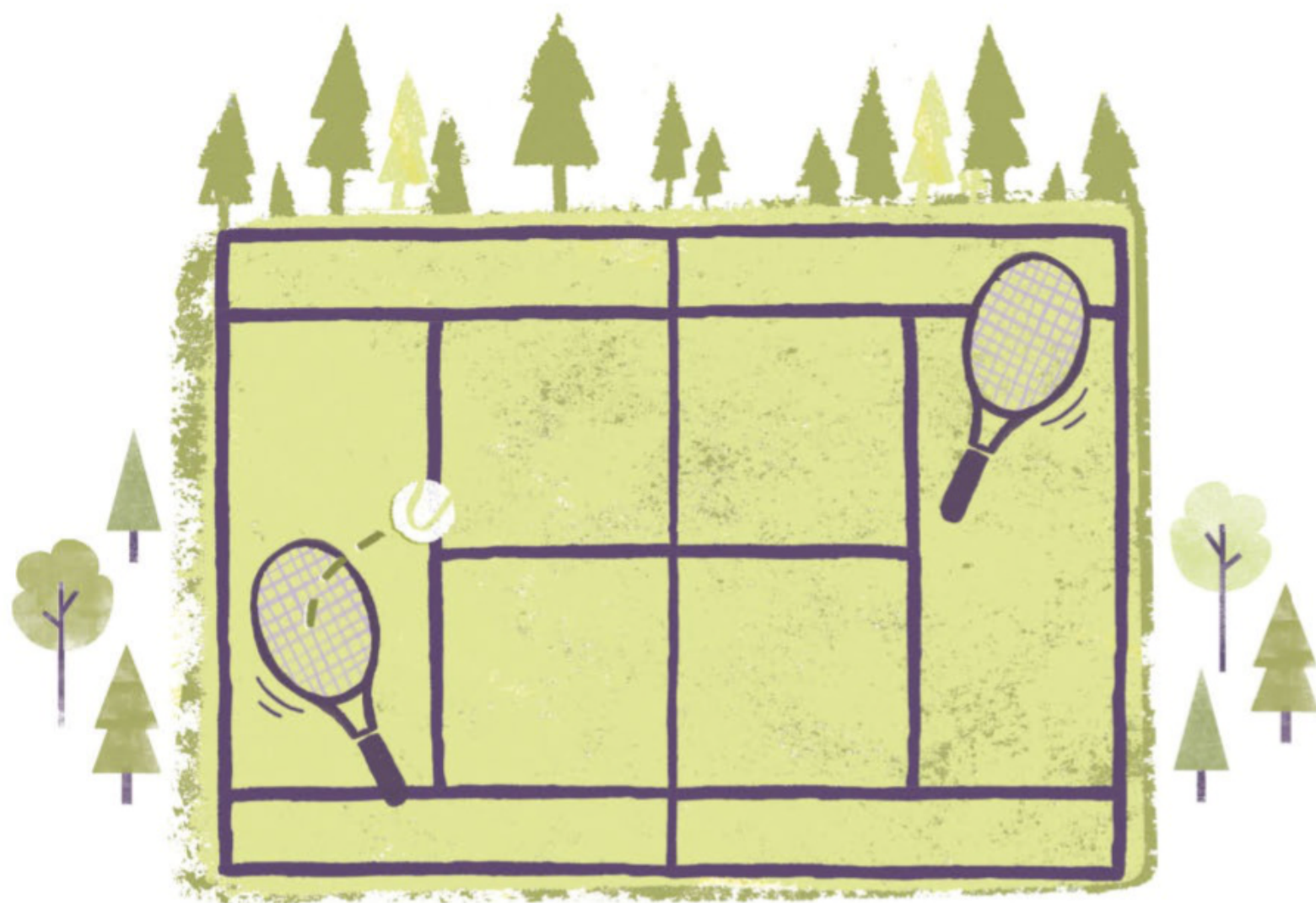


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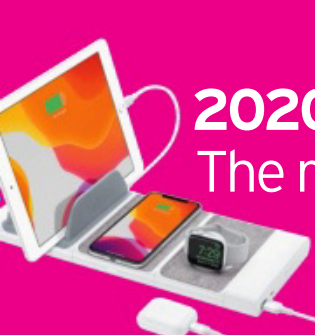
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UNFAO, Global Forest Resources Assessment 2005-2015

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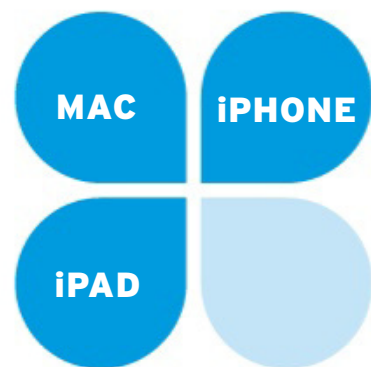
Take amazing
shots with your
iPhone camera



Rated: top 5 wireless
in-ears. Are the
AirPods still king?



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DETOX

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of essential
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HOW TO:

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Master Files in iPadOS
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SPOTLIGHT

UP CLOSE AND PERSONAL WITH...



Apple Remote

Unlike the modern Siri Remote, which has received a fair amount of antipathy, the 2005 version – resembling a 1st-gen iPod Shuffle – was actually, you know, usable.

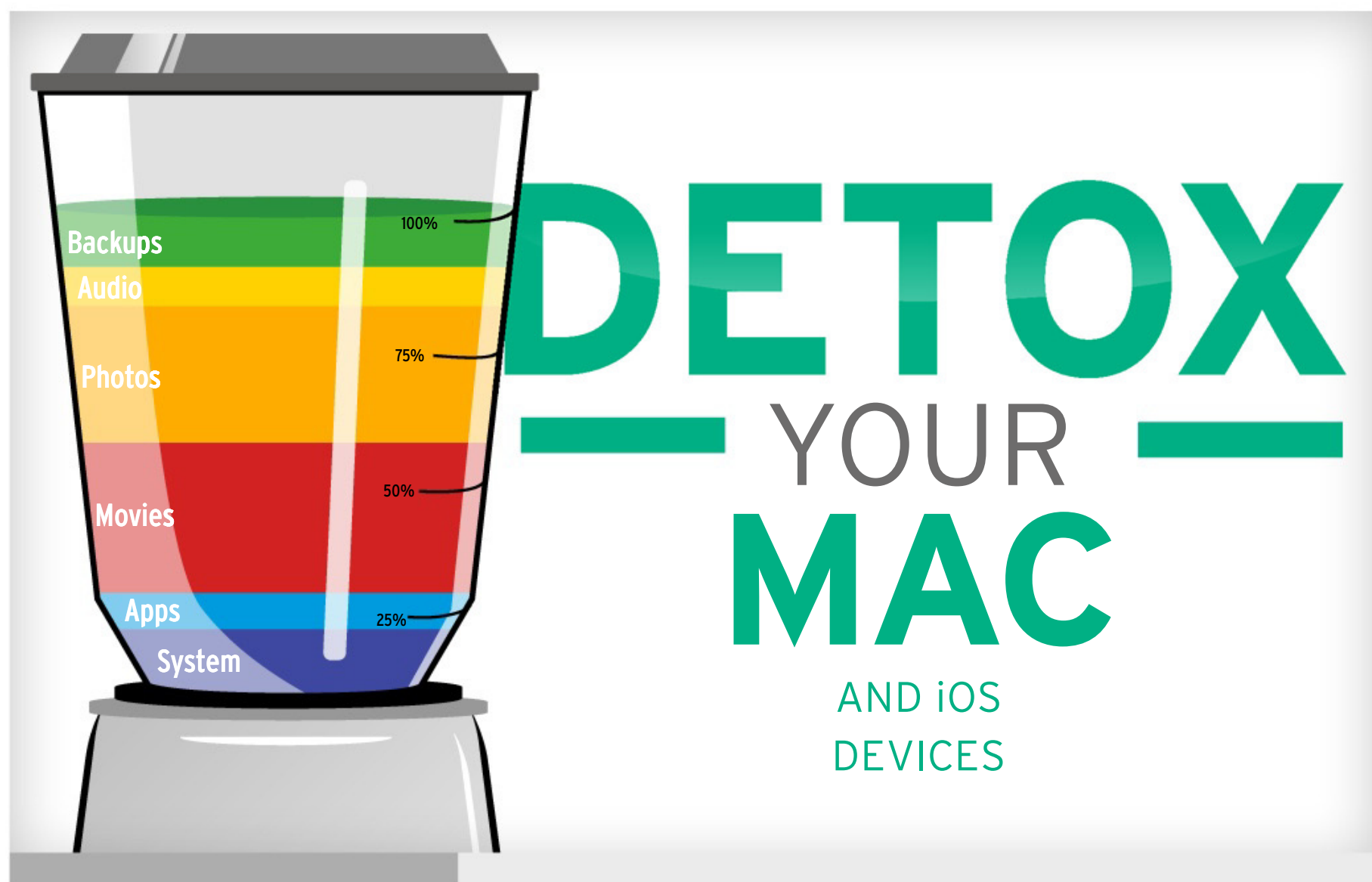
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IPAD

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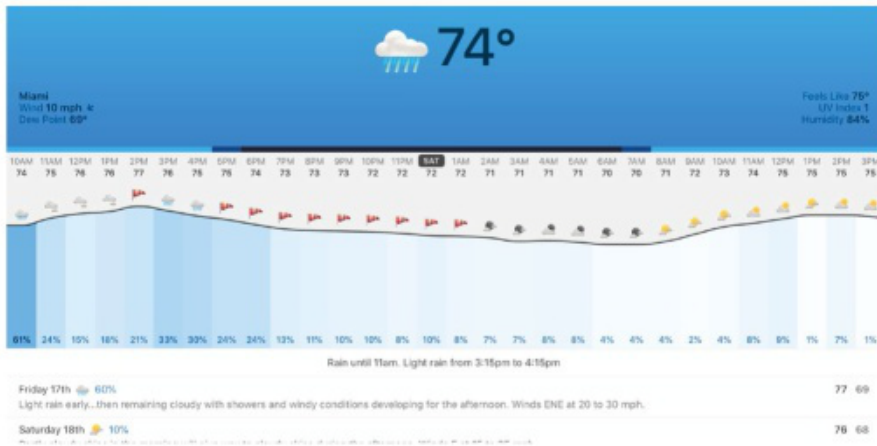
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Retweeted by @tangled_cabals

 **Lorem Ipsum News** 4 min.
@doesanyoneevenreadthis

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IS IT REALLY SAFE?



In my opinion, data is our most important personal possession in life (no, despite what you might have been told, it's not that shiny SUV you just picked up), yet most of us will happily give it away in a flash these days. Whether it's inputting your credit card details for online purchases, sharing your media to online storage services, or even just installing a smart thermostat in your home, our data, and therefore our personal freedoms, are out there for all to gawp at. And it's not just strangers knowing a great deal more about you than you'd like, it's

what those same strangers are doing with your data that's really worrying. It's fair to assume that your data is going to be protected when you give it to trustworthy-looking companies, but is that really the case? When you sign up to social media online, or create a new account for that smart camera app on your iPhone, do you really know what you're letting yourself in for? Even if those companies promise to leave your data alone, and adhere to that, is it really safe from prying eyes outside of that company?

Maybe I'm just being overly paranoid here, but I firmly believe this is an issue that's only going to get worse over time. In this month's Start, we've taken a look at some of the recent privacy issues plaguing tech companies (p8). But the thing that scares me most is the potential for disaster when it comes to smart home tech. I've got a bunch of stuff installed around my house, and I mostly love the benefits that it all brings, but in theory I've opened up the door to my most sacred of spaces. It gives me the creeps, so I've made some changes along the way. For instance, I no longer monitor my sleeping baby with a smart camera; now I just have one watching my front yard. But is it enough?

Some of you, our readers, wonder the same thing, which is why this issue's Home Life (p70) is tackling the idea of taking your smart home offline and away from prying eyes, and if so — how to do it. As ever, give me your feedback on this hot topic.

Nick

NICK ODANTZIS, Editor
Twitter: @maclife

>>>THE TEAM



Matt Lochrie
Art Editor

Spent the issue drawing a variety of smart home objects with eyes to creep out Nick.



Iain Noble
Production Editor

Iain wonders what George Orwell would've thought about tech firms spying on us. It's all a bit 1984...



Alex Cox
Contributor

Alex has 43 smart cameras installed in his home, but none of them actually work.

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» START

FEED YOUR MIND. FEAST YOUR EYES.

A question of trust

Data privacy issues in security apps and other unlikely places

BY ALEX SUMMERSBY

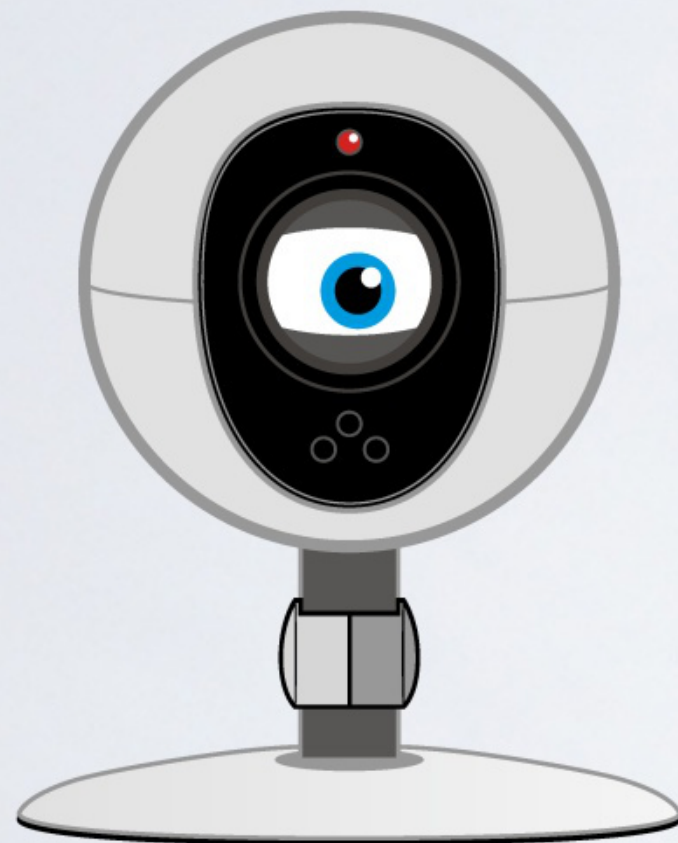
YOUR RING SMART doorbell, wireless carrier, and even Mac antivirus software could all be sending personal information about you to strangers.

Digital rights group the Electronic Frontier Foundation found that the Android app for controlling the smart doorbells by Ring, which Amazon acquired in 2018, is packed with trackers that harvest personal identifying information and send it to five third-party analytics companies.

TRACKING YOUR ACTIVITY

Only one of the five, MixPanel, is mentioned in Ring's privacy notice, but data it receives includes users' full names, email addresses, device info, and app settings. Facebook, via its Graph API, is notified when users open the Ring app and when they perform certain device actions. It receives a unique identifier, device model, and more. Branch and AppsFlyer receive unique identifiers plus various snippets of information. The Ring app also sends data to the Google-owned Crashalytics service, but the EFF says the amount of data involved is "yet to be determined."

The EFF emphasizes that these trackers are operating without the user's knowledge, consent,



or ability to opt out. "The danger in sending even small bits of information is that analytics and tracking companies are able to combine these bits to form a unique picture of the user's device," the EFF said. "This fingerprint follows the user as they interact with other apps and use their device, in essence providing trackers the ability to spy on what a user is doing in their digital lives."

It is unclear whether the Ring app for iOS has the same issues. AppleInsider points out that Apple's App Store Guidelines include provisions to protect users from many data collection practices.

Ring came under fire in 2019 after reports it had been hacked. An Alabama resident launched a class action lawsuit after alleging that a hacker spoke with his children via a Ring camera. Privacy advocates also criticized Ring for allegedly partnering with law enforcement agencies to create a "surveillance network" of Ring camera video feeds. Ironically, Ring launched its first indoor smart security camera in September 2019.

CARRIERS CAUGHT

In late January, the Federal Communications Commission confirmed that after "an extensive

investigation... it has concluded that one or more wireless carriers apparently violated federal law.” This comes almost two years after the first reports that major American telecoms carriers, including AT&T, Verizon, Sprint, and T-Mobile, collected and sold the location data of users without their knowledge or consent. The data was sold through intermediaries to a variety of customers including law enforcement agencies, bounty hunters, tracking services, and even alleged stalkers.

As we go to press, it is unclear whether the FCC will impose any penalties. All the carriers concerned say they have stopped collecting and selling user location data.

SECURITY BUT NO PRIVACY

Users of Avast antivirus and security tools on macOS and Windows, available in both free and paid-for versions, might be disclosing more than they expect if they consent to the software collecting user data, which Avast then sells on via a subsidiary, Jumpshot. Privacy advocates suggest the extent of the data collected is not made clear, and the data is so specific that it could be used to identify individuals, despite anonymization.

The data collected reportedly includes Google searches, location look-ups and GPS coordinates from Google Maps, LinkedIn pages, and YouTube video listings. Some site visit data, although anonymized, included the date and time of the visit and other tracking data.

Avast reportedly has more than 435m active users per month on Macs, PCs, and mobile devices. Jumpshot claims it has data from 100m devices, which it sells in a variety of different packages to third parties, including Google, Home Depot, Yelp, Microsoft, Pepsi, and Intuit.

One package, the so-called “All Clicks Feed” option, enables Jumpshot’s customers to track a user’s behavior and movement across websites. One marketing company reportedly paid more than \$2m for data access in 2019, which provided an “Insight Feed” for 20 domains from 14 countries around the world.

This included users’ “entire URL string” with personally identifiable information removed but a device ID included which persisted unless the user completely reinstalled Avast, making it possible to track individual users’ behavior extensively over time.

GO

Take your smart
home offline
see p70

News in brief

Apple hits new high

Apple has reported its highest quarterly revenue ever: \$91.8 billion in its financial quarter ending December 28, 2019, a rise of 9% from the corresponding quarter a year ago. Not only was this unexpected, but it came as a result of a strong recovery in demand for iPhone, resulting in “double-digit growth” in iPhone revenue.

With the release of the iPhone 11 line in September, in fact, Apple became the world’s number one smartphone vendor, according to Strategy Analytics, which estimates Apple’s global market share at 19% in the quarter.

Services and Wearables also hit new all-time records. Services grew 17% year over year, with double-digit growth in all five of Apple’s geographic segments. Apple has over 418m paid subscriptions across all platforms including the App Store, up 120m from the previous year. This number is expected to exceed 500m in the March quarter, and hit 600m by the end of calendar year 2020.

Wearables also hit a new high, despite supply constraints for Apple Watch Series 3 and AirPods Pro all quarter, and this segment of Apple’s business is now the size of a Fortune 150 company. More than 75% of Apple Watch buyers were new to Apple Watch, Apple said.

In another first, revenue from Wearables overtook revenue from the Mac. Both Mac and iPad revenue fell, but CEO Tim Cook pointed out that the new products shipping in the quarter, the MacBook Pro and Mac Pro, aren’t aimed at holiday sales, unlike new releases in the year-ago quarter, the new MacBook Air and Mac mini.

Geographically, Apple’s Greater China region returned to growth, with revenue up by more than \$400m year-over-year, but Apple cautioned that it was impossible to forecast the impact of Coronavirus.

The Americas were up by about \$4.5bn, but Japan fell by about \$600m. Tim Cook attributed this to regulatory changes – a new cap on carrier discounts with two-year contracts has badly affected smartphone sales.



MUST \$ HAVES



ANKER IPHONE LED FLASH

Connects via Lightning (the first flash certified to do so) for up to twice the range and four-times the brightness of the iPhone flash. **\$49.99 from anker.com/ledflash**



TENBA FULTON 14L BACKPACK

This 21lb backpack takes a DSLR, three to four lenses and an iPad (up to 10.5-inch), plus your lunch and jacket in the roll top. **\$99.95 from tenba.com**



HYPERJUICE 110W

This unit charges up to five devices at once via five USB-C PD 3.0 ports (two 100W, three 45W), five USB-A, and two detachable 15W Qi charging mats. **\$119.99 from hypershops.com**



What the heck?

Did a video really hack Jeff Bezos' iPhone?

BY ADAM BANKS

IN JANUARY, IT was reported that Jeff Bezos – CEO of Amazon and, more relevantly, proprietor of *The Washington Post* – had had data leaked from his phone by malware installed when he received a video from Mohammad bin Salman, the Crown Prince of Saudi Arabia. The story was based on an ongoing inquiry by UN special rapporteurs drawing on a technical analysis commissioned by Bezos. This suggested that the hack could have been done using Pegasus, a spyware product from the Israeli company NSO, or Galileo from Milan-based HackingTeam. At the time of writing, Saudi Arabia and NSO had denied any involvement, while the other parties hadn't commented.

But nobody claims to know exactly what was done, or how. When Bezos' iPhone X was later examined by Cellebrite, which "cracks" iOS devices for law enforcement, no malware was found. Perhaps code contained in the video file, received via WhatsApp on 8 November 2018 had executed itself – although iOS

should prevent this – and exfiltrated the megabyte or more of data per day that Bezos' records would show had been transmitted in the following months, then deleted itself. Ironically, WhatsApp's end-to-end encryption, which (as with Apple's iMessage) prevents messages being intercepted or faked, hampered investigation.

There are certainly examples of "cyberarms" targeting iOS by exploiting newly discovered security vulnerabilities before Apple patches them. Android and WhatsApp have also been targeted. It's assumed that national security agencies acquire tools to compromise all platforms. Because many tools are developed by third parties who also sell to others, they could in theory be used against any of us to bypass iOS' security. But the effort and expense makes it unlikely.

If anything can help to protect you from a determined attacker, it's following standard advice. Don't click unknown links and don't open unexpected attachments. And think twice about owning a newspaper.



WINS & FAILS



BAIT Google finds security flaws in Safari's Intelligent Tracking Prevention

BLOCK EA announces *Tetris* will be pulled from the App Store on 21 April 2020

NIXED Founder Jack Dorsey says Twitter will probably never introduce an edit button

SWITCH Google telling Apple how to protect your personal data? Bring on Opposite Day

VOTE If we want to watch misfits cancelling each other out, there's the Democratic Primaries

FIXED Wait, we went back to his statement and now it says maybe they will...?

> THE SHIFT

MATT BOLTON thinks it's high time Apple offered truly high-res music to go with its increasing speaker ambitions



TIME WAS, APPLE didn't need to worry about high quality music bought via iTunes. MP3 and equivalent AAC encoding was fine for the average-quality DACs and horrific headphones of iPods and early iPhones. What would be the point in offering the finest-quality ingredients for a feast for your ears if they're just going to be smooshed into a paste by the headphones?

Plus, when storage size was more limited than now, the smaller the music file size the better — we wanted to carry lots of songs and were happy to trade some quality in exchange for that.

But recently Apple has started getting more serious about sound reproduction. All of its mobile devices come with seriously impressive DACs — our pals at *What Hi-Fi* magazine give the iPod



AirPods Pro tune the sound just for your ear, so shouldn't the tracks match that effort?

touch top marks as a music player. Meanwhile, HomePod is a feat of engineering and the best-sounding speaker of its size. AirPods Pros are up there with the best buds of their kind, and pack technology to tune the sound especially for your ear-shape. The new MacBook Pros have opposing speakers to reduce distortion and vibration, tech you tend see on high-end subwoofers.

But to make the most of these higher-quality speakers you need higher-quality tracks. Apple got onboard with higher-detail music impressively early with iTunes Plus, then stuttered to a near-halt. iTunes is behind Tidal and Amazon when it comes to hi-res audio. There is the "Mastered for iTunes" system, but this doesn't give you music files with a higher level of fidelity: its purpose is to give musicians a technical template for ensuring their music suffers as little as possible from the compression and conversion process that happens when iTunes' AAC files are created. That's a good thing, and makes the tracks you hear sound closer to how they were intended than they would be otherwise, but it's still delivering a final file in which lots of fine detail had to be dumped. But we don't need that anymore.



The HomePod (and other AirPlay speakers) can play lossless tracks wirelessly... but not via Siri.

Large storage in phones means we're reaching the end of the era of miniaturizing music, in which we accepted lower quality in exchange for convenience. That convenience became the norm, and music became commodified more than ever. But now people are getting back into vinyl — they're reversing the commodification, looking for warmth and even imperfections.

Hi-res music includes more small details that get lost when music is compressed: a pick on a guitar string, a crack in a voice, a drumstick raking on a cymbal. It makes music more personal, and what is music if not that?

Apple has all the hardware to turn Apple Music into the world's best service for music lovers, but it's still missing the key ingredient. I hope 2020 is when the band comes together.

>>> Matt is the editor of Future's flagship technology magazine *T3* and has been charting changes at Apple since his student days. He's skeptical of tech industry hyperbole, but still gets warm and fuzzy on hearing "one more thing".

Six things announced at NAMM 2020

What's new for Mac and iOS users from Anaheim's global music tech show

BY ADAM BANKS

1 **Evo by Audient Evo 4**

This tiny \$129 British-made USB-C audio interface gives your Mac two phantom-powered XLR mic inputs with high-quality preamps. A Smartgain feature keeps your levels right and there's a DI jack too, plus speaker and headphone outputs.



2 **Mackie EM-USB**

If you want to record or podcast on your Mac with a minimum of kit, this \$150 condenser mic has a built-in audio interface with gain and headphone level knobs, and a mute switch.

3 **Sennheiser HD 25 Light**

This newly redesigned entry-level version of the classic HD 25 DJ headphones comes in a lightweight on-ear format. For under \$100, the closed-back cans have a simpler headband, 1.5m cable, and screw-on jack size adaptor.



4 **Mackie CR3-X**

Compact monitors are a vital tool for home mixing. These all-wood cabs with three-inch woofer and 3/4-inch tweeter promise studio-quality sound in a minimal desktop footprint for just \$100 a pair. If bass is your place, add a CR8S-XBT subwoofer.



5 **SSL 2+**

Legendary mixing desk maker Solid State Logic reckons its first USB audio boxes offer sound that's a cut above, with a Legacy 4K mode to add back that analogue sparkle. The \$280 2+ is a full production hub with two preamped XLRs, gain knobs, level LEDs, and MIDI.



6 **Arturia Keylab Essential 88**

With a full midweight 88-key keyboard, RGB-coded pads, mod wheels, knobs and faders, this might be the most impressive \$349 you can spend on your home studio. Arturia's Analog Lab synth app and the UVI Grand Piano Model D software instrument are included.

LETTER OF THE MONTH

I would like to share with *Mac|Life* readers my experience with a password and data storage app that is available for Mac and iOS devices. My Eyes Only (MEO) from Software Ops has been my password and data storage app for about ten years and has performed flawlessly. I have recommended it to many friends, who have also had positive experiences with it. My reason for this email is to recommend it to your readers because it has not been reviewed in many years.

The user interface is very simple, synchronizing MEO apps on other Macs and iOS devices and to Software Ops' encrypted server. The data is stored on your Mac and/or iPhone permanently, and is universally updated when subscribing to MEO's "syncryption" service.

In other words, make a change on one device and that change is transmitted to all devices. There is no chance to lose one's key information, even if the parent company disappears (which is very unlikely). This app does not suggest passwords, it merely stores user IDs and passwords, and any other financial or licensing information the user desires in an extremely useful interface on all of your devices.

I have no financial or business interest in Software Ops. I just want your readers to know that MEO is indispensable to my workflow, and I use it many times a day.

STEVEN B RAFFIN

Thanks for the heads-up, Steven! To our knowledge, we've not covered My Eyes Only before (at least in the last three to four years), but due to your glowing recommendation we may have to pencil it in for a future review.



terms of outright performance, provided that cost isn't a consideration. Of course, cost is a big factor for the majority of people – whether they choose to spend more on Apple products over Android/Windows isn't really relevant since we can only assume that if you're reading an Apple magazine, then you probably only buy Apple products. So, there's very little point comparing them to a product from an ecosystem that you would never consider.

Swift service

I just read the Letter of the Month in the January 2020 issue (*Mac|Life* #162). I was told the reason for the two to three week time period for battery replacement for the MacBook is that it must be sent by ground to the repair facility. When the battery is replaced it may then ship by air back to the Apple Store. To prevent me from being without a machine, Apple sold me a new MacBook Pro which I could return for a full refund when my 2015 MacBook was fixed. When the Pro arrived, my MacBook was not due back within the two-week return window, so Apple extended my return period. However, my MacBook was returned in 12 days. Pretty good service.

GARY ROBINSON



Missing Linksys

I've just finished reading the Group Test review on page 53 of the February 2020 issue, and I was surprised that the Linksys Velop was not included since on page 68 it's declared the "Best of the Best"! After reading the comments of each test, I feel you deliberately downgraded the Netgear based mainly on the fact it only had two units (even though the other three-unit sets didn't come close to the features of the two Netgear units) and the cost. If you're going to consider cost, then you should downgrade Apple products

since they're more expensive than Windows and Android products. Blaming the included app was just a way to rationalize the selection of a three-unit set.

DENNIS B SWANEY

Unfortunately we didn't quite get round to updating that issue's Best of the Best (blame our hectic pre-Christmas deadlines!), but rest assured it has been altered for the issue following this one. As to the point about downgrading the Netgear product, we think we made it pretty clear that the Netgear setup is the best in



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CRAVE

THE GEAR WE'RE LUSTING AFTER



1 **Samsung Q950TS**
samsung.com
\$TBC

>>> Samsung's new 8K TV is a little bit mind-blowing. The bezels are practically non-existent; being just 1/10th of an inch in width, they're effectively invisible from 10 feet or more away. The 33-million-pixel screen just melts away into the wall. It's surprisingly thin, too, for a TV with a full-array backlight – that's tech that means there's a full panel of LED lights behind the LCD screen, giving brighter highs than OLED screens can manage, but the LEDs can selectively dim or turn off to give rich, dark blacks. This is the TV to watch out for this year.

THE BEST
TECH OF
CES 2020!

2 Satechi 108W Pro USB-C PD Desktop Charger

satechi.net
\$79.99

»»» Power *everything* from a single adapter with this beast: it has a 90W USB-C port that can charge even a 16-inch MacBook Pro, plus an 18W adapter that's ideal for iPad (or iPad Pro), or fast-charging an iPhone. They make up its 108W capacity, so you can charge those without either of them getting anything less than full power. Oh, and there are two high-power USB-A ports for charging your headphones, camera, battery pack... whatever!



3 Omron Complete

omronhealthcare.com
\$159.99

»»» This is a combined EKG and blood-pressure monitor in one, with Bluetooth for beaming the results directly to your phone, where they can be stored in the Apple Health app. The tech here has been done before, but not all in one package that's so easy to use. As people get older, being able to track what activities or days caused blood pressure changes, or might affect the regularity of your heartbeat, puts an incredible amount of power in your hands. Millions of us will have heart problems, and this makes living with it much easier.



4 Technics EAH-AZ70W TWS

technics.com
\$249

»»» Japanese audio specialist Technics has always been at the forefront of new tech, and now it has its own true wireless headphones with active noise cancelling, giving you an alternative to AirPods Pro with some proper hi-fi heritage. Technics has developed its own "Dual Hybrid Noise-Cancelling" tech, which means using both digital and analogue tricks to stop outside noise reaching you. The amount of cancellation is highly adjustable (100 different levels, apparently), so you can lower it in the office to let in exactly the amount of outside chatter you want. And music sounds great, too...



5 **Motorola Bolt Smart Safe** motorola.com \$129

>>> The idea here is to keep items that you need every day safe, while making them easy for you to get to. It's a digital safe with a code, but you can unlock it using your phone immediately from anywhere in case someone else needs what's in there. And you'll be alerted on your phone every time the safe is opened, so there's no way anyone can sneak in. It's ideal for jewelry, medication, ID, and so on. This version bolts to a wall, but the Flex version has arms to lock it into cabinets or drawers.



6 **Netgear Nighthawk M5 WiFi 6/5G** netgear.com \$TBC

>>> 5G is off to a stuttering start, but if you're in an area where it's live, the speed is incredible. Share it with all your devices with Netgear's high-end 5G portable router to give your iPhone, iPad, MacBook and anything else you carry around with you 5G speeds. And it supports Wi-Fi 6, the newest Wi-Fi standard (it's not yet supported by Apple products, but that'll probably change in 2020) to ensure the fast 5G speeds aren't wasted on poor Wi-Fi connections. For work or family days out, this will be an essential... when 5G is in more places.



7 **Scosche BaseLynx** scosche.com \$199.95 (Pro Kit)

>>> This is a modular charging kit which you can customize for your exact Apple tech setup. There are four modules: one for Apple Watch (with built-in magnetic connector), one for iPhone (with Qi wireless charging), one with vertical stands and three USB ports (one C, two A) for iPads and other tech, and an end cap module with one USB-C and one USB-A. You can fit them in whatever order you want, and add as many as you need. The Apple Store has a "Pro" kit, which includes one of every module, for the price listed above. The Scosche website has more options (and colors).





8 Nikon CoolPix P950
 nikon.com
 \$799

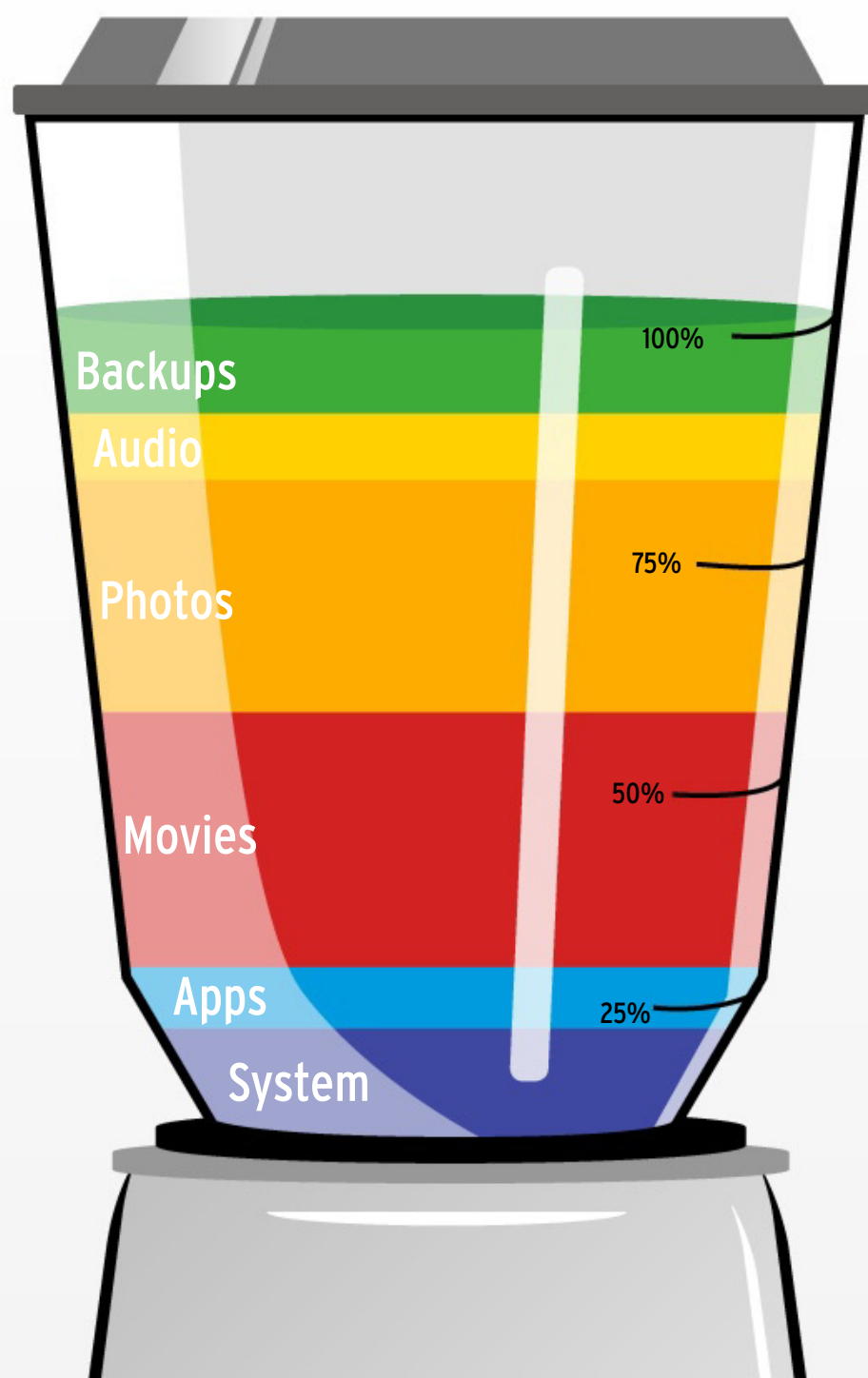
»» Bridge cameras have mostly fallen out of favor in the age of mirror-less cameras, but it's worth taking a closer look at this one. Much closer. *Eighty-three times* closer in fact, because that's the insane zoom level you get from the built-in lens on this one – specifically, 24-2000mm of range. You get a 16MP sensor backing that, which is capable of taking 4K video. For getting right into the action at your kid's sporting triumph, or catching the rare wildlife you're trying to spot, nothing takes you closer for this kind of price.

DETOX

— YOUR —

MAC

AND iOS
DEVICES



Mac running slow or short on space? This feature will show you how to clear out the rubbish and keep hold of the important stuff

WRITTEN BY ADAM BANKS

ONE THING THAT'S as sure as death and taxes is the fact that your Mac's hard disk will eventually fill up. These days it may be an SSD or Fusion Drive, but regardless of the nature of the hardware it can only hold a finite number of gigabytes. And the more files you add — whether new apps, downloads, music and videos, your photo collection, work files or anything else — the less space will be left. And the same goes for your iPhone or iPad.

As we so often say about macOS and iOS, remember that there's only a problem when there's a problem.

There's generally no need to worry about unwanted files existing, or to install software that promises to remove them. These files won't break anything or slow anything down. But when you try to save or download a file and get a warning that your drive is almost full then yep, you'll need to do something about it.

In this article, we look at all the kinds of content that are likely to be taking up storage unnecessarily, where to find them, and how to get rid of them safely. Finally, in case it feels like time for more drastic action, you'll see how to wipe your drive and start again.

Step one: Identify space hogs and optimize storage

The bigger the file, the more you'll gain by trashing it

YOUR MAC'S BUILT-IN primary drive, called Macintosh HD by default, is where all your files are stored, unless you saved them to an external drive. Check both for anything you don't need to keep.

1 Get an overview

The status bar at the foot of any Finder window (show or hide it with Cmd+V) lists free space on the current drive. For more detail, choose About This Mac from the Apple menu and click the Storage tab.

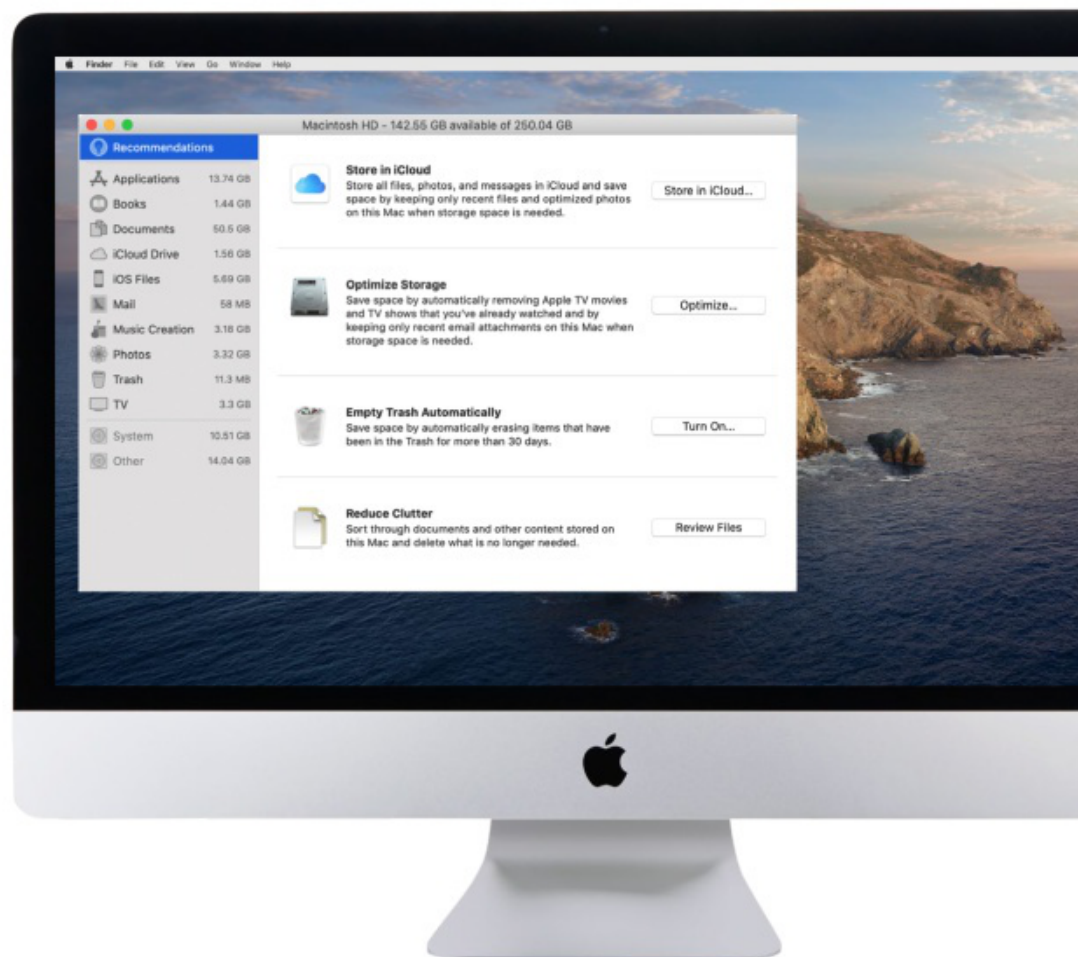
Wait for the chart to update fully and you have a color-coded breakdown of all drives. This doesn't reflect how files are arranged on the disk, just how much space they use. If it shows that photos and/or music are the major space hogs, turn to page 24.

2 Manage documents

Click Manage to open the Storage Management window. You'll see that the first of the panes listed on the left is Recommendations. As well as options

to keep more content only in iCloud, which we'll look at over the page, this lets you set the Trash to auto-empty and offers a Review Files option to "reduce clutter". This opens the Documents pane, which deals with files stored anywhere in your Home folder.

Large Files lists only the biggest. Simply click a file to show its location; click Delete to erase it. File Browser shows which folders contain the most data. However, if you keep work outside your Home folder, none of this may help much.



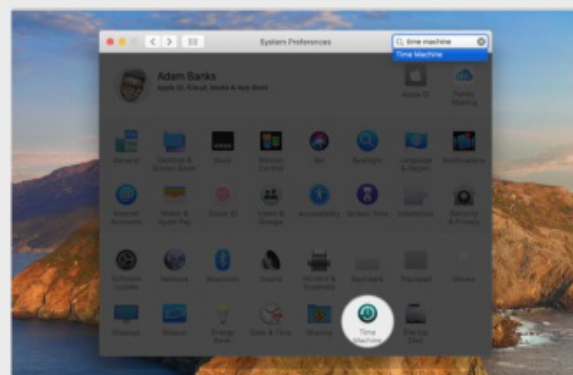
Find large files



>>> To search more widely for files worth removing, open a new window in the Finder (Cmd+N) in List view (Cmd+2). Click a drive or folder in the left sidebar and press Cmd+F. Notice that you can switch the search between the current location and the whole system (This Mac).

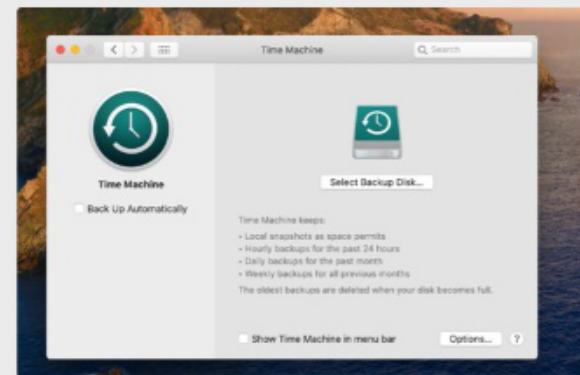
Click Kind and change it to File Size, then switch "equals" to "is greater than" and set a size, such as 50MB. Click the Size column heading (twice if necessary) to see the biggest files first. Click any you don't need and press Cmd+Left Arrow to delete.

