

**26** PAGES OF WINDOWS  
STEP-BY-STEP GUIDES  
MAKE YOUR PC PERFECT



**IMPROVE WINDOWS 10**  
IN-DEPTH WITH THE NEW CREATORS UPDATE



# Windows Help & Advice

THE BEST WAY TO

# REINSTALL WINDOWS

Give your PC a new lease of life with our **essential reinstall guide**



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# Welcome

Windows 10 is a fantastic thing – an ever-evolving smorgasbord of PC operating system goodness that brings new features and enhancements with every major update. In this issue we're taking an in-depth look at the latest: the Fall Creators Update, which makes it easier than ever to get creative on your PC – and brings Windows Mixed Reality to the AR/VR table. There's even a new look-and-feel in places, thanks to Microsoft's Fluent Design – you can find out all about it on page 58.

Of course, with every Windows update come some brickbats too, so on page 12 we're going to show you how to reinstall Windows from scratch, making your PC run faster, leaner and meaner than ever before.

And in our Explore section, starting on page 23, we'll show you how to do all kinds of incredible things with your PC – from creating animated GIFs to mirroring your desktop on your TV.

Enjoy the issue,

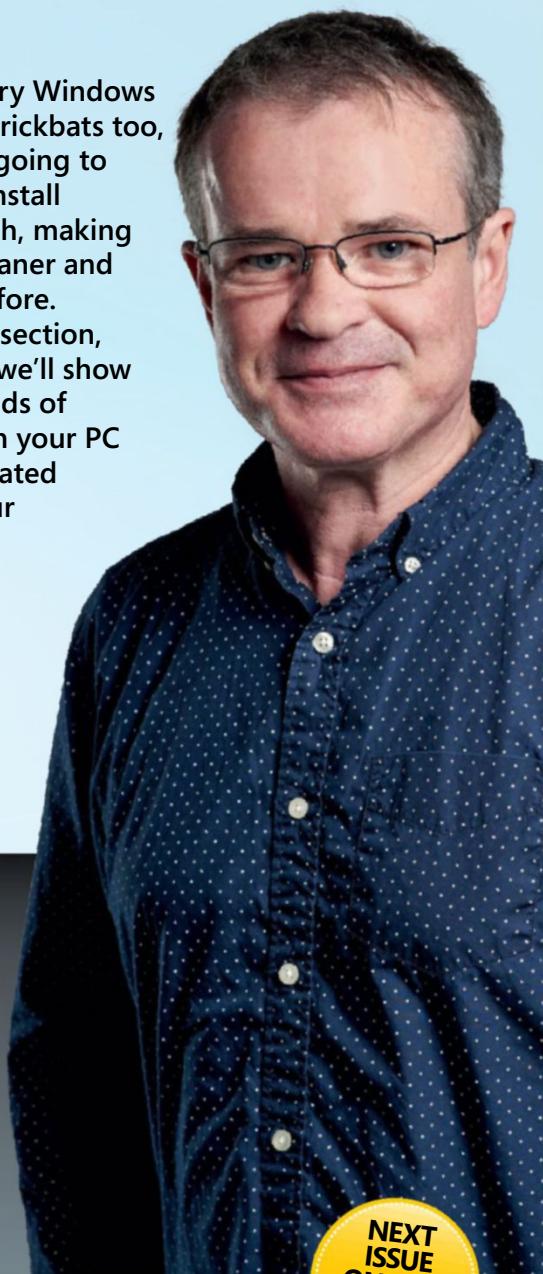
*Rob*

**Rob Mead-Green** Editor  
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AND SAVE – JUST TURN TO PAGE 20!

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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# Windows Help & Advice

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THE BEST WAY TO

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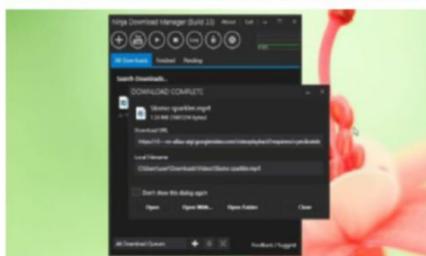
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# Discover

► NEW THINGS TO DO ► AMAZING WEBSITES ► FASCINATING FACTS



**NETFLIX AND SKILL** Enhance your viewing experience with a few nifty tips and tricks.

# Watch with mother Get more from your Netflix account – for free

Millions of us watch quality programming through Netflix, but you could be watching it better. Here's how...

The latest US series, exclusive content, classic movies – it's all there. Netflix doesn't publish numbers, but it's estimated that over six million people in the UK subscribe to the Internet streaming service, with more signing up every day. It's brilliant, but there's a lot you can do with it than you might realise.

Fancy enjoying the latest shows with someone else? Open the Google Chrome web browser on your Windows PC and install the Netflix Party extension ([netflixparty.com](http://netflixparty.com)). It synchronises video playback between everyone who's joined a specific party and offers a built-in chat, enabling you to create an impromptu movie night (with the all-important acerbic commentary) even if you're geographically distinct from your friends and family.

Another Chrome extension worth trying is FlixPlus (<http://bit.ly/2jEnazn>), which adds ratings information from

IMDB and Rotten Tomatoes, hides spoiler text for a more seamless and surprising viewing experience, lets you watch random episodes of series, and even fades out or tints content you've already watched so you don't sit through it again.

Netflix's selection is vast, to say the least, so if you're struggling to work out what to watch you might find yourself clicking through the categories. Only, well, they're often not very useful. Netflix sorts its content much more finely than it might first appear, and that can really help you burrow down to the sort of things that you really want to

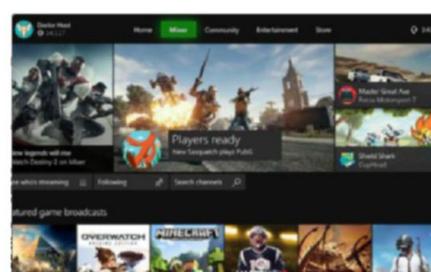
watch; visit [netflixcodes.me](http://netflixcodes.me) in your web browser and you'll be able to choose from a much broader selection of narrow categories. And if you still can't decide what to watch, then [netflixroulette.com](http://netflixroulette.com) is the website for you. It will spin up a random selection from Netflix that's surely worth a look.

## XBOX ONE X A new console for new TVs

4K is a real buzzword at the moment, and many of us have taken the leap and upgraded our TVs. Microsoft's hardware division is keeping pace; hot on the heels of Sony's 4K-compatible PS4 Pro comes the brand new Xbox One X (£449), a substantially upgraded version of its flagship console. It even one-ups Sony's competitor, packing enough power on board to run games at a native 3,840x2,160 pixels, taking full advantage of the abilities of 4K screens.



OLD LOOK The Xbox One X strongly resembles the Xbox One S. The real changes are inside.

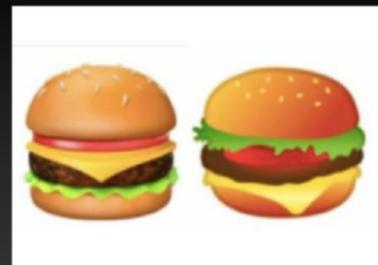


NEW LOOK The Xbox One X – as well as its elder siblings – get a new, upgraded interface.



GOOD LOOKS Every game in the Xbox library gets a visual upgrade, even if you don't own a 4K TV.

## The Knowledge... + | ▶



### The great Emoji debate

#### There's a debate?

Oh yes. A hot one. And it's gone straight to the top. After a Twitter user noted that Google's version of the cheeseburger emoji ordered the ingredients in completely the wrong order – placing the cheese below the burger patty – Google CEO Sundar Pichai promised to "drop everything" to fix the egregious ordering if a consensus could be reached.

#### So it's been fixed?

Well, not as of press time. But that stacking silliness is just the tip of the emoji iceberg. The Unicode Consortium, the non-profit group which decides which characters appear in the international unicode standard – a character library which includes the entire emoji canon – is in the middle of a big debate about what constitutes a viable emoji.

#### What's the matter?

The Unicode Consortium releases new emoji (and other characters) in major updates, the next of which is due in mid 2018. The next batch, currently standing at nearly 50 additional entries, includes a number of proposed emoji which are dividing members of the Consortium.

#### Like what?

Perhaps the most contentious entry is labeled 'Frowning pile of poo', and it's just that: a version of the inexplicably popular emoji with that stupid grin wiped off its face. The proposal that suggested its inclusion ran to a comprehensive 12 pages, but some in the Unicode Consortium feel it's a step too far.

#### Does this even matter?

That depends on who you ask. To some, emoji are simply annoying, infantile graphics that add nothing to conversation. To others, they're increasingly a part of worldwide language, and the catalogue deserves to grow and grow – although the fact that different apps and services use different visual representations of them – iOS vs Android, for example – means they're unavoidably ambiguous at times.

*Everyone's talking about...*

## Artificial stupidity

As AI makes more and more of an impact on our lives, can it really be trusted to know what it's doing?

When is a turtle not a turtle? When it's a rifle. Or maybe a stealth bomber is actually a dog. A human would know, but recent research from Kyushu University in Japan suggests that image-analysing Artificial Intelligence (AI) engines – previously considered reliable – can be thrown completely off course by changing just one pixel in an image. Items that AI engines had no problem identifying previously instead threw up random results, and researchers don't yet know why – but it has technology firms concerned, with the likes of Google and Facebook now working with their own sets of 'adversarial images' to see if they can come up with a suitable solution.

This may not

immediately sound worrying, but image recognition is fast becoming something that our lives rely on. Tesla has been trialling an autopilot mode for its existing cars, and many companies are working on their own self-driven vehicles; if a vulnerability like this exists in those cars' cameras, the result could be a highly confused two-ton death machine doing its own thing on the roads. That's a doomsday scenario, but since some

self-driving cars have already been shown to have vulnerabilities to carefully placed lasers (which, admittedly also tend to affect humans), the big names in AI are right to fix each and every potential problem.

### RISE OF THE ROBOTS

Less dangerous AI is already in action all over the web. Companies frequently make use of neural networks (essentially very limited artificial brains) to target ads and identify trends online. Others, such as

Janelle Shane ([aiweirdness.com](http://aiweirdness.com)) use them to automatically generate funny Dungeons & Dragons spells or new My Little Ponies. But some see the rapidly-developing world of AI, and its

ever-reaching roots, as a massive potential problem. Tesla's Elon Musk, for example, expressed concern at the recent World Government Summit about AI scientists being "so engrossed in their work that they don't really realise the ramifications of what they're doing", and has invested millions of dollars into researching AI's vulnerabilities. The robot revolution is still a way off – with luck, AI will know what it's doing by then.



Download this...

### Google Maps... in space

[maps.google.com](http://maps.google.com)

We'd be surprised if you hadn't heard of Google Maps by now. It's just about the only way we at Windows Help & Advice have any idea where we are in the world. But here's a trick you might not know: switch to satellite view, and use your mousewheel (or the minus buttons on screen) to zoom out all the way. Keep going, and a sidebar will pop up, enabling you to check out a whole host of other celestial bodies, all the way from the Moon to Venus to Pluto. You can even jump inside the International Space Station (ISS) for an interactive tour; click the circles highlighting many elements, and you'll be given more information on the controls, modules and gadgets on board. The lack of an up direction can make the ISS a little tricky to navigate, so try using the arrow keys to move through its corridors rather than the mouse.



OUT OF THIS WORLD Take a tour of the International Space Station with Google Maps.

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05  
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## THE 60-SECOND QUIZ

Pens at the ready, your time starts now!

1 Where is Silicon Valley located?

- A North California
- B East Texas
- C South Alabama

2 The area around which UK city has been dubbed 'Silicon Fen'?

- A Cambridge
- B Bristol
- C Exeter

3 Which '80s company first inspired tech investment in the area?

- A Acorn
- B Amstrad
- C Dragon

4 Which modern technology did that company create?

- A The ARM processor
- B The trackpad
- C The rubber keyboard

5 Which city is known as the 'Silicon Valley of India'?

- A Bangalore
- B Kolkata
- C Mumbai

6 What is the chemical symbol of silicon?

- A Si
- B Sc
- C Sn

Answers 1A 2A 3A 4A 5A 6A

# Facts & figures

Rob Mead-Green reveals a host of fascinating digital facts



## \$40 MILLION

Amount of money Snap, Inc – the creator of Snapchat – has lost on its camera-equipped Spectacles. The company has apparently been left with hundreds of thousands of unsold Specs – and even of the ones it did sell, a significant proportion were returned.



## 23

Number of cameras (or eyes) NASA's Mars 2020 rover has. The cameras will enable the rover to navigate its way across the Red Planet on its Mars mission in three years time. The previous Mars rover, Curiosity, had 17 cameras on board.



## 12

Teraflops of graphics power in Nvidia's Titan Xp card – that's double what the Xbox One X has. Nvidia is also selling a Star Wars edition, with different colour LEDs for the Jedi and Empire versions.



## \$280 MILLION

Amount of money that has been accidentally frozen by a coding error in cryptocurrency Ethereum. The bug effectively stops anyone who uses the currency from withdrawing money from multi-sig wallets



## 26,000,000

Number of Kodi media player users who are accessing illegal materials, according to the Motion Picture Association of America (MPAA). That's roughly seven out of 10 of all Kodi users. This surprising stat has been widely disputed.

# >> Incoming

The hottest new Windows hardware on the horizon!



## Acer AH101-D8EY

Price \$399, [www.acer.com](http://www.acer.com)

Acer is one of the first tech companies to embrace Windows Mixed Reality – Microsoft's take on Augmented Reality (AR) and Virtual Reality (VR), which is included as part of the Windows 10 Fall Creators Update.

The Acer AH101-D8EY comprises a double-padded headset containing two 7.34cm LCD displays (one for each eye) with an image resolution of 2,880x1,440 pixels, as well as integrated stereo headphones. It enables you to fully immerse yourself within specially created Mixed Reality worlds, with dedicated apps encompassing everything from games to travel to live concerts and culture – and navigate through them using the supplied wireless controllers.

The Acer Windows Mixed Reality Headset joins similar models from Dell, HP and Lenovo, heralding a whole new way to interact with your PC.



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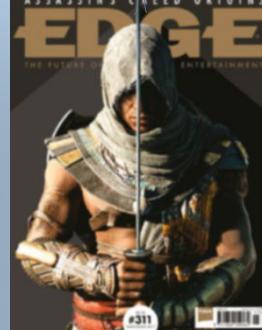
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THE BEST WAY TO

# REINSTALL WINDOWS

Make your next Windows reinstall a better experience, with the help of Nick Peers

**L**ong bootup times and sluggish performance are just two of the tell-tale signs that your Windows installation is in need of a complete do-over – especially if you haven't done so for a couple of years. That was certainly the case with one of the desktop PCs in the Windows Help & Advice office – despite having 16GB of RAM, a fast SSD boot drive and a quad-core processor on board, Windows took what seemed like an age to get going and its overall performance simply wasn't what it was.

Unsurprising, really: Since we last wiped the drive, we'd installed three major Windows 10 updates – the Anniversary Edition, the Creators Update and the Fall Creators Update and Windows had ballooned to an immodest 90GB of drive space. It was obviously time for an overhaul, but experience has taught us a few lessons along the way. Some go back to the early days of Windows; others are peculiar to Windows 10.

And that's where this feature comes in. We're going to take you on the ultimate Windows reinstall tour, whether you're installing Windows 7, 8.1, or 10. You'll discover that the

actual physical act of reinstalling is the simplest bit, so we'll step you through everything you need to do to preserve all your data, transfer your settings across the reinstall divide, and ensure that nothing gets left behind – just in case.

We'll show you how to prep for your reinstall by bringing all your key apps, drivers, and licenses into one place (oh, and don't forget to uninstall apps that need deactivating prior to reinstalling). You'll also discover how to source the latest version of your Windows install media for a cleaner, more up-to-date install out of the box. (We'll also reveal a tool that gives you the power to craft your ultimate reinstall disc).

We'll step you through the install process, but crucially, we'll be on hand to guide you through the post-setup phase: Get Windows up and running again, reinstall core apps, restore links to your data folders, bring back your app settings, and – for good measure – install a snapshotting backup regimen that enables you to roll back your PC quickly when the need arises. Long story short, everything you need is here. Enough preamble – let's reinstall Windows!



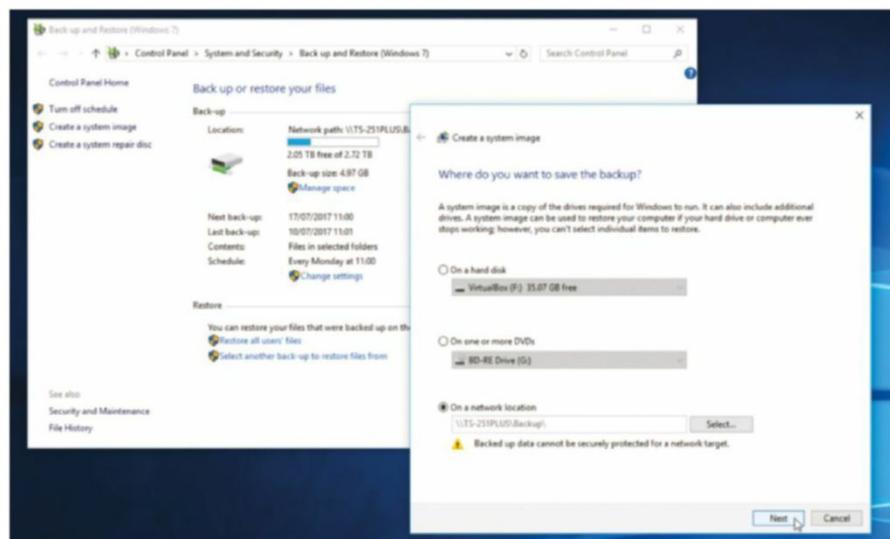
## BEFORE YOU START

Step one of the reinstall process is to make sure that your PC is fully backed up. Let's begin by taking a fail-safe drive image of your computer in its current state. Not only does this give you something to roll back to if the reinstall process fails for any reason, but it also ensures that every scrap of your current configuration – including programs and their settings – are accessible in case you need to refer to or access them after performing the install.

There are plenty of good third-party drive-imaging tools out there, but for the purposes of your fail-safe image, let's stick with the Windows 7 Backup and Restore tool. The quickest way to launch it in any version of Windows – including Windows 10 – is to press [Win] + [R] to open the Run dialog, then type 'sdclt.exe' and press [Enter]. Click 'Create a system image', choose your backup drive as the destination, and click Next. By default, your system partitions should be selected, so verify that there's enough space on your target drive – the actual backup will be smaller than the size indicated – and click Next again.

With your fail-safe backup in place, it's time to turn your attention to your data. If you've been diligently backing up your files using File History or the Windows Backup and Restore tool, you should be covered, although if you're using the latter, open it, and click 'Back up now' to ensure it's fully up to date.

Another option is to move your data to a different drive or partition, so it's



**Take a fail-safe backup image before you begin.**

left untouched when you reinstall Windows. You'll need to fix permissions after reinstalling, but we'll cover that in due course. If you don't have a second storage drive available (make sure it's not your backup drive), check out the box below for details of partitioning your system drive in two. Once set up, create a user folder on the root of your new drive or partition, then open File Explorer, and start moving user folders over to the new drive by right-clicking each in turn, and choosing Properties, then the Location tab. Click 'Move' to select the corresponding folder on your data drive, then choose Yes when prompted, and all your files are moved to the new drive. If you have cloud folders hosted on your system drive, don't forget to move them now, too –

this will save you the bother of a lengthy resync post-install. In this case, copy rather than move the files – you can link your cloud sync app to the correct folder after reinstallation.

## BACK UP PROGRAM SETTINGS

This is a key part of the reinstallation process. If you want to avoid having to meticulously record all of your program settings, the best thing to do is find ways of backing them up. Start by downloading the free portable tool CloneApp from [www.mirinsoft.com](http://www.mirinsoft.com) (go to Download Resources > CloneApp – Portable). Right-click 'cloneapp.zip', and choose Extract All – save it to your backup

# Partition your drive

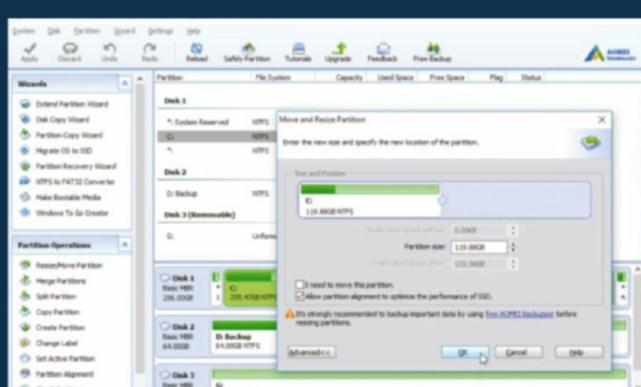
You need a secondary (not backup) drive if you want to separate data from Windows. If you don't have one, you can partition your main drive in two to separate Windows and your apps from your documents, photos, portable apps, and any files not directly tied into Windows.

It is possible to partition using the Disk Management tool (type 'diskmgmt.msc' into the Run dialog box), but if files are situated at the end of the drive, you won't be able to partition it to the size you want. Instead, download and install AOMEI Partition Assistant (<http://bit.ly/2AXfGuV>).

Ascertain how you wish to split your drive in two –

typically look to allocate 64GB or more of space for your Windows partition, depending on the number of apps and games you use, leaving the rest for your data. If you're currently low on space, temporarily move your data off the drive while you create the second partition.

Launch Partition Assistant, select your Windows drive (typically drive C), and click Check Partition. Choose 'Scan and Repair', and reboot to let it do its work. Once complete, restart Partition Assistant, select drive C again, and this time choose Resize/Move Partition. Use the slider to shrink the drive by the amount you wish to free up for your data partition. Be



sure to leave at least 5GB (preferably more) of free space for your system drive. If partitioning a solid-state drive (SSD), click Advanced, and select 'Allow partition alignment'. Click 'OK'.

Next, select the unused space, and click Create Partition. Leave all available

space allocated, and File System set to NTFS. Click 'Advanced' to set a label (such as Data), but leave all other settings alone. Click 'OK', then Apply. Review your changes, and click Proceed. Reboot when prompted – the new drive should then appear, ready for your data.

drive (or portable apps folder if you have one), then open the CloneApp folder, right-click 'CloneApp.exe', and choose 'Run as administrator'.

A list of supported apps is displayed. Click 'Select Installed', and CloneApp automatically selects all the applications in its database that you have installed – including some handy Windows settings, such as Library and network settings. Go through the list, unchecking those you have no plans to restore along with Windows.

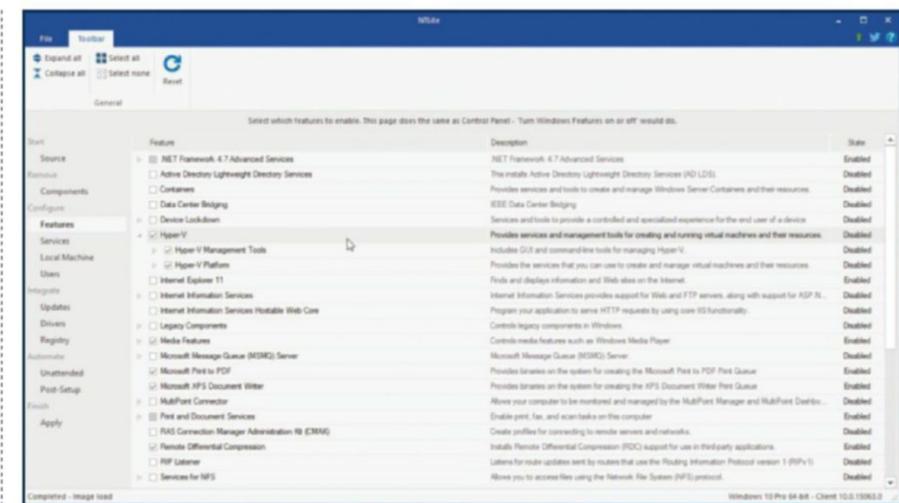
To see what's being backed up, click 'What is being backed up', and a complete list of apps and their settings – such as Registry entries or associated folders – is displayed. If you click Start CloneApp, these settings and files are backed up. Simply uncheck an item to exclude it from the backup, and then click Update when you're ready.

Not all your programs will be supported here, but you can still back up their settings using CloneApp if you can identify where they're stored – either in the Registry or in a specific folder. You should start your search under the C:\User\<username>\AppData and C:\ProgramData folders, as well as the app's own folder under C:\Program Files or C:\Program Files (x86). Also, open the Registry Editor (type 'regedit' into the Run dialog), and look under the HKEY\_CURRENT\_USER\SOFTWARE Registry key for any subkeys related to your apps.

Once you've identified where they are, click the Custom button in CloneApp, and click the appropriate buttons – Files, Folders, or Registry Keys – to manually add these locations. If you're struggling to locate them, try Googling the program name, along with words such as 'backup' and 'settings', or explore the app's own preferences or settings for an option to 'export settings' to back them up manually.

Another important consideration is any saved games you have – try the free GameSave Manager tool from www.gamesave-manager.com, where you'll find that its database supports over 5,000 games.

Now might also be the time to consider migrating to portable apps where you can – these can be stored on your PC's data drive, and will survive all your Windows reinstalls with their settings intact. Use the PortableApps.com platform tool (<https://portableapps.com>) to manage and launch them – you can download and install apps from here, or manually add them to the PortableApps folder inside their own folder. Then open the PortableApps.com platform, and click Apps > Refresh App Icons to bring them into the program menu.



## The ultimate reinstall disc

If you want full control, then it's possible to create the ultimate customised install media. But be warned: It's for technically-proficient PC users only.

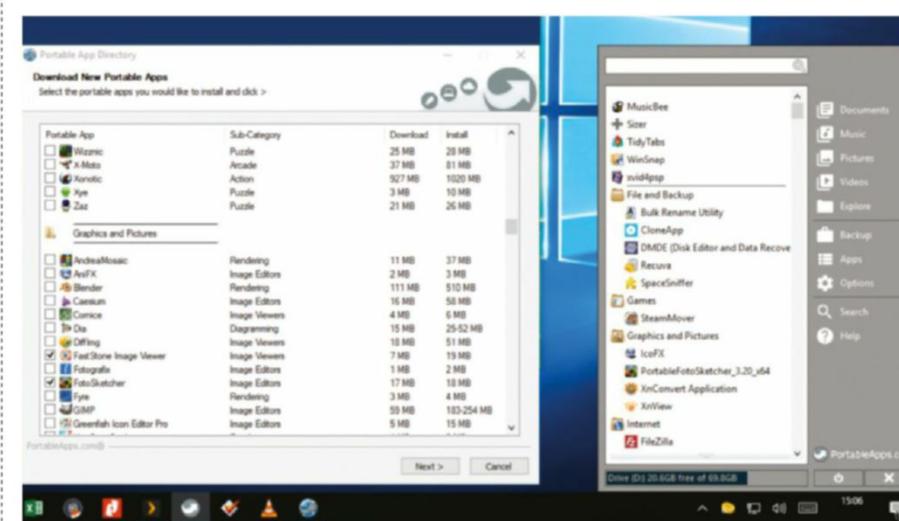
Download and install the free version of NTLite from [www.ntlite.com](http://www.ntlite.com). Once set up, launch the app. The simplest way to use it is in conjunction with a previously created installation USB flash drive – with that plugged in, click Add to select the drive containing your Windows install files. The OS should appear in the list – click it to mount it.

Once the source has been added, several options appear down the left-hand side of the NTLite window. Start with Components – read

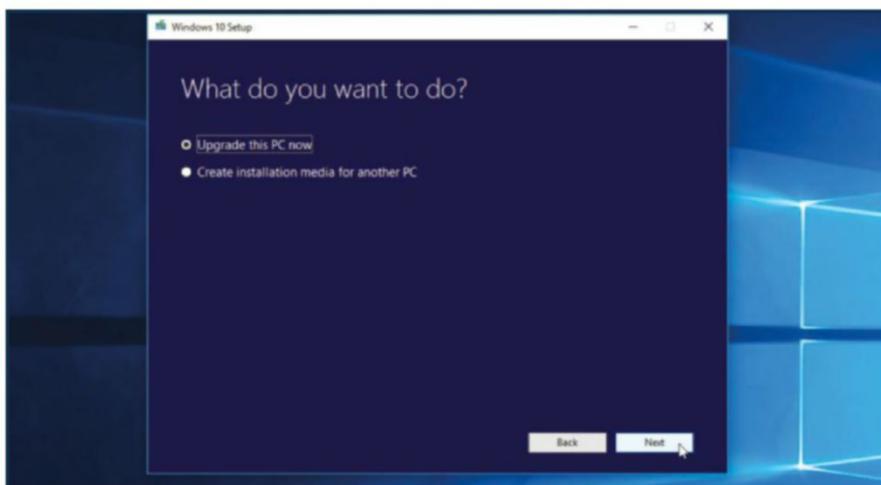
the warning – it's a good idea to test your customised Windows install in a virtual environment, such as VirtualBox, as advised – and click OK. From here, you can remove various components – including drivers, selected apps, and localization files – to slim down the size of your install media and subsequent Windows install. You'll see some options are marked in blue and greyed out – you need to pay for a full license (from £42.90) to access these.

The Configure section enables you to choose which elements are pre-installed, and which ones need to be manually enabled after

installation – you can disable Internet Explorer 11 and Windows Media Player, and enable Hyper-V support out of the box, for example. Go to Integrate to slipstream Windows Updates and Drivers into the media – these will be automatically installed after Windows, so while lengthening the overall install time, it saves you the hassle of doing so manually. Finally, the Automate section enables you to skip some of the setup questions. Once done, apply your changes, then – if necessary – generate a new ISO file, which you can burn to disc or copy to a USB flash drive using a tool such as Rufus (<https://rufus.akeo.ie>).



If you switch to portable apps, you save time configuring them.



## Repair, not reinstall

Creating a fresh install of Windows is often seen as the ultimate solution to any problem – whether it's hardware, software or Windows install-related.

However, completely reinstalling Windows maybe overkill if the problem is simply with Windows itself. If your PC is functioning perfectly other than in specific instances – such as Microsoft Edge no longer working after the Fall Creators Update, for example – a repair install may be a better option.

Repair installs simply overwrite the Windows files on your machine – leaving your apps, programs (including settings), and any data on your system drive untouched, at least in

theory. Performing a repair install varies between each version of Windows, but each procedure shares one common characteristic: You have to be able to boot into Windows to launch the repair from the Windows desktop.

If you're using either Windows 7 or 10, you can insert your Windows install media and launch the installation process from there. When prompted, choose the Custom option to 'upgrade' your existing installation. If your Windows 10 media isn't the latest version, run the Media Creation Tool instead, and choose the Upgrade option from there – make sure you select the option to keep

personal files and apps before clicking Install.

Windows 8.1 provides a handy 'refresh' option, which enables you to reinstall Windows over the top of itself – access this from 'Change PC settings' > 'Update and recovery' > Recovery, then click 'Get started' under Refresh.

The installation process is identical to performing a full reinstall, but at the end of it, your programs and data are untouched; only Windows gets refreshed, hopefully resolving whatever problems you've been having. Note: It's a lengthy process, so be prepared to wait an hour or more, depending on the speed and state of your computer.

### MORE REINSTALL PREP

Before going any further, make sure that you have the program media you need – install CDs and DVDs, plus any product keys. If you purchased digitally, simply make sure you have access to your online account, or check your email for the keys you need. If you're struggling to track down product keys, a free portable tool such as License Crawler ([www.klinzmann.name](http://www.klinzmann.name) – use the 'Mirror ServeSr (1)' link on the Download page – can track down the information you need.

Go through your list of programs for those that require activation – some, such as Nitro Pro, need to be deactivated or uninstalled before you reinstall Windows. Scour the Taskbar and Taskbar Notification area, as well as the Start menu, for any apps that you may have forgotten about.

Also consider your drivers. Driver backup tools are available, but a neater solution is to source your own core drivers now, if required. Most drivers can be reinstalled after Windows – many even come as part of Windows itself – but it's important that you check whether specific drivers are covered. These include your display drivers – particularly for older AMD cards – as well as network drivers, enabling you to get back online.

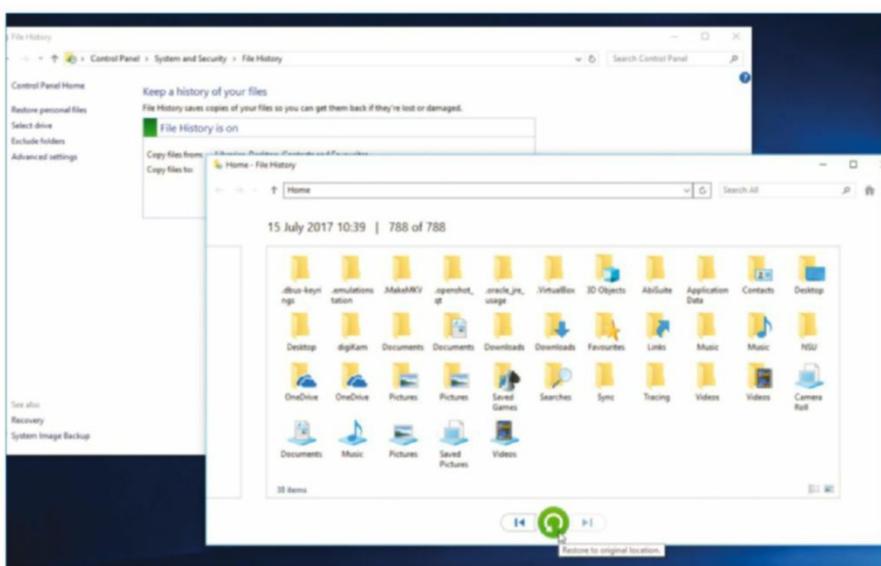
If Windows was pre-installed on your PC, don't assume your drivers are guaranteed to come back when you reinstall. Instead, visit your PC manufacturer's website now to source drivers for the version of Windows that you plan to install. You should find most here – if your PC is self-built, the motherboard manufacturer's website is a rich source of drivers, too.

If you can't find supported drivers for your version of Windows, drivers for an older version – such as Windows 7 for Windows 10 – may still work if required, so long as they're the same system type (either 32-bit or 64-bit) as your version of Windows.

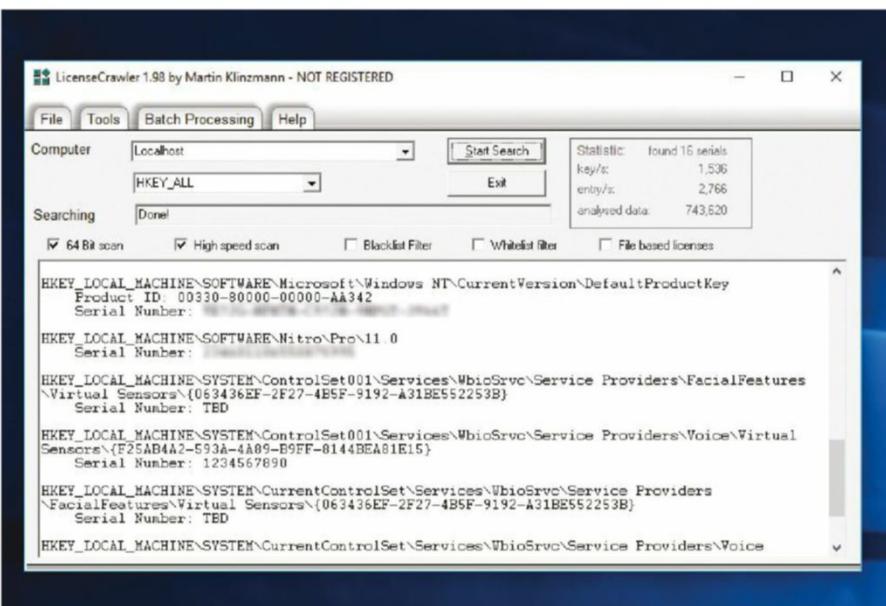
Finally, if you open Device Manager (type 'devmgmt.msc' into the Run dialog), you can see what drivers are installed for your hardware – double-click an item and switch to the Driver tab. If the Digital Signer states 'Microsoft Windows Hardware Compatibility Publisher', it's likely that the driver will be installed along with Windows; if the provider is Microsoft, then it's a given.

### BUILD YOUR REINSTALL MEDIA

Time to reinstall, right? Wrong. You may already have a Windows install CD – particularly if you're rolling back to an earlier version



**Don't forget to restore your file backup post-reinstall.**



**Make sure you note down your product keys and licenses.**

of Windows – but it may not be the latest version. Why force yourself to install more Windows Updates than necessary – the Fall Creators Update for Windows 10, or Service Pack 1 for Windows 7, for example – when you can download and create the latest version of your Windows install media, which comes with these updates pre-installed? Not only do you save yourself time, but you also ensure that your install is as clean as possible.

You need one of two things for your install media: either a blank DVD – or possibly two – or a large enough USB flash drive (typically 8GB or larger). The latter is preferable, because installing from this is much quicker than via DVD, but check that your PC can boot from USB drives before proceeding – any PC worth its salt from the last decade

should be able to, but check with your PC's manufacturer before proceeding.

If you would like to craft the ultimate reinstall disc – complete with more slipstreamed updates and Windows configured just so – check out the box on NTLite (see page 15).

Windows 7 users who want to create reinstall media with Service Pack 1 slipstreamed into it should head to [www.microsoft.com/software-download/windows7](http://www.microsoft.com/software-download/windows7) – you need to provide your Windows product key, and you're pointed toward one of two ISO downloads for 32-bit and 64-bit. Unless your PC is incredibly old, 64-bit is the preferred choice. It enables you to use more than 4GB of RAM, and offers better performance.

One key consideration may be older hardware – check that you can source

64-bit drivers, or you may have to replace the hardware or stick with the 32-bit version instead.

Once you've downloaded the ISO file, grab the Windows USB/DVD Download Tool from <https://wudt.codeplex.com> – this enables you to create your Windows 7 install media from the ISO file.

Things are simpler if you want to reinstall Windows 8.1 (go to [www.microsoft.com/software-download/windows8](http://www.microsoft.com/software-download/windows8)) or Windows 10 ([www.microsoft.com/software-download/windows10](http://www.microsoft.com/software-download/windows10)). Both versions of the Media Creation Tool enable you to download the latest version of the installer files – the Fall Creators Update, for example – and burn a DVD or create a bootable USB flash drive.

### TIME TO REINSTALL

Now it's finally time to ditch your underperforming, glitchy Windows for a brand new install. You're all backed up, your data has been moved to a new partition or drive, and you've sourced any key drivers you might need.

First, insert the install media and restart your PC. If it's set to look for a bootable DVD or USB drive, you'll see a message inviting you to press any key to boot from a CD or DVD – press it and jump to the next paragraph. If not, look for a message inviting you to enter the boot menu. When the menu appears, select your DVD drive or USB flash drive from the list, and press [Enter] on your keyboard; if two entries exist, try the one marked UEFI first.

If you're using Windows 8 or Windows 10, you may find no options appear on startup – this is down to

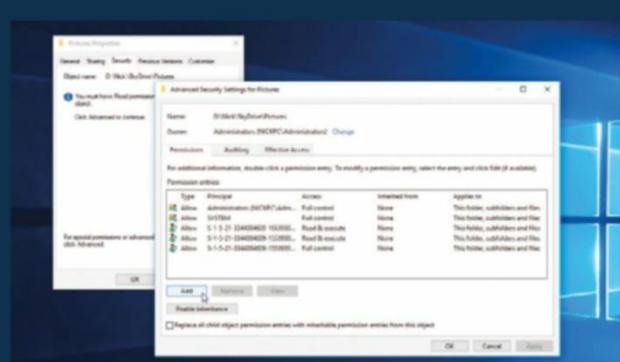
## Fix permissions

When you hive off your data to a separate partition or drive, you may have issues accessing your user folders after reinstalling Windows. That's because they're 'owned' by your current user account, and when you reinstall Windows, you'll end up creating a new user account, even if it's identical to your old one.

In most cases, when you first try to access one of these folders – when you point Windows toward them, say – you're told access is denied, but are prompted to click Continue to gain permanent access. This usually resolves the issue, adding your current user account to the list of users who

have been permitted access. If this fails, you need to manually take control of the folder. Right-click it, and choose Properties, then the Security tab. If there aren't any read permissions, click Advanced, followed by Continue. Next, click Add, followed by 'Select a principal', before clicking Advanced > Find Now.

