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OCTOBER 2023

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1 IN 500,000**

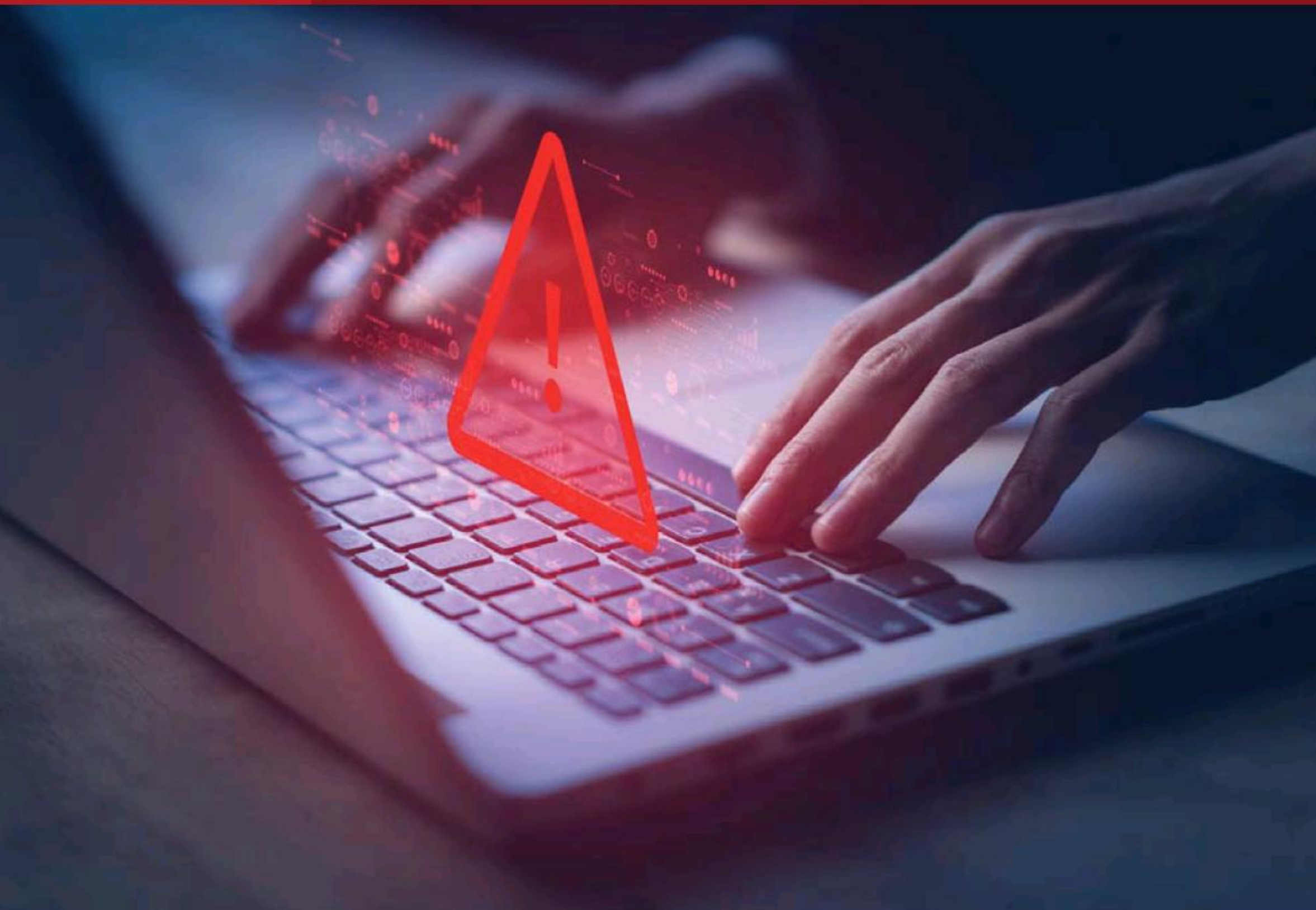
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Chrome turns on real-time phishing protection (and monitoring)

The upgraded Safe Browsing feature has nearly instant alerts for dangerous sites, but Google is downplaying the privacy issues. **BY MICHAEL CRIDER**

Despite the proliferation of tools to keep you safe, the web isn't actually getting any safer. To counter rising threats, Google has redesigned the Chrome browser's built-in protection scheme with the revamped Safe

Browsing. This new version of the distributed defense system actively monitors the URLs your browser visits, popping up a warning screen the second you stray into a part of the internet Google has determined is threatening. The update, which comes with a

bigger set of Chrome feature additions, should be live for everyone shortly.


Phishing is a particular focus of the new Safe Browsing features, as the threat is actively evolving. According to Google's blog post (fave.co/3RtjiKL), 60 percent of the domains used in these attempts to steal user data and compromise personal computers and smart devices are live for less than ten minutes before disappearing. That makes an updated local list of dangerous domains less and less useful. Google's solution is live monitoring, which checks the current URL against the centralized threat list in real time. Google says it offers a 25 percent increase in protection from phishing and malware.

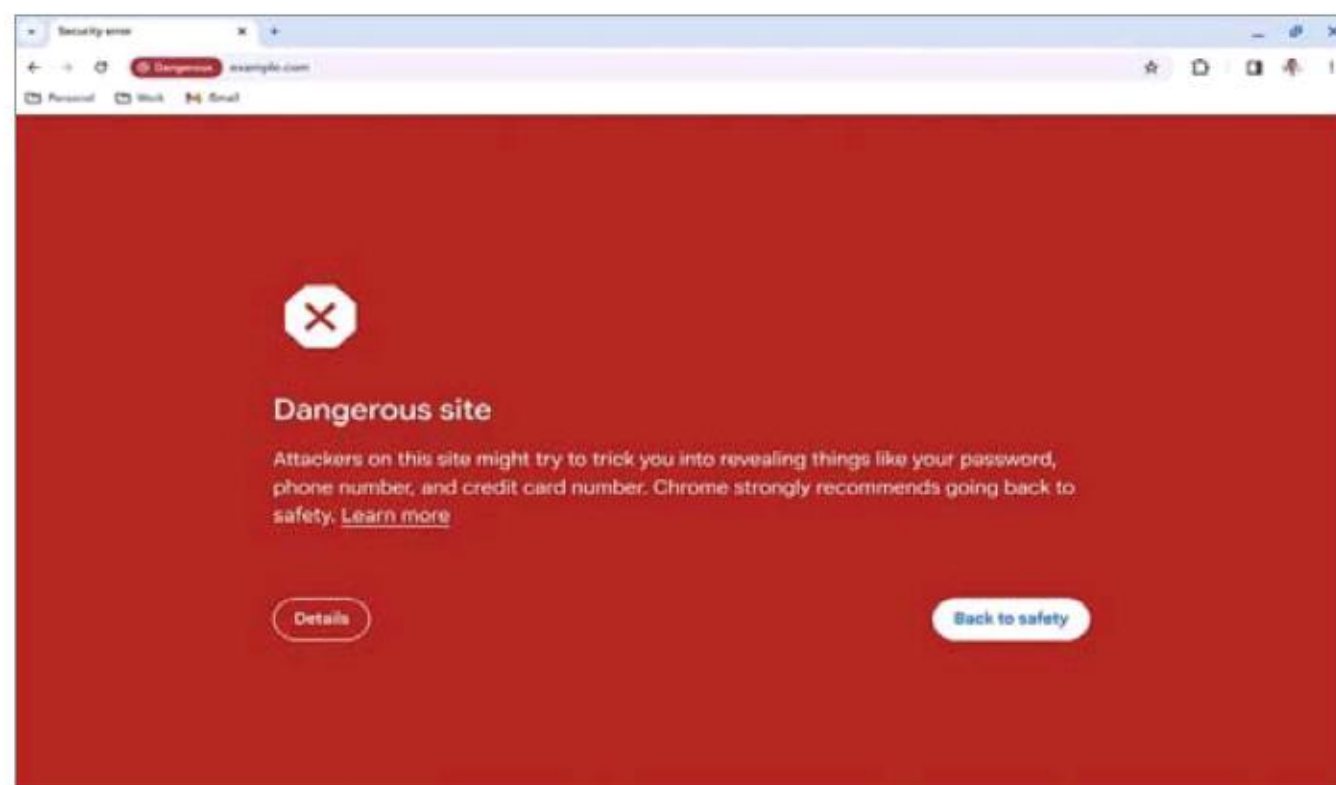
This feature was previously available in the Enhanced Protection setting in Chrome's security menu. Active monitoring will become the default, enabled in the Standard Protection setting mode. "A real-time check

will result in only the current 'known' verdict for the URL," according to information from a Google PR representative.

While user protection is laudable, not everyone is thrilled by the idea of Google checking each and every URL you visit and file you download for the sake of your safety. As Bleeping Computer notes (fave.co/46dok7c), there's a tradeoff in privacy, as data linked to your personal Google account now potentially includes a complete history of your activity on the internet. It's not just stored locally in a history file you can personally delete, but remotely on a corporate server (and temporarily, at least according to Google). A lot of users may not be keen to hand over that information to one of the world's most prolific advertisers. However, Google's PR representative stressed to me that these data are not used for ads.

Google's Safe Browsing page (fave.co/3yLlgyI) lists the benefits of integrating the

protection scheme in Chrome, Android, Gmail, Search, and Google Ads, but has little to say on the privacy aspect of the setup. While it's possible to disable Safe Browsing in Chrome and on your Google account, it's turned on by default for all users. 



Google's Safe Browsing page will warn you of suspicious sites.

Microsoft is killing WordPad, a mainstay since Windows 95

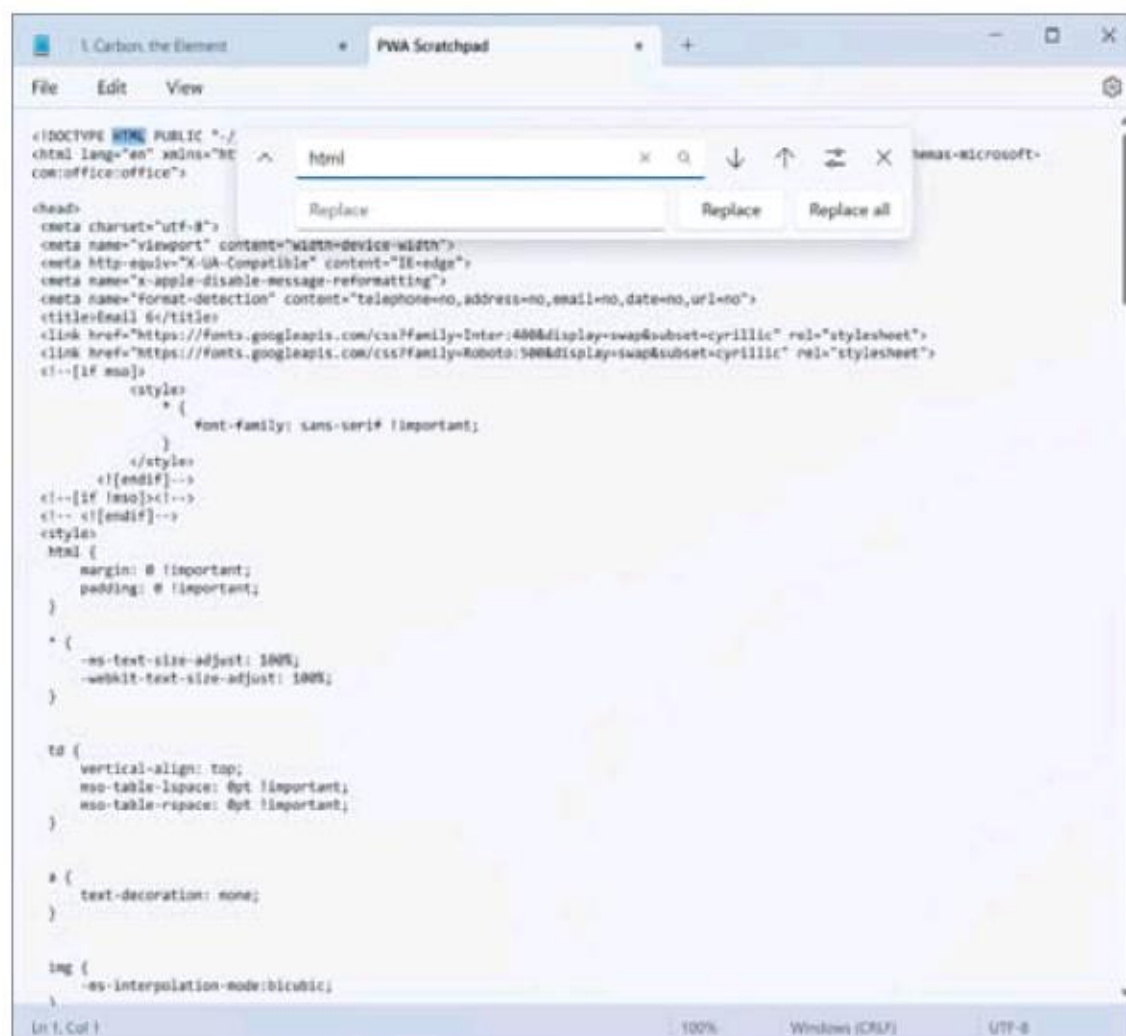
Microsoft's rich Windows text editor, WordPad, is officially deprecated. **BY MARK HACHMAN**



WordPad, a Windows rich editing app that has been a mainstay of the platform since Windows 95, is on its way out. Microsoft has marked it for deprecation, a death knell that signals it will be removed in a future version of Windows.

BleepingComputer noted the change (fave.co/48dFe7z), which has been made official in Microsoft's list of deprecated Windows features (fave.co/45WmFmw).

"WordPad is no longer being updated and will be removed in a future release of Windows," Microsoft said. "We recommend



Microsoft recommends you use Windows Notepad for plain text documents in formats like .txt.

Microsoft Word for rich text documents like .doc and .rtf and Windows Notepad for plain text documents like .txt.”

According to Wikipedia, Microsoft Wordpad was first introduced in Windows 95, replacing Microsoft Write. It's not hard to see why Wordpad

was picked to head to the chopping block, however: While Microsoft has released new features for Notepad, it has largely ignored Wordpad. The notion of a rich text editor may also be outdated, since there are text editors like Notepad or Notepad++, word processors like Microsoft Word, and, well, not much need for something that's in between the two.

