



OPTIMISE YOUR PC!
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23 PAGES OF WINDOWS
STEP-BY-STEP GUIDES
MAKE YOUR PC PERFECT!



Windows Help & Advice

BOOST YOUR HOME WI-FI

Fine-tune your own network with our **expert DIY tricks!**

THE COMPLETE WINDOWS REINSTALL GUIDE

FIX ANY PC FAST
WITH A REPAIR
OR REINSTALL

BROWSE THE WEB
WITH CONFIDENCE
SURF IN SAFETY THANKS TO
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Welcome

The chances are your PC, tablet and smartphone all rely on your home network to connect to the Internet – and that can be both a blessing and a curse. It's great when you can connect easily and speedily; less so if there are not-spots around your home or your connection is very, very slow.

Our lead feature on page 11 will help restore your sanity by giving you tips, tricks and solutions for boosting your home Wi-Fi and making your online activities more secure at the same time.

After that you might want to pull up a deckchair and discover the smart gadgets that are turning the garden into a high tech playground (page 48); then head to page 52 where we take an in-depth look at PC upgrades.

Plus we have tons of ways to make using your PC easier, more productive and more fun – see page 23 for details.

One more thing: head to www.windowsmag.co.uk and sign up for our newsletter. Enjoy,

Rob

Rob Mead-Green Editor
www.facebook.com/windowsmag



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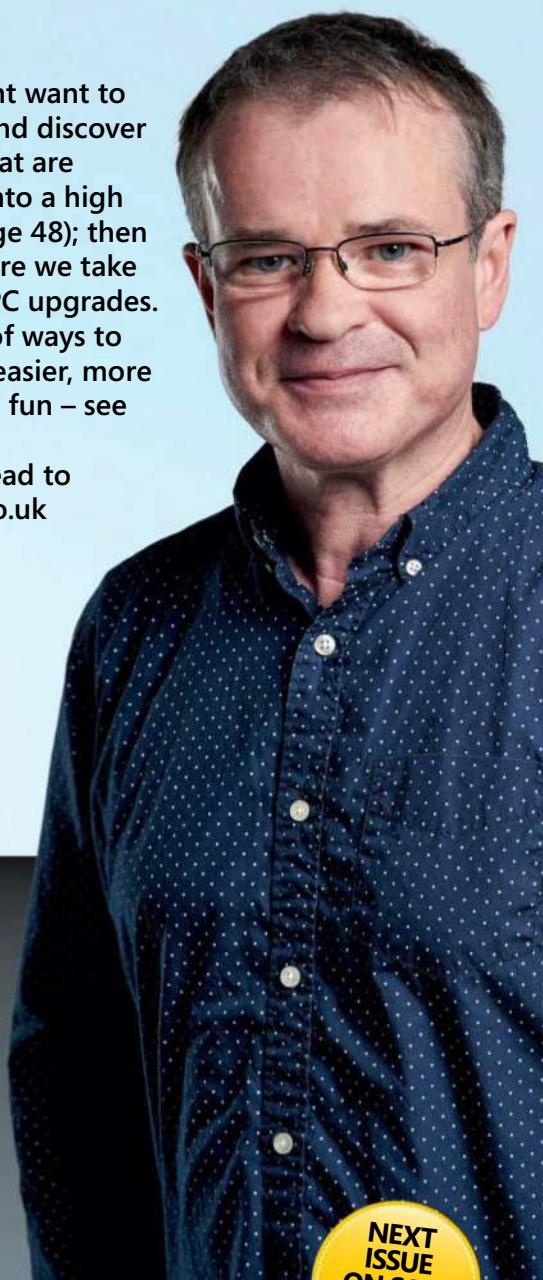
We pride ourselves in being the only magazine on the shelves to show you exactly how to get the very best from the Windows operating system, whether you're using Windows 10 or Windows 8.1. Also, don't forget to take a look at how you can read the magazine on your laptop, smartphone or tablet.

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- Make Windows work for you → Create better Word documents
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Windows Help & Advice

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"If you're looking for better ways to use your home computer, then this is the place to start. We'll show you all the tips and tricks the experts use and more!"

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Digital and print together with free Bluetooth speaker!

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DO IT ALL Get comfortable – you can be connected from just about anywhere these days.

Work wherever you are Start using online tools and get more work done

Embracing online tools isn't difficult – all you need is a slight change in philosophy

You probably have an email account that works through the web. If you're using something like Gmail or Outlook, you'll know that you can get hold of your mail wherever you happen to be. But are you really taking advantage of the ever-connected nature of online services? Take, for example, Google Drive, which can store your important files safely in the cloud, and allow you to view, edit, and share them through Google Docs; while it misses a few of the formatting features of desktop software like Microsoft Office, there's nothing fundamental that it can't do. Microsoft offers its own online service, too – if you're an Office 365 subscriber, you can access a web-based version of its full Office suite.

Editing documents and spreadsheets is fairly basic. But these days it's hard to find a task you can't complete online. If you want to edit photos, Photoshop

Express (www.photoshop.com/tools) or Pixlr (<https://pixlr.com>) are ideal and free to access; for video, you could use YouTube's built-in video editor, or Movie Maker Online (<http://moviemakeronline.com>), an ad-supported, fairly comprehensive editing package. Twistedwave's audio editor (<https://twistedwave.com>) is great if you need to cut or tweak audio clips, there are numerous file format converters online, and the list goes on; if you need to do it, you can find a service to help.

Sometimes there is no real substitute for being in front of your own software on your own PC, though. Teamviewer (www.teamviewer.com/) is by far the easiest way to set up remote control of a distant PC. Install the server app, note down the code and password it gives you, and you can jump on to your desktop from any other machine. You can even run Teamviewer from a USB flash drive.

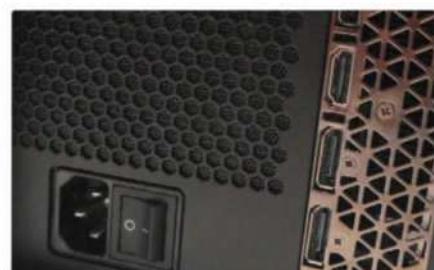
These days it's hard to find a task you can't complete online

EXTERNAL POWER Plug-in graphics are here

The concept of a plug-in graphics module, taking the hot and power-intensive work of generating pretty visuals away from the inside of a PC and into its own enclosure, isn't new. But at last the tech dream looks to be coming true – Razer, maker of RGB peripherals and pricy PCs, has introduced the Core X, the latest in a line of external boxes, but one that's affordable (almost – it's £225) and which promises to bring graphical power to any PC with a Thunderbolt 3 port.



BUILD YOUR OWN You'll need to supply your own card – but this means you can upgrade later.

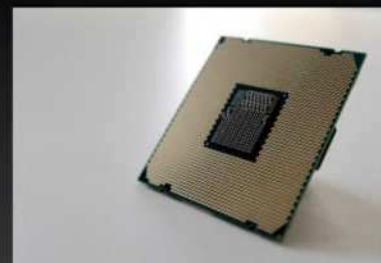


POWERED UP The Core X includes a built-in power supply to give your graphics card juice.



CONNECT IT You can hook up any laptop that supports external graphics – not just Razer's.

The Knowledge... + | ▶



Cannon Lake

What's this?

Intel loves a lake, and (at least internally) names all of its CPUs appropriately. This new mobile processor, codenamed Cannon Lake, is the latest in a long line of body-of-water based CPUs, following Ivy Lake, Kaby Lake, Coffee Lake, *et al*. It's a processor – the next generation of the Core family.

What does it mean for me?

Cannon Lake almost certainly means more computing power with less battery consumption. That's a trend that tends to follow each generation jump in CPU technology; Intel's early announcements about the first processor in the line, the Core i3-8121U, suggest it consumes an average of just 15 watts, which is incredibly low.

What else is special?

Cannon Lake drops down to using a 10nm manufacturing process. This is – when you're using it – pretty meaningless, but it means Intel's silicon is even smaller than ever before, enabling the company to cram more components into each chip and generally allowing those processors to run much cooler than before.

This is all very confusing

Isn't it just? Even we're confused by all the lake names. The big takeaway for all of us should probably just be that computers are going to keep getting faster and more efficient – and since this particular Cannon Lake chip doesn't carry any graphics technology along with it, Intel is probably going to get more comfortable working with AMD or Nvidia.

So can I get my hands on it?

Sadly not. While a host of details about Cannon Lake have leaked out, and Intel says early samples are being sent around, the tech itself probably won't be landing until early 2019 – but the good news is that Intel has also refreshed its eighth-generation processors, so the newest PCs will conform to that upward trend even while we wait.

Everyone's talking about Adaptive controllers

A fully customisable Xbox and Windows controller is helping those with disabilities get into the game

Game controllers, even after many years of development, are not suitable for everyone. It's not always possible to grip them properly, and many disabled people find they don't have the co-ordination or ability to manipulate a pair of thumbsticks or a set of small buttons. Some, like Twitch streamer Clint 'Halfcoordinated' Lexa, have adapted the way they play; Lexa has a disability which restricts the use of his right hand, but has developed a technique which enables him to use his left hand to operate a standard controller, a technique so successful that he holds world-record times for the fastest completion of a number of games on speedrun.com. But that's an unusual example.



CUSTOM CONTROLLERS

For many disabled people, adapting to standard tools is not an option. They need a solution, which suits them exactly. There have been efforts to create custom controllers to suit the needs of individuals, most notably from the charity AbleGamers (ablegamers.com), but these can be slow and impractical to produce; perfect for one

person, but impossible to share with a wider market.

Microsoft's Elite Controller, initially designed for the high-end gamer market, gained some traction with disabled gamers thanks to its ability to swap components and remap buttons for one-handed use, but the company's new Xbox Adaptive Controller, goes a lot further. In its base form it's a flat board with two large buttons and a directional controller, with mounting ports

underneath that allow it to be attached to a stand. But it's what's around the back that's the most important: a string of 19 3.5mm jack sockets, mapped to different controller functions, which accept buttons, foot pedals and other controls, allowing it to

match the user's capabilities perfectly.

In addition, the Xbox Adaptive Controller also supports analogue controllers and many existing accessibility peripherals. Gamers on Xbox One can also take advantage of 'Copilot mode', which splits the controls of a single player between multiple controllers, spreading the load and offering a co-operative multiplayer experience.

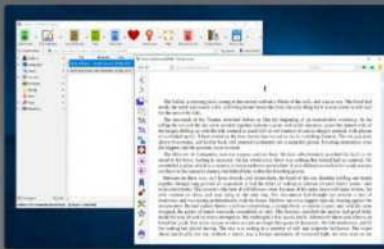
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NEXT ISSUE ON SALE
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20
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THE 60-SECOND QUIZ

Pens at the ready, your time starts now!

1 In which Windows expansion did Chip's Challenge first appear?

- A Microsoft Bob
- B Microsoft Works
- C The Windows Entertainment Pack

2 Which classic game was the inspiration for Chip's Challenge?

- A Sokoban
- B Tetris
- C Pong

3 On which platform was Chip's Challenge first released?

- A Atari Lynx
- B Sega Game Gear
- C Watara SuperVision

4 What is Chip's surname?

- A Chippington
- B Chipperson
- C McCallahan

5 How many levels were included in the Windows version?

- A 64
- B 149
- C 2,457

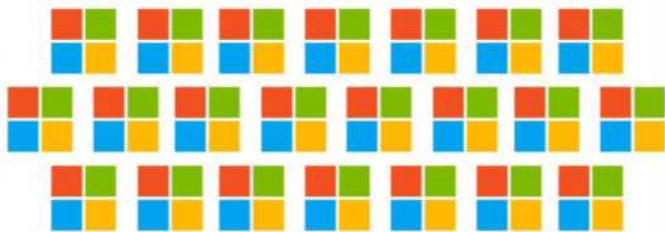
6 Who created the challenge for Chip?

- A Melinda the Mental Marvel
- B Belinda the Brainy
- C Linda the Largely Clever

Answers: 1C, 2A, 3A, 4C, 5B, 6A.

Facts & figures

Rob Mead-Green reveals a host of fascinating digital facts



\$753 BILLION

Market cap of Microsoft, making it the third most valuable company in the world after Apple and Amazon. That figure puts it ahead of Google's parent company Alphabet, which is only worth \$739 billion. Microsoft makes approximately one-third of its money from Windows, Surface and gaming.



20

Maximum number of graphics cards supported by Asus' new H370 Mining Master motherboard. Unsurprisingly it's been designed for cryptocurrency mining. It will go on sale in the US in Q3 2018.



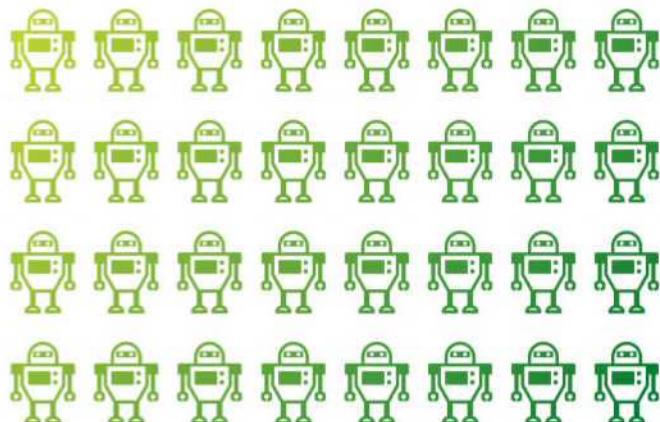
606.2 MILES

On a single charge achieved by a Tesla Model 3, setting a new hypermiling record. Hypermiling is a way to maximise the fuel efficiency of a vehicle by driving at a consistent speed with minimal braking and acceleration.

2



Number of petaflops of processing power achieved by Nvidia's HGX-2 cloud server platform, which it's dubbed "the fastest single computer humanity has ever created". The HGX-2 contains 100 Tesla V100 graphics cards and 0.5 terabytes of GPU memory, enabling it to churn through two quadrillion floating point operations per second (FLOPS). Sadly, you won't be able to buy the HGX-2 on the high street – it's for scientific computing and AI.



2,000,000

Number of people who tuned in to game developer Bethesda's Twitch channel in May to watch... a Vault Boy statue for 24 hours. The reason they were tuning in? To see if Bethesda was about to announce its next Fallout game, dubbed *Fallout 76*. It eventually did... showing a 90-second teaser trailer.

FORTNITE

\$296 MILLION

Amount of money made by Epic Games in the month of April from its smash-hit game *Fortnite* – double what it made in February. The game, which is free to play, makes its money from in-game purchases such as character costumes and dance moves.

>> Incoming

The hottest new Windows hardware on the horizon



Razer Blade

Price £1,699.99-£2,549.99 www.razer.com

Razer may specialise in PC gear for gamers, but we just can't resist the look – and power – of its new mid-range Blade. With 4.9mm thin bezels around its 15.6-inch display and measuring just 17mm thin, Razer says its the smallest gaming laptop available today. But what is it that makes it so special?

Well aside from its gorgeous unibody aluminium shell and RGB-backlit colour keyboard, it's also available with a choice of displays including a 144Hz 1080p Full HD version for super-slick gaming and streaming, and a 4K Ultra HD touch screen. Inside you'll find the latest Intel eighth-gen processors, topping out with a six-core 2.2GHz Core i7-8750H. Plus up to 16GB of RAM (expandable to 32GB), a choice of Nvidia GeForce GTX 1060 or 1070 discrete graphics cards and your pick of 256GB or 512GB solid-state drives (SSDs). It's stealthy enough to use for work; and meaty enough for triple-A gaming on the go. Available now.





BOOST YOUR HOME WI-FI

Improve performance and fix connectivity problems
with our comprehensive guide to optimising
your wireless home network

These days just about everyone has a home network of some sort. Even if you only have the one PC, chances are you're connected to the Internet through a wireless router, and that you take advantage of your home broadband Internet connection to connect all manner of devices – from a smartphone or tablet to a smart TV – through a Wi-Fi network.

Everything should be hunky dory in this modern wireless world, but of course that's not always the case. In this feature we're going to help you troubleshoot the most common networking issues from lost connections to sluggish Internet performance. We'll look at the three critical points in your network: your PC as an individual client that fails to

connect to an otherwise functioning network; your router, which manages both your internal network as well as the outside Internet; and the Internet connection itself as delivered by your Internet Service Provider (ISP) through either copper phone wires or a fibre optic network.

We'll also look at ways of improving your Wi-Fi throughout your home, helping you resolve issues with congested networks as well as interference that can drag performance down and lead to dead spots in certain areas of your living space. There's even time to look at some of your router's hidden functions, tighten security and determine how to pick your next router. If your network isn't running as well as it should, you've come to the right place.

Fix Wi-Fi problems

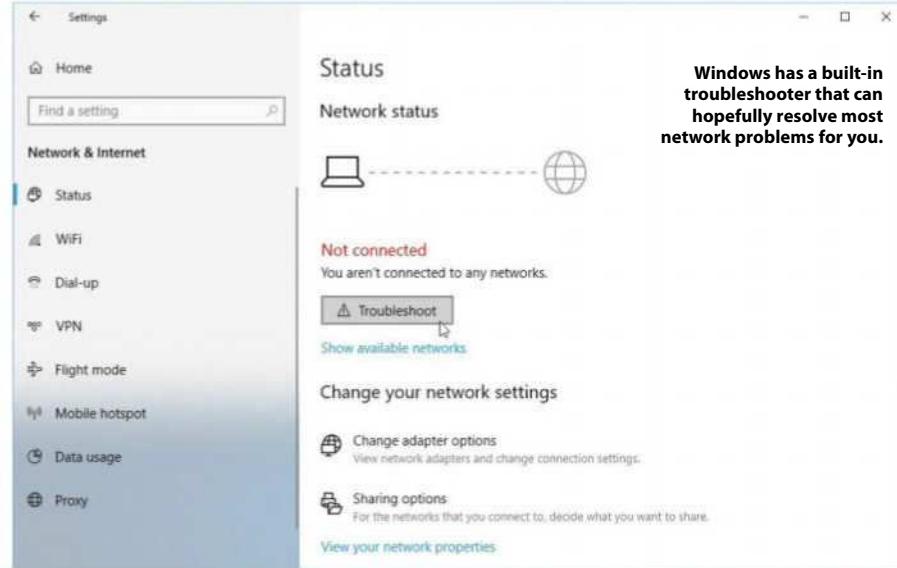
If you're struggling to connect to your network, read on for a series of basic troubleshooting steps to follow

Many connection problems can usually be traced to your PC – in other words, the rest of your network is performing as it should, but your PC is unable to connect for some reason. A quick glance at the Taskbar notification area may provide the first clue here – look at the wireless icon. A yellow exclamation mark tells you you're connected, but that there's a problem – click it to see what the diagnosis is. A red cross indicates the connection has been lost – again click for guidance.

If your network is down, you might see a greyed-out icon with a white asterisk, indicating you're disconnected, but that connections are available. Click to see what networks are visible – it's likely you'll see lots of choices, none of which you recognise. These will be your neighbours' networks – too many of these coupled with your PC's position in relation to the router can lead to interference. Turn to page 14 for some tips on how to resolve this.

First things first

Before troubleshooting, first check your Wi-Fi is physically 'on'. If it's a USB adapter, check it's plugged in firmly; if it's built into your laptop, check for a physical switch and make sure that's on, too. Click the Wi-Fi icon in the Taskbar notification area and if the Wi-Fi

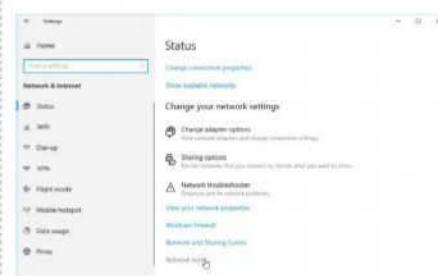


shortcut is greyed out on the pop-up menu, click it to try to switch things back on. While you're here, make sure Flight Mode isn't accidentally on.

If this doesn't help, click 'Network & Internet settings' and focus your attention on the Status and WiFi sections. Status should reveal if your connection is broken and – if it is – where the culprit lies. If you're connected to the network, but the network has no Internet access, jump to the end of this feature.

Scroll down to locate tools that can help fix more basic connection issues:

click 'Network troubleshooter' to test your connection. If it's unable to suggest a fix, the troubleshooter will steer you through a series of questions



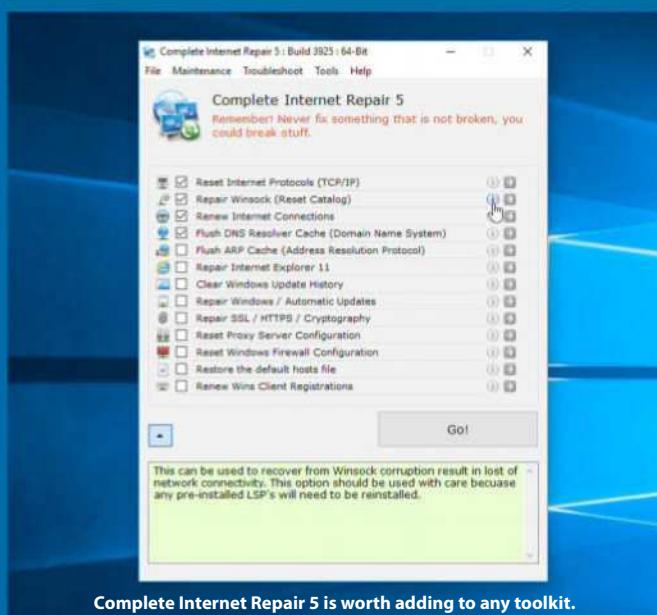
Reset network interface

Sometimes you need to reset specific parts of Windows 10's networking settings to get things working again. The simplest way to do this is with a free tool called Complete Internet Repair (www.rizonesoft.com) – tick the first four boxes and click Go!

This assumes you already have the tool; in the likely event you don't, right-click the Start button or press [Win] + [X] on your keyboard and choose Command Prompt (Admin) or Powershell (Admin). When the command prompt window appears, type the following commands one at a time, pressing [Enter] after each:

```
$ netsh winsock reset
$ netsh int ip reset
$ ipconfig /release
$ ipconfig /renew
$ ipconfig /flushdns
```

If the problem persists, return to the main text in this feature and carry on troubleshooting.



Complete Internet Repair 5 is worth adding to any toolkit.

to nail the problem you're having. If your problem is that all attempts to connect to a specific Wi-Fi network fail – despite having worked previously – switch to the Wi-Fi section and click 'Manage known networks'. Select the troublesome network and click Forget, then try to connect again.

Beyond the troubleshooter

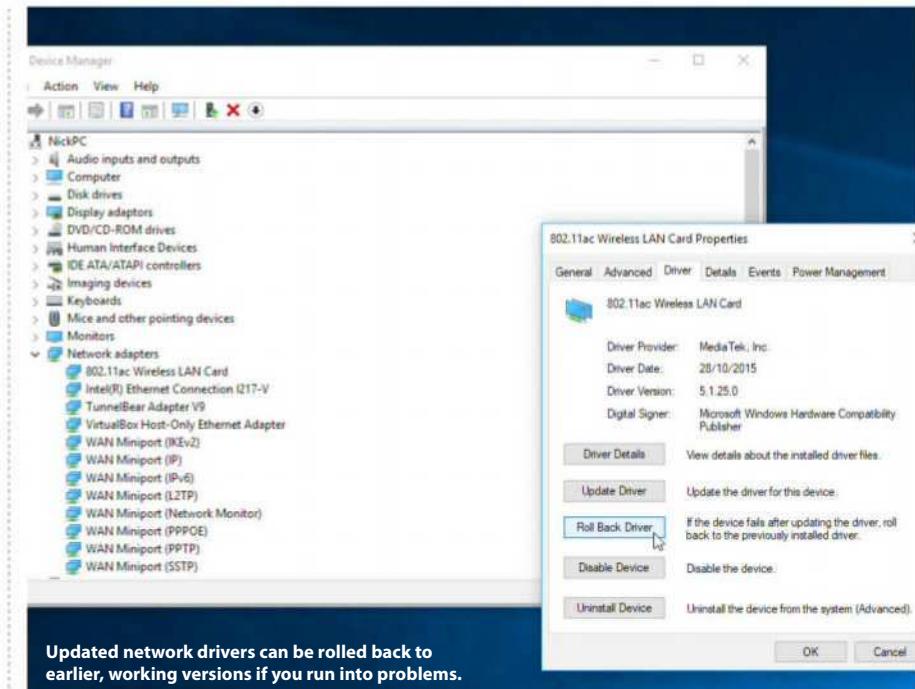
If your connection problem hasn't been resolved, there are plenty of steps left to try. If your issue is that your PC can't connect to the Internet even though the rest of your network can, check out the 'Reset network interface' box on the page opposite for a series of commands to reset various Internet-based settings.

If your problems began after a recent networking driver update – perhaps through Windows Update (visit Start > Settings > Update & Security > 'View update history' and any driver update should be clearly labelled as such) – then reverting to the previous driver may work. Right-click the Start button

"Look at the wireless icon. A yellow exclamation mark tells you you're connected, but that there's a problem – click it to see what the diagnosis is"

and choose Device Manager. Double-click your Wi-Fi network adapter, switch to the Driver tab and – if it's available – click Roll Back Driver to do so. Once done, reboot your PC.

If you wanted to investigate installing a newer driver, you'll need access to another PC with an Internet connection – visit the Wi-Fi adapter or PC manufacturer's website (if it's built in to your PC) to see if one exists; if it does, download it and transfer it across via a

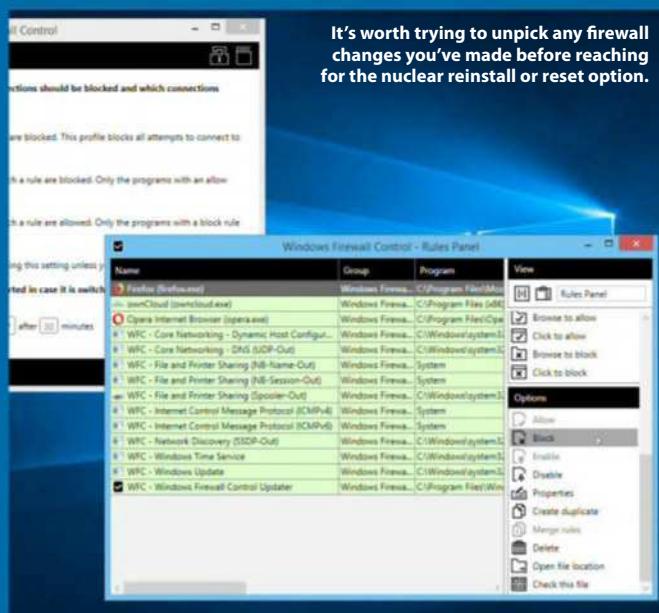


USB flash drive. If it comes with its own setup file, install it from that; if not, return to the Driver tab in Device Manager, but this time click Update Driver and choose 'Browse my computer...' to manually locate the folder containing the driver file.

Another problem may originate from your Internet firewall if it's become misconfigured in some way – check the box below for details. Also check your anti-virus tools in case disabling that

reveals it to be the source of the problem. If it is, try uninstalling and reinstalling it using a removal tool that will perform a more complete removal – see ESET AV Remover Tool (<https://support.eset.com/kb146/>) if your anti-virus vendor doesn't provide one.

Still no luck? Two steps remain. First, go into Device Manager, but this time uninstall the network driver from the Driver tab and then reboot – Windows should attempt to reinstall the latest driver, which may fix the problem. However if that fails, return to the Network & Internet section of Settings. Scroll down the Status section and then click 'Network reset'. This is a major step, but hopefully will clear any stubborn misconfigurations and enable you to finally connect again.



Fix firewall connection

Another problem may come from your firewall if it's become misconfigured in some way. Temporarily disable it via its Taskbar notification area or – if there's no obvious option – try the following command at an Administrator command prompt:

\$ netsh advfirewall set allprofiles state off

If that resolves whatever connection problem you're having, look at removing and reinstalling your firewall software – if you're using Windows' own firewall, you may need to simply reset it back to its default settings – navigate to Start > Settings >

Update & Security > Windows Security > 'Firewall & network protection', then click 'Restore firewalls to default'.

If you're managing the Windows Firewall using a third-party tool such as Windows Firewall Control (www.binisoft.org/wfc.php), it's likely that your problem stems from misconfiguring this – investigate unpicking your changes here before you attempt a full-blown reset, which will wipe all of your previous settings.

Whether or not you've managed to resolve the problem, make sure you switch your firewall back on.

Home Wi-Fi tips

Optimise your Wi-Fi connection to make it faster and more reliable with these expert tips

W

hat if your PC's wireless connection is slower than other parts of your network, or you struggle to maintain a strong and consistent connection?

Well, then there are potential issues with your Wi-Fi network's range or possible interference from other, overlapping, networks or devices.

The step-by-step guide on the page opposite reveals how to use a free app called WiFi Analyzer to help diagnose issues with your connection. The status screen reveals two key pieces of information: your Wi-Fi network speed, and a figure measured in dBm (decibel-miliwatts). The speed reveals your actual speed versus the theoretical maximum available for that network – your actual speed will always be significantly lower than the theoretical. The dBm figure refers to your Wi-Fi signal, and the lower it is the weaker the signal.

Fix poor reception

The numbers you see are based on two factors: the physical location of your router in relation to your PC, and the number of overlapping signals from your neighbours' Wi-Fi networks. Your router's physical location is critical here, because if it's too far away from your PC – or there are physical barriers between it and your PC (typically solid walls) – then the signal is too weak.

The obvious solution is to move your router closer to your PC if possible – indeed, now's the time to work out the

Find the best place in your home for your router.

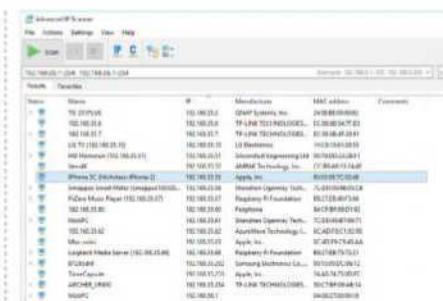


optimum position for it in your home. A central location is usually best, but consider which rooms are most important and determine how many solid walls the signal must pass through to reach them. You may also have to factor in interference from other wireless devices that share the 2.4GHz frequency band – try switching to 5GHz (see below) or replacing older devices with newer ones. For example, modern wireless DECT 6.0 phones transmit over 1.9GHz to avoid interference.

Depending on the size of your home and what it's made from, the chances are you may have to compromise before you can get a reasonable signal to most parts of it, in which case check out the 'Upgrade your network' box for four upgrade options to consider.

Reduce congestion

Another cause of slow performance is overcrowding – these days, what with your household's ever-growing list of wireless gadgets from laptops and mobiles to smart home security



devices and smart TVs, you can easily clog up your network through intense competition for bandwidth on your single 2.4GHz channel.

If you have an 802.11ac router, then a secondary reason for moving devices on to the 5GHz network, where possible, is to reduce the load on each frequency. Remember, though, that the 5GHz network has a smaller range than the older 2.4GHz one, and that older devices which use 802.11n and 802.11g Wi-Fi don't support it. But it's a godsend for those that do.

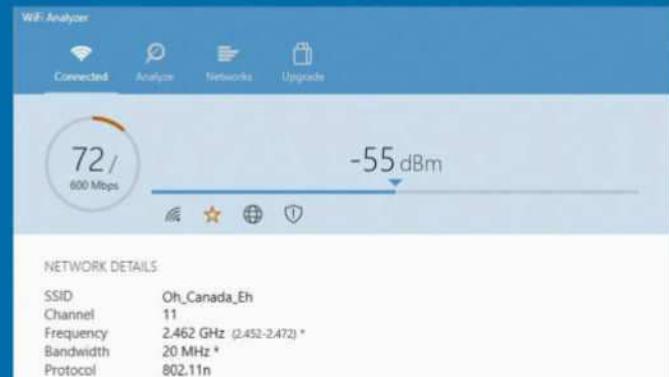
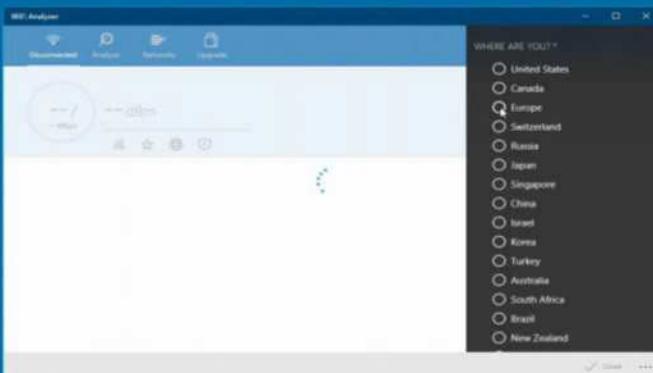
It's worth taking an inventory of what devices are connected to your network – you may find some naughty neighbours piggybacking on your connection (in which case a change of password should see them off), but it's more likely you'll simply realise just how much networked equipment you have running at the same time. The simplest way to generate a list of connected devices is with a free program called Advanced IP Scanner (www.advanced-ip-scanner.com).

Upgrade your network

If your router is more than a few years old, it may only support the older 802.11n wireless protocol. Consider upgrading to a new 802.11ac model if you can – speak to your ISP if it supplied your router – as this will boost the signal noticeably. Alternatively, invest in a Wi-Fi extender, which serves to relay the signal to a specific part of your home. Make sure it's sited centrally between your router and your PC for best results. You should also consider extending your wired network to other rooms by investigating HomePlug devices, which extend your wired network through your electric circuit. Finally, consider investing in a mesh network from the likes of Linksys, Netgear and others – turn to our group test on page 82 of this issue to find out why you should.



Reduce Wi-Fi interference



1 Install and set up

Open the Microsoft Store and search for 'WiFi Analyzer' by Matt Hafner (www.microsoft.com/en-gb/p/wifi-analyzer/9nblggh3n0n). Install the free version, then open the app, set your location to Europe and click Close. Give the app the ability to toggle your Wi-Fi and Bluetooth connections if prompted.

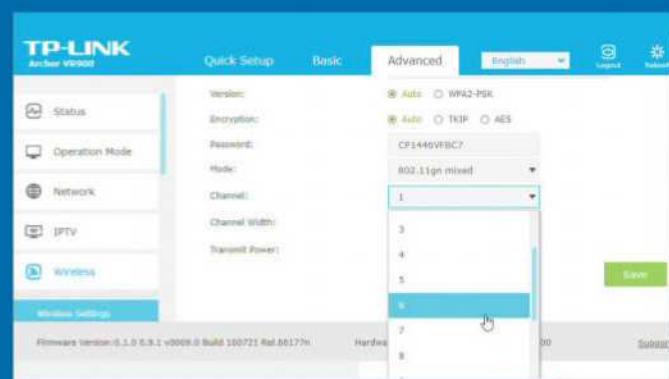


3 View overlapping networks

Switch to the Analyze tab where you'll see a series of concentric circles indicating neighbouring networks. You'll see a number overlap yours – which is marked with the Wi-Fi icon above it. Make a note of the channel recommendation, which is typically 1, 6 or 11 depending on other networks.

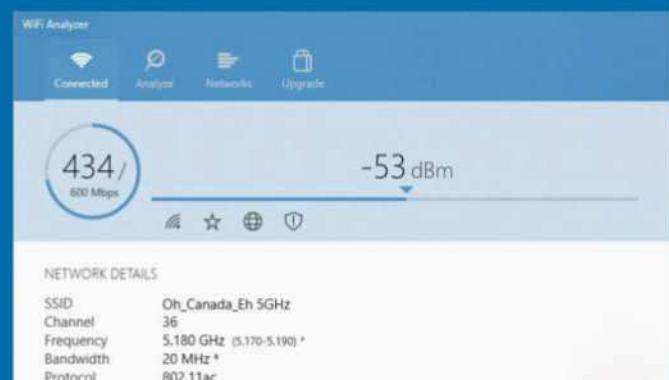
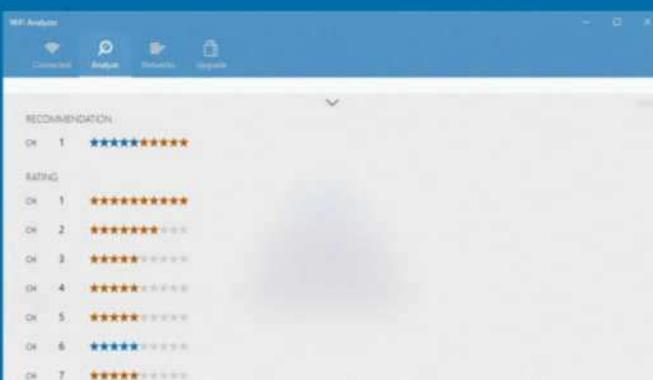
2 Review current connection

The current speed and signal strength of your Wi-Fi network will be displayed. Keep a look out for any orange icons beneath these figures – click Help and you'll see what each one refers to. One likely orange icon in the star (as shown above), which indicates the presence of network congestion.



4 Switch channel

Log on to your router's configuration utility using your web browser (see page 16). Locate its Wi-Fi setup section where you should discover an option to switch channel numbers. Select your preferred channel and click Save. Your network connection will be temporarily lost, but it should return.