You have a choice – if you share your PC with others, select your username; if you're the only user, you could select 'Everyone', which saves the hassle of having to repeat this process every time you reinstall Windows, although if it's a laptop, ask yourself if you want the data accessible to anyone



who might steal it. Click 'OK' twice, and you should now be able to assign basic permissions – choose Full Control if you were the previous owner of the folder. Click 'OK', select 'Replace all child objects', and click Apply > OK. Click 'OK' twice, and you should now have access. If

you're feeling zealous, right-click the folder again, and choose Properties, then the Security tab. Click 'Edit', then select each 'Account unknown' entry – a reference to earlier Windows installations – and click Remove followed by OK to get rid of them all.

your PC's ultra-fast boot setting. If this is the case, boot back into Windows, then navigate to Settings > 'Update & Security > Recovery, and click 'Restart now'. When the 'Advanced start-up' menu appears, click 'Use a Device' to select your boot device.

If you're downgrading from Windows 8.1 or 10 to Windows 7, you need to tweak some UEFI settings – from the 'Advanced start-up' menu, choose Troubleshoot > 'Advanced options' > UEFI Firmware Settings. Now look for the Fast Boot and Secure Boot settings, disabling both. If there's a CSM (Compatibility Support Module) setting, make sure it's enabled. Once done, save your settings and exit, then start the reinstall process.

## INSTALLATION STEP-BY-STEP

The install process is practically identical across Windows 7, 8.1, and 10. When the Windows Setup wizard starts, verify

that the language, time, and currency, and keyboard are all set to your chosen language. Click 'Next', followed by Install Now. If you're using Windows 8.1 or Windows 10, you'll be prompted for your product key. If you're using Windows 10 you can skip this step if you've upgraded to Windows 10 from Windows 7 or 8.1, because your license is digital and is tied to your computer; Windows will activate automatically after the install has completed.

If prompted to choose a Windows edition, select the one you're currently running – typically Home. Click 'Next', agree to the license agreement, and then click Next again. Now select 'Custom: Install Windows only (advanced)' by clicking it.

A list of available drives appears – your current Windows partition should be selected by default, but check that the size, type (Primary), and free space match what you expect. Click 'Format' to wipe the drive, then click OK to confirm the warning. With the drive selected, click Next.

There are two distinct phases to the installation process. First, files are copied and prepared for installation. Then Windows starts installing features and updates. It then informs you that it needs to restart – this should happen automatically, or you can click Restart Now to do so manually.

If prompted to boot from CD or DVD, don't press anything. You'll see the Windows logo appear, then a series of messages pop up about 'preparing devices' and 'getting ready'. Windows may restart several times.

## SET UP WINDOWS

This stage of the process is simple enough if you're using Windows 7: Simply enter your product key when prompted, and

follow the prompts to set up a user account, and get going. The same is true for Windows 8.1, although its Express Settings option isn't as pervasive as Windows 10's.

Windows 10 first asks you about your location and keyboard, sorts out your network connection (including any Wi-Fi configuration), then asks you whether you're setting up for personal use or for an organisation. Personal is the choice for most. You're then prompted to sign in with your Microsoft account – if you want to stick with an old-school local user account for now, click 'Offline account', followed by 'Maybe later'.

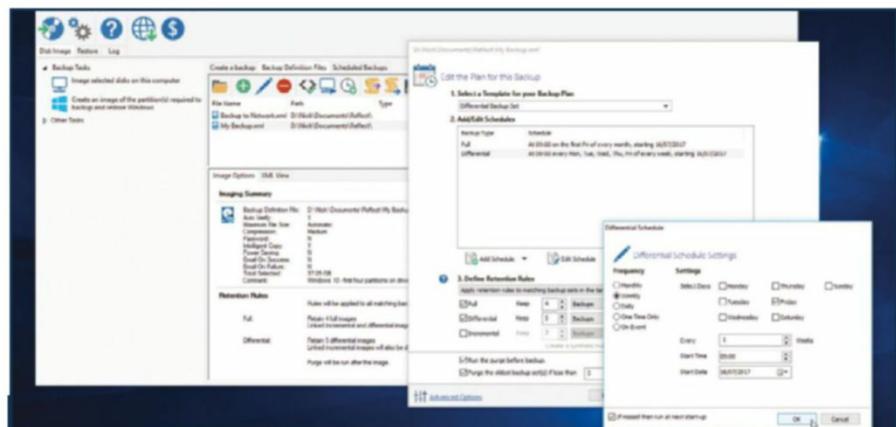
If signing into your Microsoft account, you go through the usual procedure, including any additional verification or authentication you may have set up. You're prompted to set up a PIN, then asked to set up Cortana. This is the point where your privacy comes into play, so review all the options carefully, flicking the slider to Off for any you don't need or use.

That's the end of the setup process – Windows now configures itself based on your choices, and you'll see a series of messages appear on the screen. Eventually – when all is ready – you'll find yourself back at the familiar Windows 10 desktop.

## POST-INSTALL SETUP

Now that the Windows desktop is back, you should notice things are much quicker. They won't remain this fast, though – not once you've reinstalled your core apps and settings – but you'll still end up with a much quicker computer than before once you're done.

Let's start by bringing your Windows install fully up to date. Windows Update should already be operating in the background, but you can move



## Set up snapshots

The Windows drive-imaging tool is fine for occasional image-based backups, but if you want to regularly back up your entire Windows installation without running out of drive space – handy if you want to test software, then roll things back without making permanent changes to your system, for example – you need a tool that offers differential backup images, such as Macrium Reflect Free ([www.macrium.com/reflectfree.aspx](http://www.macrium.com/reflectfree.aspx)). Differential images only record the changes made since the last backup was taken, reducing their file size dramatically.

Once you've installed Macrium Reflect Free (create the rescue media when prompted, in case of

disaster), click 'Create an image of the partition(s) required to back up and restore Windows'. Select a suitable location on your backup drive, then click Next. Click the Template drop-down menu, and choose Differential Backup Set to create a schedule that makes a monthly full drive image, then daily differential images – select Differential, then Edit Schedule to change this (to a weekly schedule, for example).

To stop you running out of spare drive space, tweak Macrium Reflect Free's Define Retention Rules by weeks, days, or number of backups. Click 'Next' to review your settings – click Advanced Options > Auto

Verify Image, and check the box to automatically verify your drive image after it's created. Click 'OK', followed by Finish. You need to enter your account password to enable scheduled backups, and Macrium is set up to back up automatically going forward, but you need to create your first backup: Switch to the Backup Definition Files tab, select your backup definition file, and click Run, choosing Full from the drop-down menu.

If you're diligent, create another backup job from here to periodically back up to an alternative location – a network drive, say – to provide an extra layer of redundancy for your Windows installation.

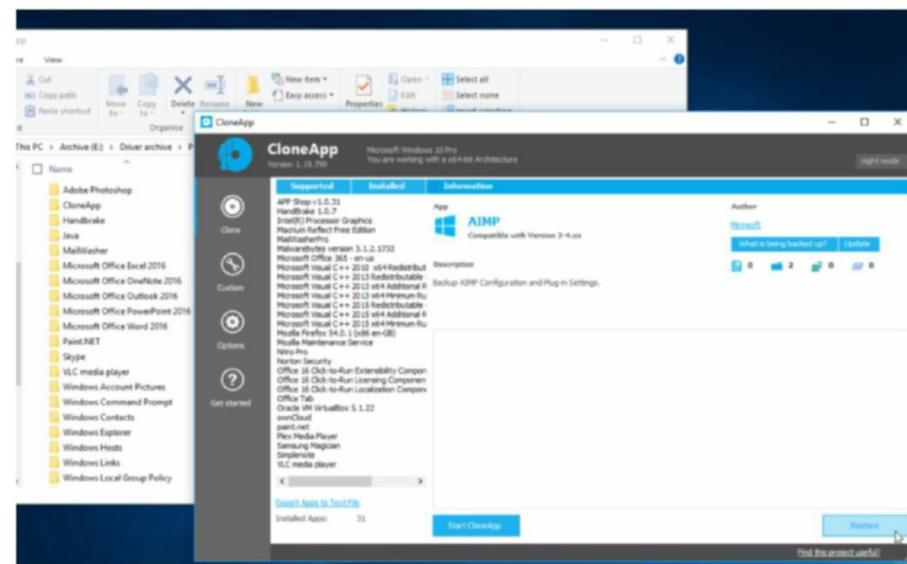
things along by opening it – via Settings > Update & Security if you’re using Windows 10 – and performing a manual scan. Let all updates install themselves, then reboot.

Now is a good time to reinstall any third-party security software you have, then it’s time to restore your personal data – or link it back into Windows if you’ve moved it to another partition or drive. If you’ve backed it up previously, you need to open File History or Backup and Restore, and choose the Restore option. Locate your backup, and choose the option to restore it to its original location.

If you’ve partitioned your main drive and hived off your data folders to another drive, open your user folder, and repeat the process for pointing your user folders to their new locations (again, choose Yes when prompted to move any existing data – this doesn’t affect your data). If you run into permissions issues, see the ‘Fix Permissions’ box on page 17.

Next, go through Settings and the Control Panel, setting things up as you remember. For example, type ‘sysdm.cpl’ into the Run dialog box to set up your Workgroup, rename your PC, switch System Restore on – Windows 10 now disables it by default – and make various other system tweaks. If you have any Windows tweaking apps, such as the Ultimate Windows Tweaker from The Windows Club ([www.thewindowsclub.com/?p=106674](http://www.thewindowsclub.com/?p=106674)) – which, among other things, enables you to use Windows Photo Viewer as your default image viewing app – now’s the time to run them.

One final step if you’re running Windows 10: Download and run the portable O&O ShutUp10 tool from [www.oo-software.com/en/shutup10](http://www.oo-software.com/en/shutup10) to tighten Windows’ privacy controls.



**CloneApp restores all backed-up settings with a click.**

### RESTORE PROGRAMS

Now might be a good time to take your first post-Windows install drive image – a nice clean image that you can roll back to if your next round of post-setup actions goes awry. See the ‘Set up snapshots’ box on the facing page for an alternative to Windows’ own Backup and Restore tool.

Once that’s done, start reinstalling all your core apps, making sure you run them to reactivate or register any license keys. Once done, run CloneApp from your backup drive. If you click Restore, every single setting you’ve backed up is restored; if this doesn’t appeal, open the CloneApp\Backup folder, and move out any program folders to exclude them from the process. If prompted to overwrite files

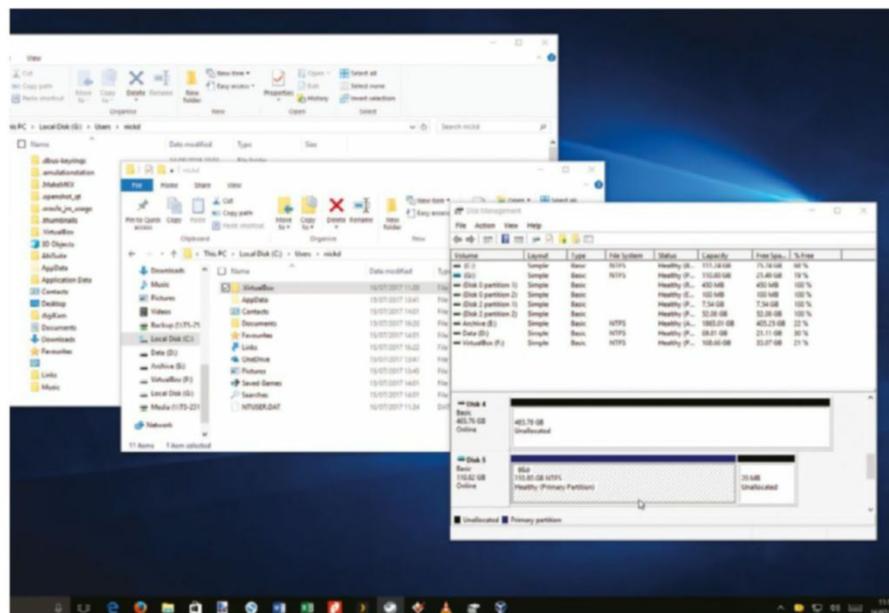
when restoring, choose Yes to replace new files with your backed-up versions. If all goes well, you should find – when you next open your programs – that they’ve got your old settings intact.

If you find you’ve forgotten to back up a file or program setting, what then? This is where your fail-safe drive image comes into play. Step one is to mount the drive image as a virtual drive in Windows. Type ‘diskmgmt.msc’ into the Run dialog, and choose Action > Attach VHD. Click ‘Browse’, and go to ‘WindowsImageBackup\<Computer Name>\Date’ on your backup drive, where you’ll find several VHDX files. Select the largest one, and click Open > OK. The partition is highlighted, so right-click it, and choose ‘Change Drive Letter and Paths’. Click ‘Add’ to allocate it a drive letter, and you can browse its contents in File Explorer, enabling you to copy off any files that you need.

If you need to locate and extract Registry settings from your old installation, open the Registry Editor, and select ‘HKEY\_LOCAL\_MACHINE’ from the list. Then choose File > Load Hive. You can then browse to the drive you’ve just mounted, and load the following files from the locations listed, depending on which Registry hive you need (typically HKEY\_CURRENT\_USER or HKEY\_LOCAL\_MACHINE\SOFTWARE).

**HKEY\_LOCAL\_MACHINE\SAM:**  
**Windows\system32\config\SAM**  
**HKEY\_LOCAL\_MACHINE\SYSTEM:**  
**Windows\system32\config\SYSTEM**  
**HKEY\_LOCAL\_MACHINE\SOFTWARE:**  
**Windows\system32\config\SOFTWARE**  
**HKEY\_USERS\Default:**  
**Windows\system32\config\DEFAULT**  
**HKEY\_CURRENT\_USER:**  
**%userprofile%\ntuser.dat**

Browse these keys for missing data, export it to your main drive as .REG files, and then reimport them to Windows’ Registry. ■



**Mount your fail-safe backup to recover forgotten settings or data.**

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# LIFE...WHERE'S THE PAUSE BUTTON?

With so many demands from work, home and family, there never seem to be enough hours in the day for you. Why not press pause once in a while, curl up with your favourite magazine and put a little oasis of 'you' in your day.



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# Explore

► WINDOWS TIPS ► INTERNET ADVICE ► EXCITING NEW PROJECTS

## Welcome



This month's Explore section is filled with great ideas to help you do more with your PC – from creating a fun animated GIF that you can share on social media (page 24) to enjoying YouTube videos even when you're offline (page 48).

We'll also show you how to make your Google and other online accounts more secure (page 27); protect your privacy online using a VPN (page 39) and how to create strong, secure passwords (page 46). We also show you how to create an emergency toolkit on a USB flash drive (page 44).

### Rob Mead-Green

#### Editor

rob.mead-green@futurenet.com

## Full listing...

**24** Create an animated GIF

**27** Secure your Google account

**30** Mirror your desktop on a TV with Google Chromecast

**32** Make an eye-catching image by blurring the edges of a photograph

**36** Enjoy music on your PC with the brilliant Winyl media player

**39** Protect your privacy online using the IPVanish VPN

**42** Pair your PC with a set of Bluetooth headphones

**44** Create a PC recovery toolkit

**46** Improve online password security with LastPass

**48** Download YouTube videos



Your guide

Dan Grabham says...

"You can mirror your desktop on your TV easily with Google Chromecast"

Turn to page 30  
to find out more

## Our promise to you...

Get more from Windows, software and all your favourite sites

### Packed with informative tutorials

Every issue, we guarantee to pack the magazine with great tutorials teaching you all the best things you can do with your PC. Each article features step-by-step instructions to make learning new skills fast and enjoyable.

### Customise Windows to work your way

We all know how to do the basics but getting the most from Windows isn't always easy. Our dedication to the operating system means you get the very best tips and tricks for all versions of Windows.

### Get more from your favourite websites

We all have our list of favourite sites but often we miss out on great features because they're difficult to use or hidden from sight. We'll show you how to do more online, for a more satisfying web life.

### Discover new programs with our help

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...

# Create a GIF from any video



Your guide *Cat Ellis* says...

"In this tutorial we'll show you how to turn any video into a fun animation you can share online"

## At a glance

### Skill level...

► Anyone can do it

Straightforward

Tricky in parts

### Suitable for...

Windows 10

Windows 8.1

Windows 7

**T**hey say a picture is worth a thousand words, but an animated **GIF** is worth a million. Despite the rise of **HTML5** video, these little animations are still hugely popular – partly because of their relatively small file size, which is friendly to mobile devices on limited data plans, and also because the format is so widely supported.

Sites such as Giphy (<https://giphy.com>) are a great source of ready-made animations, but sometimes you can only express yourself by creating your own – and with the right tools, it's surprisingly easy to do.

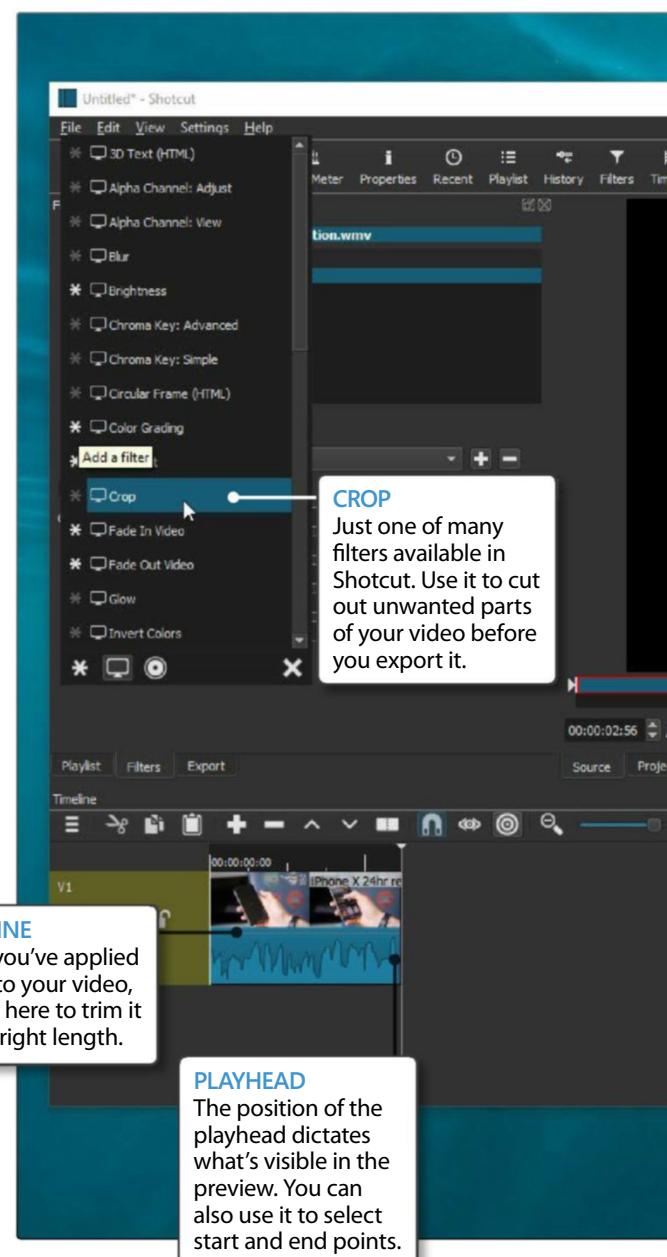
If you already have a video file, skip straight to Step 5 to find out how to edit and convert it. Alternatively, you can grab and convert a video from YouTube, as explained in Step 1, or make a recording from your desktop, as described in Step 3. This is a great way to make a GIF from a game or movie playing on your PC.

## Step-by-step Convert a video to GIF format



### 1 Find a video online

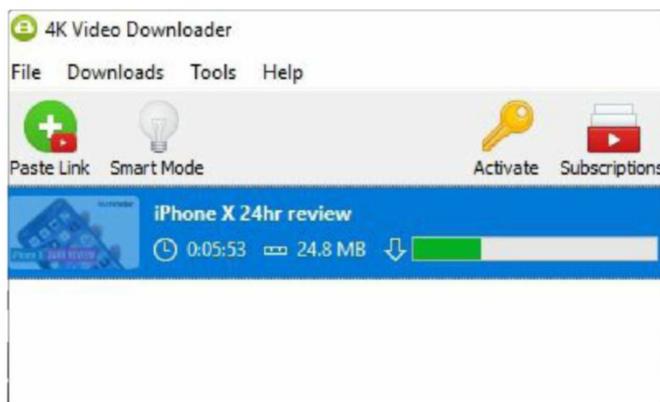
If you have the copyright holder's permission, or you uploaded it yourself, you can download a video from the web to turn into a GIF. Download and install 4K Video Downloader ([www.4kdownload.com](http://www.4kdownload.com)), then find the video you want online and copy its address from your web browser. Open 4K Video Downloader and click the green 'Paste link' button.



**CROP**  
Just one of many filters available in Shotcut. Use it to cut out unwanted parts of your video before you export it.

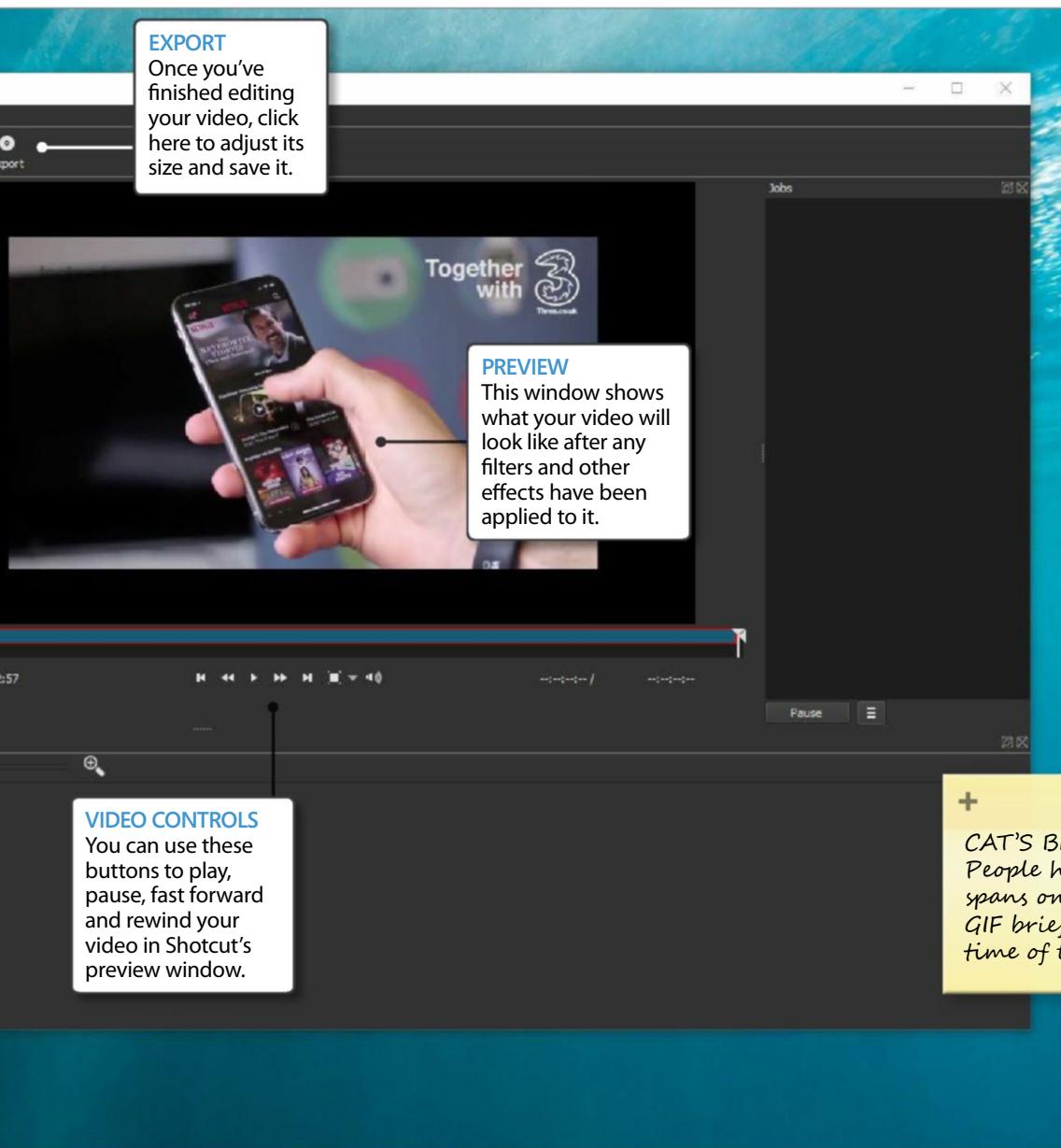
**TIMELINE**  
Once you've applied filters to your video, drag it here to trim it to the right length.

**PLAYHEAD**  
The position of the playhead dictates what's visible in the preview. You can also use it to select start and end points.



### 2 Save it to your PC

You'll now be prompted to choose a quality option. Part of the appeal of animated GIFs is their small size, so the 'High quality 480p' option is fine. Leave the format as MP4, choose a location for the saved file – we recommend either your desktop or your Videos directory – and click Download. You'll see a green progress bar; once this is full, your video is ready.

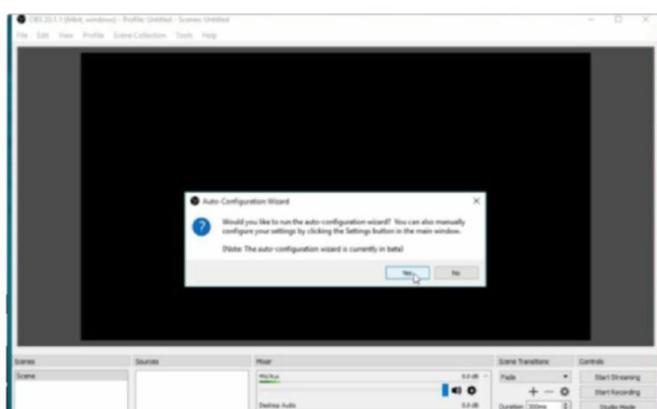


### Jargon buster!

► **GIF**  
Graphics Interchange Format – an image file type that supports animation and transparency.

► **HTML5**  
A programming language used for structuring online content, including video. It's supported by every modern web browser.

► **Codec**  
A small program for encoding data, including videos.

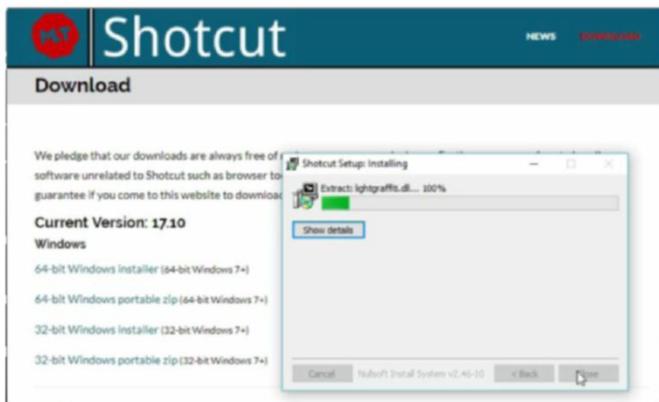


### 3 Capture a video from your screen

If you want to make a GIF from a game or other software, you need free screen recorder OBS Studio. It might look intimidating at first, but it's remarkably easy to use. Download it from <https://obsproject.com/download> and run the installer. You don't need the plugins, so feel free to uncheck them. When it's done, launch the software and skip the optimisation wizard.

### 4 Start and stop recording

Click the '+' icon under Sources and select 'Display capture' from the drop-down menu. Click the 'Start recording' button on the right, then minimize OBS Studio and do whatever you want to record. When you've finished, maximise the recorder and click 'Stop recording'. The captured footage will be saved automatically in FLV format, and stored in your Videos directory.



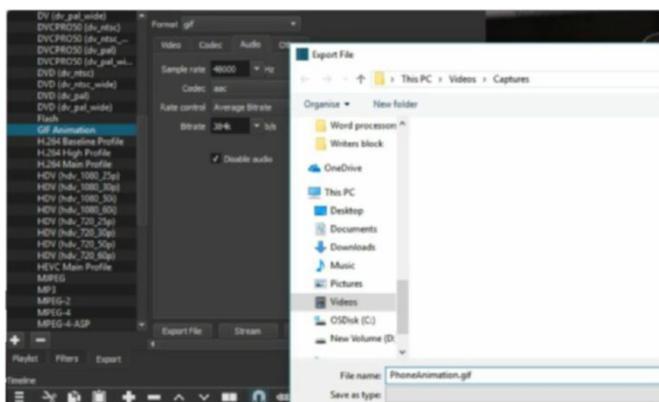
## 5 Download Shotcut

Whether you've downloaded a video, recorded your own, or found one somewhere else, Shotcut is the best tool for converting it to GIF format. It's totally free, doesn't add watermarks to your videos, and is packed with lots of handy tools and filters to make your GIFs look great. Download it from [www.shotcut.org](http://www.shotcut.org) and run the installer. When it's done, click Close and launch the program.



## 7 Keep it brief

Drag the video preview into the timeline at the bottom of the screen. Try to make your GIF ten seconds long or less. Drag the vertical white bar (the playhead) along the waveform until you find the point where you want your GIF to start and click 'Split at playhead'. Select the section of video you want to remove and tap [Delete]. Now do the same for the end of the video.



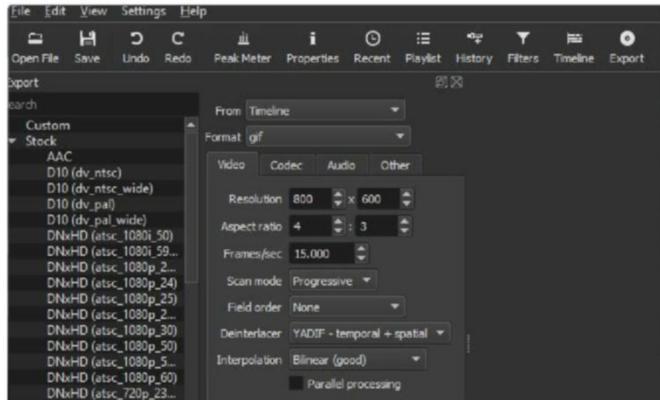
## 9 Save your GIF

GIF format doesn't support sound, so click Audio and select 'Disable audio'. Reduce the frame rate to approximately 15fps, click 'Export file', give it a name ending in the extension .gif and click Save. A status bar on the right will show you when it's finished processing. Congratulations, you've turned a video into an animated GIF, ready to share wherever you like.



## 6 Crop your video

Click 'Open file' and load your chosen video. GIFs work best if they're tightly cropped to focus on the most important part of the action. If your video needs cropping, click Filters, then click the '+' icon to add a new filter. Click the small monitor icon to see video filters, then click Crop. Now use the sliders to adjust how much is cut off the top, bottom and sides of the video.



## 8 Prepare to export

When you've trimmed your video down to a few seconds, click Export and select GIF as the format. Now take a look at the resolution. The ideal size of the GIF will depend on where you're planning to use it, but a resolution of 800x600 should be fine for most purposes. Click the Codec tab and change the codec to GIF – you'll need to scroll down a little to find it.



## 10 Get the size right

Want to share your GIF on a certain site, but not sure about the best size? Sprout Social has a handy guide at <http://bit.ly/2AtqVL4/> that shows you the optimum image dimensions for all the most popular social networks, including Twitter, Facebook and Pinterest. It's a very useful reference that will help ensure your GIFs look as good as possible when you publish them. ■

*Learn how to...*

# Secure your Google account

Find out how to perform a security audit and use simple tips and techniques to keep your personal data safe and secure online

**A**lmost every other day brings news of another online security hack. The vulnerability of our personal data has never been more apparent, but there's no reason to sit there feeling helpless or to retreat from the Internet completely. Armed with the right tips and techniques, you can tighten your

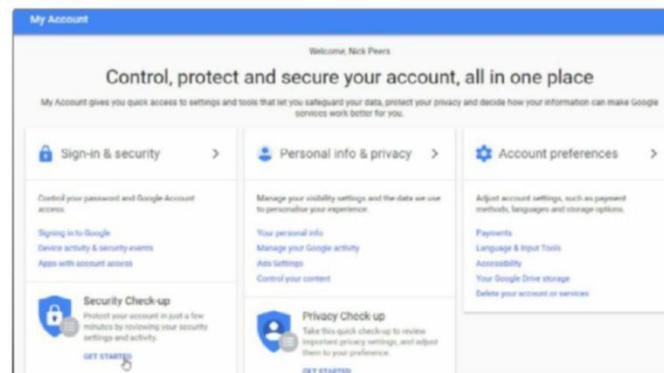
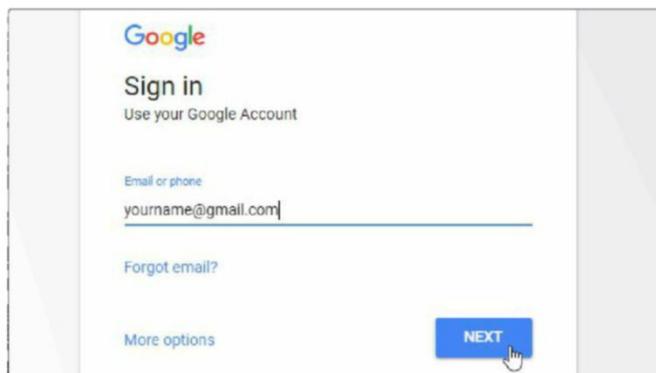
online security to make it much harder for hackers to gain access to your online accounts or personal information.

In this tutorial we're focusing on your Google account, but many of the steps will work with your other online accounts too. Most of us have connected to Google at some point, whether it's to collect email in

Gmail, sync web browser settings in Chrome, purchase books, media or apps on Google Play or back up data to the cloud using Google Drive.

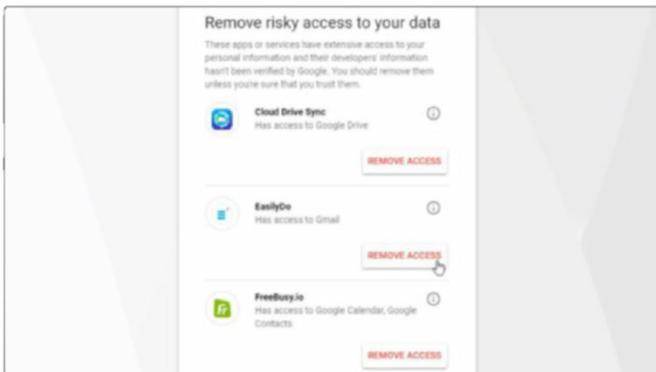
Read on to discover how to perform a much-needed security audit and to tighten protection, such as using strong passwords and [two-step verification](#).

## Step-by-step How to audit and secure your Google account



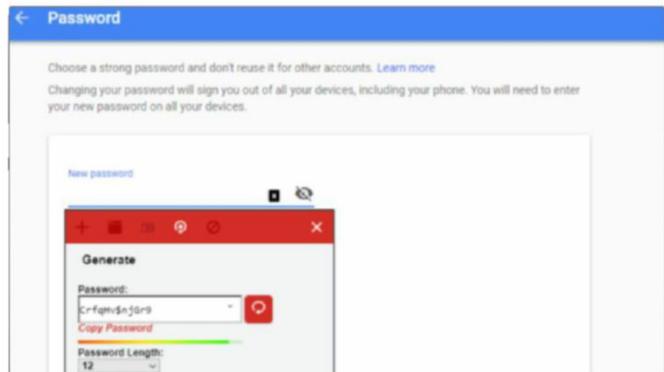
### 1 Log into your account

After performing manual scans with your security software, open your web browser and head over to <https://account.google.com> to log into your Google account. If you get a cookie mismatch error, open your browser's privacy and security settings and add 'google.com' to the list of allowed exceptions, then try again. Enter your username and password to log on.



### 2 Perform a security audit

You'll see your account settings are split into three sections – let's start with 'Sign-in & security'. Scroll down the page and click Get Started under Security Check-up. You'll be given an instant security rating, with potential issues split into four categories. Start at the top by clicking Third-Party Access to see which apps and services have unverified access to your account.

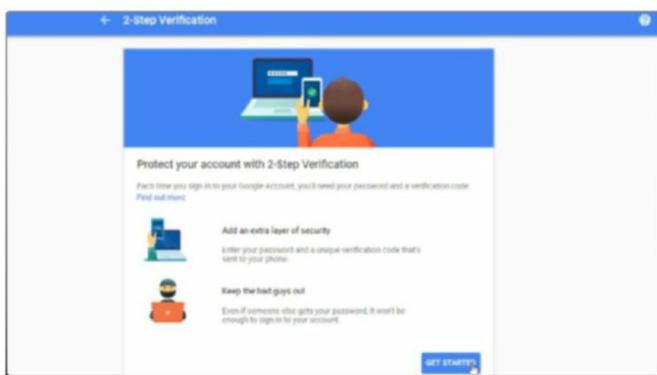


### 3 Review and revoke

Work through the sections using the annotation as a guide. It's all self-explanatory – potential security issues, such as risky apps are listed first, but don't forget to check everything within each section (click 'Show others' under Third-Party Access, for example). Revoke access where applicable, or click 'Don't recognise an event?' to change your password.

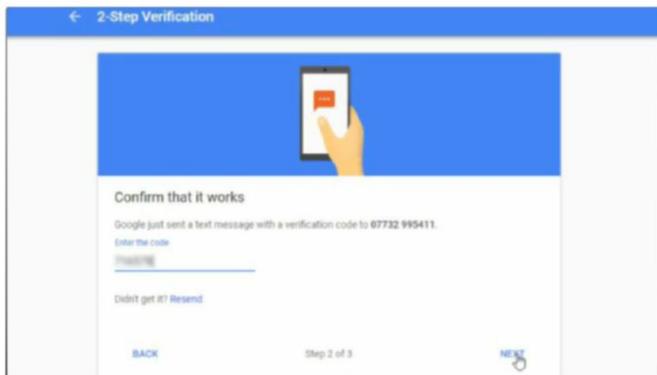
### 4 Change your password

When you've completed your audit, click 'Continue to my account'. From the main screen, click 'Signing into Google'. You'll see your password listed along with the date it was last changed. Click '...' to update it. Enter your existing password, then change it for something stronger – if you have a password manager use that to generate and store a strong, random password.



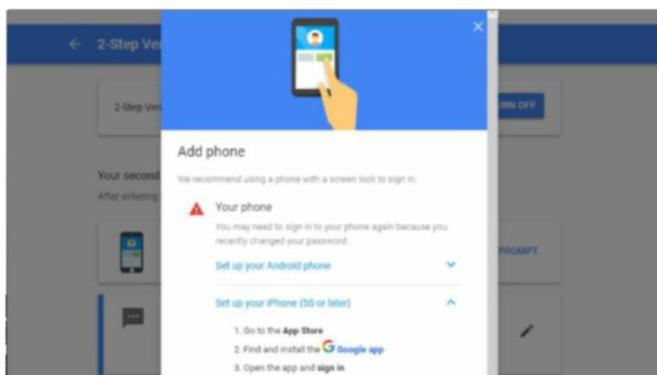
## 5 Switch on two-step verification

Two-step verification ensures you need a verification code along with your account password to sign into Google. It protects your account in case your password is compromised, and the code changes regularly for additional protection. The code can be delivered to your mobile phone. Click '>' next to 2-Step Verification, followed by Get Started to start the process.



## 6 Basic setup

Enter your password, then, if you've not already linked one, pick a phone number as well as a delivery message: text is best for mobile; phone call for landline. Click 'Next'. A code will be texted or phoned through. Enter this and click Next followed by Turn On. You may have to get the message re-sent one or two times before it comes through – let's choose a more convenient method.



## 7 Select your two-step method

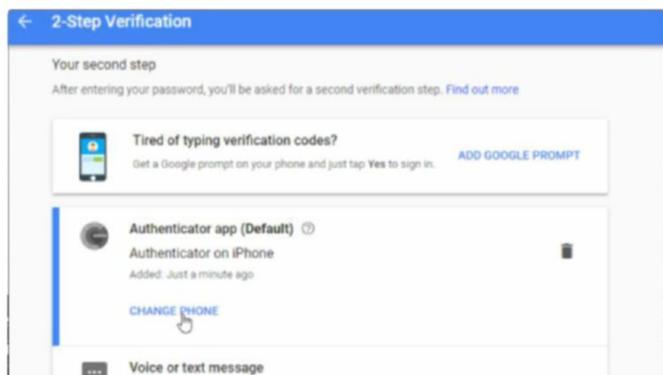
The most viable alternative is Google Prompt, which pops up on your phone when required – all you'll have to do is tap Yes to complete the sign-in process. Click 'Add Google Prompt' followed by Get Started. This involves downloading, installing and signing into the Google app on your smartphone. Follow the prompts, sign into the app and then click 'Click here to try again'.

**SUMMARY**  
The number of potential issues will be displayed here. These details can be reviewed by clicking each header in turn.

**THIRD-PARTY**  
Reveals which apps and services have been connected to your account. 'Risky' refers to apps not verified by Google.

