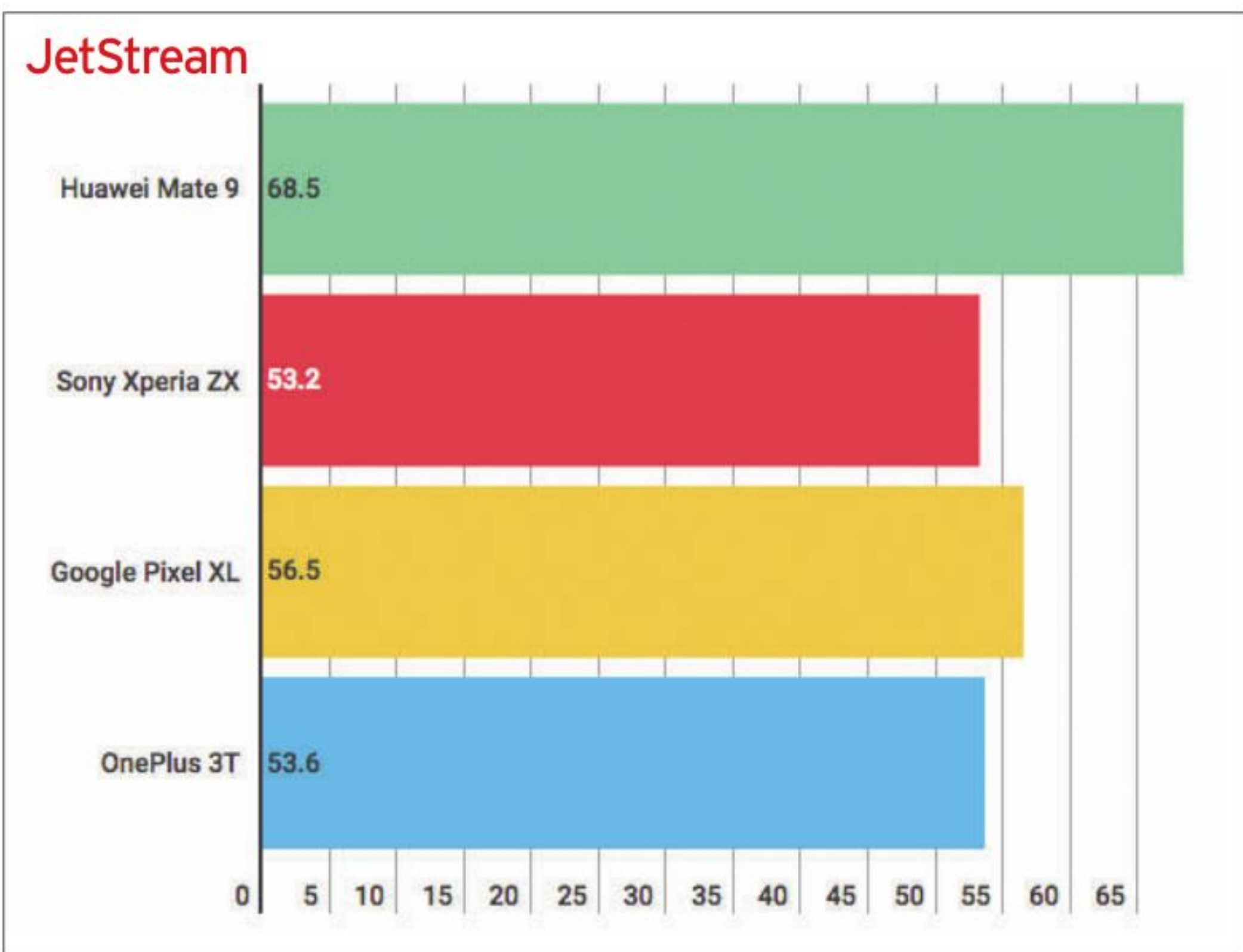
One new feature is the phone's ability to provide 'lossless zoom' which, according to Huawei, allows you to zoom in on your subject without worrying about degrading the quality of the photo. This is an impressive claim considering that unlike Apple's iPhone 7 Plus, it doesn't have a telephoto lens.

While we expected over-aggressive noise cancellation would ruin the zoomed photos they actually provided spectacular levels of detail with little to no noise. They weren't as detailed as a standard image, but for times where a zoom is required, it's a good compromise.

Along with the P9, the Mate 9 also offers the bokeh effect, which blurs out the background of an image, although it offers a significant change - the ability to zoom in. While we were initially excited about the option to adjust the size of the aperture and focus after taking the photo, we found the camera struggled to find the edges of the subject of a photo.

The Huawei Mate 9 also offers 4K video, a confusing omission from the flagship P9, and a front-facing 8Mp camera, complete with autofocus and a front-facing flash for those late-night selfies.

We were impressed with the quality of the images produced by the rear-facing camera setup - they were clear, crisp and vibrant photos with a huge amount of detail, even



when zooming in. Macro shots are equally effective, as showcased in the opposite image, where you can easily identify and count the number of rain droplets on the leaf. While

the Mate 9 captures a lot of light in low-light conditions, we feel that the photos become slightly washed out and noisy unless care is taken when taking the shot.

On the downside, the UI is different to that of the P9, and we found options such as shallow depth-of-field mode trickier to use.

Software

The Mate 9 runs the latest iteration of the Android operating system, Marshmallow. It also features an overhauled version of Huawei's UI overlay, which polarised users in the past: some loved it while others hated it. This has all changed with EMUI 5, which offers the choice between having an app tray or having all your apps displayed on the home screen, along with a myriad of other changes. It offers a unified colour scheme throughout the OS with an attractive white and blue combination, apparent from the redesigned notification centre to the settings menu. It's also much easier to use, with Huawei priding itself on the ability to access more than 50 percent of the features within two taps.

The most impressive part of EMUI 5 is its ability to improve the performance of the smartphone over time. Traditionally, this decreases after the first year, but Huawei claims that by implementing five core technologies, it can speed up the Mate 9 by 80 percent after 10,000 hours of usage. It does this through a combination of AI-based machine learning algorithms, the ability to intelligently allocate CPU resources to apps you use frequently, improve memory optimisation with automatic cleaning when idle and improvement to the I/O storage speed.

Along with this, Huawei has introduced App Twin, a feature that allows you to log in to both professional and personal apps at the same time, and is ideal for business users. Say, for example, you use Facebook for business and for pleasure, but across two different accounts – App Twin will let you use both side by side. It also offers the option to split the display and run two apps concurrently, although we feel this feature is overrated and we're not sure how many people use the feature in the myriad of Android smartphones available.

Verdict

The Mate 9 is, in our opinion, the best in the firm's line-up, offering an impressively large display



Auto settings



Macro shot

alongside powerful internals, an improved dual-camera setup and a sleek, gorgeous design. The benchmark results are some of the best we've seen, bringing excellent value for money. EMUI 5

also makes a huge difference to the overall experience, and we can't wait to see whether Huawei's new technology will actually improve the smartphone's performance over time.  **Lewis Painter**

We were impressed with the quality of the images produced by the rear-facing camera setup – they were clear, crisp and vibrant

£472 inc VAT

Buy from
■ gearbest.com

Specifications

MIUI 8.0; 5.7in full-HD (1920x1080) flexible OLED display; 2.35GHz Qualcomm Snapdragon 821 quad-core processor; Adreno 530 GPU; 4GB RAM, 64GB storage (6GB RAM, 128GB storage model also available); Dual-SIM dual-standby (2x Nano-SIM); supports 2100/2600MHz 4G LTE in UK; 802.11ac Wi-Fi; Bluetooth 4.2; GPS, A-GPS, GLONASS; Beidou; NFC; fingerprint scanner; 22.56Mp, f/2.0 Sony IMX318 rear camera with dual-tone flash, EIS 4K video stabilisation; 8Mp, f/2.0 front camera with autofocus and Beautify 3.0; USB-C; 4070mAh non-removable battery with Quick Charge 3.0; 156.3x77.6x7.8mm; 168g

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



SMARTPHONE

Xiaomi Mi Note 2

It's nearly two years since Xiaomi unveiled its Mi Note and Mi Note Pro, and a lot has changed in that time. The Mi Note 2 was somewhat overshadowed at its launch by the awe-inspiring bezel-less Mi Mix (page 30), but it is nonetheless a fantastic Android phone.

Price

The Mi Note 2 will prove a great buy for those looking for a big-screen phone with lots of power and a nice design, but unfortunately Xiaomi is releasing it only in China. Those in the UK and elsewhere can still buy through Chinese importers such as GearBest, from which we received our Piano Black review sample, though international buyers should be wary over cellular connectivity.

Actually that's one of the things that most excited us about the Mi Note 2 upon its release: it's the first Xiaomi phone to come with global LTE connectivity, but not as standard and sadly not in our review sample. The Global Mi Note 2 supports 37 bands and has full UK 4G LTE connectivity for bands 3, 7 and 20. It also matches the top-end Mi Note 2 version with 6GB of RAM and 128GB of storage. If you are buying outside China this is the Mi Note 2 to go for, and it currently costs £505 at GearBest.

Our review sample is the entry-level 4GB RAM, 64GB storage Mi Note 2 with support for UK 4G LTE bands 3 and 7. That means it won't be a great buy for O2 and Giffgaff customers, which rely solely on band 20 for 4G connectivity, but for other users it's a great phone. This version costs £472 from GearBest but, given the relatively small difference in price and increase in both storage and RAM, we'd encourage all UK users to go for the Global model, regardless of to which network they are subscribed.

Do consider that upon arrival in the UK you may be asked to pay import duty on the Mi Note 2, which will inflate this price - probably by around £30 in our experience, though the exact amount you pay will be dependent on what's written on the packaging label.

Even if you do go for the Global version of the phone, one thing you should note before you buy is



that because these phones are not officially sold outside China they are sold with the Chinese rather than International ROM. This means Google Play and any associated services with which you are familiar will not be preinstalled, and there will be some Chinese-language apps and a Chinese-character keyboard to contend with. All these things are fixable, as we'll explain below, although we wouldn't advise non-techies attempt to do so.

UK setup

When you first turn on the Mi Note 2 you will be given the option to choose United Kingdom as your region, but when it boots into the UI you'll notice there is more setup to do before you can get going.

First, you should change the time and date, since by default this will be set to GMT+08:00. Open the Settings app from the home screen and choose Additional settings,

Date & time. Disable Automatic time zone and tap on the time zone field below this, then scroll to and select GMT+00:00 Greenwich Mean Time. The time at the top left of the screen should automatically update.

Next, there's no Google Play support, so you'll need to sideload the Google Installer. To do so, go to Settings, Additional settings, Privacy and then enable Unknown sources. Now head to Xiaomi Ninja to download the Google Installer APK. Launch the downloaded file and, once it has installed, press the big blue button to begin installing the necessary Google services. Tap Install and Okay when prompted until the installer has finished.

Next go to Settings, Permissions, Auto Start and give autostart permissions to all the Google apps you've just installed. Then go to Settings, Permissions, Permissions and give each of those apps any reasonable permissions they

require (tap on a permission and choose Accept).

Google services are now ready to go on the Mi Note 2, so launch the Play store and add your Google account details when prompted. If you have any problems reboot your phone. You can also try going to Settings, Installed Apps, Google Play Store, clearing the cache and data and trying again. Sometimes it can take 30 minutes or so for a Google account to register on a device.

One of the first apps we recommend you download is Google Keyboard. Launch the app and set it as the default to remove the existing keyboard with Chinese characters. Keep in mind that no Google apps are preinstalled on this phone, so you might also wish to download those you probably take for granted such as Gmail. If you wish to install a WhatsApp backup from an old phone you will also need Google Drive, and we recommend using Google Photos in order to back up and sync all your old and new photos between phones. YouTube is another favourite, and don't forget Google Maps.

Lastly, go through the apps on the home screen (there is no app tray in MIUI 8.0) and uninstall any Chinese-language apps you don't wish to use. Those that cannot be uninstalled can be dragged on top of each other to create a new folder in which to hide away apps.

The Mi Note 2 is now reasonably well set up for UK use, but you will still get the odd Chinese notification pop up. In our experience these can be ignored, so simply swipe them off the screen to delete.

Design

The Xiaomi Mi Note 2 is one big piece of loveliness, with its gorgeous curved edges at the front and back, high-gloss black finish and rich OLED display. Unlike the Mi5s and Mi5s Plus, which now feature a metal unibody, the Mi Note 2 retains its glass

front and rear, which is very much like the design used by Samsung in its S- and Note-series flagships.

It's not the Note 7 copycat people are calling it, and an obvious difference is the lack of a stylus here, but there are some similarities. The Xiaomi, too, has a 5.7in panel, although it has a lower screen resolution of 1920x1080 pixels. The difference between full- and Quad-HD will not be noticeable in most use cases, but if you demand the very best multimedia experience then regardless of what you read the human eye can tell the difference between the two. That's not to say the Xiaomi isn't pin-sharp, however, and we really don't think you'll be disappointed with this screen.

This is the first Xiaomi phone to get the dual-curved-edge screen at the front of the device, but it's not as obvious as on the Galaxy S7 edge. This results in fewer accidental app presses from the side of the screen, but also means the panel doesn't appear to wrap around the body so far, although they are minimal the left and right screen bezels are indeed visible.

The overall effect is gorgeous nonetheless, though it's not just about how the phone looks: the way the Mi Note 2's front and rear curve into each other and are separated by only a thin metal chassis feels fantastic in the hand. This is a big phone, but it feels easily usable, especially so when you invoke Xiaomi's One Handed mode.

In order to achieve this curved screen Xiaomi has ditched the IPS LCD used in its Mi5s and Mi5s Plus in favour of a flexible OLED panel. That's a great thing in our opinion, as we love the vibrant colours and deep contrast of OLED tech,

and you can fine-tune the screen appearance to your taste. Sunlight Display means it's ideal for use in bright sunlight, and there's also a handy reading mode.

For this particular screen Xiaomi lists 100 percent NTSC colour gamut, 100,000:1 contrast ratio and a screen-to-body ratio of 77.2 percent. The latter is lower than is seen on many flagship phones, which may be surprising given the slim bezels. However, there is a fair amount of space above and below the screen, which is where you'll find the new lightning-fast fingerprint scanner built into the home button.

There are some other key differences in the build between this Mi Note 2 and its predecessor, for instance the move to USB-C and the new speaker grilles that sit either side - though there is still only one speaker. The Mi Note 2 has some decent audio credentials with 192kHz/24-bit audio, and it's plenty loud provided you keep its bottom-facing speaker clear.

The battery capacity has also increased by more than 25 percent, from 3000mAh in the Mi Note to 4070mAh in the Mi Note 2, and yet the new phone adds just 7g and less than a millimetre to its belly. It's still remarkably thin at 7.8mm. This battery supports Quick Charge 3.0, which Xiaomi says can charge the phone to 83 percent in half an hour.

The Mi Note 2 is available in Glacier Silver and Piano Black, both with a glass front and rear and 7-series aluminium frame. We received the black model, and are struggling to fault its design. If we had to point to something it would be the way the front and rear panels remember every touch, though we expect fingerprints would be less of an issue with the silver model.

Performance

The Xiaomi Mi Note 2 is available in two configurations:



one with 4GB of RAM and 64GB of storage (reviewed here), and another with 6GB of RAM and 128GB of storage. The top-end model is also available with Global LTE support. All three run the Qualcomm Snapdragon 821 quad-core processor at 2.35GHz with Adreno 530 GPU, which is quite a jump up from the Snapdragon 801 and Adreno 330 seen in the Mi Note.

When considering the core specifications, the Mi Note 2 begins to look even more like the Mi5s Plus. After all, both have the Snapdragon 821 processor, 4/6GB RAM, 64/128GB storage and a 5.7in full-HD screen. The key differences between the two are the curved OLED panel on the front and glass rear of the Mi Note 2, plus a slightly higher-capacity battery (4070mAh versus 3800mAh) and a single 23Mp camera (the Mi5s Plus has two 13Mp lenses).

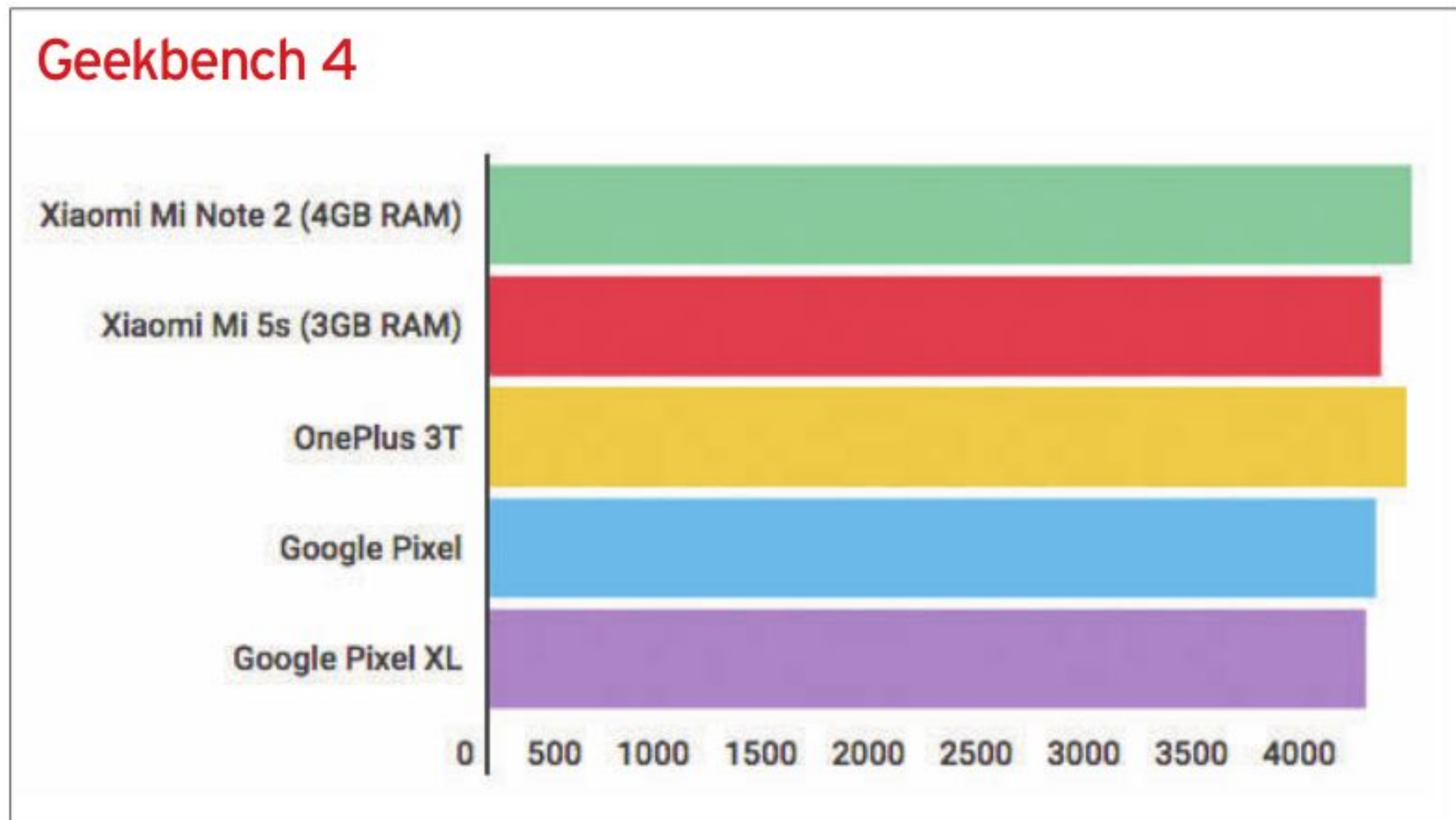
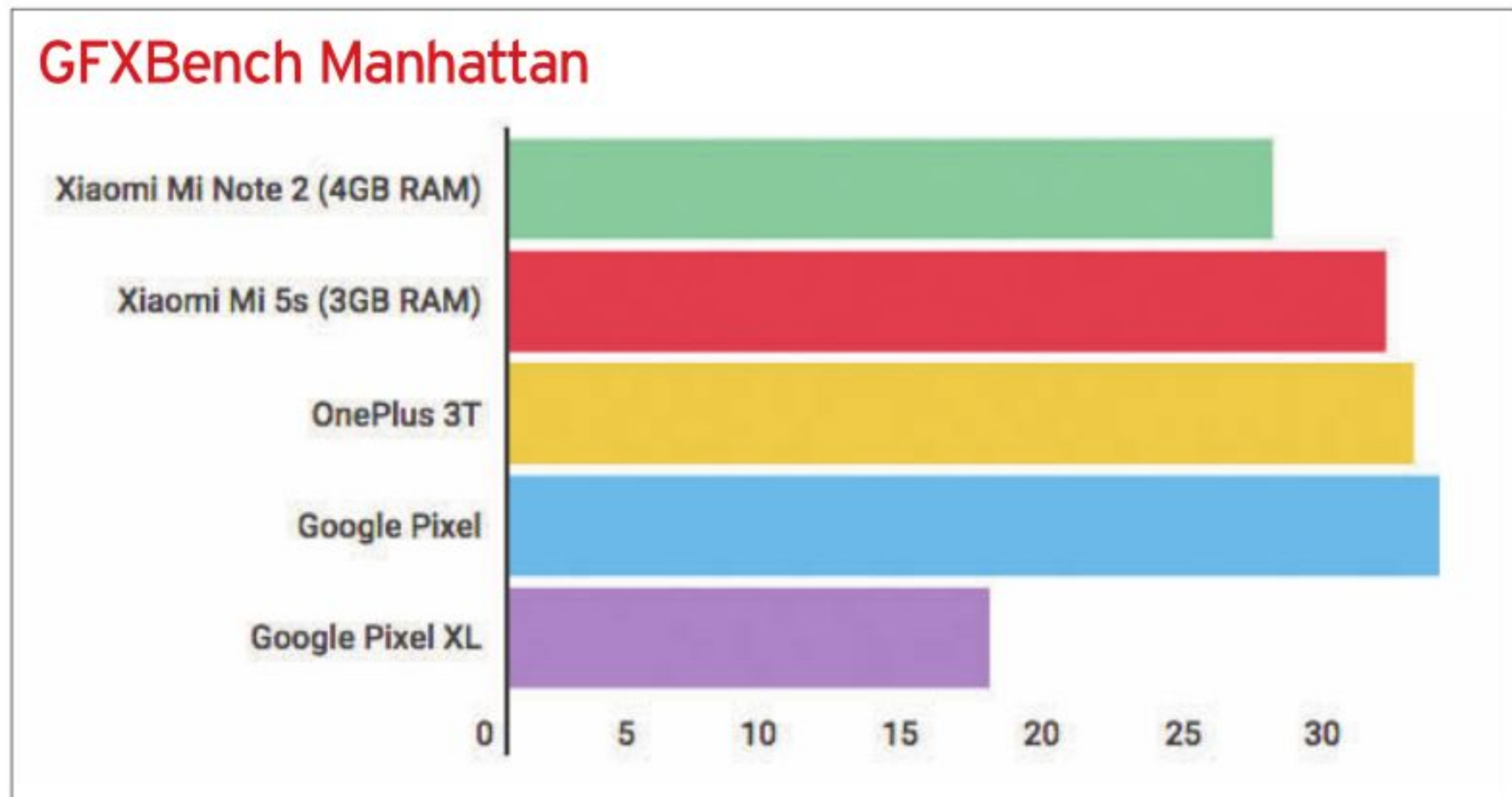
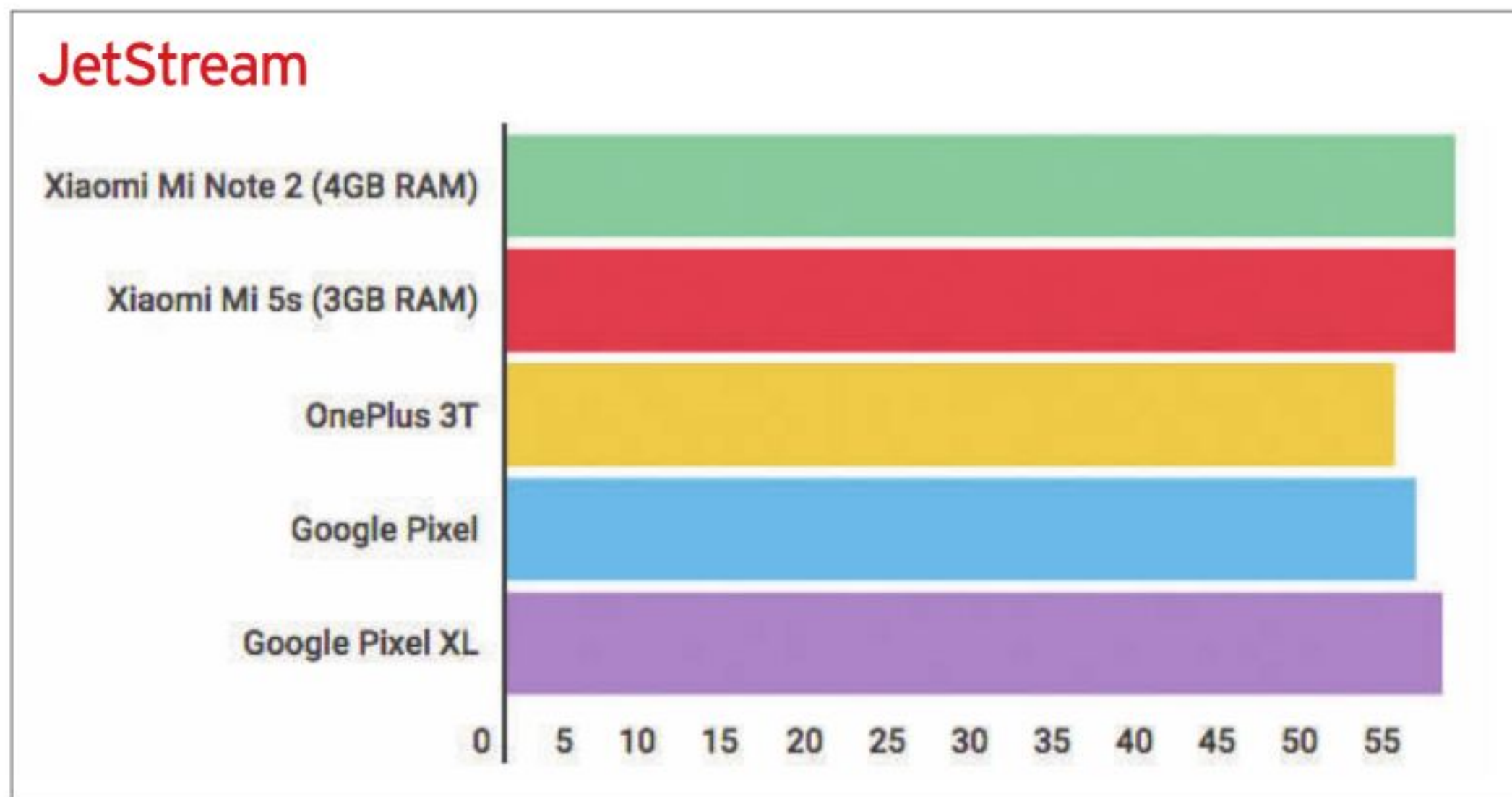
With the Snapdragon 821 inside the Mi Note 2 becomes an instant rival to the Google Pixel and Pixel XL, OnePlus 3T and Xiaomi's own Mi5s line-up. In our benchmarks it held its own against those phones, falling behind the 6GB RAM OnePlus 3T and smaller-screen Google Pixel, but keeping ahead of the Pixel XL. We haven't tested the Mi5s Plus, but against the 3GB RAM Mi5s it was only a couple of frames behind in our games tests. General processing performance was very close in Geekbench 4, but the Mi Note 2 fell behind in AnTuTu 3D.

You can compare the results of our benchmarks right, but what really matters is real-world performance. And here we cannot fault the Mi Note 2. This is an incredibly fast phone, and no matter what it does it doesn't hang around.

Storage is incredibly generous at 64GB as standard, though it's a shame there's no microSD card slot for those who demand more. The battery is also very high in capacity at 4070mAh. In our experience, it lasts for around a day and a half, though the ability to charge it to 83 percent in half an hour makes runtime seem less important. Wireless charging is not supported, and the battery is not removable.

Connectivity

The Mi Note 2 is a dual-SIM dual-standby phone. Either of the two



Nano-SIM slots can be used for connecting to a 4G network, but the other will then max out at 3G. The model we review here does not support band LTE-FDD band 20 (among others, though this is the important one for UK use), which means O2 and Giffgaff customers will not be able to receive 4G connectivity.

New in the Mi Note 2 is an incredibly fast fingerprint scanner, which is built into the Home button at the front. This ties in with the full NFC support, which is necessary for making mobile payments. Xiaomi made a big deal out of Mi Pay at the Mi Note 2 launch, though in the UK you'll be more interested in Android Pay.

Chinese phones can often give poor GPS performance in the UK,

but we had no problems with the Mi Note 2's high-accuracy GPS module. It supports GPS, A-GPS, GLONASS and Beidou. The Mi Note 2 also caters for 802.11ac Wi-Fi, Bluetooth 4.2 and USB-C, and there's even an IR blaster.

Cameras

The Mi Note 2 has a 23Mp, f/2.0 Sony IMX318 at the rear with a dual-tone flash and support for 4K video with EIS. Amazingly, despite the thin chassis this huge sensor sits flush to the phone.

The incredibly high megapixel count means photos are huge when viewed at full-size, and an immense amount of detail can be captured. We were even able to read the road signs from photos captured on our seventh floor office roof terrace.

Given good lighting colours are very realistic, and the Mi Note 2 does a great job overall. Interestingly, the front camera, rated at 8Mp, also supports an autofocus, which is impressive when even today many selfie cameras are very basic models with low resolution. The selfie camera also integrates Beautify 3.0, which can help you to create more attractive self-portraits.

The camera app in MIUI 8.0 is easy to use, with various real-time filters and photography modes.

Software

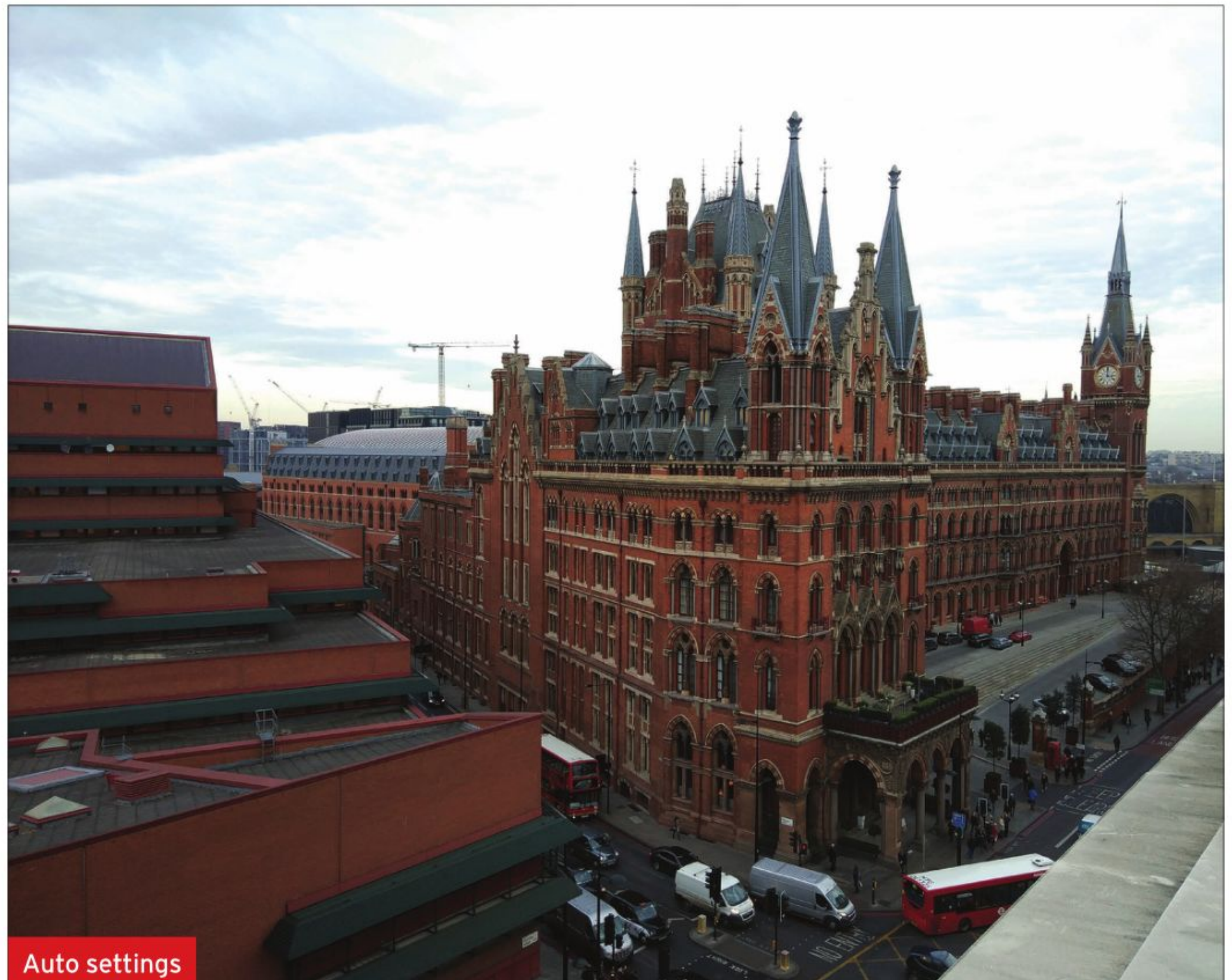
The Xiaomi Mi Note 2 runs MIUI 8.0, which is based on Android 6.0 Marshmallow. It doesn't come preinstalled with Google apps and there are some Chinese-language apps and notifications and a Chinese-character keyboard to contend with. These things are easy enough to fix when you know how, and in a small amount of time you can have the Mi Note 2 up and running as you would any other UK Android phone.

We don't want to completely lose MIUI 8 in our quest for a more familiar UI, however, as it has lots to offer. We touched on the One-handed mode earlier, which is a lifesaver when it comes to mixing big phones and small hands. This setting enables you to shrink down the screen size to 4.5-, 4- or 3.5in for easier operation.

Other features that aid usability include the Quick ball, which let you place anywhere you like onscreen a button that can quickly return you to the home screen, back a step, take a screenshot and more.

There are a number of changes in MIUI 8. The drop-down notification bar is perhaps the most obvious change, with new quick access icons running along its top. Xiaomi has also moved around a few items in the Settings menu, and introduced some new features such as double-tap to wake, Second Space (which creates a separate space on your phone), Dual Apps (allowing you to run a second version of an app on the phone), individual App Lock and support for Mi Wallet.

Other new features include an energy saving mode, enhanced video-editing tools plus some photo features that allow you to add doodles and stickers and quickly share your snaps, the new



and supposedly easier-on-the-eyes Mi Lanting font, updated QR scanner and calculator apps and an enhanced multi-tasking menu.

Verdict

The Mi Note 2 was wrongly overshadowed at its launch. This is a gorgeous big-screen Android phone

with very decent performance, a great camera and plenty of storage. We'd like to see a Quad-HD screen on Xiaomi's flagship phone, but this one should prove plenty sharp and clear. Google apps are not preinstalled, but there is a workaround if you are happy to do some tweaking.  **Marie Brewis**

£244 inc VAT

Buy from

amazon.co.uk

Specifications

6in full-HD (1920x1080, 368ppi) IPS display; 1.8GHz Helio P10 (4x 1.8GHz Cortex-A53 + 4x 1GHz Cortex-A53) octa-core processor; ARM Mali-T860 GPU; 3GB LPDDR3 RAM; 64GB storage (plus microSD up to 128GB or second SIM); mTouch fingerprint scanner; dual-band 802.11a/b/g/n Wi-Fi; Bluetooth 4.1; dual-SIM dual-standby (2x Nano-SIM); 4G FDD-LTE 1800/2100/2600MHz; GPS, A-GPS, GLONASS; 13Mp Sony IMX258 rear camera; 5Mp front camera; Micro-USB; 4100mAh battery; 163.4x81.6x7.9mm; 189g

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



SMARTPHONE

Meizu M3 Max

Meizu makes decent but affordable Android phones, and its Meizu M3 Max will appeal to those looking for a large-screen phone on a budget.

Price

The M3 Max is currently available on Amazon in white from £244 and in black from £298. Meizu advises that you to buy via Amazon UK rather than a Chinese importer such as Geekbuying (current price £177), partly because the Amazon products are shipped from within Europe so you won't have to pay import duty, and partly because these sites are not official partners of Meizu, so won't necessarily offer the same level of customer service.

We've certainly had no problems with the likes of Geekbuying and GearBest, however, and the prices are cheaper - even with the addition of import duty for products shipped from China. How this is calculated depends on the value written on the paperwork, and when we received our package containing the M3 Max and MX6 we were hit with a bill for £95.51 from DHL. Although that is for two phones, it's still a fair bit more than the usual £20- to £30 we're charged, so should certainly be factored into the overall cost of the phone before you buy.

Design

Meizu phones are well-made, good-looking handsets, but they don't stand out for having a distinctive design of their own. The M3 Max looks a bit like an iPhone 6s Plus, but with an elongated rather than circular home button. For many users that won't be a bad thing.

It's very difficult to fault this phone's design. Although it's large at 163.4x81.6mm with a 6in panel it has reasonably slim bezels on the left- and right edges and is thin at 7.9mm, which makes it easier to hold. We still found it impossible to reach the far corner of the screen with a thumb, and the phone is pretty weighty at 189g, so two-handed use is a must. A huge plus point of this extra size and weight is a high-capacity battery, which is rated at 4100mAh.

We really missed the One-handed mode of Xiaomi phones here, able to shrink down the displayed screen



to a more manageable size, but we did find a SmartTouch option in the Settings that allows you to place onscreen a button that works with various gestures. By default, a tap takes you back a step, sliding up takes you to the Home screen and sliding down pulls down the notification bar at the top of the screen. Sliding left and right lets you switch between tasks.

When you become familiar with SmartTouch it can be useful, although at the same time you'll also need to become familiar with the Home button. And we have to say it's not for us. With no back or multitasking buttons on either side of the physical home button you must tap it gently to go back, and a little harder to go to the Home screen, but not too hard as it'll send the screen into standby mode. To access the multitasking menu you slide up from the bottom of the screen, but not directly above the home button. We found this out entirely by mistake.

The other thing to say about this Home button is that it is also an mTouch fingerprint scanner. In

our experience it works well, so no complaints there.

In other respects the design is fairly standard, although that's not to say bad. It feels as though it will withstand the perils of daily use with no issue, with a reasonably clean metal rear (including a completely flush camera) and chiselled edges that flow smoothly into the 2.5D glass covering the white plastic front. There are no sharp edges, no rough bits, no creaks, cracks or gaping holes.

Unusually, the headphone jack is found on the bottom of the handset rather than at the top, but to be fair at least it has one. Also here is Micro-USB for charging, a mic and five small holes that allow audio to pass through from the phone's mono speaker. A slot-loading SIM tray sits on the upper left edge, and here you can opt to insert two SIMs or one SIM and a microSD card. With 64GB of storage built-in the need to choose between a second SIM or expandable storage shouldn't be too frustrating an issue.

The screen is decent. We've already touched on its size, which

When you become familiar with SmartTouch it can be useful, although at the same time you'll also need to become familiar with the Home button

is well suited to multimedia – watching videos in any case, if not gaming (see performance below). It’s a full-HD IPS panel, which is reasonably bright (Meizu claims 450cd/m²) and with realistic colours and great viewing angles.

The Meizu M3 Max is available in four colour options: rose gold, white, grey and gold. We’ve reviewed the white model here.

Performance

Running the show here is a MediaTek MT6755M (aka the Helio P10) processor, Mali-T860 GPU and 3GB of LPDDR3 RAM. This is an octa-core processor, comprising eight Cortex-A53 cores with four at 1GHz for efficiency and four at 1.8GHz for power.

It’s certainly capable enough for day-to-day use, but the Meizu M3 Max’s performance in our gaming benchmarks leaves something to be desired. We found navigation of the smartphone fluid, with apps launching quickly and little signs of lag. In truth, our only real hesitation came from our inexperience of Flyme OS.

We’ve seen this Helio P10 chip before in the Elephone P9000, Ulefone Future, Vernee Mars, Sony Xperia XA and Meizu’s own M3 Note. The Elephone, Ulefone and Vernee each come with 4GB of RAM, which puts the M3 Max at a slight disadvantage, although its 3GB is an improvement on the 2GB inside the M3 Note and Sony Xperia XA.

On the right, we’ve charted our various benchmark results, but to suffice to say none of these phones particularly stand out in the group for performance. If anything the two Meizus stand out for their lower gaming framerates in GFXBench.

There’s actually very little difference in the specifications of the Note and the Max, with the phone reviewed here offering a slightly larger (6in versus 5.5in) IPS display and an extra gig of RAM. It’s a little slimmer but heavier, and performance is only slightly improved.

As in the M3 Note there’s a generous 4100mAh battery. It’s

not removable and neither does it support wireless charging, but Meizu does offer its own fast-charging tech, mCharge. It says this is able to charge the battery by 45 percent in just 30 minutes, which could get you through the best part of a day’s use. Exactly how long it will last you depends entirely on you usage – some will get two days, but if that large screen is left switched on for much of the time you’ll be reaching for a power bank before the end of day two.

Connectivity

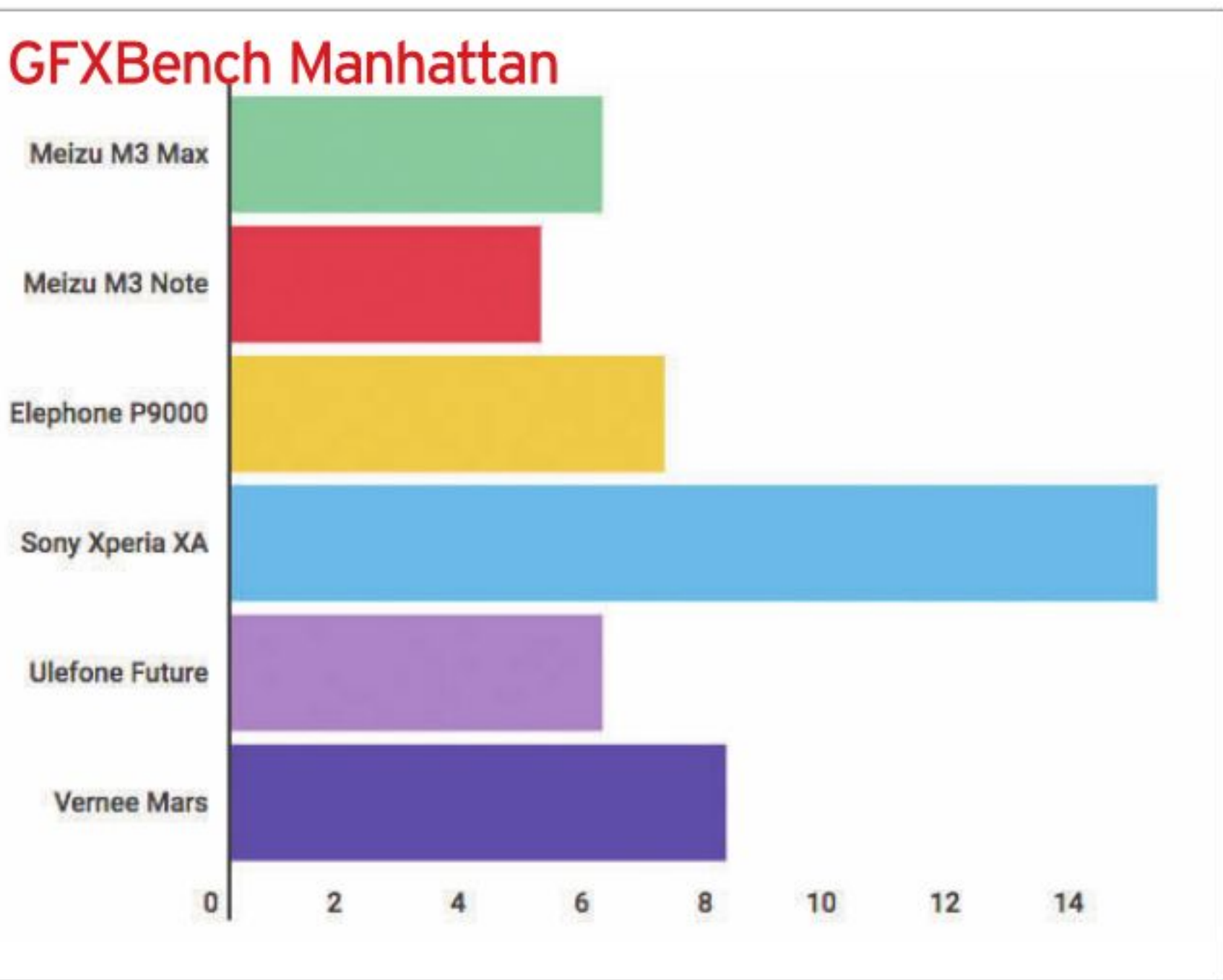
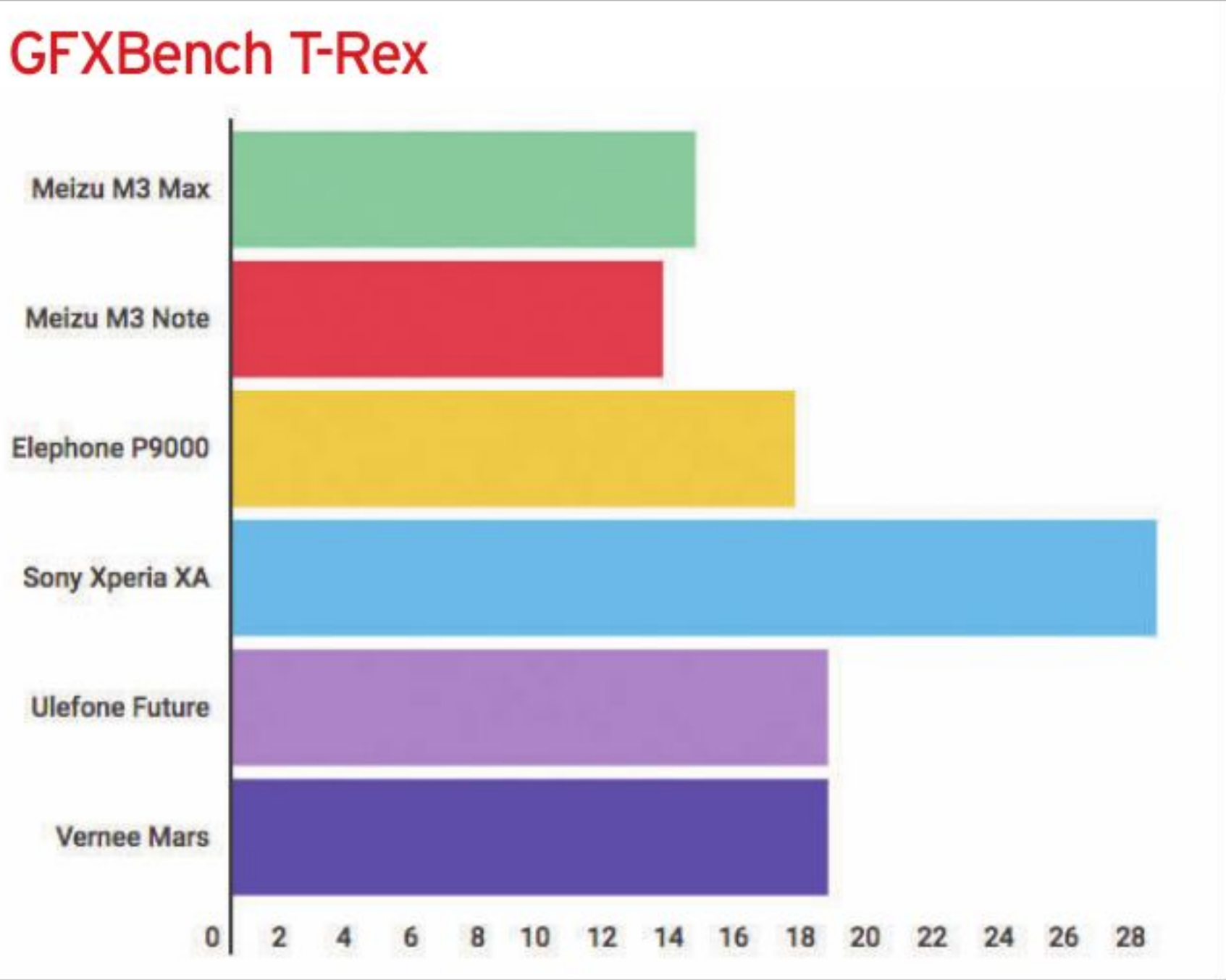
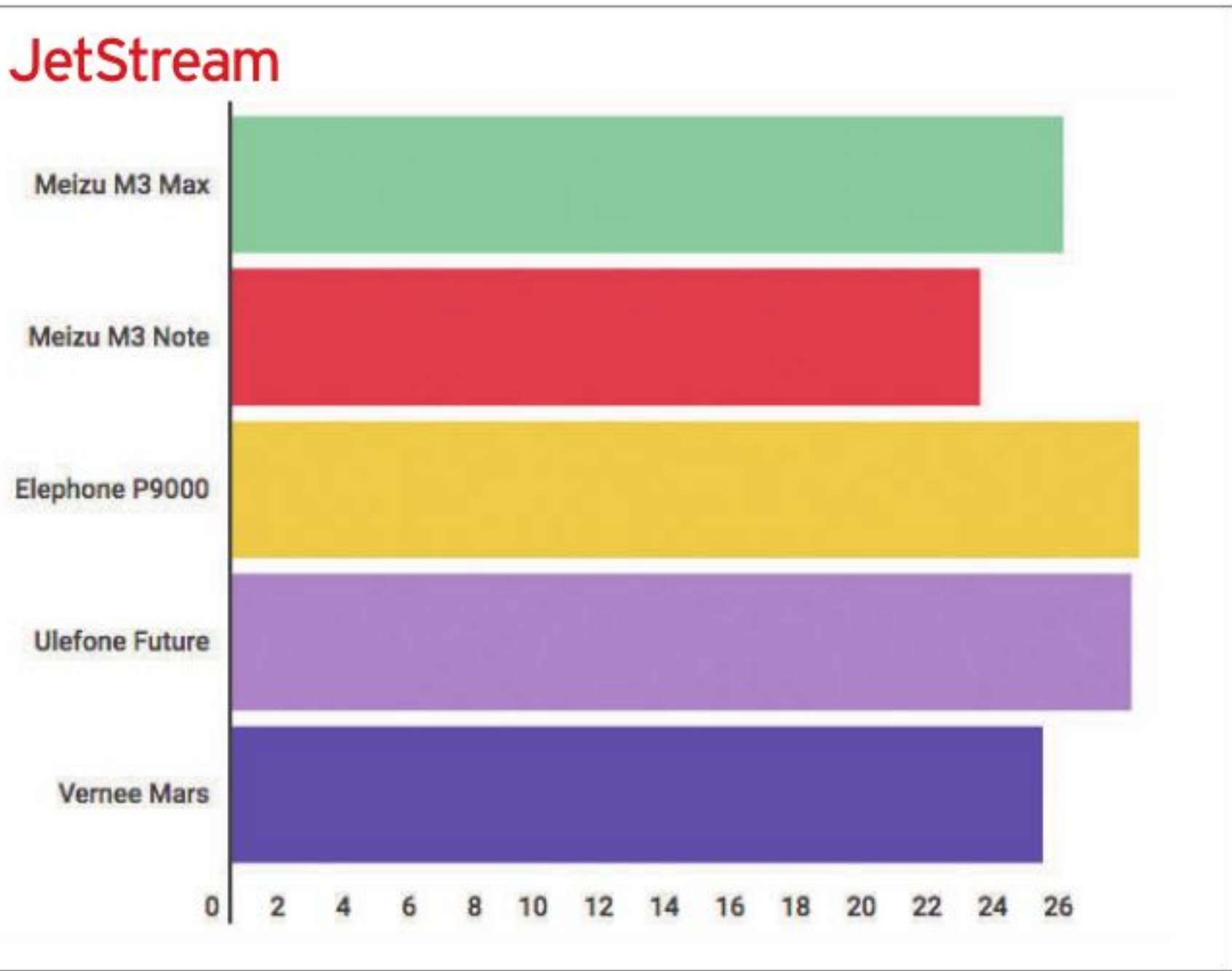
The Meizu M3 Max is a dual-SIM phone that works in dual-standby mode. Or at least it can be, provided you don’t want to add a microSD card. UK users should note that it supports 4G LTE only via the 1800- and 2600MHz bands (aka bands 3 and 7). This means there is no support for 800MHz/Band 20, which is the only frequency used by O2, Giffgaff and a handful of other mobile operators in the UK. If you are a customer of one of these networks you will not be able to get anything faster than 3G connectivity in the UK.

The Max can also cater to dual-band 802.11n Wi-Fi, Bluetooth 4.1, GPS and GLONASS, but there’s no IR blaster or NFC – the latter is necessary for making mobile payments.

Cameras

In common with many Chinese phones around this price point, the M3 Max is fitted with a 13Mp Sony IMX258 camera with a five-element lens, f/2.2 aperture, PDAF and a dual-LED flash. For the money, it’s a decent enough camera, although we are not talking flagship quality.

The camera app is basic, but sometimes uncomplicated can be a good thing. If you want to point and shoot, you just point and shoot – or point, tap to focus and then shoot. If you want access to more settings you’ll find HDR in the Settings menu, and shooting modes such as beauty and manual via the icon to the left of the shutter. Running across the top of the interface are



icons for accessing real-time filters, a countdown timer, the flash and switching the camera view.

Press the latter icon and you can access the 5Mp f/2.0 camera at the front of the M3 Max, which is as good as any other selfie or video chat camera.



Given good lighting the M3 Max can take a decent enough shot. Here you can see our standard test images of the St Pancras Renaissance Hotel, first with Auto settings and second with HDR. In the first we've entirely lost the sky, but the level of detail is reasonable and colours very true. The HDR shot is a clear improvement (with clouds and everything), although the traffic running down Euston Road caused problems given the time it took to capture the image.

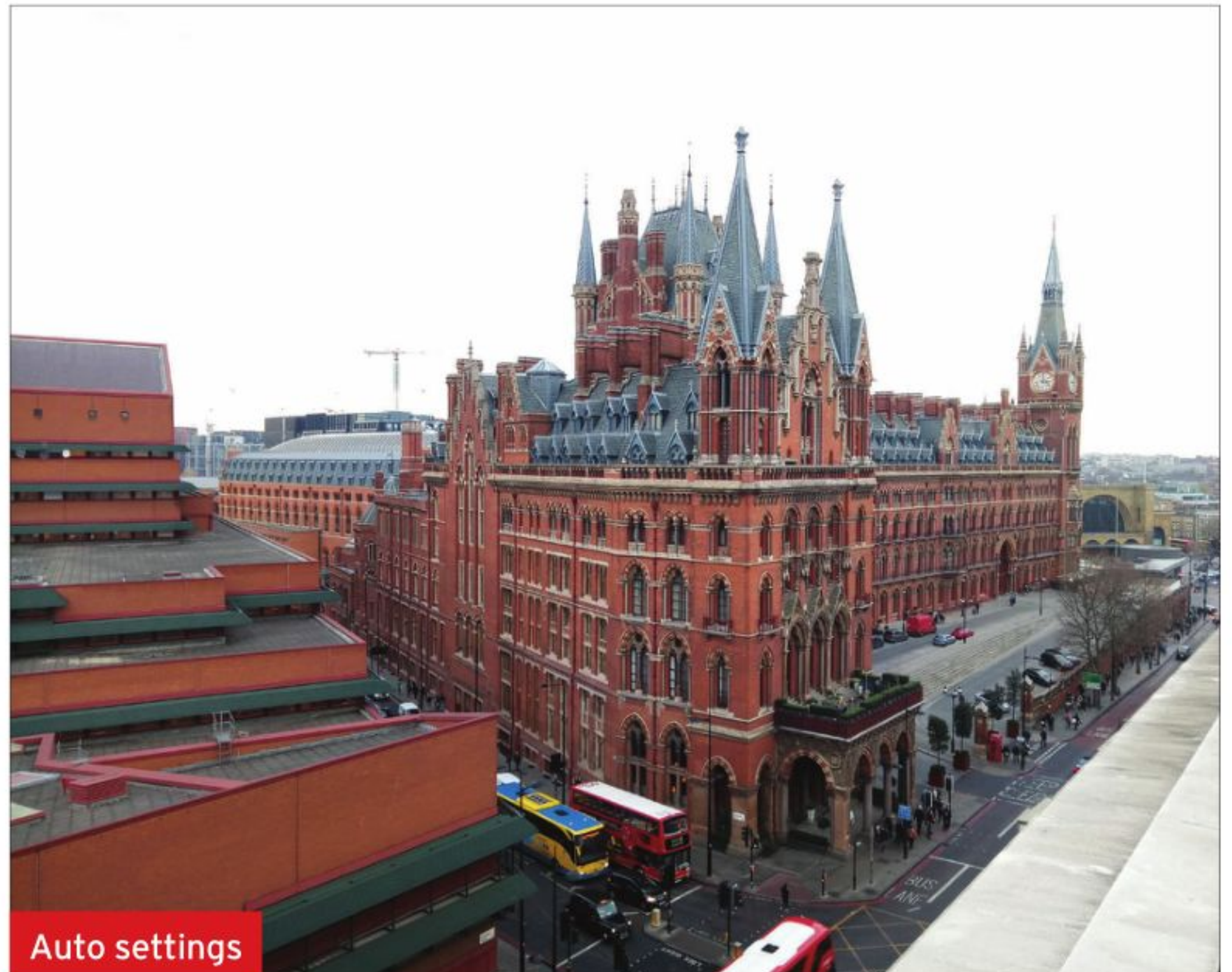
Software

The Meizu M3 Max runs Flyme OS, which is a custom version of Android 6.0 Marshmallow. By default there are no Google Play services preinstalled, but as soon as we connected to Wi-Fi we were prompted to install Google services via a notification. The phone downloaded the file, rebooted itself and we were good to go. We simply clicked on the new Play store icon to log into our Google account and start downloading the apps we required.

This is an improvement over the previous Meizu phone we reviewed, the M3 Note, which didn't allow us to run Google Play services at all, and for which we argued that it was potentially not a good buy for UK Android users. Although you are provided with Meizu's own apps for music, videos, security, weather, email and more, plus themes and apps stores, it's just not the Google Maps and YouTube setup we're familiar with. Fortunately, with Google Play support you can add these things; unfortunately, you still can't uninstall the apps preinstalled within Flyme OS. Our advice is to stick them all in a folder out the way (just drag the home screen icons on top of each other).

A key difference between this and a standard Android phone is the removal of the app tray, which means absolutely everything can be found on one of multiple home screens or within the Settings menu (which is itself fairly standard). Pull down the notification bar and you also get some customisable quick-access toggles for Wi-Fi, Bluetooth and so on, plus a screen brightness slider.

We can handle the lack of an app tray- if nothing else you will know where to find everything, and



particularly if you're an ex-iPhone user, but we thoroughly dislike the removal of the back and multi-tasking buttons either side of the home button. This multifunctional home button is truly Apple-esque, and it's not a feature we want Android to borrow. Why have one confusing button plus a SmartTouch workaround when you can have three simple buttons for which operation just makes sense? They don't need to be labelled or even visible as long as they are there.

The M3 Max supports a handful of gestures, such as double-tap to

wake and slide up to unlock. You can also draw characters onscreen in standby mode to wake the screen and instantly launch an app of your choice, which is a timesaver only so long as you remember which letter represents which app.

Verdict

We're not fans of Flyme OS, nor this strange Android-iOS mashup Meizu seems to favour. But the M3 Max is a decent-value smartphone with a nice large screen, a good build and capable day-to-day performance.

✉ Marie Brewis

The HDR shot is an improvement, though the traffic running down road caused problems given the time it took to capture the image

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Specifications

7in, 1024x768 pixel LCD screen; Android 5.1.1; 1.1GHz quad-core processor; 16GB internal storage (7.7GB usable); microSD slot (up to 32GB); Micro-SIM slot; 2Mp main camera; 0.3Mp front camera; GPS; 802.11b/g/n, 2.4GHz Wi-Fi; Bluetooth; 2820mAh battery; 191x109.4x9.25mm; 257g

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



CHILDREN'S TABLET

EE Robin

EE's Robin is a children's tablet with built-in 4G, so they can watch videos and use internet-connected apps wherever they are - without borrowing your phone. This isn't the first version of the Robin, but the upgrades over the first model are pretty minor. It's a 7in tablet that fits into a kid-proof case and comes with child-friendly software.

Price

You might think that £29 seems a fantastic price for a tablet, but this is only the upfront cost. The main expense is the EE contract, which is £17 per month for two years. This brings the total price up to £437, and that is a lot of money. However, your £17 per month gives you 2GB of 4G EE data for watching videos and more. If that's not enough, an extra £2.50 per month gives you a whopping 10GB per month.

Design

The tablet itself is built by Alcatel Onetouch and is called the Pixi 3. It has a 7in (1024x600) screen and - like many kids' tablets - uses a relatively poor quality panel with limited viewing angles.

You can buy an Alcatel Onetouch Pixi 3 from many UK retailers - including Amazon - for around £75. But even at this price, it's still disappointing to see such old tech, which is beaten by cheaper tablets, including the £49 Amazon Fire. What Amazon's tablet lacks, of course, is a 4G SIM slot which would give it internet access when out of Wi-Fi coverage.

Getting back to the EE Robin, it has a paltry 1.9Mp main camera which takes dismal photos



(and videos) and a front camera that seems to be there for games that use it for gesture recognition, because it's useless for selfies.

The processor isn't at all powerful - it can take 30- to 40 seconds to load some games - and while there's nominally 16GB of storage, you actually get 7.7GB of free space to install programs, download videos and music. You can add a microSD card up to 32GB for more storage, though.

There's a standard headphone minijack on the top, so you can attach some kid-friendly headphones and it charges using a standard Micro-USB connector. EE bundles a bumper case that has a folding handle, which doubles as a stand. This is handy when watching videos and playing certain games.

Software

The tablet runs Android 5.1.1, which is now two whole versions old. It's not a major problem, though, as the interface hasn't changed a lot and virtually all apps are still compatible with this version.

EE has partnered with Kurio and uses its software on the Robin. This means it's exactly the same kids interface as you'll find on Kurio's own Tab 2. While it has decent parental controls, it's far from the best interface. Icons and text are small, and the default view isn't 'all apps', so your children will at first be confused and wonder where

the rest of the apps are hiding. Many of the apps in the Kurio selection aren't great for young kids as there's no voice guidance - something you get with Leapfrog tablet apps - and include annoying ads.

But as this is an Android tablet, you're free to install whatever apps and games you like and add them to your child's profile. You can create several profiles, and each child can choose their avatar and background colour.

One good app is Hopster which is aimed at two- to six-year-olds and offers hundreds of episodes of downloadable UK kids' TV shows and learning games with no adverts. Unfortunately, you only get three months free if you buy the Robin on one of EE's standard plans; it's only on the Extra plans where it's free for the duration of the contract. (Hopster costs a reasonable £3.99 per month if you want to pay for it after the trial.)

A bonus is that along with 4G there's built-in GPS, so you can install and let your kids play Pokémon GO. For some people, this will be the Robin's saving grace.

Verdict

With a poor-quality screen, dismal cameras and woefully underpowered processor, this is a deeply unimpressive tablet, which is barely worth the £29 upfront cost. What you're really paying for here is the data contract, and if you're specifically after a kid-friendly tablet with 4G, this is one of few options available. If you can live with just a Wi-Fi connection, Amazon's £49 Fire is a better tablet, but it can't run Pokémon GO. Jim Martin



£33 inc VAT

Buy from
amazon.co.uk

Specifications

10,000mAh power bank with durable casing; 1.5A (7.5W) Micro-USB input with passthrough charging, charges in around 6 hours; 2x 2.1A (10.5W) USB outputs, total max output 10.5W; ZEN+ device-recognition technology; auto-on; long-term standby; 80 percent energy efficiency; cloth carry case; Micro-USB cable; 96x62x24mm; 220g; 12-month warranty



POWER BANK

Zendure A3 Power Bank 10,000mAh

Zendure isn't as well known as some power bank manufacturers, such as Anker, but they could learn a lot from how it does things. The A-series is by no means perfect, but it takes into account the features people need most and present them at a reasonable price.

Price

Various models are available in the Zendure A-series, starting with the 6700mAh Zendure A2 which, in our opinion, is one of the best all-round power banks money can buy, right through to the Zendure A8 QC, which is high in capacity and builds in the latest technology such as Quick Charge 3.0. In between those models are the 10,000mAh A3 reviewed here, the 13,400mAh A4, and the 16,750mAh A5.

Design

Zendure's power banks differentiate themselves from others on the market in three key ways: with their cool-looking and virtually indestructible crushproof PC/ABS composite material with dual-injection moulding and shock-absorbing central belt, with their much higher than industry standard efficiency rating of 80 percent, and finally with their long-term standby - you can pick up one of these banks six months after you threw it into a drawer and still find it as full as it was the day you last used it.

The A3 reviewed here is a 10,000mAh model, which offers the perfect middle ground between pocketable power banks and high-capacity power banks that can charge your phone several times. Except in this case it is both, and its 96x62x24mm, 224g body is not going to cause much of a bulge in your pocket. Zendure has done a great job of cramming in so much capacity into such a small case, while keeping down the weight and size to a reasonable amount.

With an 80 percent energy efficiency, you should see 8000mAh of power available for charging your devices. That translates to two- to three charges of an Android phone, and in excess of four charges for an iPhone. When the battery is depleted it can be recharged in as little as six hours over its 1.5A



(7.5W) Micro-USB port, and one of the neat things about this device is it supports passthrough charging, which means it will charge its own battery at the same time as any connected devices, without causing any harm to the hardware.

Where the 10,000mAh A3 differs from the A2 is in its capacity, but also the number of outputs. However, it's worth pointing out that while you get an extra USB output here, the max total output isn't any higher: the A3 can offer 2.1A (10.5W) from one USB output or shared between two. Nevertheless, not all the devices you plug in will want to draw the full charge available, and to aid in divvying up the power there's Zen+. This is clever device-recognition technology that delivers the optimum charge, rather than firing out the full amount and leaving it to your device to take only what it requires.

Performance

Operation is plug and play, so you simply plug in a USB cable and connect your mobile device to

begin charging. The power button is used only to see how much power remains in the bank.

There are features this power bank doesn't provide. For example, there's no LCD screen, and no support for USB-C or Quick Charge 3.0. However, the four LEDs lined up above the power button do a reasonable job of inferring how much power remains in the bank (each represents 25 percent of the total capacity, and USB-C and Quick Charge 3.0 are useful only for those with the most recent flagship phones. As it stands, the 10.5W output it does offer is fairly nippy.

Verdict

Higher in capacity than the class-leading Zendure A2, but with the same indestructible design and an extra USB output, the Zendure A3 is a great choice if you want a little more pocketable power for charging your phone and/or tablet away from home. If you need more power still check out the £40 Zendure A4, which is otherwise identical to this Zendure A3. Marie Brewis

Zendure has done a great job of cramming in so much capacity into a small case, while keeping down the weight and size to a reasonable amount

£159 inc VAT

Buy from
■ logitech.com/en-gb

Specifications

Multiple camera support; mobile app and web browser access; 360p, 720p or 1080p HD video; Wi-Fi 2.4- and 5GHz; 135-degree wide angle lens; auto night vision up to 15 feet; advanced motion detection; 8x digital zoom; built-in speaker and mic; 1600mAh rechargeable lithium battery; instant data encryption with secure sockets layer (SSL) web transfer; manual 360-degree pan, 110-degree tilt; 67x65x75mm; 186g



SMART SECURITY CAMERA

Logi Circle



Home security cameras are getting smarter as well as cheaper, but in terms of functionality, not much has changed. While remote viewing, night vision and two-way audio systems are all impressive, Logi is aiming to offer something unique with the Circle - security, with a social, creative aspect.

Price

The Logi Circle costs £159, which puts it in line with Netgear's Arlo Q (£169). On top of the initial price tag, those that want to take advantage of a Circle Safe subscription will have to pay an additional £7.99 a month, or £79.99 per year. All users receive access to a free 24-hour cloud backup, as well as a one-month trial of Circle Safe, which enables extra functionality, including custom time-lapse Day Briefs and a 31-day cloud backup.

Design

As far as home security cameras go, this is one of the better-looking systems. Unlike other models that aim to blend into the environment around it, the Circle makes

a statement with its modern design, and should complement its surroundings. It's available in black or white.

The Circle uses a magnet system that not only lets you rotate the camera 360 degrees on its base but also provides it with wireless charging capabilities. While it won't work with any standard wireless charger, it means you can remove the camera from its base and temporarily relocate it - the onboard 1600mAh battery will last for around 12 hours. You can also tilt the Circle 110 degrees. Note that you'll need to rotate and tilt the device manually.

The camera's small dimensions (67x65x75mm) and light weight (186g) mean it is portable and can be moved when needed. The lens is surrounded by infrared LEDs for night vision capabilities, and a speaker ring for two-way communication. A single LED displays the camera's status such as starting up, connecting to Wi-Fi and live streaming, though this can be disabled via the app. The supplied magnetic base can be screwed into the wall, although it must be within 10ft of a power socket to keep the camera charged up.