In any event, Microsoft hasn't said when it will finally eliminate WordPad once and for all. Will users rally around the software, as they did for Microsoft Paint (fave.co/3EN2llg)? We doubt it. Sorry,

WordPad, your time has come. 🛑



WordPad was first introduced in Windows 95.



Google extends Chromebook support to 10 years

Your Chromebook may now be supported longer than you thought. **BY MARK HACHMAN**

New Chromebooks will now ship with ten years' worth of security patches and updates, Google said Thursday, helping ease a persistent problem: the limited lifespan of Chromebook hardware.

Google will also support Chromebooks that were released in 2019 or later by an additional two years, also giving them ten years of patches and updates, Google said.

Windows PCs don't last forever, but Microsoft traditionally has never placed an

end-of-life date on a Windows PC until 2021, when it restricted some older PCs from upgrading to Windows 11 (fave.co/3C7aDbn). One of the differences between laptops and Chromebooks (fave.co/3RXkhnL) is that Google actually tells you when it will stop supporting Chromebooks. A Chromebook once exited support in just five years (fave.co/44YeLrj); in 2019, Google extended the Chromebook support window to eight years (fave.co/48lKaqG) instead.

(Google oddly hides this information, also known as the Auto Update Expiration date [fave.co/48mKaqO], on the linked support page. If you match your Chromebook's model number against the Google database, you can find out when your system's support window will expire.)

The problem, though, hasn't gone away: At some point, Google will stop supplying patches, putting a specific Chromebook and its user at risk. For a home user, using an out-of-date Chromebook may be an acceptable risk; for a school or government, it likely violates IT policy. As recently as April, groups have argued that this "Chromebook churn" contributes to e-waste. In fact, the U.S. Public Interest Research Group argued that Google should extend the Chromebook support lifespan (fave.co/3ZkVRKi) to ten years—exactly what Google has done.


It's not an automatic upgrade, however. If you own a Chromebook that was shipped in 2021, you'll automatically get ten years of

updates, Google said. But if you own a Chromebook that was shipped before that, you or an IT manager will have to "turn on" the additional support. It's not clear exactly how that will happen.

"You can find more information about the extended updates in our Help Center (fave.co/48mKaqO), Admin console or in Settings," Google said.

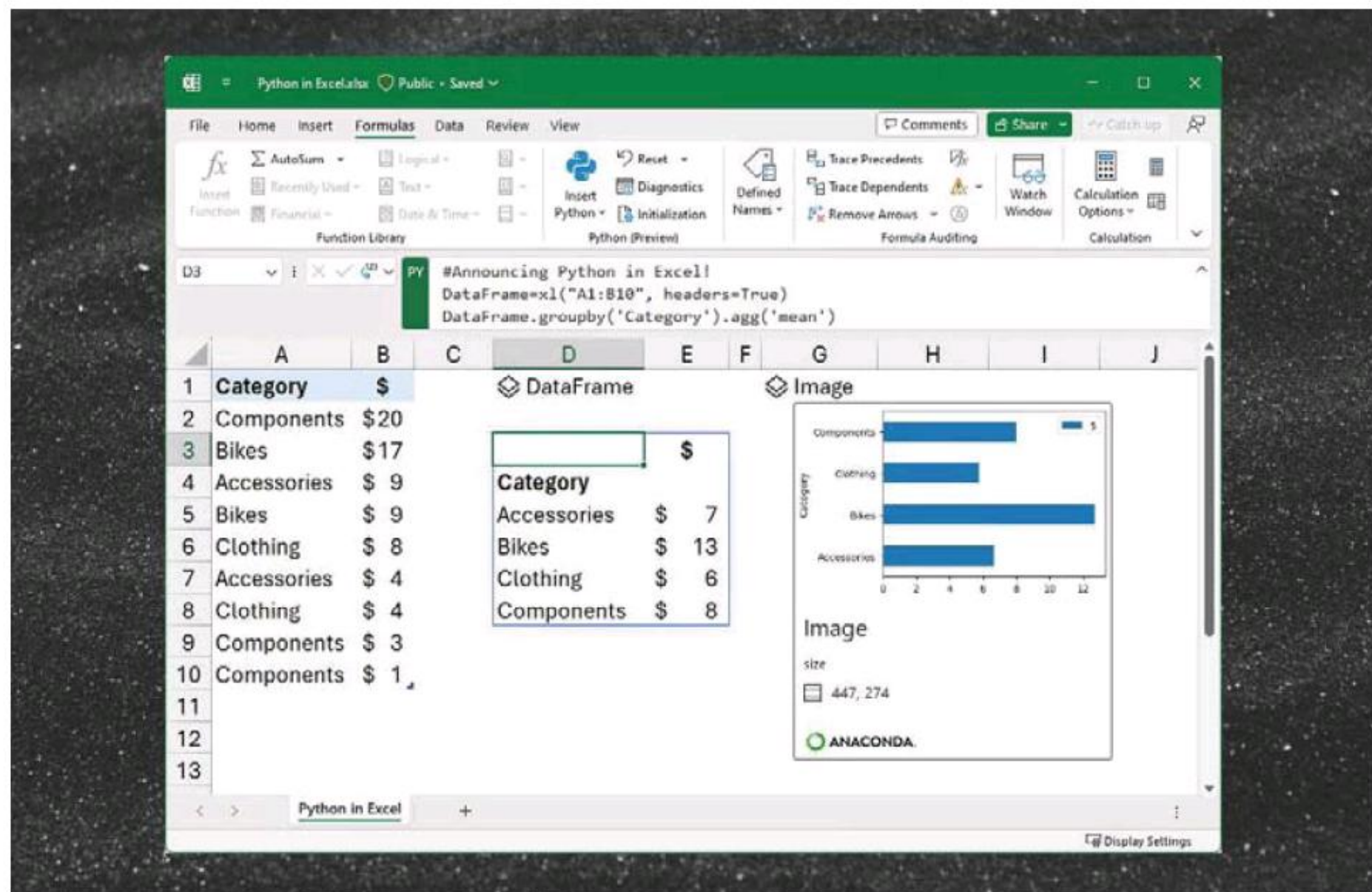
The extended support window still doesn't solve the core problem: Chromebooks will go out of support, *someday*. But Google highlighted greener solutions, like global recycling drop-off points that can be found in Google Maps (fave.co/3Rrlvev), to allow schools and users to recycle their Chromebooks. Google also highlighted its ongoing repair program to keep Chromebooks already in the field up and running.

You don't have to worry about the AUE support window in our list of the best Chromebooks (fave.co/3HbcehN); they're all new enough that they won't end support for many years. But retailers may try to foist older, expiring Chromebooks on you in what we call trap deals (fave.co/452bVlf): If you're not paying attention, you may end up buying a Chromebook that will essentially be defunct in a year or two. That problem won't go away.

Still, Google's decision means that whatever Chromebook you buy should last longer before you need to recycle it. That's a positive step in any case. 

You can now use Python in Microsoft Excel

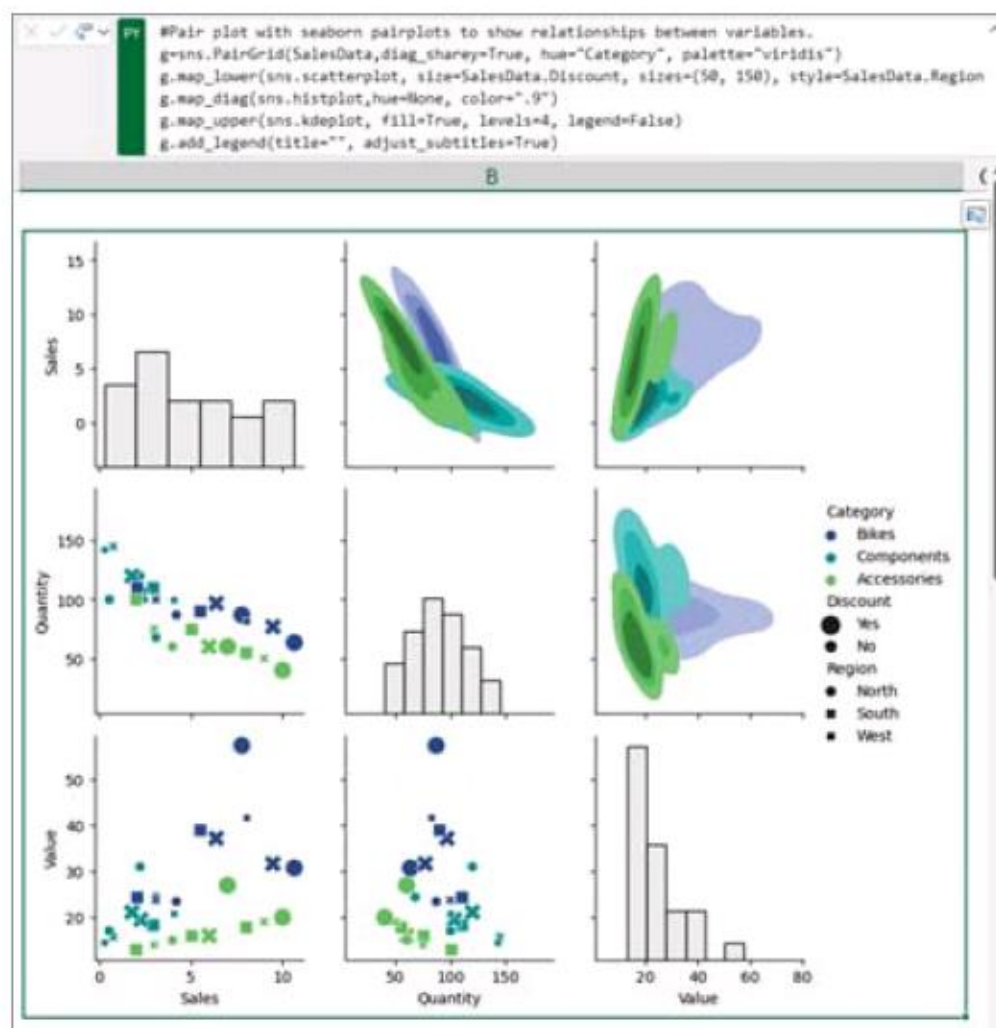
Microsoft 365 Insiders get first crack at this new preview feature. **BY ALAINA YEE**



If you've been feeling constrained by Excel's methods for manipulating data, you're in luck—you can now use Python within your spreadsheets. The inclusion of the popular programming language went live this past August, with the feature available as a public preview.

According to Microsoft (fave.co/46gf421), this integration is completely native within Excel; you won't need to run any setup

for it to work. (However, you will need to be part of the Microsoft 365 Insider program [fave.co/44QBgyE] to access preview features in Office apps.) You type Python code directly into cells using the new **=PY()** function, which then gets executed in the cloud. The results are displayed in the worksheet. In the examples shown by Microsoft, common actions like creating pivot tables and charts will be possible using



You'll be able to create tables and charts with Python.

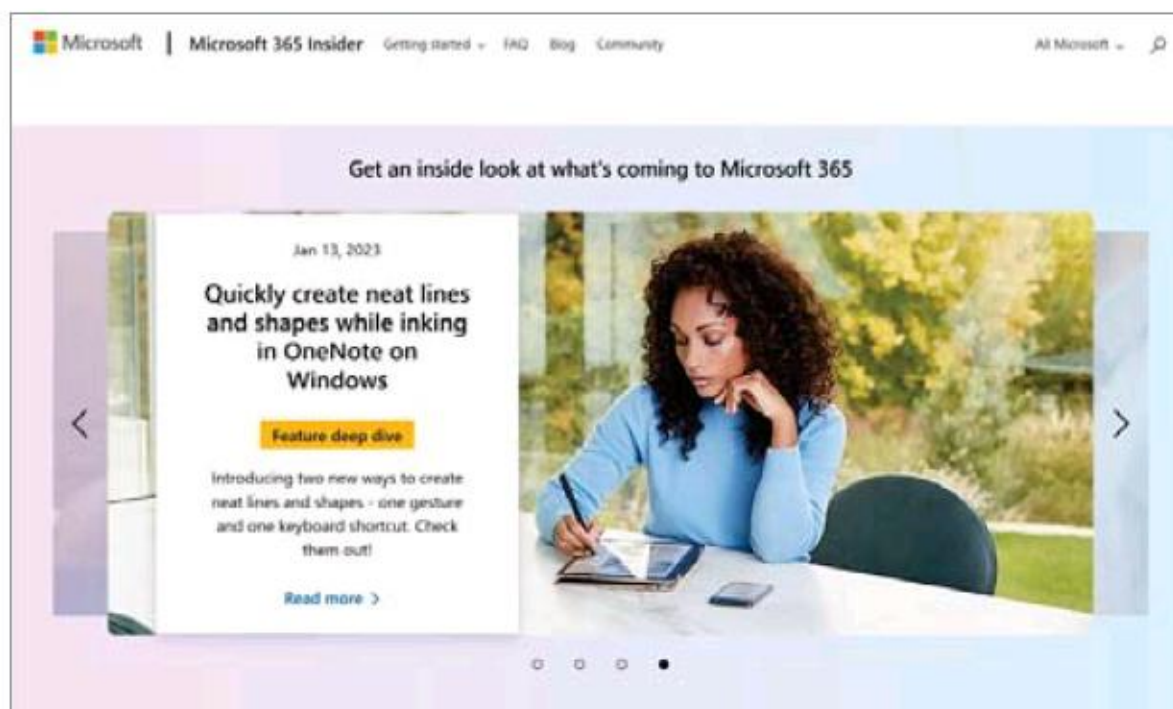
Python. Microsoft's partnership with Anaconda, a Python repository that contains popular libraries like Matplotlib, pandas, and scikit-learn, should also enable more-advanced visualizations.

The only potential limitation is that everything runs in the cloud—you won't have any access to local installations of Python, including any customizations you may have set up. This is in part for security purposes; Microsoft says Python in Excel is secured through use of isolated containers, with the code running in a hypervisor in

Azure. Online workbooks also open in separate containers. (You can read more about Microsoft's data security practices regarding Python in this support documentation: fave.co/46iHvfv.)

To get started, you must be part of the beta channel for Insiders and running Excel for Windows (build 16.0.16818.20000). Microsoft says support for Python in Excel for other platforms will come "at a later date." It is rolling out the feature gradually, however, so even Windows users may not immediately have access. Also, some functionality will be eventually gated off for paid license holders.