**YOUR DEVICES**  
Lists all mobiles and computers that have signed into your Google account.

**SECURITY ACTIVITY**  
Lists recent events, from password changes to services, websites or apps connected to your Google account.



## 8 Use an Authenticator app

If you have Google Authenticator or LastPass Authenticator on your phone, select the Authenticator option – which works when you're offline too. Select your phone type, then open your app and use its camera to scan in the barcode or click 'Can't scan it?' to manually enter a 40-digit alphanumeric code. Enter the code generated in the app to verify the connection.

**Security Check-up**

11 issues found

- Security access issues
- Services your account from your rk30sdk
- Security activity events
- Recovery ion methods
- SIGN-IN & RECOVERY**  
Review the extra layers of security you've added to protect your account against hackers.
- Your devices
- INACTIVE DEVICES**  
Phones and tablets you no longer use. Disconnect your account here before discarding the device in question.
- Remove your account from your rk30sdk
- rk30sdk Inactive for 218 days
- You haven't used Google on your rk30sdk in 218 days. Sign out and remove your account from this device.
- 5 recently used devices
- NICK'S BEST TIP!**  
Make your password at least 12 characters long, using a mix of upper and lower case letters, numbers and symbols.

**Jargon buster!****► App password**

A special unique password that is generated for an individual app or service, which doesn't support two-step verification.

**► Authenticator app**

A special app that generates and delivers verification codes for use in two-step verification after being linked to your online account.

**► Two-step verification**

A form of logon that requires an extra step in addition to a password, typically a separate verification code that's delivered directly to the user's mobile device.

**At a glance****Skill level...**

Anyone can do it

**► Straightforward**

Tricky in parts

**Suitable for...**

Windows 10

Windows 8.1

Windows 7

### Sign-in & security

#### Signing in to Google

Control your password and account access, along with backup options if you get locked out of your account.

**Make sure that you choose a strong password**  
A strong password contains a mix of numbers, letters and symbols. It is hard to guess, does not resemble a real word, and is only used for this account.

**Password & sign-in method**  
Your password protects your account. You can also add a second layer of protection with 2-step Verification, which sends a single-use code to your phone for you to enter when you sign in. So even if someone manages to steal your password, it is not enough to get into your account.

Note: To change these settings, you will need to confirm your password.

Password	Last changed: 57 minutes ago
----------	------------------------------

### Microsoft Account

#### Security basics

Make your account more secure.

Changing your password	Update your security info	Review recent activity
Make your password stronger, or change it if you think someone else knows it.	Make sure that your info is up to date. This is how you'll prove that you're you, if you ever forget your password.	See when and where you've signed in, and let us know if something looks unusual.
<a href="#">CHANGE PASSWORD &gt;</a>	<a href="#">UPDATE INFO &gt;</a>	<a href="#">REVIEW ACTIVITY &gt;</a>

Finished with the basics? Explore [more security options](#) to help keep your account secure.

**9 Use app passwords**

Some apps don't support two-step verification – for these to work, you'll need to a unique **app password**: click '>' next to App passwords to set these up. Also review and – if necessary – update your account recovery options: email, phone and security question. Once done, select 'Your personal info' followed by 'About me' to review what information is publicly available.

**10 Stay secure**

Congratulations, your Google account is now more secure than it was, particularly with two-step verification enabled. We recommend performing this audit every six months – consider changing your password at least once every 12 months too. Now roll this security audit out to other online accounts you have – including your Microsoft account, which has similar options. ■

Learn how to...

# Mirror your desktop on a Chromecast



Your guide *Dan Graham* says...

"Google's affordable media streamer is the perfect tool for viewing content from your PC or phone on an HDMI-equipped TV or monitor. Here's how..."

## At a glance

### Skill level...

Anyone can do it

► Straightforward

Tricky in parts

### Suitable for...

Windows 10

Windows 8.1

Windows 7

**G**oogle's Chromecast – and its 4K-compatible Chromecast Ultra sister – are inexpensive streaming devices that make it quick and easy to send (or 'cast') content from your smartphone or PC to your TV – or any other display equipped with an HDMI socket – via your wireless home network.

Commonly used to stream content such as movies, online videos and photos, Chromecast can also be used to 'cast' your entire PC desktop, as well as individual browser tabs using the Google Chrome web browser.

In this tutorial, we'll explain exactly how to get Chromecast up and running; how to use Google Chrome to stream various kinds of media, your desktop, browser tabs and from services such as BBC iPlayer. We'll also show you how to tweak your Chrome settings to make sure everything works as seamlessly as possible. Let's get started, shall we?



**DAN'S BEST TIP!**  
If your Chromecast doesn't appear in your PC's device list, make sure that it's switched on and powered up.

## Step-by-step How to set up your PC with Chromecast



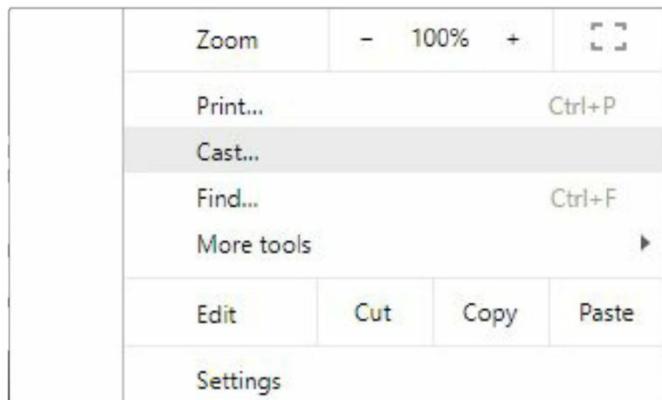
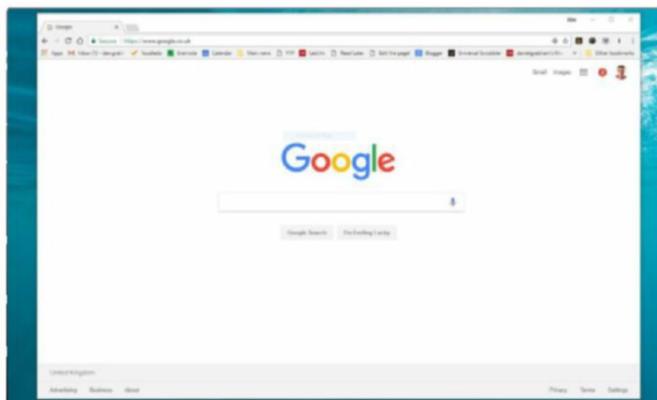
### 1 Download the app

Set up Chromecast using the Google Home app on your iOS or Android device. Google produces plenty of apps, but the Home app is one of the key ones – it enables you to set up other Google devices as well, such as Google Home. Once you've installed it, tap 'Add a device' to set up your Chromecast. The app will guide you through the entire setup process in just a few minutes.



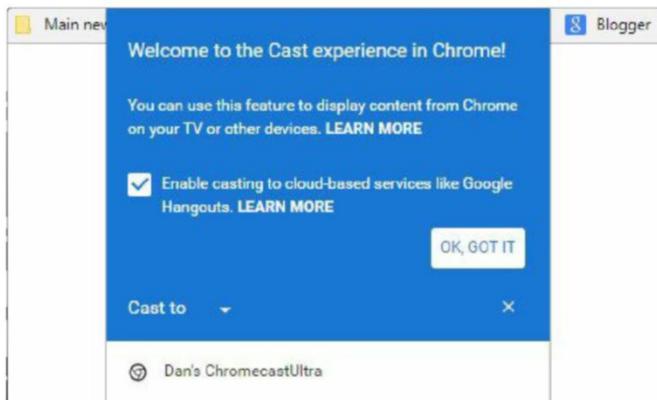
### 2 Set up Chromecast

This is pretty simple and involves two main steps: plugging a Chromecast into an HDMI port on your TV; and then connecting it to your Wi-Fi network. Updates may be downloaded during this process. You can connect to Chromecast from any phone or PC on your Wi-Fi network. This is key, because if your PC and Chromecast are connected to different networks, none of this will work.



### 3 Use Google Chrome

Once you're done, start the Chrome web browser on your PC. The Cast feature is now built into Google Chrome, so you no longer need the Google Cast extension that was necessary with the original Chromecast (if you happen to remember that). However, you do still have to use Google Chrome rather than another browser, such as Mozilla Firefox or Microsoft Edge.



### 4 Share the desktop

Click the Chrome menu button on the top right and choose Cast from the menu. When casting, click the arrow next to Cast to choose whether you want to share your browser tab or the entire desktop. If you want to cast your desktop, you can also choose if you also want to share your PC's audio and adjust the volume. Remember this will send all the audio on your PC!



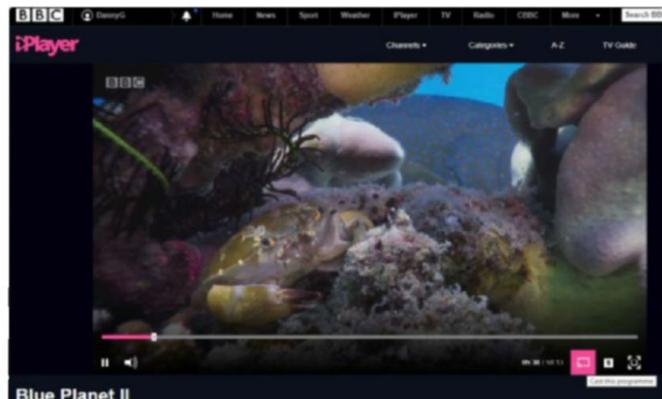
### 5 Enable cloud services

Your Chromecast is now up and running. The first time you open the Cast dialog box, you'll see an 'Enable casting to cloud-based services like Google Hangouts' option. Enable this since it lets you cast browser tabs directly to Google Hangouts and other services – it may help to avoid any issues when trying to use Cast with other services. Select 'OK, Got It' when you're done.



### 6 Chromecast settings

If there is more than one Chromecast or Google Home device connected to your home Wi-Fi network, they'll all appear in this list – even if you can only play audio to the device. If you need to rename or change settings for your Chromecast, right-click the Cast icon on the top-right then choose 'Manage Cast devices'. Click the Settings 'cog' on the page.



### 7 Cast a tab

To cast just a tab, right-click the current page and select 'Cast tab', then select your Chromecast when it appears at the top of the window. If you don't select a source manually, Chromecast will probably start casting the tab by default (although it doesn't always). Tab casting will stop if you close the tab, or you click Stop. Casting tabs can be useful for showing videos, photos and more.

### 8 Cast from video services

If you're on a site, such as BBC iPlayer or YouTube, in Chrome on your PC, you may see the Cast button – this is similar to how your Chromecast works with Android and iOS devices. Clicking the button will cast that programme or video directly to your TV. It can be a bit of overkill to do this for an hour-long programme, but for showing videos to an entire room it's brilliant. ■

Learn how to...

# Create an ethereal image



Your guide *Ian Evenden* says...

Discover how you can make an eye-catching image by blurring the edges of a photograph"

## At a glance

### Skill level...

► Anyone can do it

Straightforward

Tricky in parts

### Suitable for...

Windows 10

Windows 8.1

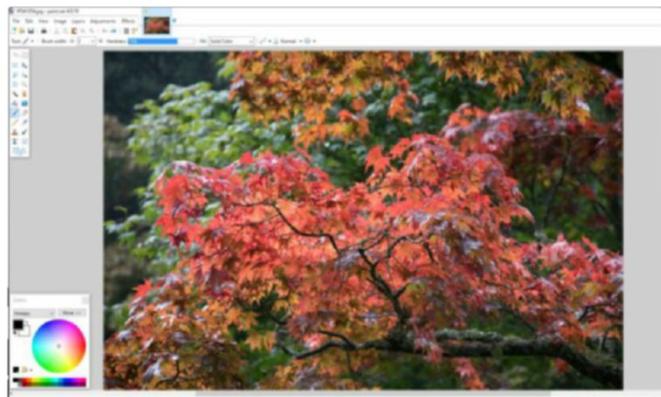
Windows 7

**P**hotographers, as a rule, like to take sharp images. At least where the subject of those images is concerned. Opening up your lens aperture, if you have such a control on your camera, can blur the background and make your subject stand out, but compact cameras and smartphones generally have sensors that are too small, and lenses that are too short, to create much of a depth-of-field effect.

This is where post-processing comes in. By using a Windows application, such as Paint.net, you can add blur to an image to create a feeling of otherworldliness, a romantic mood, or just to draw attention to your subject.

And it doesn't have to be the entire image that's blurred. Here, we're going to show you how to use Paint.net's layers, selections and filters to selectively blur parts of an image, leaving the rest sharp and untouched.

## Step-by-step Create a depth-of-field effect

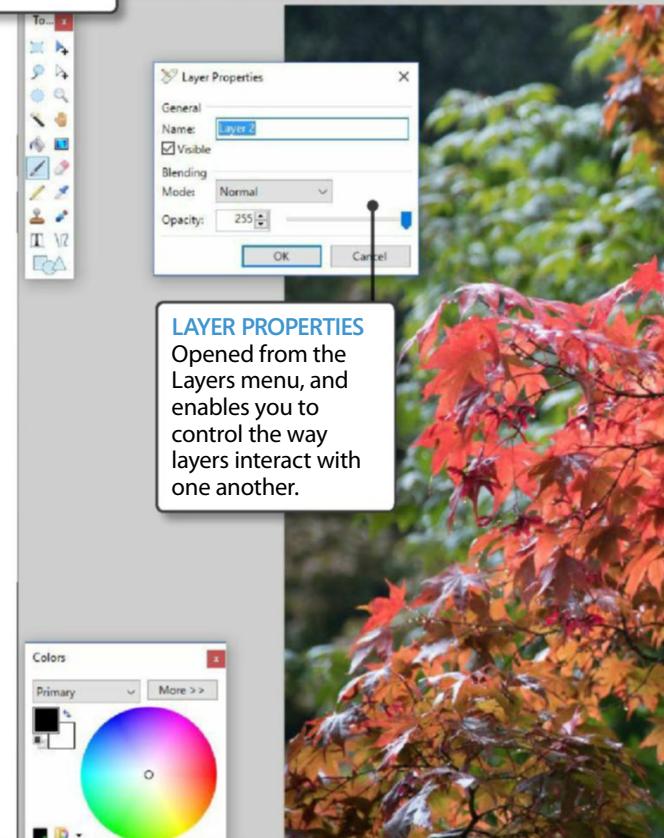


### 1 A suitable image

Not every photo is right for the blurring treatment. This one of some autumn leaves already has a slightly blurred background, but the foreground doesn't seem as separated from it as much as it could be. There's a lot of green in the image, which can be tinted another colour to warm the photo before blurring. Composition is important too, with the more central the subject the better.

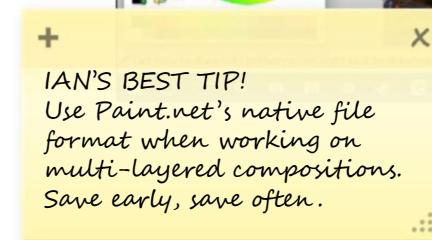
### EFFECTS

This is where you'll find the blur tools we're using here. There are plenty of other filters up there to explore, too.



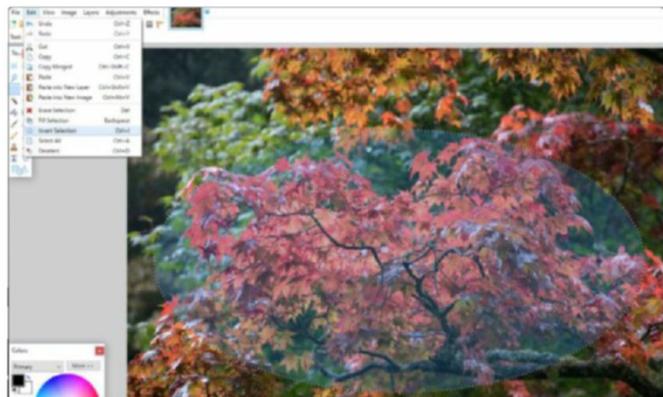
### LAYER PROPERTIES

Opened from the Layers menu, and enables you to control the way layers interact with one another.



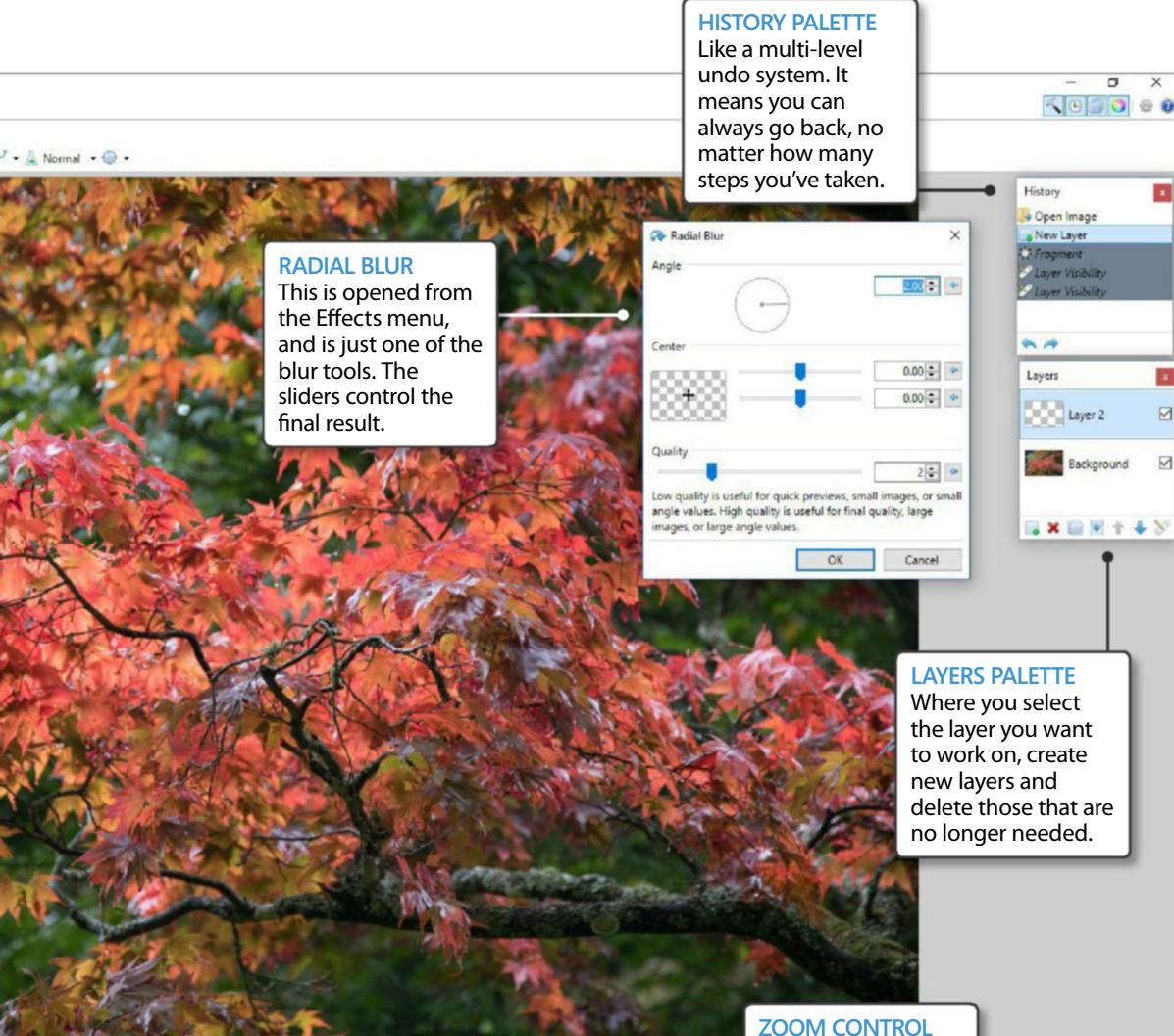
### IAN'S BEST TIP!

Use Paint.net's native file format when working on multi-layered compositions. Save early, save often.



### 2 Select and invert

Use the Ellipse Select tool to draw an oval selection around the subject of your photo, in our case the autumnal tree, trying to keep it fairly central in the frame. Once you're happy, go to Edit > Invert Selection. This will reverse your selection, so the central portion is now the only part not selected. This is a useful, time-saving trick for selecting any large area.



## Jargon buster!

### Vignette

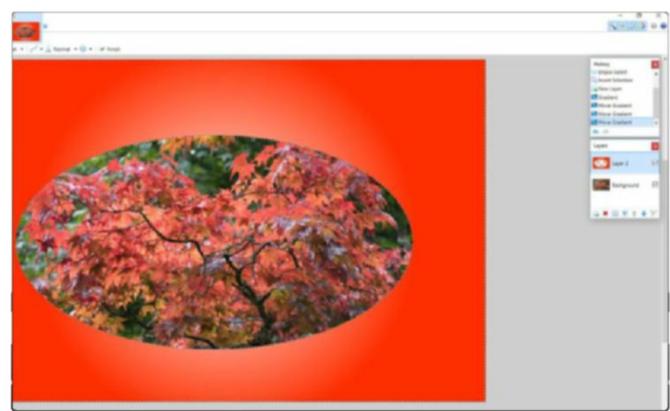
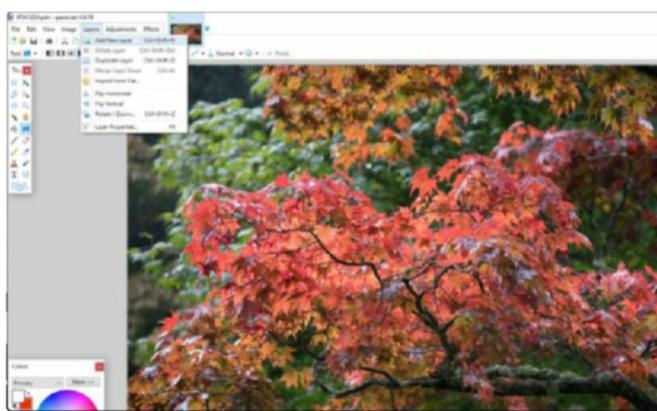
A vignette is the darkening of the corners of an image. It's another way to focus your attention on the centre – and can be very effective.

### Blend mode

How layers interact. Common ones include Multiply, which darkens the colours; Screen, which lightens them; and Dissolve, which randomly puts pixels from different layers next to one another.

### Gaussian

This function is a complex equation that expresses a normal statistical distribution. In an image editor, it's a strong blurring filter.

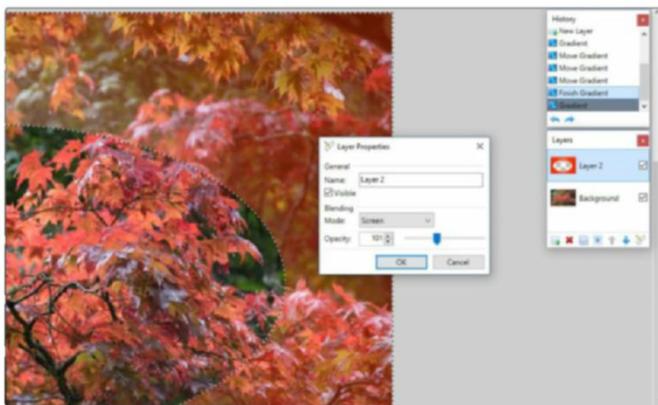


### 3 Coloured tint

Create a new layer using Layers > Add New Layer, and make sure it's on the top of the stack in the palette and selected. Choose a colour that complements your image from the Colors palette. Your chosen colour will become the foreground colour. For the background colour, expand the Colors palette with the More>> button and pick 'transparent'.

### 4 Gradient

With the Gradient tool selected, choose Radial from the options at the top, then click in the middle of the oval you made earlier. The edges of your image will become the foreground colour you selected, with no sign of the background. Bring this out by finding the tiny circle that appears by the side of the centre point of your gradient, and drag it to the edge of your canvas.



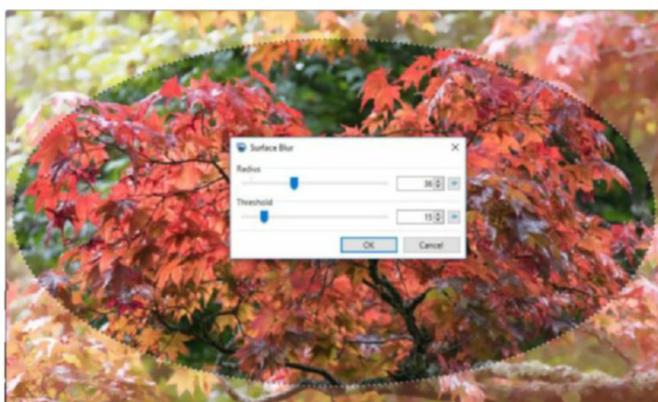
## 5 Blending

Go to Layers > Layer Properties. From here, you can set the layer's blend mode, or how it interacts with the layers below it. In Normal and at full opacity, the layer is opaque and blocks what's underneath. Change it to Screen, which lightens the colours as they blend, and bring the opacity down to around 100. You should see the layer below showing through your coloured area.



## 7 Start to blur

There are several blur filters under Effects > Blurs, and any of them can be useful depending on your source image and the final use you have in mind for your image. The first, Fragment, gives a particular look, and can catch you out because as much as you increase the Fragment Count slider, you won't see much change until you raise the Distance slider, when it bursts into life.



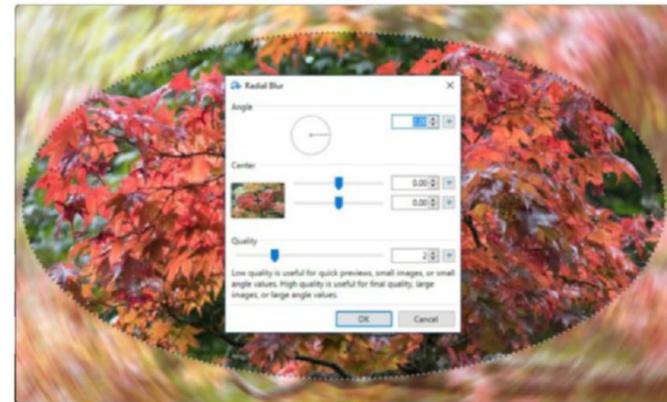
## 9 Even more blurs

Surface Blur is an interesting one, since it blurs away details while retaining the edges that make structures in your image recognisable. Its sliders are Radius, which determines how far the filter looks while averaging pixels; and Threshold, which controls how much detail is retained. This is another filter that will make your CPU fans spin up, especially when working on big files.



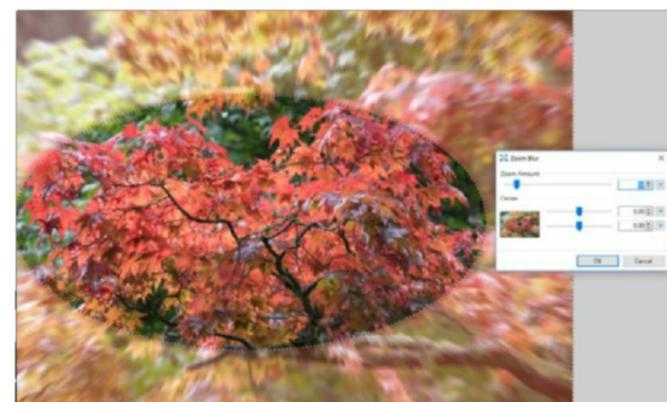
## 6 Glow

This step is optional. Select the lower layer in the stack, and keep the selection in place. Select Effects > Photo > Glow. Mess with the sliders until you have a result you're pleased with. Here, it brightens the background even more than it already had been by the blending mode change, and this suits our source image. There isn't another filter like Glow in Paint.net.



## 8 More blurs

**Gaussian** Blur is a simple blur filter with a multitude of uses, and makes the selected area very soft. Motion Blur makes your image look as if it's being pulled in the direction you choose; while Radial Blur makes it look as if your image is being twirled around, and can be controlled with a high degree of accuracy. They're both processor intensive, especially on large image files.



## 10 Still more blurs

Unfocus is similar to Gaussian Blur, but has a dreamier look. They both only have one slider: Radius. The final filter is Zoom Blur. Use this with Surface Blur to create your final look. Zoom Blur adds motion toward the centre of the image, and is ideal for guiding the eye towards the subject in a photo. Its centre point can be adjusted, and you can control how strong the effect is. ■

Back issues  
Don't miss out!



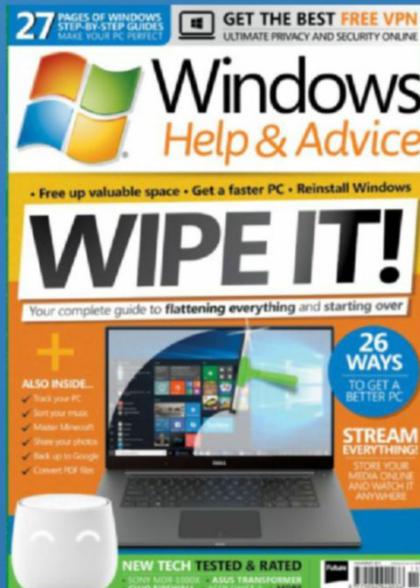
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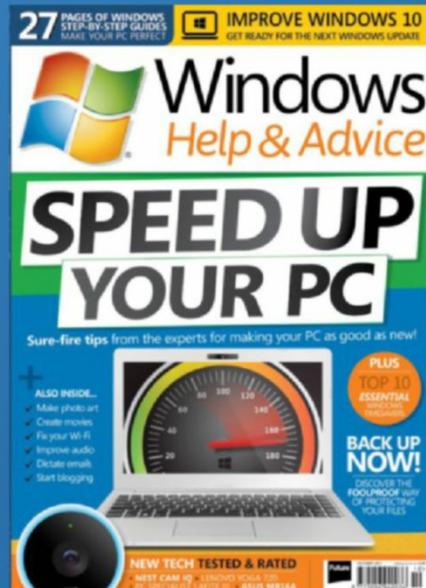
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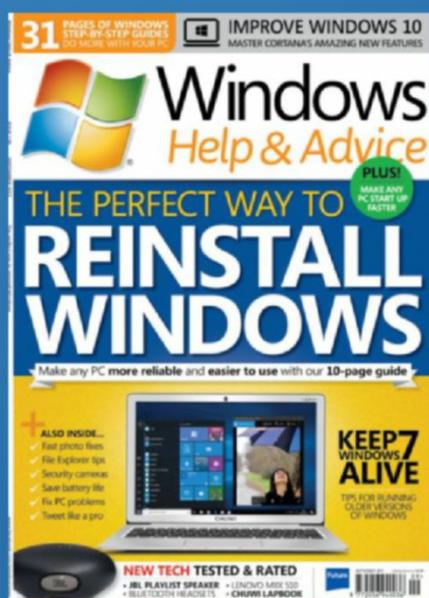
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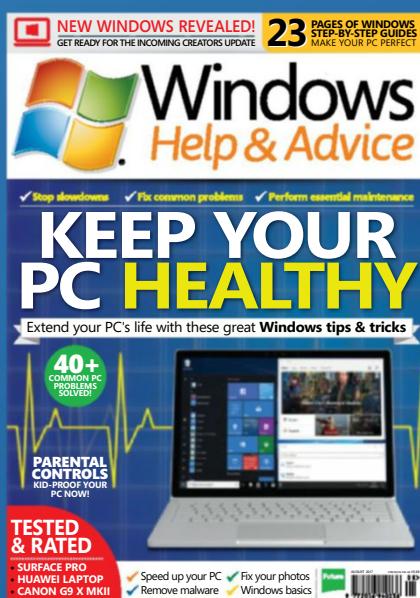
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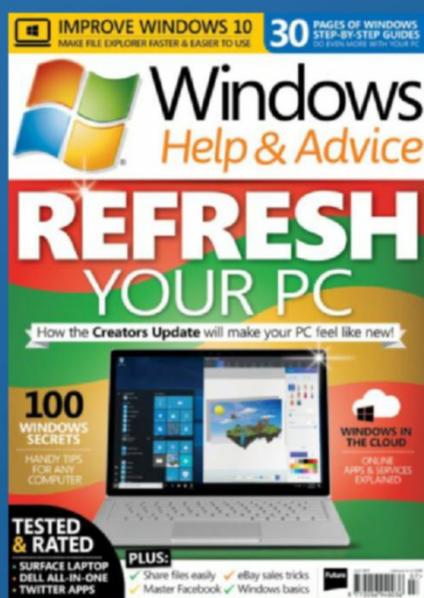
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Learn how to...

# Play music with Winyl



Your guide *Nick Peers* says...

"Manage and enjoy music on any PC with this lightweight digital music and streaming radio player"

## At a glance

### Skill level...

► Anyone can do it

Straightforward

Tricky in parts

### Suitable for...

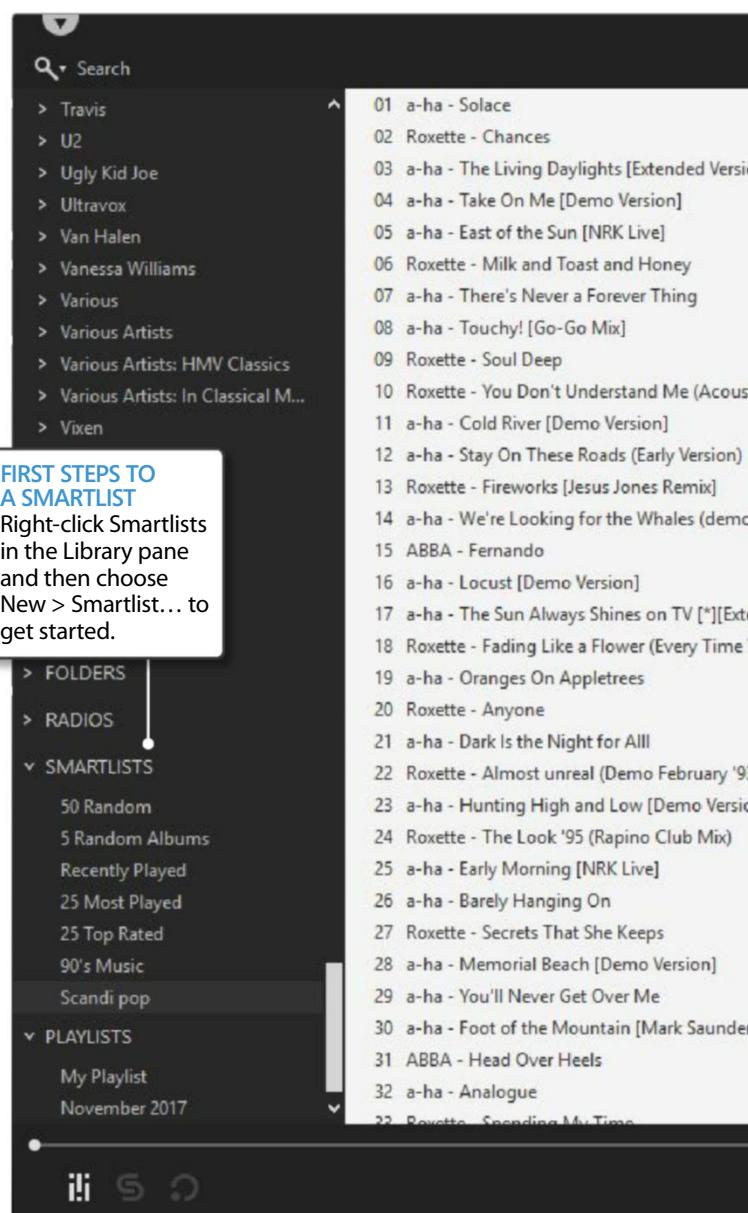
Windows 10

Windows 8.1

Windows 7

**W**inyl will appeal if you're looking for a no-nonsense, lightweight music player for your digital music library. The app consumes around 22MB of memory in use – compare that to Windows Media Player (around 50MB) or Groove Music (over 100MB) – making it suitable for older and slower machines, such as 2-in-1 tablets. Despite this, Winyl still boasts handy features and a slick user interface to help you enjoy your music.

In this tutorial we'll show you how to create your music library, plus change metadata (and artwork) using Winyl's handy tag-editing tools. You'll also learn how to customise the program and make use of its playlists and smartlists too. Finally, if you're fed up with your own music, just select Radios from the Library pane to access hundreds of streaming radio stations spanning many genres and tastes. Let's rock!

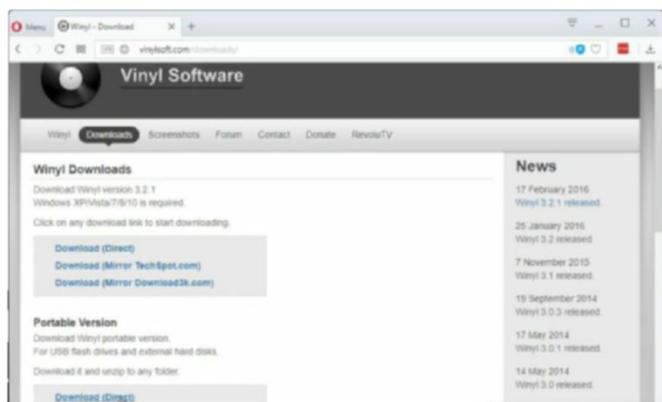


**FIRST STEPS TO A SMARTLIST**

Right-click Smartlists in the Library pane and then choose New > Smartlist... to get started.

- > FOLDERS
- > RADIOS
- ▼ SMARTLISTS
  - 50 Random
  - 5 Random Albums
  - Recently Played
  - 25 Most Played
  - 25 Top Rated
  - 90's Music
  - Scandi pop
- ▼ PLAYLISTS
  - My Playlist
  - November 2017

## Step-by-step How to | enjoy your music with Winyl



**Vinyl Software**

**Winyl** Downloads

Download Winyl version 2.2.1  
Windows XP/Vista/7/8/10 is required.  
Click on any download link to start downloading.

- [Download \(Direct\)](#)
- [Download \(Mirror TechSpot.com\)](#)
- [Download \(Mirror Download4k.com\)](#)

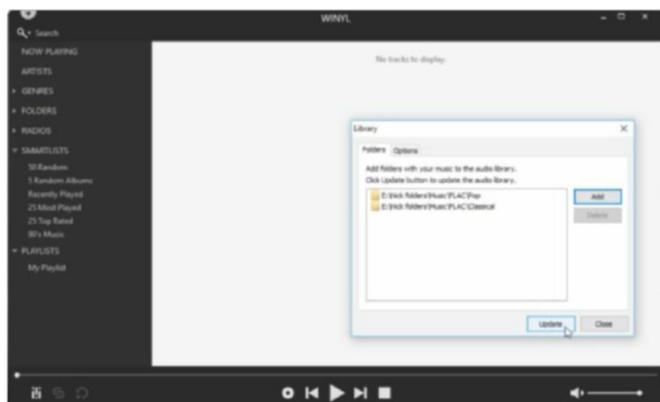
**Portable Version**

Download Winyl portable version.  
For USB flash drives and external hard disks.  
Download it and unzip to any folder.

[Download \(Direct\)](#)

### 1 Download and set up

Go to [vinylsoft.com](http://vinylsoft.com) and click Downloads. You can download a regular version of Winyl to install (use the direct link), or a portable version in ZIP format, the contents of which you extract to your portable tools folder or USB drive. Once done, open Winyl from its Start menu shortcut or – if you've extracted the portable version – by double-clicking Winyl.exe inside the Winyl folder.



No tracks to display

**Library**

Add folders with your music to the audio library.  
Click Update button to update the audio library.