HOW TO BACK UP WITH TIME MACHINE



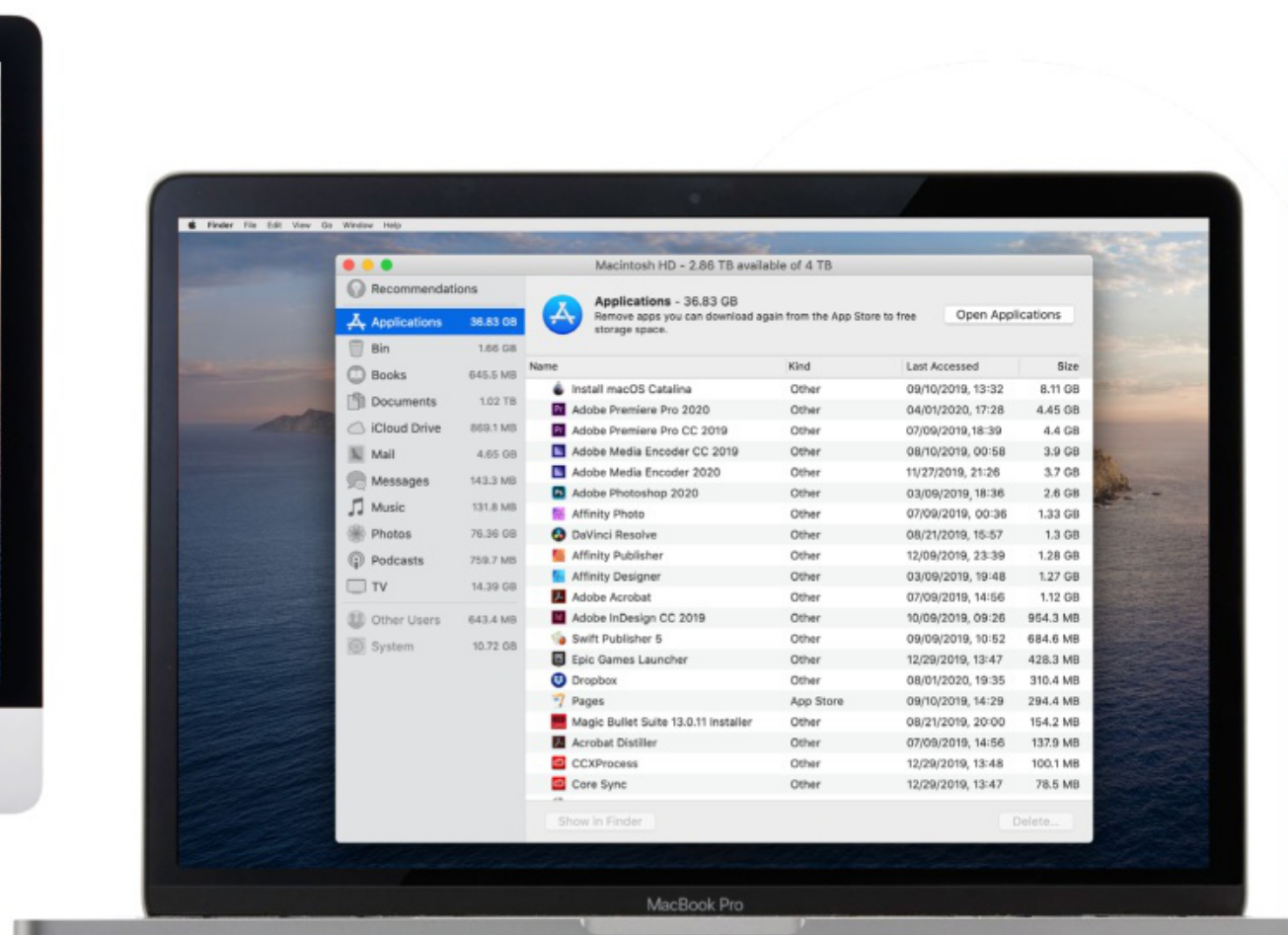
1 Time Machine Prefs

Be sure you have a backup before you start deleting files. Time Machine is an easy way to keep a backup of your Mac and attached drives. Open System Preferences and click Time Machine.



2 Select a backup drive

Use a Mac OS Extended (Journaled) formatted USB or Thunderbolt hard disk or SSD, an Apple AirPort Time Capsule, or a NAS unit with Time Machine compatibility. Click Select Backup Disk.



Take out the Trash

1 Go through your bin

As you remove unwanted files, you might notice you're not gaining any space. That's because anything you've deleted will normally still be sitting in the Trash, which means it's still taking up storage. Opt-click the Trash icon, at the right-hand end of the Dock, and choose Open.

2 Rescue any trashed files you need

Check through the list of files. If there's anything you've deleted by mistake, Opt-click it and choose Put Back to return it to its original folder, or drag it to another location.

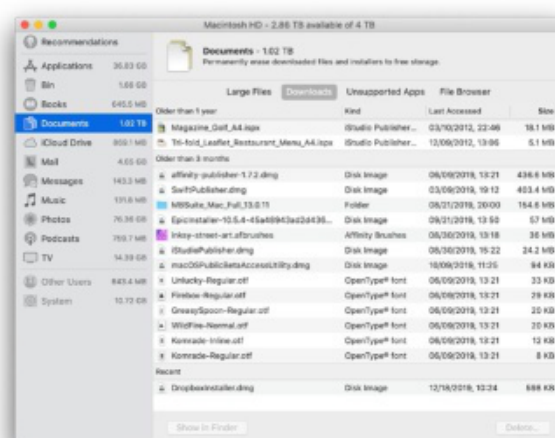
3 Delete the rest

To be cautious, you can delete individual files from the Trash: Opt-click and choose Delete Immediately. To get rid of them all, Opt-click the Trash icon and choose Empty Trash.

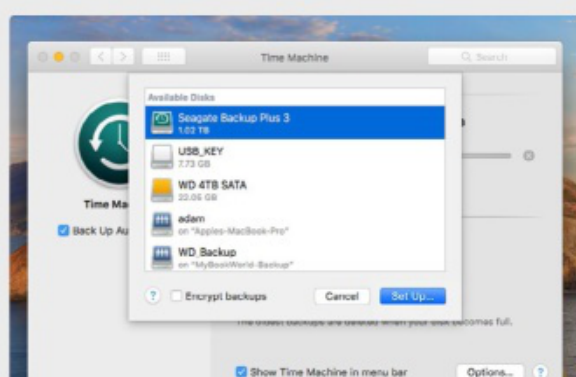
3 Delete downloads

The Documents pane also has a tab for your Downloads folder, which often contains disposable files such as installers. You can also open Downloads from its icon in the Dock, or from your Home folder in the Finder.

Click the Size column heading (Opt-click any heading and check Size to add it) to order by file size, clicking again if necessary to get the biggest first. Starting from the top of the list, delete anything you don't need.

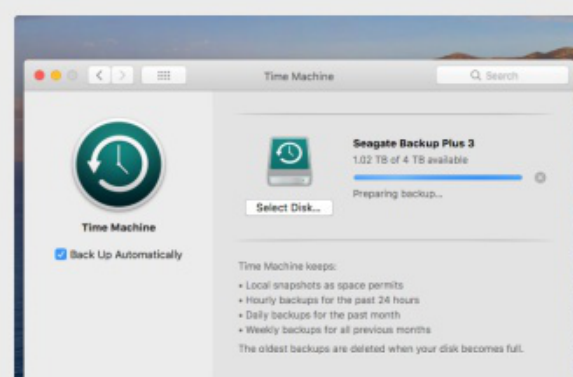


The Documents pane in Storage Management lists files that are taking up space.



3 Check available space

Eligible drives are listed showing free space. Time Machine can share a drive with other files (no need to partition it). Aim to select a drive bigger than all the space you're backing up. Click Set Up.



4 Start backing up

Check Back Up Automatically. Your first backup will start in the background. This takes time but future updates will be quicker. Check "Show Time Machine in menu bar" to add an icon in the menu bar.



5 Restore files

In future, select a file in Finder (if you've deleted it, select the folder it was in). On the Time Machine menu, click Enter Time Machine. Use the arrows to pick a dated version, then click Restore.

Step two: Remove unwanted apps, add-ons, malware, and adware

Decimated your documents? Now pulverize some programs

Check dodgy extensions



>>> Browser plug-ins can have undesired effects, such as redirecting you to advertisements.

In Safari, go to Safari > Preferences > Extensions. There may be nothing here, but if there's anything you don't recognize, uncheck it to see if that solves the problem; you can then click Uninstall to remove it. Other browsers have their own plugin options so you'll need to check online for how to go about managing those.

BESIDES DOCUMENTS, YOU could be losing space to apps, plugins and other functional files that you no longer need. And then there's malicious or annoying software you may have inadvertently added.

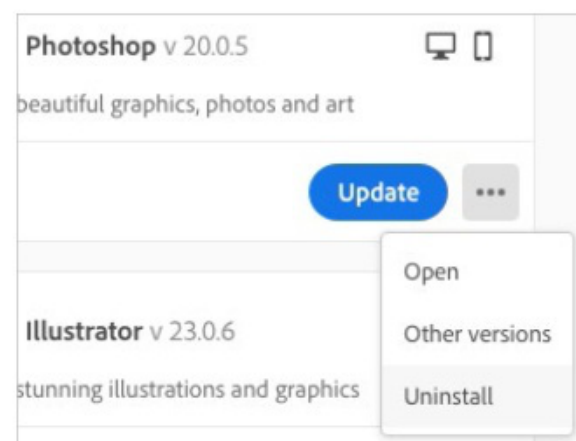
1 Delete tidy apps

Most Mac apps consist of a single file either in the main Applications folder (if installed for all user accounts) or the folder of the same name in your Home folder. Select the app in the Finder, press Cmd+Left Arrow and it's gone. Or open Launchpad from the Dock, click and hold on the app until the icons jiggle, then click the cross.

This applies to all apps from the Mac App Store, and many more. Any data left behind (such as preference or log files) is usually too small to be worth worrying about, but see "Temp files, preferences and caches" on the opposite page.

2 Uninstall fussy apps

Third-party apps sometimes come with an installer, which may add more significant content elsewhere, so use the developer's manager or uninstaller software to remove them; the same goes for third-party plugins. Removing apps doesn't affect files saved from them, but of course you won't have the app to reopen



If an app came with an installer, it probably also has an uninstaller – use it.

HOW TO TAKE CONTROL OF iCloud



1 Use Storage options

From the Apple menu, select About This Mac, click Storage, then Manage to open Storage Management. Select iCloud Drive for the option to Enable iCloud Desktop and Documents.



2 Use System Prefs

Or open System Prefs and, in macOS Catalina, click Apple ID, then iCloud; in earlier versions, click iCloud. Beside iCloud Drive, click Options. You'll see Desktop & Documents Folders.



3 Enable iCloud sync

Enabling this will sync the contents of Desktop and Documents folders (in your Home folder) to iCloud Drive. This gives you an offsite backup, but also has a space-saving benefit.



Temp files, preferences, and caches

1 Total your temp files

Some apps, such as video editors, amass huge temporary files while working that you can safely delete later to save lots of space. Look up advice for each app online.

2 Kill caches

Caches are data stored temporarily by macOS and apps for speed. In the Finder, hold Opt while clicking the Go menu and pick Library. Open the Caches folder and browse for space hogs. You can delete caches like any other file, but you'll be asked for an admin password. It's usually safe to do so, but rarely necessary.

3 Prefs go poof

Also in Library, the Preferences folder contains settings for each app. Deleting these is worth trying if an app misbehaves, but won't save any significant space.

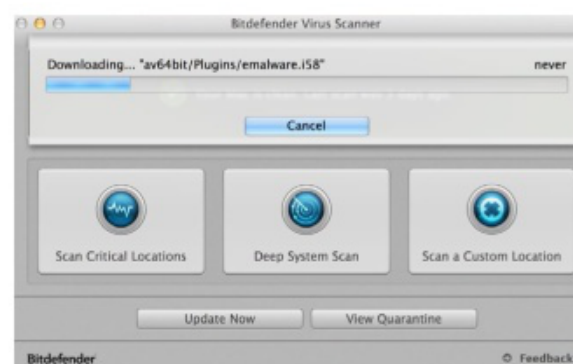
the files. Some apps, including games, may incorporate save data that's lost if you delete the app.

3 Maul malware

Malware is uncommon on Macs. It shouldn't be possible for any software to run unless you agree to install it, entering your password to do so. So the only likely way to get "infected" is if you're tricked into downloading and installing an app that pretends to be something else, such as an updater for Adobe Flash. Even then, macOS will warn you if it contains known malware.

Most unusual behavior in macOS, such as slowdowns, has more innocent causes. But if you think you may have installed malware, the most important thing *not* to do is go online, do a search and install any

tools you see recommended to remove it. These may themselves be malware! Instead, go directly to a reputable security software company, such as Bitdefender. Its free Virus Scanner for Mac (see bitdefender.com/toolbox or the Mac App Store) will scan for known malware.



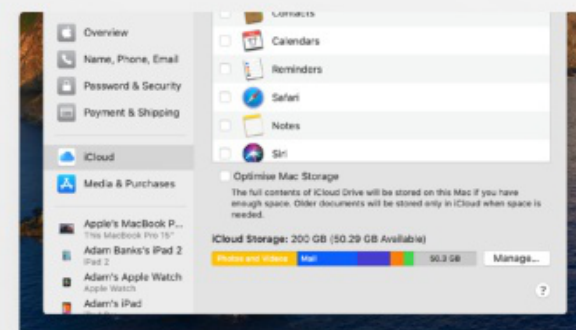
Up-to-date antivirus scanner software can reassure you about malware.

4 Automatic offload

Everything in your iCloud Drive – (accessed on your Mac from the sidebar of any Finder window) is also stored on your Mac. But when your Mac's drive fills up, macOS will delete these copies, leaving only links to your files on Apple's servers. Attempting to open a file will download it back to your Mac. By adding your Documents folder to iCloud Drive, you make it behave the same way. If most of your work is stored there, this can keep your Mac going when you'd otherwise completely run out of space.

5 Pros and cons

There are two catches to this. One is that you'll need enough space in your iCloud storage allocation for everything in your Documents folder (and on your Desktop, if you're messy enough to keep work there). The other is that if your Mac has filled up and macOS has offloaded copies of iCloud Drive files, but you can't get online at a given time, you won't be able to access your work. It's probably best to think of this as a way to tide yourself over until you make some room rather than an ideal solution.



6 Optimize Mac Storage

If you want to use iCloud Drive but always keep copies stored on your Mac regardless of space, uncheck Optimize Mac Storage in System Preferences.

Step three: Move your media to an external drive

Outboard your entertainment and make space for work

Pod save the cast



>>> The Podcasts app just had to be different, didn't it? Hold Opt while clicking the Go menu in the Finder and open Library. Inside the subfolder Group Containers, find the catchily named 243LU875E5.groups.com.apple.podcasts. Inside this is a folder called Library (again), and inside that, in Caches, are your podcasts. They're in standard .mp3 or .m4a formats, but with meaningless names.

You can copy these files to back up your podcasts, but don't try to move or delete them. Instead, open Podcasts, click Downloaded, then hover over the duration at the right of any episode. Click the three dots and choose Remove to delete the file. If you can find its file among those you've copied to somewhere safe, you can play it as audio, but you can't reimport it into Podcasts.

YOUR PHOTOS, VIDEOS and entertainment content could be among the biggest users of storage space. They're also ideal candidates to move to an external hard disk or SSD.

1 Offload your photos

How to move your photos depends on how you're currently organizing them. We'll assume you're using macOS' Photos app, which integrates with iCloud Photos (previously called iCloud Photo Library) to assemble all the photos from all your Apple devices.

In fact, iCloud Photos offers the simplest way to save space. In Photos, go to Photos > Preferences > iCloud. When you check iCloud Photos, all the pictures in the Photos Library on your Mac (normally kept inside Pictures in your Home folder) are uploaded to iCloud – provided your iCloud account has enough storage. Any pics added to iCloud Photos from your other Apple devices are also previewed in Photos.

If you choose the Download Originals to this Mac option, all the pics on your Mac

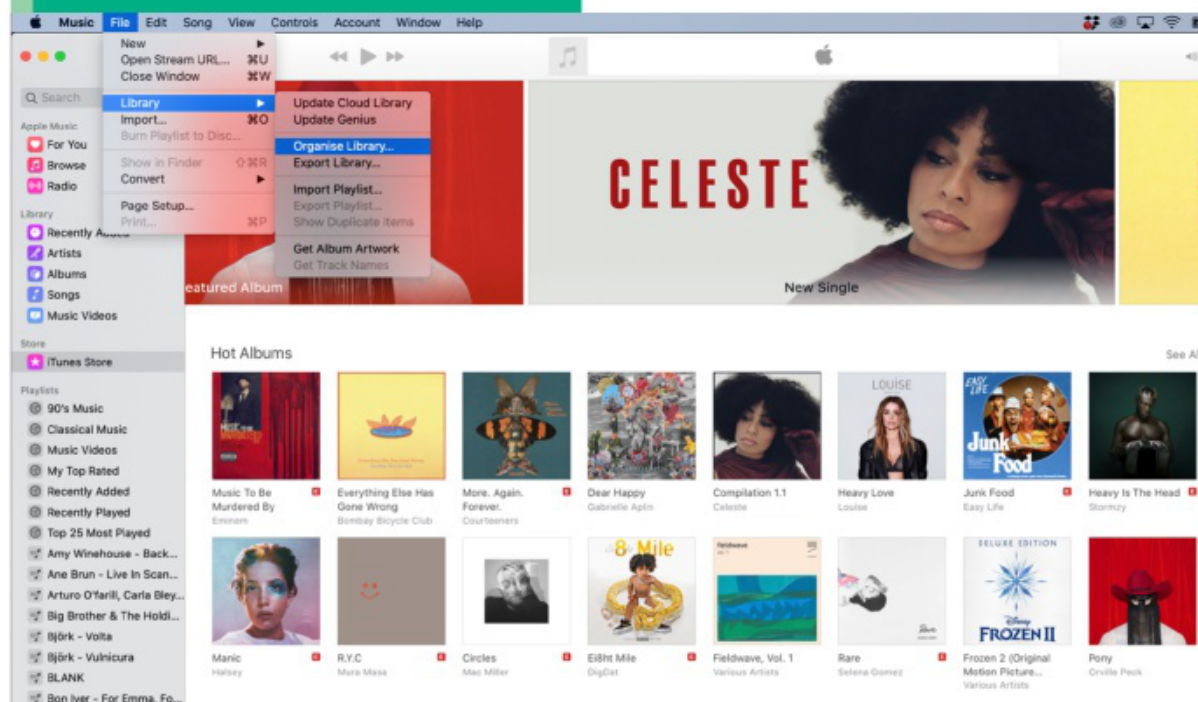
stay there, and all the other pics in iCloud Photos are copied to your Mac's Photos Library too.

The alternative is Optimize Mac Storage (a separate setting from the option for iCloud Drive). In this case, as your Macintosh HD gets full, photos synced to or from iCloud Photos are reduced to low-res previews in your Photos Library, keeping the full versions in iCloud. That can save a lot of disk space, but also means you can't rely on having a safe copy on your Mac of any photos you accidentally delete from iCloud Photos. Remember, with iCloud Photos, deleting a photo anywhere deletes it everywhere.

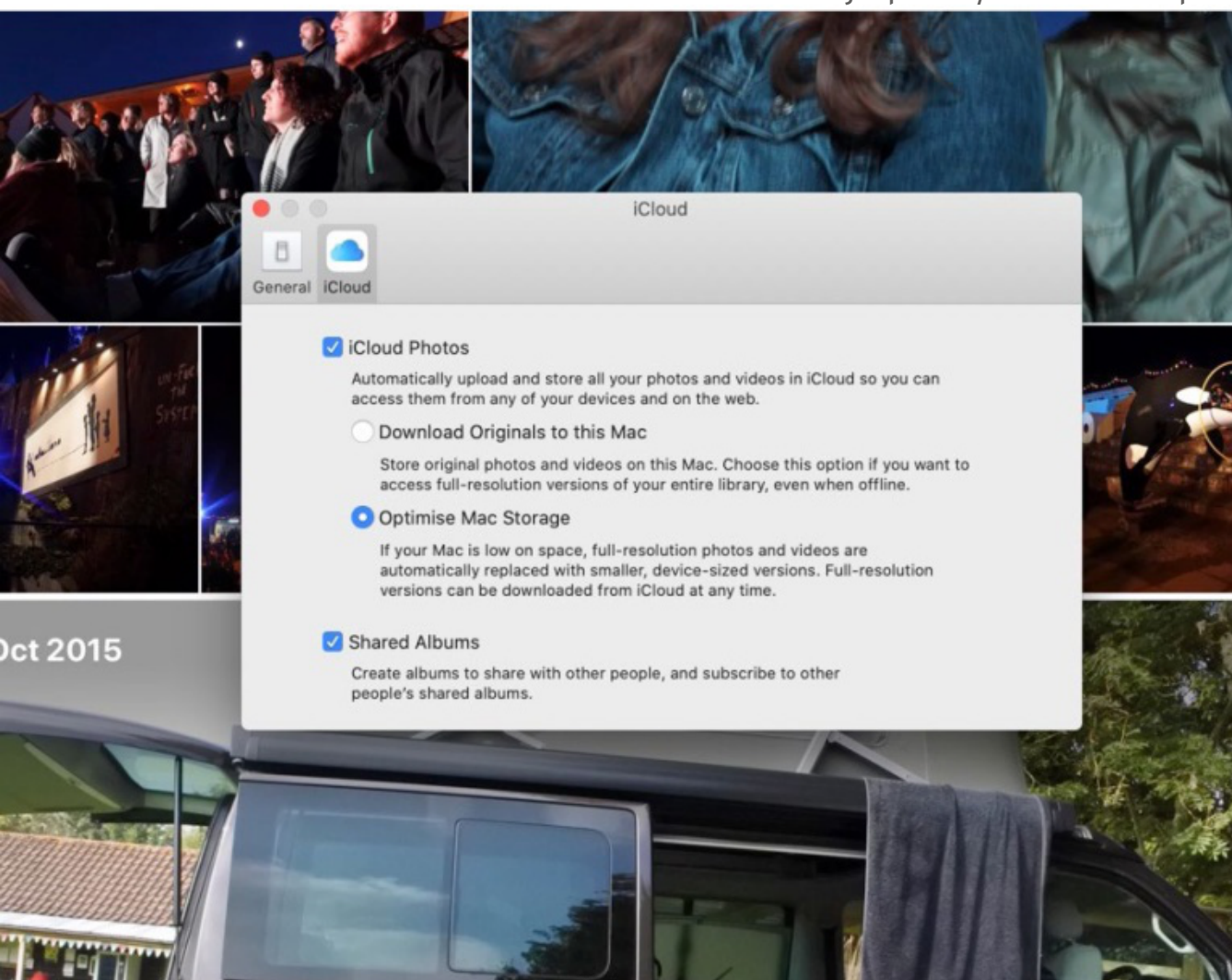
A better way is to keep originals, but on an external drive. First make sure all the pics seen in Photos are actually in your Photos Library. If you imported them with "Copy items to the Photos library" unchecked in Photos > Preferences > General, they may be scattered around other folders. In the Photos view (under Library in Photos' main window), select everything (Cmd+A) and go to File > Consolidate. This will either offer to copy any stray pics into the Photos Library or confirm that they're all there already.

Now go to Photos > Preferences > General and click Show in Finder. Quit Photos and, in the Finder, drag Photos Library to your external drive. When it's finished copying, hold Option while clicking the Photos icon in the Dock. In the Choose Library dialog, click Other Library and select your newly copied Photos Library on the external drive. Everything should look the same as before.

If you've been using Optimize Mac Storage because you ran out of space, you can now switch to Download Originals to Mac: the full versions of all your iCloud Photos pics will download to your Photos Library on the external drive, continuing as



Switch to iCloud Photos' Optimise Mac Storage option if you need to save space.



any new photos are added. Once you're sure everything has copied correctly and is working as expected, delete Photos Library from your Macintosh HD and empty the Trash.

2 Move your music

Music downloaded from the iTunes Store or imported into macOS Catalina's Music app lives in the Music folder in your Home folder. (If you're using an older version of macOS, it's much the same, except that the folder is called iTunes.)

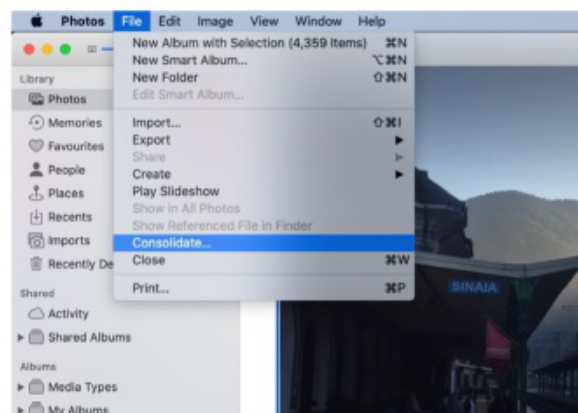
As with Photos, you may have imported music into Music without moving

the original files. In Music, go to File > Library > Organize Library and check Consolidate Files to bring everything together. Having done this, quit Music and, in the Finder, copy the whole Music folder – containing the Media folder and subfolders – to your external drive.

Holding Opt, open Music and navigate to the Music Library file inside Music/Media in your new location. (Unlike Photos Library, Music Library lives in the same folder as your music but doesn't contain it – it's just an index.) Then go to Music > Preferences > Files, click Change and select your new Music folder so that new files will be stored there too. All OK? Delete the original Music folder.

3 Shift your shows

If we tell you that videos belonging to macOS Catalina's TV app live in a folder called TV inside the Movies folder in your Home folder, you can figure out everything you need to know about moving it to an external drive based on the instructions for Music, above.



Drives to banish your media to



SEAGATE FAST SSD 1TB

\$189.99 FROM seagate.com **FEATURES** Transfer up to 540MB/s, USB-C and USB-A 3.0 cables included

This SSD doesn't need to be plugged in to the wall. Its speed is limited by the USB 3 Gen2, but it's four-times quicker than most hard disks and cheaper than Thunderbolt drives.



WD MY PASSPORT ULTRA FOR MAC 4TB

\$129.99 FROM shop.westerndigital.com **FEATURES** 5,400rpm hard disk, USB-C cable, USB-A adapter

This USB 3.0 hard disk isn't fast but has room to back up a 2TB Mac and store a large media collection. Speed won't really be an issue once you have completed the initial bulk file transfer.



G-TECHNOLOGY G-DRIVE USB 3.0 DESKTOP 4TB

\$129.95 FROM shop.westerndigital.com **FEATURES** 7,200rpm hard disk, USB-A cable

This chunky Mac-formatted hard disk offers a relatively high speed of up to 165MB/s, which isn't held back by the USB 3 Gen1. The supplied USB-A to B cable will need an adapter for USB-C.



Step four: Rip it up and start again

Erasing a whole drive is possible, but you'll need a backup

WHEN YOU FEEL like your Mac is hopelessly cluttered, it might seem easier to delete everything and start from scratch than work out what to remove. If all your work, photos and other content was in iCloud, you could theoretically just erase your Macintosh HD, reinstall macOS, then let everything sync back. In reality, it's never that neat, and you'll need to ensure that you don't lose any data.

One approach would be to manually copy all of your own content to an external drive, erase your startup

drive and reinstall macOS (see step 1 of "Restore files after reinstalling macOS", opposite), then copy everything back. Time Machine (see page 20) can make this more foolproof.

SAME AGAIN

In System Preferences > Time Machine, check that you have a complete up-to-date backup stored on your external drive. Click Options to check that you haven't excluded anything from the backup. Then follow one of the processes shown opposite, either to restore the whole

backup or to reinstall macOS and then selectively restore content.

Restoring everything isn't logically going to save any room, so the most likely time to resort to this is if your drive is not just full, but behaving oddly — perhaps losing space for no reason, or refusing to free up space even after emptying the Trash. Try Disk Utility to check and repair the drive before resorting to this.

BELT AND BRACES

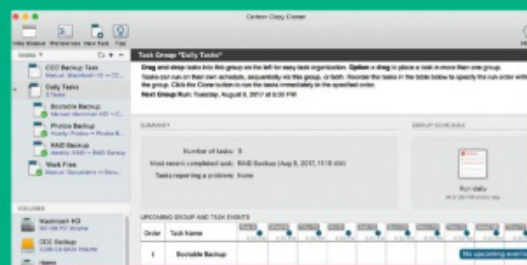
We really can't emphasize this too much: unless you have a good reason to take drastic action, don't. If you do go for a reinstall, remember that once you erase your drive, the only copy of your crucial files, until you restore them, is your backup — which is the same as not having a backup.

If your work is synced to iCloud Drive, that will serve as an extra backstop. (And don't worry, although the act of manually deleting a synced file would delete it from iCloud Drive too, erasing your whole drive leaves your iCloud Drive intact, ready to sync back.) If not, try to make a separate copy of anything important elsewhere.

Drive cloning



>>> Duplicating a whole drive is another way to get a copy that you can restore cleanly after erasing or keep as a backup. You can copy a drive to an empty one using Disk Utility's Restore function (see bit.ly/apple-diskutilrestore) or create a disk image from it on another drive (see bit.ly/apple-diskutilcreate).



But any corruption may be duplicated, and there are complications to imaging startup drives. Third-party utilities such as Carbon Copy Cloner (see bombich.com) may be preferable.

HOW TO Reinstall Macintosh HD from Time Machine



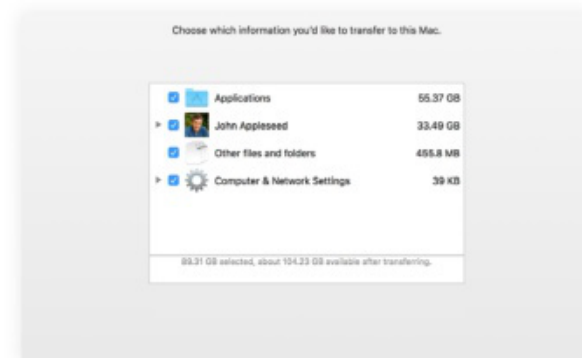
1 Download the app

You'll find that all the major cloud services have free apps available for iPadOS. Open the App Store and search for the name of the service you want. Get the app and wait for it to complete downloading and installing.



2 Choose your backup

Select Restore From Time Machine Backup. When prompted, select the Time Machine backup drive as the Restore Source, then confirm the backup you want to use. Next, confirm the destination to restore to, usually Macintosh HD.



3 Restore your data

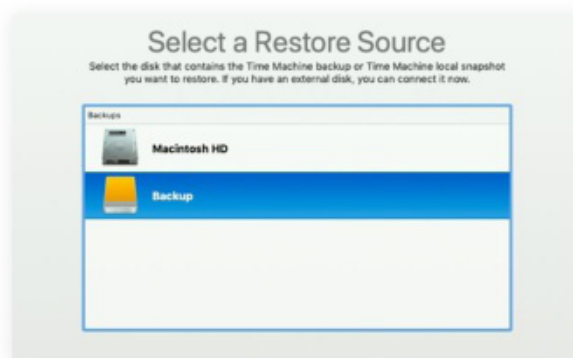
The destination drive is erased and replaced with your backup, which may take up to several hours. Since this restores everything, it's not a way to save space, but may fix problems that have arisen on the drive.

HOW TO Restore files after reinstalling macOS



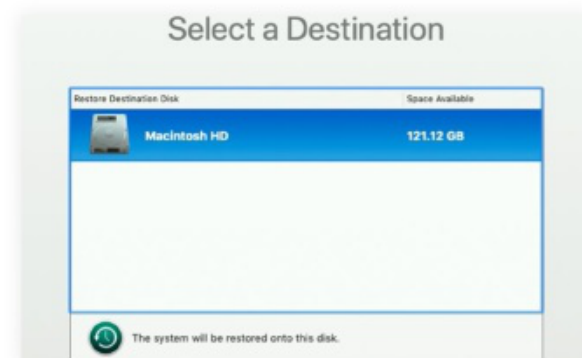
1 Reinstall macOS

Alternatively, you can start from Recovery (see above) and use Disk Utility to erase your startup drive: see bit.ly/apple-erasedisk. Back at macOS Utilities, use Reinstall macOS: see bit.ly/apple-reinsmacosrec.



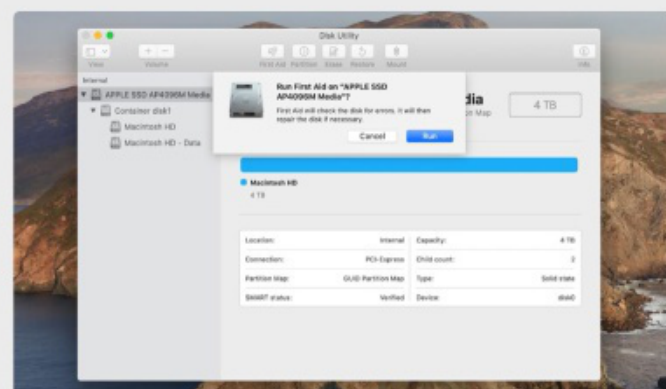
2 Use Migration Assistant

Your Macintosh HD now contains nothing but a clean copy of macOS. On restart, Migration Assistant will offer to restore files. Choose "From a Mac, Time Machine backup, or startup disk" and click Continue.



3 Restore files

Having confirmed the location of your backup, choose what to restore from it. Be sure to include your main user account. If you miss anything, re-run Migration Assistant from the Utilities folder in Applications.



Tag files and folders with names and colors to make them easier to find in the sidebar.

Check your drive with Disk Utility

It can be an easy fix for storage glitches

If a drive is acting oddly, run Disk Utility, from the Utilities folder in Applications. Select a drive and click First Aid. It'll report any problems and usually repair them. Most repairs can't be done on the drive you started up from, so in this case

restart from Recovery and run Disk Utility from there. If First Aid reports problems that can't be fixed, ensure you've an up-to-date backup, erase the drive and restore (see above). This often works, but in the worst case the drive might need replacing.

Detox your iPhone or iPad

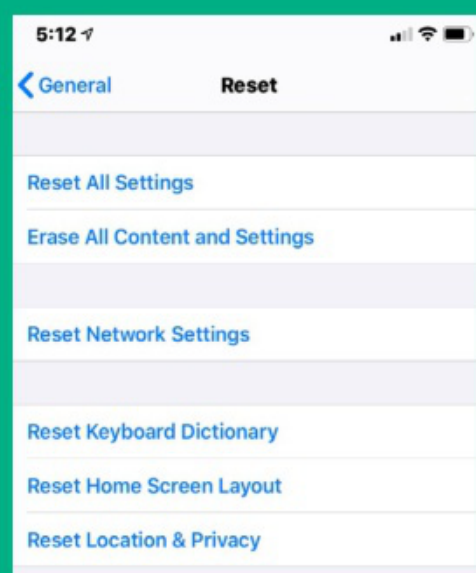
If your mobile storage needs decluttering too, start here...

ONCE UPON A time, iPhones and iPads came with very small amounts of storage compared to Macs. These days, their options overlap all the way from 128GB to 1TB. Even so, most of us have relatively little room on our mobile devices, which can quickly amass apps, photos, videos, and downloaded content.

Erasing your device



>>> If you need to wipe everything from an iPhone or iPad, including all your personal data and logins, go to Settings > General > Reset and tap Erase All Content and Settings. Hang on, though: first check that you have an iCloud backup (see “How to back up your device to iCloud”).



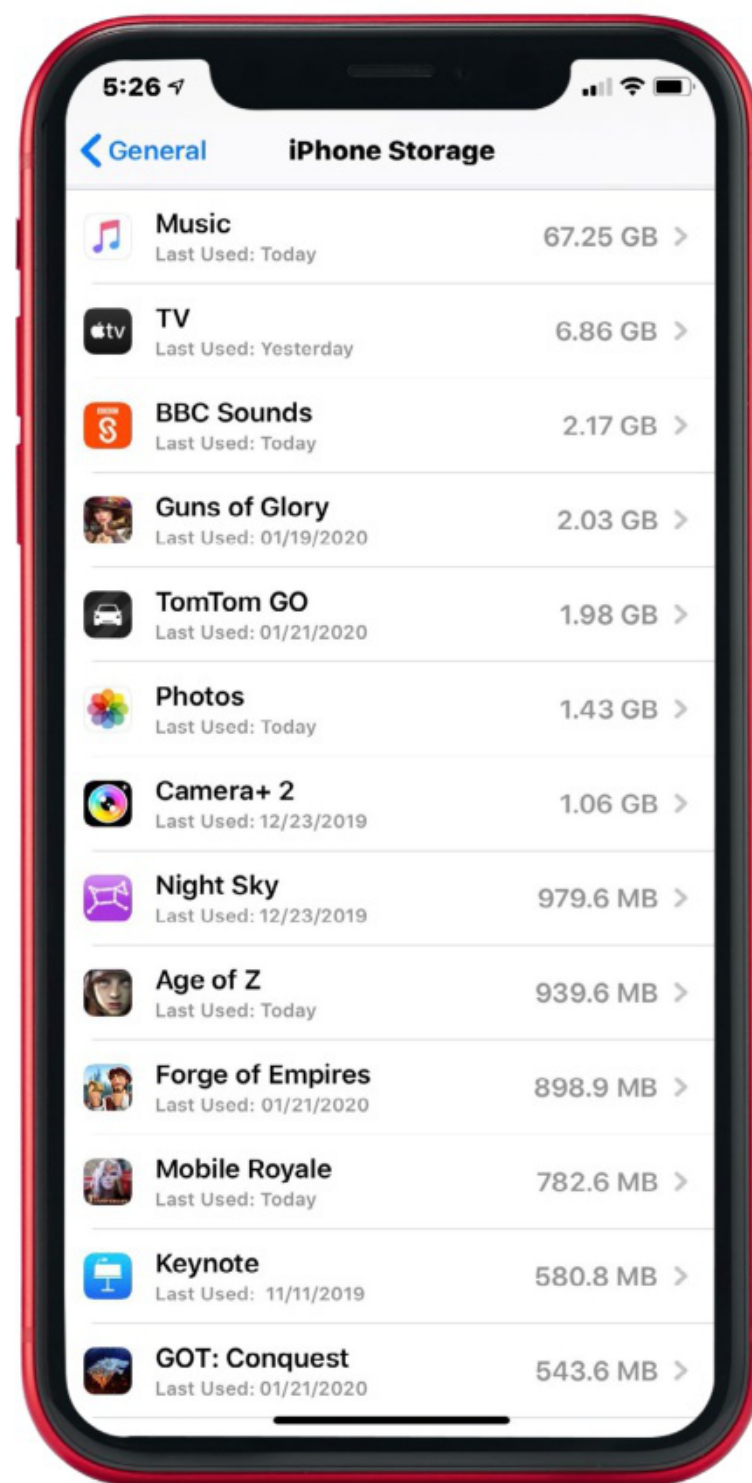
On the other hand, most of it is likely to be either purchased from the iTunes Store or synced to iCloud. You can take advantage of this by leaving your content in the cloud until it's needed, saving space in your device's onboard storage.

Because iOS and iPadOS give you less freedom to screw up their file systems, it's unlikely you will ever have anything to gain by wiping your device. But you'll certainly want to do so before selling it or passing it on to the next family member.

And it's also worth making sure you keep it backed up: even if most of your stuff is in iCloud anyway, the gratifying simplicity of restoring a new device from a backup will mitigate the stress of fumbling your original one into that woodchipper. For more details on that, see bit.ly/apple-resticloud.

1 Remove unwanted apps

Everyone knows to touch and hold an app icon on your Home screen to make all the icons jiggle, each showing a cross that you can tap to delete it. Nowadays, the touch and hold first pops up a menu, where you can choose Edit Home Screen to do the jiggly thing or simply tap Delete App. But it makes more sense to go to Settings > General > iPhone (or iPad) Storage and



Apps are shown in order of size, so you can easily recognize the space hogs and remove them.

scroll down to the list of apps. This way you can see how much space each app is taking up, so you know if deleting it will help. They're shown in order of size.

Some of the amount shown may be data associated with the app rather than the app itself. Tap an app to see the breakdown. You can then choose Offload App, which removes the app but keeps the data so you can access it again if you reinstall the app, or Delete App, which trashes the whole lot. Before choosing the latter, be sure you understand whether your data exists somewhere else (such as in iCloud, Game Center or a third-party

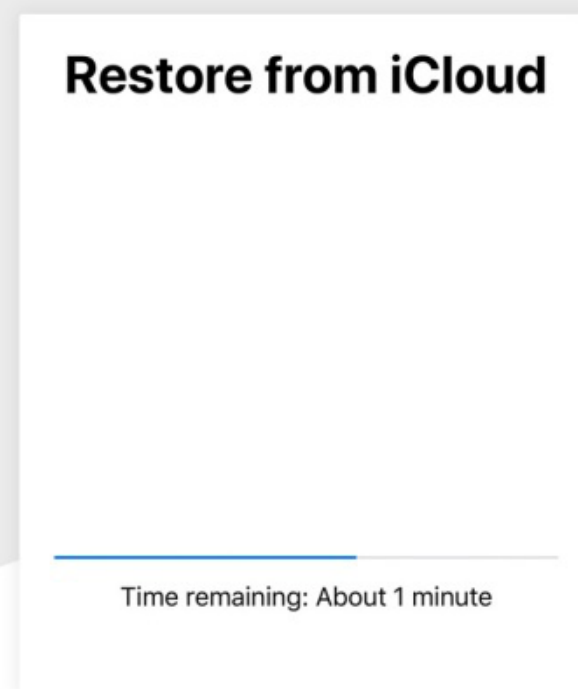
HOW TO Back up your device to iCloud (in iOS)



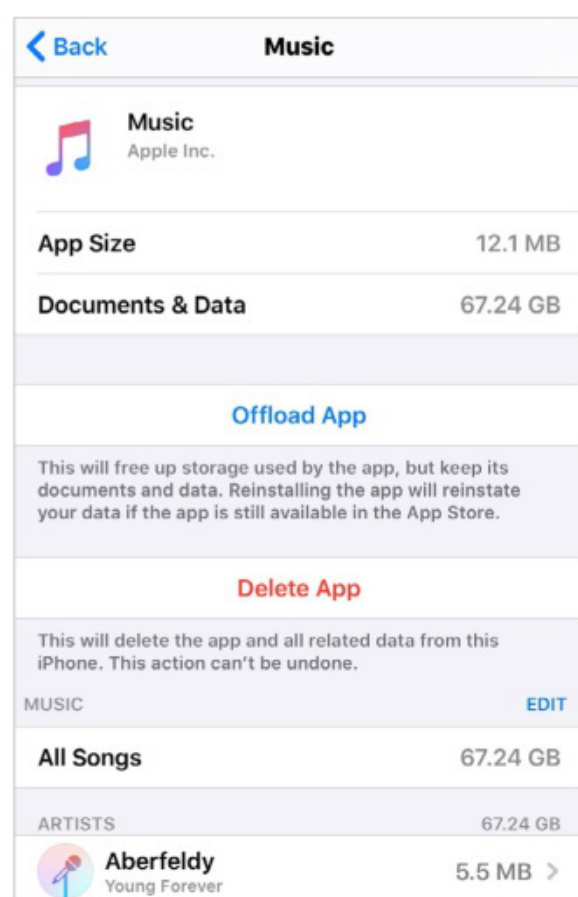
1 Turn on iCloud Backup
Open Settings and tap your name, then iCloud, then iCloud Backup. Turn the switch on. Your device will back itself up daily whenever it has power and internet – as long as your iCloud storage has room for your backup.



2 Check iCloud storage
The chart at the top shows how full it is. You'll need much less space than your device's storage: see bit.ly/apple-icloudbackup. Tap Manage Storage for more details and the option to buy more iCloud storage.



3 Restore from backup
If you wipe your device or buy a replacement, you'll be asked when starting it up if you want to restore from a backup. You do! Select your iCloud backup and restore it. It's OK if the new device isn't the same model.



You can keep some tracks on your device, while others download on demand.

online account linked to the app). If you want to delete only some content, you will usually need to do that from within the app.

2 Prune your tunes
The Music app is a special case, in that it lets you manage its content directly from Settings > General > Storage. Tap Music here and all your tracks are listed below the Offload and Delete options. They're shown in alphabetical order by artist, because... look, they just are, OK? Tap Edit to show red minus icons that you can use to remove everything by a particular artist, perhaps because they've just been cancelled on Twitter. Or tap an artist to drill down and select albums or tracks to offload.

If the track was synced to your iPhone from your Mac, it'll disappear, but may resync later unless you change your sync options in macOS (from the iTunes app in

earlier versions, or the Finder in Catalina). Tracks that are synced from the iTunes Store, Apple Music or iTunes Match will still appear in the Music app after you remove them, with a cloud icon to redownload them.

3 Optimize photo storage

Running out of space on your iPhone? Got hundreds of photos sat on it? Already have iCloud Photos turned on? Well, if all your photos are in iCloud now, surely you can start deleting some off your phone to save space? Wait...

This is exactly what you shouldn't be thinking! iCloud Photos syncs all changes across your devices. So when you take a photo on your iPhone, it appears in iCloud Photos and everywhere that iCloud Photos syncs to. Equally, when you delete a photo from your iPhone, it disappears from iCloud Photos and everywhere that

iCloud Photos syncs to. You can't get it back. So don't do that, unless you actually want to destroy that pic completely.