Features

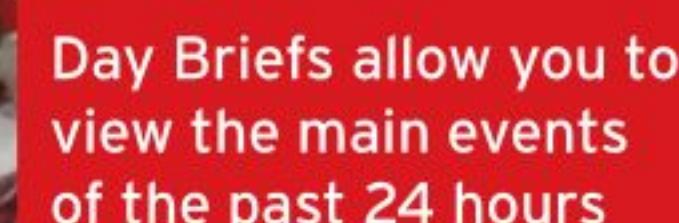
Here at *PC Advisor* we've seen our fair share of smart security systems, and with most the setup is a long-winded process that takes around half an hour to accomplish. The Logi Circle, however, is different. After plugging in the camera and downloading the Logi Circle app (available for both iOS and Android), we simply enabled Bluetooth and followed the in-app instructions. Within two minutes, the camera was successfully connected to our home Wi-Fi and streaming directly to our phone. The Circle offers both 2.4- and 5GHz Wi-Fi capabilities, with the latter offering speedier connections.

Another nice surprise was the app's design. Many security cameras offer an impressive set of features, but are let down by the app. This isn't the case here, with its clean and intuitive UI offering a refreshing change to its clunky competitors. The app opens with the stream displayed full screen, with several timestamps dotted along the right-hand side. These are events, colour coordinated to show clips where (it thinks) a lot happened, alongside others where it detected minimal movement. A swipe from



Unlike other models that aim to blend into the environment around it, the Circle makes a statement with its modern design

For the price, the Logi Circle is an attractive option for those seeking a smart security camera for the



recording important events and providing them to you in a nicely edited, shareable video. It's not perfect, though: there's no motion zone support or built-in siren, two features that are standard when looking to buy a smart security camera.  **Lewis Painter**



£149 inc VAT

Buy from
■ y-cam.com

Specifications

10/100 Ethernet and mobile network (with Plus subscription); device capacity up to 32 sensors and eight remotes; 1-year warranty (3 years with Plus subscription); hub, 157x157x30mm

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



SMART ALARM SYSTEM

Y-Cam Protect



Y-Cam has, until now, produced great home security cameras, but is now broadening its sights to alarm systems. The Protect is the result, and Y-Cam reckons it's the best smart alarm you can get in the UK. As well as connecting to your router, it also has a built-in SIM and battery, so the alarm will sound and send you an alert even if your broadband goes down or there's a power cut.

Price

The Protect Alarm System costs £124. Included in the box is the hub,

a motion sensor, a door/window sensor and a remote fob. You can connect up to 32 sensors and eight fobs. Additional motion sensors cost £20; door/window sensors and fobs cost £16 each.

As you might expect, you will have to pay a monthly subscription fee to use the SIM, and it's either £5.99 per month or £59.99 per year. This is called the Plus service and it gets you not only app alerts when using the SIM but also text messages when the alarm is triggered (even if the hub is using your broadband to connect).

You can also set the Plus button on the fob or in the app to send a custom emergency message to two mobile numbers, which could be useful in some situations.

The Plus subscription also gives you a three-year extended warranty and unlocks a 30-day activity log, which you can't see if you go for the free internet-only plan. And if you own a Y-Cam HomeMonitor camera, you'll also get upgraded to 30 days' storage for recordings rather than the standard seven days.

There's also a Plus Premium option, which is £9.99 per month and gives you 30 days' storage for an unlimited number of HomeMonitor cameras.

Features

There are lots of smart alarms, but the Protect has what Y-Cam is calling 'Triple Layer' security.

It means that it keeps protecting your home if your internet or mains power fails: there's always a backup.

The battery lasts eight hours, which is hopefully long enough to cope with most power cuts. The motion- and door/window sensors are battery powered and should last a year before needing replacements. They keep their size down by using non-standard batteries, but these are easy enough to buy online. The motion sensor is just like a traditional home alarm system and detects any motion, which means it can be triggered by pets as well as people.

As well as full arming there's a 'home' arming button. This enables only the door/window sensors. Unlike some rivals, there's no vibration sensors, which would trigger the alarm if a potential break-in is detected.

Of course, unlike a traditional dumb alarm, you will get a notification on your phone whenever the siren is triggered, and a text message if you subscribe to the Plus service. You can also arm or disarm from anywhere, so long as you have an internet connection on your phone. This can be useful if you have a cleaner, for example.

When you arm it, the hub informs you with a nice English voice and it beeps for a few seconds to let you exit (you can set the time delay for this). Similarly, if you trigger the alarm because you've stuck the



Protect Remote

sensor on your front door, you'll hear beeping and then a spoken message when you've disarmed it.

Installation

The hub measures 157x157x30mm and is designed to sit next to your router, or hang on the wall. It needs a wired network connection to the router as there's no Wi-Fi: Y-Cam deemed Wi-Fi too unreliable for an alarm system. But, if you do want to place the hub somewhere else, you can use powerline network adaptors.

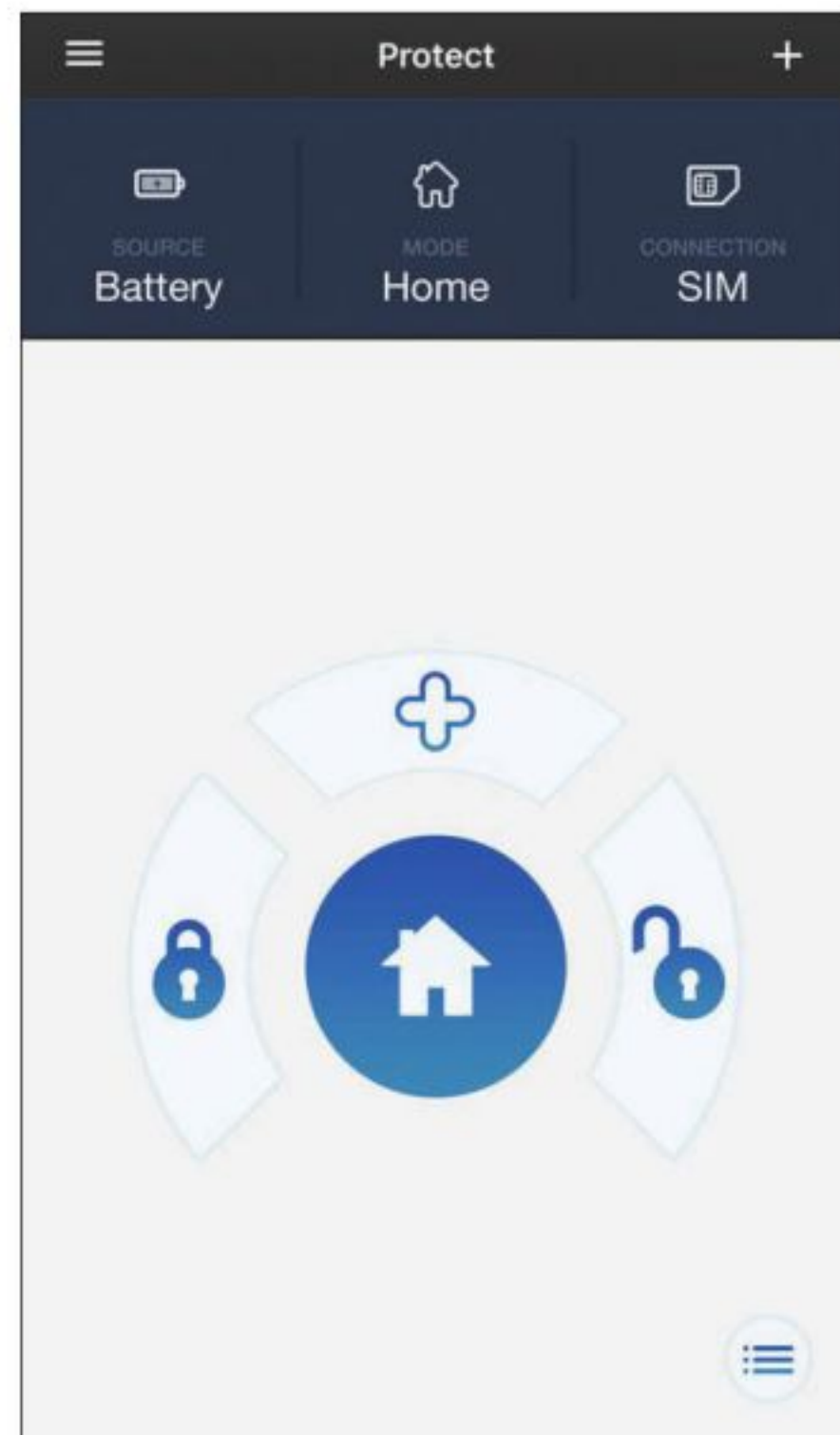
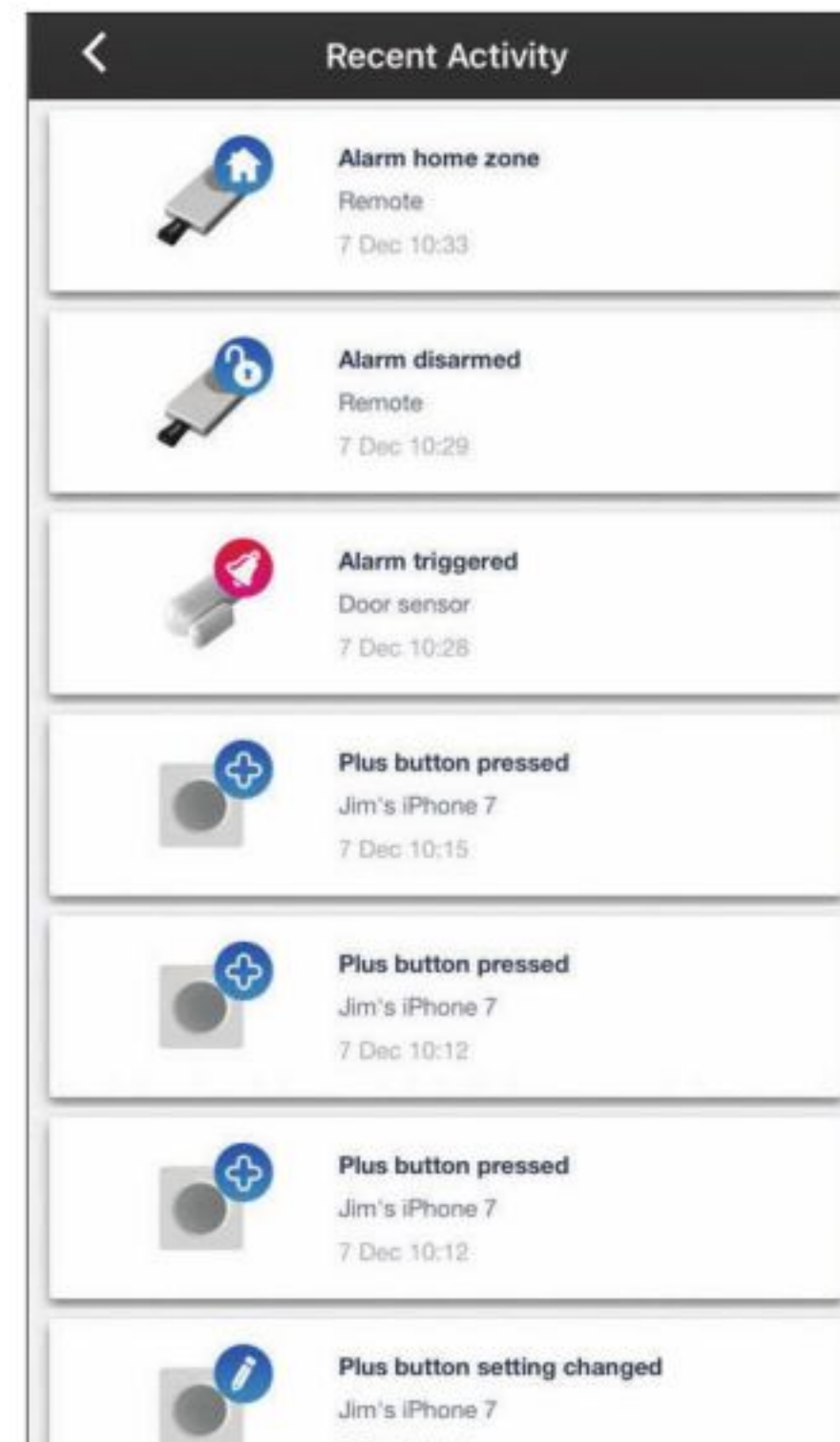
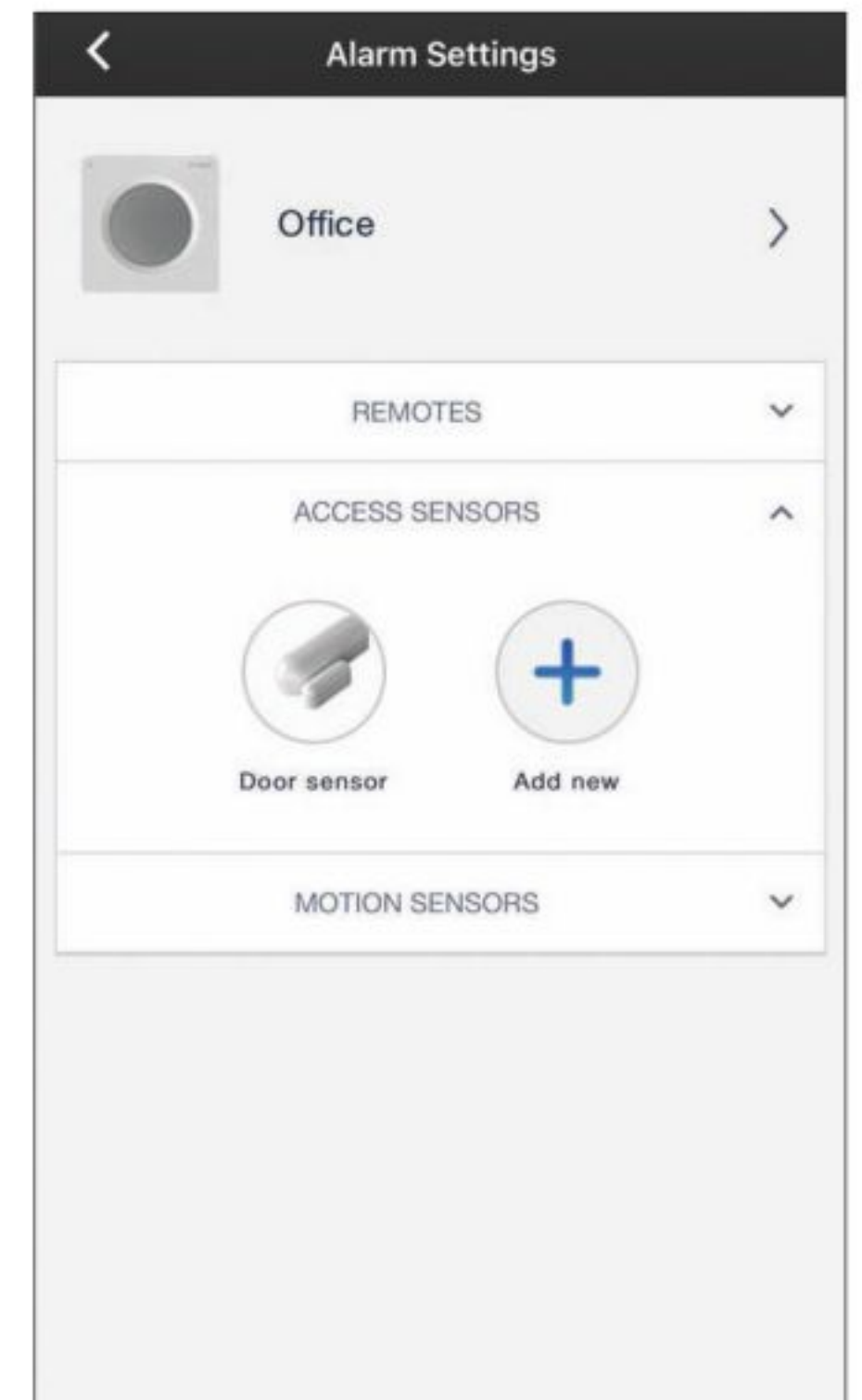
The motion and window/door sensors are wireless and come with sticky pads, making installation a breeze. Adding them in the app involves entering a code printed on a sticker, but it's a shame that this can't be automatically recognised by your phone's camera as with Apple HomeKit products: you have to key it in manually. It's quick enough, though, and only has to be done once.

You'll need the Y-Cam app for iOS or Android, but you'll already have this if you own a HomeMonitor camera. The interface is simple enough, and clearly shows the status of the hub: its power source, armed status and whether it's using the SIM or your broadband. Below is the same button layout found on the fob, which makes things easier.

The settings are a little hidden away, as you have to go to the hamburger menu, then settings, then choose your Protect hub, and then tap the arrow pointing right.

Here you can choose the time delay for triggering a sensor after arming, the name of your hub, the custom text message to send and whether or not the sensors' tamper triggers are enabled or not. Note that the tamper switches are internal and won't be triggered if someone rips the sensor off the wall or door/window frame. However, doing so will trigger the alarm anyway.

You can also see which network the SIM is connected to (it will use whichever UK network provider's signal is strongest, usefully) and upgrade the hub's firmware.



Performance

In general, the Protect performs well. It arms and disarms quickly after pressing the button on the fob, or in the app. Alerts also arrived swiftly to say the system was armed, disarmed or triggered, and there are also alerts sent if certain settings are changed.

On occasion we found it took a long time to get a response in the app to tell us that the system had been armed or disarmed. There's no immediate feedback to let you know a button press has been registered, either, but Y-Cam is working on an app update to address this and a few other things such as a warning to tell if your phone has no internet connection.

The app can also be a bit slow to load images and the settings page, and we're certain it's not an issue with our own 4G or Wi-Fi.

One other problem with the app is that if you set the Plus button to turn all your HomeMonitor cameras on or off, it merely responds with an 'Action is successful' message when the button on the fob or in the app is pressed. It is at least feedback, but doesn't tell you whether the cameras were switched on or off, so you could inadvertently turn them off when you meant to turn them on.

Our only other criticism is that the siren isn't particularly loud, certainly not loud enough to make

a thief want to leave the premises immediately. It's doubtful any neighbours would hear it, but this isn't such a bad thing as people tend to ignore house and car alarms: the important thing is that you'll know if the alarm is triggered wherever you are. You can then view the feed from your HomeMonitor camera(s) and call the police if necessary.

You can control the alarm system with the Y-Cam app

Verdict

The Y-Cam Protect is a good-value home alarm system which reliably informs you when a sensor has been triggered. It has a built-in battery and SIM, so will continue to work even if there's a power cut or your broadband fails. Using the SIM demands a small subscription fee, but this also brings a list of other benefits, and it's good value overall.  **Jim Martin**



Unlike a dumb alarm, you will get a notification on your phone whenever the siren is triggered, and a text message if you subscribe to the Plus service

£109 inc VAT

Buy from
overclockers.co.uk

Specifications

14 compute units; 896 stream processors; 1220MHz (Boost Mode) core speed; 7GHz memory speed; 128-bit memory bus width; 4GB GDDR5 RAM; 4096x2160 maximum digital resolution; PCIe 3.0; CrossFire Ready; DirectX 12; HDR; <75W power consumption; 400W minimum system power supply; 1x 6-pin power connector; 1x DVI-D, 1x HDMI 2.0b, 1x DisplayPort 1.4; 2 card slots; 238x121mm; 3-year warranty

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



GRAPHICS CARD

XFX AMD Radeon RX 460 4GB Double Dissipation

The AMD Radeon RX 460 4GB Double Dissipation from XFX is a reasonably-priced graphics card featuring AMD's latest graphics technology and optimised for playing the latest AAA games at 1080p resolution. It comes in at the bottom of a range of three GPUs based on the fourth generation of AMD's Graphics Core Next (GCN) technology and brings with it all of the main technologies of the more expensive cards, but at a much lower price. This means you get Freesync, DirectX 12 and Vulkan support as well as Virtual Super Resolution and HDR ready graphics.

Features

XFX has taken AMD's reference design and added an almost negligible 20MHz overclock, but the hardware has been enhanced in several more significant ways.

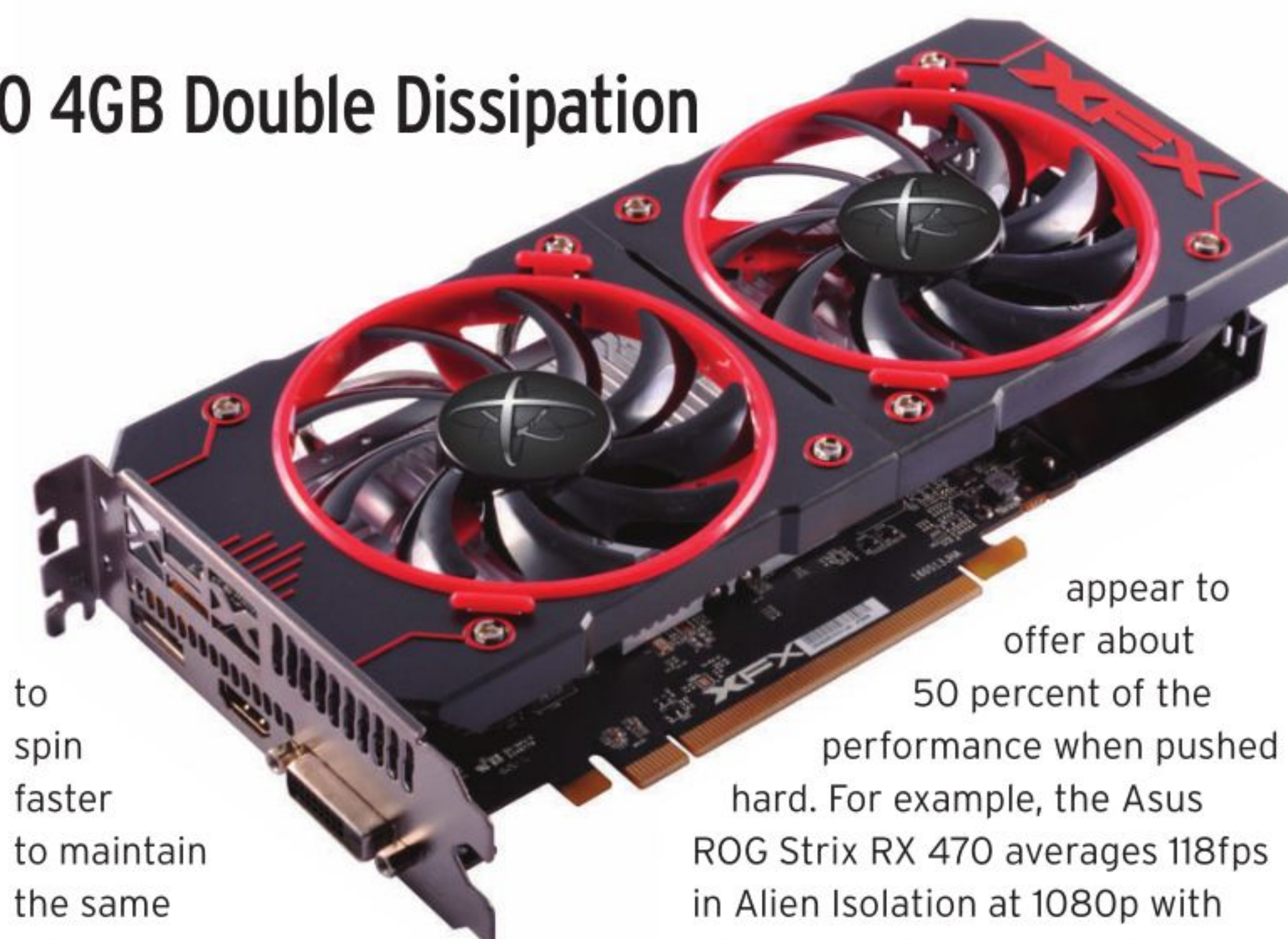
Our review sample is XFX's Double Dissipation model, featuring two 'silent but deadly' 90mm fans, which adjust their speed to keep the system as quiet as possible, shutting off entirely when they're not needed. Even when blowing at full speed, this card remains relatively quiet. These fans clip into place and can easily be detached (although not fully removed) without tools, allowing free access to the heatsink below for cleaning purposes.

Installation

The card features a standard-height design that should fit in most standard PC cases, but do be aware that it is both longer and wider than the smallest RX 460 boards you'll find available, so check the capacity of your case if you have a compact or small form-factor PC.

Its dual-slot design means you'll need adequate room inside your case as well as two spare slots at the rear. It's also a few centimetres longer than a standard RX 460 board, although at 238mm you're unlikely to have any issues with anything but the smallest cases.

These extended dimensions make room for the card's large heatpipe-based cooler and the twin fans mounted above it. These provide additional cooling over a single-fan system, while generating less noise than a single fan, which would have



to spin faster to maintain the same temperatures.

If you do need something physically smaller, XFX also makes single-slot versions of the card which also feature a single fan design and are short enough to fit in compact system cases.

Unlike comparable Nvidia-based products, you can also use RX 460 cards in a dual-card CrossFire setup. We wouldn't recommend designing your system around such a configuration, though.

Designed to be compatible with less expensive PC systems, the card requires only a 400W power supply as a minimum, although a 450W model is recommended. The card requires a single 6-pin power connector, but if your power supply doesn't have one, you can use the handy Molex power adaptor cable, included in the box, to hook it up to a spare hard drive connector instead. That said, with a power rating of only 75W, you'll probably be able to use this card just fine without using the 6-pin power connector at all, although it's there if you need more headroom for overclocking.

Performance

As stated earlier, the RX 460 is designed for competent gaming at 1080p resolution and our test results show that it does indeed meet these requirements. You won't always be able to select 'Ultra' quality settings, but you should be able to enjoy new game releases with smooth gameplay and decent visual quality.

Featuring 14 compute units and 896 stream processors, the RX 460 offers less than half the computing power of the more expensive RX 470. In real-world tests, it does

appear to offer about 50 percent of the performance when pushed hard. For example, the Asus ROG Strix RX 470 averages 118fps in Alien Isolation at 1080p with Ultra settings, while the XFX RX 460 4GB achieves 67fps.

As both of these results are well above the 60Hz limit of a standard monitor, the RX 460 will give you just as good a gaming experience at 1080p for considerably less money.

However, switching to Thief in DirectX mode at the same 1080p 'Ultra' settings, we see average frame rates of 56- and 43.1fps respectively, indicating that the RX 470 is delivering a noticeably better experience than the RX 460 although the RX 460 is performing much better than half as well as the more expensive card.

These differences will become more noticeable if you use a gaming monitor with a high refresh rate and, of course, if you attempt to play at resolutions higher than 1080p. If this is what you need, we would recommend saving up for the RX 470 as it will certainly be able to deliver a higher-quality gaming experience than an RX 460 on a 1080p monitor.

Another big difference, between the RX 460 and the RX 470 is that the latter is designed to be capable of running VR games. The RX 460, however, most certainly is not. Looking at the Steam VR benchmark, we achieve a 'Low' VR rating, a VR Quality score of 0.5 and a 'Not Ready' designation.

Verdict

At launch, the RX 460 delivered very impressive performance for the money and this XFX AMD Radeon RX 460 4GB Double Dissipation model is a fine example, with its quiet fans and decent built quality. However, Nvidia's GTX 1050 and GTX 1050 Ti cards offer better frame rates in this price range. Paul Monckton

£107 inc VATBuy from
overclockers.co.uk**Specifications**

640 CUDA cores;
1345MHz/1455MHz (Base/
Boost) core speed; 7GHz
memory speed 7GHz;
112GB/s memory
bandwidth; 128-bit memory
bus width; 2GB GDDR5
RAM; 4096x2160 maximum
digital resolution; PCIe 3.0
x16; DirectX 12; OpenGL 4.5;
HDR ready; 75W power
consumption; 300W
recommended system
power supply; DVI-D, HDMI
2.0, DisplayPort 1.4; 2 slots;
166x112mm

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

**GRAPHICS CARD****Palit GeForce GTX 1050 StormX 2GB**

Small enough to fit into cramped PC cases, and without the need for any dedicated power wires, the Palit GeForce GTX 1050 StormX 2GB is a no-hassle way to add genuinely competent 1080p gaming performance to PCs that would otherwise be unable to support a modern graphics card.

Price

The GTX 1050, and the more powerful GTX 1050 Ti, are Nvidia's latest additions to the 'Pascal' range of graphics cards, which has been dominating high-end gaming since its release in Summer 2016.

At £107, the Palit StormX won't break the bank either. It's a decent amount cheaper than the GTX 1050 Ti, which is around £150, though performance is also in line with the lower price, as you can see below.

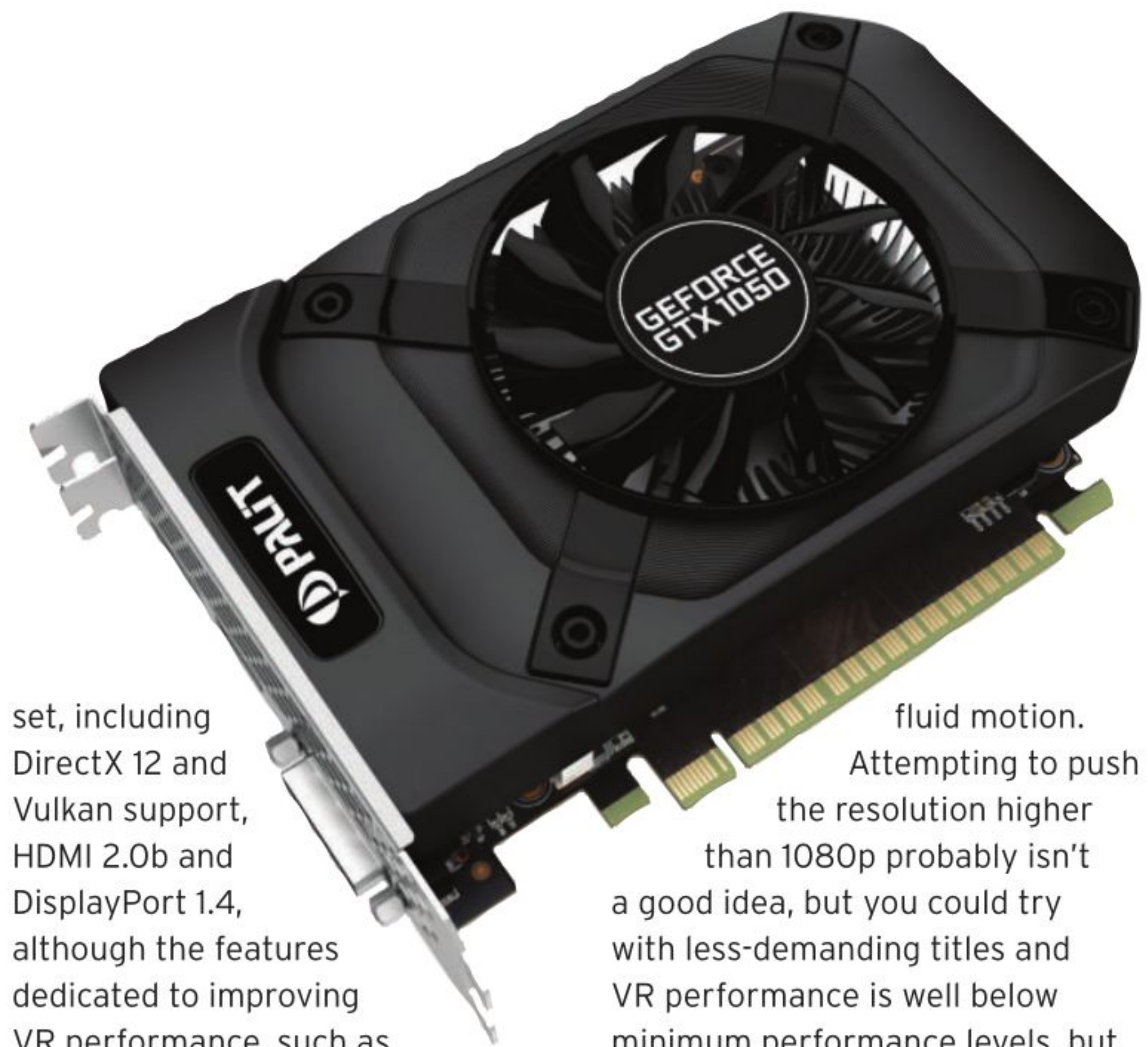
Unlike the more powerful cards in the range, the GTX 1050/GTX 1050 Ti boards aren't based on cut-down versions of the more powerful GPUs. Instead they use an entirely new version of the Pascal chip designed for the entry-level gaming market.

Features

This Palit board uses the less expensive of the two chips, the GTX 1050 which features a 1455MHz Boost clock speed that's actually a little higher than that of the GTX 1050 Ti, but comes with only 640 CUDA cores compared to the 768 of the Ti version. With 2GB of GDDR5 RAM on a 128-bit bus, it achieves a maximum memory bandwidth of 112GB/s.

These specifications put the card ahead of the GTX 950 it replaces, yet the new board draws only 75W maximum power, removing the need for a supplementary 6-pin power connector and reducing the minimum recommended power supply rating from 350- to 300W. This greatly improves the card's compatibility with older and less-capable PC hardware, though the removal of that 6-pin power connector also limits any overclocking potential, which might otherwise push the power draw beyond what can be delivered by the motherboard alone.

Being a Pascal card, the GTX 1050 provides an up-to-date feature



set, including DirectX 12 and Vulkan support, HDMI 2.0b and DisplayPort 1.4, although the features dedicated to improving VR performance, such as Simultaneous Multi-Projection are of little use here as the card isn't capable of VR-grade performance.

The Palit card features a basic, functional two-slot design with a single fan atop a standard finned heatsink. As you would expect at this price, there's not backplate or fancy heatpipe-based cooler. It provides single DVI, HDMI and DisplayPort outputs and measures a compact 166x112mm.

Performance

The introduction of the GTX 1050 and GTX 1050 Ti can be seen as Nvidia's answer to the AMD Radeon RX 460 and our tests show that even the GTX 1050 is able to outperform the Radeon in the majority of benchmarks.

Focusing on 1080p performance, we find the Palit GeForce GTX 1050 StormX 2GB capable of averaging over 60fps at high settings in Thief and much higher still in Alien Isolation. These scores are well ahead of even a 4GB Radeon RX 460. The GTX 1050 also achieves quite playable frame rates of around 50fps with Ultra settings, if you value visual quality more than

fluid motion. Attempting to push the resolution higher than 1080p probably isn't a good idea, but you could try with less-demanding titles and VR performance is well below minimum performance levels, but this is to be expected given the cards stated performance goals.

Results like this are really impressive for a card costing just under £110, making it a really compelling purchase compared to a Radeon RX 460 (see opposite). If your budget is limited, you won't be dissatisfied with what this card can deliver for the money.

If, on the other hand, you're looking for the best graphics card you can install in your low-end PC, it's well worth considering spending 50 percent more for a 4GB GTX 1050 Ti, which will give noticeably better performance and some degree of future-proofing. It may seem like a big leap in percentage terms, but £50 isn't a huge amount compared to the cost of modern games.

Verdict

The GTX 1050 could be the perfect card for converting a low-end computer into a competent gaming machine, and this board from Palit is a strong no-frills example at a good price. However, you should consider a 1050 Ti if you can afford it.  **Paul Monckton**

Being a Pascal card, the GTX 1050 provides an up-to-date feature set, including DirectX 12 and Vulkan support, HDMI 2.0b and DisplayPort 1.4

£69 inc VAT

Buy from
amazon.co.uk

Specifications

A4 colour inkjet printer with 5760x1440dpi resolution; 2400x1200dpi scanner/copier; paper tray 1, 100 sheets A4; paper tray 2, 20 sheets photo paper; USB, Wi-Fi, Apple AirPrint, Google Cloud Print; 130x385x335mm; 6.7kg

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

COLOUR INKJET PRINTER

Epson Expression Premium XP-640



Epson's 'small in one' multifunction printers are a good choice for homes where space is tight, but previous models in the range have tended to be conventional four-colour printers. As the name implies, the new Premium model is more advanced and uses five inks to produce high-quality photo prints.

Design

The XP-640 uses five separate ink cartridges, with the traditional cyan, magenta yellow and black inks complemented by a special 'photo-black' ink that helps to improve contrast and colour in photo prints. However, it maintains the compact dimensions of its predecessors, measuring just 358x335x130mm. It doesn't skimp on features though, including a 1200x2400dpi A4 scanner and copier, USB and Wi-Fi connectivity with Apple's AirPrint for iOS devices, and Google Cloud Print and Epson's own Connect app for other mobile devices.

With photo printing in mind, the XP-640 includes two separate paper trays, with the main paper tray holding 100 sheets of standard A4 paper, while the second tray holds 20 sheets of photo paper. The printer also includes a USB interface and memory card slot for quickly printing photos from a camera or storage device.

The XP-640 also supports duplex (two-sided) printing, so it'll certainly be versatile enough for most home users. We did have a couple of minor complaints, though. The paper trays feel light and flimsy and the initial setup is a bit confusing. The printed manual instructs you to start by loading paper into the upper (photo) tray, while the installer program requires you to start by loading the lower (plain paper) tray so you can print out some test pages in order to calibrate the print head properly.

Performance

Those aren't major weaknesses, though, and the XP-640 does deliver when it comes to print quality. Its 5760x1440dpi resolution ensures that text output is close to laser quality. And, of course, the five-ink system ensures very crisp, colourful photos and colour graphics.

It's not really fast enough for business use (and it's not intended for this), but print speeds of around 12 pages per minute (ppm) for plain text, and 8ppm for mixed text and graphics, should be perfectly adequate for most routine printing at home.

Photo printing was a little sluggish, though. Epson quotes a speed of 20 seconds for 6x4in postcard print, but our test prints took 45 seconds when using the 'standard quality' settings, and 75 seconds for 'high quality'. Even so, keen photographers won't mind waiting a few seconds longer in order to get this sort of quality.

Running costs

Running costs are a bit of a mixed bag, though, even if you use Epson's largest high-yield cartridges. A complete set of four XL-size photo inks comes to £62.96 and should last for 650 pages, which works out at 9.7p per page.

That's not bad, given that it includes the extra photo-black ink, but plain mono printing proves to be relatively expensive. The XL black cartridge costs £17.99, but only lasts for a more modest 530 pages, giving an above-average price of 3.4p per page for simple text documents. Fortunately, Epson does sell all five inks together as a 'multi-pack', so if you buy shop around, you should be able to get those costs down to around 3p for mono, and 9p for colour.

Verdict

The strength of the XP-640 is its five-ink printing system, which makes it a good choice for people who want to print high-quality photos on a regular basis. However, its running costs are a little higher than average. **Cliff Joseph**



£249 inc VAT

Buy from
020 7744 0330

Specifications
Windows 10, Mac OS X 10.8 or later; DVI-D; HDMI; 2x DisplayPort; USB-C; 3x USB 3.0 SuperSpeed; 1x Audio In/Out; 214x167x102mm

Build: ★★★★★

Features: ★★★★★

Value: ★★★★★

Performance: ★★★★★

★★★★★

USB-C DOCKING STATION

Targus Dock410

The latest laptops may have the best ever performance, screen quality and battery life, but they tend to be a little thin on ports and connections. It's one thing to ditch the DVD drive, but quite another to remove the Ethernet socket. Some laptops, such as the new 13in MacBook Pro, have only two ports, the new USB-C type. This is where docking stations come in.

The Dock410 is a universal USB-C docking station which is designed to be used with the new generation of laptops that have USB-C ports. Since the connection to the laptop must be with a USB-C cable, the Targus can't be used with older laptops that don't have USB-C.

It isn't aimed specifically at fixed- or hot-desks: it's equally at home on both types.

Price
Currently, the Dock410 not available to buy directly on the UK site, but it will appear soon. To buy it in the UK now, just call Targus on 020 7744 0330. The current price is £249.

Design
Unlike other models, the Dock410 is much narrower, which means it takes up less desk space. It has raised rubber strips to hold your laptop in place, should you want to rest the back of it on the dock to create a more comfortable typing angle.

It has the following ports for connecting all your desktop peripherals, such as a keyboard, mouse, printer, Ethernet cable, monitors and more:

- 1x Gigabit Ethernet
- 2x DisplayPort outputs
- 1x DVI-D output
- 1x HDMI output
- 3x USB 3.0 ports (one is powered for fast charging)
- 1 minijack audio input/output

It measures 214x167x102mm, which is roughly half the size of many docks. On the left is a headset



minijack connector, which supports headphones with a built-in mic (or just plain stereo headphones), and a Kensington lock slot to help protect the dock from being stolen.

On the right is a USB-C port and a standard USB 3.0 port for connecting peripherals.

Around the back is the USB-C port you'll use to connect the Dock410 to your laptop, and this will also provide power alongside data to charge it - it uses the latest USB-C power delivery standard, supplying up to 60W.

We tried it with an HP Elite X2 tablet and a brand-new 15in MacBook Pro and both devices were powered with no problems.

There are a further two USB 3.0 ports here, plus Ethernet and the display outputs. The Dock410 supports two monitors up to 4K, but you'll probably want to use the DisplayPort outputs for these to ensure a 60Hz refresh rate.

In any case, you can only choose one port on each side, either DisplayPort or HDMI on the left; either DisplayPort or DVI-D on the right.

What you need to know about USB-C
USB-C connectors are reversible, which means the orientation of the cable doesn't matter: you can plug it in either way up. Using adaptors, you can also convert USB-C to previous USB versions.

This is handy, but it's a shame that not all USB-C ports are created equal. Although the physical connectors are the same on all laptops and tablets, they don't necessarily support the same technologies.

For example, some only support USB 2.0 speeds, while others use USB 3.1 (5Gb/s) or the latest USB 3.1 Gen 2 standard (10Gb/s).

USB-C can also be a video

output, like an HDMI or DisplayPort connector. But again, not all laptops are created equal in this respect. For example, in order to drive two external displays, a USB-C laptop must have a graphics card which supports MST (Multi-Stream Transport mode). If not, you'll be limited to running just one external monitor. Also, if you're planning on using a dock with a Mac, then note that dual external displays are not supported by macOS.

Right now, it's early days for MST and running DisplayPort over USB-C, and Targus is keen to point out that the user experience when trying to run dual displays can vary wildly depending on the laptop you use.

Obviously, we were limited to running a single external display on our 15in MacBook Pro, and while we did get two displays working on the HP Elite X2, it was a process of trial and error, first attempting to enable the screens through the usual Windows 10 options, and resorting to using the Intel control panel when that didn't work properly.

Targus suggests considering using just one external display with the Dock410 - not because of limitations with the hardware itself but because of the variable experience you get with different USB-C laptops and tablets.

Verdict
The Dock410 is a compact docking station that will add all the ports and connections that are missing from many of today's laptops. It's exclusively for laptops with USB-C ports, and will charge them as well as providing video, audio and data over a single USB-C cable. It's best to stick to a single external monitor though, as you may run into issues driving two (and macOS is limited to a single external display anyway).  **Jim Martin**



From £34 inc VAT

Buy from
■ amazon.co.uk

Specifications

Sony PlayStation 4,
Microsoft Xbox One,
Windows 10 PC

GAME

Resident Evil 7: Biohazard



After seven numbered entries (including the prequel Resident Evil Zero) and countless spin-offs, it's probably not too surprising that publisher Capcom took Resident Evil 7: Biohazard as an excuse for a bit of an overhaul. The new game brings the series into a first-person viewpoint, and echoes the likes of Alien: Isolation by bringing in more enemies that you simply have to run and hide from, rather than tackle head-on, while upending the series' themes with a delve into Texas Chainsaw Massacre territory. But how does it hold up? Is Resident Evil 7 a return to form, or a stumble in the dark? Read on to find out.



Price

As you might expect for a major third-party game, Resident Evil 7 is coming out on both the PlayStation 4 and Xbox One, in addition to the PC. There are a couple of differences between the platforms, though. The biggest one is that the PS4 version is fully compatible with PlayStation VR, so you can play the entire game in VR (if you dare).

If VR isn't your thing, you might arguably be better off picking up the Xbox One version, because it's part of Microsoft's Play Anywhere scheme. That means you can buy one copy of the game and play it on both PC and Xbox One, with all of your save data seamlessly transferring between the two. This

only works if you buy a digital copy through either the Microsoft or Xbox digital stores though, not on Steam or retail editions.

Prices start at £34 for the PC version, and £42 for the PS4 and Xbox One games. A Collector's Edition is also available for both consoles, priced £69. If you want to make the most of Play Anywhere, head to the official Microsoft store to get the base game for £52 or the deluxe version for £69. Finally, additional content is available via a season pass for £24.

Plot

For the most part, the Resident Evil games have followed the ongoing adventures of the likes of Chris Redfield, Jill Valentine and Leon Kennedy, who by this point have killed so many zombies and mutated monsters that it's hard to imagine that any of it could faze them any more. It's with this in mind that the game instead drops us into the head of a brand new character: Ethan Winters. His wife Mia went missing three years ago, and seemed lost for good until he receives an email from her telling him to come and find her at a Louisiana farm.

Predictably enough, he goes along, and equally predictably, all is not as it seems. The farmhouse is decrepit and rotting, Mia is nowhere to be found, and the Baker family don't seem to be especially

hospitable. They sit somewhere on the wrong side of *Deliverance* on the 'murderous hillbillies' scale, and are as demented as they are dangerous. It's that crazy edge that really makes them work - rather than cold and calculating, they're completely unpredictable and the game finds some pretty consistently surprising things to do with them.

The new setting, new characters and narrower scope help pull the story and give it weight. Gone are the globetrotting threats of Resident Evil 6, replaced by a more personal evil, and for the most part it feels correspondingly more dramatic. Unfortunately, it loses some of that focus across the 10-hour story, giving in to some grandiose temptations and in the process losing much of its charm - especially once it moves on from the Bakers, whose villainous presence is sorely missed in the endgame. There are also a few loose ends, which we suspect may be tied up in the DLC (or perhaps the game's alternate ending), leaving the story as-is feeling slightly incomplete. And the less said about the final boss the better - the final five minutes of the game almost undo a great deal of the good that's come beforehand.

Gameplay

While the Resident Evil series started off as pure survival horror, over time the games began to ramp

up the action. That really began with the excellent Resident Evil 4, but the fifth and sixth games each escalated the action and in turn suffered when it came to scares, leaving a lot of fans feeling that for a horror series, Resident Evil really wasn't very horrifying any more.

This game is in part an attempt to go back to the series' roots, rediscovering the tense survival horror that made its name, but in large part it's achieved that by turning to the series (at least in its main games): a first-person camera. All of a sudden, instead of watching over Ethan's shoulder, you're right inside his head, and instead of monsters coming for him, it really feels like they're coming straight for you.

This is a clear bit of inspiration from the likes of Alien: Isolation and the Amnesia games, which proved decisively that the first-person perspective is good for more than just action-packed shooters. Those games' influence is felt just as strongly in the shift towards stealth-based horror. Just as Alien: Isolation gave you no choice but to run and hide whenever the iconic xenomorph reared its ugly head, so Resident Evil 7 introduces a few enemies who you just can't tackle head-on. Whenever you find yourself up against one of the Bakers, rather than going in guns blazing you'll instead have to sneak around and stick to the shadows, before breaking into a mad dash if you're unlucky enough to get spotted. It's these sections, which will feel familiar to anyone who tried the game's 'Beginning Hour' demo, that are the game at its best: making you feel tense, powerless and terrified.

The game doesn't stay that way for long, and perhaps one of the most surprising elements is just how much it feels like a traditional Resident Evil game once it gets going. Before long you pick up a pistol, and later on your arsenal expands to include a shotgun, flamethrower, grenade launcher and even a machine gun. You can use all of these to slow down and stun the game's biggest enemies, but also to kill the more straightforward opponents. These are primarily the 'Molded', humanoid monsters built out of the sort of black mould that anyone in a damp house will be all too familiar with. In grand Resident

Evil tradition, you're best off aiming for the head, but you can also blast off the odd limb to slow them down.

Get outside of combat, and things feel even closer to the series' roots. You'll pick up green herbs to craft first aid kits out of. You'll have to keep a tight hold of your inventory thanks to limited storage space. You'll wander around finding animal-shaped keys to fit matching animal-shaped locks, or solve puzzles by casting shadows on the walls to open hidden doors. It's all very... well, very Resident Evil.

There is one major innovation left to the game, though it feels slightly under-utilised. Every now and then you'll stumble across a VHS tape, and if you plug it into a VCR you'll find yourself stepping into another character's shoes for a brief segment of the game. Not only is this a great way to strip you of your accumulated gear temporarily, it's also used smartly to tease upcoming areas, or reveal undiscovered secrets you might otherwise miss. The core gameplay in these sections isn't radically different, but they're a welcome way to break the game up.

Performance

We played Resident Evil 7 on a PS4 Slim and we experienced smooth performance throughout, with reliable framerates and few bugs. We once ran into a minor AI issue that saw an enemy walking relentlessly into a wall after we closed a door in its face, but otherwise experienced no problems. Loading times were pretty lengthy, often a minute or two, but thankfully they only occur infrequently: when loading up a save file, restarting after a death, or loading into and out of one of the VHS segments.

The game's graphics are mostly impressive, especially the lighting: the Baker estate is dark and oppressive, and you'll find yourself clinging to the light sources dotted around. We imagine some may find the game too dark, and at times it is difficult to see what's going on while using the recommended brightness settings, but for us this was part of the game's charm: it made us genuinely scared of darker areas and unseen threats. On a less positive note, a few of the textures are a bit lacklustre, and the facial animations are definitely below par, but overall these don't detract from the game too much.

Any graphical glitches are more than made up for by the sound design, which is impeccable. Each of the game's locales has its own selection of distinctively unsettling sounds, from the creaking of the house to the gentle squelch of mould beneath your feet. It's enough to keep you constantly on edge, always trying to tell if those are your footsteps you hear or something else's, if that sound was the house settling or something else rather unsettling. And as great as the game's scares are, as frightening as its enemies get, they only work because the sound design refuses to ever let you get comfortable.

Verdict

Resident Evil 7 isn't perhaps the reinvention some hoped for, and at times its modern influences don't quite mesh with the more traditional puzzle solving and combat in the rest of the game. Still, if there's one thing it does do well, it's scare you, and in that sense alone this is a welcome return to form for the series.  **Dominic Preston**



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Specifications
Sony PlayStation 4

GAME

The Last Guardian



To say that fans have been waiting a while for The Last Guardian is a bit of an understatement. First announced in 2009, after entering development in 2007, it is the third game by Fumito Ueda, the creator of PlayStation 2 classics Ico and Shadow of the Colossus. So, now that the game is finally out, was it worth the wait?

Plot

The game starts out cryptically. You control a young boy who awakens in a strange cave next to a giant beast, whom you later name Trico. As you begin to explore the space, your actions are narrated by the boy's older self, recounting his memories as an adult - a system the game cleverly uses to provide occasional hints as to what you should do next.

When you first wake up, Trico is badly wounded, disorientated and as dangerous as any wild beast would be in that situation, not least a giant, magical, half-bird half-cat creature that can shoot lightning from its tail. As a result, your first task is to calm it down by finding barrels of food to feed it and carefully removing the spears lodged in its side. It's a striking introduction, cleverly introducing a few key gameplay mechanics, while also establishing Trico as both dangerous and vulnerable - a potential threat as much as an ally - a dynamic the game plays with throughout.

Across the campaign (which took us about 12 hours to complete) you'll learn to work with Trico to escape the derelict, ruined castle in which you find yourselves, solving puzzles, navigating platforming sections and fighting enemies. There's little in the way of explicit story (and even less in the way of dialogue), but the game drops details of its world along the way, though never so much as to lose its sense of mystery.

That's partly because the real story here isn't about the castle or even your escape from it: it's about the relationship you build with Trico as you work together and save each other countless times. Trico is one of gaming's most complex and lifelike AI characters yet, and The Last Guardian does an astonishing job of slowly building trust between the two of you. Every development in the central relationship feels both organic and earned, leading to some heart-stopping moments along the way and a finale that packs an almost unbearable emotional punch.

Gameplay

The game is split into three rough types of gameplay: platforming, puzzle solving and combat, and each is used in unique ways to reinforce the bond between player and beast.

Let's take the platforming first, which is a curious mix of climbing around the world and climbing around Trico. That's because at any

time you can grip onto his feathered back, clambering up and around him to reach new heights. This is especially important because as the game goes on and your bond grows stronger, Trico will allow you to ride on his shoulders as he leaps to perilous perches you could never hope to reach on your own, or will lift you up to platforms and doors with no obvious climbing route. Sometimes you can gently guide Trico forward, suggesting where he should head next, but at other moments he's in full control, leaving you only to cling on for dear life and enjoy the game's spectacular views.

When controlling the boy himself, The Last Guardian does a fantastic job of using both animation and the control scheme to reinforce his youth. He stumbles when he runs, limbs flailing with childish abandon, and skitters nervously when he gets too close to an edge he might fall off. Still, he's a pretty capable explorer, and the game owes a debt to Tomb Raider and Uncharted games, setting you to leap, crawl, and climb around ruins that might come toppling down at any moment. Inevitably, at times they do, leading to some impressive sequences as either you or Trico accidentally a destructive chain reaction, forcing you to scramble your way to safety.

At times, the path forwards isn't always clear and that's where the game's puzzle elements come



into play. The disparity between the boy and Trico's sizes means the challenge is often to find a way for you to both progress, as you scout ahead to find a way to open a gate or unblock a passageway. Other puzzles are more closely tied to Trico, as you have to work to convince it to jump down into a pool of water or have to find a way to destroy one of the 'evil eye' symbols dotted around, which leave the beast frozen with fear.

The puzzles are mostly well designed, making good use of your skill set and requiring solutions that encourage careful observation of the environment around you. Unfortunately, they can at times be one of the game's most frustrating elements, thanks to an unexpected problem: Trico is too well designed. To be more specific, he is meant to be a giant, wild animal. And, well, it acts like one. You can shout instructions or guide him towards specific objectives or directions, but there's never any guarantee that he will do what you want it to. At its worst that's *The Last Guardian* in a nutshell, and the frustration of guiding Trico will no doubt prove too much for some players to bear. In another sense it's a fascinating wrinkle on the game, turning Trico itself into the puzzle as you have to figure out what he wants and how to convince him to do what you want.

Thankfully, none of those frustrations are to be found in the combat, which is a smart inversion of the typical gaming power fantasy. Anyone who's played *Ico* will immediately spot the evolution from that game to this, though the system has been flipped on its head. There, you fought off shadowy figures who couldn't really harm you but would try and seize your companion, who you were tasked with defending. Here, the magical automata who attack are too small to threaten Trico, but will do everything in their power to kidnap you, leaving you almost entirely dependent on the beast for protection.

You can contribute, but your options are limited: you can shove guards to briefly knock them over, and on occasion you can pull the helmets off ones that Trico has already knocked to the floor, taking them out of the fight for good. Later in the game you play a bigger role in combat, as you encounter

guards carrying miniature versions of the 'evil eye' symbol that Trico is so afraid of, leaving it up to you to disarm them and help Trico get back in the fight. Even early on though, the combat is surprisingly compelling, given that you don't really get to do much fighting at all. Games rarely make us feel truly vulnerable, and even less often leave us reliant on someone, or something, else to protect us. That *The Last Guardian* not only tries this but makes it both intense and satisfying to play, is an impressive accomplishment.

Performance

First, the good. As mentioned before, the game's animation is top-notch, and Trico in particular looks uncannily lifelike as he leaps, flaps, and paws his way about the world. Anyone who's had a pet (especially a cat) will recognise in Trico some strikingly familiar body language, and the design is as much an achievement in real-world observation as it is in technical accomplishment.

Fortunately, the world around Trico is beautiful enough to keep up. The castle design is for the most part consistent - don't expect hugely varied environments as you progress, barring a few exceptions - but it's been assembled with an impeccable eye for detail. Your journey is not an entirely linear one, and the game has a remarkable way of surprising you by dropping you back into an area you've explored before, but from a new perspective. The result is that this world of crumbling towers and spacious ruins feels as real as it does beautiful. The game's vistas in particular are breathtaking, and we often

found ourselves pausing to take in the view. Unfortunately, all of that comes at a price, and despite being built specifically for the PS4, performance is still occasionally lacklustre. In most sequences, the console happily keeps up, but a handful of sections saw framerates plummet on our PS4 Slim. Luckily, it didn't happen often, and it was mostly during the game's more cinematic sequences, which don't require split-second timing. Still, it's a frustrating blemish for a game that was so long in development.

We also encountered a few bugs and glitches through our playthrough, which occasionally forced us to reload the last checkpoint in order to move ahead. There's also at least one puzzle in the game that seems broken: it requires the player to stand in such a specific (and arbitrary) position to trigger Trico to act that there's no way it can be working as intended. The camera is also an occasional frustration, especially when following Trico through narrower spaces, which is really the only element of the game that feels like a hangover from its PS3-era origins.

Verdict

The Last Guardian is beset by performance problems, camera complaints and feline frustrations. Some will find that these get in the way of the game as a whole, but for our part its accomplishments were enough to overcome the occasional frustration. The beautiful world, thrilling platforming and tense combat alone would make the game worth playing, but it's Trico that makes *The Last Guardian* one of this console generation's best.  **Dominic Preston**



BEST TVs 2017

Steve May rounds up the best TVs you can buy in the UK. From £249 to £4,000, there's something for every budget and all have a superb picture, regardless of price

If you're after a new TV and want the best there is, you've come to the right place. Over the following pages we look at the very best sets - including 4K and HDR models - available to buy in the UK right now. We've tested and rated specific models, but other sizes are available in all ranges, so if one is slightly out of your price range or you just don't want such a large one, then our ratings apply to those models, too.

All but one of the TVs tested here have 4K resolutions. These UHD (Ultra HD) sets are the ones to buy now. Only go for a so-called Full-HD (1920x1080 pixels) model if you can't afford a 4K model. 4K content is becoming more widely available, with broadcasters gearing up to show a lot of sport and drama in at this resolution throughout 2017. It's also available over your internet connection (as long as it's quick enough, around 15Mb/s or so) via Amazon Video, Netflix and Sky Q. Alternatively, you can buy a 4K Blu-ray player and buy physical discs.

BT also offers pay TV subscribers UHD sport (football, rugby, Moto GP, squash, to name but four) via its Infinity broadband delivered Sports channel. Because this streams at 2160/50p a much faster broadband connection is required. The firm will generally refuse to offer a 4K set-top box to those Infinity customers on less than a 45Mb/s connection.



TV buying guide

The latest generation of 4K televisions combine 3840x2160-pixel resolution - that's four times more than Full HD - with the latest HDMI inputs able to handle incoming 4K content sources, such as Ultra HD Blu-ray and media streamers like the Nvidia Shield and Amazon Fire 4K TV box.

The key specification to look out for when it comes connectivity is a HDMI version 2 input with HDCP 2.2 support. The latter is a new level of copy protection and is being used by all external 4K sources, so the more inputs that support it the better. If you buy a budget 4K set, it most likely will only have one HDCP 2.2 compliant input. This could prove to be a bit of an albatross when the content floodgates finally begin to open.

The prices of 4K UHD TVs has fallen dramatically. Most are typically priced where HD models were just a few years ago. Manufacturers are transitioning all their larger sets to 4K resolution, so you'll probably end up with one even if it's not that important to you. While the extra resolution that 4K offers is best appreciated on a large screen (55in plus), that hasn't stopped smaller panels appearing. While there's no reason not to buy a 4K TV at 40 inches, and the performance can be excellent, don't expect to see overt picture improvements from typical viewing distances.



The general rule when buying a 4K set is to go larger than your HD screen and view at the same distance, or sit closer. Or do both. 4K scales really large without revealing the pixels themselves, so it's comfortable to view up close.

It's worth remembering though, that the 4K UHD specification is an ever-evolving beast. Unlike previous leaps in TV quality (black and white to colour, SD to HD), it's not intended to launch fully formed. Hence a rolling calendar of phased updates, which will continue past 2020, maxing out with 8K resolutions screens. A new generation of HDR (High Dynamic Range) UHD TVs arrived in 2016, which offer higher peak whites and better colour depth than we have now. However, to appreciate these capabilities you need to feed your HDR 4K TV with HDR content, and there isn't much around.

How we test TVs

All TVs are put through their paces with a variety of Full-HD and native 4K content. To further help assess motion resolution, colour performance, black levels and greyscale, we employ a variety of industry-grade test patterns.

All TVs are viewed with real-world content, delivered via onboard tuners, and with a selection of favoured Blu-rays, including *Kill Bill Vol 2* (Uma Thurman's burial is a dastardly test of dynamic

contrast) and *Interstellar*. All 4K TVs will 'upscale' HD content to a lesser or greater degree (it won't simply appear as a small box in the middle - it is 'stretched' to cover all eight million pixels). It's a task some do better than others.

Where appropriate, we also don 3D glasses to see just how convincing a dimensional experience the TVs deliver, with a little help from Disney's *Tangled* and *Avengers: Age of Ultron*.

Of course, to really gauge the value of these UHD screens, you'll need a native 4K source, and the only real options currently available are Amazon and Netflix (and 4K Blu-ray discs). Some sets have 4K services integrated, for the rest we delivered them via the Amazon 4K Fire TV box, a £79 streamer.

Finally, file-playback tests comprised accessing a collection of audio and video clips, comprising various codecs and wrappers, from USB and a DLNA-capable QNAP NAS running Plex and Twonky Media.

While the extra resolution that 4K offers is best appreciated on a large screen (55in plus), that hasn't stopped smaller panels appearing



SONY ZD9 SERIES

£4,000 inc VAT • sony.co.uk ★★★★★

The 65in Sony ZD9 may come with a steep price tag, but it's also one of the best implementations of HDR on an LED TV we've seen. Key to its success is Sony's unique full array Backlight Master Drive, which comprises an unspecified number of precision calibrated LED lights controlled by a proprietary lighting algorithm. These allow the ZD9's backlight to work with uncanny precision. The set has no problem delivering the kind of spectral highlights that really make HDR shine.

Design is also striking. The bezel of the ZD9 is trimmed in a rose gold, while connections are hidden behind removable panels. There are four HDMI inputs, all HDCP 2.2 ready, plus digital optical audio output and Ethernet/Wi-Fi. Active 3D is also supported.

The ZD9 runs the Android TV OS. This can be inelegant at times, but there's no shortage of streaming services. These include Netflix, Amazon Video (both 4K capable) and YouTube, plus a full complement of Catch-Up TV, courtesy of a YouView TV guide overlay.

Picture quality is outstanding. In addition to that Backlight Master Drive, the set has an X1Extreme HDR image processor which does a remarkable job with all sources, even when they're not 4K resolution.

If the set does have an Achilles heel, it's the audio. A small carp (which is what it sounds like), given the general excellence of this superb set. And you'll probably use a soundbar anyway.

LG OLED65E6 (E6 SERIES)

£3,999 inc VAT • lg.com/uk ★★★★★

LG has been refining its OLED TVs for a number of years, and if the E6 is any indicator, it's been time well spent. By any measure, this is a spectacular flat screen set.

The design is gorgeous - indeed, this might be the prettiest TV you can buy right now. It features an ultra-thin picture-on-glass design that really shows off the unique form factor of OLED. A Harman Kardon designed soundbar adds a level of industrial detail.

Connectivity includes four HDCP 2.2 HDMI inputs and three USBs. There's also an optical digital audio output, legacy video, plus Ethernet/Wi-Fi. LG's webOS smart portal, now in its third iteration, provides a slick user interface. Apps, channels and inputs are all accessed via a bar at the bottom of the screen, navigated by LG's magic remote cursor/pointer.

Streaming services include Netflix and Amazon, Now TV and Catch-Up TV services. Both Netflix and Amazon Video support 4K. The E6 also handles Dolby Vision HDR, currently seen on certain Netflix shows. Picture quality is superb. What's immediately noticeable is that all content, both HD and 4K, benefits from the



set's rich black performance - Sky HD looks stunning. Audio quality is also top draw. The Harman Kardon sound system has pronounced stereo separation and delivers a well-balanced sonic performance.

Overall, we rate the E6 a cracking TV, both in terms of design and all-round performance.

PANASONIC TX-58DX802B

£1,289 inc VAT • panasonic.co.uk ★★★★★

Panasonic isn't a brand normally associated with ostentation, but the TX-58DX802B is a real peacock of a panel, not least because of its fancy easel design. The set's look isn't going to be for everyone, but fashionistas should love it.

The Active 3D capable screen is supported by two triangular stands, with the soundbar connected to the panel by a proprietary lead. The finish here appears to be mesh, but it's actually patterned fabric. Designed by Harman Kardon, this 12-driver soundbar does a cracking job of delivering, wide, crisp audio.

Connections include four 4K-ready HDMI inputs with HDCP 2.2 support, three USBs, digital optical audio, legacy AV and Ethernet.

The My Home Screen v2.0 smart portal is powered by the Firefox operating system. It's a minimalist interface which offers welcome customisation. You can pin shortcuts to your favourite channels, services or inputs directly on the home page.

The set comes with Freeview Play, the new connected iteration of the terrestrial TV standard.

Image quality is commendable, although its HDR presentation doesn't quite hit the highs of full-array backlit 4K HDR sets. Colour and detail are excellent. Inconsistent edge-lighting is disappointing though, and can become noticeable when watching a letterboxed movie.

Combine a keen price, with superior aesthetics and decent image quality though and you have a screen to shortlist.





SONY KD-55XD9305

£1,800 inc VAT • sony.co.uk ★★★★★

Sony attempts to give OLED a run for its high-style money with this ultra slim edge-lit 4K HDR set. Key to the KD-55XD9305's design is a clever Slim Backlight Drive, while cosmetic niceties include a strip of gold running around the frame.

There are four HDMI's, all HDCP 2.2 enabled, plus AV inputs, three USB ports, optical digital audio and Ethernet/Wi-Fi.

The Smart platform is Google's Android OS, coupled to a YouView EPG (Electronic Program Guide) that delivers a full set of mainstream Catch-Up services. The television boasts two satellite tuners and dual Freeview. Streaming services include Netflix and Amazon Instant Video, both 4K enabled. The TV is also 3D capable.

Picture quality is high. That Slim Backlight Drive cleverly pairs two LED light modules with dual light guides which split screen coverage 50/50. The technique allows the set to boost contrast.

Picture processing is first class. Tinkering with Black Adjust (Medium), Auto Local Dimming and X-Tended Dynamic Range, delivers a really cinematic look. Motion handling remains a Sony strength, making this a great set for sports viewing.

Audio performance is largely functional. You'll want to resort to a separate sound source at some point.

Overall, the XD93 is an innovative UHD screen. If you're after a beautifully designed HDR-capable LED TV, it merits an audition.

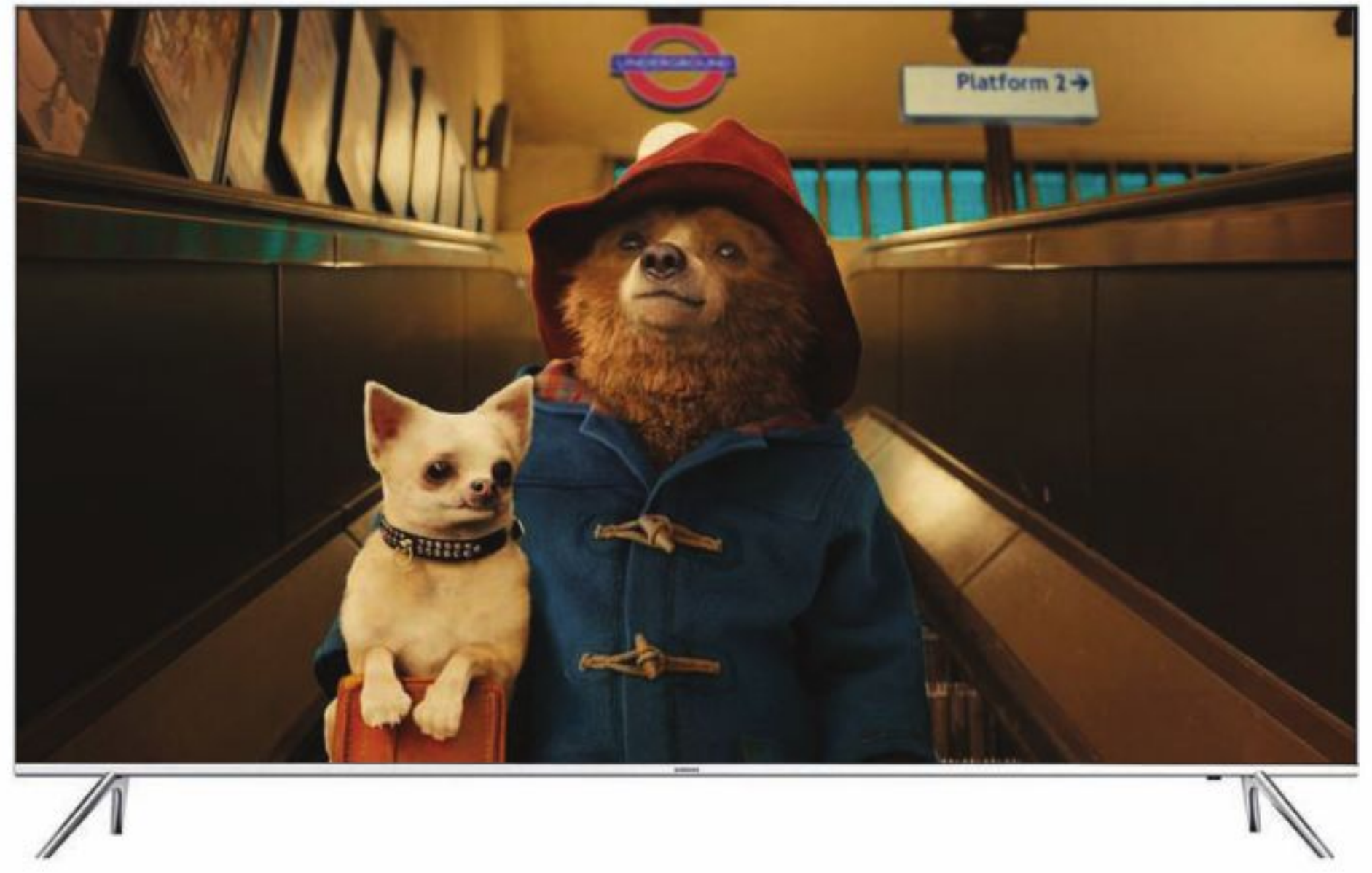
SAMSUNG KS7000

£999 inc VAT • samsung.com/uk ★★★★★

The KS7000 sits in the sweet spot of Samsung's Quantum Dot SUHD TV range. This 49in set is 4K HDR enabled and boasts a top-flight Tizen-powered smart connected platform. Smart Hub apps include 4K Netflix and Amazon plus key Catch-Up TV services, and a wealth of casual games. Navigation is fast, thanks to a quad-core processor.