- E:\Nick\Videos\Winyl\PLAC\Pep
- E:\Nick\Videos\Winyl\PLAC\Classical

**Add**

**Update** **Close**

### 2 Set up libraries

You'll be prompted to point the program towards your music folder (or folders). Click 'Add' to manually browse for – and select – the parent folder containing your music. If your music is scattered across multiple locations on your PC, click Add as many times as you need to select additional folders. When you're done, click Update and wait for Winyl to scan through your music files.

on][Version]

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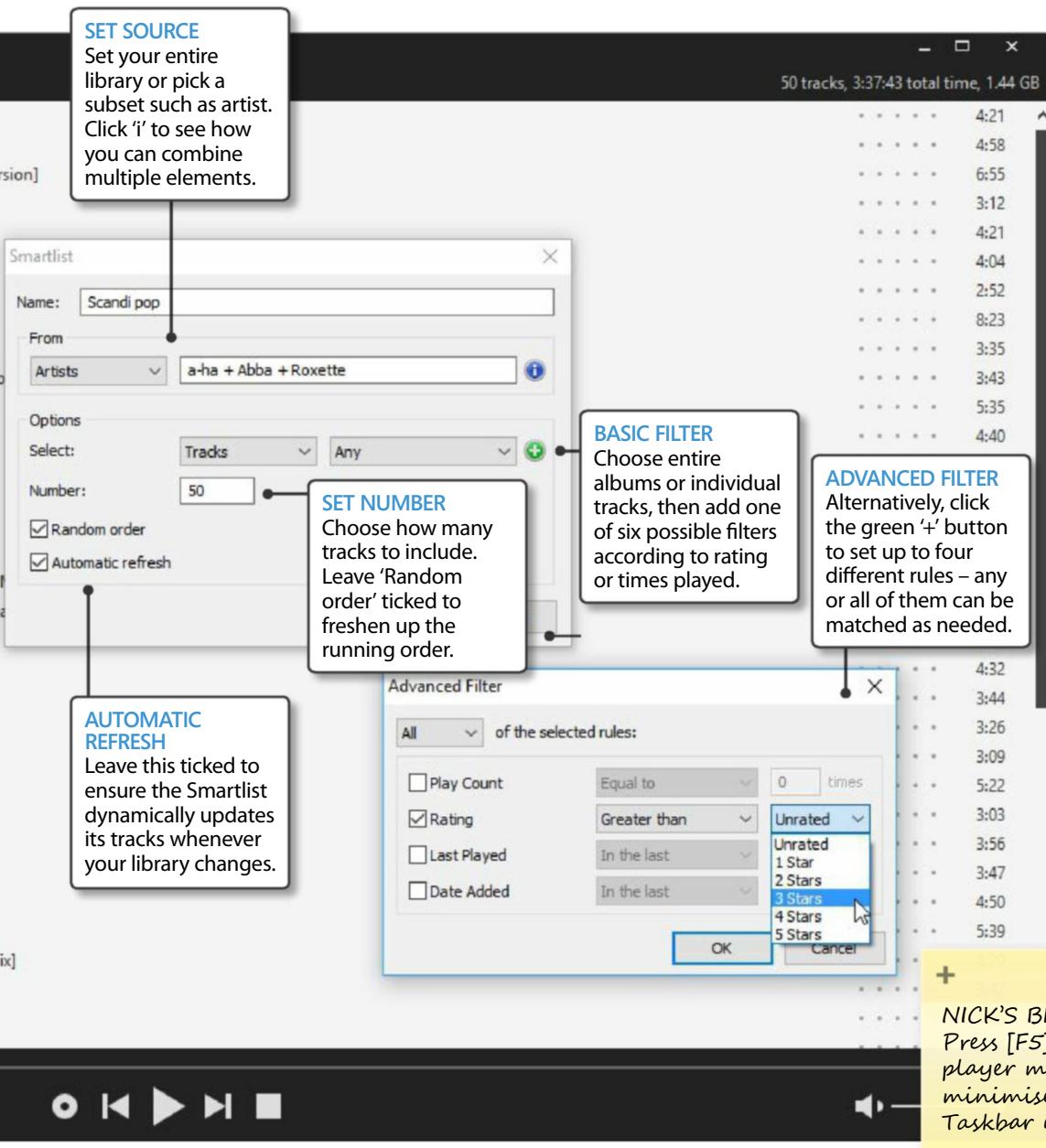
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### Jargon buster!

#### ► Metadata

Information or 'tags' which provide extra descriptive details about a media file, such as artist, album title, track name, genre and more.

#### ► Skin

A customisable package used to provide design elements of a user interface such as window borders and buttons.

#### ► Smartlist

A playlist that has been dynamically generated from a filtered source. Sources range from a specific artist, year or genre to your entire library; filters can include track popularity or rating.

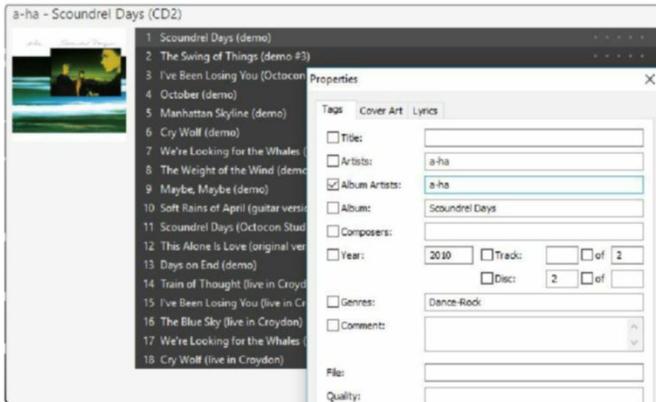


### 3 Review library

Once the progress bar disappears, your screen will remain blank. Don't panic – expand the Artists link on the left and you should see all your music organised by artist. Select one and you should see a list of tracks organised into albums appear. You can also navigate by folder or genre – assuming music has been tagged as such – using the links on the left side of the window.

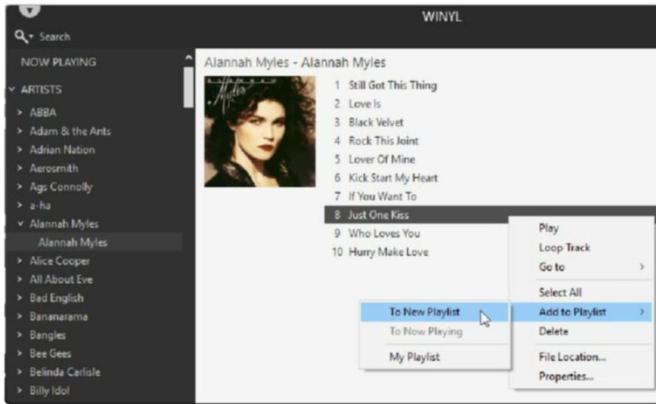
### 4 Listen to your music

Select a track or album, then click the Play button at the bottom of the window to start listening to it. Playback controls include skip back and forward, shuffle, repeat and volume adjustment. Press [F6] to open the Equalizer window to alter the sound using a 10-bar graphic equaliser with preamp and support for over 20 presets, from Rock and Pop to Bass Reducer.



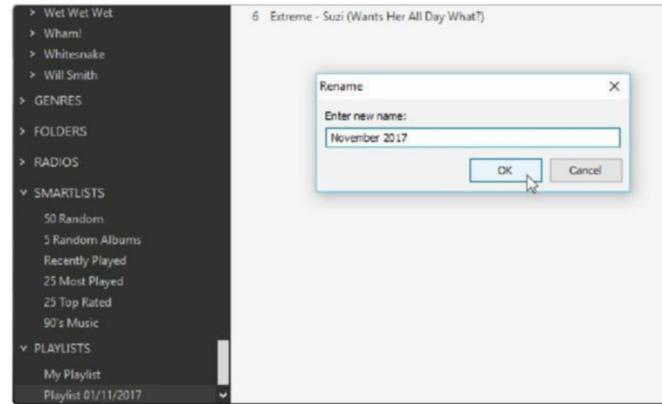
## 5 Edit library information

You can fix incorrect matches or add extra information to both entire albums and individual tracks. To update a single track, right-click it and choose Properties, or click on an album title to select all the tracks, then right-click and choose Properties. Use the Tags tab to change the track or album's **metadata** – here we're adding the Album Artists tag to file the album correctly.



## 6 Add album art

Switch to the Cover Art tab to review the current album art. Drag a photo from a folder or the Firefox web browser to the 'Drag picture here' window to change it, or click Google to search for artwork based on the artist and album title – although this doesn't work in the portable version. You can choose to embed the artwork into the music file itself, or save it as a separate file.



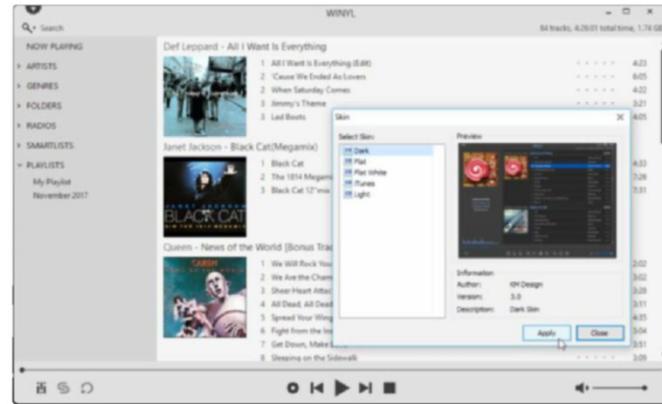
## 7 Create a playlist

Create your own mix compilation by adding favourite tracks or albums to playlists. Select each track or tracks (use [Ctrl]-click or click an album header), then right-click and choose 'Add to Playlist' > To New Playlist to create a new playlist, named Playlist DD/MM/YYYY. Add additional tracks in the same way, this time choosing the Playlist name under 'Add to Playlist'.



## 8 Manage playlists

Manage your playlist from the left-hand pane under Playlists. Start by right-clicking its name and choosing Rename to change it, or Delete to remove it. Select the playlist to view its contents and running order in the main pane. Click and drag a track to change its position in the running order, or right-click the track and choose Delete to remove it from the playlist.



## 9 Use Smartlists

**Smartlists** are playlists automatically generated using rules or filters rather than manually selected tracks. The annotation reveals how to create your own, but a number of examples are included, from '50 Random tracks' to '25 Most Played' and '90's Music'. Select one and the selected tracks will appear in the main window. Don't like the random choice? Click again to change it.

## 10 Customise Winyl

Press [F4] to change the look of Winyl; a choice of six light or dark **skins** are available. Open the Settings sub-menu to disable visual effects and smooth scrolling to improve performance on low-end machines, or select Settings > Advanced for more customisation options, such as choosing what items appear in the Library pane as well as the transparency of the mini player. ■

Learn how to...

# Protect your privacy online

Nobody should know what you're doing online except you. Make sure that your connection stays private with the brilliant IPVanish VPN

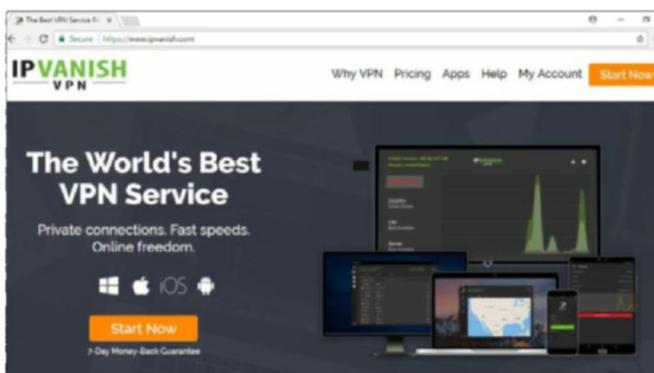
**T**here's a lot going on online, and not all of it good. Sometimes the connections we use to connect to the Internet are not entirely secure – who's listening in to that Wi-Fi network in the coffee shop down the road? Sometimes we're denied access to services we could enjoy if we simply lived somewhere else in

the world. And sometimes the websites we visit – or even our Internet Service Providers (ISPs), or the government – log all sorts of information about us and our activities online.

A Virtual Private Network, or VPN, is the solution to each of these problems. It sits between your web browser and your

Internet connection – whether you're using public Wi-Fi or connecting at home or work – and encrypts everything you send and receive, only unlocking it once it's been sent to a completely different geographical location. Your Internet address changes, and nobody can see what you're doing.

## Step-by-step Hide your traffic with IPVanish



## We have a better offer for you!

Get an extra **20%** off your first billing on any plan!

Offer is only good for the next :

**07:25**

**GET OFFER NOW**

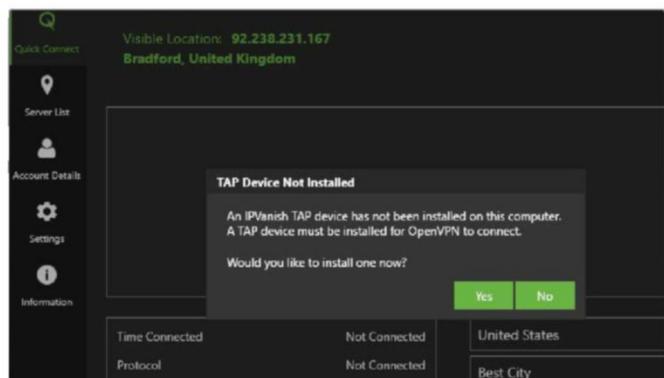
### 1 Get started

Open your web browser and head to [www.ipvanish.com](http://www.ipvanish.com), then click the Start Now button. Note that IPVanish isn't free; a VPN is a relatively demanding service, and the company charges a monthly fee for use of its facilities with a seven-day money-back guarantee. There are free VPNs, but IPVanish is our top pick – and who knows what the free ones are doing with your information?



### 2 Sign up

Select your payment option (bear in mind that anything other than the monthly payment is billed in one chunk) and create your account – in the spirit of anonymity, all you need is an email address and a password. You can even pay anonymously, although this means owning Bitcoin. Here's a tip: loiter on the site for a while, and you'll be offered a discount on your first billing.

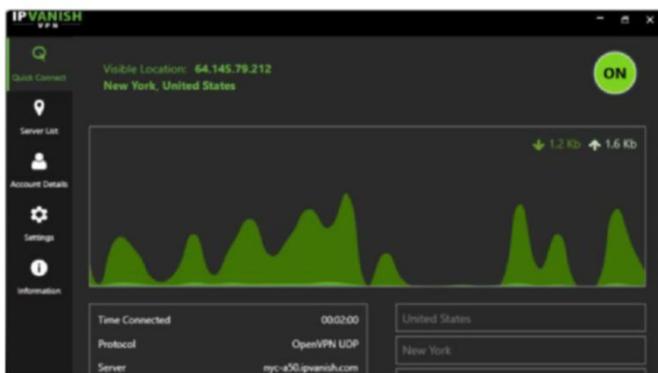


### 3 Verify and install

You'll be sent an email to the address you supplied. Click the link within, head to the 'My account' link at the top of the site to log in with the details you used in the previous step, then click the Apps link. Click 'Download now', followed by Download Windows App, then run the file you downloaded. Simply click through the installer to get it installed, then Run IPVanish when it's complete.

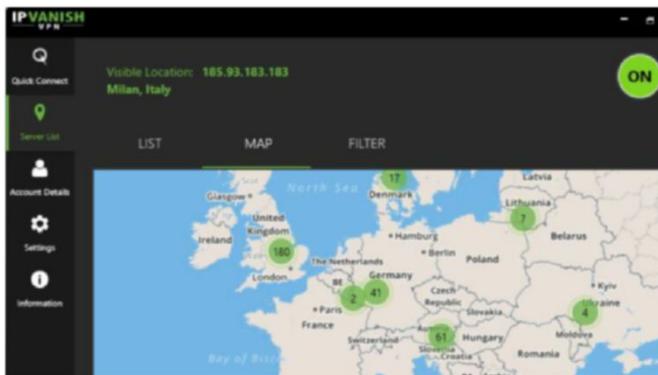
### 4 First steps

Sign into the app with your username (your email address) and the password you set earlier. You'll be taken first to the Quick Connect screen; click the big green Connect button for the first time and IPVanish will ask to install a **TAP device** – this isn't sinister. Confirm it's OK to do this, and click the relevant prompts when they pop up. You'll be prompted again when it's complete.



## 5 Finally online

Click 'Connect' again, and IPVanish will hook you up to a random [server](#) in the USA. You'll see the location information at the top left of the window change as it does so, and the graph in the centre will start moving to show that traffic is flowing through the VPN. Open your web browser and head to [www.whatismyip.com](http://www.whatismyip.com). The information shown there should match your new locale.



## 6 Moving around

Click the red Disconnect button and you'll go back to broadcasting your location, with your traffic back out in the open. Now's a good time to try one of IPVanish's other servers. Click 'Server List' in the left-hand menu to see the map; drag it around with the left mouse button, and zoom with the mousewheel. Click one of the green locations to move your connection there.

The screenshot shows the IPVanish website's 'Configuration Files' section for Mac OS, listing 'L2TP XML' and 'PPTP XML' files. To the right, the 'Server List' section is displayed with a table:

Country	Location	Address	Status
South Africa	Johannesburg	jnb-c13.ipvanish.com	2% capacity
South Africa	Johannesburg	jnb-c14.ipvanish.com	2% capacity
Hong Kong	Hkg-c17.ipvanish.com		2% capacity
Brazil	Rio De Janeiro	gig-a06.ipvanish.com	2% capacity
Brazil	Sao Paulo	gru-a13.ipvanish.com	3% capacity
Brazil	Sao Paulo	gru-a14.ipvanish.com	3% capacity
Australia	Johannesburg	jnb-c15.ipvanish.com	3% capacity
Latvia	Riga	rkt-c02.ipvanish.com	3% capacity
Latvia	Riga	rkt-c03.ipvanish.com	3% capacity
Latvia	Larnaca	mlc-c03.ipvanish.com	3% capacity
Mexico	Guadalajara	gdl-c09.ipvanish.com	3% capacity
Mexico	Guadalajara	gdl-c10.ipvanish.com	3% capacity
Turkey	Izmir	izm-c01.ipvanish.com	3% capacity

## 7 Find the fastest

If you want the speediest connection, selecting the server with the lightest load is key. You can connect to specific servers using the drop-down boxes above the Connect button on the Quick Connect screen, but head to the My Account section of the IPVanish website and click the Server List button to see current loads. Click the top of the status column to find the lightest ones.

The screenshot shows the IPVanish app interface. On the left, the 'Server List' tab is selected, showing a map of Europe with green dots. On the right, a 'Status Update' box contains the following text:

**WHERE AM I?**  
Your visible location shows where in the world your internet connection purports to be from. Keep an eye on it.

**Visible Location: 195.181.161.16 Prague, Czech Republic**

**MOVE HOUSE**  
The server list is the quickest and easiest way to select a new location anywhere in the world you fancy connecting to.

**Time Connected** 00:01:32  
**Protocol** OpenVPN UDP  
**Server** prg-c16.ipvanish.com  
**Data Up** 26.2 Mb  
**Data Down** 64.5 Mb

**STATUS UPDATE**  
Use this box to find out how long you've been online, and the total amount of data you've sent through your VPN.

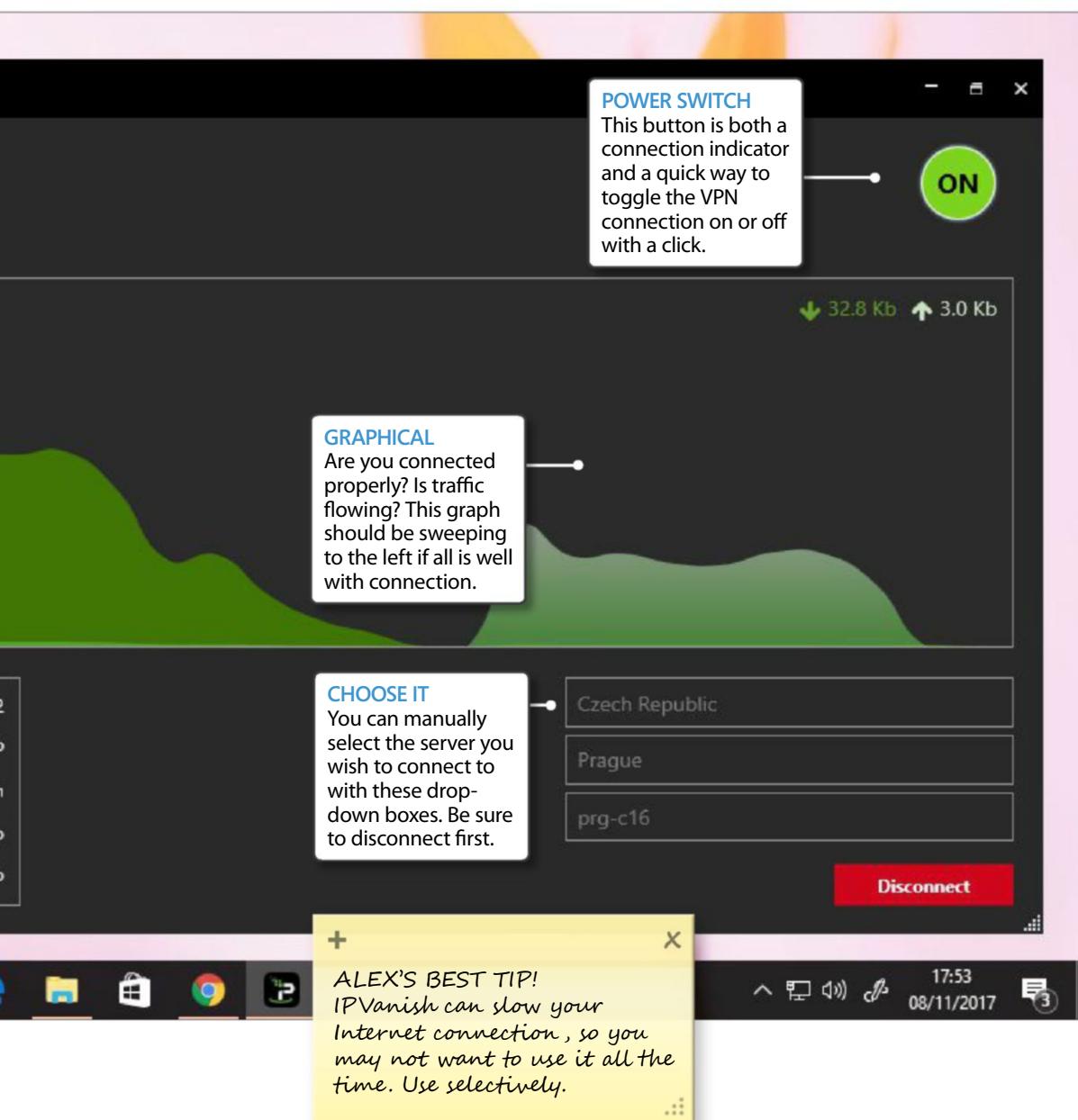
The screenshot shows the IPVanish website's 'Server List' section with a 'FILTER' tab selected. It includes a search bar and dropdown menus for filtering by country and latency:

- Filter server by: Any Country
- Latency: 50 - 100ms
- Any Latency: < 50ms, 50 - 100ms, 100 - 150ms, 150 - 200ms, > 200ms

Country	City	Latency
Austria	Graz	1
Austria	Vienna	6
Bulgaria	Sofia	1
Czech Republic	Prague	17
France	Paris	26

## 8 Lowest latency

You can also find servers by their [latency](#). A low-load server won't be much good if it's half the world away and behind a clogged connection. Head to the server list within the IPVanish app, and click the Filter tab. Use the lower drop-down box on the left, and select 50-100ms to see servers which offer a reasonably fast response – double-click a likely looking one to connect to it.



## Jargon buster!

### ► TAP device

A virtual network card – entirely existing in software – which is used to redirect network traffic before it leaves your PC.

### ► Server

Your web traffic is piped through the private network to another computer, the server, before it reaches the Internet.

### ► Latency

Overall speed is one thing, but latency is just as important. It's the speed with which a device responds – high latency means a sluggish experience, especially on a VPN.

## At a glance

### Skill level...

Anyone can do it

### ► Straightforward

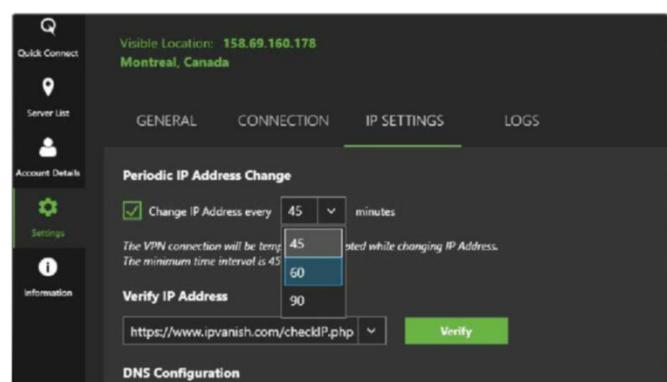
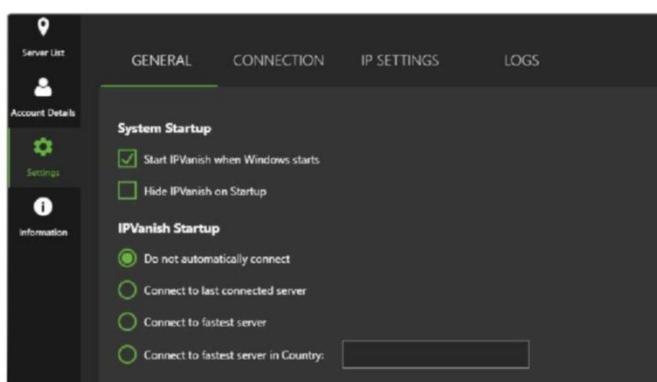
Tricky in parts

### Suitable for...

Windows 10

Windows 8.1

Windows 7



### 9 Automate it

If you're paranoid, you may want to set IPVanish to work on your connection the moment you boot up your PC. Just go to the Settings screen and check the box at the top of the General tab. You may also wish to set it to automatically connect to your last server or a country of your choosing using the radio buttons below. Using a VPN isn't a great choice if you need top speed.

### 10 Auto switching

If encrypting your internet connection and sending it across the world isn't quite enough for you, you can harden IPVanish further in the IP Settings tab. Check the top-most box, and specify a time: IPVanish will now automatically change your address for a new one periodically. Be warned that you'll experience a blip in your internet connection when it does so, but it won't last long. ■

Learn how to...

# Use your PC with a set of Bluetooth headphones



Your guide *Dan Graham* says...

"Enjoy music, movies and games in Windows using a pair of wireless headphones – and discover some quick and easy fixes if they don't work as planned"

## At a glance

### Skill level...

Anyone can do it

### ► Straightforward

Tricky in parts

### Suitable for...

Windows 10

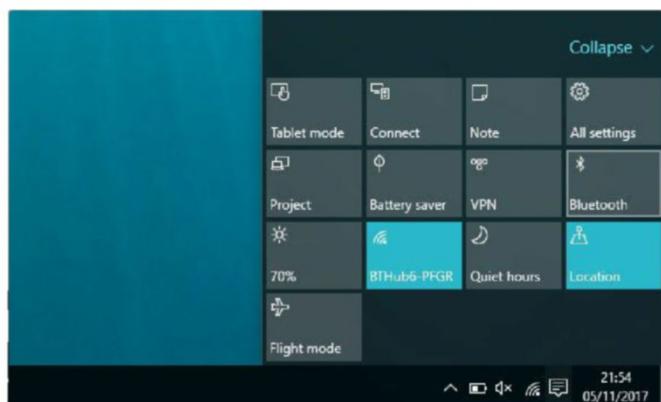
Windows 8.1

Windows 7

We all connect headphones or speakers to our computers. Thanks to Bluetooth, this is increasingly something you can do wirelessly. Bluetooth audio devices aren't new, of course, but they are now ubiquitous in a way they weren't before. Many headphones now use Bluetooth – even at the more budget end of the market – while we're used to connecting wirelessly between our mobile devices and wireless headphones, too – sometimes because more mobile devices are eschewing traditional headphone jacks. That isn't an issue on laptops and desktops yet, so it's simply that it's more convenient to go wire-free, not to mention that it also gives you the versatility to move around and not be tethered to your PC continually. So let's show you how easy it is to connect up Bluetooth headphones to your PC – and what to do if it doesn't completely work out.

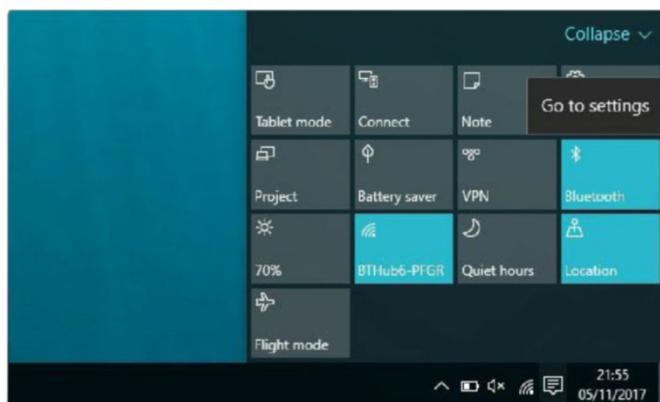


## Step-by-step How to configure and connect Bluetooth headphones



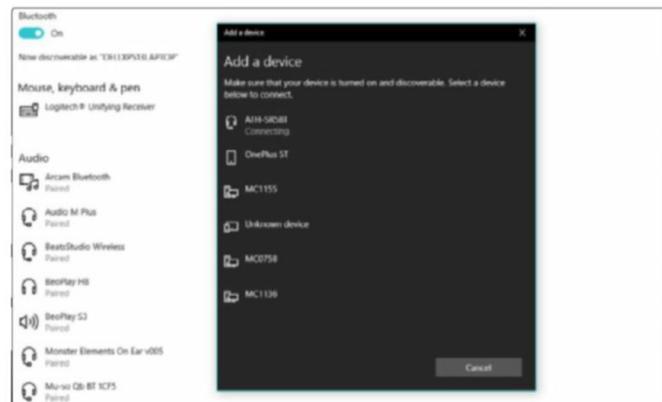
### 1 Check that Bluetooth is active

The first thing to do is to switch on Bluetooth on your PC. Go to the Action Centre by clicking on the icon on the far right-hand side of the Taskbar next to the clock. Then click the Bluetooth icon. If it's already highlighted (as some of the other tiles are here) then it's already on. On some PCs switching on Wi-Fi will also switch on Bluetooth, and it's also often on by default.



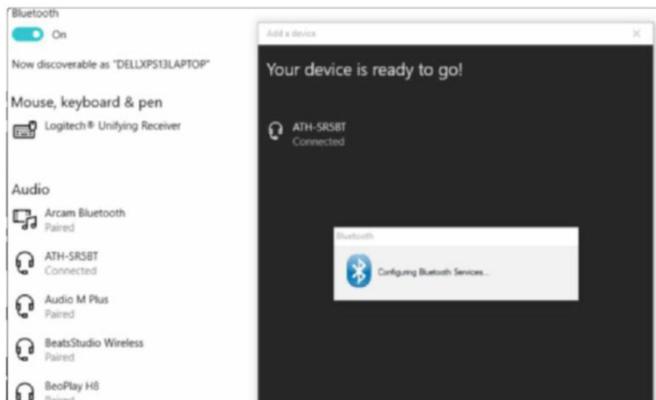
### 2 Use Bluetooth's settings

You can enter the Bluetooth settings window in one of two ways – either via the Settings app or by right-clicking the Bluetooth button in the Action Centre. You can also search for Bluetooth Settings direct from the Taskbar, press [Win] and type 'Bluetooth'. Note the Connect option in Action Centre, as you'll need that later to reconnect to a Bluetooth device.



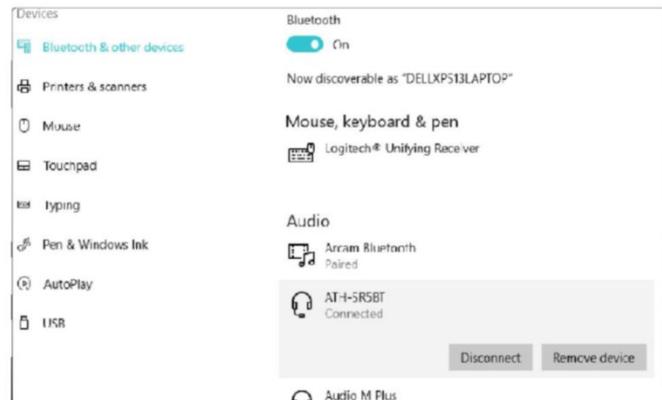
### 3 Manage Bluetooth devices

The Bluetooth settings are contained within the Devices sub-menu of the Settings app. There are a lot of devices here, but you may have some or none depending on what's been paired with your PC. There's also a switch at the top of the list to toggle Bluetooth on and off. Note: Bluetooth sends out wireless signals, it will switch off if you put your PC in Airplane Mode.



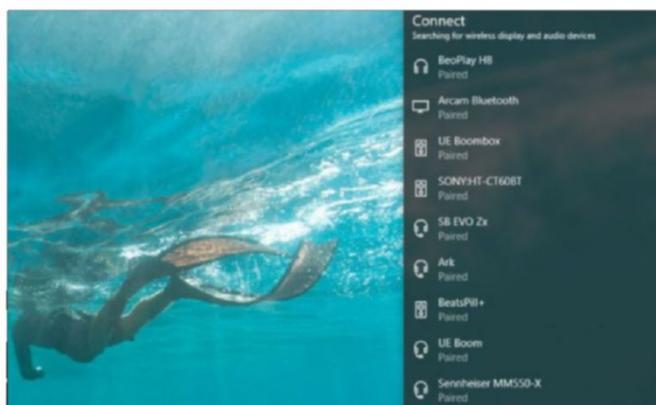
### 4 Pair your headphones

Switch your Bluetooth headphones on and make sure they're in pairing mode. Usually this involves holding down the power button for longer when you switch them on, but this does vary depending on model – check the user manual to be sure. When they're in pairing mode, you'll see them pop up in this list of Bluetooth devices with 'Ready to pair' next their name.



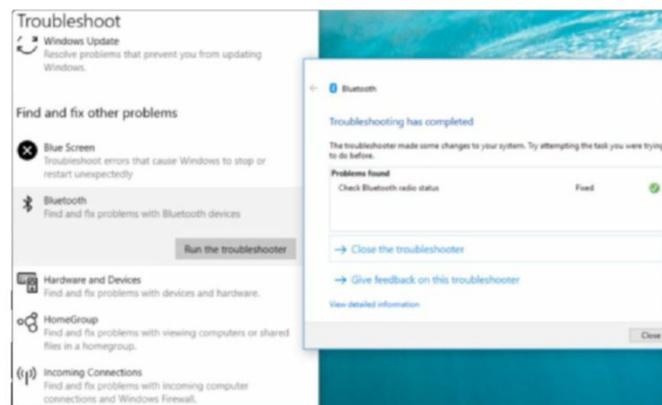
### 5 Pairing tips and tricks

Click the Pair button. If there is a problem, turn Bluetooth off on your PC, then on again before restarting your headphones. If you leave it too long, your headphones might come out of pairing, so do check that. Once you've clicked Pair, your PC will add the Bluetooth headphones to your system – in other words, it will install the driver software. This may take a few minutes.



### 6 Removing your headphones

Once your headphones have been installed by Windows you'll see them appear in the list as Connected. When you highlight the headphones in Bluetooth's settings, you'll also see a button called 'Remove device'. You might need this if you need to re-pair, although this isn't a usual occurrence. Now that the device is paired, it should automatically connect to your PC from now on.



### 7 Reconnect your headphones

Your headphones will only automatically reconnect if Bluetooth remains active on your PC. If you have to manually reconnect your headphones, you can also go to the Connect menu in the Action Centre to reconnect to the device – with Bluetooth and the headphones turned on, just select the device from the menu. Not all devices that appear will be active.

### 8 Troubleshoot your connection

Your Bluetooth headphones and PC should connect when the two devices are in range of each other and with Bluetooth active, but if they don't and unpairing and re-pairing doesn't work, press [Win] and type 'Troubleshoot' to open the Settings > 'Update & security' menu, then select Bluetooth under 'Find and fix other problems', then click 'Run the troubleshooter' for a fix.

Learn how to...

# Make an emergency toolkit on a USB stick



Your guide *Cat Ellis* says...

"Put together all the essential apps you'll need to deal with potential PC disasters"

## At a glance

### Skill level...

► Anyone can do it

Straightforward

Tricky in parts

### Suitable for...

Windows 10

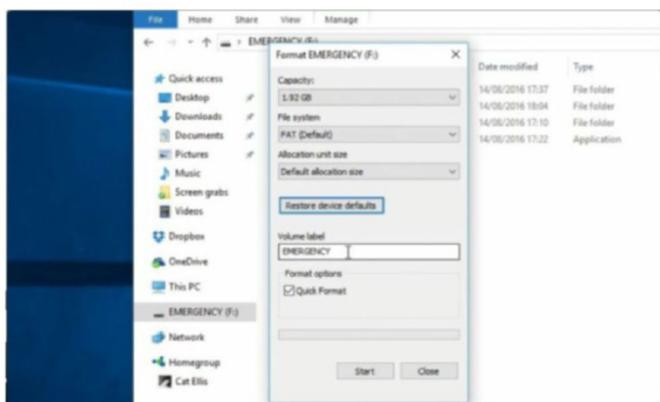
Windows 8.1

Windows 7

**V**iruses, malware, accidental deletion or corrupted data can all put your valuable files at risk. The best insurance is to make regular backups, but what if you run into trouble in between backups, or you let your routine slide, or a friend has a crisis with their PC? That's where an emergency USB toolkit of portable apps comes in, giving you everything you need to fix the damage and save the day.

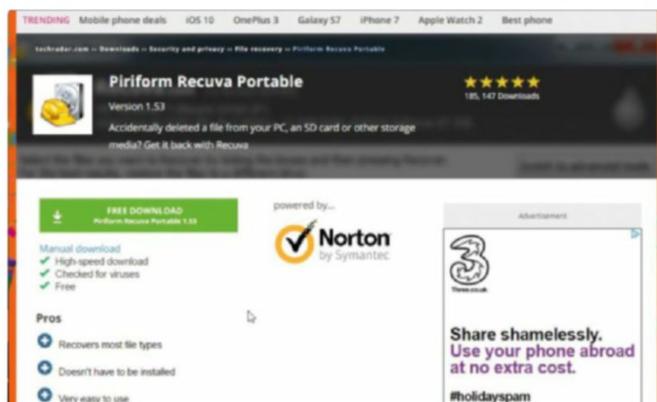
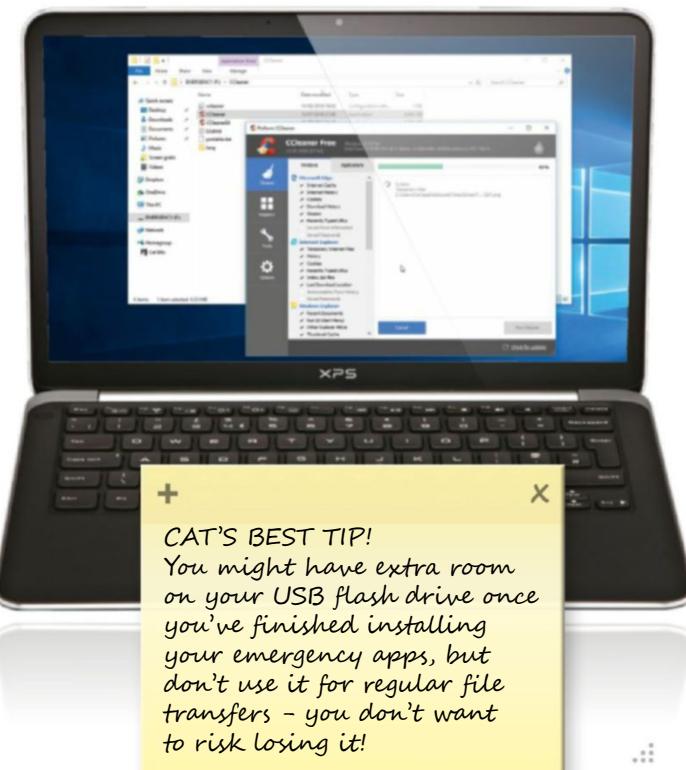
When you install a program, not only are the files it needs to run saved on your startup drive, it also makes its own changes to the rest of your system – such as adding entries to the Windows registry. Portable apps don't do this, meaning you can save them to a USB flash drive and use them on any PC by double-clicking the program's EXE file. We've put together a collection of the best ones for use in emergencies.

## Step-by-step Be ready for PC emergencies



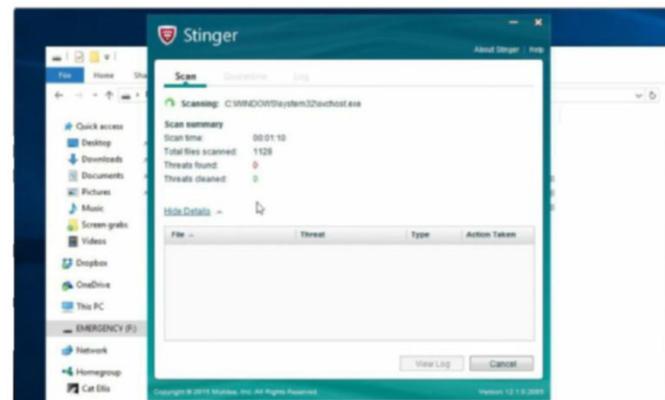
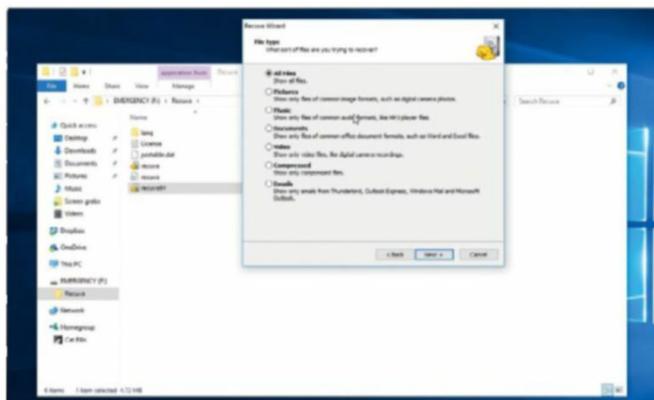
### 1 Prepare your USB stick

First, you'll need a USB flash drive – 1GB will be fine. Plug it into your PC and open File Explorer, then right-click it in the menu on the left, select Rename and name it 'Emergency'. If you've used the flash drive before, you can wipe it by right-clicking it and selecting Format > 'Restore device defaults' > OK. Make sure there isn't anything you want to keep on the USB flash drive first.