Instead, go to Settings > Photos and check Optimize iPhone (or iPad) Storage. Much like the option in macOS (see page 20), this means full-resolution photos and videos will stay on your device until space gets low; then they'll automatically be replaced by low-res previews while the originals stay in your iCloud and download as you open them.

If you have lots of storage on your iPhone or iPad, you can choose Download and Keep originals to save the full original copies of all content in iCloud Photos on this device. But remember, deleting

a photo anywhere still deletes it from here. To keep a permanent backup, you'll need to copy your photos and videos out to some other location that isn't synced.

4 Delete old iMessages

Did you notice Recommendations at the top of Settings > General > iPhone (or iPad) Storage? These will highlight any apps whose data seems to be taking up an inordinate amount of space. A surprising culprit is Messages: over time, your conversations, including any picture messages you sent or received, can add up significantly.

You probably have Messages activated in Settings > Apple ID > iCloud to sync your

messages between devices (including Macs), which means messages are taking up space both on your devices and in your iCloud storage.

Recommendations may offer to Auto Delete Old Conversations, pointing out how much space you could save straight away by removing all those more than a year old. Clicking Enable does this and continues to delete old messages as they reach this age. They'll be erased completely, not just from this device. You may also get a recommendation to Review Large Attachments in Messages. The same options are available at any time simply by tapping Messages in the list of apps below.



Use Optimize iPhone (or iPad) Storage to stop pics filling up your device.



You can easily remove unwanted attachments in Settings > iPhone Storage > Messages.

Note, though, that none of the above applies to the Mail app, which should always optimize its use of on-device storage so it takes up very little space, mostly accessing your mailboxes live from their servers.

5 Use iCloud Drive

Anything you store in iCloud Drive is not normally held offline in your device's storage, but accessed from the cloud, so it effectively takes up no space.

Open Pages, Numbers or Keynote, for example, and tap the chevron at the top left of the screen until you reach the Locations screen, then tap Browse. If you tap iCloud Drive, then tap Create Document, your new file lives in the cloud and, except while you're working on it, takes up no space on your device. If you instead tap On My iPhone (or iPad), the document is created in your device storage; it takes up space, but can be edited even when you can't get online.

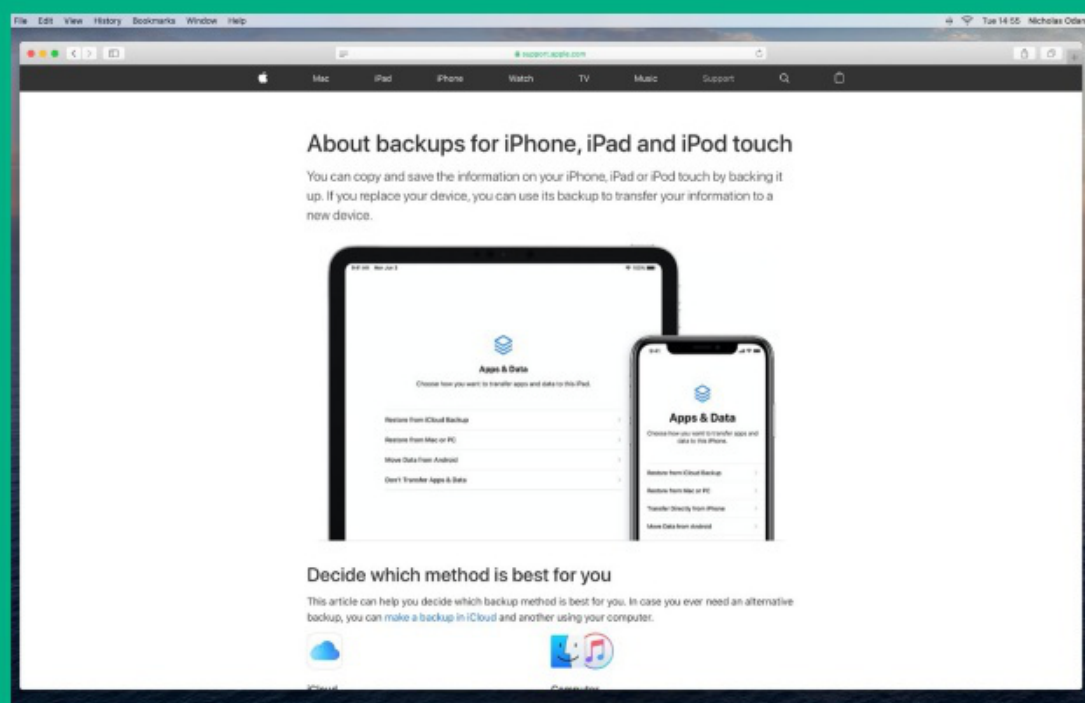
To move a document between the two locations later, long-press it and choose Move. Remember that, as well as browsing within relevant apps, you can see and rearrange all your iCloud Drive content in the Files app.

What's in my backup?

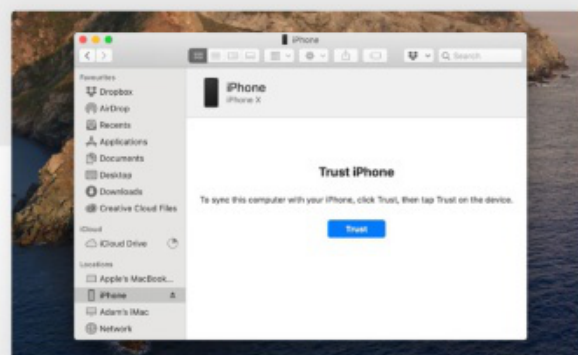


>>> Neither iCloud backups nor backups to your Mac include everything. For more details, see bit.ly/apple-backupsmob. When you enable encryption for a local backup (to your Mac), more personal data is included: see bit.ly/apple-encryptbackup. Note that if you forget the password you set,

nobody can decrypt your local backup. In contrast to this, iCloud backups are encrypted on Apple's servers, but Apple can decrypt them. It will only do so at your specific request if you get locked out of your stuff, or if it has received a valid order from law enforcement or the security services.



HOW TO Back up your device to iCloud (on a Mac)



1 Connect to your Mac

Unless you've previously set up your device to sync via Wi-Fi, connect it with a USB cable. Previously, it would appear in iTunes; in Catalina, look in the left sidebar of a Finder window. Select Trust on both devices.



2 Make a local backup

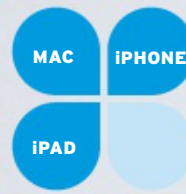
The right-hand pane shows the contents of your device. You can sync media to it from your Mac: see bit.ly/apple-findersync. To back it up, select the second option under Backups. Check Encrypt and click Apply.



3 Restore from backup

Switch back to iCloud backup to keep that going. To erase and restore a device from your local backup later, connect it and click Restore iPhone (or iPad). You'll need to turn off Find My, using your Apple ID password.

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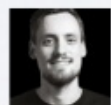
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**Photography
masterclass**

Take great shots on your iPhone!

Discover how to shoot, edit and share better-looking photos on your iPhone

WRITTEN BY **GEORGE CAIRNS**



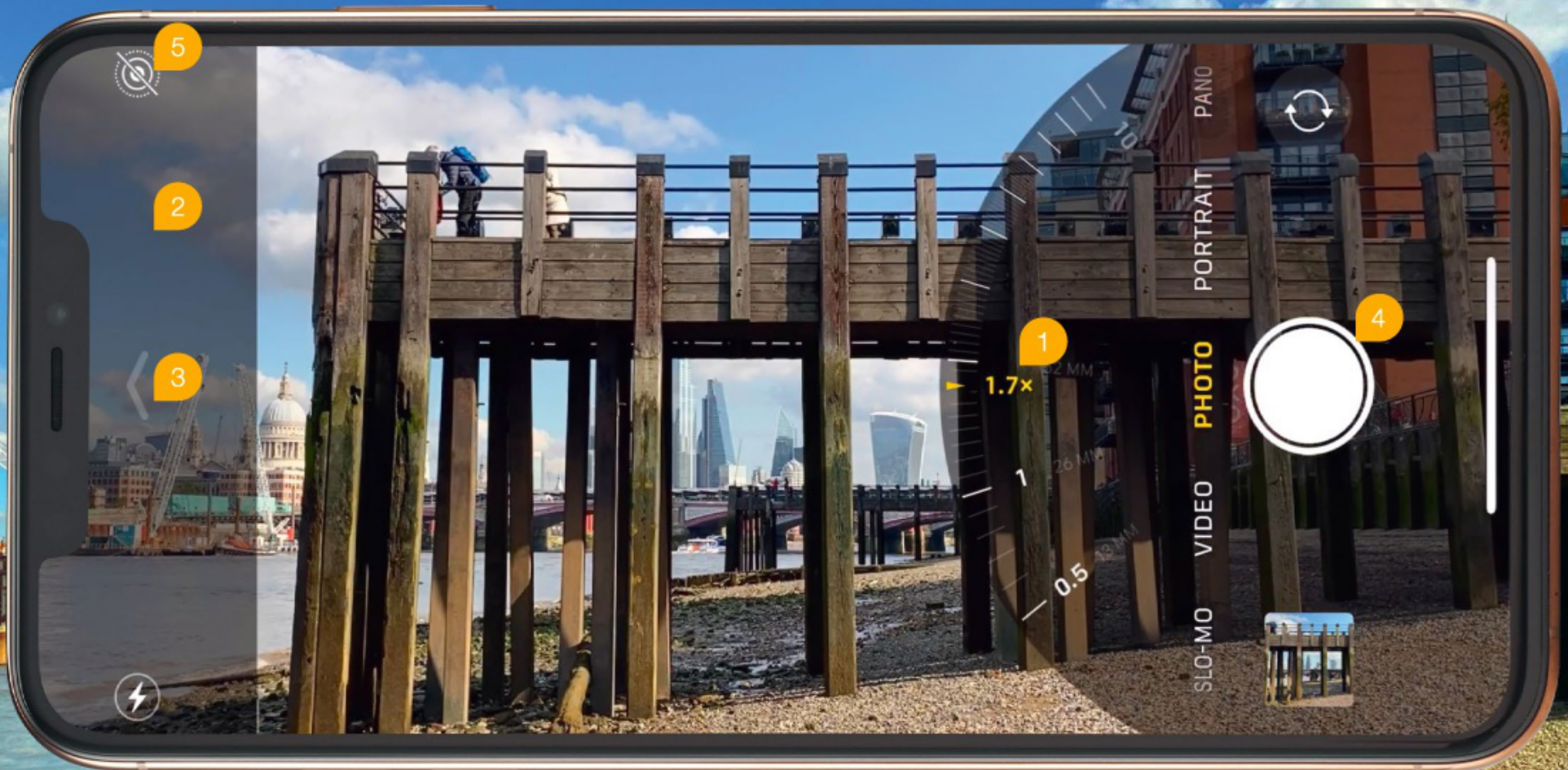
THE IPHONE IS the perfect device for photographers. It's a camera that's always on hand to capture sudden photo opportunities. It's a digital darkroom packed with tools that can fix problems with color, tone, and composition. It's a portable gallery that lets you display photos on a high resolution display or share shots via social media. iPhones are also effective photography tools as they draw less attention when you're taking a photo (compared to using a bulky DSLR camera). As everybody's staring at phones these days people won't give you a second glance when you compose your

shot. This low-profile provides more opportunities to capture documentary-style street photos, for example.

Traditional DSLR photographers may look down on an iPhone because it lacks the manual controls and mechanical features that can produce particular effects. For example, a DSLR user can choose a wide aperture to create a background blur for a portrait. They can freeze a moment in time using a fast shutter speed, or add motion blur to people and cars using a slow shutter speed. And they can also instantly swap lenses to capture a wide-angle view or use a telephoto lens for a candid close-up.

The iPhone 11 and 11 Pro has narrowed the gap between iPhones and DSLRs because the telephoto and wide-angle lenses give more control over composition. Using the iPhone 11's Night mode, you can shoot in low light without a flash, and the enhanced Portrait mode lets you add a background or foreground blur to objects. Combined with the photo and video editing tools released in iOS 13, you can use your iPhone to create pro-standard pictures similar to those on DSLRs.

We used an iPhone XR and iPhone 11 Pro for this feature, but you can apply many of our tips, tricks and techniques to older iPhone models.



Camera app options

- 1 SCROLL TO ZOOM**
 Tap icons to jump between the iPhone 11 Pro's Telephoto (2x), Wide (1x) and Ultra-wide (0.5) lenses. Alternatively, drag the wheel to zoom in or out in increments. Up to 2x is an optical zoom. Any higher is digital zoom.
- 2 PREVIEW**
 When using the Wide (1x) or Telephoto (2x) lenses, you'll see a faded preview of the camera feed outside of the captured area. This helps you zoom in or out (or pan to reframe) to include important details in the scene.
- 3 TOGGLE MODES**
 Tap the arrow icon to toggle between the Camera app's shooting modes (such as Slo-Mo, Video, Photo, Portrait, Pano) and other settings such as Flash controls, Night mode, Aspect Ratio, Self-timer, and Filters.
- 4 SHUTTER BUTTON**
 Tap here to snap a shot in Photo mode or record a clip in Video mode. In Photo mode, hold the shutter button and slide up/right to record video. Hold the shutter button and then slide down/left for burst mode.
- 5 LIVE PHOTO**
 Tap here to toggle the Live Photo mode on or off. Live Photo enables you to capture a short video clip that you can process in creative ways, such as mimicking long exposure motion blur produced by a DSLR. (See page 41,)

Portrait & landscape photography

Discover how to capture perfect portraits and scenic landscapes

PEOPLE AND PETS are common subjects for a photograph, or you may prefer cityscapes or rural landscapes. Whatever your subject preferences, the iPhone packs all the tools and shooting modes you need. Here are some shooting tips and techniques that will help you capture the shot you're after.

1 Portrait mode

Digital SLR cameras have a Portrait mode that uses a wide aperture setting to create a blurred background (or bokeh). This helps complement the sharply focused subject in the foreground. The iPhone 7 Plus, 8 Plus,

X and XR models also boast a Portrait mode that uses software to simulate this background blur effect, but they can only apply blur to portraits of people. Try shooting a pet and the iPhone says it can't find a face to work with. Thanks to their extra lenses, the iPhone 11 and 11 Pro's Portrait modes can apply a selective blur to any subject, making these models behave more like DSLRs.

2 Adjustable blur

With a DSLR, you're stuck with the strength of the background blur due to the lens's aperture setting. A wide blur-inducing aperture has a

small f-stop value such as f/1.8.

A narrow aperture such as f/16 will produce less blur. On the iPhone, you can use the Photos app to adjust the f-stop to dial in more blur and hide unwanted background objects, or reduce the blur to reveal more of the subject's original background. This post-production adjustment gives the iPhone more control over the final look of a portrait's bokeh effect.

3 Perfect panoramas

The Camera app's Pano mode lets you pan the iPhone to capture a wider field of view in a single image. By default, you need to pan the

HOW TO Use different lenses



1 Digital zoom

On single-lens iPhones, such as the XR, pinch to zoom in for a closer view of the subject. This is just a digital zoom though, so will lack the high image quality produced by the dedicated Telephoto lens on the iPhone 11 Pro.



2 Telephoto

Tap the 2x icon to select the iPhone 11 Pro's 52mm lens. This enables you to capture a candid view of your subject without moving from your shooting spot. Perfect for shooting editorial-style stock photos and clips.



3 Go wide

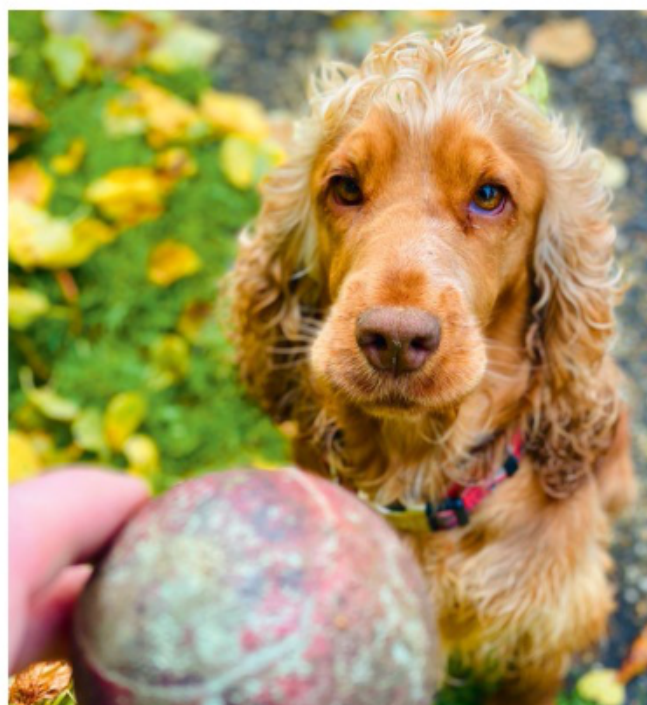
The iPhone 11's Ultra Wide lens can be selected by tapping the 0.5 icon. This 13mm lens is perfect for capturing landscapes and cityscapes. It creates elongated figures so is more suitable for places than people.



The Pano mode can give a wider field of view than any lens, making it perfect for landscape photography.

iPhone left to right to capture a panorama, but if you tap the arrow it will jump to the opposite side of the screen, letting you pan right to left. The Pano mode works best on static landscapes. If there are moving subjects they can be distorted when the panned video is stitched together into a single shot. You can also tilt the camera vertically in Pano mode to capture more of a tall building. This mode can also be used to capture a wider angle of view on iPhone models that lack a Wide or Ultra Wide lens.

4 High Dynamic Range Landscapes can suffer from high-contrast lighting. If the camera exposes to capture more highlight detail then the landscape's shadows can be underexposed. If shadow detail is captured then the brighter sky can be blown out. By setting older iPhones to HDR mode, they will snap three consecutive shots to capture detail in



On the iPhone 11 you can blur the background or foreground of any subject for prettier pet portraits.

a landscape's shadows, midtones, and highlights. The three exposures are then composited into one shot. On the iPhone 11 Pro, you can turn on Smart HDR in the Camera Settings menu to make the Camera blend the best parts of separate exposures into a single "best exposure" shot.

5 File formats

iPhones such as the 11 Pro can save photos in the HEIC (High Efficiency Image File) format to take up less storage space. You can go to Settings > Camera > Formats and choose Most Compatible. This saves files as slightly larger JPEGs, which are easier to share online, edit in third-party apps and view on PCs.

BEST THIRD-PARTY APPS/PHOTOS EXTENSIONS

LIGHTROOM

\$9.99/month adobe.com

Lr Lightroom has a more advanced set of retouching tools than iOS Photos. It also boasts a camera mode that can shoot raw .DNG files. This enables you to tease out missing detail without adding compression artefacts, creating professional results.

HALIDE CAMERA

\$5.99 halide.cam

Halide This app gives you DSLR-style camera settings, such as White Balance presets and manual ISO adjustment. Focus peaking enables you to see which areas are sharp. You can also AirDrop its .DNG files to your Mac and edit them in Photos.

SHUTTERSTOCK CONTRIBUTOR

Free shutterstock.com

Shutterstock Contributor After shooting a series of photos, upload your favorites to Shutterstock's stock photo marketplace via the Contributor app. It will even suggest keywords for your shots, and the review process can be very quick.



Go to Settings > Camera > Grid to summon a Rule of Thirds grid to help you with your composition.

Master low-light photography

Discover how to reveal more detail in the dark

SHOOTING IN LOW-LIGHT locations is a challenge. An iPhone can try using a faster ISO and a wider aperture to make it more sensitive to available light but this can add nasty image noise to your shots. Here are some handy suggestions for capturing better-looking photographs in low-light scenarios.

1 Summon the flash

One way for you to cast more light on a subject is to activate the built-in flash by tapping the Camera app's flash icon. Flash is not an ideal solution, though. A burst of flash

can illuminate a person standing close to the iPhone, but it will plunge the distant background into underexposed shadow. And some locations may not permit the use of flash, such as inside a church or museum.

2 Use a tripod

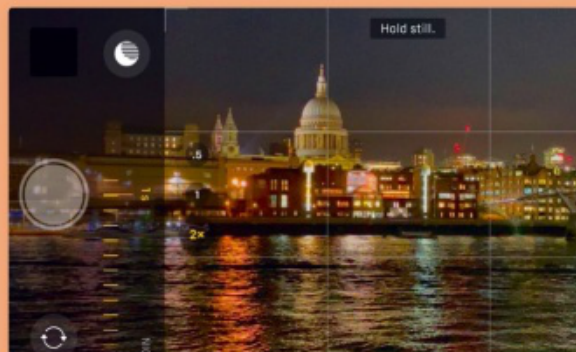
When your iPhone meters a low-light scene it will use a slower shutter speed to let in more light. If you don't hold the iPhone still enough, you may add unwanted shake-induced blur to the image. By using a tripod, you can keep the iPhone rock-steady during the long

exposure. This will cause static subjects such as buildings to look sharp. Moving subjects such as cars and people may appear motion-blurred depending on the shutter speed, which adds a dynamic sense of movement to the scene. If you have an iPhone 11 model, a tripod is not as essential thanks to Night mode.

3 Use Night mode

On the iPhone 11 models, you can shoot in Night mode when faced with low-light locations. This enables you to capture a handheld long-exposure while keeping camera-shake blur at bay. Night mode produces

HOW TO Use the iPhone 11 Pro's shooting modes



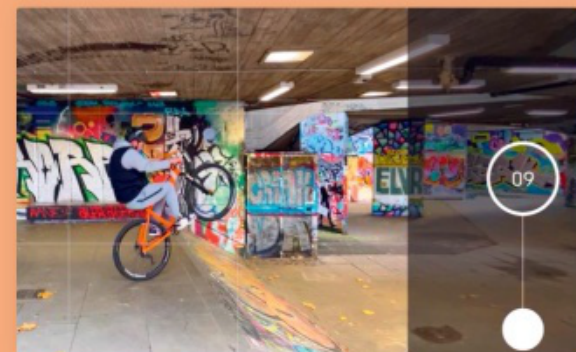
1 Night mode

Here, the yellow Night mode icon has activated automatically. It has chosen a four-second exposure to capture the scene's details. After tapping the shutter button, a countdown slider indicates the exposure time.



2 Motion blur

This Night mode shot was captured with a handheld iPhone 11 Pro. Despite the slow shutter speed of 1/10 of second, the static background is sharp while the walking person displays motion blur that adds energy to the scene.



3 Burst mode

On an older iPhone, you can capture a series of consecutive shots by holding your finger on the shutter button. On the iPhone 11, drag left (or down) to trigger Burst mode. A shot number will appear in the shutter button.



The iPhone 11's Night mode enables you to capture stunning nocturnal cityscapes.

astonishingly good results, revealing details such as clouds and stars that are not as visible to the naked eye. Your Night mode shots will suffer less from high ISO speed noise.

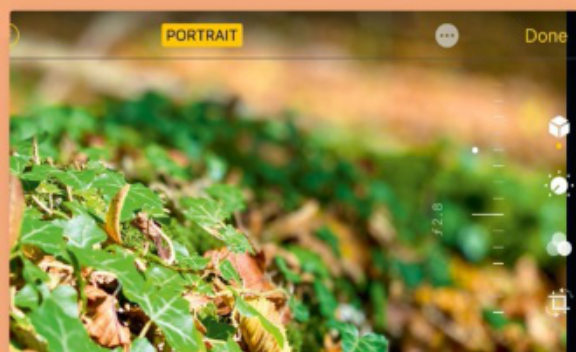
4 Read the metadata

To understand the settings that the iPhone uses in low-light locations, click on a picture in your Mac's Photos app. Click the "i" icon at the top right. This opens a metadata panel that provides you with the photo's shooting settings such as ISO (sensitivity to light). The higher the ISO speed, the more sensitive to light your iPhone will be.

A high ISO speed such as 2,000 will add ugly particles of picture noise to your low-light shot. When faced with a high ISO speed shot, click on Edit and use the Noise Reduction slider to smooth out the noise.

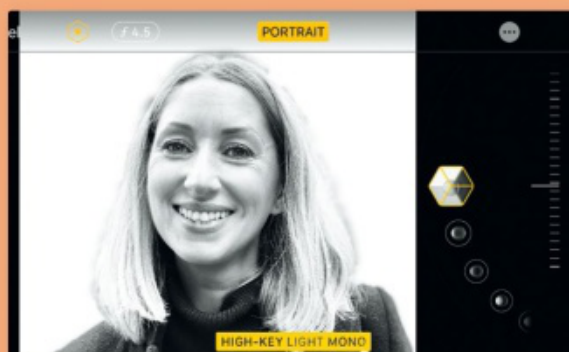
5 Shoot in raw

Photo file formats such as HEIC and JPEG compress an image so that it takes up less space. This makes it harder to reveal color and detail in low-light shots. With an uncompressed image, such as a .DNG (Digital Negative), you can restore missing detail without revealing as many nasty compression artefacts.



4 Portrait mode

The Portrait mode's shallow depth-of-field blur isn't restricted to portraits of people or pets. You can use it to add bokeh blur to other subjects. Here we used Portrait mode to draw attention to the foreground ivy.



5 High-key Mono

The High-Key Light Mono setting uses the depth mask created in Portrait mode to isolate the subject from their background. This is a quick way to simulate a high-contrast monochrome studio photo in any location.

BEST iPHONEOGRAPHY ACCESSORIES

MINI TRIPOD

\$36.99 [manfrotto.com](https://www.manfrotto.com)

This mini tripod and universal iPhone clamp enables you to capture rock-steady clips and Live Photos. Its small size gives you dramatic low-angle shots. It's also great for capturing motion blur during long exposures.



LED LIGHT LUMIMUSE

From \$54.99 [manfrotto.com](https://www.manfrotto.com)



The LED Light Lumimuse enables you to light your photo or video subject from an angle and reveal more detail in low-light locations. The light comes in 3, 5 and 8 LED brightness options, and you can adjust the intensity of the light.

MUVI X-LAPSE

\$29.95 [veho-world.com](https://www.veho-world.com)

On a tripod, your iPhone can capture stunning time-lapse clips that show the ebb and flow of people or clouds at high speed. This clockwork tripod rotates very slowly, adding a smooth pan to your time-lapse clips.



Selectively adjust a backlit subject to reveal missing shadow and highlight detail.

Master image/video-editing

Get your photos and clips looking their best

AFTER SHOOTING A photo or capturing a clip, you may need to tweak its color, tone, and composition to improve it. Fortunately, iOS 13's Photos app boasts a powerful digital darkroom to counteract common problems. It can also process footage using the same tools, helping clips to make the grade.

1 Tints and casts

Your iPhone needs to capture true colors under various lighting conditions. This can be a challenge due to the different color temperatures of light. Daylight can

cause a shot to look too cold and blue. Artificial light can make skin tones look too warm and orange. Your Camera app will perform an Auto White Balance (AWB) operation to capture cast-free colors. If it can get white objects to be free of blue or orange casts, the rest of the image will have cast-free colors too. If your shots still suffer from color casts you can counteract these in the Photos app. Tap Edit, then tap the Adjust icon and swipe to the Warmth slider. Drag it left to warm up a cold blue shot or right to cool down a warm orange cast. You can also remove

green or magenta color tints using the Tint slider. Drag it left to counteract a green tint or right to reduce magenta. These fixes will work with stills or clips.

2 Tonal tweaks

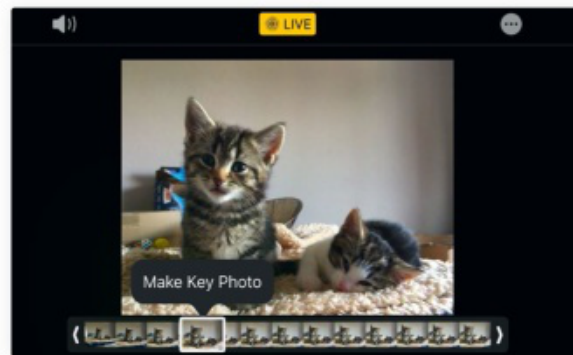
In contrasting lighting conditions, your iPhone may struggle to capture detail in the shadows and the highlights (even when shooting an HDR image). The Adjust panel's Shadows slider enables you to lighten underexposed shadows without overexposing highlights. The Highlights slider claws back any

HOW TO Edit Live Photos in iOS 13



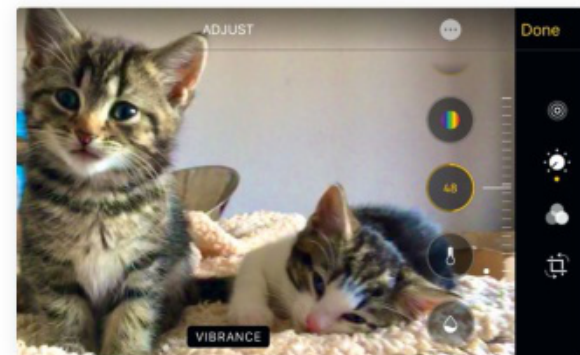
1 Shoot in Live mode

After shooting in Live mode, hold your finger on a Live Photo to play a three-second movie. Live Photos can be edited in the Photos app to choose the best frame, adjust colors and tones, and even create animations.



2 Set a key frame

Tap Edit, then tap the Live icon. Trim the start and end point of the Live Photo. Drag the white rectangle to choose the best frame. Tap Make Key Photo to display this frame as the Live photo's thumbnail.



3 Adjust clip

Tap the Adjust icon and tweak colors and tones to make the clip look its best. Here we have increased the Vibrance amount to boost the saturation of the Live Photo's weaker colors without oversaturating stronger ones.

SHARING IMAGES ON SOCIAL MEDIA AND ELSEWHERE

After processing your pics, you may want to share them with friends, family, and social media followers. Some social media sites will present a cropped version of your shot. For example, if you share a portrait photo on Twitter, it may be presented in a landscape box that cuts off key parts of the image. Consider cropping a portrait shot as a landscape shape in Photos. Tap Edit, then tap Crop and check the landscape icon. Drag inside the crop window to reframe the subject. Tap Done. Tap Share, then tap your chosen social media app's icon.



Crop a shot so that key areas will display in your Twitter feed.



The Photos app lets you apply filters either before or after you shoot to help you create a specific look.

missing sky detail without underexposing a darker landscape.

3 Distortion

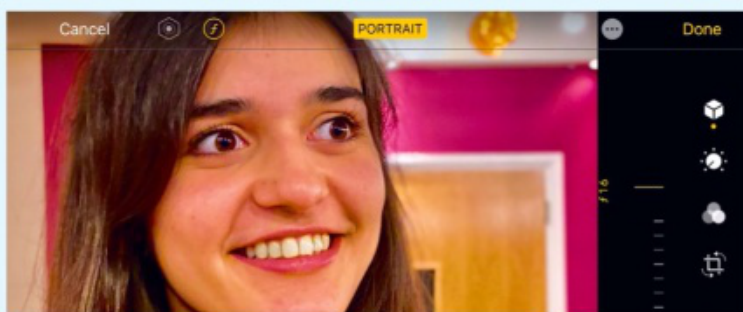
If you shoot a tall building from a low angle its vertical walls appear to converge inwards towards the top of the frame. This phenomenon is called perspectival distortion. If you use an Ultra Wide lens, you'll want to embrace this perspectival distortion as a feature of wide-angle photography. However, when using

other lenses you can process the picture to make the walls of a building run parallel with the side edges of the frame. Tap Edit, then tap the Crop icon. Tap the Vertical correction icon. Drag the slider right to reduce vertical perspectival distortion.

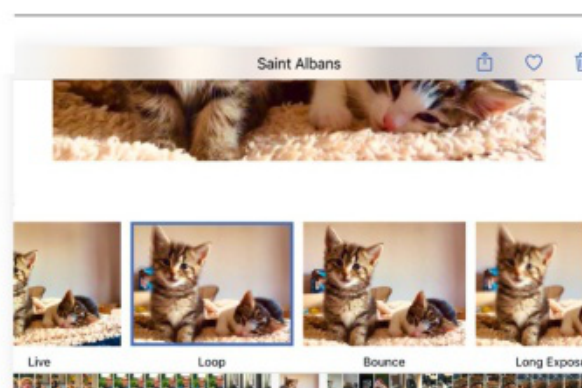
4 Fun with filters

The Camera app's Filter icon enables you to quickly grade a photo or clip's colors and tones to produce a wide range of looks in seconds.

Nine thumbnails act as springboards to create striking effects such as Vivid Warm or Dramatic Cool. You can also produce high-contrast mono effects such as Silvertone. The strength of each filter can be dialled down to achieve a more subtle look.

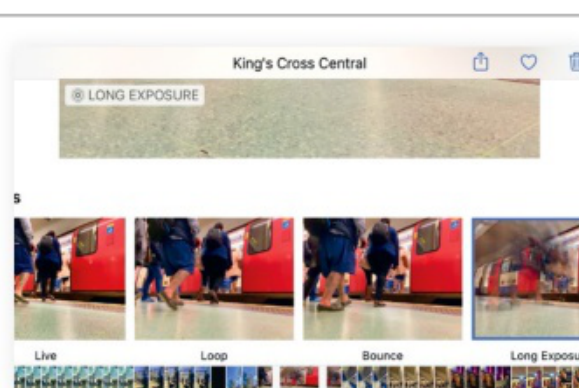


Tap the F icon then dial in more (or less) background blur.



4 Animate the clip

When viewing a Live Photo, swipe up to access its animation tools. Loop plays the clip then mixes it back to the start. Bounce works well with animals as it plays the clip backwards and forwards to create repetitive movement.



5 Slow shutter effects

On a DSLR camera you can close the aperture and use a slow shutter speed to add motion blur to moving people or objects. You can mimic this technique by applying the Long Exposure animation to your Live Photo.



6 Long Exposure

We shot this Live Photo on a tripod so only the people would move. The Long Exposure effect blurred the moving people while keeping the train looking sharp. This technique can turn ocean waves into abstract foamy streaks.

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REVIEWS

TOUGH TESTING, TRUSTED RATINGS



HERE AT MAC|LIFE we believe you should only buy the things that you really need, which is why our Reviews section is so important to us, and you. We don't want you to waste time and money on inferior products, and while we aim to include only the best hardware and

apps, occasionally we like to include products that look promising, even if they don't always deliver.

We only use carefully selected experts, with specialist knowledge in their respective field, so no matter which review you're reading, you can be confident the person who's tested it knows their stuff, allowing you to make an informed purchase.

Each review is rated using a five-star system, with half stars, which is easy to understand because we give an explanation next to each one. The products that really stand out, those with a five-star rating get a *Mac|Life* Editor's Choice award.

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Image rights clockwise from top: Kevin Reutter, Bjango, Dell, Epson.

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Mac|Life's pick of the best apps

Dell P2720DC USB-C monitor

Sit back and admire the view

\$479.99 From Dell, dell.com

Features 2,560x1,440, 60Hz, DisplayPort 1.2, HDMI 1.4, USB Type-C



Screen positioning is easy to adjust and there's plenty of range.

DELL P2720DC USB-C MONITOR

- ▣ Contrasty and colorful
- ▣ Consistent brightness
- ▣ Great stand and ports
- ▣ Only 1440p at 60Hz

AWESOME ■■■■■

Dell's stellar reputation in the monitor game is not ill-deserved and, perhaps, ought to be even stronger than it is. The company consistently puts out market-leading panels at mostly affordable prices. The 27-inch P2720DC, as you might imagine, is no exception – and the screen itself is only part of a winning combination.

Take, for instance, the stand. Simple to attach out of the box, not overly distracting, and perfectly inconspicuous next to an iMac or above a MacBook, it's a fabulous piece of engineering. It tilts, swivels, and rises up and down with a mechanically-compensated action that makes everything particularly easy – and if you want to go vertical you can rotate it with a fingertip.

The P2720DC also scores a host of points for connectivity, sporting daisy-chain-ready DisplayPort 1.2 (meaning you can string two of these together) as well as HDMI 1.4 and a USB Type-C port which does all the things USB Type-C should. Not just connecting, but also offering USB expansion via two side-mounted USB 3.0 ports and a pair of slightly trickier USB 2.0 ports, and passing through 65W of power to your MacBook even when the monitor itself is turned off. Great if you're sick of cables and expansion dongles.

And then there's the IPS panel. Although the viewable area doesn't quite reach the edges of the super-slim bezel, the P2720DC puts out an absolutely expansive 1440p image with the impeccable viewing angles that only IPS panels can provide. It's bright

enough, contrast-heavy and utterly consistent from corner to corner, behind a matte front plastic that does a particularly good job of dampening unwanted reflections. That said, it's not ultra high-end – as beautiful as the image is, the panel can only handle 60Hz at most – and it does lack the lurid glossy bravado of, say, an iMac 5K panel.

Realistically, that's neither a positive or a negative. For general use, this neutral and measured image won't feel offensive or even exciting – this isn't a monitor that wants to take over your desk, it's one that wants you to get on with your work. We're more than happy with its color output at 99% sRGB, and it sailed through our bank of tests. It may be stuck to 60Hz, but that's a smooth 60Hz with a tight refresh rate and not a shred of blur.

There are certainly cheaper monitors on the market, some of which might even reach 4K resolutions, but skimping on your second (or indeed third) screen is like buying a cheap mattress. It's something you're going to use for many hours every day, and Dell's effort here is an incredibly comfortable one.

THE BOTTOM LINE. The P2720DC is quality engineering with a whole host of expansion options and a pin-sharp 1440p panel in a package that's the perfect desktop expansion for a MacBook. **ALEX COX**





The understated, handsome P2720DC has a 90° swivel range and 26° tilt.

Most of the ports are on the underside of the rear shelf, bar the USB 3.0 ports on the side.

Drafts 17

Drafts was already good. Now it's great

Free (IAPs) From Agile Tortoise, getdrafts.com

Needs macOS 10.13 or later

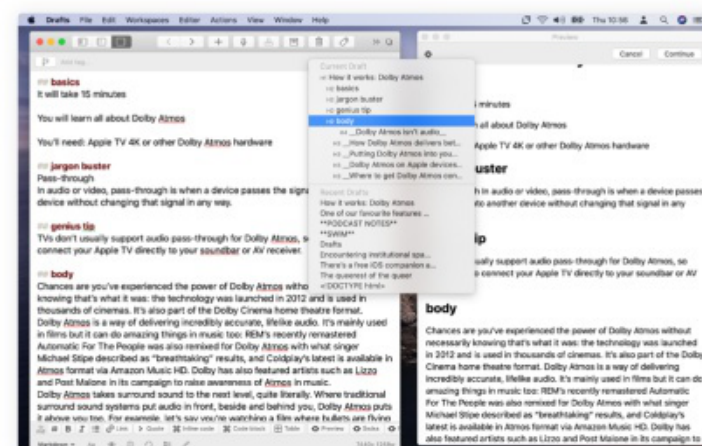


you can set differently for a variety of text formats. Some of these options are limited to Pro subscribers, so for example you can't override the system light/dark mode setting or use multiple workspaces if you're not a paying customer.

Where Drafts gets really clever is in Actions, the feature we missed in last year's release. Actions connect your Drafts to other apps and system features, so for example you can append your draft to an Evernote journal or a Google Doc, email it or send it to Twitter, change everything into Title Case or post it to WordPress. Pro users can manage these Actions, make their own Actions, or add more from the online directory which includes Actions for tasks such as posting to Buffer, trimming white space, sending lists to the Reminders app, and hundreds more. Actions mean no two people's Drafts apps will be alike, and that you can tailor the app to do exactly what you want to do. If your Mac has a Touch Bar you can also access your Actions from there.

Last year we said that Drafts was an excellent notes app. This year, it's superb.

THE BOTTOM LINE. The new Drafts is an incredibly powerful, customizable, and flexible note-taking and writing powerhouse. **CARRIE MARSHALL**



Drafts is a great environment with useful tools for all kinds of writing, from articles to code.

The addition of Actions (in the right sidebar) turns Drafts into a powerhouse.

When we reviewed Drafts last year we said it was a good note-taking and writing app that lacked the best features from its iOS sibling. Those features have now been added, alongside improvements including Touch Bar support and the ability to post to Medium.

Drafts is all about getting your ideas down quickly with the minimum of effort, and to that end it sits in your menu bar ready for action. You can use its icon to create a new draft ready for you to type, or to create one including the contents of the clipboard, and you can add your note hands-free thanks to the built-in dictation support. The app also syncs with its iPhone, iPad and Apple Watch equivalents so you can create and view your notes on the move.

Your drafts can be set up as Markdown, Javascript, plain text, Taskpaper and more, and you can embed details including the location where you created your draft and the location where you've updated it. It's easy to reorder text, and professional writers will appreciate the subtle word and character count in the lower right-hand corner, as well as the extensive customization options that

DRAFTS 17

➕ Actions are amazing

➕ Extensive customization

➕ iOS/watchOS companions

➖ A little intimidating

AWESOME ■■■■■



DJI Mavic Mini

An ultra-small, ultra-light affordable drone

\$399 From DJI, amazon.com

Features Three-axis gimbal, GPS Precise Hover, 30-minute maximum flight time, microSD card

DJI's latest addition to its fleet is aimed at bringing drones to the masses, thanks to a lower price and a tiny weight of 0.5lb.

That weight includes the battery and microSD card (32GB included). Like bigger Mavic drones, it's foldable, so it becomes dinky enough to carry around with ease at just 6.3 inches long, eight inches wide and 2.2 inches tall.

The Mavic Mini shoots 1080p video at up to 60fps and super-crisp 2.7K at up to 30fps. The fact that it doesn't shoot in full 4K is no real hindrance since this drone isn't aimed at pro video work — what it takes looks fantastic on a tablet or phone.

For those who are into aerial photography, the drone's camera shoots immaculate 12MP stills that really “pop” when snapped in good lighting conditions. It isn't too shabby in low light either.

Despite its diminutive dimensions, the Mavic Mini is extraordinarily stable in

flight and very fast and nimble when switched to Sport mode, while a reliable GPS lock keeps it stationary when it's not moving. On the automative flight mode front it offers a small variety of “Quick Shots” including drone, rocket, circle and helix, but no follow-me mode.

It will stay connected at over 2.5 miles, and can fly for up to 30 minutes per full charge. The new DJI Fly app is tailor-made for the Mavic Mini; its interface is easy to get a handle on and it isn't cluttered with too many submenus.

The basic package includes a simple controller equipped with a phone cradle (for live streaming), on/off and “return to home” buttons, a smooth gimbal wheel to control elevation of the camera, and shoulder buttons for photos and videos.

THE BOTTOM LINE. A lovely camera-equipped drone that costs no more than a decent compact camera. **DEREK ADAMS**

Video and stills both look fantastic, even if the drone is being buffeted by the elements.



The Mavic Mini folds up into a conveniently small size for carrying.

DJI MAVIC MINI

- ✚ Incredible value and ultra-compact size
- ✚ Flies impeccably
- ✚ Shoots superb video and takes great images
- ✚ No obstacle avoidance or follow-me mode

AWESOME ■■■■■

Life Is Strange 2

Protect your super-powered sibling on the long road home

\$39.99 From Square Enix, lifeisstrange.com

Needs macOS Catalina 10.15



You play as big brother Sean, protecting and teaching the super-powered Daniel.

Life Is Strange gave the adventure genre a shot in the arm when it was released a couple of years ago. What could have been a fairly conventional point-and-click adventure was enriched by a strong, involving story about teenagers Max and Chloe as they search for a missing friend — and Max’s discovery that she has the ability to rewind time and change the decisions that she makes along the way.

Rather than being a direct sequel, *Life Is Strange 2* introduces an entirely new story that focuses on two young brothers, Sean and Daniel Diaz. The boys find themselves fleeing the police after a neighborhood brawl that leaves their father dead, so they decide to head south from Seattle to their father’s old home in Mexico. Like its predecessor, *Life Is Strange 2* was released as a series of episodes, each costing \$7.99 (you can buy the entire “season” of five episodes for \$39.99, although that doesn’t actually save you any money, which is a little disappointing).

Sixteen-year-old Sean is the older brother, and the game lets you play as Sean as you

take care of the younger Daniel, with each episode seeing the two brothers visiting new locations on the road to Mexico. There are many difficult decisions along the way — do you beg, borrow or steal the things you need? — and things get even more complicated when Sean discovers Daniel has telekinetic powers. The game’s “education” system means Daniel learns from Sean’s choices and behavior, so the way that you play as Sean will ultimately decide how the game ends.

The storytelling can seem a little leisurely at times and, like all adventure games, it involves a lot of clicking on random objects in the hope of finding something useful. But it’s a well-written story, and there are moments when Daniel’s super-powers take off and make it feel like you’re playing in one of those Netflix shows about teenage super-heroes on the run from evil grown-ups. It’s a shame, though, that some (mostly unnecessary) F-bombs help to earn the game an M-rating, as the story would appeal to many younger players. The game also requires Catalina (10.15) and a fairly recent Mac to run, so make sure to check the system requirements before buying.