The Freeview HD/satellite 7-Series set uses Samsung's separate One Connect junction box. This tethers to the screen via a dedicated umbilical cable. Connections include four HDMI's, which all support HDCP 2.2, three USBs, digital optical audio output, plus Ethernet/Wi-Fi. It also ships with two controllers, one traditional, the other simplified.

The HDR picture performance of this mid-ranger is extremely good, producing effective peak highlights that really add depth to TV and games. Unusual for a bottom-edge-lit set, it warrants Ultra HD Premium certification, which is a guarantee of 1,000 nits peak brightness, although it can't hold this level of illumination for long. Using a Quantum Dot filter, the set also delivers deep, accurate



colours. Black levels are outstanding. Motion resolution is also high, making this a great choice for sports enthusiasts.

Audio performance is less remarkable, although the two downward firing microspeakers have a fair amount of welly at 40W.

Overall, Samsung's high performing 4K HDR television should be considered excellent value.

PANASONIC TX-65DX902B

£3,299 inc VAT • panasonic.co.uk ★★★★★

Panasonic has enlisted the help of Hollywood cinematographer Vanja Cernjul to help tune this flagship television - and in terms of colour fidelity and fine detail, the results are absolutely mesmerising. Images have a consistent, cinematic quality. To achieve high contrast HDR, the TX-65DX902B uses a full array backlight with 512 LED lights. This generally works well, but can sometimes create visible halos around illuminated objects.

The set is beautifully built. Its pedestal feet have a distinctive engraved finish while the panel itself has a textured trim. Handsome springs to mind. Connections include four HDMI's, all HDCP 2.2 compatible. There's also three USBs, component and composite video, plus an optical audio output and Ethernet/Wi-Fi.

There are twin tuners for Freeview Play and Freesat. The set comes with two remote controls, a Bluetooth touchpad and a posh IR pointer. It supports Active Shutter 3D. The Smart platform is built



around Firefox and is simple to use. Services include Netflix and Amazon Video (both 4K), plus YouTube, Wuaki TV and Chili Cinema. All Catch-Up services are provided. The TV's audio performance is adequate, with considerable volume and stereo separation.

Overall, the Panasonic TX-65DX902B is a premium television capable of an outstanding performance.

HISENSE 65M5500

£899 inc VAT • hisense.co.uk ★★★★★



Hisense's budget 65in 4K HDR has a spec that belies its price tag, and could be a good bet for big-screen bargain hunters. The 65M5500 looks classy from a distance, but up close is a bit plasticky. There are four HDMI inputs, but only two support HDCP 2.2. There are also three USBs, digital audio, legacy video outputs and Ethernet. The tuner choice is Freeview HD or satellite.

The Smart platform is basic, but you will find some key streaming services. Both Netflix and Amazon support 4K; there's also BBC iPlayer and YouTube. The media player offers wide file support, including MKV and FLAC. It isn't 3D capable, though.

Image quality is better than you might expect for the price. Detail and colour vibrancy are high. Backlight uniformity is a little uneven, but this is only really evident on fully dark sequences. The HDR mode gets a little unruly though, as the backlight intensity is often boosted to a point where detail is lost.

Perhaps the Hisense's biggest weakness is motion handling, there are no interpolation modes here which help retain detail and the Ultra Smooth Motion image processor is only used to smooth out horizontal pans.

Audio isn't great either. Make do with it while you can, but budget for a soundbar. Overall though, this 65in Hisense 65M5500 can be considered a solid value buy.

FINLUX 48UXE304B-P

£499 inc VAT • finlux.co.uk ★★★★★

This 48in Finlux is the cheapest 4K TV to offer a Freeview Play tuner. When it comes to forward looking features, it's clearly facing the right direction. Freeview Play mixes internet delivered catch-up with a roll-back programme guide and over the air DVB.

All four HDMI inputs are 4K HDCP 2.2 enabled, there's also a trio of USBs, legacy AV, PC VGA, optical audio and Ethernet/Wi-Fi, but no 3D TV compatibility.

While the basic specification is leading edge, the Finlux Smart Platform looks somewhat dated. Available services include 4K Netflix, YouTube and TuneIn. There's also a capable media player



for USB devices and network attached storage. Image quality is reasonable, but there's a little devil in the detail. To ensure 4K content looks its best, you'll need to delve into the menu modes and switch the default Picture Zoom setting from Auto to Full. It's only when you do this that the set can display clean, crisp 2160p video. Left unchanged, UHD detail can be obscured by a curious moiré pattern. This edge-lit set doesn't support HDR, but images still have snap. There are backlight uniformity errors, but these are in keeping with the budget price tag. The set's audio performance is pretty average.

In all, Finlux's 48UXE304B-P is a reasonably well specified budget UHD flatscreen.

PHILIPS 65PUS8901 AMBILUX

£3,999 inc VAT • harrods.com ★★★★★

Philips televisions are unique in offering Ambilight, that funky mood lighting created by LED strips on the back of the set. Now with Ambilux, it's taken the idea to another level entirely. Instead of the usual LED bulbs, Ambilux features nine LED projectors, arranged in a half circle on the back panel. These literally cast images behind the set. This may sound nuts, but it can also look pretty cool, particularly when gaming. The catch is that Ambilux requires that the TV sit precisely 9cm from any (white) wall.

But Ambilux is just one attraction of 65in 4K UHD 65PUS8901. This 4K screen also offers great picture quality and excellent audio. There are four HDMI inputs, all of which support HDCP 2.2. Plus SCART and component, optical digital audio, three USBs and Ethernet/Wi-Fi. That remote control has a touchpad on one side and a thumb keyboard on the other. There's no support for 3D.

The smart platform is Android. Apps include BBC iPlayer, Netflix with 4K and YouTube. Media playback is good, coping with



a variety of file types. Image clarity is extremely high. Colours are vibrant, but Philips' Micro Dimming Pro backlighting system struggles to deliver deep, nuanced blacks.

Audio quality, courtesy of a 30W sound system, is surprisingly beefy. The concept of Ambilux may sound bonkers (because it is), but in the right room, it looks extraordinary. We think Ambilux is well worth checking out.

PHILIPS 55PUS6401

£649 inc VAT • philips.co.uk ★★★★★

Philips has made some serious upgrades to its 6 Series UHD TVs for 2016. Available in 43-, 49- and 55in screen sizes (43PUS6401, 49PUS6401 and 55PUS6401 respectively), these sub-£1,000 mid-rangers offer two-sided Ambilight plus HDR (High Dynamic Range) 4K compatibility plus all the trappings associated with the Android TV smart platform.

And they all look decidedly upmarket, too. The bezel of the 55in 55PUS6401, while not ultra narrow, has a distinguished gunmetal grey finish, with a so-called 'pinch' stand, basically two bolt-on A-frame feet. The look is classy, not cheap.

Rear connections comprise four HDMI, two of which are labelled ARC and one MHL, plus three USBs, including a fast 3.0 input. There's also a SCART, component with phono audio, Ethernet and digital audio output.

It should be noted that only two of the HDMI support HDCP 2.2, which is required for 4K content sources like UHD Blu-ray and set top boxes. Tuner choice is Freeview HD or generic satellite. The remote control is a standard IR pointer.

The Android TV smart platform isn't as rough as it once was, although it's still prone to tedious software updates and moments of failure. The Home page features Google's Play and Games offerings, as well as BBC iPlayer, Vimeo, Netflix (which supports 4K streams), Wuaki.tv, Chili Cinema, DailyMotion, Deezer and casual games.

In truth, it's not a comprehensive collection, but Amazon Video has recently been added in an update and there should be enough to keep most people entertained. There's also an internet browser, but frankly you'll encounter so many weird formatting problems with sites in the wild that it's not really that usable. A quad-core processor helps keep navigation lively and games playable.

Picture quality warrants a thumbs up, with UHD detail and colour vibrancy outstanding. There's genuine precious metal to be enjoyed during the rise of the *Golden Army in Hellboy II* (Blu-ray), but our titular hero does verge a little on the orange rather than his trademark hellish red.

In many ways, the set proves a great partner for Sky UHD. Ultra HD movies played from a Sky Q Silver, look superb. The screen



relishes the detail. Philips Pixel Plus HD image processing supposedly aids definition, allied to a Natural Motion processor. The latter doesn't use its algorithms to maintain motion clarity though, more it smooths out horizontal picture judder.

JVC LT-42C550

£249 inc VAT • uk.jvc.com ★★★★★

Prices may be tumbling on 4K UHD sets, but there's still demand for cheap Full HD TVs. If you're buying one for a second room or bedroom, your budget may well dictate fewer pixels.

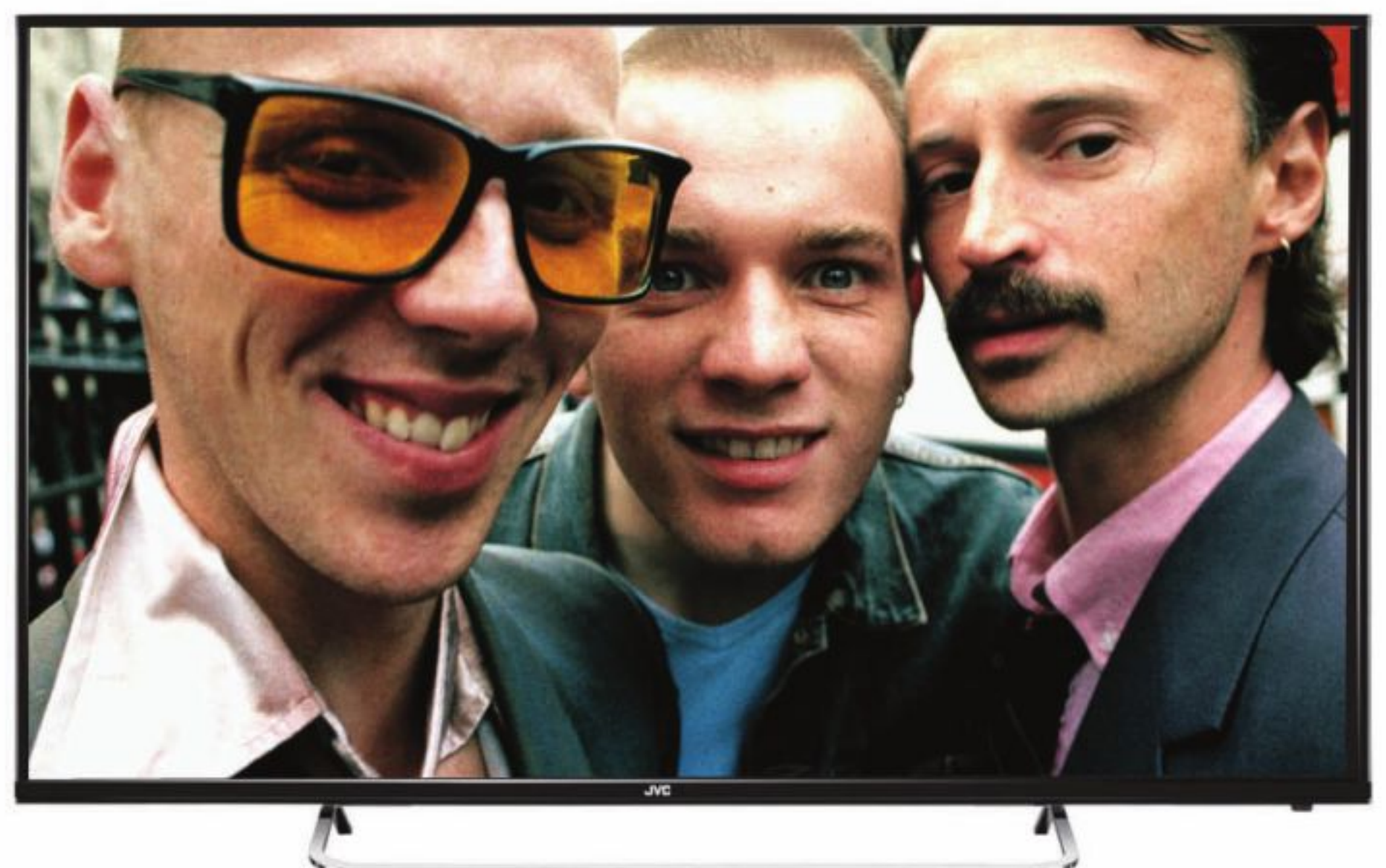
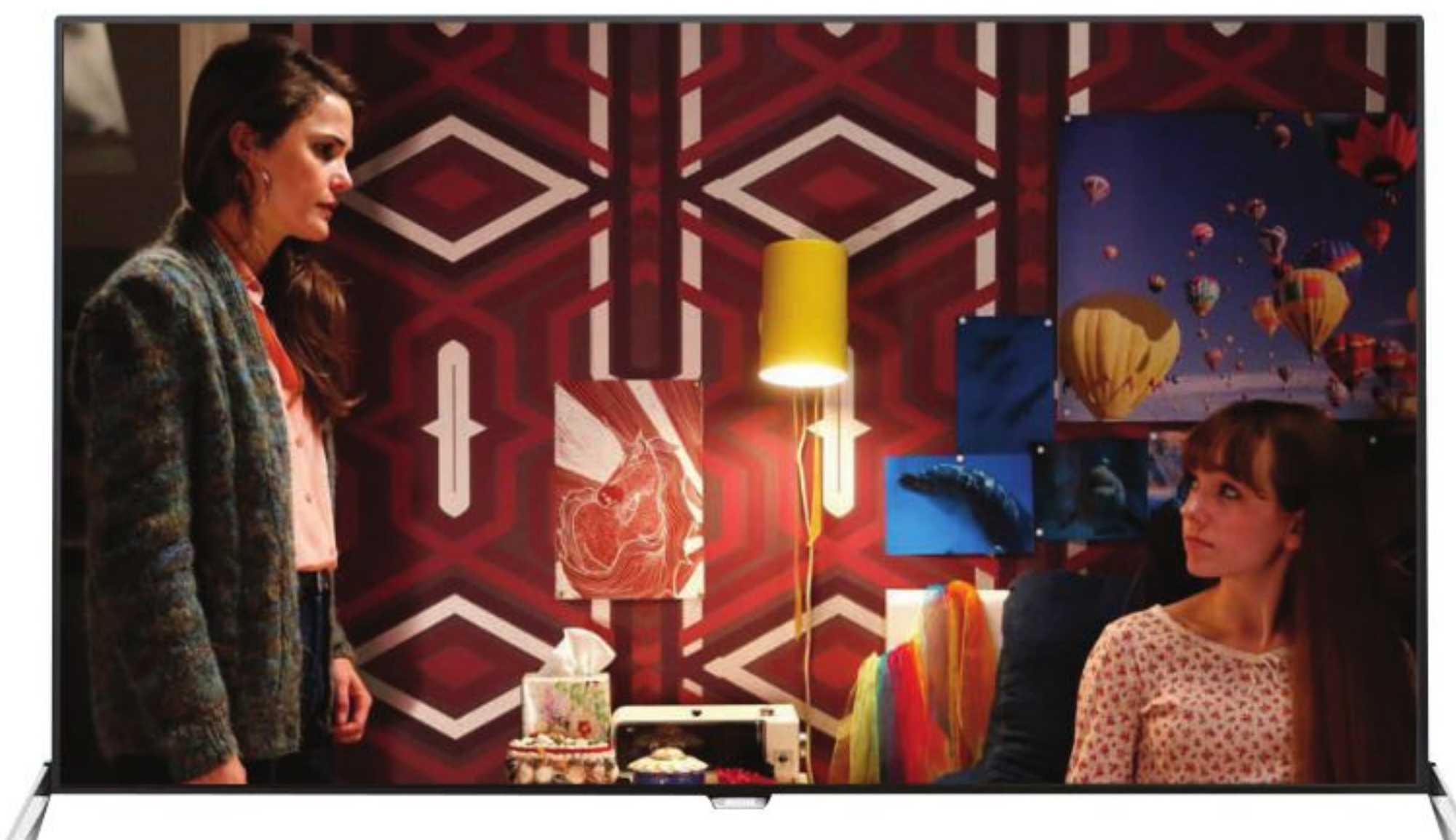
The JVC LT-42C550 is just one such cheapie. Connectivity includes a trio of HDMI, plus legacy video, a VGA PC input, digital audio output, single USB and Ethernet, as mandated by the Freeview HD specification. There is no smart connectivity.

The USB port can be used to timeshift to a connected hard drive, or for media playback.

While you shouldn't expect too much in the way of fancy image processing, 1080p images look pleasingly crisp. Beware the presets, though. Standard, Movie and Dynamic all come with excessive edge enhancement, and can't be altered. There is, however, a User setting which allows you to drop Sharpness and cure the ugly contours.

Colour performance is typical for a low cost LED LCD TV (skin tones look a tad unnatural) and there's no true black level. But drop the brightness and boost contrast and you'll get a punchier picture. Audio performance can kindly be described as grim.

Those looking for a low price HD TV will find the JVC LT-42C550 does what it needs too. Just don't expect anything other than a budget performance. ☒



THE 22 BEST FEATURES IN: WINDOWS 10 CREATORS UPDATE

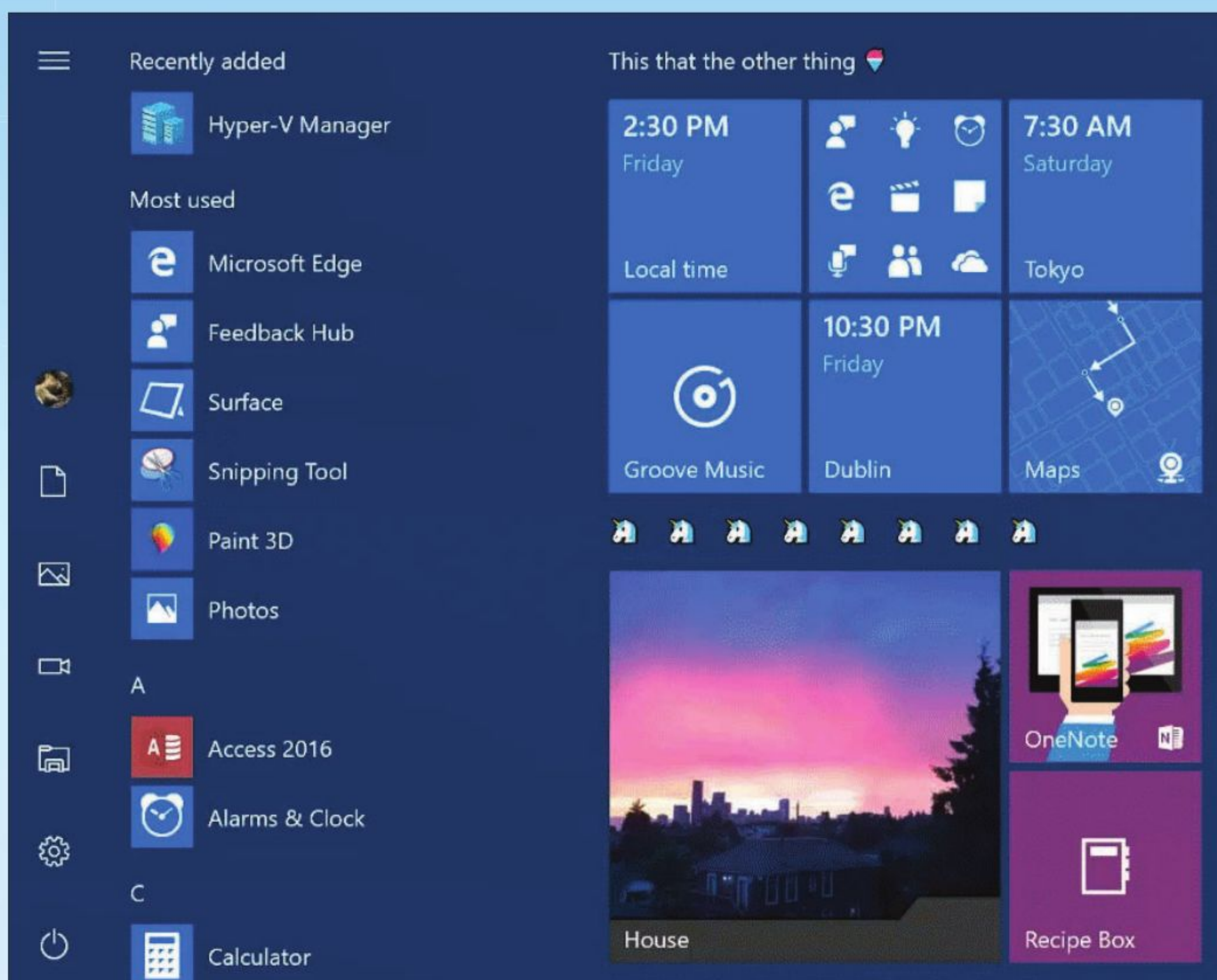
A boatload of new Windows 10 features is a great way to kick off 2017, writes [Mark Hachman](#)



One build, almost a new operating system

Microsoft releases new builds of Windows 10 for its Insider beta testers every so often – some minor, some significant. The recent Windows 10 Insider Preview Build 15002 is a big deal. The company's notes on the new build run to over a dozen pages and we found over 20 notable new features. (We left out some minor tweaks to keep this list manageable.) Some are cosmetic improvements that enhance the user experience, while others add powerful new features that Windows lacked before.

Running a vanilla PC? Don't be jealous. This will all be part of the Creators Update- most likely coming in a couple of months. Eventually, you'll be able to try these out, too. Let's dive in.



Start menu folders

Windows Phone owners have long been able to group tiles in the Start menu into a folder by dragging and dropping them onto one another. That capability is now present in Build 15002. The result is a tidier Start menu, though without the Live Tile effects that a standalone tile delivers.

App throttling

One of the more intriguing behind-the-scenes improvements to Build 15002, app throttling does what its name suggests: it chokes background apps, so that more CPU resources will be devoted to foreground tasks. Microsoft isn't even providing this feature to every Insider - only a small test group that it is selecting.

If your PC is low on memory or running an older CPU, this might be just the thing. Interestingly, rumours suggest that Microsoft may be implementing a 'game mode' in upcoming builds that will dial down the resources of background apps, prioritising the game itself. In any event, Microsoft says we should all stay tuned for "more updates" in February.

Task Manager			
File Options View			
Processes Performance App history Startup Users Details Services			
Name	PID	Status	Description
MicrosoftEdgeCP.exe	14320	Throttled	Microsoft Edge Content Process
MicrosoftEdgeCP.exe	17168	Throttled	Microsoft Edge Content Process
conhost.exe	13160	Throttled	Console Window Host
conhost.exe	7652	Throttled	Console Window Host
devenv.exe	7216	Throttled	Microsoft Visual Studio 2015
lync.exe	6116	Throttled	Skype for Business
notepad.exe	3968	Throttled	Notepad
notepad.exe	4812	Throttled	Notepad
ScriptedSandbox64.exe	7976	Throttled	ScriptedSandbox64.exe
POWERPNT.EXE	6912	Throttled	Microsoft PowerPoint
ShellExperienceHost....	13252	Throttled	Windows Shell Experience Host
OUTLOOK.EXE	9228	Throttled	Microsoft Outlook

Blue light settings

Displays emit blue light - the kind of light you see during the day. Windows can show warmer colors to make it easier to sleep at night.

On until sunrise (7:25 AM)

Turn off now

Color temperature at night



Schedule

Lower blue light automatically

☒ On

☒ Lower nightly at sunset (5:09 PM)

☐ Set hours

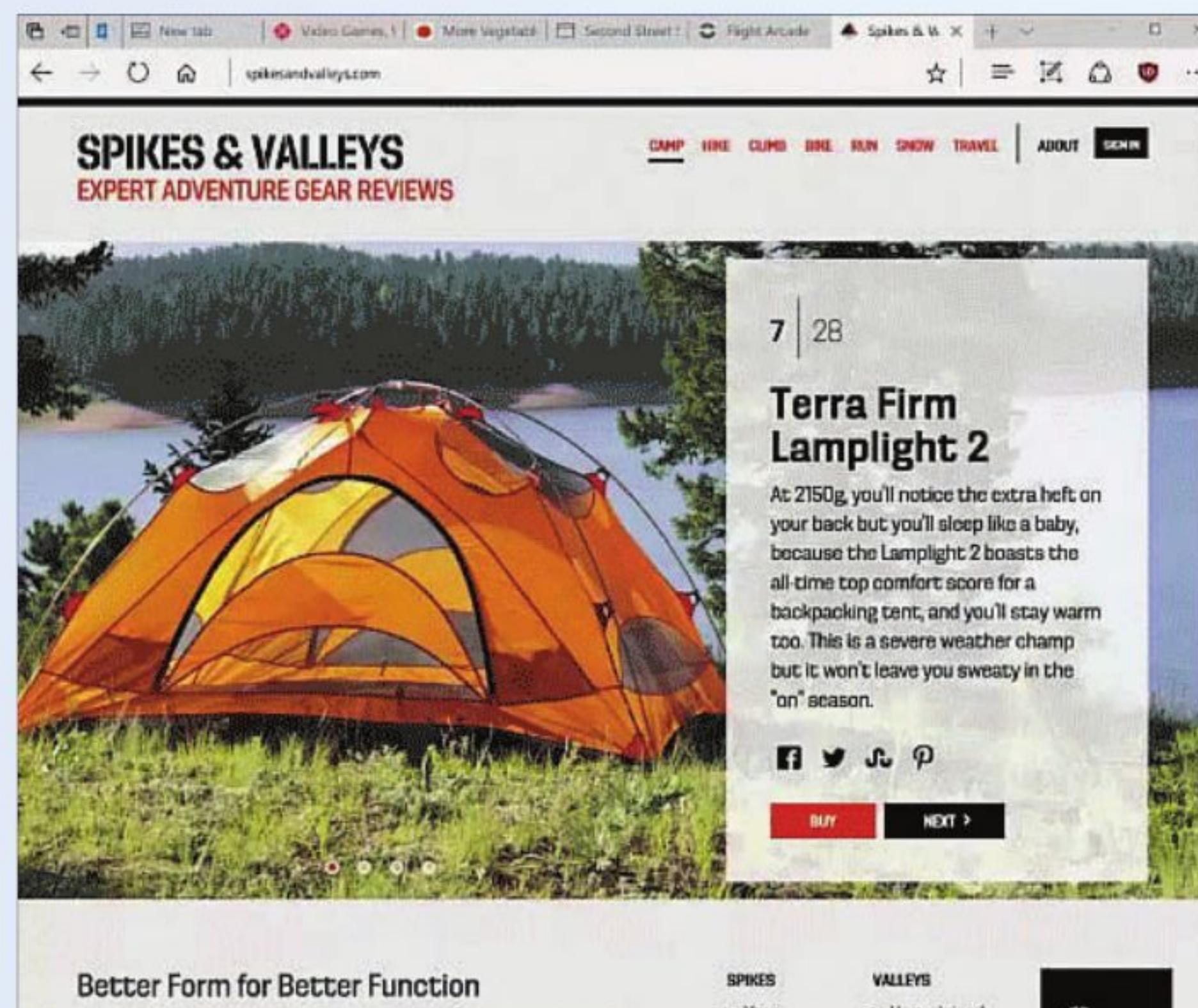
Blue-light controls

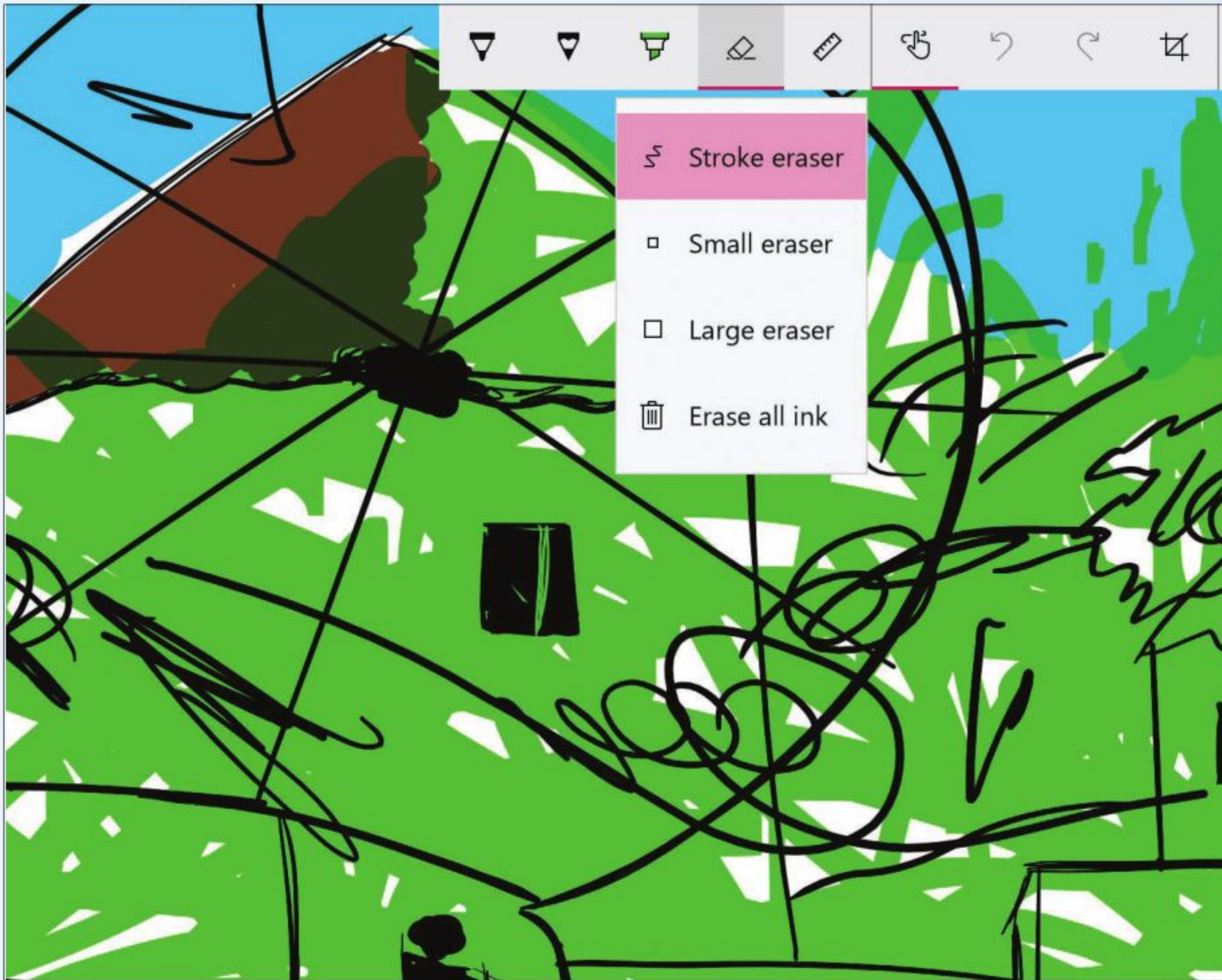
At the very least, the presence of blue light after sundown can mess with your circadian rhythms, preventing you from getting a good night's sleep. Other studies have suggested links to obesity and even cancer. With Build 15002, you can tell Windows to automatically decrease the amount of blue light your display produces after dark.

Microsoft Edge tab preview

The ability to preview other tabs is something that other browsers have already put in place, but the capability has now been added to Microsoft Edge as well. Simply click the down-caret icon from the tab list and scroll back and forth in a tab carousel.

Sometimes you just want to start with a clean slate. Edge now allows you to tombstone tabs you don't want to deal with right now, and restore them later. Yes, you could break out a window of Edge tabs and minimise them, but this appears to put less stress on your PC's resources



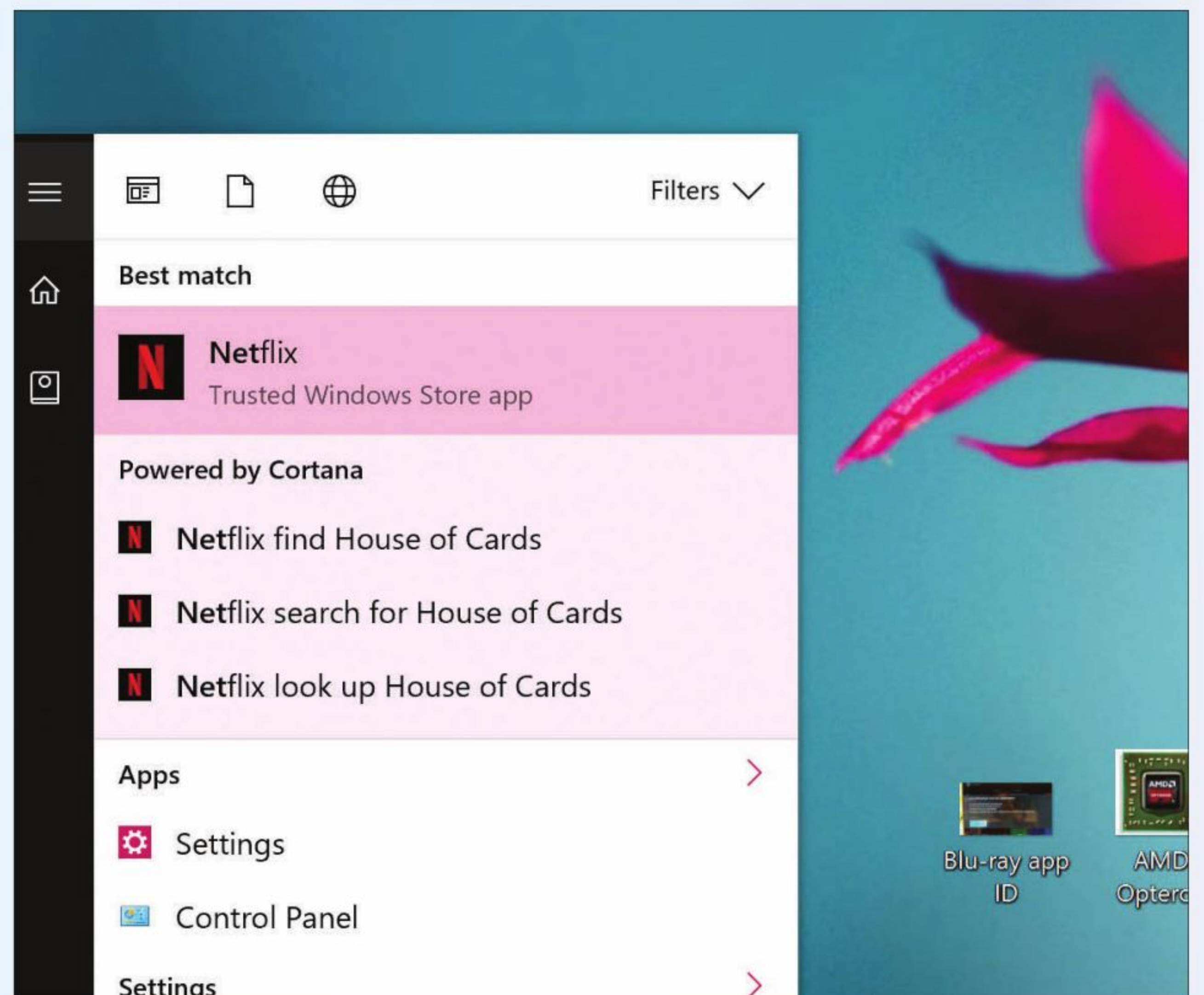


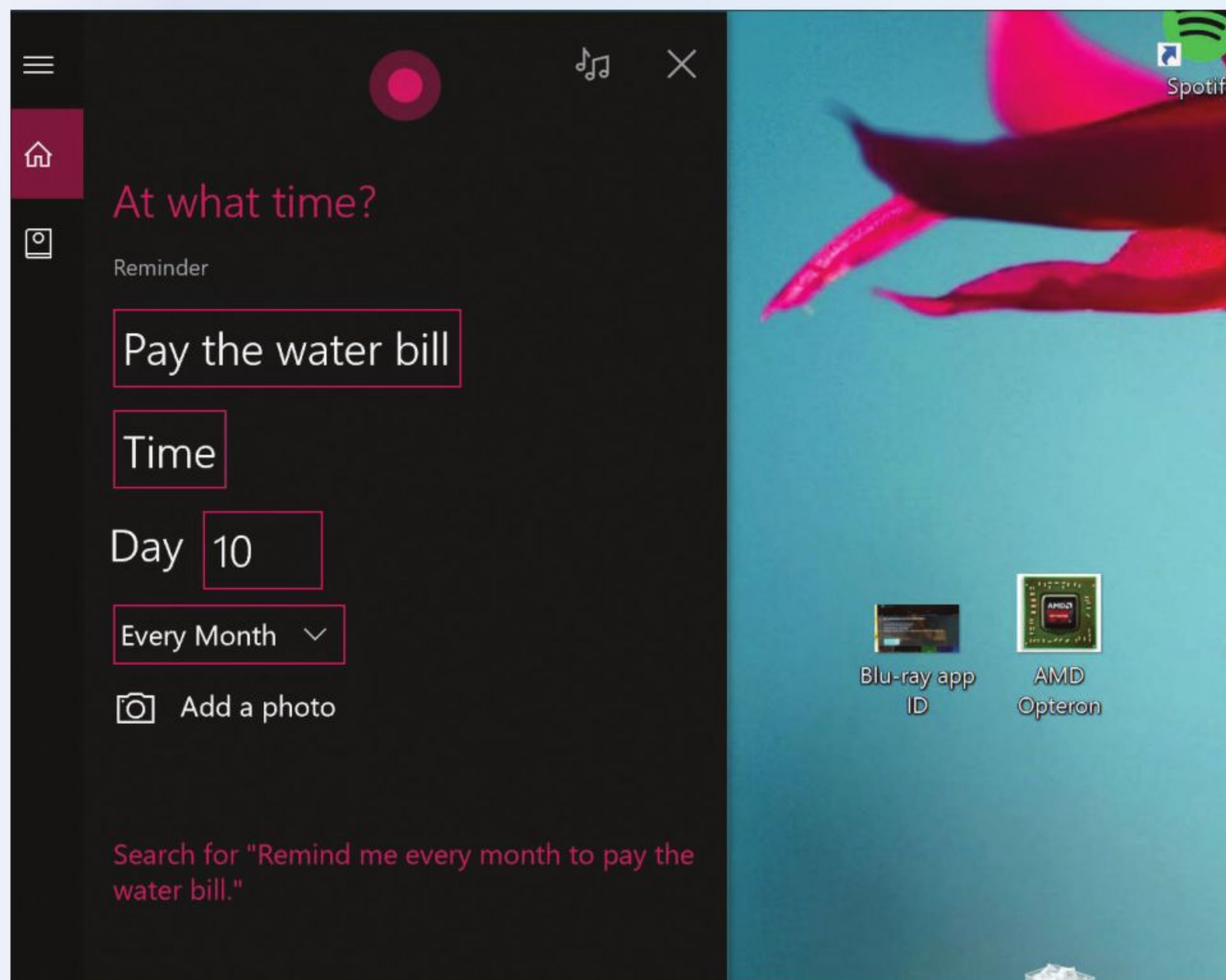
Windows Ink adds a stroke eraser

Another small but incredibly useful addition, a stroke eraser doesn't cut a swath from your digital ink, but merely backtracks, erasing one stroke at a time. We don't necessarily think you should be using Windows Ink, but if you do, this is a handy tool.

Suggested Cortana commands

One of the most frustrating aspects of a digital assistant is not knowing everything it can do. Windows has partially solved this problem with Build 15002. Now, if you start typing a command into the Cortana search box, you'll see some suggested commands pop up. As you can see, they have a way to go to be truly useful.





Cortana now has recurring monthly reminders

It seems weird, but Cortana hasn't had monthly or annual reminders until now.

Windows Updates that you can now (sort of) pause

Though many would agree that an up-to-date PC is essential, most users also want to control exactly when those updates are installed – not during a meeting, for example. With Build 15002, Windows Pro, Enterprise, and Education customers (not Home) can pause updates for 35 days, giving more time for new patches to be tested in the wild. You can also decide whether Windows updates your drivers, too.

Excluding Home users just seems a little petty, though. Hopefully Microsoft adds this capability in a future revision."

Choose when Feature and Quality Updates are installed

Pause Updates

You can temporarily pause updates from being installed for up to 35 days. Some update definition updates, will continue to be installed.

☐ Off

You can pause updates until 14/2/2017

Choose how updates are delivered

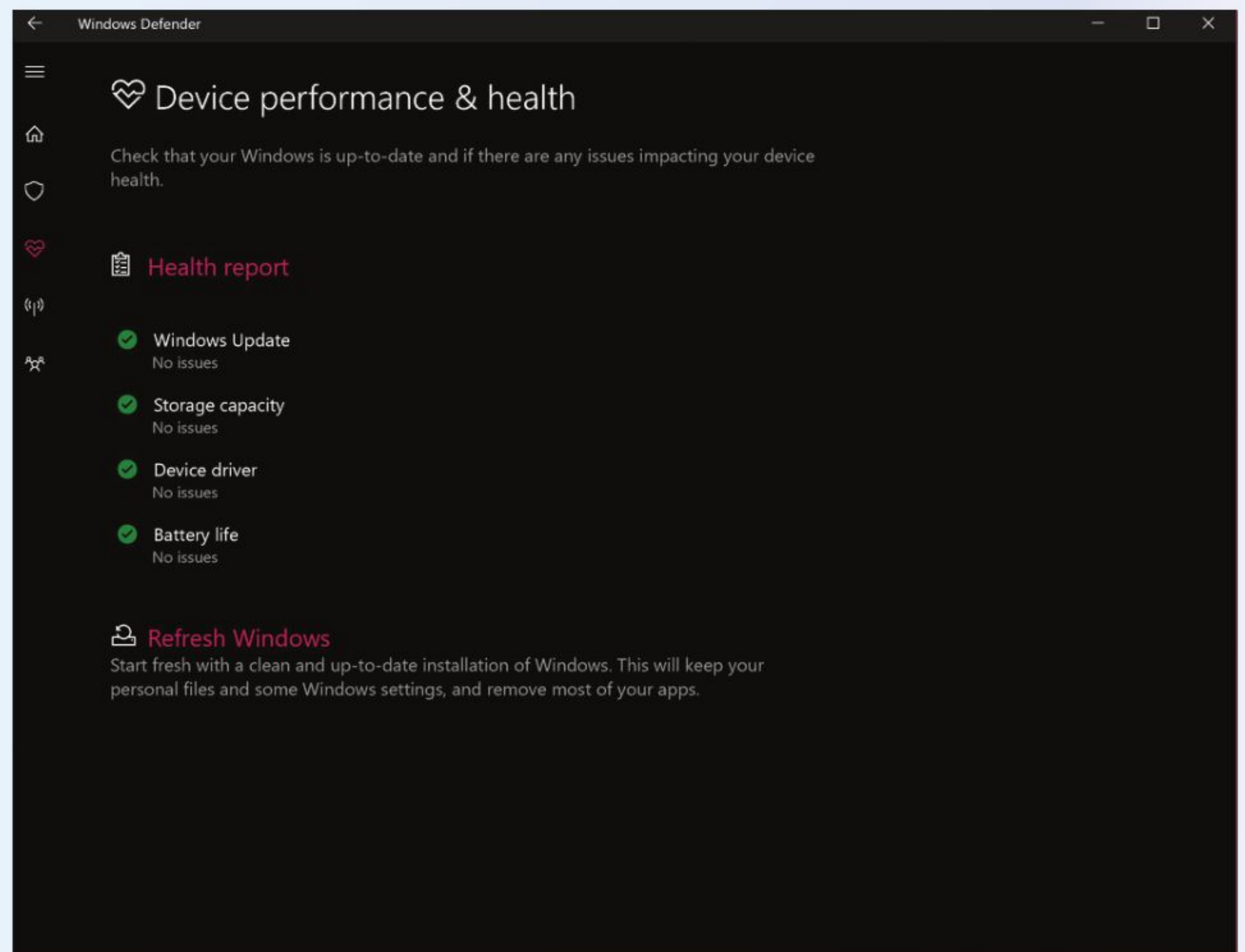
Note: Windows Update might update itself automatically first when checking for other updates.

Privacy settings

Refresh Windows on demand within Windows Defender

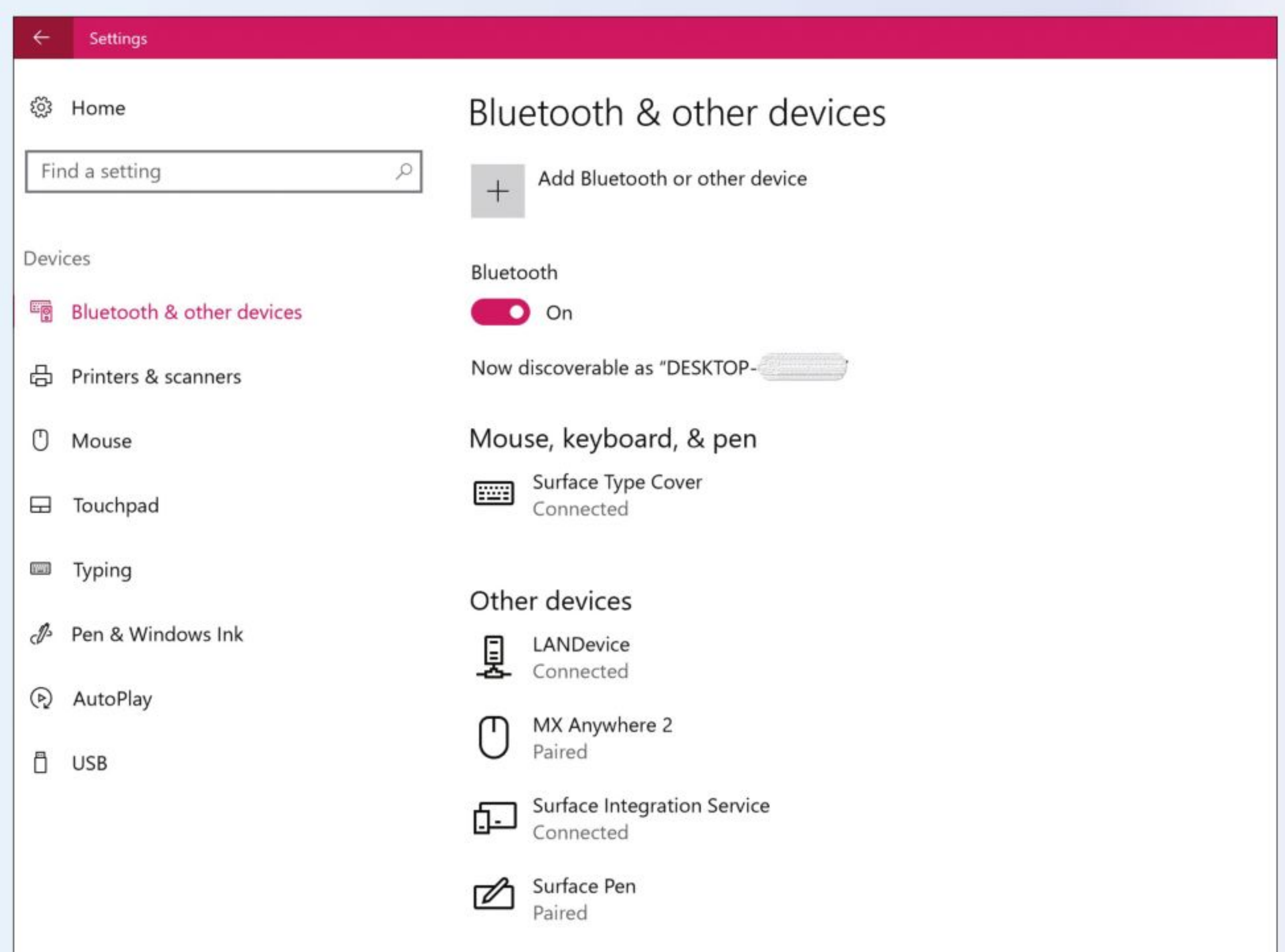
Restoring Windows with a clean install is a pretty big deal, especially as it requires reinstalling pretty much everything. Refreshing Windows, which preserves your data and some of your apps, can be a less intensive way of ensuring your PC continues to run smoothly.

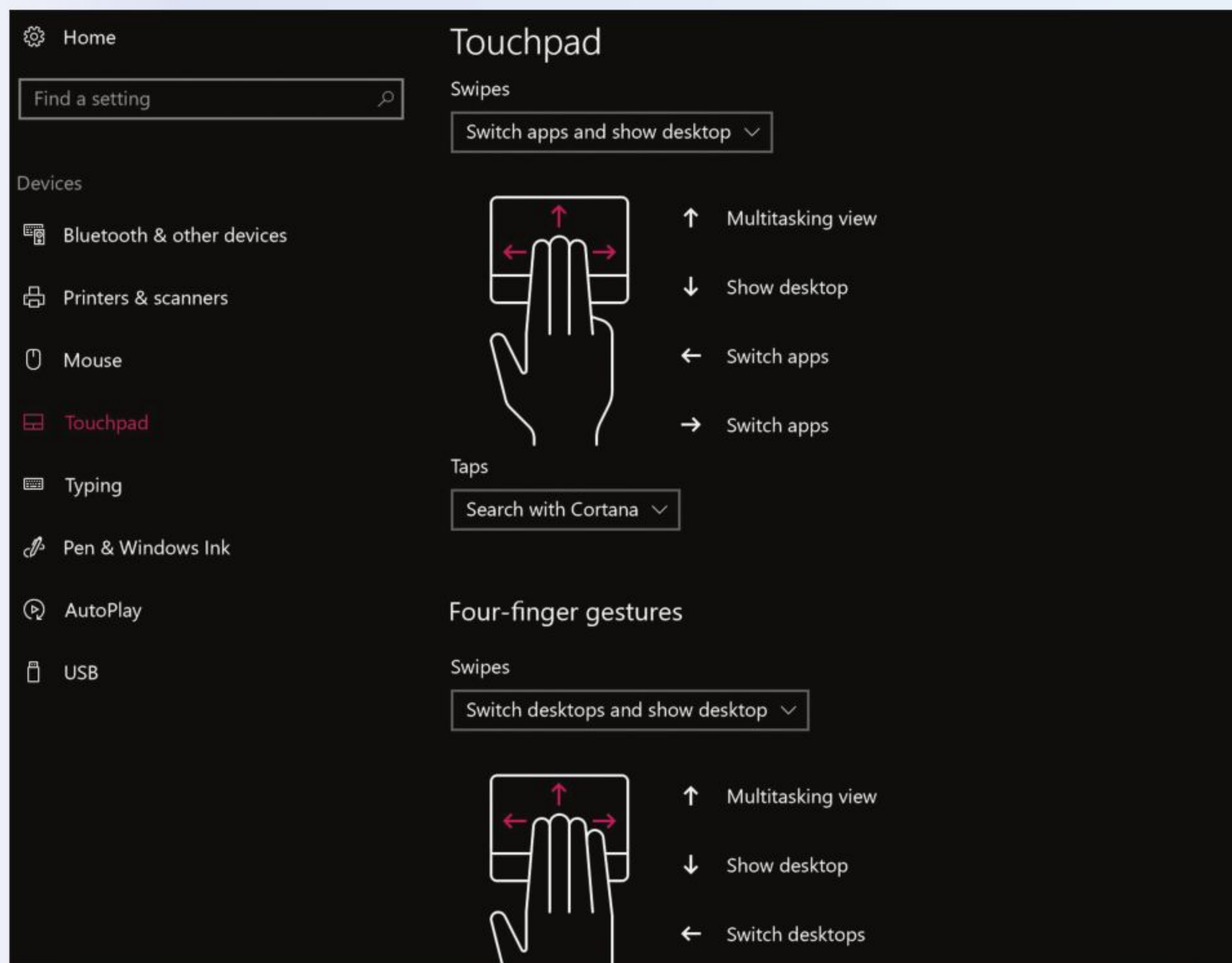
The Refresh option is usually buried behind a bit of text within the Settings > Recovery menu. Pulling it out into the Defender app helps assure users that it's not a radical step, but a more routine part of your's PC regular maintenance.



A unified devices Settings menu

Build 15002 has tidied up the Settings menus, and Devices is one page that's received a significant makeover. Here, you'll find a nicely organized summary of the devices connected to your PC without having to chase them down across several different Settings pages.



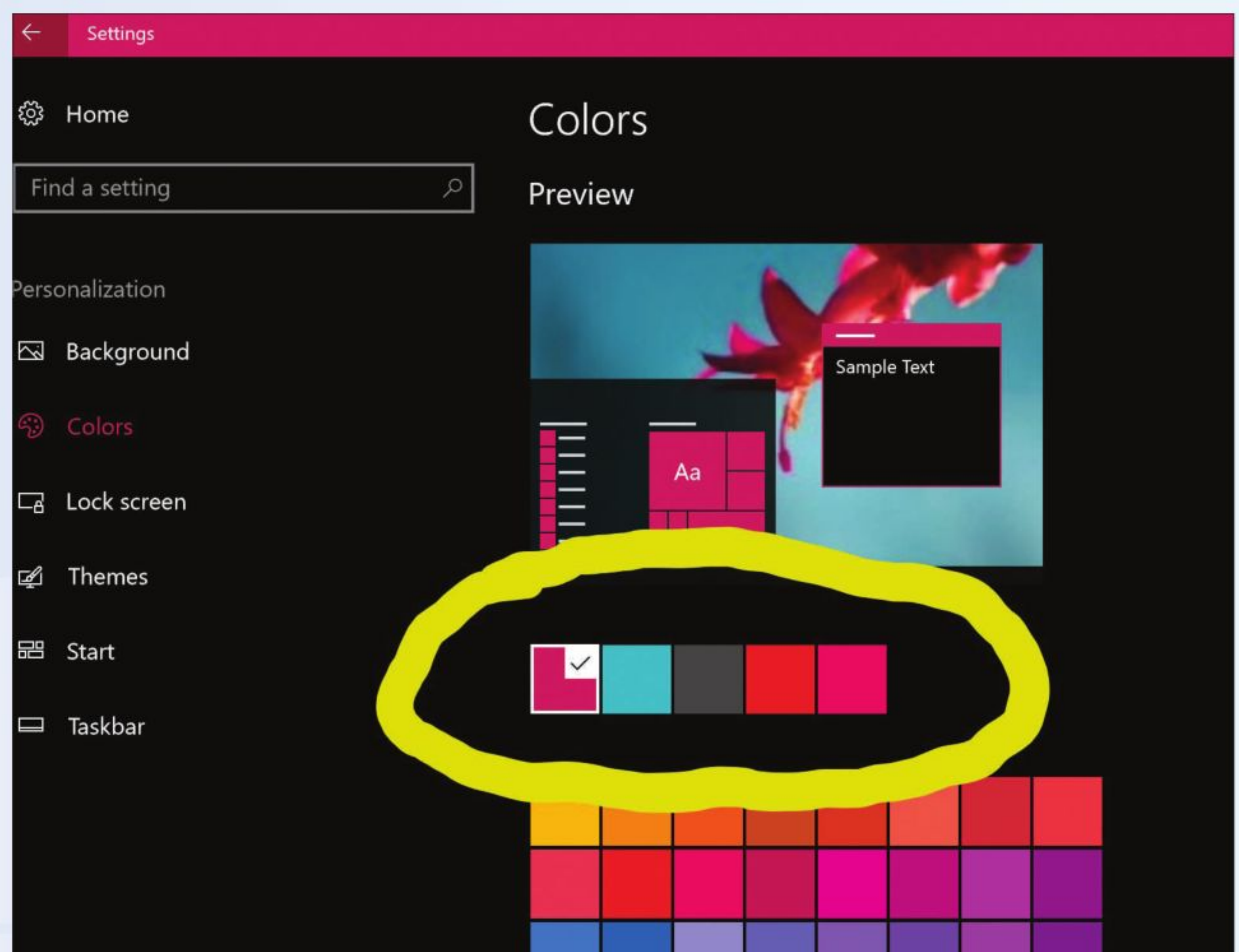


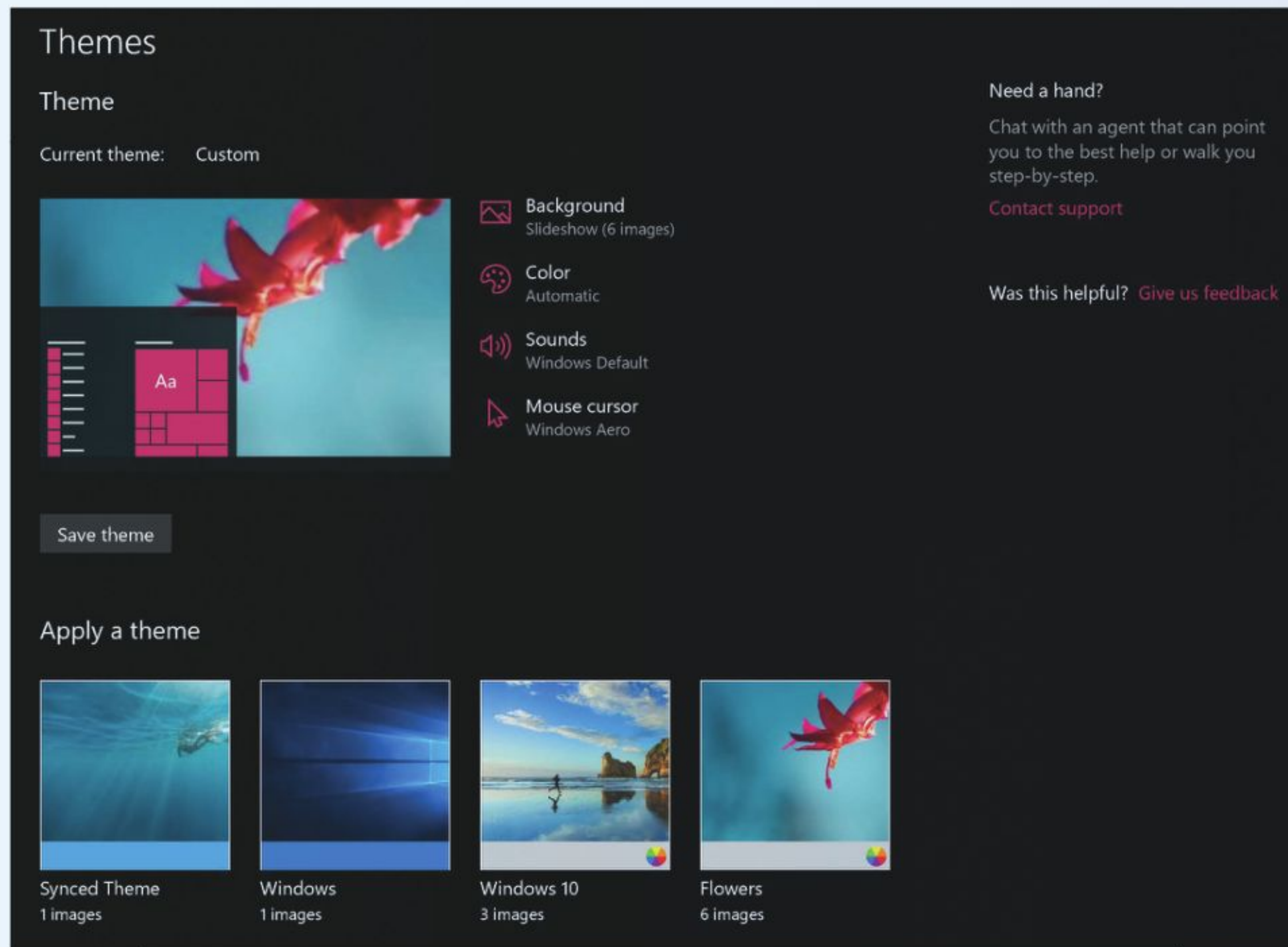
Comprehensive touchpad settings and gestures

If you're running vanilla Windows 10, open the Settings menu and search for the 'Touchpad' screen. Pretty bland, right? What Build 15002 adds is in essence a construction yard for creating and setting your own gestures using three- and four-finger swipes. You don't have to use them, but they can be a handy little shortcut if you do. Note that you can also assign a touchpad gesture to control the master volume of your PC.

Personalisation keeps track of your changes

Some of us don't care what our desktops look like, while others want them just so. Windows 10 now tracks the changes you've made to personalise your PC, and allows you to back up to a previous choice. It's not the biggest update in the world, but it's a nice convenience.





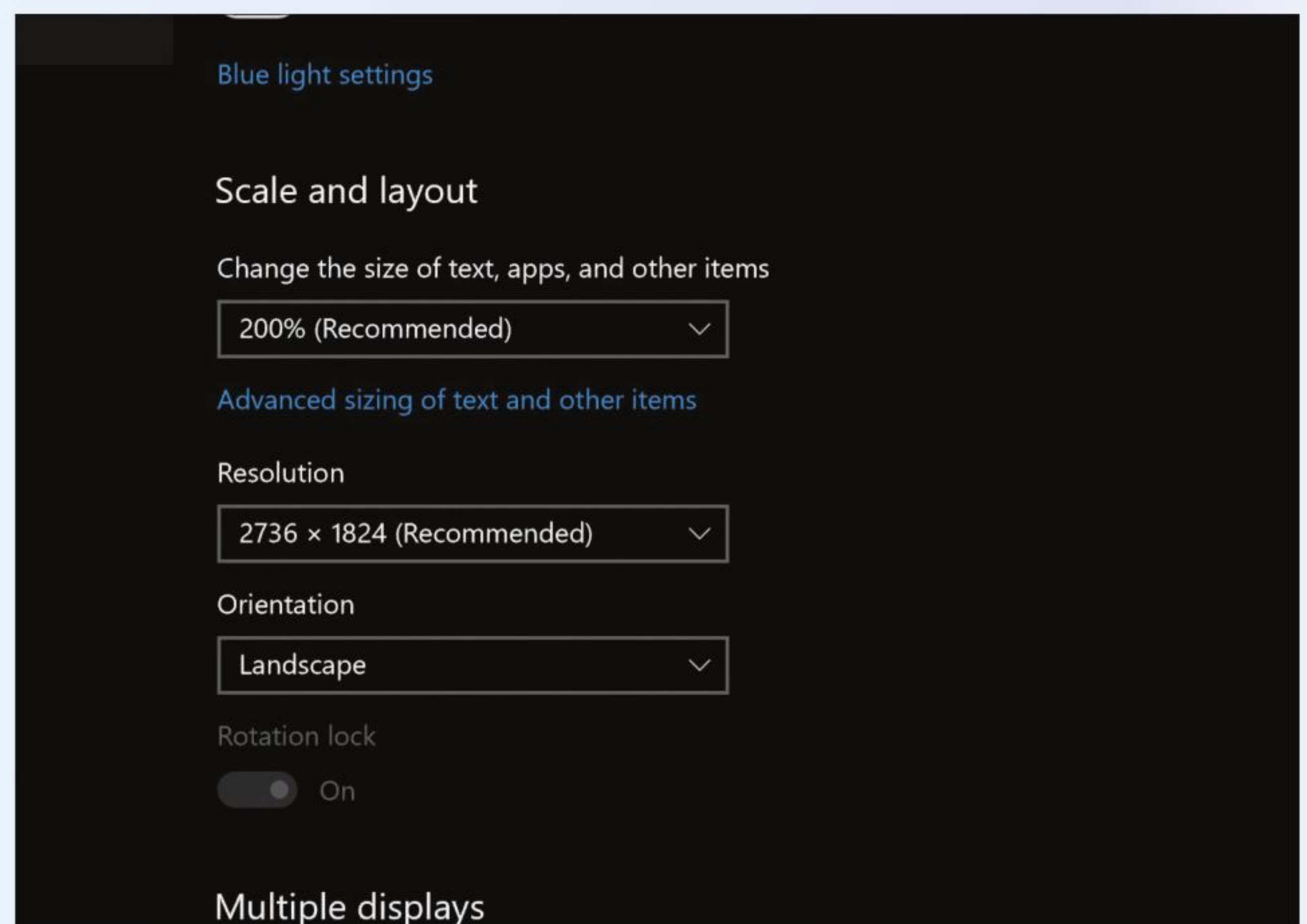
Simplified Themes Settings

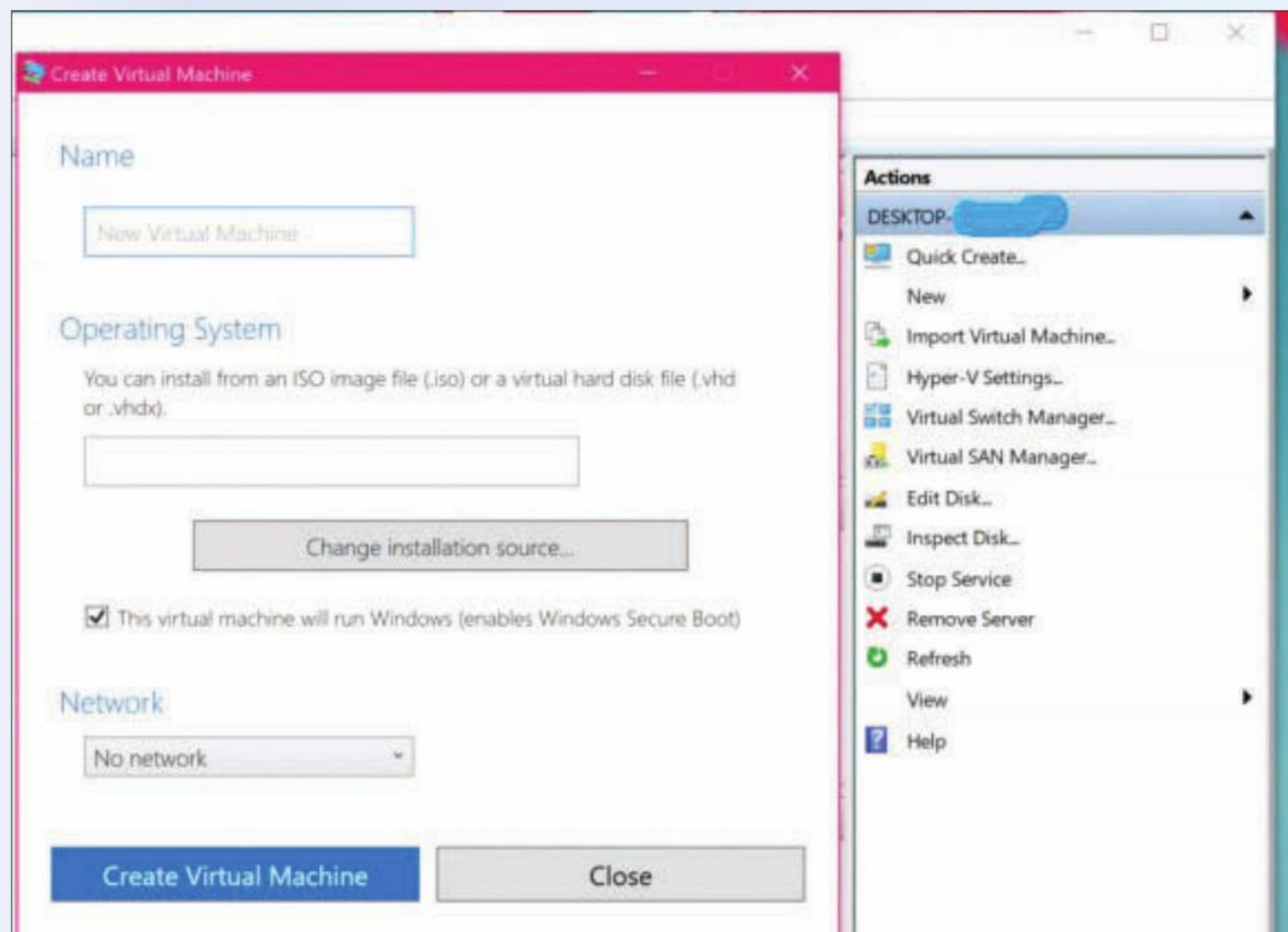
Most users find a desktop theme and stick with it, perhaps because it's easier than digging into Settings and changing it. The new Themes page within the Settings Menu is nicely organised, and allows you to go back and forth easily.

There's a second element to this page that we like: look to the upper right. Note the support link? Most pages within the new Settings include this additional prompt, which is a helpful touch.

Display Settings get a makeover, too

The Display menu, otherwise known as Settings > System > Display, has also received an updated look as part of Build 15002. The key change is moving the display resolution front-and-centre on the page, an inexplicable omission in the current stable build of Windows 10 that this new build rectifies.