5 Test new connection

Reopen WiFi Analyzer and check the main tab again – hopefully you'll find both the top speed and signal strength have been significantly improved by your changes. If not – review the other channel star ratings as shown and experiment with different channels to see which one produces the best results for your PC.

6 Switch to 5GHz

If your router and PC support it, and the signal is strong enough, try connecting to your 5GHz network. Both the network and the traffic on it will be less congested, and if you're physically close to your router you'll also benefit from noticeably improved performance and transfer speeds.

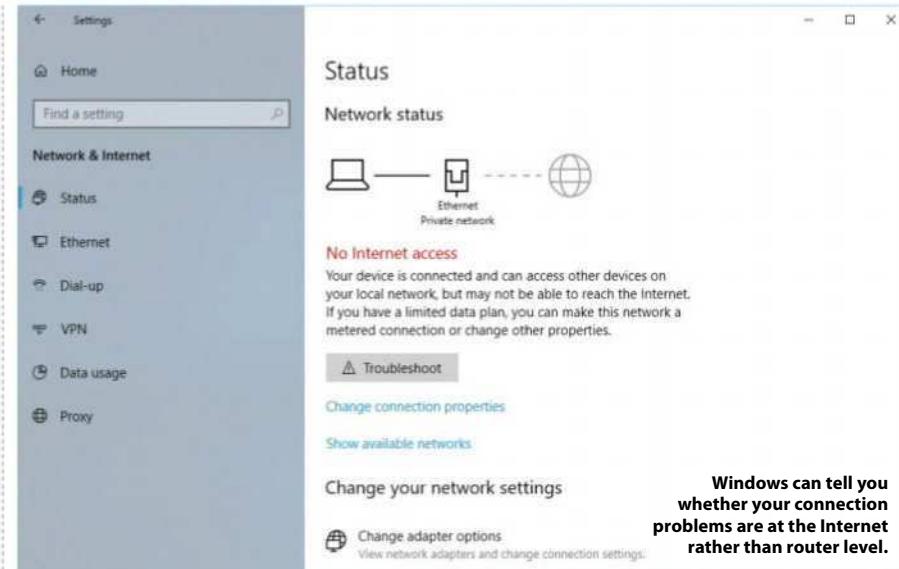
Maximise your router

Fix network-wide problems involving your router, plus tighten its security and unlock hidden features

Your router – or modem router – is the glue that binds your network (and the outside Internet) together, and it's where you should go to troubleshoot, secure and tweak your network. If you have a connectivity problem that extends throughout your network, your router is the place to start your diagnosis.

The adage of 'try switching it off and on again' is particularly apt. Your router is designed to be left on 24-7, but like your PC can fall over if you don't occasionally reboot it. If your network goes down, therefore, step one is to switch it off (at the plug if it doesn't come with its own power switch), wait 30 seconds and then switch it on again.

If your connectivity problems persist, then open Start > Settings > Network & Internet and check the network status. Click 'View network properties' for more details – if it's operational you have a connection to your router at least. Check that your PC has been assigned an IPv4 address and a default gateway has been specified – this is your router's IP address. If it's not working, try connecting a PC directly to the router via one of its Ethernet ports and check again – if there's still a problem then your router may need repairing or replacing – but before doing so, look for instructions on how to reset it to factory settings in case that resolves the



problem (turn to page 18 for tips on accessing the Internet while your network is down).

Configure your router

Your router is configured through your web browser – type the default gateway IP address into your browser and it should direct you to your router's configuration page. Log in as directed – if you've never changed the password, check underneath your router or in its manual for the default one to use – and make sure you change it to protect your network from drive-by hackers.

You should find yourself at a status page that lets you see the state of your Internet connection as well as your wider network, including its Wi-Fi



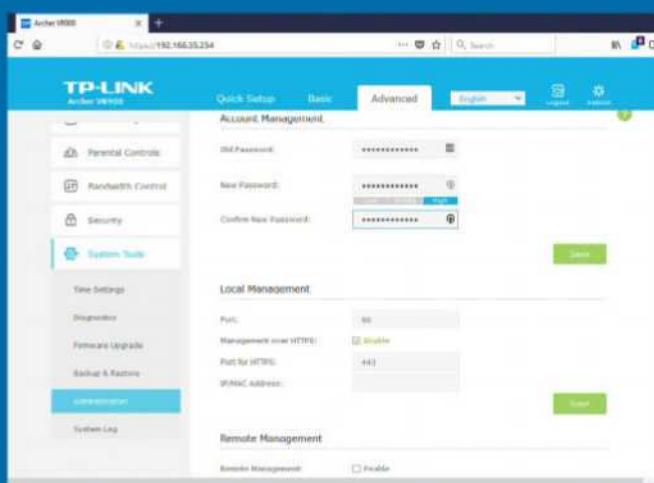
Tighten security

Your router's configuration settings are where you go to tighten your network's security. Start by changing the default password used to log on to the router. Also enable HTTPS for accessing the router's configuration utility – this encrypts the connection for greater security. Also look for, and disable, any 'remote management' options to prevent the router from being configured from outside your local network.

While you're here, check your Wi-Fi encryption settings – make sure that WPA2-PSK is set as the encryption type and use a strong password to

protect it. If visitors frequently ask for access to the Internet, enable the guest network (again with WPA2-PSK encryption and a strong password) to protect both yourself and them from your local network.

Take the time to check for any firmware updates, which may include security fixes such as one that closes the KRACKS vulnerability. You may be able to do this from within the router configuration utility or you may have to check (and download the file) manually through your router manufacturer's website (or ISP if it supplied your router).



connection – if not, browse the available pages to locate it. If the problem is with your Internet connection turn to page 18 for more troubleshooting advice, although if you're told you're connected but can't access the web in any way you may find the problem lies with your router's DNS settings. These act as a kind of 'address book' for the Internet – try replacing the default settings (normally provided by your ISP) with 1.1.1.1 and 1.0.0.1 (Cloudflare) to see if that resolves your connection issues. You should find that Cloudflare's DNS is quicker than your default settings, too.

Most of the time your router's configuration pages are used to tweak and secure your network – when it comes to troubleshooting, if you can't find the information you need to get things up and running again, look for a quick setup wizard that enables you to try setting up your network from scratch. You could also try repeating the settings that worked previously – specifically Wi-Fi network names and passwords – and see if that resolves the problem. If not, look for a setting to perform a factory reset – this will typically be found in the Advanced or System Tools section.

You may find other handy tools here, such as a diagnostics tool for checking your Internet connection that may help guide you towards a solution that doesn't involve the nuclear option of tearing everything up and starting again from scratch.

"If you're told you're connected but can't access the web in any way you may find the problem lies with your router's DNS settings"



USB ports on your router let you network drives and printers.

Get more from your router

Are you making maximum use of your router? Modern routers do far more than simply manage your network. Start by examining your router for USB ports – these can be used in several different ways. You may be able to connect a USB printer to share it directly over the network (no more switching on a single PC to print) or connect a USB drive to use as shared storage or backup.

You might also want to consider upgrading to a new router – check this is permitted if you currently use a model supplied by your ISP. The benefits of doing so will almost certainly include speed improvements within your network – make sure your chosen model has Gigabit Ethernet ports for super-fast wired connections, and that its wireless connection is 802.11ac to allow for both 2.4GHz and 5GHz networks to reduce congestion and interference, as well as boosting the 2.4GHz network's performance in adjoining rooms. The router's AC number (AC3200, for example) indicates the combined speed on offer – 300-600 Mbps for 2.4GHz networks, with the rest allocated to the 5GHz band. For mesh networking options turn to page 82.

Three hidden features to explore

ID	Service Description	External Port	Protocol	Internal IP Address	Internal Port
1	8e297710d264e7020af5c03c973c9aef	8080	TCP	192.168.25.2	8080
2	8e297710d264e7020af5c03c973c9aef	443	TCP	192.168.25.2	443

1 UPnP

Also known as Universal Plug 'n' Play – a feature that's designed to make it easy for devices and services to connect to each other over both local networks and over the Internet. It's a potential security hole, so look for a manual option (Virtual Servers) to direct your traffic.

Order	Destination	Min Rate (Mbps)	Max Rate (Mbps)	Profile	Priority
1	192.168.25.2	100	100	100	Normal
2	192.168.25.2	100	100	100	Normal

2 QoS

Also known as Quality of Service. Do some people in your household use more network bandwidth than others? Bandwidth control settings enable you to cap their speed and prevent bottlenecks for everyone else – also look for parental controls that limit access by IP address.

Mac Address	Reserved IP	Group	Enable	Modify
BB:37:0B:07:52:31	192.168.25.15	Default	Enabled	Cancel OK

3 Address Reservation

Want to apply a specific IP address to a device on your network without having to configure the device itself – handy if it's mobile and moves between networks? Address Reservation is a feature that enables you to allocate a specific address directly from the router itself.

Resolve Internet problems

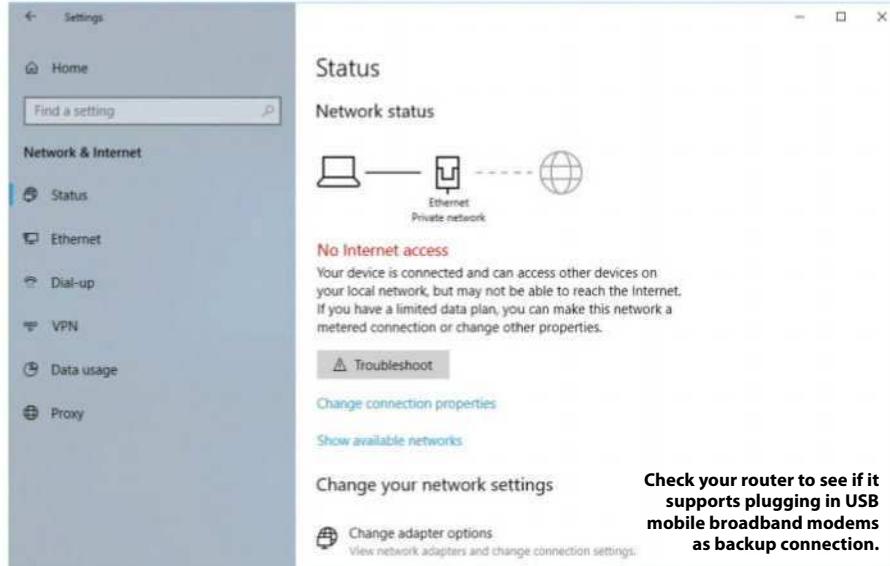
Can't get connected? Not getting the speeds you expect? Read on for some lifesaving tips and techniques

What if you've been troubleshooting your network problem and ended up here? That's because the problem has been traced to your Internet connection, and it's likely you're going to need outside help to get the problem sorted. Hopefully you have a backup Internet connection to hand – typically your smartphone. You can try to troubleshoot on this device or investigate your phone for an option to create a mobile hotspot from it, enabling other wireless devices on your network such as your laptop or 2-in-1 tablet to piggyback the connection and access the web.

Use your mobile

If you own an iPhone, you should open your device and head to Settings – look for the Personal Hotspot option to set things up; If you own an Android smartphone you'll need to dig deeper: go to Settings and tap More under Wireless Networks. Select 'Tethering and portable hotspot', followed by 'Wi-Fi hotspot' and then follow the prompts to set the portable hotspot up. Once done, connect your computer to this network via the Wi-Fi icon in Windows' Taskbar notification area.

If you have a USB mobile broadband modem, check your router to see if it supports 3G modems – if it does, you can plug this into your router and set it



up via your router's configuration utility so it can serve your entire network as a fallback until your broadband Internet connection is restored. Bear in mind, though, that you're likely to have a cap on how much mobile data you can use – it's probably a good idea to restrict your mobile broadband usage to troubleshooting your connection problem, otherwise you could end up with a very nasty bill if you only have a few gigabytes to play with.

If you don't have an alternative mobile data option, and you have friendly neighbours, ask them if you could

temporarily jump on their broadband Internet connection – assuming that it's working too, of course – so you can troubleshoot your problem.



Benchmark your Internet connection

How fast is your Internet connection – both under ideal circumstances and at the present time? The first port of call should be your router's configuration utility in your web browser – look to see if the current rate and maximum rates are displayed under its status screen. Upstream refers to upload speeds and are inevitably slower than downstream or download rates. Convert Kbps to Mbps by dividing it by 1,000.

If you're unable to determine this figure, you can benchmark your connection through your browser by visiting www.

speedtest.net – it should detect your ISP (or the actual provider being used if you're with an ISP that piggybacks on a third-party connection) and choose a server close to your current location. Click 'Go' to perform a one-time test.

Results will vary depending on the current state of your connection as well as the number of users online. If you want to track performance over time create an account – this will enable you to monitor your results history. Armed with this information you should be able to get an idea of your overall performance.



You can benchmark your Internet connection in real-time using an online tool such as Speedtest.net.

Once your backup connection is up and running, it's time to take the next step. First, visit your ISP and look for a status page (try Googling the ISP name and 'status' if you're struggling to track it down) that may alert you to known connection issues. From here you can also check the ISP's support pages for more help and potential telephone contact numbers if you can't fix your own problem.

Resolve speed issues

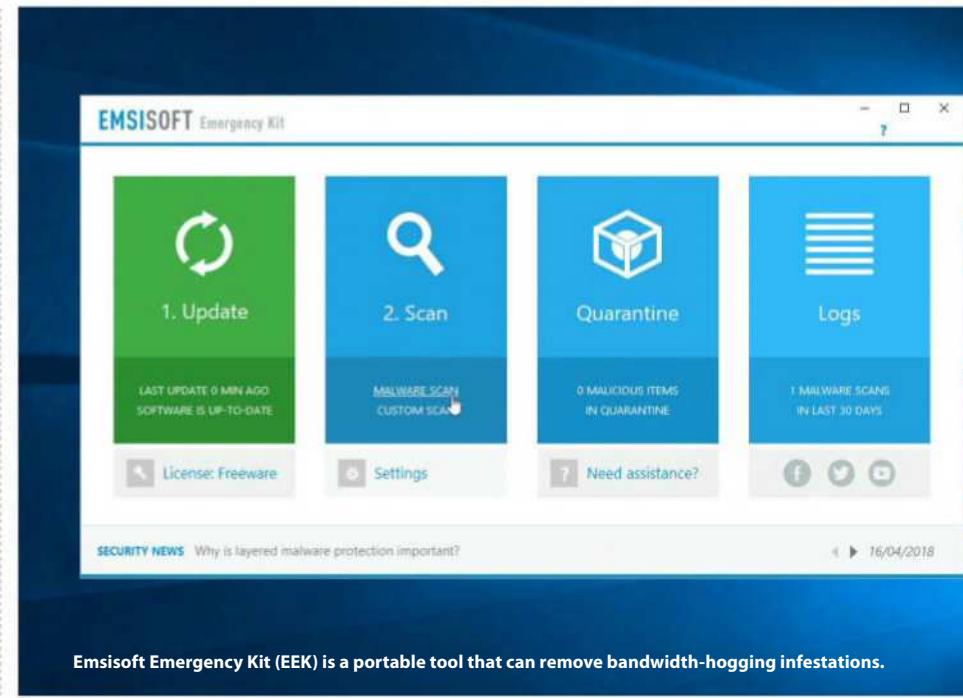
If your Internet connection feels sluggish, first determine what the overall speed is with the help of the 'Benchmark your Internet connection' box on the opposite page. This gives you a benchmark to work from. The speeds you'll see are likely to be less than what you might be expecting (hence the 'up to' caveat from your ISP), but if they're radically different you'll need to investigate further.

Remember your actual performance will be determined by elements such as

"It's probably a good idea to restrict your mobile broadband usage to troubleshooting your connection"

distance to your telephone exchange, the time of day you're connecting and even the quality and type of the line delivering the connection to your home – particularly if you're using older copper wires and can't take advantage of faster fibre optic networks. If you're a heavy Internet user, you may also find your connection slows at specific times of day or at certain points in the month due to your ISP's 'fair use' policy – check its website and your package for details.

If your Internet speed checks out, but you still only get sluggish performance



Emsisoft Emergency Kit (EEK) is a portable tool that can remove bandwidth-hogging infestations.

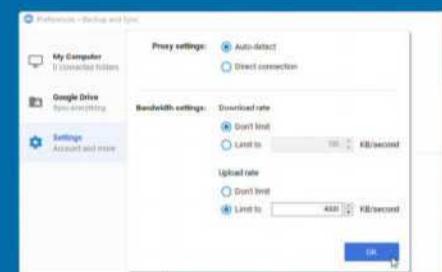
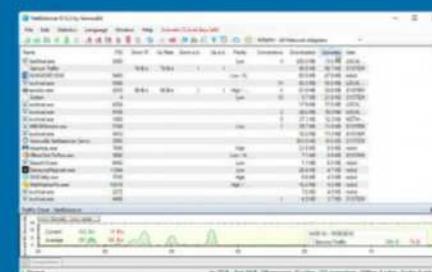
from the devices on your network, then these are elements you can control. You may have too many devices trying to connect at once, or some devices are hogging the available bandwidth, which, remember, is shared across your entire network.

We've touched on how you can stop individual devices on your network from monopolising the bandwidth on the previous page (look under QoS or Quality of Settings in your router configuration tool). But if you don't want to restrict access by device, you might

want to consider which individual applications are maxing out your available bandwidth (cloud sync providers are notorious for bringing Internet connections grinding to a halt, for example) and restricting those. If you're struggling to find out which apps are responsible, check out the step-by-step guide below.

Your investigation may even reveal the culprit to be malware. Dig out past issues for more detailed advice on disinfecting your PC, but if your own anti-malware software isn't up to the task, download standalone tools on a clean PC – Emsisoft Emergency Kit (www.emsisoft.com/en/software/eek/), for example – and copy them across using a DVD or a USB flash drive to see if they might be more effective. ■

Identify and fix bandwidth hogs



1 Isolate apps

Download and install NetBalancer (www.netbalancer.com) – the free version has all the functionality you need. Once installed and rebooted, double-click the widget to access the main program. Cancel the registration and allow predefined priorities to be set.

2 Bandwidth hoggers

A list of apps that are using your Internet connection will appear – click the 'Down R' and Up Rate column headers to see which ones are currently consuming the most bandwidth, or the Downloaded and Uploaded headers to see which ones have historically transferred the most data.

3 Tame rogue apps

The trial version of NetBalancer will automatically rein in bandwidth-hogging apps, but this feature disappears after it reverts to the free version. Once you've isolated individual apps, either remove them or investigate ways of putting manual limits in place.



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Explore

► WINDOWS TIPS ► INTERNET ADVICE ► EXCITING NEW PROJECTS

Welcome



In this month's Explore section you'll find some amazing ways to make the most of your PC – on page 24 we'll show you how to use layers in Photoshop Elements 2018 to add a realistic-looking logo to an image, and on page 38 we'll show you an easy way to transfer photos from an iPhone to your PC without using the dreaded iTunes.

You'll also discover a better way to track your workouts with Map My Run (page 36); how to clean up a cluttered Gmail inbox (page 40); and how to make your laptop's battery last longer (page 44).

Rob Mead-Green

Editor

rob.mead-green@futurenet.com

Full listing...

- 24** How to add a logo to an image using Photoshop Elements 2018
- 27** Surf the web in safety
- 30** Take control of your downloads
- 32** Use Skype in Windows 10
- 36** Track your workouts
- 38** How to easily transfer photos from an iPhone to your PC
- 40** Clean up your Gmail inbox
- 42** Protect yourself from a ransomware attack
- 44** Control your PC's power usage

- 46** How to power up the context menu in Windows 10



Your guide
Matt Hanson says...

"Surf safely with these essential add-ons for Edge, Chrome and Firefox"

*Turn to page 27
to find out more*

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Get more from Windows, software and all your favourite sites

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From speed-up and security software to superb photo apps, there's always something new to try on your PC. The Windows Store in Windows 10 and Windows 8.1 is packed with software to download.



Learn how to... Add a logo to an image



Your guide *Ian Evenden* says...

"A useful timesaver for online shop owners – don't photograph stock hundreds of times, cheat!"

At a glance

Skill level...

Anyone can do it
Straightforward
► Tricky in parts

Suitable for...

Windows 10
Windows 8.1
Windows 7

Anyone running a small business with an online shop front is going to need to take photos of their stock, and this can be a time-consuming process.

If your business relies on printing, you can save time by photographing blank products, then compositing a logo or pattern on to them using image editing software. This can be especially useful if you're printing to order, since it means you don't need to print off one copy of everything you intend to sell.

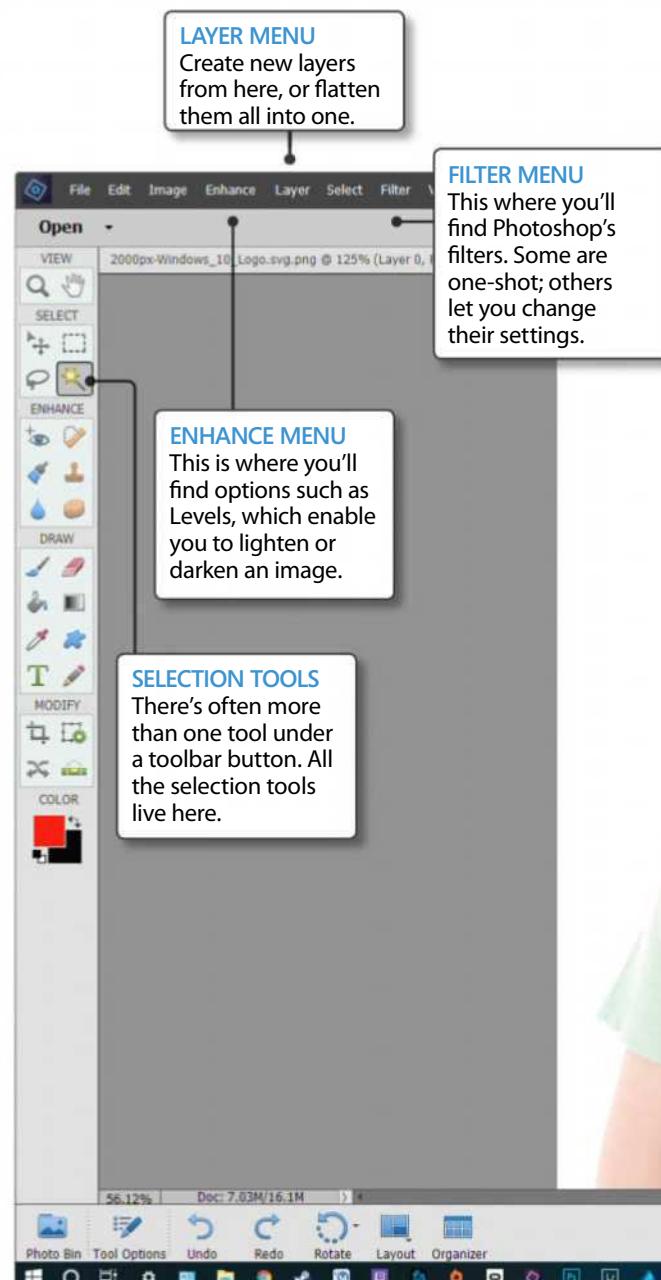
Check out a range of selling sites, however, and you'll soon see that the way many logos and graphics are superimposed on T-shirts and the like looks highly unrealistic. There are ways of making the graphic follow the folds of the shirt, however, as we will see. We're going to use Adobe Photoshop Elements 2018 for this, a free trial of which can be downloaded from <https://adobe.ly/2Eh3Ynv>.

Step-by-step | Paste a logo onto a T-shirt



1 Get a logo

It sounds simple, but having a logo is the first step toward compositing it onto a T-shirt or mug. Creating one is beyond the scope of this tutorial, but there's more to it than bashing some clipart and text together. That said, a simple line of text can make for a perfectly serviceable minimalist logo. We're using a Windows 10 logo here, which is just text and a few squares. Simple is good.



2 A transparent background

You'll need a transparent background behind your logo, otherwise it will drag its background colour with it when you superimpose it. You can tell when something is transparent in Photoshop because it's displayed as a grey-and-white check pattern. Having a transparent background means the graphic isn't tied to the background, so it can be dragged to another image.

MODES
Photoshop Elements has three different modes: Quick, Guided and Expert. We're using Expert mode here.

LAYERS
These are your image layers. You can drag them to change their order, or blend them using a drop-down menu.

IAN'S BEST TIP!
Select > Refine Edge enables you to shrink or expand a selection, smooth out kinks or make edges slightly fuzzy.

Jargon buster!

► **Transparency**
Literally what it says – transparent areas of an image show through what is underneath it.

► **Magic Wand**
A selection tool which, within parameters set by you, selects areas of continuous colour.

► **Filters**
Blur, pixelate or otherwise alter your image with these. They work on the whole image, unless you have selected a specific area.



3 Get transparent

If a logo's been supplied with a white background, there's an easy way to remove it. Choose the **Magic Wand** selection tool, and click in the white area. Hold [Shift], and click in any other white areas that aren't contiguous with the first, such as the inside of letters. Double-click the Background layer in the Layers palette, and give it a name, then press [Del] to make it transparent.

4 Enter the T-shirt

You can use a stock image of someone wearing a plain T-shirt, or you can shoot your own. The latter is preferable as you will have control over the pose and direction your model is facing, but the stock image may be easier to come by and cheaper for a small business. Create a copy of the T-shirt itself by selecting it and placing it on a new layer with Layer > New > Layer via Copy.



5 Wrinkles everywhere

This copy of the T-shirt includes the wrinkles that will make the logo look more natural. With the shirt's layer selected, open the Levels adjustment (Enhance > Adjust Lighting > Levels) and slide the slider to the right to darken the layer. Push it past the point at which it still resembles the original colour; we're going to blend it with the original which will lighten it later. Click 'OK'.



7 Get in position

It's worth spending time getting the logo into exactly the right position. With its layer selected in the Layers palette, you can use the Move tool to change its position, and Image > Transform > Free Transform to alter its shape. If your model is at a slight angle to the camera, use Image > Transform > Perspective to make one end of the logo larger than the other.



9 Add some noise

Any T-shirt with a printed design doesn't stay pristine for long, and you can simulate the fading with a [filter](#). Click on the logo layer, and use the Magic Wand to select the transparent areas, before choosing Select > Inverse to select the logo instead. Open the Filter menu and experiment with noise filters, such as Add Noise. Lower the opacity of the logo layer to 85 percent.



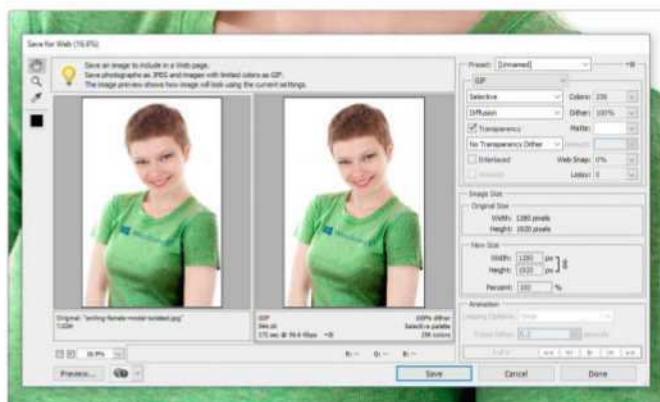
6 Introduce the logo

Bring in the logo by dragging the layer you created in Step 3 across from the other image file. If it's too big, use the resizing handles to shrink it, then rotate it so it's in roughly the right place. If it's too small, reduce the size of your target photo using Image > Resize > 'Image size', rather than stretching the logo to make it bigger. Click the green tick to commit your changes.



8 Blend your image

Now arrange your layers so the original model image is at the bottom of the stack, the logo is next, and the darkened T-shirt you created in Step 5 is on top. Then change the blend mode of that top layer to Multiply, and your logo should show through, appearing to bend around the folds in the T-shirt. It's an optical illusion really, but it's an effective one.



10 Flatten and save

Now your composition is complete, save it as a PSD file to preserve the layers – you can use this as a template for future images, swapping in new logos and blending them in the same way. Flatten the layers into one using Layer > Flatten Image, and export the image as a JPEG or PNG for web use – File > 'Save for web' will help you reduce the file size for faster page loading. ■

Learn how to...

Surf the web in safety

Add these essential add-ons to Microsoft Edge, Chrome or Firefox to give you the ultimate protection when online

The web can be a dangerous place, full of ransomware, adware, viruses and other nasties – and that means your browsing habits, and your privacy, can be put at risk.

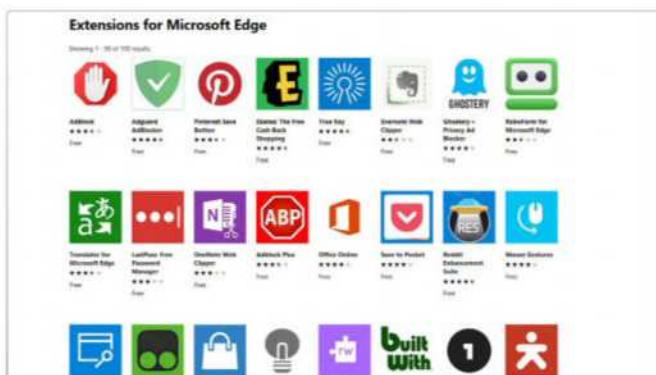
While having an anti-virus program helps – either Windows 10's own built-in Windows Defender tool, or a third party

piece of software such as Norton Antivirus – there are also a number of add-ons (also called **extensions**) that can be added to your web browser to give you extra protection. These add-ons are lightweight tools that run from within your browser, which means they don't need to be installed separately. This helps saves drive

space, and ensures that your PC won't get slowed down either.

The three most popular **web browsers** are Google's Chrome, Mozilla's Firefox and, of course, Microsoft Edge, the default option if you're using Windows 10. In this step-by-step guide we'll look at the best security add-ons for each one.

Step-by-step | Make your browser more secure



1 Add extensions to Edge

If you're using Microsoft Edge, head to www.microsoft.com/en-us/store/collections/edgeextensions/pc to see a range of extensions. To install one, click on the icon of the extension you want. Then, click 'Get the app'. The extension will then be added to Edge. You may need to restart Edge for the extension to load. You can also use the Microsoft Store app in Windows 10 to do this.

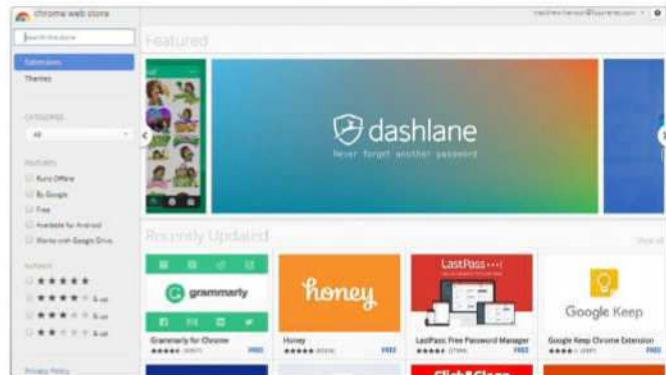


3 Create stronger passwords

LastPass is a password manager that can securely store all your passwords for various websites, and enables you to log in via Edge on a number of different devices. This extension helps protect your security since you can use it to create unique, difficult-to-guess passwords for each site you visit without having to remember them. It's available for Firefox and Chrome, too.

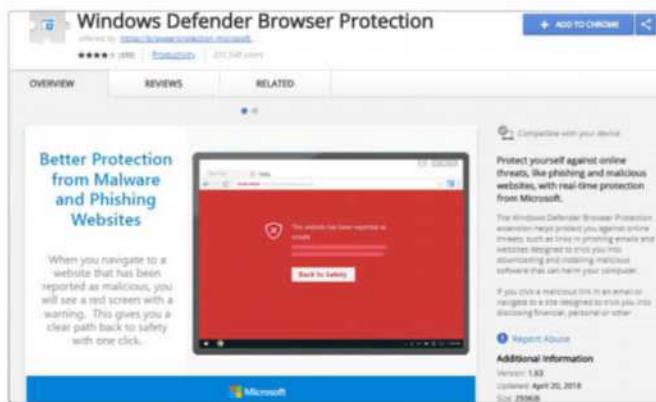
2 Install Ghostery

Ghostery is a very useful extension for Edge. It blocks ads, and while this makes websites load faster, it is also a good security measure, since some online ads contain malware. This extension also blocks trackers on websites that collect data on you, and it can anonymise your data to further protect your privacy. Ghostery is also available for Firefox and Chrome.



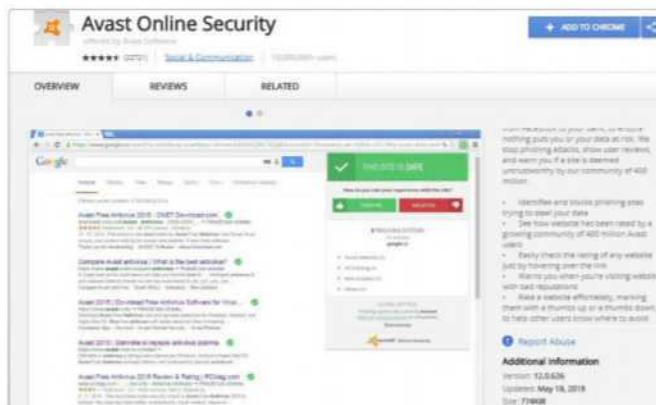
4 Adding extensions to Chrome

Chrome is the world's most popular web browser, and for good reason – it's fast, reliable and supports extensions, which you can download from the Google Webstore (<https://chrome.google.com/webstore>). From there, you can search for the extension you want. Click the icon and it will give you more information about it. Next, click 'Add to Chrome'.



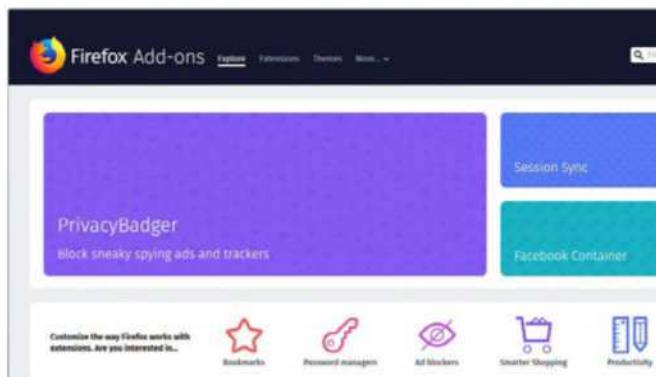
5 Windows Defender Browser Protection

This extension from Microsoft helps improve the security of Google Chrome. According to Microsoft, the Windows Defender extension for Chrome (available from the Google Webstore) catches 99 percent of phishing attacks, while Chrome, without the extension, only catches 87 percent. If you're impressed with how Windows Defender works in Windows 10, this is worth installing.



6 Avast Online Security

Avast is another well-known name in online security, which has provided a free extension for Chrome and Firefox. It identifies and blocks **phishing** sites, and uses its community of 400 million users to help identify threats. This makes the Avast add-on a very useful tool for protecting your PC. It will warn you if you attempt to visit to a site with a bad reputation, and you can rate sites, too.