THE BOTTOM LINE. The game takes some time to warm up, but there are plenty of fireworks along the way. **CLIFF JOSEPH**

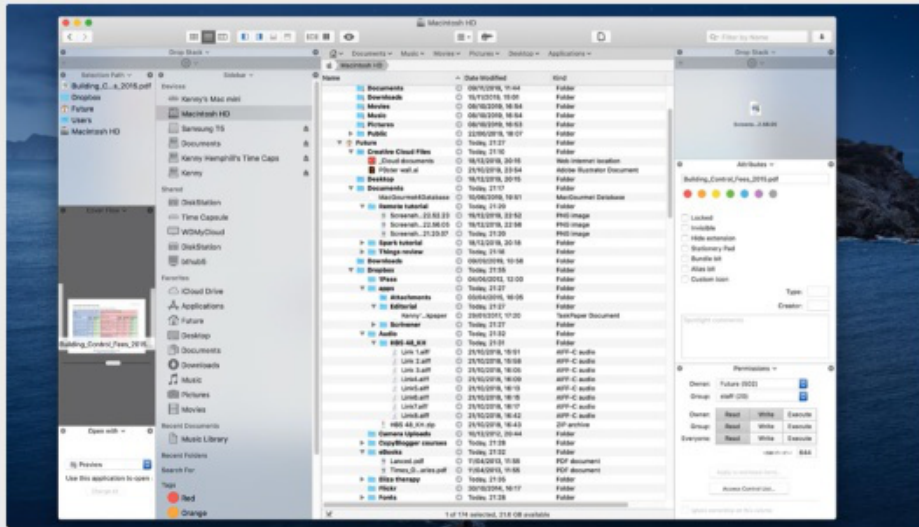


“You wouldn’t like me when I’m angry!” Daniel’s telekinetic powers will affect the final outcome.

LIFE IS STRANGE 2

- ⊕ Strong, dramatic storytelling
- ⊕ Attractive graphics and soundtrack
- ⊖ Uneven pace
- ⊖ Shame about the M-rating

GOOD ■■■■■



Path Finder 9

Popular Finder replacement sees the return of a much-loved feature

\$36 From CocoaTech, cocoatech.com

Needs macOS 10.11 or later

When Path Finder first arrived, at the same time as version 1 of OS X, the need for an alternative to the Finder was great. Finder has improved significantly since then, but it still can't compete with everything Path Finder has to offer.

Path Finder 9's key new feature is the return of collapsible module shelves, which were removed in version 8. They can host as many modules as you want and can be collapsed to reduce clutter. Modules contain info like file previews, tags, permissions, and the menu to choose which app it should be opened with. Version 9 also improves compatibility with macOS Catalina and overall performance and stability.

Drop Stacks are another useful feature. They allow you to move or copy files from multiple locations at once by providing a temporary "holding area" for files you select.

PathFinder supports Dropbox and iCloud Drive, file tagging, and allows you to synchronize the contents of folders. There are lots of little ways in which it improves on Finder, such as the ability to customize colors for alternate rows in list view, and it can print a list of files in a Folder.

THE BOTTOM LINE. A good upgrade to an old favorite that will be welcomed by longtime users. **KENNY HEMPHILL**

PATH FINDER 9

- Collapsible module shelves
- Customizable alternate row colors in list view
- Drop Stack makes working with multiple files easy
- Can be a bit daunting for new users

GREAT ■■■■

Kygo Life A11/800

Premium ANC wireless cans at a mid-range price

\$299 From Kygo Life, kygolife.com

Features ANC, Bluetooth 5.0, carry case

Scandinavian headphone maker Kygo's noise-canceling headphones rival premium cans, like the Bose QuietComfort 35 II, with a much lower price tag – you can pick up the A11/800s for as little as \$185 on Amazon. They're solid and comfy, if a little flimsy given the price.

They have active noise cancellation that's enabled via a physical button or through the Kygo app, the option to listen to the headphones in a wired capacity for when battery life is at a premium, a proximity sensor so they pause when taken off, and Siri voice command support.

Most importantly, the A11/800 sound delightful. Warm in all the right ways, their 40mm drivers hit all the right notes, with well-balanced sounds regardless of what you're listening to.

Battery life is just under 40 hours with ANC off, and about 18 hours when it's enabled. USB-C connectivity means fast charging, too.

THE BOTTOM LINE. The A11/800 are a remarkably capable pair of ANC headphones, considering the price tag. **JENNIFER ALLEN**

KYGO LIFE A11/800

- Great audio performance
- Good battery life
- Comfortable fit
- Feel a little bit flimsy

GREAT ■■■■

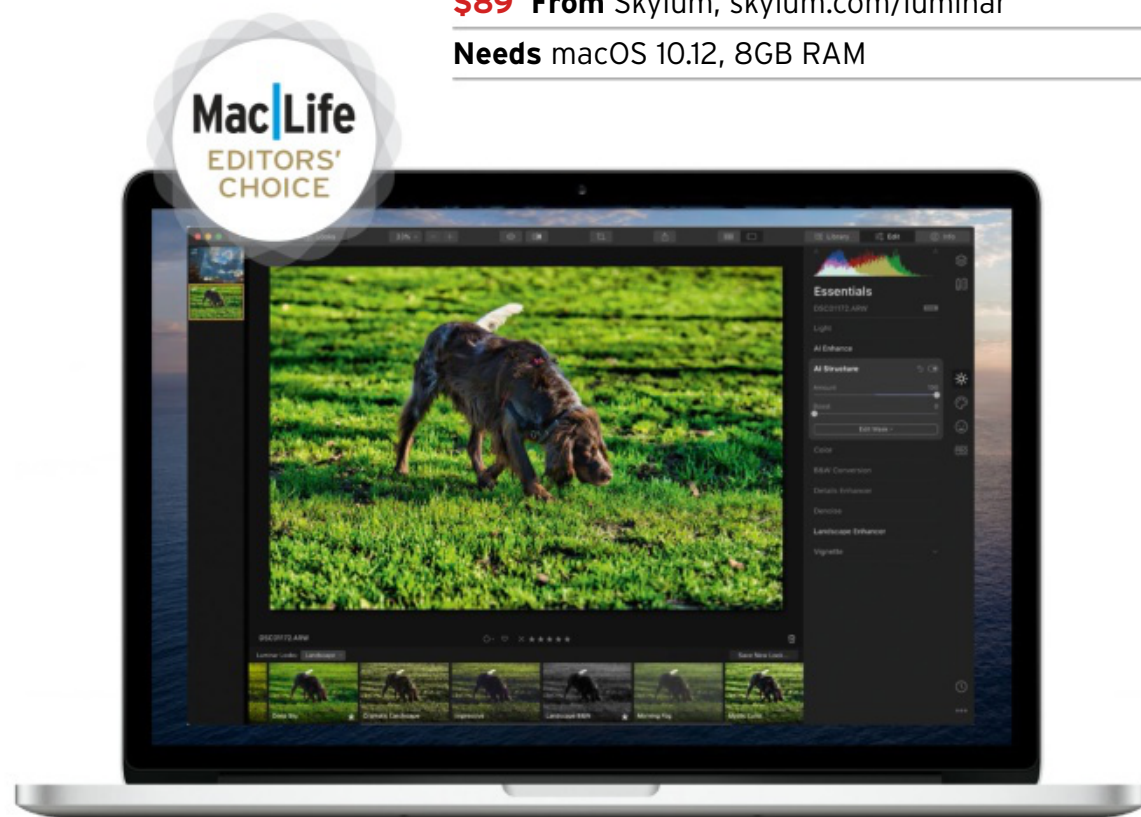


Luminar 4

User-friendly photo editing for all skill levels

\$89 From Skylum, skylum.com/luminar

Needs macOS 10.12, 8GB RAM



purchased, along with other “looks” — pre-created templates for enhancing whole images. The AI is also particularly impressive when put to work on portraits, with the app identifying skin, eyes, mouths and more with ease and letting you change their shape, appearance and smoothness. The new skin smoothing algorithm is excellent, removing imperfections without appearing artificial. It’s also adept at removing objects from flattened images — set a brush size and draw around something that’s reasonably well defined and it can be removed effectively.

Luminar 4 is a sort of mixture of the best features of other leading photo editing apps. It has easily accessible editing and masking tools and great presets like Lightroom, but adds layer functionality and AI. It’s also much more user friendly and catalogue-oriented for photographers than Photoshop. The AI really works and there’s a greater depth of features than in similar apps, all presented in a slick and easy interface. For all but the most demanding photographers, it’s an excellent way to enhance and edit your photos in a professional way.

THE BOTTOM LINE. An excellent, user-friendly set of tools for photo editing and enhancement. Suitable for a wide range of skill levels. **HOLLIN JONES**

Use presets or AI to quickly enhance and enrich images, then make tweaks.

Skylum specializes in photo editing applications and Luminar 4 is its flagship suite, running as a standalone app or as a plug-in for Photos, Photoshop, or Lightroom. It uses AI to streamline the process of identifying areas of images for enhancement, and offers a powerful set of tools without requiring a person to have advanced knowledge of graphical concepts.

With all major image formats supported, including RAW, you load either a single file or a folder of files. There’s support for layering and adjustment layers like in Photoshop, and AI powered “essential” adjustments like white balance, color, exposure and detail, among others. Many of these have a Mask option that lets you draw in free-form, radial or gradient masks under which adjustments will be applied. Various automatic options like Landscape Enhancer are available that make a good stab at enriching and clarifying your shots, with amount and other controls you can tweak.

The Creative tab reveals further options like AI sky replacement, which is remarkably effective at identifying and replacing skies with preset alternatives. More presets can be



Auto detect the sky then replace it with a couple of clicks. Choose from preset skies or add more via an IAP.

LUMINAR 4

- A slick, well designed toolset
- AI is scarily effective
- Sensibly priced, no subscription model
- Plug-ins really just open the image in Luminar

AWESOME ■■■■■

Sensei

Tidy up your Mac for peak performance

\$59 From Cindori AB, sensei.app

Needs macOS 10.15

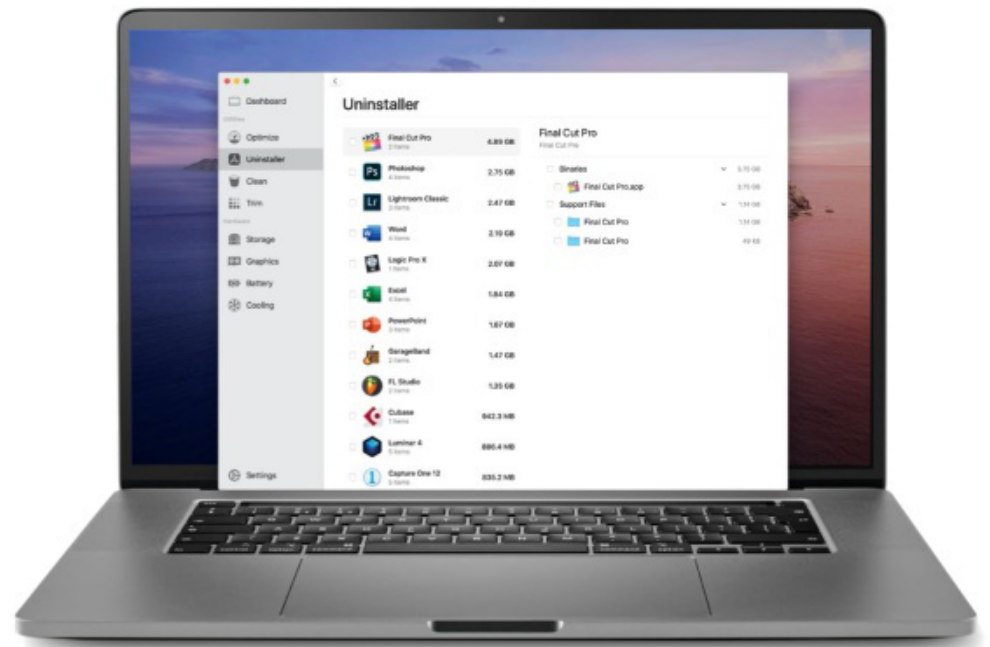
MacOS is easy to use, but with each new iteration Apple has hidden away more and more of the nuts and bolts of the OS. And it still doesn't provide easy tools for tasks like uninstalling apps, which often bury their content deep in system folders. It's also easy to accumulate a lot of media files and over time this clutter — much of which is hard for the average user to find — can start to fill up your hard drive. Even the more technically minded users have to use disparate apps to monitor and tweak system performance.

Enter Sensei, a “performance tool” that runs on any Mac that supports Catalina. Its interface is slick and easy to use, while under the hood it scans all the dark corners of the system where clutter can accumulate. It provides several core tools. First is Dashboard, which displays stats about your hardware, RAM and CPU usage in a very clear fashion. This is useful for understanding which apps or processes are using resources, and quitting or even uninstalling repeat offenders.

Next is Optimize, where you can disable launch agents and login items such as unwanted printer helpers, which can hang around using memory long after the hardware has given up the ghost. A very straightforward uninstaller is next,



The Dashboard provides at-a-glance information about your Mac's hardware and current load.



allowing the removal of apps with a few clicks. Oddly this would sometimes claim it was unable to delete apps when several were selected, but repeating the process seemed to work after a couple of tries.

The Cleaning tab shows you big files and folders and again allows quick deletion, or at least tells you what's using space so the files can be offloaded to an external hard drive. The Trim tab, which uses an Apple-certified driver, lets you enable Trim to prolong the life of SSD drives by altering the way that data is written. Finally, a hardware monitoring section shows you stats about storage, battery, graphics, and cooling. Your Mac shouldn't overheat if it's working properly, but this section can help you understand what's going on if there is a problem.

Sensei is a fantastic app, particularly for clearing out large files and logs and uninstalling apps and libraries, as well as monitoring performance and battery health. It's the kind of app that's so useful Apple should include it in macOS.

THE BOTTOM LINE. An invaluable and friendly tool — if a little pricey — to keep your Mac healthy and nimble. Apple ought to take notice. **HOLLIN JONES**

Apple doesn't provide an uninstaller for regular users but with Sensei you can identify and remove apps easily with just a couple of clicks.

SENSEI

- Very easy to use
- Quickly identify and delete clutter
- Monitor CPU, RAM, and battery performance
- It's quite costly

EXCELLENT ■ ■ ■ ■ ■

HP DreamColor Z31x

Professional display with “cinema 4K”

\$2,999 From HP, store.hp.com

Features 31.1-inch 4K display **Needs** Mac with HDMI, DisplayPort or USB-C

Apple’s new 32-inch Pro Display provides dazzling 6K resolution and image quality, but it’s very expensive, with prices starting at \$4,999 not including a stand.

There are, of course, many budget monitors suitable for home and office use, but creative users who need a more affordable professional-quality display might want to look at alternatives such as HP’s DreamColor Z31x. It’s still not cheap, with this 4K 31.1-inch model costing \$2,999, but that’s still only around half the price of the Apple Pro Display. There’s also a 27-inch model with 2560x1440 resolution available for \$1,749.

It’s also worth pointing out that the Z31x provides “cinema 4K” with a resolution of 4096x2160, which is closer to the aspect ratio used in cinemas, rather than the 3840x2160 resolution used by many 4K displays. The Z31x also supports 99% of the DCI-P3 color space used in the professional film and broadcasting industries, as well as 100% of the sRGB and Adobe RGB color standards. Only providing 99% of DCI-P3 – and the lack of support for HDR – means that it might not be the best option for would-be Oscar winners (and also explains why Apple’s Pro Display is so expensive) but it should be more than adequate for most graphic designers, photographers, and video editors. It has its own color calibration sensor built into the top edge of the screen, but also allows you to load your own preferred color profiles via one of the display’s USB ports.

The image quality is extremely clear and sharp, with strong contrast that produces rich, vibrant colors. It includes one USB-C port, two HDMI and two DisplayPort interfaces, for connecting multiple Macs and PCs. It also includes an Ethernet interface, and seven USB 3.1 ports for connecting peripherals. You can even link two USB ports to two of the video ports, allowing you to quickly switch control of the display, mouse and keyboard between two computers.



It may not match the 6K resolution and HDR support of Apple’s Pro Display, but the Z31x will be ideal for many designers, photographers and video-editors, while still leaving you with extra cash to put towards that new Mac Pro you’ve been waiting for.

THE BOTTOM LINE. A cheaper, but still high-quality, alternative to Apple’s Pro Display, with an impressive display suitable for a range of applications. **CLIFF JOSEPH**



Unlike Apple, HP includes a tilt-and-swivel stand in the price of the Z31x.

HP DREAMCOLOR Z31X

- Impressive “cinema 4K” image quality
- Versatile connectivity features
- Expensive (but cheaper than Apple)
- No HDR, only 99% DCI-P3

GREAT ■■■■

Tough testing, trusted ratings

The “cinema 4K” resolution of the Z31x is ideal for professional video-editing.





The XP-8600 uses six separate colored inks to produce high-quality photo prints.

Epson Expression Photo XP-8600

A high-quality photo printer with an equally high price

\$249.99 From Epson, epson.com

Features Wi-Fi and USB connectivity, two-sided printing, six-color system

There are plenty of affordable multi-function printers that can provide good quality text and graphics for home and office users, but Epson's new XP-8600 is a specialist printer that is very much aimed at keen photographers who want to produce really high-quality photo prints.

It's a bit pricey, costing \$249.99, but that price includes a six-color printing system (rather than the four colored inks used by conventional inkjet printers) that produces more subtle color graduations and lifelike skin tones for portrait photography. It's packed with useful features too, including Wi-Fi and USB connectivity, support for AirPrint for iOS devices, and two-sided printing. There are two paper trays that hold 100 sheets of A4 paper, and 20 sheets of photo paper. You can print on CD and DVD disks, and there's a third tray at the back for

special art papers and cards, so the XP-8600 can handle just about every printing task you throw at it. And, of course, it also features a scanner and copier.

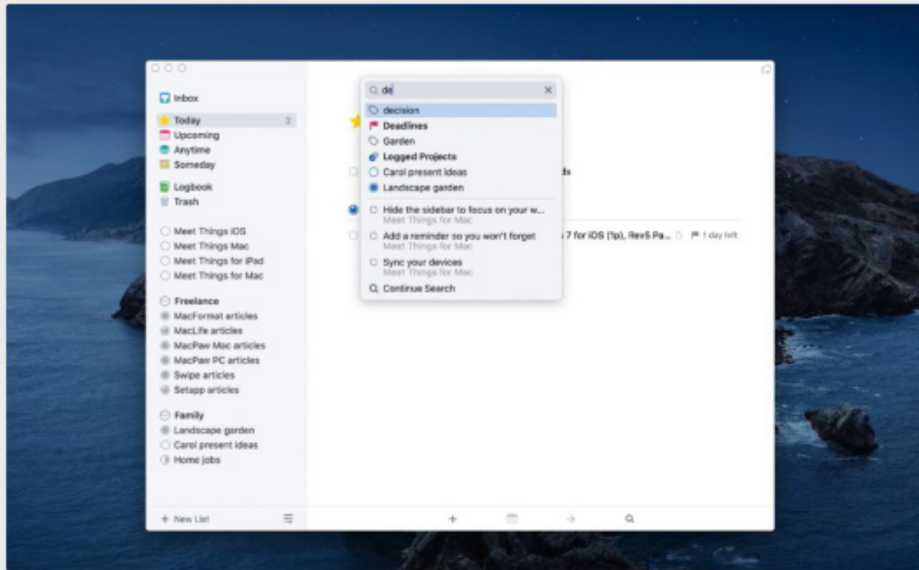
Print speed for text and graphics is fairly modest, at around 8.5 pages per minute, but the XP-8600 zips along when it comes to photos, taking just 18 seconds to produce a four-inch by six-inch photo print. The quality is impressive too, with the six-color printing and 5760x1440 dpi resolution producing finely detailed photo output, with bold colors and strong contrast. But replacing six separate inks can be expensive, so the XP-8600 will only be suitable for keen photographers who are prepared to pay for that extra quality.

THE BOTTOM LINE. Expensive, but the quality six-color photo printing is worth it for serious photographers. **CLIFF JOSEPH**

EPSON EXPRESSION PHOTO XP-8600

- ⊕ Six-color printing system
- ⊕ Multi-function, with scanner and copier
- ⊕ Compact design
- ⊖ Expensive to buy and run

GREAT ■■■■



Things 3.11

Finding lists of tasks is now quicker

\$49.99 From Culture Code, culturecode.com

Needs macOS 10.13 or later; 64-bit processor

Things is one of the most popular productivity apps on the Mac for a simple reason — it works really well. Now version 3.11 adds to that by beefing up the Quick Find feature.

Quick Find allows you to start typing anywhere in the app and, without doing anything else, call up a search box to search for the text string you're typing. Version 3.11 adds several new lists to the groups you can search for. For example, start typing "deadline" and you'll see a list of tasks with upcoming deadlines. Other new lists include "repeating", "tomorrow", "all projects", and "logged projects". Starting to type any of those will display its name in the search suggestions list. Choose the list and you'll see the tasks that fall into that category. Also new: if you invoke Quick Find (which you can also do with Cmd+F) it will display the lists you've accessed most recently. Those lists now include project headings.

Other improvements include the ability to see the date and time a task was created, better Touch Bar support, and you can now open links in the background by Command-clicking them. One of the best just got better.

THE BOTTOM LINE. Things isn't cheap, but it is brilliantly useful for task management. **KENNY HEMPHILL**

THINGS 3.11

- Find makes it easy to locate tasks
- Can now see date and time of task creation
- Improved Touch Bar support
- Expensive to use on Mac, iPhone, and iPad

GREAT ■■■■

Corkulous

Organize all your ideas by pinning them to cork

Free (IAPs) From Corked Labs, corkulous.com

Needs macOS 10.15 or later

Corkulous is a virtual corkboard for your Mac that you can use to collect, organize, and share ideas. The free version has a ten-item limit; a subscription is \$1.99 a month (Buying a Mac subscription doesn't cover iOS and vice-versa.)

It's based around collections, each of which is a dedicated board to which you can add sticky notes, shapes, web links, note cards, emoji, sketches, and to-do lists. You can also pin PDFs and contacts, and sticky notes and note cards enable you to use Markdown to embed links or code. These items are fully searchable and you can restrict your search to specific items such as sticky notes or labels.

If you have a subscription you can also pin boards to boards, effectively creating a visual equivalent of nested folders. You can sync with the iOS app via iCloud, and you can also sync and share with other users via Dropbox or export boards as board files, text, PDF, or PNG.

It's a fairly niche app, but useful for those who prefer to organize ideas or research visually.

THE BOTTOM LINE. A fast, fun and vivid way to organize your content. **CARRIE MARSHALL**

CORKULOUS

- Very fast
- Very easy
- Subscription is Mac-only
- Very limited free version

GREAT ■■■■



I N - E A R



W I R E L E S S

H E A D P H O N E S



A choice selection of Bluetooth buds
for all your listening needs

REVIEWED BY SRIVATS LAKSHMAN

CHOOSING A GOOD pair of wireless earbuds is a tricky process. There are so many options across so many price points, it's often easy to get lost when trying to make a decision. Luckily, we've got you covered. This test pits some of the most popular in-ear wireless headphones against each other, with prices ranging from \$249 to \$346.

Crucially, each pair of earbuds is equipped with noise cancellation tech. This helps cut out background sounds, enabling you to focus on what you're listening to – perfect for when you're on a train or trying to focus on that email in a noisy cafe.

There's no set of buds that plays as well with your iPhone as Apple's AirPods. Thanks to their built-in H1 chip, the AirPods (and new AirPods Pro – on test here) offer handy features such as a battery status widget, hands-free Hey Siri and audio sharing that make them super-easy to use. Other earbuds offer different features, functions and input methods, and we'll explore these too.

With great features comes even greater battery demand. Due to their small size,



Not all earphones follow the same form. Some like the Libratone Track Air+ have a very different look.

wireless earphones tend to have limited battery life, which is why each of the pairs on test also comes with a charging case. This enables you to pop the earbuds back into the case at the end of a listening session to boost their power. We've tested for active listening time and how much extra time you get from the charging cases. Note that we've listed the maximum times we got from the earbuds; activating noise cancellation does impact battery life.

We'll also look at how robust each of the earbuds on test are and how likely they are to cope with a sweaty gym session or even a soaking in a downpour. An IPX4 rating means they're splash-resistant, an IPX5 rating means they're hardier still.

Things to consider...

Everything you need to know before getting started

1 SOUND QUALITY

Whether you're into rock or classical, pop or podcasts, your earbuds should suit the kind of sounds you're into. Expect crisp, clean highs, reasonably deep but tuneful bass and realistic mid-range vocals. If cymbals sound splashy, bass is woolly or distorted and vocals are overly sibilant, you might want to make a different choice. Ideally, the earbuds should offer acoustically transparent, balanced sound.

2 COMFORT

Ears come in a variety of different shapes and sizes and that means finding the best-fitting, most comfortable earbuds is key. The earbuds in this test come with different-sized silicone tip options so you

can try them out and find which ones work best. Long-term comfort is also important.

3 BATTERY LIFE

Good earbuds should offer around five to six hours of listening per charge (without noise cancellation), and ideally around 20-24 hours with the accompanying charging case. This will get you through the week for most uses, unless you wear your headphones all day.

4 USABILITY

Input methods are important. Some earbuds offer tapping as an input method, others offer buttons. It's vital to know which system works best for you. All of the buds on test work with Siri voice control.

How we tested

We connected each of these buds to an iPhone 11, and ran a series of music and call tests both indoors and outdoors. We tested the earphones with a variety of music, with and without noise cancellation.



▲ HIGHER...

B&O BEOPLAY E8 3.0 TRUE WIRELESS

bang-olufsen.com

\$350

These luxury in-ear buds, which come with a Qi-enabled case, offer 35 hours of playtime and exceptional sound.



▼ ...OR LOWER?

CAMBRIDGE AUDIO MELOMANIA 1

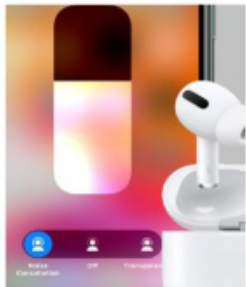
amazon.com

\$99.95

If price is critical then Cambridge Audio's Melomania 1 offer nine hours of listening on a single charge. Sound quality is good too.

> Test 1 Initial set-up

Pairing up the earbuds for the first time



Thanks to Apple's H1 chip, the AirPods Pro are by far the easiest to pair. There's no app, no button pressing, and no confusion. Just open the lid and bring the case near your iPhone and you're good to go.

Pairing Master & Dynamic's MW07 Plus is also quick and easy – just pop them into your ears and pair them via Settings > Bluetooth. There's no app to download and install, and no need to fiddle around too much.

Libratone's Track Air+, Sony's WF-1000XM3 and Jabra's Evolve 65t all require companion apps to get set up. While this is a small step, it feels unnecessary, especially since none of the apps offer much in the way of additional features. Pairing these three is also a little problematic, since each requires you to power on a particular bud and connect, which isn't as easy as the AirPods.

APPLE AIRPODS PRO	M&D MW07 PLUS	LIBRATONE TRACK AIR+	SONY WF-1000XM3	JABRA EVOLVE 65T
■■■■■	■■■■■	■■■■■	■■■■■	■■■■■

> Test 3 Design

Checking out looks and usability



Apple's AirPods Pro offer a new pinch input mechanism, on a shorter stem. This is quite hard to operate, especially with gloves. A longer stem would have been helpful. The case is also slightly bigger than the original AirPods'. M&D's MW07 Plus really stand out – the metallic case houses two beautiful

marble-like earbuds. They have physical buttons (two on the left earbud for volume, one on the right for other functions) that are large and easy to press.

The left bud on Jabra's Evolve 65t also has a physical volume button, but it's smaller and harder to press. The buds are also smaller, making them hard to wear/remove. The Libratone TrackAir+ and Sony WF-1000XM3 both offer tapping as an input method. Libratone's buds are just the right size to operate. Sony's buds are very large, and the case isn't easy to pocket, either. At least its colorful finish makes it stand out.

APPLE AIRPODS PRO	M&D MW07 PLUS	LIBRATONE TRACK AIR+	SONY WF-1000XM3	JABRA EVOLVE 65T
■■■■■	■■■■■	■■■■■	■■■■■	■■■■■

> Test 2 Build & battery

How well will the earbuds last?



With an IPX4 rating for splash resistance, the AirPods Pro can handle both sweat and the average rain shower, while their five-hour battery life makes them great for outdoor runs. Master & Dynamic's MW07 Plus go further, offering both 10 hours' listening time between recharges and an IPX5 rating (resistant to jets of water). However, the stainless steel charging case is heavy at 84g, making it less suited for runs.

Like the AirPods Pro, Libratone's TrackAir+ are also IPX4 rated. With six hours on a single charge, they're good at lasting the day. Sony's WF-1000XM3 offer eight hours of listening time, but the lack of waterproofing means they're no suited to a sweaty workout. Jabra's Evolve 65t meanwhile offer five hours of listening time, and are water resistant to IPX5 too.

APPLE AIRPODS PRO	M&D MW07 PLUS	LIBRATONE TRACK AIR+	SONY WF-1000XM3	JABRA EVOLVE 65T
■■■■■	■■■■■	■■■■■	■■■■■	■■■■■

> Test 4 Audio quality

How good do these earbuds sound?



The AirPods Pro sound good, especially with Active Noise Cancellation (ANC) turned on. The sound feels natural, with a good balance between the highs and lows. However, Master & Dynamic's MW07 Plus are better, delivering much clearer highs and stronger bass without compromising the sound too much.

Even with ANC switched off, the audio quality is exceptional.

Libratone's TrackAir+ deliver pretty good highs, but aren't as clean sounding. However, the companion app does have an equalizer (EQ) to help redress the balance. Sony's WF-1000XM3 offer a balanced sound with ANC active, but the lows get lost when it's switched off. Like the TrackAir+, Sony's companion app has an EQ. The HearThrough mode on Jabra's Evolve 65t mode is the least pleasant of the group, with robotic voices and sound, although with Passive Noise Cancellation active there isn't any issue, and the bass and treble are well balanced.

APPLE AIRPODS PRO	M&D MW07 PLUS	LIBRATONE TRACK AIR+	SONY WF-1000XM3	JABRA EVOLVE 65T
■■■■■	■■■■■	■■■■■	■■■■■	■■■■■



THE WINNER

M&D MW07 Plus

Outstanding design and performance

APPLE'S \$249 AIRPODS Pro very nearly won the test. However, while they're easy to pair with your iPhone and offer great sound quality, usability isn't as great – their shorter stems making them trickier to get to grips with.

At \$199.99, the Libratone Track Air+ are great value for money. They're the best option if you're on a tight budget, and we were impressed with the striking triangular design, sound quality and IPX5 water resistance.

Sony's WF-1000XM3 aren't for everyone. While they offer great sound

quality, the lack of waterproofing is a concern; they're great for commuting, not for running in the rain. Their sheer size is another letdown. Jabra's Evolve 65t don't justify their high \$346 cost either, thanks to their poor design and so-so sound quality.

Master & Dynamic's MW07 Plus are unique in every way. With their eye-catching design, stainless steel case and great sound quality there's really no better alternative here – even if they are



Master & Dynamic's MW07 Plus earbuds come in a variety of different finishes.

one of the most expensive headphones on test at \$299.

Master & Dynamic's MW07 Plus won't let you down. Whether you use ANC or not, the audio quality will keep you immersed in your music. And with up to 10 hours of battery life between recharges, they'll also get you through the day.

How do they compare?



SPECS	APPLE AIRPODS PRO	M&D MW07 PLUS	LIBRATONE TRACK AIR+	SONY WF-1000XM3	JABRA EVOLVE 65T
PRICE	\$249	\$299	\$199.99	\$229.99	\$346
WEBSITE	apple.com	masterdynamic.com	libratone.com	sony.com	jabra.com
BATTERY PER CHARGE (ANC OFF)	5 hours	10 hours	6 hours	8 hours	5 hours
WITH CHARGING CASE	24 hours	40 hours	24 hours	24 hours	15 hours
INPUT METHOD	Pinch	Physical button	Tap	Tap	Physical button
COMPANION APP	No	No	Yes	Yes	Yes
WATERPROOFING	IPX4	IPX5	IPX4	No	IPX5
BUDS WEIGHT	5.4g each	9g each	5.6g each	8.5g each	L 5.8g; R 6.5g
CONNECTIVITY	Bluetooth 5.0	Bluetooth 5.0	Bluetooth 5.0	Bluetooth 5.0	Bluetooth 5.0
INITIAL SET-UP	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
BUILD & BATTERY	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
DESIGN	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
AUDIO QUALITY	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
OVERALL	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

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



APP LIFE

THIS MONTH'S MOST INTERESTING IPHONE & IPAD APPS

Snowflake Weather

A mixed outlook

\$4.99 (IAPs) From Bjango, bjango.com/ios/snowflake/

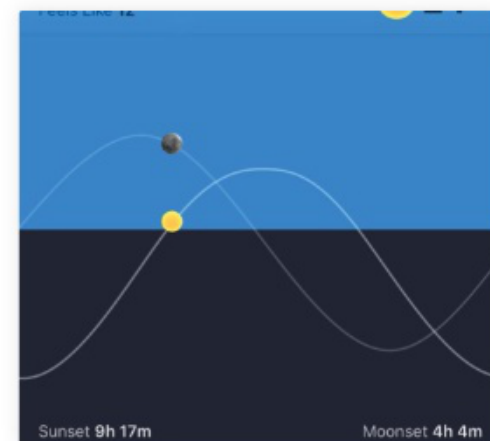
Made for iPhone, iPad, iPod touch and Apple Watch **Needs** iOS 11.0 or later; watchOS 5.0 or later



Do we need another weather app? That was our first question when setting eyes on Snowflake Weather. But since it's by Bjango, creators of *MacLife* favorite iStat Menus, we were determined to give it a shot. Our second question was perhaps more important: how does the app differentiate itself from the Carrots and Dark Skies that are already a permanent fixture on millions of iPhones?

For the most part, the answer is "information density". Much like iStat Menus, you get the feeling Snowflake's creators really love data — and this app is determined to give you a whole lot of it. Whether you're in the Home tab or the details view, loads of figures are hurled your way. Fortunately, Snowflake largely succeeds in making everything meaningful and digestible.

A huge icon and number sit at the top of the Home tab

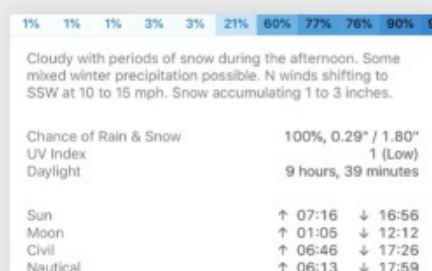


Want to know what the sun and moon are going to do today? There's a tab for that!

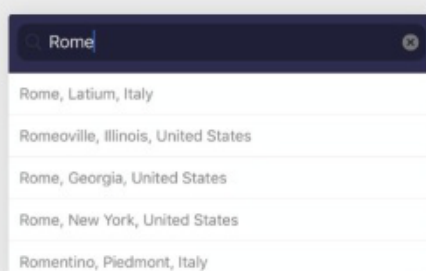
screen, so you can take in the current conditions and temperature at a glance. Below that, a graph outlines what's coming over the next few days, and an extended forecast underneath that lets you plan further ahead. Need more details? Tap a day to delve into an explosion of facts, or tap the

APP TIPS

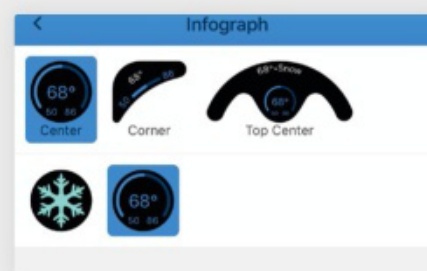
Know the weather wherever you are



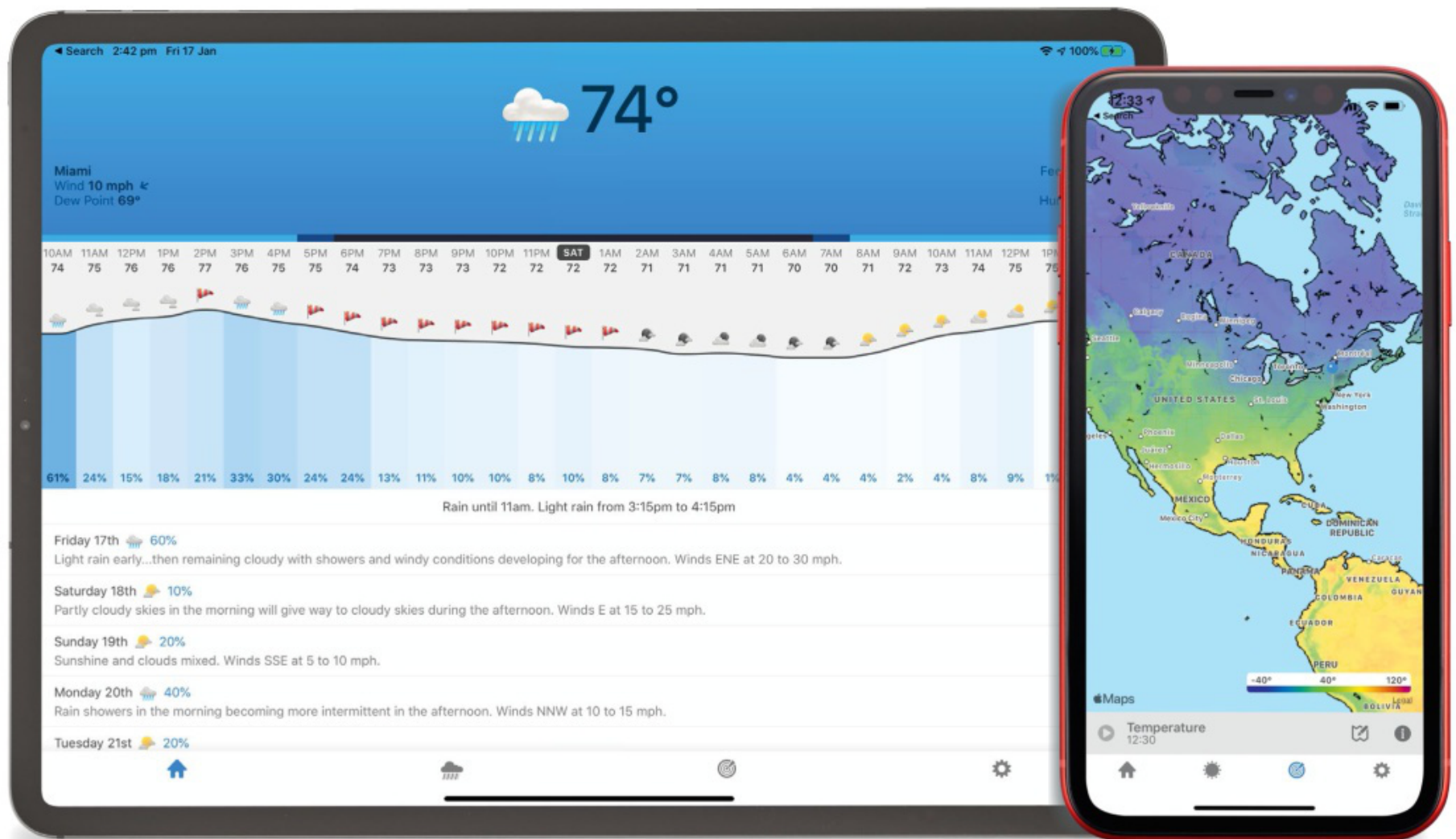
Tap a day in the Home tab to access details about that day's weather forecast, including UV predictions, sunset times, and rainfall and wind graphs.



The main view doesn't let you switch locations, but previous searches are stored in the settings tab's Location menu and can be accessed there.



If you subscribe, you can adjust the way Snowflake displays on your Apple Watch, defining the information shown in each of its complications.



second tab to dig deeper into the current day's weather, including precipitation chances, sun and moon information, pressure and UV outlooks, and more.

To access the third tab, which houses maps and radars, you'll have to subscribe for a buck a month. You can then switch between a range of settings (such as radar, wind speeds, and temperature), assuming they're covered for your chosen location (radar coverage is patchy).

This IAP also opens up another of the app's main draws: customization. You get four themes and six icons, and can decide what's shown in the current conditions area, the app's Today view widget, and on Apple Watch.

It's broadly impressive stuff — and the app has a distinct personality of its own. But there are concerns. The first is that Snowflake does in some areas feel a bit version 1.0. On iPad, the design whiffs too much of “blown up” iPhone app, and it's terrible at switching between multiple locations, forcing you to delve into a menu within its settings. Also, it sometimes feels a touch unfinished. For example, the wiggly graph that shows sun and moon positions takes up half the screen on iPhone, and yet neglects to add hour indicators across its width.

The second issue is whether Snowflake does enough to stick around. It lacks Dark Sky's refinement and imminent rainfall graph, and Carrot's

sense of fun. On the plus side, it does deal with info-heavy forecasting in a more pleasing way than, say, WeatherPro. If you feel your current weather app is a bit lightweight, then Snowflake is worth a look; but if you're happy with Carrot or Dark Sky, it's unlikely this newcomer will convert you.

THE BOTTOM LINE. There's plenty to like here, especially if you're keen on weather apps that serve up lots of data

CRAIG GRANNELL

SNOWFLAKE WEATHER

- Loads of information
- Customizable (with IAP)
- No imminent rainfall visuals
- Awkward location access

GOOD ■■■■

Above left: The main view is packed full of figures, but nonetheless remains readable.

Above right: Snowflake's map has many layers, but access requires you to pay a monthly subscription.

Nighthawk for Twitter

Tidy up your Twitter timeline

\$3.99 From Team Nighthawk, tweetnighthawk.com

Made for iPhone, iPad, iPod touch **Needs** iOS 13.0 or later



If you use Twitter a lot, chances are you often feel overwhelmed by the experience. Its native app isn't very good at filtering out the fluff, instead preferring to throw anything and everything at you all at once. That means you could end up finding your best friend's wedding photos pushed down your timeline by tweets from that burger company you followed three years ago just to get free vouchers. It's hardly ideal.

Nighthawk exists to make Twitter a bit more bearable and, well, human. There's a tab at the bottom of the app for "Close Friends". Pick a handful of your best buds and this tab will be populated with their tweets and nothing else, letting you focus on the people who matter to you, with all of the unwanted cruft filtered out.

Speaking of filters, Nighthawk comes with several options to cut

down on unwelcome content. Whether that's movie spoilers, foreign politics or customer care queries, Nighthawk does an admirable job of cleaning up your timeline. You can even ban retweets to let you see original content only.

That said, the app has its limitations, some of which are quite jarring. There's no way to search for Twitter accounts, meaning you can't follow anyone who you didn't already follow when you first loaded the app, or even view their tweets. You also can't switch accounts on the fly, making the app very restrictive if you manage more than one Twitter page.

And while you can send new tweets (and have the app check them for typos and "spicy" content that you might regret posting), you can't add images, videos or other content to your tweets — it's strictly a text-only affair. While the developer says these features are coming soon, the app in its current state is sorely missing them; it's another limitation that impacts Nighthawk's usefulness.

These restrictions mean it isn't ready to replace the native Twitter app or third-party rivals like Tweetbot. Instead, it's forced to act



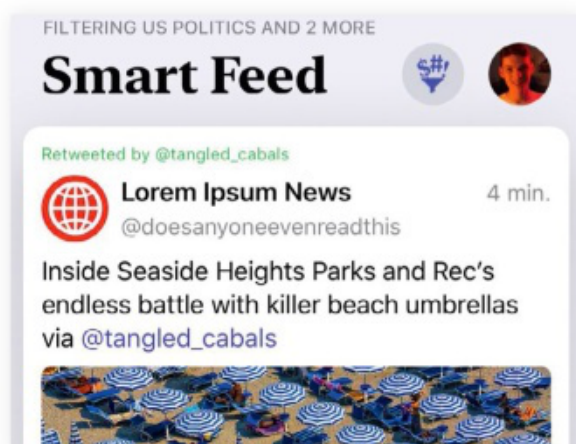
as an extra app you use if you want a bit more peace and quiet while browsing Twitter. That's admirable, but requiring users to switch between Nighthawk and other Twitter apps depending on what features they want is a tough sell.

THE BOTTOM LINE. Great at filtering junk, but at present it lacks some key features. **ALEX BLAKE**

NIGHTHAWK FOR TWITTER

- Creates a more focused Twitter experience
- Lots of customization options and tweet filters
- Can't follow accounts or manage followers yet
- One account only

SOLID ■■■■■



A few filters will turn your timeline into a "Smart Feed".