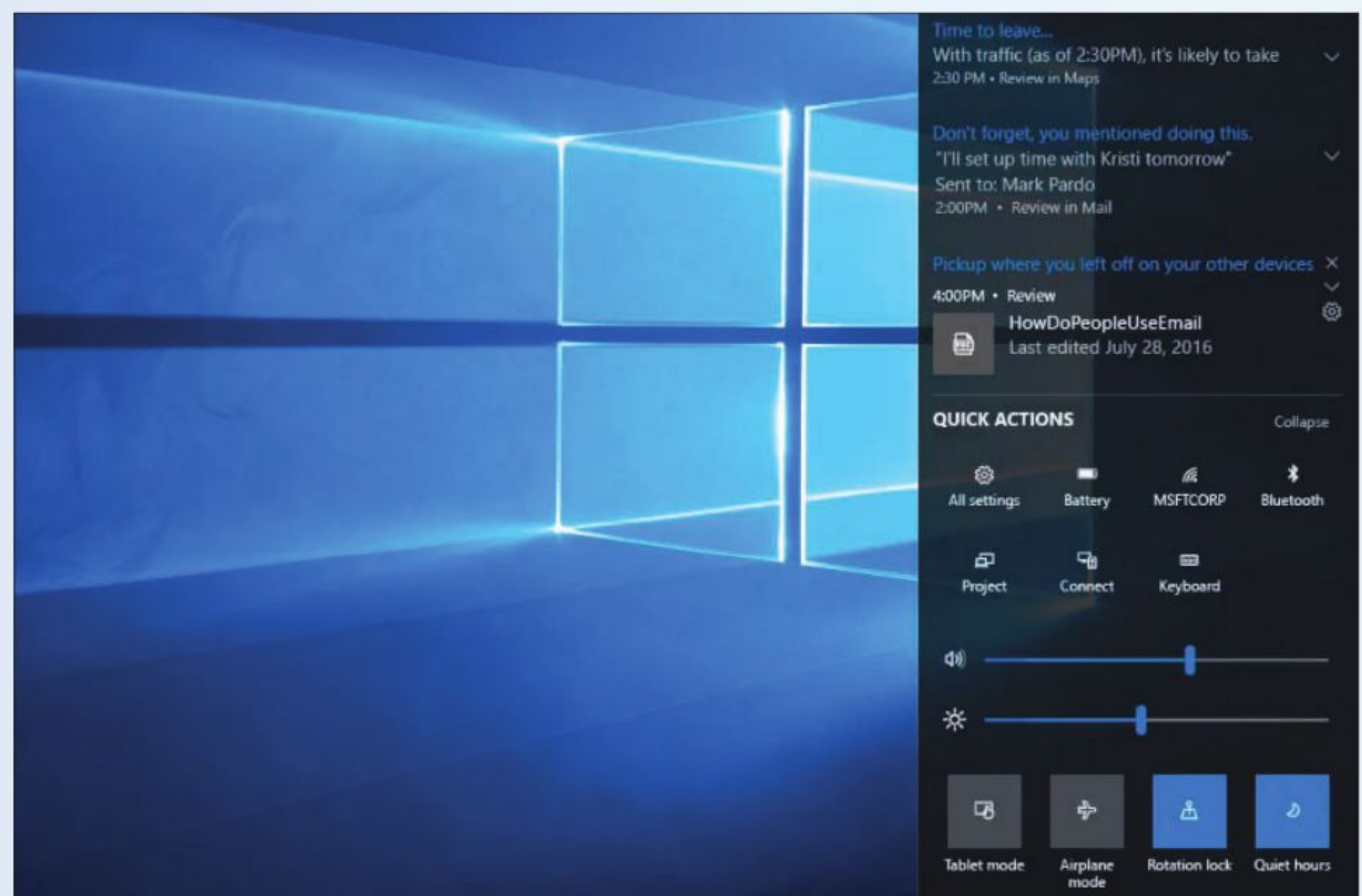


Hyper-V Quick Create launches new virtual machines in a jiffy

Hyper-V - an option only available to Windows 10 Pro, Enterprise or Education - is an optional component that first must be installed within Windows to create virtual machines, a secure way of testing out a new app or other piece of software without risk to your PC. The new Quick Create option makes them, well, quick and easy to deploy in just a few clicks.

Revamped Quick Actions

Microsoft's reimagining the Action Center's Quick Actions as well. Currently, Quick Actions simply allow quick on-off access to specific functions, such as Wi-Fi or projecting your display to other devices. But a brief splash in a Creators Update highlight reel shows fresh tools for adjusting variable options like screen brightness and audio volume via sliders.



Braille

You will need to install 3rd party software that is required to communicate with your Braille device. By selecting Download and Install Braille, you will install:

- BRLTTY, distributed by the BRLTTY developers and licensed under the following terms: [GNU GPLv3](#)
- LibLouis, distributed by the LibLouis team and licensed under the following terms: [GNU LGPLv2.1](#)

An error occurred

Download and Install Braille

Device Manager

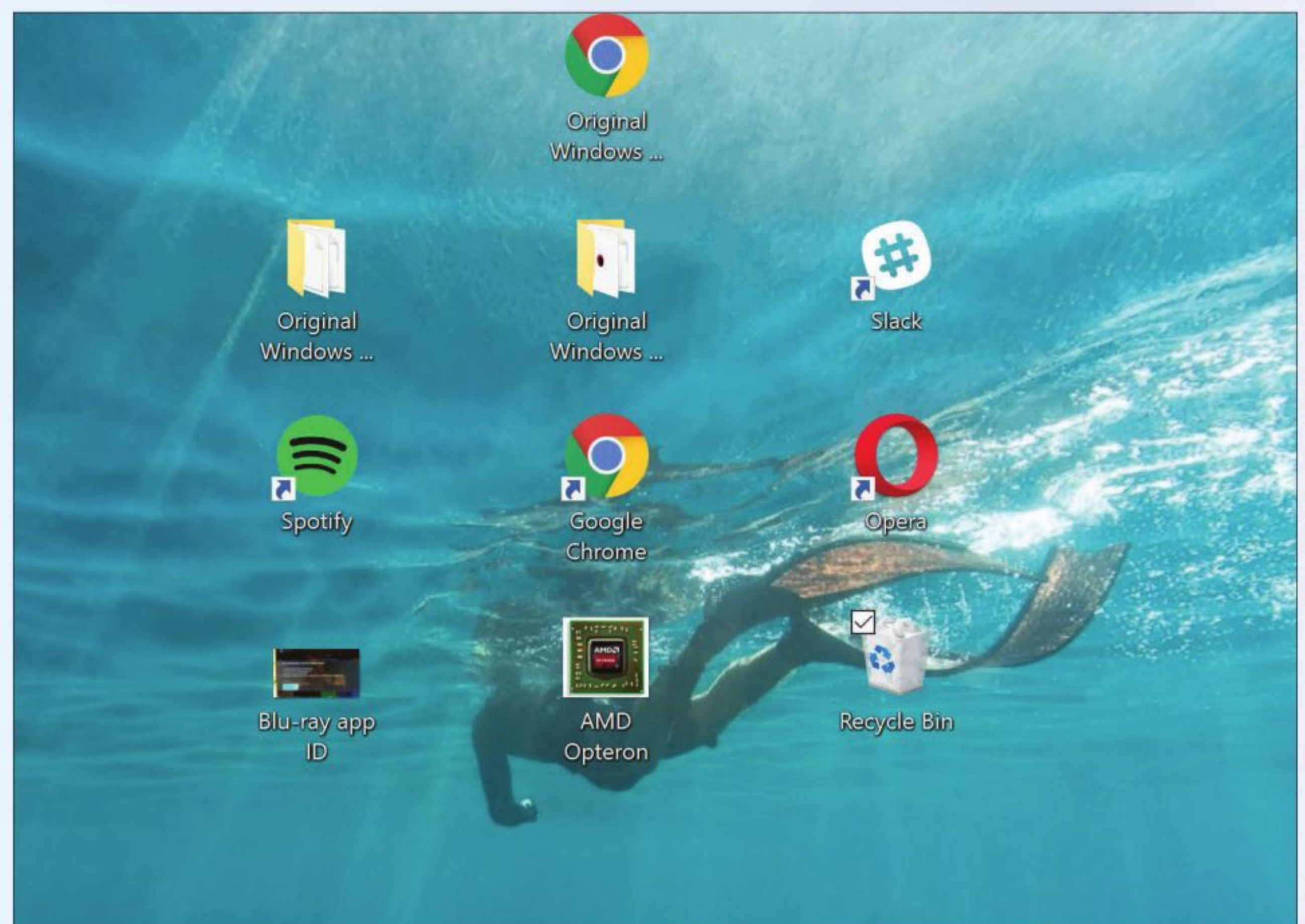
Accessibility improvements in Narrator, Braille

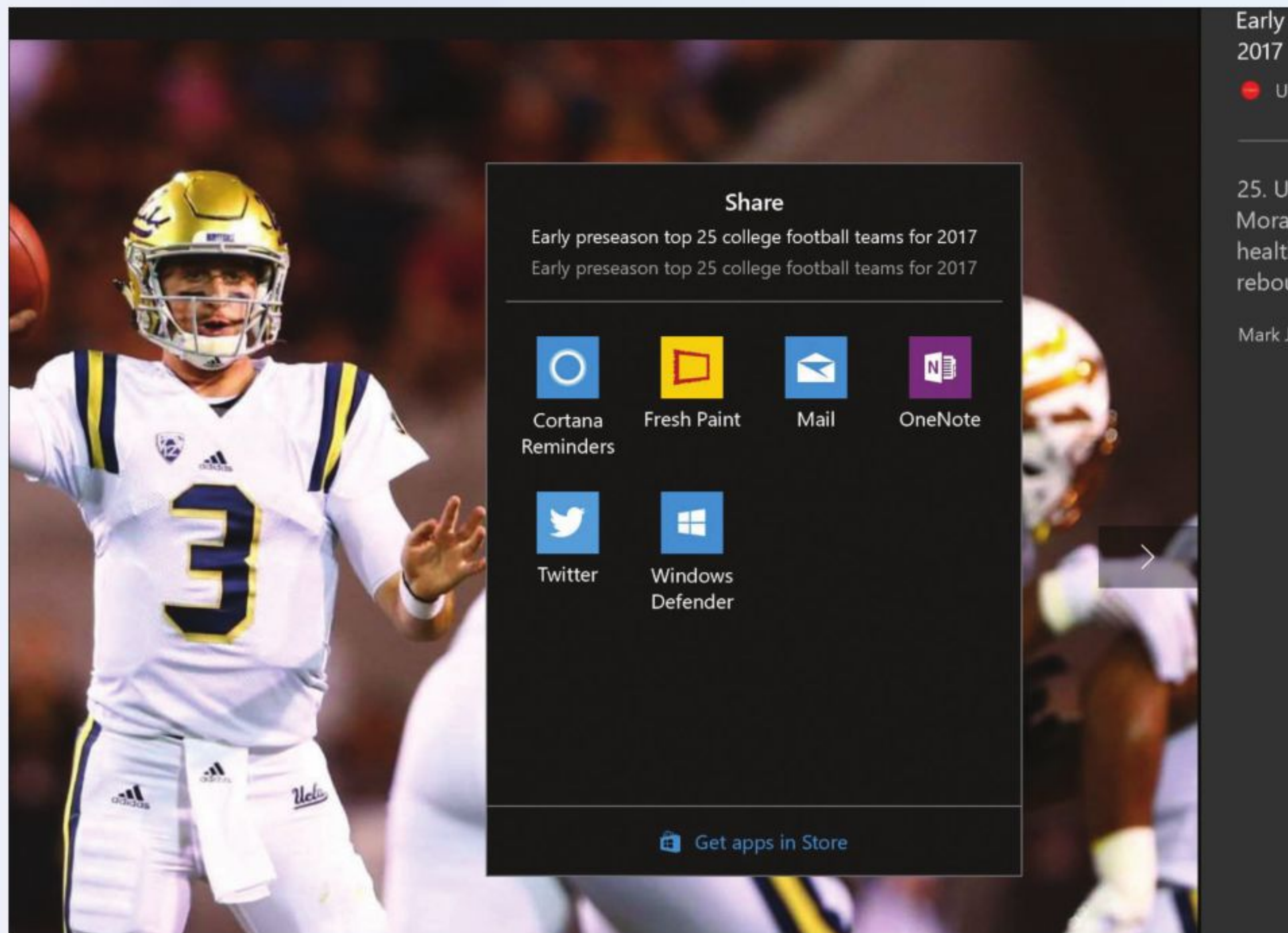
Windows has always included accessibility features such as Narrator, which reads the contents of a window to those with poor eyesight. Now, Narrator works in both the WinPE (repair Windows) and WinRE (Windows recovery) environments, as well as Windows. Microsoft has also said previously that Braille support will arrive on Windows 10 soon. The setting is present in Build 15002, but Braille support isn't here yet.

Proper icon scaling

One of the perpetual bugs we notice with Windows 10 is the lack of icon scaling. Sometimes you can un- and re-dock a Surface Book, and everything looks as it should. On other occasions though, icons become crazily resized, and app windows get thrown out of whack. Build 15002 promises to reconcile this once and for all, and in my limited time with it, it seems to.

If Windows doesn't apply the changes consistently, you may be able to enable what Microsoft calls 'high DPI support' by right-clicking on a program's EXE file, opening its properties, and checking 'Override high DPI scaling behaviour' under the Compatibility tab. 





Context-aware sharing

In the current version of Windows 10, sharing options for, say, the MSN Money app fly out from the side of the screen, Windows 8-style. Within Build 15002 of Windows 10, you get the screen at right - nicer looking, and with richer sharing options as well. Though why you'd need to share a web page with Windows Defender isn't immediately obvious.

Web payments coming soon

Build 15002 also includes support for the new Payment Request API, which stores checkout and shipping preferences in your Microsoft Wallet. Conceptually, it feels like something that should have been implemented years ago, so it's finally here - except not quite yet. Payments is in a preview state, and won't actually process payments until a future build, Microsoft says.

Microsoft Wallet

Confirm and pay

www.webstoreurl.com

Pay with

MasterCard

John Smith •• 5567

▼

Ship to

John Smith

13311 NE 100th St, #100

Seattle, WA 98100

▼

Shipping options

Standard - FREE 5-6 Business days

▼

Email receipt to

johnsmith@outlook.com

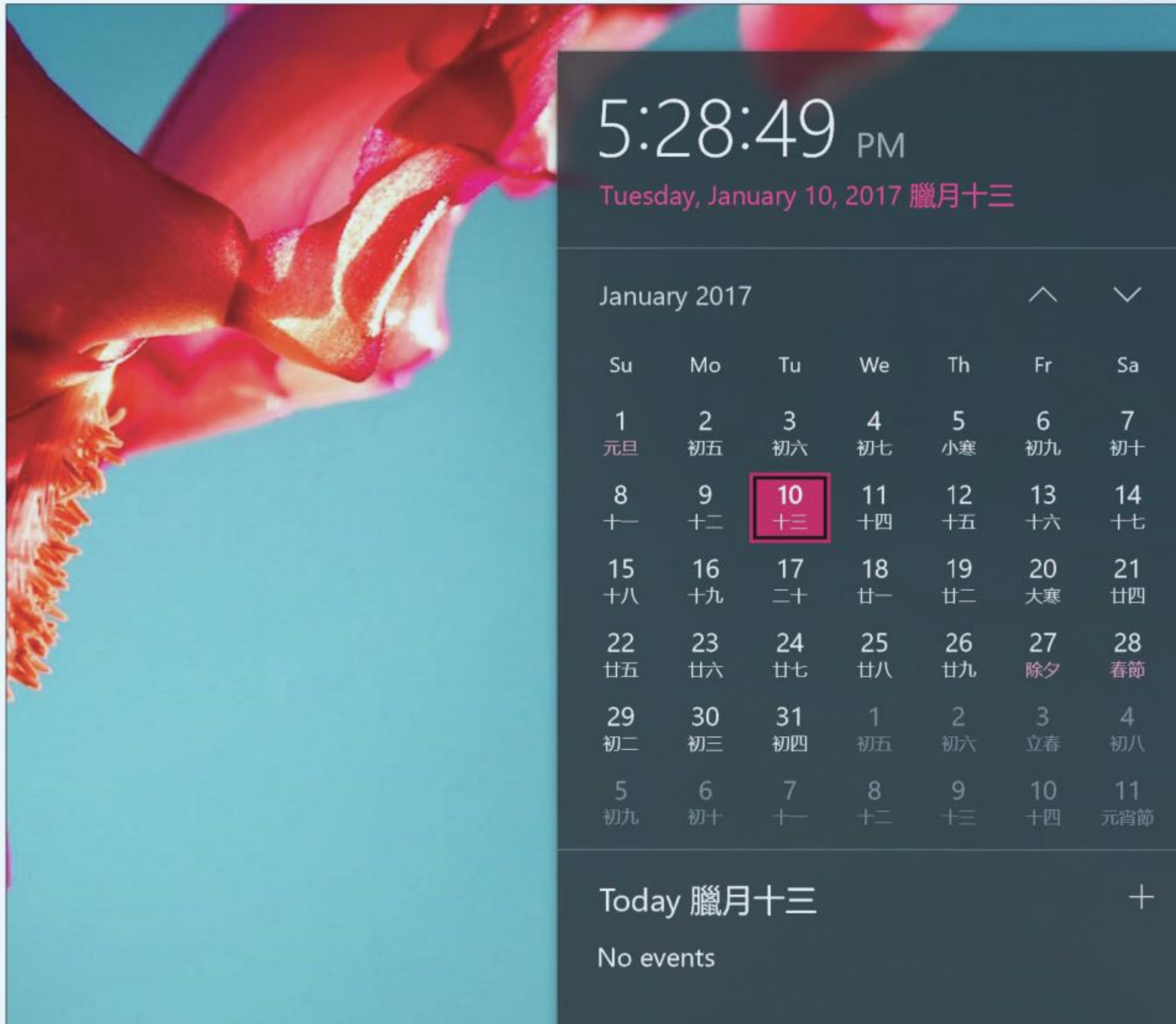
▼

Total (USD)

Show details ▼

\$345.00

Pay



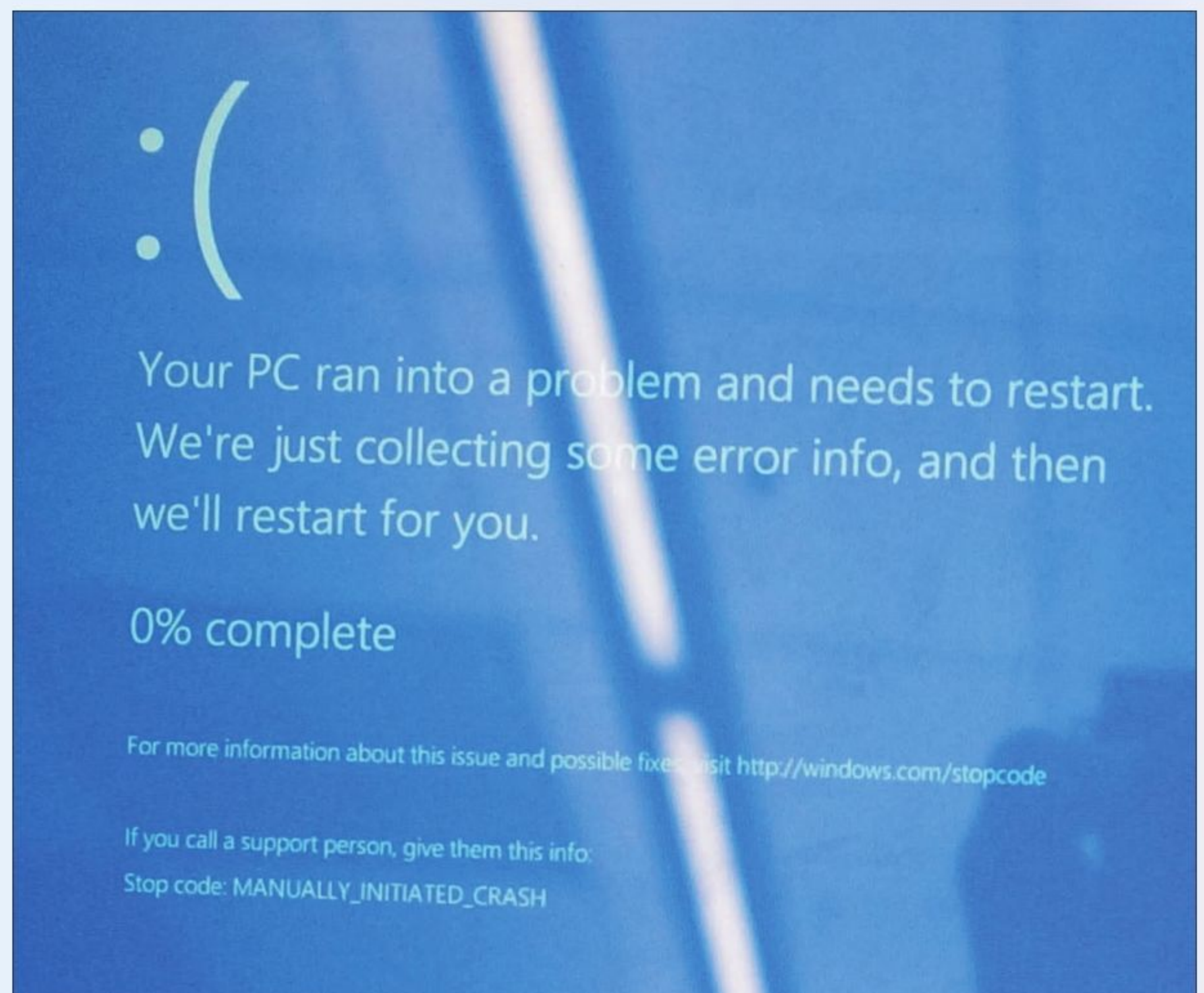
New lunar calendar options

About 400 million people speak English as their first language, but 900 million more speak Mandarin Chinese, making Windows' next addition much more relevant. Windows 10 has added support for the lunar calendar within Build 15002. To access it, simply go to Settings > Time & Language > Date & Time and select the lunar calendar.

A new green screen of death

If everything goes wrong, and your Insider PC crashes, you'll now see a green (yes, green) screen of death. (We haven't been able to trigger one yet.) The idea is that IT administrators and users will be able to visually distinguish between a development PC and an actual production machine, prioritising the important one.

It's worth noting that, yes, you can push your PC onto the Insider track by accessing the Update & Security setting within the Settings menu. But if you do, be careful: save your work, and be aware that the new GSoDs can strike at any time. ☒





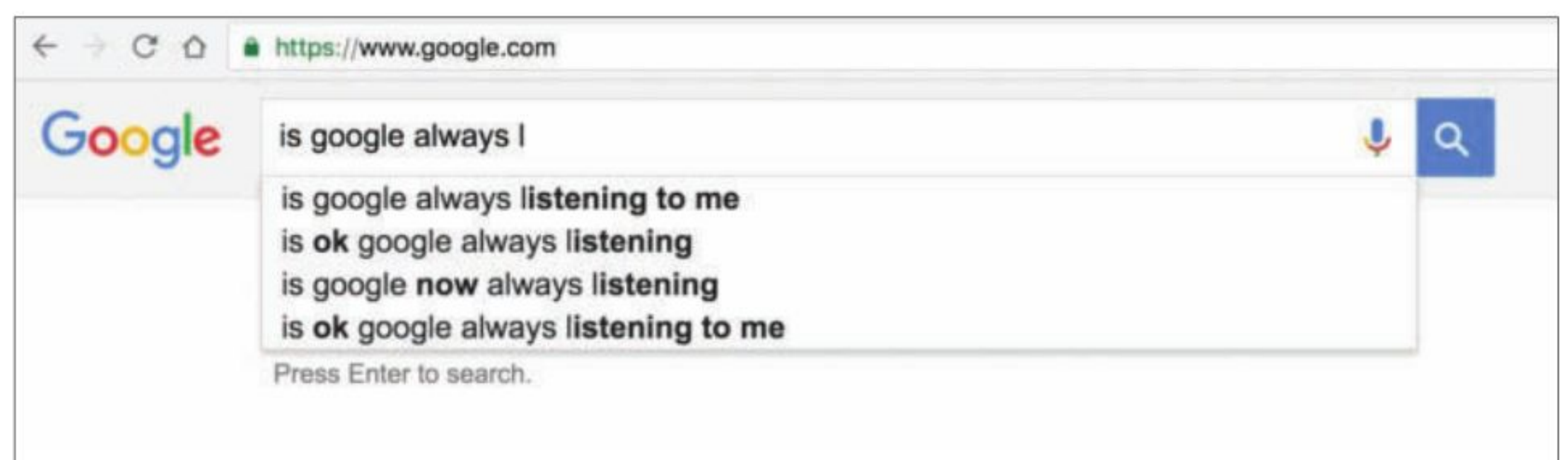
Does Google listen in on your life and should it?

Many think Google spies on your life to improve its results. It doesn't, but should it? **Mike Elgan** reports

Many Google users believe the company records audio through phones and computers, then applies those recordings to the AutoComplete options in Google Search.

We asked followers on Google+ about this and one wrote: "If me and my wife are talking about some random subject like how long turtles live, I'll type 'how' and it will fill in 'long do turtles live' like it was listening. And I'm terrified and impressed."

The anecdotal evidence is convincing. Some believe AutoComplete is more than just specifically accurate, it's personal. One commenter said that his friend got an address over the phone from his wife. When he started to type that address into Google Maps, the app suggested the correct directions after he typed only the first number of the property.



Another flatly proclaimed that "the mic is always on listening mode."

What's going on here?

What Google actually records

The search giant is careful about when, where and how it records user audio. The only way for the firm to end up with a recording of your conversations is for you to use one of its voice products, such as

The AutoComplete feature of Google Search is sometimes so accurate that users wonder: Is Google eavesdropping on my conversations?

the Google app, Google Assistant in the Allo messaging app, Chrome browser, Pixel phone or Google Home appliance. You also have to take deliberate action, press the

The firm applies voice-recognition software to your words, and uses those words to process your request or command. It retains a copy of the recordings to improve its software

microphone icon, for example, or say either “OK Google” or “Hey Google”.

The firm applies voice-recognition software to your words, and uses those words to process your request or command. It retains a copy of the recordings to improve its software. If you are worried about the information that Google is keeping, it provides a detailed history of every recording it has on your My Activity web page. Each recording or set of recordings is presented on its own card. These are listed by date and service – for example, Assistant, Google App or google.com. On the left you’ll see the text version of your command, which is a link that, when clicked on, takes you to Google Search results for those words. On the right you’ll find a Play button, so you can listen to each recording. A More Options menu on the top right of each card enables you to delete any recording.

It’s unlikely for a recording to happen by accident. From a smartphone, for example, the handset must be unlocked and the recording begun by specific user action, such as pressing the icon. On a Pixel phone, the user can set up automatic listing mode by changing the default in settings to enable the Trusted Voice setting. That makes the phone listen for the OK Google command. The Google Home product also listens to this.

So how can the AutoComplete options reported by some users be explained?

It’s magic

We think the best explanation is that Google is producing AutoComplete options by means beyond the user’s understanding. Consider four possibilities.

1. Coincidence

Let’s say you do 100 searches using Google Search. The probability is that AutoComplete will be helpful some of the time, useless at others and sometimes uncannily accurate. Occasionally a specific thing you’re searching for will by coincidence happen to be something lots of other people are looking for, and therefore shows up in AutoComplete. Sometimes you believe you’re coming up with a search query out of the blue, but in fact you’ve been influenced by social trends online.

2. Accident

Google claims it doesn’t listen to ‘utterances’ – chatter unrelated to a specific voice search or command, but sometimes it does. On

this writer’s own My Activity page, more than 10 percent of the recordings don’t fit Google’s criteria for audio that should be recorded and retained. In one case, someone this writer knows who has a thick Scottish accent says something that sounds exactly like OK Google, but that’s not what they actually said. In others, we don’t hear anything remotely similar to OK Google on the recording. We just hear a snippet of a conversation. Still, a short one- or two-second sentence of otherwise random conversation was recorded in each instance, and the words therein could have been factored into a set of AutoComplete options.

In other cases, it’s possible that words spoken in the background or immediately after a legitimate OK Google command could be included.

Here’s another scenario. Let’s say that someone has enabled the Trusted Voice setting on a Pixel phone. They are visiting a friend, who owns a Google Home device. The friend says to their Home device: “OK Google, how tall is Taylor Swift?” Two days later, after forgetting the result, the friend with the Pixel goes to do a search, types in ‘how tall is’ and AutoComplete offers ‘Taylor Swift’ in the options. Was Google listening? Yes, the other person’s OK Google command also triggered and recorded on the Pixel phone without the knowledge of the user.

3. Unexpected sources for signals

It’s clear that with Google Maps, the search giant includes AutoComplete options based on not only this writer’s activity but their wife’s. It’s easy, based on activity, for the firm to figure out who’s intimately connected. For example, it should be clear that we are both heavy Google Maps users, usually travel together to the same GPS coordinates and addresses.

It’s also easy to forget that you have previously searched for something. If you don’t remember that fact, AutoComplete options can be surprisingly accurate.

4. Artificial intelligence

The human mind is not generally capable of understanding the cumulative power

of personal data to predict outcomes. Google AI is capable of connecting many dots behind the scenes to predict results. If you think about it, someone whose search results generally reveal hypochondria and who types the words ‘where can I’ into a search bar during a flu epidemic is likely to look for: ‘where can I get a flu jab’. The user may wonder how did Google know what we were thinking?”

On that last point science fiction writer Arthur C. Clarke said that “any sufficiently advanced technology is indistinguishable from magic”. Magician David Blaine does amazing tricks. One explanation is that he has magic powers. A far more likely reason is that it only looks like magic because his audience doesn’t know how he does the tricks.

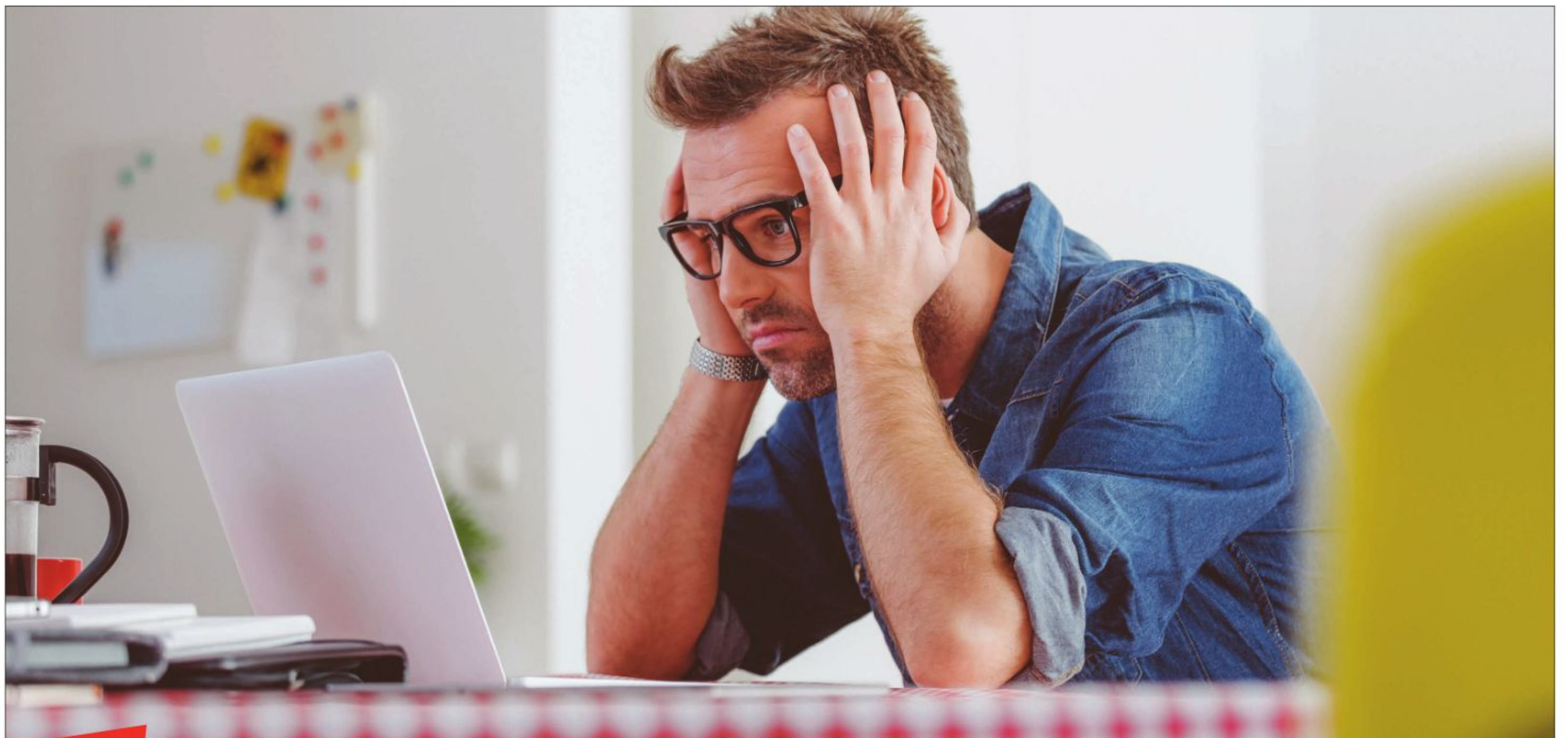
Likewise, Google Search sometimes – usually not, but sometimes – produces uncanny results. One explanation is that the firm is recording everything and uses those illicit and illegal recordings to improve AutoComplete. A far more likely explanation is that its users don’t know how Google produces AutoComplete options, and are therefore occasionally surprised. The firm isn’t listening all the time. But should it?

With rare and accidental exceptions, Google doesn’t record your conversations without your knowledge or permission for the purpose of improving AutoComplete. The best evidence for this is the fact that it isn’t always accurate or even helpful. In other words, the problem with AutoComplete is not that it’s ‘too good’ too often, but that it’s not good enough often enough. If it actually did listen in on your life, AutoComplete would be amazing. No, better still, it would be unnecessary.

If Google listened to, recorded and processed every audible voice and sound within range of your phone, tablet or laptop and applied that data to improving both Google Search AutoComplete and Google Assistant results, you would gain amazing powers of awareness, knowledge and foresight. Maybe the search giant should record everything.

What if privacy was assured? For example, what if the firm verifiably processed audio on the phone and did not retain the recordings, but was able to use every conversation to improve and personalize data. And what if there was an on-off switch, where you could set Google to listen always by default, or only when you threw the switch? 

With rare and accidental exceptions, Google doesn’t record your conversations without your knowledge or permission for the purpose of improving AutoComplete



8 tech dangers everyone can avoid with these simple tips

Read [Eric Geier's](#) tips and be smarter about buying and using tech devices

Tech novices need our help. They tend to run into the same pitfalls, and some of them make the same mistakes over and over again. A novice friend may have cost you hours of informal tech support. Here's something you can show them before that next desperate phone call. To the novices out there: get smarter by reading this.

1. Don't fall for a remote support scam

Remote support scams usually start when someone calls you out of the blue, saying you have some computer problem or have been hacked. You might see a dialog box pop up on your computer, prompting you to call or download something. The person who answers may say they're from Microsoft or Windows support, or are certified from them.

The scammers typically show you false or misleading issues, and they're too often successful at scaring novices into believing their promise of a fix. They usually offer some type of long-term support plan, anywhere from £100 to £800 for one to four years of support. Never trust them. Do not go to any website they mention, do not

let them onto your computer, nor provide any payment information. No legitimate company will ever cold call you, and no legitimate software will ever inundate you with pop-ups demanding you call them or purchase something to fix your PC.

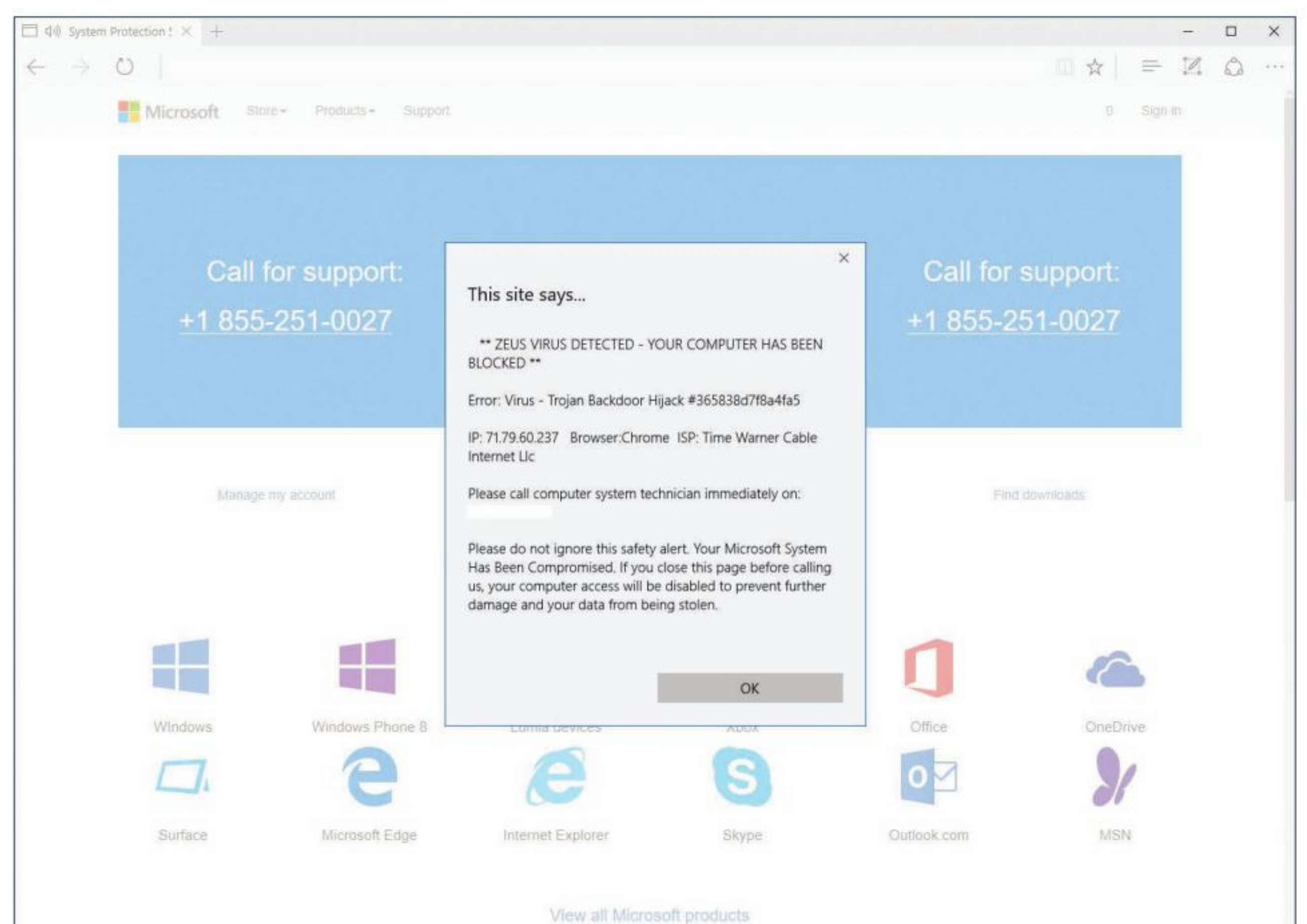
2. Back up those files

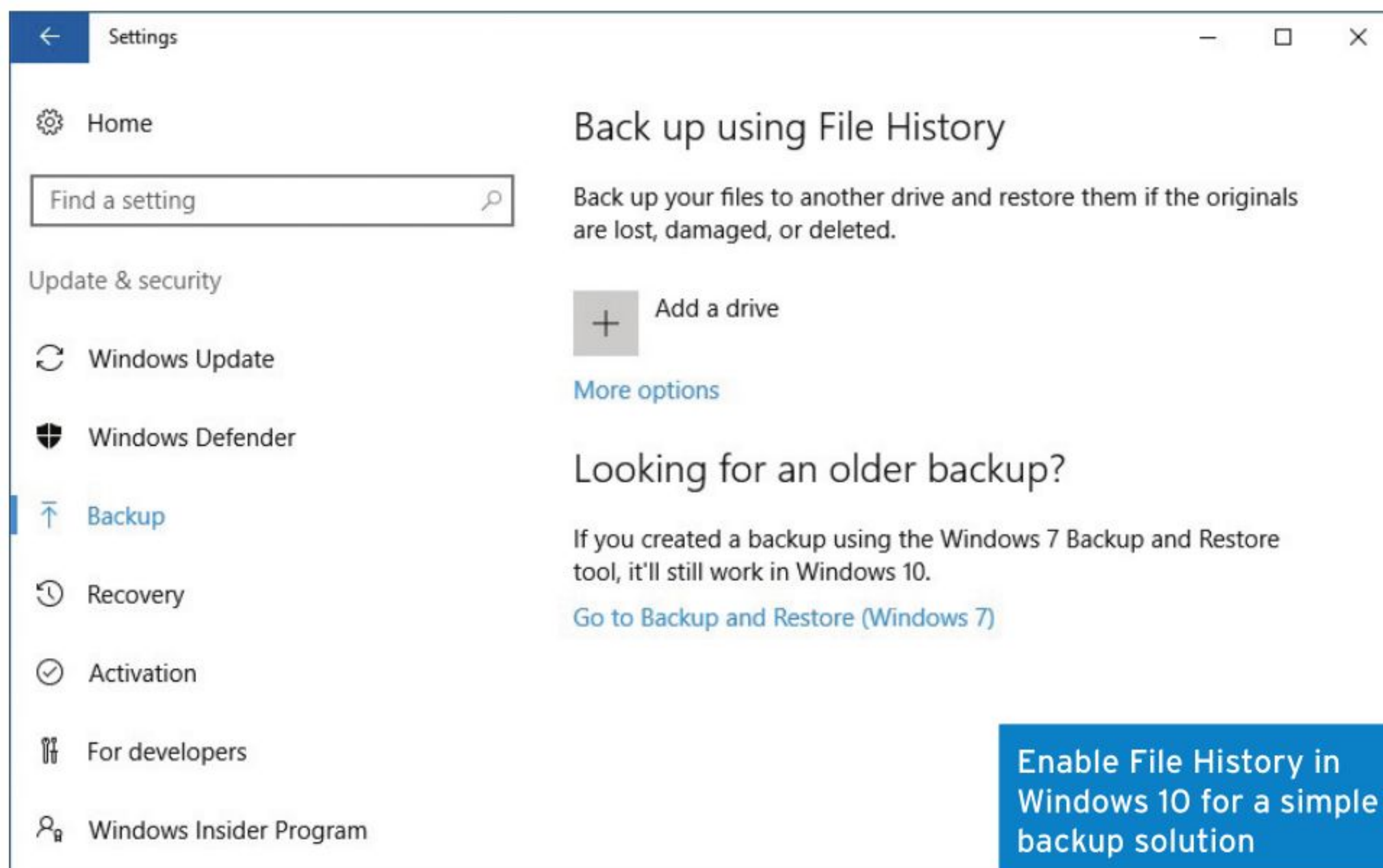
Backing up your computer is one of those things most people put off and don't

appreciate until they lose all those important documents, photos and other files. Make sure you aren't one of them.

At the very least, grab yourself a good-sized external hard drive or a flash drive and use the backup features built into Windows. In Windows 8 and later, you could use the backup drive as the destination for File History. To further protect your data against fire or other local disasters that might

Beware the remote support scam pop-up. You don't really have a problem, but you will if you click that





destroy your drives, consider an online or cloud backup service.

3. Get extra malware protection

No single antivirus program can catch the millions of viruses and their variants out there. Many of them also don't stop

for extra protection is Malwarebytes Antimalware (tinyurl.com/z8xsb8e). It's free to run manual scans, but we recommend purchasing the premium edition for the active protection and scheduled scans.

If Malwarebytes doesn't float your boat, similar programs worth checking out

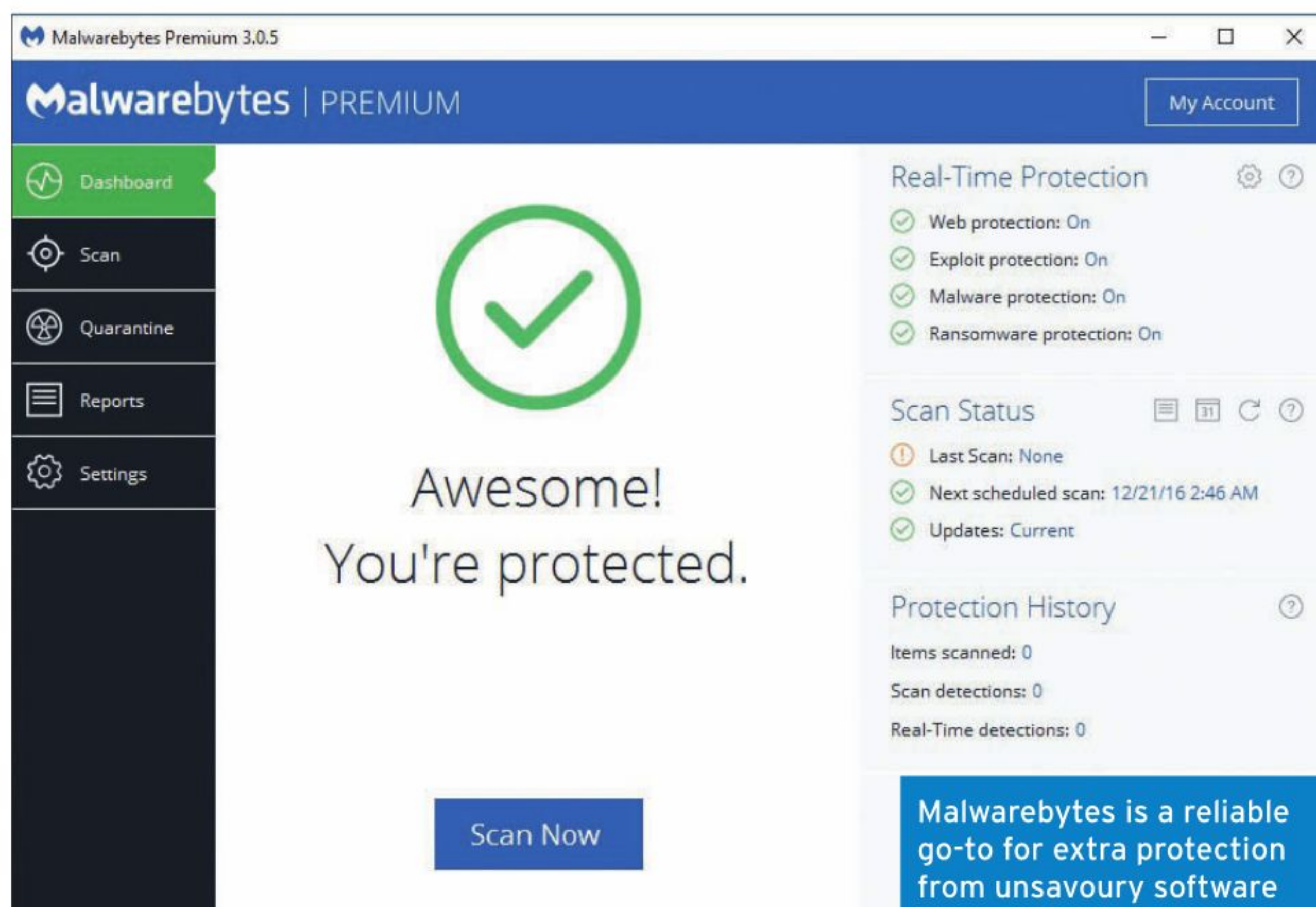
Low-end Android tablets might look appealing, especially when on sale for under £100, but they could have a poor touchscreen, an inadequate battery, or a mediocre interface

other junk, which may not officially be malware but can lead to other problems, commonly called potentially unwanted software (PUP). Therefore, it's best to have some extra protection alongside your full antivirus, whether you're running the built-in antivirus in Windows 8 and later or a third-party antivirus. Our favourite

include HitmanPro (hitmanpro.com), Spybot Search & Destroy (tinyurl.com/c8oj66) and SUPERAntiSpyware (tinyurl.com/ox7un).

4. Don't purchase the cheapest computers and tablets

Don't get us wrong, we love a good deal and consider ourselves economical



shoppers, but we also know you get what you pay for, and novices often get short-changed by buying cheap computers and tablets. Before making a tech purchase, ensure you do your research and read reviews (in *PC Advisor*, naturally) to find the best deals.

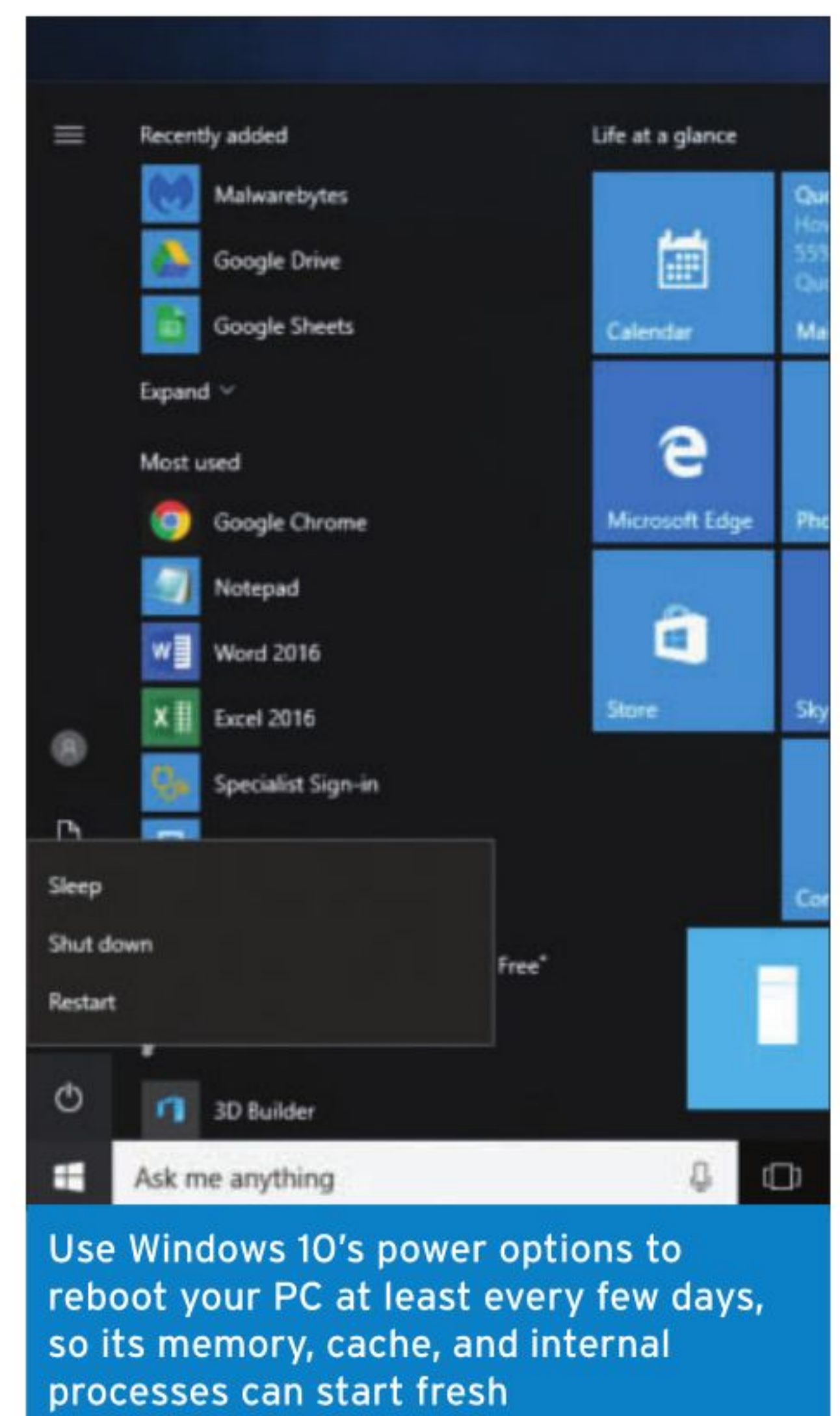
Ultra-low-cost PCs typically have very low-end processors and also skimp on USB ports, expansion slots, and other features you might need over time. Low-end Android tablets might look appealing, especially when on sale for under £100, but they could have a poor touchscreen, an inadequate battery, or a mediocre interface.

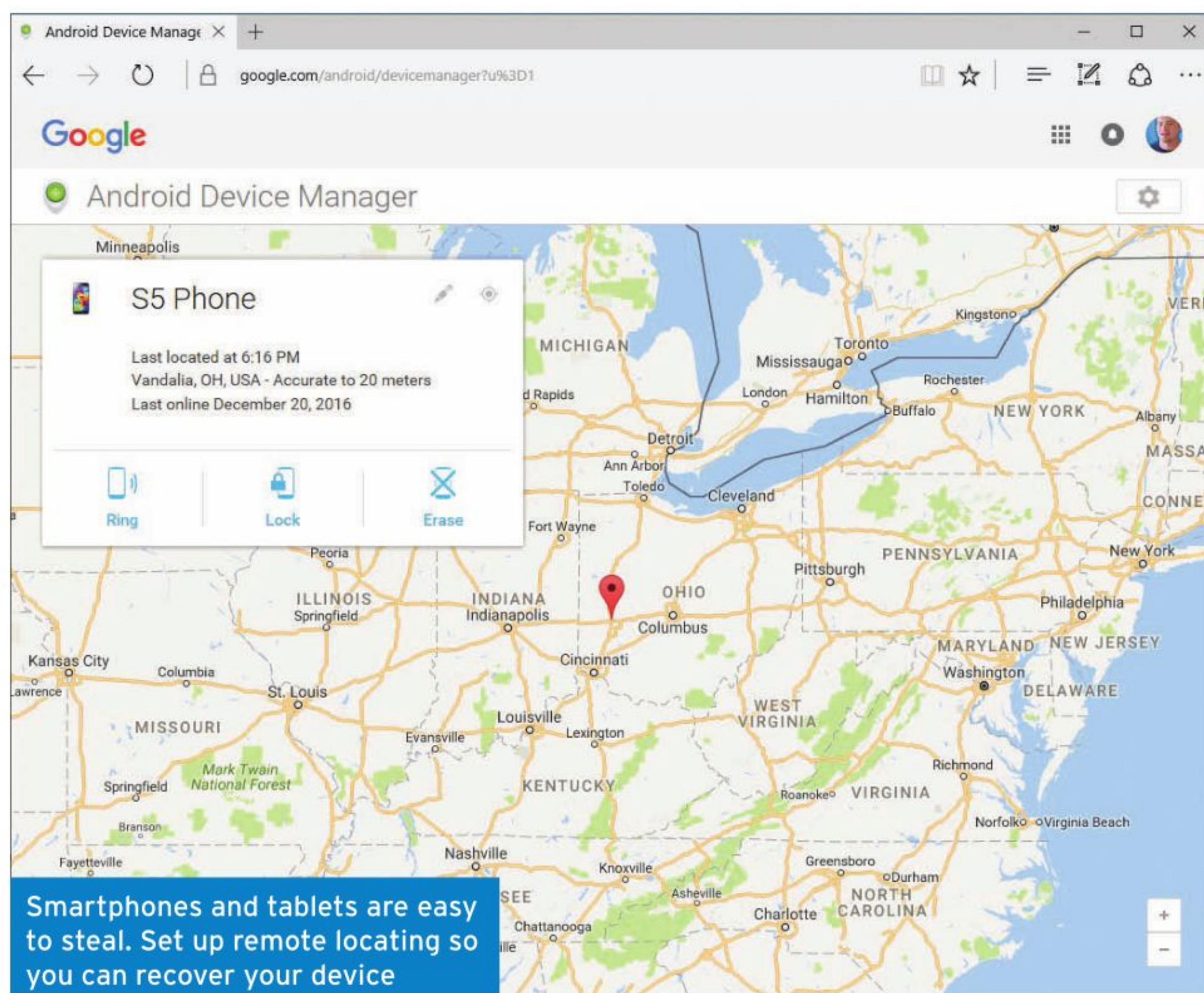
The CPU in that computer or tablet matters more than anything else, yet it's one of the hardest components to compare due to the variety of naming and numbering schemes. Here's a pro tip: you can use a third-party benchmarking website to compare the performance. Simply find the processor model number from the specifications and search for its Passmark CPU Mark number (tinyurl.com/o9gjxsq). The higher the number, the faster the processor should be. Avoid the more sluggish CPUs, as they'll end up frustrating you.

5. Compare online and in-store prices

It's not true that you'll always find something cheaper online. Brick-and-mortar stores run sales or put products on clearance, and they don't charge for shipping, a frequent catch with online purchases.

Restocking fees are another online danger that you'll rarely encounter in a real





store. Always read the fine print on returns before buying from anywhere. If an online price is cheaper, ask a local retailer if they'll match the price. It's a great way to get the product sooner while still saving money.

6. Reboot before you call your tech

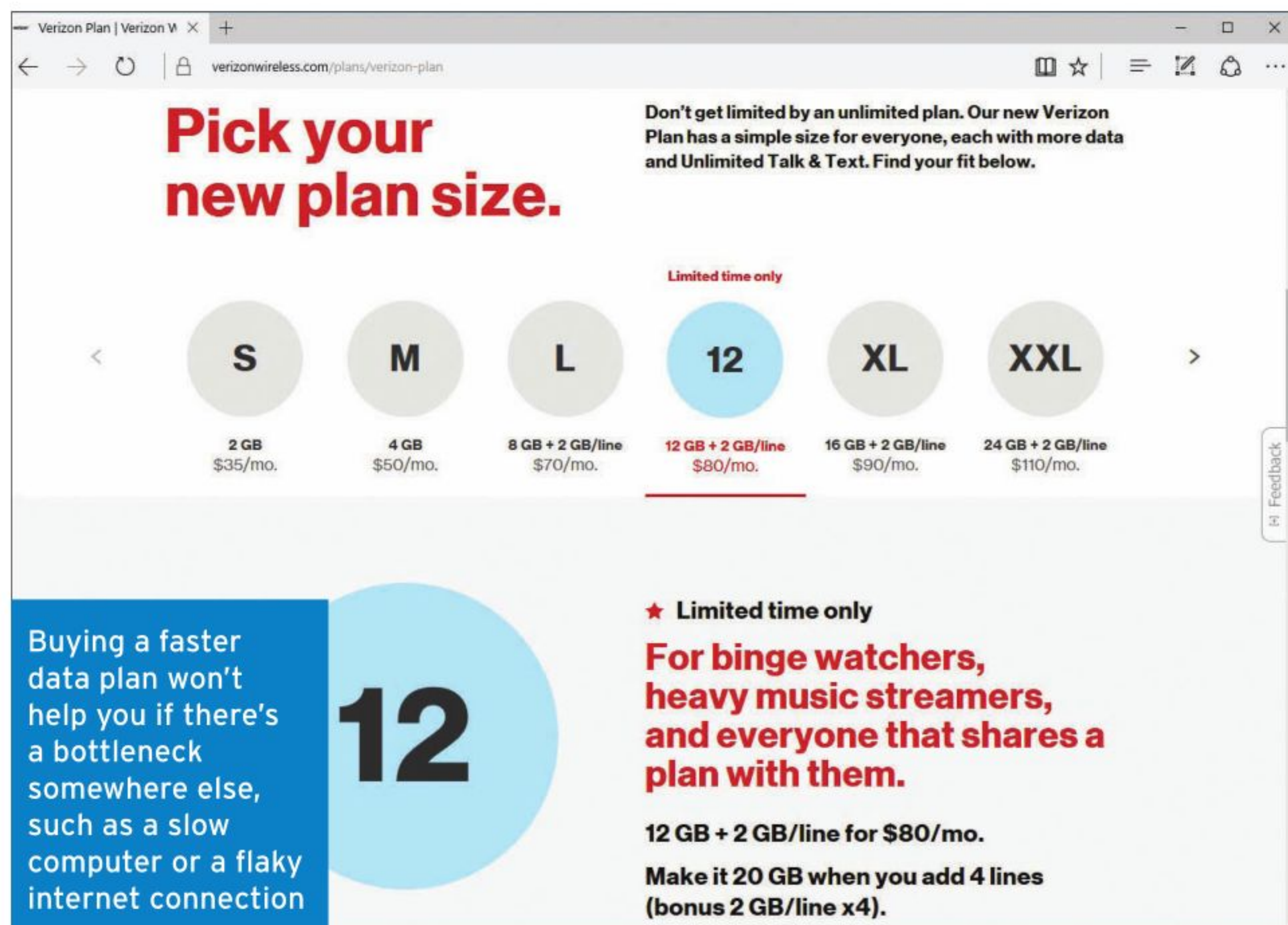
One of the first troubleshooting steps for just about any computer or tech issue is to reboot all the affected computers or other devices. Better yet, it's something a novice can do as easily as any expert.

For instance, if you're having an issue with printing, reboot both the computer and printer. If your internet connection disappears or becomes sluggish, reboot

the computer, internet modem, and router if you have a separate one. You should make a habit of rebooting your PC or shutting it

If your browsing or downloading speed seems slow, consider the computer speed itself, the quality of the web connection, and the quality of the connection to the computer

down completely. Gone are the days when simply letting it sleep was a good idea. All you're doing is burning extra electricity and letting your RAM accumulate leftover bits of programs and files like your kitchen's



junk drawer. We usually suggest doing a full shutdown of your computer when you're done using it for the day, instead of letting it sleep. If nothing else, reboot every few days.

7. Set up remote locating on mobile devices

As you may know too well, smartphones and tablets are easily misplaced or stolen. Taking a couple of minutes to set up remote locating may help prevent a major headache in the future. Depending on the device and its operating system, you may be able to do some of all of the following:

- Pinpoint the device on a map from another device or computer.
- Make the lost device sound an alarm to help find it.
- Remotely lock or wipe a lost device.
- Display a message for those who find it.

You can access the remote capabilities of Apple and iOS devices via the iCloud and Android Device Manager. But you might want to double-check it's set up and working now, before you really need it. For both platforms, there are also many free and paid apps that provide remote functionality.

8. Don't get oversold on internet and data plans

We often see novices with higher-than-needed internet speeds at home. What a fast-talking salesperson won't tell a novice is that buying a faster web speed won't make the computer faster, or even make the internet faster in some cases.

If your browsing or downloading speed seems slow, consider the computer speed itself, the quality of the web connection, and the quality of the connection to the computer. Check the speed of your internet connection with a free online service like Speedtest (speedtest.net). Ensure you're getting the internet speeds you're currently paying for before moving to a higher speed. Most households can get all the web content they need with Internet speeds in the five- to 20Mb/s range.

We also see a lot of tech novices with larger-than-needed data plans for their smartphones and other mobile devices. Take a look at the history of your data usage to gauge what's needed and make changes accordingly. Also, remember that using Wi-Fi connections can help reduce the amount of cell data needed. ☒

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4 simple Linux projects for newbies and intermediate users

If you fancy trying something new, [Alex Campbell](#)'s projects can be completed in a couple hours

It's the start of 2017 and most people are looking toward the year ahead and maybe trying out something new. With this in mind, why not improve your Linux skills with these easy-to-follow projects?

1. Try a new Linux distribution

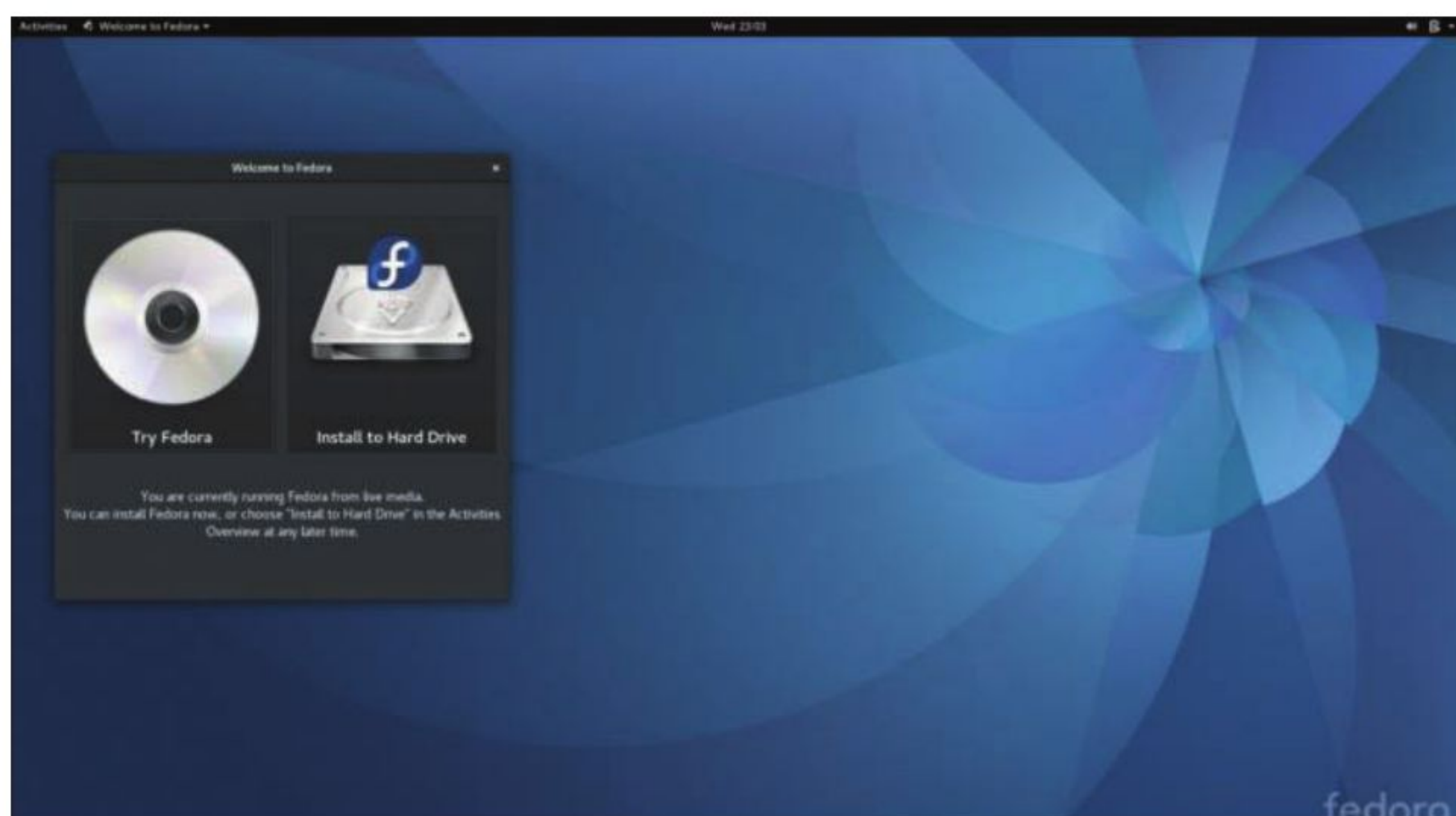
A lot of Linux users love it because of the level of customisation it allows. Once everything is set up, workflows can be quicker, and computing can be a more personal experience. But sometimes it's

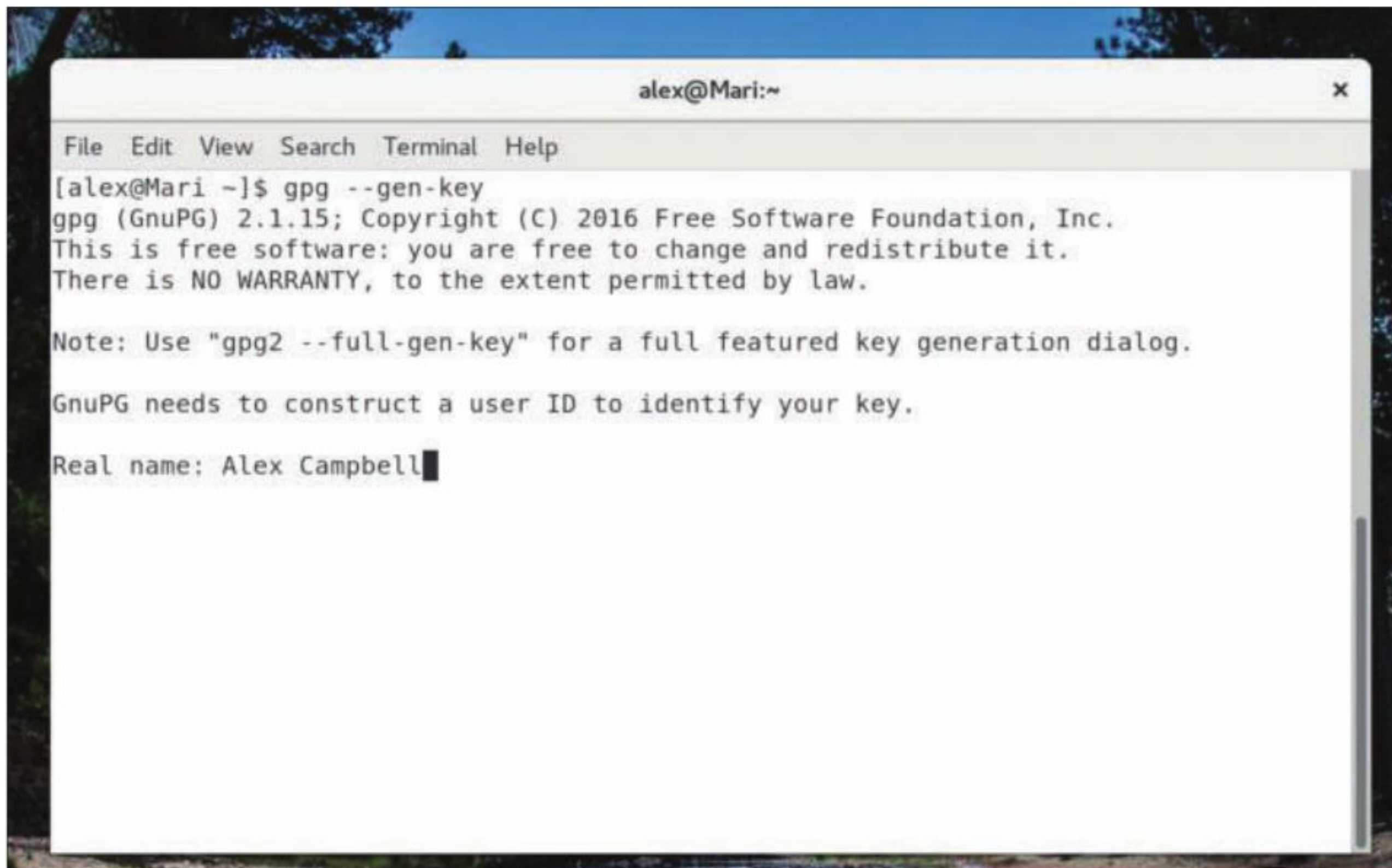
good to step out of your comfort zone. If you've never tried running a Linux OS, this is a great time to dip your toes in the water. Total novices might want to try Fedora 25 (getfedora.org) because of the ease of writing the image to a USB stick. Canonical's Ubuntu 16.04 (tinyurl.com/jr63kws) is also a good starting point. Both operating systems can run 'live' on a USB drive (meaning you don't have to go full-bore and nuke Windows if you're just looking to test drive).