(Details will come closer to the official launch.) So if you want to be sure of having unrestricted access to Python in Excel when first testing it out, you're best off doing it during the preview phase. 🔌



You will need to be part of the Microsoft 365 Insider program to access preview features in Office apps.



Western Digital slammed with lawsuits over dead SanDisk SSDs

Several SanDisk Extreme series SSDs have erased customers' data. The manufacturer, Western Digital, is now facing a number of lawsuits. **BY BILLY EKBLOM**

So far, 2023 has been a bad year for Western Digital. Last spring, a major security breach occurred that locked customers out of their cloud-connected storage devices (fave.co/3PGcQUi). Now the manufacturer is

under fire for SSDs that unexpectedly disconnect and erase users' data.

Ars Technica (fave.co/3RpWznK) has summarized the situation and notes that three different lawsuits have now been filed against Western Digital after months of complaints by



Complaints mainly concern a number of models in the SanDisk Extreme series of SSDs.

customers. They mainly concern a number of models in the SanDisk Extreme series of SSDs, but the 4-terabyte version of WD My Passport is said to have the same problem. One member of the Ars Technica editorial team—and another at The Verge (fave.co/3RqTOSV)—reportedly experienced the sudden loss of data.

Western Digital released an update (fave.co/3RjluYW) in May, intended to solve problems with SSDs

suddenly disconnecting from the computer. But given the large number of testimonies and the lawsuits that have now been filed against the manufacturer, as well as the corroborating reports from the Verge and Ars Technica, it seems that the problem still exists to some extent.

Ars Technica has tried to get a comment from Western Digital, which said it does not comment on ongoing litigation. The Verge has also not received any answers to their questions.

Regardless of how this all shakes out, these reports of dying SanDisk SSDs serve as a painful reminder about storage reliability (fave.co/3PGcVay). Just like the original WD MyCloud outage, it harshly reiterates why you should always follow the backup rule of three (fave.co/45cjl5T). 🔌

Western Digital

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My Support

Support

Your Portable SSD May Require a Firmware Update

English

We have identified a firmware issue that can cause SanDisk Extreme Portable SSD V2, SanDisk Extreme Pro Portable SSD V2, and WD My Passport SSD products to unexpectedly disconnect from a computer.

To address and resolve this issue, we have developed a firmware updater tool that allows the needed firmware to be installed, enabling your continued use of the SSD on your Windows and/or macOS device.

Impacted Products

SanDisk Extreme Portable SSD V2

Where is my Serial Number?

SanDisk Extreme Pro Portable SSD V2

Where is my Serial Number?

WD My Passport SSD

Where is my Serial Number?

Check If Your Device Has Been Impacted

1 Input your serial number below.

Type in Serial Number

2 What OS are you using?

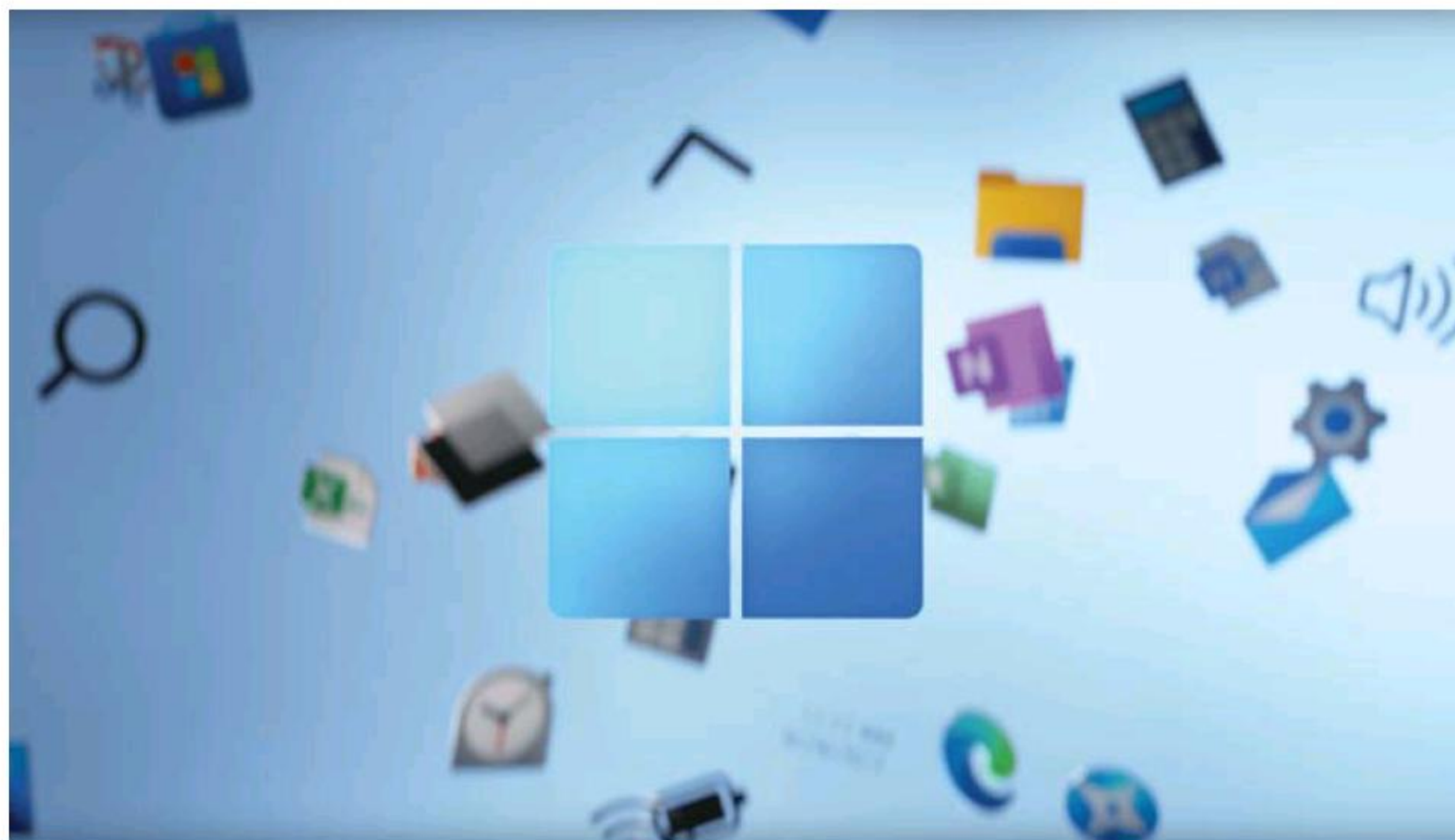
Select OS

Submit

Western Digital released a firmware update in May.

Microsoft's incessant Windows ads are getting out of control

They remind me of an endless, unwanted pitch for a time share. **BY ALAINA YEE**



Several months ago, I wrote about my irritation with Windows ads—how I hate having Microsoft push services and products within a piece of software *I paid for*. Sadly, the situation hasn't improved since then. Instead, it's getting worse.

When I last complained about this in April (fave.co/46hjN8s), the ads were set to come to the Windows 11 Start menu, as well as badger people using local accounts. But then they spread to the Settings app ([fave.co/](https://fave.co/46hjN8s)

3Lslqn1) in Windows 11. After that, they showed up in pop-ups that appeared when an update completed. Now, not only is Microsoft nagging Windows 10 users to upgrade (fave.co/3ZpfVeM), but as The Verge documents (fave.co/48vhZWG), new Microsoft ads are springing up on the Windows 11 taskbar while you're active in apps and games.

Look, I'm not in marketing, but if an ad causes a seasoned tech journalist to briefly think his PC got infected with malware, maybe your advertising approach needs improving.

(In a statement to The Verge, a Microsoft spokesperson called this ad behavior “unintended” and said it is being addressed. Meanwhile, Reddit posts complaining about the pop-up date back several months.)

I suppose this could be like spam, where the campaign is purposely designed to reel in easy marks. But for every person who decides they will try Microsoft 365 after all or suddenly abandon a local account in favor of a Microsoft account, thousands are likely confused by these repeat prompts. And the more savvy users then have to reassure them and explain what’s happening. (Hi.)

“I thought I got rid of that window” is something I’ve heard all too often from friends and family. Yes—you did.

The latest set of ads in Windows 11 have been for Bing, which Microsoft seems insistent on promoting during the current artificial intelligence wars. (The company has

also been placing a floating Bing search bar on the desktop without warning; I hate that more than the ads every time I see it on yet another PC I own, as it feels deeply invasive.) Perhaps Microsoft thinks exposure will increase interest in its search engine.

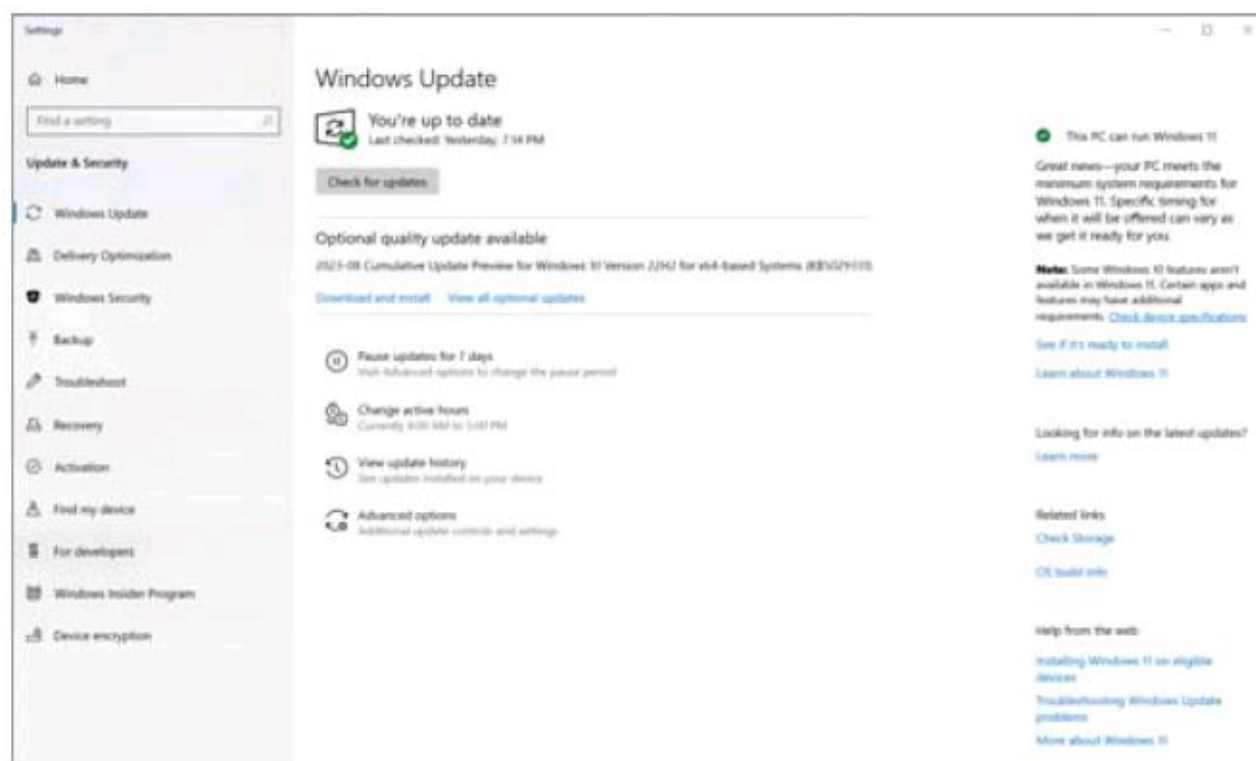
But let’s set the record straight. People who have installed Chrome vastly outnumber those who use Edge. By market share, Chrome is around 60 percent, while Edge is 5 percent. And keep in mind that a person has to go through the trouble of downloading Chrome and installing it. They’re actively and consciously making this choice.

Most of those users also want Google as their default search engine, especially if they’re invested in the ecosystem (that is, they have a Google account). They have little reason to jump ship. Bing is comparable as a search engine at best. It doesn’t have a special quality to lure people away.

Windows 10 offers no relief from Microsoft’s ads, either. On that side of the fence, Microsoft is turning up the pressure to upgrade to Windows 11. There are of course the regular reminders in Windows Update. But recently, I’ve spotted an update notification icon that camps in the taskbar. I’ve also run into an interstitial screen that popped up after



This screenshot taken by The Verge shows the pop-up ad appearing over a game—the occurrence of which briefly caused senior editor Tom Warren to think his PC had malware.



Right now, my Windows 10 computer is free of pushy Windows 11 notifications—but I expect another round to pop up soon, since Windows Update is still reminding me I have a compatible PC.

an update—one that not only blocked my ability to get to my desktop, but required declining Windows 11 twice. Worse, escaping from that upgrade prompt was tricky. Its buttons were confirmations to switch over to Windows 11—in order to refuse, you had to click on a smaller, less visible text link on the bottom left.

You can hack the Windows registry to make these Windows 11 nags stop (which Tom's Hardware explains in its own article about the escalation of Windows ads; fave.co/3ZpfVeM), but it's only an option for those with a Windows 10 Pro license.