Calory

Quickly count your calories

Free (IAPs) From Funn Media, calory.app

Made for iPhone, iPad, iPod touch, Apple Watch **Needs** iOS 11.0 and watchOS 5.0 or later



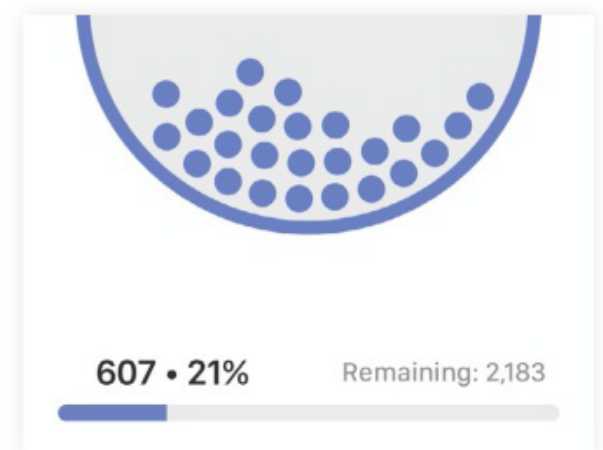
Calory is designed to make it quick to enter your calorie intake for each meal, helping you log your calories and eat more healthily. Its homepage shows a circle that gradually fills as you approach 100% of your daily intake, giving you an at-a-glance view of how you're doing.

There's a vast library of meals and ingredients, each with calorie intake noted. You can specify the serving size from a handful of default options, but you can only add custom serving sizes to some meals, which seems like an oversight.

The app's most useful feature is its History section, allowing you to see your

intake by week, month, or year. You can also view your weight gained or lost on a graph; you can enter your weight manually, or the app can use Apple Health data to calculate it for you. That tie-in is a great addition, particularly if you track your fitness with an Apple Watch. We also like Calory's option to set your own custom Siri Shortcuts from within the app.

Premium features include a handy Today widget, a larger food database, plus water and nutrient tracking. The base app has enough to help you improve your diet, but the premium features are certainly worth considering.



Entering a new meal and viewing your progress is fast and straightforward.

We wish it made better use of color: its two-tone screen makes it hard to pick out details and some judicious highlights could've helped. It's a minor hitch, though, compared to the app's benefits.

THE BOTTOM LINE. A good app with well-thought-out features, but it needs some extra polish. **ALEX BLAKE**

GREAT ■■■■■

Song of Bloom

An art game that blossoms

\$1.99 From Philipp Stollenmayer, kamibox.de/songofbloom

Made for iPhone, iPad, iPod touch **Needs** iOS 8.0 or later



One of the best games in the early days of the iPhone was *Eliss*. An artistic multi-touch delight, it showcased that not everything had been done in the world of gaming. A decade later, *Song of Bloom* confidently demonstrates that's still very much the case.

Ultimately a puzzle game, *Song of Bloom* also feels every inch an art piece. Whether or not you believe games can be art, you'll be left in no doubt that *Song of Bloom* is artistic in nature, and has great artistry within its range of tactile vignettes, which beg you to experiment and play with them.

Progress happens by performing specific actions at precise moments. In the animated looping narrative sketches that begin each turn, drawing a shape in the right place is enough to access a new scene. But when you're immersed within that scene, you'll sometimes need to interact with your device in ways that games don't usually demand.

All of which probably sounds a bit vague, but *Song of Bloom* is a better experience when it retains the capacity to surprise. Also, while it's unique, clever, and sometimes demands somewhat obscure solutions, regular hints are provided to help you.



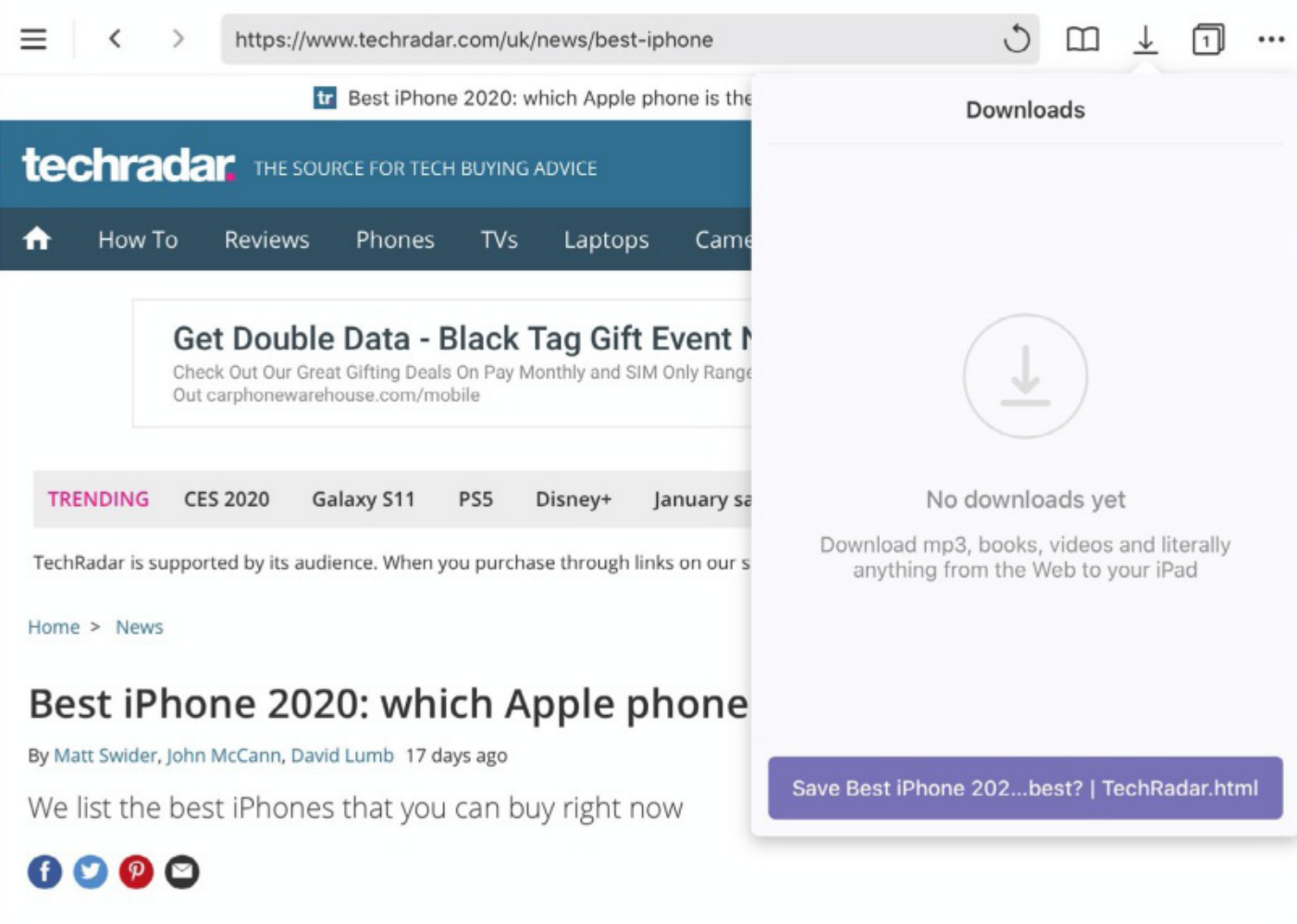
Probably don't do this kind of thing in an actual gallery – they won't like it.

Short of getting stuck, chances are an hour in and you'll be done. But if you want something more than another me-too match-three, this is a superb addition.

THE BOTTOM LINE. Unconventional and beguiling, *Song of Bloom* shows games can still say something new.

CRAIG GRANNELL

AWESOME ■■■■■



Version 7 features an improved web browser with private browsing and the ability to download files.

and view Word and Excel documents. Files can be tagged and marked as favorites. But tag support is limited to colors — you can't create your own named tags. And we couldn't find any way to view all the files tagged with a color. Our only other, minor, criticism is that while the Files app (which opens inside Documents) and Photos albums are available from the main screen, to see files stored on a cloud service or server, you need to tap "Connections" then the name of the service. We would like to be able to add them to the main screen.

Other than that, it works very well. The web browser with its ability to download files is great, as is Wi-Fi Transfer. The new "+" button makes creating folders and importing files easy. It's free, but if you want to sign or edit PDFs from within the app you'll need the \$49.99 IAP.

THE BOTTOM LINE. Does much of what the Files app does but offers the ability to share files with PC users and download them from the web.

KENNY HEMPHILL

DOCUMENTS 7

- + Improved web browser
- + Can share files with a computer
- + Can connect to Sharepoint
- + Tagging support could be improved

GREAT ■■■■■

Documents 7

iOS Files app not enough? Try this...

Free (IAPs) From Readdle, readdle.com

Made for iPhone, iPad, iPod touch **Needs** iOS 10.11 or later

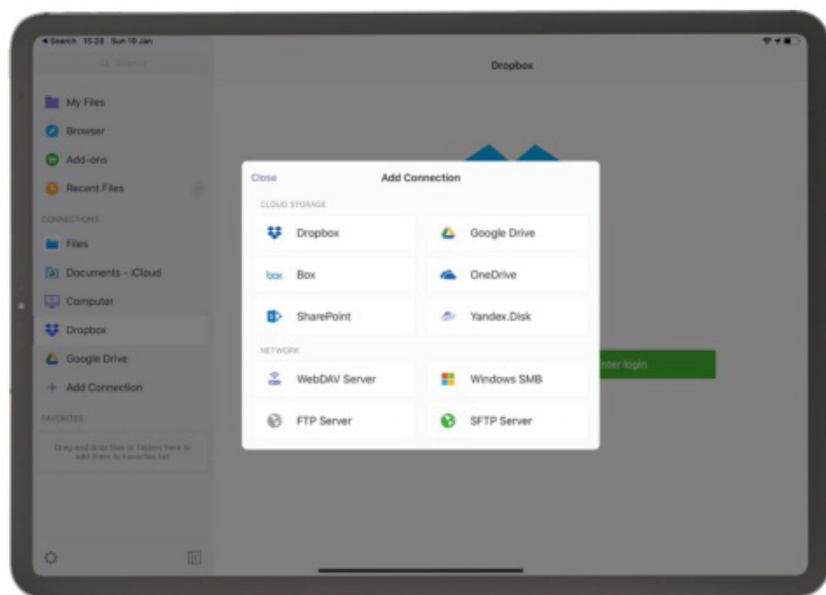


Documents allows you to access files on several different services, including Microsoft Sharepoint.

Documents began life as a handy way to share all your files between apps on an iPhone or iPad. A decade or so later, it's evolved into a lot more than that and offers quite a bit more than Apple's own files app, so it's worth checking out.

New in version 7 are an improved web browser that supports private browsing, integration with the Files app so you can open files from Apple's app in Documents, a Dark mode, and the ability to mark up images and annotate PDFs. Also new is a big "+" button at the bottom right of the screen. Tap it and you can create a new folder, text file, or PDF. Or you can import photos from the Photos app, files from Files, or transfer files from a Mac or PC using Documents Wi-Fi Transfer tool. The "+" button also lets you add cloud storage services like Google Drive and Dropbox to Documents. The app can also connect to SFTP, SMB, WebDAV, and even Sharepoint.

You can also watch movies, listen to music, and view photos, as well as open zip files



Planny 3

The do-anything life organizer

Free (IAPs) From Kevin Reutter, kevinreutter.de

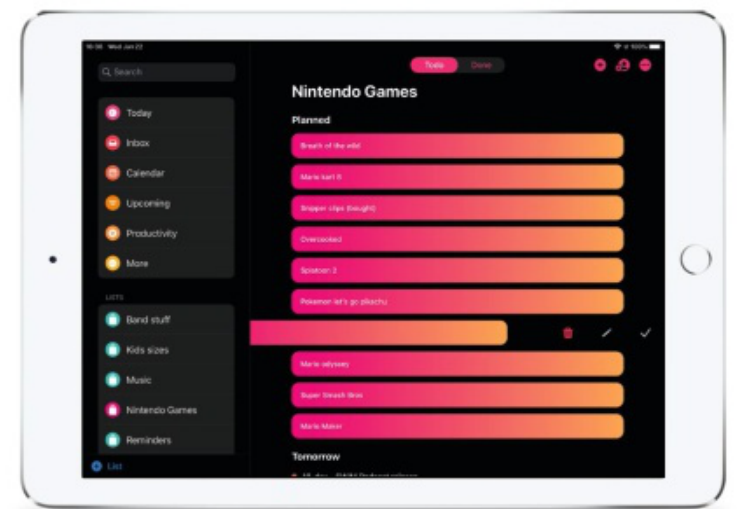
Made for iPad, iPhone, iPod touch **Needs** iPadOS 13.0 or later



Planny is designed to organize your life by combining your calendar, reminders, notes and to-do lists in one app. Version 3 adds support for Dark Mode, new Siri Shortcuts, and document scanning; and on iPad you get multi-space and multi-window support. It also introduces a long-press contextual menu for easier organization, the ability to create subtasks underneath individual tasks and integration with Apple's Game Center so you can compare your productivity rankings and achievements with friends or colleagues.

To get the most from it you'll need a subscription to unlock the Calendar view, location-based reminders, iCloud sync and backup, FaceID unlocking, sketching, printing and tagging, and the teamwork collaboration features. The iCloud sync is particularly useful as Planny is also available for your Mac and Apple Watch.

You can create lists, events with deadlines, and tags. Planny can identify tasks that you might want to add to your daily plan and remind you if you're going to miss a deadline. It also offers gamification in the form of productivity ratings: the



more deadlines you meet or tasks you complete the more points you earn, with points deducted if you don't do them or reschedule them.

We encountered some issues. The interface is a bit confusing: for example it's not obvious where you would create new tags, and setting recurring events isn't done in the Calendar section where you'd expect but in a separate part called Routines. We also encountered interface bugs (version 3.2.2 on iPadOS 13.1): significant delays between selecting a section and Planny switching to it, and some buttons that didn't respond. The developer issues updates regularly so we're sure these will be fixed, but they take the shine off an otherwise impressive app.

THE BOTTOM LINE. Planny 3 combines your to-dos, notes and events very well, but it's a little buggy.

CARRIE MARSHALL

PLANNY 3

- ➕ Everything in one place
- ➕ Mac and Watch companions
- ➖ Can be a little confusing
- ➖ Some bugs

GREAT ■ ■ ■ ■ ■

It's great in Dark Mode. You can choose more sober colors if you prefer.

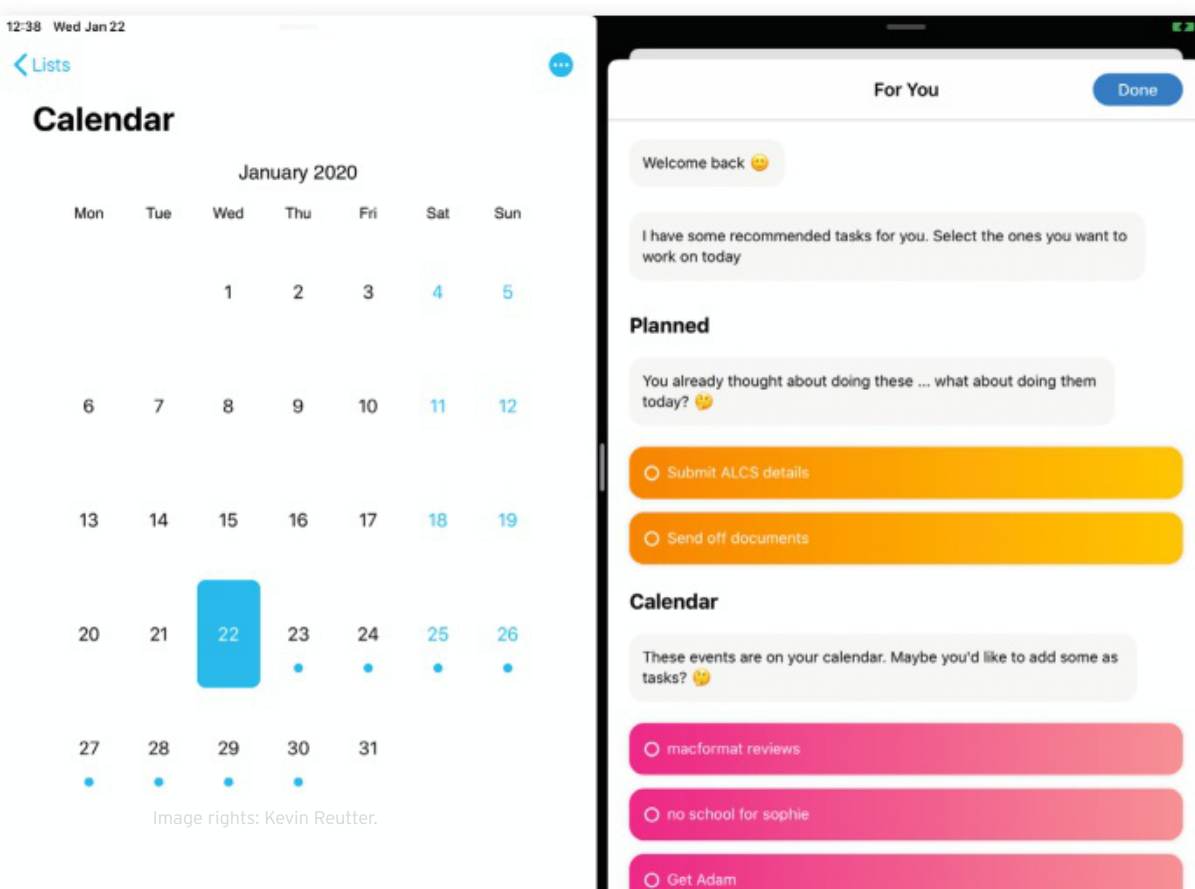


Image rights: Kevin Reutter.

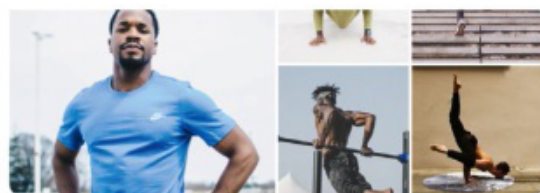
ROUNDUP

6 apps to improve your home

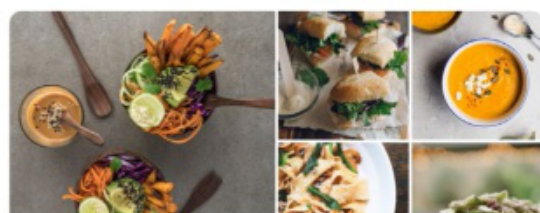
Your iPhone or iPad can be an invaluable tool for remodelling

Ever since the days of CAD, computers have been a useful helper for renovating your home. In the last few years, things have taken a real step up, though (and we don't just mean because we had some new stairs put in). The arrival of augmented reality (AR) apps, which can basically overlay virtual objects onto video streams of

the real world, means you can now alter your home without actually touching a thing. You can try new furniture and then just magic it away, or create a layout of your home by scanning its walls. Forget "measure twice, cut once" — now you can triple check what you're doing before you even get your coveralls on.

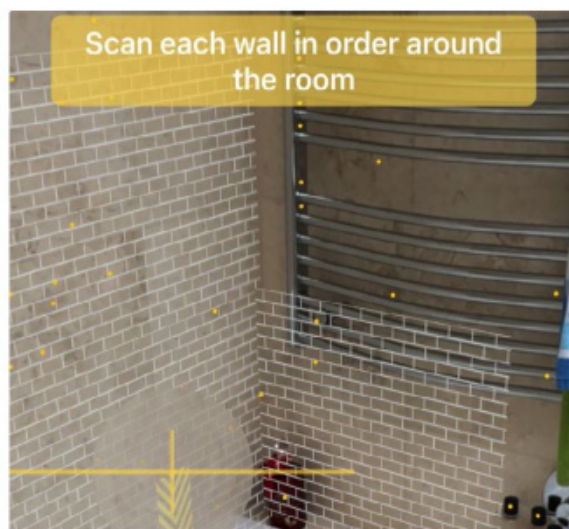


Bodyweight workouts
Just now!



 **PINTEREST**
Free Made for iPhone, iPad, iPod touch

Step 1: inspiration. Maybe you already know what you have in mind for your home, or maybe you just know it's time for an unspecified change. Pinterest is a place where you can collect images you've snapped or seen online of furniture or looks you like. You can also browse other people's collections, giving you a library of new ideas in one app.



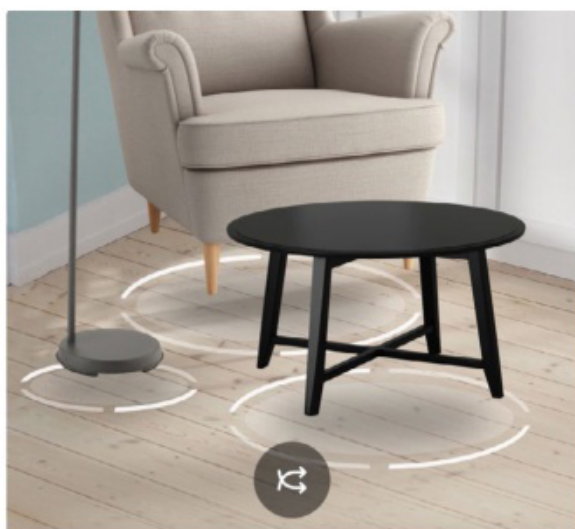
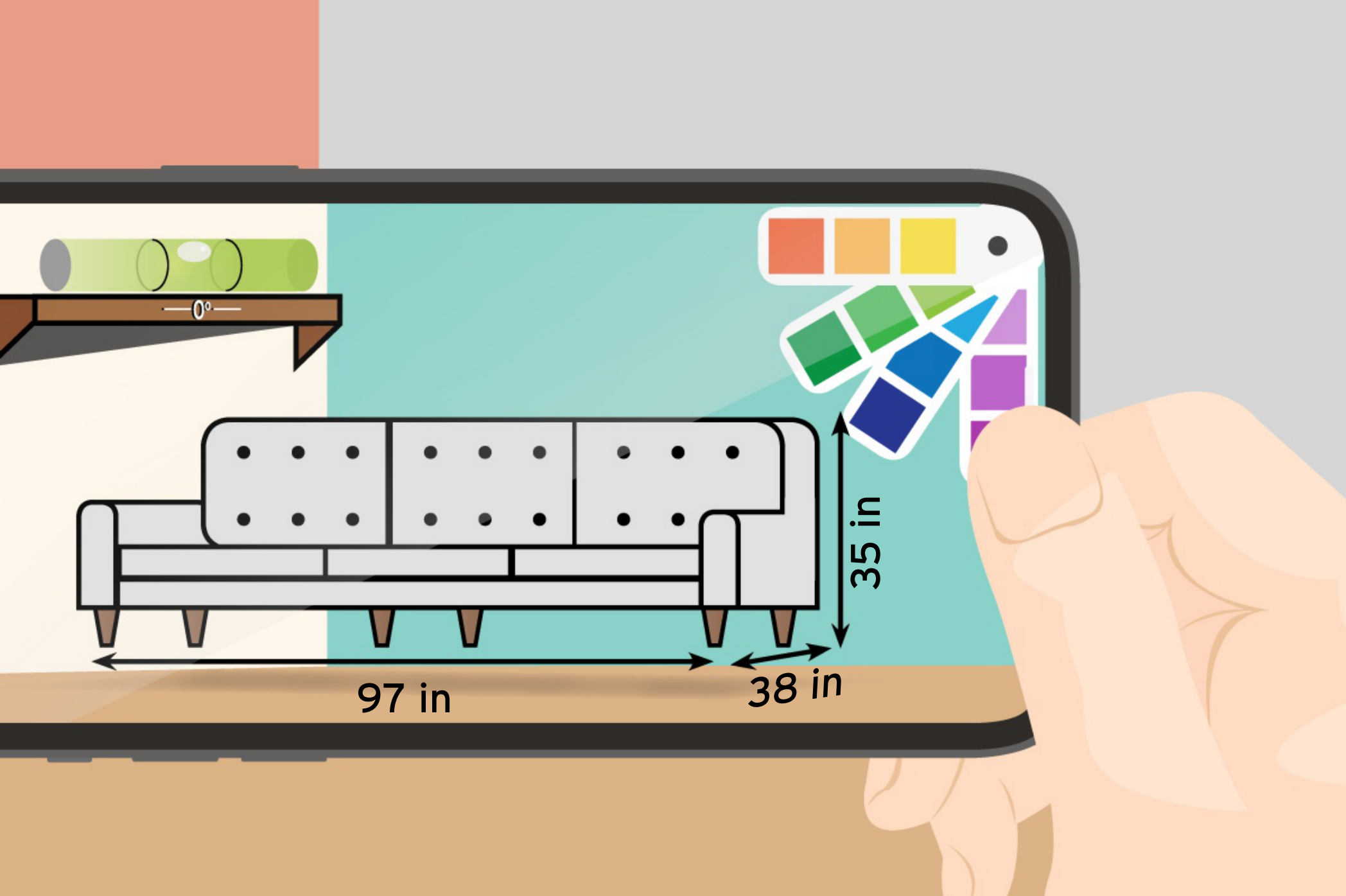
 **ROOMSCAN PRO – FLOOR PLAN APP**
Free (IAPs) Made for iPhone, iPad, iPod touch

This offers multiple ways to create a floor plan. You can scan in augmented reality, touch the phone to walls to mark their location, or even integrate it with laser measurers. You get a plan at the end, which you can then sketch over. You can even create 3D models. The plans can be exported too, to share with contractors.



 **PLANNER 5D – INTERIOR DESIGN**
Free (IAPs) Made for iPhone, iPad, iPod touch

In this app, you can fill a 3D model of your house with furniture, which can be customized so you can get it all as close to reality as possible, then see if it feels too crowded by exploring in augmented reality. It's not all about 3D though – you can get a handy 2D top-down view (with furniture locations) to share.



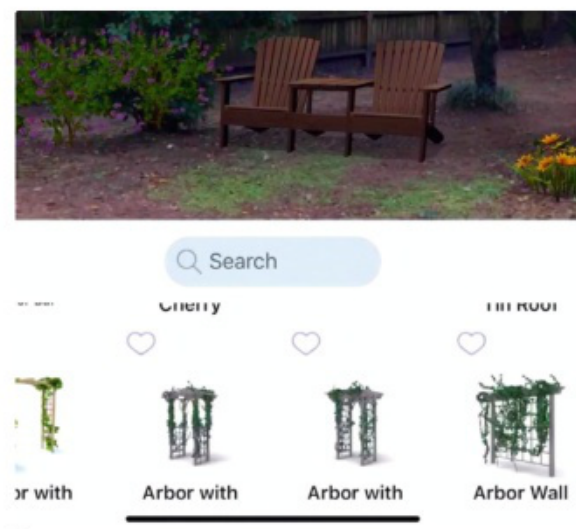
IKEA PLACE
Free Made for iPhone, iPad, iPod touch

Planner 5D shows you what hypothetical furniture looks like in a model of your home. Ikea's app uses AR to put its products into your house, live on your camera. Even if you don't want an Ikea product, it's still useful for seeing if a chair in that color really works in that corner. You can put lots of stuff to each room to see what a big change would be like.



PAINT TESTER
Free (IAPs) Made for iPhone, iPad, iPod touch

Paint Tester is another app that helps you test changes on your real home, rather than a model. You take a picture of the room you want to paint, then choose a color (from its range, or from a photo you've taken, so you can try store paint swatches), then you can magically swap the walls in the photo for the new color you've chosen.



iSCAPE
Free (IAPs) Made for iPhone, iPad, iPod touch

AR isn't just for indoors: use this app to rethink your yard. Add flowers, trees or furniture, lay down paving, add a trellis, even create terraced layers of plants... and then walk around your new garden, with your phone showing how it'll look from every angle. You can then share these plans with professionals, or just store them for your own reference.



Best of the best

Can't find the hardware or app you're looking for in our reviews section? Then check in here – we've highlighted the best in every major category, as voted for by us

> HARDWARE				
CATEGORY	PRODUCT	WEB	PRICE	FEATURES
MESH ROUTER	Zxyl Multy U	zxyl.com	\$269.99	AC2100, 3 nodes, tri-band, MU-MIMO
PORTABLE BATTERY	Powerstation USB-C XXL	mophie.com	\$149.95	19,500mAh, USB-C and USB-A ports
THUNDERBOLT 3 DOCK	CalDigit TS3 Plus	caldigit.com	\$309.99	15 ports, 85W power supply to MacBook
MIRRORLESS CAMERA	Fujifilm X-A7	fujifilm.com	\$699	24.24MP APS-C sensor, 4K/30fps video
PRINTER	Epson Expression Photo HD	epson.com	\$349.99	Wide-format, wireless printing, 200 capacity
EXTERNAL STORAGE DRIVE	G-Drive mobile Pro SSD	g-technology.com	\$399.95	500GB/1TB, shock protection, TS3 port
NAS DEVICE	WD My Cloud Pro PR2100	wdc.com	\$399.99	Up to 20TB, 4GB RAM, 2x Gigabit Ethernet
Qi CHARGER	Moshi Porto Q 5K	moshi.com	\$84.95	5000mAh battery built-in, 5W charging
ON/OVER EAR HEADPHONES	Bose NC700	bose.com	\$399.95	10 noise-cancelling steps, 20 hours battery
IN-EAR HEADPHONES	M&D MW07 Plus	masterdynamic.com	\$299	Noise-cancelling, wireless charging case
SMART SECURITY CAMERA	Reolink Argus 2	reolink.com	\$129.99	Rechargeable battery, wire-free, night vision
PORTABLE SPEAKER	Anker Soundcore Flare	soundcore.com	\$59.99	360-degree sound, IPX7 waterproofing
21.5-INCH MONITOR	Dell P2219HC	dell.com	\$149.99	1920x1080, IPS, HDMI, 2x DisplayPort, USB-C

> iOS APPS

CATEGORY	PRODUCT	WEB	PRICE	NEEDS
TO DO (PRODUCTIVITY)	 Things 3	culturedcode.com	\$9.99	iOS 10 or later
WRITING	 Scrivener	literatureandlatte.com	\$19.99	iOS 9 or later
EMAIL	 Spark	sparkmailapp.com	Free	iOS 10 or later
PHOTO EDITOR	 Pixelmator for iPad	pixelmator.com	\$4.99	iOS 11 or later
VIDEO EDITOR	 LumaFusion 2.0	luma-touch.com	\$14.99	iOS 11 or later
CAMERA	 Camera+ 2	camera.plus	\$2.99	iOS 11 or later
MUSIC CREATION	 GarageBand	apple.com	Free	iOS 11.4 or later
IDEAS ORGANIZER	 OmniOutliner3	omnigroup.com	Free (IAPs)	iOS 11.2 or later
NOTE-TAKING	 Whink	whinkapp.com	\$4.99	iOS 10 or later
MIND-MAPPING	 MindNode 6	mindnode.com	\$14.99	iOS 11 or later
DOCUMENT SCANNER	 Prizmo 5	creaceed.com	Free (IAPs)	iOS 12.2 or later
CALENDAR	 Fantastical 2	flexibits.com	\$4.99	iOS 10 or later
WEATHER	 Carrot Weather 2	meetcarrot.com	\$4.99	iOS 11 or later

> macOS APPS

CATEGORY	PRODUCT	WEB	PRICE	NEEDS
TO DO (PRODUCTIVITY)	 Things 3	culturedcode.com	\$49.99	OS X 10.11 or later
WRITING	 Drafts 17	getdrafts.com	Free (IAPs)	macOS 10.13 or later
EMAIL	 Canary Mail 2	canarymail.io	\$19.99	OS X 10.10 or later
PHOTO EDITOR	 Affinity Photo	affinity.serif.com	\$49.99	OS X 10.7 or later
VIDEO EDITOR	 Final Cut Pro	apple.com	\$299.99	macOS 10.13 or later
SCREEN CAPTURE	 ScreenFlow 8	telestream.net	\$129.00	macOS 10.12 or later
MUSIC CREATION	 Logic Pro X	apple.com	\$199.99	macOS 10.12 or later
FILE ORGANIZER	 ForkLift 3	binarynights.com	\$29.95	OS X 10.11 or later
DESKTOP PUBLISHING	 Adobe InDesign	adobe.com	\$20.99 (p/m)	macOS 10.13 or later
BACKUP	 Carbon Copy Cloner	bombich.com	\$39.99	OS X 10.10 or later
VIRTUALIZATION	 Parallels Desktop 15	parallels.com	\$79.99	macOS 10.11.5 or later
CALENDAR	 Fantastical 2	flexibits.com	\$49.99	OS X 10.11 or later
PERSONAL FINANCE	 Quicken	quicken.com	\$34.99 (1 year)	OS X 10.11 or later



HOME LIFE

BETTER LIVING THROUGH SMARTER TECHNOLOGY

> TAKE YOUR SMART HOME OFFLINE

STAY SPY-FREE

Can you cut the cord on your smart devices and control your smart home privately?

BY ALEX COX



Reader Colin Robertson recently contacted us with a concern about connectivity and oversharing. “It feels more and more like an adversarial relationship between consumers and the companies who want to spy on — I mean, serve us,” he writes. “I’m interested in the convenience of video doorbells and thermostats, but all of these solutions involve companies that want to access your data for themselves via the cloud.”

Is removing that a realistic ideal? Those who recall the first wave of X10 devices will remember the way the local smart home once operated, and that’s not something we’re looking to revisit. While it was a more private way to do things, it was plenty

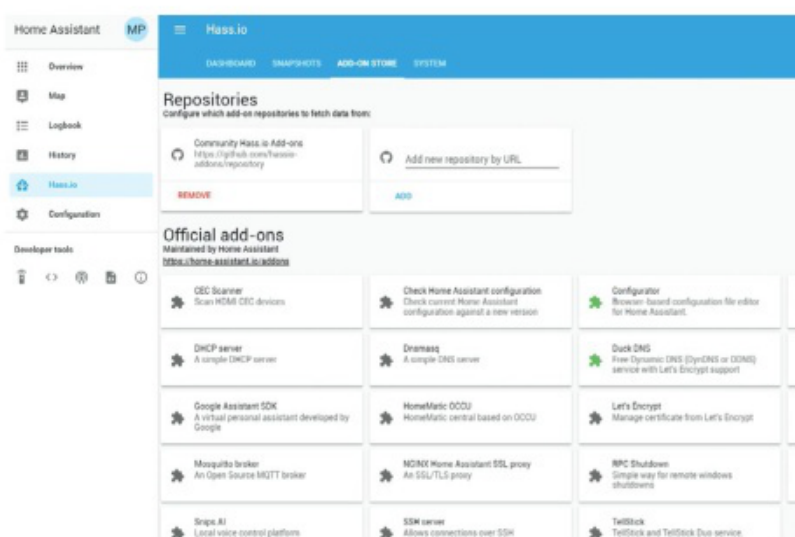
clunky; switches and relays forced to carry massive antennae, only the most simplistic operations available, limited central processing that forced you to keep a noisy computer running at all times — it was the convenience and power of the smartphone and the cloud that pulled smart devices out of the doldrums and made them mean something.

GO LOCAL

So is it possible to run a local, or at least private, smart home without losing those modern conveniences? We immediately run into a few big problems with data (see Data gone wild, page 72) and with the core nature of smart home devices: many, if not most of them, are tied inexorably to the cloud. Control passes almost immediately from a typical smart device to a server online, where it’s acted upon and a message is bounced back to, say, your phone to offer an alert, or to another device to tell it to switch on or change a parameter.

More complex kit relies on much of its smart functionality being offloaded elsewhere. A wireless camera that can recognize faces, for example, likely won’t have the capability built into its hardware — the face is actually recognized in a server farm, because it’s a computationally expensive task.

To really pull this off, we’ll need to bring that processing in-house. That means dropping most wireless smart devices — a proper power supply offers more opportunities for internal processing without the battery running flat in a few seconds



Home Assistant gives you extendable, fine-tuned smart home control, though it can be a little obtuse.

Employing HomeKit is a good way to keep your devices contained – Eve's Thermo offers zoned heat control.

Offline-happy cameras



EUFYCAM E

\$299.99 (two cameras) eufylife.com

Eufy's wireless cams connect to a base station which stores recordings on an SD card, so you don't have to download footage. Not the cheapest solution, but neat if you're looking for a powerful camera without a cloud connection.



WYZE CAM V2

\$19.99 wyze.com

For in-home security, the low price of the Wyze Cam makes covering your whole home cost-effective. You can't use features like Family Sharing without the cloud, but that's probably a positive if you find that kind of thing unsettling.

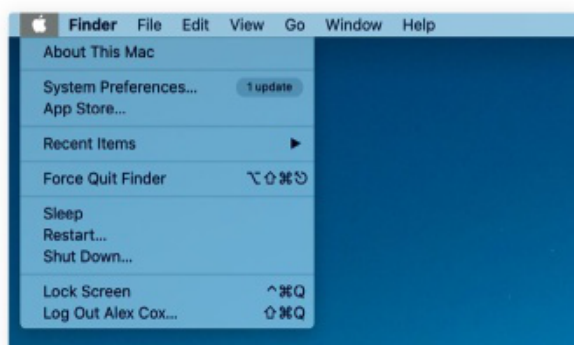


SWANN SMART WIRELESS INDOOR/OUTDOOR CAMERA

\$119.99 swann.com

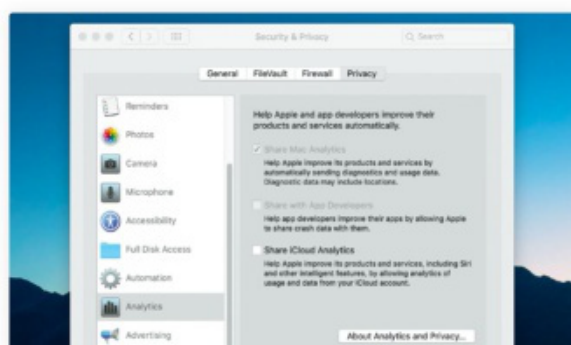
A versatile camera with a 120° field of view, great night vision, and a magnetic mount that makes it quick to remove if you want to get to recordings stored on its internal memory. Fully weatherproof, too, so perfect for outdoor use.

HOW TO Make your Mac more private



Find the setting

Want to reduce the amount of data you send to Apple? Open System Preferences by clicking the Apple icon on the title bar and selecting (yes) System Preferences. You've done this before. Then head to the Security & Privacy section.



Cut it off

Make sure the Privacy tab is open, click the lock icon in the bottom left, and enter your password. Now switch everything off. You may also wish to restrict Siri's field of knowledge, so head back to the Siri section of system preferences.



Managing Siri

You can switch off Ask Siri altogether with the check box, but you can also control which applications the assistant pokes its nose into. Click Siri Suggestions & Privacy and deselect any apps whose data you'd rather keep private.



Zigbee hub Mixtile is in short supply so far, having just finished a successful crowdfunding campaign.

— and making some sacrifices. Not as many, perhaps, as you might expect; some smart hubs work hard for themselves. Amazon Echos above the Dot, Google devices beyond the Home Mini, and the HomePod (or iPad) can perform some processing without the cloud. The latter — the HomeKit enabler — does even more.

The heavy lifting the HomePod performs means HomeKit devices don't require their own internet connection, just a local one. It's one of the things that makes HomeKit a uniquely low-power protocol, one which tends to pool those smart

home devices more into the domain of the home, but one that doesn't actually solve our problem — that HomePod is still chatting online.

GOOD CHOICES

If you're happy to lose at least some functionality, there are ways to keep your data away from the cloud. When buying devices, look for a Bluetooth connection, or a non-Wi-Fi wireless protocol — look for Zigbee, Z-wave, Caseta or Radio RA2. These devices don't explicitly need a connection to the internet, but they do generally need to be controlled from a hub of

some kind that may or may not require a connection of its own.

Primary choice for disconnected hubs seems to be the Hubitat Elevation (\$80), which is designed to be a local-only device, focusing on functions which don't need to go through the cloud, like switching on lights. It's compatible with Zigbee and Z-wave devices, and requires that you attach it to the internet initially to activate it — after that, in local-only mode, you can use it to set up the kind of complex rules that you might have built in the Alexa, Google Home, or Apple Home apps.

The Hubitat is also compatible with those super-cheap Yeelight bulbs from Xiaomi — reassuring if you're not trusting of their Chinese origins and want to contain what little data they might be passing around. For a similar alternative, the Mixtile Hub (around \$149) boasts of being cloud-free and even includes (limited) voice actuation facilities.

OTHER OPTIONS

If you're comfortable with at least a little cloud communication, the Homey (\$299) is a good choice since

it offers control of a wider range of devices. Parent company Athom states: “Only the things that are absolutely necessary for Homey to communicate with the outside world are stored in the cloud.” It maintains that “most of your personal data is stored locally; account information, your devices”. Admittedly, that’s probably more than you’d be willing to give up if you were hunting for a truly cloud-free solution, however private the Homey’s storage procedure may be, but it does mean more complex wireless devices can find a place in your smart home.

You could, if you were confident, dig deep into your router’s inner workings and block connections to and from suspect servers while watching which functionality breaks; you might also want to set something like PiHole running between your home hardware and your ISP’s DNS server to filter out unwanted trackers.

Consider Home Assistant, which you can download from hass.io and install onto a platform like a Raspberry Pi. It’s a complete smart home control platform, free to use, and while it does demand some technical tinkering, it’s the platform that many swear by. One neat side-effect is that it’ll allow you to jump

Data gone wild

Your data is one of the most valuable assets any company holds. The adage goes that when a product is free, you are the product: Facebook, Google, et al make money from the contents of their data centres. While in theory nothing stored should ever link your personal info with your actions, you’re forced to trust the collecting company to look after data. Smart home manufacturers couldn’t produce the products they do without using that data, whether it’s metrics about product use or voice recordings that help to refine the abilities of smart assistants. Many of us don’t care, and why should we? Handling of that data, in theory stored securely and used to make our experience better, is the price of a connected home. So what’s the problem, beyond the thought of it making us uncomfortable? It’s the small print. A dive into Amazon-owned camera-maker Ring’s terms of service, to give an



Ring’s terms of service highlight the problems surrounding data protection.

example, is sobering. “You give Ring the right, without any compensation or obligation to you, to access and use your content,” reads one passage. That’s not just fuzzy data: in Ring’s case, it’s likely to be video footage of your family. Ring’s recent public security issues seem to stem from poorly secured user accounts. We, at the end of the chain, are equally responsible for locking down our data as the companies we put our trust in. That means keeping up with security patches, using strong unique passwords, and taking advantage of two-factor authentication if at all possible.



Athom’s Homey looks like it came from another planet, but it’ll keep your smart home interactions down to earth.

in and access things from afar without any cloud connectivity — you can go straight through your router if you’re comfortable setting up a tool like OpenVPN. See also systems like the Mac-specific but paid-for Indigo (indigodomo.com) or perhaps Domoticz (domoticz.com), which may suit you better — it pays to put in the effort to take control.

INCREASING COMPLEXITY

Let’s finish off talking about those specific-use cases our reader mentioned. There’s no reason for a smart thermostat to explicitly require an internet connection, and

there are indeed a few (outside of the major examples) that can run local-only. Shop around and you may be able to find an older Z-wave thermostat from the Radio Thermostat Company of America, though these (particularly the CT100 Plus model, which is just about ideal) can be hard to come by.

When it comes to a video doorbell, you’re pretty much out of luck — but there are, as shown in the “Offline-happy cameras box” on page 71, a few smart cameras that can be pulled back to local-only recording if you’re happy to climb a ladder to remove the internal SD card.



ASK

TECH SUPPORT & TECHSPLANATIONS

Email Mac|Life at ask@maclife.com

Hot topics right now

Make sure you check out these important support articles on Apple's website to better understand the latest features.

ADD SOME REAL MUSCLE TO YOUR MAC

The Blackmagic eGPU are external graphics processors that give your Mac more graphics processing power, which is good for things like gaming, video processing, and more. To find out how to use one on your Mac, go to bit.ly/ml165ask1.

CAN'T CONNECT TO THE APP STORE?

There are usually a number of simple reasons why you can't browse the App Store or another of Apple's services. Here's what to do if it happens to you: bit.ly/ml165ask2.

HOW TO FIND YOUR IOS DEVICE BACKUPS

To locate and manage backups for your iPhone, iPad or iPod touch on a Mac, PC or iOS device, check out this article: bit.ly/ml165ask3.