For users who have been running Fedora or a version of Ubuntu for a while and feel fancy a something new, Gentoo (gentoo.org) or Arch Linux (archlinux.org) will present a bit more of challenge when it comes to setup, but will offer a great learning experience.

2. Create an OpenPGP keypair

Creating an OpenPGP keypair is a great way to learn how public-key encryption tools work. Some Linux distributions come with GnuPG (called gpg) preinstalled, since the OS needs it to verify the signatures of packages.





Creating a keypair in Linux is easy, and can be accomplished by running `gpg: gen-key` in a terminal window. The Fedora Wiki has a great tutorial on creating keys in KDE, GNOME at tinyurl.com/Lvx5rvL, and through the command line. If you're using Windows, you can use GPG4Win to create keys.

While OpenPGP is far from perfect - most people don't want to encrypt stuff from the command line, and a lot of desktop applications feel clunky - it's still worth learning. For now, OpenPGP is one of the strongest encryption tools out there.

If you're going to create keys for messing around, a key with the default depth of 2048 bits is just fine. We prefer 4096-bit keys for real-world keypair. It's also a good idea to create a revocation certificate (to tell the world if your keys are obsolete or stolen), and to have a safe backup (as in not on your PC or phone) of your private key. And finally, always try to create keys on your PC instead of a phone or tablet.

3. Create a backup scheme

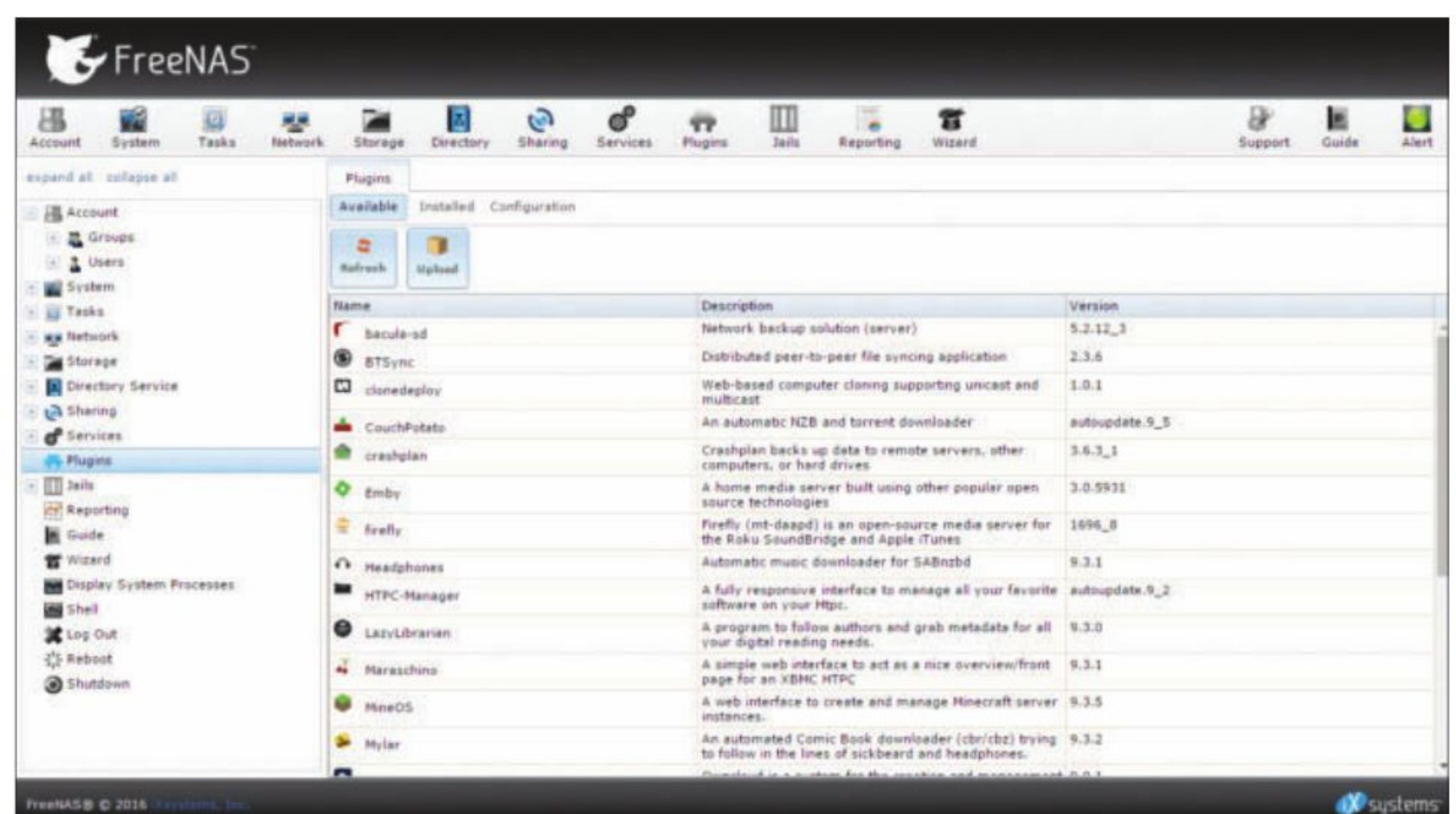
Like saving for retirement, the best time to start backing up is yesterday. The second-best time to start backing up is now.

Some services can back up your files automatically, but you can make local backups using Linux programs such as `rsync`. `Rsync` is a bit like a smarter `copy` command, in that it only copies over files

FreeNAS is a popular choice for home NAS machines. It is easy to set up, and can be run from a USB thumb drive, so that the PC's hard drives can be used for storage only

that have changed. If you couple `rsync` with compression via `tar` and schedule it using the `crontab`, you can have automatic backups

Docker would make it possible to access your files remotely as easily as you would with Dropbox or Google Drive.



sent to your network attached storage (NAS) or remote server through SSH.

A new hard drive (used just for backups) or a cloud service might feel a like an unnecessary expense, but weigh that cost against your grief should the three-year-old hard drive you've got your life on fails. Just back up your stuff.

4. Build a NAS

At *PC Advisor*, we're firm believers that everyone should have a NAS (see our top recommendations on page 138). You can think of your NAS as a own private cloud for the home. The thing is, these devices can be expensive, but not everyone needs an eight-drive hulking machine humming away in the closet. Luckily, it's easy to make one out of an old PC and a new hard drive or two.

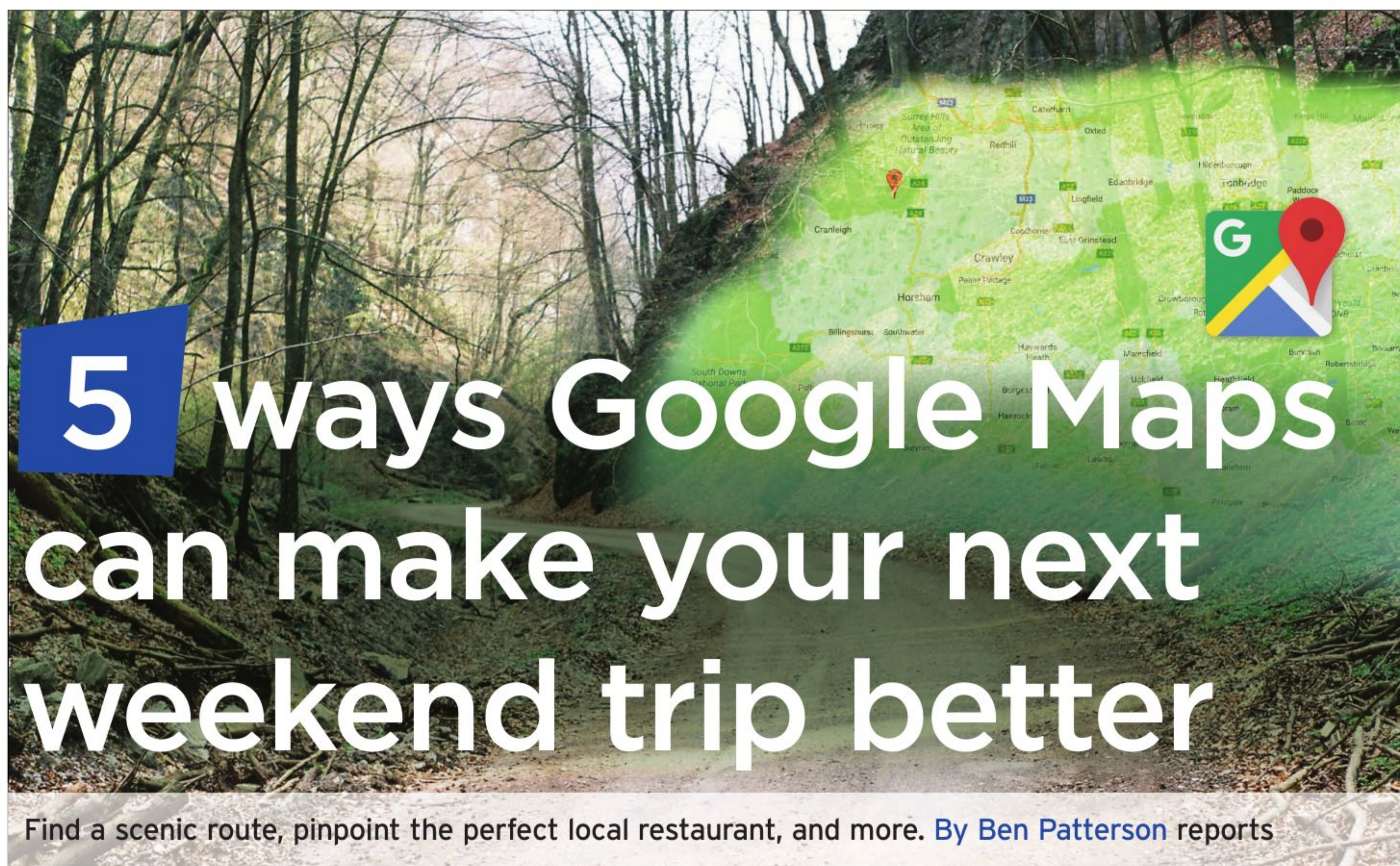
The FreeBSD-based FreeNAS (freenas.org) is a popular choice for home NAS machines. It is easy to set up, and can be run from a USB thumb drive, so that the PC's hard drives can be used for storage only.

A popular Linux-based option is OpenMediaVault (openmediavault.org). Like FreeNAS, OMV has a plugin system that allows you to install different software applications such as the Emby media server. You can also install the containerization plugin Docker (docker.com) on an OMV server. Used in conjunction with the personal cloud software Nextcloud (nextcloud.com),



If you're feeling up to the task, you can try doing all this yourself by setting up an Ubuntu or Fedora server, and using Docker to install the applications, such as Nextcloud, that you need.

None of these projects should take very long and they will have some benefit down the road. If you've got a spare evening, it's worth taking some time to learn something new about Linux. ☒



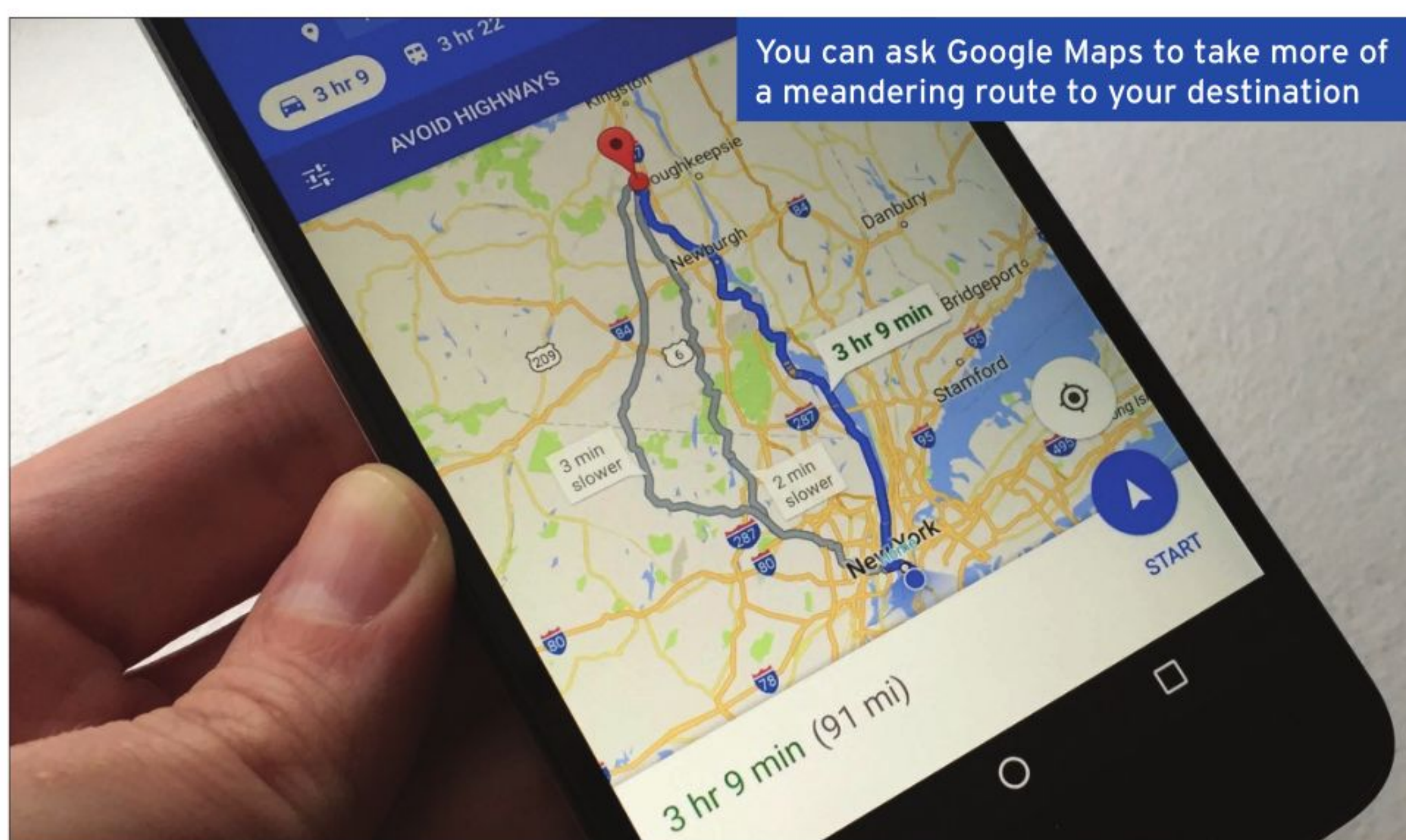
Yes, Google Maps makes it easy to find the shortest distance from A to B, but sometimes it's not the fastest route you're after. It's the nicest one. Luckily, speed and ruthless efficiency aren't the only things Google Maps is good for.

Enable the right settings and Google Maps for Android and iOS can help plot the perfect meandering route to your destination, find restaurants with local colour, keep track of what you saw, scout out the most charming B&Bs, and keep you oriented while you're hiking in the signal-free countryside.

1. Take the scenic route

If you want Google Maps to find the roads less travelled for your next getaway, try this. First, perform a regular location search - tap the blue navigation button near the bottom of the screen, and make sure the 'from' and 'to' fields are filled out correctly. Next, tap the three-dot menu button in the top corner of the screen, then tap Route options. Among the choices: avoid highways, avoid tolls, and avoid ferries. You can enable one, two, or all three settings if you wish.

Once that's done, Google Maps will reroute you to a longer, but (hopefully) more scenic,



way to your destination. Before hitting the road though, take a close look at the route to make sure you aren't being sent anywhere too remote, such as a dirt track.

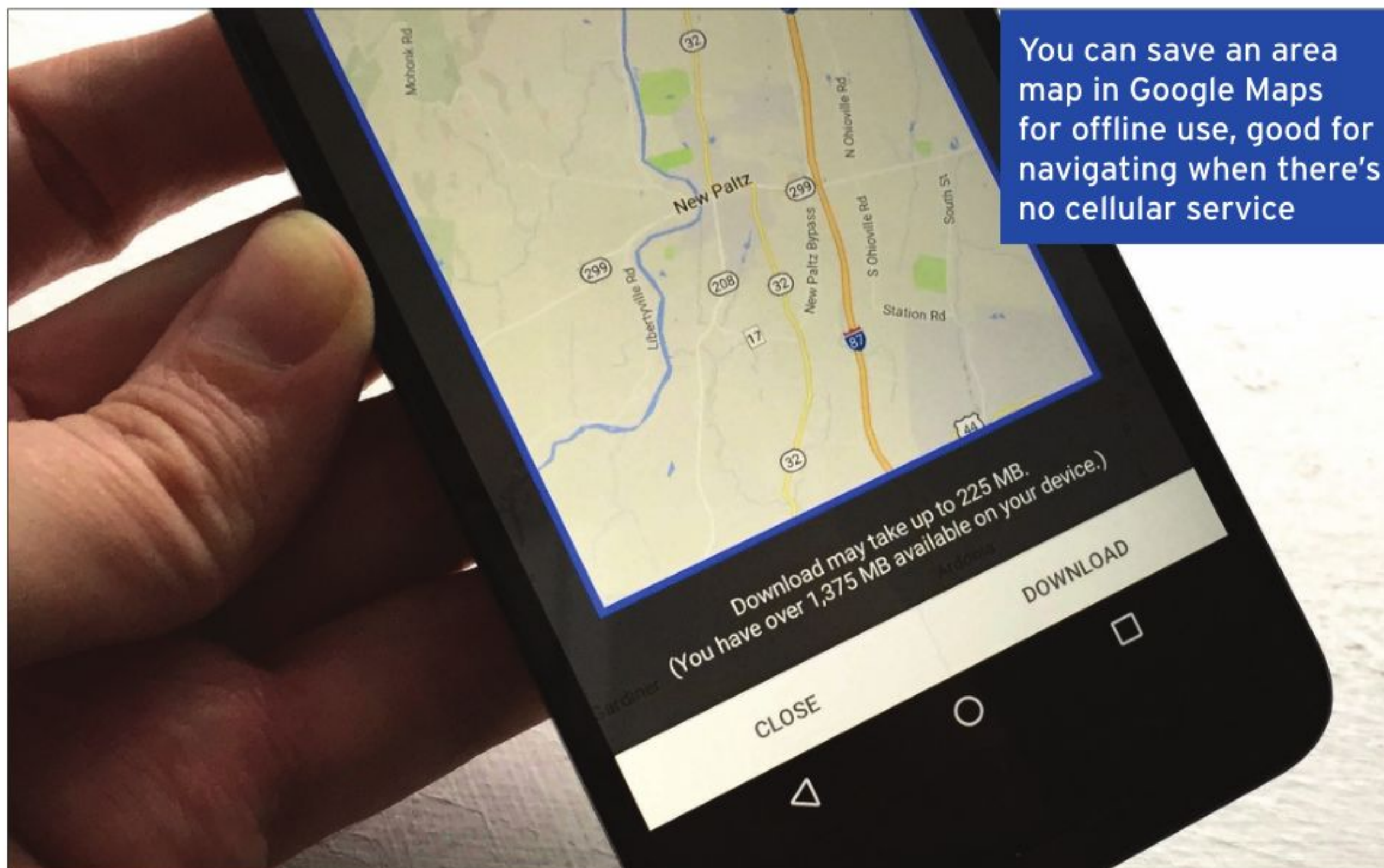
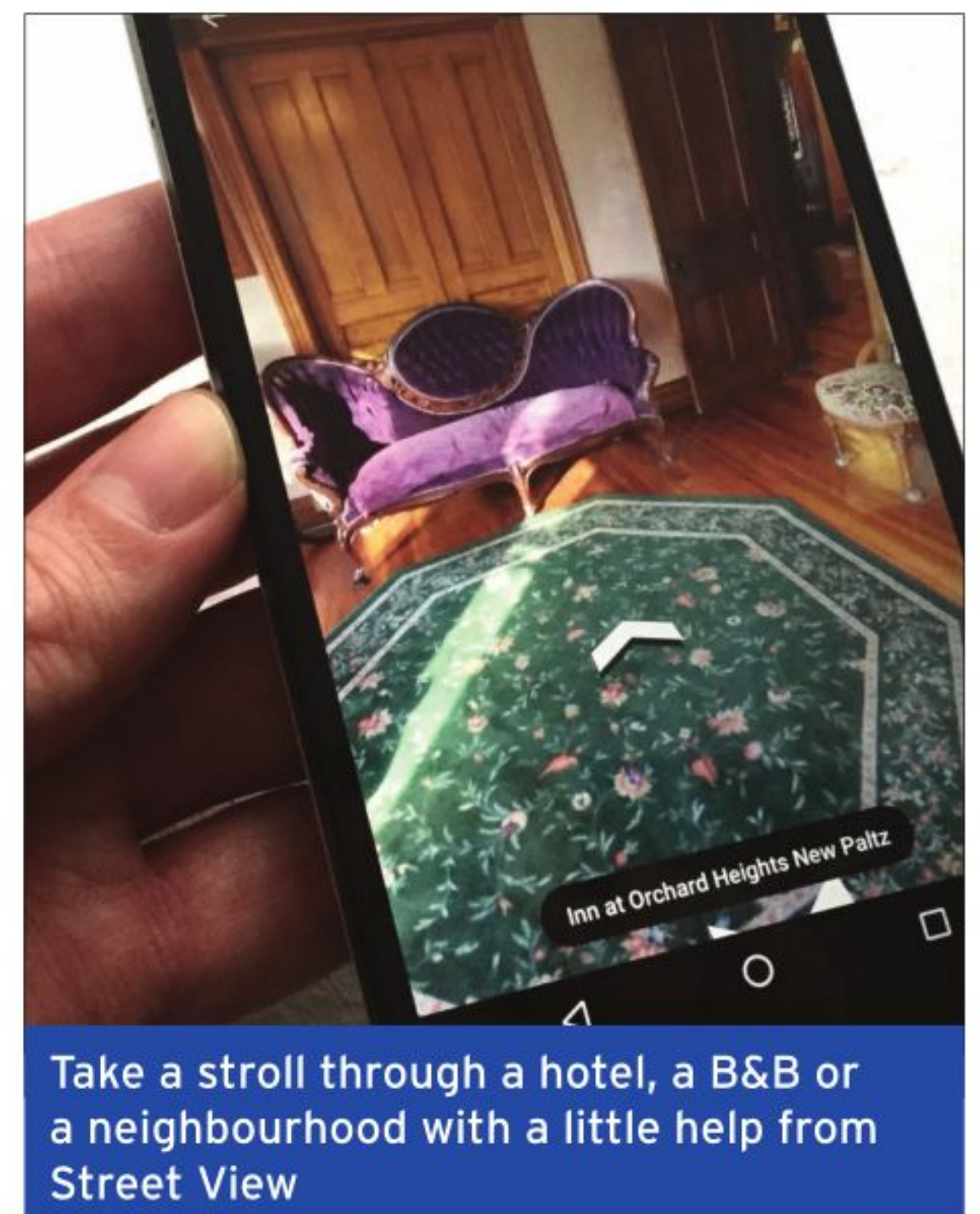
2. Download area maps to your phone

Whether you're taking the scenic route to your destination or a walk in the country,

there's a good chance your holiday excursion could take you well outside your carrier's LTE coverage area. If you want to keep Google Maps up and running even when your cellular connection gets iffy, try downloading local map data to your phone for offline use.

The first step is to search Google Maps for the place you're going then tap the location label at the bottom of the screen. Next, tap the Download button (it should be near the middle of the screen, next to the Save and Share buttons), then drag the selection square to cover the area you want to download - and of course, the bigger the area, the more storage you'll need on your Android or iOS device.

Enabling the right settings and Google Maps can help plot the perfect meandering route to your destination or keep you oriented while you're hiking in the signal-free countryside



Once you've downloaded a map, you'll be able to navigate and search the area even when you're out of cell phone range, although details on local haunts will be limited until you go back online.

3. Take a tour in and around your hotel

Having trouble picking the perfect B&B? If you feel yourself starting to slide down the TripAdvisor rabbit hole, you can narrow down your choices with a little help from Street View. Tap the name of a hotel or bed and breakfast on Google Maps, then see if there any Street View tours available; just look for the 360-degree arrow in the corner of a thumbnail. If you're lucky, the proprietor or even a visitor will have created a virtual tour of their establishment using Street View; just swipe and tap to take a look around.

Even if there aren't any Street View tours of the place you're considering, you can at least take a stroll around the neighbourhood. Find the hotel or B&B on Google Maps, tap and hold a spot on a nearby street, then swipe and tap to get the lay of the land.

4. Find out where the locals eat

If you don't want to get caught in a tourist trap when it comes to eating out, you can use the app to pinpoint restaurants and cafés with some real local flavour.

Open Google Maps, zoom in on an area, tap the main menu button in the top-left corner of the screen, then tap Explore to start browsing nearby restaurants, cafés and pubs. The tabs along the top let you specify a meal (breakfast, lunch, dinner, and so on), and if you scroll through the various categories, you'll find a 'Where the locals eat' option. See a restaurant you like? Tap Read more for photos, menus, hours and a chart that shows the place's busiest hours.

5. Keep a diary of where you've been

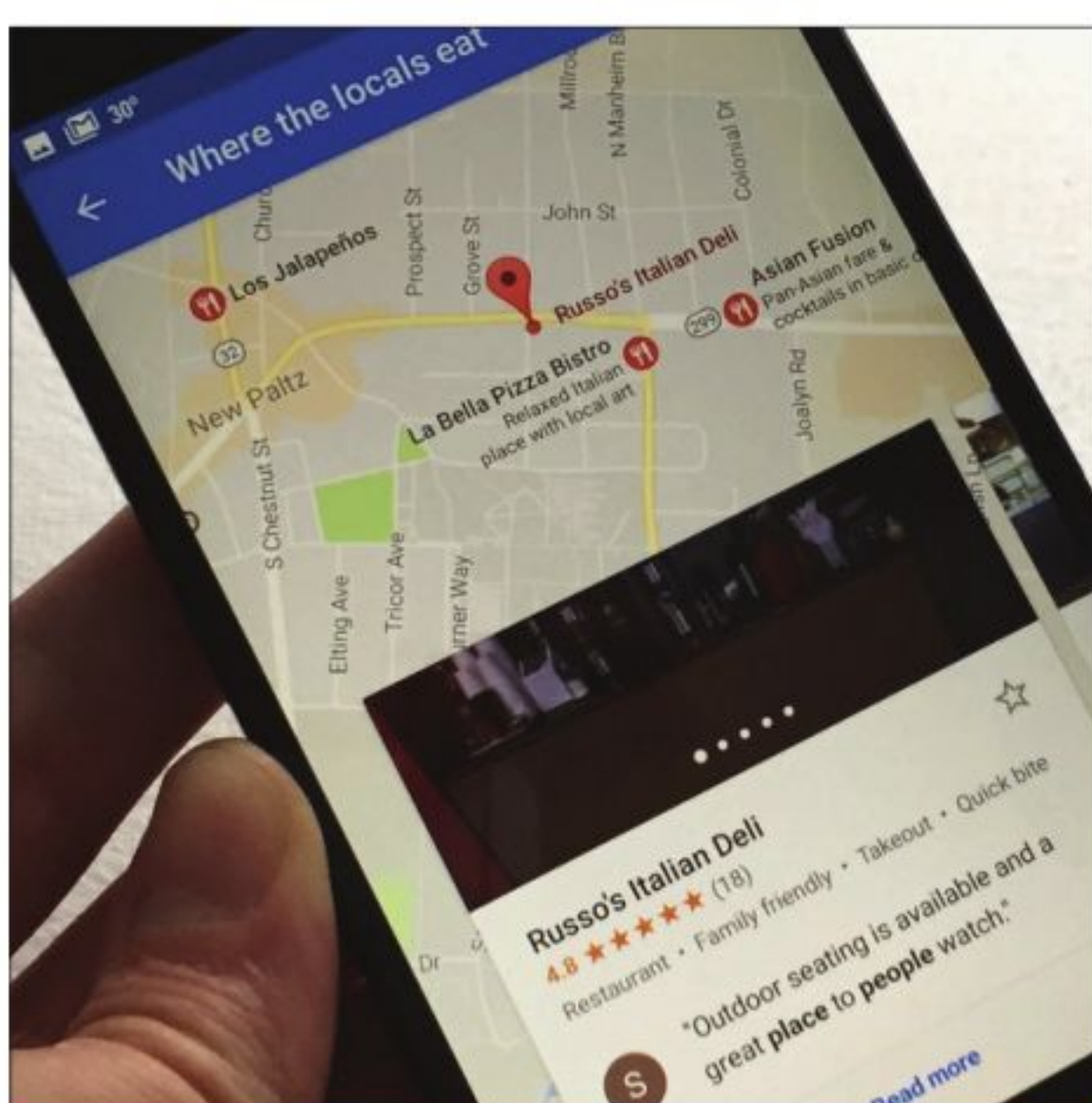
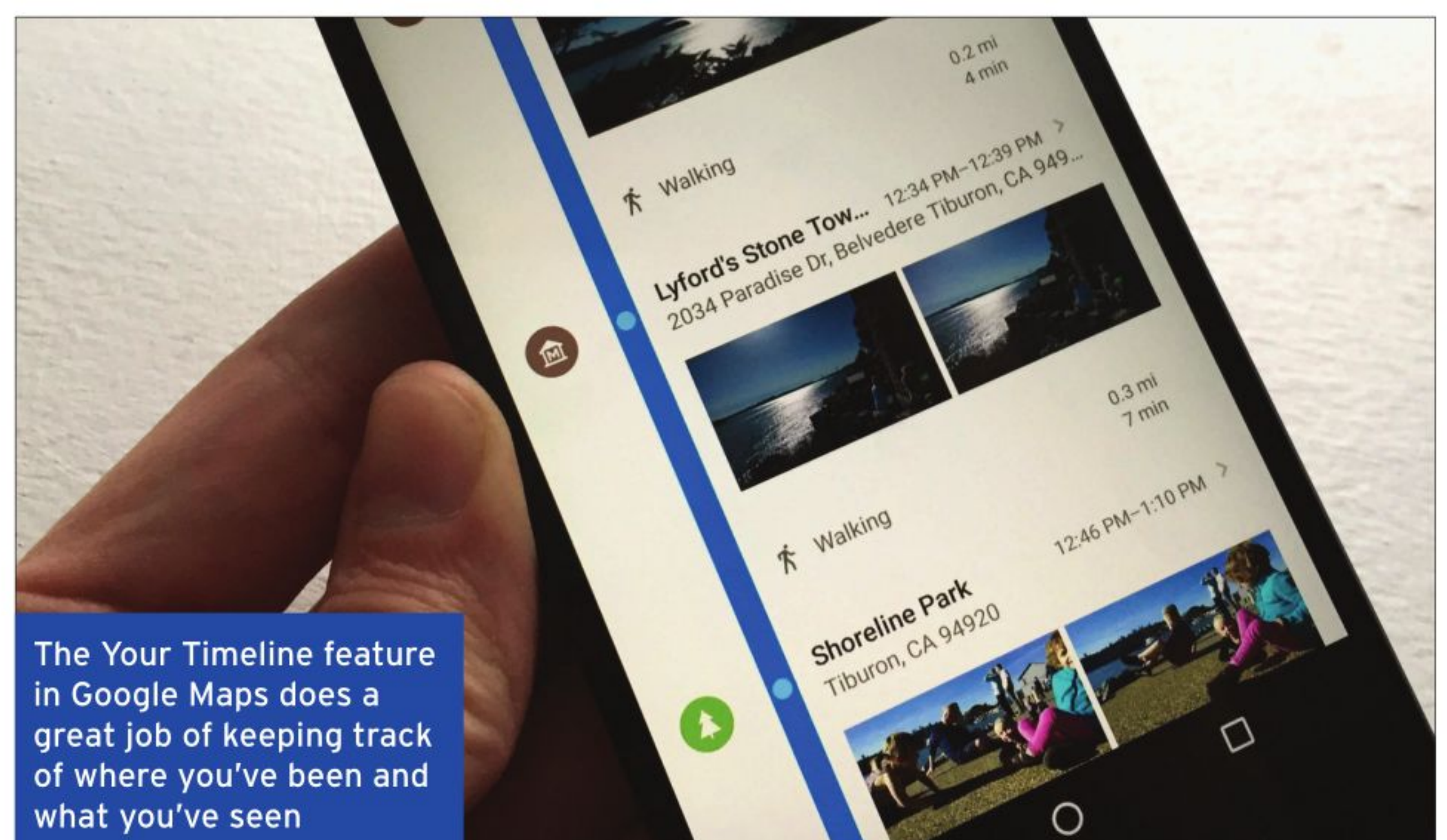
Don't want memories of your weekend jaunt to slip away? Google Maps has a nifty feature that'll help you remember where you went and what you saw, but you'll have to enable an eyebrow-raising privacy setting first.

Location History is a setting that lets Google track and save the location of your various Google-connected devices, including

your Android phone. The firm says it only uses your location to help boost its local recommendations, and that you're the only one who can view your location history. (To access the Location History setting on an Android Nougat device, tap Settings > Location > Google Location History.)

Now, if the Location History feature still sounds creepy, leave it off. If, however, you trust Google with your location data, you can try a Location History-aided feature called Your Timeline, which displays both a timeline and a map showing everywhere you went on a given day.

To open Your Timeline, tap the Google Maps main menu button in the top-left corner of the screen, then tap Your Timeline. Tap a date in the Your Timeline calendar to see your day's journey plotted on the map, plus a timeline of where you went (you can edit a location if Google Maps gets it wrong), how you got there (the app does a good job guessing whether you walked, drove, took public transport or flew), and when you arrived and left. You'll even see any photos you took along the way. 



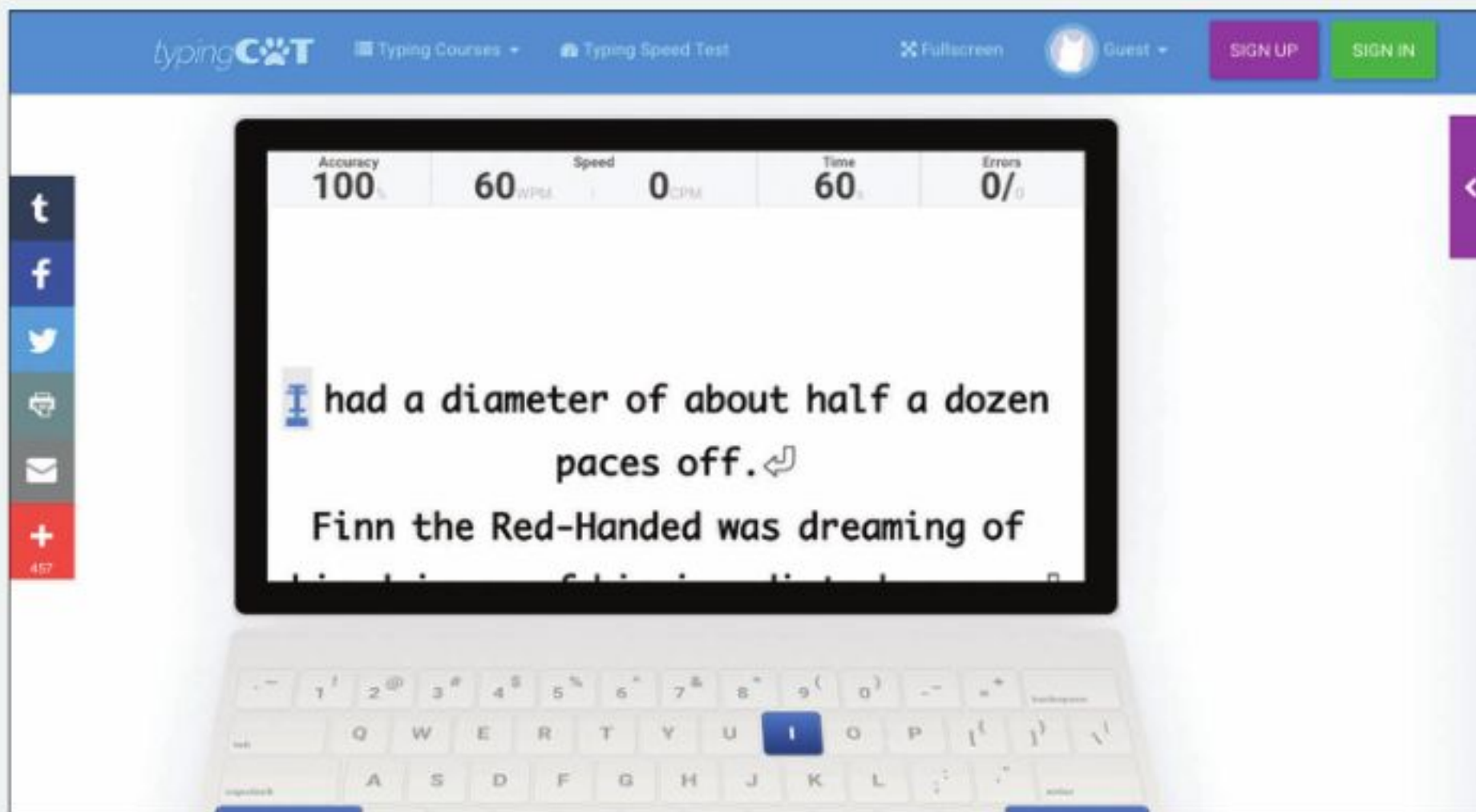


Give your typing skills a boost

Martyn Casserly's tips will have you going from two fingers to touch-typing in next to no time

Touchscreens and voice control interfaces may well be growing fast, but if you want to get some serious work done then most people will still turn to the humble keyboard. This doesn't mean it's the easiest option though, as it requires a decent amount of practice to get up to the kind of speeds that will keep up with your brain.

So how do you improve your typing speed? Well, we've gathered together a number of tips, techniques and apps that can get your fingers flying across the keyboard. All they need are a little dedication and patience. So let loose your dynamic digits: there's work to be done.



How fast can you type?

Before improving your speed it's a good idea to find out how fast you can type. One simple, free way to do this is by taking an online speed test. We recommend visiting thetypingcat.com and clicking on its Typing Speed Test option at the top of the page. On the right side of the next screen you'll see options for one, three, or five minutes tests. Click the one you want then click on the purple arrow on the left to begin. Now just type over the text on the main screen until the time runs out, remembering to include capitalisation and punctuation. When the test completes you'll be given your current rate of writing. Make a note of it so you can return later and see how much you've improved.

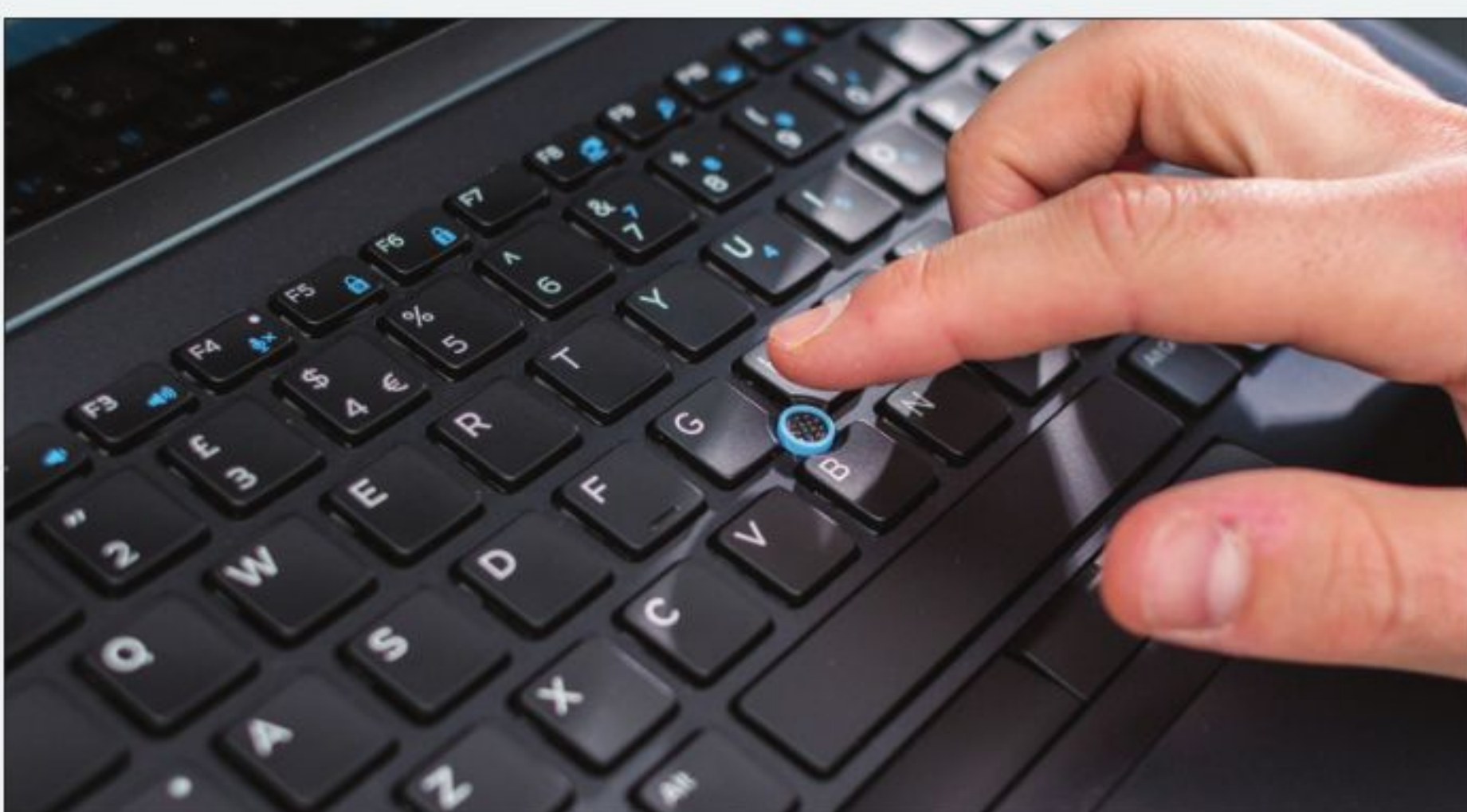
Using all your fingers

It's not uncommon for people to type with just two fingers, but if you want to get quicker, you'll need to employ all your digits. At first this can feel uncomfortable, a little bewildering, and will most likely make you type slower. Persevere though, and within a few weeks you'll see significant improvement. It's like any new skill, you slowly build up muscle memory, then after a while you don't even need to think about what you're doing as your fingers will instinctively know where to go.

One of the key aspects of typing faster is minimising the amount of movement in your hands. When you first try typing with all of your fingers there's a good chance that you'll be moving your hands all over the keyboard. This is not a good idea though as it increases the chances of you getting lost and hitting the wrong keys. To stop this, and build in good habits from the start, there is a standard hand position that you should adopt.

If you look at your keyboard, you should see two little raised lines on the F and J keys. The reason for these lines is that the F and J keys are where your index fingers should be when you start typing. Those letters are centrally placed and will be the anchor points that your fingers return to throughout any typing session.

Try positioning your index fingers on them now and then placing your other fingers on the three keys to the left of F (D, S and A) and the right of J (K, L and ;). Your thumbs get to join in too, as they will be used to hit the spacebar. If you're using a laptop, then the



base of your palms will rest either side of the trackpad. Desktops will vary depending on the type of keyboard you are using and the arrangement of your desk.

With your fingers now in the standard typing position you can try typing out a few words to familiarise yourself with the new arrangement. Remember it will feel weird at first and you will no doubt be slower than normal. It takes time to build up the right technique but the rewards will be worth it in the end.

Try some typing tutorials

Armed with your new finger placements it's a good idea to go through some typing lessons. A good place to start is back at thetypingcat.com as the courses are free and acquaint users with the standard typing position. The Basic course starts with just a couple of letters that you need to enter in the correct order.



These are F and J, both of which should be typed with your index fingers. It's very helpful as right from the start you are familiarising yourself with having your hands in the correct position and keeping them there while you use the Spacebar and Enter keys.

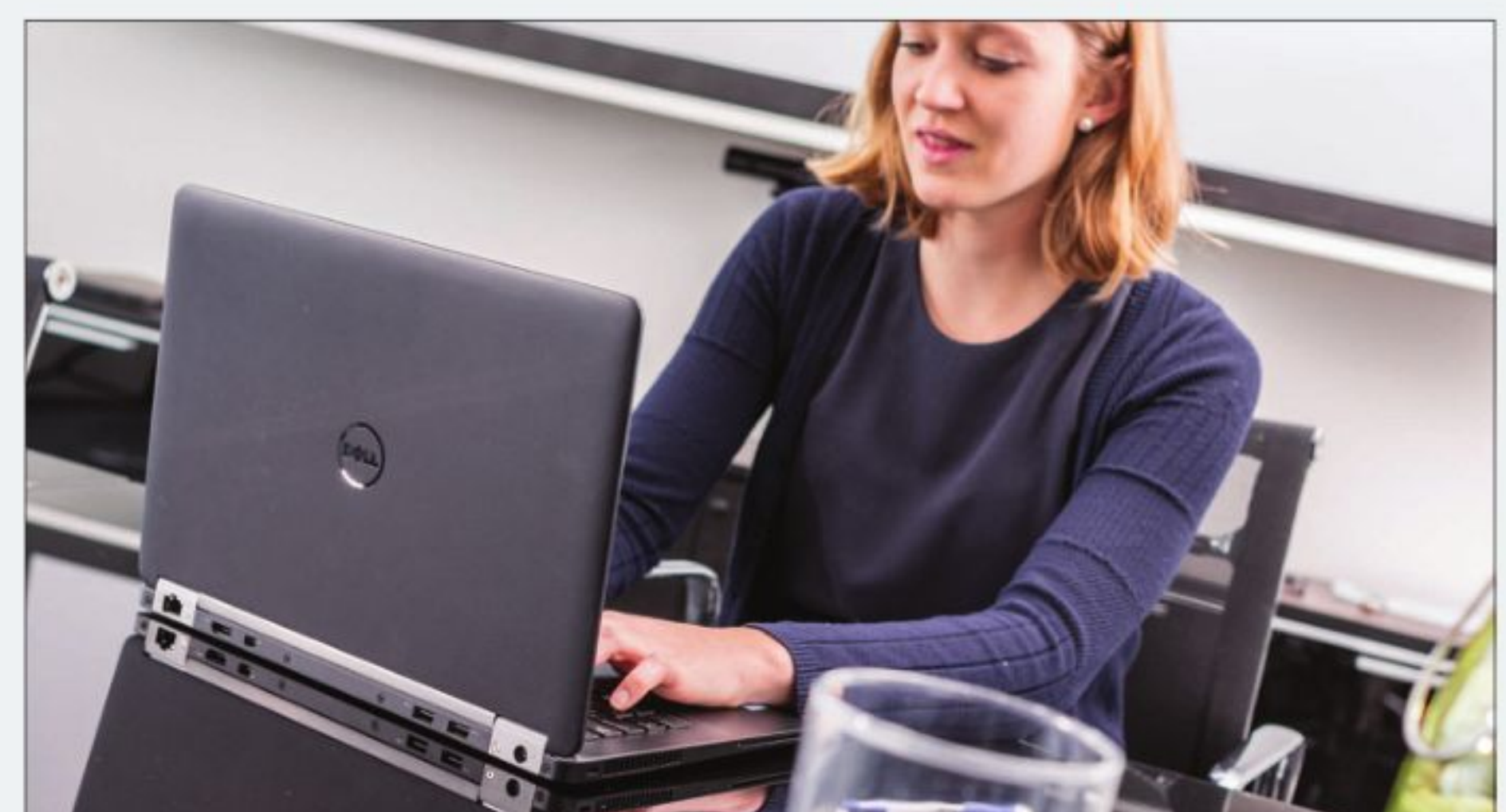
The lessons progress at a comfortable rate, focusing on one row of the keyboard at a time. When you've worked through those you can progress to the Advanced course which incorporates punctuation, capitalisation and numbers.

Keep your eyes on the screen

The eventual aim of typing quickly is to be a touch-typist. It might seem impossible when you first start out, but if you stick to the courses above and use the correct position for your hands, then it will be achievable in a month or two.

As you work through the exercises and generally practice your new skills try allocating a little time to typing blind. At first it will be a random mess, but that's okay. Just keep trying little by little and you will surprise yourself how quickly it all comes together.

As the old saying goes, if the best time to plant a tree was 20 years ago, the second best time is today. So if you do want to speed up your fingers start with a small acorn, practice each day, and watch it grow into something impressive. ☒





Check that your IoT devices are secure

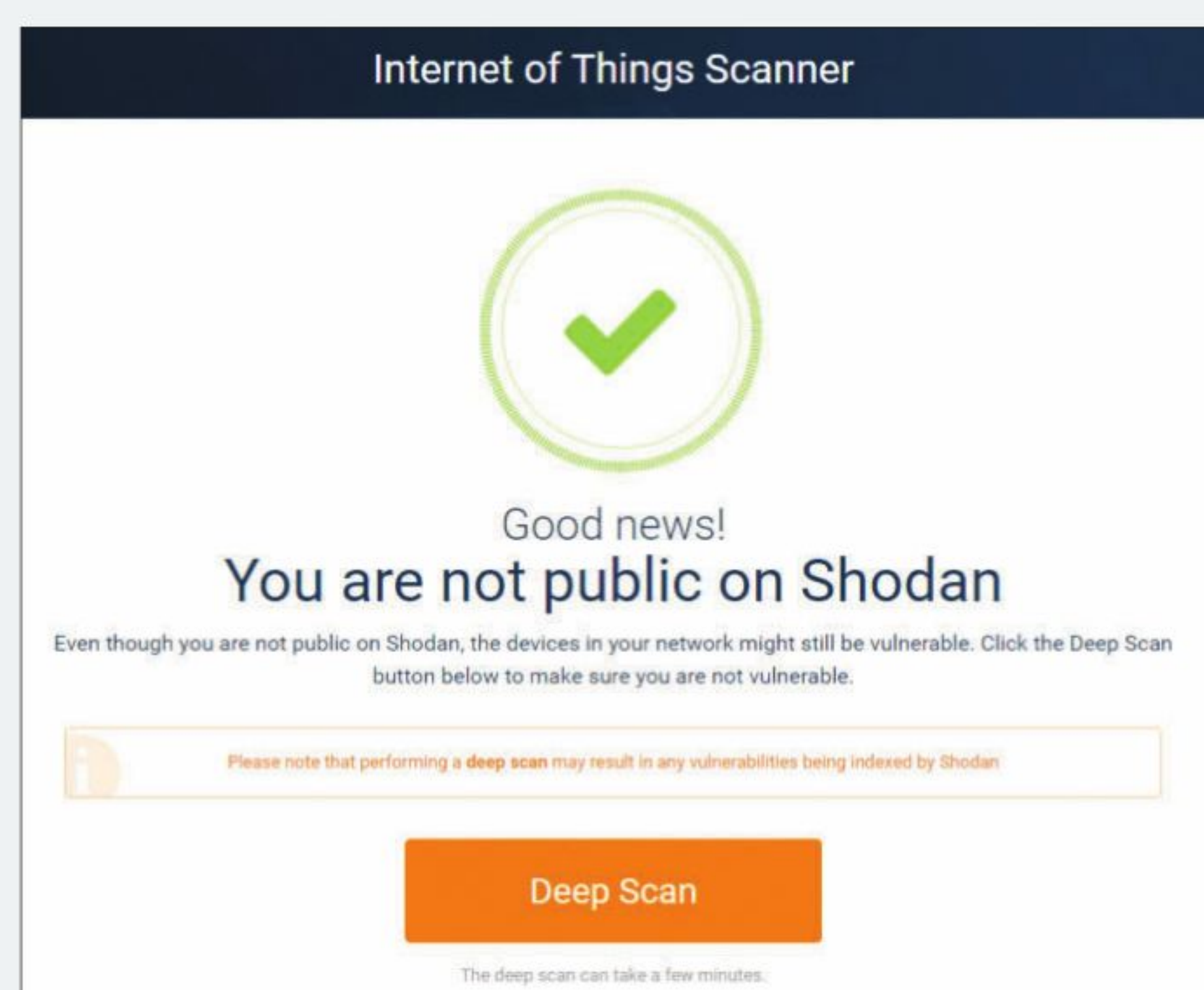
Don't let your smart clock expose you to hackers. Ian Paul shows how BullGuard's web app can help

You've spent a good amount of time getting Alexa to properly activate your wireless speakers, living room lights and smart cam, but is your new IoT setup secure?

BullGuard (bullguard.com) has a quick and easy tool that can help you find out if there are any basic problems. It's called the Internet of Things Scanner. The service checks to see if any of your devices are on Shodan (shodan.io), a search engine that lets anyone find Internet of Things devices like cameras, printers, and thermostats that are publicly accessible on the internet. Anything that's publicly accessible may also be vulnerable to hackers if there are any security flaws in the software that can be exploited.

Using BullGuard's web app is easy, just land on the website and click Check if I am on Shodan. A few seconds later you should have your answer. If all goes well, you'll see a result like the one above. Next, you can click Deep Scan to take a look at devices on your network and see if BullGuard's scanner can find any security issues. The downside, BullGuard warns, is that a deep scan may cause vulnerable devices to be listed on Shodan. But if it does find any problems, BullGuard says it will offer details on how to secure your vulnerable devices.

The company also has an IoT consumer guide with three basic tips for securing your network that anyone should do regardless of whether they have smart devices at home or not: set a password on your smartphone, change the default password for your



router's administration features, and change your Wi-Fi network password from the default.

That's about all there is to BullGuard's IoT scanner. It's a simple way to check for any obvious vulnerabilities whenever you add any new devices to your growing collection of smart home devices. ☒



Download media in Chrome for offline viewing

Chrome now lets you download web pages and video for offline viewing. Marie Brewis shows how

Google has updated its Chrome mobile browser to allow offline viewing of web pages and video. This is great news if you're going to be away from a web connection with little to keep you occupied, although as always you'll need to prepare before you leave. Fortunately, that's a piece of cake.

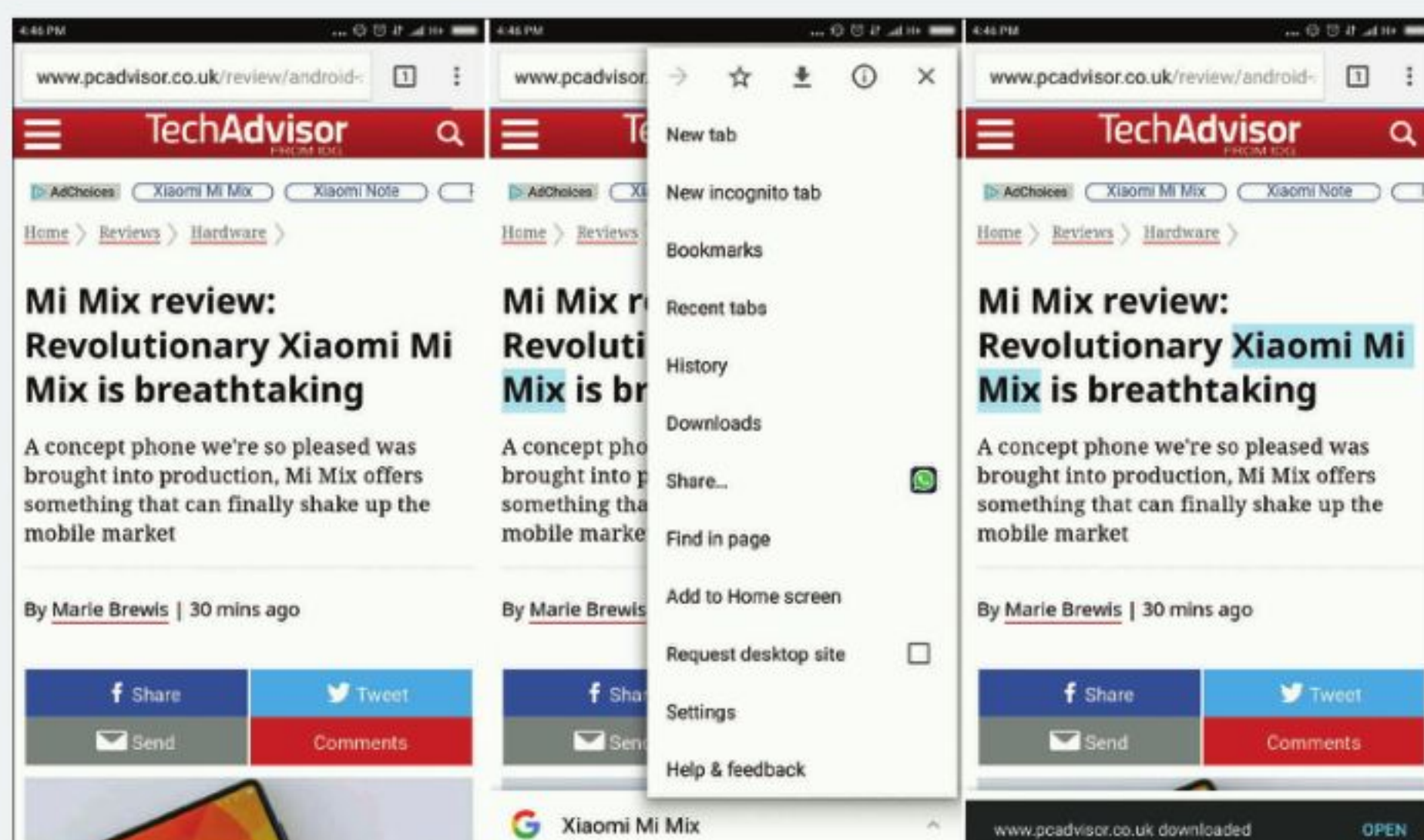
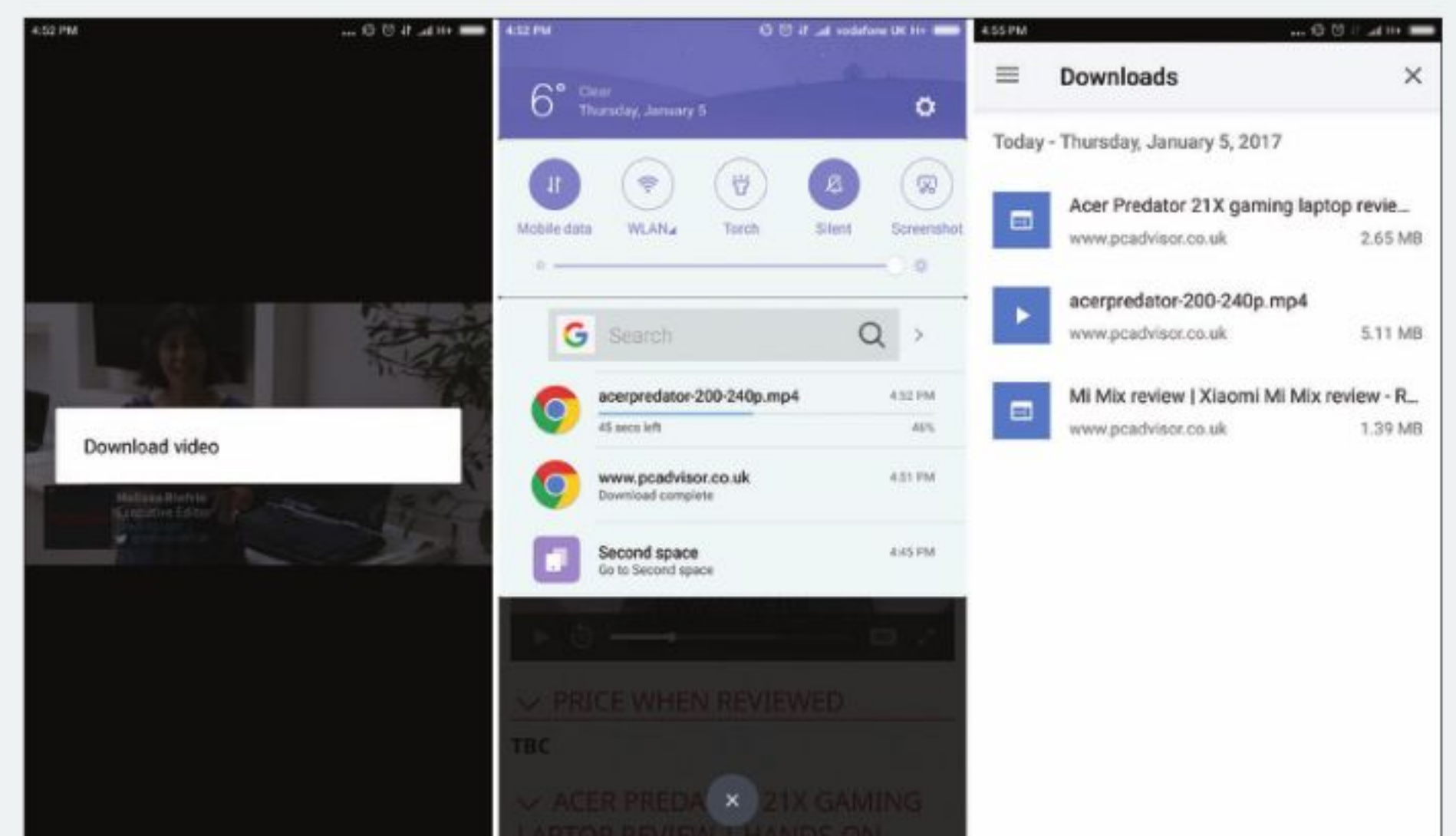
Download web pages

Launch Chrome and browse to the web page you want to be able to read offline. Tap the three dots at the top of the Chrome window and hit the download icon (in between the star for bookmarks and the information icon). If you don't see this icon you will need to update Chrome. The web page will automatically download, but do note that in our experience if it is a multi-page article you will need to repeat this process for each page.

To later view the web page when you are offline, either pull down the notification bar at the top of the screen and hit the notification that the page has downloaded, or re-enter Chrome and again press the three dots icon at the top right of the page. Select Downloads, then choose the web page from the list.

Download video

Launch Chrome and find a video. Hit play on the video, then tap and hold on it. You'll get a pop-up that says Download video. Tap this. The video will download to your device. To access it either pull down the notification bar at the top of the screen and hit the notification that says the video has successfully downloaded, or re-enter Chrome, tap the three dots icon at the top right, choose Downloads and select the video from the list. 





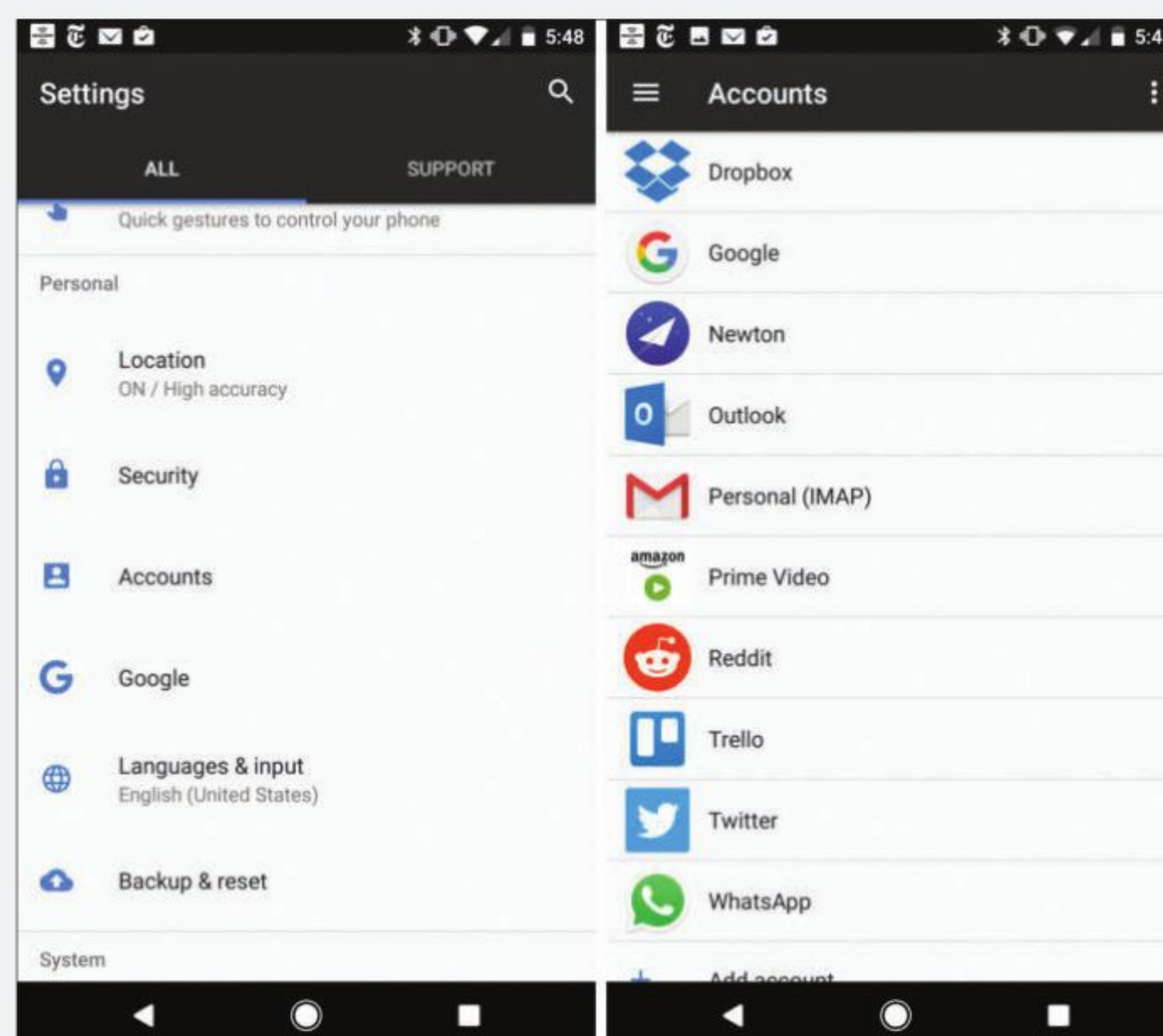
Manage a Google account on an Android phone

The Accounts tab in Settings lets you wipe accounts from your phone. Michael Simon explains how

Everyone who owns an Android phone has a Google account, but there are lots of other apps on our phones that require their own login credentials. The longer you have your phone, the more they can pile up, and before long your app drawer is filled with all sorts of services that may or may not be tied to an active account.

But you don't have to open each app to manage them. Whether you want to add, remove, or tweak one of your accounts, Google has built a handy way to do it right inside the Settings app.

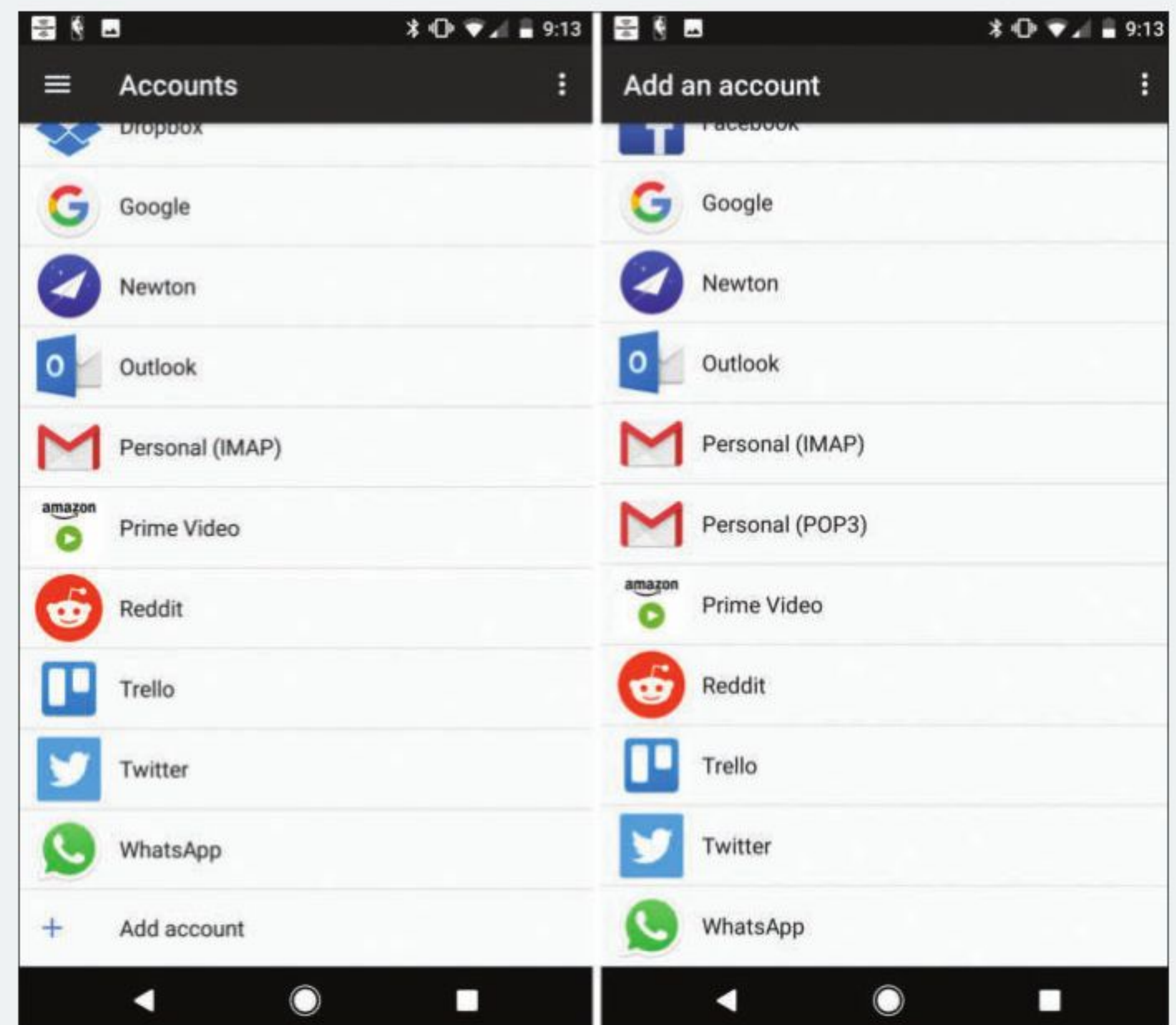
The Accounts tab in Settings holds the keys to all of the online accounts on your phone



Under the Personal tab in Settings, you'll find an option for Accounts. This is separate from the Google tab, where you'll see a slew of preferences related to how your Google account operates on your device. Accounts keeps a running list of the social media, storage, and email accounts you have on your phone and gives you the power to delete them and control their background activities.