7 Install add-ons in Firefox

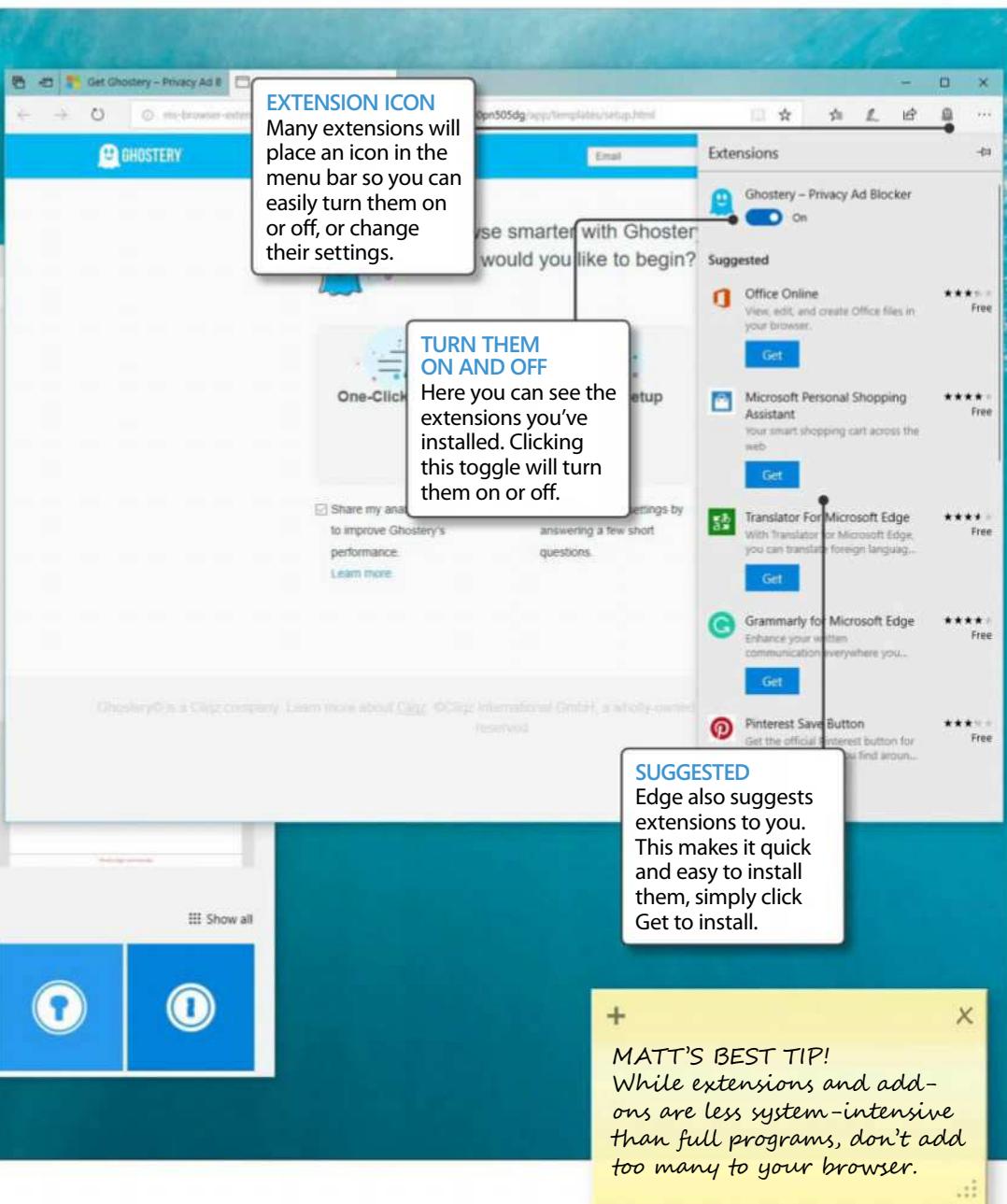
Firefox is another popular web browser, and like Edge and Chrome, you can install extensions to help boost your security when browsing the web. Head to <https://addons.mozilla.org> to find the range of add-ons for Firefox. Click on the icon of the add-on you want while running Firefox, then click 'Add to Firefox'. You will then be able to access the newly-installed add-on.

The screenshot shows the Microsoft Store page for the LastPass extension. It features a large red circular icon with three white dots. The product title is 'LastPass: Free Password Manager' with a rating of 4.5 stars and 172 reviews. It is labeled as 'Free' and has a 'Get' button. A callout box points to the 'Get' button with the text: 'Gives you the ability to search for and install extensions for Microsoft Edge. Find an extension, then click Get to install.' Below the main title, there are sections for 'Description', 'Reviews', and 'Screenshots'. A 'People also like' section is shown at the bottom right.

The screenshot shows the Firefox Add-ons page featuring the 'Facebook Container' extension. It has a purple icon with a grid of squares. The extension is described as 'Prevent Facebook from tracking you around the web. The Facebook Container extension for Firefox helps you take control and isolate your web activity from Facebook.' A 'Featured Extension' badge is visible at the top right. At the bottom right, there is a blue 'Add to Firefox' button.

8 Facebook Container

Facebook has been in the news lately, with many people concerned about how much info it collects from you – even if you're not on the site. Mozilla has created an add-on (<https://addons.mozilla.org/en-US/firefox/addon/facebook-container/>) that isolates your Facebook identity in a separate, window, so the social network can't track you when you visit other websites.



Jargon buster!

► Extension

Extensions, also known as add-ons, are small bits of software that add features to an already-installed app, like a web browser.

► Web browser

Web browsers are pieces of software that let you access the Internet. As they are your main tool for browsing the web, they need to have strong security features to help protect you.

► Phishing

Phishing is a scam where a malicious site or user pretends to be a trustworthy brand, such as a bank or online store, in an attempt to get you to reveal data, such as passwords.

At a glance

Skill level...

Anyone can do it

Suitable for...

Windows 10

Windows 8.1

Windows 7

Web Security
by [Web Security](#)

Web Security actively protects you from malware, tampered websites or phishing sites that aim to steal your personal data.

[Add to Firefox](#)

Rate your experience

How are you enjoying your experience with Web Security?

[Log in to tell Web Security](#)

[Report this add-on for abuse](#)

Screenshots

Extensions

Ghostery - Privacy Ad Blocker **On**

Suggested

- Office Online **Free**
- Microsoft Personal Shopping Assistant **Free**
- Translator For Microsoft Edge **Free**
- Grammarly for Microsoft Edge **Free**
- Pinterest Save Button **Free**

MATT'S BEST TIP!
While extensions and add-ons are less system-intensive than full programs, don't add too many to your browser.

Browse smarter with Ghostery! How would you like to begin?

One-Click Setup | Custom Setup

Share my analytics data to improve Ghostery's performance. [Learn more](#)

Choose my own settings by answering a few short questions.

9 Web Security

An add-on that does exactly what it says on the tin. Web Security (<https://addons.mozilla.org/en-US/firefox/addon/web-security>) uses an extensive database to block websites that are known to contain malware or try to obtain your data. This add-on is only available for Firefox, so be wary of other extensions for Chrome that have the same name.

10 Managing your add-ons

Installing add-ons and extensions is easy, but what happens if you want to remove them, or change their settings? The process differs depending on which browser you are using. If you're using Edge, click the ellipsis (...) and select Extensions. In Chrome, click the three vertical dots, then click More Tools, then Extensions. In Firefox, press [Ctrl] + [Shift] + [A] on your keyboard. ■

Learn how to...

Take control of your downloads



Your guide *Cat Ellis* says...

"A download manager makes saving files faster and easier. Once you've tried it, you'll never go back to downloading in your web browser!"

At a glance

Skill level...

- ▶ Anyone can do it
- Straightforward
- Tricky in parts

Suitable for...

- Windows 10
- Windows 8.1
- Windows 7

Not so long ago, software, music, movies and TV shows were only available on CDs and DVDs, but those days are long behind us. Now if you want to enjoy a new album, film or boxset, you have two other options: stream it, or download it. Streaming has a few advantages – mainly that you can begin watching or listening to the media immediately – but if you want to keep the file forever then you'll need to download it.

That's where download managers come in. These programs can slash the amount of time it takes for files to download by breaking them up into smaller chunks. They can also resume downloads automatically if your Internet connection experiences a hiccup, and some can even convert files to different formats. In our opinion, Ninja Download Manager is one of the best download managers around – and it's completely free.

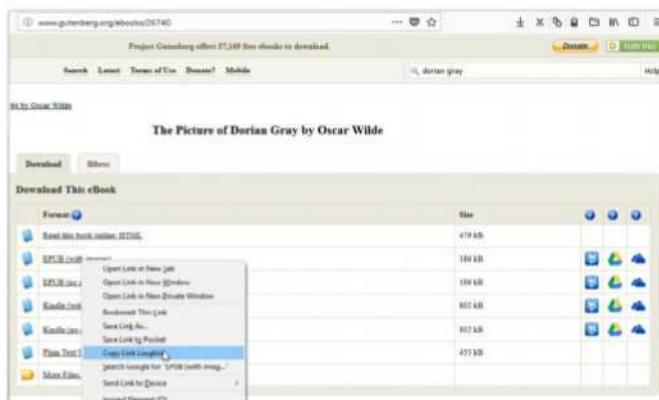


Step-by-step | Make downloading effortless



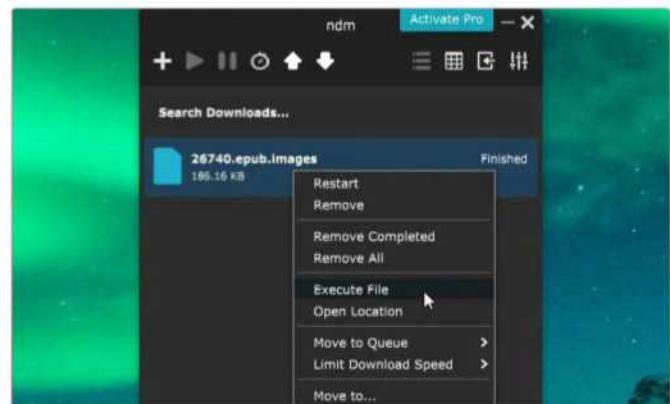
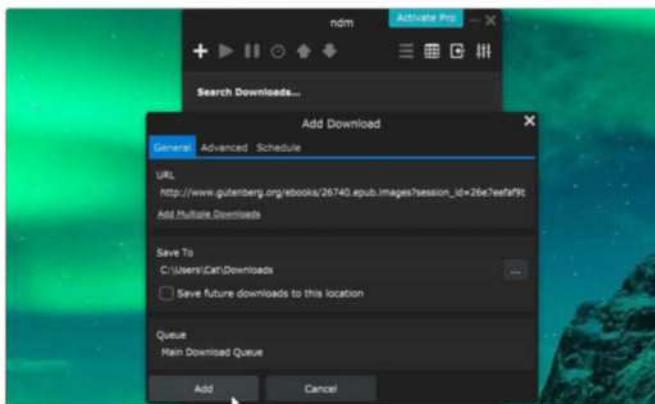
1 Get Ninja Download Manager

There are two versions of Ninja Download Manager: free and paid. To get the free one, visit nijadownloadmanager.com, scroll to the bottom of the page and select 'For Windows'. Run the setup file, read the terms and select 'I accept the agreement'. Click 'Next' to finish installing the app, then click Launch NDM. When the program launches, select 'Continue in free mode'.



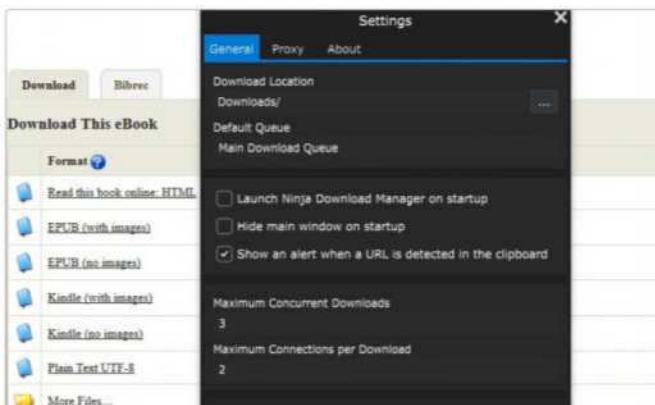
2 Copy a file link

We'll start by downloading an e-book that's in the public domain. Visit www.gutenberg.org and select or search for a book. When presented with a list of file download options, right-click one of the EPUB options and select 'Copy link location'. You can do exactly the same thing with video and music files, which will download noticeably faster than they will in your web browser.



3 Paste and download

Now return to Ninja Download Manager and click the '+' icon. You'll see that the URL is pasted from your clipboard automatically. You can download other files at the same time by selecting the 'Add multiple downloads' link, and choose where the downloaded files should be saved. When you're happy, click Add and the file will begin downloading.



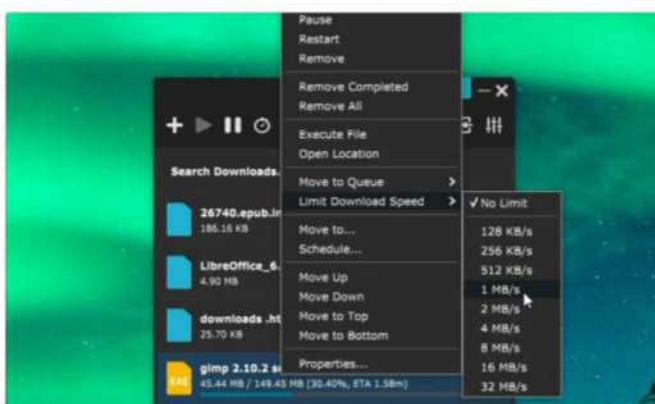
4 Manage the download queue

Current and completed downloads will appear in a queue, ordered from oldest to newest. Right-clicking downloaded files gives you the option to restart the download, open the file, move it to a different location, and move it up or down the list. It's a good idea to leave downloaded files in the list; the search bar at the top is much more convenient than Windows' search function.



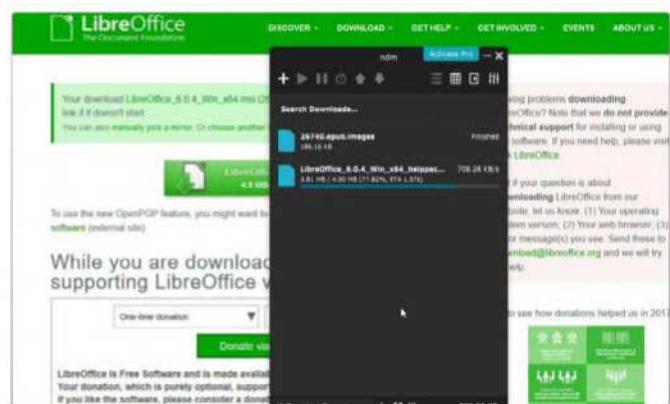
5 Detect links automatically

You can set Ninja Download Manager to detect copied links and give you the option to download them instantly. Click the Settings button (top right) and check 'Show an alert when a URL is detected in the clipboard'. Return to Project Gutenberg and select another link, and a notification will appear in the top right of your screen. Click this to start downloading the file.



6 Add a browser extension

To make Ninja Download Manager easier to use, click the Settings button, then 'Browser setup' and choose Chrome, Firefox or Opera. Follow the on-screen instructions to install its extension (there's no option for Microsoft Edge or Internet Explorer at the moment, sadly). Now, when you visit a web page, click the NDM icon to send downloads straight to Ninja Download Manager.



7 Download links directly

You can also right-click links in your web browser and select 'Download with Download Ninja' to add them to the download queue. To change the order in which files are downloaded, right-click them and move them up or down. To do something else online while the files download, you can limit the download speed as well, so you'll have enough bandwidth for other tasks.

8 Enjoy faster downloads every day

Now you understand the basics, the next time you want to download a file (or a free program like LibreOffice, shown here), Ninja Download Manager will make the process easier and faster. The pause and play options at the bottom of the window let you pause and resume downloads, and you can easily manage all your downloaded files in the playlist. Happy downloading! ■

Learn how to...

Use Skype in Windows 10



Your guide **Matt Hanson** says...

"The Windows 10 Creators Update brought an overhauled Skype app. Here's how to use its best features"

At a glance

Skill level...

- ▶ Anyone can do it
- Straightforward
- Tricky in parts

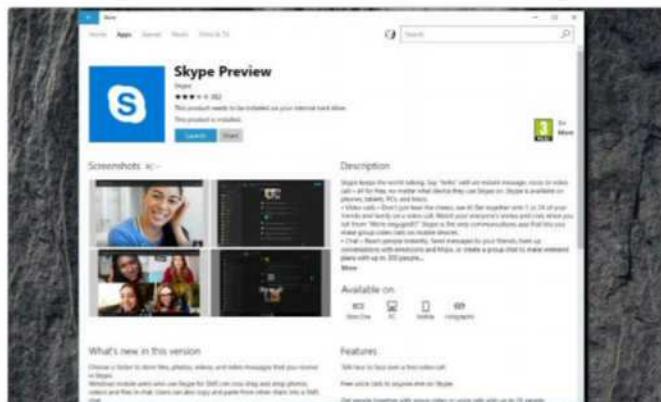
Suitable for...

-  Windows 10
-  Windows 8.1
-  Windows 7

Last year's Creators Update introduced a wide range of new features to Windows 10, and one of the apps that saw the biggest changes was Skype. Ever since Microsoft acquired the video calling service in 2011, it has been an integral part of Windows, seamlessly embedded into the operating system and making it incredibly easy to keep in touch with friends and family around the world via free voice and video calls. If you haven't tried Skype, then now is an excellent time to start since it's free to download and use.

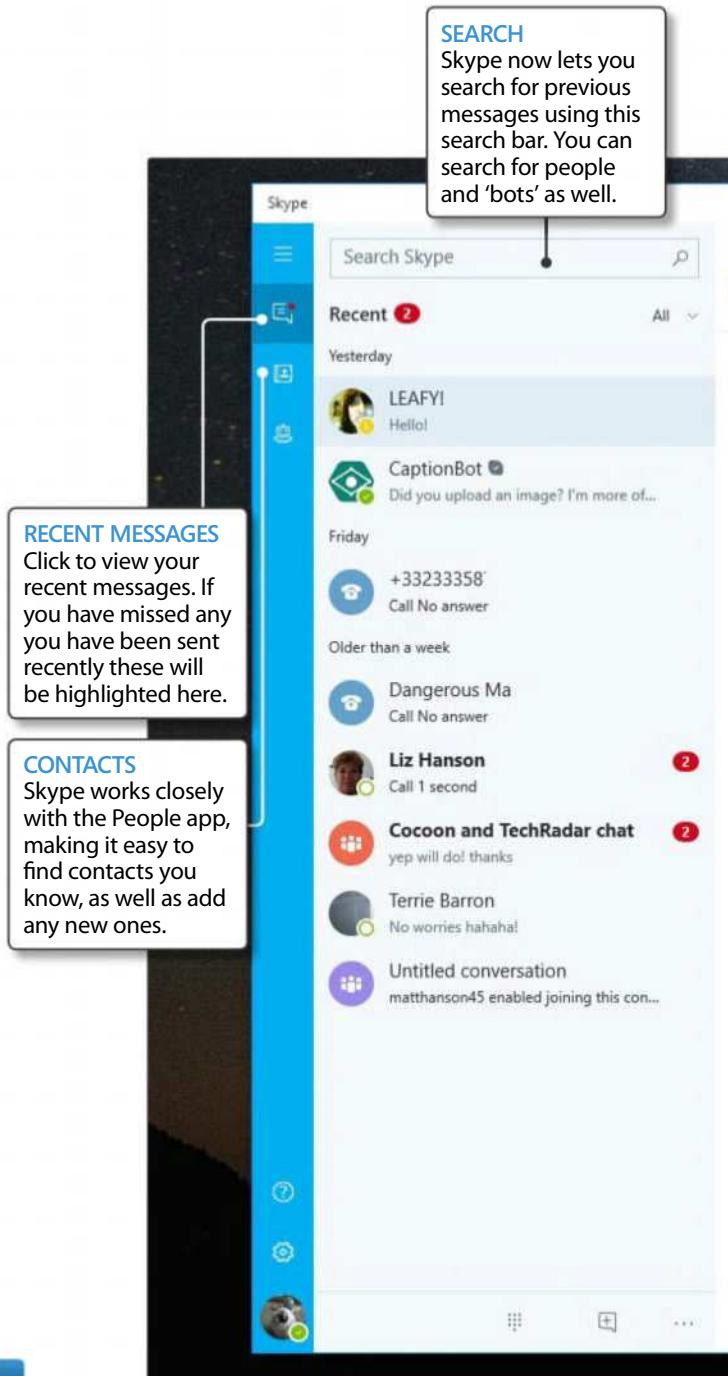
Video and voice calls to other Skype users are free – potentially saving you huge amounts of money on phone bills. You can also buy Skype credits enabling you to phone – and text – mobile phones and landlines from the Skype app on your Windows 10 device. Read on to find out how to get started and make use of its exciting features...

Step-by-step | Get started with Skype in Windows 10



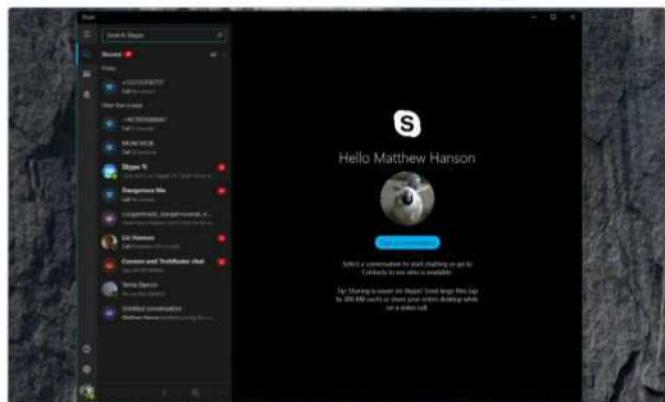
1 Download the latest Skype app

To make use of these new features (or if you've not used Skype yet), you'll need to install the latest version of its Windows 10 app. If you have the [Windows 10 Creators Update](#), the app should be updated as well, but you can also download the new version even if you haven't updated Windows. Open the Windows Store, search for 'Skype' and select Skype or Skype Preview.

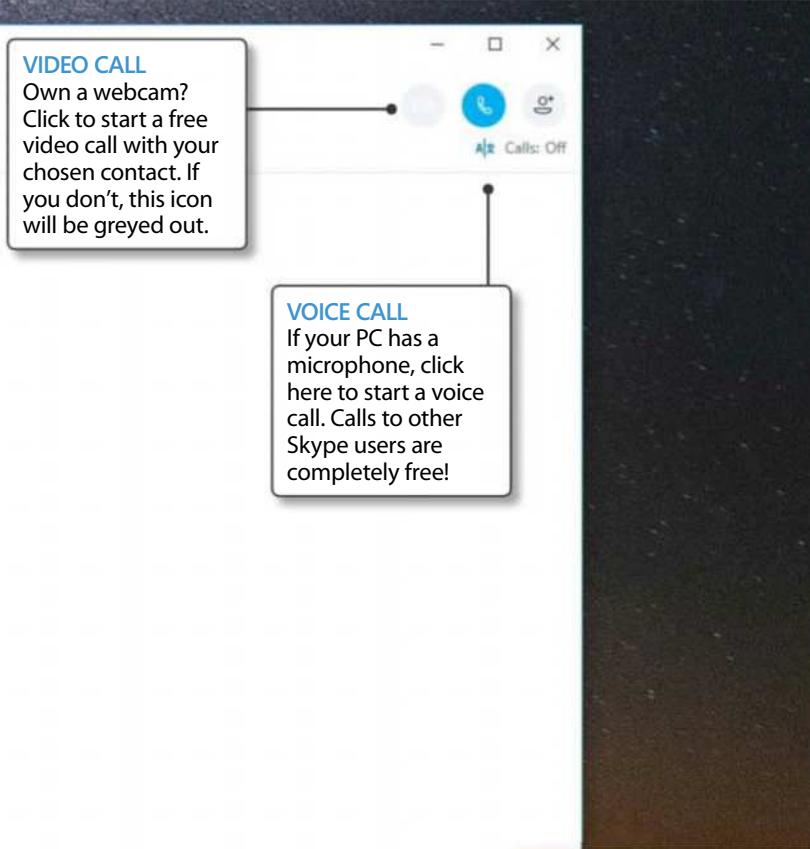


2 Launch Skype

After making sure that the latest version of the Windows 10 Skype app has been installed, you can launch it by opening the Start menu and typing in 'Skype'. Once Skype has launched, a window will appear listing some of its new features. Don't worry about reading that too carefully, since we will explain each one here! Close the window and you'll see the main Skype interface.



★ LEAFY!

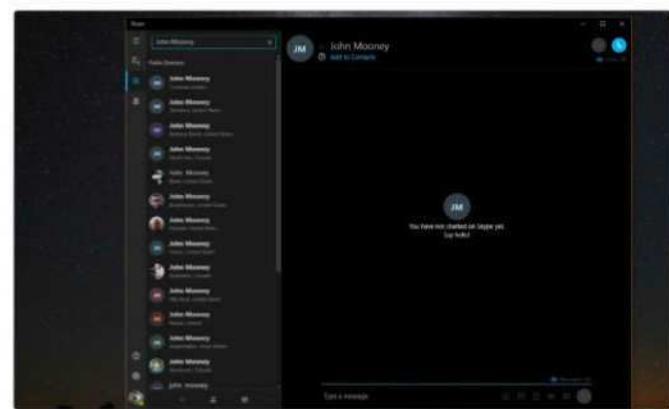
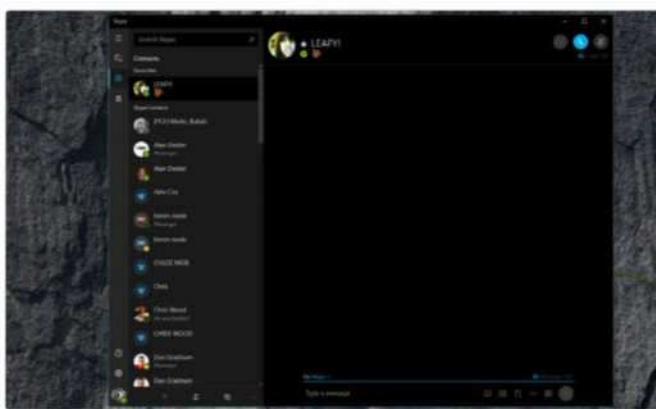


Jargon buster!

► **Windows 10 Creators Update**
Released in April 2017, the Creators Update came with a wide range of new features, including a revamped version of Skype. You should have an updated version of the app already, but if not you can get it from the Microsoft Store.

► **Emoticons**
Popular icons that people use in text and messages to convey emotions. Skype, like pretty much any messaging program, has a large range of emoticons that you can use.

A screenshot of the Skype desktop application. On the left, there's a sidebar with a 'Via Skype' dropdown and a 'Type a message' input field. In the center, there's a conversation window with two messages: 'Hi there! 😎' from 'LEAFY' on 19/09 and 'Hello!' from 'LEAFY' on 10/04. The message 'Hello!' has a small 'Sent' label next to it. At the bottom, there's a toolbar with icons for file operations and a status message 'All Messages: Off'. A yellow sticky note is overlaid on the right side of the screen with the text: 'MATT'S BEST TIP! Skype uses a 'dark' theme by default. To change this to a 'light' theme select Settings in the bottom-left corner.'



3 View your contacts

Skype is all about staying in touch with people, and to do that, you need to add contacts to Skype. The good news is that adding people to Skype is now even easier. If you use the People app in Windows 10 as an address book, you should see your contacts are already in Skype. You can use the search bar at the top of the app window to easily find who you're looking for.

4 Add a contact

If you want to add someone to Skype, click the icon of a person with a '+' sign next to them, which is found at the bottom of the Skype window. The latest version of Skype lets you see any mutual contacts you have with people you search for. This makes it easier to identify the right people. Once you've found who you're looking for, click 'Add to Contacts' to add them to Skype.



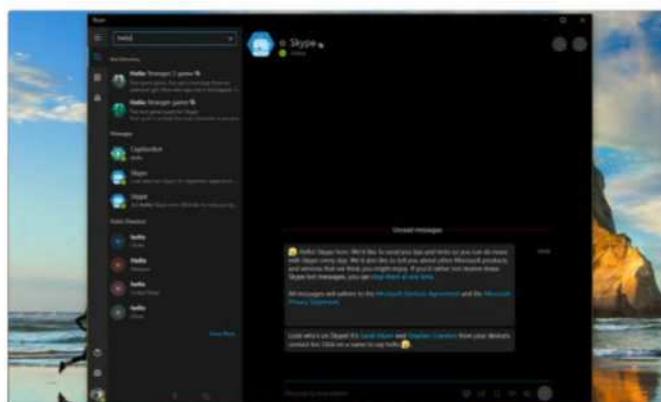
5 Add a phone number

While you can make video and text calls to other Skype users for free, calls to other landline and mobile numbers cost money. Luckily, you can use Skype Credit to make these calls instead. Skype credits are cheap to top up and use, and cost a lot less than making regular international calls. To add a phone number, click the icon of the telephone with a '+' sign next to it.



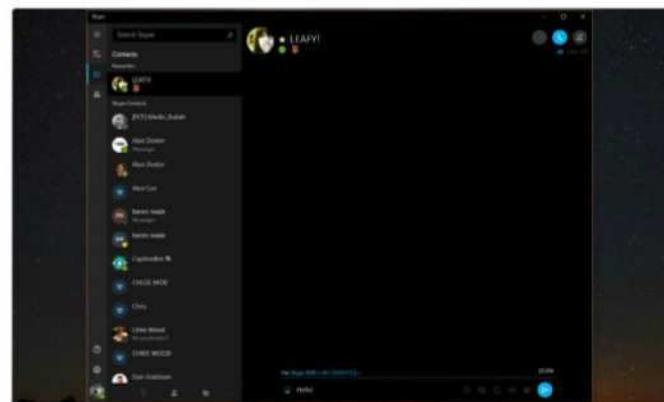
7 Make better group calls

Group calls are when two or more people are involved on the same call – making them ideal for virtual business meetings, or big family reunions. Skype makes group calls even easier – and more fun – than was the case previously. To add people to a group call, click on the icon of a person with a '+' sign next to them, then select who you want to join.



9 Search your chats

Skype works brilliantly as a free instant messaging program, enabling you to have text chats with contacts around the world. You can even exchange pictures, video and **emoticons**. For that reason, one of its newest features is a welcome one – the ability to search your messages. To do that, click the Recent Messages icon, then in the Search Skype box, type the phrase you are looking for.



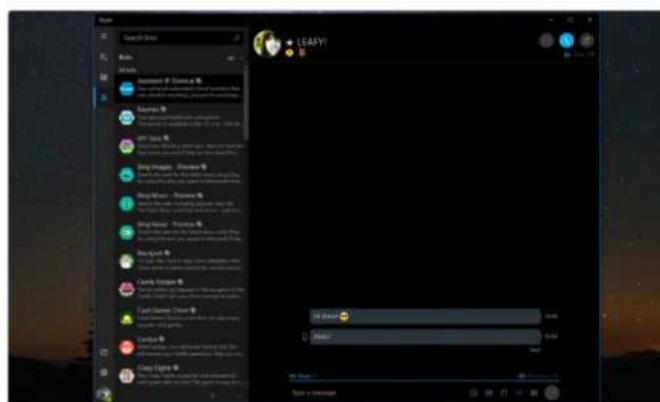
6 Send a text message

One of the most useful features of the Skype app is the ability to send regular text (or SMS) messages. Again, these are paid for using Skype Credit, but are still cheaper than using your phone when texting people in other countries. To do this, select a Skype contact who has a phone number. Where it says 'Via' in the chat box, select Skype SMS, type in your message and tap Send.



8 Easily switch between devices

Microsoft has worked hard to make Skype an integral part of your life, and one of the ways it has done this is by adding a feature to the app that enables you quickly and easily switch between devices while on a call. This is great if you're at your desktop PC, but want to switch to your tablet while you move around your home without interrupting your chat.



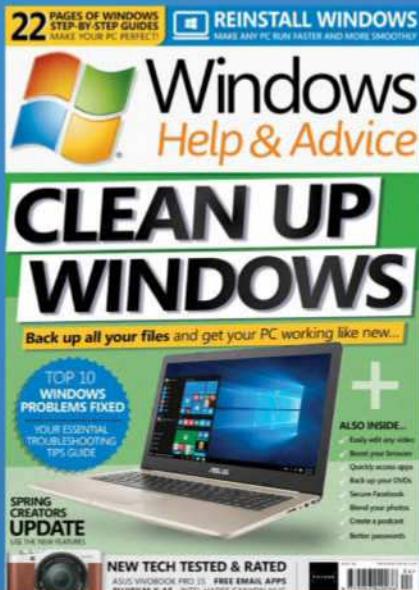
10 Don't forget the basics

Skype remains an excellent video and voice calling app, and all the features that made it so popular remain. If you want to start a video call, click on the contact you want to call, then on the Camera icon in the top-right corner of the app. To make a voice call, click the telephone icon. Microsoft is dedicated to improving Skype, so keep an eye out for more new features in future! ■

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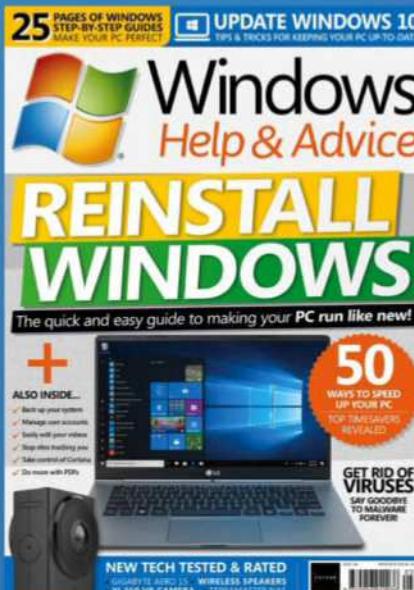
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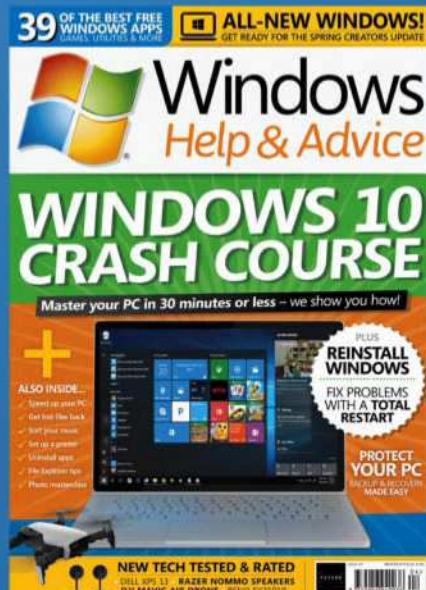
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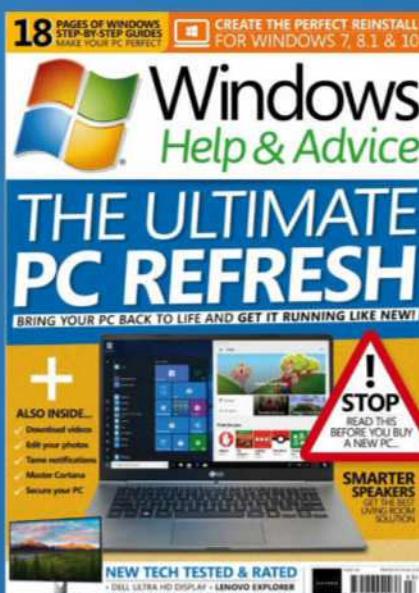
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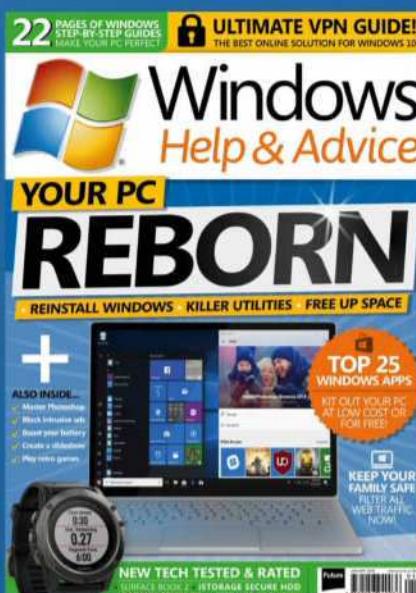
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Learn how to...

Track your workouts with Map My Run



Your guide *Cat Ellis* says...

"Whether you're stepping out for the first time or are an experienced runner, tracking your workouts is a great way to keep yourself motivated"

At a glance

Skill level...

- ▶ Anyone can do it
- Straightforward
- Tricky in parts

Suitable for...

- Windows 10
- Windows 8.1
- Windows 7

Running is a great way to get in shape, meet other people and enjoy the great outdoors, and it's even more rewarding if you can see your progress over time, find new routes to enjoy, and push yourself to achieve more each time you tie your laces and hit the pavement. There are lots of running apps around that use your phone's GPS to monitor your speed and distance, but Map My Run is one of the best thanks to its brilliant online dashboard, which is packed with data about your runs.

Map My Run is available for Android and iOS smartphones, plus Apple Watch, Android Wear and Samsung Gear smart watches. Here we'll be demonstrating the Android version, but the principle is the same for any device. There are both free and paid-for versions, but the free one offers all the main features you need. Let's get started!

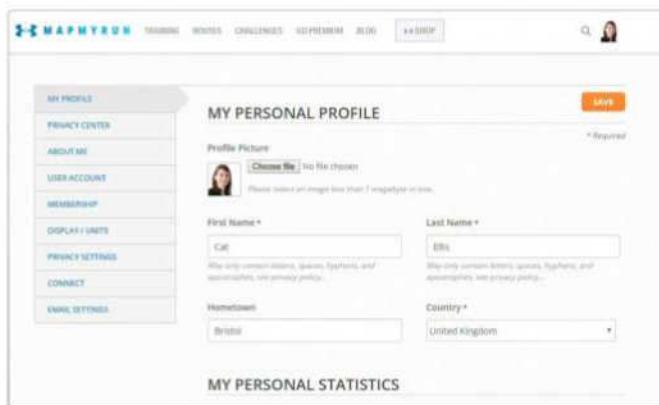


Step-by-step | Track your workouts



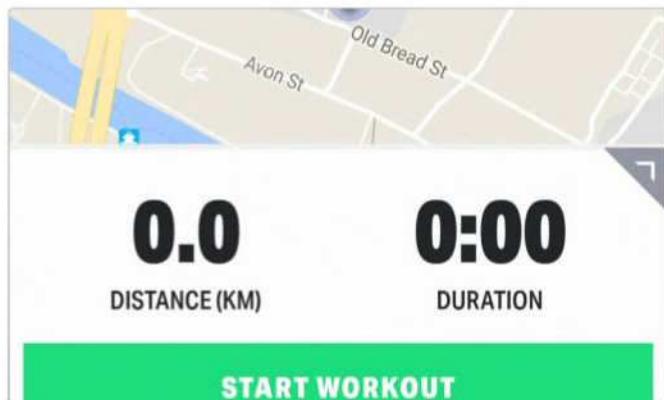
1 Set up an account

Visit www.mapmyrun.com on your PC and click the green 'Sign up' button (top right). You can either log in using your Facebook account, or create a new account. We recommend the latter; you can always link Map My Run to Facebook later, but doing it immediately means your workouts will be published to Facebook by default unless you change it straight away.