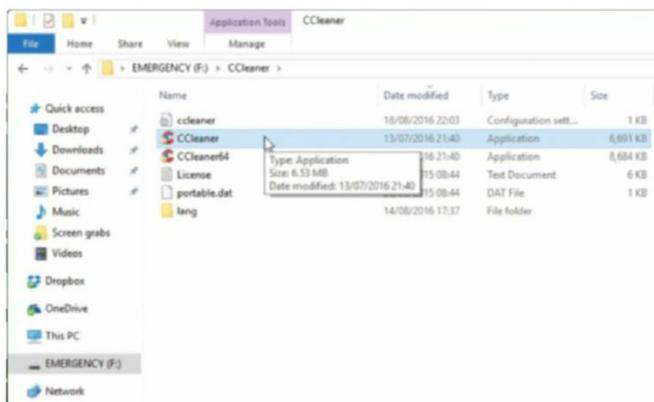
### 2 Prepare for accidents

Now to build your toolkit. A common disaster is accidentally deleting a file – from your hard drive, an SD card or other storage. Piriform Recuva can help you get it back, but installing this after you've lost files can result in them being overwritten. It's far better to have it ready to run from your USB stick. Download it from [www.piriform.com/recuva](http://www.piriform.com/recuva) – using 'Manual download' is easiest.



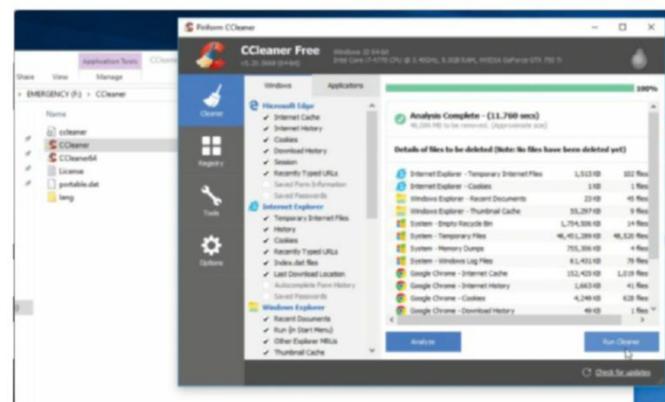
### 3 Recover deleted files

Click the downloaded ZIP file in your browser, and select Extract > 'Extract all'. Click 'Browse' and select your USB flash drive. Right-click and create a folder called 'Recuva' (to make it easier to find in future). Open this folder and click 'Select folder' > Extract. Now if you need to restore a deleted file, just plug in your USB flash drive, double-click Recuva.exe and follow the instructions.



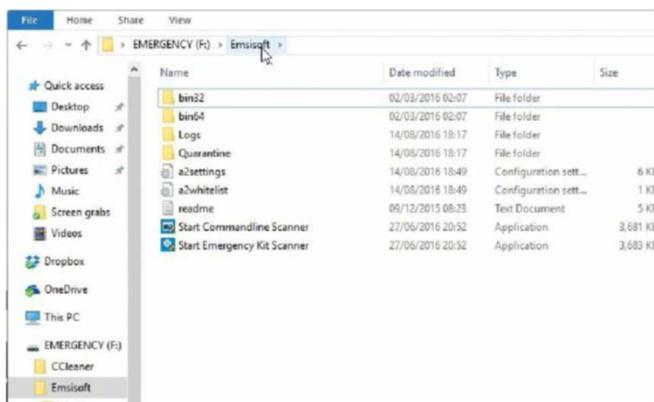
### 4 Download a virus-zapper

If you suspect your PC has a virus, McAfee Labs Stinger can help stop it in its tracks. Download it from [www.mcafee.com/uk/downloads/free-tools/stinger.aspx](http://www.mcafee.com/uk/downloads/free-tools/stinger.aspx). This program doesn't come in a ZIP archive, so once it's downloaded you can drag the EXE file straight to your USB flash drive using File Explorer. When you want to run it, just double-click the file and click Scan.



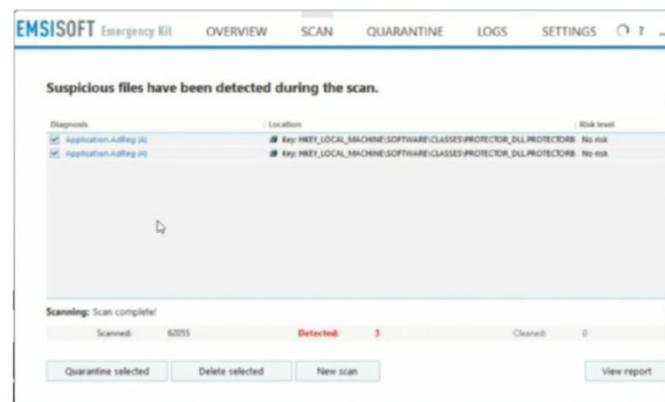
### 5 Get ready for a deep clean

If your PC is running slow, or you're getting error messages about corrupted files, CCleaner can save the day. Download it from [www.piriform.com/ccleaner/builds](http://www.piriform.com/ccleaner/builds) (it's the second link), then extract the downloaded file to your USB flash drive just as you did for Recuva, saving it in a new folder called 'CCleaner'. To run it, double-click the file CCleaner.exe.



### 6 Sweep away junk and fix errors

To free up extra space and improve performance, click Analyze and CCleaner will search your hard drive for unnecessary files. Once it's finished, look through the list, uncheck the boxes next to anything you want to keep, then click Run Cleaner. To solve errors with the Windows registry, select Registry from the menu on the left and select 'Scan for issues' > 'Fix selected issues'.



### 7 Get set to blast malware

Emsisoft Emergency Kit, from [www.emsisoft.com/en/software/eek/](http://www.emsisoft.com/en/software/eek/), will check your PC for programs that aren't strictly viruses but are still malicious. Double-click the downloaded file and it will run an installer, which automates the process of extracting the files from a ZIP archive. Select your USB flash drive as the destination, make a folder called 'Emsisoft' and click OK.

### 8 Ready for anything

Double-click Start Emergency Kit Scanner and let Emsisoft update itself. Now, whenever you think your PC has a malware infection (you notice unexpected changes to your web browser, for example), insert your USB flash drive, launch Emsisoft, click Scan and follow the instructions. Label the USB flash drive and keep it handy – you never know when you'll need it. ■

Learn how to...

# Improve password security with LastPass



Your guide **Alex Cox** says...

"Managing multiple website logins and using hacker-proof passwords needn't be a chore. LastPass makes bulletproof personal security an easy task"

## At a glance

### Skill level...

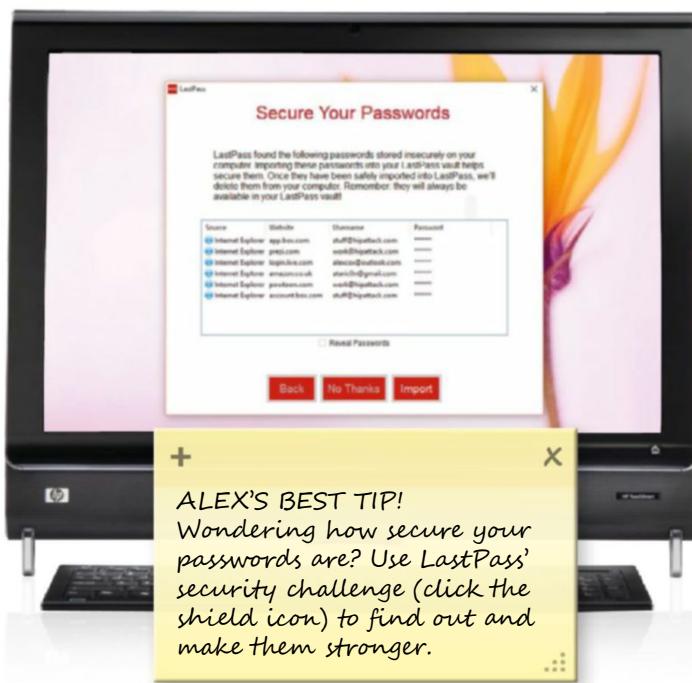
- ▶ Anyone can do it
- Straightforward
- Tricky in parts

### Suitable for...

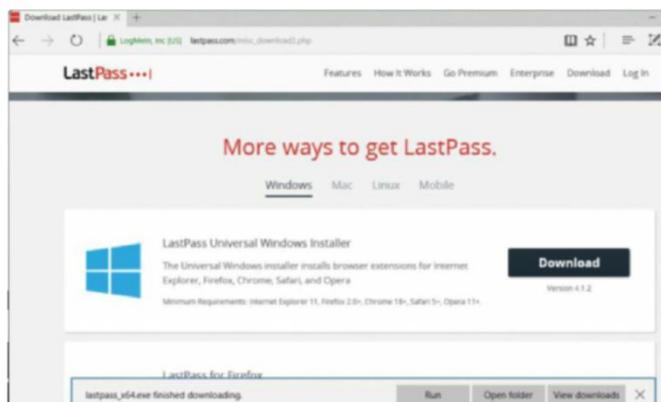
- Windows 10
- Windows 8.1
- Windows 7

**S**ecurity experts often offer words of wisdom, such as: "Use a different password for every site" or "Make sure you don't use any dictionary words". But then they'll say contradictory things like: "a string of dictionary words is more secure than a random jumble of characters". Those security experts don't want us to have an easy life, that much is clear.

Seriously, though, your online security is important. Share passwords between sites and, if one of them happens to lose its password database to a hacker, your security across all those sites is compromised. Remembering a host of long-winded passwords is difficult, though; do you write them all down in a book? If someone gets hold of that book, what then? It's much better to use a secure service, itself password protected, to manage the whole thing for you...

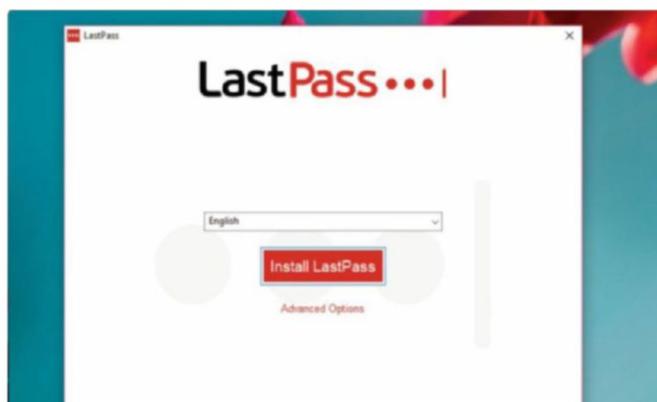


## Step-by-step Lock down your passwords



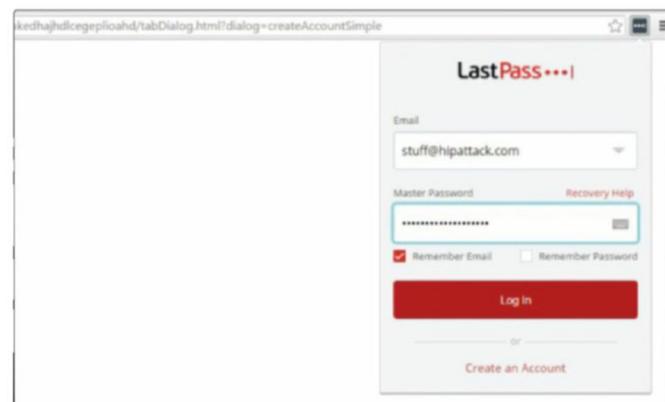
### 1 Getting hold of it

Although you can use LastPass entirely online, it's more effective to use its browser extension on your PC to manage logging into sites. You never actually have to remember the passwords you've set. Head to [lastpass.com/download](http://lastpass.com/download), and download the Universal Windows Installer, which will add the LastPass extension to your browsers.



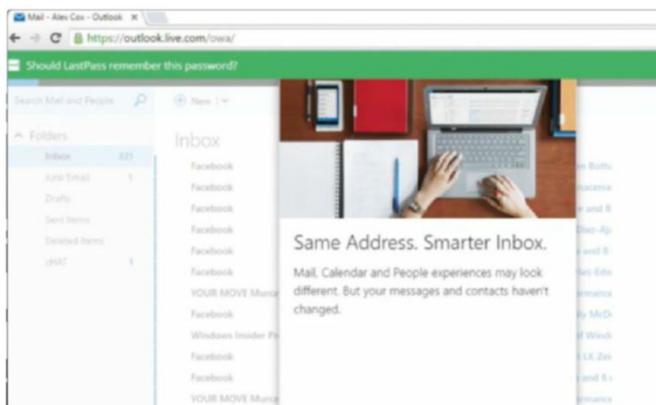
### 2 Installing it

If Windows asks whether you want the app to make changes to your PC, click Yes. Click 'Install LastPass', then 'Create a New Account'. You now need to set your master password, which is the only password you'll have to remember. Make it a good one, and one you've never used anywhere else; try to make the green bar fill up to ensure it's strong enough. Click 'Create Account'.



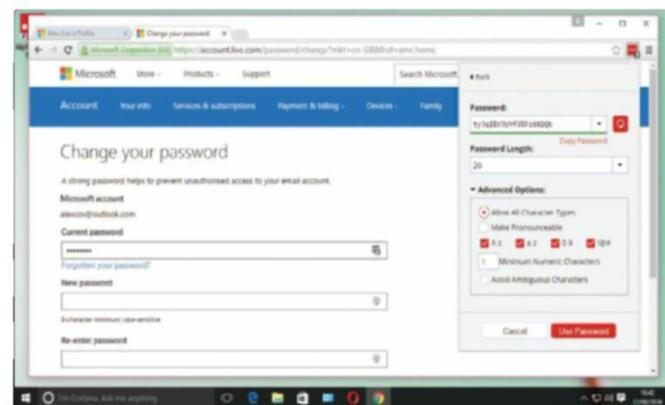
### 3 Begin the lockdown

LastPass sniffs through your web browsers and attempts to detect insecurely stored passwords at this point. Click 'Import' and it'll bring them into its secure vault and delete the insecure references to them. LastPass will now open up any browsers into which it couldn't automatically install itself – you'll need to follow the instructions on each to get its browser extension ensconced.



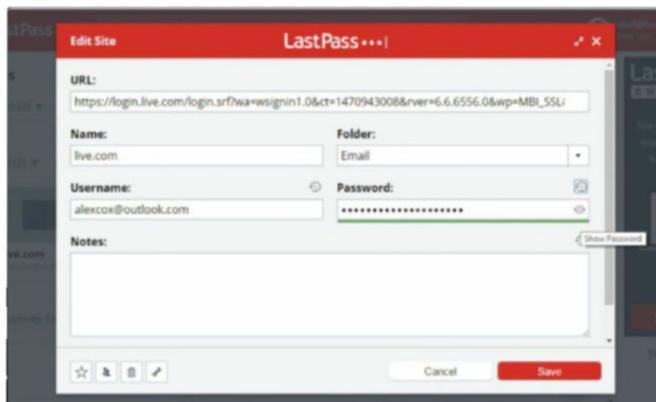
### 4 Finding it

You'll now find LastPass – in whichever web browser you prefer – as a grey icon to the right of the address bar. Left-click it and enter the details from Step 2 to log in; we'd suggest *not* allowing it to remember your master password, since this adds an extra layer of security. Now head over to a site that requires you to enter a username and password – we're using outlook.com.



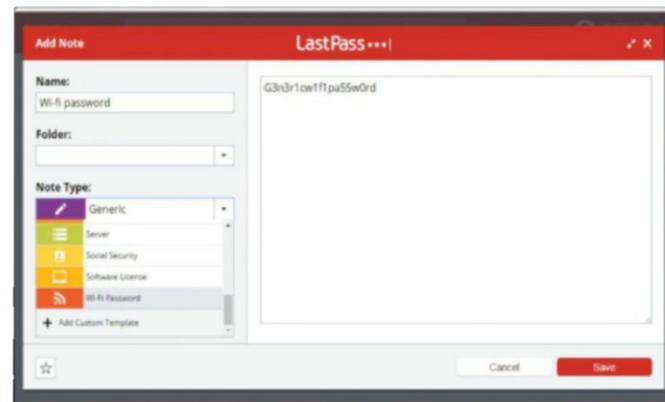
### 5 Making memories

The login text-boxes will look slightly different from usual, with the LastPass logo on the right. Input your username and password as usual, and LastPass will pop up a green bar offering to remember your details. Click 'Save Site', and confirm the details on the next page. Now log back out of the site and come back; you'll find that LastPass has filled in your details automatically.



### 6 Character soup

Let's create a new password. Head to your chosen site's account settings page and find the password change portion. Fill in the details the site asks for until it asks for your new password. Click the LastPass icon, then Generate Secure Password, and use the controls to create a suitably complex jumble of characters. Copy and paste it into the password box, and confirm the change.



### 7 In the vault

LastPass' vault is where it stores your passwords, should you ever need to use them to log in on a device that doesn't have LastPass installed. Either click the My Vault option in the LastPass extension, or head to lastpass.com and log in with your details to see it. Find the login for which you need the password, click the spanner icon, then click the eye icon to reveal all.

### 8 More secrets

The vault isn't just a place to keep passwords. You can use its encrypted space to store anything you'd like to keep secret (but might need quick access to), such as Wi-Fi passwords, passport info or bank details, though we'd still use caution with the latter. Click the notepad icon, click Add Secure Note, and fill in the form; you can attach photos and documents if required.

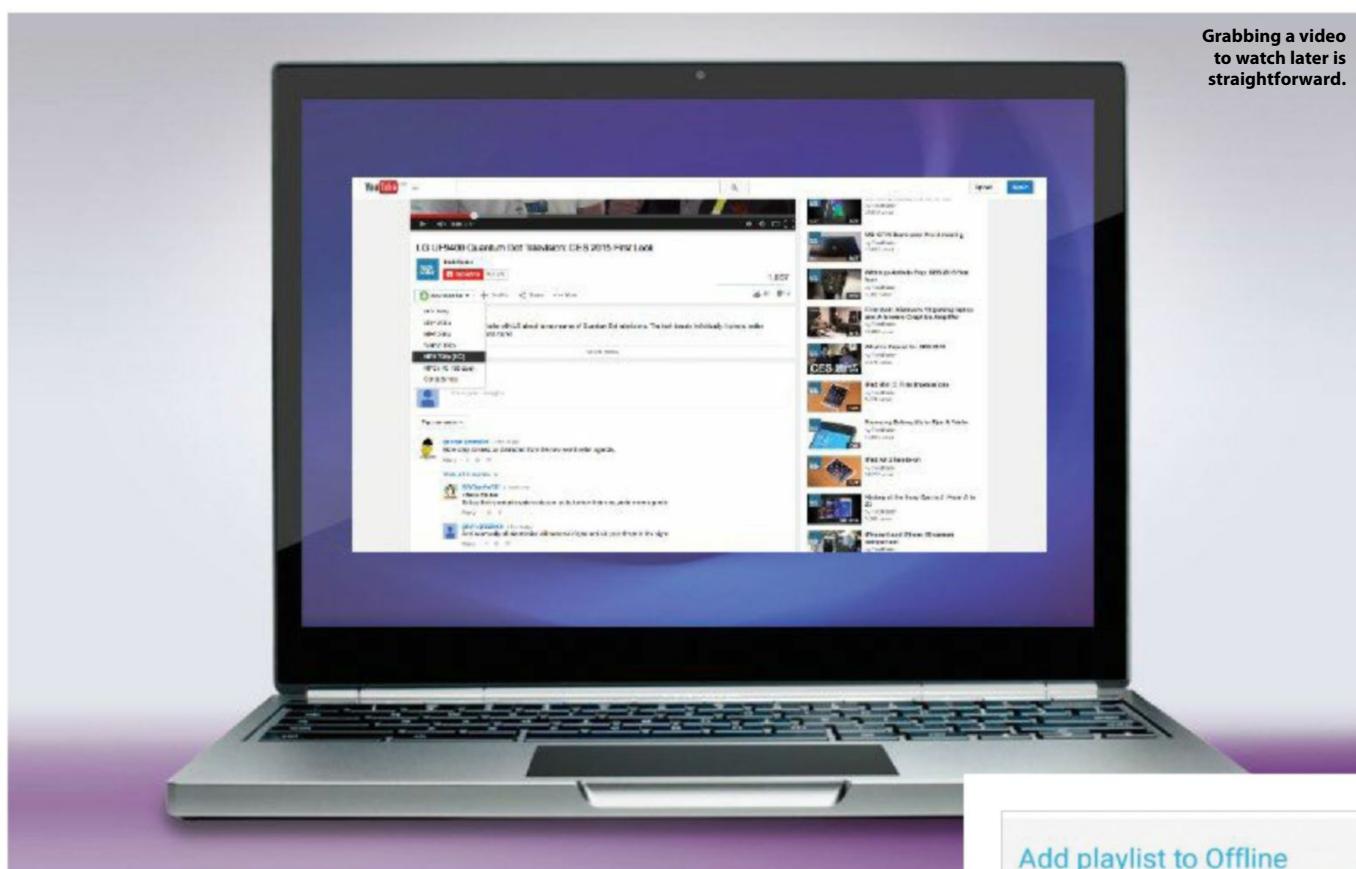
Learn how to...

# Download YouTube videos for free



Your guide [Gary Marshall](#) says...

"Save videos from YouTube to watch offline at a time that is convenient for you!"



## IS IT LEGAL TO DOWNLOAD YOUTUBE VIDEOS?

It's against YouTube's terms and conditions, which say you can only use its content for streaming, and you could argue that it's unethical too – many artists depend on YouTube's adverts for their income, so any ad-free playback you do is depriving them of money. We suspect the legality of this is similar to ad-blocking: content owners would rather you didn't do it and try their best to stop the tools from working, but there's not a lot they can do to prevent you watching videos ad-free if your listening comes under 'fair use' in copyright terms. Then again we're not lawyers, so proceed with this at your own risk.

**T**here are many reasons why you would want to download YouTube videos, as anybody who's going to be in a poor coverage area, who has a capped mobile broadband data plan or who won't be able to stream high-quality video will appreciate the ability to download YouTube videos for offline use. It's also handy if you suspect that the video is about to disappear for sinister reasons too...

Downloading videos from YouTube couldn't be simpler, although the methods you employ will depend on the device that you are using.

### Add playlist to Offline

Normal - 360p

HD - 720p

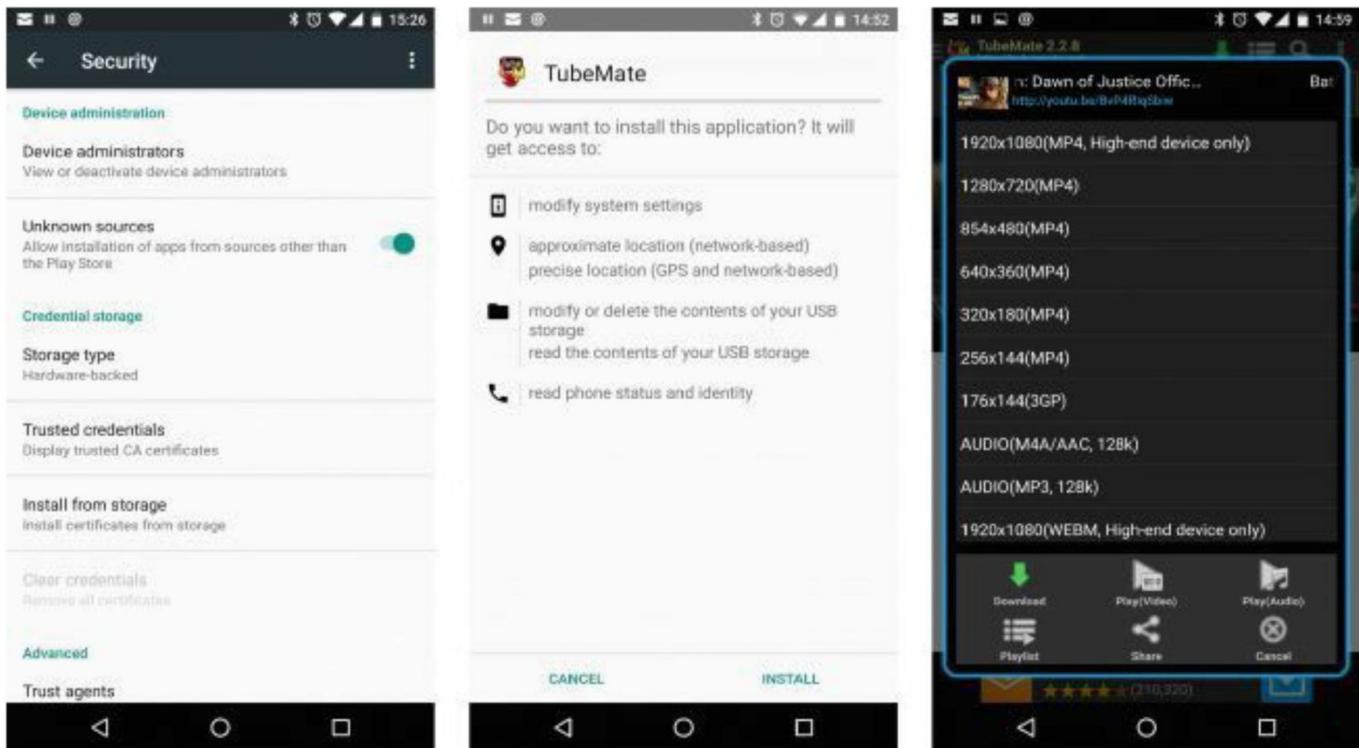
Remember my settings

Cancel

OK

Check to see if the video you want has been made available for offline viewing.

In this guide we'll show you how to download YouTube videos for free, as well as looking into the ethics and legality of downloading YouTube videos.



## Download to your Android phone

YouTube added offline viewing to its Android app back in late 2014, but the feature is limited to YouTube Red subscribers. If a video is available for offline viewing (not all videos are, and it's up to the video owner to decide whether offline viewing should be available for each clip) you'll see an icon showing a down arrow. Tapping on that will download the clip for offline viewing.

However, this isn't the most flexible of ways to download YouTube videos to your Android device, but at least it's officially supported. If you want a bit more freedom to download YouTube videos on Android, then you should look at using a third-party app.

There are a number of free apps to help you download YouTube videos, and one of the best ones is TubeMate. This app isn't available on the Google Play Store, so first of all you'll need to allow your Android device to install and run apps downloaded from other places. Be cautious when you turn on this setting, as you'll want to make sure you only download apps that you know are safe and reliable.

**"Downloading videos couldn't be simpler, although the methods you use depend on the device"**

Open up Settings and go to Security. Scroll down and next to where it says 'Unknown sources', tap the toggle to turn this setting on. Now on your Android device browse to the TubeMate YouTube Downloader website and tap Download. You may see a warning message pop up about downloading .apk files, so click OK to allow it. Once downloaded, run the file and then tap to install it.

With the app installed, open it up and watch videos as you would in the normal YouTube app. If you see a video you want to save for later, load it up, then tap on the green arrow icon at the top of the screen. You'll be given a range of video formats and resolutions to download the file as. Select the one you want and it will then download the YouTube video to your Android device.

## Download to your PC

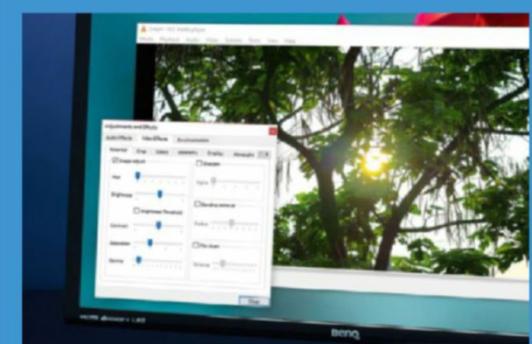
It's important to note that under YouTube's terms and conditions, downloading other people's YouTube videos is prohibited. If you've submitted your own video, you can download it by logging into YouTube, going to your channel's

## WHAT FORMATS CAN I DOWNLOAD YOUTUBE VIDEOS IN?

If you're downloading using the YouTube app for Android, you'll download an MP4 video file – although it appears to only play back in Google's own YouTube app. With video-converter services, you'll usually get a choice of file formats. The most common of these are MP4, 3GP, AVI, and MOV; the choice of format and quality settings will affect what you can watch your video on, and how good the video will be.

If you're not too fussed about video quality, 3GP is the file format for you. It's perfect for small-screened mobile phones and awful on anything else, but the files are tiny – which matters on old mobiles, since they don't usually have very much on-board storage or any memory expansion capabilities.

For other devices, MOV is Apple's video format and works on every Mac, AVI was developed by Microsoft and works happily on PCs, and MP4 is the video equivalent of MP3 and works on pretty much everything. For maximum compatibility we'd suggest that you stick with MP4.



Need to play back various formats on your PC? Get hold of VLC from [www.videolan.com](http://www.videolan.com) – it's supremely compatible.

**Clip Converter** offers a simple way to download YouTube content to your PC.

Welcome to Clip Converter - YouTube to MP3, MP4 Downloader and Converter!

Video URL to Download:  ...or Upload and Convert File

Conversion Format:  Download  MP3  M4A  AAC  MP4  3GP  AVI  MOV

**Clip Converter** is a free online media conversion application, which allows you to record, convert and download nearly any audio or video URL to common formats. Currently supported services: YouTube (720p, 1080p, 4K), Vimeo and many more. This free and fast converter allows you to watch your favorite YouTube videos offline on your PC, TV or nearly any other device.

**How to convert and download a YouTube video:**

1. Paste your YouTube URL at 'Video URL' and press Continue.
2. Select the format (MP3, MP4, M4A) and the options for the conversion. The default options are for most videos a good setting.
3. Press the 'Start' button at the bottom to start the conversion.
4. This may take several minutes. After the conversion is finished you can download the converted file.

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## HOW ABOUT VIDEO QUALITY?

The next decision you'll need to make is the video quality. If you're downloading via a service such as ClipConverter, you'll be given a choice of video sources. That's because YouTube streams in multiple qualities ranging from 3GP for old mobiles to 4K Ultra HD for large Ultra HD displays.

3GP aside, you have five options here for your computer, smartphone or tablet: 360p, 480p, 720p, 1080p and 4K (if available). The higher the quality the bigger the file, so the trick is to balance quality and size: unless you're watching on a really big screen, you can probably manage without 4K or even 1080p quality unless you've got oodles of spare storage – although watching 360p video on a typical HDTV or HD tablet display is likely to be a fairly blocky experience.

Unless you have unlimited storage capacity, the trade-off usually means finding the lowest video quality that you can tolerate on the display you'll be watching the video on.

If the video you're downloading has music, it doesn't matter what video quality you choose – the soundtrack has the same bit-rate whether you go for a 480p video or a 4K one. That's because YouTube's audio and video streams are two separate things, so adjusting the video quality doesn't make any difference to the quality of the soundtrack.

## "There are lots of YouTube video downloader sites and apps, but many can be less than reputable"

Video manager, finding the video you want to download and then clicking Edit > Download MP4. If that doesn't work, for example because YouTube has decided you've downloaded too many of your own videos (the limit is two videos an hour) or because the clip contains an audio track you didn't write yourself, then you'll need to turn to a third-party app.

### Download YouTube to your PC with an app

There are lots of YouTube video downloader websites and apps, but many of them can be less than reputable: expect unwanted software installation, misleading download links, terrifying terms and conditions and masses of other dense information to sift through. We've come to trust ClipConverter.cc, www.clipconverter.cc/ though, since it doesn't do any of those

things. However, if you stumble across a better alternative, please do let us know!

Using ClipConverter couldn't be simpler. Point your browser to its website, paste the URL of the YouTube video you want to convert, choose the file format you want and edit the options (if you want to – the defaults work well too).

The web app will then give you a choice of sources at different quality, ranging from tiny 3GP mobile files to huge 4K Ultra HD files, and once you've chosen your options clicking on Start will fly through the conversion process and present you with a download link on completion.

You don't have to capture entire videos, either – if you only want to download a chunk, for example because you're using it for criticism or review, you can specify the start time and end time for the file conversion. ■

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The blockchain and the Internet have spawned cryptocurrency, and it's here to stay

# THE RISE OF NEW MONEY

**O**n January 3, 2009, a programmer (or programmers) working under the pseudonym Satoshi Nakamoto launched something remarkable: a new form of money, a digital cryptocurrency called Bitcoin. The idea was that Bitcoin would be completely independent of outside forces – no banks, no governments. It would be a distributed method of wealth that required no trusted third party to verify transfers or hold money. Supply was limited, to combat inflation. A simple idea done with clever maths.

Cryptocurrencies run on a peer-to-peer system. Transactions take place between two parties without intermediaries, verified by horribly involved calculations. This maths is based on public-key cryptography; put very simply, each transaction is verified by the completion of a series of cryptographic puzzles, and added to the blockchain. The blockchain is the ledger, which is distributed and checked by the network. To reward those who do the hard work of maintaining the ledger, they are paid in coins – as you ‘mine’, you run the network.

The maths may be complex, and the concept big, but in use, it’s fairly easy. Create a wallet with public and private cryptographic keys, and you can buy and transfer coins. At first glance, there’s one clear problem: no collateral at all. Bitcoin is built on sand and trust, yet it works...





A novelty gold-plated version of the Bitcoin – there are a good few of these about. Worthless, but it provides something to photograph for Bitcoin articles, at least.

**E**nthusiastic early adopters got the Bitcoin gears turning, but the initial value of the coins was negligible and negotiable, and they were traded between friends. The first cited proper purchase took place in May 2010, for two pizzas, at a cost of 10,000 coins.

In July 2010, a Bitcoin was worth eight cents. By early 2011, it achieved parity with the dollar. Early this year, it reached parity with gold. Since then, it has gone well beyond that. As we type this, a Bitcoin is worth £5,939. Those pizzas cost the equivalent of over £59 million today. Bitcoin maybe valuable, but it's also volatile – at the time of writing, it had jumped to a high of £6,002 and fallen to a low of £3,935 all within the past month. There have certainly been some spectacular slumps along the way, the value halving or worse a number of times.

Money is trust, and to be worth anything, it must be transferable to goods or other currencies. At first, you would have to talk a merchant into accepting it; now, Bitcoin has reached a turning point, depending on where you are in the world. It is not fully integrated with the banking system, or even legal tender, yet it can be spent.

The United States Department of the Treasury classifies cryptocurrencies as virtual currencies, and therefore not under its remit; however, their generation counts as money transmitters. Last year, a US federal judge ruled that Bitcoins are "funds

within the plain meaning of the term". So, it is money. In China, individuals can trade in Bitcoins, but the banks cannot.

Elsewhere in the world, it ranges from being completely illegal to being widely accepted as money. Generally, it is treated as 'private money', not legal tender, but is still wealth, and subject to the same taxation. One acid test for money is whether you can pay your taxes with it. That next step has been taken. From April this year, Japan started counting Bitcoin as legal tender. Russia, Germany, and others reportedly have plans for similar steps. Bitcoin is on the verge of going fully legit. Full government approval inevitably leads to regulations at some point, or attempts, anyway.

### Financial stability

Until legislation fully catches up with cryptocurrencies, you are operating largely outside the traditional financial framework, and therefore the legal protection of the central banks and governments, including in the UK. You are pretty much on your own if things go wrong. Don't panic, though; Bitcoin has amassed enough adherents to be respectably stable.

Another acid test for money is whether you can swap it for other money, preferably the folding kind. To do this, you need to go to a Bitcoin exchange. There are some 64 of these worldwide, and levels of security, privacy, and control vary. Over the years, a number have had their security breached, gone bankrupt, or, in at least

one case, simply disappeared with all the funds. This is where that democratic and distributed – and hence loosely regulated – aspect of cryptocurrencies can look worryingly fragile. Some research is recommended before you start making large transactions. Scary? A little, but the cowboys are rapidly being weeded out.

The days of these unregulated exchanges may well be numbered, anyway. Becoming legal tender opens the way for the traditional financial institutions to start trading in Bitcoin. Increasingly, it is becoming yet another cog in the wheels of international business. This summer, the Swiss bank Falcon added Bitcoins to its accounts – customers can now buy and hold them in their own accounts. At the end of August, this was expanded to Ether, Litecoin, and Bitcoin Cash, too. Amazon, Apple, and Google are all working on integrating Bitcoin services.

Widespread adoption is coming quickly.

Meanwhile, there are more than a few technical problems to deal with. The increasingly technical complexity of transactions has begun to drag. Currently, a Bitcoin transaction takes about 20 minutes to process; occasionally, an hour or more. On smaller deals, merchants often ignore this, and take the payment on trust – if you are buying a fancy new watch, you'll probably have to wait.

This, along with the attendant meagre results when mining, has helped spark a bit of a civil war in the Bitcoin camp, which led to it being split

## TOP CRYPTOCURRENCIES YOU CAN MINE



Bitcoin was the first and is by far the largest cryptocurrency, with a market capitalisation of \$133-odd billion. However, it has spawned many more, and these are the current biggest alternatives. Values here are, as ever, volatile as anything.



**ETHEREUM**  
Launched in 2015 and subject to huge recent growth, Ethereum is currently worth about \$34 billion (£25 billion). It uses a scripting language, which can be executed over the network, making it an ideal platform for other applications.



**BTCIN CASH**  
Split from Bitcoin earlier this year, Bitcoin Cash's coins are currently worth around 15 percent of the value of the originals, or \$20 billion (£15 billion) as a whole. Bitcoin Cash (BCH) uses a larger block size to increase the speed of any transactions.



**LITECOIN**  
Worth over \$3.8 billion (£2.8 billion), Litecoin is technically very similar to Bitcoin, although tweaked to be faster – transactions are currently about four times quicker. It was launched in 2011, which makes it one of the original cryptocurrencies.

**DASH**  
Worth about \$3.4 billion (around £2.5 billion), Dash is similar to Bitcoin, but uses a two-tier structure of miners and masternodes. Self-funding and self-governing, it operates a decentralised business model known as a DAO.



in two. A clone of Bitcoin was created – Bitcoin Cash – which altered the maths to allow for much faster transitions. Unfortunately a software upgrade, called SegWit2x, which was due in November and aimed at speeding up Bitcoin transactions was cancelled at the last minute – making the value of Bitcoin even more volatile. Interestingly, the upgrade was also causing conniptions, leading to a talk over a second split or ‘hard fork’.

The decentralised nature of Bitcoin was designed to ensure no single failure would have much impact, and no single player could dictate terms. That has been eroded considerably now; huge swathes of the network run in large data centres. Salcido Enterprises is building a data centre in North Washington, USA that will consume 7.5MW of hydro-electric

power. Going further up the scale, in Xinjiang province in China, a major player called Bitmain is building a data centre that will consume up to 135MW of power, and Bitcoin mining will be its main job. Bitcoin has come a long way from its hobbyist roots.

Bitcoin has an intrinsic limit of 21 million coins, which is expected to be more or less reached by around 2040, although it'll take a lot longer to mine the very last block. What happens then could be awkward. By this point, the complexity of the blockchain will be considerable, and there will be no new coins to pay for running things. It's inevitable then that transaction fees will have to be levied at some point.

As a cryptocurrency ‘matures’, it increasingly falls under the control of those with the computing power to run it. Control over the supposed

democratic and distributed currency gathers around the big data centres and the exchanges. It's an old story: The ‘kids’ come along with something cool, and the ‘suits’ take it away, commercialise it, and sell it back. Man. However, digital money's full integration into more mainstream financial markets is hampered by its very nature. The markets like centralised exchanges and institutions, and don't like volatile currencies.

### Volatile value

Rapid changes in value are not too much of an issue when ordering pizza, but a corporation making a big international payment won't like to see percentage swings in value of the currency used over the minutes or hours it takes to verify a payment, which could end up being millions of dollars either way.

The central concept of the blockchain is proven, though. A number of currencies have been created that cannot be mined, but concentrate on the business of transfers. They launch with a fixed number of tokens. The biggest of these is Ripple, currently worth over \$9.1 billion (£6.7 billion). The aim is similar to Bitcoin: seamless and easy transfers of any currency to anywhere else, with no third-party fees or involvement. It positions itself as a complement to, not a rival of, Bitcoin. Transactions go through in seconds, which alleviates the problem of the currency's value



**ETHEREUM CLASSIC**  
This was born out of a fork of Ethereum after the DAO Ethereum spin-off project had \$50 (£37) of its Ether tokens stolen. Ethereum Classic is the original Ethereum blockchain, and is currently worth around \$1.7 billion (£1.26 billion).