In my book, if a company has to *trick* people to get them to change products, it knows no one wants to switch. Not that it's a secret people prefer Windows 10. As Tom's Hardware points out, Windows 10 makes up

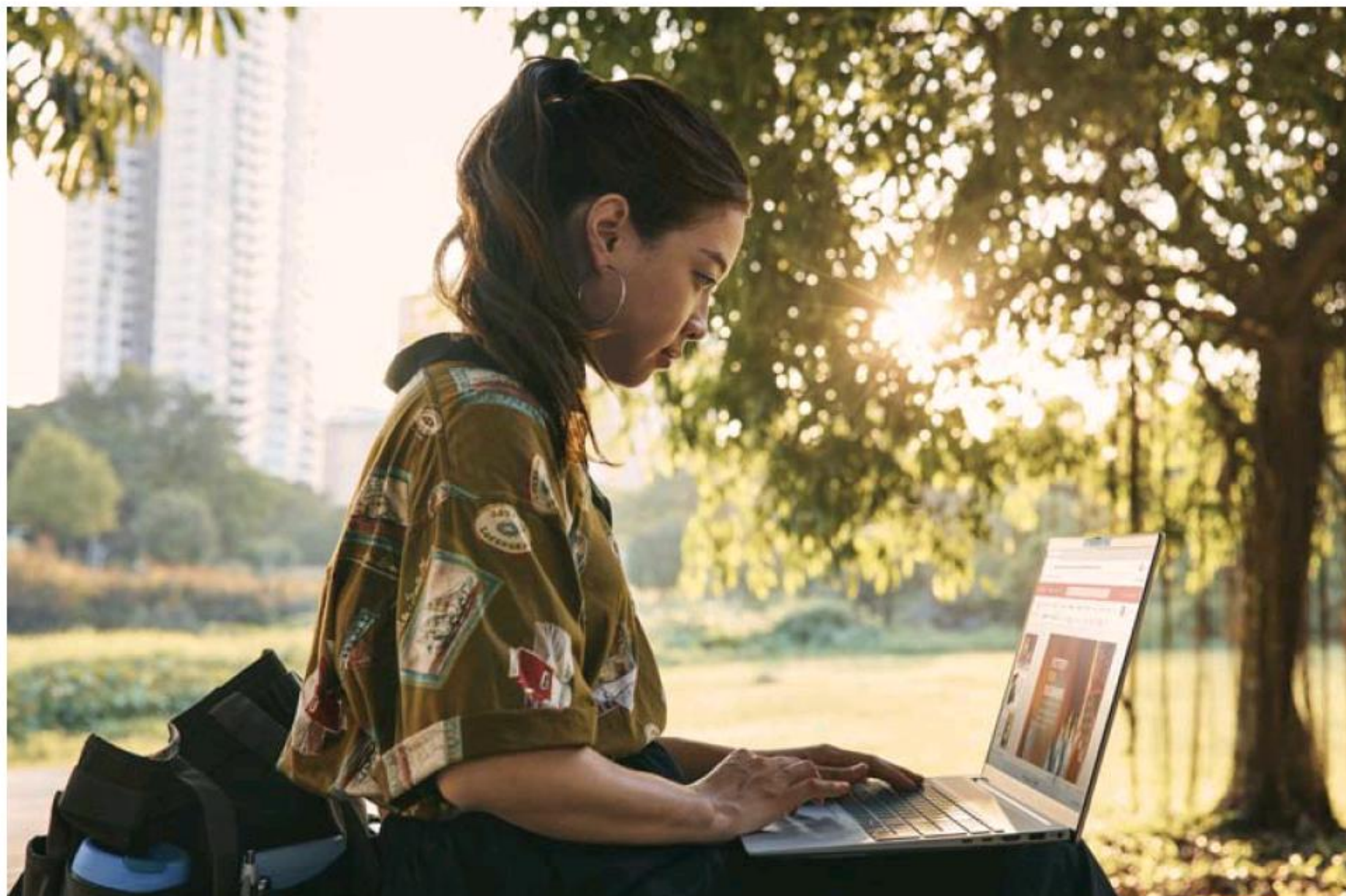
over 70 percent of Windows installations.

Microsoft could take so many other tacks to win over hearts. Letting people transition naturally to Windows 11 is the easiest—there's only two years left before Windows 10 hits its end of life. Improving Windows 11's user interface (fave.co/3lhGcnE) and offering more cool features (fave.co/3rhHazW) would also entice people over

faster. (This is my reason for still preferring Windows 10.) And Bing sounds a heck of a lot more appealing when highlighting its biggest advantage over Google: Microsoft Rewards (fave.co/46ylsAX). It lets you earn points toward an Xbox Game Pass subscription or gift cards to restaurants and stores.

It's so confusing, because we all can be swayed into liking a product or service. A smart marketer plays up the benefits and makes them impossible to live without. Annoying people—and doing so with an increasing level of determination—isn't in the playbook. But apparently Microsoft missed that memo.

(P.S. Linux fans, this is your regular reminder that your favorite distro does not solve all Windows problems [fave.co/3OezAu0]. I am still not interested.) 🔌



HP's Pavilion Plus laptops offer metal builds and surprising value

The new 14- and 16-inch designs offer a lot of bang for the buck, with base models starting at 16GB RAM and 512GB SSD. **BY MICHAEL CRIDER**

The Pavilion lineup is HP's answer to the IdeaPad or Inspiron line in its competitors, sort of the Toyota Camry of the consumer PC world. But the company is spicing up this vanilla image with this year's new entries, the Pavilion Plus 15 and 16. Anodized aluminum bodies give these laptops a more premium look, and better internals make a case for users looking

for a bit more power and capability in a mid-range design.

The 14-inch Pavilion Plus offers the widest options, with both 13th-gen Intel Core i5 or i7 and AMD Ryzen 5 or 7 (up to a 7840H) choices depending on the build. But the screen is the star of the show. While the base model has a serviceable 1920×1200 IPS panel, you can choose between a



Both models have a premium look.

2560×1600 IPS with 120Hz or an even sharper 2880×1800 OLED, also at 120Hz. If you're upgrading the screen, go for the AMD option, since you can also get Radeon 740M, 760M, or 780M included for a little extra graphical punch. The webcam gets a welcome 5-megapixel improvement.

Other hardware options are fairly standard, but it's nice to see the configurations start at 16GB of DDR5 memory and 512GB of PCIe 4.0 SSD storage. I/O is no slouch, either, with double USB-C ports, two USB-A ports for older connections, and full-size HDMI. HP claims up to 13.5 hours of video playback on a single charge, and you can get the laptop in silver, blue, or pink colorways. Prices start at \$850, which is impressive given that

16GB/512GB base model, and the laptop will start shipping in September.

The 16-inch version of the Pavilion Plus offers fewer choices, with only two Intel processors (i5-13500H and i7-3700H) and two colors, silver and gold. (Hey, Yukon Cornelius approves.) There's just one screen on offer, but it's a solid one, a 16-inch IPS offering 2650×1600

resolution at 120Hz. Graphics come in either an integrated Intel Xe or a GeForce RTX 3050 discrete GPU, and the bigger battery boosts longevity to a hair under 16 hours. The same storage and memory options are present, ditto for ports, with a small upgrade to Thunderbolt 4 on one USB-C port. Prices start at \$1,000, with the models launching this month. 🔌



The 16-inch version is available in silver (pictured) and gold.

Thunderbolt 5 will debut in 2024 with gamer-class charging

So far, however, Intel isn't saying when Thunderbolt 5 will appear on your next Core-powered notebook. Spring? Fall? It's a guessing game. **BY MARK HACHMAN**



It's official: The next-generation Thunderbolt spec, called Thunderbolt 5, will debut next year with enough charging power and bandwidth to support eGPUs and a new class of "external AI devices."

Intel teased the new Thunderbolt specification at the end of 2022, promising that the next-gen Thunderbolt (fave.co/45X2vc6) would continue the trend of doubling bandwidth, all the way to 80Gbps in one direction. That included a promise,

now confirmed, that the four lanes of Thunderbolt could be reconfigured to allow three lanes from a laptop to a monitor, rather than two. That will allow the option of a 120Gbps connection to a display, which Intel now refers to as Bandwidth Boost.

Thunderbolt 5 will eventually be integrated within Intel's Core platforms, primarily laptops. Although Intel has a prototype dock and laptop that it will begin showing off to customers, integrated Thunderbolt 5 will debut in laptops "in

2024,” Intel executives said. Unfortunately, Intel is not saying whether that will be inside its new Meteor Lake chip (fave.co/3PI6UKt) or some other platform.

Thunderbolt 4 and 5 will coexist for some time, though, Intel said, eventually giving way to the updated spec.

Intel’s discrete Thunderbolt 5 controller will be known as “Barlow Ridge,” a chip that Intel will sell to Thunderbolt dock and device makers.

Thunderbolt and the associated ecosystem of Thunderbolt docks (fave.co/3vtA0BE) quietly emerged into the mainstream alongside the growth of working from home, as workers discovered that their laptops were lacking in display and I/O ports, which had largely been replaced by a single USB-C connection.

More and more of these laptops now run the Thunderbolt high-speed connection through the USB-C port—and Thunderbolt embeds the DisplayPort protocol. All this means is that a variety of devices, from docks to displays to SSDs to even external GPUs, can run over a single Thunderbolt cable. That cable will remain at its current 1-meter length in Thunderbolt 5, Intel executives said, though a 2-meter active cable is in development.



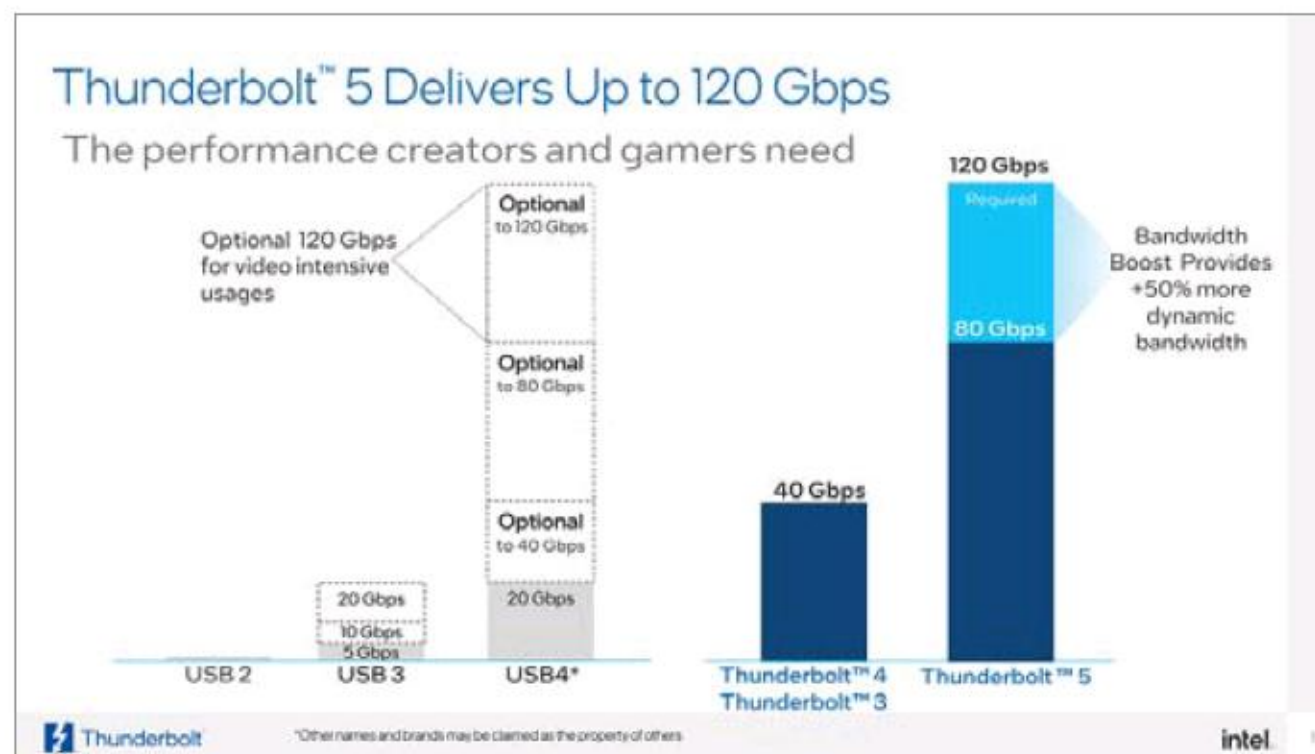
Thunderbolt docks emerged into the mainstream alongside the growth of working from home.

WHAT'S IN THE THUNDERBOLT 5 SPEC?

The rule of thumb with Thunderbolt 4 is that the 40Gbps connection allows a laptop to connect to two 4K displays running at 60Hz. The additional bandwidth of Thunderbolt 5 will allow for three 4K displays *running* at 144 Hz—which you might call the entry level for the refresh rates gamers typically demand.

Intel executives said that Thunderbolt 5 will be backward compatible with earlier implementations of Thunderbolt. If you plug a Thunderbolt 5 device or dock into a laptop equipped with Thunderbolt 4, the device or dock will work, albeit at the older, slower 40Gbps speed, they said.

Thunderbolt 5 will also double the available data bandwidth to address storage



Thunderbolt 5 will provide improved performance.

devices and eGPUs, going from 32Gbps in Thunderbolt 4 to 64Gbps in Thunderbolt 5. Two additional features are worth noting: Thunderbolt 5 will supply 240W of charging power downstream to the PC (plus a maximum of 15W to connected devices) and the spec will support PCIe Gen 4, versus PCIe 3 in Thunderbolt 3. Gamers should cheer both improvements, as the first will allow some gaming notebooks to store their proprietary charging cables inside the box and use a USB-C charger and cable instead. The second will allow those PCs to connect to faster PCIe Gen 4 SSDs and devices, too.

The additional display bandwidth will also be able to drive multiple 8K HDR displays or single displays at up to 540Hz. (Intel isn't breaking out all of the possibilities quite yet.)

Thunderbolt 5 also supports DisplayPort 2.1 (versus version 1.4 HBR3 supported in Thunderbolt 3). The difference is that

DisplayPort 2.1 supports a maximum 10K resolution (10,240×4,320, 60Hz) on a single display, versus the 8K resolution DisplayPort 1.4 supported. DP2.1 also includes an improved version of Display Stream Compression (DSC 1.2a), which can do a better job of

managing bandwidth versus the older spec.

Intel's Bandwidth Boost is a new feature, and one users shouldn't have to worry about, especially if they have a standard 1080p or 4K display. According to Jason Ziller, general manager of the Client Connectivity Division at Intel, Bandwidth Boost will be handled by the Intel Connection Manager utility.

"If it detects a high-bandwidth display that's requesting the extra bandwidth, [it] will automatically switch into that bandwidth boost mode," Ziller said. "And then...if you disconnect the display, the same thing would [come into] play, in that it would readjust to whatever devices are connected."

Though few users probably use Thunderbolt to network two PCs, the available networking bandwidth in Thunderbolt 5 has doubled to 64Gbps. That's the same amount of bandwidth that users will have to access storage devices like

SSDs—again, double that of Thunderbolt 4. Given that Thunderbolt 5 supports PCIe Gen 4, laptops could gain a nice I/O performance boost, overall.

And yes, that includes even eGPUs. While Thunderbolt 3-enabled eGPUs exist, few if any Thunderbolt 4 eGPU enclosures were ever produced. Ziller specifically highlighted Thunderbolt 5 eGPU enclosures as devices that could be attached to Thunderbolt 5.