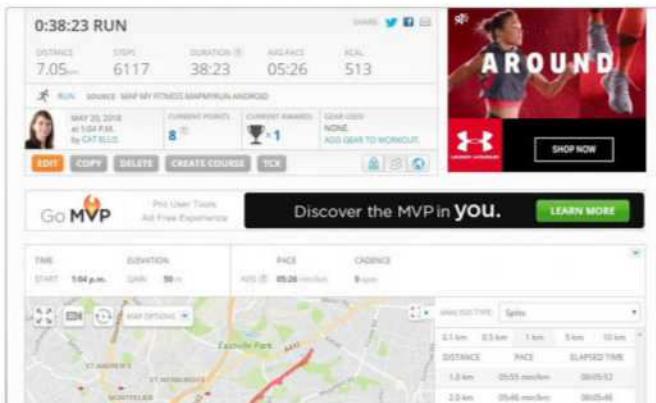
2 Create a profile

Once you're logged in, set up your profile by moving your mouse over the person icon (top right) and selecting Settings > 'My profile'. You don't have to enter anything here, but adding your height and weight will make Map My Run's calorie counts more accurate. Adding your country helps with GPS tracking. Add as much information as you're happy to share, then click Save.



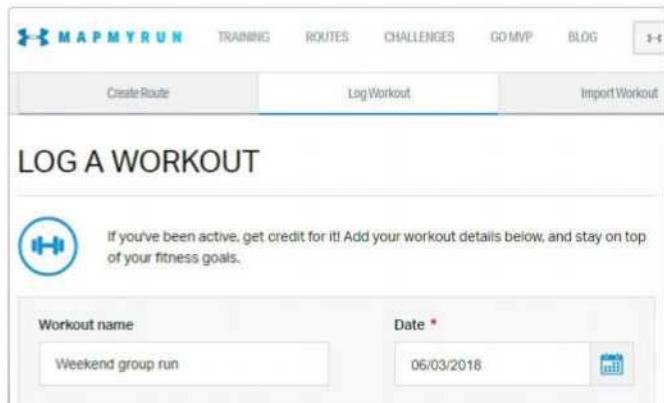
3 Get the app

Now grab your phone (or watch) and search for Map My Run in the appropriate app store. The official app is called 'Run with Map My Run'. Once the app's installed (it's quite large, so it's best to download it over a Wi-Fi connection if possible), launch it and log in using your account details. Make sure your device's GPS is active so the app can find your location.



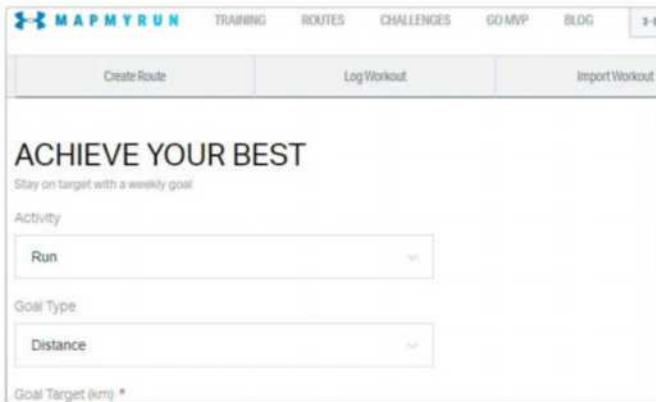
4 Go for a run

When you're ready to start running, tap the green 'Start workout' button and your device will find you and begin tracking your movement. By default, the app will announce how long you've been running and your current pace each kilometre, but you can change this in the app's settings. When you've finished running, tap 'Pause workout' > 'Hold to finish', then tap Save.



5 See your stats

Because your activity is linked to your Map My Run account, you don't need to connect your phone to your PC to see all your workouts. Just log in on your PC, move your mouse over Training and select Workouts. You'll see a map of your route, your splits (how long it took you to run each kilometre), an estimated calorie count and much more.



6 Log a workout manually

Went for a run but forgot your phone or watch? Don't worry; you can enter it in Map My Run afterwards. Select Training > Workouts, then click 'Log a workout'. Add as much detail as you can (the more information you can add, the more useful it will be), then click Save. You can also share your workout on Facebook and Twitter if you're particularly proud of it!



7 Set some goals

Map My Run also can help you stay motivated by setting personal targets. To set a target, select Training > Goals and either pick one of the standard options (completing any activity a certain number of times per week) or create your own. Once you've achieved it, you'll receive an award on your profile. There are 'Challenges' too, but these are only open to runners in the US.

8 Try something new

There's lots more to discover in Map My Run, but one of our favorite features is the ability to find new, interesting places to run. Tap 'Load route' in the mobile app to see options near you. You can also use the app to capture photos along the way. It's a great way to make the most of your workouts, so sign up today and get running! ■

Learn how to...

Easily transfer photos from your iPhone



Your guide *Ian Evenden* says...

"Back up your photos and videos to your PC quickly and easily, and avoid iTunes, with this free alternative"

At a glance

Skill level...

- ▶ Anyone can do it
- Straightforward
- Tricky in parts

Suitable for...

- Windows 10
- Windows 8.1
- Windows 7

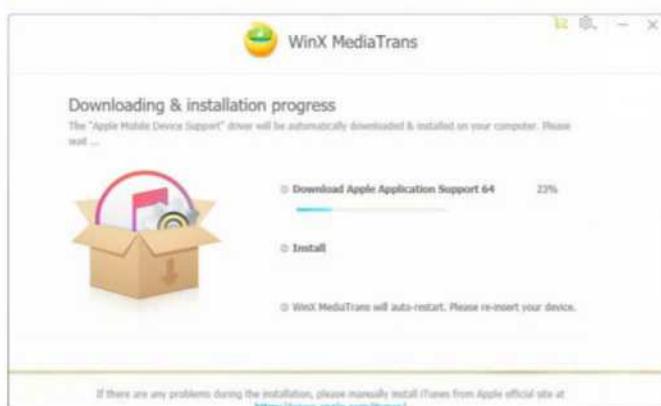
The iPhone was a revolutionary device when it launched in 2007 and continues to lead the way today, but it's always had one weakness: the way it connects to a PC.

Until iOS 6 broke the link between your iPhone and computer, we were forced to use the clunky and unreliable iTunes software to do almost anything with our prized portable possession. Today, you hardly need to hook an iPhone, or its iPad and iPod touch siblings, up to a computer, as everything is done through dedicated apps. Unless, that is, you want to copy images or videos directly from your iPhone to your PC's storage drive.

Try to do this, and iTunes rears its head again, making life slightly more difficult than it needs to be. There are alternatives to using Apple's software, however, including WinX MediaTrans, which we'll look at here.



Step-by-step | Transfer iPhone photos to your PC



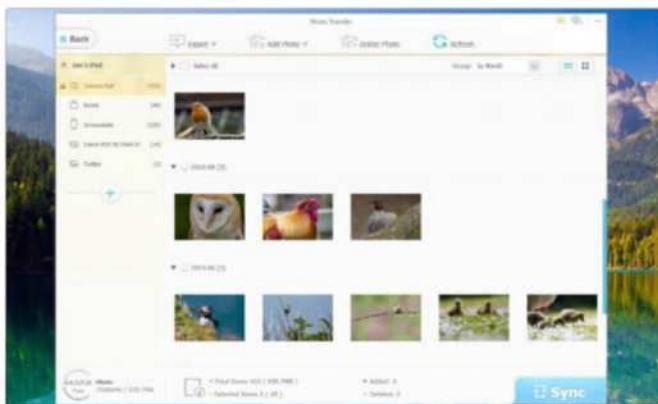
1 Install

Find WinX MediaTrans at www.winxdvd.com/mediatrans. Download and run the installer. Once installed, you'll need to download its drivers for Apple products, both 32-bit and 64-bit versions. We found this took a long time, but it's possible the server or our Internet connection was having a bad day. Once it's done, you can run the app and plug in your iPhone.



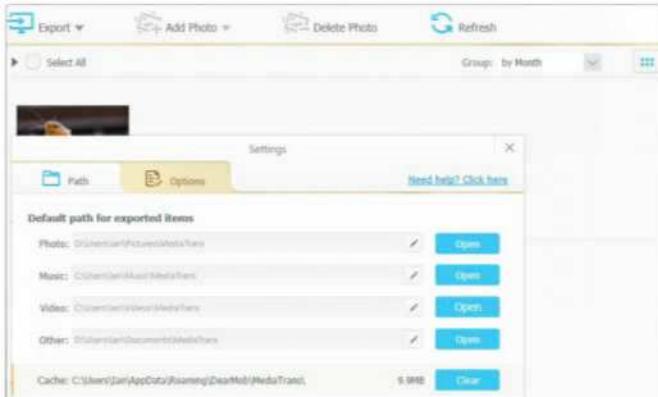
2 Plugged in

You'll know if your iPhone has been detected by your PC because, if it's the first time you've connected them together, a notification will appear asking what you want to do when it's plugged in. In WinX MediaTrans, the 'Not connected' line (top left) changes to the name of your device. If you can't get it to connect, try plugging its cable into a different USB port.



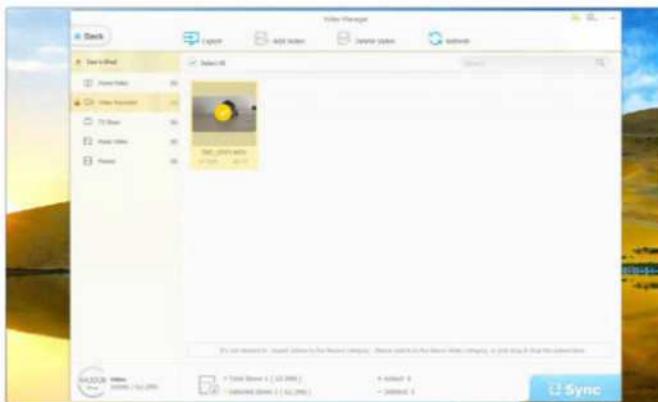
3 Find your photos

Choose the Photo Transfer option from the top row of icons in the app's main view. It will think for a moment while it accesses the data on your iPhone or iPad, then display your images sorted by date. Drop down the arrow next to a date to see the images taken that day, and click the checkbox next to the arrow to select them all. Click on individual images to select them directly.



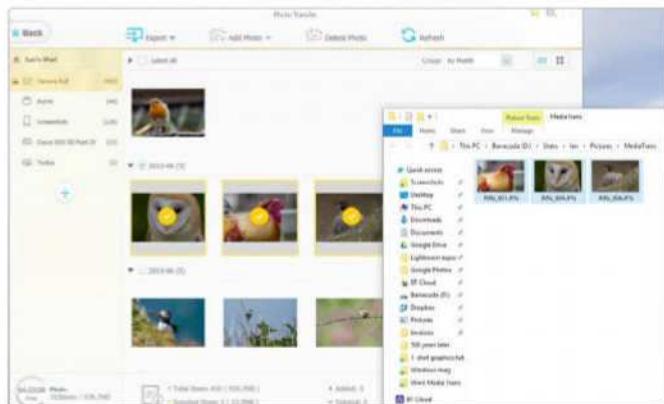
5 Change default folders

By default, your images are saved on your PC in the Pictures folder within your User folder. To change this in WinX MediaTrans, drop down the menu from the cogwheel at the top right of the interface, and choose Settings. From there, you'll be able to pick the folders the app saves photos, videos and music to by clicking the pen icon next to their name, and navigating to a new folder.



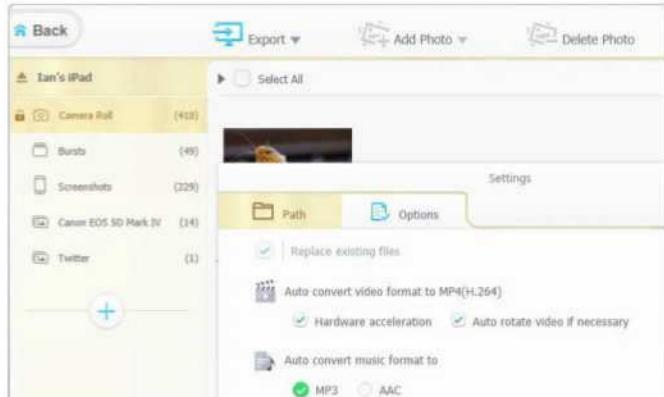
7 Transfer your videos

MediaTrans can transfer videos to your PC just as easily as it can with photos. From the main window, select Video Manager from the top row of icons, and you'll be presented with all the videos you've recorded with your iPhone's camera. You can select and import them just as you did with photos, but this time they're saved into the Videos folder in your User folder.



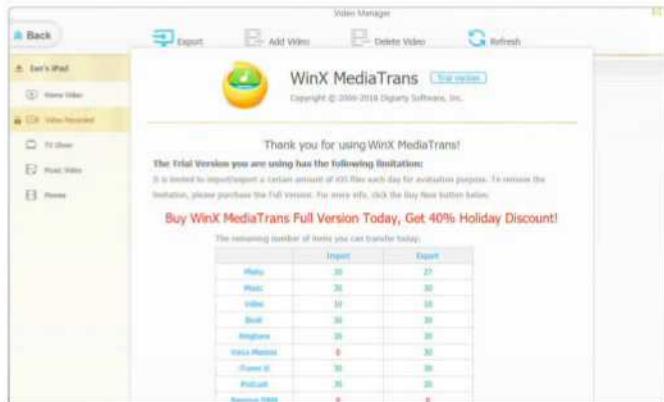
4 Export your photos

The Export button turns blue when there's something selected, ready to export. There's a drop-down menu with the option to export your files as they are, or convert HEIC (High Efficiency Image Codec) image files to JPEG. HEIC is a file format Apple introduced in iOS 11, but it's not supported by Windows 10 yet, so convert HEIC files to JPEG for maximum compatibility.



6 Other settings

Also in the Settings you'll find options for converting videos from iOS 11's HEVC (High Efficiency Video Codec) to the less space-saving but more commonly supported MP4/H.264. This format is likely to be used by TVs and set-top boxes that haven't yet had an update to the newer filetype and, of course, your PC will have no problem playing it.



8 Remove all limitations

MediaTrans is free to download, but limits the number of photos and videos you can export per day unless you pay for a registration key – you can either buy a one-year licence for \$39.95 (£29.18), or pay \$59.95 (£43.80) for a lifetime licence – it's worth it if you need to transfer a large number of photos and videos on a regular basis. Registering also unlocks additional features. ■

Learn how to...

Clean up your Gmail inbox



Your guide *Nate Drake* says...

"Is your inbox collapsing under the weight of spam and other unwanted messages? Follow this guide to declutter and streamline your email"

At a glance

Skill level...

► Anyone can do it

Straightforward

Tricky in parts

Suitable for...

Windows 10

Windows 8.1

Windows 7

Gmail users enjoy a generous inbox quota of over 15GB.

While space isn't a concern, it's tricky to sift through a mounting pile of messages.

Google has tried to address this problem by automatically marking certain messages as 'important' and sorting your mail into five broad categories: Primary, Social, Promotions, Social, Updates and Forums. There's also an advanced junk mail filter.

These measures may not be enough for a Gmail account that's truly bulging at the seams. In this guide, you'll learn how to sort messages using smart labels, as well as how to mass delete and filter unwanted content. We'll also show you how to mark all emails as read and archive older content.

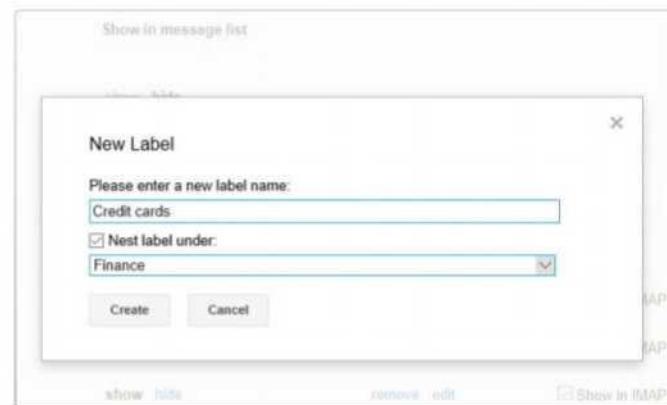
Plus you'll learn advanced search techniques, such as mail received before a certain date.

Step-by-step | Tidy up your Gmail inbox



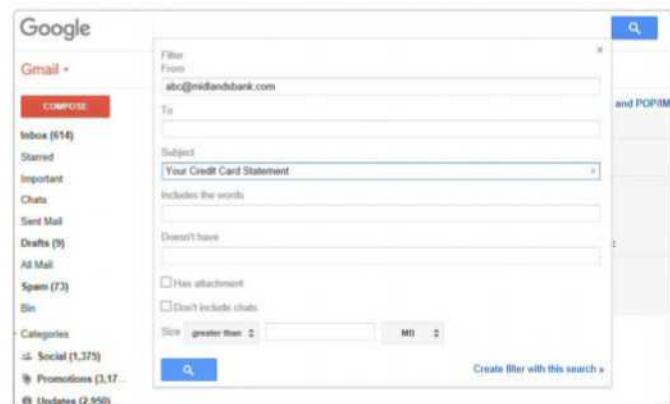
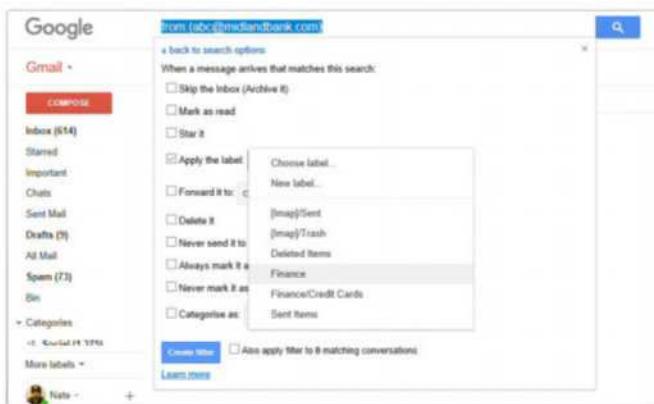
1 Unsubscribe and report

Gmail helpfully sorts your emails into separate categories. The Primary tab shows messages, which are most likely to be important. Click through the Promotions and Forums sections and unsubscribe to content you no longer need. Gmail does its best to protect you from junk. If you see any, open the drop-down menu next to the Reply button and choose 'Report spam'.



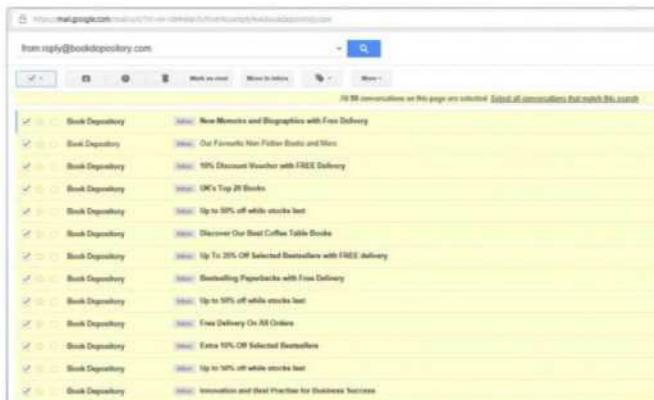
2 Use labels

Labels are a great way to manage your messages. They act like traditional email folders in that you can drag messages into a certain category – Finance, for example. To do that, click Settings (top right) and choose the Labels tab. Click 'Create New Label'. Enter the label name. Messages can have multiple labels. You could select 'Nest label under', then Finance, for example.



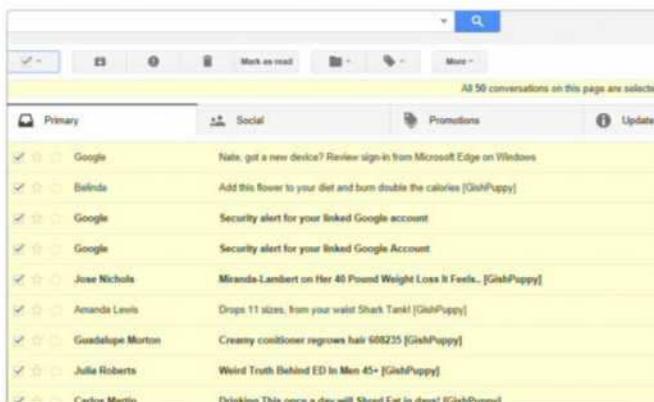
3 Basic filtering

Labels can be handy but it's a nuisance categorising emails each time they come in. Fortunately Gmail can apply filters. Click settings at the top right then 'Filters and blocked addresses'. Click 'Create a new filter'. Enter the email address you want to filter and then choose 'Create filter with this search'. From here, you can choose actions such as 'Apply the label'. Then 'Create Filter'.



5 Mass delete emails

If you've found a message you want to delete, Gmail can help you delete others like it. Use the search bar to do this. You can find emails from specific senders – 'from: sales@marvinsmagicpills.xyz'; for example. Next, check the tick box at the top left and select All, then choose 'Select all conversations that match this search' at the top of the screen. Then click Delete.



7 Mark all messages as read

Gmail automatically displays the number of unread message beside Inbox. As junk mail mounts, it's hard to keep track of important messages. To reset your unread message count to zero, check the 'Select all' box (top left), then choose 'Select all conversations'. Next, click 'Mark as read'. If you use category tabs – Primary, for example – you'll need to do this for each one.

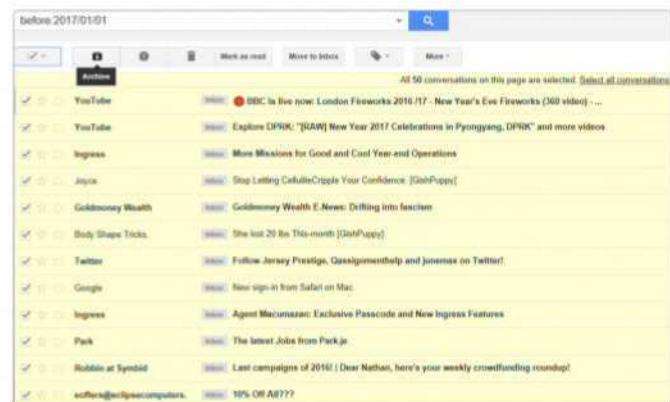
4 Advanced filters

Gmail can do more than just label messages from a specific sender. This can be useful if, for example, you want to find credit card statements sent from your bank, but aren't interested in their marketing messages. To get started, create a new filter as outlined in the previous step but this time fully explore the options – you can filter by subject by using the Subject field, for example.



6 Block unwanted emails

Deleting unwanted messages makes your inbox tidier, but won't prevent the sender from emailing you in future. Luckily, Gmail has feature for blocking unwelcome emails; open any email from an undesirable sender and choose the drop-down option beside the reply button. Click 'Block address'. Blocked senders appear under the 'Filters and blocked addresses' Gmail setting.



8 Archive messages

You probably have some emails cluttering up your inbox that are too important to delete. Gmail enables you to archive those messages – they're moved from the inbox and stored in All Mail instead. List the messages you want to archive – by searching for 'before: YYYY/MM/DD', for example. Select 'all conversations', then the Archive button at the top of the screen. ■

Learn how to...

Protect yourself from a ransomware attack



Your guide *Cat Ellis* says...

"In this tutorial we're going to show you how to avoid ransomware, or rescue your PC if it's already infected"

At a glance

Skill level...

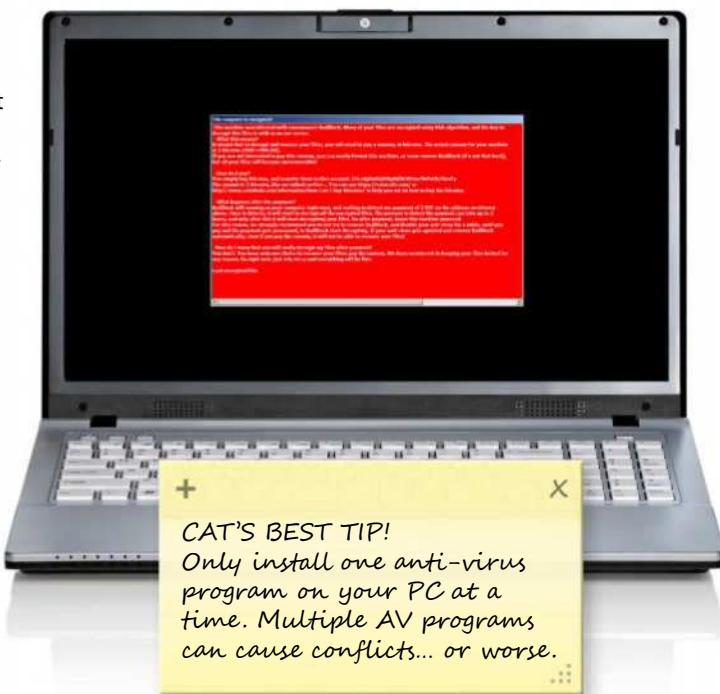
- ▶ Anyone can do it
- Straightforward
- Tricky in parts

Suitable for...

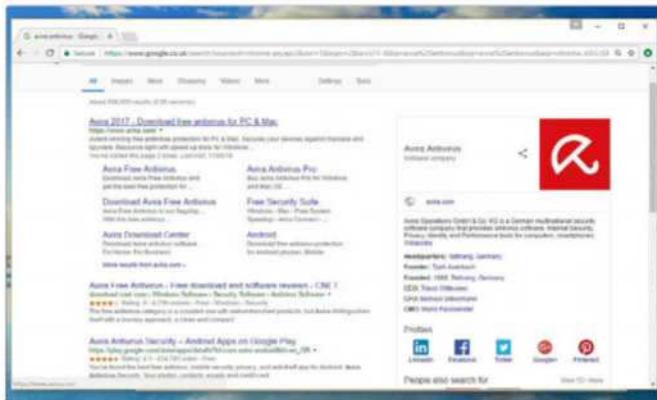
- Windows 10
- Windows 8.1
- Windows 7

Ransomware is a particularly nasty type of malware (malicious software) that encrypts your valuable files and won't release them until you've paid a fee – usually several hundreds of pounds. Last year, computer systems in over 150 countries were affected by a virulent strain of ransomware called WannaCry, with victims including universities and hospitals. It's a serious problem, but there are ways to avoid it, and to protect your files in case the worst happens.

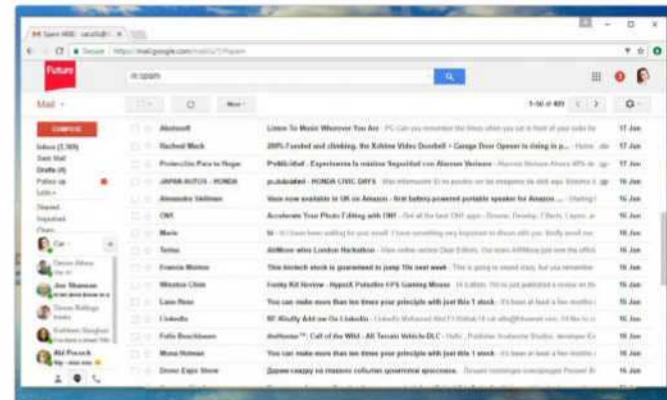
If your PC is infected, you might be unable to access your documents, or you might not be able to log in at all. In either case, the most important thing is not to panic, and don't be tempted to pay the fee to unlock your files. There's no guarantee that they will be released, and even if they are, your money will be lining the pockets of criminals. Take a deep breath – it'll be fine.



Step-by-step | Avoid or remove ransomware



A screenshot of a web browser displaying search results for 'Avast Free Antivirus'. The results include various links to download the software, including official developer sites and third-party download pages. The Avast logo is visible on one of the result cards.



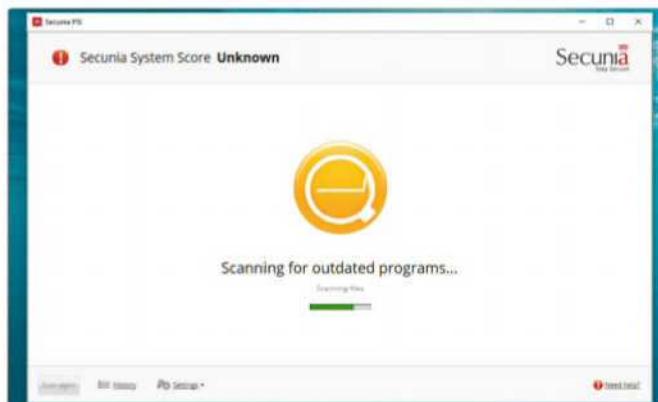
A screenshot of a web browser displaying search results for 'F-Secure'. The results include various links to download the software, including official developer sites and third-party download pages. The F-Secure logo is visible on one of the result cards.

1 Download safely

Malicious programs, such as ransomware, can be attached to files and programs downloaded online, so always be careful. When you're downloading a new app, make sure you get it from the developer's own site, not a third-party source, and make sure the URL begins 'https', indicating that it's certified secure. If you use torrent sites, only download from legal, legitimate sources.

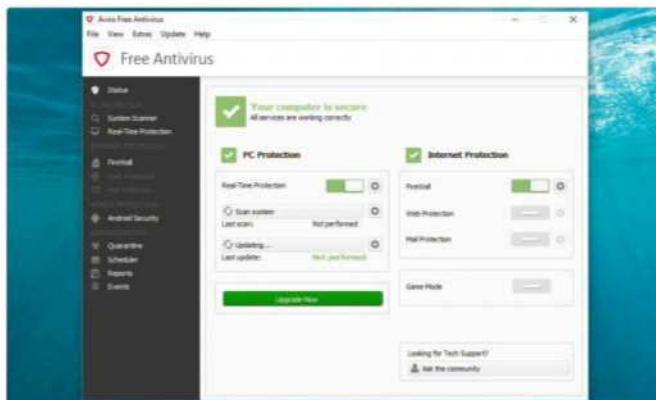
2 Take care with emails

When you receive an email with an attachment – even if it's from someone you know – think carefully before opening it. Criminals often try to trick you by sending emails about parcels you aren't expecting or invoices that need paying, and sometimes your friends' email accounts can be hijacked to send messages. If you see an email that looks dodgy, delete it without opening it.



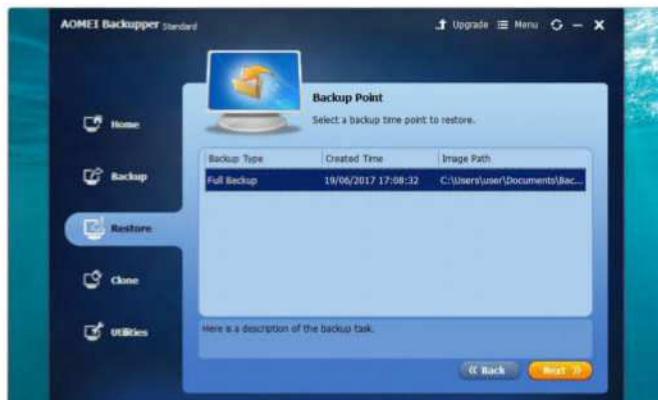
3 Back up your files

Prevention is better than cure. If you back up files regularly, you can simply restore them in the event of a ransomware attack – while also protecting them against physical damage or theft, if you keep the backup in a different physical location. Try AOMEI Backupper (<http://bit.ly/2tbK5VO>). It's a great free tool that makes backing up and restoring files as easy as can be.



4 Update your software

Criminals often exploit security problems in Windows and other software. To avoid falling victim, make sure you install all Windows security updates when prompted. Many other programs update themselves automatically, but for those that don't, try the free Secunia Personal Software Inspector (<http://bit.ly/2sKEQwd>). It scans your PC for older software and downloads any updates.



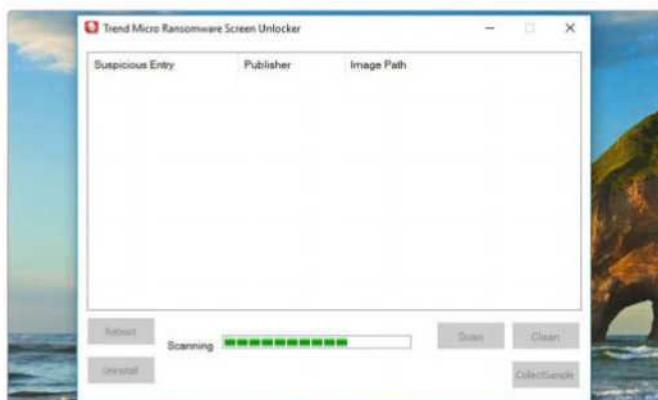
5 Strong security software

No PC should ever be without an anti-virus program, but some cover a broader range of malware than others. Windows 10 comes with Windows Defender, but it doesn't have the best detection rates. If you're looking for an alternative, try Avira Free Security Suite (www.avira.com/en/get-antivirus). It's easy to use, and particularly good at detecting and blocking ransomware.



6 Restore and recover

All of these steps will help you avoid ransomware infection, but if something nasty slips through the net, don't panic. If you've backed up your system with AOMEI Backupper, you can restore it using the guide at <http://bit.ly/2rSOLMA>. Alternatively, insert your original Windows disc and select the option to repair or reinstall the OS. Microsoft has a guide at <http://bit.ly/2nLIUdi>.



7 Decrypt files for free

If you don't have a backup, there are still ways to solve the problem without paying. Not all ransomware works the same way, so Avast has created a set of free decryption tools that you can use to unlock your files at <http://bit.ly/2tbCiay>. Clicking on the name of a program on the website will reveal the symptoms it causes, and download the tool you need to remove it.

8 Unlock your screen

If your PC's screen has been locked, you need Trend Micro's Ransomware Screen Unlocker Tool (<http://bit.ly/1qiSmSp>). This comes in two versions: one for ransomware that still lets you start Windows in Safe mode (see the guide at <http://bit.ly/299ejN1> to see if you can), and another if you can't. Either way, install the tool you need and the wizard will unlock your display in no time. ■

Learn how to...

Control your PC's power usage



Your guide *Ian Evenden* says...

"If you don't need your PC to run at full power all the time, you can control how much energy that it uses"

At a glance

Skill level...

Anyone can do it
Straightforward

► Tricky in parts

Suitable for...

 Windows 10
 Windows 8.1
 Windows 7

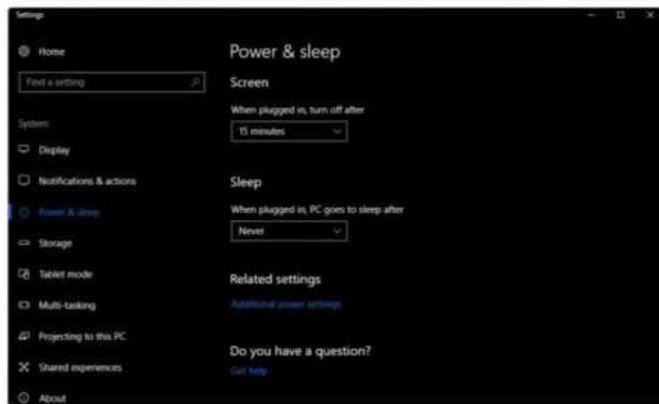
Modern PCs can use a lot of electricity. The power supply in a desktop can potentially draw over a kilowatt, especially if the PC was built with gaming or 4K video editing in mind. You don't need that if you're surfing the web or preparing a few word processing documents, however, and that's where Windows' power management options come in.

Laptops use less power than desktops, but when on the move you need to conserve your battery life, and power saving can help. Not only can you specify when your PC will go to sleep, or hibernate, but you can also dig deep into the settings to restrict your processor's maximum frequency or when your hard drives stop spinning to save power.

If that sounds a bit technical, Windows already has some power plans built in, so you can easily switch between high performance and power saving with just a few clicks.