Once you open the tab you'll be met with an alphabetical list of any apps on your phone that have active accounts tied to them. All of your Google accounts will be fittingly collected under the Google tab, but any other email addresses you use will be tied to the appropriate client. So if you use Newton Mail and Gmail to manage your iCloud address, they will show separately.

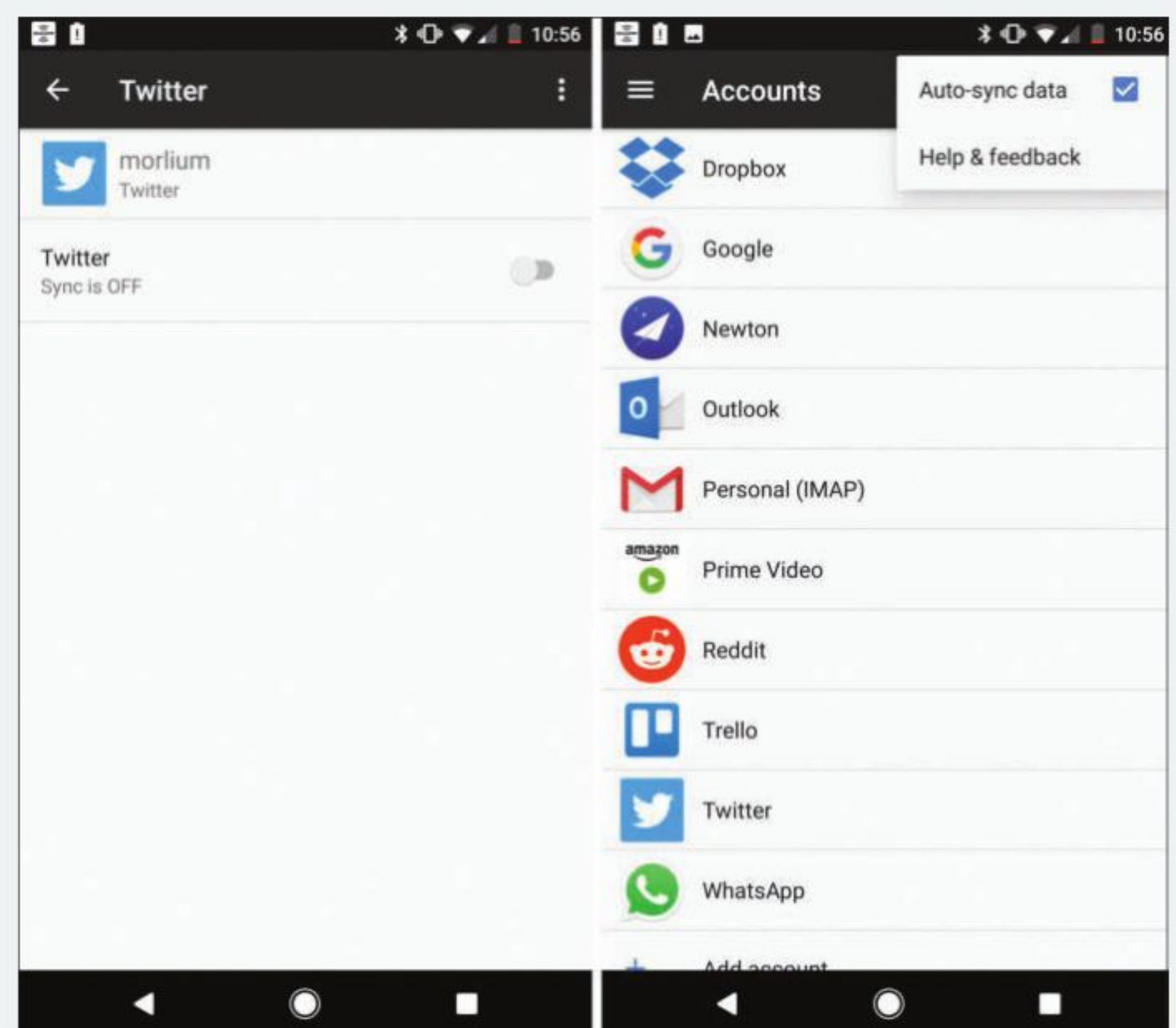
These two screens might look the same, but the Add Account page also includes any apps that haven't been linked with an account yet



At the bottom of the list you'll find an Add account button, which does exactly what you'd expect it to do. Tap it and you'll get a list of all the apps on your phone that require an account, so you can link a new one or add another to Facebook, Twitter, Gmail, and so on.

Select one of the apps and you'll be taken to its respective login page where you can login with a new username. (The Google button, which takes you to Google Play Services account page, requires fingerprint or passcode authentication first.) When you return to the Accounts page it will have been added to active list.

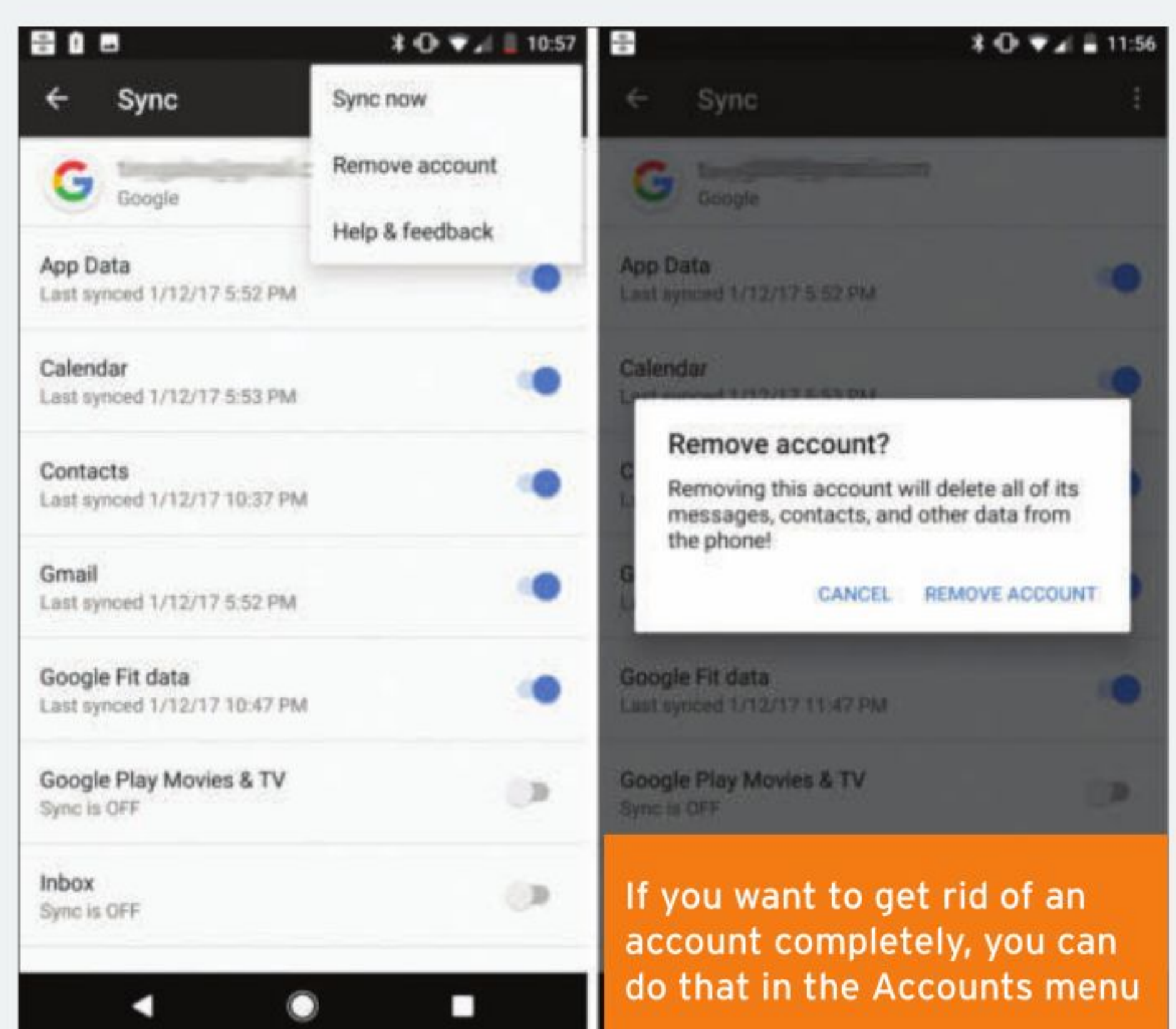
You can adjust the sync settings for individual apps or turn it off completely in the Account tab



Along with adding accounts, you can also manage how much data each is using in the background. Every app has its own sync settings, so you'll be able to get an idea of any that may be harpooning your battery life. Most provide a simple on/off switch, but some offer more granular controls. You can also opt to turn off auto sync completely by tapping the three dots in the top-right corner and unchecking the Auto-sync data box.

While you'll have to visit the individual apps to do things such as change your password, you can still use the menu to remove any dormant or compromised accounts. For example, if you wanted to delete a Google account from your phone, you would tap the app icon, select the account you want to remove (if more than one is linked), and press the menu button in the top right corner. Then, in the drop-down menu, select Remove account, confirm it's what you want to do it, and it'll be instantly wiped away from your phone.

Repeat that process for any account you want to remove from your phone. However, remember that this method only unlinks the account. To delete the app completely, you'll need to find the icon on your phone, tap and hold it, and move it to the Uninstall droplet at the top of the screen. ☒



If you want to get rid of an account completely, you can do that in the Accounts menu



Set up an Android phone for ultimate privacy

Derek Walter shows how to replace data-hungry apps with ones that don't need to know all about you

It's not an exaggeration to say that your smartphone is the most personal device you have. The fact it's always with you, however, sure does generate a lot of information about your habits. Your location history, Google searches, web browsing habits, app usage, and even recordings of your voice talking to the Google Assistant.

Yes, your phone and the Google services powering it are incredibly useful in many tangible ways. And if you use a strong

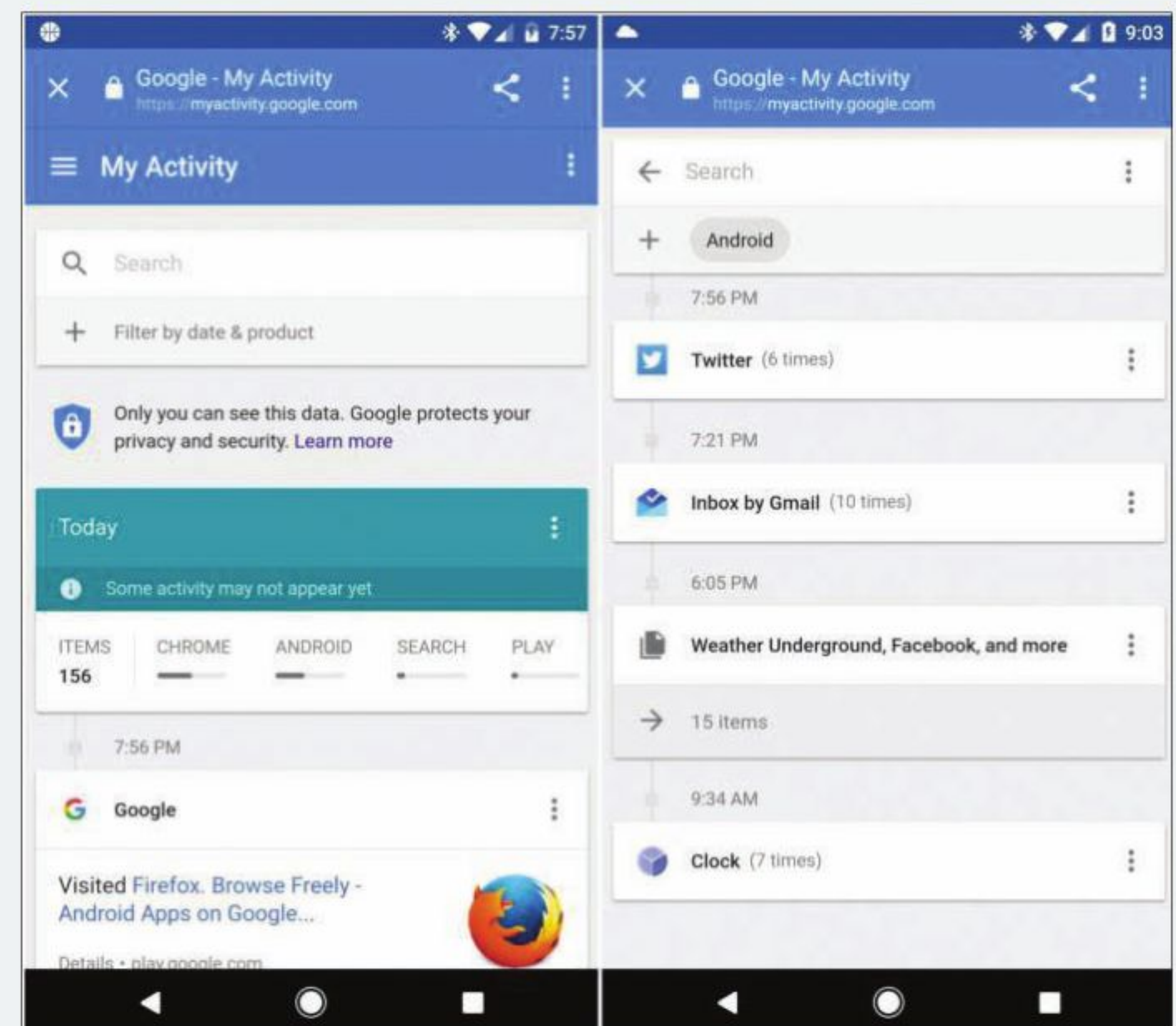
password and two-factor authentication, your information is likely safer on Google's servers than just about anywhere else. But it's not paranoia to take stock from time to time of just how much you're handing over to Google or if you'd rather not place all your digital privacy eggs in the same basket. Here are some simple tips about how you can stay in control of all that critical information and ensure that privacy isn't something you have to surrender.

Get right with Google

Since you're on Android, using a Google account is essential in order to buy apps and use the company's suite of services. Even the privacy-focused Blackphone puts Google services front and centre.

If your goal is to do a little de-Googling because you don't want the company to know every thing about you, the first place to start is the My Activity account center (tinyurl.com/gqb9ug7). In essence, this is the dashboard for every instance where your activity touches Google servers. The site is mobile friendly, so you can attack all these details from your phone as well as on the desktop.

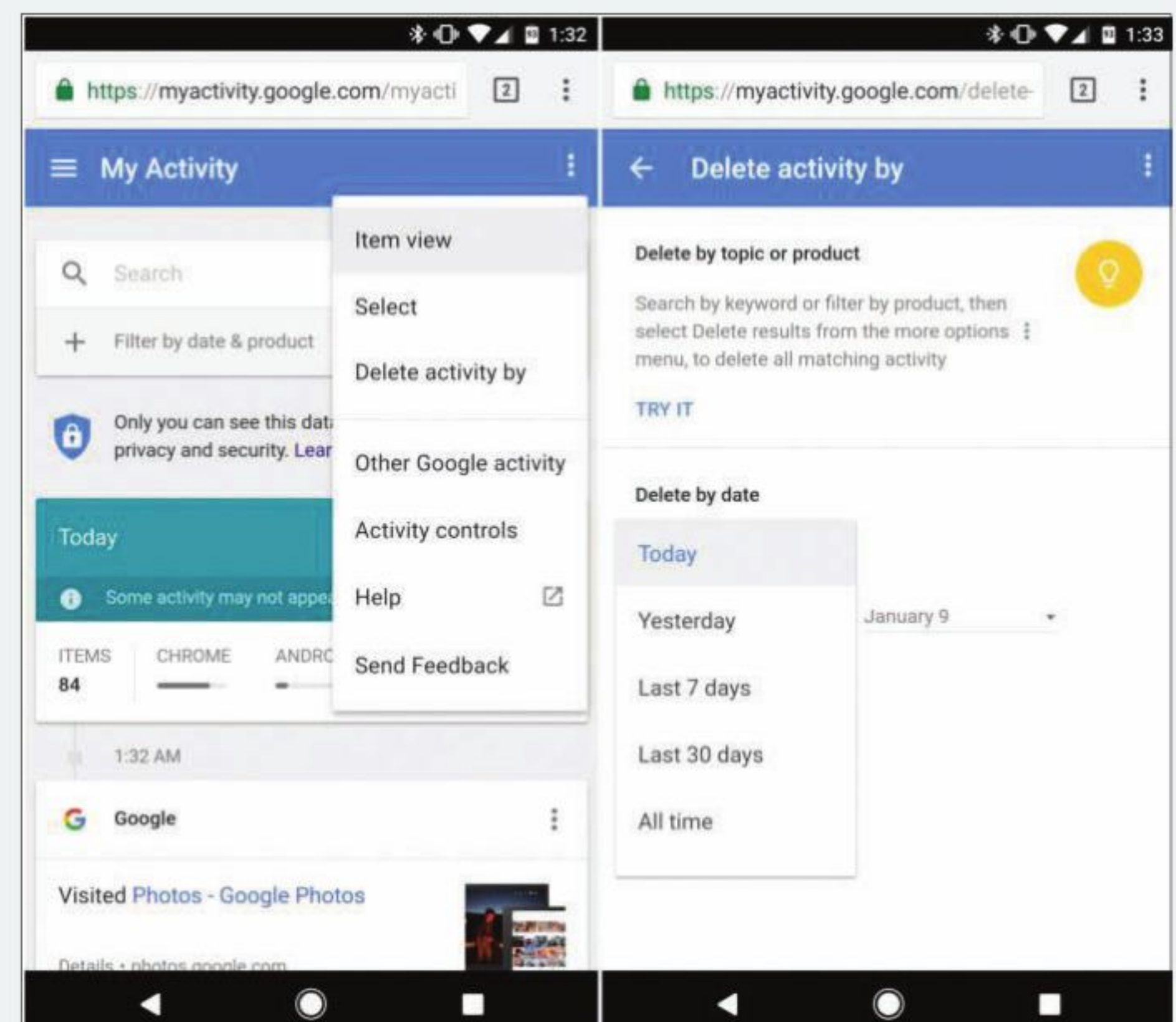
My Activity is the home for everything Google remembers about your daily interactions



The amount of information is a little staggering, especially if this is your first time there. For example, touch 'Android' and you'll see a timeline of the interactions from your phone, such as which apps you've used on your phone, tablet, or Android TV. Same goes for Chrome, Search or Play. There's also a search function, which is surprisingly a little hit and miss at finding your stuff.

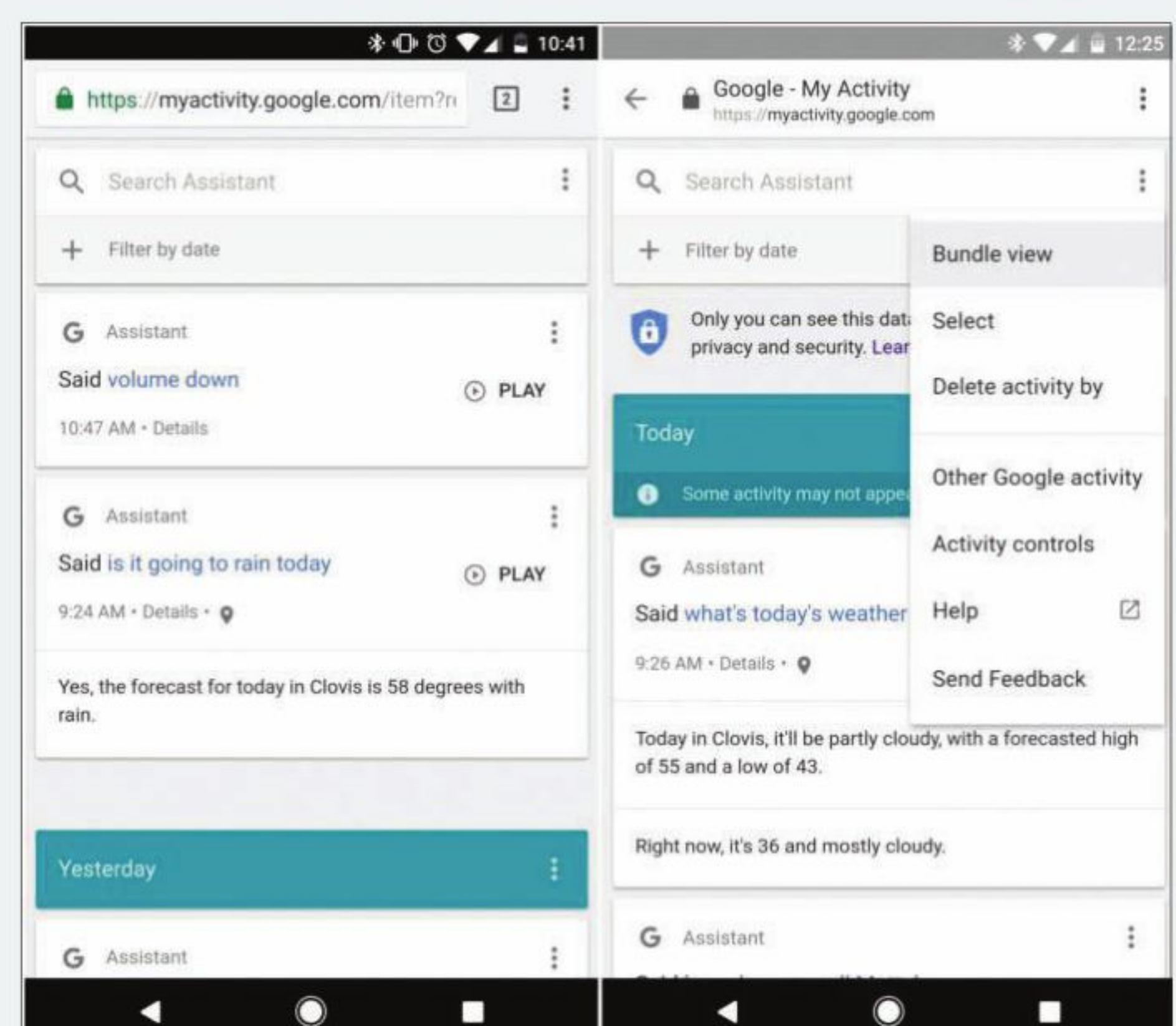
The key to this section is that you can also clean things out. Touch the overflow (three vertical dots) button at the top right and you'll have an option to delete details by a certain timeframe. You can also opt for the nuclear option and delete everything if you want a fresh start.

You can delete activity from a specific time period or send everything to the digital trash bin at once



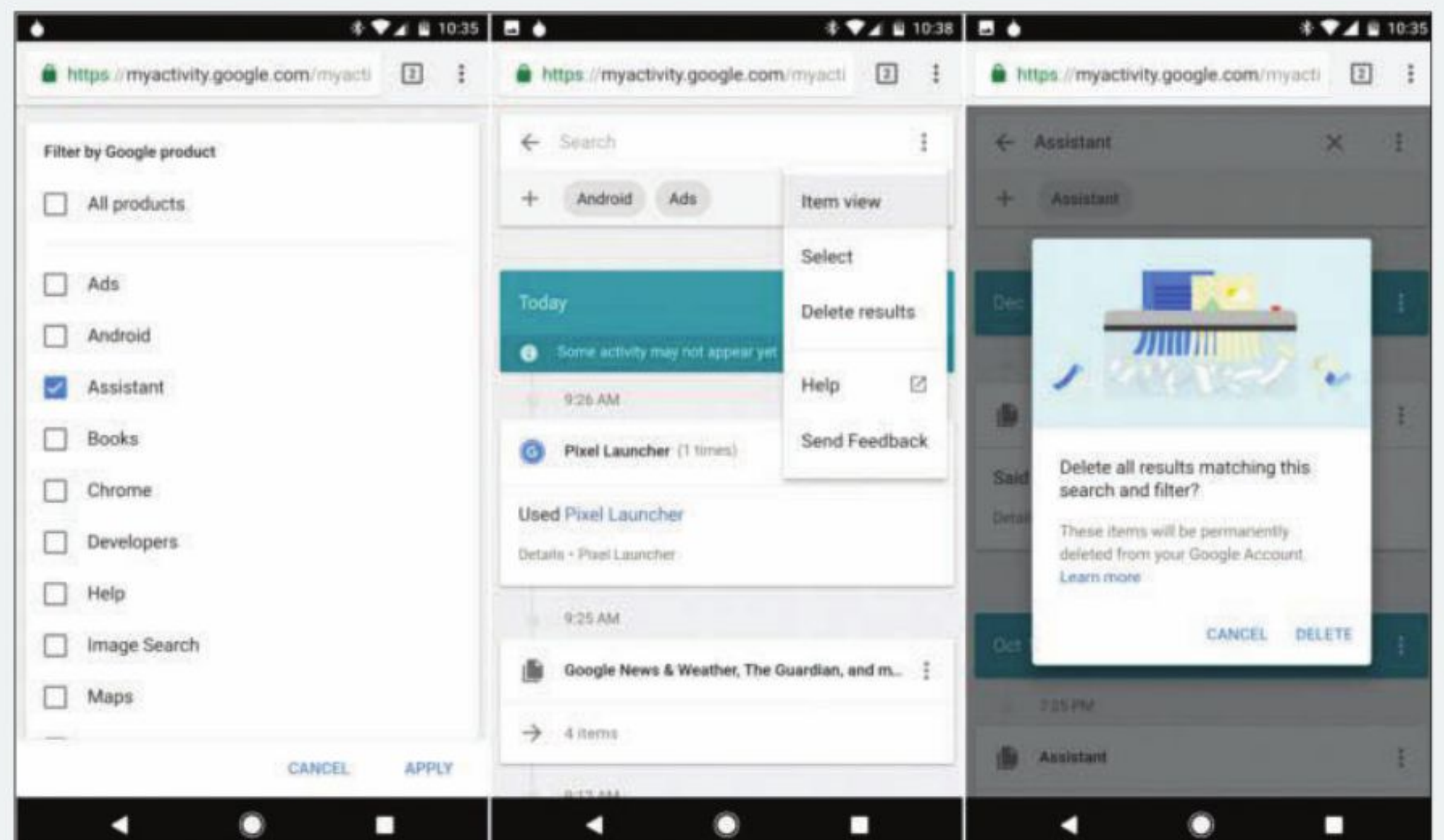
The most interesting addition to this section is found if you use the Google Assistant, which is what powers the artificial intelligence smarts inside the Pixel, Google Home and Allo. Every voice interaction with Google is recorded, and you can play it back.

You can play back and also delete your voice interactions with the Google Assistant



It's a little creepy to know your voice recordings are saved for all time, so you can delete this if you'd like. However, you're better off acknowledging that this is one of the trade-offs we make for having an artificial genie always at your disposal. It remembers.

This is where the 'delete activity by' button can come in handy. It allows you to delete content from a specific application. Touch Filter by date & product and then select Assistant or any other app you want to seek out. This way all your voice searches, Google searches, or other interactions are sent away at once. Returning here often, just to see what's going on, is also a good idea as a way of ensuring your account is secure and nothing suspicious has taken place.



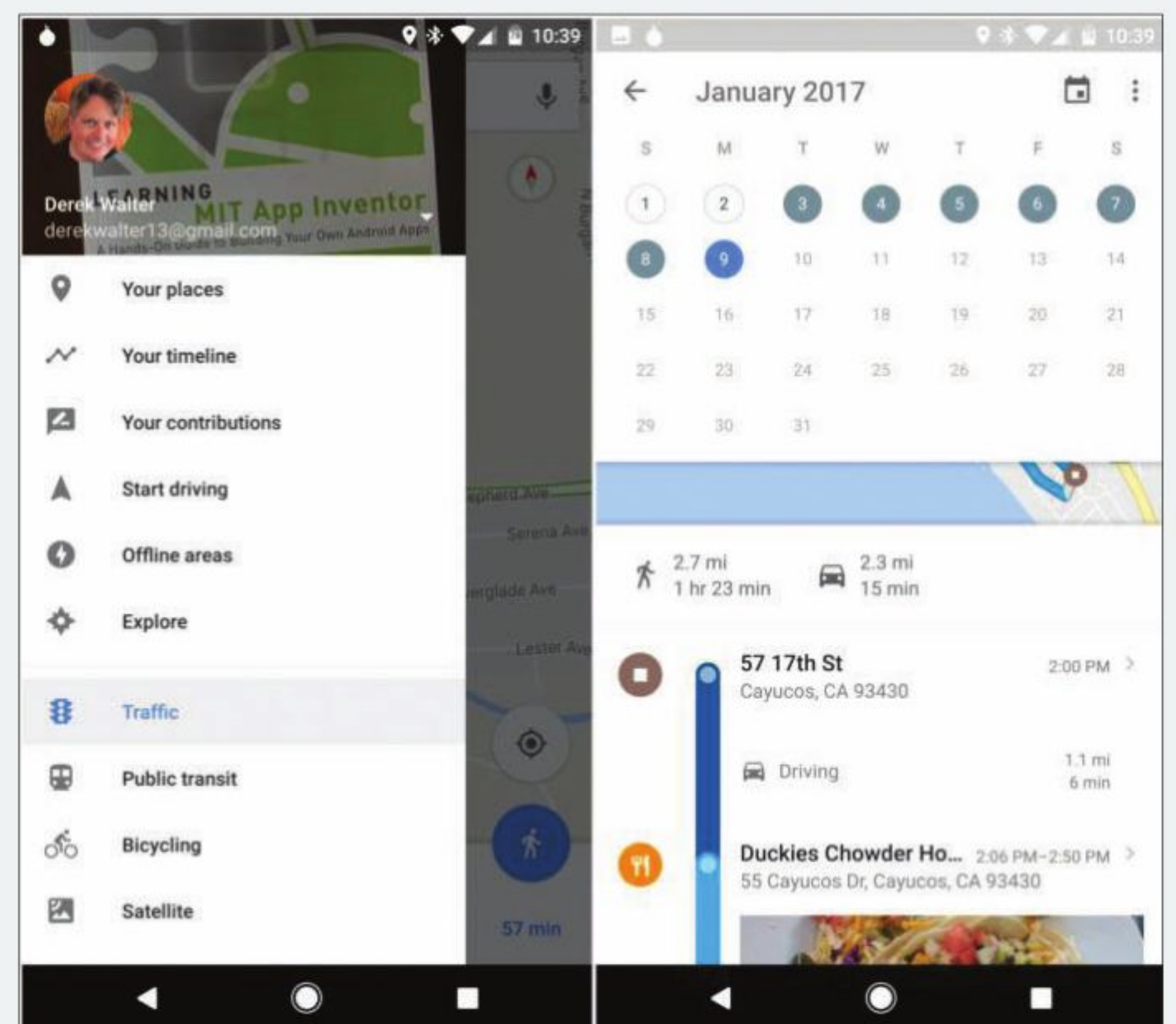
You can wipe away your voice commands all at once

Location, location, location

So much of how your phone interacts with different apps and services is through your location. Think Google Maps, Google search suggestions, Uber, and other services.

One area you should check is your Google location history. This is a detailed timeline of everywhere your Android device has gone. It's actually useful, as it's helped us remember where we went on a certain day. However, it's easy to understand that some may not want this saved for all time. Head to Maps > Your timeline and you'll see what Google has on you. Your location is saved in an attractive timeline by each day, and it even integrates with Google Photos to show which pictures you took by location.

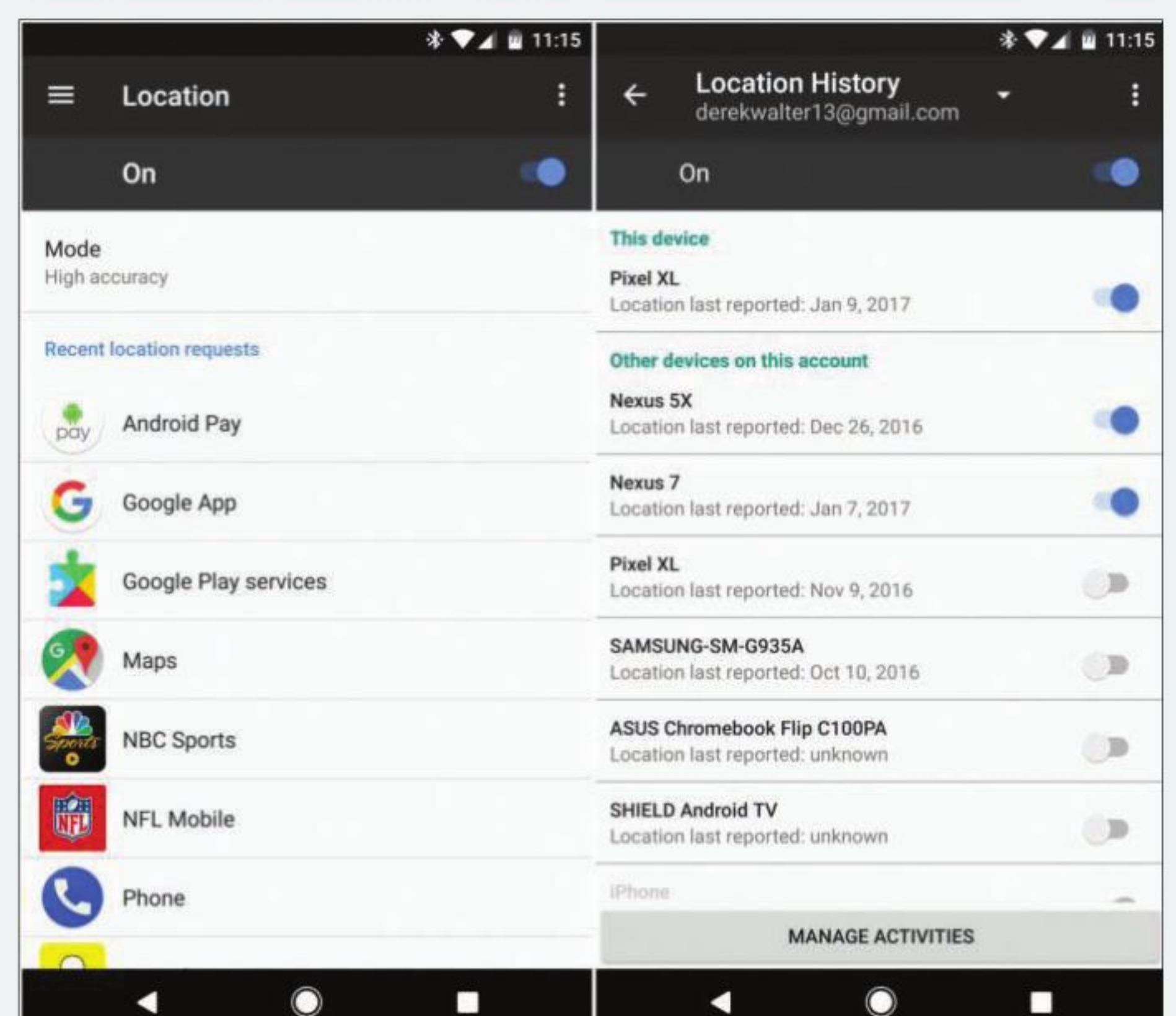
Every move you make is traceable inside of Google Maps



You can tame this behaviour, though. Head to Settings > Personal > Location. From here, you can see which apps have recently accessed your location. There's also a switch to turn this off if there are particular apps you don't want included or are turning into a battery drain. Keep in mind that shutting off all location-based tracking means no more regional tips from Google Now, gift card offers from Android Pay, or other location-based alerts. You're also likely to get far fewer Opinion Rewards surveys since many of these come from your location.

You can also get more specific and turn on or off location services for specific apps or devices if you want more control. Phones, tablets and PCs that have used your Google account tend to hang this feature around a while, and for security your best bet is to ensure you've wiped them properly before resale.

Find out which apps and devices are using Google's location services

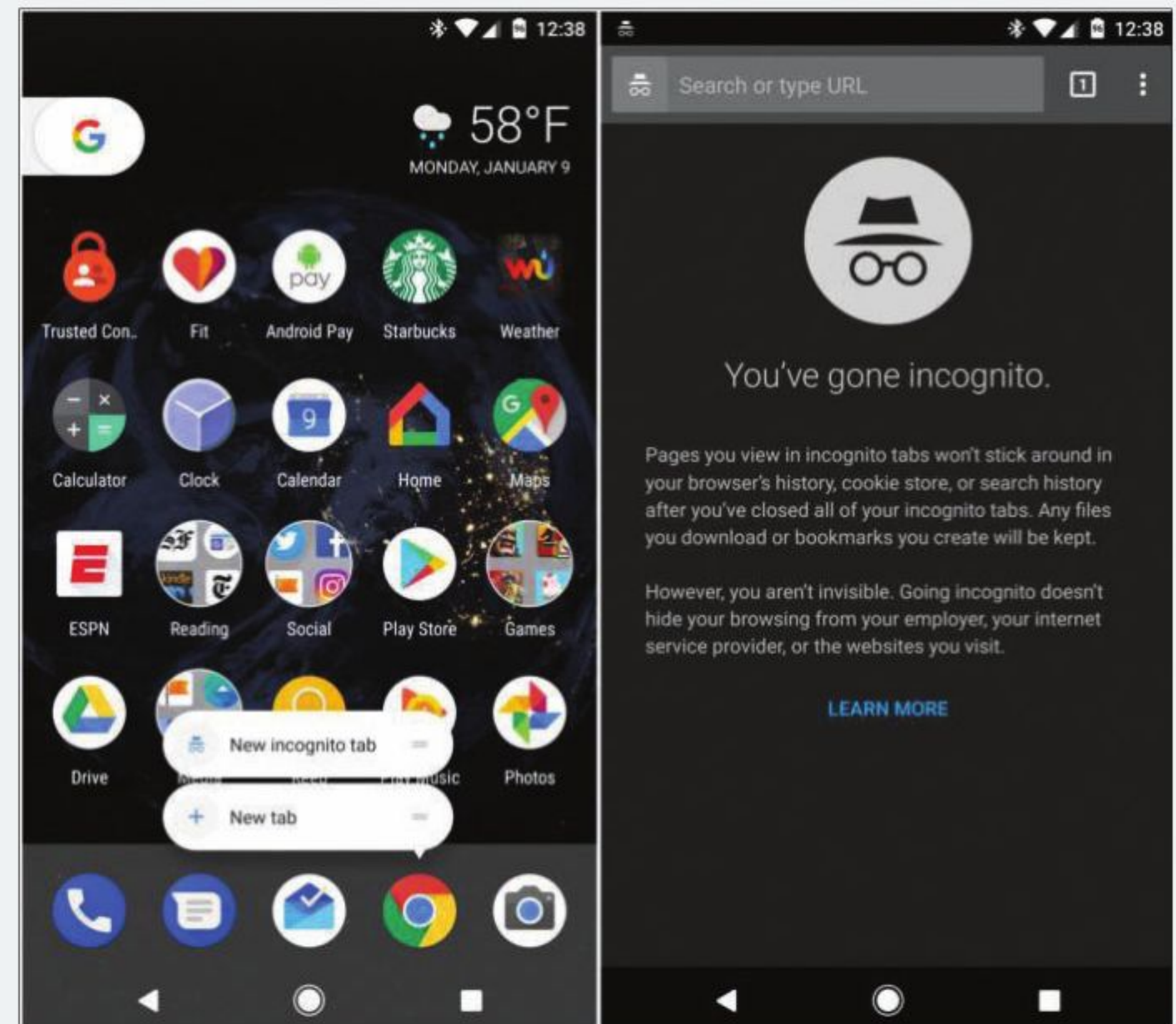


Go outside the circle

Along with tightening the reins on your Google account, you can also opt to go dark with some other apps and services you use.

Just like on the desktop, you can browse the web with Chrome in Incognito mode. It's even easier if you have a Pixel as it's one of the app shortcuts (press and hold the Chrome icon). This doesn't save any of your Google searches or web history to your account, however it doesn't mean that you're completely invisible. Your internet service provider and other information is still visible to the server you visit.

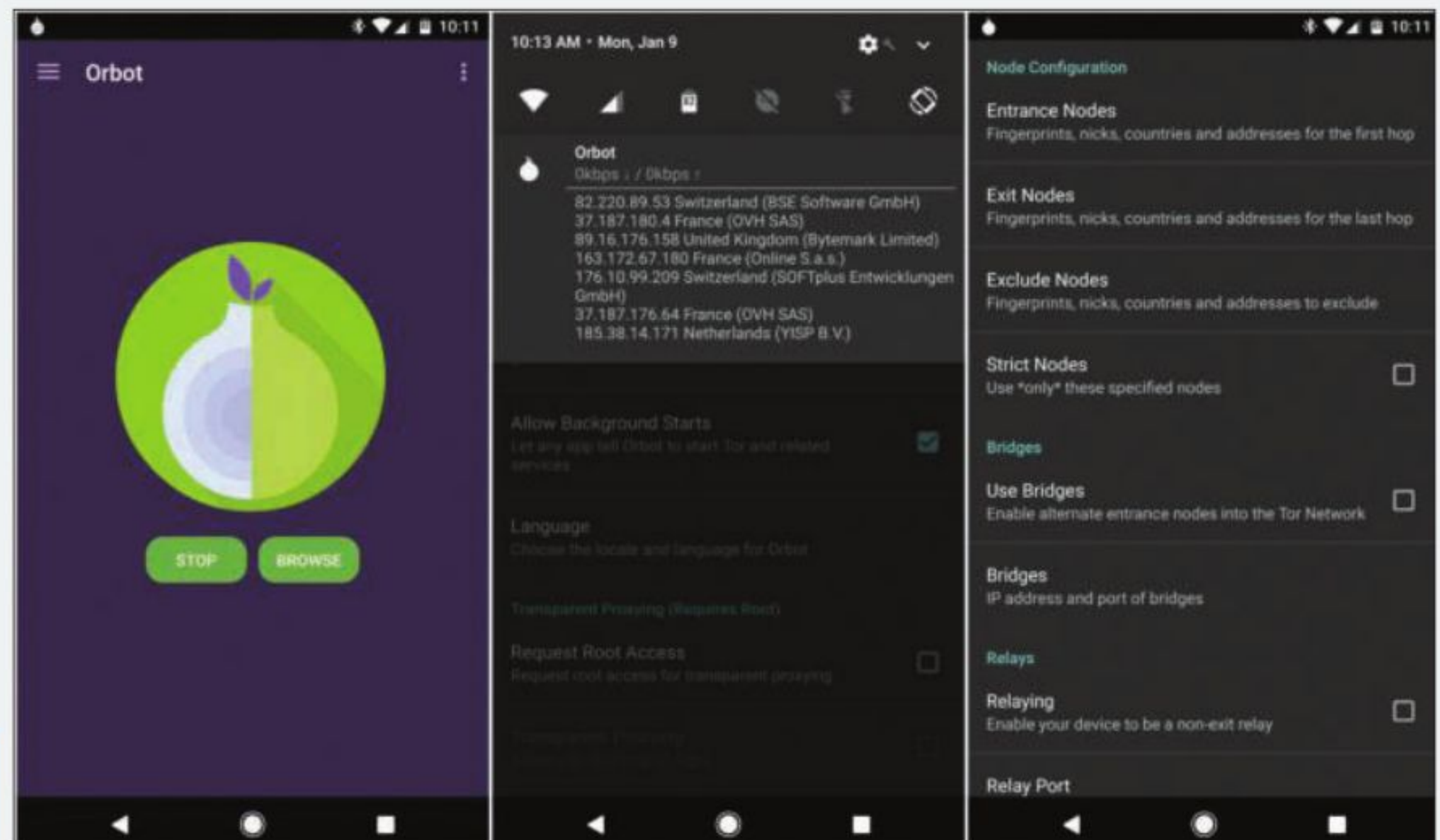
Go Incognito mode if you want to browse without much of a trace



For even stronger private browsing, there's a toolset for using Tor on Android. Orbot uses Tor to create a proxy and scramble your Internet traffic. You then use the Orbox browser to surf the web securely. It's so secure, it won't even let you take a screenshot of the browsing section.

More technical users can also dive into node configuration, bridges and relays.

Tor browsing isn't just for the desktop

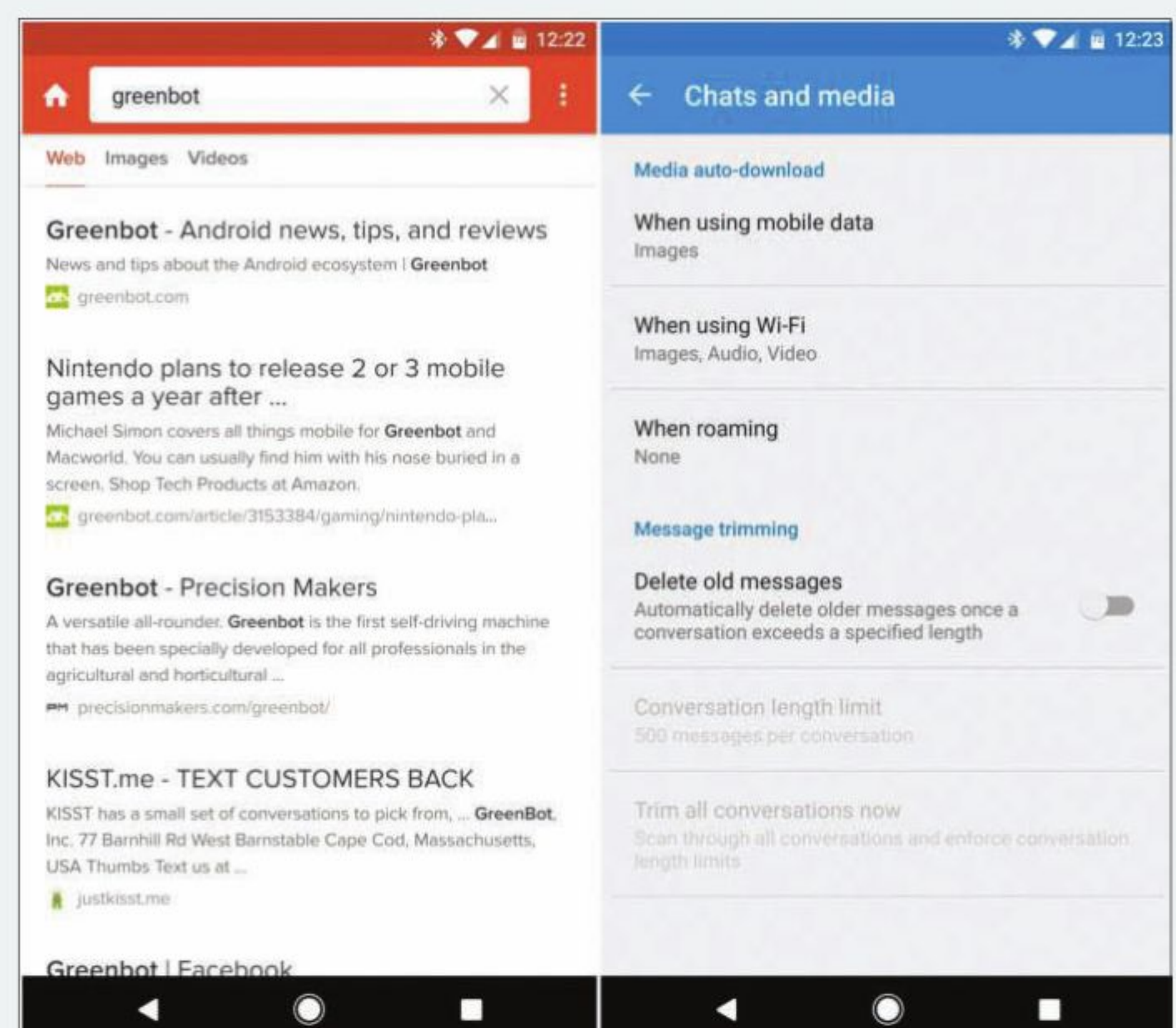


If you want a more conventional solution, you can always opt out of the Chrome ecosystem by going with Firefox and a different search engine. The best mostly private option is DuckDuckGo. Not only is it a solid search engine but none of your search history or other details are saved by the company.

On the email front, you can get by with some more private alternatives to Gmail. One of the best is ProtonMail. It's a popular, encrypted email service with the servers based in Switzerland. You're not going to get all the cool tricks like travel itineraries in your Google Now feed, but you can rest assured that your email account is securely hosted.

The other area that gets a lot of attention is messaging. There are many good, private messaging options for you. Personally, we're a fan of Signal, as we find it to have the best feature set and a robust development pace. It uses end-to-end encryption, which means that only the sender and recipient are able to see the message.

Privacy and security are just as much a mindset as they are about using specific apps, however. The real key is to think about apps that you interact with and what privacy trade-offs you may be making for their services. In many cases it's worth it. Yet as technology creeps ever more into our lives, it's best from time to time to decide just how much is enough. ☒



DuckDuckGo, Signal, and many other apps are good choices if you want to elevate your privacy



Master Android's hidden System UI Tuner

Michael Simon reveals how to find Android's hidden menu for greater control over Google's OS

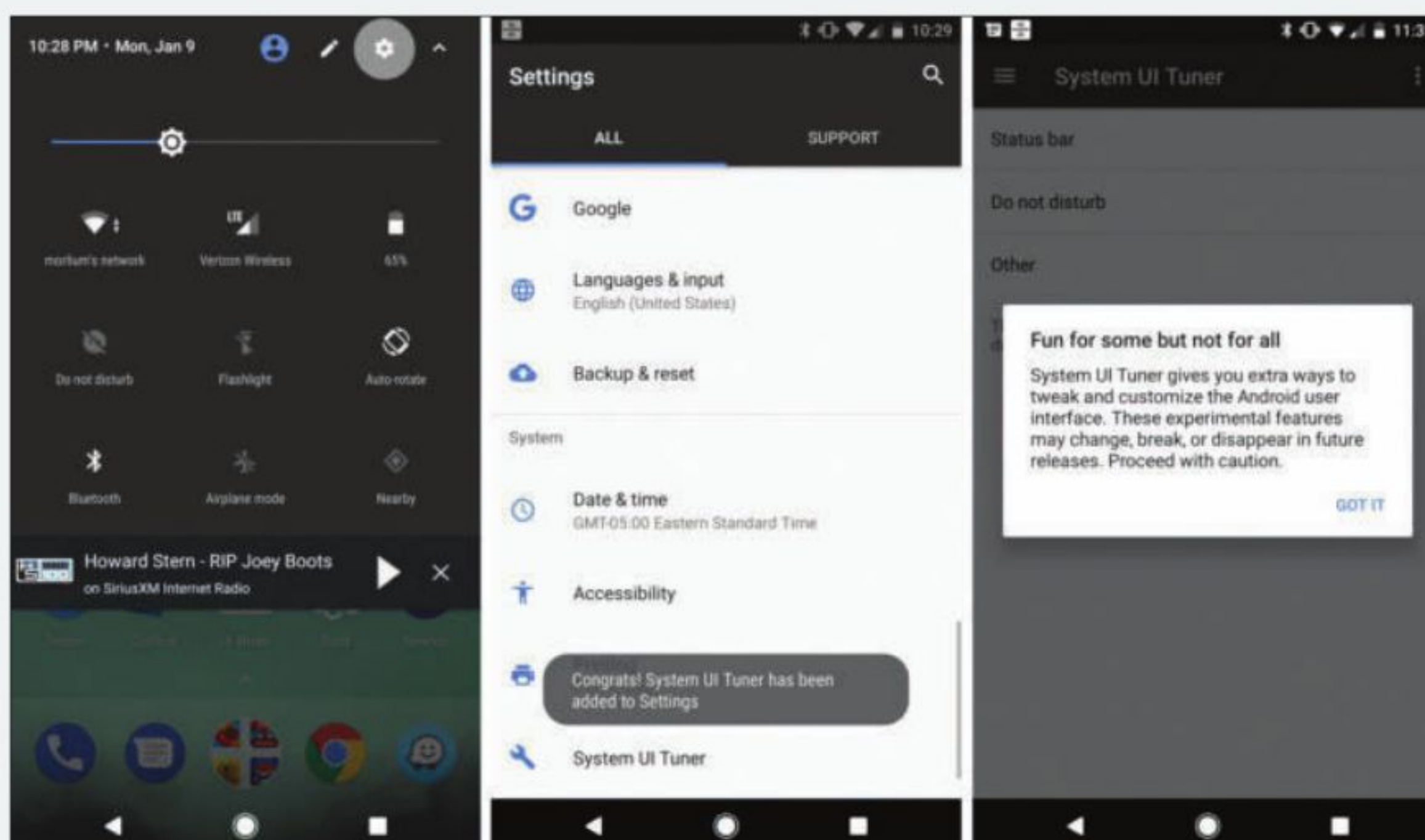
One of the things that makes Android, well, Android is the incredible control we have over the interface. And it's not just wallpapers and ringtones. With a little tinkering we can completely change the look of our phones, whether it's through rooting,

flashing a custom ROM, or installing a third-party launcher. But if you're a little skittish at the thought of voiding your warranty, you can still tweak Android with a few tricks via the System UI Tuner, a feature Google has built right into Settings.

Hide and seek

When the Marshmallow preview launched in 2015, it brought a menu of customisation options in Settings called System UI Tuner. It gave us a first look at the features that Google was still working on; the menu could be found under the System heading. However, once the third preview came along, the search giant stopped making it something you could accidentally stumble upon and changed it to a hidden menu that needs to be activated through a very deliberate process. And it's still there, hidden away from casual users.

First, you need to pull down the notification shade. Then, tap and hold the gear icon in the top right of the screen for a few seconds (on newer phones you'll feel a vibration upon activation). Once you let go, the tiny cog will roll away and you'll be taken to the Settings app and a box will appear saying, "Congrats! System UI has been added to Settings." To get to the menu, scroll all the way to the bottom of the settings screen. In



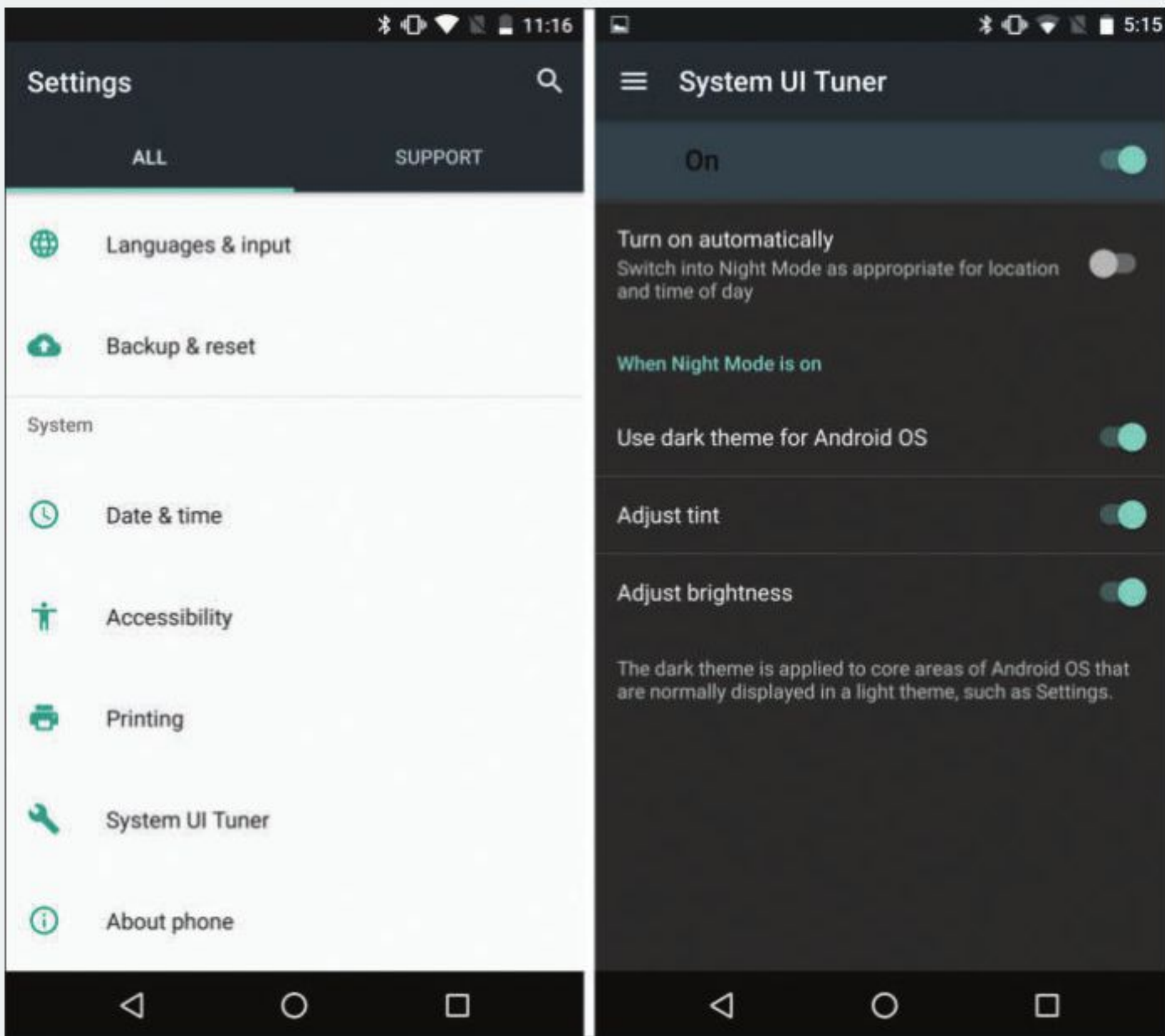
the second-to-last spot, you'll see a new System UI Tuner option, right above the About phone tab. Tap it and you'll open up a set of options for tweaking the interface.

Different strokes

While System UI Tuner is guaranteed to work on Nexus and Pixel phones, your mileage may vary with other manufacturers. Most notably there is no way to activate the menu on the Galaxy S7.

Also, as is the case with any beta or developer feature, there's no guarantee that the toggles will work properly, as evidenced by the warning at the bottom of the window: "These experimental features may change, break, or disappear in future releases. Proceed with caution." However, it's one of the first things we do at *PC Advisor* whenever we get a new phone, and we've never experienced any real problems with it.

Over its near-two-year existence, the System UI Tuner has contained a variety of options, some of which have been moved into the main settings and others that have disappeared. For example, during the Nougat beta testing, both a night mode and a dark theme could be enabled via the System UI Tuner, but only the night mode made it into the shipping version (as Night Light), while we're still waiting for a dark theme to re-emerge.

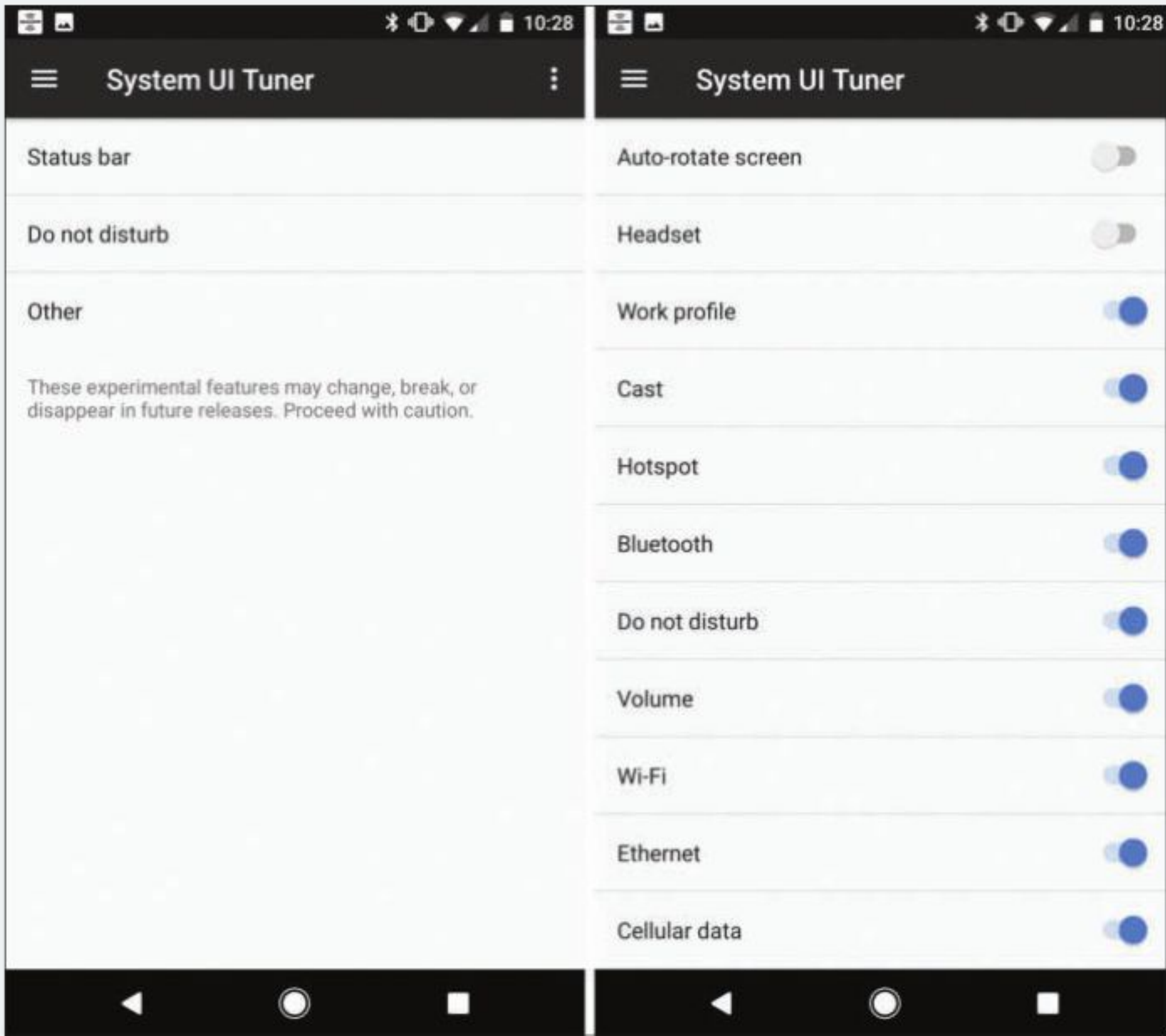


Tune-up

Depending on the version you're running, you'll see different options inside System UI Tuner. For phones that are still on Marshmallow, there will be three: Status bar, Show embedded battery percentage and Demo mode. And in its most recent incarnation in Nougat, there are also three options, for Status bar, Do not disturb, and Other.

As you might have guessed, the Status bar tab does the same thing across both versions. Tap on it and you'll see a page of toggles representing each of the icons that appear in the status bar. If you're tired of staring at the same icons every day, you can turn some (or all) of them off to stop them from appearing.

Marshmallow's Embedded battery percentage option, which can be found at the bottom of the Status bar tab in Nougat, lets you show how much power you have left via a tiny number inside the icon. Marshmallow's Demo mode might not be as useful though, unless you're a developer or a tech journalist who takes a lot of screenshots. All it does is strip the status bar of any notification icons and makes sure the battery icon shows fully charged. In Nougat, it's been moved to the Developer options tab.



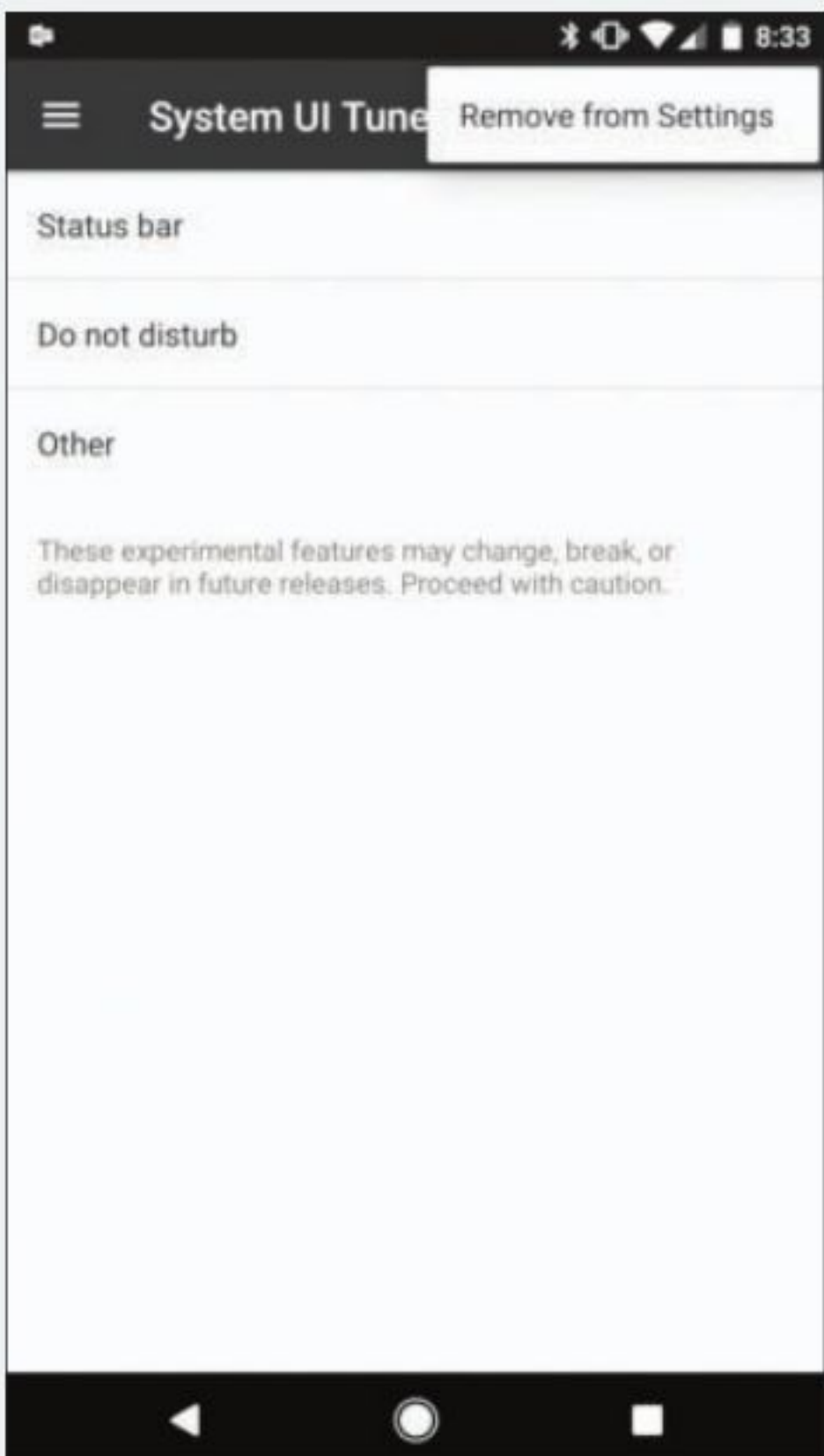
Power trip

Nougat's Do not disturb settings are straightforward. Inside the tab you'll find two options: Show with volume controls and Volume buttons shortcut. Turn the first one on and you'll see a Do not disturb switch whenever you raise or lower the volume. Toggle the second and you'll be able to quickly turn on DND by lowering the volume all the way and pressing the volume down button one more time.

The final option, Other, hides the setting for the most interesting UI tweak, power notification controls. Turn it on and it will add a slider to the individual app settings inside the Notifications settings. Divided into six levels,

they are intended to give you granular control over the notifications you receive, from blocking all alerts to preventing full-screen interruptions and peeking. At one time, the Other tab also included toggle for enabling a split-screen swipe up gesture, but that has since been removed. That's kind of the point with the System UI Tuner. With any given update, options can be added or taken away with nary a warning. It's one of those fun elements that Google provides to users in the know, and once you activate it, you'll likely never want to turn it off.

But if you ever want to, it's much easier to find. Just tap the three dots in the right corner and select Remove from Settings. ☒





Stream PC games to your TV with Steam Link

Dominic Preston reveals how to set up your Steam Link as well as which controllers are compatible

Valve's Steam Link (£39) is billed as a budget-friendly, hassle-free way to bring the best of PC gaming to the living room by streaming your Steam games from your main computer straight to your TV.

It is designed to be easy to set up, though the included Quick Start Guide is pretty uninformative - it's just a diagram of two different hardware setups, with no real instructions. There are a few different configurations to think about, and a couple of problems you might run into along the way, so read on to find out how to set up the Steam Link and how to enable in-home Steam streaming.

Set up your PC

The Steam Link works by mirroring the display from your PC to Steam's device, so the first step is to make sure your computer is correctly set up. For starters, the Steam application must be installed and running on your PC, plus you'll need to be logged in to your Steam account. If Steam isn't running, then the Link won't be able to find your computer and connect to it. If you think you'll be using it a lot, set Steam to launch when your PC does. Bear in mind that this will slow down your computer's startup time slightly.

Next, make sure your host PC is connected to your home network. Steam recommends you use a wired connection to reduce latency, though it also works over Wi-Fi. During testing, we noticed occasional lag over Wi-Fi but nothing we couldn't tolerate. A lot will depend on your home network bandwidth.

Finally, make sure your host PC has In-Home Streaming enabled within Steam. This should be activated by default, but

it's worth making sure. Open Steam, then click Steam in the top-left, then Settings. Under the In-Home Streaming tab check that Enable streaming is checked and then you are good to go.

Plug in the Steam Link

The Steam Link comes bundled with the cables you need: a power adaptor, HDMI 2.0 and ethernet. First, connect the device to your TV, using the included HDMI cable. If you decide to follow Steam's advice and use a wired connection, plug the included ethernet cable into the back of the Steam Link, with the other end going into your router. Next, plug the device into the mains.