**BITCONNECT**  
Launched in February 2016, BitConnect has seen huge growth since, with coins jumping 1,800 percent in six months, and currently worth \$624m (£461 million) in total. BitConnect includes the facility to earn interest on lent coins.



**MONERO**  
Based on different technology to Bitcoin and a fork of Bytecoin, Monero experienced huge growth thanks in part to its use on the darknet market AlphaBay (now defunct). Currently worth about \$2 billion (£1.5 billion).

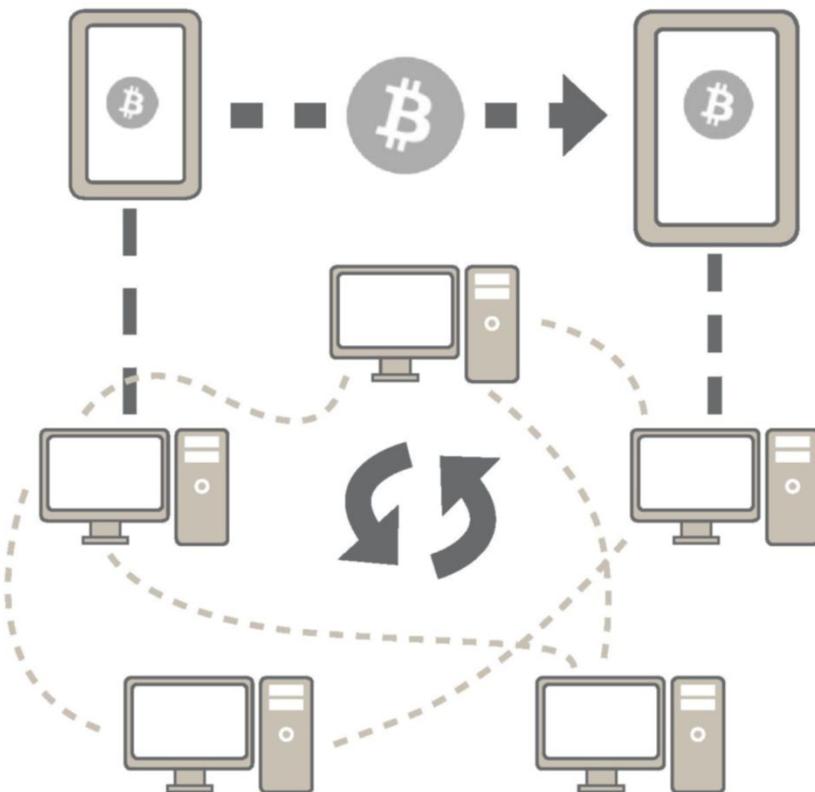


**ZCASH**  
Under a year old and already worth \$792 million (£585 million), Zcash's blockchain can hide the amounts and recipients, or make selective disclosures to third parties – making it handy for complying with money-laundering and tax regulations.



**BYTECOIN**  
Not to be confused with Bitcoin (BTE versus BCN). The first currency based on the CryptoNote protocol, which is behind a number of coins. Old for a cryptocurrency, it's been around since 2012, and is current valued at \$234 million (around £173 million).

# THE BLOCKCHAIN



It's a little complicated. And it should be – it's cryptography. Every requested transaction is packaged into a block with a timestamp, and broadcast to every machine on the network, the nodes, to be verified. Once it is, the transaction goes through, the block is added to the chain, and all nodes are updated with the new longer chain. This blockchain is essentially a list of transactions.

To verify a transaction, the blockchain must be checked to ensure sufficient coins have been added to your account to cover the output. These are then not considered valid for future transactions. Coins are kept in a wallet application, protected by cryptographic keys – one public, one private. Your transaction is encrypted using your private key and the recipient's public one, to

ensure only they receive it, and they know it's from you.

Before a block can be added to the chain, each must contain the answer to a complicated maths problem, created using a one-way cryptographic hash function, which essentially turns input into a mass of tangled data. To unlock this requires the network to guess a number which, combined with the previous block, gives the correct answer. Thus, each block is cryptographically locked to the previous one.

These puzzles take considerable power to unlock. To reward those who go through the hard work, successful solutions receive Bitcoins. Each block can contain multiple transactions, limited by the block size: currently 1MB, with typically 1,700 transactions for a Bitcoin. The difficulty level is periodically recalculated, to

ensure that security is maintained, and that each block takes about ten minutes to process. Every four years, the block reward is halved.

Security is tight. Nodes only accept the longest verified chain, and any erroneous block quickly disappears. To force the system to accept a modified transaction would involve taking on the combined mathematical power of all the nodes. Blockchain technology isn't limited to cryptocurrencies; coins can represent anything, such as shares, copyright registrations, digital identities, contracts, votes, or anything else you want to keep on a secure verifiable ledger. Or the tokens can be the data itself – distributed secure cloud storage is being worked on.

You are going to hear a lot more about blockchain apps in future, for sure.

bouncing around too much. It's designed specifically with banks and business in mind, citing better security and scalability than Bitcoin and its ilk. You can trade in these business-orientated cryptocurrencies on the exchanges, but there's none of the fun of mining, or watching values bounce around.

Mining coins offers the tantalising prospect of 'free' money, and it's this aspect of cryptocurrencies that catches the eye of many. Fortunes made by adopters of the first currencies have fuelled a healthy interest in new launches. Getting in early is key: Hit on a coin that rises, be one of the first to mine, and you're a millionaire in days. Yeah, well, probably not. It's not 2012 anymore, and anything that looks to have a chance of being remotely successful has serious computing power thrown at it in short order. Despite what the sellers of mining machines may say, it is a tenuous business to run on a small scale, unless you hit the right vein.

## Losing money

Any cryptography can be broken. The early years saw a number of large losses. In 2014, 650,000 coins were stolen from what was at the time the biggest exchange – Mt. Gox, in Japan – leading to its bankruptcy, and the halving of Bitcoin's value. Technology is improving, but there will always be the shadow of hacks, as there is in all electronic banking systems, generally originating from inside the company. The foundations of Bitcoin have proved to be robust enough to survive early glitches, though.

As with any digital property, duplication is easy. If there can be one, there can be many. There are currently over 600 cryptocurrencies, and frequent new launches. Their values drop as you scroll down the lists, from Bitcoin's billions to virtually nothing for new contenders. There's Titcoin, which is, ahem, designed to pay for 'adult services'. And PotCoin, which is, well, you guessed. Others are plain scams. At the bottom of the market, it's like the Wild West.

Last year, one of the senior Bitcoin developers, Mike Hearn, rather publicly left, and told the world why. He claimed it was a 'failed experiment'. He bemoans the fact that, while founded on libertarian principles, Bitcoin was effectively controlled by five people who have the authority to change the source code, and that there was much dissent between them. The other problem he cited were the big miners: 95 percent of the network is controlled by a handful of people with big data centres. "The fundamentals are broken, and whatever happens to the price in the short term, the long-term trend should probably be downward".

His points about the control of Bitcoin are valid; his prediction on price is anybody's guess. However, Bitcoin is

increasingly looking to be a solid bet in the long term. A number of big players have made considerable investments in cryptocurrencies: venture capital names and hedge fund managers, through to key figures in the tech business.

Snapchat's Jeremy Liew went as far as postulating a Bitcoin value of \$500,000 (£369,600) by 2030. If that sounds optimistic, he is not alone. Facebook's Chamath Palihapitiya said that "it's the ultimate insurance policy against autocracy, currency curbs, and other forms of value destruction". The digital equivalent of gold under the bed. Cryptocurrencies are popular in countries that have experienced financial disasters, such as hyperinflation, or have lived under oppressive governments. Not quite what its originators had in mind, but still. Big names invite confidence, and it's this that keeps Bitcoin and its friends afloat. Bill Gates believes in it, and that's good enough for most.

Predictions of any authority on the cryptocurrency market in the short term are next to impossible. It is young and volatile, and we can expect more spikes and crashes along the way. As markets mature, they tend to coalesce. Many smaller currencies will fade. Can Bitcoin make it? In one form or other, probably. Most likely as an investment unit; it's just too slow in its current form for everyday money transfers. Bitcoin may not remain the main player, but it's attracted enough investments to ensure it can survive some pretty heavy weather.

There are some terribly enthusiastic supporters for Bitcoin. They talk of a revolution, of values hitting \$250,000 (£184,800) a coin by 2020. A tantalising possibility. Given its limited supply, it would take much investment capital moving from gold or shares into Bitcoin to send values skyward. It has reached a point for many where a coin or two in a balanced portfolio is well worth considering. Bitcoin cannot be manipulated by governments; you cannot simply create more. Soon it will be readily tradable for goods and services, and be part of the monetary system. Then you may well be glad you have one. There are issues, which Mike Hearn highlighted. It may be free from government control, but it is still under control, and currently by a rather small group. There are interesting times ahead. Yes, Bitcoin could crash and burn, but so can any monetary system.

It's clear that digital currency is here to stay. To those raised on hard cash and chequebooks, cryptocurrencies look odd. There's no collateral, nothing underneath. But the genie is out of the bottle, and our kids won't know a world without them. Meanwhile, there's one clear winner: Satoshi Nakamoto. He/she/they mined a lot of the early coins, a million or so. ■

## MINING COINS

**Asus's forthcoming B250 Mining Expert board will offer a staggering 19 expansion slots, in order to fit as many GPUs as possible in a single system.**



Cryptocurrency mining has recently led to a scarcity of certain graphics cards, such as AMD's Radeon RX480.



Mining Bitcoins means running the SHA256 double round hash verification process, the maths that verifies each block in the chain. Complete a block, and you are rewarded with a portion of a coin. Essentially, your processing power is converted into coins. The main cost is the electricity burnt to run the hardware. To help take some of the randomness out of hitting the solutions to each block, it's best to join a mining pool, where efforts and rewards are spread.

In the early days, an average PC could do the job – the blockchain was short and the maths simpler. Fat chance now; you really need Application-Specific Integrated Circuits, or ASIC machines. These rigs pack the required mathematical power but are otherwise pared down to the minimum. Mining power is measured in hashes per second – the base operation

of the cryptography. These days, this is expressed in trillions of hashes per second (TH/s). Probably more important is efficiency: watts per gigahash (W/GH). Powerful machines are not cheap – a 14TH/s box running at 0.1W/GH would set you back £2,000 or so. Older and smaller machines are much cheaper – £150 or so – but are horribly inefficient. Margins are tight, and the field of play very fluid. It's a delicate balance between profit and loss, and only the latest and most efficient hardware has a chance to run profitably.

Still want to mine? If you're serious, you'll need an air-conditioned room, with substantial racks of the latest ASIC machines, and a friendly electricity company. Too much? You can run a box or two at home, or cobble together custom rigs using high-end graphics cards. You don't have to own the hardware yourself; cloud

**ASIC machines do the majority of mining now. This is an Antminer S9, capable of 13.5TH/s. The other product is heat. Serious farms need air conditioning – or, better yet, they operate near the Arctic Circle.**

mines rent out capacity. You pay so much per TH/s, but you have to hope the cost is less than the returns.

New cryptocurrencies are a gamble; modest hardware may return lots of coins, which the market may then decide are near worthless. Accusations of scams abound, and many clones of current blockchains are launched, and many flounder. Yes, you could hit a winner early and win big, but the mining world is pretty savvy now, and competition is fierce. Or you could stick to one of the established cryptocurrencies, and find that you've turned £500 of electricity into £300 of coins. It happens.



# WINDOWS 10 FALL CREATORS UPDATE EXPLAINED

The Fall Creators Update is here! This is everything you need to know

**W**hen Windows 10 launched back in 2015, Microsoft promised that this would be the ultimate version of Windows that will continue to get new features and major updates well into the future, and it's stayed true to its word with the release of the Fall Creators Update, the most recent package of new features that's available to download for free.

Following on from this year's earlier Creators Update, and last year's Anniversary Update, the Fall Creators Update brings a wide range of new features and tools that makes Windows 10 even better. As the name suggests, many of these new features are geared towards creative pursuits, such as editing your home videos and photos, and exploring 3D worlds in mixed reality, but

it also brings some more serious, behind-the-scenes, updates that make Windows 10 even more secure.

There are loads of new and exciting features in the Fall Creators Update, so we've put together this six-page guide that explores the biggest changes, and how they can transform the way you use Windows 10. Of course, it's no good just banging on about the new features if you aren't able to use them, so we'll also show you how you download and install the Fall Creators Update right now, without having to wait for your computer to update itself.

The Fall Creators Update is a free update for all Windows 10 users, and it's been tested by Microsoft and a range of volunteers, so you should be able to download and install it without experiencing any issues.



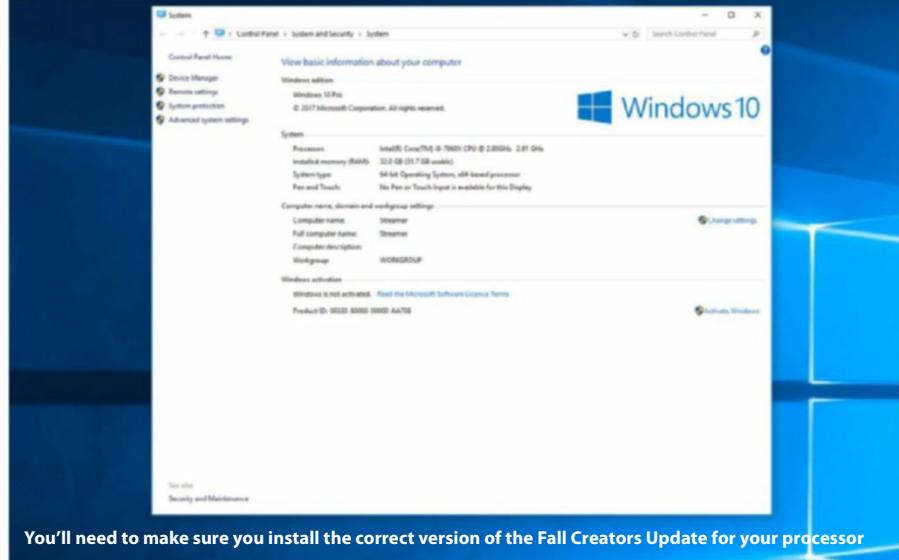
# Installing the Update

The Fall Creators Update will make your PC even better than before - here are the steps you need to take for a happy and hassle-free upgrade

**O**ne of the most pleasing results of Microsoft's determination to make Windows 10 the ultimate version of Windows is that you get a constantly-evolving operating system that's continually getting new features for free – rather than having to pay for a new operating system every five years. It also means you don't need to worry about compatibility – if your PC or device is able to run Windows 10, then it means you'll be able to install and run the Fall Creators Update as well.

As with previous major updates to Windows 10, such as the Anniversary Update, Microsoft will be rolling out the Fall Creators Update as an automatic update in waves. This means that for many people you won't need to do anything to get the Fall Creators Update – Windows 10 will quietly download it when you're doing something else, then will inform you when the update is ready to be installed.

By releasing the update in waves, it does mean you may have to wait for the update to appear. This isn't necessarily a bad thing, since it means Microsoft's servers aren't being hammered by millions of users wanting to get the update right away. It also enables Microsoft to monitor the success of the software, and catch any bugs or issues. If some arise, Microsoft can get to work fixing those while the update rolls out.



You'll need to make sure you install the correct version of the Fall Creators Update for your processor

If you are eager to try out the Fall Creators Update, and don't want to wait for the rollout to reach your device, we don't blame you, and thankfully there is an easy way to download and install the update yourself. Check out our step-by-step guide on the facing page that will take you through the process.

## Preparing for the update

Whether you wait for the update to reach you via Microsoft's rollout, or you manually download and install the Fall Creators Update, you should make sure that your device, and the important files

and documents you store on it, are backed up and ready for the update. After all, this is a major update to your device's operating system, and while it's



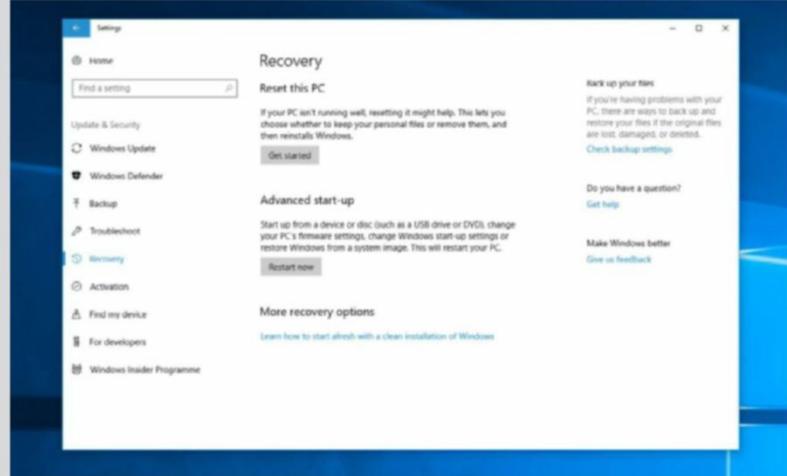
## Changing your mind

Once you have installed the Fall Creators Update, you're given a period of ten days to test out the new features. If, during that time, you don't like the update, or there are problems that prevent your PC from working, then you can easily roll back to a previous version of Windows 10.

To do this, go to Settings > 'Update & security' > Recovery and click on 'Get started' under where it says 'Go back to the previous version of Windows 10'. A window will appear

asking you why you want to revert to a previous version. Answer the question (this helps Microsoft improve future versions of Windows), then click 'No, thanks' from the next window. This is where you'll be asked you if you want to check for any updates.

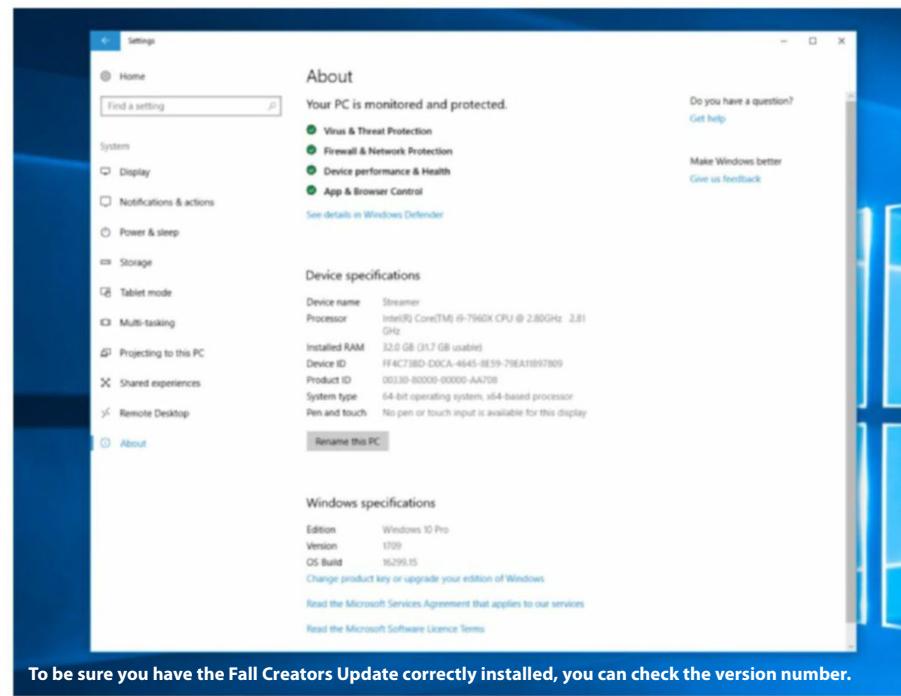
Click 'Next' on the window that follows, then 'Next' again, making sure you have your Windows login details handy. Then click 'Go back to earlier build' and the Fall Creators Update will uninstall itself.



After the ten-day 'trial' period has elapsed you won't be able to roll back the Fall Creators Update – you'll need to do a full Windows 10 reinstall instead.

unlikely that anything will go wrong, you don't want to put your irreplaceable files at risk unnecessarily. So, the first thing you should do is make sure you have copies of any documents or photos you do not want to lose. This can be done by either copying the files to an external hard drive or USB flash drive, or by making sure the files are also stored on a cloud service, such as OneDrive, which is built into Windows 10, or the likes of Dropbox or Google Drive.

You'll also want to make sure that your hard drive has enough space to download and install the Fall Creators Update. Microsoft recommends at least 16GB of space for the 32-bit version, and 20GB for the 64-bit version. Before installing the Fall Creators Update, you'll need to know which version you'll need. This is determined by whether or not your device has a 32-bit or 64-bit processor. As a general rule, most modern devices will have a 64-bit processor, but you can double-check to be sure by typing 'System' into the



To be sure you have the Fall Creators Update correctly installed, you can check the version number.

## "Make sure that your PC's hard drive has enough space to download and install the Fall Creators Update"

Search box on the Taskbar (right next to the Start menu button).

In the window that appears, there should be a setting labelled System. From there you'll see 'System type' and it is here that Windows 10 will state whether it is 32-bit or 64-bit. Once you know which version you're using, you can follow the guide below for installing the Fall Creators Update.

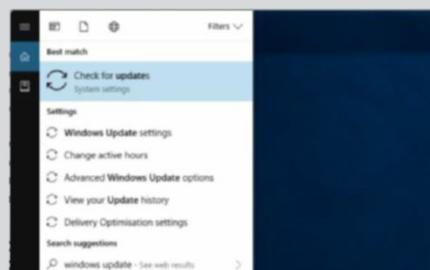
### After installing the Update

Once you've downloaded and installed the Windows 10 Fall Creators Update, you can quickly check to make sure you're running the update correctly by opening the Start Menu and clicking on the Settings button (the icon which looks like a cog). Click 'System' then About at the bottom of the left-hand menu. Under where it says 'Windows

specifications' there will be a number next to where it says Version. The Fall Creators Update is version 1709, so if that number, or one higher than that, is displayed, then the Fall Creators Update has been successfully installed on your PC or other Windows device.

As with any major update to an operating system, there may be a few bugs or issues that need to be ironed out. In the Search box on the Taskbar, type in 'Windows Update' and then select 'Check for updates'. If there are any further updates available, install them, since they may contain fixes for any problems you're experiencing – another reason to back up your PC.

## How to install the Fall Creators Update



### 1 Windows Update

The easiest way to download and install the Fall Creators Update is to use the Windows Update tool. Type 'Windows Update' in the Search box on the Taskbar, then select 'Check for updates'. If The Fall Creators Update is ready to be installed on your machine, it will appear here. Click to install the update, and follow the onscreen instructions. Your PC will need to restart, so make sure any open documents are saved before you begin.

### 2 Update Assistant

If the Fall Creators Update doesn't appear in Windows Update, then it means Microsoft hasn't rolled out the update to your device yet. Don't worry as Microsoft provides a tool for starting the upgrade manually, called the Update Assistant. Go to <http://bit.ly/2iWVGEV> and click 'Update now' to download it, then check for the latest version of Windows 10. Once downloaded, run it, then select Update Now. The tool will do the rest.

### 3 A fresh install

If you want a fresh install of the Fall Creators Update, you'll need to download an ISO file with it included. This will wipe all your files and settings, so make sure they are backed up first. Go to the Download Windows 10 web page (<http://bit.ly/2A3zV9B>), and where it says 'Create Windows 10 installation media', click the 'Download tool now' button. You'll need a blank DVD or a USB flash drive with 5GB of free space for the files.

# New features in full

The Fall Creators Update brings Mixed Reality, Fluent Design and better battery life to your PC – read on to find out these features can help you

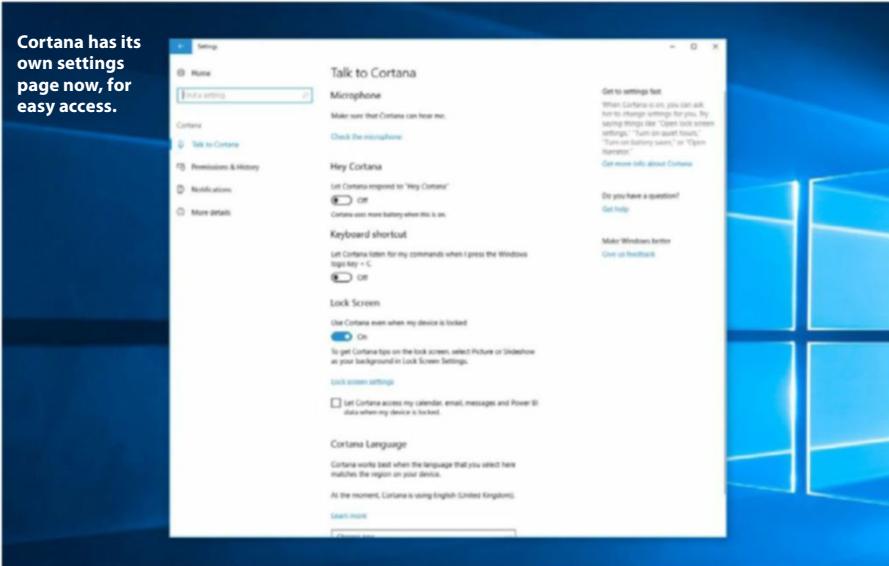
**N**ow that the Fall Creators Update has been downloaded and installed on your PC, the fun begins – checking out all the cool new things that Microsoft has included. There's a huge amount of new features included in this update, so we will focus on the most exciting additions.

## Windows Mixed Reality

Probably the most incredible feature to have been added to Windows 10 with the Fall Creators Update, Windows Mixed Reality has the potential to change the way you interact with your PC in future. Essentially, it enables you to use Windows 10 and various apps in a virtual reality (VR) setting. A number of big name brands, such as Asus, Dell, HP and Lenovo have created special headsets for Windows Mixed Reality.

You can explore Windows and its various Mixed Reality apps with the Mixed Reality Portal, which enables you to walk around a virtual home, and launch things from inside the home.

Paint 3D, Microsoft's reimagining of its classic Paint software that was brought in with the earlier Creators Update, has also been given a slight revamp with the Fall Creators Update, and now enables you to create 3D artwork and view it in 3D in either a virtual reality setting using the headset, or placed in the real world using augmented reality (AR). This



doesn't need any fancy headsets – you can simply use a Windows 10 laptop or tablet with a back-facing camera. The camera captures the real world, while Windows 10's Mixed Reality Viewer app intelligently places the 3D model into the real-world image displayed on the device's screen. You can even move your device around to view the model from different angles.

## Improved Edge browser

If you use Edge, Microsoft's default web browser in Windows 10, then you're going to love the Creators Fall Update,

since it brings a number of new features to the software. You can once again pin your favourite websites to the Taskbar for easy access, and the browser can



## Mixed Reality headsets

One of the most exciting new features of the Fall Creators Update is support for Windows Mixed Reality, and to coincide with the launch of the update, a number of big names in the computing world have launched their devices.

For example, the Acer Windows Mixed Reality head-mounted display (HMD) launched at £300, while the Dell Visor can be bought for £350. Both of these prices are well below the asking price of VR headsets such as the Oculus Rift

and HTC Vive. Other Mixed Reality headsets include the HP Windows Mixed Reality Headset, the Lenovo Explorer, the Asus Windows Mixed Reality Headset and the Samsung HMD Odyssey.

With this early support for Windows Mixed Reality from these brands, it's clear there's a lot of faith in Microsoft's new augmented reality (AR)/virtual reality (VR) platform – and we should see even more Mixed Reality devices become available in the very near future.



Windows Mixed Reality mixes augmented reality and virtual reality tech to bring you a whole new way to interact with your PC – and gadget makers are already getting onboard.

handle PDF files and e-books better as well, making it a very versatile tool.

So, if you have a stylus you can now write on and annotate PDF and e-books – useful if you’re using your device for studying, and you can also open and fill out PDF forms. As for e-books, your reading progress is synced with your Microsoft account, so you can carry on from where you left off when you switch to another device!

### Cortana is better than ever

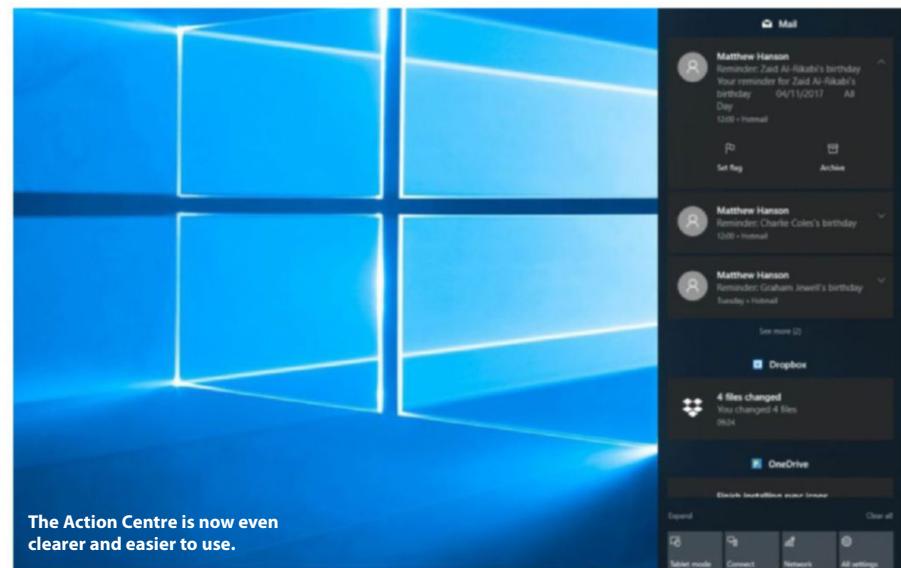
Microsoft has continued to invest in Cortana, the virtual personal assistant that made its debut with the first version of Windows 10, and it’s now smarter – and more useful – than ever before. You can now tweak Cortana from a new Cortana section in the Settings app, and the virtual assistant can now access your photos and recognise certain aspects of them, thanks to machine learning, enabling you to use Cortana to find particular photos faster. It even tags them for you.

**“Known as Fluent Design, this new look uses transparency effects to make Windows 10 look better”**

You can also ask Cortana to control your PC, so you can say ‘Hey Cortana, restart PC’ or ‘Hey Cortana, lock PC’, and the virtual assistant will do your bidding.

### Better battery life

The Fall Creators Update can also help prolong the life of the battery of your device. It does this thanks to a clever new feature known as Power Throttling,



which enables Windows to control your processor, putting it into a low-power state when it’s not doing anything too taxing. By dropping the power

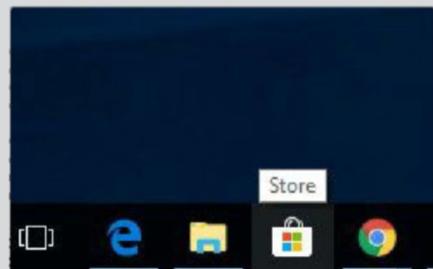
you should not see any nasty side effects as a result of this feature.

Power Throttling is turned on automatically when you set your PC to Battery Saver or Recommended mode in Windows 10. If you choose Best Performance, it’s disabled.

### Improved interface

Microsoft has been working hard on improving the look and feel of Windows 10, and you can see some of the fruits of its labours with the Fall Creators Update. Known as Fluent Design, this new look uses transparency effects to make Windows 10 look better, while being easier to use. The Start menu has seen elements of Fluent Design added, and it can now be resized horizontally and vertically. The Action Centre (which appears on the right side of the screen) has also been given a new look. ■

## Using the Microsoft Store



### 1 A new Store

Remember the Windows Store, that had an icon on your Taskbar and allowed you to install Windows apps? You’ll notice that with the Fall Creators Update the icon is no longer there – instead there’s a new icon that leads you to the Microsoft Store. Don’t worry, it’s essentially the same as before, it’s just that Microsoft has rebranded it so that it fits in with its non-Windows products – such as the Xbox One – as well.

### 2 Search the Store

Click on the icon to open the Microsoft Store and you’ll see the home page. This lists the top apps and games for you. Clicking on a tile will take you to more information. You can also browse by category: Apps shows you the Windows Apps available; Games if you fancy a break from working. Music, and Films & TV lets you buy or rent media. To find a particular app, game or media, type the name in the Search box at the top-right of the window.

### 3 Buy from the Store

Once you’ve found what you’re looking for, you’ll be taken to a new page where you’ll see additional information. If you choose a game and see it is an Xbox Play Anywhere title, you’ll also be able to play it on your Xbox One – and you won’t need to pay for a second copy! If the app or game costs money the price will also be shown. Click the Buy button and follow the instructions to pay for the selection and install the app or game on your PC.

# 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  
[windowshelpine@futurenet.com](mailto:windowshelpine@futurenet.com)

## Security PROTECT NETWORK WITH OPENDNS

**Q** I understand that I can use DNS settings to secure my computers at the network level. How do I do this?

**Craig Jarvis**



### Mayank's solution

OpenDNS ([www.opendns.com](http://www.opendns.com)) offers several ways in which

you can both improve security and performance across your entire network. For it to apply to every device on your network, log on to your router through your web browser and go hunting for its DNS settings – these may be on their own tab, on the main screen or under the DHCP settings.

For basic OpenDNS, set the primary DNS to 208.67.222.222 and the secondary DNS to 208.67.220.220 respectively. This

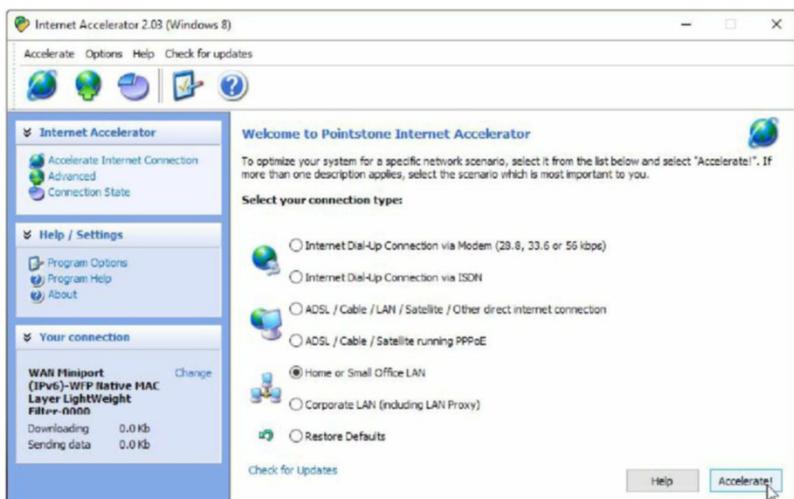
should deliver noticeably faster response times when accessing web pages. Some protection is built-in, but if you're happy to apply a network-wide pornographic filter, set the router's DNS settings to 208.67.222.123 and 208.67.220.123 instead. Now all adult content will be blocked automatically from all connected devices.

If that's a step too far, leave the basic OpenDNS settings in place and sign up for OpenDNS Home Free at <https://signup.opendns.com/homefree/> – once done, you can log in and set up custom filters utilising over 50 different categories. Set up your home network, then choose a basic filtering level: High, Moderate, Low, None and Custom are all available. Work through the various options for protecting your network from malware and botnets to phishing.

Finally, if your public IP address changes over time, tick Dynamic IP Update under Advanced Settings and download the Dynamic IP Updater client on a PC that's on 24-7, so changes are automatically

The screenshot shows the TP-Link Archer VR900 router's configuration interface. The left sidebar has tabs for Network, Internet, LAN Settings (which is selected), Interface Grouping, DSL Settings, Dynamic DNS, and Advanced Routing. The main area has tabs for Quick Setup, Basic, and Advanced (which is selected). Under Advanced, there is a language dropdown set to English. The LAN Settings section includes fields for IP Address Pool (192.168.35.51 - 192.168.35.254), Address Lease Time (1440 minutes, optional), Default Gateway (192.168.35.254, optional), Default Domain (optional), Primary DNS (208.67.222.222, optional), and Secondary DNS (208.67.220.220, optional). There is also a 'Client List' section showing 15 total clients. At the bottom right are Save and Refresh buttons.

**PROTECT YOUR  
HOME NETWORK**  
Tighten security at  
the router level  
with OpenDNS.



**WEB BOOSTER**  
Fine-tune your  
PC's network  
performance  
with the Internet  
Accelerator tool.

**Quickfire questions**

What's the difference between eMMC and SSD in laptops?  
**Adrian Ullswater**

eMMC solid-state storage is basically USB flash drive technology reworked for laptops. The best eMMC can't compete with SSD when it comes to benchmarks, so don't choose it if you're looking for fast performance.

Can you recommend a cheap alternative to Dreamweaver for dynamic web sites?  
**Will Ainsworth**

Try WebSite X5 ([www.websitex5.com](http://www.websitex5.com)), which adopts a wizard-like approach. Prices start from £14.50 if you get on with the trial version.

## "Internet accelerator tools attempt to tweak various system settings to fine-tune network and Internet performance"

forwarded on to your account; otherwise you'll need to log in whenever the IP changes to continue being supported.

### Internet **BEST INTERNET ACCELERATOR**

**Q** I would like to speed up my broadband connection.  
What's the best free Internet accelerator tool for Windows 7?  
**Peter Claxton**



#### Rob's solution

Internet accelerator tools basically attempt to tweak various system settings to fine-tune network and Internet performance. They won't have any effect on your physical connection, but you may find they have a minor performance benefit (it's unlikely you'll see major improvements, however). We could only find one free tool – Internet Accelerator, which you can download from [www.pointstone.com](http://www.pointstone.com) (look under Software > Freebies). Although Internet Accelerator will run on Windows 10, it's not been designed for it; we recommend trying it on older versions of Windows, and take a System Restore point or drive image first, just in case it makes things worse and the Restore Defaults option doesn't work.

### Windows **UPDATE CRIPPLED MY USER ACCOUNT**

**Q** My main – and only administrator – user account has lost key functionality after a

Windows feature update: no Start menu, search facility, library files or drive access. I've tried various solutions, and even performed a refresh install, but it hasn't fixed the problem. Strangely, my wife's non-administrator account is unaffected. Please can you help?

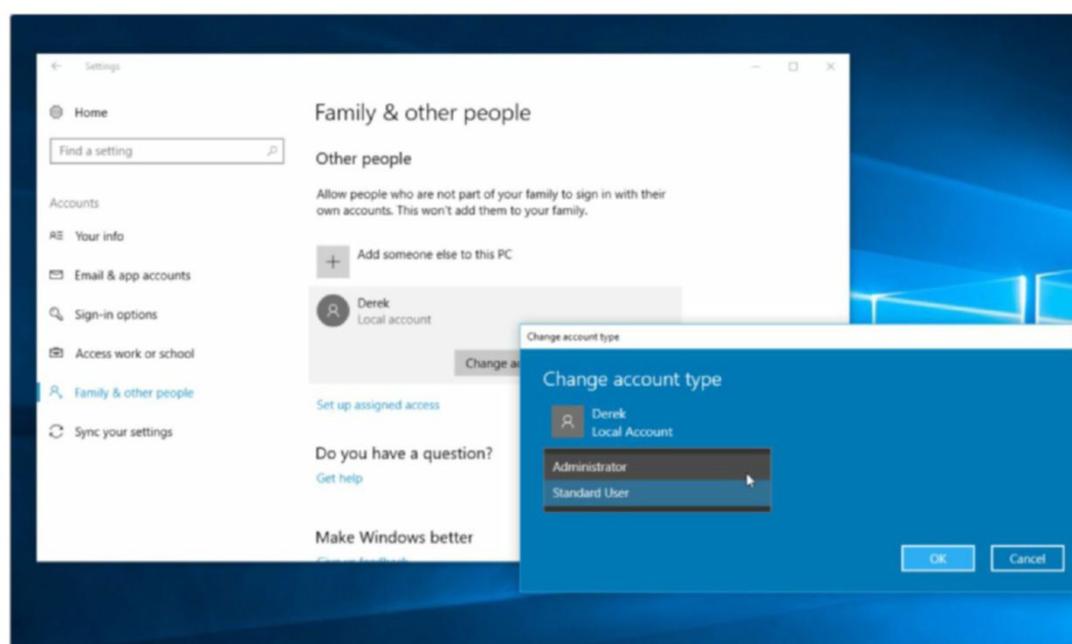
**Kevin Riddick**



#### Nick P's solution

Kevin had managed to create another user account, but it was a standard user, with no apparent means for elevating to administrator. Thankfully, this can be done by temporarily enabling the system Administrator account. First, while logged into your

**ELEVATE ACCESS**  
Use a system  
Admin account  
to upgrade a  
Standard User.



**Jargon buster!**

**► DNS (Domain Name System)**

A naming system used to connect a website's domain name – such as Microsoft.com – to its Internet Protocol (or IP) address (64.4.11.42).