➤ Preserving your old Time Machine backups in Catalina

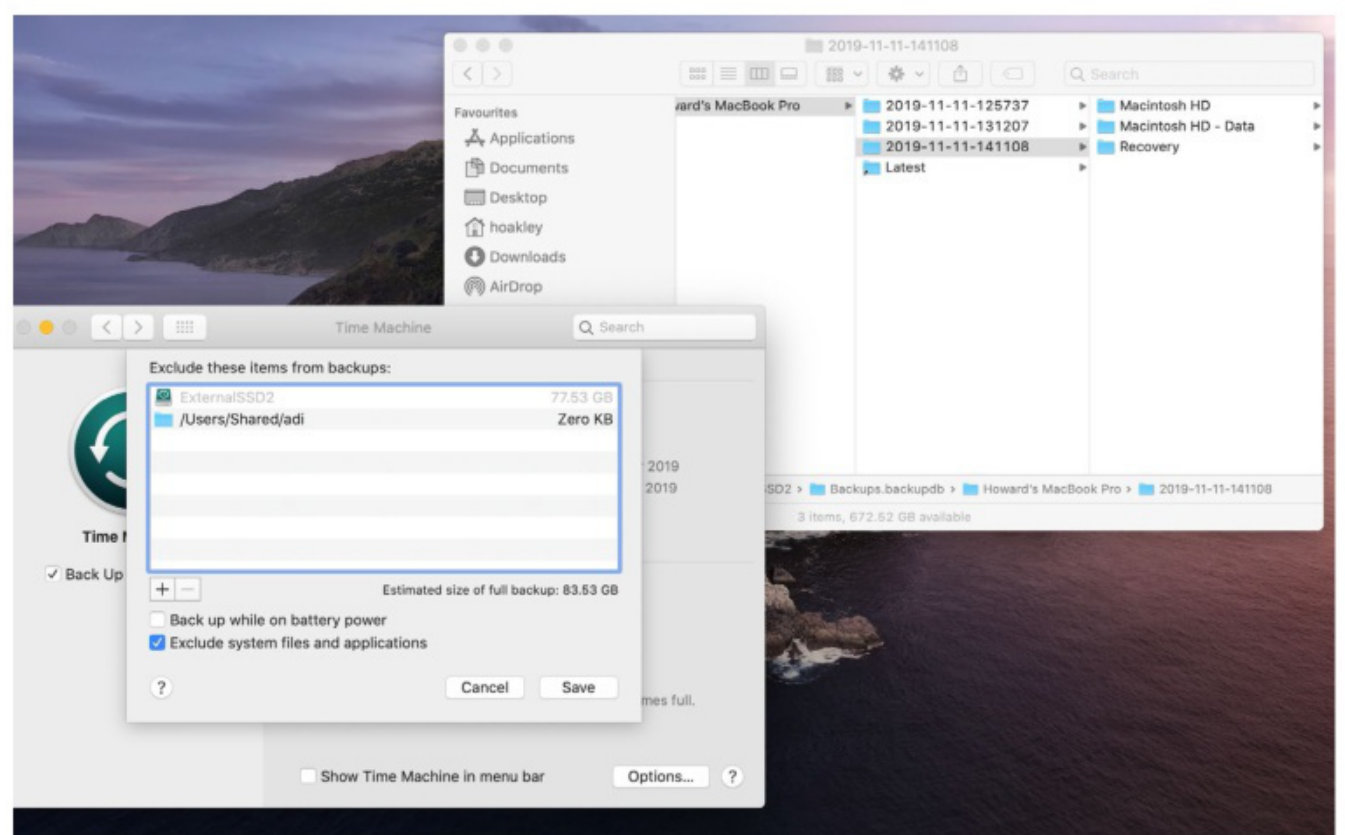
I'm preparing to upgrade to macOS Catalina, but gather it upgrades Time Machine backups so they can't be accessed from older versions of macOS. How can I prevent that?

Time Machine backups have changed in Catalina, and Apple warns users that all backups made by, and converted for, 10.15 won't work with previous versions of macOS, even Mojave...

This is partly because, in Catalina, backups contain three volumes instead of the single boot volume: one for the writable Data volume, another for the read-only System volume unless you decide not to back that up, and a third for Recovery, which is normally invisible as it's not mounted. In addition to this, Catalina uses different methods to determine what it should back up. These include using snapshots when backing up an

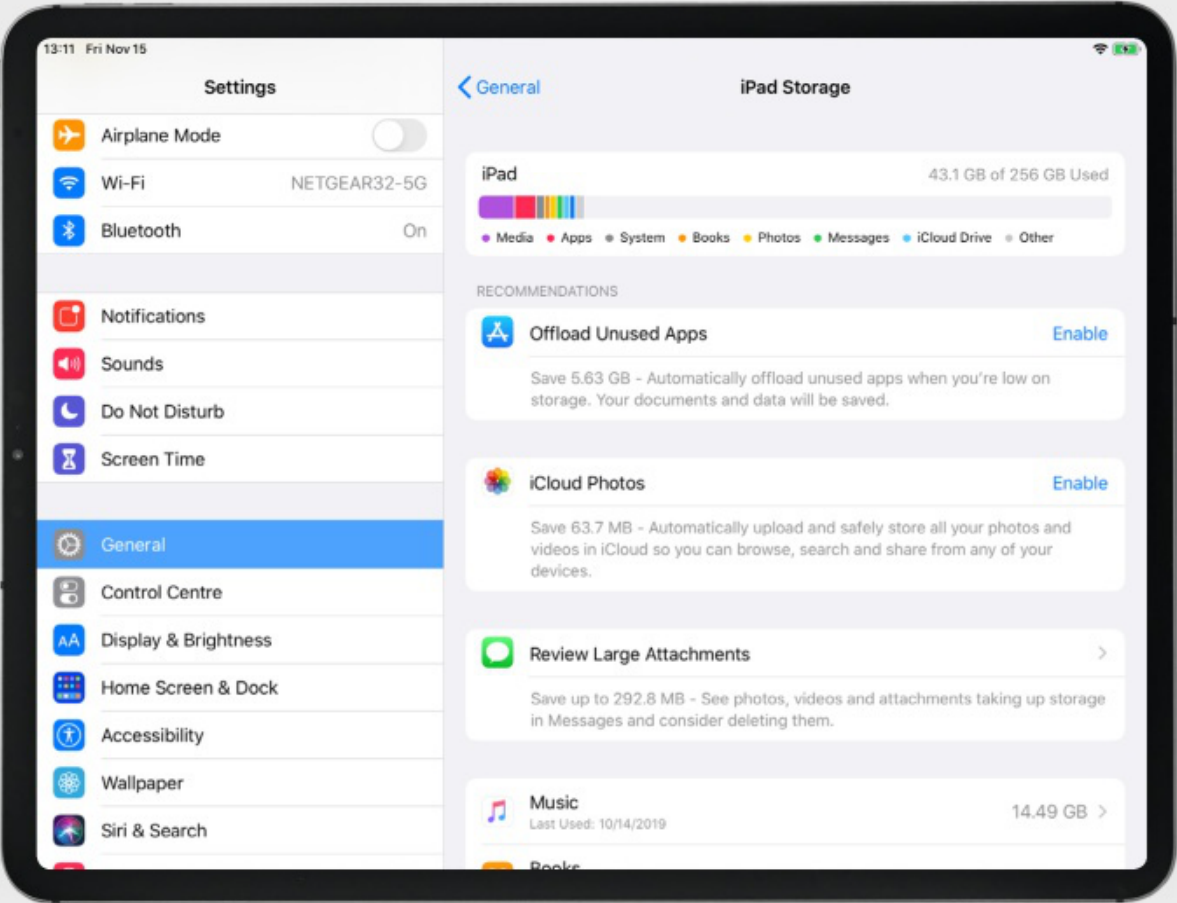
APFS volume, with the option of using macOS's internal database of changes made to the file system, on both APFS and those still in older Mac Extended format. Those are put in new database files in the backup, which won't work with older versions of Time Machine.

To retain your existing backups unaltered, before upgrading to macOS Catalina, make good backups in case you need to revert to them. Turn Time Machine off, and then archive your existing backups. After the upgrade is complete, turn Time Machine back on, and make a new backup set, ideally to a different volume or disk.



Before you make the leap to Catalina, make sure you turn off Time Machine to archive your existing backups.

Get official documentation at support.apple.com | Get help with hardware at support.apple.com/repair



iPad/iPhone Storage offers recommendations which can quickly and simply free up storage for you.

➤ System stealing iPad storage

When I updated my iPad 2 16GB, it alerted me that it was almost full. Most of its storage is now used by the System. I originally bought it as a book reader, but have added apps since. What can I do?

This is a well-known problem when keeping older devices with their smaller storage capacities up to date with the latest iOS/iPadOS they can run.

Offload as much as you can in the way of apps, their data, and everything else stored on your iPad. Revert it to its original role as a book reader, and keep only essential functions and features. An excellent starting point is in Settings > General > iPad/iPhone Storage.

At the top are recommendations to save significant space which work with just a single tap. Below those is a list of all installed apps with the storage space they're currently using. Starting at the top, with the apps which are

using most space, tap each in turn and consider what you need to keep.

When you've done that, you may still be able to eke out more space by backing your iPad up, either to iCloud or your Mac, then erasing it using Settings > General > Reset > Erase All Content and Settings.

Once complete, to restore it from iCloud, turn it on and follow its onscreen setup sequence until it reaches the Apps & Data screen, where you select the iCloud Backup option. Restoring from your Mac backup is performed by connecting it to your Mac, then either using iTunes or the Finder (Catalina) to Restore Backup.

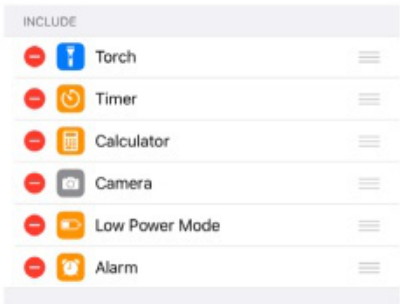
Quick-fire questions & answers

HOW TO OPEN A .DOCX FILE IN FILES USING PAGES?

Although Word .docx files preview properly in Files, iPadOS doesn't have options to choose which app to open them with; tapping Open may use an inappropriate app. However, you can open them from within the Pages app. This is a current limitation of iPadOS compared with macOS.

HOW TO MAKE IT EASIER TO ENABLE LOW-POWER MODE?

The easiest access to controls like this is in the Control Centre, which you can access by swiping down from the top right of your screen. To add Low Power Mode to Control Centre, open Settings, tap Control Centre > Customize Controls then tap on the green + next to Low Power Mode.

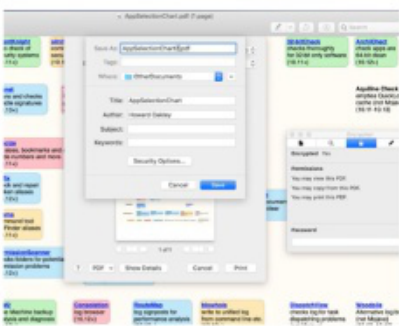


IS THERE A HUB WITH THREE USB-C PORTS YET?

Yes, but it comes with a “free” built-in LG UltraFine 4K display. That offers one additional Thunderbolt 3 port, and three USB-C. Smaller hubs are becoming available now: Belkin promises one with two USB-C ports, and more may come in the future.

HOW TO PRINT A PDF WHICH WON'T IN ADOBE READER?

Open it using Preview, or another PDF reader, and print it from there. If it still won't oblige, save it as a different file, and try printing that. If that doesn't work, printing could be disabled for that PDF, or it could be defective or damaged, and you should obtain a substitute if you can.



Mozilla Firefox lets you install your own trusted certificates in its Preferences.

> Security problems with printer

Whenever I connect to my networked HP 7740 printer using Safari, I get a warning that “This Connection Is Not Private” and am advised that I “should go back to the previous page”. Why, and how can I stop this?

This is unusual for a peripheral like a printer, and is the result of the printer's firmware not fully implementing secure networking connections using HTTPS. Safari and most other web browsers now insist that secure network connections are made using recent versions of Transport Layer Security (TLS), and with valid security certificates which can be traced back to a Certificate Authority. This is to protect you, and applies equally well whether the other end of the connection is a printer a couple of metres away, as in your case, or a server in California.

Your printer tries to negotiate its secure connections using a self-signed security

certificate, which is easily forged or cheated. All good browsers should now draw attention to this, and recommend you don't trust it. Some browsers let you ignore this, but that's increasingly dangerous because of the growth in sites that exploit such weaknesses.

Open the printer's settings and switch from using secure HTTPS connections to unsecured HTTP. Those don't rely on security certificates, and aren't encrypted either, so should be fine for local connections within your network. You wouldn't then want to connect to that printer from the internet, although you shouldn't do that without going through VPN to your router anyway.

> Vanishing pointer after update

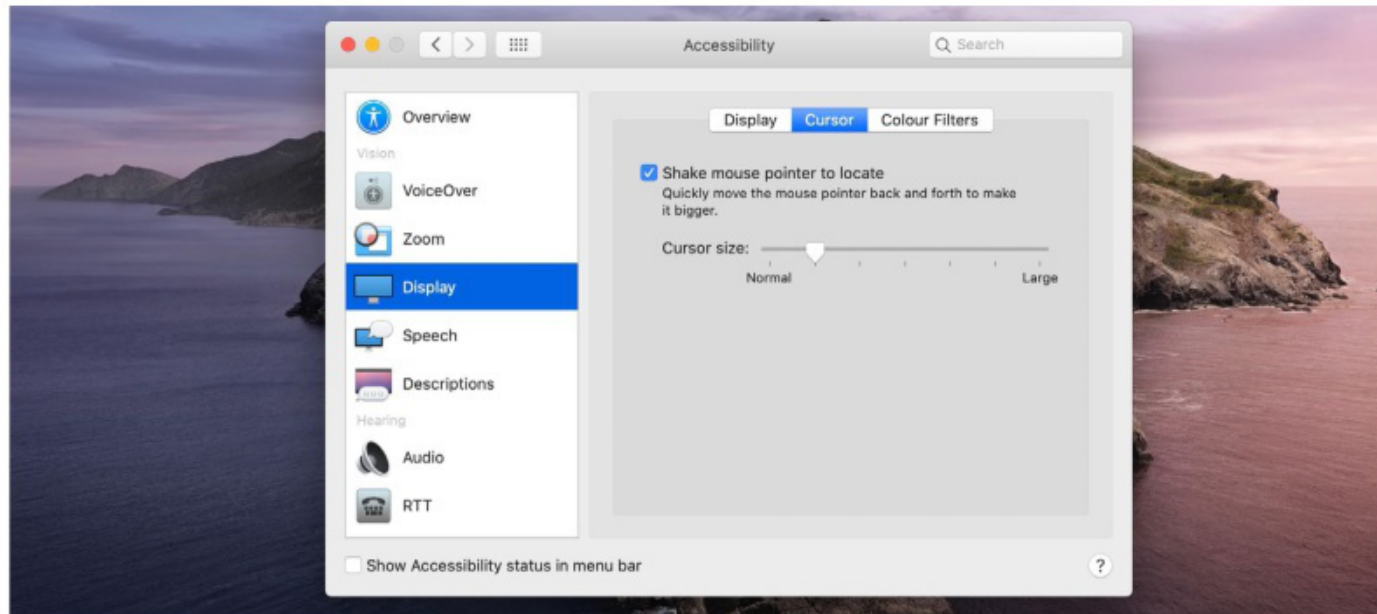
After updating to macOS Mojave 10.14.6 the mouse pointer keeps disappearing, but it continues to track properly. Only moving it fast and shaking it makes it reappear. How can I bring it back?

There's nothing in that update which should have affected the visibility of your pointer, but there are several controls and settings which could've changed its behavior and had this effect.

Go to System Preferences > Accessibility and select the Display item on the left. Adjust your Cursor Size there, and check the item to "Shake mouse pointer to locate". Then if the pointer is ever hard to find, you can wiggle your mouse or

your finger on the trackpad, and the pointer will grow in size.

Now shut your Mac down, wait for at least 20 seconds, and start it up with the Shift key held down using a wired keyboard – this will put it into safe mode and clear its caches. Once it's been running for a minute or two, restart it in normal mode and your pointer should now behave itself.



If your pointer becomes hard to see, in the Accessibility pane increase its size and set shaking to help locate it.

USB "STICK" OR SSD FOR A BOOTABLE INSTALLER?

Use an SSD if you can. USB memory "sticks" are convenient and cheap, but far slower than an SSD, and less versatile. Not all sticks can be formatted in APFS, and some don't work properly with Catalina installers.

WHY DOESN'T MACOS DETECT MY USB SPEAKERS?

There are known problems with USB audio fed through USB-C adapters. It's worth trying a different cable instead, perhaps with mini USB-B to C. macOS 10.15.1 is thought to have fixed some of these long-standing issues.

> Wireless keyboard and trackpad drop out

My MacBook Pro doesn't get on with my Bluetooth Matias keyboard or Apple Magic Trackpad, which keep disconnecting and reconnecting. Is there something wrong with it?

Occasional disconnect-reconnect cycles can occur with Bluetooth keyboards, trackpads and mice, but should be very infrequent. If they're common, remove the file com.apple.Bluetooth.plist from the Preferences folder in your top-level Library folder and restart.

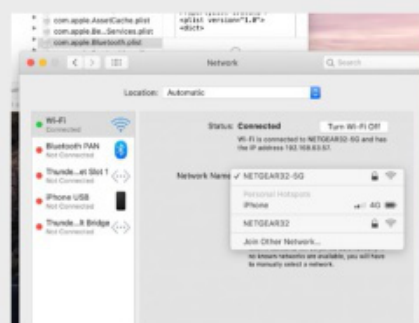
After that, suspect radio interference problems. If you have Wi-Fi, connect using its 5GHz channels, rather than 2.4GHz which overlaps with the frequencies used by Bluetooth.

Give the two networks different names, so you can select connections over 5GHz in their Wi-Fi settings, which usually offers faster speeds anyway.

Some USB devices emit interference which affects both Wi-Fi and Bluetooth frequencies. Identify those by testing with the

peripherals turned off, and see whether that improves wireless reliability. Sometimes moving a device or changing its cable can fix this.

Another trick is to ensure there are no solid or dense objects such as piles of paper between the Bluetooth peripheral and Mac, which can reduce signal strength markedly. Finally, Handoff features, such as AirDrop, can trigger intensive exchanges on both Wi-Fi and Bluetooth. If you have another Mac close by, try moving it away so such exchanges won't overload your Mac's radio systems.



Bluetooth issue? Remove its preferences file and restart, plus tell Wi-Fi to use 5GHz not 2.4GHz.

WHY DID EL CAPITAN STOP GETTING SECURITY UPDATES?

Apple stopped providing full security updates for 10.11 over a year ago, but still pushes “silent” updates to its security tools. Open the App Store pane and ensure “Automatically check for updates” and “Install system data files and security updates” are both checked.

DOES A SAFE BOOT CHECK MY DISKS FOR ERRORS?

This depends on the macOS version. In Mojave and earlier, checks are run, any error repaired and your Mac automatically restarted, but there’s no way to discover what happened. This isn’t true in Catalina, though. If you want to check properly, start up in Recovery Mode and run Disk Utility there.



HOW CAN I GET SPOTLIGHT TO REINDEX MY DISK?

Open Spotlight and select Privacy. Click on “+”, add your disk to that list, or drag and drop it onto the window to remove indexes. Then select it and click on “-” to remove it, forcing new indexes to be built.

WHY DOES DISK UTILITY SHOW TWO VOLUMES IN 10.15?

Catalina creates a new Volume Group, consisting of: a writable volume named Macintosh HD – Data containing your own apps, Home folder, and more; a read-only volume named Macintosh HD for system files.

> Flawed Finder in Catalina

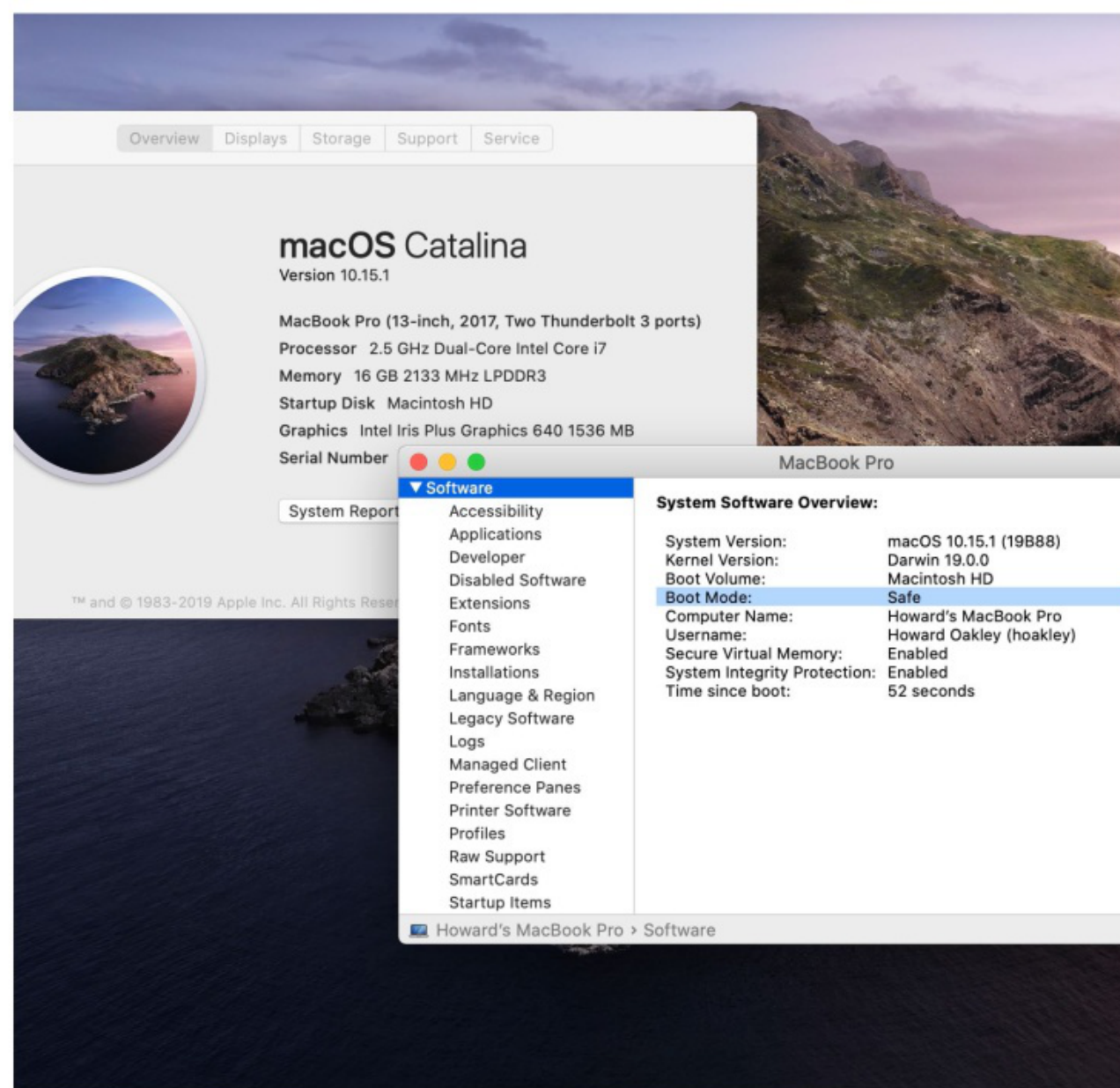
After upgrading to Catalina, some Finder actions don’t work properly. Using the Move to Bin command in the pop-up menu sometimes doesn’t work, and trying to drag a file from one folder to another is also intermittently successful. How can I fix those?

These don’t appear to be known issues with Catalina, suggesting that you have third-party software installed which is causing a conflict, or that your upgrade wasn’t completely successful. Recent versions of macOS have also altered the dwell time that you need to hold a click or a tap for a Finder item to be ready to move.

If you have any product which customizes the Finder in any way, adding Finder Quick Actions or modifying its dialogs such as those for opening and saving files, try updating, disabling or uninstalling it. One prime candidate for this is an older version of Default Folder X, which will need updating.

This can be hard to identify, but two tricks which can help are starting up in safe mode, with the Shift key held, and creating a new user account to see if that’s also affected. If that second account turns out to be fine, then you know that it’s something installed in the Library of your Home folder.

If you draw a blank with those, try reinstalling the latest version of macOS Catalina, using a fresh installer app obtained from the App Store and Software Update. Another reliable way to do this is by entering macOS Recovery with Cmd+R held at startup on a wired keyboard.



Check when you’ve started up in safe mode by selecting the software item in System Information.

> MBP no longer sleeps when closed

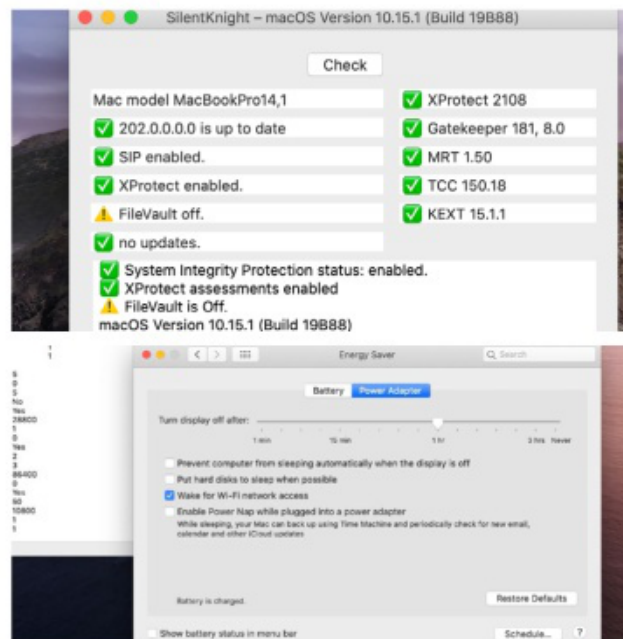
After the Mojave Supplemental Updates, my MacBook Pro 2016's stopped sleeping when I close its lid, and continues using its battery at a high rate. How can I get it to sleep again?

These late updates brought firmware updates for almost all models, affecting functions such as sleep and wake. For some Macs, they brought serious problems such as kernel panics when trying to wake from sleep.

Check your Mac's firmware is up to date using the free SilentKnight tool from bit.ly/mac348sltkgt. If it isn't, install the latest Combo updater for Mojave, as only macOS installers and updaters can update firmware.

Then reset SMC (bit.ly/mf348rstsmc) and NVRAM (bit.ly/mf348rstnvram), which are involved with functions like sleep. Open the Energy Saver pane, and check that nothing there is now preventing your Mac from entering proper system sleep when its case is closed. On rare occasions a sensor can fail, something you would need a service technician to assess.

Check whether your Mac is running the latest and correct firmware using the free utility SilentKnight.



Sleep settings in your Energy Saver pane are reflected in the Power item in System Information.

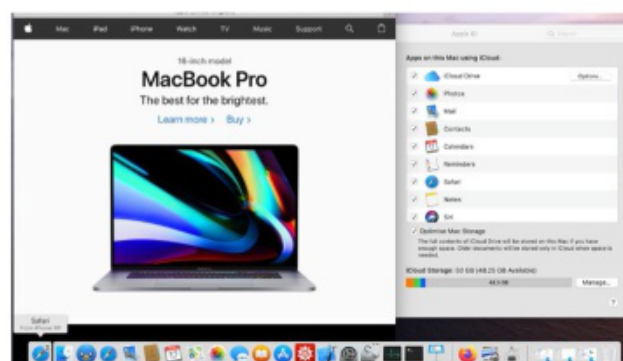
> iCloud Tabs won't share with iPhone

Since getting iOS 13, my iPhone can't see the list of tabs open in Safari on my Macs. All three are on the same iCloud account, with Safari sync on. Do I have to upgrade the Macs?

iCloud Tab sharing in Safari works best when all Macs and devices are running the latest system release, and the current version of Safari. It's vital that your iPhone is updated, as early releases of iOS 13 had many problems. All also need to have a good connection to the same iCloud account: this can't be shared between users with different Apple IDs.

Open the iCloud pane in macOS, and Settings > [your name] > iCloud in iOS. On each, disable Safari from iCloud, close the pane or Settings, then go back in and turn it back on. Some report that closing all open tabs, force-quitting Safari on any iPhone or iPad, and opening Safari again can fix it. To

force quit Safari, swipe up to open the App Switcher, then swipe up on Safari's card to kill the app. On a Mac, close all open tabs and quit the Safari app instead.



With Safari enabled in the same iCloud account, your Mac and iOS devices should share tabs.

Essential support articles

Our advice may refer to the following features; check out the support articles linked below for full instructions.

macOS RECOVERY

The Recovery system contains tools to help you look up info online when macOS won't start, and to repair or reinstall the system. Learn more at bit.ly/mlrecovery.

SAFE MODE

When you start your Mac in Safe mode, macOS performs extra checks and stops certain third-party software from running. See how to use it at bit.ly/mlsafemode.

RESET SMC & NVRAM

These features handle low-level functions and store key settings for your Mac, respectively. Resetting them can fix various issues described at bit.ly/mlresetsmc and bit.ly/mlresetnvram.

HARDWARE ISSUES

Your Mac includes tools that check for certain hardware issues without going to a Genius Bar. For Macs introduced in June 2013 or later, see bit.ly/mldiag, otherwise see bit.ly/mlahwt.

SHARE WITH US!

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MacLife



CREATE

HOW TO DO ANYTHING ON YOUR MAC, IPHONE & IPAD

Create and restore a backup

Use SuperDuper to fine-tune and schedule your Mac backups

REQUIRES

SuperDuper app, external
USB drive

YOU WILL LEARN

How to back up and
restore files using
SuperDuper

IT WILL TAKE

10 minutes



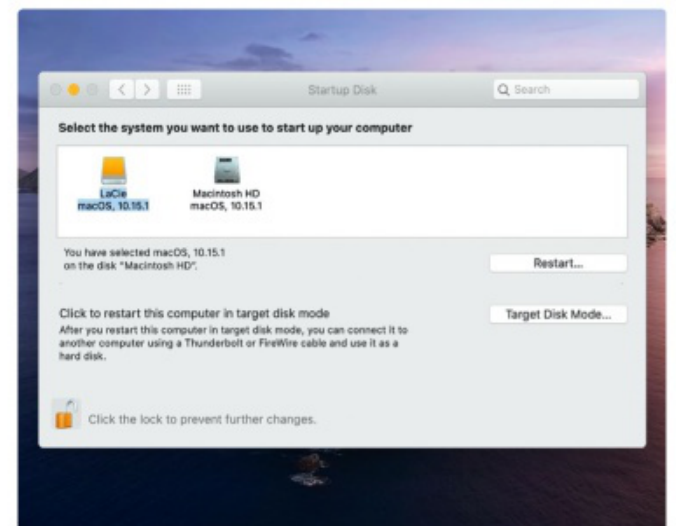
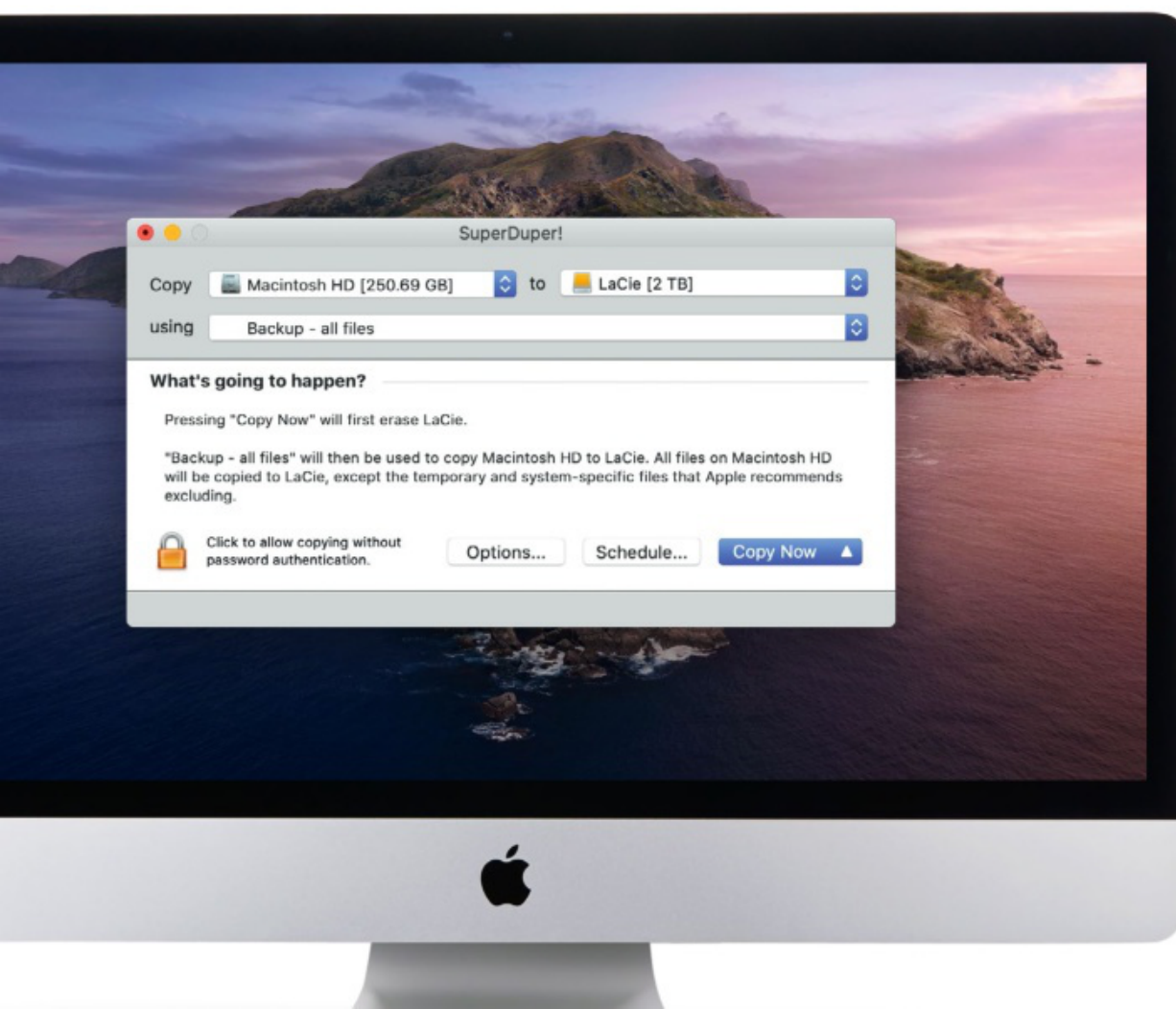
APPLE'S TIME MACHINE is a good example of how the Mac is supposed to work. It takes a tedious time-consuming chore — performing regular backups of your important files — and just makes it work automatically so that you can just plug in your backup drive and forget all about it.

Time Machine does have some limitations, though. It automatically backs up files every hour during the day, and then saves daily and weekly backups going further back in time. But it doesn't allow you to create your own schedule for backing up your files — such as a regular end-of-the-day backup for

important work projects. And, while Time Machine can help to “restore” your Mac if anything goes wrong, it doesn't allow you to “boot” your Mac from your Time Machine backup drive in case your Mac's own internal drive develops a fault.

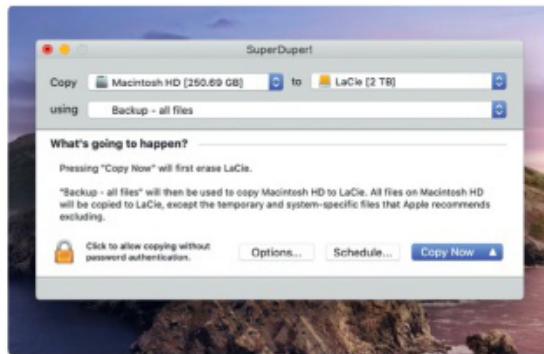
That's where other backup apps, such as SuperDuper, can come in really handy. The app is free to download, and provides basic backup options so you can try it out and see if you like it before paying for the full version (\$27.95).

It's worth paying the licence fee, though, for additional features such as the ability to create your own backup schedules. And, most importantly, SuperDuper allows you to boot your Mac from your backup drive, making it a really useful diagnostic and recovery tool in case anything goes seriously wrong with your Mac's hard drive. **CLIFF JOSEPH**

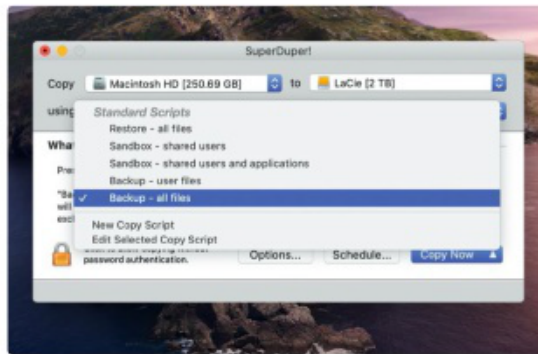


A key advantage of SuperDuper is that — unlike Time Machine — it allows you to boot your Mac from your backup drive, using Startup Disk in System Preferences.

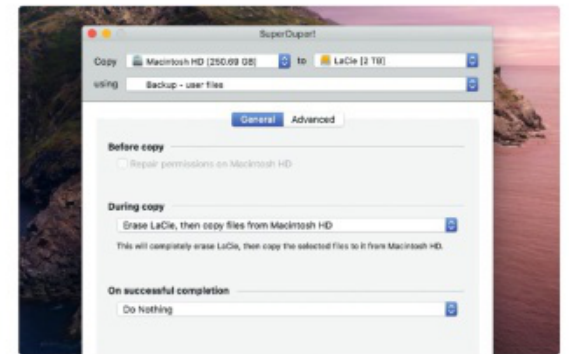
HOW TO Back up your Mac with SuperDuper



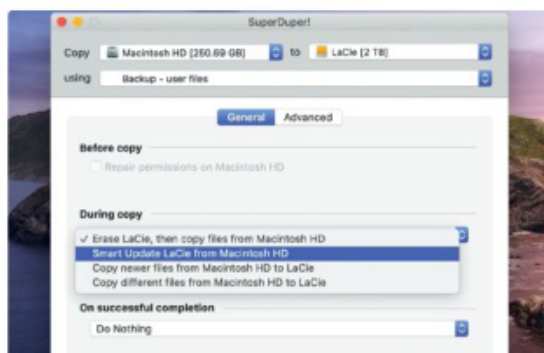
1 Feel the source
To set up your first backup, select a “source” and a “destination”. The source is your Mac’s hard drive, so select that in the “Copy” menu. Here, the destination is an external LaCie drive, which we select in the “To” menu.



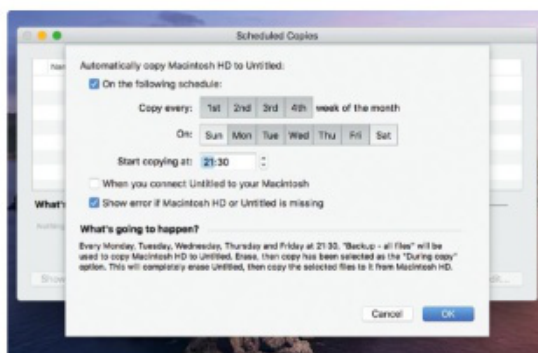
2 Backup basics
There are a number of backup options. The main one is “Backup – all files”, which copies the entire macOS itself, and all your personal files. Alternatively, “Backup – user files” just copies your Home folder.



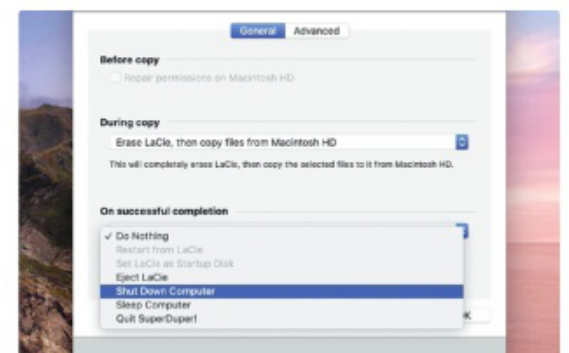
3 Other options
You can click Options to fine-tune the backup process. By default, SuperDuper will erase your backup drive each time, then make a totally new backup. But that can take time, so let’s look at some other options.



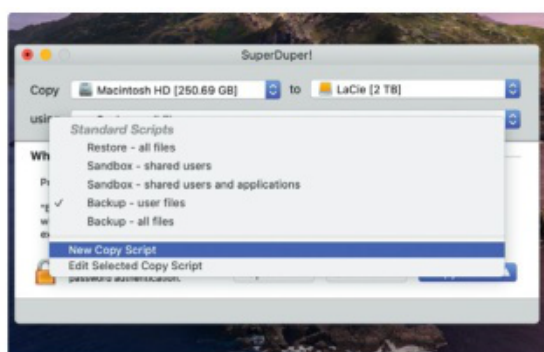
4 Get smart
Click on the During Copy menu to modify the backup process. The best option here is Smart Update, which will keep your last backup, and only copy new files from your Mac, or remove files that have been deleted recently.



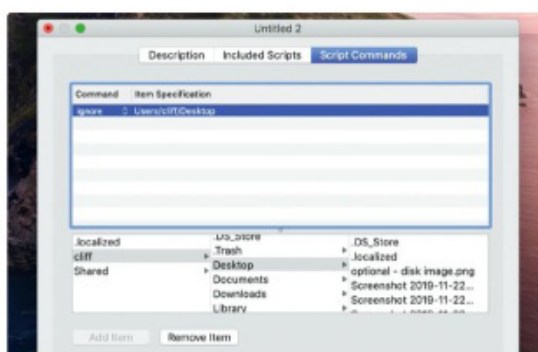
5 Scheduled backups
The free version of SuperDuper allows you to perform manual backups by clicking Copy Now. But it’s worth buying SuperDuper for the ability to schedule automatic backups that repeat every day or every week.



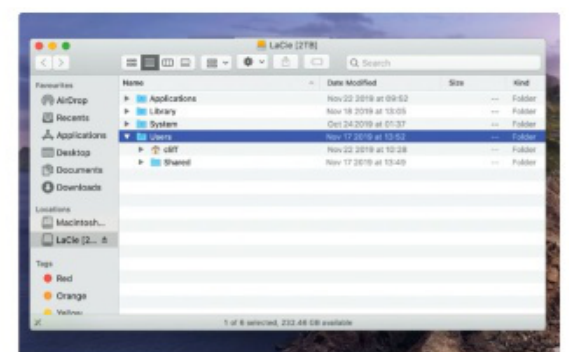
6 Over and out
You can also tell SuperDuper what to do when it’s finished backing up. You can tell it to eject your backup drive, or to shut your Mac down automatically so that you don’t have to wait around for the backup to finish.



7 Pick and choose
Like Time Machine, SuperDuper allows you to exclude individual files and folders from your backups. The program’s interface gets fiddly here, but you start by clicking the Using menu then selecting New Copy Script.



8 Custom backups
The Script window enables you to locate files and folders, and then tell SuperDuper to “ignore” them during the backup. You can also add files or folders to create custom backups that concentrate on a specific group of files.



9 Find your files
The backup on your external drive is an exact duplicate of the files and folders on your Mac, so if you delete any files by accident you can simply find them on the backup drive and copy them onto your Mac again.



Crop, clone and recompose

How to improve composition and content using intelligent tools

REQUIRES

Adobe Photoshop
Elements 2020

YOU WILL LEARN

How to use Crop,
Straighten and Content-
Aware tools

IT WILL TAKE

15 minutes



PHOTOSHOP ELEMENTS 2020

brings a wealth of new tools to help tweak a photo's content and composition.

Here, in the first part of our three-part guide, our example image suffers from a wonky horizon caused by a tilted camera. There's too much dull sky at the top of the frame, and the two people in the shot aren't walking side by side.

Thanks to Elements 2020's tools, we can create a more considered composition. We can straighten tilted lines and remove

the clouds by turning the shot's portrait aspect ratio into landscape. A landscape shot will have more balance, with the path on the left and the river on the right. We can even slightly scale up the woman on the right and reposition her to walk alongside her friend with help from the Content-Aware Move tool.

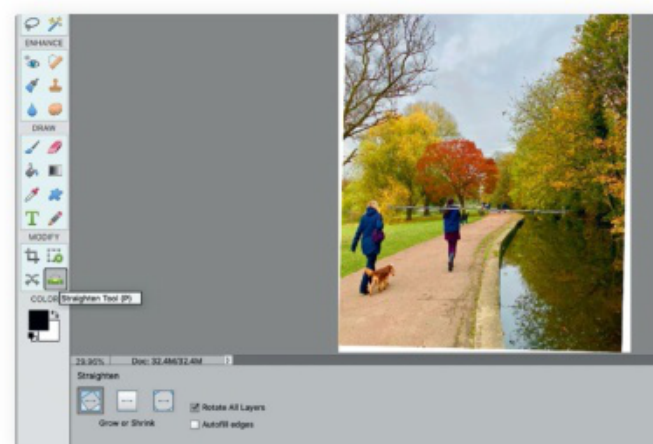
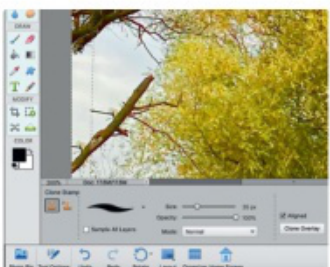
As Photoshop Elements has Content-Aware we can improve a shot by quickly replacing or repositioning pixels, and automatically filling in white edges caused by the Straighten tool. **GEORGE CAIRNS**

HOW TO Recompose your photos



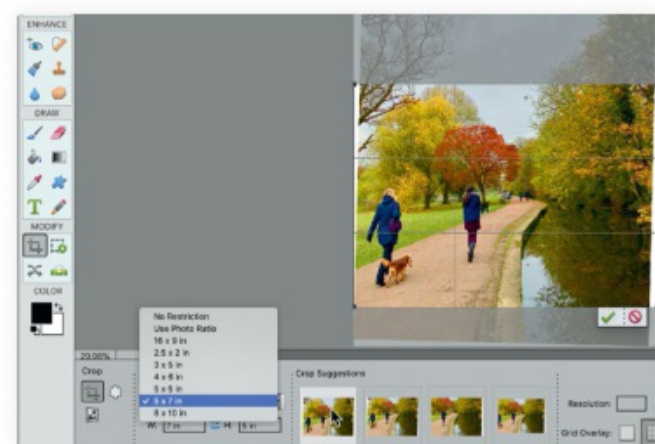
GENIUS TIP

If the Content-Aware Fill command doesn't work perfectly, you can use the Clone Stamp tool to extend appropriate objects, such as tree branches.