A surprising new category could be external AI accelerators, Ziller said. Intel's Pat Gelsinger has said that the new Meteor Lake processor will usher in the "AI PC," (fave.co/3PI7gkh) and apparently Thunderbolt 5 could complement an eGPU with a specific AI box. "We may see a similar thing for different types of external AI accelerator solutions that could be improving things like video, videoconferencing, collaboration, audio effects, various types of creator and gamer

effects that are using AI, and then the local AI inferencing," Ziller said, thus avoiding the need to send AI requests to the cloud.

HOW WILL YOU KNOW IT'S THUNDERBOLT 5?

Intel has slightly reworked the Thunderbolt logo, giving it an updated look. On a laptop, though, the rules are the same: Look for a port with a lightning bolt atop it, and it should signal a Thunderbolt connector, not a generic charging cable. Thunderbolt cables will continue to carry the lightning-bolt logo, then a small "5" beneath to designate it as Thunderbolt 5.

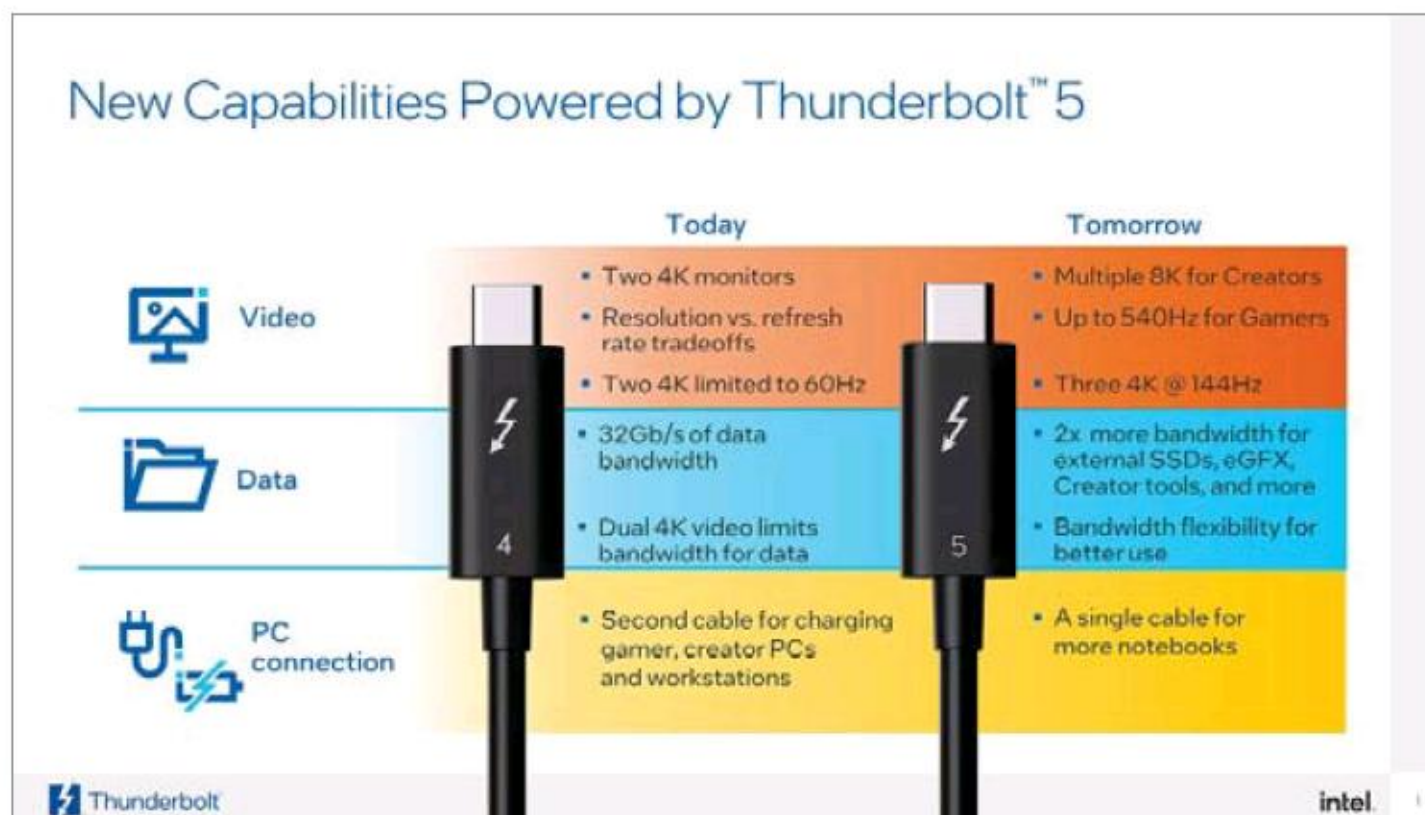
Since technical collateral will only be provided to Thunderbolt developers beginning in the fourth quarter, docks and devices will take some time to ship.

Still, there are several key issues the market will have to work out. For one, Thunderbolt

is primarily a mobile solution: Ziller said that about 90 percent of all Core laptops ship with Thunderbolt, but there is a "much lower attach rate" on desktops, especially powerful gaming ones. More and more monitors are now including a USB-C connection, but it's still unclear whether any will have Thunderbolt built in, either as a hub or a display connection. The irony is that Thunderbolt 5's bandwidth exceeds DisplayPort, but that



Gamers will appreciate the extra bandwidth.



The Thunderbolt 5 logo has been slightly modernized. You'll still be able to identify a Thunderbolt 5 cable and port from its distinctive lightning-bolt logo.

continues to be a popular connector on graphics cards.

Ziller also didn't really speak to the lingering question of USB4 2, USB's own 80Gbps answer to Thunderbolt 5. Intel has said before it will license Thunderbolt to anyone. But because of Intel's supposed refusal to certify non-Intel platforms, notebooks with AMD Ryzen chips inside use USB4; Intel Core notebooks use Thunderbolt.

"From a technical standpoint, the Thunderbolt 5 silicon could go into any device that has the appropriate connections," Ziller said when asked if this situation would change with Thunderbolt 5. "So theoretically, it could be done."

Ziller also didn't address the elephant in the room: A competing technology, DisplayLink, is arguably cheaper and more

stable than Thunderbolt itself.

A DisplayLink USB-C dock (fave.co/3EJlvuc) uses a hardware-driven compression technology from Synaptics to provide many of the benefits that Thunderbolt devices do, for less. But maybe as Thunderbolt

devices become more pervasive, DisplayLink docks will fade away. We'll have to wait and see.

THUNDERBOLT 5 FEATURES

Overall throughput (including display): 80Gbps, up to 120Gbps upstream via Bandwidth Boost


Data throughput (storage, eGPUs): 64Gbps

Standards supported: DisplayPort 2.1, PCI Express 4.0, USB4 2, USB3 20Gbps

Thunderbolt networking: 64Gbps

Power delivery: 140W downstream PC charging (required), 240W downstream PC charging (optional), 15W per device

Backwards compatibility: Thunderbolt 4/3, USB 4/3, DisplayPort 2.1

Cable length: 1-meter passive; 2-meter active cable in development. 



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AMD Radeon RX 7700 XT and 7800 XT: The 1440p GPUs you want

Game on. **BY BRAD CHACOS**

PCWorld
EDITORS'
CHOICE

Ten long months after the launch of the high-end Radeon RX 7900 series (fave.co/3kFEZ0q), AMD is finally finishing its next-gen graphics card lineup with the launch of the \$450 Radeon RX 7700 XT and \$500 Radeon RX 7800 XT. And their arrival means that for the first time this generation, there are 1440p gaming options finally worth buying.

Nvidia's offerings in this price range flatly aren't compelling. The \$400 8GB GeForce RTX 4060 Ti and \$500 16GB version of the same GPU are better suited for 1080p gaming thanks to their ultra-nerfed memory

configurations, meaning you need to spend \$600 on the RTX 4070 to get compelling 1440p performance from Team Green—a steep price for that resolution.

Enter the Radeon RX 7700 XT and 7800 XT. AMD's new graphics cards deliver great 1440p gaming performance for a whole lot less than its Nvidia rivals, though they aren't as energy efficient or as good at ray tracing as the GeForce GPUs. If you're willing to bend on those aspects, AMD's new graphics cards are worth a long, hard look—though this much money for 1440p gaming still feels pricey.

We've put Sapphire's custom Nitro+ Radeon RX 7800 XT to the test against Nvidia's

RTX 4060, along with the company's new all-white Pure Radeon RX 7700 XT. Let's dig in!

SPECS AND FEATURES

We already covered the Radeon RX 7800 XT and 7700 XT's key technical features (fave.co/44UYhAv) in our coverage of their announcement. Hit that link for our full analysis, or peruse the AMD-supplied chart of more in-depth specs below.

AMD clearly built these new graphics cards for 1440p gaming, unlike Nvidia's RTX 4060 Ti. The Radeon RX 7800 XT wields 16GB of fast GDDR6 memory and a wide 256-bit memory bus, while the cut-down Radeon RX 7700 XT drops to a still-respectable 12GB of memory and a 192-bit bus. By contrast, the RTX 4060 Ti packs just 8GB of memory and a 128-bit bus—a setup more ideal for 1080p gaming.

RADEON RX 7800 XT AND 7700XT SPECIFICATIONS

	AMD RADEON RX 6700 XT	AMD RADEON RX 7700 XT (AIB ONLY)	AMD RADEON RX 6800	AMD RADEON RX 7800 XT
Architecture	RDNA 2	RDNA 3	RDNA 2	RDNA 3
Manufacturing Process	7nm	5nm GCD + 6nm MCD	7nm	5nm GCD + 6nm MCD
Transistor Count	17.2 billion	28.1 billion	26.8 billion	28.1 billion
Die Size	335mm ²	200mm ² GCD; 150mm ² MCD	520mm ²	200mm ² GCD; 150mm ² MCD
Compute Units	40	54	60	60
Ray Accelerators	40	54	60	60
AI Accelerators	—	108	—	120
Stream Processors	2,560	3,456	3,840	3,840
Game GPU Clock	2,424 MHz	2,171 MHz	1,815 MHz	2,124 MHz
Boost GPU Clock	Up to 2,581 MHz	Up to 2,544 MHz	Up to 2,105 MHz	Up to 2,430 MHz
Peak Single Precision Performance	Up to 13.21 TFLOPS	Up to 35 TFLOPS	Up to 16.17 TFLOPS	Up to 37 TFLOPS
Peak Single Half Performance	Up to 26.43 TFLOPS	Up to 70 TFLOPS	Up to 32.33 TFLOPS	Up to 74 TFLOPS
Peak Texture Fill Rate	Up to 413 GT/s	Up to 550 GT/s	Up to 505.2 GT/s	Up to 583 GT/s
ROPs	64	96	64	96
Peak Pixel Fill Rate	Up to 165.2 GP/s	Up to 244 GP/s	Up to 202.1 GP/s	Up to 233 GP/s
AMD Infinity Cache	96 MB (1st Gen)	48 MB (2nd Gen)	128 MB (1st Gen)	64 MB (2nd Gen)
Memory	12GB GDDR6	12GB GDDR6	16GB GDDR6	16GB GDDR6
Memory Speed	16 Gbps	18 Gbps	16 Gbps	19.5 Gbps
Effective Memory Bandwidth with AMD Infinity Cache	Up to 1,278 GB/s	Up to 1,995.3 GB/s	Up to 1,664.2 GB/s	Up to 2,708.4 GB/s
Memory Bus Interface	256-bit	192-bit	256-bit	256-bit
PCIe Interface	PCIe 4.0 x16	PCIe 4.0 x16	PCIe 4.0 x16	PCIe 4.0 x16
Total Board Power	230W	245W	250W	263W

It's also worth comparing AMD's new graphics cards against their direct predecessors. The Radeon RX 6800 XT launched (fave.co/3A1WxIT) at \$650 with 72 compute units back in 2020. The new Radeon RX 7800 XT is priced much lower—at \$500, it's even less than the \$550 Radeon RX 6800 non-XT launched at—but packs just 60 CUs, matching the 6800 non-XT's compute unit count.

Conversely, the \$450 Radeon RX 7700 XT comes with 54 compute units, an improvement of 14 over its predecessor, the Radeon RX 6700 XT (fave.co/3WYfzuh), while costing \$30 less at launch.

The new Radeon 7000 GPUs are built using TSMC's 5-nanometer process, a leap forward from the 7nm process used in Radeon 6000 GPUs. The 7700 XT and 7800 XT also use a novel design introduced this generation, splitting memory controllers and the second-gen Infinity Cache off into discrete Memory Cache Dies built using the 6nm process. All Radeon RX 7000 graphics cards also support AV1 encoding and DisplayPort 2.1, a more advanced DP version than you'll find on competing Nvidia GPUs.

Modern hardware is supercharged by advanced software these days. In addition



The new Radeon RX 7800 XT is much cheaper than its predecessor.

to the usual suite of killer Radeon features like FSR, Radeon Super Resolution, and Smart Access Memory, AMD is rolling out two new software features to bolster this launch. The AMD Adrenalin driver that adds Radeon RX 7700 XT and 7800 XT support also folds in Hypr-RX (fave.co/3rraYFr), a long-awaited toggle that can drastically boost gaming performance by flipping on several other AMD features all in one fell swoop.

Later this month, AMD's just-as-long-awaited FSR 3.0 technology (fave.co/3rglgag) will make its debut in *Forspoken* and *Immortals of Aveum*. It's pitched as a DLSS 3 (fave.co/3oXUkw6) alternative that can dramatically speed up visuals by inserting interpolated frames between rendered ones—but unlike Nvidia's tech, it doesn't need dedicated AI hardware and can run on any modern GPU, regardless of



Sapphire has released an all-white “Pure” Radeon RX 7700 XT.

manufacturer. It remains to be seen how well FSR 3.0 actually performs, but it looks mighty exciting on paper.

THE SAPPHIRE TOUCH

AMD built a reference design for the Radeon RX 7800 XT, though not for the 7700 XT. Rather than using that, however, we’re conducting our initial evaluations using a pair of custom Sapphire cards: the Sapphire Nitro+ Radeon RX 7800 XT, as well as the all-new Sapphire Pure Radeon RX 7700 XT, the first entry in a fresh, all-white Pure series of Sapphire GPUs.