**► eMMC**

Stands for embedded MultiMediaCard, a memory card standard, based on USB flash drive technology that is used for solid-state storage. eMMC is normally integrated into a device's motherboard.

## Quickfire questions

Whenever I try to print my bank statement from NatWest using the Print command in Edge, it comes up with my printing app, but the preview screen just seems to get stuck. Everything else prints fine.  
**Graham Moore**

Try looking on the web page for a Print icon or option – clicking this should deliver better results. However, if this doesn't work, try another web browser such as Google Chrome or Mozilla Firefox.

My friend's PC won't boot. What's the easiest way I can log on to it and copy off key files for him?  
**Sharon Crews**

AOMEI has just released PE Builder 2.0 ([www.aomeitech.com/pe-builder.html](http://www.aomeitech.com/pe-builder.html)). Create a rescue DVD or flash drive on your PC, then boot from that to recover the files in a Windows-like environment.

How can I stop Google Backup and Sync throwing up an alert every time I connect a new drive to my PC?  
**Bev Davis**

Right-click the Google Backup and Sync icon in the Taskbar notification area, click the More button and then choose Preferences. Once there, click 'USB devices & SD cards' and untick 'Plug in a camera or phone to back up files'.

non-administrator account, right-click the Start button and choose 'Command Prompt (admin)' or 'Windows Powershell (admin)'. Enter the password for your corrupt administrator account, then type the following command:

**net user Administrator /active:yes**

Close the command prompt window, then log out. You should see a new Administrator account appear, select this to log in (it's not password-protected). Now go to Start > Settings > Accounts > 'Family & other people'. Select your new account and click 'Change account type'. Select Administrator and click OK.

Log out of the Administrator account and back into your new account – click Start > Settings > Accounts > Your Info to verify the account is now an administrator one. You can now open another Command Prompt (admin) window and type:

**net user Administrator /active:no**

Once you've transferred any files or settings across from your old user account to your new one, you can then delete the old account.

### Data recovery RECOVER DATA FROM A USB FLASH DRIVE

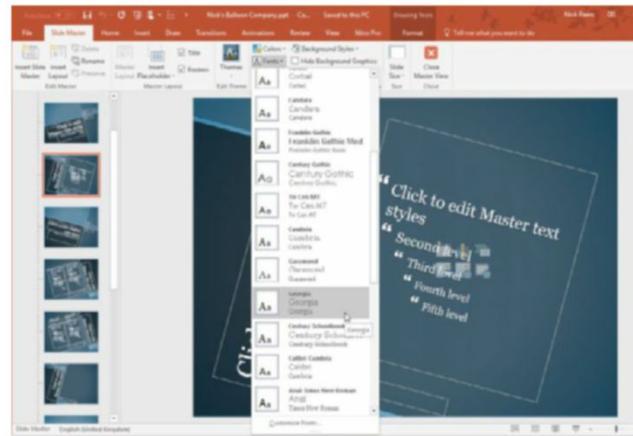
**Q** My flash drive got knocked out of my laptop at work and now I get a message that it needs formatting on whichever computer I plug it into. Can you recommend some decent recovery software that I can use please?

**Fred Pearce**



#### Cat's solution

Assuming the drive hasn't been damaged, you may have luck recovering the files using DMDE ([www.dmde.com](http://www.dmde.com)), which we featured in last issue's lead feature.



#### QUICK REFRESH Make changes to your master slides to update your presentation.

Choose the Physical Disk option and DMDE will scan for lost or corrupt partitions – hopefully it'll be immediately visible, enabling you to select and mount it, then copy the files off intact.

If this fails, you may need to take a risk and try a quick format when prompted by Windows. Once complete, DMDE or even Recuva ([www.piriform.com](http://www.piriform.com)) should be able to detect any recoverable data. As always with data recovery, avoid writing any files to the drive until you've recovered what you need.

### Microsoft Office UPDATE A SLIDESHOW'S LOOK AND FEEL

**Q** I want to update a slideshow's look and feel without having to rework it all from scratch. What's the best way to go about this?  
**Hannah Gillespie**



#### Rob's solution

If your slideshow's existing layout is based on templates created inside a slide master, then simply switch to the View tab on the ribbon and click Slide Master. You'll see all the slide template slides,

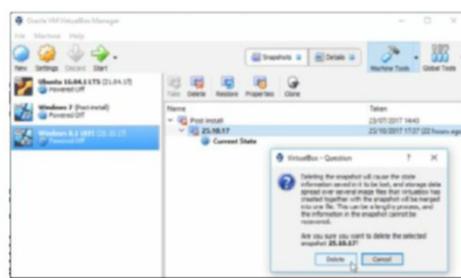
## CLONE AND COMPACT VIRTUAL HARD DISKS

**Q** I'm running out of space on my VirtualBox partition, where I keep multiple virtual machines. Can I reclaim drive space without having to move them?  
**Craig Hurst**



#### Rob's solution

There are two different techniques we'll look at – start by browsing to <https://forums.virtualbox.org/viewtopic.php?t=22422> where you can download and extract the portable CloneVDI tool. Then follow the steps outlined here...



#### 1 Streamline snapshots

Virtual machine snapshots take up a lot of space. Delete the ones that you no longer need by right-clicking a snapshot and then choosing Delete – their changes will be merged into the current state or the next snapshot in a chain.

#### 2 Clone VDI

Over time your virtual disk files will become bloated – by cloning the disk using CloneVDI you can opt to compact them by removing all unnecessary space. Launch CloneVDI and click Browse to select your source hard disk file.



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do our best to help:  
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@futurenet.com](mailto:windowshelpline@futurenet.com)  
Or write to:  
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complete with available layouts for each slide. Editing these – including updating fonts and styles – will automatically update any of main slides in your presentation based on the layout in question. You'll then need to go through the slideshow to see how the changes affect your slides – you may still need to tweak individual slides.

If slides aren't affected by these changes, simply right-click one and pick the closest possible match from the Layouts sub-menu, then tweak accordingly.

## Hardware FLAKY ETHERNET CONNECTION

**Q** Since upgrading to fibre broadband my PC's Ethernet connection has kept dropping out. I have a Wi-Fi adaptor, which works fine with it, and none of my other Ethernet-connected devices have any problems. What's the cure?

Tom West



### Mayank's solution

This could be either a driver problem or a hardware glitch. Tom tried a different Ethernet cable as well as router port, all to no avail, plus verified he had the latest drivers installed. The upgrade to fibre appears to have been coincidental, although the act of plugging the PC's Ethernet cable into a new router may have triggered or exacerbated an underlying issue. Tom revealed that his Ethernet port – which was part of his PC's motherboard – did wiggle when touched, which suggests a loose connection caused by a dry solder joint.

Tom wasn't confident with a soldering iron, but he had a spare internal PCI-Express slot, so we directed him towards the TP-Link

TG-3468 PCIe Gigabit Ethernet card (<http://bit.ly/2hTDmZQ>), which is available for around £8.50 online. Installing and using this resolved Tom's connection problem.

## Windows SYSTEM RESTORE PROBLEM

**Q** I'm stymied with regards to upgrading to Windows 10. My Windows 7 Ultimate PC refuses to carry out a System Restore, which I regard as vital when upgrading. The fault is 0x80070005, which appears to be a common one, but with no simple fix. Can you advise?

John Ellinghouse



**Nick O's solution**  
System Restore isn't needed during an upgrade – it's not

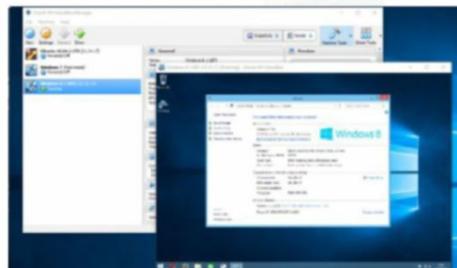
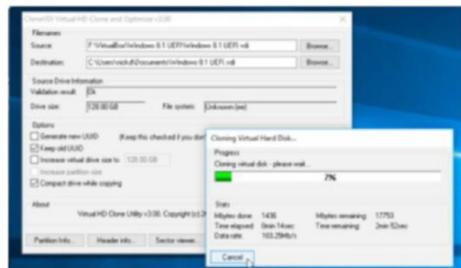
required should you subsequently want to roll back your system to the previous version. A more effective fallback would be to take a system image using Macrium Reflect Free ([www.macrium.com/reflectfree](http://www.macrium.com/reflectfree)) or the built-in Windows Backup and Restore tool – then if anything bad does happen, you will be able to restore Windows 7 effortlessly.

There's little point in trying to fix System Restore ahead of the upgrade – a better bet is to wait until Windows 10 is in place and see whether it's magically fixed by the update. System Restore will be switched off by default – switch it back on by typing 'System restore' into the Search box and clicking 'Create a Restore point'. If the problem persists, get back in contact and we'll continue to examine the problem. ■

**"The act of plugging the PC's Ethernet cable into a new router may have triggered the problem"**



**NETWORK FIX**  
Onboard Ethernet  
port playing up?  
Simply swap it for  
a PCIe card.



## Jargon buster!

### ► PCIe (PCI-Express)

An interface expansion slot found inside most desktop PCs. This is designed to house peripherals including graphics cards, expansion ports (such as USB) and network adaptors.

### ► UUID

Universally Unique Identifier. A 128-bit number used to uniquely identify an object. In VirtualBox, UUIDs are assigned to virtual drives to separate them from each other.

### 3 Set options

Click Browse... to choose a different folder or drive. Make sure that the name of the file matches the original. Tick 'Keep old UUID' and 'Compact drive while copying' on the main screen. Click 'Proceed' and wait for virtual disk file to be cloned.

### 4 Compact and copy

Once complete, check that the new file is smaller than the old file. If it is, move the original out of its folder, then move the cloned file in. Close and restart VirtualBox and test to see if the clone works correctly; if it does, you can discard the old file.

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# Welcome to... Windows 10

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

## Welcome



Just starting your Windows journey? Confused by the changes Microsoft has made to the

Creators Update? Maybe you just want to learn something new about Windows 10. Well, this is the section for you!

There's not enough space to tell you absolutely everything you need to know here, but *Windows Help & Advice* always has your back. On page 70 we'll show you how to master the desktop, customise application icons and take control of notifications; and on page 72 we'll explain how you can customise the Start menu from changing the default colours to managing your Live tiles.

**Matt Hanson**  
Associate Editor  
[www.facebook.com/windowsmag](http://www.facebook.com/windowsmag)

## Featuring...

**70** How to master the Windows 10 desktop

**72** Change the way the Start menu works

**REINSTALL  
WINDOWS FOR  
A FASTER PC  
SEE PAGE 12**

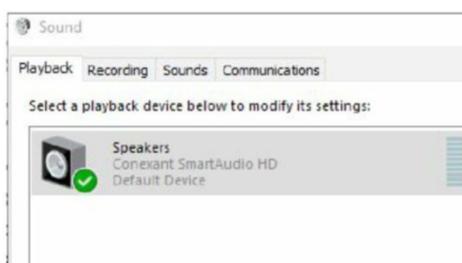


### Windows 10 tip of the month

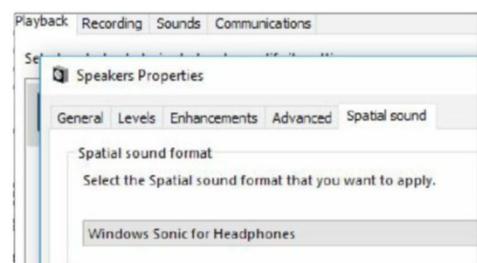
Experience a new world of sound

## Enjoy immersive sound with spatial audio

If you love watching movies or playing games on your PC, the Creators Update takes the sounds you hear to a whole new level, delivering spatial audio that really makes you feel a part of the action. To enable it, right-click the Speakers icon in the Taskbar. Select 'Spatial sound (Windows Sonic for Headphones)' and enable it. Or click 'Playback devices' to open the Sound control panel. Then follow these steps...



**PROPERTIES** Select the playback device you want to set up and select the Properties button or double-click.



**SOUND** In the pop-up window, click the 'Spatial sound' tab and choose 'Windows Sonic for Headphones.'

# Master the desktop

You'll spend a lot of time there, so here are some great ways to make it work for you...

**W**hen not actually using applications, the Windows desktop is where you'll spend much of your time, moving files about, hunting for that obscure application you installed six months ago and suddenly need, or lining up your windows so that they fill the space perfectly (a time-wasting

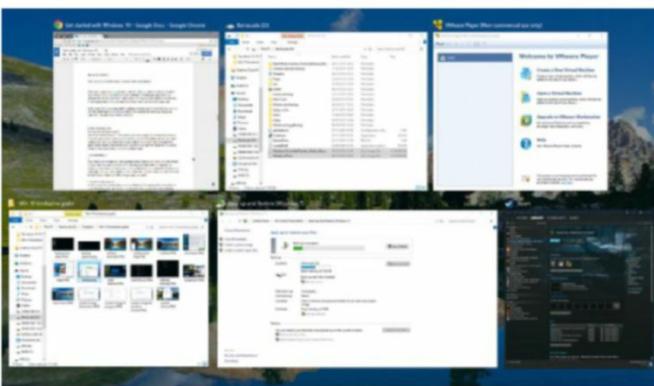
pastime that's all but dead now thanks to window snapping).

In Windows 10, the desktop and the Taskbar get a few new tricks that make working with files and folders even easier, and the new search bar means pulling up an application you don't use often is a breeze. Follow these tips to a happy start...



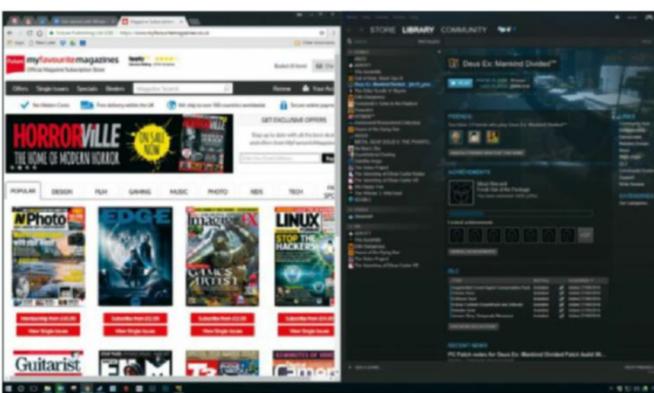
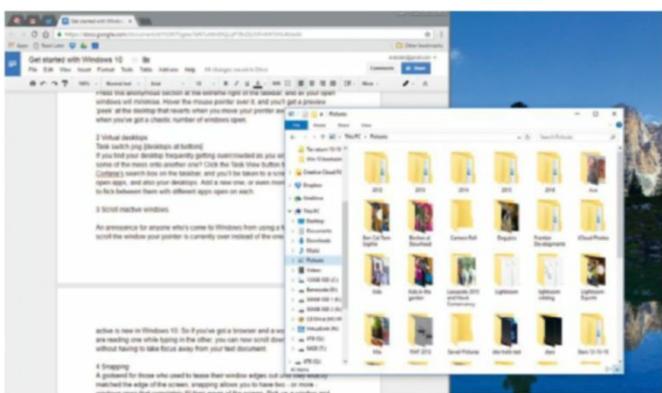
## 1 Show desktop/peek

The Show Desktop button isn't marked, and some people don't even know it exists. Press this anonymous section at the extreme right of the Taskbar, and all your open windows will minimise. Hover the mouse pointer over it, and you'll get a preview 'peek' at the desktop that reverts when you move your mouse pointer away. It's very useful when you've got a chaotic number of windows open on your desktop.



## 2 Virtual desktops

If you find your desktop frequently getting overcrowded as you work, why not offload some of the mess onto another one? Click the Task View button to the right of Cortana's search box on the Taskbar, and you'll be taken to a screen that shows your open apps, and also your desktops. Add a new one, or even more, and you'll be able to flick between them with different apps open on each. It's a great way to stay organised on your PC.

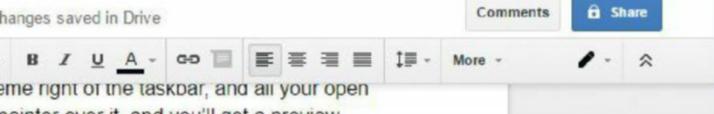


## 3 Scroll inactive windows

An annoyance for anyone who's come to Windows from using the Mac, the ability to scroll the window your pointer is currently over – instead of the one that's currently active – is new in Windows 10. So, if you have a browser and a word processor open, and are reading one while typing in the other, you can now scroll down in the browser without having to take your focus away from your text document.

## 4 Window snapping

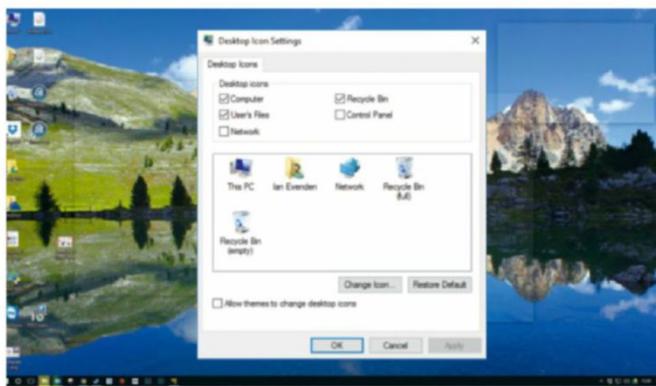
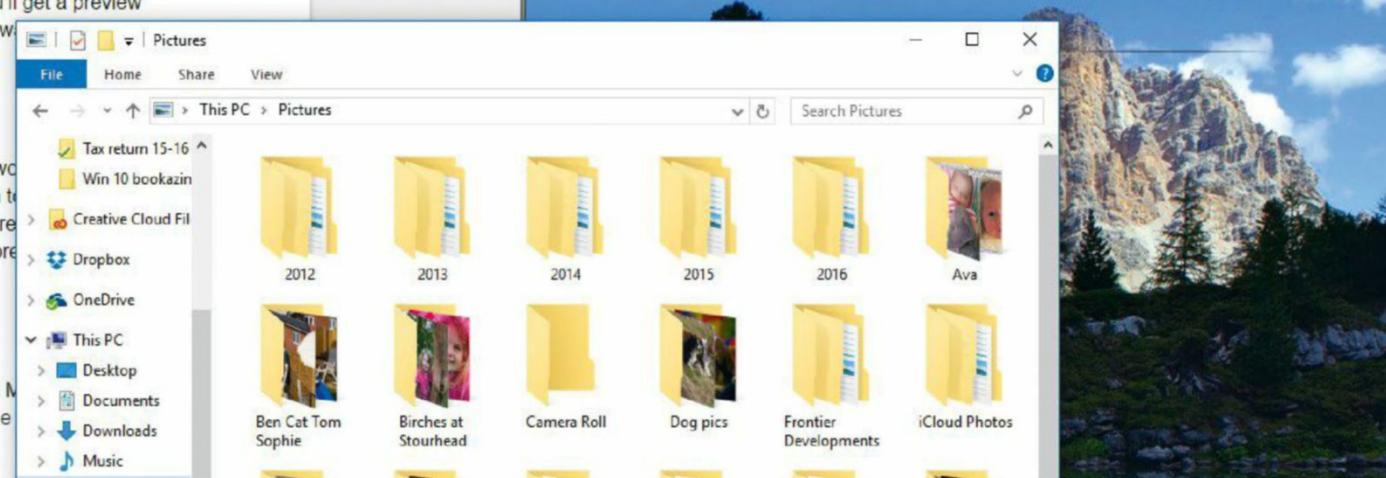
A real godsend for those who used to tease their window edges out until they exactly matched the edge of the screen, snapping in Windows 10 enables you to have two or more windows open that completely fill their areas of the screen. Pick up a window and move it to the extreme left or right edge of the desktop to try it (you'll see it 'snap' to the new half screen format). You can adjust how much of the screen they take up too.



move right or the taskbar, and all your open pointer over it, and you'll get a preview. You move your pointer away windows open.

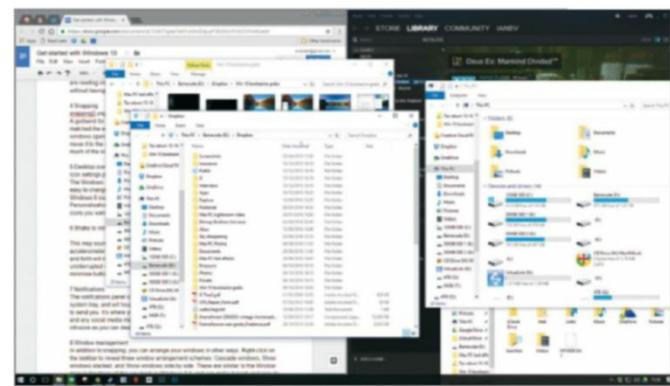
overcrowded as you work the Task View button to you'll be taken to a screen a new one, or even more open on each.

Windows from using a mouse instead of the one



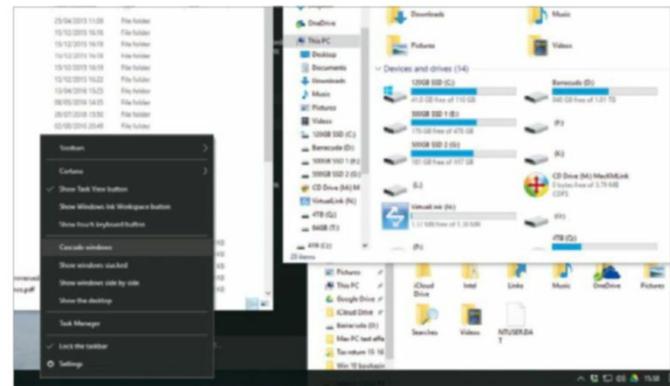
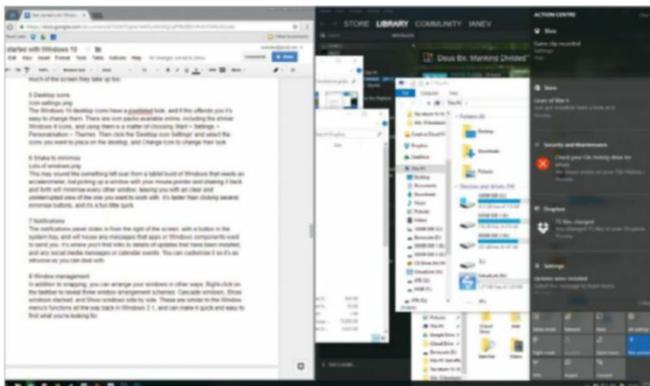
## 5 Desktop icons

The Windows 10 desktop icons have a pixelated look, and if this offends you it's easy to change them. Luckily, there are icon packs available online – including the shinier Windows 8 icons. Download the icon pack you want to use, then go to Start > Settings > Personalisation > Themes. Click the 'Desktop icon Settings' and select the icons you want to place on the desktop, then use the Change Icon option to change their look.



## 6 Shake to minimise

This may sound like something left over from a tablet build of Windows that needs a built-in accelerometer, but picking up a window with your mouse pointer and shaking it back and forth will minimise every other window, leaving you with a clear and uninterrupted view of the one you want to work with. It's much faster than clicking several minimise buttons, and it's a fun little quirk that's a good one to remember.



## 7 Notifications

The notifications panel – or Action Centre – slides in from the right of the screen, with a button in the system tray, and will house any messages that apps or Windows components want to send you. It's where you'll find links to details of Windows updates that have been installed on your machine, and any social media messages or upcoming calendar events. You can customise it so it's as intrusive as you can deal with.

## 8 Window management

In addition to window snapping, you can arrange your windows in some other ways too. Right-click on the Taskbar to reveal three window arrangement schemes: 'Cascade windows'; 'Show windows stacked'; and 'Show windows side by side'. These are similar to the Windows menu's functions that have been available all the way back to Windows 3.1, and can make it quick and easy to find what you're looking for.

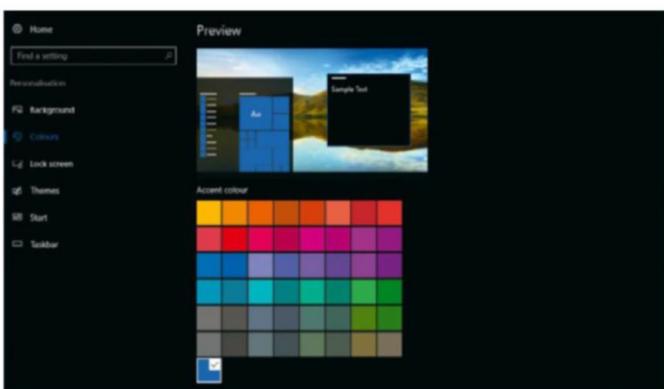
# Customise the Start menu

The Start menu in Windows 10 is more powerful than ever – here are some easy tips to make it work for you

**T**he Start menu's return was big news when Windows 10 launched, and it has evolved as the operating system has been updated. It's become a fast, and efficient way to access apps and settings – Windows 8's full-screen monstrosity is now a distant memory, thankfully!

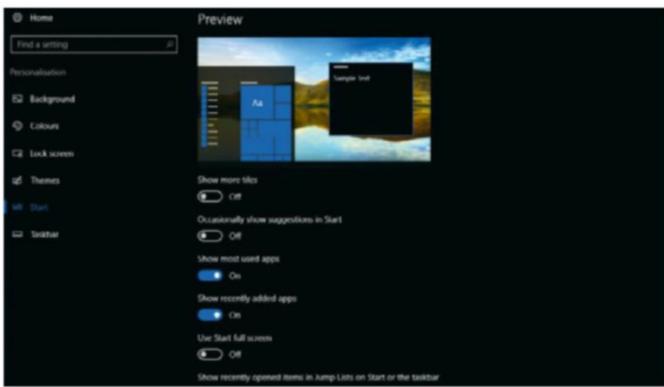
However, if you don't like how the Start menu looks when you first pop it up on your fresh

install of Windows 10, it doesn't have to stay that way. It's fully customisable in ways that were never possible in earlier versions of the operating system, and can be made to work in just about any way you want, standing out from its background for ease of reading, or automatically blending in with the colour scheme of whatever theme you have currently set on your desktop.



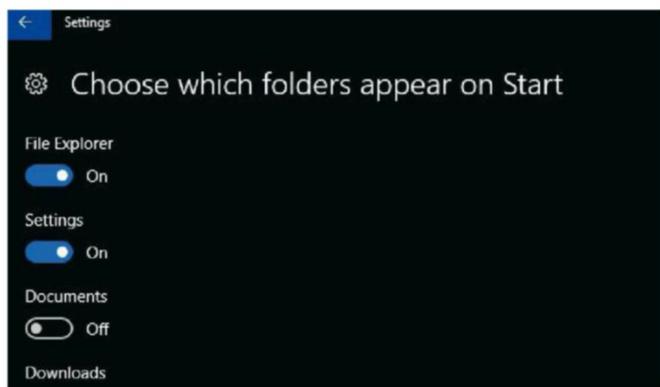
## 1 Colour

Your Start menu's background can be any colour you like – all you have to do is untick a box. Open up Settings, then Personalisation and finally Colours. Untick the 'Automatically pick an accent colour from my background' option and you'll be able to pick a colour from the palette. So your Start menu can be a contrasting red or yellow rather than a dull blue or grey. Play around to find a combination that works for you.



## 2 Size

To make space for all the customising you can do to the Start menu, you can easily resize it to your liking. Just move your mouse pointer to the top-border or right-border of the Start Menu, the pointer will change into arrows, and you'll be able to increase or decrease height and width, dragging it out to completely fill the screen if you want to. This is particularly useful if you have a PC filled with programs that you access regularly.

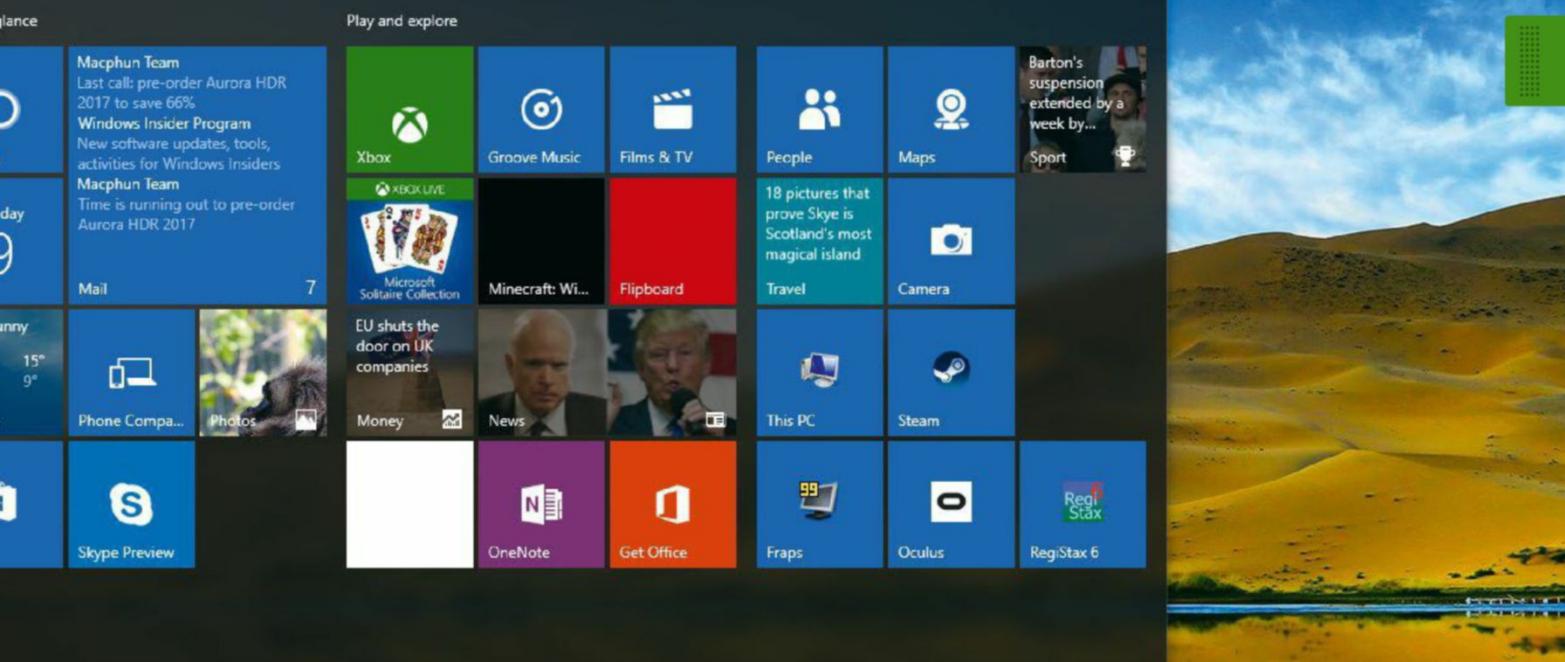


## 3 Folders and tiles

Your Start menu is made up of lists and tiles, and some of these can be shortcuts to folders such as Documents. Settings > Personalisation > Start enables you to tinker with this, so if you never shoot videos you can stop the empty Videos folder from taking up space on the menu. You can turn the links to the Settings window – and the one that opens an empty File Explorer window – on and off too.

## 4 Hide program lists

By default, the Start menu will show you lists of both your most used programs and the most recently opened ones. This can end up repeating itself, so if you want to get rid of one or the other of the lists, or both, open up Settings > Personalisation > Start, from where you'll be able to toggle the lists on or off. You can also prevent apps from appearing on the lists so you only get a view of the things you really need from day to day.



## 5 Use it to search with

Hitting the [Win] key on your keyboard to pop up the Start menu's Search box is one of the fastest ways to look for anything in Windows 10. Just type a few characters and you will get suggestions for applications and documents stored on your computer that match your initial query. You can also use the arrow keys on your keyboard to navigate the Start menu, if you'd rather not use the mouse.



## 7 Pin tiles and shortcuts

If there's something you need to be able to find quickly, but which gets lost in the lists of the Start menu, you can pin and reposition it so it's always prominently placed. To do that right-click an item and choose 'Pin to Start'. It will now appear in tiles. Now click and drag the tile to where you want to move it to. To resize the tile, right-click, choose Resize then the tile size you want. You can pin shortcuts to the Taskbar for easy access too.

## 6 Live tiles

Live tiles are tiles that are constantly updated with data, usually gleaned over the internet to make them up-to-date. There's one for the Mail app that shows your most recent messages, one for the Weather app that uses your PC's location to tell you what's going on outside the window, and so on. If you find them distracting, you can turn them off by right-clicking them and choosing the appropriate option.



## 8 Bring back the Start screen!

It may have been almost universally mocked and reviled in Windows 8, but the full-screen Start menu is still there in Windows 10, ready to block out all your work at a single press of the [Win] key! But, if you liked it, go to Settings > Personalisation > Start and tick the box marked 'Use full-screen Start when in the desktop'. Note that wording: the Start menu now won't actually cover up your apps like it used to do in Windows 8.

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# Upgrade

► NEW HARDWARE ► ESSENTIAL ACCESSORIES ► LATEST GADGETS

## Welcome

 Movies, games and music are often distributed online these days, but getting them downloaded onto your PC isn't always quick or easy.

That's why on page 88, you'll find our pick of the best download managers – apps which can speed up file downloads and even convert them on the fly, so you don't have to. Best of all, all of our picks are free.

We also take an in-depth look at the HP's Surface Pro rival, the Spectre x2 (page 76); check out the brilliant new laptop from Xiaomi (page 78); and revel in the glorious sight of BenQ's 32-inch monitor (page 80).

**Nick Odantzis** Deputy Editor  
windowsmagazine@futurenet.com

## This issue's highlights



### 76 HP Spectre x2

Can this comely black-and-gold tablet best its Microsoft Surface Pro rival?



### 78 Xiaomi Mi Notebook Pro

Slick and powerful laptop from the Chinese smartphone maker



### 80 BenQ PD3200U

A big, bold and beautiful 32-inch monitor that's perfect for both work and play



### 88 Best download managers

Fetch files, music, movies and photos quickly and easily with these free apps

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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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RATING EXPLAINED ★★★★☆ Superb ★★★★☆ Very good ★★★☆☆ Good ★★★☆☆ Disappointing ★★★☆☆ Poor



## HP Spectre x2

£1,499 | \$1,299 [www8.hp.com](http://www8.hp.com)

A stylish and powerful Microsoft Surface Pro competitor

There's no denying the influence of Microsoft's Surface Pro, a winning Windows 10 tablet design that has been emulated by a succession of rivals from the Lenovo Miix 510 and Acer Switch 3 to Samsung's Android-powered Galaxy Book.

Now HP is at it. Well, at it again, since this is the latest iteration of the Spectre x2. Previously posited as an affordable alternative to the Surface Pro, it's now anything but. Starting at an aggressive £1,349 (\$1,149) price point, the HP Spectre x2 intimidates with more than its gold-and-black aluminium finish.

### Pricing and availability

The HP Spectre x2's price isn't bad when you consider its spec. For \$1,299, the US model, tested here, has a 2.4GHz Intel Core i7-7560U processor, 8GB of RAM and 360GB of solid-state storage. Pair that with a 3,000x2,000 display, and you have a better-than-competent slate.

For £1,549 (\$1,599), the Surface Pro comes with a slightly better 2.5GHz Intel Core i7-7660U, 8GB of RAM, a 256GB SSD and 2,736x1,824 PixelSense display. In the UK, the HP Spectre x2 is available in only one version. It packs the same Core i7 i7-7560U chip and 8GB of RAM as the US model, but has 512GB of flash storage and a £1,449 asking price. That also covers a three-year Care Pack should anything go awry.

### Design

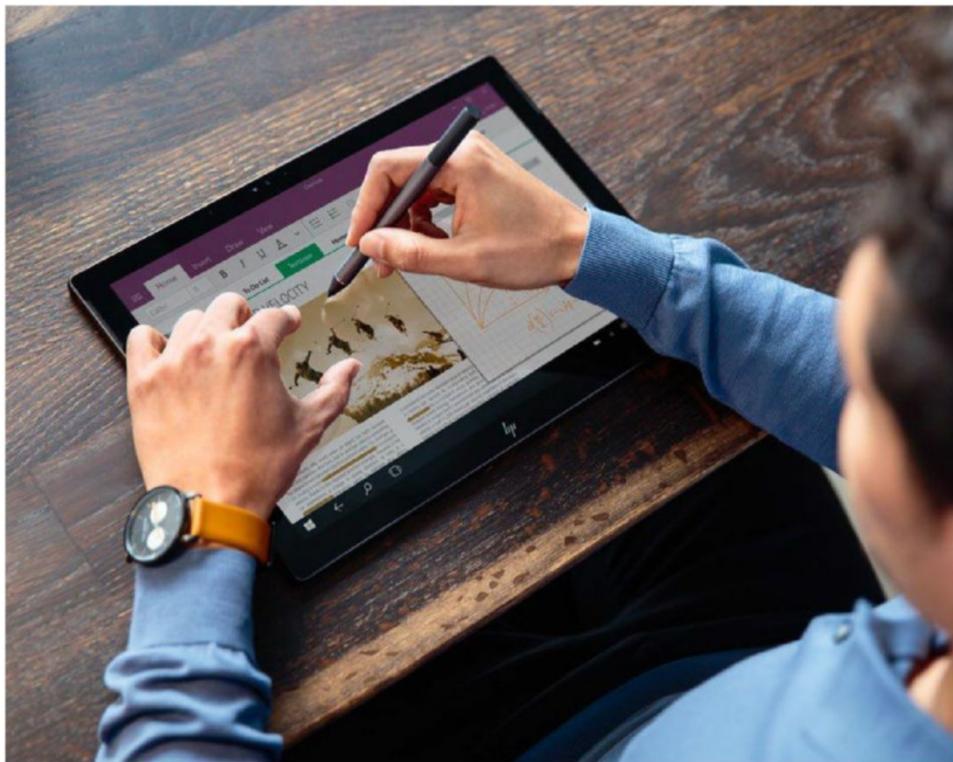
One of the best parts of owning an HP Spectre x2 is flaunting it at a coffee shop or library. Those familiar with HP's other offerings will recognise its illuminant appearance from the HP Spectre and Spectre x360 15 before it. Trimmed with a gold stand and a chic logo to match, the HP Spectre x2 is a design feat. It doesn't make the same mistake as the Lenovo Miix 510, a more evident derivation of the Surface Pro, by effectively

enabling it to thrive independent from its main tastemaker. It's a near bezel-less beauty that destroys the notion that gold is gaudy.

In fact, none of the issues you'll experience with the HP Spectre x2 have to do with its form, but rather it's function that's to blame for its few shortcomings. The most heartbreaking of these is the trackpad – wide and functional, it ultimately overstays its welcome.

Don't think about seating this tablet even slightly off the edge of your table or desk. On our review unit at least, the HP Spectre x2 can be audibly and haptically clicked on both the left and right-hand side areas on the outside of the trackpad. You can imagine how much of a nuisance this can be.

Aside from that, the HP Spectre x2 is a joy to use. The stunning display is noticeably more vivid than that of the Surface Pro, not to mention the magnetically-attached keyboard and Active Stylus Pen,



## KEY FEATURES

### HP Spectre X2

**Supplier** www.hp.com  
**Processor** 2.4GHz Intel Core i7-7560U (dual-core, 4MB cache, up to 3.8GHz with Turbo Boost)  
**Graphics** Intel Iris Plus Graphics 640  
**RAM** 8GB LPDDR3-1866 SDRAM  
**Display** 12.3-inch; 3,000 x 2,000 pixel WLED-backlit; multi-touch-enabled  
**Storage** 360GB PCIe SSD (NVMe M.2)  
**Connectivity** Intel 802.11b/g/n/ac (2x2) Wi-Fi; Bluetooth 4.2; 2 x USB 3.1 Type-C Gen 1; 1 x independent headphone/mic combo; 1 x microSD card slot  
**Cameras** 5MP webcam and HP IR camera with integrated dual array digital microphone (front-facing); HP 13MP camera (rear-facing)  
**Weight** 0.78kg (tablet); 1.15kg (tablet and keyboard cover)  
**Size** 293.9x207.1x7.7mm (tablet); 293.9x207.1x13.2mm (tablet and base)

test. That's a simulation of normal productivity tasks you might engage in throughout the day.

Now, four hours and 45 minutes is how long the HP Spectre x2 lasted in our movie test, where we loop *Guardians of the Galaxy* in VLC player at 50 percent brightness until the system dies. That's longer than in the PCMark 8 test, but it's only useful for determining battery life in passive use cases.

More demanding tasks, such as video editing, will kill the battery faster, making this a tablet you'll have to keep plugged in most of the time. The HP Spectre x2 certainly can't keep up with the Surface Pro, which lasted four hours and three minutes, and six hours and 58 minutes respectively.