1 Straighten the horizon

Open a photo in the Expert mode workspace. In the Tools panel's Modify section, pick the Straighten tool. Click and drag to draw along a tilted horizon. The photo will rotate to counteract the tilt, leaving white edges.



2 Change aspect ratio

Click on the Crop tool. In the Options panel, choose a 5 x 7 inch size. Click the blue swap arrows to make Width 7 and Height 5. This creates a landscape-shaped crop. Click on the best crop suggestion. Click the check.



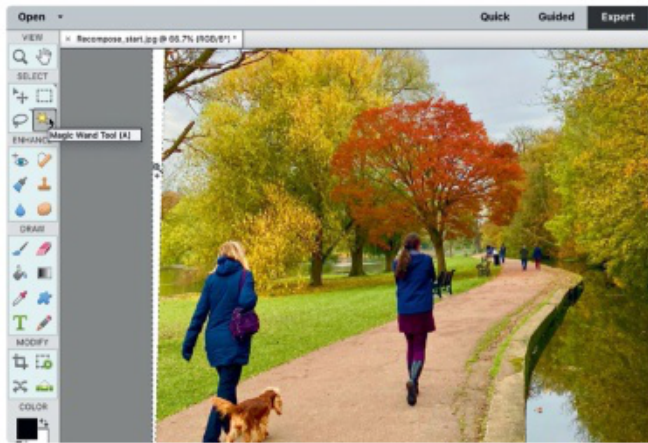
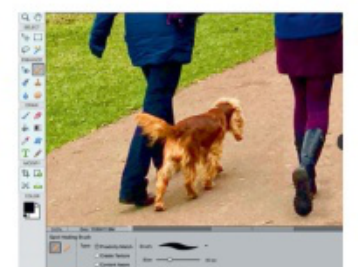
JARGON BUSTER

Elements 2020 has a new Auto Selection tool that uses Content-Aware recognition to make selections quickly. Simply draw a rectangle around a person and their complex outline will become selected.



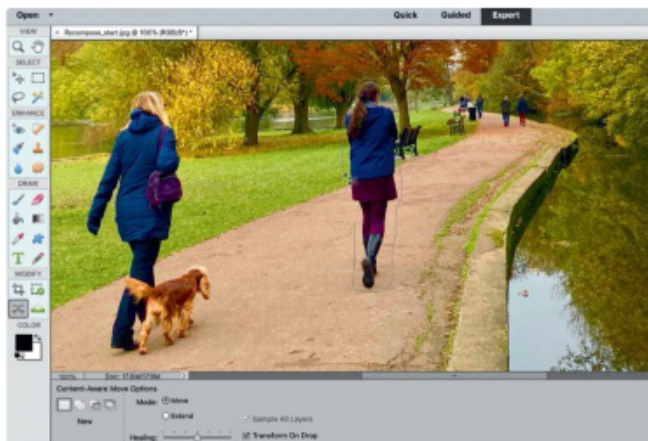
GENIUS TIP

The Spot Healing brush does a great job of tidying up unwanted pixels left over from a Content-Aware Move procedure. Set it to Proximity in the Options bar. It will automatically sample and relocate nearby pixels over the problem area.



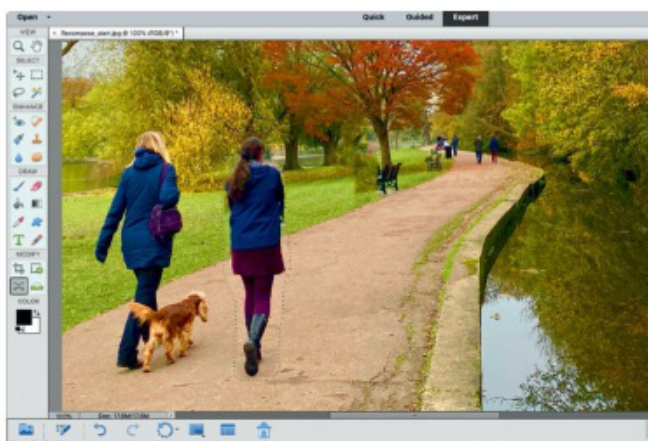
3 Select white edges

In the Tools panel, choose the Magic Wand tool. Hold Shift and click to select the white edges. Choose Select > Modify > Expand. Use a value of two pixels to make the selection marquee overlap the contents of the photo.



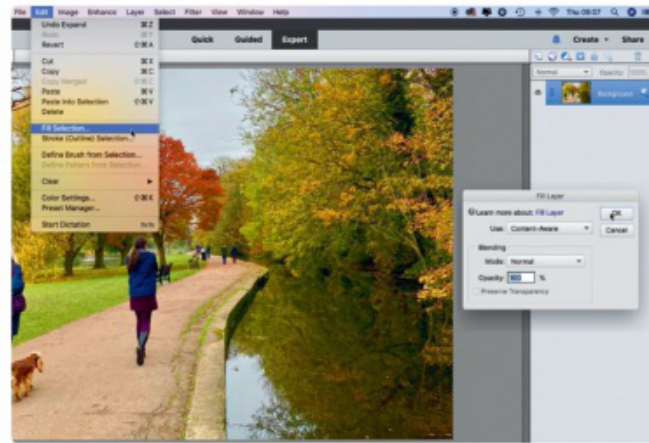
5 Select a person

Press C+D to deselect the marquee. In the Modify section of the Tools panel, click to choose the Content-Aware Move tool. Draw a selection round the subject you want to move. In the Options bar, tick Transform On Drop.



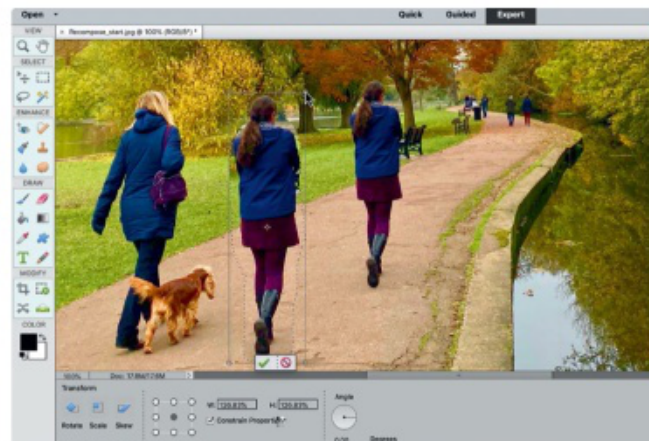
7 Examine the results

The Content-Aware Move tool will try to fill the person's original location with appropriate pixels. It will also try to blend the repositioned person in with their new location. We then need to manually tidy things up.



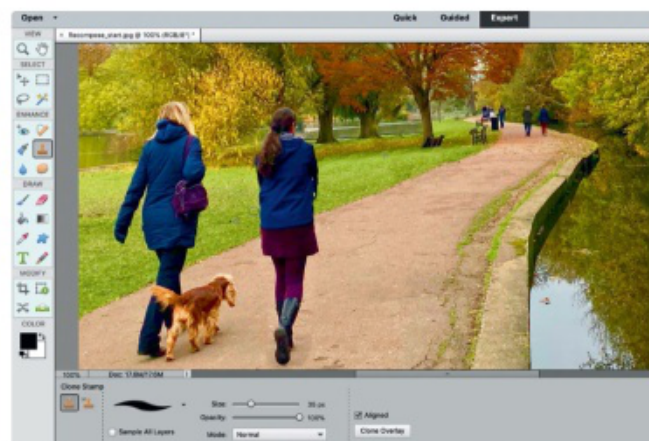
4 Fill the white edges

Choose Edit > Fill Selection. In the Fill Layer window set the drop-down menu to use Content-Aware. Click OK. This intelligent tool then fills the selected white edges with appropriate pixels of tree, grass, water, and sky.



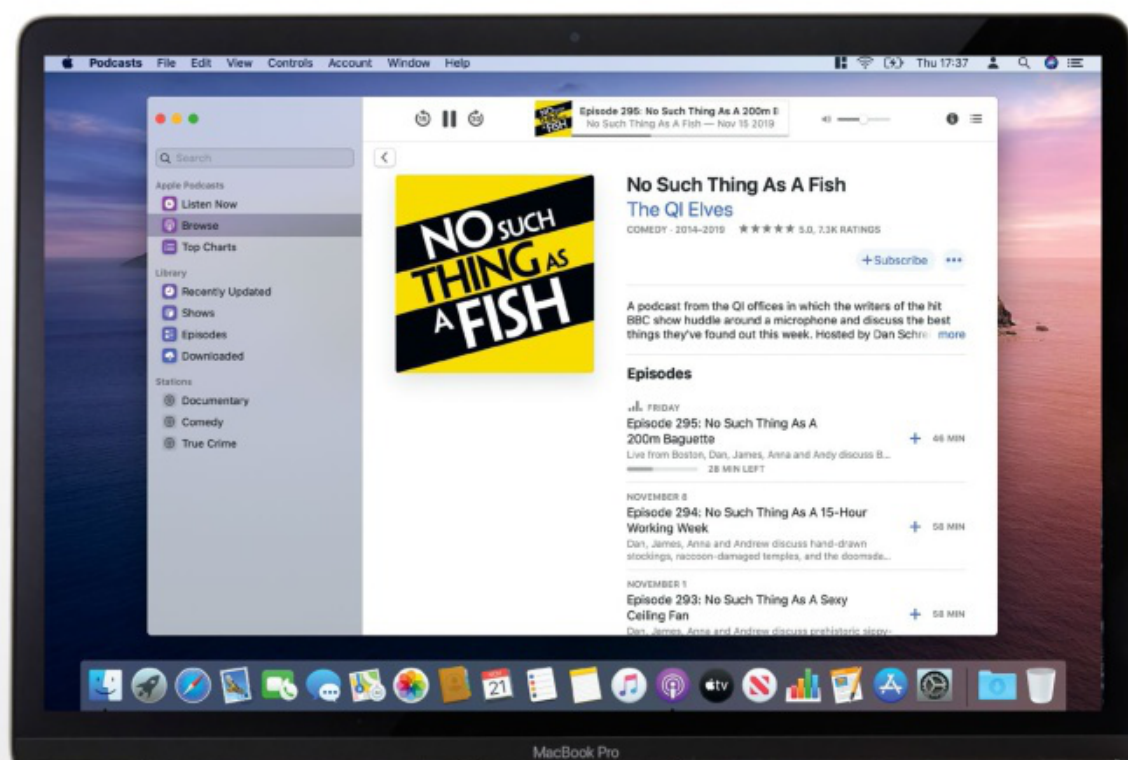
6 Move and scale

Drag to move the selected subject. Drag the Transform box's control handles to scale the figure up so that they match the size of the adjacent subject. Click the check to apply the move and transformation.



8 Tidy up

Grab the Clone Stamp tool. Press Opt and click to sample grass next to the relocated subject and spray to extend the grass up to the edges. Sample and spray grass, tree and lake pixels over the half-hidden bench.



Podcasts on your Mac

Get to grips with Apple's new Podcasts app in macOS Catalina

REQUIRES

A Mac, Apple Podcasts app

YOU WILL LEARN

How to find, subscribe to and manage podcasts in Apple's Podcasts app

IT WILL TAKE

10 minutes



APPLE HAS LONG used iTunes as a catch-all hub for podcasts, music, movies and more.

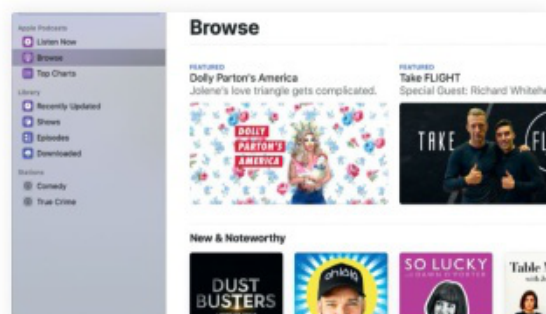
But in macOS Catalina, the company has split all these functions into separate apps. That means if you're a podcast fan and want to play your favorite shows on your Mac, there's a new app to get to grips with.

Fortunately, Apple's Podcasts app is easy to learn and contains some useful features to help you enjoy your podcasts. Although it's not as in-depth as rivals

like Overcast or Castro on iOS, that works in Podcasts' favour if you just want to get up and running as quickly as possible.

That doesn't mean there aren't any deeper controls. You can sort your podcasts along common themes using Stations, and search for episodes based solely on a sentence or snippet you may have overheard. Go a little deeper and you'll find Podcasts has some excellent features for both discovering new podcasts and curating your episode collection. **ALEX BLAKE**

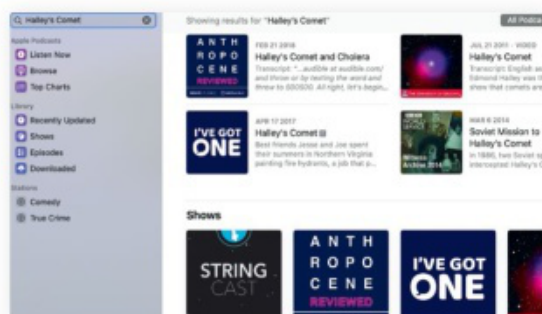
HOW TO Find and subscribe to podcasts



1

Use the sidebar

The left-hand sidebar is where you'll find new shows. You can discover popular and topical shows or sort by category in the Browse tab. To look through the most popular podcasts among other users, click Top Charts.



2

Search by phrase

One of the new features in Podcasts is the improved search box. Every podcast is transcribed, and you can now find episodes or shows based on a phrase mentioned in an episode. It's surprisingly effective.

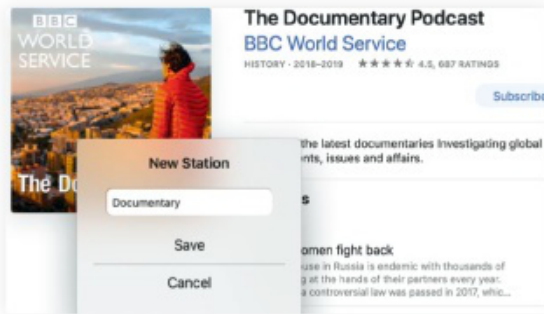


3

Subscribe to a podcast

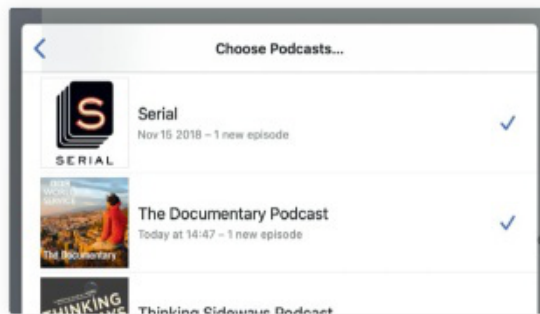
Got to a show's page in Podcasts, then click Subscribe on the right. It'll now appear in Listen Now in the sidebar. To unsubscribe, click the three dots next to Subscribe, then click Unsubscribe.

HOW TO Make and manage Stations



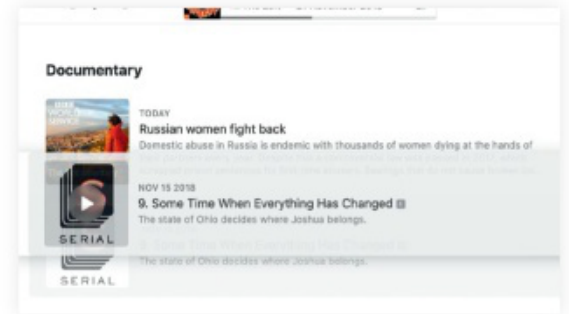
1 Create a Station

In Apple Podcasts, a Station is essentially a playlist, letting you group subscribed podcasts along a common theme. To create one, click File > New Station or press Cmd+N. Give your station a name, then click Save.



2 Adjust its settings

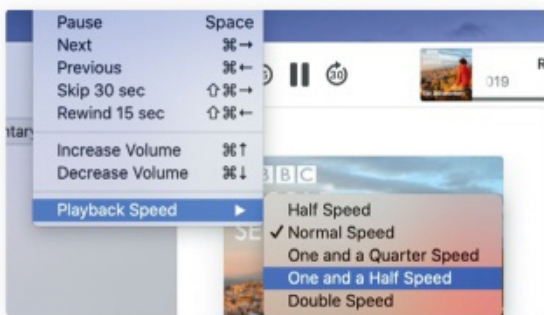
In the Station settings window you can choose how podcasts should be ordered, how many episodes should be included, and more. Add a podcast by clicking Choose Podcasts. When you're finished, click Done.



3 Reorder episodes

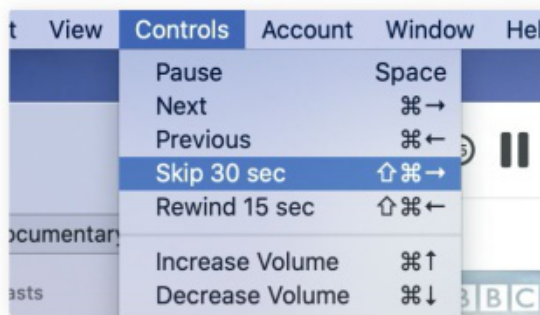
Your Station will now be populated with episodes from your shows. To reorder episodes, click and drag one, then move it up or down the list. Click Play on an episode and the app will work through the Station.

HOW TO Adjust playback controls



1 Change speed

In the menu bar, click Controls > Playback Speed. You can choose from Half Speed, Normal Speed, One and a Quarter Speed, One and a Half Speed and Double Speed. This can be changed again at any point during a show.



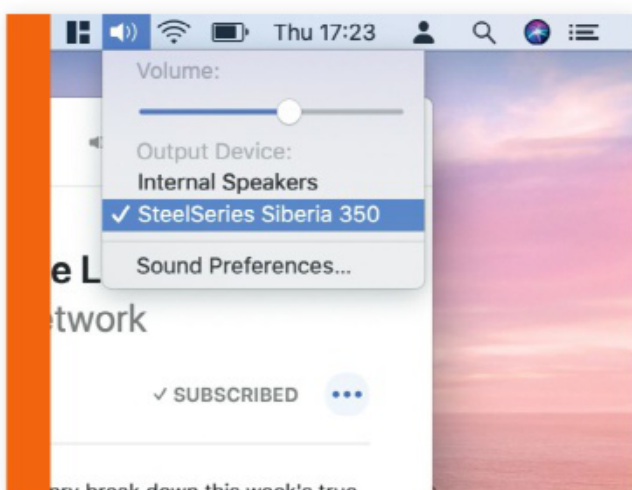
2 Skip forward or back

To skip ahead 30 seconds, press Shift+Cmd+Right Arrow; to go back 15 seconds, it's Shift+Cmd+Left Arrow. Or click Controls > Skip 30 sec or Controls > Rewind 15 sec. Skip episodes with Cmd+Right Arrow or Cmd+Left Arrow.



3 Adjust the volume

You could increase the volume using the volume controls on your keyboard, but this will affect your entire Mac. To just increase the volume within the Podcasts app, press Cmd+Up Arrow. To turn it down, press Cmd+Down Arrow.



> PLAY THROUGH EXTERNAL SPEAKERS

Get a better audio experience with Podcasts

Podcasts can be configured to play through external speakers or headphones, including those equipped with AirPlay and wireless headphones like AirPods. To use non-AirPlay speakers, you just need to connect them to your Mac. Podcasts will automatically play through them and mute your computer's speakers. To use AirPlay, click the AirPlay icon at the top of the Podcasts app, then check the box next to the speakers you want to use. If you have more than one set of AirPlay speakers, you can select them both at once, if you like.

Master your printer in Catalina

Control a printer with your Mac's built-in tools

REQUIRES

A Mac, a printer with Wi-Fi or USB cable

YOU WILL LEARN

How to connect a printer to your Mac via USB or Wi-Fi

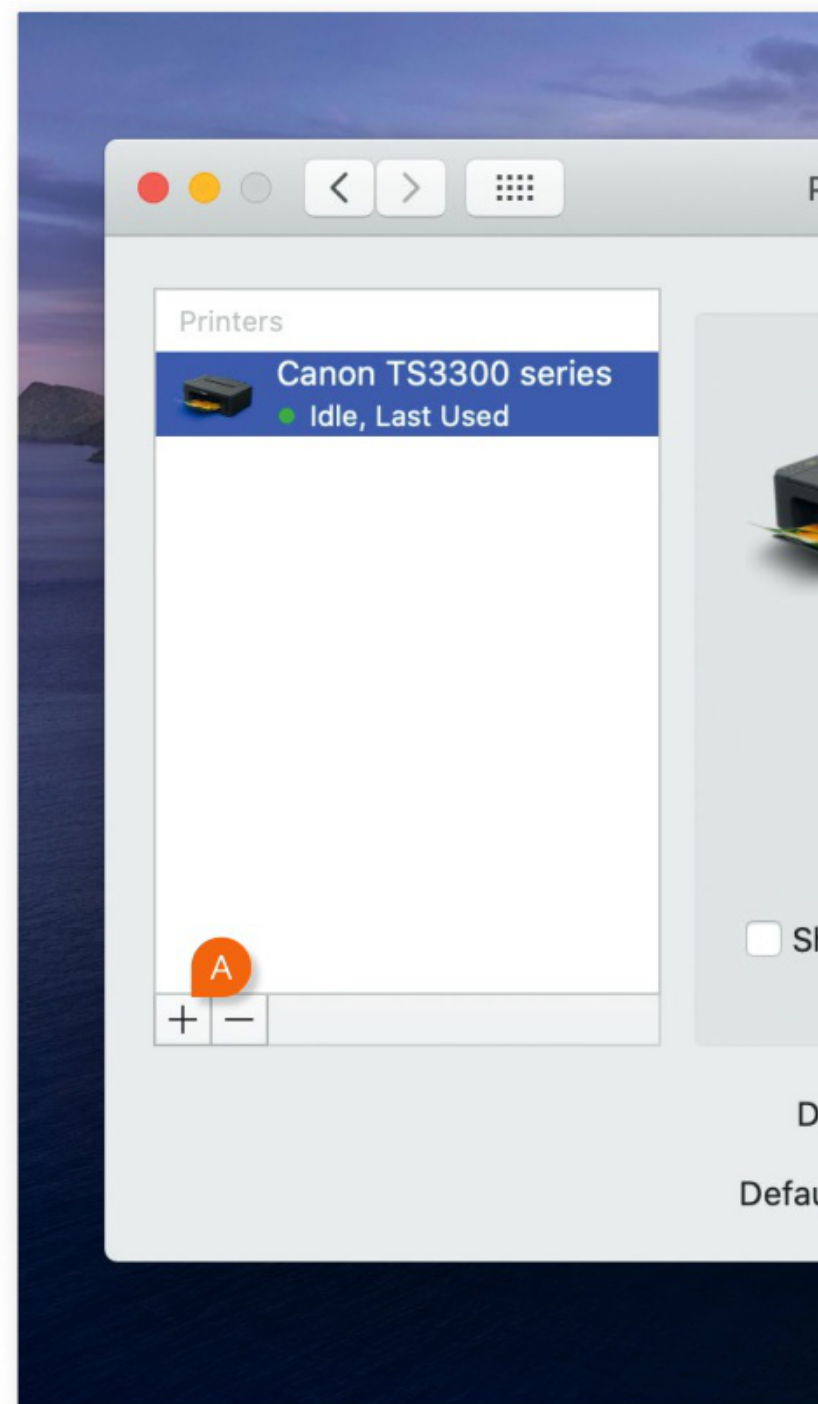
IT WILL TAKE

5 minutes

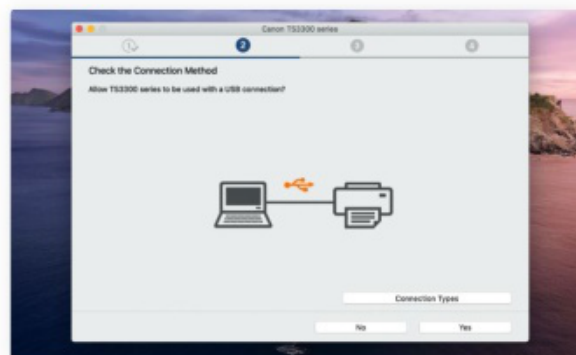


ONCE UPON A time, all printers would be packed in a box with a nice big manual, a USB cable and a CD with all the software you needed to control the printer. Nobody uses CDs anymore, though, and most modern printers now have built-in Wi-Fi, so you'll often find that you don't even get a cable to help you set up the printer. Most manufacturers do provide an online link so you can download the printer software — but that's often not necessary because macOS itself actually contains the software you need to control a new printer, and a scanner too. Everything you need can be found in the Printers & Scanners panel in your Mac's main System Preferences. We've focused on macOS Catalina here, but the printer features in macOS haven't changed much in recent years, so the steps will work with older Macs (and older printers too).

CLIFF JOSEPH

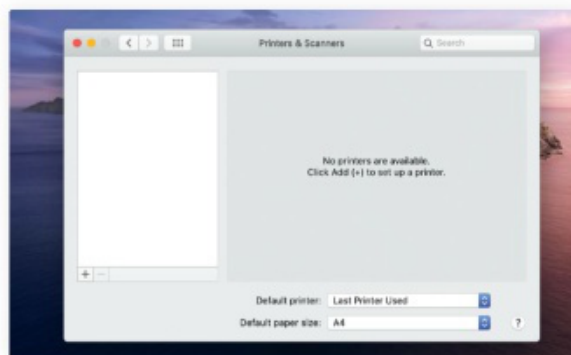


HOW TO Set up your printer from macOS



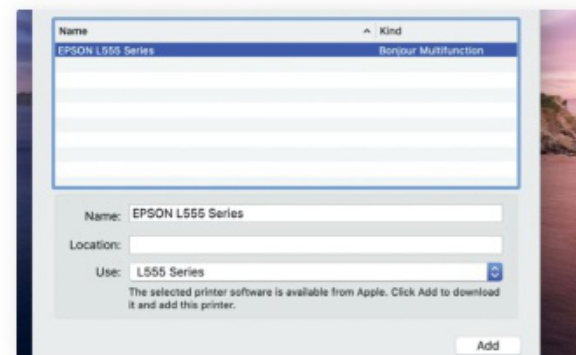
1 Quick install

Most recent printers enable you to download an installer program from the manufacturer's website. But macOS can help you to install many different types of printer even without the manufacturer's own software to hand.



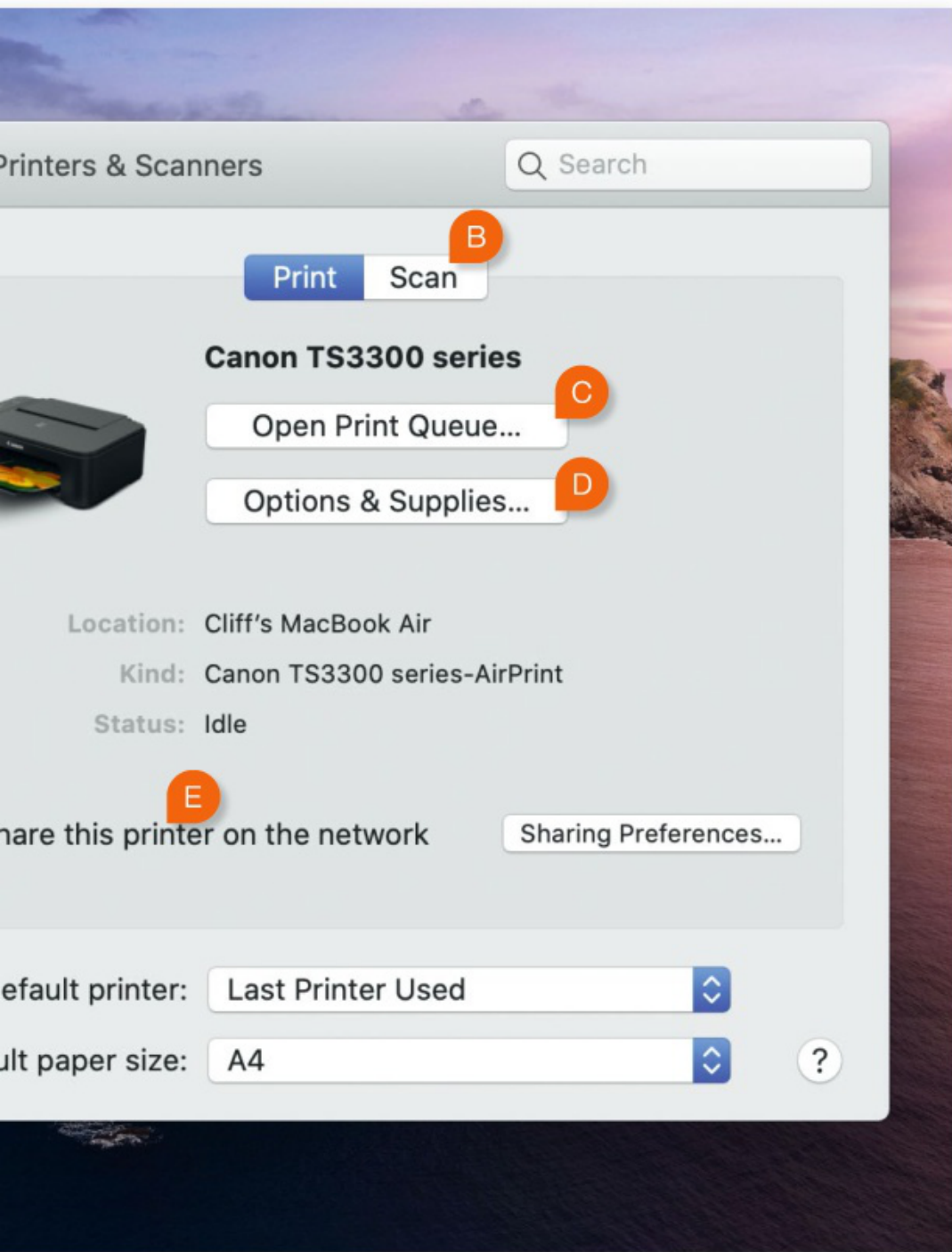
2 Printer preferences

The Printer preferences panel shows all printers that are connected to your Mac. Just click the "+" button to add a printer, and your Mac automatically looks for any printers connected via a network or USB cable.



3 Available from Apple

This Epson printer shows up on our network. It's an old printer, and we lost the installer CD years ago — but macOS helpfully tells us that "printer software is available from Apple". Click Add to download the software.



A

PRINT WORKS

To add a new printer to your Mac or remove an old printer, simply press the “+” or “-” buttons.

B

SCAN AND PRINT

Most modern printers also include a scanner, so just click Scan to view the scanner controls.

C

JOIN THE QUEUE

You can view the progress of all printing jobs, and cancel jobs, by clicking Open Print Queue.

D

INK SUPPLY

Most printers allow you to monitor various settings, including the ink levels, so that you can buy more ink before it runs out.

E

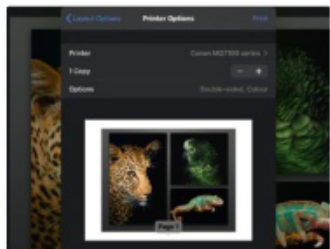
SHARING IS GOOD

Even if your printer uses a USB cable, your Mac can still share the printer with other people on your network.



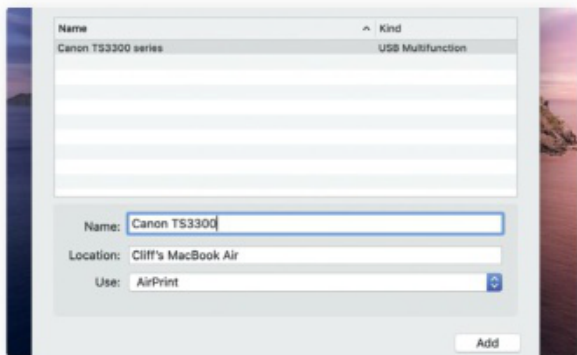
JARGON BUSTER

AirPrint is a piece of software, designed by Apple but built into many new printers, that allows them to automatically work with Macs, iPhones and iPads.



GENIUS TIP

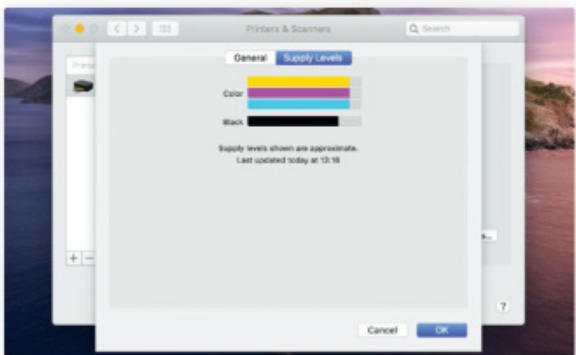
If your printer works with AirPrint, you can find the Print command inside the Share menu found in many apps.



4

AirPrint ready

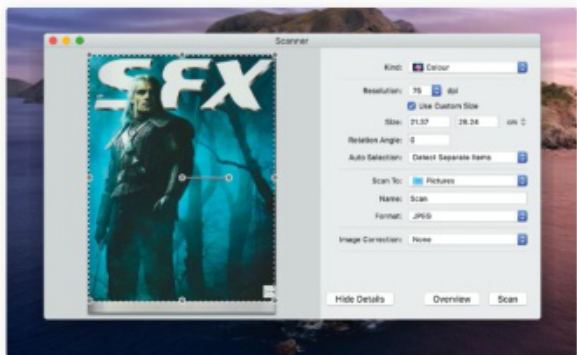
Many newer printers, such as this Canon model, have Apple's AirPrint software already built-in. That allows it to work automatically with all Macs, iPhones and iPads without needing to download any software at all.



5

Printing options

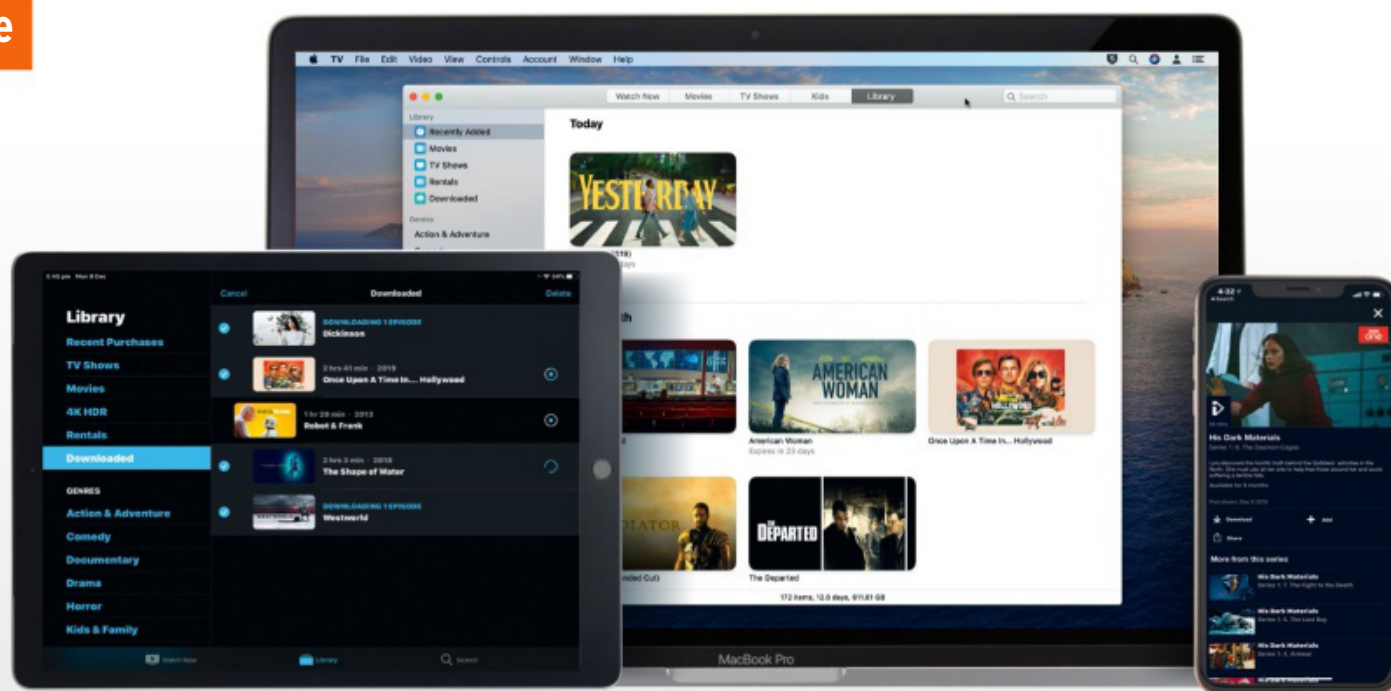
Once the printer is installed, you can press the Options & Supplies button to check that everything is working properly. You can clean the print-head to improve quality, and check the ink levels before they run out.



6

And scanning too

Most modern printers include a scanner too, and you can control that from here as well. Click the Scanner button to launch the built-in scanning app, get a quick preview scan, and adjust resolution and other settings.



View movies and TV offline

Enjoy your favorite films and TV programs wherever you are

REQUIRES

macOS Catalina, iOS 13 or iPadOS, an iTunes account

YOU WILL LEARN

How to manage downloads in the TV app

IT WILL TAKE

15 minutes



THERE ARE THOUSANDS of movies and TV shows to enjoy in the Apple TV app on macOS, iOS, and iPadOS. You can

either buy or rent content from the iTunes Store (as you've always been able to do), access any previous purchases you've already made, and even enjoy the new shows available on Apple TV+, as long as you've bought an eligible device recently or subscribe to that service.

If you have a fast internet connection, you can normally stream content straight to your device — and this is still the only

way to enjoy Ultra HD content on devices such as the Apple TV 4K. However, you can also download your TV shows and movies for offline viewing, enabling you to keep watching even when you're away from home, and that includes Apple TV+ programming such as *The Morning Show*, too.

Here we'll explain how to download movies and TV shows for later viewing, how to identify what you've downloaded, and how to remove shows you've already seen so you can free up space on your device. **ROB MEAD-GREEN**

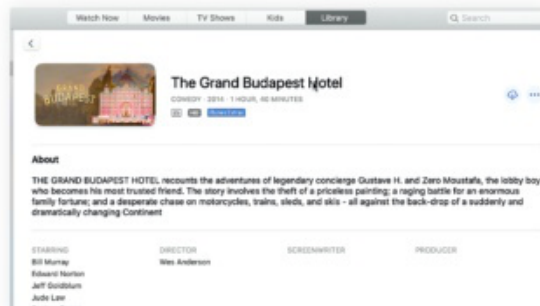
HOW TO Manage downloads on macOS



1

Rent or buy on Mac

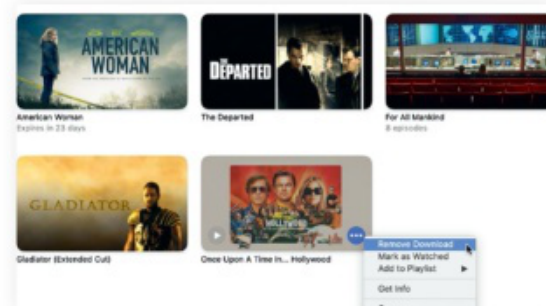
When you rent or buy content from iTunes, you're given the option to Play it or Download it. Choose from SD, HD or HDR versions (if available), depending on the choices you've made in TV > Preferences > Playback.



2

Download your library

You can also download any previous iTunes purchases. Click the Library tab to see what's available. To download something, click its card, then the cloud icon with a downward-facing arrow.



3

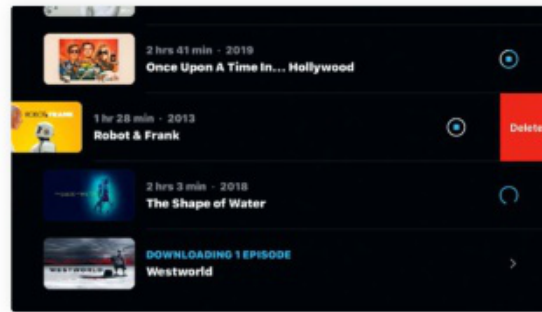
Manage downloads

Anything you've downloaded will appear in TV > Library > Downloads. Mouse over an item to reveal the Play and More (three dot) icons. To remove a download, click More and choose "Remove download" from the menu.

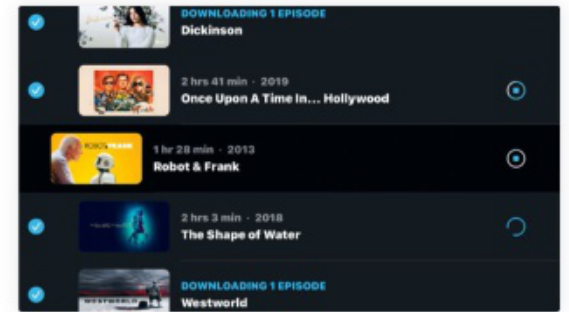
HOW TO Manage downloads on iPadOS



1 Rent or buy on iPad
Everything you've previously bought or rented on your Mac, iPad, iPhone or Apple TV should be available across all your devices, provided you're logged in to iTunes with the same Apple ID. We're about to download *Hala* here.

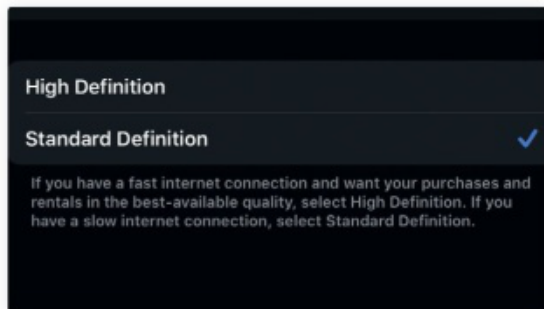


2 Manage downloads
Anything you're downloading (or have previously downloaded) in the TV app will appear in Library > Downloaded. To watch a download, tap it to start playback. To delete it, swipe left, then tap the red Delete button.

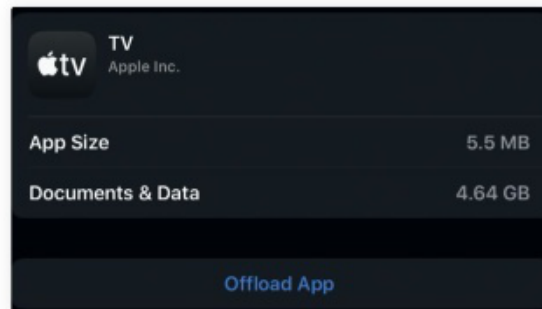


3 More deletion options
To delete multiple downloads at the same time, go to Library > Downloaded, then tap Edit in the top-right corner. Next, tap on items you want to delete, then tap Delete in the top-right corner.

HOW TO Manage downloads on iOS



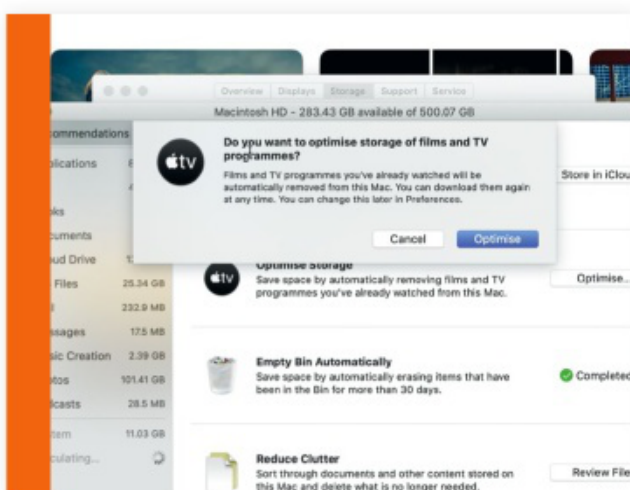
1 Download on iPhone
The process on iPhone is the same as on iPadOS. To save storage space and make downloading faster, head to Settings > Apple TV > iTunes Videos > Purchases and Rentals and select Standard Definition quality.