We got our first taste of this generation’s refined Nitro+ design in the big, badass, and beautiful Nitro+ Radeon RX 7900 XTX (fave.co/3PqoYHo). I fell in love with the sleek metal design, punctuated by a

raised, illuminated full-length RGB light bar that’s so vibrant it has to be seen to be believed.

Adam Patrick Murray tested these GPUs from PCWorld’s San Francisco office. Here are his thoughts on the Sapphire Nitro+ Radeon RX 7800 XT and Sapphire Pure Radeon RX 7700 XT’s designs:

Both graphics cards are the same length, but the Nitro+ is a thicker “true” 3-slot card, with a full-length built-in bracket that screws into the PCIe slot for extra rigidity. Both have 2x 8-pin power, but the Nitro+ also has PWM and ARGB headers and a 3-stage BIOS switch. The Nitro+ features a full-length RGB strip and RGB Sapphire logo on the back



We’re conducting our initial evaluations using a pair of custom Sapphire cards: the Nitro+ Radeon RX 7800 XT and the Pure Radeon RX 7700 XT.



The Sapphire Nitro+ Radeon RX 7800 XT has a sleek metal design.

up to high enough speeds to be noticeable. Both feel a bit overbuilt for the GPUs that are featured in them, which could limit their usefulness in smaller cases. Their premium definitely feels justified.

We've said it before and we'll say it again: Sapphire makes great, highly custom graphics cards. On to the benchmarks!

plate, while the Pure only has a light-up red Sapphire logo on the side with a hardware on/off switch in case you want to disable it.

Both cards are well built, offer unique design aesthetics (more white builds please!), and are constructed with a mixture of metal and plastic. The Pure's white metal and white plastic match better than the steel shroud and the metal backplate of the Nitro+, but there is just more plastic on the Pure and it's obvious in the hand. Anti-sag brackets came with both cards, but the Pure was light enough and the Nitro+ was rigid enough that neither felt absolutely necessary to use. It's nice to have, though.

I never experience temps above the low 60s on either card, and the fans never ramped

OUR TEST RIG

We're taking a break from our usual testing rig and full suite of games for this review. My house recently burned down and my GPU test machine, as well as its backup, were both destroyed—a fact I couldn't confirm until mere days before this launch.



The Pure's white metal and white plastic match better than the steel shroud and the metal backplate of the Nitro+.

Fortunately, my pal and PCWorld lead video director Adam Patrick Murray had a high-end test system as well as an RTX 4070 on hand to help out. Here's the rig he tested on (fave.co/3sQpOFS):

- AMD Ryzen 7 7800X3D
- ID-Cooling IS-55 w/ Noctua fan
- Asus ROG Strix X670-I Gaming WiFi
- 32GB G.Skill Flare X5
- Solidigm P44 Pro 2TB
- SilverStone Extreme 850R Platinum
- Fractal Design Terra (all panels off during benchmarks)

TEST RESULTS

	AMD RADEON RX 7700 XT	AMD RADEON RX 7800 XT	GEFORCE RTX 4070
CYBERPUNK 2077 Ultra preset, no upscale/RT	80.8	96.8	75.9
CYBERPUNK 2077 Ultra preset, RT med, FSR bal	60	70	76.3
TOTAL WAR SAGA: TROY Ultra, Battle benchmark	134.7	157.1	138.8
F1 22 Ultra High, no upscale/RT, HBAO+, Miami	174.3	205.33	190
HORIZON ZERO DAWN Original quality	125	155.7	148.7
COD: MW2 Extreme preset, no upscale	126.3	153.3	117
SHADOW OF THE TOMB RAIDER Highest, DX12, no RT	135	161	162.7
WATCH DOGS: LEGION Ultra, DX12, no RT	96.7	112.7	96
MAX GPU TEMPERATURE Degrees Celsius, F1 22 Miami Track	57 C°	60 C°	64 C°
MAX GPU POWER DRAW Watts, F1 22 Miami Track	242W	276W	195W

PERFORMANCE

Adam was only able to run half our usual games benchmark suite, and only at 1440p—the resolution AMD is targeting with its new Radeon GPUs. He ran each benchmark at least three times and averaged the score for each game, while also keeping track of maximum GPU temperature and power draw data for the runs. Per usual, all vendor-specific software features (like AMD's FSR and Nvidia Reflex) were disabled in game, and the highest possible in-game graphics settings were used for each title.

Well, that's a win for AMD.

The \$500 Radeon RX 7800 XT manages to solidly beat the \$600 GeForce RTX 4070 in every game, at worst drawing even in *Shadow of the Tomb Raider*. The step-down Sapphire Pure Radeon RX 7700 XT battles admirably, going toe-to-toe with the 4070 more often than not and hitting excellent frame rates across the board. For graphics cards that cost \$100 to \$150 less than the RTX 4070,

that's a resounding success—and remember that Sapphire's custom designs ran inaudibly as well.

It's not a clean sweep, though. The GeForce RTX 4070 pulls ahead when you flip on *Cyberpunk 2077*'s strenuous, gorgeous real-time ray-tracing effects and FSR Balanced upscaling, though the 7800 XT only falls a step behind. AMD's duo also draws considerably more power than Nvidia's efficient 1440p GPU. Both were expected results given what we've already seen from the rest of the modern AMD and Nvidia lineups, though it's surprising how close the 7800 XT manages to get to the GeForce card in ray-traced *Cyberpunk*.

BOTTOM LINE

You should definitely buy the Radeon RX 7700 XT and 7800 XT if you're looking for a modern 1440p graphics card that costs under \$500. In that case, these are the only options around.

Nvidia's \$400 8GB RTX 4060 Ti and \$500 16GB RTX 4060 Ti are best suited for 1080p gaming thanks to their pipsqueak memory configuration, while the RTX 4070 starts at \$600. As you saw in our performance benchmarks, the Radeon RX 7700 XT meets or beats the 4070's rasterization performance for a whopping \$150 less. We didn't test the RTX 4060 Ti on Adam's rig, but the 7700 XT would absolutely obliterate it, especially at



When it comes to third-party options, Sapphire's design excellence continues with the Nitro+ 7800 XT and new all-white Pure 7700 XT.

1440p. The Radeon RX 7800 XT is even faster, surpassing the RTX 4070 in all but one game (*Shadow of the Tomb Raider*), and by significant margins.

That said, there are valid reasons to consider the RTX 4070 (though not the 4060 Ti, fave.co/3oZVIDQ). Nvidia's more-advanced ray-tracing technology continues to outpace AMD's second-gen RT implementation, and the RTX 4070 consumes notably less power than both of the new Radeon cards—a key distinction in areas of the world where electricity prices are skyrocketing. That lower power use also enables smaller RTX 4070s to exist. Nvidia's


arsenal of awesome software—like Reflex, Broadcast, DLSS, and DLSS 3—also hold true appeal for people who tap into those features. FSR 3, AMD's DLSS 3 rival, is set to launch this month but DLSS 3 is already supported in dozens of games.

If you just want your graphics card to be really fast in games, AMD's Radeon RX 7700 XT and 7800 XT are a no-brainer. Nothing else compares in this price range.

That said, we aren't completely enamored with the pricing AMD chose. The Radeon RX 7800 XT should be just a few hairs faster than the last-gen RX 6800 XT, which already goes for about \$500 on the street. So while AMD hammers the value proposition of Nvidia's RTX 40-series, the 7800 XT doesn't offer much of a price-to-performance advantage over what's already available. And if the Radeon RX 7700 XT was priced at \$400, it would be hands-down the best value graphics card of this generation. As it is, at just \$50 less than its bigger brother, the 7700 XT almost feels like it exists to upsell would-be buyers into opting for the 7800 XT, especially considering that the 7700 XT has 4GB less VRAM and a smaller memory bus (while still being great for 1440p gaming).

As such, if you already have a Radeon 6000 or GeForce 30-series GPU, AMD's new offerings won't make for a compelling upgrade. But if you're using a 2-gen-old card or building new, the Radeon RX 7700

XT and 7800 XT are easily the best 1440p options available. AMD is really locking down the sub-\$500 market for this graphics card generation.

When it comes to third-party options, Sapphire's design excellence continues with the Nitro+ 7800 XT and new all-white Pure 7700 XT. Either would be an excellent fit for any 1440p gaming build, though their size might preclude them from small form-factor builds. They're beautiful, frigid, and whisper silent. Sapphire charges a mere \$60 premium for the Nitro+, making it significantly cheaper than even basic RTX 4070 models. Its luxurious design and fierce performance makes it a worthwhile investment. You won't find an RTX 4070 card anywhere near its caliber for \$600. 

AMD Radeon RX 7700 XT & 7800 XT



PROS

- Excellent 1440p performance.
- 16GB of memory and a wide bus.
- Beats RTX 4070 performance for \$100 less.
- Sapphire's industrial design is impeccable.
- Whisper quiet and icy cold.

CONS

- Relatively high power draw.
- Behind Nvidia in ray tracing performance.
- FSR 3 hasn't launched yet.

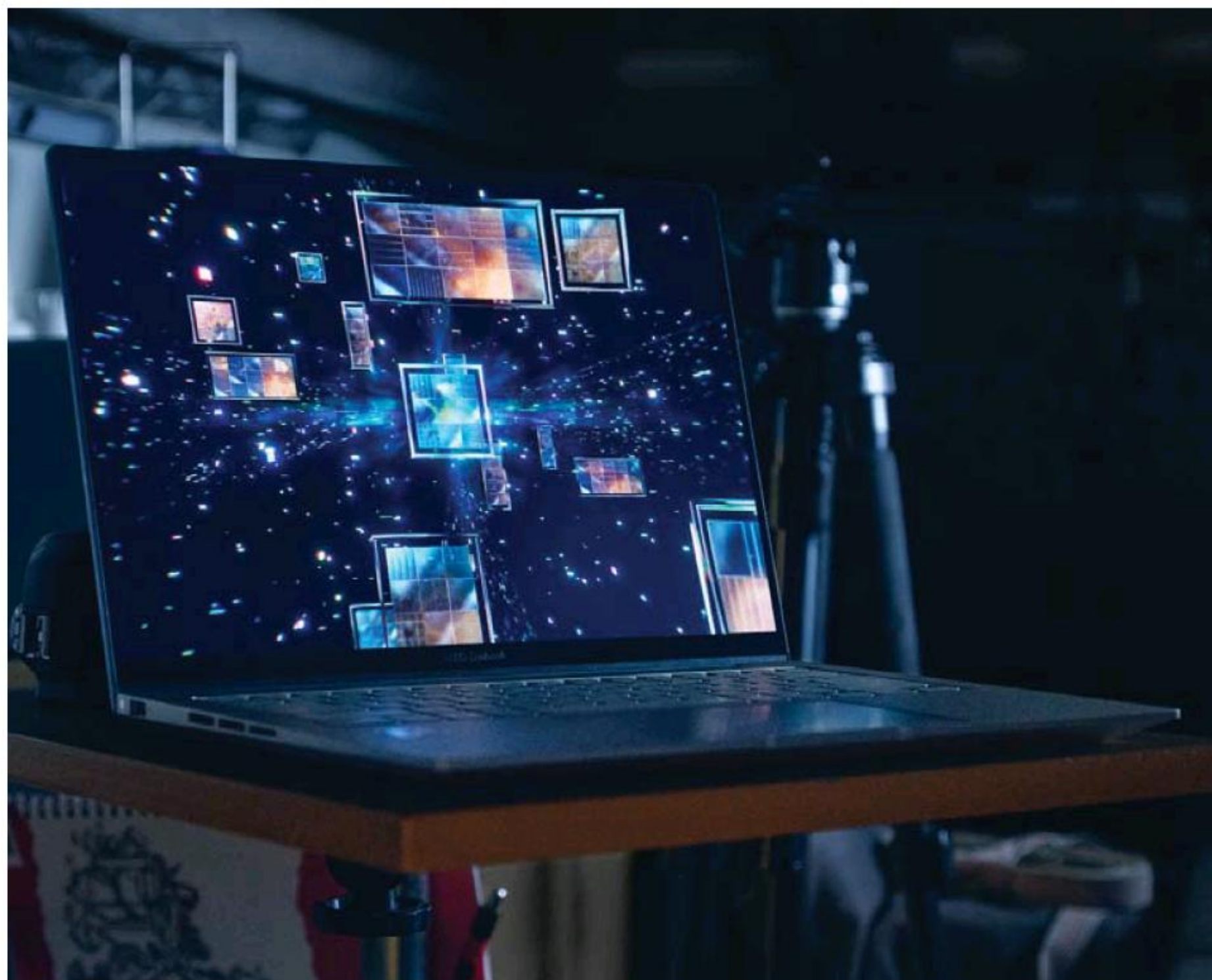
BOTTOM LINE

AMD's Radeon RX 7800 XT trounces the GeForce RTX 4070's gaming performance for \$100 less, albeit with higher power draw and slower ray-tracing performance.

From \$450

Asus Zenbook 14X OLED: More than a beautiful display

A solid laptop for the everyday person. **BY MATTHEW S. SMITH**



It's tempting to think the inexpensive Asus Zenbook 14X OLED, which retails for just \$799.99, is little more than a vessel for delivering a crisp, beautiful OLED display. On the contrary, the 14X OLED is an inexpensive yet fundamentally great

laptop that scores well in battery life, build quality, and day-to-day usability.

SPECS AND FEATURES

The headline feature is, of course, the 14.5-inch OLED display. It packs a

resolution of 2880×1800 and a 120Hz refresh rate, specifications that put competitive laptops with 1080p displays to shame.

CPU: Intel Core i5-13500H

Memory: 8GB LPDDR5

Graphics/GPU: Intel Iris Xe

Display: 14.5-inch 2880×1800 120Hz OLED

Storage: 512GB SSD

Webcam: 1080p

Connectivity: 2× Thunderbolt 4 / USB-C, 1× USB-A 2.1, 1× HDMI 2.1, 1× 3.5mm audio jack

Networking: WiFi 6E, Bluetooth 5.2

Biometrics: IR webcam for Windows Hello facial recognition

Battery capacity: 70 watt-hours

Dimensions: 12.67×8.88×0.67 inches

Weight: 3.44 pounds

MSRP: \$799.99

But the 14X OLED is more than a pretty screen. It has an Intel Core i5-13500H processor, which is a step up from the Intel Core i5 U-series and AMD Ryzen 5 series processors found in most competitors. And its most important traits are those that don't show up on a spec sheet—like a quality keyboard, durable design, and strong real-world battery life.