Finally, you'll need some way of controlling the Steam Link. It works with either a console-style game controller or a mouse-and-keyboard combo, which can be connected using the USB ports along the back and side, either with a cable or a USB wireless receiver. Any mouse and keyboard should work, as long as the relevant drivers are installed on the host PC. As for controllers, the Link works with the official Steam Controller, Xbox One, Xbox 360 and XInput controllers. Other accessories such as driving wheels and flight sticks may work, but you'll need to double-check first.

Sony's PlayStation 4 DualShock 4 is also compatible, and can be used wirelessly by Bluetooth. You'll need to use another input device to go to the Bluetooth settings on the Steam Link, then pair the controller by holding down the 'PS' and 'Share' buttons. You'll see it in the available devices list. Connect to it. Because of this, you'll need to use a different controller or mouse and keyboard to

set up the Steam Link, and pair the PS4 controller once it's up and running. It's worth noting that when we paired our DualShock 4 with the Link it unpaired it from our PlayStation 4, so the next time we turned on Sony's console we had to reconnect the controller.

Connect the Steam Link to a PC

The next step is to switch your TV to the appropriate HDMI input. You'll see the first Steam Link setup screen. Follow the on-screen instructions to set your language, connect to your network, and if necessary update the device firmware. You'll also need to select your preferred streaming settings. The basic options are Fast, Balanced and Beautiful. We recommend Balanced. You can also delve into the advanced options to alter the bandwidth allocation and resolution if you want to make more fine-tuned adjustments.

Next, you'll see a screen that asks you to locate computers running Steam on your home network, so you can connect the Steam Link to your PC. If you're like us, this might be when you first run into problems because despite being connected to the same network and having streaming enabled, our PC didn't show up on the list. The only fix we found was a simple one: wait. After a few minutes the Steam Link seemed to find the correct computer, and allowed us to connect without any further problems.

Once you're connected, that's pretty much it. You'll see your Steam library on your television in Big Picture Mode, and you can now play your games or browse the store to buy more.

Connect a Steam Controller to Steam Link

First, make sure both the Steam Link and Controller are turned off. Remove any other controllers, mice or keyboards from the Link. Next, turn on the device. It will instruct you to connect an input device, so grab your Steam Controller. Hold down 'X', press the Steam button, and it should quickly pair with the Link.

Play non-Steam games with the Steam Link

The easiest way to do this is to add the games to your Steam library - in essence, creating a shortcut to the application from within Steam. To do so, select 'Add a game' within Steam, and select the relevant application from the list, or browse through your PC to find

it. Some games will, by default, open a launcher such as Blizzard's Battle.net or Ubisoft's uPlay. To skip this step, right-click on the game in your Steam library, go to Properties, and change the target to the 'game.exe' instead of the 'launcher.exe'.

Mirror your desktop with the Steam Link

One of the Steam Link's best features is something that Valve doesn't advertise. While it's primary purpose is to stream games to your PC or TV, it does that by sending your computer's video output to the Link - all of the video output, not just games. This means you can use Steam's device to mirror whatever is on your computer, allowing you to browse the web, watch videos, play music, and more, right on your TV.

To access the rest of your computer's functionality through the Steam Link, select the 'power' symbol at the top-right of the Steam menu, and select Minimize Big Picture Mode. You'll then see your PC's desktop, which you can then operate.

There are, however, a couple of caveats. First, you'll need to have a mouse and keyboard connected to the Link because trying to use your PC with a controller is more frustrating than fun. Secondly, Steam must be running on the host PC in order to start and maintain the connection.

Using a PC and the Steam Link simultaneously

Unfortunately, this is impossible. Because the device directly outputs the video from your graphics card, it will send whatever is being displayed on your main PC to the Link, so whatever is happening on one device will be mirrored on the other. This means that as long as you are using your computer to stream games to the Steam Link, you can't use it for anything else.

Using Steam Link with a Mac

While the Steam Link launched with numerous compatibility problems with OS X, these have now mostly been fixed. You will, however, be limited to the more narrow selection of Mac games, and may run into more issues with controller compatibility, but for the most part it should run just as smoothly as it does with a Windows PC. ☒





Organise your cables and chargers

Simon Jary reveals inexpensive ways to tame the cable clutter behind your desk

In this supposed wireless age our desks, TVs, living rooms and whole houses remain a viper's nest of trailing, tangled, tense cables. Nowhere are these wires more massed than where you heap your device chargers for phone, tablet, camera, power banks, and even other chargers. There's probably a knotty pair of old earbuds in there, too.

In this author's house this is a drawer in the kitchen once reserved for handy items such as corkscrews and foil cutters, non-standard cutlery and cocktail sticks. What days they were. Fighting through the knotty cables to the corkscrew requires a rolled-up sleeve and several minutes of fighting through Lightning, Micro-USB, Mini USB, 30-pin, and proprietary charging cables. Sometimes we even come across a FireWire 400 cable, which is then hastily pushed to the back of the drawer again.

Less cables, less clutter

First, reduce the numbers. Throw out any chargers or cables no longer attributed to anything useful in the house, then ask yourself if you really need seven Micro-USB cables? Two Lightning should be enough for most iPhone houses and one 30-pin for the old iPad. Now invest in some charger cables that feature more than one charging end. This could halve the number of cables to tame.

Tylt has a neat charger cable called the Tylt Flyp-Duo Reversible (pictured top right), a two-in-one cable solution for charging and syncing data to smartphones and tablets. Priced £16, it's

Manufacturers hardly help. Fitbit, for example, has a different charging cable for each and every one of its activity trackers. And all of them are non-standard and proprietary.

Apple is consolidating on Lightning, but owners of older iPhones or iPads still have to fish out a 30-pin charger every now and again. And don't mention the dongle hell of owners of the new MacBook Pro, which has USB-C slots that connect to nothing but dongle adaptors so you can keep functioning.

Mercifully, many non-Apple products rely on the universal Micro-USB cable, which means you can charge most devices with just a couple of these tucked away neatly. That said, we hate Micro-USB for its non-reversible form that means you have to squint to see which way round it has to go.

So how do you tame this pit of charger cables?

equipped with Micro-USB and Apple Lightning connectors. You'll find Micro-USB on almost every device not made by Apple, such as battery cases and power banks, so this is a great choice if you have at least one Apple device. Plus, the main USB end is reversible, so you don't have to worry about which way it goes in, which saves a lot of fiddling. The tangle-free Flyp-Duo is available in four colours (black, blue, green and red) and lengths from 30cm to 1m.

We also recommend the Just Mobile Aluminium Cable Lightning Cable (£27), with both Micro-USB and Lightning connectors in a coiled cable. It's small and useful, plus approved by Apple.

For most purposes a short cable is fine and will reduce clutter. Even 1ft is too unwieldy for us. As long as it reaches from the wall socket to the surface we're happy. You can find 4- and 6in Micro-USB and Lightning cables on Amazon.

Another way to kill cables is to move to a set of headphones and a Bluetooth speaker, and free up desk space with a wireless keyboard and wireless mouse, although these require charging (usually via Micro-USB), so you'll need those cables listed above.

**Tylt Flyp-Duo Reversible**

Lose the plugs, too

Unless you're charging straight from a computer you'll need a plug adaptor for all those cables. You can purchase one with more than one USB port. The £7 Foxnovo Portable 5V/2A Dual USB Output UK-plug, for example, has two.

We've also changed one of our power socket wall plates to include the two standard plug sockets and two USB slots. We'd be wary of buying these off eBay or even Amazon, but reputable builders merchants such as Screwfix sell them for around £20.

We're also fans of compact wall chargers such as the £25 Zendure A-Series 4-Port USB Charger (pictured), which has four USB ports and has different plug faces for travellers, too.

**Zendure A-Series 4-Port Charger**

Pack cables away

Now you've cut back on the number and length of your charger cables, you need to tame them. We tested a bunch of cheap cable tidy organisers, and here are our favourites.

The simple, zipped Damai Universal Cable Organiser (£9.49 and pictured right) is a waterproof nylon case that will fit in any drawer or cupboard, or in your backpack or suitcase when travelling. It features 10 elastic loops to hold various cables, earbuds, and five mesh pockets for USB stick flash drives and so forth. As a bonus, it comes with three reusable Velcro fastening cable ties, and zips up into a neat and tidy case you can slip out of sight.

The ButterFox Universal Cable Organizer is a smaller version that wraps up small, and so makes an even better travel companion. It uses a drawstring, rather than zip, to secure the wrap-up bag. At the time of writing, it's available for £8.

The firm also sells the equally lightweight but larger Universal Electronics Accessories Travel Organizer (£8), a zipped carry case with handle that's more suitable for bulkier items such as laptop chargers and power bricks. It would make a good organiser for travel plug adaptors, mice, power banks and other items as well as the usual charger cables. You can see through the mesh side, and there are two internal net pockets for accessories such as memory cards, USB drives, and so on. ☒

Damai Universal Cable Organiser



Install an SSD and speed up a PlayStation 4

Installing an SSD in your PS4 will give it a new lease of life. Lewis Painter explains how

START While the PS4 Pro provides users with high-end 4K gameplay, there's no need to throw away your existing PS4. In fact, users can upgrade its standard hard drive with an SSD, making it perform much faster. This means boot times should be quicker (32.8 seconds down to 19.9 seconds in our experience), games should install faster and in-game loading should be speedier too, breathing new life into the aging console. Before you begin you'll need the following:

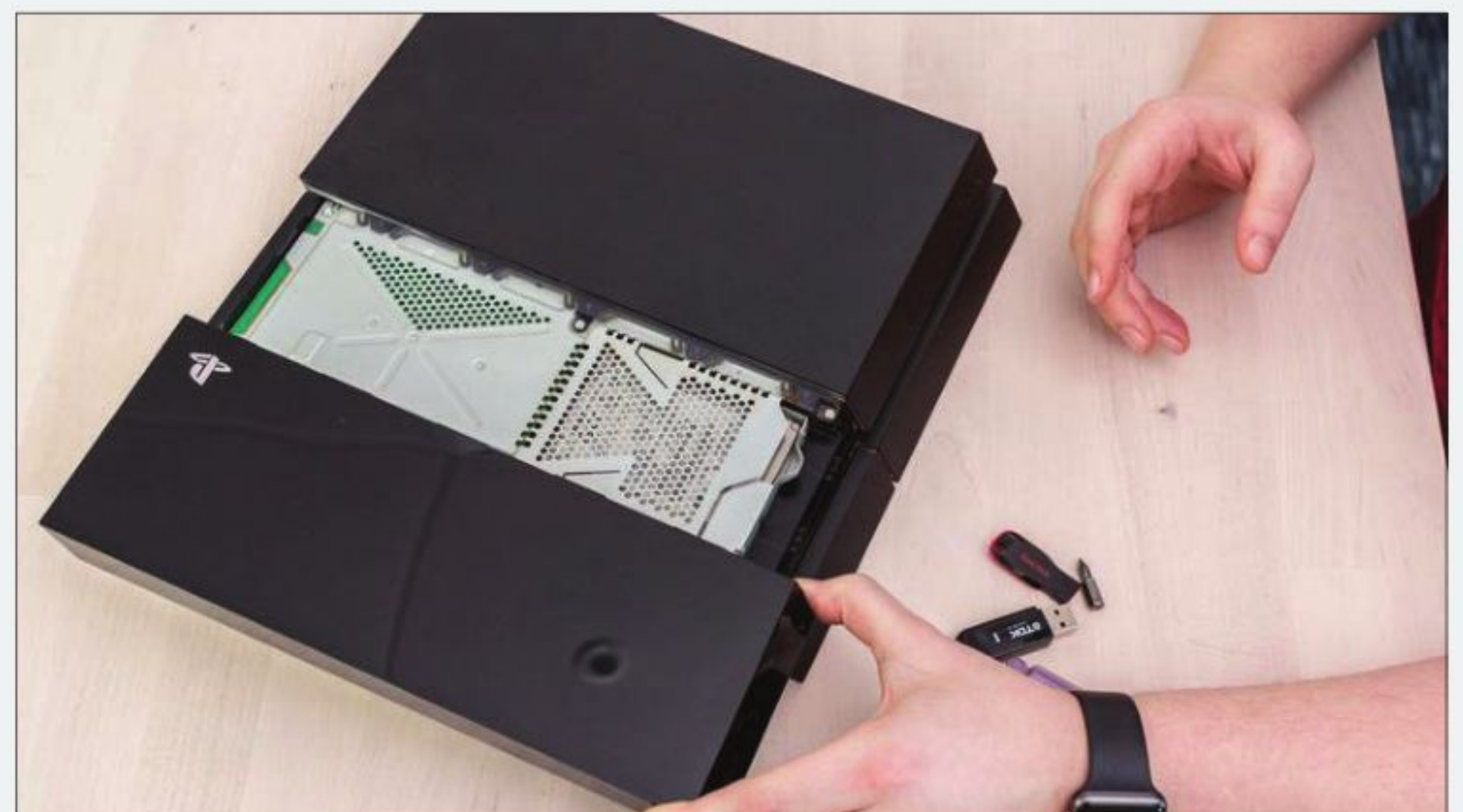
- A crosshead screwdriver.
- Two USB flash drives.
- A solid-state drive no thicker than 9.5mm. We used Crucial's MX300 1TB SSD, priced £245. You can buy it from tinyurl.com/jhcchgg.



2 If you've had your PlayStation 4 since it came out, you'll probably have a number of saved games on the console. Removing the HDD will remove these, so before you start you'll need to back up your device. You can either upload them to your online storage if you have PS Plus, or you can copy them to a USB memory stick. Plug in your USB drive, head to Settings > Application Saved Data Management > Saved Data in System Storage > Copy to USB and select the saves you'd like to transfer. You can now remove your PS4's hard disk drive.



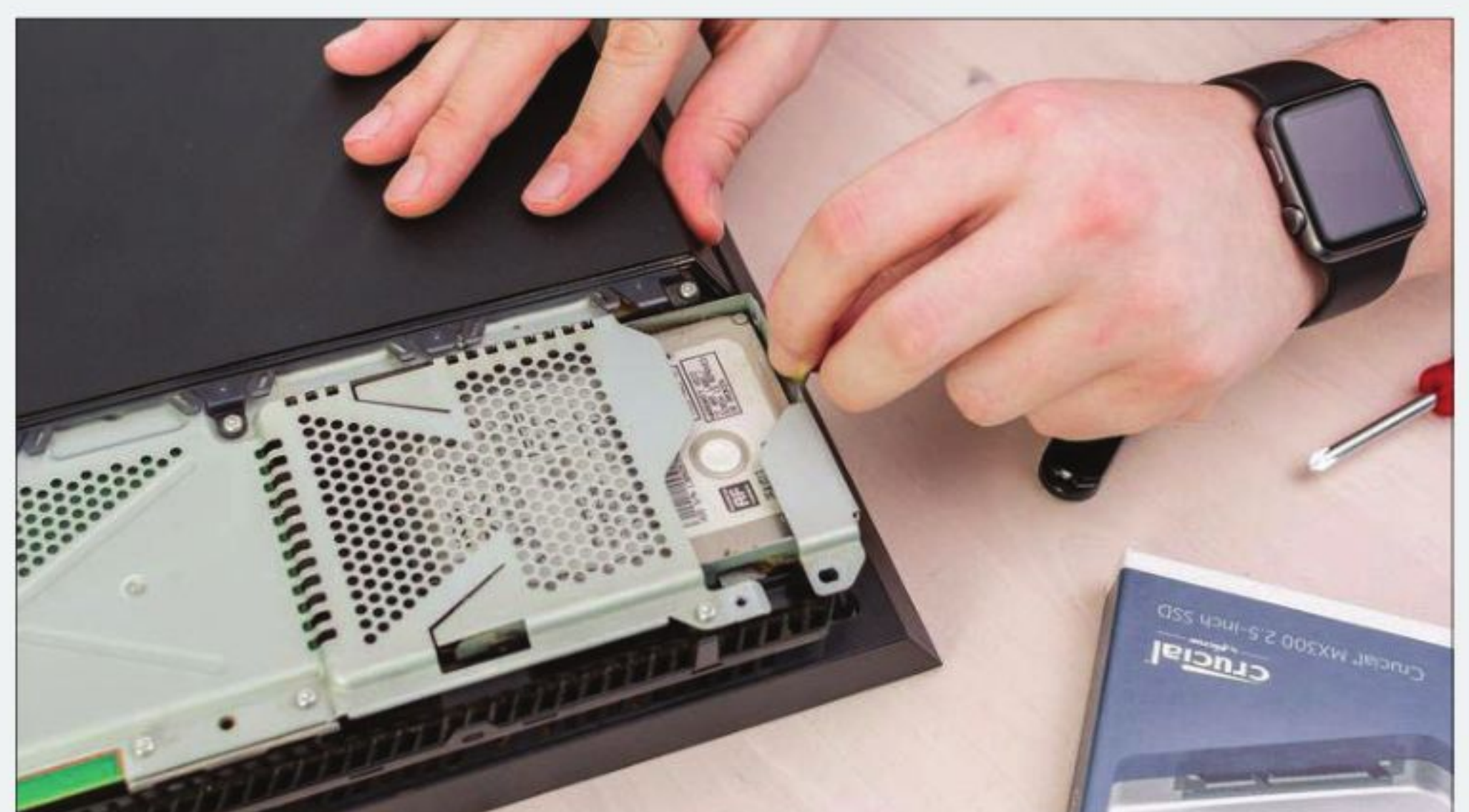
3 First, remove the console's top plate by sliding it to the left. You shouldn't have any problems lifting this off.



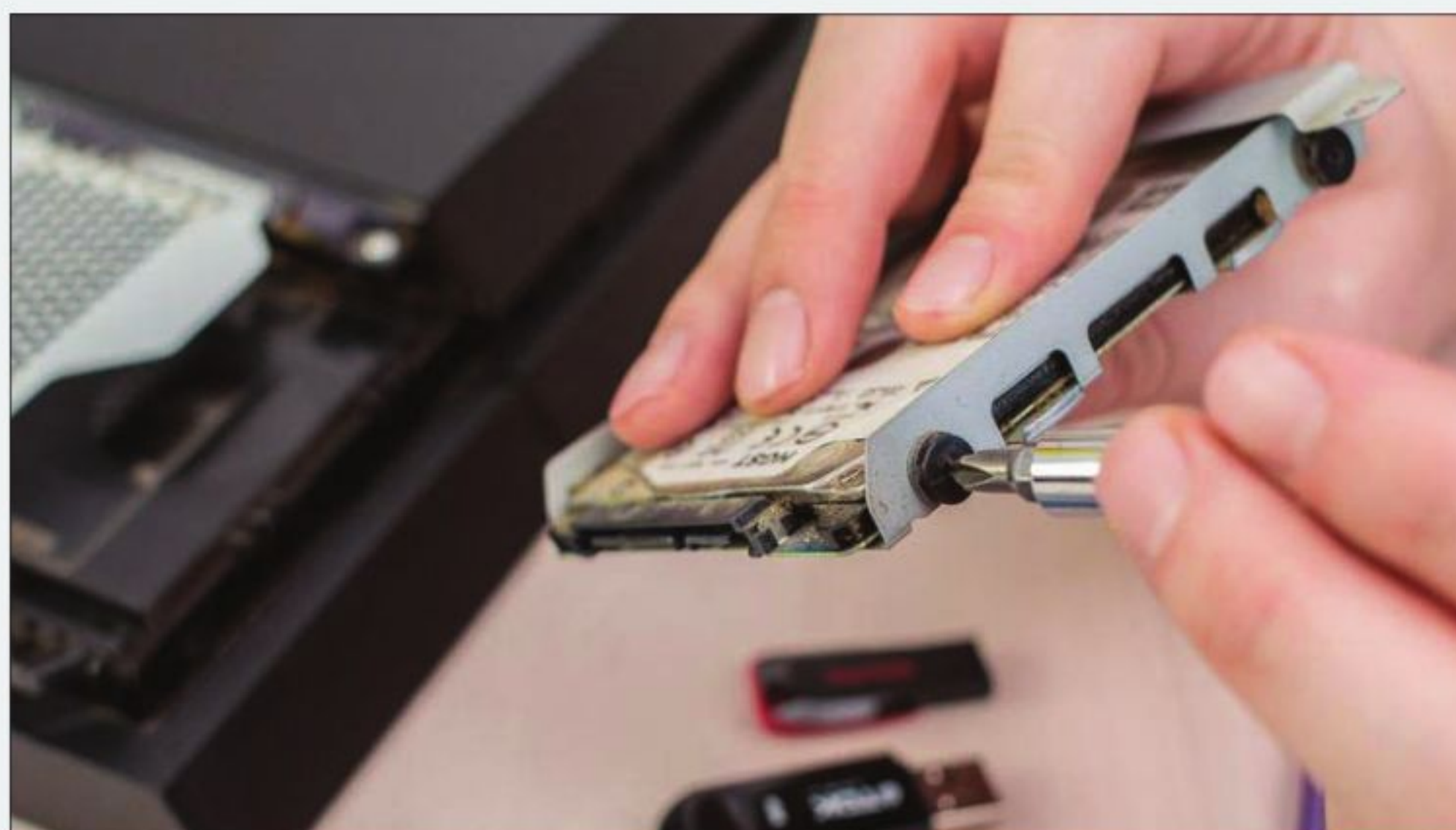
4 Next, remove the largest screw at the front of the console, which keeps the hard drive bay secure. As you can see, it's larger than the screws around it.



5 Pull the hard drive towards you and remove it from the console - it should come out with no issue once you've removed the big screw.



6 Once you've successfully removed the hard drive, you'll find that it's securely fastened within a metal frame. To remove the hard drive from the frame, unscrew the four black screws located on the sides of the cage - two either side - using a crosshead screwdriver. Once removed, the hard drive should be easily removable.



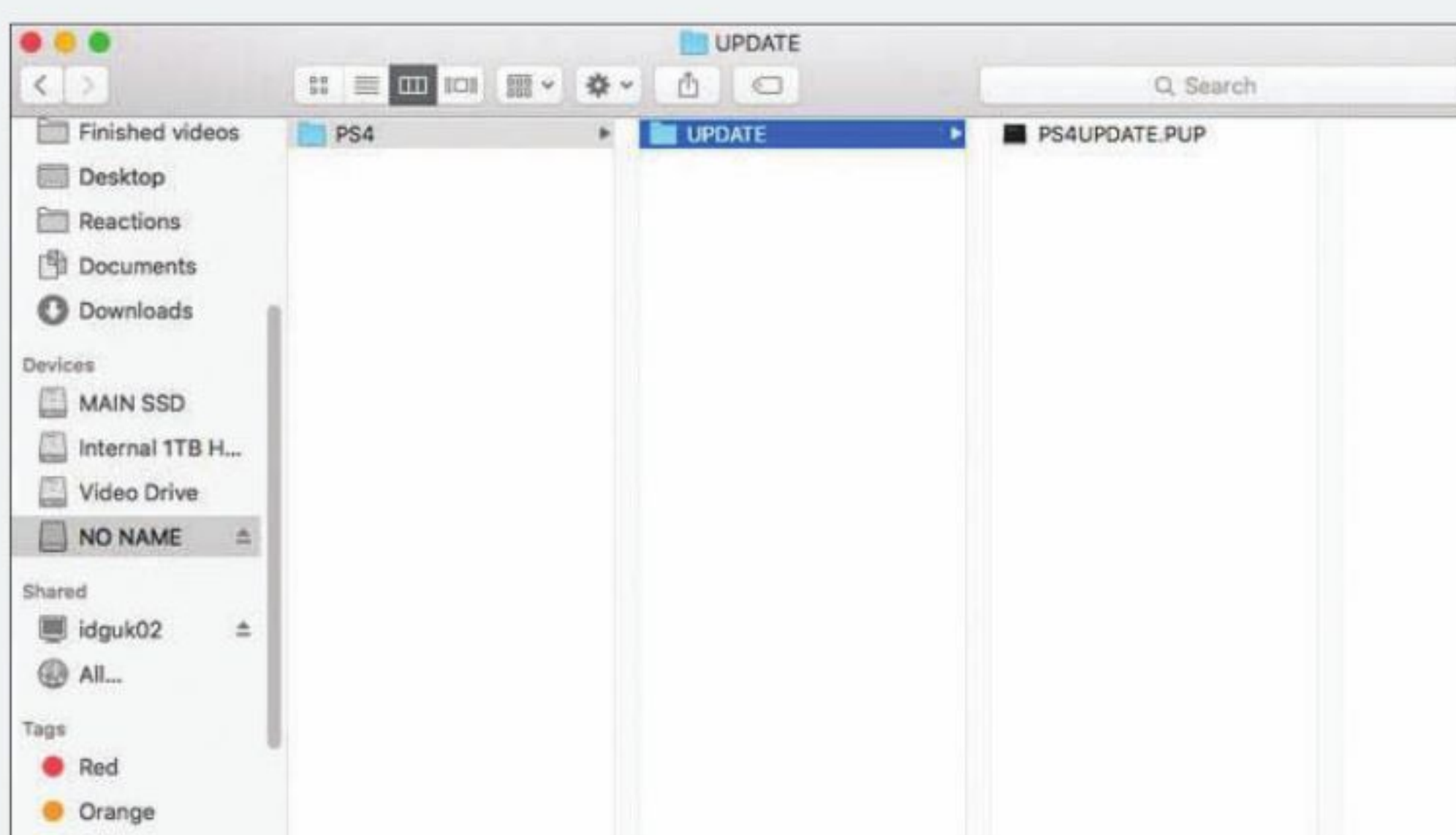
7 It's now time to replace the hard drive with your new, fast SSD. Make sure the end with the connectors isn't covered by the frame, align the case to the holes on the side of the SSD and replace the screws removed in the previous step. If all goes to plan, the new drive should be held securely in place by the four screws, ready to be put back into the PS4.



8 Once the SSD is secured within the metal frame, slot it back into the PS4 the same way it was removed, screw the Sony-branded screw back in and reattach the top plate to protect the internals of the console. Don't turn it on just yet though, as there are a few more things left to do.



9 While the SSD may now successfully be inside your PS4, it's completely empty - you need to install the PS4 software to use the system. First, grab your second flash drive, plug it in a PC or Mac, and create a folder on the USB named PS4, with another folder within it named UPDATE. Head to tinyurl.com/jh9u4w8, download the latest version of the software (the name should be PS4UPDATE.PUP) and save it in the UPDATE folder.



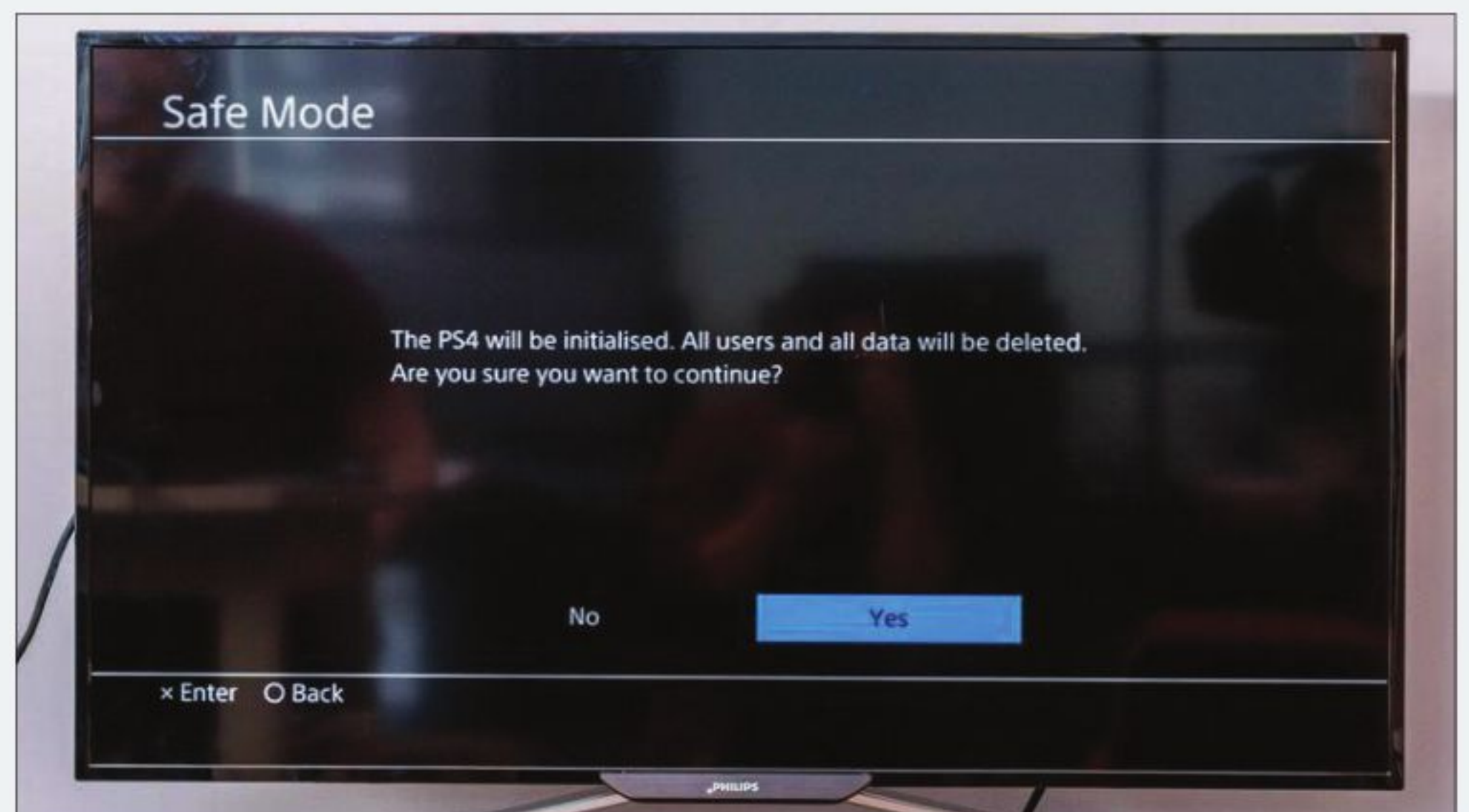
- 10** Next, plug the USB drive into your PS4 using one of the two forward-facing USB ports and hold the Power button for seven- to 10 seconds to boot into Safe Mode.



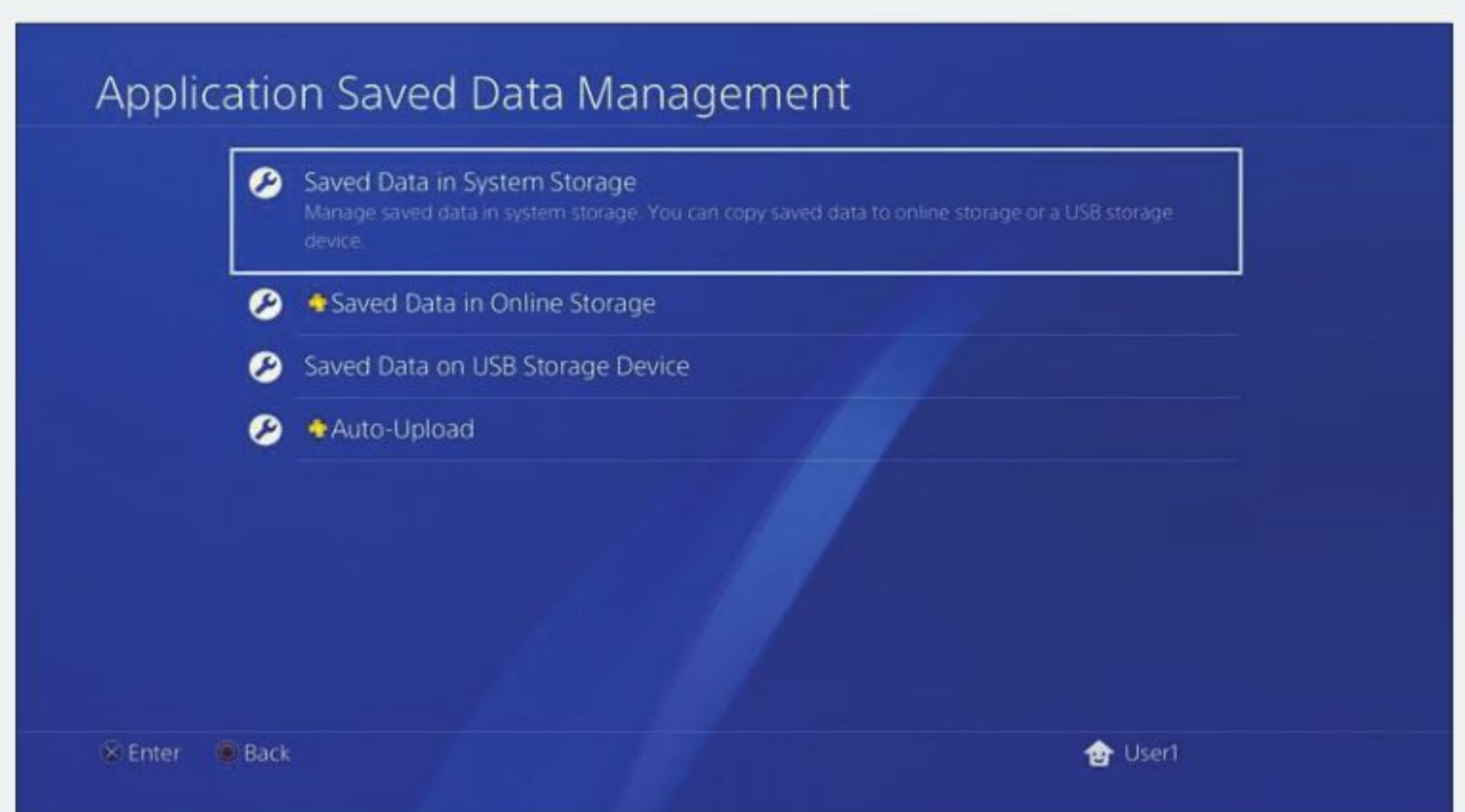
- 11** Once the PS4 has booted into Safe Mode and you're at the main Safe Mode menu, select 'Initialise PS4 (Reinstall System Software)' - this should be the seventh option on the list.



- 12** The console will then scan for the software stored on the flash drive you plugged in, and run through the process of installing the PS4's operating system. Simply follow the on-screen instructions and press 'X' when prompted. If all goes well, the operating system will be successfully installed and you'll be prompted to go through the first-time setup, as if it were a new console.



- 13** Now that you've installed the SSD, you'll want to restore your game save data. Plug your USB drive into the PS4, head to the Settings menu and select Application Saved Data Management > Saved Data on USB Storage Device > Copy to System Storage. That's it. You're good to go, and games should install and load a lot faster. ☒





Fashion your own touchscreen gloves

Making your own touchscreen gloves is inexpensive and simple to do. Martyn Casserly reveals how

In the cold weather you don't want to have to keep taking off your gloves whenever you want to answer a phone call or check your email. But that's exactly the scenario in which many smartphone owners find themselves. This is due to the fact that touchscreens

work by interacting with the small electrical charges in our fingers, something that warm woolly mittens negate. Of course, you can buy specialist gloves that will work happily with your handset, but if you're handy with a needle then it's easy to make your own.

START The materials for DIY Touchscreen gloves is about as simple as it gets. Aside from your gloves all you'll need are a darning needle and some conductive thread. Okay, that last bit is a little more specialist and might not be lying around the house. Conductive thread is, as the name suggests, one that is able to conduct the electric charge in your fingers. To do this, it has metal properties woven in that allow a current to pass through. It can be slightly thicker than normal thread and invariably somewhat more expensive, but you can use it for a number of projects other than this one.

Shop around and be sure to buy from a reputable seller as we've heard reports of fake conductive thread being sold online.

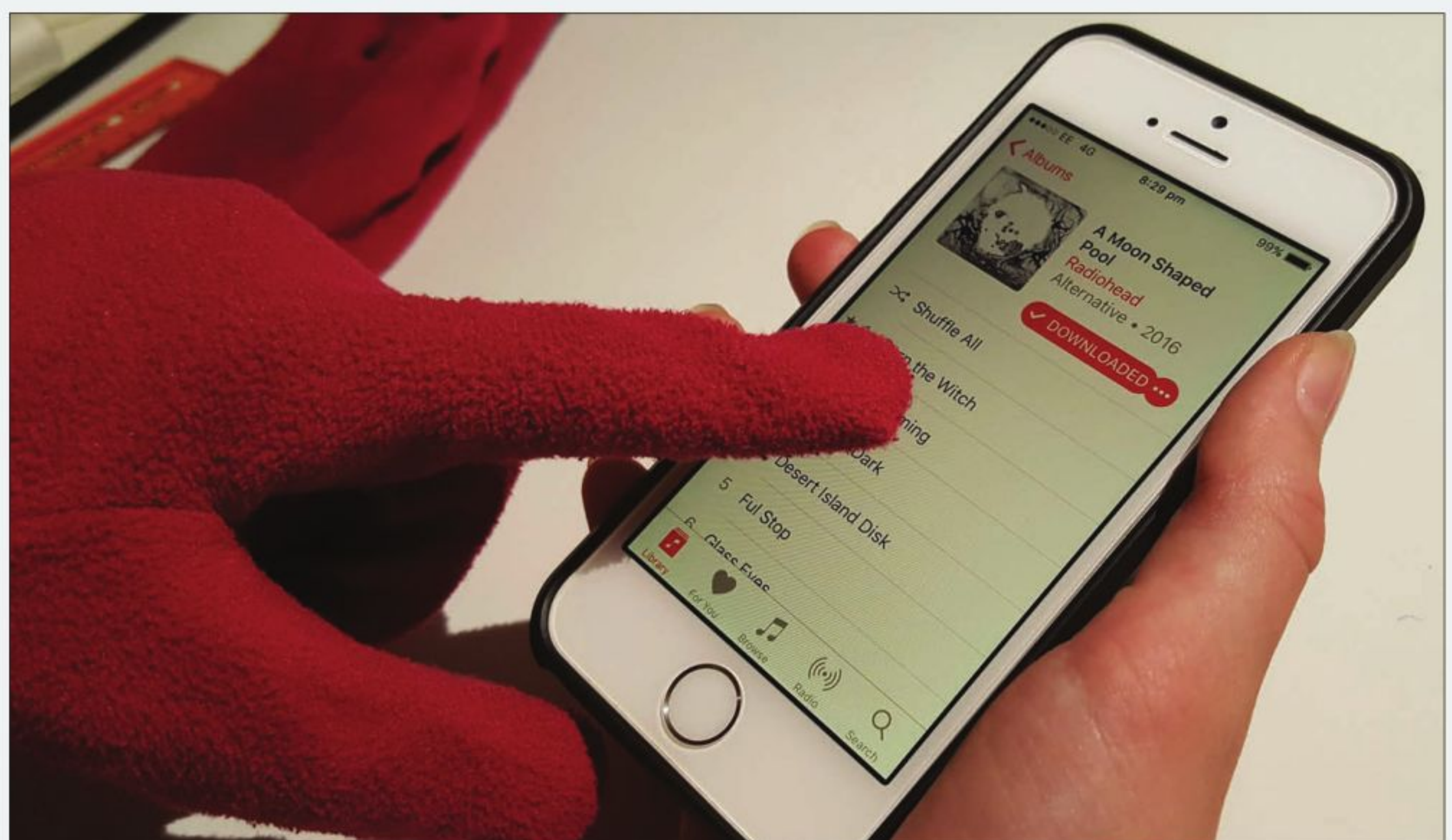


2 There really is nothing more to creating touchscreen gloves than sewing a criss-cross pattern into the tips of whichever fingers you want to use. Be sure to weave the thread in and out of the fingertips so that some of it touches your fingers and the other part touches the screen. Make a reasonable size grid if you can, as some phones will ignore small touch surfaces as they think there are just accidental brushes rather than intended actions.

Of course, you won't be able to use a fingerprint reader with the gloves on, so you might want to change your settings or remember your passcode before you head out.



3 With the stitching complete, you can now put on your gloves and start to use your smartphone. It might take a little bit of adjustment to ensure the thread is in the right place for your finger to press against it, but once that's refined you'll be free to publicise your success on social media, even when it's snowing. ☒





Keep your ears warm with our audio earmuffs

Martyn Casserly shows how to turn your old earmuffs into the warmest headphones in the world

START

As you may have surmised from the photo this project involves a bit of sewing, so if that isn't your strongpoint, it might be worth buttering up any needlepoint fans in your family. Equipment-wise, you'll need earmuffs, some felt or soft, thick material, earbuds, darning needle, thread, scissors, ruler and a marker pen.

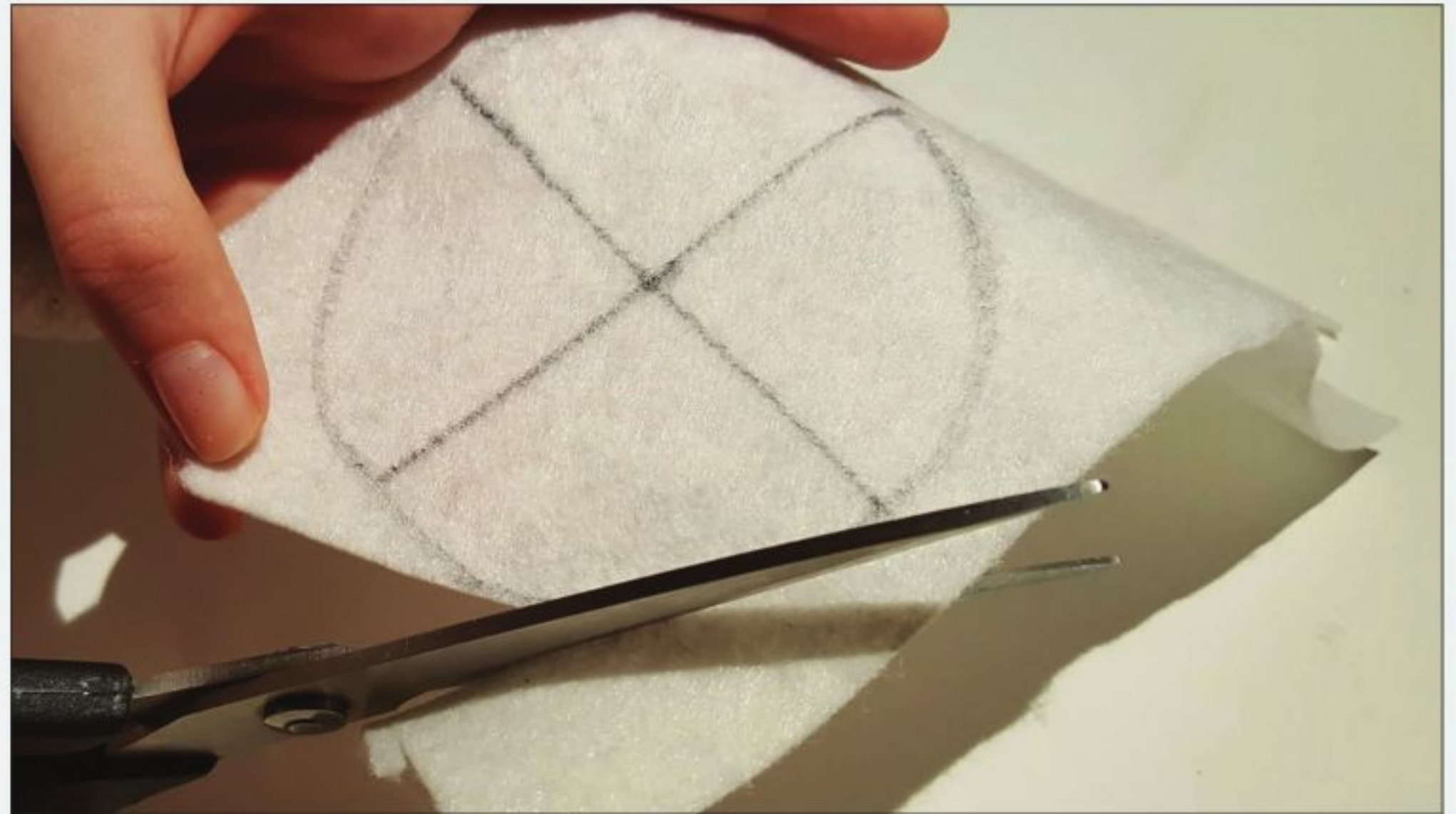


2

First, you'll need to measure the size of the earpieces on your earmuffs.



3 Next, mark up the felt with a line that will fit inside the circumference of the earpiece. You'll be sewing these directly onto the earpieces, so be sure to make the covers slightly smaller in diameter. You can use a compass to draw a circle, though we just drew a cross shape and joined up the edges freehand.



4 Cut out the felt covers and then repeat the process so that you have two.



5 The next step is to place the earbuds inside the earpieces. You'll want to position them about level with your ears so that you'll be able to hear them. When you're happy with the placement sew a couple of loops around the base of the buds to hold them securely.



6 We're using earbuds, but if you have an old pair of on-ear headphones you can remove the speakers from the plastic casings and use them instead. Due to the design they will probably give you the best volume, too.

With the earbuds in place, the last thing you need to do is sew the covers onto the earpieces. These will not only keep the earbuds secure if the loops come loose but will also make it more comfortable to wear the earmuffs themselves.

And that's it. Now you have warmth and music. ☒



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Trial Software | ★★★★★ [Download](#)
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Best laptops



1



2



3



4



5

Dell XPS 13 9360

Lenovo Yoga 710 (11in)

Asus ZenBook UX310UA

Dell Latitude 13 7370

HP Envy 13

	Dell XPS 13 9360	Lenovo Yoga 710 (11in)	Asus ZenBook UX310UA	Dell Latitude 13 7370	HP Envy 13
Price	£999 inc VAT	£549 inc VAT	£699 inc VAT	£1,079 inc VAT	£799 inc VAT
Website	Dell.co.uk	Lenovo.com/uk	Asus.com/uk	Dell.co.uk	Hp.com/uk
Build rating	★★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.7GHz Intel Core i7-7500U	Intel Core M3-6Y30	2.3GHz Intel Core i5-6200U	Intel Core m5-6Y57	2.5GHz Intel Core i7
RAM	16GB DDR3	8GB LPDDR3	8GB DDR4	8GB	8GB DDR3
Storage	512GB SSD	128GB SSD	128GB SSD, 500GB HDD	256GB SSD	256GB SSD
Screen size	13.3in IPS	11.6in TN glossy	13.3in LCD	13.3in InfinityEdge	13.3in matt
Screen resolution	3200x1800	1920x1080	3200x1800	1920x1080	1920x1080
Graphics	Intel HD Graphics 620	Intel HD 515	Intel HD 520	Intel HD 515	Intel HD 520
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11ac	802.11ac	802.11a/b/g/n/ac	802.11ac	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✗	✓	✓
USB	2x USB 3.0	1x USB 3.0	1x USB 3.0, 1x USB 2.0	1x USB 3.0, 2x USB-C	3x 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	720p webcam	HD webcam	0.9Mp webcam	HD webcam	HD webcam
Operating system	Windows 10 Home	Windows 10 Home	Windows 10 Home	Windows 10 Professional	Windows 10 Home
Bundled software	None	None	None	None	None
Gaming scores	Not tested	Not tested	Not tested	Not tested	Not tested
Battery	60Wh	40Wh lithium-ion	48Wh lithium-ion	34Wh	45Wh lithium-ion
Battery life	12 hours 30 mins	9 hrs 45 mins	8 hrs 10 mins	8 hrs 23 mins	1 hr 24 mins
PCMark 8 score	2499	4712	2097	2942	2657
Dimensions	304x200x15mm	281x195x14.9mm	323x223x19mm	304.8x210.5x14.mm	326x226x13mm
Weight	1.3kg	1.04kg	1.45kg	1.12kg	1.3kg
Warranty	1 year	1 year	1 year	1 year	1-year collect-and-return
FULL REVIEW	TINYURL.COM/ZCTTZLO	TINYURL.COM/ZSVR34C	TINYURL.COM/ZYLAEF8	TINYURL.COM/HDHYG2P	TINYURL.COM/HDAQHQX

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	Acer S 13 S5-371	Microsoft Surface Book	Apple MacBook Air 13in	Apple MacBook (2016)	Lenovo Yoga 900-13ISK
Price	£549 inc VAT	£1,299 inc VAT	£849 inc VAT	£1,049 inc VAT	£1,499 inc VAT
Website	Acer.com/uk	Microsoft.com/en-gb	Apple.com/uk	Apple.com/uk	Lenovo.com/uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.3GHz Intel Core i3-6100U	Intel Core i5	1.6GHz Intel Core i5	1.1GHz Intel Core m3	2.5GHz Intel Core i7
RAM	8GB LPDDR3	8GB	4GB LPDDR3	8GB LPDDR3	16GB DDR3
Storage	128GB SSD	128GB SSD	128GB SSD	256GB SSD	512GB SSD
Screen size	13.3in IPS	13.5in PixelSense	13.3in glossy	12in IPS	13.3in IPS
Screen resolution	1920x1080	3000x2000	1440x900	2304x1440	1920x1080
Graphics	Intel HD Graphics 520	Intel HD Graphics 520	Intel HD Graphics 6000	Intel HD Graphics 515	Intel HD 520
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/ac	802.11ac	802.11a/b/g/n/ac
Ethernet	✗	✗	✗	✗	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	2x USB 3.0	2x USB 3.0	2x USB 3.0	1x USB-C	2x USB 3.0, 1x USB 2.0
FireWire	✗	✗	✓	✗	✗
Thunderbolt	✗	✗	✓	✗	✗
DisplayPort	✗	✓	✗	✗	✗
HDMI	✓	✗	✗	✗	✗
DVI	✗	✗	✗	✗	✗
VGA	✗	✗	✗	✗	✗
eSATA	✗	✗	✗	✗	✗
Media card slot	✓	✓	✗	✗	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	N/A	N/A	N/A	N/A	N/A
Extras	HD Webcam	Surface Pen	720p FaceTime	480p FaceTime	720p webcam
Operating system	Windows 10	Windows 10 Professional	macOS Sierra	macOS Sierra	Windows 10 Home
Bundled software	None	None	None	None	None
Gaming scores	27.6/12.3fps Alien Isolation	Not tested	Not tested	Not tested	Not tested
Battery	4030mAh lithium-ion	Not stated	38Wh lithium-ion	41.4Wh lithium-polymer	40Wh lithium-ion
Battery life	10 hours	12 hours	12 hrs 49 mins	8 hrs 23 mins	5 hr 21 mins
PCMark 8 score	2040	Not tested	Not tested	Not tested	2295
Dimensions	327x287x15mm	312.3x232.11x3mm	300x192x17mm	280.5x196.5x35mm	299x209x16mm
Weight	1.33kg	1.52kg	1.4kg	920g	1.3kg
Warranty	1 year	1 year	1-year return-to-base	1 year	1-year collect-and-return
FULL REVIEW	TINYURL.COM/ZAU8QLM	TINYURL.COM/ZZF4ZQ2	TINYURL.COM/PH3YN5K	TINYURL.COM/HSSXYUJ	TINYURL.COM/Z8VGOZ8

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	HP 250 G4	Asus X555LA	Dell Inspiron 11 3000	HP Stream 11	Asus X553SA
Price	£299 inc VAT	£349 inc VAT	£179 inc VAT	£179 inc VAT	£279 inc VAT
Website	Hp.com/uk	Asus.com/uk	Dell.co.uk	Hp.com/uk	Asus.com/uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.1GHz Intel Core i5-5005U	2GHz Intel Core i3-5005U	1.6-2.1GHz Intel Celeron N3050	2.16GHz Intel Celeron	2.1GHz Intel Core Celeron
RAM	8GB	4GB DDR3	2GB	2GB DDR3	8GB DDR3
Storage	1TB HDD	1TB HDD	32GB SSD	32GB SnaDisk eMMC drive	500GB
Screen size	15.6in matt	15.6in glossy	11.6in matt	11.6in matt	15.6in glossy
Screen resolution	1366x768	1366x768	1366x768	1366x768	1366x768
Graphics	Intel HD GPU	Intel HD Graphics 5500	Intel HD	Intel HD Graphics	Intel HD
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11b/g/n	802.11b/g/n	802.11a/b/g/n	802.11b/g/n	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	×	×	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 2x USB 2.0	1x USB 3.0, 1x USB 2.0	1x 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 jack, mic
Optical drive	DVD±RW	DVD±RW	×	×	Super-Multi DVD
Extras	Webcam	Kensington lock slot, webcam	Webcam	Kensington lock slot, webcam	VGA webcam
Operating system	Windows 10	Windows 8.1	Windows 8	Windows 8.1	Windows 10 Home
Bundled software	None	None	None	None	None
Battery	31Wh Lithium-ion	37Wh Lithium-ion	32Wh Lithium-polymer	37Wh Lithium-polymer	48Wh lithium-ion
Battery life	5 hrs 5 mins	5 hrs 17 mins	8 hrs 15 mins	8 hrs 45 mins	4 hrs 35 mins
PCMark 8 Home score	2171	1985	Not tested	Not tested	Not tested
Batman (Low/High)	Not tested	30fps/Not tested	Not tested	Not tested	Not tested
Dimensions	384x254x24mm	381x257x26.3mm	292x196x19.9mm	300x205x20mm	380x258x25.3mm
Weight	2.1kg	2.1kg	1.39kg	1.25kg	2.2kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/Z5XNZOR	TINYURL.COM/OMYZQJ3	TINYURL.COM/Z3AUEFY	TINYURL.COM/GNRP9BC	TINYURL.COM/ZLN2DVF

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Best budget laptops	<div> <div>6</div> <div>7</div> <div>8</div> <div>9</div> <div>10</div> </div>				
	Chuwi HiBook Pro	Lenovo Yoga 300	Chuwi Hi10 Pro	Asus Transformer TP200SA	Jumper EZBook Air
Price	£172 inc VAT	£299 inc VAT	£128 inc VAT	£309 inc VAT	£230 inc VAT
Website	En.chuwi.com	Lenovo.com/uk	En.chuwi.com	Asus.com/uk	Geekbuying.com
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	1.84GHz Intel Atom X5	2.16GHz Intel Pentium N3700	1.44GHz Intel Atom X5	1.6GHz Intel Celeron N3050	1.44GHz Intel Atom X5
RAM	4GB DDR3	4GB DDR	4GB	2GB	4GB DDR3L
Storage	64GB	500GB	64GB	32GB	128GB
Screen size	10.1in matt IPS	11.6in IPS	10.1in full-HD	11.6in IPS	11.6in full-HD
Screen resolution	2560x1600	1366x768	1920x1200	1366x768	1920x1080
Graphics	Intel HD Graphics	Intel HD Graphics	Intel HD Graphics	Intel HD Graphics	Intel HD Graphics
Video memory	N/A	N/A	N/A	N/A	N/A
Wireless	802.11b/g/n	802.11ac	802.11b/g/n	802.11ac	802.11ac
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	1x USB-C	1x USB 3.0, 2x USB 2.0	1x USB-C, 1x Micro-USB	1x USB-C-1, 1x USB 3.0, 1x USB 2.0	1x USB-C
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✗	✗	✗	✗	✗
DisplayPort	✗	✗	✗	✗	✗
HDMI	✓	✓	✓	✓	✗
DVI	✗	✗	✗	✗	✗
VGA	✗	✗	✗	✗	✗
eSATA	✗	✗	✗	✗	✗
Media card slot	✓	✓	✓	✗	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone minijack	Headphone jack, mic	Headphone jack, mic
Optical drive	✗	N/A	✗	✗	N/A
Extras	720p webcam	None	2Mp/2Mp front and rear cameras	None	None
Operating system	Windows 10 Home	Windows 10 Home	Windows 10/Android 5.1	Windows 10	Windows 10
Bundled software	None	None	None	None	None
Battery	8000mAh	48Wh lithium-ion	6500mAh	38Wh lithium-polymer	8000mAh lithium-polymer
Battery life	Not tested	6 hrs 34 mins	8 hrs	7hrs 30 mins	8 hrs
PCMark 8 Home score	940	1457	1041	Not tested	1052
Batman (Low/High)	Not tested	Not tested	Not tested	Not tested	Not tested
Dimensions	262x167.5x8.5mm	299x209x22mm	261.8x167.3x8.5mm (battery)	297x201.3x18.4mm	294x200x14.9mm
Weight	550g	1.39kg	562g (battery); 545g (keyboard)	1.2kg	960g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/JVYEQYV	TINYURL.COM/HRXVJXT	TINYURL.COM/J7F5URW	TINYURL.COM/GS2CGB6	TINYURL.COM/Z8C9B49

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Best Chromebooks	1	2	3	4
	Dell Chromebook 11 (3120)	Asus Chromebook Flip C100PA	Dell Chromebook 13 (7310)	Chromebook Pixel (2015)
Price	£202 inc VAT	£249 inc VAT	£1,078 inc VAT	£799 inc VAT
Website	Dell.co.uk	UK.asus.com	Dell.co.uk	Google.co.uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★
Processor	2.16GHz Intel Celeron N2840	1.86GHz Rockchip RK3288C	2.9GHz Intel i5-5300U	Intel Core i7
RAM	4GB DDR3	4GB DDR3	8GB	8GB DDR3
Storage	16GB SSD	16GB SSD	32GB SSD	32GB SSD
Screen size	11.6in HD	10.1in	13.3in	12.85in IPS
Screen resolution	1366x768	1280x800	1920x1066	2560x1700
Graphics	Intel HD graphics	Rockchip Mali T764	Intel HD graphics	Intel HD 5500
Video memory	N/A	N/A	N/A	N/A
Wireless	802.11a/b/g/n	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac
Ethernet	Gigabit	Gigabit	None	Gigabit
Bluetooth	✓	✓	✓	✓
USB	1x USB 3.0, 1x USB 2.0	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
Optical drive	N/A	N/A	N/A	N/A
Extras	Webcam	Webcam	Webcam	Webcam
Operating system	Google Chrome OS	Google Chrome OS	Google Chrome OS	Google Chrome OS
Bundled software	None	None	None	None
Battery life	9 hrs 46 mins	9 hrs 33 mins	10 hrs 46 mins	9 hrs
SunSpider score	697ms	803ms	219ms	Not tested
Dimensions	297x217.7x120.1mm	262.8x182.4x15.6mm	381.9x252.5x19.9mm	297.7x224.55x5.3mm
Weight	1.25kg	890g	1.72kg	1.5kg
Warranty	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/ZQFP4MF	TINYURL.COM/J9CU5YH	TINYURL.COM/HKLN3U9	TINYURL.COM/HQDFR8H

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Best Chromebooks	<div> <div>5</div>  </div> <div> <div>6</div>  </div> <div> <div>7</div>  </div> <div> <div>8</div>  </div>			
	Acer Chromebook 14	Acer Chromebook R11	HP Chromebook 11	Asus C300M
Price	£199 inc VAT	£229 inc VAT	£229 inc VAT	£250 inc VAT
Website	Acer.co.uk	Acer.co.uk	Hp.com/uk	UK.asus.com
Build rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Performance rating	★★★★☆	★★★★☆	★★★☆☆	★★★★☆
Overall rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Processor	1.6GHz Intel Celeron N3060	1.6GHz Intel Celeron N3050	1.7GHz Exynos 5250	Intel Celeron N2830
RAM	2GB	2GB DDR3	2GB DDR3	2GB DDR3
Storage	16GB eMMC	16GB SSD	16GB	16GB SSD
Screen size	14in LCD	11in IPS	11.6in IPS	13.3in
Screen resolution	1366x768	1366x768	1366x768	1366x768
Graphics	Intel HD graphics	Intel HD graphics	Intel HD graphics	Intel HD graphics
Video memory	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
Ethernet	Gigabit	Gigabit	None	Gigabit
Bluetooth	✓	✓	✓	✓
USB	2x USB 3.0	4x USB 3.0, 1x USB 2.0	2x 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
Optical drive	N/A	N/A	N/A	N/A
Extras	HD webcam	Webcam	Webcam	720p webcam
Operating system	Google Chrome OS	Google Chrome OS	Google Chrome OS	Google Chrome OS
Bundled software	None	None	None	None
Battery life	11 hrs 13mins	9 hrs 30 mins	5 hrs	9 hrs 28 mins
SunSpider score	638ms	Not tested	Not tested	Not tested
Dimensions	340x236x17mm	19.2x294x204mm	297x195x17.4mm	339x230x20.3mm
Weight	1.6kg	1.25kg	1.03kg	1.4kg
Warranty	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/HH8OOT4	TINYURL.COM/GOVMT3X	TINYURL.COM/HB3JEBG	TINYURL.COM/HW86CWG

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Best gaming laptops

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5



Asus RoG G752VM

Alienware 17

Asus RoG G752

Asus RoG GL552VW-DM201T

Dell Inspiron 15 7559

Price	£1,599 inc VAT	£1,350 inc VAT	£1,299 inc VAT	£899 inc VAT	£999 inc VAT
Website	Asus.com/uk	Alienware.co.uk	Asus.com/uk	Asus.com/uk	Dell.co.uk
Build rating	★★★★★★	★★★★★½	★★★★★½	★★★★★½	★★★★★½
Features rating	★★★★★★	★★★★★★	★★★★★½	★★★★★½	★★★★★½
Value rating	★★★★★½	★★★★★½	★★★★★½	★★★★★½	★★★★★½
Performance rating	★★★★★★	★★★★★★	★★★★★★	★★★★★½	★★★★★½
Overall rating	★★★★★½	★★★★★½	★★★★★½	★★★★★½	★★★★★½
Processor	2.6GHz Intel Core i7-6700HQ	4.1GHz Intel Core i7-6820	2.7GHz Intel Core i7-6820HK	2.6GHz Intel Core i7-6700HQ	2.6GHz Intel Core i7-6700HQ
RAM	16GB DDR4-2400	8GB DDR5, 16GB DDR4	32GB DDR4	8GB DDR3	16GB DDR3L RAM
Storage	256GB SSD, 1TB HDD	512GB SSD, 1TB HDD	1TB HDD	1TB HDD	128GB SSD, 1TB HDD
Screen size	17.3in IPS	17.3in IPS	17.3in IPS	15.6in IPS	13.6in IPS
Screen resolution	1920x1080	1920x1080	1920x1080	1920x1080	3840x2160
Graphics	Nvidia GeForce GTX1060	Nvidia GeForce GTX 980M	Nvidia GeForce GTX 980M	Nvidia GeForce GTX 960M	nVidia GeForce GTX 960M
Video memory	Not specified	Not specified	Not specified	Not specified	N/A
Wireless	802.11ac	802.11ac	802.11ac	802.11ac	802.11ac 1x1 MIMO
Ethernet	Gigabit	Gigabit	Gigabit	Gigabit	Gigabit
Bluetooth	✓	✓	✓	✓	✓
USB	4x USB 3.0, 1x USB-C	3x USB 3.0, 1x USB-C	3x USB 3.0	2x USB 3.0, 1x USB 3.0	3x USB 3.0
FireWire	✗	✗	✗	✗	✗
Thunderbolt	✗	✓	✓	✗	✗
DisplayPort	✓	✗	✓	✗	✗
HDMI	✓	✓	✓	✓	✓
DVI	✗	✗	✗	✗	✗
VGA	✗	✗	✗	✗	✗
eSATA	✗	✗	✗	✗	✗
Media card slot	✓	✓	✓	✓	✓
Audio	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic	Headphone jack, mic
Optical drive	✓	None	✓	None	N/A
Extras	1.2Mp webcam	2Mp webcam	1.2Mp webcam	HD webcam	0.9Mp webcam
Operating system	Windows 10	Windows 10 Home	Windows 10	Windows 10	Windows 10 Home
Bundled software	None	None	None	None	None
Gaming scores	Not tested	Not tested	Not tested	Not tested	34/27fps in Tomb Raider
Battery	67Wh lithium-ion	31Wh lithium-polymer	66Wh lithium-ion	48Wh lithium-polymer	74Wh lithium-ion
Battery life	4 hrs	3 hrs 59 mins	4 hrs 37 mins	4 hrs 50 mins	5 hrs 27 mins
PCMark 8 score	Not tested	3400	4184	3102	Not tested
Dimensions	428x334x43mm	430x292x34.4mm	428x334x43mm	384x257x34.5mm	383x265x26.1mm
Weight	4.1kg	3.8kg	4.4kg	2.6kg	2.8kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/H23QHQC	TINYURL.COM/JYK953S	TINYURL.COM/J8AFNHP	TINYURL.COM/HQKNNRJ	TINYURL.COM/ZZV3JQZ

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5



Wired2Fire Diablo Fury

Yoyotech Warbird RS10 V2

Chillblast Fusion Tracer RX 480

Overclockers UK Kinetic HR

Mesh Storm PCA

Price	£914 inc VAT	£824 inc VAT	£749 inc VAT	£660 inc VAT	£699 inc VAT
Website	Wired2fire.co.uk	Yoyotech.co.uk	Chillblast.com	Overclockers.co.uk	Meshcomputers.com
Build rating	★★★★★★	★★★★★½	★★★★★½	★★★★★½	★★★★★½
Features rating	★★★★★½	★★★★★½	★★★★★½	★★★★★½	★★★★★½
Value rating	★★★★★★	★★★★★★	★★★★★½	★★★★★★	★★★★★½
Performance rating	★★★★★½	★★★★★½	★★★★★½	★★★★★½	★★★★★½
Overall rating	★★★★★½	★★★★★½	★★★★★½	★★★★★½	★★★★★½
Processor	3.5GHz Intel Core i5-6600K (OC 4.4GHz)	3.5GHz Intel i5-6600K (OC 4.6GHz)	2.8- to 3.4GHz Intel Core i5-6420P	3.7GHz Intel Core i3-6100	3.2GHz Intel Core i5-6500 (3.6GHz Turbo)
CPU cooler	ID Cooling SE-214X	Coolermaster Hyper 212 EVO	Intel Stock Cooler	Stock cooler	BeQuiet Pure Rock Slim Compact
Memory	16GB DDR4	8GB DDR4	8GB DDR	8GB DDR4	8GB DDR4
Storage	250GB SSD	1TB HDD	1TB HDD, 250GB SSD	1TB SSHD	1TB HDD
Power supply	500W FSP	500W Evga 80Plus	500W PSU	500W Kolink	500W Aerocool Quiet
Motherboard	Asus Z170-P	MSI Z170-A Pro	Gigabyte GA-H110M-S2H	Asus H110M-K mATX	Asus B150M Pro Gaming
Operating system	Windows 10 Home (64-bit)	Windows 10 (64-bit)	Windows 10 Home	Windows 10 (64-bit)	Windows 10 Home (64-bit)
Screen	None supplied	None supplied	None supplied	None supplied	None supplied
Graphics	Nvidia GeForce GTX 1060	Nvidia GeForce GTX 1060	AMD Radeon RX 480	Sapphire Nitro+ OC RX470	GeForce GTX 1060
Sound	Onboard	Onboard	Onboard	Onboard	Onboard
Connectivity	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet	Gigabit ethernet
Ports	4x USB 3.0, 2x USB 2.0, 1x USB Type-C, 2x DVI, HDMI, DisplayPort, eSATA	5x USB 3.0, 3x USB 2.0, 2x DisplayPort, 2x HDMI, DVI	3x USB 3.0, 6x USB 2.0, 2x PS/2, DisplayPort, DVI, HDMI	3x USB 3.0, 5x USB 2.0. VGA: 2x HDMI, 2x DisplayPort, DVI. Motherboard: DVI-D, VGA	5x USB 3.0, 5x USB 2.0, line in, line out, PS/2, 10/100/1000 (LAN)
Optical drive	None	None	None	None	None
Case	NZXT Source 340	Aerocool Aero-500	CiT F3 Black and Red	Kolink Victory Micro-ATX Gaming Dase	CiT Storm Black ATX
Keyboard & mouse	None supplied	None supplied	None supplied	None supplied	✓
PCMark 8 2.0 Home score	5200	4686	3984	4048	4158
Alien Isolation score (4K)	17.02/49.28fps	48.7/59.1fps	45.1/52.7fps	42.6/50.8fps	46.5/56.9fps
Thief (4K High)	32.4/38.9fps	31.7/38.2fps	32.3/40.1fps	30.7/37.4fps	24.9/35.7fps
Thief (1080p Ultra)	72.1/89.1fps	48.3/81.7fps	48.8/70.3fps	32.4/65.3fps	32.6/67.8fps
VRMark Orange	7063	6993	6934	5812	6356
Power Consumption	46.5/263	52.6/249W	53/297W	37/308W	38/215W
Warranty	2 years C&R, 1 year return to labour	3 years RTB (1 year parts & labour, 2 years labour)	3 years C&R, 5 years labour only, lifetime phone	2 years parts & labour C&R, 1 year RTB labour only	Lifetime labour, 2-year parts, 1 year free C&R
FULL REVIEW	TINYURL.COM/JSJLOPV	TINYURL.COM/ZZLFK56	TINYURL.COM/GRASZCO	TINYURL.COM/ZR2EGFB	TINYURL.COM/ZUYDBHD