2 Manage downloads
Again, you can see what you've downloaded to your iPhone at Apple TV > Library > Downloaded and can manage the content from there. Or head to Settings > iPhone Storage > Apple TV+ to delete unwanted content.



3 Other content
You're not limited to Apple TV+ and iTunes content, of course. Content from third parties (such as BBC iPlayer) appears under Apple TV > Watch Now > What to Watch. (You'll need to manage downloads from their specific apps.)



> MANAGE TV STORAGE ON MAC

Remove Apple TV downloads automatically

One drawback of downloading Apple TV app content on Mac is that you can very quickly fill up the available space. To ensure that doesn't happen, head to Apple > About This Mac and click the Storage tab, then Manage. In the window that appears you'll see four options: Store in iCloud, Optimize Storage, Empty Bin Automatically, and Reduce Clutter. In the Optimize Storage section, click the Optimize button, then Optimize again in the pop-up window. Now any Apple TV downloads on your Mac will automatically be deleted once you've watched them.



Master the iOS Share Sheet

Discover a faster way to share with a new personal Share Sheet in iOS 13

REQUIRES

An iPhone running iOS 13 or later/iPad running iPadOS

YOU WILL LEARN

How to customize the Share Sheet

IT WILL TAKE

5 minutes



IF YOU SHARE web pages, images and documents frequently, you will have noticed a new design to the

Share Sheet in iOS 13. It's just one of a number of tweaks Apple has made to the sharing tool, which is now also more customizable and personal than before.

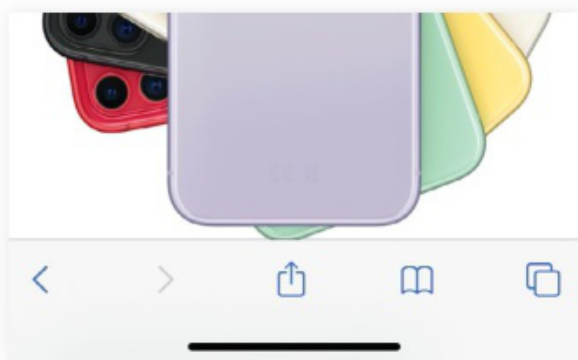
The Share Sheet now consists of five options: Quick Share, Send To App, Actions for the current app, Favorites, and Other Actions. The new look does take up more space, but it can be customized. The

Quick Share row is home to frequent Mail, iMessage and AirDrop contacts, so you can quickly share with people listed here. The Send To App row allows you to send the message to another app, like Notes, WhatsApp and Facebook.

Actions are based on the app you're using, such as Add to Bookmark in Safari, Use as Wallpaper for Photos, etc, while Other Actions offer Print, Save to Files, Copy, and so on. You can pin as many of these as you like to the Favorites section.

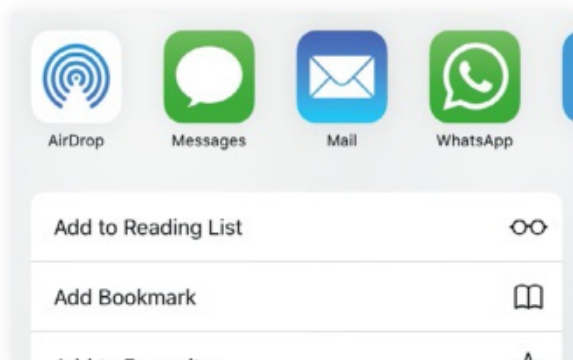
SRIVATS LAKSHMAN

HOW TO Customize the Share Sheet



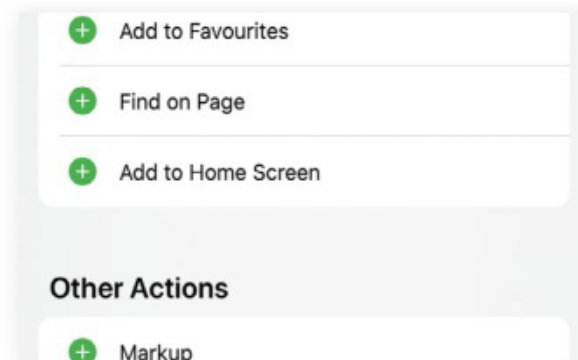
1 Open Share Sheet

The Share Sheet icon (the square with an arrow) is in different locations in different applications. In Safari, you'll find it at the centre of the bottom row of action icons. If you can't see it, scroll down or tap on the bottom of the screen.



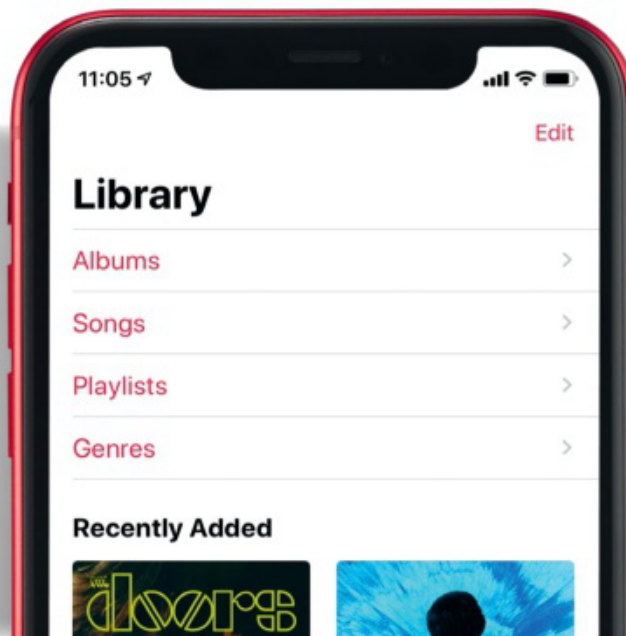
2 Edit Actions

When opening the Share Sheet, you will see the Quick Share and Send To App options, as well as a few others. Scroll down to reveal all the options in the sheet. Tap Edit Actions (at the bottom in blue) to bring up the Edit menu.



3 Select favorites

The Actions menu allows you to pin a favorite by tapping "+". This sorts the option into a separate tab called Favorites. Delete favorites by tapping "--" and then Remove. There's no limit to the number of shortcuts listed here.



Sing along with real-time lyrics

Start an instant karaoke session with time-synced lyrics in iOS 13

REQUIRES

An iPhone running iOS 13 or iPad running iPadOS, Apple Music subscription

YOU WILL LEARN

How to view time-synced lyrics in iOS 13

IT WILL TAKE

5 minutes



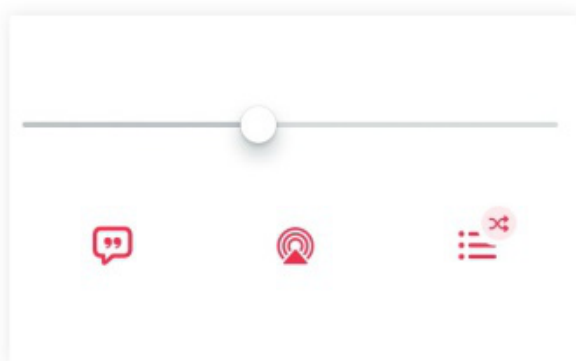
PERHAPS THE MOST fun feature among the updates to the Music app in iOS 13 is the addition of time-synced lyrics.

Rather than just show the lyrics of a song (as in previous iOS versions), in iOS 13, song lyrics can be expanded to go full screen and move along in time with the music. This is not only a great way to learn the lyrics to your favorite song, but also means you can easily kick off an impromptu karaoke session with friends and family.

The feature is also available on Mac and Apple TV. Currently, time-synced lyrics are only available for songs in Apple Music, so if you don't have a subscription you won't be able to use the feature. Lyrics are available for iTunes purchases, but they're not time-synced.

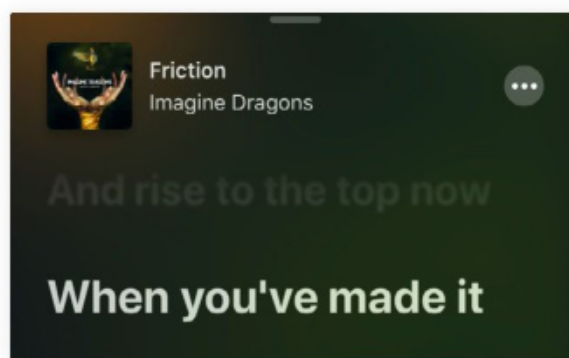
As yet, not all Apple Music songs have time-synced lyrics, as Apple is working through its Apple Music catalogue. Note that explicit lyrics are disabled by default in some regions, but can be allowed in Settings. **SRIVATS LAKSHMAN**

HOW TO View time-synced lyrics



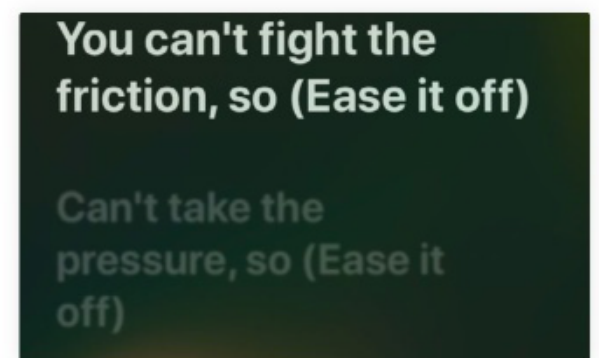
1 Open a song

Find a song, either in your library or on Apple Music, and tap it to play. On the bottom left, you'll see a red speech-bubble icon. If it's greyed out, it means lyrics aren't available yet for that song. Tap the icon and the lyrics will open up.



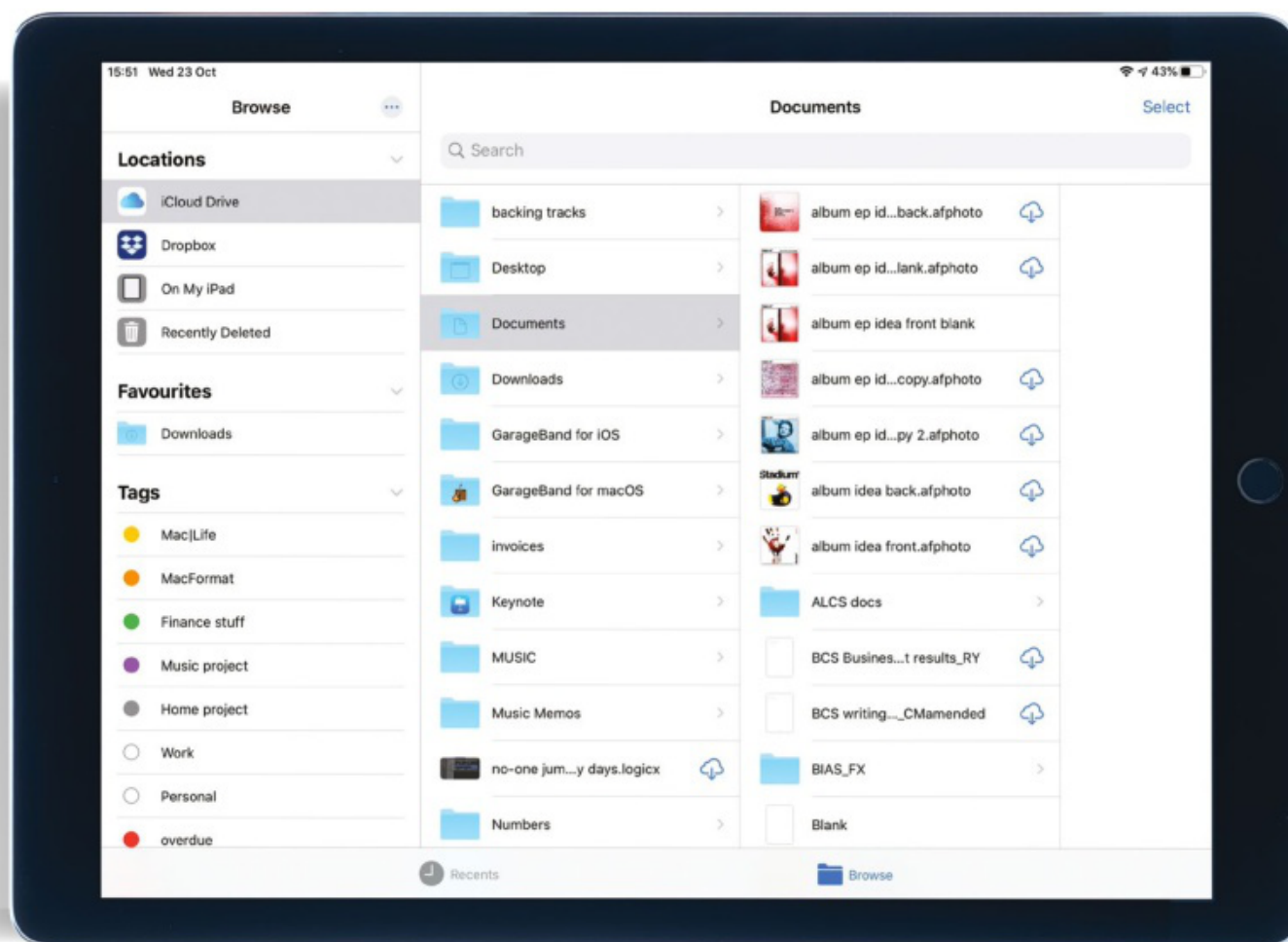
2 Sing along

As the song progresses, the current line will be highlighted in white (other lines will be less visible) and scroll to the top of the page. You can scroll up/down to move the song along, and tap on a particular line to jump to that point.



3 Pause, or move on

After a few seconds, iOS automatically hides playback controls. To access them, tap on the lower part of the screen and they'll pop up. Tap the album artwork or the speech-bubble icon to close the interface and return to Now Playing.



New features in Files

Proper file management is easy on your iPad with this update

REQUIRES

An iOS device with iOS 13
or iPad with iPadOS

YOU WILL LEARN

How to use the new
features in Files

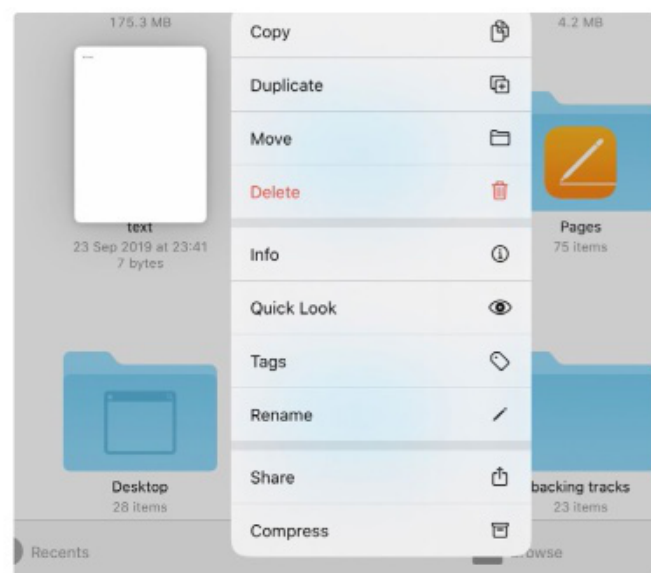
IT WILL TAKE

10 minutes



FOR MANY YEARS, Apple didn't want anybody to go anywhere near file management on iOS devices:

that was something you did on your Mac, not your simpler, streamlined iOS device. That changed in iOS 11 with the introduction of the Files app, which enabled you to access your iCloud Drive as well as third-party services such as Dropbox. You can use it to play media



The option to copy a link only appears for cloud services such as Dropbox: it's not yet available for iCloud Drive.

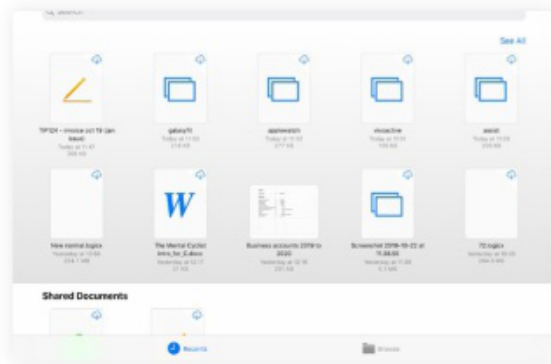
files, view and annotate documents, and send files to apps such as Mail and Messenger. And in iPadOS (plus iOS 13 on iPhone) the Files app has been given some key new features.

Files doesn't look much different in iPadOS, but it's become considerably more powerful. It had to, because iPadOS introduced support for new kinds of storage: if you have a USB to Lightning adapter, you can move files to and from USB drives, SD cards, SSDs, and hard drives. iOS also supports SMB file servers so you can connect to devices such as home networked storage devices.

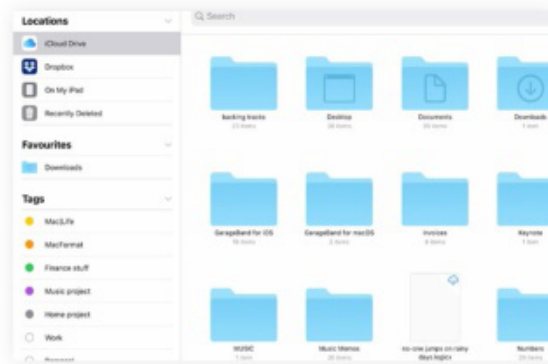
Files also works a lot more like Finder does on your Mac. You now have a Downloads folder where you'll find stuff from Safari and Mail, you can compress files and unzip them, and you can create your own folders. You can even scan documents directly into the Files app.

One thing that hasn't made it to Files just yet is iCloud Drive sharing. That's expected very soon. You can easily share links from Dropbox and other cloud storage services that you link within the Files app, though. **CARRIE MARSHALL**

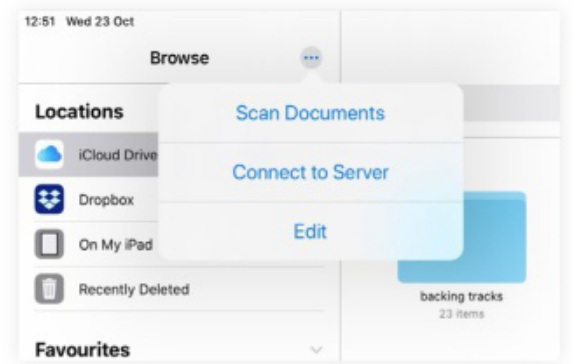
HOW TO Find your way around Files



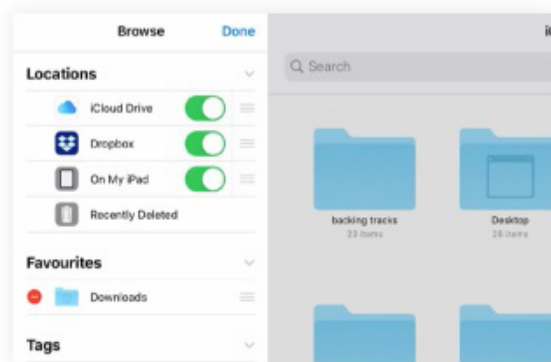
1 See your stuff
At first glance, Files doesn't look any different from before. It opens in Recents view, which shows you the most recently used files in your iCloud Drive. You'll see there's also a Browse option at the bottom of the screen.



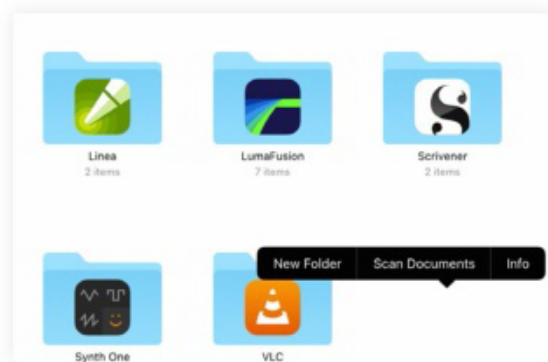
2 See all your storage
When you tap Browse you'll get this view, with a sidebar showing all your available locations – including attached drives and any cloud storage options – and the main window showing you the currently selected folder.



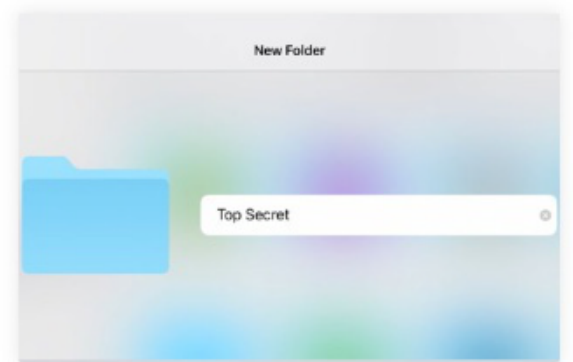
3 Scan directly to Files
iOS's document scanner is now in Files, so you can scan without having to launch a third-party scanner or camera app. Tap on the three dots to the right of Browse and select Scan Documents.



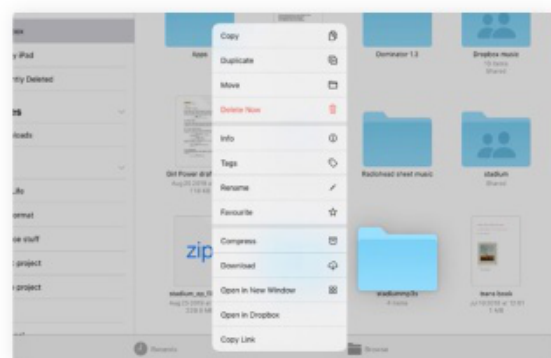
4 Edit locations
The Browse options also enable you to connect to a networked server such as a media server, or to edit and re-order the list of locations and tags that appears in the Sidebar at the left of the window. Tap Done to finish.



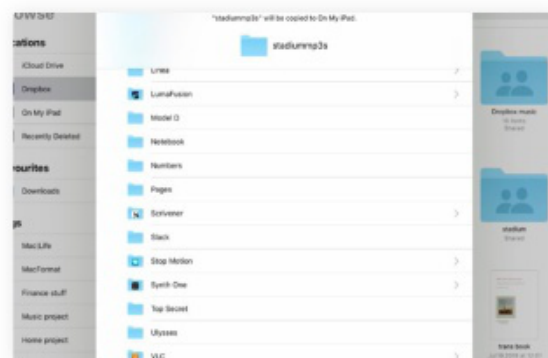
5 Make your own
Apps have been able to make their own folders for ages, and now you can join in the fun. To create a new folder, long-press in a blank bit of the main screen to see three options: New Folder, Scan Documents, and Info.



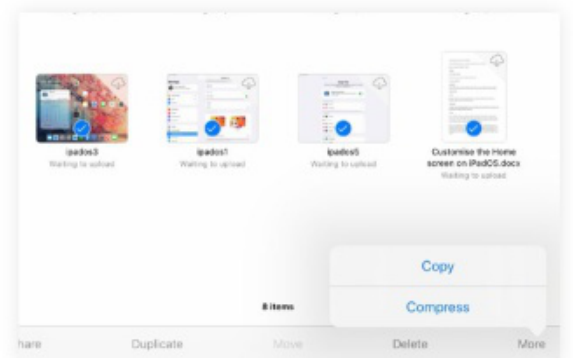
6 Name your folder
If you tap on New Folder you'll be taken to this really rather large field where you can give it a descriptive name. Type whatever you want to call your folder, or use the little "x" icon if you need to clear the whole field.



7 Explore the options
Long-pressing on a file or folder brings up the actions that you can use on it, with file operations such as copying and moving; tagging or favoriting; downloading if it's in the cloud; or just copying a link for sharing.



8 Move it around
If you select the Move option, you'll now be able to scroll through the available folders, just as if you were moving a message in Mail. It's quite a long list if you have a lot of apps installed on your iPhone or iPad.



9 Zip it up
You can easily compress multiple files, creating a compact .zip file that's better for sending or sharing. Select the files by tapping Select in the top-right corner, then tap each file so a check appears. Tap More > Compress.



Multitasking in iPadOS

Do more things at once with Split View and Slide Over

REQUIRES

iPad running iPadOS

YOU WILL LEARN

How to use the new multitasking features on your iPad

IT WILL TAKE

10 minutes



GENIUS TIP

You can drag apps into Split View or Slide Over from Spotlight if you have a keyboard: in an app, use **Cmd + Space Bar** to open Spotlight, then search for an app.



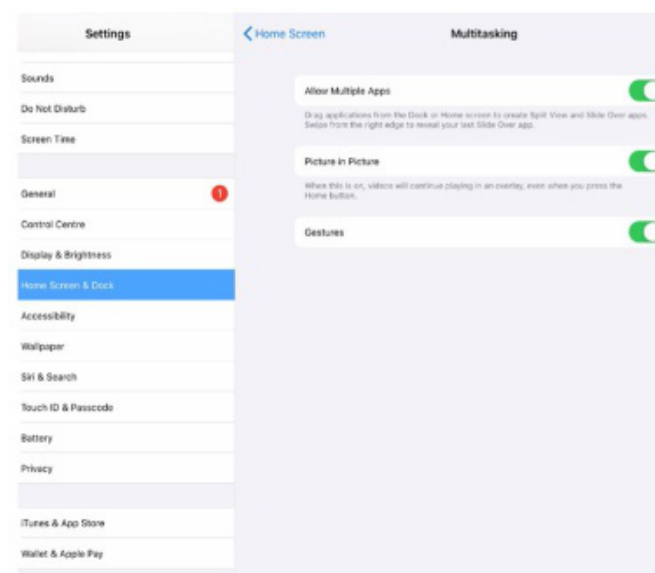
THE FIRST iPADS didn't multitask: you could do one thing at a time and nothing else. A very basic kind of multitasking was introduced in iOS 4 for iPhones, but iPads didn't get it until iOS 4.2 in 2010. Even then, it wasn't really multitasking: it was fast app switching and the ability for a very small selection of apps to use a handful of features — such as location services or audio playback — in the background.

Today, though, iPads really do multitask. You can run apps in Split View, where two different apps or two copies of the same app run side by side. Or you can run them in Slide Over, where one app hovers over the other(s).

Some of these features were in iOS 12, but they've been improved for iPadOS 13: its version of Slide Over supports up to five apps and Split View runs up to three apps or app windows. There's also a new App Exposé option that shows every open instance of a specific app, including any in Slide Over and Split View views. To see it, press and hold on the app's icon in the iPad dock then tap on Show All Windows.

It's all very useful stuff, but we'll be honest: it isn't always obvious what you need to do in order to do what you want, and sometimes it takes more than one swipe or drag to get Slide Over or Split View to function. But it's worth persevering with, because iPad multitasking is a real time-saver. You'll get used to the right movements quickly!

CARRIE MARSHALL



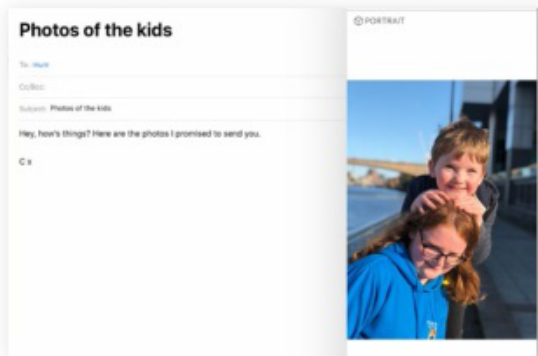
If you don't want to use multitasking and want to turn off its gesture support, you can do that in **Settings > General > Home Screen & Dock**.

HOW TO Multitask in iPadOS



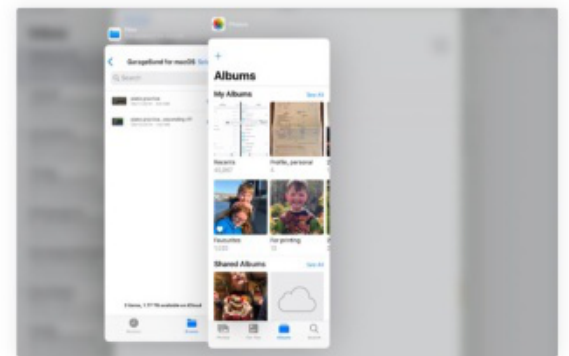
1 Drag it out

Slide Over is great for quickly checking documents or messages. To use it, open the main app you want and then slide up to see the Dock. Drag the icon for the second app towards but not onto the edge of the screen.



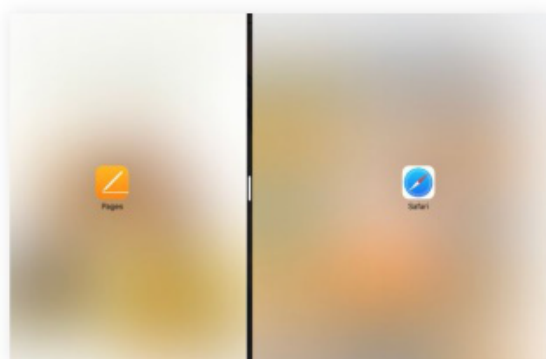
2 Drop the app

When you stop dragging, the second app will appear in a panel at the side of the screen. You can use it like any other app. To move it, drag from the top. To close it, swipe it off the side of the screen, again from the top.



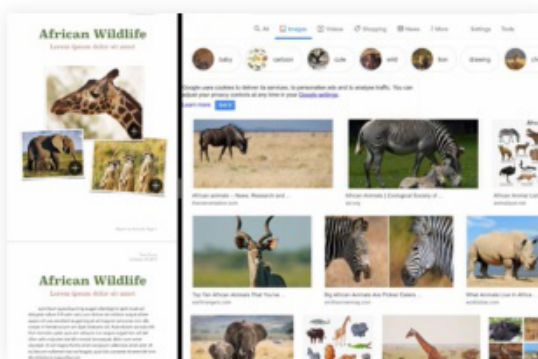
3 Slide Over switcher

To switch apps within the Slide Over window, swipe up from the bottom of it to see all apps you've used in Slide Over recently and pick one to switch to it. You can also swipe left or right at the bottom of the window to switch.



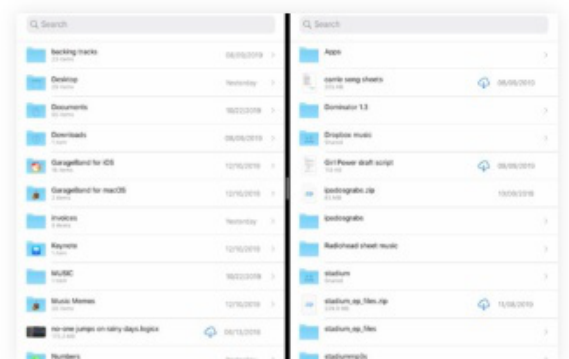
4 Use Split View

Split View works much like Slide Over, but shows both apps all the time. Follow the same process as for Slide Over, but this time drag the icon to the very left or right edge. The screen will show your app icons side by side.



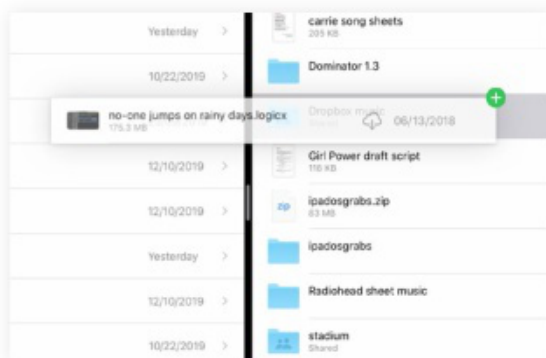
5 Adjust the split

See that thick divider between the two apps? Drag it sideways to change the proportions of the two apps. We use this one a lot with PDFs and documents that don't automatically resize to fit the app window.



6 The same app twice

You can have multiple versions of the same app in Split View: two Pages documents, two folders in Files, two websites in Safari. Open the app as normal, pull up the Dock, and drag the app's icon to the edge like usual.



7 Window swapping

If you open two instances of an app in Split View, you can drag items from one to another. Here we're dragging a Logic project from iCloud Drive to Dropbox. To close one, drag the divider to the edge of the screen.



8 See what's running

Swipe upwards from the bottom edge of the screen until the thumbnail view appears. This shows your recently opened apps, including Split View pairings. You can also see this by pinching anywhere with four fingers.



9 See one app's windows

If you have multiple windows of one app running, tap and hold on its icon on the Dock, then Show All Windows. This shows every instance of it, so you can jump to the right one.

Heart rate tracking and ECG

Taking care of your heart is easy with the Apple Watch



YOU WILL LEARN

How heart tracking and ECG work on the Apple Watch; how to take an ECG reading

BY FLASHING
LED LIGHTS,
APPLE WATCH
CAN WORK
OUT YOUR
HEART RATE



WHILE ITS ORIGINAL

intention was not a focus on well-being, the Apple Watch has now become synonymous with health and fitness. There is one physical measure that the device has packed since its launch in 2014, though: heart rate tracking. While the heart rate isn't actually the most reliable measure of a person's cardiovascular health, it's the simplest to measure, and it can provide a basic indication of a possible medical condition.

Apple has invested heavily in medical technology in an effort to make the heart rate tracker as accurate as possible. And that tech also forms the backbone for the more technically-demanding ECG (electrocardiogram) tracking, which Apple incorporated in Apple Watch Series 4.

HEART RATE TRACKING

So now here's the science bit: photoplethysmography (PPG) is a method of detecting blood volume changes in a microvascular bed of tissue, allowing a person's heart rate to be measured non-invasively on the skin's tissue. And this is how the heart rate tracker on the Watch works.

According to Apple: "Blood is red because it reflects red light and absorbs green light. Apple Watch uses green LED lights paired with light-sensitive photodiodes to detect the amount of blood flowing through your wrist... When your heart beats, the blood flow in your wrist — and the green light absorption — is greater. Between beats, it's less. By flashing its LED lights hundreds of times per second, Apple Watch can calculate the number of times the heart beats each minute."

These LEDs and infrared diodes are housed in the ceramic back of the Watch. The infrared is the primary system, and takes a reading every 10 minutes in the background even if the Watch is not in use. The LEDs kick in as a fail-safe, when the data from the infrared seems inconsistent. The LEDs are used to measure heart rate during workouts, breathe sessions and heart rate variability tests (the variation in the time interval between two consecutive heartbeats).

ECG TRACKING

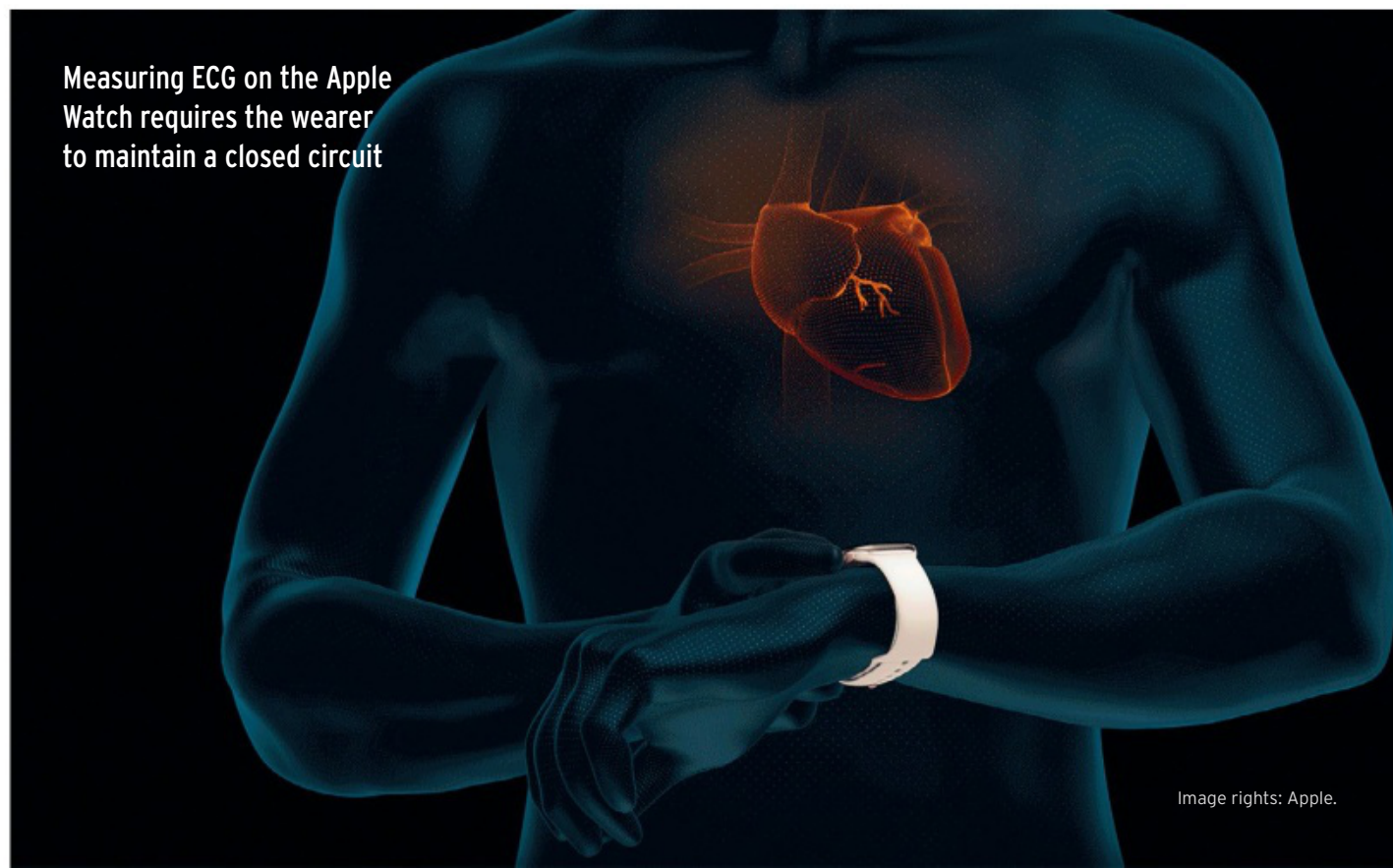
An electrocardiogram, which measures your heart rate, rhythm and electrical activity, is a little more complicated. ECG



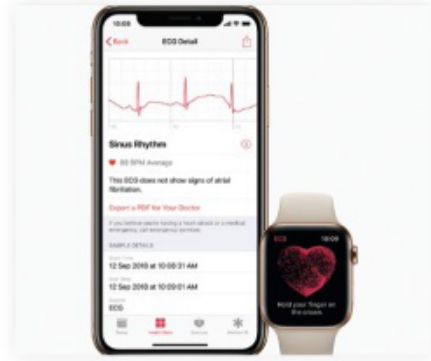
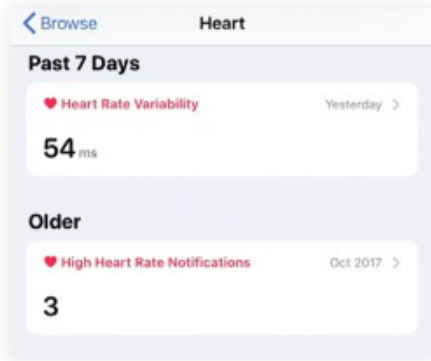
KEY FACT

Photoplethysmography (PPG) used to measure heart rate is similar to a pulse oximeter. The system illuminates the skin and measures change in light absorption as blood circulates.

Measuring ECG on the Apple Watch requires the wearer to maintain a closed circuit



EXPLAINED Taking an ECG reading



JARGON BUSTER

Atrial fibrillation is a heart condition that causes the heart to beat abnormally fast, or irregularly. There's no known cause, but it's known to be impacted by smoking and drinking.

1 Set up
To set up ECG, open Health on your iPhone, and open the Heart option. You should see an option to Set Up ECG App. Follow the steps indicated. Once you've set up the app, you should see it appear on your Watch. If you don't see the option, update to the latest iOS and watchOS.

2 Take a reading
Open the ECG app and rest your arm on a table or your lap. With your opposite hand, hold your index finger on the Digital Crown, but do not press it. The recording takes 30 seconds, so for the best results, don't move during this reading time.

3 View results
Once the test is completed, you can view results in the Health app on your iPhone. The app classifies results into Sinus Rhythm, Atrial Fibrillation, Low or High Heart Rate, or Inconclusive. You can export the results as a PDF to share with your doctor if you want.

readings need to be as accurate as possible, and this is one of the reasons it's taking Apple time to get the feature approved by government and medical boards in a number of countries; currently 40 countries have permitted the ECG feature on the Apple Watch.

With Apple Watch Series 4, Apple introduced a crystal electrode plate on the back of the Watch and on the Digital Crown for ECG measurements. With the Watch against your skin, you place your finger on the Digital Crown to create a closed (or full) circuit between both your hands. The closed circuit allows electrical impulses to flow through the Watch, so it can measure the impulses as they flow across your chest.

ACCURACY

One of the biggest concerns over health smarts is accuracy. Because they're not tested to the same standard as medical equipment used by professionals, devices like the Apple Watch cannot be used as a substitute for hospital tests.

Apple clearly states that the Watch is not 100% reliable, saying: "Even under

ideal conditions, Apple Watch may not be able to get a reliable heart rate reading every time for everybody. And for a small percentage of users, various factors may make it impossible to get any heart rate reading at all." Some factors that can affect accurate readings include skin thickness, perfusion (the amount of blood flowing through your skin), tattoos, and taking part in sports that involve irregular movements (such as boxing, tennis, etc).

The Watch has to be on top of your wrist for the sensors to work, but Apple says the fit of the Watch can also affect readings. It's also important to keep your Watch and skin clean and dry, as water and dirt can affect the sensors.

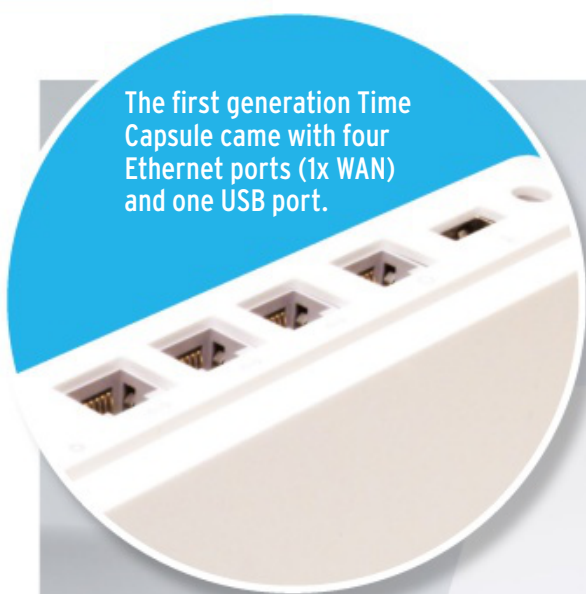
Apple has made significant improvements to the sensors over the years, and the Watch has been able to identify heart conditions for some users, which Apple has proudly mentioned in its keynotes. Apple's Health app already provides a comprehensive well-being overview, and the company is looking to expand its health-tracking features into related areas such as blood pressure and glucose monitoring. **SRIVATS LAKSHMAN**



KEY FACT

While PPG requires contact with the skin, there's a remote contactless version that uses video to analyze subtle changes in the skin color when blood flows. This is not visible to the human eye. Studies have shown it can be achieved with a regular camera, so maybe one day you'll be able to read your heart rate using the camera on your iPhone!

The first generation Time Capsule came with four Ethernet ports (1x WAN) and one USB port.



RANDOM APPLE MEMORY

Time Capsule

Adam Banks remembers the Apple accessory that made protecting your content as easy as plugging your Mac into the wall

OF ALL THE activities your Mac enables, backing up your files is not the most obviously enthralling. Yet backup was first on the bill when Steve Jobs delivered his San Francisco Expo keynote in January 2008. Introduced as a “Backup Appliance” for Mac OS X’s Time Machine software, Time Capsule was a version of the AirPort Extreme router with a hard drive built in.

Not only did this leverage wireless networking, then a novel concept and a headline-grabbing selling point, but it allowed one or even several Macs to be backed up with no effort whatsoever. Starting at \$299, the initial capacities of 500GB or 1TB would suffice for up to four typical contemporary systems.

Eyebrows were raised at Jobs’ claim that Time Capsule featured a “server-grade hard drive”. Although the Seagate Barracuda and Hitachi Deskstar disks installed weren’t marketed as such, their specs arguably justified the description. But cooling is a major factor in the longevity of hard drives, and the AirPort’s compact slab offered little air flow. As it turned out, however, it was another component that compromised reliability, with power supply failures in an early batch of units provoking a free upgrade program in 2010.

Generally, however, Time Capsule proved a popular way to achieve something that all too many home and small office users had simply found too

much hassle to bother with. In 2013, a fifth-generation redesign, renamed AirPort Time Capsule, brought a new pillar-shaped case, with options now ranging up to 3TB. But that year was the last to see updates to any AirPort product, and in April 2018 the demise of the range was made official. Today, while Time Machine is still included with every Mac and uniquely easy to use, non-Apple storage hardware – whether wired or wireless – is required to make it work.

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