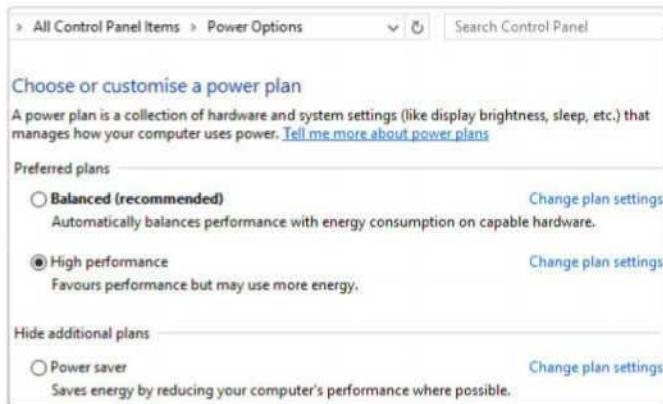


Step-by-step | Take the power back



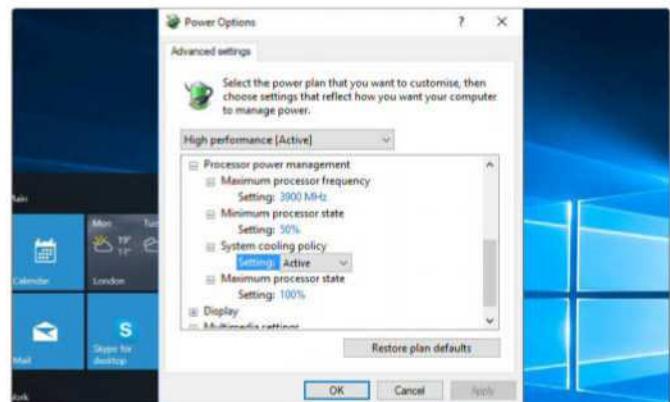
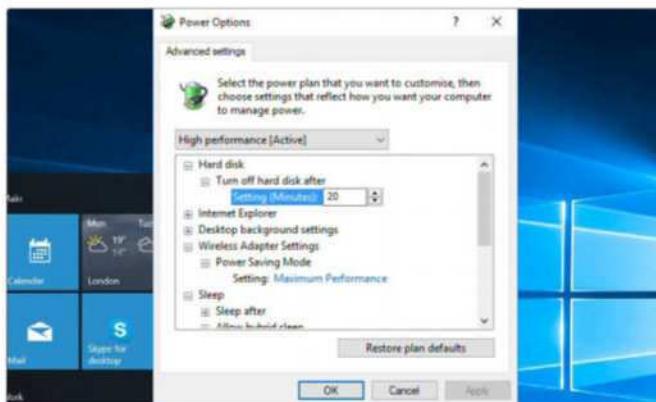
1 Use Power & sleep settings

In Windows 10, pop up the Start menu and type 'power', and look for 'Power & sleep' in System Settings. Click on this, and a window will appear enabling you to alter the settings. Choose how long you'd like to leave your PC idle before it goes to sleep or turns off its screen. If you have a laptop, you can have different settings for battery power or when plugged in.



2 Additional power settings

Click the 'Additional power settings' link to be taken to the Power Options window. Here, you can choose between Windows' preset power plans: Balanced, 'High performance' and 'Power saver'. If you're playing games or editing video, you'll want 'High performance'. If you're trying to eke out every last bit of battery life, choose 'Power saver'. Most people should choose Balanced.



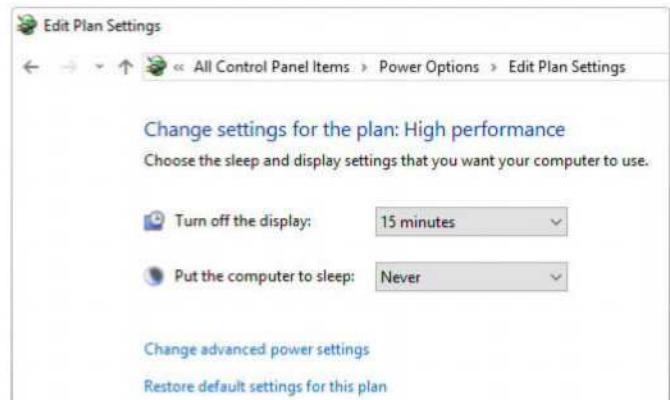
3 Advanced power settings

Click 'Change plan settings' on any plan to be taken to a new screen, then click 'Change advanced power settings'. An options window will appear. The most interesting items here are probably 'Power buttons' and 'lid' which changes what the PC does when its power button is pressed or its lid is closed. 'Multimedia settings' lets you set the level of processing power used for video playback.



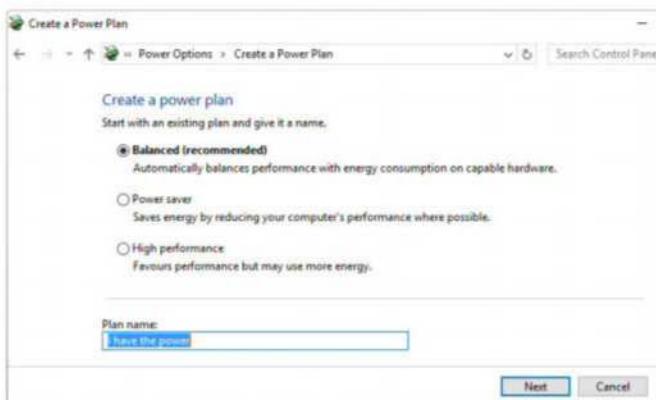
4 Processor power management

You can also tinker with the settings for your processor's power management. Intel and AMD make a lot of their CPUs' ability to manage their own speeds and power consumption, so only do this if you know what you're doing. If you do, you can set the maximum processor frequency and change other settings from the 'Advanced settings' window. Proceed with caution.



5 In Windows 7

If you're still using Windows 7, you'll find it has a similar approach to power management, but the settings for it are in a different place. You'll find the options in Control Panel > 'Hardware and Sound' > Power Options, or you can search for 'power settings'. You'll see the same three power plans as Windows 10, and you can click through to the 'Advanced settings' window too.



6 Custom plan

If any of the three built-in plans aren't to your taste, you can either change them or create a new one. To change existing plans, use the 'Change plan settings' link to the right of the plans in the Power Options window. Your choices are limited to screen timeout and how long it takes for the computer to enter sleep mode, unless you want to tinker with the Advanced settings.



7 Create your plan

At the left of the Power options window in Windows 10 you'll see a link marked 'Create a power plan'. Click it, and you'll be asked to select one of the three existing plans to use as a template, and to give your new plan a name. Click 'Next', and the display off/PC sleep time drop-downs appear, so you can choose how long your PC will stay on. Click 'Create' to save your new plan.

8 Restore defaults

You can tinker with any of the power plans, and make some deep changes using the Advanced settings, but there's always a way back, whether you've been fiddling with a built-in plan or a custom one. At the bottom of the Edit Plan Settings window there's a link marked 'Restore default settings for this plan'. Clicking it does exactly what you'd expect. ■

Learn how to...

Power up the context menu in Windows



Your guide *Cat Ellis* says...

"Make the right-click menu work for you by adding brilliant new tools and options, and removing the ones you never use"

At a glance

Skill level...

► Anyone can do it

Straightforward

Tricky in parts

Suitable for...

Windows 10

Windows 8.1

Windows 7

The Windows context menu, which appears when you right-click a file or folder, is packed with handy tools. Not only can you open, copy or delete a file or folder using it, you can also use it to pin items to the Taskbar for quick access, scan them for viruses with Windows Defender (very useful if it's something you've just downloaded), or create a handy shortcut.

The context menu is capable of so much more, though. With a few extra programs, you can transform this humble list into a powerful resource that will save you time and make everyday tasks effortless.

You can customise the Windows tools available when you right-click a file, making it easier to power down your PC, change properties, or empty the Recycle Bin. Alternatively, if your context menu is cluttered, there's an easy way to get it under control so it only shows the options you use.

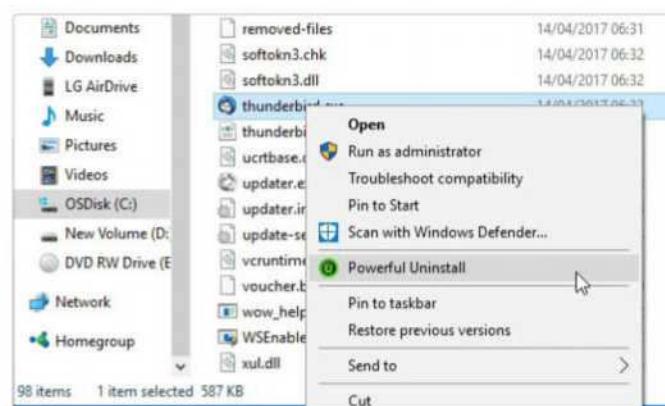


Step-by-step | Create a bespoke right-click menu



1 Make uninstalling easier

Usually when you want to remove a program, you have to do it through the Apps & Features control panel, only sometimes items get left behind. There's a free tool called IObit Uninstaller that lets you remove any program by right-clicking its icon. Once it's finished, it performs a deep scan to make sure there's no junk left. Get it from www.iobit.com/en/advanceduninstaller.php

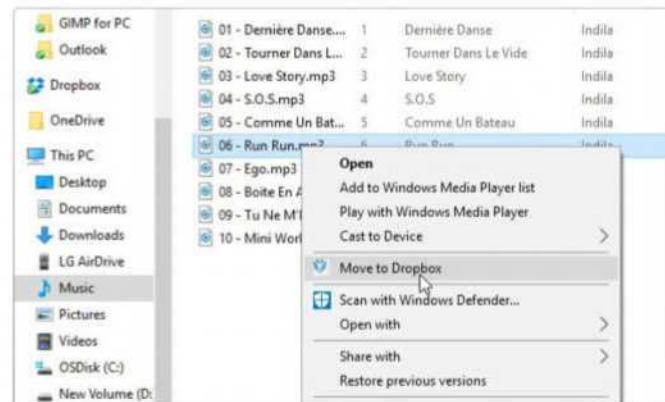


2 Remove programs with a click

Run the installer and the tool will be added to the context menu. To try it, right-click the icon of an app you don't want and select 'Powerful uninstall'. Check that the app shown is correct, then click Uninstall. You can create a Restore Point before you start, just in case. The app's own uninstaller will then run, and any residual files or registry entries will be identified for removal.

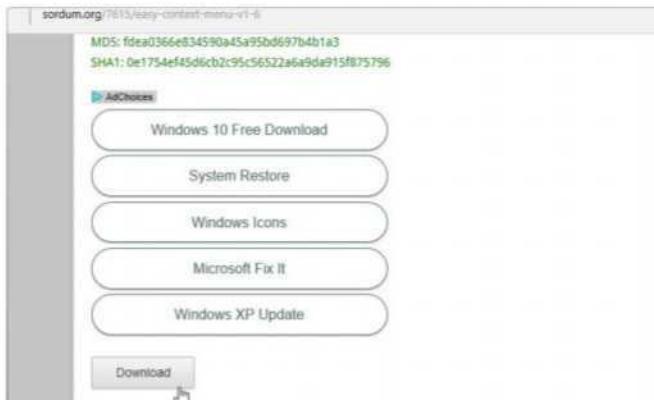
Explore

Power up Windows' context menu



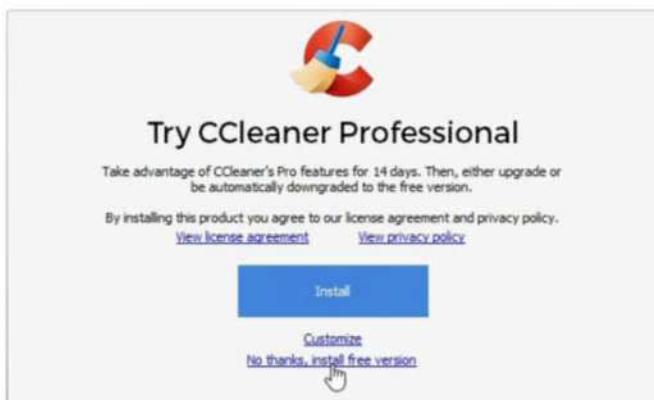
3 Get instant cloud storage with Dropbox

Another great tool for your context menu is Dropbox, which lets you send any file from your PC to an online cloud server, so you can access it from any device with an Internet connection. The free version of Dropbox gives you 2GB space for your files, which goes a long way. To get started, go to www.dropbox.com and click 'Download the app', then run the installer.



5 Boost your menu with extra tools

Easy Context Menu is a free tool that lets you add all kinds of handy tools to your right-click menu. Download it from [www.sordum.org/7615/easy-context-menu-v1-6/](http://sordum.org/7615/easy-context-menu-v1-6/) (it's not obvious, but click the rectangular grey Download button at the bottom of the page). Extract the ZIP, and double-click EcMenu.exe. Easy Context Menu doesn't have to be installed, so it will start immediately.

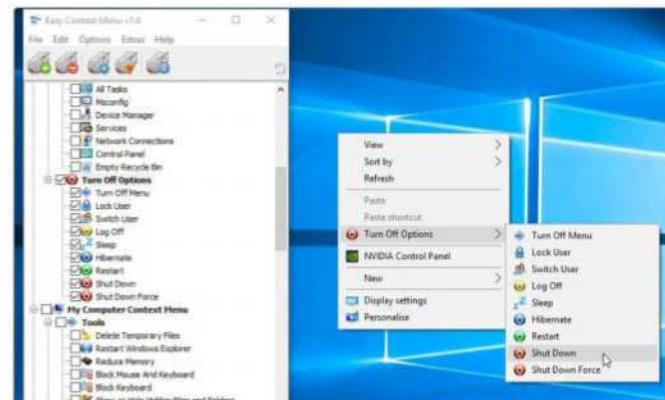


7 Clean up the clutter

If your context menu is starting to look big and unwieldy, removing the tools and options you never use can make it much more manageable. To get rid of the junk, download the free version of CCleaner from www.piriform.com/ccleaner/download and run the installer. When you're offered a trial of the Pro edition, select 'No thanks, install free version'.

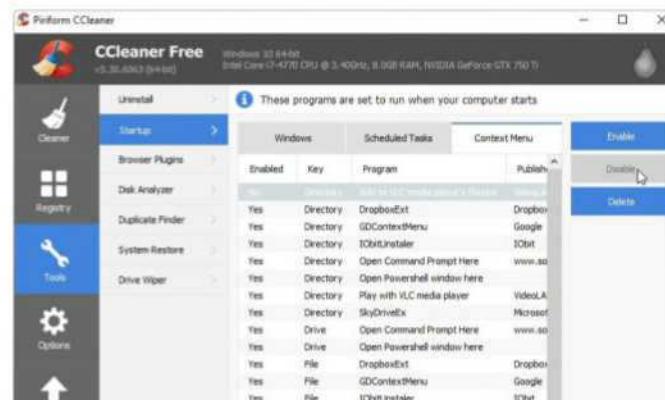
4 Access your files anywhere

When the Dropbox app starts, you'll be asked to either create an account or sign in via Google. Once you've logged in, right-click a file and select 'Move to Dropbox'. The file will now be accessible from any device with the Dropbox app installed, or via www.dropbox.com. See the Dropbox icon in the notification area. If there's a green tick, the files you've moved have been uploaded.



6 Add quick controls

You'll now see a huge list of options that you can add to the context menu. Some of these are advanced Windows tools that you won't need on a regular basis, but others – such as Turn Off Options and Empty Recycle Bin – are very handy to have at your fingertips. Check the boxes beside the tools you want to add, then click the green '+' icon on the top left to save the changes.



8 Make the finishing touches

Run CCleaner and select Tools from the menu on the left, then click Startup and select the 'Context menu' tab. Take a look through the list; if there's anything you'd like to remove, just click it once and select Disable. You can always reactivate it later on if you change your mind. Congratulations! Thanks to these tools, you now have a fully customised context menu. ■

Get started with **the smart GARDEN**

Summer is here at last, so it's time to check out the latest tech designed to help out in your smart garden

Now that winter is a fast-fading memory, it's time to get out in the garden and enjoy all the delights that it has to offer – with some smart tech on your side, it needn't be hard work to maintain either.

A good starting point for any smart garden is a soil sensor that can measure things like temperature and moisture, and send notifications to your mobile device to let you know when your plants need attention.

Oddly, while there are a number of soil sensors available in the US, few of them are currently on sale in the UK – Edyn and PlantLink even seem to have vanished from Amazon UK in recent months. Parrot made a Flower Power sensor a couple of years ago, but its website says this product is no longer on sale. Similar products are available online if you (ahem) dig around. The Xiamo Mi and Flower Care 2 smart soil sensors are currently priced around £20.

The main option for gardeners in the UK is the Koubachi Plant Sensor. Koubachi has now been taken over by Gardena, a German company that is emerging as the



Forget toiling away in the garden for hours, get a robo mower to do your dirty work for you.

new gardening superpower. The original Koubachi sensor can still be found online, but Koubachi is shutting down at the end of 2018 so if you want to be sure of technical support – and future app updates – we'd recommend the new version, the Gardena Smart Sensor. You can buy the Smart Sensor on its own for around £110 but, as part of its master plan for global garden domination, Gardena also sells the sensor with a number of kits that include other devices, such as smart sprinklers and robot lawnmowers, costing up to £1,600.

Gardena's products start at around £30 for its Water Computer, which is a kind of smart valve that connects to your garden hose or sprinkler system. The Water Computer doesn't use an app, but it does have a small LCD display that shows you the amount of water being used and provides programming options to control frequency, duration

"A good starting point for any smart garden is a soil sensor that can measure things like temperature"





Explained

Mesh networking

› This isn't a mesh net to protect your plants; mesh networking uses multiple Wi-Fi routers around your home to extend the reach of your network (check out our group test on page 82). So, a nearby mains socket can connect a mesh router and give you Wi-Fi out in your garden as well.

Quick-fire questions

Which apps?

› There are dozens of gardening apps available, with one of the top rated being GardenTags. This is a social media app for gardeners, where you can share information or ask for advice from thousands of other gardeners, or use in-app purchases to get personalised advice from professionals such as TV gardener Michael Perry.

Is it safe?

› You don't have to worry too much about accidents with a smart sprinkler, but robot lawnmowers can potentially be dangerous. Be sure to check which safety precautions are built in, such as sensors that can spot a person nearby, or a child lock that can prevent a mower being activated by accident.

Philips' latest Hue smart lights include Calla, which lights your path.



SUMMER LIGHTS

Use smart lighting to highlight your hard work

When the work is done, you can relax and unwind in your own personal oasis. To set the mood, Philips has launched a number of new smart lights in its Hue range, which all work with the

Hue Bridge (£50). The Calla (£117) bollard light can be used to illuminate paths. You can also dot Lily spotlights (£248 for three) around your garden for some dramatic lighting effects.

Quick-fire questions >

What about garden security?

Most security cameras are designed for indoor use, but there are a number of outdoor cameras that can be used to keep an eye on your garden, too. Netatmo's Presence (£250) cleverly combines a powerful floodlight with a concealed security camera. Netgear's Arlo Pro 2 is more expensive (£579), but it also includes two weather-proof cameras for indoor and outdoor use, and even a powerful siren to scare off intruders.

What about the weather?

The weather is becoming increasingly unpredictable these days. To keep an eye on things while you're away, you could invest in a sensor, such as Netatmo's Weather Station (£139). This device monitors temperature, humidity, and barometric pressure so that you can schedule watering and other tasks using remote control.

and the schedule. Gardena also sells a more advanced kit called the Smart Water Control Set (around £380) that includes both the Water Computer and a Wi-Fi hub that can connect to the Gardena mobile app, which can be used to schedule watering sessions, as well as providing remote control if you want to check on things while you're away.

Gardena doesn't have the gardening market all to itself, though. Hozelock is a Birmingham-based company that specialises in water and sprinkler systems, and its Cloud Controller provides a similar hose attachment with an app and Wi-Fi connectivity for a more affordable price of around £120.

Robo crop

As for mowing the lawn, there are smart options that can help here, too – even if they are a bit pricey. A number of companies sell robot mowers that can zoom around the garden and trim the lawn all by themselves, while you put your feet up and supervise with the aid of a nice, cool drink. These robo mowers have been pretty expensive in the past, generally starting at around £1,000 and going beyond the £2,000 mark for high-end models designed for large gardens. The leading company in this field is Robomow, which recently launched a couple of more affordable models for smaller gardens. The RX12u costs £599

In August 2017, Gardena teamed up with Netatmo to enable its app to control more than just its own garden gadgets.

and is 'smart' in the sense that it has built-in sensors that enable it to detect the edge of the lawn and to navigate around obstacles while trimming it.

If you want more control via an app, you'll need to step up to £849 for the RX20u model, which can be programmed with a mowing schedule and can split your garden into a series of zones for individual attention. There's also a remote control feature that lets you 'drive' the mower from the comfort of a deckchair.

Bosch also makes a range of robotic mowers, but they are a little more expensive, starting at £799.99 for the auto-navigating Indego 350, or £899.99 for the app-controlled 350 Connect model. And, of course, Gardena's in there too, with its Sileno mowers, which start at around £650. However, Gardena, as mentioned earlier, has a master plan to link all of its garden gear together via its app, so that you can mow the lawn, check soil conditions, and turn on the sprinkler using just that app. The app even works with devices from other companies too, such as Netatmo's Presence security camera. So, while Amazon, Apple and Google battle it out for control of the smart home, it looks like there's another battle for our smart gardens coming up in the future, too.





Green fingers? Keep them clean and remotely mow your lawn instead!

FIVE OF THE BEST

The best tech for your smart garden >



SMART SENSOR CONTROL SET

£320

gardena.com/uk

This comprehensive kit from Gardena includes a soil sensor to keep an eye on your plants, along with a water control that attaches to your taps to control water and sprinkler systems. There's also a Wi-Fi hub for the Gardena app – which can control the company's lawnmowers and other devices, too.



HOZELOCK CLOUD CONTROLLER

£120

hozelock.com

This well-established gardening company is entering the digital age, and its Cloud Controller is an affordable option for controlling your garden sprinkler or watering system. Attach the valve to your tap, and the hub to your router for scheduling and remote control using the Hozelock app.



NETGEAR ARLO PRO 2

From £579

arlo.com/uk

It's a little pricey, but this two-camera security kit is ideal for use in the garden. The cameras are rated IP65 weatherproof for outdoor use, and are battery-powered so you can move them around easily. The Arlo Pro 2 also includes a 100dB siren to scare away intruders, and you get free 7-day rolling cloud storage.



PHILIPS HUE LILY

£248

meethue.com

Team these three multi-coloured LED spotlights with a Philips Hue hub (£50) and you'll be able to create an eye-catching display in your garden. Naturally, the lights can be controlled using the free Hue app for your iOS or Android smartphone. The lights are also IP65 rated against water ingress.



ROBOMOW RX20U

£849

robomow.com

Robot mowers are pricey, but Robomow's latest models finally come in below the £1,000 mark, with the app-controlled RX20u coming in at around £849. The mower is recommended for lawns up to 200m² in size, features a child lock for extra safety, and comes with a rechargeable two-hour battery.



OPTIMISE YOUR UPGRADES

Identify bottlenecks and break through into pro-grade benchmarking

By **Zak Storey**

Computers are funny things: a complicated collection of components, each working in conjunction with the rest to produce on-demand output. But as with any team effort, there is always a weak link in the chain. As more and more people join the PC enthusiast community, it's easy to get swept up in the hype, and upgrade a very basic system with high-end componentry. And while that's not always a bad thing, it can lead to those weak links being stretched to breaking point, as top-end hardware makes its way into a system that wasn't designed to host it.

This can lead to bottlenecking, when one piece of hardware doesn't perform as well as it should, due to another component in the system being ill-equipped to handle the potential performance levels. As with the neck of a bottle, only so much can come through at once, so the power that's ready to be tapped is unused. It's usually easy to spot the part that is underperforming – a GPU, CPU, or RAID setup – but identifying which component is causing the bottleneck can be more difficult.

So, which are the most common problem parts? How do you identify them? And how do you break through that barrier? Read on to find out...





Integral system parts

The most common cause of bottlenecking is your platform and processor

CPU

Bottlenecking is typically down to your processor. Your CPU processes everything from rendered in-game frames to memory storage requests, complex program processes, and more. It's an intricate part of the puzzle, and the easiest to become overwhelmed in any system.

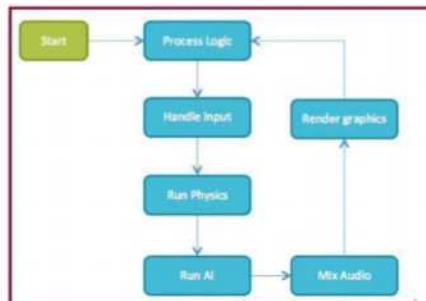
Most common bottlenecks, especially in games, are due to the processor not being fast enough to handle all the data and processes thrown at it at any given time.

Six or seven years ago, most games required two to four high-powered cores to get the job done. Single-core was king, and the more instructions per clock your CPU could process, the better. Intel's well-founded single-core legacy comes from its early Nehalem architecture, which has seen no fewer than seven iterations since then, each capitalising on improved single-core performance and support for newer hardware. Even today Intel still holds that reputation, and despite the fact that AMD's Ryzen is now much closer to Intel's single-core performance, the gaming community still leans toward Intel rather than its Team Red rival.

CPU symptoms

The most common and obvious sign of a CPU bottleneck is low frame rates in games, even when using a powerful GPU. In short, your CPU is in control of the entire game. From a simplified point of view, it runs the process logic, handles your input to the game, runs the physics for that event, then calculates the AI's response, mixes the relevant audio given the triggers activated previously, and finally makes a request to the GPU to render the frame. At which point, it returns straight back to the process logic, and starts all over again. It does all this while running the OS and background

apps, and moving data in and out of various frame buffers, DRAM, cache, and off the storage medium, back and forth between the GPU. To achieve a smooth 60fps, your processor has to manage all of that 60 times per second. In more complex titles, there are even



A simplified version of what your CPU goes through to produce a frame.

more steps added to the game logic process chain, and as multiple events occur at the same time, it's easy to see how a low-end CPU struggles to handle a modern title.

Game coding

How the processor performs in game, however, is dictated by the game devs. A CPU always operates at the same speed and frequency, processing the same number of instructions per clock every single second. If you send it a complex process to compute, filled with unnecessary jargon and redundant code, it takes up more of your processor's resources, so it takes longer to go through that chain we mentioned earlier, which in turn slows down frame rates. The developers can also allocate which processes take advantage of which cores, and how many of those cores.

Solving the conundrum

How do you spot a CPU bottleneck? Typical symptoms include long in-game load times, slow texture loading, and lower frame rates than you'd expect, given the GPU you're using. On the flip side, you may notice seemingly high frame rates, but textures don't appear to render correctly, with horrendous levels of stutter and lockups.

To confirm this diagnosis, we need to do some testing and data collection. This requires an in-depth benchmark, such as the one integrated into *Assassin's Creed Origins* or *Tom Clancy's Ghost Recon: Wildlands*, and a third-party system monitoring app, such as HWInfo or HWMonitor. *Assassin's Creed* features a benchmark head-up display (HUD), which actively shows you how many cores are being utilised, and what percentage of load they're under,

while also displaying your maximum GPU load. Regardless of what you use, you're looking for CPU and GPU load.

If, for instance, you have a processor with two cores and multithreading – an old Intel Core i3, say – and all four of those logical cores are registering 100 percent load for the duration of your benchmark, with the GPU hovering around 60 to 80 percent, then your PC's processor is the bottleneck, because in an ideal world, the reverse would be true. This is called an absolute bottleneck, since you'll see in-game degradation, frame stuttering, non-loading textures and slow load times.

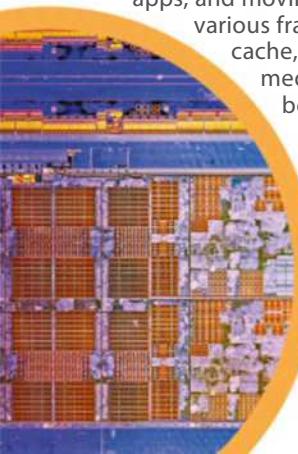
That said, you don't necessarily need all of your CPU cores running at 100 percent load to find yourself with a bottleneck; minor ones can occur due to slower single-core performance, as you'll see later with our benchmark results on page 60.

The differences are most notable at higher refresh rates, with higher powered GPUs, but they still exist at the low end. If you play competitive FPS games, for instance, at 144Hz and above, at 1080p Full HD, single-core performance is still very much king in contrast to multicore brute force.

Can you still bottleneck?

Despite what most people think, we've come a hell of a long way over the last seven years. And although Intel's ten percent incremental performance increases generation upon generation haven't exactly wooed anyone, almost a decade of them has led to single-core performance increasing by a staggering 93 percent since Sandy Bridge. Combine that with access to more cores as the market heats up, thanks to the battle between AMD and Intel, and what you're left with is quad-core Intel i3s pumping out nearly twice as much grunt as their siblings back in 2010.

Game development has stagnated in comparison. Although graphics in the big story-driven AAA titles have improved in leaps and bounds, few developers take advantage of more than four cores. This is purely down to the fact that the majority of the market still sits on quad-core parts. What that means is that in today's world, even that Core i3-8100 will be more than enough to play the vast majority of modern AAA games without bottlenecking any GPU, certainly at 4K.



Thanks for the memory

How much is enough? What about frequency?

Memory is an integral part of any system, and it interacts with the CPU in a very interesting way. It's essentially a hyper-fast, volatile storage medium, designed to hold data that needs to be accessed more quickly than that found on non-volatile hard drives, yet using files that are larger than those that can be held locally on the internal CPU cache.

When it comes to processors, outside of rendering tasks or simulations that operate off large data sets, it's difficult for your memory to bottleneck your system. Most everyday tasks don't process or shift enough data fast enough for the bus between the DDR and the CPU to ever become truly saturated, or for the memory to be under 100 percent load all the time.

You can encounter bottlenecks when video rendering, as large amounts of data and imported video clips are transferred from the non-volatile storage to the DDR, then the CPU and GPU, but aside from that, memory speed (frequency, in this case), for Intel at least, matters very little.

Infinity Fabric

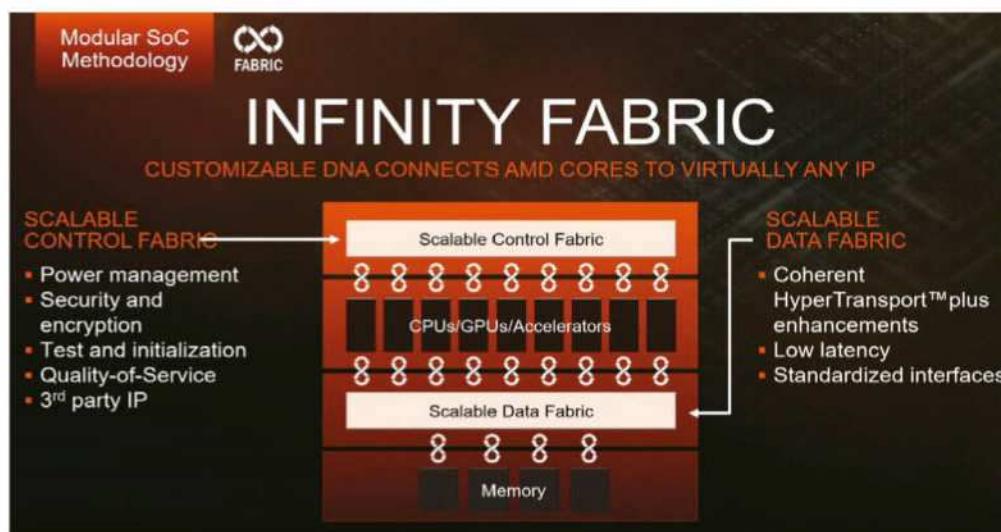
AMD's Ryzen architecture, on the other hand, does take advantage of increased memory speeds for flat single and multicore performance increases,

because the interweaving fabric that connects each of Ryzen's core complexes together runs at the same frequency as the memory itself. This means that the higher the memory speed, the faster the Infinity Fabric runs, and therefore the faster each core complex can transfer data and instructions between the other complexes and cores in turn. That said, there are diminishing returns



Memory is the support class of PCs.

from increasing memory frequency with Ryzen parts – typically, anything above 3,200MT/s on the Ryzen 1000 series will fail to see any further improvement, while the Ryzen 2000 series increases that limit to 3,600MT/s.



AMD's Infinity Fabric thrives on higher frequency memory.

DUAL-CHANNEL VS QUAD-CHANNEL

Frequency? Bandwidth? Dual and quad-channel? In reality, maximum performance is a combination of four factors: the base clock frequency at which the memory operates; the number of data transfers possible per clock (DDR means double data rate); the width of each channel or memory bus (64 bits); and the number of channels used to transfer data to and from the CPU.

Say we have a 16GB kit (2x 8GB) of dual-channel DDR4, with a base frequency of

1,600MHz. We can do the following calculation to figure out how much memory bandwidth we have. We take the 1,600 (MHz), break that down into Hz (1,600,000,000), and multiply it by the data rate (2) to get 3,200,000,000, aka 3,200MT/s (or 3,200MHz if you're in marketing). Multiply that by 64 (the width of each channel in bits), and multiply that by 2 (the number of channels), and we're left with the final figure in bits per second. Divide that by 8 for

bytes, and it's 51.2GB/s, which is the maximum amount of data that can be transferred to and from your memory modules at any time. For quad-channel, you double that figure.

The important thing to note here is that no matter how many sticks of memory you have installed in your system, the CPU can only write or read from however many channels it supports at one time, so for mainstream platforms, that's two. You could have four sticks installed in a dual-channel

system just fine, but all you're essentially doing is increasing the maximum memory capacity of your rig, enabling you to store more data in your DRAM – it's not faster than just running two.

As far as video editing is concerned, the more bandwidth you have the better, especially if you're working on 4K video and higher, because those files and frames are often stored directly in DRAM, and it's very easy to bottleneck a system that way.

Graphics bottlenecks

The wonderful world of VRAM, and how a GPU does what it does

Memory is also a vital component when it comes to rendering graphics, both with integrated and dedicated GPUs. It all comes down to the notion of a frame buffer. In short, the GPU cores found in both graphics cards and CPUs rely on the frame buffer to store rendered textures, which can be called upon, when required, for quick, smooth, and efficient rendering, and the piecing together of frames in game. For a standalone GPU, the card itself features its own dedicated memory, designed specifically with that one task in mind. These memory chips typically run faster than their DRAM counterparts, and have a wider bus, which allows for a larger amount of data to pass through at any given time. For instance, an Nvidia GeForce GTX 1080 has a 256-bit bus, with its GDDR5X chips running at a base clock frequency of 5GHz (or 10GT/s), and can transfer up to 320GB/s of data to and from the memory found on the graphics card itself – and that's all off a single channel (dual-channel is rumoured to be coming with GDDR6).

Integrated graphics run off a very similar system, with both Intel and AMD's latest APUs featuring far smaller capacity memory located on the CPU's integrated GPU, and it acts in exactly the same manner.

The big problem for GPUs, however, is when the total dedicated VRAM

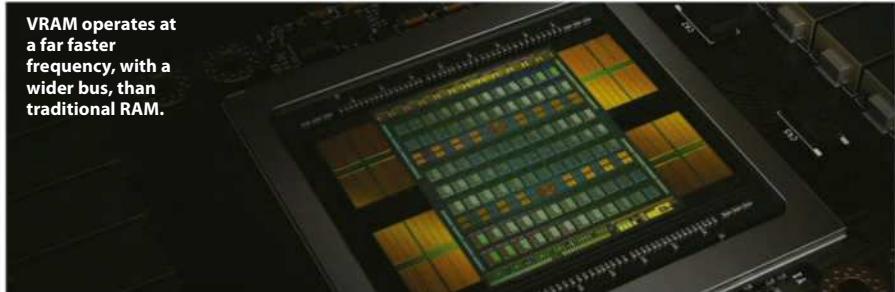
storage capacity becomes saturated. It's not the width of the bus that's the problem, but more the total capacity not being big enough to hold all the high-definition textures and pre-rendered frames necessary to smoothly render the frames in the game you're playing. In this situation, the GPU offloads any remaining texture files on to traditional DRAM, which is far slower than its VRAM counterpart. These files have to be transferred across from the GPU to the CPU, and then to the DRAM, before going back again when they're needed. This increases CPU utilisation, bumps up texture load times, and increases frame latency as the data has to go back to the GPU via the CPU. This is where you begin to get your memory bottleneck, and why, on occasion, you'll find GPUs with cores that are capable of driving games at two separate resolutions, often coming with multiple VRAM configurations.

VRAM operates at a far faster frequency, with a wider bus, than traditional RAM.

Load ratios and 4K

When it comes to GPU core performance, resolution and frames per second play a big part in overall system load. Generally speaking, the higher the frame rate, the harder the CPU has to work to process all that information effectively, and the easier it is for your CPU to become the bottleneck in a system. As the resolution increases from 1080p to 4K, that load is then offset to the GPU, and the graphics core spends more time rendering each scene (due to that 300 percent increase in the number of pixels). Because of that, the load shifts away from the CPU and on to the GPU, and simultaneously frame rates fall, because the GPU simply can't keep up.

This is important, because an Nvidia GeForce GTX 1080 Ti and Intel Core i3-8100 combo is more likely to work better at 4K than at 1080p, so far as bottlenecks are concerned.



OVERCOMPENSATING

Having read the above, you should now have some understanding of just how important it is to buy the right GPU for the resolution you want to take advantage of, and the games you want to play. Memory and GPU cores are typically well paired. A GTX 1060, for example, combined with 3GB of VRAM, is more than enough for 80 percent of most modern AAA 1080p titles, with 6GB of VRAM being enough to future-proof you for the next four years, or just enough to scrape by on for 1440p.