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Best smartphones	1	2	3	4	5
	Samsung Galaxy S7 edge	Samsung Galaxy S7	LG G5	Apple iPhone 7	OnePlus 3T
Price	£639 inc VAT	£569 inc VAT	£529 inc VAT	£599 inc VAT	£399 inc VAT
Website	Samsung.com/uk	Samsung.com/uk	LG.com/uk	Apple.com/uk	Oneplus.net
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 6.0 Marshmallow	Android 6.0 Marshmallow	Android 6.0 Marshmallow	iOS 10	Android 6.0.1 Marshmallow
Processor	Qualcomm Snapdragon 820	Qualcomm Snapdragon 820	Qualcomm Snapdragon 820	A10 Fusion	Qualcomm Snapdragon 821
RAM	4GB	4GB	4GB	2GB	6GB
Storage	32GB	32GB	32GB	32/128/256GB	64/128GB
MicroSD support	✓	✓	✓	✗	✗
Graphics	Adreno 530	Adreno 530	Adreno 530	Not stated	Adreno 530
Screen size	5.5in	5.1in	5.3in	4.7in	5.5in
Screen resolution	2560x1440	2560x1440	2560x1440	1334x720	1920x1080
Pixel density	534ppi	577ppi	554ppi	326ppi	401ppi
Screen technology	IPS	IPS	IPS	IPS	AMOLED
Front camera	5Mp	5Mp	8Mp	7Mp	16Mp
Rear camera	16Mp, LED flash	12Mp, LED flash	8/16Mp, LED flash	12Mp, LED flash	16Mp, LED flash
Video recording	4K	4K	4K	4K	4K
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM
Dual-SIM as standard	✗	✗	✗	✗	✗
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 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2
GPS	GPS, Glonass	A-GPS, Glonass	A-GPS	A-GPS, Glonass	A-GPS, Glonass
NFC	✓	✓	✓	✓	✓
USB OTG	✓	✓	✓	✓	✓
Extra features	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner
Geekbench 4.0 (multi)	6469 (Geekbench 3.0)	6466 (Geekbench 3.0)	5404 (Geekbench 3.0)	6088	4257
JetStream	66.1	61	53.5	160.2	53.6
GFXBench: T-Rex	53fps	53fps	53fps	60fps	60fps
GFXBench: Manhattan	27fps	27fps	29fps	60fps	47fps
Battery	3600mAh, non-removable	3000mAh, non-removable	2800mAh, removable	Lithium-ion	3400mAh, non-removable
Dimensions	151x73x7.8mm	142x70x7.9mm	149x74x7.7mm	138.3x67.1x7.1mm	152.7x74.7x7.4mm
Weight	157g	152g	159g	138g	158g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/ZDKDRE4	TINYURL.COM/J5CQ90U	TINYURL.COM/JES3ZUD	TINYURL.COM/JKDLR6H	TINYURL.COM/GM92C55

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Best smartphones	    				
	Xiaomi Mi 5s	Google Pixel	Apple iPhone 7 Plus	Google Nexus 6P	HTC 10
Price	£282 inc VAT	£599 inc VAT	£719 inc VAT	£449 inc VAT	£569 inc VAT
Website	Xiaomi-mi.co.uk	Google.co.uk	Apple.com/uk	Google.co.uk	Htc.com/uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 6.0 Marshmallow	Android 7.1 Nougat	iOS 10	Android 6.0 Marshmallow	Android 6.0 Marshmallow
Processor	Qualcomm Snapdragon 821	Qualcomm Snapdragon 821	Apple A10 Fusion	Qualcomm Snapdragon 810	Qualcomm Snapdragon 820
RAM	3/4GB	4GB	3GB	3GB	4GB
Storage	64/128GB	32/128GB	32/128/256GB	32/64/128GB	32GB
MicroSD support	✗	✗	✗	✗	✓
Graphics	Adreno 530	Adreno 530	PowerVR Series7XT Plus	Adreno 430	Adreno 530
Screen size	5.15in	5in	5.5in	5.7in	5.2in
Screen resolution	1920x1080	1920x1080	1920x1080	2560x1440	2560x1440
Pixel density	428ppi	441ppi	401ppi	518ppi	565ppi
Screen technology	IPS	AMOLED	IPS	AMOLED	Super LCD
Front camera	4Mp	8Mp	7Mp	8Mp	5Mp
Rear camera	12Mp, LED flash	12.3Mp, LED flash	12Mp, LED flash	12.3Mp, LED flash	12Mp, LED flash
Video recording	4K	4K	4K	4K	4K
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM
Dual-SIM as standard	✗	✗	✗	✗	✗
Wi-Fi	802.11a/b/g/n/ac	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 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2
GPS	A-GPS, Glonass	A-GPS, Glonass	A-GPS	A-GPS, Glonass	A-GPS, Glonass
NFC	✓	✓	✓	✓	✓
USB OTG	✓	✓	✓	✓	✓
Extra features	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner
Geekbench 4.0 (multi)	4157	4116	6106	3939 (Geekbench 3.0)	5132 (Geekbench 3.0)
JetStream	57.4	54.9	168.7	Not tested	44.1
GFXBench: T-Rex	59fps	58fps	58fps	34fps	52fps
GFXBench: Manhattan	43fps	47fps	44fps	14fps	27fps
Battery	3200mAh, non-removable	2770mAh, non-removable	2900mAh, non-removable	3450mAh, non-removable	3000mAh, non-removable
Dimensions	145.6x70.3x8.3mm	143.8x69.5x8.5mm	158.2x77.9x7.3mm	159.3x77.8x7.3mm	145.9x71.9x9mm
Weight	145g	143g	188g	178g	161g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/H6X5M3Z	TINYURL.COM/J4V6WVC	TINYURL.COM/ZSKOF5P	TINYURL.COM/NABSV4E	TINYURL.COM/HPEW53R

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Best budget smartphones



	Motorola Moto G (3rd gen)	Vodafone Smart Ultra 6	Vodafone Smart Prime 7	Vodafone Smart Prime 6	Xiaomi Redmi 3S
Price	£149 inc VAT	£125 inc VAT	£75 inc VAT	£79 inc VAT	£121 inc VAT
Website	Motorola.co.uk	Vodafone.co.uk	Vodafone.co.uk	Vodafone.co.uk	Xiaomi-mi.co.uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 5.1.1 Lollipop	Android 5.0.2 Lollipop	Android 6.0 Marshmallow	Android 5.0.2 Lollipop	MIUI 7.5
Processor	1.4GHz Snapdragon 410	2.5GHz Snapdragon 615	1.2GHz Snapdragon 210	1.2GHz Snapdragon 410	1.4GHz Snapdragon 4130
RAM	2GB	2GB	1GB	1GB	2GB
Storage	16GB	16GB	8GB	8GB	16GB
MicroSD support	Up to 32GB	Up to 128GB	Up to 128GB	Up to 64GB	Up to 128GB
Graphics	Adreno 406	Adreno 405	Adreno 304	Adreno 306	Adreno 505
Screen size	5in	5.5in	5in	5in	5in
Screen resolution	1280x720	1920x1080	1280x720	1280x720	1280x720
Pixel density	294ppi	401ppi	294ppi	294ppi	294ppi
Screen technology	IPS	IPS	IPS	IPS	IPS
Front camera	5Mp	5Mp	5Mp	2Mp	5Mp
Rear camera	13Mp	13Mp	8Mp	8Mp	13Mp
Video recording	720p	1080p	720p	1080p	1080p
Cellular connectivity	4G	4G*	4G*	4G*	4G
SIM type	Micro-SIM	Nano-SIM	Micro-SIM	Micro-SIM	1x Micro-SIM, 1x Nano-SIM
Dual-SIM as standard	✗	✗	✗	✗	✓
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 4.1	Bluetooth 4.0	Bluetooth 4.1
GPS	GPS, A-GPS, GLONASS	GPS, A-GPS	A-GPS	A-GPS	GPS, A-GPS
NFC	✗	✓	✓	✗	✗
USB OTG	✗	✗	✗	✓	✗
Extra features	FM radio, accelerometer	FM radio	FM radio	FM radio	Rear-mounted fingerprint scanner
Geekbench 3.0 (single)	Not tested	649	Not tested	464	Not tested
Geekbench 3.0 (multi)	1628	2469	1098	1401	2848
SunSpider	1344ms	1545ms	Not tested	1301ms	Not tested
GFXBench: T-Rex	10fps	14fps	10fps	9.4fps	24fps
GFXBench: Manhattan	4fps	5.7fps	4fps	3.8fps	13fps
Battery	2470mAh, non-removable	3000mAh, non-removable	2540mAh, non-removable	Not specified	4100mAh, non-removable
Dimensions	142.1x72.4x11.6mm	154x77x9mm	144x72x8mm	141.65x71.89x9mm	139.3x69.6x8.5mm
Weight	155g	159g	128g	155g	144g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/HTEFW7H	TINYURL.COM/Q7Q9NXR	TINYURL.COM/ZTLQLUZ	TINYURL.COM/Q5DSNHE	TINYURL.COM/J8HXZ49

* Locked to Vodafone. All other models here are unlocked

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Best budget smartphones	    				
	Vodafone Smart Ultra 7	Motorola Moto E 4G 2015	Cubot P12	Wileyfox Swift	Xiaomi Redmi Note 3
Price	£135 inc VAT	£109 inc VAT	£74 inc VAT	£129 inc VAT	£118 inc VAT
Website	Vodafone.co.uk	Motorola.co.uk	Cubot.net	Wileyfox.com	Xiaomi-mi.com
Build rating	★★★★☆	★★★★☆	★★★★★	★★★★☆	★★★★★
Features rating	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Value rating	★★★★☆	★★★★☆	★★★★★	★★★★★	★★★★★
Performance rating	★★★★☆	★★★★★	★★★★☆	★★★★☆	★★★★★
Overall rating	★★★★☆	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 6.0.1 Marshmallow	Android 5.0 Lollipop	Android 5.1 Lollipop	Cyanogen OS	Android 5.0 Lollipop
Processor	1.8GHz Mediatek MT6755M	1.2GHz Snapdragon 410	1.3GHz MediaTek MT6580	1.2GHz Snapdragon 410	2GHz MediaTek MT6795
RAM	2GB	1GB	1GB	2GB	2GB
Storage	16GB	8GB	16GB	16GB	16GB
MicroSD support	Up to 256GB	Up to 32GB	Up to 32GB	Up to 32GB	No
Graphics	Mali-T860MP2	Adreno 306	Mali 400mp	Adreno 306	Not specified
Screen size	5.5in	4.5in	5in	5in	5.5in
Screen resolution	1920x1080	960x540	1280x720	1280x720	1920x1080
Pixel density	401ppi	245ppi	294ppi	294ppi	403ppi
Screen technology	IPS	IPS	IPS	IPS	Full HD
Front camera	5Mp	0.3Mp	5Mp	5Mp	5Mp
Rear camera	13Mp	5Mp	8Mp, LED flash	13Mp, LED flash	13Mp, LED flash
Video recording	1080p	720p	1080p	1080p	Not specified
Cellular connectivity	4G*	4G	3G	4G	4G
SIM type	Micro-SIM	Micro-SIM	Micro-SIM	Micro-SIM	Micro-SIM
Dual-SIM as standard	✗	✗	✓	✗	✓
Wi-Fi	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11b/g/n	802.11ac
Bluetooth	Bluetooth 4.1	Bluetooth 4.0	✗	Bluetooth 4.0	Bluetooth 4.0
GPS	GPS, A-GPS	GPS, A-GPS, Glonass	GPS, A-GPS	A-GPS	GPS, A-GPS, Glonass
NFC	✗	✗	✗	✗	✓
USB OTG	✗	✗	✓	✓	✗
Extra features	FM radio, accelerometer	Double-twist launches camera, lockscreen alerts	Gesture controls	3D G-Sensor	Fingerprint scanner
Geekbench 3.0 (single)	Not tested	464	Not tested	Not tested	Not tested
Geekbench 3.0 (multi)	3002	1463	1401	1456	4597
SunSpider	Not tested	1301ms	1726ms	1760ms	907ms
GFXBench: T-Rex	13fps	13fps	13fps	10fps	122fps
GFXBench: Manhattan	5.3fps	6fps	6fps	4fps	8fps
Battery	2960mAh, non-removable	2390mAh, non-removable	2200mAh, removable	2500mAh, removable	4000mAh, non-removable
Dimensions	152.2x78.1x8.7mm	66.8x5.2-12.3x129.9mm	141x71x9.4mm	141x71x9.4mm	150x76x8.65mm
Weight	150g	145g	71.5x8.1x143.9mm	135g	164g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/ZL3X7QG	TINYURL.COM/Q7Q9NXR	TINYURL.COM/JVEOZSF	TINYURL.COM/PO9KG38	TINYURL.COM/JQNP2RB

* Locked to Vodafone. All other models here are unlocked

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Best phablets	    				
	Xiaomi Mi Mix	Samsung Galaxy S7 edge	OnePlus 3T	Google Nexus 6P	Apple iPhone 7 Plus
Price	£639 inc VAT	£639 inc VAT	£399 inc VAT	£449 inc VAT	£719 inc VAT
Website	Xiaomi-mi.co.uk	Samsung.com/uk	Oneplus.net	Google.co.uk	Apple.com/uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 6.0 Marshmallow	Android 6.0 Marshmallow	Android 6.0.1 Marshmallow	Android 6.0 Marshmallow	iOS 10
Processor	Qualcomm Snapdragon 821	Qualcomm Snapdragon 820	Qualcomm Snapdragon 821	Qualcomm Snapdragon 810	Apple A10 Fusion
RAM	4/6GB	4GB	6GB	3GB	3GB
Storage	128/256GB	32GB	64/128GB	32/64/128GB	32/128/256GB
MicroSD support	✗	✓	✗	✗	✗
Graphics	Adreno 530	Adreno 530	Adreno 530	Adreno 430	PowerVR Series7XT Plus
Screen size	6.4in	5.5in	5.5in	5.7in	5.5in
Screen resolution	2040x1080	2560x1440	1920x1080	2560x1440	1920x1080
Pixel density	326ppi	534ppi	401ppi	518ppi	401ppi
Screen technology	IPS	IPS	AMOLED	Quad HD capacitive	IPS
Front camera	5Mp	5Mp	16Mp	8Mp	7Mp
Rear camera	16Mp, LED flash	16Mp, LED flash	16Mp, LED flash	12.3Mp, LED flash	12Mp, LED flash
Video recording	2160p	4K	4K	4K	4K
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM
Dual-SIM as standard	✗	✗	✗	✗	✗
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 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2
GPS	GPS, Glonass	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	A-GPS
NFC	✓	✓	✓	✓	✓
USB OTG	✓	✓	✓	✓	✓
Extra features	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner
Geekbench 3.0 (single)	Note tested	6469	Not tested	Not tested	Note tested
Geekbench 3.0 (multi)	4301 (Geekbench 4.0)	Not tested	4257 (Geekbench 4.0)	3939	6106 (Geekbench 4.0)
SunSpider	Note tested	53fps	Not tested	636ms	Not tested
GFXBench: T-Rex	60fps	27fps	60fps	34fps	58fps
GFXBench: Manhattan	46fps	27fps	47fps	14fps	44fps
Battery	4400mAh, non-removable	3600mAh, non-removable	3400mAh, non-removable	3450mAh, non-removable	2900mAh, nin-removable
Dimensions	158.8x81.9x7.9mm	151x73x7.8mm	152.7x74.7x7.4mm	159.3x77.8x7.3mm	158.2x77.9x7.3mm
Weight	209g	157g	158g	178g	188g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/ZC5LMDC	TINYURL.COM/ZDKDRE4	TINYURL.COM/GM92C55	TINYURL.COM/NABSV4E	TINYURL.COM/ZSKOF5P

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Best phablets	    				
	Xiaomi Mi Note 2	Samsung Galaxy Note5	Apple iPhone 6s Plus	Google Pixel XL	Huawei P9 Plus
Price	£472 inc VAT	£499 inc VAT	£619 inc VAT	£719 inc VAT	£629 inc VAT
Website	Xiaomi-mi.co.uk	Samsung.com/uk	Apple.com/uk	Google.co.uk	Consumer.huawei.com/uk
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 7.1 Nougat	Android 5.1.1 Lollipop	iOS 9	Android 7.1 Nougat	Android 6.0 Marshmallow
Processor	Qualcomm Snapdragon 821	2.1GHz Exynos 7420	A9	Qualcomm Snapdragon 821	HiSilicon Kirin 955
RAM	4/6GB	4GB	2GB	4GB	4GB
Storage	64/128GB	32/64GB	16/64/128GB	32/128GB	64GB
MicroSD support	✗	✗	✗	✗	Up to 256GB
Graphics	Adreno 530	Mali-T760MP8	M9	Adreno 530	Mali-T880 MP4
Screen size	5.7in	5.7in	5.5in	5.5in	5.5in
Screen resolution	1920x1080	1280x720	1920x1080	2560x1440	1920x1080
Pixel density	386ppi	518ppi	401ppi	534ppi	401ppi
Screen technology	AMOLED	Super AMOLED	IPS	IPS	AMOLED
Front camera	8Mp	5Mp	5Mp	8Mp	8Mp
Rear camera	22.5Mp, LED flash	16Mp, LED flash	12Mp, LED flash	12.3Mp, LED flash	12Mp, LED flash
Video recording	2160p	4K	4K	2160p	1080p
Cellular connectivity	4G	4G	4G	4G	4G
SIM type	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM	Nano-SIM
Dual-SIM as standard	✗	✗	✗	✗	✓
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 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.2
GPS	GPS, Glonass	A-GPS, Glonass	A-GPS, Glonass	GPS, Glonass	A-GPS, Glonass
NFC	✓	✓	✓	✓	✓
USB OTG	✓	✓	✓	✓	✓
Extra features	Fingerprint scanner	Heart-rate sensor, fingerprint scanner	Fingerprint scanner	Fingerprint scanner	Fingerprint scanner
Geekbench 3.0 (single)	1663 (Geekbench 4.0)	1497	2527	1581 (Geekbench 4.0)	Not tested
Geekbench 3.0 (multi)	4137 (Geekbench 4.0)	Not tested	4407	4067 (Geekbench 4.0)	6682
SunSpider	Not tested	718ms	210ms	Not tested	Not tested
GFXBench: T-Rex	Not tested	37fps	59fps	55fps	44fps
GFXBench: Manhattan	31fps	15fps	38fps	30fps	20fps
Battery	4070mAh, non-removable	2300mAh, non-removable	Lithium-ion	3450mAh, non-removable	3400mAh, non-removable
Dimensions	156.2x77.3x7.6mm	153.2x76.1x7.6mm	158.2x77.9x7.3mm	154.7x75.7x8.5mm	152.3x75.3x7mm
Weight	166g	171g	192g	168g	162g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/GSOBSEE	TINYURL.COM/OCQAJPL	TINYURL.COM/OYRA5MX	TINYURL.COM/HBXFGXX	TINYURL.COM/ZABGKKC

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Best tablets	1	2	3	4	5
	Apple iPad Air 2	Samsung Galaxy Tab S2 8	9.7in Apple iPad Pro	Apple iPad mini 4	Sony Xperia Z3 Tablet Compact
Price	£399 inc VAT	£319 inc VAT	£499 inc VAT	£319 inc VAT	£299 inc VAT
Website	Apple.com/uk	Samsung.com/uk	Apple.com/uk	Apple.com/uk	Sony.co.uk
Build rating	★★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	iOS 10	Android 5.0 Lollipop	iOS 10	iOS 10	Android 4.4 KitKat
Processor	Apple A8X, Apple M8	1.9GHz Exynos 5433	Apple A9X, Apple M9	Apple A8, Apple M8	2.5GHz Snapdragon 801
RAM	2GB	3GB	3GB	2GB	3GB
Storage	16/64/128GB	32GB/64GB	32GB/128GB/256GB	16GB/64/128GB	16GB/32GB
MicroSD support	✗	Up to 128GB	✗	✗	Up to 128GB
Graphics	Apple A8X	Not specified	Apple A9X	Apple A8	Adreno 330
Screen size	9.7in	8in	9.7in	7.9in	8in
Screen resolution	2048x1536	2048x1536	2048x1536	2048x1536	1920x1200
Pixel density	264ppi	320ppi	264ppi	326ppi	283ppi
Screen technology	IPS	Super AMOLED	IPS	IPS	IPS
Front camera	1.2Mp	2.1Mp	8Mp	1.2Mp	2.2Mp
Rear camera	8Mp	8Mp	12Mp, LED flash	8Mp	8.1Mp
Video recording	1080p	QHD	1080p	1080p	1080p
Cellular connectivity	4G version available	4G version available	4G version available	4G version available	4G version available
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac	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 4.0	Bluetooth 4.1	Bluetooth 4.2	Bluetooth 4.2	Bluetooth 4.0
GPS	A-GPS, Glonass	A-GPS, Glonass	GPS in cellular model only	A-GPS, Glonass	A-GPS, Glonass
NFC	✗	✗	✗	✗	✓
USB OTG	✗	✓	✗	✗	✓
Fingerprint scanner	✓	✗	✓	✓	✗
Waterproof	✗	✗	✗	✗	✓
Extra features	None	None	Stereo speakers	None	PS4 Remote Play, stereo speakers
Geekbench 3.0 (single)	1816	Not tested	Not tested	1719	Not tested
Geekbench 3.0 (multi)	4523	4305	5257	3101	2708
JetStream	Not tested	Not tested	142	Not tested	1017ms
GFXBench: T-Rex	48fps	26fps	60fps	52fps	28fps
GFXBench: Manhattan	Not tested	11fps	34fps	25fps	11fps
Battery	7340mAh, non-removable	4000mAh, non-removable, Qi	7306mAh, non-removable	5124mAh, non-removable	4500mAh, non-removable
Dimensions	240x169.5x6.1mm	198.6x134.8x5.6mm	170x240x6.1mm	203.2x134.8x6.1mm	213x124x6.4mm
Weight	437g	265g	437g	304g	270g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PLQXWSZ	TINYURL.COM/P37QFDW	TINYURL.COM/HFY7T4Z	TINYURL.COM/PBMONMA	TINYURL.COM/NJ6VHEO

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Best tablets	    				
	Google Pixel C	Huawei MediaPad M3	Amazon Fire	Sony Xperia Z4 Tablet	Xiaomi Mi Pad 2
Price	£399 inc VAT	£299 inc VAT	£49 inc VAT	£499 inc VAT	£144 inc VAT
Website	Google.co.uk	Consumer.huawei.com/uk	Amazon.co.uk	Sony.co.uk	Mi.com/en
Build rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Features rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OS (out of box)	Android 6.0 Marshmallow	Android 6.0 Marshmallow	FireOS 5	Android 5.0 Lollipop	Android 5.1 Lollipop
Processor	Nvidia Tegra X1	Hisilicon Kirin 950	1.3GHz quad-core	Snapdragon 810	Intel Atom X5-Z8500
RAM	3GB	3GB	1GB	3GB	2GB
Storage	32GB/64GB	32GB/64GB	8GB	32GB	16GB/64GB
MicroSD support	×	Up to 256GB	Up to 128GB	Up to 128GB	×
Graphics	Nvidia Tegra X1	Mali-T880 MP4	Mali 450	Adreno 430	Intel HD Graphics
Screen size	10.2in	8.4in	7in	10.1in	7.9in
Screen resolution	2560x1800	2560x1600	1024x600	2560x1600	2048x1536
Pixel density	308ppi	359ppi	171ppi	299ppi	326ppi
Screen technology	IPS	IPS	IPS	IPS	IPS
Front camera	2Mp	8Mp	VGA	5.1Mp	5Mp
Rear camera	8Mp	8Mp	2Mp	8.1Mp	8Mp
Video recording	1080p	1080p	Not specified	1080p	Not specified
Cellular connectivity	×	×	×	4G version available	×
Wi-Fi	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac	802.11a/b/g/n	802.11a/b/g/n/ac, dual-band	802.11a/b/g/n/ac, dual-band
Bluetooth	Bluetooth 4.1	Bluetooth 4.1	Bluetooth 4.0	Bluetooth 4.1	Bluetooth 4.1
GPS	×	×	×	A-GPS, Glonass	×
NFC	×	×	×	✓	×
USB OTG	×	×	×	✓	×
Fingerprint scanner	×	✓	×	×	×
Waterproof	×	×	×	×	×
Extra features	None	None	None	None	None
Geekbench 3.0 (single)	Not tested	Not tested	Not tested	Not tested	Not tested
Geekbench 3.0 (multi)	4048	5060 (Geekbench 4.0)	Not tested	4573	3280
JetStream	Not tested	Not tested	Not tested	580ms (SunSpider)	454
GFXBench: T-Rex	48fps	Not tested	Not tested	37fps	30fps
GFXBench: Manhattan	28fps	Not tested	Not tested	16fps	13fps
Battery	9000mAh, non-removable	5100mAh, non-removable	Not specified	6000mAh, non-removable	6190mAh, non-removable
Dimensions	242x179x7mm	215.5x124.2x7.3mm	191x115x10.6mm	254x167x6.1mm	200x133x7mm
Weight	517g	517g	313g	393g	322g
Warranty	1 year	1 year	1-year return-to-base	1 year	1 year
FULL REVIEW	TINYURL.COM/ZA79M7Z	TINYURL.COM/ZA79M7Z	TINYURL.COM/J3LJP7T	TINYURL.COM/JG34GZP	TINYURL.COM/H7DYTTL

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Best smartwatches	1	2	3	4	5
	Huawei Watch	Apple Watch Series 2	Motorola Moto 360 2	Samsung Gear S2	Fossil Q Founder
Price	£289 inc VAT	£369 inc VAT	£229 inc VAT	£199 inc VAT	£259 inc VAT
Website	Consumer.huawei.com/en	Apple.com/uk	Motorola.co.uk	Samsung.com/uk	Fossil.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Operating system	Android Wear	iOS 10	Android Wear	Tizen-based OS	Android Wear
Compatibility	Android	iOS	Android, iOS	Android, iOS	Android, iOS
Display	1.4in 400x400 AMOLED	38mm, 340x272; 42mm, 390x312, AMOLED	1.37in 360x325 LCD	1.2in 360x360 AMOLED	1.5in, 360x326 LCD
Processor	Snapdragon 400	S2	Snapdragon 400	1GHz Exynos 3250	Intel Atom Z34XX
RAM	512MB	Not stated	512MB	512MB	1GB
Storage	4GB	4GB	4GB	4GB	4GB
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery	300mAh	273mAh	300mAh	250mAh	400mAh
Dimensions	42x11.3mm	38.6/42.5x33.3/36.4mm	42x11.4mm	42.3x49.8x11.4mm	47x13mm
Weight	40g	28.2g/34.2g	53.6g	47g	156g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PXV9PVX	TINYURL.COM/HAT545L	TINYURL.COM/GUJR9XX	TINYURL.COM/P4UKB74	TINYURL.COM/Z3X6D6F

Best smartwatches	6	7	8	9	10
	Samsung Gear S3 Frontier	LG G Watch R	Asus ZenWatch 2	Motorola Moto 360	LG Watch Urbane
Price	£349 inc VAT	£195 inc VAT	£149 inc VAT	£199 inc VAT	£259 inc VAT
Website	Samsung.com/uk	Lg.com/uk	Uk.sasus.com	Motorola.co.uk	Lg.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Operating system	Tizen-based OS	Android Wear	Android Wear	Android Wear	Android Wear
Compatibility	Android, iOS	Android	Android, iOS	Android	Android
Display	1.3in 360x360 Super AMOLED	1.3in 320x320 P-OLED	1.63in 320x320 LCD	1.56in 290x320 LCD	1.3in 320x320 P-OLED
Processor	1GHz Dual-core	1.2GHz Snapdragon 400	1.2GHz Snapdragon 400	TI OMAP 3	1.2GHz Snapdragon 400
RAM	768MB	512MB	512MB	512MB	512MB
Storage	4GB	4GB	4GB	4GB	4GB
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery	380mAh	410mAh	300mAh	320mAh	410mAh
Dimensions	46x49x12.97mm	46.4x53.6x9.7mm	40.7x49.6x10.9mm	46x11.5mm	46x52x10.9mm
Weight	62g (without strap)	62g	50g	49g (leather band model)	67g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/GSSNXZM	TINYURL.COM/QATY8FT	TINYURL.COM/ZVRZLNJ	TINYURL.COM/O9C69K6	TINYURL.COM/Q3VK7ES

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Best activity trackers	1	2	3	4	5
	Fitbit Charge 2	Fitbit Charge HR	Apple Watch Series 2	Fitbit Alta	Xiaomi Mi Band 2
Price	£129 inc VAT	£119 inc VAT	£369 inc VAT	£99 inc VAT	£33 inc VAT
Website	Fitbit.com/uk	Fitbit.com/uk	Apple.com/uk	Fitbit.com/uk	Mi.com/en
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Compatibility	iOS, Android, Windows	iOS, Android, Windows	iOS	iOS, Android, Windows	iOS, Android
Display	OLED	OLED	AMOLED	OLED	OLED
Pedometer	Yes	Yes	Yes	Yes	Yes
Heart-rate monitor	Yes	Yes	Yes	No	Yes
Sleep tracking	Yes	Yes	No	Yes	Yes
Alarm	Yes	Yes	Yes	Yes	Yes
Third-party app synching	Yes	Yes	Yes	Yes	Yes
Call notifications	Yes	Yes	Yes	Yes	Yes
Waterproof	Yes	Yes	Yes	Yes	Yes
Battery life	5 days	5+ days	18 hours	5 days	20-day
Weight	35g	26g	28.2g/34.2g	32g	7g (tracker only)
FULL REVIEW	TINYURL.COM/Z3NN8RL	TINYURL.COM/PCKV4SU	TINYURL.COM/HAT545L	TINYURL.COM/ZO8TN2L	TINYURL.COM/ZAF60AW

Best activity trackers	6	7	8	9	10
	Fitbit Surge	Misfit Ray	MyZone MZ-3	Microsoft Band 2	Fitbit One
Price	£199 inc VAT	£79 inc VAT	£129 inc VAT	£199 inc VAT	£79 inc VAT
Website	Fitbit.com/uk	Misfit.com	Myzone.org	Microsoft.com/en-gb	Fitbit.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Compatibility	iOS, Android, Windows	iOS, Android	iOS, Android, Windows	iOS, Android, Windows	iOS, Android
Display	Touchscreen	No	No	AMOLED	OLED
Pedometer	Yes	Yes	No	Yes	Yes
Heart-rate monitor	Yes	No	Yes	Yes	No
Sleep tracking	Yes	Yes	No	Yes	Yes
Alarm	Yes	Yes	No	Yes	Yes
Third-party app synching	Yes	Yes	No	Yes	Yes
Call notifications	Yes	Yes	No	Yes	No
Waterproof	Yes	Yes	Yes	Yes	No
Battery life	5 days	6 months	7 months	2 days	10-14 days
Weight	51g	8g	Not stated	159g	8g
FULL REVIEW	TINYURL.COM/O83DR47	TINYURL.COM/JG3XVT9	TINYURL.COM/HK5JOXX	TINYURL.COM/HHP4LMR	TINYURL.COM/PT2TC6F

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Best printers	1	2	3	4	5
	Canon Pixma MG7550	Samsung Xpress M2835DW	Brother HL-L9200CDWT	HP LaserJet Pro M277dw	HP OfficeJet 7510
Price	£130 inc VAT	£143 inc VAT	£548 inc VAT	£258 inc VAT	£129 inc VAT
Website	Canon.co.uk	Samsung.com/uk	Brother.co.uk	Hp.com/uk	Hp.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Colour inkjet	Mono laser	Colour laser	Colour laser	Colour inkjet
Max print resolution	9600x2400dpi	4800x600dpi	2400x600dpi	300dpi	1200x600dpi
Actual print speed	B=14.3ppm	B=22.7ppm	B=30ppm C=30ppm	B=15ppm C=13ppm	B=12.5ppm C=7.5ppm
Scan/fax facilities	2400x4800dpi scanner	None	None	1200x1200dpi scanner, 300x300dpi fax	1200x1200dpi scanner, 300x300dpi fax
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=1p C=5.9p	B=2.2p C=9p	B=1.7p C=3.3p
Media card/auto duplex	x✓	x✓	x✓	x✓	x✓
Input capacity	125 sheets	250 sheets	750 sheets + 50 sheet	150 sheets + 50 sheet	250 sheets + 75 sheet
Dimensions	435x370x148mm	368x335x202mm	410x495x445mm	420x417x322mm	613x725x287mm
Weight	7.9kg	7.4kg	28.3kg	16.3kg	13kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/PZ3SVH7	TINYURL.COM/QECOF7V	TINYURL.COM/PT52MH6	TINYURL.COM/GPXACL7	TINYURL.COM/HDXF85Y

Best printers	6	7	8	9	10
	Epson EcoTank ET-2500	HP OfficeJet 3830	Lexmark CS410dn	HP Envy 5640 e-All-in-One	Epson Expression XP-530
Price	£229 inc VAT	£60 inc VAT	£268 inc VAT	£69 inc VAT	£92 inc VAT
Website	Epson.co.uk	Hp.com/uk	Lexmark.co.uk	Hp.com/uk	Epson.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Technology	Colour inkjet	Colour inkjet	Colour laser	Colour inkjet	Colour inkjet
Max print resolution	5760x1440dpi	1200x1200dpi	2400x600dpi	4800x1200dpi	5760x1440dpi
Actual print speed	B=7.5ppm C=4ppm	B=11ppm C=4ppm	B=30ppm C=30ppm	B=12.5ppm C=8.5ppm	B=9.5ppm C=9ppm
Scan/fax facilities	2400x4800dpi scanner	None	None	1200x1200dpi scanner	2400x1200dpi scanner
Supported interfaces	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, 802.11b/g/n, AirPrint	USB 2.0, ethernet, 802.11b/g/n	USB 2.0, 802.11b/g/n	USB 2.0, ethernet, 802.11b/g/n
Cost per page	B=0.2p C=0.4p	B=6p C=7p	B=1.8p C=9.5p	B=2.2p C=9p	B=3.8p C=5.2p
Media card/auto duplex	xx	x✓	x✓	✓✓	x✓
Input capacity	100 sheets	60 sheets	250 sheets	125 sheets + 15 sheet	100 sheets
Dimensions	169x489x300mm	222x454x362mm	291x442x407mm	454x410x161mm	390x341x138mm
Weight	4.6kg	5.8kg	20.5kg	6.8kg	6.2kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/ZWCECPA	TINYURL.COM/HBTE9BX	TINYURL.COM/PT52MH6	TINYURL.COM/JGZPOZ3	TINYURL.COM/HRFB62D

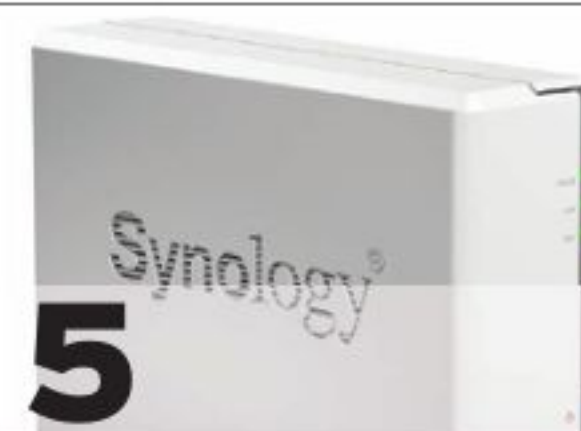
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Best wireless routers	    				
	1	2	3	4	5
	Apple AirPort Extreme	TP-Link Archer VR900	BT Smart Hub	Netgear Nighthawk R7000	TP-Link VR2600
Price	£169 inc VAT	£139 inc VAT	£129 inc VAT	£150 inc VAT	£174 inc VAT
Website	Apple.com/uk	Tp-link.com	Bt.com	Netgear.co.uk	Tp-link.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Standards supported	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac	802.11a/b/g/n/ac
Frequency modes	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)	2.4GHz/5GHz (concurrent)
Antennas	6x internal	3x external	7x internal	3x external	4x external
Built-in modem	x	✓	✓	x	✓
Manufacturer's rating	1300/450Mb/s	1300/600Mb/s	Not specified	1300/600Mb/s	1733/800Mb/s
WPS	x	✓	✓	✓	✓
Ports	Gigabit WAN, 3x gigabit LAN, USB	Gigabit WAN, 1x USB 3.0, 1x USB 2.0	Gigabit LAN, 1x USB 3.0	Gigabit WAN, 1x USB 3.0, 1x USB 2.0	2x USB 3.0, 4 x RJ11
Average power use	8W	N/S	N/S	9W	N/S
Max speed (11n/11ac)	171/572Mb/s	146/622Mb/s	85/239.5Mb/s	171/592Mb/s	Not tested
Dimensions, weight	98x168x98mm, 945g	245x181x90mm, 720g	240x155x65mm	285x186x45mm, 750g	263.8x197.8x37.3mm
Warranty	1 year	Not specified	Not specified	Not specified	Not specified
FULL REVIEW	TINYURL.COM/MFDLLSC	TINYURL.COM/OF8KYPC	TINYURL.COM/ZL9TV96	TINYURL.COM/Q2NRQ8Q	TINYURL.COM/Z6E2DMG

Best powerline adaptors	    				
	1	2	3	4	5
	TP-Link AV2000	TrendNet Powerline 500 AV2	TP-Link AV1200	Solwise SmartLink 1200AV2	Devolvo dLan 1200+
Price	£99 inc VAT	£41 inc VAT	£88 inc VAT	£43 inc VAT	£119 inc VAT
Website	Uk.tp-link.com	Trendnet.com	Uk.tp-link.com	Solwise.com	Devolvo.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
No of adaptors in kit	2	2	2	1 (2 required)	2
Max throughput	2000Mb/s	600Mb/s	1200Mb/s	1200Mb/s	1200Mb/s
Near test result	432Mb/s	146Mb/s	500Mb/s	410Mb/s	357Mb/s
Far test result	117Mb/s	71Mb/s	200Mb/s	107Mb/s	126Mb/s
Ethernet ports	2x gigabit	1x gigabit	1x gigabit	2x gigabit	1x gigabit
Passthrough socket	Yes	No	Yes	Yes	Yes
Wireless hotspot	No	No	No	No	No
Encryption	128-bit	128-bit	128-bit	128-bit	128-bit
Dimensions	131x72x42mm	55x87x58mm	230x190x100mm	62x122x41mm	130x66x42mm
Weight	Not specified	90g	898g	Not specified	Not specified
Warranty	1 year	3 years	1 year	2 years	3 years
FULL REVIEW	TINYURL.COM/H9W89QM	TINYURL.COM/QYEPJQ7	TINYURL.COM/NVONCWT	TINYURL.COM/NZ4EJW8	TINYURL.COM/Q4E004M

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Best NAS drives



	Synology 216+II	Asustor AS1004T	Qnap TS-251A	WD My Cloud Mirror 4TB	Synology DS115j
Price	£239 inc VAT (diskless)	£239 inc VAT (diskless)	£249 inc VAT (diskless)	£239 inc VAT (diskless)	£83 inc VAT (diskless)
Website	Synology.com	Asustor.com	Qnap.com	Wdc.com	Synology.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Drive bays	2	4	2	2	1
Processor	1.6GHz Intel Celeron N3060	1GHz Marvell ARMADA-385	1.6GHz Intel Celeron N3060	1.3GHz Marvell ARMADA-385	800MHz Marvell Armada 370
Memory	1GB DDR3	512MB	2GB DDR3	512MB	256MB DDR3
Remote access	✓	✓	✓	✓	✓
eSATA	✓	✗	✗	✗	✗
USB port	2x USB 3.0, USB 2.0	2x USB 3.0	3x USB 3.0, HDMI, USB 3.0 micro B	1x USB 3.0	2x USB 2.0
Raid options	0/1/JBOD/Basic/Synology Hybrid	0/1/5/6/10/JBOD	0/1/JBOD	0/1/JBOD	None
Software	DSM 6.1	Control Center	QTS 4.2	My Cloud	DSM 5.1
Dimensions	108x165x233.2mm	218x2165x164mm	102x169x219mm	139.9x170.6x49mm	71x161x224mm
Weight	1.25kg	1.5kg	1.28kg	1.6kg	700g
Warranty	2 years	3 years	2 years	2 years	1 year
FULL REVIEW	TINYURL.COM/JRWSCE3	TINYURL.COM/GLCBLG6	TINYURL.COM/JK6KQLN	TINYURL.COM/J76VSHR	TINYURL.COM/MNEYVVK

Best portable hard drives



	Adata SE730	Samsung Portable SSD T3	Transcend ESD400	SanDisk Extreme 500 Portable SSD	Western Digital My Passport
Price	£106 inc VAT	£606 inc VAT	£420 inc VAT	£70 inc VAT	£159 inc VAT
Website	Adata.com	Samsung.com/uk	Transcend-info.com	Sandisk.co.uk	Wdc.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Price per GB (at capacity tested)	46p	32p	39p	31p	4p
Capacity tested	250GB	2TB	256GB	240GB	4TB
Capacity range	250GB	250GB, 500GB, 1TB, 2TB	128GB, 256GB, 512GB, 1TB	120GB, 240GB, 480GB	1TB, 2TB, 3TB, 4TB
Storage	MLC NAND Flash	NAND Flash	NAND Flash	NAND Flash SSD	HDD
Sequential performance	380.8/278.5MB/s	406.9/211.2MB/s	410.8/163.8MB/s	398.3/203.4MB/s	119.3/112.8/s
4K performance	19.8/38.9MB/s	21.9/2.3MB/s	16.1/2.7MB/s	19.8/3.7MB/s	0.5/1.6MB/s
Other interfaces	USB 3.1 Gen 2 Type-C	USB 3.1 Gen 2 Type-C	USB 3.0	USB 3.0	USB 3.0
Encryption	None	256-bit AES	None	128-bit AES	256-bit AES
Software	None	T3 Security Enabler	Transcend Elite Data Management	SanDisk SecureAccess	WD Backup, WD Utilities
Dimensions	44x73x12mm	58x74x10mm	92x62x10.5mm	75.7x75.7x10.7mm	81.5x110x16.3mm
Weight	33g	51g	56g	79g	245g
Warranty	3 years	3 years	3 years	3 years	2 years
FULL REVIEW	TINYURL.COM/OABWL4B	TINYURL.COM/M72D3EP	TINYURL.COM/J43SQM5	TINYURL.COM/HNKNV3M	TINYURL.COM/GP6JNCM

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Best SSDs	<div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> </div>				
	Samsung 850 Evo (500GB)	Toshiba Q300 (480GB)	Samsung 960 Pro (512GB)	Samsung 960 Evo (1TB)	Samsung 850 Pro (1TB)
Price	£109 inc VAT	£79 inc VAT	£311 inc VAT	£404 inc VAT	£365 inc VAT
Website	Samsung.com/uk	Toshiba.co.uk	Samsung.com/uk	Samsung.com/uk	Samsung.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Price per GB	23p	18p	65p	43p	36.5p
4K performance	36.3/106.2MB/s	29.8/65.1MB/s	41.5/165.9MB/s	32.8/50.2MB/s	36/89MB/s
Sequential performance	525.4/512.1MB/s	529.3/511.5MB/s	2048.8/1822.7MB/s	1717.8/1729.8MB/s	508/482MB/s
Memory cache	512MB DDR3 SDRAM	Unknown	512MB DDR3	1GB	1GB LPDDR2
Controller	Samsung MGX	Toshiba TC58NC1000	Samsung Polaris	Samsung Polaris	Samsung MCX
Encryption	AES 256-bit	None	AES 256-bit	AES 256-bit	AES 256-bit
Flash	Samsung 3D V-NAND	TLC NAND	Samsung V-NAND	Samsung V-NAND	Samsung 40nm V-NAND MLC
Connection	SATA III 6GB/s	SATA III 6GB/s	NVMe 1.2	NVMe 1.2	SATA III 6GB/s
Power consumption	4.7W active/0.5W idle	3.6W active/0.3W idle	5.1W active/0.4W idle	5.7W active/0.4W idle	5.8W active/0.6W idle
Warranty	5 years	3 years	5 years	3 years	10 years
Dimensions	69.85x100x6.8mm	69.85x100x7mm	22.15x80.15x2.38mm	22.15x80.15x2.38mm	69.85x100x6.8mm
FULL REVIEW	TINYURL.COM/JB2VWLF	TINYURL.COM/ZZBWFJZ	TINYURL.COM/JOQMWUE	TINYURL.COM/HBSLQJD	TINYURL.COM/OVHDALD

Smart thermostats	<div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> </div>				
	Heat Genius	Honeywell EvoHome	Nest Learning Thermostat	Hive Active Heating 2	Tado
Price (from)	£249 inc VAT	£249 inc VAT	£199 inc VAT	£179 inc VAT	£199 inc VAT
Website	Heatgenius.co.uk	Honeywelluk.com	Nest.com	Hivehome.com	Tado.com/gb
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Zones controlled	6	12	1	1	1
Hot water control	✓	✓	✗	✓	✓
Underfloor heating	✗	✓	✗	✗	✗
Warranty	2 years	18 months	2 years	1 year	1 year
Verdict	Heat Genius is very good at a very useful thing. It is easy to use and efficient. How long it takes to pay for itself will depend on your circumstances, and it may be that a full system is too much of a long-term investment for you. If you are looking to install in your a zoned smart heating system, we are happy to recommend Heat Genius.	EvoHome is the best smart heating system we've tested. It isn't perfect though, and it's also very expensive, or can be. But if you value convenience and comfort above saving money, it's the one to buy.	If you need only a single thermostat and don't need control over hot water, the Nest is a good choice. The Nest Protect smoke and carbon monoxide alarm also works with the thermostat, but it's not cheap. There's also the Nest Cam, but the tie-in with the thermostat is minimal.	The Hive Active Heating system is a great upgrade for anyone that wants or needs the ability to be able to control their heating remotely. It's by no means the most advanced smart thermostat, but it will do the job at a good price for a lot of people.	Tado is the best smart thermostat if you like the idea of presence detection as it simply follows you and your smartphone via GPS, and turns the heating up or down as you get further away or nearer home. There's also hot water control, but the thermostat itself isn't the best looking.
FULL REVIEW	TINYURL.COM/Q2TUKL9	TINYURL.COM/Q3CXA4Z	TINYURL.COM/N9MWV4G	TINYURL.COM/PDLCSAS	TINYURL.COM/O4K3A2A

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Best graphics cards



Asus ROG Strix GTX 1080

MSI GTX 1070 Gaming X 8G

Zotac GeForce GTX 1050 Ti

Nvidia GTX 1080 Founders Ed

Nvidia GTX 1060 Founders Ed

	Asus ROG Strix GTX 1080	MSI GTX 1070 Gaming X 8G	Zotac GeForce GTX 1050 Ti	Nvidia GTX 1080 Founders Ed	Nvidia GTX 1060 Founders Ed
Price	£659 inc VAT	£419 inc VAT	£149 inc VAT	£619 inc VAT	£275 inc VAT
Website	Asus.com/uk	Uk.msi.com	Zotac.com	Nvidia.co.uk	Nvidia.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	Nvidia GeForce GTX 1080	Nvidia GeForce GTX 1070	Nvidia GeForce GTX 1050 Ti	Nvidia GeForce GTX 1080	Nvidia GeForce GTX 1060
Installed RAM	8GB	8GB	4GB DDR5	8GB	6GB
Memory interface	256-bit	256-bit	128-bit	256-bit	192-bit
Core clock/boost	1759/1898MHz	1607/1797MHz	1392/506MHz	1607/1733MHz	1506/1708MHz
Memory clock	10,010MHz	4006MHz	7GHz	10,000MHz	4006MHz
Stream processors	2560	1920	768	2560	1280
Texture units	160	120	48	160	80
Power connectors	1x 8-pin, 1x 6-pin	1x 8-pin, 1x 6-pin		1x 8-pin	2x 6-pin
DirectX	12	12	12	12	12
Digital interface	DVI, 2x HDMI, 2x DisplayPort	DVI, HDMI, 3x DisplayPort	DVI-D, HDMI, DisplayPort	DVI, HDMI, 3x DisplayPort	DVI, HDMI 2.0, 3x DisplayPort 1.4
Warranty	3 years	3 years	3 years	3 years	3 years
FULL REVIEW	TINYURL.COM/HL4SOJ2	TINYURL.COM/J6HWN55	TINYURL.COM/J6HWN55	TINYURL.COM/ZEQXYQU	TINYURL.COM/HH6TYT8

Best graphics cards



XFX Radeon RX 480

XFX AMD Radeon RX460

Sapphire Radeon R7 250X

Asus GeForce GTX 980 Ti

Zotac GeForce GTX 980 Ti

	XFX Radeon RX 480	XFX AMD Radeon RX460	Sapphire Radeon R7 250X	Asus GeForce GTX 980 Ti	Zotac GeForce GTX 980 Ti
Price	£249 inc VAT	£129 inc VAT	£65 inc VAT	£639 inc VAT	£532 inc VAT
Website	Novatech.co.uk	Xfxforce.com	Sapphiretech.com	Asus.com/uk	Zotac.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Graphics processor	AMD Radeon RX480	AMD Radeon RX 460	AMD Radeon R7 250X	nVidia GeForce GTX 980 Ti	nVidia GeForce GTX 980 Ti
Installed RAM	8GB	4GB GDDR5	1GB GDDR5	12GB	12GB
Memory interface	256-bit	128-bit	128-bit	384-bit	512-bit
Core clock/boost	1120/1288MHz	1220MHz	950MHz	1216/1317MHz	1105/1140MHz
Memory clock	7000MHz	7GHz	1125/4500MHz	7200MHz	7010MHz
Stream processors	2304	896	640	2816	2816
Texture units	144	56	40	172	172
Power connectors	1x 6-pin	1x 6-pin	1x 6-pin	2x 8-pin	1x 8-pin, 1x 6-pin
DirectX	12	12	12	12	12
Digital interface	3x DP 1.4, HDMI	DVI-D, HDMI, DisplayPort	1x DVI, HDMI, DisplayPort	DVI, HDMI 2.0, 3x DisplayPort 1.2	DVI, HDMI, 3x Mini-DisplayPort
Warranty	2 years	3 years	2 years	3 years	5 years
FULL REVIEW	TINYURL.COM/HSVQWBQ	TINYURL.COM/JKSP5OE	TINYURL.COM/OLJ83SQ	TINYURL.COM/NDZZQKJ	TINYURL.COM/POYHNUH

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Best 4K flat-panel TVs					
	1	2	3	4	5
	Panasonic TX-50CX802B	Samsung UE48JU7000	Sony KD-55X8505C	Philips 40PUT6400	Finlux 55UX3EC320S
Price	£1,299 inc VAT	£1,200 inc VAT	£1,200 inc VAT	£449 inc VAT	£799 inc VAT
Website	Panasonic.co.uk	Samsung.com/uk	Sony.co.uk	Philips.co.uk	Finlux.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	50in	48in	55in	40in	55in
Panel type	LCD (LED)	LCD (LED)	LCD (LED)	LCD (LED)	LCD (LED)
Native resolution	3840x2160	3840x2160	3840x2160	3840x2160	3840x2160
3D enabled	✓	✓	✓	✗	✗
Apps	BBC iPlayer, ITV Player, All 4, Demand 5, Netflix, YouTube, Amazon	BBC iPlayer, ITV Player, All 4, Netflix, Amazon, YouTube and apps store	YouView with BBC iPlayer, ITV Player, All 4 and Demand 5; Netflix, YouTube, Amazon	BBC iPlayer, Netflix, YouTube, Spotify Connect, Daily Motion, Philips App Store, Google Play	BBC iPlayer, Netflix, YouTube, Twitter, Facebook, Viewster, Flickr
Networking	Ethernet, Wi-Fi, Wi-Fi Direct	Ethernet, Wi-Fi, Wi-Fi Direct	Ethernet, Wi-Fi, Wi-Fi Direct	Ethernet, Wi-Fi, Wi-Fi Direct	Ethernet, Wi-Fi
Inputs	3x HDMI, 3x USB	4x HDMI, 3x USB	4x HDMI, 3x USB	4x HDMI, 3x USB	4x HDMI, 3x USB
Dimensions	112.1x4.6x65.2cm	108.7x6.7x63cm	123.6x6x72.2cm	90.4x8.3x52.6m	123.3x10.6x71.3cm
Weight	18kg	11.1kg	19.9kg	7.8kg	17.2kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/ZLFQ3JV	TINYURL.COM/Q2W3VZY	TINYURL.COM/ZGSP9FM	TINYURL.COM/JQVWCFU	TINYURL.COM/P934VXT

Best 4K flat-panel displays					
	1	2	3	4	5
	BenQ BL3201PT	Philips BDM4065UC	BenQ RL2460HT	AOC G2460VQ6	ViewSonic VX2457-mhd
Price	£699 inc VAT	£600 inc VAT	£168 inc VAT	£122 inc VAT	£139 inc VAT
Website	Benq.co.uk	Philips.co.uk	Benq.co.uk	Aoc-europe.com	Viewsoniceurope.com/uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	32in	40in	24in	24in	23.6in
Panel type	IPS	VA	TN matt	TN matt	TN matt
Native resolution	3840x2160	3840x2160	1920x1080	1920x1080	1920x1080
Pixel density	157ppi	110ppi	92ppi	92ppi	93ppi
Brightness	350cd/m²	120cd/m²	250cd/m²	250cd/m²	300cd/m²
Static contrast ratio	1000:1	5000:1	1000:1	1000:1	1000:1
Response time	4ms	8.5ms	1ms	1ms	2ms
Ports	DVI-DL, HDMI, DP, mDP	HDMI, DP, mDP, VGA	2x HDMI, DVI, VGA, Aux in/out, HDMI out	DP, HDMI, VGA, Aux in/out	DP, HDMI, VGA, Aux in/out
Dimensions	490.2x740.3x213.4mm	904x512x88mm	579x213x502mm	565.4x219.3x411.6mm	558.7x229.6x422.4mm
Weight	12.5kg	8.5kg	5.2kg	4.27kg	4.08kg
Warranty	3 years	2 years	3 years	3 years	2 years
FULL REVIEW	TINYURL.COM/NPA62QL	TINYURL.COM/Q2W3VZY	TINYURL.COM/ZA48HDY	TINYURL.COM/HOGLYL3	TINYURL.COM/HBVD2GD

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Best e-book readers



	Amazon Kindle Voyage	Amazon Kindle Oasis	Amazon Kindle (8th gen)	Amazon Kindle Paperwhite	Amazon Kindle (7th gen)
Price	£169 inc VAT	£269 inc VAT	£59 inc VAT	£109 inc VAT	£59 inc VAT
Website	Amazon.co.uk	Amazon.co.uk	Amazon.co.uk	Amazon.co.uk	Amazon.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Screen size	6in touchscreen	6in touchscreen	6in touchscreen	6in touchscreen	6in touchscreen
Screen technology	E Ink	E Ink	E Ink	E Ink	E Ink
Screen resolution	1440x1080	1440x1080	600x800	768x1024	600x800
Built-in light	Yes	Yes	No	Yes	No
Storage	4GB	4GB	4GB	2GB	4GB
Book store	Amazon Kindle	Amazon Kindle	Amazon Kindle	Amazon Kindle	Amazon Kindle
Cellular connectivity	Optional extra	Optional extra	No	Optional extra	No
Battery life	Six weeks	Eight weeks	Four weeks	Eight weeks	Four weeks
Dimensions	162x115x7.6mm	143x122x8.5mm	160x115x9.1mm	117x169x9.1mm	169x119x10.2mm
Weight	180g	131g	161g	206g	191g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NXAAU3Q	TINYURL.COM/Z924POY	TINYURL.COM/HJONZA4	TINYURL.COM/PREZPRK	TINYURL.COM/NSFORJE

Best media streamers



	Roku Streaming Stick	Roku 3	Google Chromecast 2	Amazon Fire TV Stick	Google Chromecast
Price	£49 inc VAT	£99 inc VAT	£30 inc VAT	£35 inc VAT	£30 inc VAT
Website	Roku.com	Roku.com	Play.google.com	Apple.com/uk	Play.google.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Type	Dongle	Set-top box	Dongle	Dongle	Dongle
Ports	HDMI, Micro-USB	HDMI, USB, ethernet	HDMI, Micro-USB	HDMI, Micro-USB	HDMI, Micro-USB
Processor	600MHz single-core	900MHz single-core	13.GHz dual-core	Dual-core	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)	None
Voice search	No	Yes	No	No	No
Remote control	Yes	Yes	No	Yes	No
Dimensions	78.7x27.9x12.7mm	89x89x25mm	52x52x13.5mm	84.9x25x11.5mm	72x35x12mm
Weight	18g	170g	39g	25g	34g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/OAP9QF9	TINYURL.COM/PT7MGUL	TINYURL.COM/Q4B6B29	TINYURL.COM/NAQRNOC	TINYURL.COM/QBGTC52

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Best games consoles	1	2	3	4	5
					
	Sony PlayStation 4 Pro	Microsoft Xbox One S	Sony PlayStation 4 Slim	Sony PlayStation 4	Microsoft Xbox One
Price	£349 inc VAT	£349 inc VAT	£259 inc VAT	£259 inc VAT	£349 inc VAT
Website	Playstation.com	Xbox.com	Playstation.com	Playstation.com	Xbox.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Processor	Octa-core AMD x86-64	1.75GHz octa-core AMD x86	Octa-core AMD x86	Octa-core AMD x86	1.75GHz octa-core AMD x86
Graphics	4.2TFlops AMD Radeon GPU	AMD Radeon GPU at 914MHz	1.84TFlops AMD Radeon GPU	1.84TFlops AMD Radeon GPU	1.31TFlops AMD Radeon GPU
RAM	8GB GDDR5	8GB DDR3	8GB GDDR5	8GB GDDR5	8GB DDR3
Storage	1TB	500GB, 1TB or 2TB	500GB	500GB	500GB
Optical drive	Blu-ray, DVD, game discs	4K Blu-ray, DVD, game discs	Blu-ray, DVD, game discs	Blu-ray, DVD, game discs	Blu-ray, DVD, game discs
Ports	3x USB 3.1, AUX, HDMI	3x USB 3.0, HDMI 2.0, Kinect port	2x USB 3.0, AUX, HDMI	2x USB 3.0, AUX, HDMI	USB 3.0, HDMI
Connectivity	Ethernet, 802.11b/g/n/ac, Bluetooth	Ethernet, 802.11b/g/n/ac	Ethernet, 802.11b/g/n, Bluetooth	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, 4K, Kinect option
Dimensions	327x295x55mm	3294x226x64mm	275x53x305mm	275x53x305mm	333x274x79mm
Weight	3.3kg	2.9kg	2.8kg	2.8kg	3.2kg
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/HCNB3XP	TINYURL.COM/HWO8PUJ	TINYURL.COM/HUL2J8Q	TINYURL.COM/NBFLQK2	TINYURL.COM/M6J4KHS

Best budget portable speakers	1	2	3	4	5
					
	Denon Envaya Mini	Sumvision Psyc Monic	UE Roll	Marsboy 5W Orb	Lumsing B9
Price	£99 inc VAT	£37 inc VAT	£99 inc VAT	£38 inc VAT	£23 inc VAT
Website	Denon.com	Sumvision.com	Ultimateears.com	Amazon.co.uk	Lumsing.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Speaker(s)	Not specified	Not specified	Not specified	Not specified	Not specified
Bluetooth	Bluetooth 4.0	Bluetooth 4.0	Bluetooth	Bluetooth 4.1 + EDR	Bluetooth 3.0 + EDR
Handsfree calls	Yes	No	No	No	Yes
NFC	Yes	No	Yes	No	Yes
Frequency response	Not specified	90Hz to 20KHz	108Hz to 20kHz	80Hz to 18kHz	20Hz to 20kHz
Impedance	Not specified	Not specified	Not specified	4 ohms	4 ohms
Extra features	IPX4 splashproof	None	IPX7 splashproof	MicroSD slot	MicroSD slot, lanyard
Claimed battery life	10 hours	7 hours	9 hours	12 hours	25 hours
Dimensions	209x54x51mm	200x60x60mm	134x39x40mm	150x148x138mm	177x50x70mm
Weight	558g	Not stated	330g	454g	300g
Warranty	1 year	1 year	2 years	1 year	1 year
FULL REVIEW	TINYURL.COM/QDRNP3P	TINYURL.COM/JC8CZM2	TINYURL.COM/O7T7ZUU	TINYURL.COM/JJLOPCD	TINYURL.COM/P623MK8

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Best headphones	1	2	3	4	5
	B&W P9 Signature	Bose QuietComfort 35	Denon AH-D600	Sharkk Bravo	Denon AH-MM400
Price	£699 inc VAT	£289 inc VAT	£229 inc VAT	£249 inc VAT	£196 inc VAT
Website	Bowers-wilkins.co.uk	Bose.co.uk	Denon.co.uk	Sharkk.com	Denon.co.uk
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Type	Circumaural over-ear	Circumaural over-ear	Circumaural over-ear	Circumaural over-ear	Circumaural over-ear
Frequency response	Not stated	Not stated	5Hz to 45kHz	6Hz to 45kHz	10Hz to 40kHz
Nominal impedance	Not stated	Not stated	25 ohms	32 ohms	32 ohms
Sensitivity	Not stated	Not stated	108dB	118dB	96dB
In-line remote	No	No	Yes	No	Yes
Mic	Yes	Yes	Yes	No	Yes
Extra tips	N/A	N/A	N/A	N/A	N/A
Carry case	Yes	Yes	Yes	Yes	Yes
Cable length	Not stated	1.2m	3m	1.35m	Not stated
Weight	413g	310g	250g	294g	310g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/HDR2UUG	TINYURL.COM/JZWSSSQ	TINYURL.COM/NBCFJW6	TINYURL.COM/Z5BGX9X	TINYURL.COM/J7G56N9

Best headphones	6	7	8	9	10
	Final Audio Design Sonorous III	Audio-Technica ATH-WS99	Bose QuietComfort 20	Bowers & Wilkins P5	Kef M100
Price	£299 inc VAT	£79 inc VAT	£259 inc VAT	£249 inc VAT	£119 inc VAT
Website	Final-audio-design.com	Eu.audio-technica.com/en	Bose.co.uk	Bowers-wilkins.co.uk	Kef.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Type	Circumaural over-ear	Over-ear	In-ear	On-ear, foldable	In-ear
Frequency response	Not stated	8Hz to 25kHz	20-21kHz	10Hz to 20kHz	20Hz to 20kHz
Nominal impedance	25 ohms	37 ohms	32 ohms	22 ohms	50 ohms
Sensitivity	105dB	120dB	105dB	108dB	-25dB
In-line remote	No	Yes	Yes	No	Yes
Mic	No	Yes	Yes	Yes	Yes
Extra tips	N/A	N/A	Yes	N/A	Yes
Carry case	No	No	Yes	No	Yes
Cable length	1.5m	0.8m	1.3m	1.2m	1.3m
Weight	410g	250g	44g	195g	18g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/JQW529E	TINYURL.COM/QDRCCAT	TINYURL.COM/OEAGFOF	TINYURL.COM/NNRV6UT	TINYURL.COM/Z384BD2

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Best power banks					
	1	2	3	4	5
	Zendure A2 (2nd gen)	Anker PowerCore 10000	Omnicharge13	CHJDG UltraCompact	Xiaomi 10,000mAh
Price	£25 inc VAT	£20 inc VAT	£103 inc VAT	£19 inc VAT	£11 inc VAT
Website	Zendure.com	Anker.com	Omnicharge.co	Chargedpower.com	Mi.com/en
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Capacity	6700mAh	10,000mAh	13,600mAh	10,000mAh	10,000mAh
Input	1x 7.5W Micro-USB	1x 10W Micro-USB	DC 4.5-36V, 1W-34W	1x 5W Micro-USB	1x 10W Micro-USB
Outputs	1x 10.5W USB	1x QC 3.0 USB	2x 4.8A USB ports, plug socket	1x 10.5W USB	1x 10.5W USB
Auto-on/-off	Yes	Yes/No	No	Yes/No	Yes
Passthrough charging	Yes	No	Yes	Yes	Yes
Status indicator	4 LEDs	4 LEDs	OLED display	4 LEDs	4 LEDs
LED flashlight	No	No	No	No	No
Carry case	Yes	No	No	No	No
Dimensions	93x48x23mm	92x60x22mm	135x85x23.5mm	93x19x63mm	91x60.4x22mm
Weight	137g	188g	365g	181g	207g
Warranty	1 year	1 year	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/NGCN05F	TINYURL.COM/ZSREH65	TINYURL.COM/JL97MK5	TINYURL.COM/JMOUUUO	TINYURL.COM/NFQZOCB

Best desktop chargers					
	1	2	3	4	5
	Tronsmart Titan	Tronsmart U5PTA	CHOEtch 6-port Charger	Aukey USB Charging Station	iClever USB Travel Charger
Price	£25 inc VAT	£22 inc VAT	£25 inc VAT	£17 inc VAT	£20 inc VAT
Website	Tronsmart.com	Tronsmart.com	Choetech.com	Hisgadget.com	Hisgadget.com
Overall rating	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Max output	90W	54W	60W	54W	50W
Outputs:					
USB 1	QC 2.0	QC 3.0	QC 2.0	QC 2.0	12W USB
USB 2	QC 2.0	12W	QC 2.0	12W	12W USB
USB 3	QC 2.0	12W	12W	12W	12W USB
USB 4	QC 2.0	12W	12W	12W	12W USB
USB 5	QC 2.0	12W	12W	12W	12W USB
USB 6	N/A	N/A	12W	N/A	12W USB
Colours available	Black	Black	Black	Black	Black
Dimensions	160x81x28mm	165x156x56mm	71.5x29x88.4mm	94x60x25mm	100x69x27mm
Weight	292g	390g	158g	149g	180g
Warranty	1 year	18 months	1 year	1 year	1 year
FULL REVIEW	TINYURL.COM/GMVDCHM	TINYURL.COM/QG4X5D9	TINYURL.COM/QG4X5D9	TINYURL.COM/P2CZMCU	TINYURL.COM/MPA4DWC

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10 biggest hacks of user data in 2016...

...and how to protect yourself in 2017. [Howard Wen](#) reports

You take great pains to come up with a strong password when registering for an account on a website, only to see that site get hacked. Several had their databases of user accounts not only breached but stolen in 2016. The following websites are ranked starting with the fewest number of user accounts with stolen passwords.

Also, these hacks were reported to have been executed during 2016, so this list does not feature Myspace (427 million user accounts stolen) or Yahoo (a cool billion). Both were supposedly hacked before 2016, but were only reported last year. This list also does not include reports of user records that were exposed due to poor security, but where there is no evidence they were actually stolen.

10. i-Dressup: 2.2 million

This social site for teenage girls was found to have a vulnerability in June when a hacker extracted user account passwords and emails from it. They claimed it took them three weeks to download the information for 2.2 million accounts, but that there were 3.3 million

more still open for the taking. The passwords weren't protected with encryption.

Lesson: Don't sign onto a site that doesn't provide strong encryption.

9. DLH.Net: 3.3 million

The registered users of this gaming site, had their full names, usernames, passwords, email addresses, and other data taken on 31 July. Around 84 percent of the passwords were decrypted because they had been protected with weak algorithms. Facebook access tokens were also stolen from those who had signed in to DLH.Net using their account with this social network.

This website was hacked by the same unknown perpetrator, who on 10 July breached the official forum for the game Dota 2, swiping nearly two million forum member usernames, passwords, email addresses and IP addresses. These passwords were protected with weak encryption; over 80 percent of them were cracked. This hacker also exploited security vulnerability in the site's forum software.

Lesson: Don't sign into a site using your Facebook credentials, unless it's Facebook.

8. Leet: 5 million

Leet is a cloud service that lets you set up servers on your Android smartphone or iPhone to host games for the mobile version of Minecraft. In a hack that possibly took place in early February 2016, someone stole account usernames, passwords, email addresses and IP addresses. Initially, 2 million records of user information were released in September, soon followed by another 3 million.

Lesson: Make absolutely sure that you don't use the same password for more than one site.

7. ClixSense: 6.6 million

Around 2.4 million people who signed up for this site, which paid them to fill online surveys and watch ads, had their full names, email addresses, passwords, dates of birth, gender, home addresses and IP addresses dumped onto the internet for all to see. The hackers offered for sale the same personal details for another 4.2 million people who had signed up with ClixSense. The information contained in this data, stolen in early September, was current as of mid-August and was stored without any encryption.

Lesson: Don't divulge personal information such as your home address or date of birth.

6. Lifeboat: 7 million

Here's another Minecraft-related site hack. Somehow the usernames and passwords for all members of this community, who play the mobile version of Minecraft together online, were leaked onto the internet. The company admitted that it had been aware of this theft since early January and decided to force users to change their passwords. However, the press reporting this contacted three registered members of Lifeboat, who all claimed they hadn't received a notice to reset their passwords.

Lesson: Change your passwords frequently, even when you're not prompted to.

5. Dailymotion: 18 million

This video streaming site - not as popular as YouTube but still heavily visited - had its user database stolen on 20 October by an unknown hacker through unknown means. Over 85 million usernames and email addresses were taken, of which one out of every five had passwords associated with these accounts. These passwords were protected with strong encryption, making them difficult to crack.

Lesson: Think about creating multiple email accounts, one for your personal business, another for online entertainment, gaming, and so on.

4. Mail.ru: 25 million

Yet another major hack tied to gaming communities and insecure message forums: in July and August, hackers attacked three gaming forums hosted by this Russian internet company. Among the records lifted

were usernames, passwords, email addresses and dates of birth. Some of these forums also exposed the IP addresses and phone numbers of users. About half the passwords were easily cracked due to their weak encryption.

Mail.ru downplayed the hack, saying these attacked forums contained "old passwords". They assured users that the stolen account data was not connected to email accounts and other services provided by the company.

Lesson: Don't give out your phone number.

3. Weebly: 43 million

Weebly is a web hosting platform that lets you easily put together a personal site or simple online store. Usernames, passwords and IP addresses for more than 43 million accounts were stolen in a hack that took place in February. Fortunately, the passwords were secured with strong encryption, and the company said that it did not believe any customer's account had been improperly accessed. The firm also sent emails to customers requiring that they reset their passwords.

Lesson: When you get an email from a web hosting platform telling you to reset your password, do it.

2. VerticalScope: 45 million

If there's a single lesson that everyone should conclude from the hacks of user account databases in 2016, it's to be extra careful when signing up for an account on a message forum. In February, a hacker stole member information for over 1,000 message forums that covered cars, sports and tech communities hosted by the company VerticalScope. This haul contained usernames, passwords and IP addresses - the passwords had weak encryption. And many of these forums were running an old version of software with known security vulnerabilities.

Lesson: Beware of message forums.

1. FriendFinder Networks: 412 million

In May 2015, the FriendFinder Networks company's AdultFriendFinder dating site was hacked, resulting in the personal information of 3.5 million members being stolen: usernames, passwords, email addresses, birth dates, postcodes and sexual preferences. That was nothing compared to 2016.

Leaping to number one, this company, known for its adult-oriented websites, had 20 years' worth of user account information stolen in October. The massive, pilfered trove exposed usernames, passwords and email addresses. The passwords for five of their sites (which include AdultFriendFinder and Penthouse.com) were in plaintext or secured with weak encryption, so weak that 99 percent of them had been cracked.

There was also evidence of accounts that may have been marked for deletion. Yet this breach revealed the existence of these accounts anyway.

Lesson: No words.

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