### Summary

The HP Spectre x2 is clad with darling looks that distinguish it from the competition. It may be slightly weaker than the closest Surface Pro configuration it rivals, but it's also less expensive. Sadly, the scrupulous trackpad and pedestrian battery life make the Spectre x2 a chore to use on the go.

Whereas the Surface Pro brings better penmanship and battery life to the table, the HP Spectre x2 is a testament to fashion and value on high-end Windows 10 tablets. ■

The HP Spectre x2 is one of the best Windows tablets ever made. Only poor battery life lets it down.

  
**Windows Help & Advice Verdict**



which are bundled in the package. Plus, there's a microSD card slot, a headphone jack and two USB-C ports to work with.

There are two cameras on-board here, one to be used as a regular webcam and, the other, an infra-red sensor for Windows Hello facial recognition-based logins. The latter works well, despite you having to reconfigure it from time to time.

It's a miracle that the Spectre x2 comes with a stylus at all, yet we have to complain where it's due. This isn't the Surface Pen. This is the

– and that's something that's reflected in our benchmarks.

In our 3DMark Sky Diver test, the HP Spectre x2 scores 4,238 points compared to the Surface Pro's 6,431. While in the more CPU-centric Cinebench test, the Spectre x2 scored 351 points compared to the Surface Pro's 414.

That's not to say the Spectre x2 is lacking, only that HP has opted for a more conservative i7 chip than Microsoft has in the Surface Pro. This is likely an effort to keep costs down while still brandishing an i7.

## "Trimmed with a gold stand and a chic logo to match, the HP Spectre x2 is a design feat"

HP Active Pen, a dual-button writing and drawing tool that supports only 2,048 pressure points of sensitivity, as opposed to the 4,096 of the Surface Pro.

Still, 2,048 pressure levels is nothing to scoff at. It's the same number you could expect from a Wacom Cintiq tablet. Once heralded as the pen tablet to end all pen tablets, however, the Cintiq has fallen behind the times in recent years, so to say that the HP Spectre x2 shares its sensitivity will garner a 'so what?' from Microsoft.

### Performance

The HP Spectre x2 is handsome and powerful. Its i7 processor doesn't boast quite as much horsepower as the newest Surface Pro, though

The HP Spectre x2 still performs better than the Intel Core i5-equipped Lenovo Miix 510, which scores 3,269 and 323 points in Sky Diver and Cinebench, respectively.

In real-world applications, these numerical differences between the HP Spectre x2 and the Surface Pro don't matter much. They're both highly capable flagships that can double as your tablet and your PC, replacing each if you're so inclined.

### Battery life

The more important question is, how long can you expect to use the HP Spectre x2 without its clunky power adaptor? Unfortunately, the answer is not long – just two hours and 40 minutes, according to our PCMark 8 Conventional battery life



## Xiaomi Mi Notebook Pro

£868 | \$1,140 [www.xiaomi.com](http://www.xiaomi.com)

If Apple designed a Windows laptop, this is what it might look like

**X**iaomi has fingers in a lot of pies. The Chinese company may be better known for its smartphones but it also makes a host of other products, from air purifiers to electric rice cookers. Its laptops, however, have been the real head-turners over the past 18 months. Following the Xiaomi Mi Notebook Air 13.3 (2017) and the Xiaomi Air 12, meet the new kid on the block, the Mi Notebook Pro.

### Design

Ruthless postmodernism is how one might define the design of the Mi Notebook Pro – the chaps in charge at Xiaomi opted for a darker colour scheme compared to its smaller sibling. ‘Deep grey’, as they call it, is an attractive alternative to the silver brushed metal designs that most ultra-slim laptops sport.

There’s no significant tapered profile here. Instead, you have an almost perfectly rectangular slab of metal alloy – with some curves here

and there – that weighs just under 2kg, with its dimensions (360x244x15mm) making it hardly portable; that’s the price you have to pay for its 15.6-inch display.

In comparison, the Mi Notebook Air, which sports roughly the same configuration, is more than a third lighter and costs less. The biggest differences are the size and fewer ports. With the Notebook Pro, you get one HDMI port, two USB Type A ports and an audio jack on the left side, with two USB Type-C ports and an SD card reader on the right. Note that one of the Type-C connectors is used as a power port. The power button is located at the top right-hand side of the device, not our favourite location.

As with other Xiaomi laptops, there’s no logo on the top of the device. Flipping it over exposes a large flat surface with a Mi logo, a removable sticker, five rubber feet, a pair of speaker grilles and a multitude of air vents. Open the

laptop and you’ll see that display, which is covered by a Gorilla Glass sheet, an odd choice given that the display is not touch-capable.

The long, single hinge is reminiscent of Apple’s notebooks, and so is the layout of the keyboard. Remember, this is a 15.6-inch model so it has enough space for a numeric keypad. You won’t find one here, though – instead Xiaomi has opted for full-size keys with a low activation force, short 1.5mm travel (to give better sense of confirmation), a 0.3mm thick hyperboloid keycap (rather than a flat one) and a noticeable absence of any double-function keys – at least on the main bank of keys.

And yes, this is a backlit keyboard and unlike some competitors, it only offers an on-off option. The touchpad is large and houses a fingerprint reader. It doesn’t have physical right and left buttons which might put off some folks.



## KEY FEATURES

### Xiaomi Mi Notebook Pro

**Supplier** www.gearbest.com  
**Processor** 3.4GHz Intel Core i5-8250U  
**Graphics** Nvidia GeForce MX150; Intel UHD Graphics 620  
**RAM** 8GB DDR4  
**Display** 15.6-inch 1,920 x 1,080 (Full HD)  
**Storage** 256GB Samsung PM961 SSD  
**Connectivity** 802.11ac Wi-Fi; Bluetooth 4.2; 2x USB Type-A; 2x USB Type-C; 1x HDMI; audio jack; microSD  
**Weight** 1.99kg

## Specifications

The Xiaomi Mi Notebook Pro is one of the very few laptops to feature Dolby's Atmos sound technology, which is used in conjunction with the onboard pair of 2.5W Harman Kardon Infinity speakers.

It is also one of the first to offer an 8th-generation Intel Core processor. Our review sample came with the Core i5-8250U, which is far superior to previous Core i5 CPUs for one good reason: it is the first time that Intel has opted for a quad-core architecture for the i5

switch seamlessly between Intel's integrated graphics and the dedicated graphics to save battery life when the latter isn't needed.

## Performance

This laptop performs more like a Core i7 than a Core i5-powered model, especially on heavily-threaded applications, such as Cinebench, where the extra grunt of the Nvidia discrete GPU comes in handy. The Mi Notebook Pro achieves a staggering 89.44 fps on that benchmark, an almost

**"The keyboard offers superb feedback and good travel on a par with major league rivals"**

range, and it's one that supports multi-threading.

So it has four cores, eight threads, a base frequency of 1.6GHz and a Turbo frequency of 3.4GHz. Add in 6MB cache, support for DDR4-2400 memory and a new graphics subsystem (Intel UHD Graphics 620) and you have a compelling CPU that should easily surpass even a Core i7-7600U processor in multi-threaded tasks.

The Nvidia GeForce MX150 discrete GPU, which is equipped with 2GB GDDR5 memory, is based on the Pascal architecture and should deliver up to around a third extra performance compared to the GeForce 940MX. The MX150 also supports Optimus technology, which enables applications to

unheard-of score for a non-workstation device. Its read/write speeds struggle to match those of the Xiaomi Notebook Air 2017, though, despite using the same Samsung PM961 NVMe SSD. You should not see any big difference in real-life performance, however.

The 61Whr 4-cell battery also enables this machine to last for seven hours 22 minutes between recharges – that's less than a MacBook Pro, but is still better than most PC laptops – note the Mi Notebook Pro comes with a Chinese version of Windows 10 Home Edition and had to be reformatted to be benchmarked.

The Mi Notebook Pro is noisy under heavy usage, which is to be expected. There are two fans that

are fed by a heat pipe (which is itself connected to a large 'thermal conductivity area') and they kick in – with a vengeance – when the CPU/GPU becomes too hot.

The keyboard offers superb feedback and good travel on a par with the major league rivals, while the touchpad is sensitive and responds well to finger gestures.

The screen is the outstanding component here. With a Full HD resolution and 300-nit brightness, it provides the optimum level of performance for most tasks. Colours are bright and punchy, although some might complain about the lower pixel density (lack of sharpness) usually associated with large displays.

The model sent for review was the cheapest of three versions available. The Xiaomi Mi Notebook Pro is also available – on pre-order at the time of writing – with a Core i7-8550U processor, and in a variant with 16GB of memory.

## Summary

The Xiaomi Mi Notebook Pro is a great laptop – an outstanding piece of technology, in fact. The question is whether you're prepared to spend almost £870 (\$1,140) – and potentially far more than that if you have to add taxes – on a piece of kit knowing that you will have to reinstall Windows, and also potentially wait for months for support/repairs if anything goes wrong. On balance, we wouldn't do this ourselves, but if you are ready to take a punt, then this notebook is a fantastic piece of kit. ■

**The Mi Notebook Pro is a great laptop, with cutting-edge specs and affordable pricing.**

**Windows Help & Advice Verdict**





## BenQ PD3200U

£800 | \$1,000 [www.benq.com](http://www.benq.com)

A large 4K screen for your desk

With PC graphics cards becoming increasingly powerful, using a 4K Ultra HD monitor is an increasingly viable option, and the BenQ PD3200U is an excellent example of a 4K screen for both business and pleasure.

At such a high resolution, you need a large screen to avoid having to squint at tiny text and minuscule icons, and with its 32-inch diagonal screen size, the BenQ PD3200U provides that while avoiding being obviously large – remember, this is a monitor for your desk, not a TV.

BenQ is a trusted brand when it comes to monitors, and we've had plenty of nice things to say about its other displays, so we're hoping for big things from this big monitor.

### Price and availability

A 4K monitor of this size is never going to be a budget proposition; however at £800 (around \$1,000), the BenQ PD3200U is actually pretty reasonably priced.

It means that having a large 4K monitor isn't going to necessarily break the bank. However, there are cheaper 4K monitors out there. The Acer XB281HK, for example, is a 28-inch UHD monitor with G-Sync and a 1ms response rate, and can be had for £600 (around \$800), while the Philips 328P6VJEB is the same size as the BenQ PD3200U, but can be had for around £530 (\$700). It doesn't have some of the PD3200U's more pro-orientated features, but it's a good alternative.

### Design and features

The BenQ PD3200U looks simple yet elegant. It's clear this is a monitor made with work and productivity in mind. BenQ describes it as a "simple, functional design for increased efficiency", which we'd broadly agree with.

The PD3200U maybe big, but it doesn't feel it, thanks to the thin bezels that surround it. Its footprint is reasonable too, so it doesn't feel

like it's taking up an inordinate amount of space on your desk. The supplied stand can be put together and attached to the screen without the need for any tools, which makes set-up easy, yet it still feels sturdy. Its neck is also fully adjustable, enabling you to tilt and swivel the screen and adjust the height. The screen can be rotated 90 degrees into portrait mode, giving you more flexibility. The neck is also set quite far back into the base, so the screen can be pushed back for more desk space. There's an integrated carry handle too.

The PD3200U also comes with a KVM (Keyboard Video Mouse) switch, which enables you to plug in a second PC and switch between the two using a single monitor, keyboard and mouse, making your desk even less cluttered.

On the right-hand side of the monitor are two HDMI 2.0 ports, a DisplayPort 1.2, a mini DisplayPort, SD card slot, two USB 3.0 ports and



a 3.5mm audio port. With HDMI 2.0 you can now use HDMI to display 4K visuals at 60Hz, which means you can also plug in a PS4 Pro or Xbox One X into the monitor and use it as a display for those.

As far as features go, the BenQ PD3200U's main selling point is its 3,840x2,160 resolution, which provides excellent image quality.

The 32-inch screen size – which amounts to a 708.4mmx398.5mm display area – ensures that, despite the high resolution, text, icons and other visual elements aren't too

a CAD/CAM mode, which ups the contrast for lines and shapes in technical illustrations. It also includes Low Blue Light and Flicker-free technology, making it more comfortable to use at night.

Animation Mode boosts the brightness of dark areas without overexposing light areas of an image, while Darkroom Mode, enables you to work comfortably in dark environments. A customisable switch (included) connects to the monitor and enables you to switch between presets and options.

## "You can work comfortably on the PD3200U with a large number of programs and windows open"

small, with the pixel-per-inch count coming in at a comfortable 137.68.

The panel type is IPS, with a native contrast of 1,000:1. This ensures viewing angles are very good, which is essential for a screen of this size, as when sitting in front of it at a desk it really does take up almost all of your peripheral vision.

With BenQ is pitching this as a pro monitor, colour accuracy at any angle is important, and the 100 percent sRGB colour gamut adheres to industry standards. It also meets Rec. 709 video production specs.

The PD3200U is part of BenQ's Designer Monitor range, which means it has been individually factory-calibrated before being shipped. Plus, it comes with a range of modes for professionals, such as

Both the straightforward design and the breadth of features makes the PD3200U an excellent monitor for productivity, and its selection of ports allow it to perform as a great entertainment screen as well.

### Performance

In use, the BenQ PD3200U is very impressive. Windows 10 scales brilliantly at 4K, and even at that high resolution, menus, text and icons are easily readable, mainly because of the large screen size.

You can work comfortably on the PD3200U with a large number of programs and windows open, including web browsers which are able to show almost entire web pages without the need for scrolling, along with an image

## KEY FEATURES

### BenQ PD3200U

**Supplier** [www.benq.com](http://www.benq.com)  
**Screen size** 32 inches  
**Resolution** 3,840x2,160 pixels @ 60Hz  
**Brightness** 350cd/m<sup>2</sup>  
**Native contrast** 1,000:1  
**Response time** 12ms; 4ms (G2G)  
**Connectivity** 2x HDMI 2.0; 4x USB 3.0; 1x DisplayPort; 1x mini DisplayPort; headphone jack; SD card reader  
**Weight** 8.5kg  
**Dimensions** 492.66x740.28x223.62mm

editor and more. Ultra HD resolution is equivalent to four 1080p screens, and it feel like you have a huge amount of space when using the PD3200U – albeit without the fuss and extra desk space you'd need to drive four separate monitors at the same time.

Images and video files also look excellent on the BenQ PD3200U. This is where the factory calibration really comes into its own – the PD3200U looks great straight out of the box, little tweaking needed.

If you're buying this as a business monitor for your work you'll be impressed with its performance, especially considering its price.

But what about performance for non-professional applications? The PD3200U supports HDR, which along with the HDMI 2.0 support makes this a viable screen for 4K games consoles and UHD.

Although the 60Hz refresh rate won't impress gamers used to higher refresh rates and G-Sync or FreeSync technology, if you're playing modern games at 4K, 60Hz is all you need. Its 4ms response time is on the slow side, though.

If you're looking for an excellent high-resolution monitor with accurate colour reproduction, which can also do a good job of displaying films and games, the BenQ PD3200U is a great choice.

### Summary

The BenQ PD3200U performs brilliantly with its 4K resolution and large screen size helping to boost your productivity. Other monitors feel claustrophic by comparison. ■

The BenQ PD3200U is a fantastic 4K monitor, suited to home and professional applications alike.

  
Windows  
Help & Advice  
Verdict





## Silicon Power Armor A85

£78 | \$75 [www.silicon-power.com](http://www.silicon-power.com)

Portable storage that can take some serious knocks

The Silicon Power Armor A85 may look like a hip flask containing some luxurious libation, but in reality it's a portable external hard drive that's been built to be abused beyond all reasonable expectations – it's shockproof, dust- and waterproof to IP68, drop-proof to US military standards (up to 3m) and is pressure-proof too – Silicon Power's marketing for the product even shows it under the wheels of a parked car, although that's not something we'd suggest you try.

The 1TB model on test here sells for around £78 in the UK and \$75 in the US. It's also available in 2TB, 3TB, 4TB and 5TB capacities, so you can choose the model which best meets your needs. The top-end 5TB model costs £227/\$248.

### Design

There are only two items in the box: the Armor A85 and a short (32cm) USB cable that has Type A super-speed connectors at both ends.

The advantage of this design is never worrying about which end to plug in. However, this layout isn't a common USB cable, so misplacing it might prove problematic.

Silicon Power's approach to avoiding that scenario is to make the join between the black cap and the sandblasted aluminium section a thick rubber band that you can use to hold the cable. We're not sure how well this will work in practice, but at least Silicon Power has considered that cable loss could be an issue.

The USB Type A port on the drive is hidden under a thick plug on the black cap end that incorporates a tight rubber seal. The plug looks good for keeping unwanted water and dirt out of the drive, but it's also an excellent route to breaking a fingernail trying to pop it out.

The temptation would be to leave it in the open state, but failure to replace it after use would undermine the ability of the drive

to handle being accidentally dunked in water, of course.

A downside of this level of protection is that if the hard drive dies inside its cocoon, that's where it will stay – no practical means to extract it exists, at least not without an angle grinder.

Beyond these points, there is relatively little to say about this design, other than it's built to handle abuse rather than win any style awards.

On one level, the A85 Armor is just a hard drive stuffed inside a thick metal tube. However, that thinking ignores the tricky technical details the Silicon Power engineers had to resolve to make that work. Like avoiding overheating issues with the drive in an enclosed metal space, and cossetting the drive from accidental assaults of water, dust, and the general trials and tribulations of careless ownership.

The solution isn't subtle, and primarily involves the creation of a



gently curved aluminium tube and a rubber sleeve that isolates the drive from whatever is happening physically to the outer case.

The engineers also created a suspension system that isolates the external connector from the floating internal hard drive, an obvious point of potential failure.

Engineered in this fashion, the Armor A85 survived the MIL-STD 810G Method 516.6 Procedure IV, aka the transit drop test. And Silicon Power's promotional material claims it can withstand

more than 30 minutes at a depth of up to one metre.

A reasonable assumption for this test is that the immersion would take place with the USB cover in place, and therefore not connected to another device at the time.

The Armor A85 certainly talks the talk, but can it walk the walk?

### Performance

Silicon Power has previously used Seagate's Momentus hard drives in its products and we suspect that's what's inside here too.

**"Silicon Power specifically told us to get the Armor A85 wet and, unbelievably, drive a car over it"**

500kg of force, should something unfortunate happen to it.

As tempting as driving over the device a few times before benchmarking is, the three-year warranty and its ability to handle MIL-STD 810G convinced us that the Armor A85 is tough in more ways than just the looks department.

The transit drop test is to perform 26 drops on each face, edge, and corner from a height of 122cm above the floor. And all those test drops can only be divided among five test items. The device must also survive a single 3m drop test and still be functional afterwards.

Having compliance to IP68 in this context means the device should be dust-proof and protected against immersion in water for

We only got to test the 1TB model, but as mentioned previously, the same outer shell is used with a range of drives up to 5TB. The only difference, other than the capacity, is that the larger versions are marginally heavier.

Performance isn't SSD level, but it's more than acceptable when compared with many portable drive solutions that use conventional drive technology.

In our benchmark tests, CrystalDiskMark rated the read speed at 119.3MB/s and the write speed at just a little less: 118.4MB/s. To achieve those levels you'll need a USB 3.0 connection with USAP mode active – it should be natively on any Windows 8.x or Windows 10 PC with the right hardware.

### KEY FEATURES

#### Silicon Power Armor A85

**Supplier** www.silicon-power.com/  
**Capacity** 1TB, 2TB, 3TB, 4TB, 5TB  
**Material** Aluminium, rubber, plastic  
**Colour** Silver/black  
**Connectivity** USB 3.1 Gen 1 / USB 3.0,  
USB 2.0 compatible  
**Weight** 298-364g (by capacity)  
**Dimensions** 132.5x92.3x25.9mm

Normally, the suppliers of review kit to Windows Help & Advice expect us not to intentionally abuse their device because they'd like it back at some point. However, Silicon Power specifically told us to get the Armor A85 wet, and unbelievably, drive a car over it. So obligingly – post-benchmarking – that's exactly what we did.

Unsurprisingly, the car exercise did leave some minor abrasions on the Armor A85, but that didn't stop it from working. The A85 also survived complete immersion in water, though it's worth noting that it doesn't float. That's an issue because dropping it into a depth of more than one metre might be catastrophic even if it can be successfully retrieved.

As far as performance goes, the Armor A85 does what it says on its rather thick aluminium tin.

### Summary

This isn't the quickest external drive we've tested, but the Silicon Power Armor A85 is undeniably one of the toughest. If you're taking a trip where data loss might result from dust or water penetration, then the Armor A85 is an affordable solution that can withstand plenty of punishment at your hands.

The only significant caveat is that the drive doesn't float, so dropping it into anything other than shallow water could be its undoing without some kind of extra means of flotation being added.

The only other issue concerns the unusual twin-ended USB Type A cable, which could be difficult to replace if you lose it. ■

A USB 3.0 portable drive that performs reasonably well, and under the toughest conditions.

Windows  
Help & Advice  
Verdict





## GoPro Hero6 Black

£500 | \$500 [www.gopro.com](http://www.gopro.com)

GoPro's best, most powerful action camera ever

**L**ooking at the tiny GoPro Hero6 Black, it's almost impossible to tell it apart from last year's GoPro Hero5 Black. There are, however, plenty of noteworthy differences on the inside.

The new camera can capture super-slow-motion video at a high resolution, output a stabilised image in 4K, and transfer everything to your phone at faster speeds – your video can be posted before your GoPro-documented adventure is even over if you wish.

It's not perfect, of course. The problem with GoPro's devices is that the image quality is more impressive than phones and other devices are capable of handling at times, thanks to huge file sizes.

It's a big problem when you offload and edit the video, especially slow-motion footage at a silky-smooth 240 frames per second. You can find your phone and PC overwhelmed by the demands of GoPro video files.

That said, GoPro's edit-in-post software is a lot better in 2017, so as long as you don't feel in over your head transferring HD and 4K video files to your device this is the best action camera you can buy today.

The biggest change to the Hero6 Black is the arrival of GoPro's first custom chipset, the aptly named GP1 processor. This enables the Hero6 Black to offer 4K video capture at a smooth 60 frames per second (fps); the Hero5 Black is only capable of shooting at 30fps.

That's not all. The Hero6 Black can capture 1080p Full HD footage at an impressive 240fps. In between those two extremes it's possible to shoot 2.7K footage at 120fps.

GoPro hasn't just concentrated on boosting the frame rate of the Hero6 Black over its predecessor, also tinkering with the image stabilisation system. Thanks to the GP1, it's possible to have image stabilisation active while shooting 4K footage. Stabilisation is capped

at 30fps, but it's a marked improvement over its Hero5 Black predecessor. Stabilisation is also possible at up to 120fps at Full HD.

The Hero6 can also capture 12MP still images in single, burst and time-lapse modes. What's new is a built-in HDR (High Dynamic Range) mode for high-contrast scenes. This replaces the Wide Dynamic Range mode on the Hero5 Black, and, again thanks to the GP1 processing engine, it captures images with greater detail in both the shadows and highlights. And, if you're in the habit of venturing out after dark, Night mode is here for more accomplished low-light shooting.

### Build and handling

While there was quite a design shift from the Hero4 Black to the Hero5 Black, the Hero6 Black doesn't look any different from its predecessor. This action camera is as discreet as ever, it's compact, feels extremely durable, and is waterproof (down to



10m) without the need for a housing. The absence of a housing also means that with no casing getting in the way of the built-in mic, audio quality is better.

It also comes with a sturdy plastic frame that allows for all sorts of fun camera mounts, while the entire design is incredibly tight, snuggly fitting the microSD card right up against the user-swappable battery.

The Hero6 Black has a 5.08cm touchscreen on the back for reviewing photos and videos, and adjusting settings, using what

and run in low-power listening mode, waiting for the command 'GoPro turn on'. Leave it longer than eight hours and the Hero6 Black shuts down completely.

### Video and photo quality

The GoPro Hero6 Black is built for catching action incredibly fast and you'll benefit from the enhanced performance if want to record video at 'normal' frame rates too. The image stabilisation has been beefed up, with footage slightly cropped to reduce shakiness. The

effect is noticeable, but don't throw away your GoPro Karma Grip, as software-based stabilisation can only correct so much.

Low-light performance has always been a GoPro shortcoming, but the Hero6 delivers improved dynamic range, thanks to its new processor, resulting in better image quality indoors and out.

### Editing and apps

Raw support is welcome for still images, although because of the sensor's small size don't expect image quality to be any better than from a decent point-and-shoot compact. Nonetheless, it's a handy feature to have.

The Hero6 takes uncompromised video, but offloading that raw

## "If using the touchscreen is too much effort, the GoPro Hero6 Black also offers voice control"

seems like the world's tiniest touch-based user interface. You'd think this might be fiddly to use, but it's not bad, with simple swipes and taps enough to access the settings and make changes.

If using the touchscreen is too much effort, the Hero6 also offers voice control. This isn't enabled by default, but it's easy to activate in the preferences menu, and you can then shout 'GoPro start recording', or 'GoPro take a photo' for the Hero6 to spring into action. There are 12 simple voice commands, covering pretty much everything you're likely to want to do.

The Hero6 Black also has a new Wake On Voice function. Turn the camera off with a voice command and your Hero6 Black will switch off

## KEY FEATURES

### GoPro Hero6 Black

**Supplier** www.gopro.com  
**Processor** Custom-designed GP1  
**Display** 5.08cm touchscreen  
**Video quality** 4K; 1080p Full HD  
**Image resolution (Stills)** 12MP  
**Image stabilisation** Yes  
**Waterproof** to 10m  
**Sensors** GPS, accelerometer, gyroscope  
**Connectivity** 5GHz Wi-Fi; Bluetooth; microSD card slot  
**Voice control** Yes

GoPro footage has increasingly been a pain due to large file sizes, especially with older phones. GoPro is tackling this issue with a three-pronged approach: First, the Hero6 supports the High Efficiency Video Coding (HEVC) codec, which can halve file sizes, meaning it'll save space on compatible phones, and make camera-to-phone transfers faster. Second, the Hero6 utilises the 5GHz wireless frequency, which can offer transfer speeds three times faster than the Hero5 could manage. We found transfer times were faster in our early testing. Third, QuikStories returns as a way to transfer and compile your footage into an automatic video collage, adding transitions and even music. The best part is that videos remain fully editable.

Shooting video with your GoPro isn't the hard part. Transferring hours of 4K 60fps video and 240fps super-slow motion-movies, though, can feel like a chore. The Hero6 Black does a good job at chipping away at the workload. But we still find that offloading and editing camera footage takes practice.

### Summary

The GoPro Hero6 Black instantly becomes the best action camera. At £500 (\$500), though, the Hero6 Black is £100 (\$100) more than its now reduced-in-price predecessor.

Is slow-motion video worth the extra money? No, but improved image stabilisation, wider dynamic range and better low-light performance, plus faster transfer speeds and small file sizes are. ■

With huge improvements over its predecessor, the Hero6 Black is our new favourite action camera.

 **Windows Help & Advice**  
Verdict



# MESH NETWORKING

Mesh networking is the new hotness in Wi-Fi. Are you ready to take your network to the next level?



## 1 Zyxel Multy X WSQ50

£249 (two nodes), [zyxel.com](http://zyxel.com)

If you're not a fan of the traditional router look, Zyxel's heavy, wide white pebble of a device won't float your boat. But these nodes have some serious tech inside, with an AC3000 radio combination that dedicates over half of that bandwidth to inter-device communication. Even at the furthest distance we could muster, the device pair communicated flawlessly with one another, though we hit the only set-up snag out of any of the mesh networking options in this test – the Multy refused set-up on our Android device, but worked fine on iOS.



## 2 Google Wifi

£229 (two nodes), [store.google.com](http://store.google.com)

Google's marketing muscle fired up the mesh Wi-Fi revolution, and the Google Wifi itself doesn't disappoint. Immensely simple to set up, it's USB-C powered for maximum flexibility, looks cute and features two Gigabit Ethernet ports. Google Wifi does a great job at shaping traffic for top speeds while streaming or gaming, and effectively filled our home despite its relatively low-power AC1200 signal. The accompanying app for Android and iOS is a masterwork, making keeping tabs on your network and configuring individual devices an absolute breeze.



## 3 Ubiquiti Labs Amplifi HD

£360 (router & two nodes), [amplify.com](http://amplify.com)

Amplifi doesn't expect you to reserve a precious surface in your home for a Wi-Fi module: its nodes are magnetically hinged onto plug sockets. Plug them in, angle them until the LEDs display the best signal, and you get nigh-invisible extension. The central router module – a neat cube with a circular touchscreen display – controls them all, offers an at-a-glance look at your network speeds (or a clock) and includes a four-port Gigabit switch. No dedicated interconnect radio means this isn't the fastest combo, but the Amplifi HD is cheap and discrete.





**T**he days of the traditional router may be numbered. We all live in complex homes. We all have those corners that stubbornly refuse to give up a decent signal. And most of us have to put up with an awkwardly-

located central access point, which just makes solving the problem more difficult. There are options out there, such as powerline and Wi-Fi repeaters, but mesh networks do it better: they send signals between individual nodes, usually using a

dedicated radio channel, meaning you can place them in those murky areas of your home that really need the boost. Still have wireless black spots? Then you can seamlessly add another. It's easier, it's faster and it's all app-controlled.



## 4 TP-Link Deco M5

**£229 (three nodes)**, [tp-link.com](http://tp-link.com)

The Deco's nodes, far squatter than Google's with a twisty conical surface to discourage you from using them as a coaster, don't have quite the same broadcast power as some of the others on test, although this three-node collection is cheaper than most two-node packages. The Deco's nodes are simple to set up, with an Android/iOS app that offers a good slice of peace of mind: built-in traffic-sniffing anti-virus and web filtering, which you can activate and configure on groups of machines at once, gives supreme control over network activity.



## 5 BT Whole Home Wi-Fi

**£199 (three nodes)**, [shop.bt.com](http://shop.bt.com)

Less flexible than other mesh systems – you can pause the whole network, but not disable it for particular devices, and there's no kind of parental controls on board – BT's Whole Home pack has its work cut out for it. But it's a winner: at £100 less than its original launch price, it's a real steal for a three-node setup with great signal strength and speed, a straightforward set-up process, and stand-up small footprint Wi-Fi discs, which tell you (and feed back to the free Android/iOS app) when they've been positioned poorly relative to each other, in different areas of your home.



## 6 Linksys Velop

**£360 (three nodes)**, [linksys.com/gb](http://linksys.com/gb)

Parental controls are a common feature on modern Wi-Fi devices, but few do it better than Linksys in its excellent Android/iOS app. Filtering by device, temporarily activating guest access, cutting out certain kinds of content – it's easy. Set-up is similarly simple, just plug in, poke the app a little and go. Each unit packs a powerful AC2200 radio combination for an amazing signal, even when just running a pair of nodes. Adding an extra unit is costly, though, at an eye-watering £199, and three is probably overkill for the average two-storey home.



# THE BEST FREE DOWNLOAD MANAGER 2017

## Enjoy fast and secure downloads – free!

### 1 Ninja Download Manager

<https://nijadownloadmanager.com>

Ninja Download Manager is a relative newcomer to the downloading party, and it looks considerably more contemporary than its, er, contemporaries.

Its interface is simple and modern (if a little dark), and its

accelerator can help you get your files ten times faster. It does this by splitting each file into chunks, then downloading each one using a different server connection, making downloads not only faster, but also more reliable. If you're

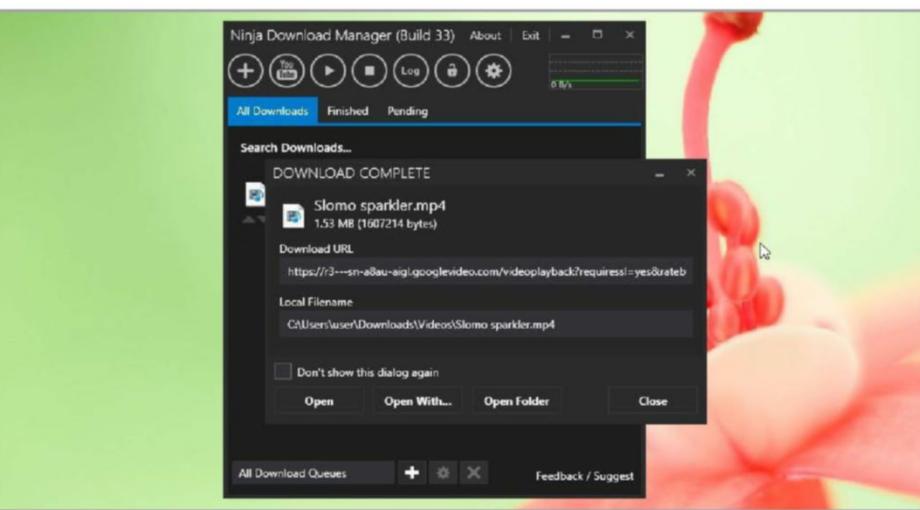


With Ninja, you can begin listening to an audio file while it's still downloading.

into music and movies you'll be delighted by its sequential setting, which lets you begin playing a file while it's still downloading.

There's also a built-in video downloader with support for YouTube and Vimeo, and a video converter that changes the file format automatically once it's finished downloading. There are lots of fantastic downloaders around, but if you love music, films and TV then Ninja Download Manager is the tool for you.

Note: the free version of Ninja Download Manager can be found on the developer's homepage.



### 2 Free Download Manager

[www.freedownloadmanager.org](http://www.freedownloadmanager.org)

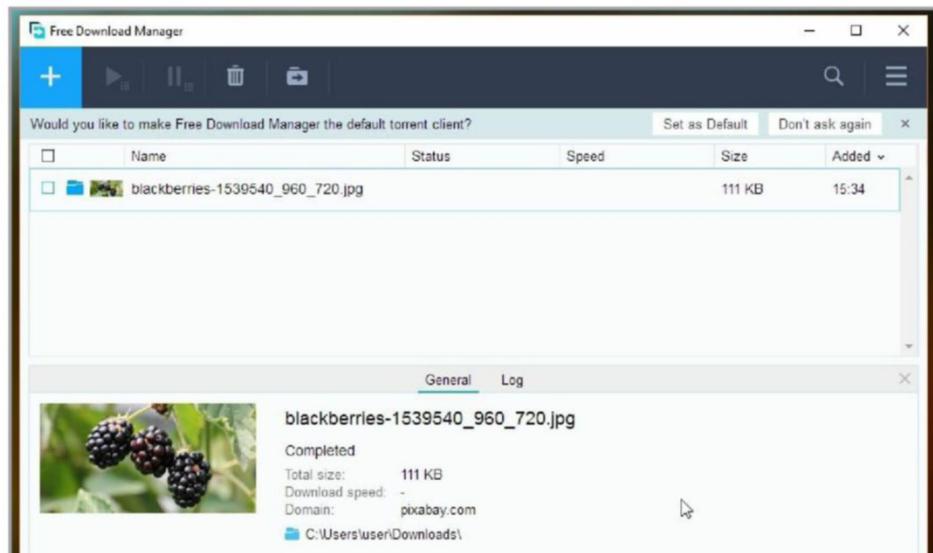
Free Download Manager aims to be all things to all people, and it succeeds. It's a download accelerator, a BitTorrent client, an audio and video previewer and a

traffic management tool – and because it's open source, it's completely free and receives regular updates from its community of developers.

Free Download Manager gives you full control over your downloads.

Free Download Manager includes powerful scheduling features and a very handy remote control that enables you to leave your downloads running on your PC and then check on their progress from any internet-connected device.

It can spider sites to download specific kinds of files, and you can choose to download only the bits of a ZIP file you actually want. Free Download Manager is a truly exceptional program, and it was tough to choose between this and Ninja Internet Download Manager for the top spot.



## 3 Download Accelerator Plus

[www.speedbit.com](http://www.speedbit.com)

There are four versions of Download Accelerator Plus (DAP): A Premium version, which costs £29.95 for a single user licence; a Speedbit Acceleration Pack, which

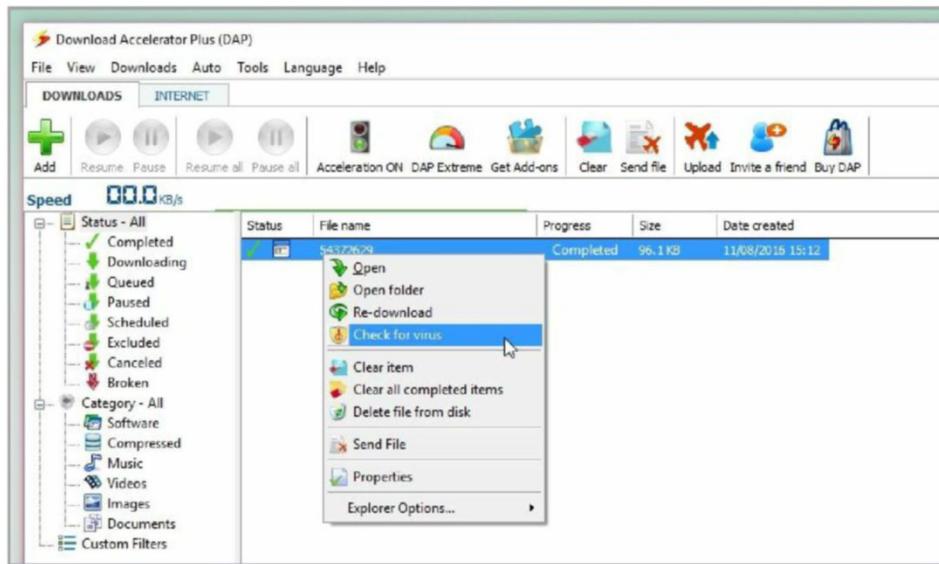
also includes a Video Accelerator Premium Licence for £59.95 a year; and Speedbit Acceleration Pack Home (which includes licences for three PCs of both the Premium

The free version of DAP enables you to preview videos while they're being downloaded.

and Video Accelerator editions). And then there's the free version, which we're looking at here.

Luckily the free version is much more than just a demo and has all the essential features you need for quick and reliable downloads. It lacks the DAP Premium's privacy protection, but it does include a link checker, video previewing, file conversion, safe downloading and multiple connections to boost the speed of your downloads.

Download Accelerator Plus is clearly designed for media fans, and can help you avoid slow servers and Internet congestion.



RATING



## 4 JDownloader

<http://jdownloader.org>

JDownloader is a free, open source download manager with a massive developer community, and it's available for Windows (32-bit and 64-bit), Linux and Mac.

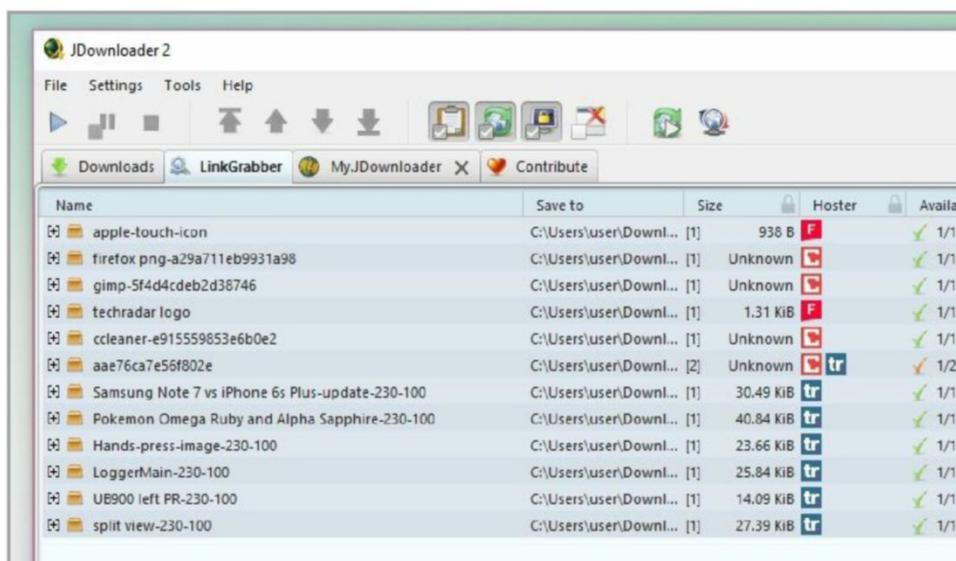
It's really one for power users, with support for over 300 decryption plugins, automatic RAR extraction, password list searching and Optical Character

JDownloader is a powerful tool that's available for all platforms.

Recognition (OCR) to complete some of the captcha 'I'm not a robot' checks you encounter on some download sites.

You'll need the Java Runtime Environment to run it, and you'll have to be careful when installing it: the installer contains adware, which will be bundled in with the download manager if you don't specifically deselect it.

No matter, JDownloader is still a powerful and easy-to-use app for the automatic downloading of files from various sites. Just feed it with a URL and JDownloader will handle the rest. Worth having.



RATING



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