The big problem, however, lies with the people who drop

the cash on a GTX 1080 Ti, only to then game at 1080p. Unless you're absolutely obsessed with playing first-person shooters (FPS) at 200Hz and above, with super-low latencies, such a purchase makes little sense from a consumer standpoint. Even if you roll with the notion of it being part of a smart future-proofing decision, the reality is that HD textures are highly unlikely to reach 11GB in size any time soon, and even if they do, by that point 1080p will be positively antiquated technology in comparison to both the GPUs and the resolutions of the future.



Storage chokes

Your choice of platform dictates whether or not you can run a RAID

Storage solutions are the next biggie on our list of bottleneck conundrums, and the issue pretty much boils down to the introduction of the latest PCIe SSDs, from the likes of Samsung, causing problems for those interested in setting up multiple drives in RAID 0. Traditionally, when you wanted more speed from your system, the obvious way to do this was to take two storage drives – spinning platters or flash SSDs – and set them into a redundant array of independent disks (RAID) with striping. You'd take two drives, and force the data saved to be split in half and written to both simultaneously. Then you could read the original data from both drives at the same time, effectively doubling performance, in exchange for a little more vulnerability, because if one drive fails, half your data is gone.

PCIe SSD RAID 0?

The big question is: Can you do that with PCIe SSDs? Technically, yes you can, but you won't gain any performance out of it. At least, not from most mainstream platforms (check out our results on page 60). The problem derives from how both Intel and AMD have configured the use of their chipsets and storage I/O, and it's all to do with the PCIe lane interconnects. Let's break it down.

Intel's mainstream platform takes advantage of what's known as a DMI (Direct Media Interface). Briefly speaking, this is a direct connection between the CPU, the PCH/chipset, and the I/O storage devices in your system (SATA, USB, and M.2 SSDs). From Z170 onward, Intel has been using DMI 3.0, which is essentially four PCIe 3.0 lanes. What that means is that the maximum throughput from the chipset to the CPU via the DMI is currently 3.93GB/s (or 3,930MB/s).

All of a sudden, it's easy to see what's causing your bottlenecks when running twin M.2 PCIe SSDs in RAID 0, because there's simply not enough bandwidth to allow for a straight doubling of performance, as was possible with SSDs and HDDs through the SATA interface and DMI 2.0 (maximum throughput about 2GB/s).

AMD's Ryzen architecture runs things differently. The PCH to CPU interconnect



AMD's attitude to RAID 0 PCIe SSDs is something we can get behind.

actually only runs four PCIe 2.0 lanes, similar to Intel's original DMI 2.0, as opposed to DMI 3.0's four PCIe 3.0 lanes we see today. However, that's dedicated to onboard USB 3.1/0 and USB 2.0 devices. This is because although both Intel and AMD's processors reserve 16 PCIe 3.0 lanes directly for graphics solutions, AMD also reserves an additional four PCIe 3.0 lanes directly to the CPU for PCIe SSDs and SATA drives, with no interim chipset adding latency to the affair.

That said, it's still only four PCIe 3.0 lanes, and a 3.93GB/s max transfer rate between the CPU and its storage, so again there's not enough bandwidth.

What about the high end?

At the high end, both platforms change things up quite dramatically. As both teams field processors with more and more dedicated onboard CPU PCIe 3.0 lanes (Intel's top-end chip offers a fruity 44, while AMD's Threadripper has 64), it is possible to run PCIe SSDs directly off the CPU, as opposed to running them through the chipset and DMI.

Despite Intel having multiple PCIe lanes on its chips, it hasn't supported RAID on PCIe SSDs until very recently. With Skylake-X, it introduced VROC (Virtual RAID on CPU) for the first time, allowing PCIe SSDs using those direct CPU PCIe lanes to theoretically form a RAID directly on the CPU itself. There's a few caveats to this. Firstly, you need a VROC key – this is a physical dongle that you plug in to the motherboard to enable the feature. It's not possible to buy these separately, because they're typically only bundled with specific motherboards and SSDs (although you can buy one from a third party). And once that hoop's been jumped through, you can also only use Intel SSDs for VROC, which limits you to Intel's Optane 760P SSDs.

AMD's Threadripper series packs a whopping 64 PCIe lanes directly on the chip itself, enabling you to RAID whatever you like directly on the CPU without any proprietary nonsense, and is realistically the most sensible platform, where you'll see sequential speeds bounce up because of it.



RAID 0 support is limited, depending on the platform.

Testing time

Let's fire up some software, and perhaps a spreadsheet or two, and figure out where exactly your bottlenecks are

CPU

There are a few obvious bottlenecks we're going to ignore, as they're processor limitations. For instance, video editing benefits from more cores and higher single-core/IPC. But the biggie is in game. Go to www.cupid.com and download HWMonitor (dodge the Pro version), run that, and minimise everything aside from the Utilisation section for your processor and graphics card. Here you'll see all your threads, and their current, minimum, and maximum utilisation, along with your GPU utilisation. Load up the gaming benchmark of your choice (Unigine's Superposition is a solid alternative at <https://benchmark.unigine.com>), then [Alt] + [Tab] back to HWMonitor, select the View drop-down menu, click Clear Min/Max, then go back to your benchmark, and click Run.

You're looking for whether your CPU load is at 100 percent across all threads while your GPU load is at about 60–70 percent. If it is, you'll want to upgrade the CPU to something with a little more grunt – an Intel Core i3-8100, or an AMD Ryzen 3 1300X at minimum.

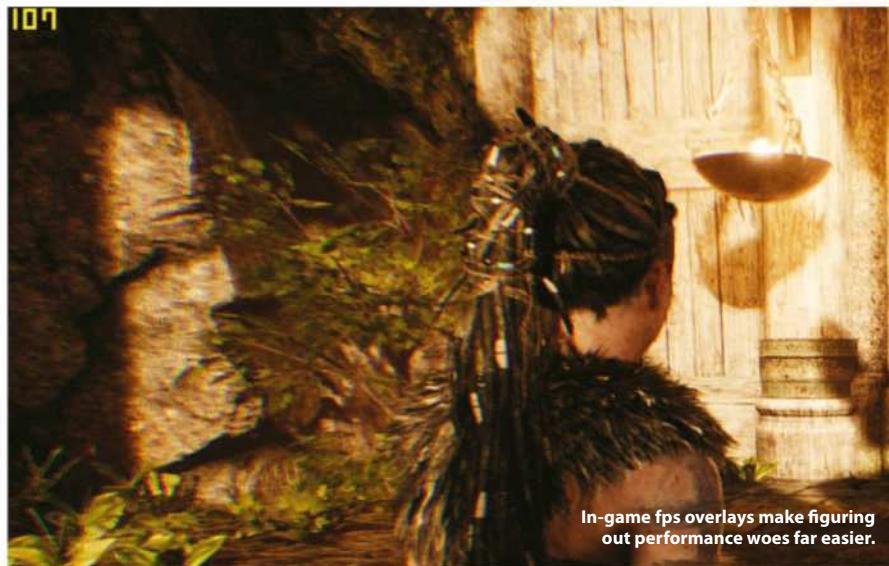
GPU

Again, the obvious bottleneck with the GPU comes from a lack of core performance for the resolution you want to play at. You want to hit around 40fps in game to have something of an enjoyable experience; 60fps is the sweet spot, but it's not the end of the world if some titles don't reach that – it's not suddenly unplayable. There's a ton of ways to see frame rates in game; some titles support it as an option, but if that's not possible, you can download a trial of Fraps (www.fraps.com), which includes a visual fps overlay to enable you to see your frame rate.

We can test whether a lack of VRAM is bottlenecking your system by using HWMonitor and the game you're having difficulty with. Keep HWMonitor open and those utilisation windows up, and play the game you're having difficulty with. If you notice the memory is maxing out at 100 percent, either reduce the resolution of the textures, or opt for a newer GPU.

SSD

And finally, we have the wonderful world of solid-state bottlenecks.

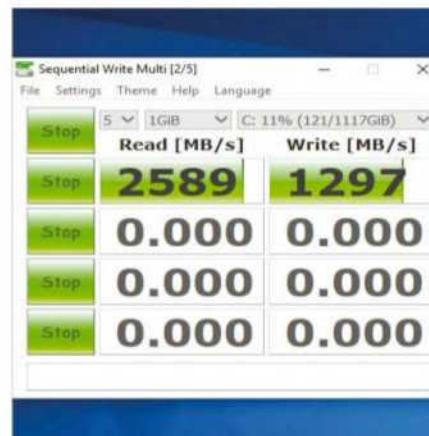


In-game fps overlays make figuring out performance woes far easier.

Unfortunately, as we've already discussed in depth, anyone who's running more than one PCIe SSD in something like a RAID 0 array – unless you're running those devices in a Threadripper motherboard, and have gone about extensively setting up the array for them – it's an absolute truth that you're bottlenecking both drives, while simultaneously increasing your risk of data loss. CrystalDiskMark is our go-to benchmarking software for this challenge, so download the latest version of our favourite SSD benchmarking from <https://crystalmark.info>, then run the QD32 Sequential speed test on the drive or array in identify just how fast it's running.

If you're running multiple PCIe drives on any mainstream board, it may also be worth checking to see whether all your M.2 slots are running in PCIe mode,

and not SATA – after all, you don't want a 3,000MB/s drive to be capped at 550MB/s because of the SATA interface.



CrystalDiskMark is our favorite SSD testing utility.

Case studies

Let's look at a few rigs we've specced together with obvious flaws

THE ANCIENT GAMER

INGREDIENTS

CPU	Intel Core i3-3240
Cooling	Stock
Memory	8GB (2x 4GB) DDR3 @ 1,600MT/s
GPU	2x GTX 970
Motherboard	Gigabyte GA-Z77X-UP5 TH
SSD	120GB Samsung 840 Evo
HDD	1TB Western Digital 7200rpm
PSU	550W Corsair TX550M

There are two major problems here, the first of which is the dual GTX 970s running in SLI. This forces the GPUs to operate in PCIe x8 mode, as opposed to 16. Couple that with the fact you have just a dual-core processor, and most games are immediately going to throttle even at 1080p Full HD.

The GPU solution is fine on its own for 1080p, but the problem lies with that processor. It would make sense to upgrade the motherboard and CPU to something with more cores and single-core grunt.

The second and possibly more alarming problem is the 550W bronze-rated power supply. By default, you should be drawing around 450W from the wall – even with this dual SLI setup – but only having 100W of headroom doesn't fill us with confidence if things spike under extreme load. The worst case scenario: The power supply can pop, and take parts with it. Best case: The power supply just won't power on under those circumstances.

THE EAGER PROFESSIONAL

INGREDIENTS

CPU	AMD Ryzen 7 1700 @ 3.8GHz
Cooling	Stock
Memory	32GB (2x 16GB) DDR4 @ 2,666MT/s
GPU	Nvidia GeForce GTX 1080
Motherboard	MSI X370 Gaming Pro Carbon AC
SSD	1x 512GB Samsung 970 Pro
HDD	1x 1TB Samsung 960 Evo
PSU	700W Be Quiet! Pure Power 10

In this scenario, the end user has taken a single Ryzen 7 1700 and ramped it up to 3.8GHz across all eight cores and 16 threads. Which is fine – the 1700 is more than capable of handling those kind of voltages and frequencies. However, the biggest problem that we have here is something we haven't covered so far, and that's thermal throttling, which in its own way is a very particular form of bottlenecking.

In short, as the temperature gets too high, if your processor is stable, it immediately begins to downclock itself, to ensure it doesn't damage any of the silicon at its heart. You may think it's running at 3.8GHz, and it may very well be at startup, but as soon as you get in game, or start running some computational tasks, that frequency is going to drop, just to keep the chip safe.

On top of that, this rig has multiple PCIe SSDs installed. The Samsung 970 Pro for the OS is directly installed on to the motherboard, and will operate just fine utilising those four dedicated lanes we spoke about earlier. The problem is the 1TB 960 Evo – although some motherboard manufacturers do allow you to run an additional PCIe SSD in an M.2 slot, they are usually forced to utilise the majority of the interconnecting lanes between the PCH and the CPU. In Ryzen's case, that's four PCIe 2.0 lanes, meaning maximum transfer rates of 2.0 GB/s. Not good.

THE EPEEN STREAMER

INGREDIENTS

CPU	Intel Core i9-7900X @ 4.7GHz
Cooling	NZXT Kraken X72 360mm AIO
Memory	8GB (2x 4GB) DDR3 @ 1,600MT/s
GPU	Nvidia Titan Xp
Motherboard	Asus Prime X299 Deluxe
SSD	1x 250GB Samsung 960 Evo
HDD	1x 1TB Crucial BX300 2.5-inch
PSU	1,200W Corsair AX1200i

In our final selection, we have a combo designed to make any tech journalist flinch. The issue here isn't that obvious at first glance, but it all comes down to the motherboard and CPU combo, combined with that hefty overclock. Although the Core i9-7900X is cooled by the 360mm AIO to an impressive 4.7GHz overclock, the problem lies with the VRMs on the motherboard. There's too much voltage being pushed through them, and not enough heatsink to provide them with sufficient cooling. In short, the mobo's BIOS is forced to reduce the voltage to keep temperatures within acceptable parameters.

Although the CPU may well register at 4.8GHz, and be operating at 100 percent utilisation, the performance can be even lower than stock in some cases. The best way to spot this is by installing HWInfo, and analysing your VRM temperatures – anything above 110-degrees Celsius when under load is bad news. Run Cinebench R15 at stock and then at your overclock settings, and if you notice a drop in score without a drop in utilisation or registered clock speed, you know it's the VRMs causing the issue.

There are two solutions: You can either drop the voltage back, or opt for a beefier cooling solution, one that directly cools the VRMs. EKWB and some other aftermarket liquid-cooling companies offer monoblocks for both the VRMs and the CPU on most mainstream motherboards.



Bottleneck results

Exactly how do different setups affect your performance?

How We Tested

Obviously, we no longer have a lot of the old hardware we've featured below, so much of this is synthetic, rough benchmarking, utilising a Core i7-8700K. The theory is fairly simple: We found our old Cinebench R15 single-core figures for everything back to Sandy Bridge, and declocked the Core i7-8700K to the point at which we achieved similar, if not identical, scores to the old processors. At that point, we disabled a variety of cores and/or Hyper-Threading, depending on the configuration of the part we were trying to emulate at the time.

Other than that, our test rigs included 16GB of DDR4 for our mainstream platforms, operating at 3,200MT/s (MegaTransfers per second), and 32GB of DDR4 for our X399 and X299 RAID testing. Our PCIe SSDs of choice consisted of dual Samsung 960 Pro 512GB SSDs, operating through onboard M.2 slots, or Asus's included ROG Zenith adapter. As for mobos, our Intel games

and RAID testing featured MSI's Z370 Godlike Gaming. For Ryzen RAID testing, we plumbed in our recent MSI X470 Gaming M7 AC. For our Intel RAID testing, we took advantage of the Asus Prime X299 Deluxe, and for Threadripper RAID testing, we grabbed our Asus X399 ROG Zenith Extreme, in combination with the included PCIe SSD adapter.

All games were tested at the Ultra preset, with HD textures. 3DMark's Sky Diver was run at default for 1080p, and then adjusted to 4K for the 4K testing. The DNC runs for the Core i3-2120 in *Assassin's Creed: Origins* were actually to do with how the benchmark performed. It genuinely did complete each run, but there was massive lag in loading textures, with wire meshes and HD textures taking an eternity to load – if at all. As the scenes became more complex, frame stuttering occurred, and although the frame rate remained high, it was clear that this isn't how the benchmark was meant to run. ■



INTEL CORE I7-8700K CLOCK SPEEDS & CORE SETUP

	Cinebench R15 Single-Core (Index)	Frequency/Active Cores
Intel Core i3-2120	80	3.1GHz/2+2
Intel Core i5-3570	132	3.2GHz/4+0
Intel Core i7-4790K	169	3.7GHz/4+4
Intel Core i3-8100	154	3.6GHz/4+0
Intel Core i7-8700K	190	N/A

SSD RAID 0 TESTING (2X SAMSUNG 960 PRO 512GB)

	CDM Seq Read	CDM Seq Write	CDM Random 4K Read	CDM Random 4K Write
Intel Core i7-8700K	3,456 MB/s	2,170 MB/s	49 MB/s	138.3 MB/s
AMD Ryzen 7 2700X	3,066 MB/s	2,006 MB/s	49 MB/s	123.7 MB/s
Intel Core i9-7900X	3,157 MB/s	2,165 MB/s	43 MB/s	183.32 MB/s
AMD Ryzen 7 Threadripper 1920X	5,912 MB/s	3,859 MB/s	38 MB/s	180.2 MB/s



NVIDIA GEFORCE GTX 1060 3GB (AVG FPS) @ 1080P

	Assassin's Creed Origins	Middle Earth: Shadow of War	3DMark Sky Diver
Intel Core i3-2100	58 (DNC)	74	17,091 (index)
Intel Core i5-3560K	54	74	21,563 (index)
Intel Core i7-4790K	58	73	26,943 (index)
Intel Core i3-8100	57	74	23,182 (index)
Intel Core i7-8700K	58	72	32,900 (index)

NVIDIA GEFORCE GTX 1060 3GB (AVG FPS) @ 4K

	Assassin's Creed Origins	Middle Earth: Shadow of War	3DMark Sky Diver
Intel Core i3-2100	24	26	11,310 (index)
Intel Core i5-3560K	24	26	15,632 (index)
Intel Core i7-4790K	24	26	17,098 (index)
Intel Core i3-8100	24	26	16,581 (index)
Intel Core i7-8700K	24	26	17,033 (index)

NVIDIA GEFORCE GTX 1080 TI 11GB (AVG FPS) @ 1080P

	Assassin's Creed Origins	Middle Earth: Shadow of War	3DMark Sky Diver
Intel Core i3-2120	65 (DNC)	92	19,286 (index)
Intel Core i5-3570	65	119	27,547 (index)
Intel Core i7-4790K	84	120	37,042 (index)
Intel Core i3-8100	67	122	29,496 (index)
Intel Core i7-8700K	98	123	49,871 (index)

NVIDIA GEFORCE GTX 1080 TI 11GB (AVG FPS) @ 4K

	Assassin's Creed Origins	Middle Earth: Shadow of War	3DMark Sky Diver
Intel Core i3-2120	54 (DNC)	51	11,066 (index)
Intel Core i5-3570	49	51	16,303 (index)
Intel Core i7-4790K	51	51	22,582 (index)
Intel Core i3-8100	52	51	17,340 (index)
Intel Core i7-8700K	52	51	31,383 (index)

Meet the... Support Squad



Support

► WINDOWS HELP ► HARDWARE FIXES ► SOFTWARE SOLUTIONS ► INTERNET TIPS



Do you have a
PC problem?
Get in touch...
Email full details of
your problem to the
support team and we'll
do our best to help
windows.helpline@futurenet.com

Backing up FILE HISTORY REPLACEMENT

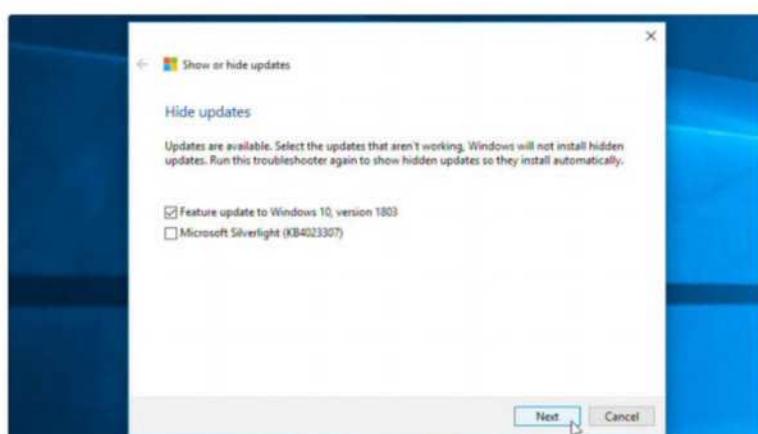
Q I need to switch to a more reliable form of backup as I find File History sporadic at best. Although it's set to save daily, it can go many days – or even a week – without saving anything. I'm backing up to my network drive, so any alternative would need to support that.
Philip Cross



Rob's solution

File History should be more reliable than that, but it can be good *not* to trust Windows to keep your data backed up. Any alternative has to offer the same features – versioning (so you can roll back to an earlier version of a file), real-time backup of changes and full support for network drives.

One of our favourite free tools is EaseUS ToDo Backup Free – to



PAUSE UPDATES
Use Windows 10
Pro and you can
defer non-critical
updates for up
to 12 months.

avoid providing your email address in return for the download link, get it from www.majorgeeks.com/files/details/easeus_todo_backup_free_edition.html. You will also need to avoid various 'offers' after confirming your default backup location (you can change this later) before the program's installed.

Once you've jumped through those hurdles, though, you'll have a backup tool that does all you need of it. Click the small arrow button next to the shopping cart and choose Settings to change the default backup path, enabling you to connect to your NAS or a network drive folder. Choose the Smart Backup option to protect key folders with regular (half-hourly) backups and the ability to roll back to earlier versions.

Privacy STOP WEBSITE TRACKING

Q Given the media coverage about online snooping, do you have any suggestions to stop websites tracking my every move?
Sara Poulter



The screenshot shows the EaseUS Todo Backup Free 10.6 interface. At the top, there are several backup options: Disk/Partition Backup, File Backup, System Backup, Edit Smart Backup, Mail Backup, Buy Now, Clone, and System Clone. Below these are buttons for System Transfer and Browse to Recover. A progress bar indicates 'Please wait, backing up...' with an estimated time remaining of 00:23:36. On the left, a 'Smart Backup' section is visible. In the center, a 'Settings' dialog box is open, showing options for Language (English), Default backup path (\ITS-251PLUS\Backup\EaseUS), and checkboxes for Automatically check for updates, join the Customer Experience Improvement Program, and Show notification tray when backup. Buttons for Save and Cancel are at the bottom right of the dialog.

SMART BACKUP EaseUS
ToDo Backup Free is an
alternative to File History.

[Upgrade now](#) to get more powerful edition. [Activate now](#)



Cat's solution

If you're using either Firefox or Chrome you should search their respective browser add-on stores for an open-source extension called Privacy Possum – head to <https://github.com/cowlicks/privacypossum> for full details.

Simply add this to your browser and it'll work in the background, blocking tracking cookies that uniquely identify you across multiple websites along with 'refer' headers (that reveal your location); 'etag' tracking (which exploits your browser's cache to help identify you uniquely); and browser fingerprinting, that reveals the actual browser you're using it. No configuration is required – click its icon for a report on what it's blocking, and to switch it on or off as required.

Windows

NO MORE FEATURE UPDATES, PLEASE!

Q Having struggled to get the Windows 10 Spring Update installed on my PC, I would like to find out how, if it's possible, to opt out of these feature updates going forward. It's getting ridiculous.
Ian Pendrey

Nate's solution

Sadly, it's impossible to opt out of Windows 10 feature updates indefinitely, Ian, but there are a couple of tricks you can perform to at least delay the inevitable.

If you're running Windows 10 Professional, you can delay feature

updates for up to a year, which should mean that by the time you do upgrade the worst of the bugs will have been ironed out, and the update should go relatively smoothly. To do this go to Start > Settings > Update & Security > 'Advanced options' where you'll find the drop-down menu enabling you to defer feature updates for up to 365 days. There's also a switch to temporarily pause updates for up to 35 days in special circumstances.

If you're using Windows 10 Home, you can only delay a failed feature update from reappearing: download the 'Show or hide updates' troubleshooter package from <http://support.microsoft.com/kb/3183922> – run the tool, choose to hide updates and select 'Feature

TIGHTEN PRIVACY
Block known web tracking agents with the Privacy Possum app.

"You can only delay a failed feature update from reappearing"

Jargon buster!

► AirPrint

A feature found on Apple mobile devices that enables you to print wirelessly to compatible printers from an iPhone, iPad, and so on.

► ISO

A file that contains a complete backup (known as a disk image) of a physical disk, often stored on a DVD or flash drive.

The screenshot shows a web browser window with the URL <https://www.birminghammail.co.uk/birmingham-sport/birmingham-city-fc/>. The page content includes news articles and advertisements for Harry's razors. In the browser's extension bar, the Privacy Possum extension is visible with the status "ENABLED". A tooltip from the extension indicates it has blocked tracking headers from various sources. A cookie consent banner at the bottom of the page states: "This website uses cookies. Using this website means you are okay with this but you can find out more and learn how to manage your cookie choices [here](#)".

Quickfire questions

Is there some way I can limit the number of emails that Thunderbird downloads from my IMAP webmail accounts?

Francesca Willis

Right-click the account name in the left-hand pane and choose Settings > Synchronisation & Storage and choose how many days, weeks, months or years you wish to sync. You can also clear out older messages using this Settings option.

I'm unable to install the Spring Update – it keeps throwing up either one of the following error codes: 0x80070005 or 0x80240034.

Andrew Couper

Andrew tried various fixes, but Windows Update refused to budge. However, the update installed at the first time of asking when he used the Windows 10 Update Assistant (www.microsoft.com/software-download/windows10).

I have a floppy disk drive on my old desktop, but not my laptop. How do I access floppies on the latter?

Adrian Nunes

USB floppy drives are available for as little as £7 on eBay, or you could look at software that can create ISO files from floppies, which you can mount as a virtual drive on your laptop, such as Free WinISO Maker (www.winiso.com/products/winiso-free.html).

update to Windows 10, version 1803'. Click 'Next' and it will be hidden indefinitely – run the troubleshooter again when you're ready to install the Spring Update.

Windows CHROME AND CORTANA FREEZES

Q After installing the Spring Update, my main web browser (I'm using Google Chrome) seems to randomly lock up my PC. Pressing [Ctrl] + [Alt] + [Del] has no effect and I'm forced to hold the power button to perform an uncontrolled shutdown, then restart. Is this a known problem?
Thomas Redwood



Rob's solution

This is probably linked to the problem that affects various applications – and even Cortana, Microsoft's virtual personal assistant. Some people have managed to unfreeze their computer by pressing the power button once to send the PC to sleep – it can then be woken until the next freeze occurs (also try holding [Win] + [Ctrl] + [Shift] + [B] together).

The bug has been linked to newer computers with integrated Intel graphics, and Microsoft has subsequently released a fix that should resolve the problem. If you're on a Windows tablet, it's also possible to bring the PC back to life by refreshing the screen (press the volume buttons simultaneously three times in the space of two seconds).

Hardware DISAPPEARING SOLID-STATE DRIVE

Q Every now and then – there's no pattern – my second



CABLE FIX

This type of SATA connection is more robust than using a cable.

solid-state drive (SSD) will disappear completely. I've pointed my user folders to this drive, so Windows hangs for around five minutes during loading before landing me on a blank desktop. Sometimes a reboot brings the drive back, but other times I have to open it up and remove and reconnect the drive cable. Is this a dying drive?

John Stevens



Nick P's solution

After some basic checks suggested the drive should be in good health, we asked John to check the connection. He swapped out the cable, but the problem returned again. He then discovered that the cable no longer clipped into place on the drive, suggesting the connector may be the issue. The only solution here to keeping the

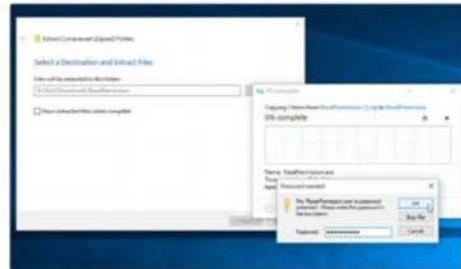
QUICKLY RESET FOLDER PERMISSIONS

Q I've messed up user permissions on a personal folder. What's the easiest way to fix this, please?
Carl Oswald



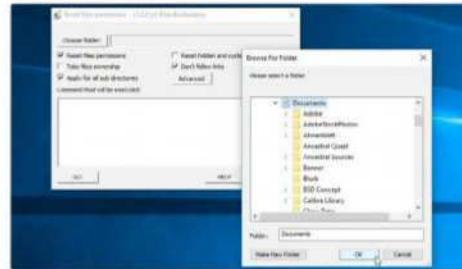
Cat's solution

We've found a handy graphical tool that makes the process easy, without you having to delve into the command prompt. Download the tool from <http://lallouslab.net/downloads/ResetPermission.zip>, then follow the step-by-step guide here to use it.



1 Extract and run

Right-click ResetPermission.zip and choose 'Extract All...'. When prompted, enter the password 'lallouslab'. If your security software blocks the tool, restore it from the quarantine. It's safe to run. Double-click resetpermission.exe to get started.



2 Select target folder

Click 'Choose folder:' to browse to the folder you wish to perform the reset on. Be sure to avoid root directories and system folders (use the Windows Repair Tool – www.beepingcomputer.com – to fix system permissions issues).



Do you have
a PC problem?
Get in touch...

Email full details of your problem to the support team and we'll do our best to help:
windows.helpline@futurenet.com
Or write to:
Support Squad,
Windows Help & Advice magazine,
Future Publishing Ltd,
Quay House,
The Ambury,
Bath BA1 1UA

drive going is to house it in an external enclosure where it's pushed directly into the SATA interface and screwed in place, so the connection can't wiggle loose. John will, of course, have to replace the drive internally with a new drive, but at least the old one will enjoy a new lease of life – once the data's moved across to his new drive, he can use it as a backup or wipe it for some other use.

Microsoft Office EXCEL 2010 TEMP FILE PROBLEM

Q I've noticed that Excel 2010 (on a Windows 7 PC) has stopped deleting temporary files that appear when I open a file.

It's most noticeable with my personal.xlsx file – which contains a macro – as each time I open it, I get an error message for each ~\$personal.xlsx file that was previously created, which says it's the incorrect file format or something similar. I have to click Cancel for each message until the file finally loads. Eventually I clear out the temporary files manually and the whole cycle begins again. Can I stop this from happening?

Neil Lomas



Mayank's solution

We're aware of this problem occurring on network shares – this is down to a permissions problem, and the best thing to do is work on a local copy rather than one over your network. However, this wasn't the case for Neil, who emailed back to report the problem had suddenly stopped as abruptly as it started. He suspected a recent Office 2010 update, but on checking this we found only security fixes had been applied in recent months. It may have been a

permissions issue that resolved itself, but if it raises its ugly head again, we've asked Neil to get back in contact. In the meantime, it's possible to at least generate a batch file that can remove the temporary files quickly if they come back – visit www.gmayor.com/what_to_do_when_word_crashes.htm for an example. You should be able to tweak the script to work with Excel rather than Word by typically replacing references to 'do*' in the script with 'xi*'.

Networking

MY WI-FI PRINTER HAS DISAPPEARED

Q Something weird is happening – I can no longer print to my HP OfficeJet 6500A wireless printer from my Windows 10 PC, which is also an HP. I've uninstalled,

removed everything, reconnected and then run the installation disc – everything seems to install smoothly, but nothing happens when I try to print. Any ideas?

Lionel Davies

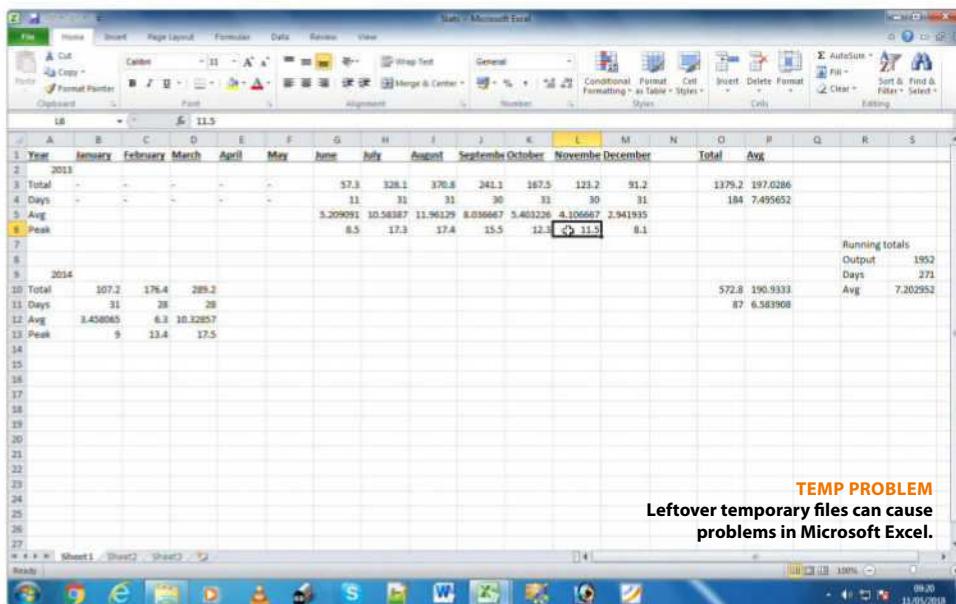


Nick P's solution

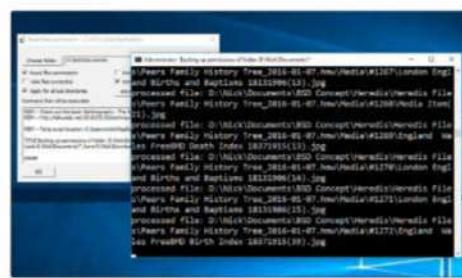
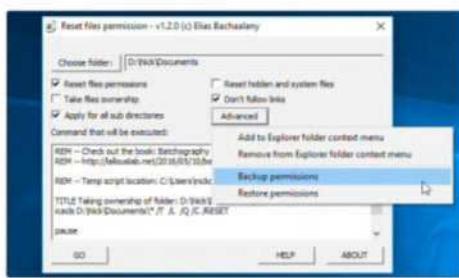
First, verify that the problem is with the printer – we asked

Lionel to try printing from a laptop, and he discovered it worked perfectly, as did AirPrint from his iPad. This suggested that the issue was with the Lionel's HP PC.

One quick fix – which solved Lionel's problem – is to try temporarily connecting the printer to the troublesome PC via a USB cable. Once done, it should refresh the connection and enable the PC to print wirelessly again.



"It's possible to at least generate a batch file that can remove temporary files quickly"



Jargon buster!

IMAP

Stands for Internet Message Access Protocol, and used by email clients to view, edit and delete messages from a server without downloading them.

File permissions

A method to restrict access to files based on specific user or user groups. File permissions range from simple viewing to full control (including editing and deleting).

3 Back up existing permissions

File permissions are a complicated beast, and it's easy to get things wrong. Don't compound your original problem; take a fail-safe backup of the existing permissions by clicking the Advanced button and choosing 'Backup permissions'.

4 Reset permissions

In most cases, the default tick boxes should be left alone, but if you'd like your user account to take ownership of the files – which should increase your access to them – then tick 'Take files ownership'. Click 'Go' when you're ready to proceed.



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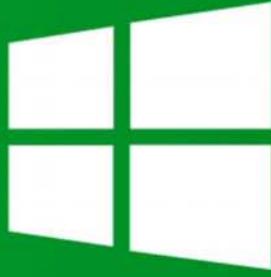
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Welcome to... Windows 10

► WINDOWS 10 TIPS ► FEATURES EXPLAINED ► NEW TIPS AND TRICKS

Welcome



If you're having problems with your PC, many of them can be solved by performing a repair or reinstall of the operating system – whether you're running Windows 7, 8.1 or 10.

On page 68 we'll show you how to set about repairing your existing Windows installation – it will leave your existing apps, files and settings in place, but can work wonders if Windows has got its knickers in a twist.

Our guide to a full, destructive reinstall on page 70 is more drastic, but can sometimes be the best way to fix your PC. We'll explain exactly what you need to do to give your PC a completely fresh start.

Matt Hanson
Associate Editor

Featuring...

68 Repair your Windows installation

70 A full, destructive Windows reinstall

BOOST YOUR HOME WI-FI – FIND OUT HOW ON PAGE 11!

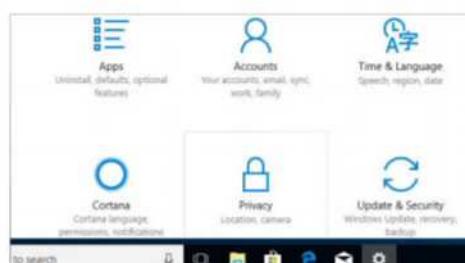


Windows 10 tip of the month

Review your privacy settings

Choose what Windows shares about you

It's more important than ever to protect your privacy, both online and offline. And while sharing some details about yourself can be useful – like telling Windows where you are so it can deliver relevant search results, some things you might not be quite so happy to share – do you really want all the apps that request it have access to your webcam or microphone? Here we'll show you how to review your privacy settings.



FIND IT Head to Start > Settings and in the window that opens click the Privacy option in the bottom row.



CHECK IT In the next window, click each Privacy setting in the left-hand pane and review each one carefully.

Repair a Windows install

If you're trying to fix a problem, a refresh or repair install may be the best route to go down. Here's what you need to do...