The Asus Zenbook 14X OLED is a humble slab of matte-blue metal adorned only by a few subtle geometric shapes along the display lid.

DESIGN AND BUILD QUALITY

The Asus Zenbook 14X OLED, like most inexpensive Windows laptops, isn't much to look at. It's a humble slab of matte-blue metal adorned only by a few subtle geometric shapes along the display lid. I must admit that I miss the classic "concentric circle" design of past Zenbooks, and I don't get why Asus hasn't continued to use that design on all Zenbook machines.

Looks aside, the 14X OLED is exceptionally well built for its price point. Both the display lid and lower body show little flex when the laptop is handled, and the body panels hold up when pressure is applied. The Zenbook 14X OLED's build feels noticeably more durable than those of

similarly priced alternatives like Acer's Aspire 3 14-inch, HP's Envy 14, and MSI's Prestige 14 (fave.co/3Nb6oRV).

The Zenbook 14X OLED weighs 3.44 pounds, measures about a foot and a half wide, and is 0.67 inches thick. These figures are similar to those for alternatives like the Acer Swift X 14 (fave.co/3LxQIJ9), Lenovo Slim 7i, and MSI Prestige 14. A few alternatives, like the LG Gram 14 Style, can significantly undercut the 14X OLED's size and weight—though at a higher price.

KEYBOARD, TRACKPAD

Asus provides a spacious keyboard for the Zenbook 14X OLED. Most keys are large and the layout feels immediately familiar. Key travel is respectable at 1.4 millimeters, and keys bottom out with a precise action that provides a tad of tactile feedback. It's a great typing experience that outpaces most competitors'.



Asus has included a spacious keyboard.

The keyboard lacks a numpad (which is true of most 14-inch laptops), but Asus compensates with a touch-sensitive numpad that's hidden in the touchpad. It's activated by a long press of the touchpad's upper right corner. I don't think it's a great substitute for a real numpad, but it might work in a pinch.

The touchpad is otherwise typical of a budget Windows laptop. It measures 5 inches across and about 3 inches deep, providing a smooth, responsive touch experience. Multi-touch gestures are reasonably easy to use, although the touchpad's size can feel a little limiting. It's certainly not the best touchpad available, but it does the job.

DISPLAY, AUDIO

The Asus Zenbook 14X OLED includes "OLED" in its name for a reason. The 14.5-inch OLED touchscreen, which delivers a

resolution of 2880×1800, is the laptop's most appealing feature.

OLED panels have a reputation for excellent contrast and color performance, and the 14X OLED is no exception. It provides an infinite contrast ratio that can reach a perfect minimum luminance of zero nits. Dark, nuanced content provides an immersive, alluring, and lifelike experience with excellent detail in dimly lit scenes.

The display also has an excellent color gamut that covers 100 percent of DCI-P3 and 97 percent of Adobe RGB. This color performance is similar to those of competing laptops that use the same OLED panel—and there's a lot of them. Still, it's impressive to see this level of color quality in an affordable laptop.

The OLED panel can only reach a maximum SDR brightness of 335 nits, which is a bit weak. However, laptops in this price category often have panels that are not as bright as those in laptops sold for \$1,000 and above, so this downside is less of a disadvantage in the 14X OLED than in more expensive laptops. The 14X OLED's brightness is fine for use indoors, but can feel inadequate outdoors or near large, sunlit windows.

Brightness improves to 513 nits in HDR mode, though this remains insufficient for

great HDR performance (a brightness of 1,000 nits or better is preferred). HDR is disabled when the laptop is on battery power, too, so you can't watch HDR movies on the go. This isn't a problem exclusive to the 14X OLED: All Windows laptops with HDR I've tested had the same restriction.

The display panel has a pixel density of roughly 234 pixels per inch—a major improvement over 1080p resolution, which provides roughly 155 pixels per inch on a panel of similar size. The difference might be hard to discern on the Windows desktop, but the added sharpness is noticeable when viewing high-quality video content or editing high-resolution photos.

The 14X OLED's audio quality matches the impressive display. Audio comes through clear and crisp with minimal distortion through the midrange, even at high volumes.

The speakers are downward-firing, which can muffle the volume when the laptop is used on your lap. But because the speakers are strong to begin with, they still outperform most competitors' offerings.

WEBCAM, MICROPHONE, BIOMETRICS

A 1080p webcam is integrated into the slim



The display is this laptop's most appealing feature.

upper bezel of the Asus Zenbook 14X OLED. It provides good image quality with decent sharpness and acceptable color reproduction, but it retains the grainy and muted look of a webcam. Most Windows laptops introduced in 2023 are upgrading to 1080p webcams, so the 14X OLED's webcam doesn't stand out from the crowd.

However, Asus includes an infrared camera with support for Windows Hello facial recognition login. This is an unusual but appreciated upgrade for a laptop priced under \$800. Windows Hello facial recognition is quick, easy to use, and works even in a dimly lit room.

The built-in microphone array has strengths and weaknesses. It captures clear audio with good volume even when you're leaning away from the laptop, but the microphones also tend to pick up background noise. The 14X OLED sounds good in voice and video calls, but shoppers with a talkative canine companion or a loud window AC should be wary.

CONNECTIVITY

The Asus Zenbook 14X OLED packs a pair of Thunderbolt 4 ports (which also support USB-C) alongside one USB-A port and one



A selection of the Zenbook's connectivity options.

HDMI 2.1 port. A 3.5mm audio-out jack rounds out the options.

That's an acceptable but unremarkable range of connectivity for a modern laptop. The most notable pain point is the lonely USB-A port: There are plenty of situations where a second port would prove useful. The laptop also lacks an Ethernet port, so those looking for a wired Internet connection will need to use a USB-C to Ethernet adapter.

Both Thunderbolt 4/USB-C ports support Power Delivery, and the laptop ships with a 90-watt USB-C power brick. The power brick is a compact square unit measuring 3 inches across and about an inch thick. This gives Asus an edge over some competitors: Some inexpensive laptops still use old-school barrel-plug power adapters.

Wireless connectivity spans Wi-Fi 6E and Bluetooth, as is true of nearly all Windows laptops sold in 2023. Wi-Fi performance was

solid. with strong download speeds of up to 1 gigabit per second, the maximum possible over my home Wi-Fi network.

PERFORMANCE

Intel's Core i5-13500H powered the Asus Zenbook 14X OLED I reviewed (a Core i7-13700H is available for an extra \$200). The i5-13500H packs four performance cores and eight efficient cores for a total of 12 cores and 16 threads. It also has a maximum Turbo frequency of 4.7 GHz. The 14X OLED I tested paired this processor with Intel Iris Xe graphics, 8GB of memory, and a 512GB solid state drive.

The Zenbook 14X OLED has a mediocre showing in PCMark 10, a holistic system benchmark. Blame the laptop's integrated graphics—this benchmark does include a graphics test, so any laptop with lackluster graphics performance will fall behind. With that said, the 14X OLED's performance in this test is broadly in line with what I expect for the

Cinebench R15

CPU performance



LONGER BARS INDICATE BETTER PERFORMANCE

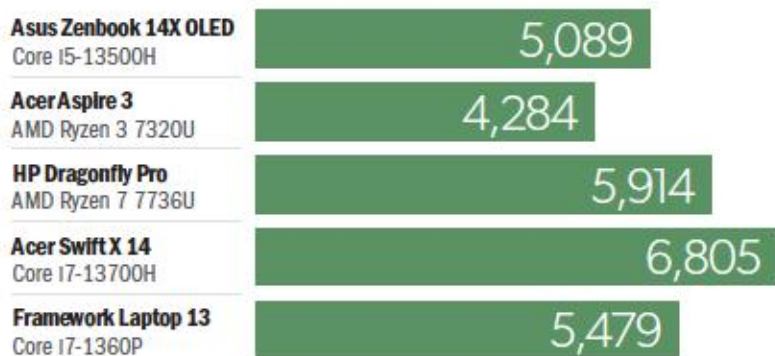
price, and the laptops that outperform it are more expensive.

Cinebench R15, a short-duration multi-core benchmark, provides a strong result for the Asus Zenbook 14X OLED. It hit a score of 2,037, which beats most laptops used for comparison and only falls notably behind the Acer Swift X 14. That's fair, as the Swift X 14 is much more expensive (it retails for \$1,599) and has an Intel Core i7-13700H processor.

The Handbrake result is arguably less favorable to the 14X OLED, though it's a

PCMark 10 Overall

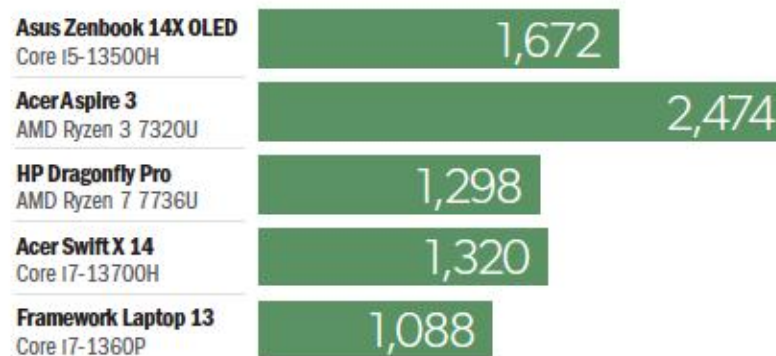
CPU performance



LONGER BARS INDICATE BETTER PERFORMANCE

Handbrake 0.9.9 Encode

Seconds



SHORTER BARS INDICATE BETTER PERFORMANCE

nuanced debate. Intel's Core i5-13500H struggles to keep up with AMD's Ryzen 7 7000-series chips, which have an edge of roughly 25 percent. However, both of the AMD Ryzen 7 laptops are several hundred dollars more expensive, so an edge in performance could be expected. As mentioned, Asus offers an upgraded Zenbook 14X OLED with Intel's Core i7-13700H for \$999.99, which presumably would compare better against the Ryzen 7 competition.

The Asus Zenbook 14X OLED's processor performance isn't stellar, but it's respectable for the price. I'm not sure the same can be said of its graphics performance, as Intel's aging Iris Xe struggles.

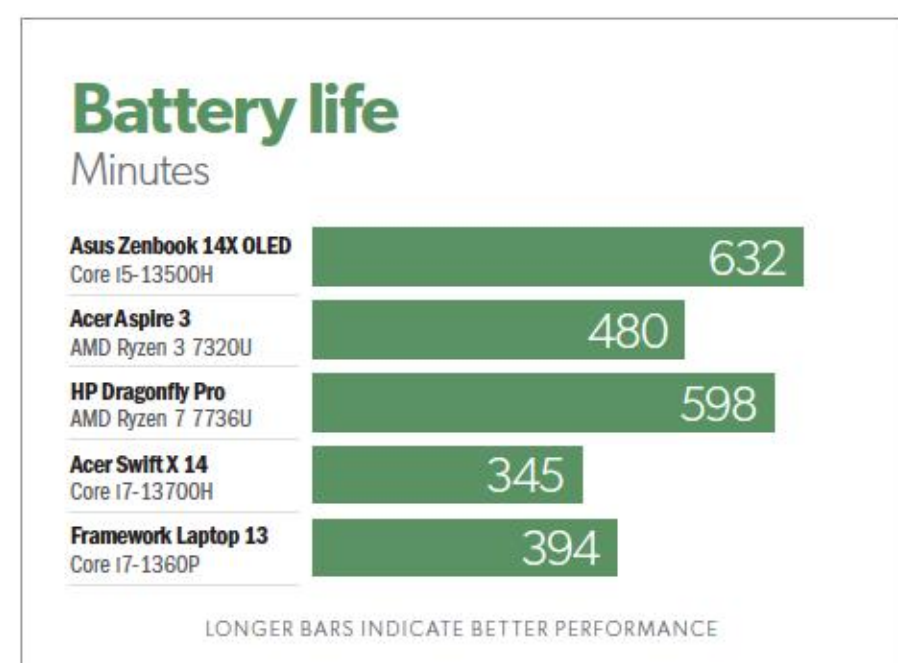
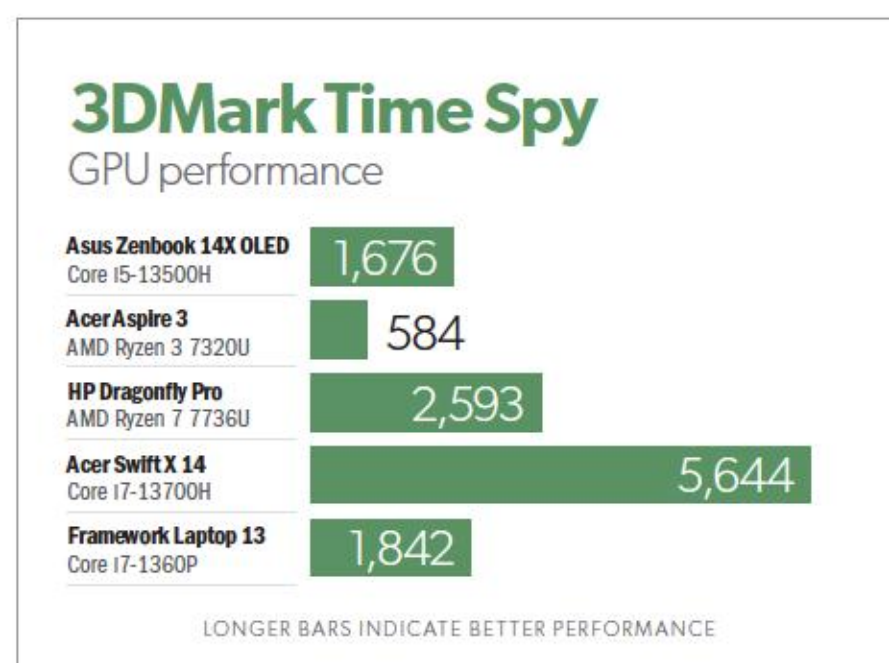
3DMark Time Spy delivered a score of 1,676, which is toward the low end of what I expect from laptops with Intel Iris Xe graphics (most score between 1,600 and 2,000). This is a big upgrade from bottom-dollar alternatives, like the Acer Aspire 3, but also

way short of AMD laptops with the company's top-tier Radeon 680M graphics. A laptop with discrete graphics, like the Acer Swift X 14, will blow the doors off the Zenbook 14X OLED. That's a bit disappointing. To be fair, few Windows laptops sold below \$800 have discrete graphics, and those that do are usually budget gaming laptops that don't compete directly with the slimmer, lighter 14X OLED. Shoppers looking for a 14-inch laptop with acceptable 3D graphics performance should up their budget.