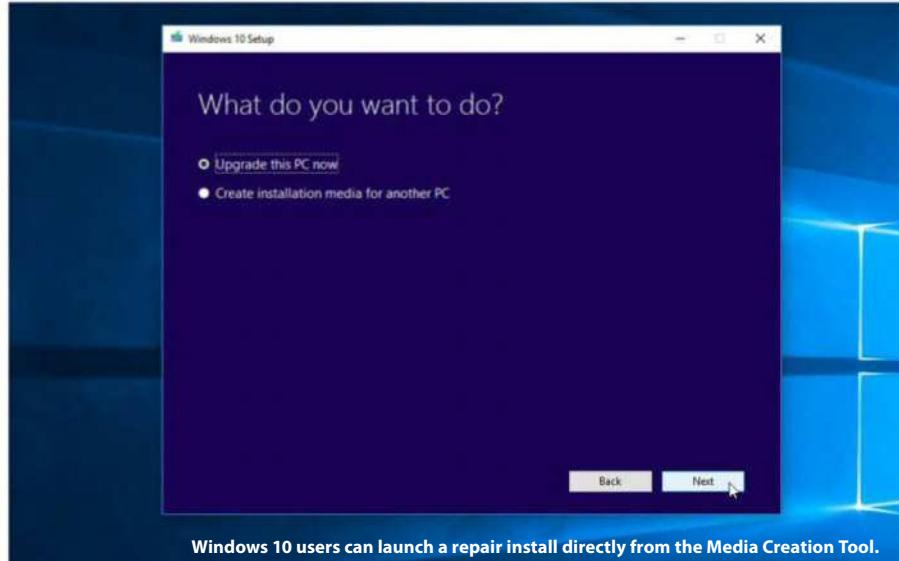
Not all reinstalls require a complete wipe of your hard drive. A repair or refresh installation leaves your programs, settings and files in place, and restricts itself to installing a fresh copy of your Windows files over the top of your existing copy. If your problem is linked to a corrupt file or Windows setting, the repair installation can usually fix it.

All repair installs share one common characteristic: you must launch them from Windows itself. You can't boot from your install media and repair Windows through that; you need to boot into Windows, then start the repair process from there. If you're unable to boot into Windows, therefore, you'll need to skip to page 70 and perform a full destructive recovery instead.

Start the repair

Starting a repair install varies depending on your PC model and what version of Windows you're running. Windows 8.1 and 10 users should (at least initially) avoid the Refresh/Reset options provided under Settings > 'Update & recovery'. These options will preserve your files and any apps you've installed through the Microsoft Store, but any desktop programs you've installed will be wiped along with Windows itself.

Instead, you should 'upgrade' your copy of Windows, which performs a



Windows 10 users can launch a repair install directly from the Media Creation Tool.

similar non-destructive reinstall to reset/refresh with the added bonus that all your programs – including those you've installed outside of the Microsoft Store – will be preserved. To do so, you'll need your Windows installation media – see the step-by-step guide on the facing page if you don't have the latest version.

Why do you need the latest install media? It's because upgrade installs only work if the version of Windows on your PC matches that on your install media, so if you've installed Service Pack 1 in Windows 7, for example, you need up-to-date installation media to avoid

the laborious task of first attempting to uninstall Service Pack 1 through Windows Update (assuming that you're able to), then reinstalling Windows and



Both Windows 8.1 and 10 offer a similar way to repair your Windows installation.

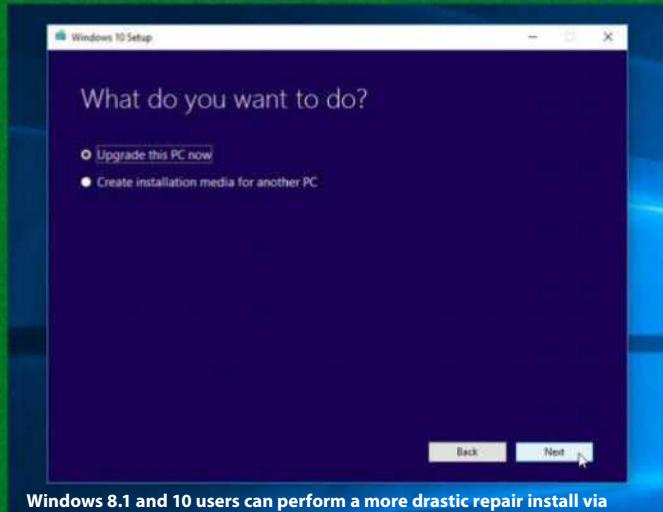
Post repair steps

Start by stress-testing your desktop to verify that everything works as it should – sometimes the repair can introduce more problems than it solves, in which case if you're running Windows 8.1 or 10 you can undo the changes. Go to Start > Settings > 'Update & recovery' > Recovery and look for an option to go back to your previous version – click 'Get started' and then follow the prompts.

If the repair doesn't appear to fix your underlying problem, Windows 8.1 and 10 users can take one more intermediate step – the reset or repair. It will

see you waving goodbye to all those desktop programs you've installed (including MS Office and your third-party security software), but it will preserve your Microsoft Store apps, files and Windows settings. Leave your install media inserted, then head over to the 'Update & recovery' > Recovery section under Settings. This time, click the 'Get started' button under the Refresh (Windows 8.1) or Reset (Windows 10) option and follow the prompts.

If this more drastic approach doesn't work, or you're running Windows 7, then to page 70 for destructive reinstall options.



Windows 8.1 and 10 users can perform a more drastic repair install via the Reset or Refresh option – be warned, you'll lose your desktop apps.

then downloading and reinstalling Service Pack 1, along with all of your other updates.

Windows 10 users can also launch the repair process directly from the Media Creation Tool by choosing Upgrade when prompted, but given the amount of time it takes to download the files, you might as well create your install media instead – just in case the upgrade install doesn't work and you decide to go down the path of a full-blown destructive install.

Launch the repair process

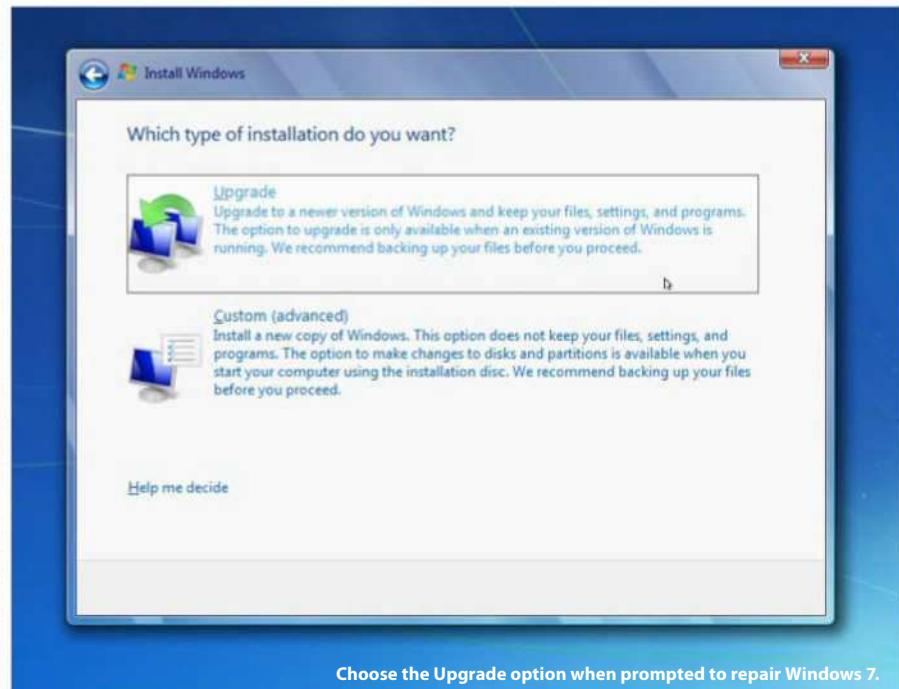
The procedure from this point onwards varies according to which version of Windows that you have. If prompted to download updates, do so to save time post-install.

Windows 8.1 and 10 users will be asked what they want to keep. Windows 8.1 users should find settings, personal files and applications are selected by default (click 'Change settings' if this isn't the case), while it's 'Keep personal

"Start by seeing if the specific issue has been solved, then check to see that the rest of Windows still works"

files and apps' in the case of Windows 10 (don't worry, in this circumstance, 'apps' also applies to any desktop programs that you have installed).

Windows 7 users need to pop in their install media, double-click setup.exe and follow the regular reinstall process. When prompted, click 'Go online to get the latest updates for installation (recommended)' to download post-SP1 security fixes now, then accept the licence agreement and choose Upgrade when prompted.

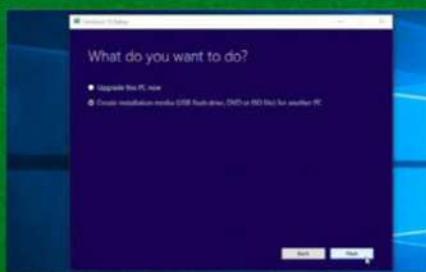


Choose the Upgrade option when prompted to repair Windows 7.

settings (if they appear); make sure you review all settings to lock down privacy.

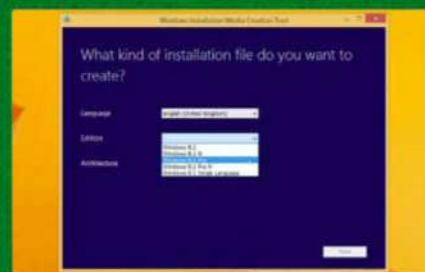
If all goes well, you should find yourself at the desktop, ready to see if your problem has been fixed – start by seeing if the specific issue that you were experiencing before has been solved, then check to see that the rest of Windows still works as it should – if it's not, follow the advice in the 'Post repair steps' box on the facing page. There's also a possibility – particularly with Windows 7 – that the repair install will result in a non-booting PC. If this happens, dig out the rescue media you created using Macrium Reflect Free (see page 51 of issue 146 for how to do this) and use it to restore the drive image you took before embarking on the repair. Then turn the page for more options.

Get the latest install media



1 Windows 10

Head to www.microsoft.com/software-download/windows10 and click 'Download tool now'. Once downloaded, open MediaCreationTool.exe. When prompted, select 'Create installation media' and follow the prompts to create either a USB flash drive or an ISO file (for burning to DVD).



2 Windows 8.1

Download the Media Creation Tool from www.microsoft.com/software-download/windows8 – input your language, edition of Windows 8.1 and PC architecture (32-bit or 64-bit) and then click Next. Choose to create either a USB flash drive or an ISO file and then follow the prompts to the end.



3 Windows 7

Go to www.microsoft.com/software-download/windows7 and enter your product key – choose a 32-bit or 64-bit version as required. Once downloaded, double-click the file to burn to DVD, or use the Windows USB Download Tool (<https://wudt.codeplex.com>) to create a USB flash drive.

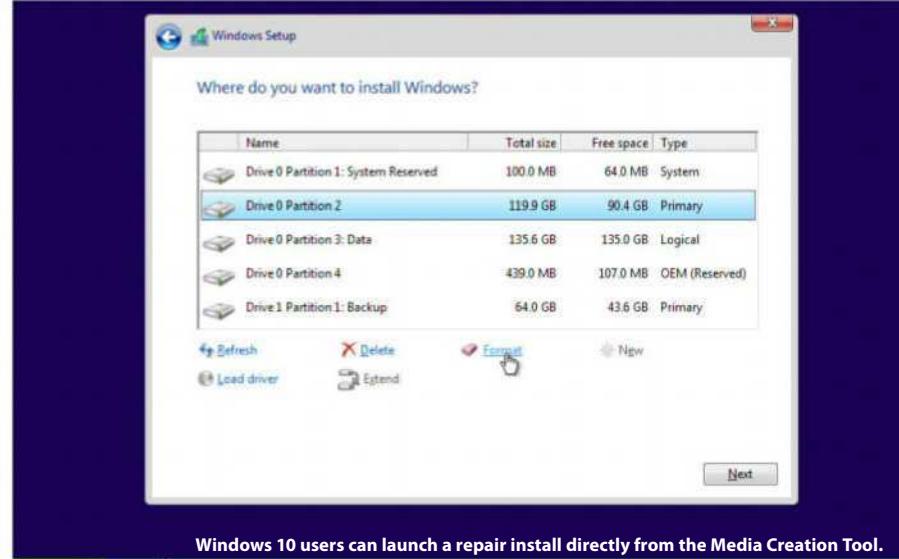
A full, destructive reinstall

If you're looking to wipe the slate clean, or need to recover from major issues, the nuclear option is always the best one

Reinstalling Windows from scratch – namely, wiping your system drive to install a fresh version of Windows on to it – is the ultimate choice for anyone looking to revive a slow PC or resolve a major, non-hardware issue. Here we'll step you through the entire process – if you're simply looking to repair an existing Windows install, turn to our guide on page 68.

Before you begin, make sure your PC is fully backed up by following the 'Back up Windows 10' tutorial on page 43 of issue 148. A full reinstall really is destructive – nothing left on your C drive will exist once you've finished.

If you'd like to transfer selected program settings from old installation to new, download the portable CloneApp tool (www.mirinsoft.com) to your backup drive. Once complete launch the tool by right-clicking CloneApp.exe and choosing 'Run as administrator' and go through its list of 247 supported apps to see if yours are there. If any are, tick the box beside each one you want to save the settings for. If any apps aren't covered – or you want to back up additional settings – then choose Custom where you manually specify the files, folders and Registry keys where your program settings are stored. You should also follow the step-by-step guide on page 69 to ensure you have the latest installation media for your



Windows 10 users can launch a repair install directly from the Media Creation Tool.

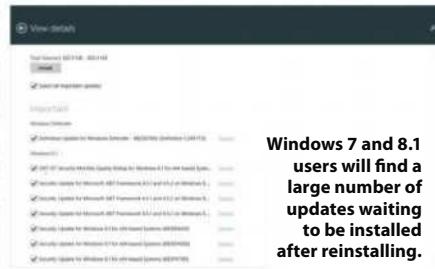
target version of Windows. This will ensure a cleaner, more up-to-date installation from the off.

It's also worth sourcing networking and graphics drivers now rather than relying on Windows. Consult your PC or motherboard manufacturer's website for these, or visit your Wi-Fi adapter or graphics card manufacturer's site – download them to your backup drive.

Uninstall any products that require activation – this should deactivate the licences and allow you to use them with your new install. Be sure to have product keys and program installers to hand.

START YOUR REINSTALL

A full destructive reinstall should always be started by booting from your installation media, be it a DVD or USB



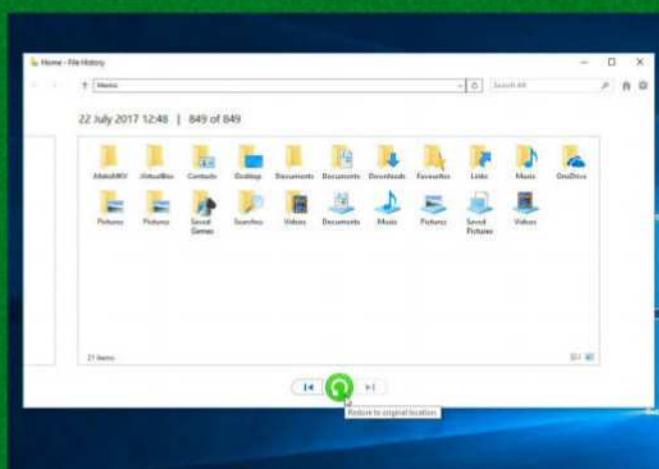
Restore programs, settings and data

Once Windows is reinstalled, open Windows Update to bring Windows fully up to date – don't be surprised if there are hundreds of updates still to apply in the case of Windows 7 and 8.1. Once it's fully up to date, consider reinstalling Macrium Reflect Free and taking your first drive image – a vanilla backup you can restore in future instead of reinstalling Windows itself.

Next, it's a case of reinstalling your core apps. Once in place, open CloneApp from your data drive. If you click the Restore button, every single program setting you

backed up will be restored – if there are any backup settings you don't want to restore, select Options to locate the backup folder, then open it and move any program folders you want to ignore out of the folder temporarily before clicking the Restore button. Now, take your second Macrium Reflect backup – a 'perfect' snapshot, as it were.

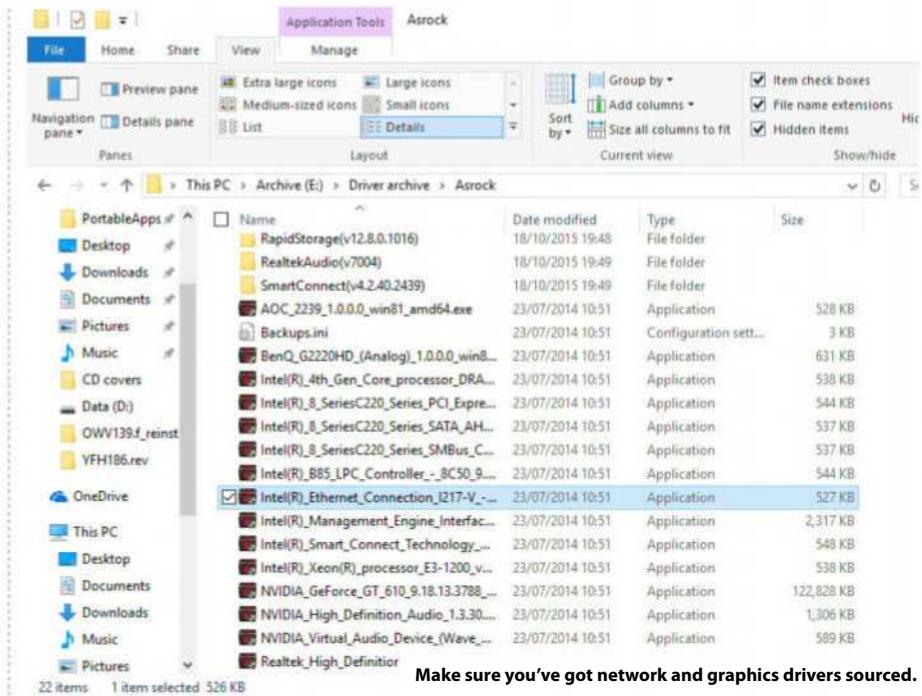
Finally, open File History or the Windows Backup and Restore tool and take steps to restore any data you backed up, then make sure the tool is configured to carry on backing up going forward.



Open File History, link it to your previous backup and then you can restore all your data back to its original location with one click.

flash drive. Check the step-by-step guide on page 69 for some pointers. The reinstall process doesn't differ much across Windows 7, 8.1 or 10. You'll be asked to verify your language, location and keyboard are set correctly, then it's a case of clicking Install Now. If prompted, enter your product key or click Skip if you're running Windows 10 on a PC you upgraded during the free period. When asked what type of installation you wish to perform, choose the Custom option.

Next comes the trickiest part of the process. A list of drives and partitions will appear – you need to select the one Windows is currently installed on. By default, it should be detected and selected, but verify it's correct before clicking Format (click the advanced Drive Options button if it's not visible). Click 'OK', then once formatted, verify the drive is still selected and click Next. You'll see a checklist of tasks to be performed – sit back and wait. When Windows reboots, you may a 'press any



"Next comes potentially the trickiest part of the process. A list of drives and partitions will appear – you need to select the one Windows is currently installed on"

key' prompt to boot from CD or DVD. Ignore and let the installer continue.

SET UP POST-INSTALL

The post-setup prompt begins with Windows 7 users being prompted for their product key, then it's a case of setting up a user account. Windows 8.1 users will get an Express Settings prompt – click the option to customise these and go through them carefully.

Post-Creators Update, Windows 10 no longer gives you an Express Settings

option. For now, confirm your location and keyboard, set up your network if required and choose 'personal use' when prompted. You can either sign in with your Microsoft account or click 'Offline account' > 'Maybe later' if you plan to stick with the old-style Windows 7 local user account. If you opt for the Microsoft account option now is a good time to set up a PIN to speed up future logins (note: the PIN is tied specifically to this PC, and you can always bypass it using your regular account password

should you forget it at any point). You'll then be asked to set up Cortana – this is where Windows 10's notorious privacy settings come into play, so review all of the options carefully, flicking the slider to Off for any you don't need or use.

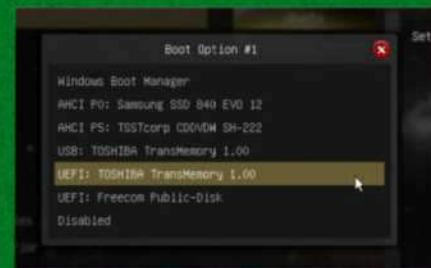
That's the end of the setup process – Windows will configure itself based on your choices and you'll see a series of messages appear on-screen. When all is ready, you'll find yourself back at the familiar Windows desktop screen of a fresher, faster, smoother-running PC. ■

Start the install process



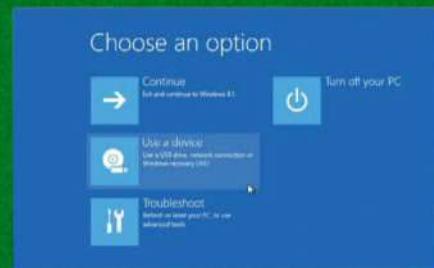
1 Reboot for media

If you're running Windows 7, or have Fast Boot disabled, insert your boot media and start your PC. Look for a 'Press any key to boot from CD or DVD' option (even if you've booted from a USB flash drive) – press the key and you should find the Windows install process starts.



2 Tweak boot options

If you boot back into Windows, restart your PC again, but this time press a key, such as [F11], when prompted to open a boot menu. Do so, select your boot media (choose UEFI if the option appears) to boot; otherwise, enter Setup to change the boot device order.



3 Windows 8.1/10

If Fast Boot is enabled, open Settings in Windows and navigate to 'Update & recovery' > Recovery, then click 'Restart now' under 'Advanced start-up'. When the boot options appear, choose 'Use a device' to select your USB flash drive or DVD from the list.

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Upgrade

► NEW HARDWARE ► ESSENTIAL ACCESSORIES ► LATEST GADGETS

Welcome

We've hopefully already helped solve your home networking issues with our lead feature, starting on page 11, but in Upgrade this month we're taking a different tack.

On page 88 you'll find a round-up of the next big thing in wireless tech – mesh networks; systems that promise to banish Wi-Fi dead spots, making it easy for anyone to access the Internet on any device, anywhere in your home.

On page 74 you'll be able to read our in-depth review of Dell's first XPS 15 2-in-1. And on page 76, we check out the Asus ZenBook 13.

Nick Odantzis Deputy Editor
windowsmagazine@futurenet.com

This issue's highlights



74 Dell XPS 15 2-in-1

Dell's reinvented the XPS 15 as a hybrid laptop-tablet. Find why you'll want one



76 Asus ZenBook 13

Shiny, smart, affordable – but is this 13-inch laptop as good as it looks?



82 Mesh networks group test

Solve your wireless woes with our round-up of the best mesh devices



88 Best free screen recorders

Four great apps for capturing your screen streams easily – and for free!

Our promise to you...

The Upgrade section is your key to finding out about the latest products, all designed to help you get more from your PC

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Our reviewers are 100 per cent independent, with years of experience in the world of computing. Our rigorous testing procedures mean that only genuine, high-quality products are awarded high star ratings. If you see an item of hardware bearing a high score, you can be confident that it is an excellent product.

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How we review

Our expert reviewers guarantee to test every piece of hardware rigorously and thoroughly, using only acknowledged experts to establish the worth of a product. We always review from the viewpoint of our readers; the day-to-day practicality and quality of a product is paramount.

RATING EXPLAINED

★★★★★ Superb ★★★★★ Very good ★★★★★ Good ★★★★★ Disappointing ★★★★★ Poor



Dell XPS 15 2-in-1

£2,199.99 | \$2,199.99 www.dell.com

The convertible laptop of your dreams

Dell has been on a tear with its 2018 redesigns. On top of a overhaul of its XPS 13 flagship ultrabook, Dell has now reinvented the XPS 15 as a 2-in-1 hybrid laptop.

To convert a powerhouse laptop into a hybrid machine you'll want to use as a tablet, Dell fitted Intel's Kaby Lake G processors to deliver 'discrete-level' graphics on a single chip. The XPS 15 2-in-1 also features a magnetically driven keyboard and an innovative cooling system to further reduce weight and size.

Given that we liked the previous XPS 15, giving it a 360-degree hinge and an eighth-generation Intel Core processor with AMD Vega graphics has sweetened the deal. If only this laptop had defied physics and run cooler and quieter, it would have scored top marks.

Price and availability

Prices for the XPS 15 2-in-1 start at £1,699.99 in the UK. That nets you a 15.6-inch Full HD touch display,

eighth-gen Intel Core i5-8305G processor with Radeon RX Vega M GL (aka 870) graphics, 8GB of DDR4 memory and a 256GB solid-state drive (SSD). To get a 4K screen, you'll need to spend £2,199.99 and a model with the same CPU and graphics, but with 16GB of RAM and 512GB of storage. In the US, the Dell XPS 15 2-in-1 starts at \$1,299.99 for an 8GB RAM/128GB SSD model. A 4K version with 16GB of RAM and a 256GB SSD costs \$2,199.99.

Design

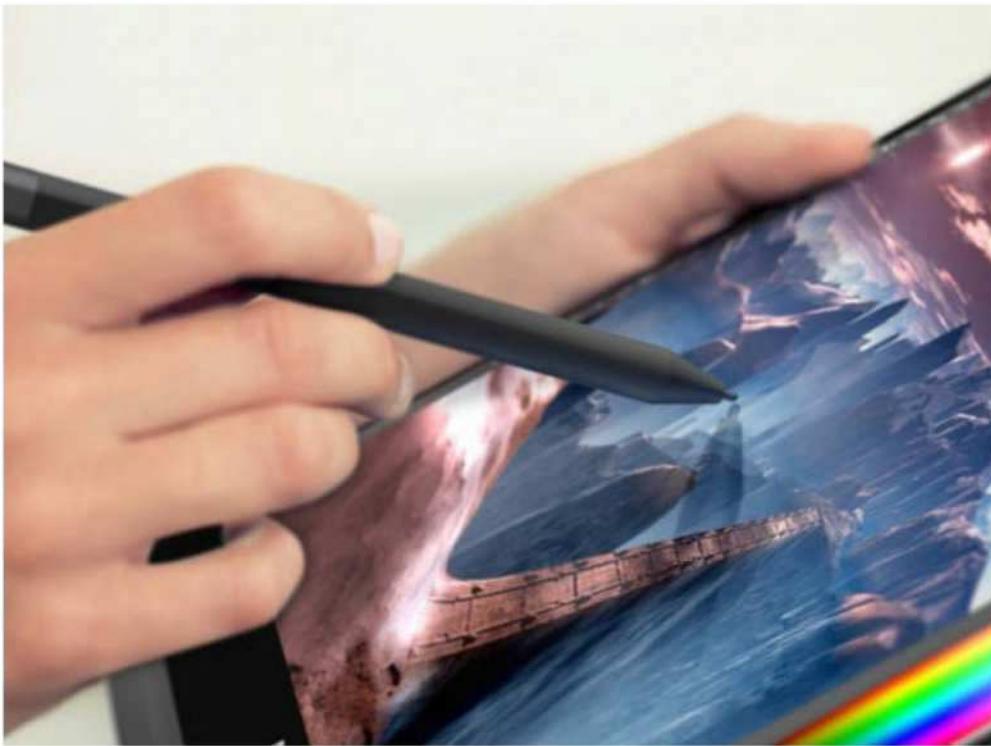
The XPS 15 2-in-1 shares its look and feel with the XPS 13 2-in-1. You get the same anodised aluminium lid and base with a carbon fibre keyboard rest, this time with aluminium hinges that allow for 360-degrees of rotation. The only thing that's truly unique to this laptop's exterior is the rear vent that looks a bit like a reverse air scoop on a car. This is where the laptop expels a lot of its heat.

Dell's most impressive revisions went into slimming down the XPS 15 into a hybrid laptop that's also comfortable to hold – Dell claims it's the smallest and thinnest 15.6-inch 2-in-1 laptop available today at 9.16mm thin and 354mm wide. Our review unit weighed 2kg.

Given its size and weight, the XPS 15 2-in-1's packs in a good selection of ports: two Thunderbolt 3 and two USB-C 3.1, a microSD card reader and a headset socket.

What has made this incredibly diminutive size possible is two-fold. First is Dell's use of its next-gen InfinityEdge display with a new 1,500:1 contrast ratio that makes blacks all but disappear onscreen. This nearly bezel-less display frame enables it to house a screen that's 15.6 inches wide diagonally.

Beneath said screen is a 720p central webcam paired with an infrared lens for Windows Hello logins. Although the webcam placement gives friends and family



KEY FEATURES

Dell XPS 15 2-in-1

Supplier www.dell.com
Processor 3.1GHz Intel Core i7-8705G Processor (quad-core, 8MB cache, up to 4.1 GHz)
Graphics Radeon RX Vega 870 graphics, Intel HD Graphics 630
RAM 16GB DDR4 (2,400MHz)
Display 15.6-inch, 4K Ultra HD (3,840x2,160) InfinityEdge anti-reflective touch display
Storage 512GB PCIe SSD
Connectivity 802.11ac Wi-Fi; Bluetooth; 2x Thunderbolt 3 (USB-C); 2x USB-C 3.1; microSD card slot, headset socket
Camera 720p Widescreen HD webcam with four array digital microphones, Windows Hello compliant IR camera
Weight 2kg
Size 354x235x9-16mm

an up-your-nose point of view during video chats, Windows Hello works surprisingly quickly. Plus, there's a fingerprint reader in the power button, for yet another Windows Hello option.

Second is brand-new MagLev keyboard technology, that enables the base to be thinner than before. By employing rare-earth magnets beneath the keys, rather than domed membraned switches like most laptops, this laptop mimics the feel of a physical key response with only 0.7mm of travel.

"The XPS 15 2-in-1 can use its extra headroom to perform better with either serious tasks or gaming"

After typing on the keyboard for just a few moments, that shorter travel is apparent: it's definitely not a 1:1 simulation of standard laptop keyboard behaviour. To make up for the lack of travel, the keys are more rigid, requiring a firmer press, but they also reset more quickly.

At first it takes a little getting used to, especially with how the island keys just barely rise above the rest of the carbon fibre-laden keyboard deck. Also, having Page Up and Page Down keys right next to the arrow keys is just the worst. But, once you get the hang of it, it's an impressive innovation.

Thankfully, the glass-coated, Microsoft Precision touchpad remains unchanged and is as delightful to use as ever.

Performance

The Intel-meets-AMD processor inside the XPS 15 2-in-1 is a force to be reckoned with. Across the board, the Dell XPS 15 2-in-1 delivers 100-500 point higher scores in 3DMark and CineBench tests than a XPS 15 with a GeForce GTX 1050.

On the processor end, the Dell XPS 15 2-in-1 is no slouch either, achieving better Cinebench and GeekBench scores than its rivals.

This can be attributed to a new sensor hub that tells the processor-graphics hybrid chip to liberally

boost frequencies. The hub works in tandem with software on the CPU to monitor device cooling and power and makes these decisions for you, giving you more of an automatic performance boost.

The XPS 15 2-in-1 can use its extra frequency headroom to perform better with either serious tasks, like photo and video editing, or gaming. In fact, we're able to play *Overwatch* at 1080p and high settings with a consistent 60 frames per second (fps). *Destiny* ran at 45fps with the game set to 1080p and Ultra quality settings.

Of course, all of this performance comes at the price of heat. To help combat this, Dell developed a new type of Gore insulation. This directs heat out of the device, allowing

components to operate at higher temperatures. It works really well. Having this machine on your lap feels no warmer than an ultrabook running on load. Unfortunately, any time we plugged the laptop into wall power the fans kicked in on full tilt within minutes. Nvidia Max-Q laptops might have spoiled us for silent gaming notebooks, but the XPS 15 2-in-1 is loud as a gaming notebook running at maximum.

Dell says the XPS 15 2-in-1 can last for up to 15 hours on battery, but it only ran for about a third of that (five hours and eight minutes) in our video playback test. It lasted an hour longer with more regular tasks, such as web browsing.

Summary

The 'smallest and thinnest 2-in-1 device of its size' is very impressive, thanks in part to its hybrid CPU/discrete graphics chip. All the while, this laptop maintains one of the thinnest profiles in its 15-inch class with mostly decent battery life.

Having all this power in such a small package comes at a high price, though, and the Dell XPS 15 2-in-1 is also one of the loudest 15-inch laptops we've ever tested. If you can look past these issues, this is one of the most innovatively engineered and powerful, ultra-slim 15-inch laptops in years. ■

Dell's XPS 15 2-in-1 sets a new bar for hybrid laptops, packing plenty of power into an ultra-thin shell.

 **Windows Help & Advice**
Verdict





Asus ZenBook 13

£899 | \$999 www.asus.com

A shiny cover brings all the Windows fans to the yard

Carrying around a laptop that's ultra-thin, lightweight and yet packs a punch seems to bring about a feeling of confidence on most days. Knowing that a powerful tool is in your backpack or briefcase is reassuring; even more so when that tool doesn't cost a small fortune.

Take the new Asus ZenBook 13 as an example: this ultra-portable laptop packs Intel's latest Core i5 processor, an Nvidia GPU and is more affordably priced than HP's latest Spectre 13. Heck, it's priced the same as Dell's XPS 13, but with slightly better hardware inside.

Price and availability

If you're in the market for the latest ZenBook 13, you won't have any options to customise its internals in the US. The \$999 price tag gets you the modestly configured laptop you see here. In the UK, the same model we tested is £899, with a more powerful model featuring

an Intel Core i7 and double the storage costing £1,299.

A similarly specified HP Spectre 13 starts at \$1,149 in the US, while in the UK it doubles the storage and a serves up a 4K display for £1,599.

The new Dell XPS 13 is priced at \$999 (£1,299), but doesn't have a touchscreen, and makes do with half the RAM, and half the storage found in the ZenBook 13. All in all, the ZenBook 13 is competitively priced for what it offers.

Design

The next time you find yourself looking for a mirror, just close the lid of the ZenBook 13 instead. It's not only shiny, but reflective enough to serve as an impromptu looking glass. We tested the Royal Blue model, but the Slate Grey model is just as reflective and shiny.

There are a number of ports on the ZenBook 13. On the right side is a microSD card reader, a 3.5mm headphone socket, and a USB 3.0

port. On the opposite side is where you'll find a USB Type-C port, another USB 3.0 port, and a full-size HDMI port.

A standard keyboard is backlit with a white light and several levels of intensity. The chiclet keys offer 1.4mm of travel and are incredibly comfortable to type on. We use a lot of keyboards, and most take some sort of adjustment before we really get into a flow. With the new ZenBook 13's keyboard, however, it was love at first type.

The 13.3-inch display is surrounded by Asus' 6.8mm NanoEdge bezels. The touch-sensitive display is smooth and responsive to our fingers. We didn't have an Asus Pen to test on this particular unit, but it is available as an option should you want a stylus for jotting notes and drawing. Note, however, that the hinge doesn't let the display fold flat, so you'll have to adjust to drawing with the screen in laptop-like orientation.



KEY FEATURES

Asus ZenBook 13

Supplier www.asus.com
Processor 1.6GHz Intel Core i5 8250U (quad-core, 6MB Cache, up to 3.40GHz with Turbo Boost)
Storage 256GB SSD (SATA3)
RAM 8GB (LPDDR3)
Graphics Nvidia GeForce MX150 (2GB DDR5 RAM), Intel UHD Graphics 620
Screen 13.3-inch, Full HD (1,920 x 1,080) wide view touch display
Connectivity 802.11ac Wi-Fi; Bluetooth 4.2; 1x microSD card reader, 1x 3.5mm combo audio socket; 2x USB 3.0 Type-A; 1x full-sized HDMI, 1x USB 3.1 Type-C
Camera VGA webcam
Weight 1.12 kg
Size 310x216x13.9mm

from an ultrabook by a long shot, but it's reasonably long enough.

Speakers

Smaller laptops don't normally have the best sound output, and that is also true of the ZenBook 13. The speakers sound muffled, even when the laptop is sat on a desk, without any real power or robust sound behind them. If you do opt to play any games or listen to music on this laptop, you'll want to use some headphones or earbuds.

Summary

The ZenBook 13 is a competitively priced laptop that offers more than enough power for the casual user and the occasional video editor. It's not going to be enough to get through intense *Fortnite* rounds, but for casual gaming duties it should get by.

The super reflective lid is a magnet for fingerprints, which is either going to upset you or not matter at all. One of the smaller, yet most important, highlights of this particular model is the fingerprint reader's new location – freeing up the touchpad. It's unfortunate, then, that the touchpad remains frustrating to use.

Overall, the flaws with the ZenBook 13 aren't deal-breakers, but caveats that you deserve to be made aware of regarding this otherwise impressive ultrabook. ■

Even though the display is Full HD (1,920x1,080 pixels), it's very sharp and leaves the impression of being of a higher resolution.

Asus also now seems to have accepted that having a fingerprint sensor in the top-right corner of the touchpad is a bad idea – something we've long complained about. It now sits just below the right arrow key, and is far more convenient to use. Thanks, Asus.

With the fingerprint sensor out of the way, this is the first time we've had a chance to truly get a feel for

nearly pulled off a complete sweep against the HP Spectre 13, save for the single-core Geekbench test, where it scored 4,136 compared to the Spectre 13's 4,782.

In daily use, the ZenBook 13 starts off sluggishly, but as it warms up any slowness disappears and it performs without any hiccups or issues. At multiple times we had many Chrome tabs and windows open and switching between them, along with multiple apps and emails, arrived at a rapid pace without any issues.

"In daily use, the ZenBook 13 starts off sluggishly, but as it warms up any slowness disappears"

an Asus touchpad. The touchpad works with gestures, but almost too well. When using two fingers to scroll down a web page, we often accidentally triggered the zoom function in Google Chrome. The gestures are different enough (two finger swipe and pinch-to-zoom) that we are puzzled by the mix-up.

Performance

Over the course of a week, we've put the ZenBook 13 through our daily work routines. There was lots of Slack messaging, Chrome tabs, music streaming and everything else in between. There was even a bit of casual gaming.

The addition of Nvidia GeForce MX150 graphics showed in our benchmark tests. The ZenBook

As we previously said, we didn't test out any intense games, but did take some time to play a few online games and found it to get the job done without issue. You can expect to play more casual games without a problem, but anything more intense might drag.

Battery life

Through our tests and daily use, we are able to confidently say the ZenBook 13 has a battery that's more than enough to get you through a commute, flight or through a day of meetings.

The PCMark 8 battery test came in at three hours and 49 minutes, but the movie test was a strong six hours and 38 minutes. That's not the longest battery life we've seen

The ZenBook 13 isn't a speed demon, but it has a killer display and a smooth-as-butter keyboard.

 Windows
Help & Advice
Verdict





Lifx A60/A19

£59.99 | \$59.99 www.lifx.com

Smart lights get funky

Smart lighting is without a doubt one of the most useful – and most fun – elements of the smart home. The ability to make your lights turn on, dim, and even change colour, all just using your voice, starts off as incredibly novel, and quickly becomes a staple smart home feature.

Lifx has created something really interesting with the A60/A19. Lifx's smart light doesn't try to ape the design and performance of a traditional filament light bulb like its biggest competitor – Philips Hue – does. Instead, Lifx really leans into the cool, funky angle, pushing the range of colours (16 million) and the futuristic look of the bulb itself.

Price and availability

The Lifx A60 is available worldwide, under slightly different names. In the UK it costs £59.99 and is named the A60 (obviously); whereas in the US it's known as the A19 and costs an identically priced \$59.99.

Lifx does cut prices from time to time, though, so keep a close eye on its website, and you just might save yourself some money.

Anyway, unlike Philips' Hue bulbs, Lifx doesn't need a hub to work, so the initial cost will be slightly less, even if the individual bulbs are more expensive.

Design and features

The Lifx A60/A19 looks like a lightbulb, only more hi-tech. It's a little too large for a conventional bulb, and some of the lines are in the wrong place.

Whereas competitor Philips has gone with a "it's a normal lightbulb, honest" look with its Hue smart light designs, Lifx has made a statement. Even when the A60/A19 is switched off, you definitely know it's a smart bulb.

Whether that works for you is a question of preference. The white casing and white plastic hockey puck-style 'bulb' will stand out –

but then how often do you really look at your lightbulbs?

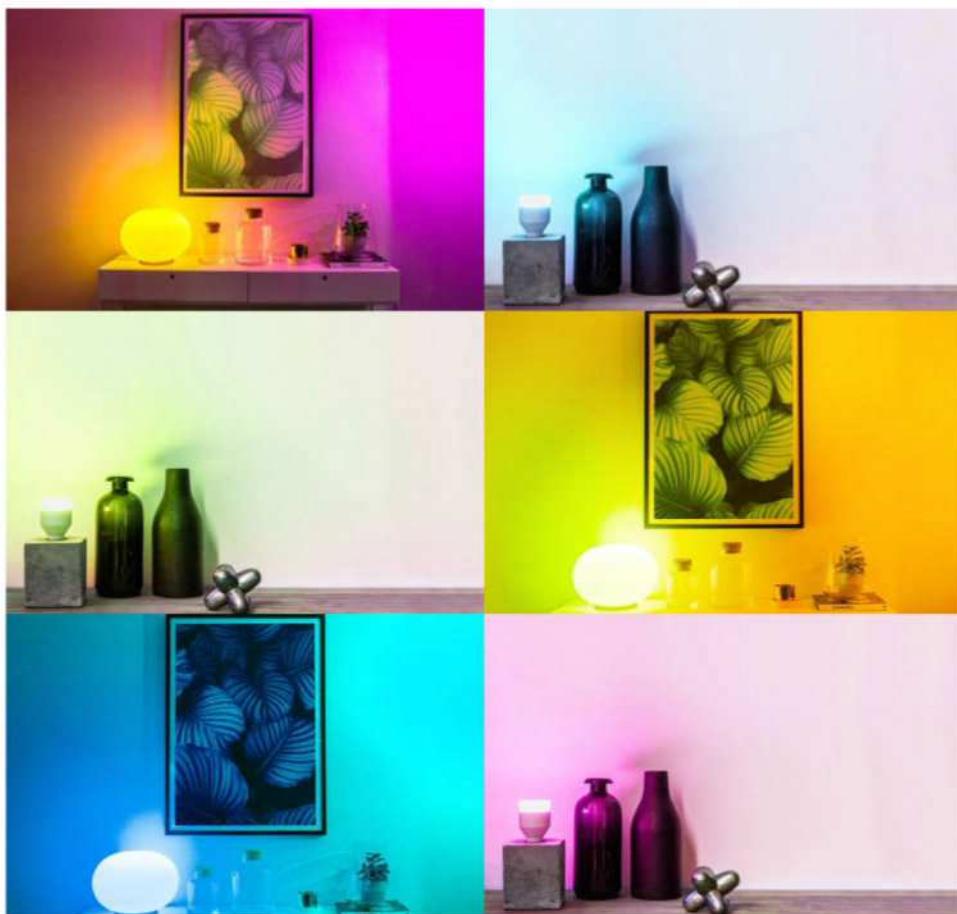
The bulb is available with either an E27 screw or a B22 bayonet cap so will fit into any compatible socket, and aside from a Lifx logo, the design is very understated.

Installation and set-up

Installation is as simple as popping the Lifx A60/A19 into a light fitting. That's it. No attaching panels to walls like with another Lifx statement product, the Nanoleaf.

Set up of the bulb with your phone is a little more complicated. You need to use either an iPhone or an Android smartphone to connect to a Wi-Fi signal being transmitted by the bulb, which enables your phone to connect the bulb to your home's Wi-Fi network. We usually dislike this method of setting up a device, but our experience in this instance was pretty painless.

As the light had already been set up in another location before we



KEY FEATURES

Lifx A60/A19

Supplier www.lifx.com
Power consumption 11W (maximum)
Brightness 1100 ANSI lumens
Colour range 16 million colours
Dimming 1 percent to 100 percent
Connectivity 802.11b/g/n Wi-Fi; WPA2
Brightness 11 ANSI lumens
LED lifespan 22.8 years (3 hours per day)
Bulb type E27 Screw or B22 Bayonet
Weight 210g
Size 62x63x11mm

actually wanting green) but not the nuance of a specific tone. When you select 'white', however, it'll go for a tone that's close to that of a traditional lightbulb.

Smart home integration

Because Lifx bulbs work across all smart home platforms and ecosystems, it's incredibly easy to include them in routines, or scenes, or whatever your particular ecosystem refers to these setups as.

So, for example, you can set your Lifx bulb up to join in with your morning wake-up routine, or even set up an IFTTT command so your lights turn red if your heating gets above a certain temperature.

Summary

The Lifx A60/A19 is the smart bulb that we'd recommend for someone looking for an individual 'feature' light, rather than a replacement for a conventional lighting setup.

The bulb works straight out of the box and doesn't require a hub, which could well draw some people away from Philips Hue (it's certainly a cheaper option), but the light that it throws isn't as natural.

The result of this is that you can end up sitting in some pretty unconventional lighting states, which we enjoyed once we got used to it, but which may not be to everyone's taste. And given that the Hue range is capable of creating some extreme colours of its own, as well as conventional lighting effects, it would be nice to see some more traditional options added to the Lifx range. ■

The Lifx A60/A19 initially strikes an odd chord, but once you get used to its colours, it's easy to live with.

 Windows
Help & Advice
Verdict



got it home, it needed to be reset, and this was as simple as turning it on and off again five times in rapid succession using the light switch.

You're given the option to either use the Lifx app to control the bulb, or control it via a third-party system like Apple's HomeKit, Amazon Alexa, Google Home or IFTTT.

whites, ranging from a harsh, clinical light to a warm amber glow.

It's worth highlighting again that none of these look like the soft glow you'd get from an old-fashioned filament bulb, but once you get used to that, that orange glow is actually very pleasant to sit in and enjoy. In addition to tone, you're also able to adjust the light's

"The level of customisation can be overwhelming if you're just going for a stab-in-the-dark approach"

Usage

When the Lifx A60/A19 first burst into life we were a little startled by how bright and artificial the light it emitted looked. However, the Lifx app has a vast range of options for adapting the light's output, and we were able to quickly find light settings that we preferred.

The level of customisation can be overwhelming if you're just going for a stab-in-the-dark approach to finding a colour you're happy with, but if you've ever used a colour wheel in Adobe Photoshop or similar software you'll be right at home with the colour selection from the Lifx app.

Thankfully, if you're just looking for a more standard 'white' light, there are a number of preset

brightness, and you can get some genuinely lovely light out of this bulb as it's fully dimmable.

Once you've found a lighting effect that you like, you can save it as a custom lighting option, so you don't have to go through the entire process from scratch every time you want to find a setting.

However, you'll get the greatest level of customisation when using the Lifx app, rather than using a third-party integration like HomeKit, even though Apple's Home app is one of the best of its kind around.

Obviously when using voice commands you're limited to 'broad brush strokes' control, so you'll be able to choose 'red' or 'green' for example (we can't imagine anyone



Even H2 Wireless

£199 | \$229 www.weareeven.com

Prescription sound for your ears

The headphone market is one of the most crowded and competitive in consumer technology. Just about everyone has wireless headphones for sale nowadays, so companies are increasingly trying to stand out by supporting additional features like active noise cancelling, Bluetooth aptX HD support, and 'smart' listening experiences via smartphone apps.

While the Even H2 doesn't support any of the above features, what makes it stand out in this context is its unique EarPrint technology. What EarPrint does is provides listeners with a short listening test to see exactly what frequencies need to be boosted in order to achieve 'better' sound.

After spending several weeks with the Even H2, we came away impressed by the company's second headphone offering for its long battery life and unique listening experience. However,

some fit and finish issues and a dubious 'better' sounding experience keep us from recommending these headphones wholeheartedly for everyone.

That said, if you suffer from hearing loss or just want to try something different, the £199 (\$229) Even H2 Wireless are definitely worth considering.

Design

The design of the Even H2 Wireless is refined and mature with its real walnut wood, metal, and leather construction. The headband and ear pads are made of PU leather, which make for a comfortable listening experience but there is quite a bit of clamping force, which may be uncomfortable during long listening sessions. The headphone forks and band are made of the aforementioned metal and the ear cups are made of walnut wood.

With that in mind, the H2 Wireless feels like a premium

headphone, which is impressive for such a young company. However, its fit and finish leaves something to be desired.

The real walnut is a nice touch, however the port cutouts for the microUSB and 3.5mm headphone jack ports are a bit rough. Worst of all, though, the buttons feel cheap and make a hollow clicky sound when pressed. Plus, it's easy to mix them up since the play/pause button isn't textured.

In addition to the three playback buttons, there's an EarPrint button, which toggles your customised EQ and doubles as a power button – but you can find out more about the EarPrint technology in the Performance section.

The headphones fold up nicely to fit in the included case for travel. Also included in the box is a nice braided micro-USB cable for charging and a 3.5mm-to-3.5mm cable in case the H2 Wireless runs out of battery power.



Performance

Since it's the marquee feature of this headphone, let's talk about Even's EarPrint feature.

When you first pair and set up the H2 Wireless, you are given what's basically a hearing test. We recommend doing the test in a quiet room. The onboard voice

In terms of sound quality, the H2 Wireless is an exciting-sounding headphone with loads of bass. While the H2 sounds relatively neutral with EarPrint turned off, the headphone cranks the bass response even when our EarPrint noted that our ears' could pick up bass frequencies at 'soft' volumes.

"After your EarPrint test, you're given a visual representation of how good your hearing is"

talks you through every step clearly and it's nice having a friendly voice walk you through the test and features of the headphone. However, her bubbly nature can get annoying, especially when she says "Yes! Connected!" each time you fire up the headphones.

After your EarPrint test, you're given a visual representation of how good your hearing is at various different audio frequencies. The app gives you a nice explanation about what each frequency represents, such as the human voice or wind chimes. You can take the EarPrint test as many times as you'd like and switch between different EarPrints in different listening environments, which is a nice addition.

While the EarPrint equalisation made music sound exciting, it added too much bass for our liking, especially in jazz and classical recordings. Additionally, the headphones have a noisy Bluetooth connection, which is especially noticeable when music is off or playing softly, like with Bill Evans' solo piano tracks.

While we wished for a more neutral presentation, we can see why many love the sound quality of the H2 Wireless: it sounds bright and exciting with mainstream music. However, your listening experience will largely depend on how good your hearing is. A good way to test if you'll like the H2 Wireless is by going on Even's website and taking the EarPrint test

KEY FEATURES

Even H2 Wireless

Supplier www.weareeven.com
Type On-Ear
Drivers Beryllium, 40mm
Impedance 32 Ohms
Frequency range 20-20,000 Hz
Total harmonic distortion <3%
Sound pressure level 110db (+/-2db)
Connectivity Bluetooth; 3.5mm headphone socket; USB
Battery Lithium Ion (up to 20 hours continuous listening)
Microphone Yes
Controls Play; Pause; Call Control; Volume Up; Volume Down; EarPrint On/Off
Materials Real walnut ear cups; brushed metal; PU leather
Weight 300g

using a web browser. The company also offers a 30-day money back guarantee if you want to try them.

Summary

The Even H2 Wireless offers a unique listening experience in that it tailors sound to your hearing abilities thanks to its EarPrint feature. We liked the H2 for its easy-to-use hearing test and mobile app, but overall, the headphone lacks refinement. The fit and finish is good, but the cheap plastic buttons and rough wood tooling let it down. Additionally, the EarPrint equalisation makes music sound exciting but adds too much bass. Plus, the noisy Bluetooth connection is quite distracting for listeners who listen at low volume.

In the end, the Even H2 fills a unique niche – listeners with hearing loss or those who simply want a tailored listening experience will enjoy the H2 Wireless but it's not polished enough to go against established players.

£199 (\$229) is a lot to spend on a pair of headphones, especially when you can get one of our favourite noise cancelling headphones, the Plantronics BackBeat Pro 2, for less money. However, we hope Even keeps working on refining its headphones since the EarPrint technology is very compelling. ■

For most, the H2 will sound great, but fit and finish issues prevent us from a fulsome recommendation.


Windows
Help & Advice
Verdict



MESH NETWORKS

A mesh network takes home networking to the next level of reach and simplicity

Reviewed by ALEX COX

MESH NETWORKS ON TEST...

- › BT Whole Home Wi-Fi £189
- › Google WiFi £329
- › Linksys Velop £399.95
- › Netgear Orbi Pro £479.99
- › TP-Link Deco M5 £229.99
- › Zyxel Multy X £249





There's no question about it: mesh networks are hot right now. It's not just marketing hype either – although their makers no doubt love the fact that they can charge a little more for home networking hardware. It's a real change in the way networking operates that makes a massive difference to coverage and speed.

Mesh networking is a fairly simple concept. Rather than relying on a central router – which can be difficult to extend – mesh uses individual nodes, each of which shares a signal with the others through what's called a backhaul channel. Add a new node

enabling faster communication and freeing up radio space for more network traffic.

Above the backhaul channel, typically, comes a collection of cutting-edge Wi-Fi radios. Each member node of a mesh network looks after its own little area of space – your PC, your phone, your tablet and your other devices simply and seamlessly connect to the node that has the highest signal strength from wherever they are.

There are some downsides, however. A standalone router doesn't need to do between-device intercommunication, so you'll suffer slightly more lag with a mesh. You'll

Your devices seamlessly connect to the node that has the highest signal strength

to your mesh network, and it simply joins that behind-the-scenes channel – as long as one of your nodes is close enough to talk to it, your network can go further. If you have Ethernet strung through your home, you'll often be able to use that as a backhaul, too,

need to plug in a number of devices around your home, marginally upping your power bill and tying up sockets. And the initial cost is quite high as you're essentially purchasing a bunch of routers at once – although the difference isn't always that extreme.

Things to consider...

What you need to know before getting started

1 Home size

Do you really need a mesh network? If you're living in reasonably close quarters, the answer is probably no. Mesh networks are best suited to larger homes, or those built of particularly dense materials that cause Wi-Fi dead spots.

2 How many nodes?

If your Wi-Fi does need the range extension that mesh offers, how many nodes will you require? Check the specs of the mesh network you're looking at – there'll generally be a suggested range per node – and compare it to your home's dimensions.

3 Current kit

If your router is currently working fine, don't jump on the mesh bandwagon if you're looking for speed;

while mesh networks are efficient, you won't find a big speed boost unless you're currently struggling along on an outdated version of Wi-Fi.

4 Available sockets

Your nodes will each need powering, so they must be placed close to a power outlet. This isn't a huge deal, since nodes are generally pretty flexible about where you place them, but they'll need good communication with other nodes wherever they go.

5 Cheaper options

Throwing everything away and replacing your kit with a mesh network will certainly offer up results, but a Wi-Fi extender, or some cheap Powerline adaptors, may be all you need to quash those dead spots. Think carefully.

How we tested

To make the test fair, given the differing number of nodes included with each system, we set up two nodes of each in matching positions, in a three-floor house with known signal dead spots. One node was then moved close to the front of the house to measure signal distance outdoors, and signal strength was tested from predefined points. Each was set up and configured using its respective iOS app.



Higher...
Ubiquiti Amplifi
amplifi.com
£370

Not much tops the Orbi Pro's price. Ubiquiti's Amplifi system, which includes a router and two socket-mounted nodes (with adjustable antennas), comes pretty close though at £370.



...or lower?
Netgear WN3000RP
netgear.co.uk
£19.99

Netgear's socket-mounted extender isn't mesh, and it's not the fastest with its single 802.11n radio, but it's only £20 and will cover an awkward dead spot.

Test 1 Getting connected

How hard is it to hook up?



The set-up process is something mesh, in general, does well. None of the products tested here are particularly difficult to connect. Some are more involved than others, but the contrast isn't huge. Linksys' Velop, for example, is one of the slickest we've seen – plug it in, open the app, and it's all hooked up in a couple of minutes.

On the other hand, Google WiFi's initial process can take a while, but adding additional nodes is fuss-free. The TP-Link Deco M5, Netgear Orbi Pro and Zyxel Multy X use Bluetooth to create that initial connection, which simplifies things, and BT Whole Home Wi-Fi's on-disc connection details and coloured LEDs make for a slick setup, though not every initial connection was as trouble-free as it could have been in our testing. The Zyxel Multy X, in particular, put up a fight, taking an hour of fiddling and resetting before it finally acquiesced, despite its straightforward instructions and seemingly basic installation method.

TEST RESULTS

BT Whole Home Wi-Fi	★★★★★	Netgear Orbi Pro	★★★★★
Google WiFi	★★★★★	TP-Link Deco M5	★★★★★
Linksys Velop	★★★★★	Zyxel Multy X	★★★★★

Test 2 Power rating

The quest for a super signal



Power, in mesh, is a little relative – when you're distributing the load, you don't really need a lot of individual muscle. So while Google's WiFi's AC1200 radios might look 'weak' when compared to the AC3000 combos of the Zyxel Multy X and Netgear Orbi Pro nodes, there's not a huge speed difference, even when loading up

the network with a couple of 4K streams. Google's programming and load balancing are top-notch, but the power dip translates into a slight lack of reach.

BT Whole Home Wi-Fi's many communications channels (the setup uses a 4x4 MIMO radio combo) means it blazes along even without its dedicated backhaul; Zyxel's nine-antenna, dedicated backhaul setup gives the Multy X impeccable performance and reach; and the Linksys Velop flies when talking to the wireless card of a modern PC. Even the TP-Link Deco M5 is powerful enough.

TEST RESULTS

BT Whole Home Wi-Fi	★★★★★	Netgear Orbi Pro	★★★★★
Google WiFi	★★★★★	TP-Link Deco M5	★★★★★
Linksys Velop	★★★★★	Zyxel Multy X	★★★★★

Test 3 Complexity

Simple Wi-Fi or something more?



Everyone does mesh a little differently. BT's solution, for example, is a bridge. This means it doesn't actually do any of the heavy lifting – you need to hook it up to your existing router to manage DHCP and the like, then each of its nodes works as an access point. Netgear's Orbi system has a specific node that manages routing, and satellite nodes that communicate with that.

The rest can attach any node to your modem – but you'll lose access to Ethernet connections you might already have hooked up to your current router, which might necessitate a little reorganisation of your network, particularly if you're currently running a smart hub or a network printer. Realistically, though, no mesh network is particularly complex. It's a much smoother ride than trying to extend a network with traditional Wi-Fi repeaters, but it pays to know what's different.

TEST RESULTS

BT Whole Home Wi-Fi	★★★★★	Netgear Orbi Pro	★★★★★
Google WiFi	★★★★★	TP-Link Deco M5	★★★★★
Linksys Velop	★★★★★	Zyxel Multy X	★★★★★

Test 4 Security and app

Because control is important



Mesh is generally app-controlled, and that gives you access to more than just a few stats. TP-Link's Deco app gives you an extra layer of network-wide anti-virus protection, and parental controls are a common feature on everything but the Netgear Orbi Pro – though bear in mind that it's slightly more business-minded than the standard Orbi, which features

'Circle with Disney' parental controls, so you can at least get a little deeper with your network traffic control.

BT's Whole Home Wi-Fi app isn't brilliant, and TP-Link's effort is a little more confusing than the others, whereas Zyxel's well-designed app gives good access to its security features. Google and Linksys shine in this department with a pair of excellent apps. Neither provides a huge amount of depth or control, but for fire-and-forget mesh, they're comprehensive enough.

TEST RESULTS

BT Whole Home Wi-Fi	★★★★★	Netgear Orbi Pro	★★★★★
Google WiFi	★★★★★	TP-Link Deco M5	★★★★★
Linksys Velop	★★★★★	Zyxel Multy X	★★★★★

THE WINNER

Linksys Velop

An easy-to-use and super-fast system

Linksys' Velop is, as far as we're concerned, the top home mesh network on the market today. The individual nodes are elegant and don't take too much surface space, the setup process is flawless, and the app – despite offering relatively few controls – is perfect for what Velop aims to achieve: utter simplicity. It also manages to top the rest of the networks on offer, bar the business-class Netgear Orbi Pro, in terms of range and power, coping with whatever we could throw at it.

That's not to say that the Linksys Velop is without its flaws. Its relative lack of Ethernet ports could be a curse if you'd rather keep your smart home bridges in one place, although a cheap Ethernet hub would solve that problem in a flash. While we love the look of the individual nodes, many



Velop's columns use colour-coded LEDs to indicate their status.

of its rivals manage to be less conspicuous. There are also cheaper mesh networks around and – as our final scores below show – there's surprisingly little to be lost by spending less than the Velop's £399.95 asking price.

The individual nodes of the Linksys Velop are elegant; the setup process is flawless, and the app is perfectly simple



ROB SAYS...

I keep considering mesh networking for our home, but our main computing use is gaming, and none of us want to put up with the latency. I think if you have a very large house, and perhaps often work at home, it's more of a worthwhile investment. For our humble abode and video games habit, extenders are a much more appropriate and affordable option.

How do they compare?



> THE SPECS	BT HOME WI-FI	GOOGLE WIFI	LINKSYS VELOP	NETGEAR ORBI PRO	TP-LINK DECO M5	ZYXEL MULTY X
PRICE	£189	£329	£399.95	£479.99	£229.99	£249
PACKAGED NODES	3	3	3	2	3	2
RADIO	AC2600	AC1200	AC3000	AC3000	AC1300	AC3000
ANTENNAS	4x4 MU-MIMO	2x2 MU-MIMO	2x2 MU-MIMO	3x3 MU-MIMO	4x4 MU-MIMO	4x4+1 MU-MIMO
ETHERNET PORTS	1 per node	2 per node	2 per node	4 per node	2 per node	3 per node, plus modem
DIMENSIONS	77x165x165mm	106x106x68mm	79x79x185mm	172x83x246mm	120x120x38mm	170x50x230mm
GETTING	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
POWER RATING	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
COMPLEXITY	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
SECURITY & APP	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

Note: The final verdict scores reflect the overall opinion of a product and are not necessarily an average of the criteria listed in the table.

BLUETOOTH SPEAKERS

Now summer's here we're taking the plunge with six of the best uber-portable, travel-friendly Bluetooth speakers



1 Bose SoundLink Micro

£99.95, bose.co.uk

The SoundLink Micro's silicone rubber skin won't win any design awards, but this tough cookie should survive plenty of drops and dunks before the music stops for good. Audio is bass heavy, but overall the sound is powerful considering the speaker's petite (100x100mm) dimensions. The six-hour battery life isn't bad for such a dinky speaker, but you'll be charging the SoundLink Micro more regularly than the other speakers on test here. That travel-friendly rubber strap is handy for attaching to handlebars, a parasol, a hiking pack...



2 B&O Beoplay P2

£149, bang-olufsen.com

The P2 is the priciest speaker here, but in return you get sound quality unmatched in the small speaker field, plus up to 10 hours of battery life and some sweet style – everything from the lightweight aluminium body to the leather strap screams premium. An internal polymer layer delivers extra protection for outdoor adventures, though it's unlikely to survive a prolonged dip in the pool. Aside from the discrete power button there are no physical controls. Instead, touch gestures launch Siri and give you full command over your audio.



3 Denon Envaya Pocket

£89, denon.co.uk

Denon's IP67-rated waterproof speaker is sturdy and offers up to ten hours of playback. Connecting your device to the Envaya Pocket takes mere seconds and the controls, including a dedicated button for answering calls and talking to Siri, are simple to use. We were expecting better audio from the full-range drivers, passive radiator and 2x 6.5W digital amp – the sound is clear but lacks low-end punch. We also experienced distortion when blasting rockier tracks. Still, it's easy on the eye and fits neatly in the hand and in backpacks.



There are far too many portable Bluetooth speakers that look like cheap plastic oblongs with gutless audio. These budget blasters might be OK for the garden shed, but if you like to take your

music further afield you need a speaker that can perform on the go, unfazed by a day at the beach or an all-night campfire shindig.

The travel-friendly speakers we've selected needed to tick a few boxes before being considered. Namely,

are they built to survive in the outdoors? Are they small and light enough for carry-on luggage, a rucksack or beach bag? And does the sound do justice to our cool summer jams? Time to press play to see which one tops the chart...



4 Braven Ready Solo

\$99.99 (£71), braven.com

Braven's burly budget portable offers the best battery life on test, doling out a generous 12 hours per charge. Inside, an extended range driver and all-direction subwoofer produce impactful lows and clear mids and highs. A shock- and debris-proof housing and IP68 waterproofing should be enough to handle little accidents. A noise-cancelling speakerphone means you can still take care of business on the go. The Ready Solo is also the only speaker here with a USB port to keep your device juiced, ensuring the music never stops.



5 UE Wonderboom

£89.99, ultimateears.com

The Wonderboom might not be the most stylish speaker here, but the playful colour options and size-defying 360-degree sound make it the perfect party centrepiece. It works particularly well with the lush production of modern pop and rock, but adds weight to everything from classical to folk. The Wonderboom is waterproof and even floats, so you can listen by the pool or in the bath. Additional features, including ten hours of battery life, a 100-foot range and the ability to pair two speakers, are the icing on the cake.



6 JBL Clip 2

£49.99, uk.jbl.com

The Clip 2 is a good option for lovers of the great outdoors. A combination of fabric and rubber ensures durability and waterproofing, while the built-in carabiner is ideal for hanging the speaker up or dangling it from a backpack. At this price the audio suffers – it won't fill a room with hip-shaking bass, but for personal use there's no arguing with the clarity – though the eight-hour battery life is impressive. Bluetooth pairing is a breeze, or there's a built-in 3.5mm cable (assuming your device has a headphone socket).



THE BEST FREE SCREEN RECORDER 2018

Record or stream games and other software from your desktop

1 OBS Studio

<https://projectobs.com/>

If you're a gamer, OBS Studio is easily the best screen capture software for you. Unlike FRAPS (which only lets you record for 30 seconds at a stretch unless you've

bought a license), OBS Studio is open source, and completely free.

OBS Studio supports both streaming and recording in high definition, with no limits on the



With OBS Studio you can record from multiple screens, or stream games live.



number or length of your creations. You can stream live to Twitch or YouTube gaming, save projects and come back to them later, or encode your footage in FLV format and save it locally.

Because OBS Studio can record directly from your graphics card, it can capture games running in full-screen, with customisable hotkeys to control the recording. OBS Studio can also make full use of multi-core CPUs for improved performance, and can record at 60fps (or even higher).

OBS Studio is by far the best screen recorder for gamers.



RATING



2 Flashback Express

www.flashbackrecorder.com/express/

OBS Studio is our top choice for recording from a desktop or webcam, but Flashback Express comes an extremely close second. Despite being a free version of a paid program, FlashBack Express

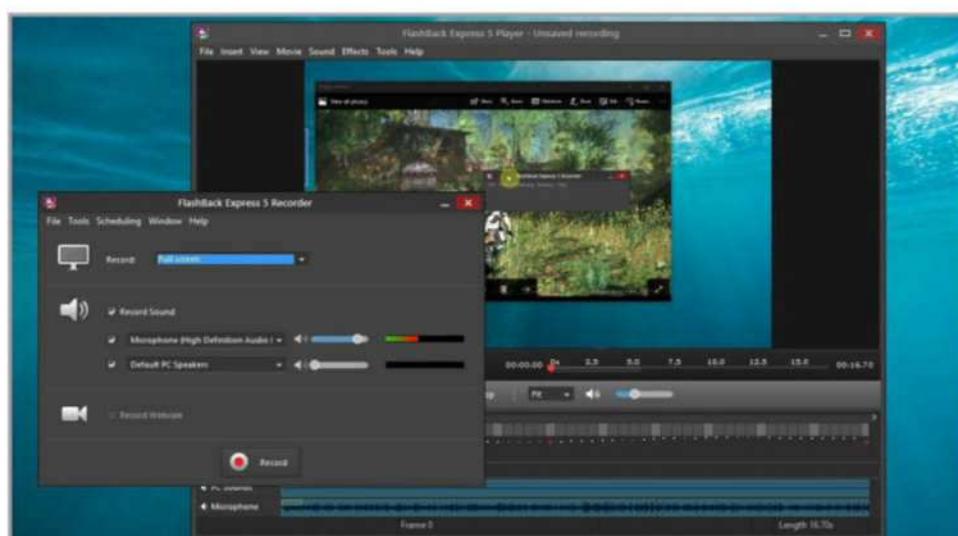
won't put ugly watermarks over your recordings or impose time limits, and it has features and tools that rival many premium apps. Its interface is less intimidating than OBS Studio, so if you've never

Flashback Express is a brilliant screen recorder that's surprisingly simple to use.

used a screen recorder before, it's an excellent choice.

You can record from your whole screen, a window, a selected area, or a webcam. Once you have finished, your recording will appear in a simple editor, where you can edit it to suit your needs, then export it to YouTube, an FTP server, or your PC.

That's all fairly standard fare for a free screen recorder, but dive into Flashback's advanced options and you'll find a wealth of thoughtfully designed settings that will make your desktop recordings look truly professional.



RATING



3 Apowersoft Free Online Screen Recorder

www.apowersoft.com/free-online-screen-recorder

Whether you want to record a presentation, software demo or tutorial, Apowersoft Free Online Screen Recorder is worth a try. It's a browser-based tool, which

means it's not suitable for games, but for any other tasks it's ideal.

The first time you use Apowersoft Free Online Screen Recorder, you'll be prompted to

The online edition of Apowersoft is more powerful than many desktop apps.

download a small launcher application. You'll then be provided with a control bar packed with more options than found in many screen recorders.

Apowersoft Free Online Screen Recorder also offers customisable keyboard shortcuts for speed and convenience. You can choose whether or not to include the cursor in the recording.

You can also edit clips. Selecting to do so downloads an additional component – Apowersoft Video Editor – which lets you make adjustments before exporting your video in your preferred format. A truly exceptional tool.



RATING



4 TinyTake

<https://tinytake.com>

TinyTake is a free screen recorder designed to grab webcam and desktop footage, not in-game action. Starting a recording is simple – just click the button, then

select an areas of the screen and tap [Ctrl] + [R].

Your recordings won't be watermarked, but you're limited to five minutes of footage at a time.

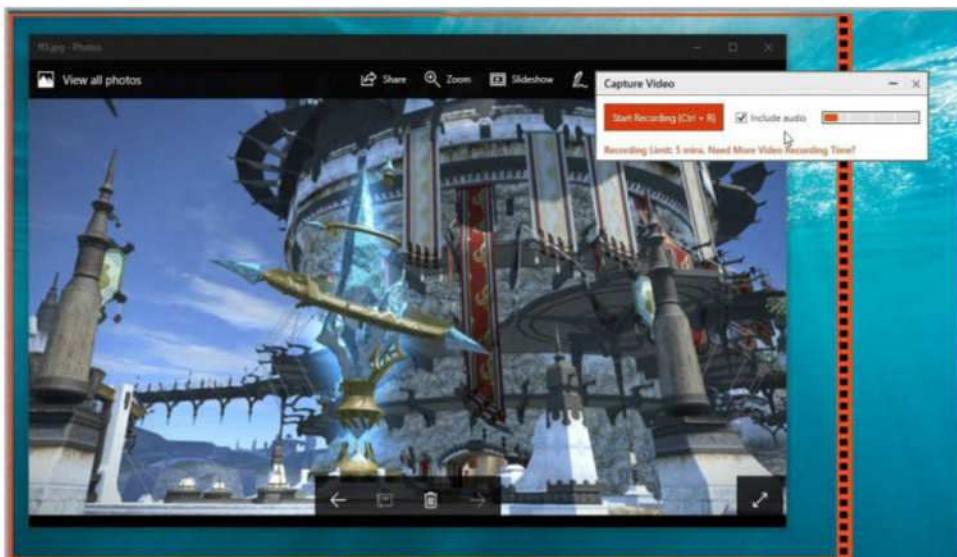
TinyTake is incredibly easy to use, and is ideal for webcam and desktop footage.

That might not sound like much compared with some of the free screen recorders here, but it's plenty for a YouTube tutorial.

Once you're done, you can preview your video and export it to your PC, to YouTube, or to TinyTake's cloud storage service, which gives you 2GB for your clips.

Other tools, like annotations, are exclusive to the premium versions of TinyTake, which is designed for commercial use.

TinyTake is a lean, streamlined screen recorder, but the lack of editing tools is a shame, hence its fourth place position in our test.



RATING



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Printed by William Gibon & Sons Ltd, 26 Planetary Road, Willenhall, West Midlands, WV13 3XT

Distributed by Marketforce, 5 Churchill Place, Canary Wharf, London, E14 5HU
www.marketforce.co.uk Tel: 0203 787 9060

ISSN 2050-5906

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In the next issue.

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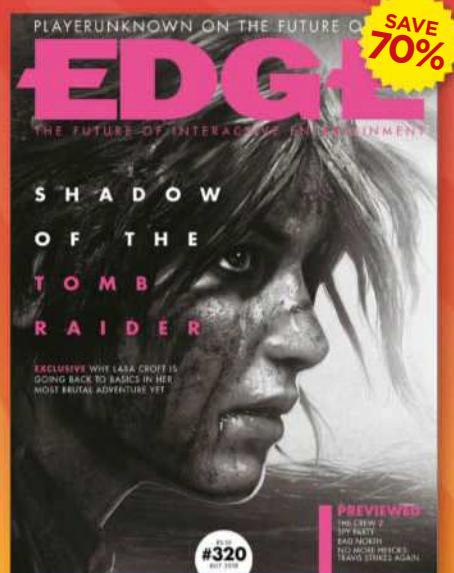
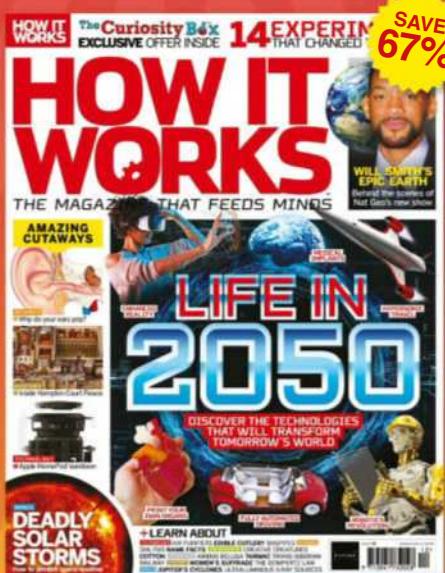
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