BATTERY LIFE

Asus crams a 70 watt-hour battery into the Zenbook 14X OLED. Its capacity is average for a 14-inch laptop, but the laptop's lack of discrete graphics and otherwise modest specifications help it achieve strong results in battery tests.

The 14X OLED lasted 10 hours and 32 minutes in our standard battery test, which loops a 4K trailer of the short film *Tears of*






The Asus Zenbook 14X OLED is an excellent midrange laptop.

Steel. That's a good result for our test, and the 14X OLED leapfrogs many laptops of similar size.

Also, as mentioned earlier, the laptop charges over USB-C and ships with a compact 90-watt power adapter. The laptop's solid battery life means you can leave it at home for day trips, but it won't take up excess room if you need it.

BOTTOM LINE

The Asus Zenbook 14X OLED is an excellent choice for if you want a simple, sensible laptop that nails the fundamentals of a good laptop experience at a low price. It's possible to find laptops that are slimmer and lighter, or larger and more powerful, at this price point—but they often make sacrifices in display

performance, keyboard quality, or battery life. The 14X OLED not only avoids these problems, but delivers results that are often comparable with those of more expensive laptops. That makes for great value. 

Asus Zenbook 14X OLED



PROS

- Robust build quality.
- Excellent OLED display.
- Enjoyable keyboard and touchpad.

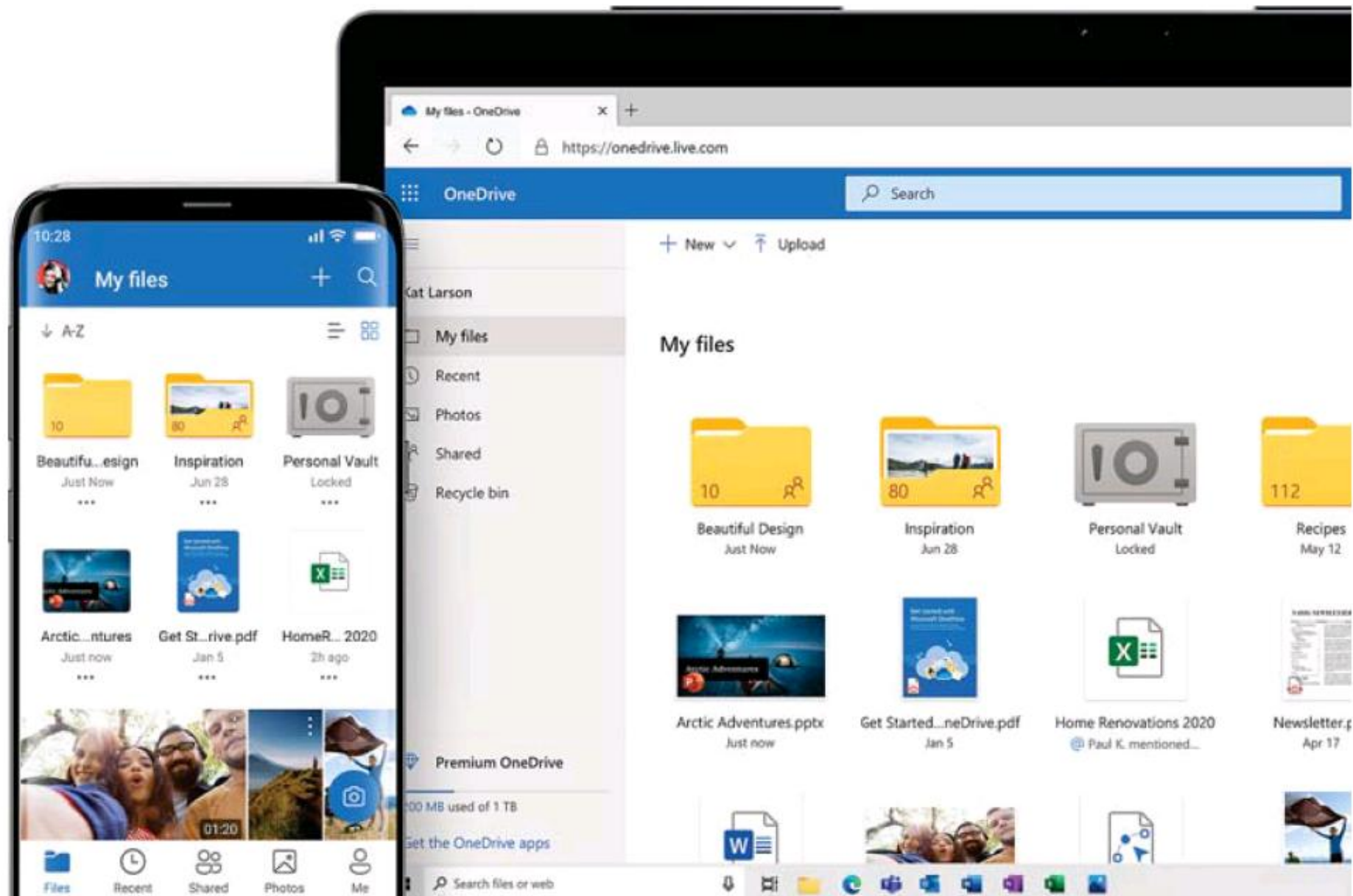
CONS

- Boring exterior design.
- Weak graphics performance.
- Could use another USB-A port.

BOTTOM LINE

The Asus Zenbook 14X OLED is a cheap, cheerful laptop that checks all the right boxes.

\$799



Microsoft OneDrive: Affordable cloud storage, plus Office

Microsoft's cloud service is part of the Office subscription, and with plenty of space and the best extra features, it's hard to beat. **BY ANDERS LUNDBERG**



Microsoft's cloud storage service is called OneDrive (fave.co/3JSny46), and if you're running Windows 10 or

11, you'll have noticed that the company is very keen for you to use it. It would be easy to think that as a first-party program it would be best in class on Windows, but that's not necessarily the case. In the basic functions of

syncing and sharing folders and files, Google Drive is almost as good, and Dropbox is still better on a technical level.

But OneDrive is good enough, and if you're one of the millions of people who want to use Microsoft Office, it's by far the most affordable option. In fact, if you subscribe to Office, OneDrive can basically be counted as part of the package.

CHEAP, CHEAPER, ONEDRIVE

Every OneDrive user gets 15 GB of free storage, while premium accounts that offer 100 GB and 1 TB of cloud storage cost \$1.99 and \$6.99 per month, respectively. That's excellent pricing. A family subscription to Microsoft 365 costs \$9.99 per month and gives you up to six accounts, each with a terabyte of space. What's more, there's nothing to stop you from creating more than one account for yourself and using the extra accounts with third-party programs, such as backups. I personally have two accounts and use one solely for backing up my computer (I use the Arq Backup, fave.co/3rgcEBN, but it works just as well with Duplicati, fave.co/3PgOa3e, or Duplicacy, fave.co/3PmNBVt).

Should you still pay for Office, you get several terabytes of storage for free, or looking at it the other way round: For about

the same price as the competitors, you get all of Office for free alongside Microsoft's cloud storage. Outstanding.

SMART SYNC

Similar to Dropbox but unlike Google Drive and the Windows version of iCloud Drive, OneDrive uses block-level copying. This means if you make changes to a large file, OneDrive only needs to upload the changed bits and not the whole file again. Depending on how you use your computer, this can make a big difference in sync speed—or hardly any difference.

OneDrive has a setting to hide and not sync selected folders to a drive, which is handy if you have a large folder on one computer that you don't need access to on another. Open OneDrive settings, select Account on the left and then "Select

folders" to set which ones will be made available in the OneDrive folder.

On top of that, OneDrive can also offload folders and individual files from your computer so that they are only stored in the cloud, but can be retrieved if you want to access the content. In Windows Explorer, you can see whether a folder or file is



A family subscription to Microsoft 365 for \$9.99 gives you up to six accounts, each with 1TB of space.



OneDrive makes it easy to share files with friends and family.

local or cloud-only via a small icon in the Status column: blue cloud for only in the cloud, green tick for also stored locally. Right-click and select “Always keep on this drive” or “Free up space” to choose whether to keep the item on your computer for offline access.

Right-clicking also brings up a OneDrive submenu where you’ll find options for sharing, changing permissions, viewing version history, and more. You can download older versions directly from the version history here; you do not need to open OneDrive in the browser.

FACTS

Tested: 2023

Manufacturer: Microsoft

Platforms: Windows, Mac, Android, iOS

Free account space: 5 GB

Storage space:

5 GB, 100 GB, 1 TB,
6 × 1 TB

Monthly price:

Free, \$1.99, \$6.99,
\$9.99


**Synchronization
of optional files and
folders:** Yes

Family sharing:

Family subscription
provides a 1TB account
each for up to six family
members

Backup function: No, but can be used
with third-party software

File history: Yes (25 previous versions,
30 days for deleted files)

Other features: Office applications
included in the same subscription, Microsoft
Defender for mobile phones. 

Microsoft OneDrive

★★★★★

PROS

- Affordable.
- Lots of space.
- Extra family subscription can be utilized for backup.

CONS

- Third-party software needed to use for backup.

BOTTOM LINE

OneDrive, as part of Microsoft 365, is the most affordable cloud storage service on the market, and with a bit of tweaking you can utilize all six terabytes you get with the family plan. Sync isn’t quite as good as Dropbox, but it’ll do for most things.

From free to \$10

Crucial X9 Pro external SSD: Fast, good-looking, easy on the wallet

The 10Gbps Crucial X9 drives is a sprinter for its class, but saves cash for those who can't use or don't need the 20 Gbps X10 Pro. **BY JON JACOBI**



PCWorld
EDITORS'
CHOICE

If you don't need the super-fast transfers offered by Crucial's pricier 20 Gbps X10 Pro (fave.co/48mS7fC), then the Crucial X9 Pro external SSD will save you some cash and still deliver all the everyday performance the average user needs.

PRICE, DESIGN, AND FEATURES

Crucial sells the X9 Pro in 1TB for \$80, 2TB for \$130, and 4TB for \$240 capacities. That's not the least expensive 10 Gbps SSD on the market, but given the superior performance, it's not bad pricing at all. The 20 Gbps Crucial X10 Pro runs



The pewter-hued X9 Pro is a svelte object of desire.

around \$40 more at each capacity.

The pewter-hued X9 Pro is a svelte object of desire at around 2.56 inches (65mm) long, 1.97 inches (50mm) wide, and only 0.38 inches (9.6mm) thick.

Its bottom (shown at right) has a less slippery finish, though I wouldn't describe it as non-slide. The cavity is for lanyards and features a status and activity light inside.

The X9 Pro weighs in at a feathery 1.5 ounces and is IP55 rated (fave.co/3a70n9R). That rating indicates it can ward off

enough dust and water spray to keep on ticking. Just don't leave it in your pocket when you go diving—even if it's in shallow water.

The company warranties the X9 Pro for five years but doesn't provide TBW (terabytes that can be written) ratings, which are often the mitigating factor in warranty claims. Lack of

information or not, companies rarely if ever deny a warranty claim given reasonable use.

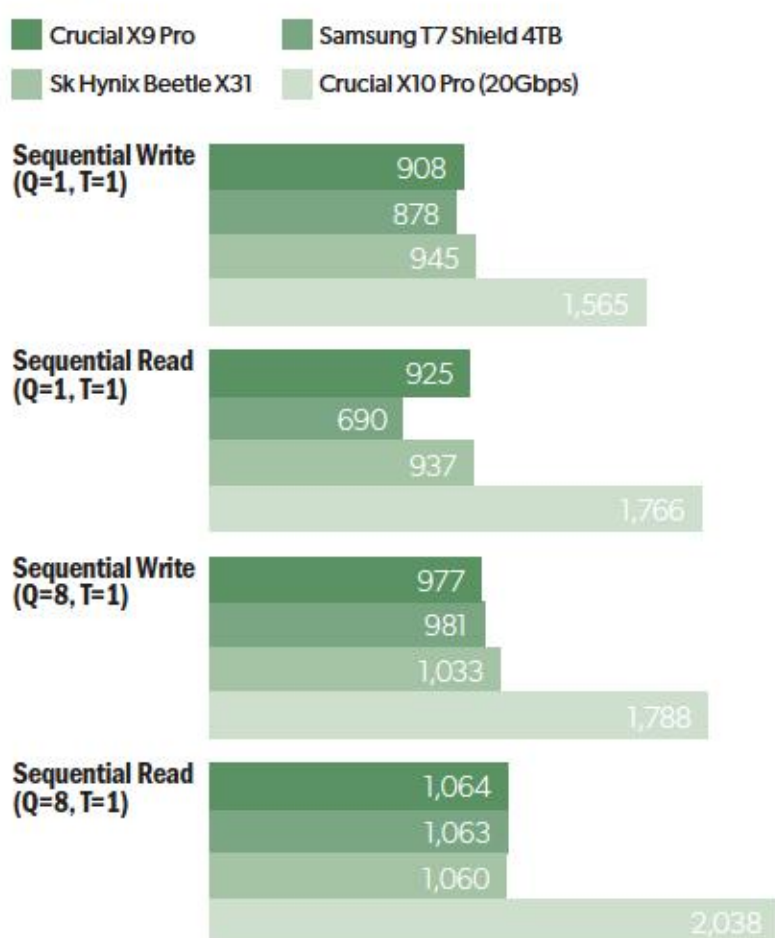
Crucial bundles a Type-C to Type-C cable but doesn't include a Type-A adapter. That's okay with 20 Gbps drives such as the X10 Pro, which almost always plug into a Type-C port,



The bottom of the X9 Pro has a slightly less slippery finish.

CrystalDiskMark 8 Sequential Performance

MBps



LONGER BARS INDICATE BETTER PERFORMANCE

This test shows the obvious advantage of the 20 Gbps X10 Pro, but the X9 Pro held its own among the 10 Gbps drives.

but a 10 Gbps drive like the X9 Pro is far more likely to be used in Type-A ports. Grab one of those at the checkout counter if need be.

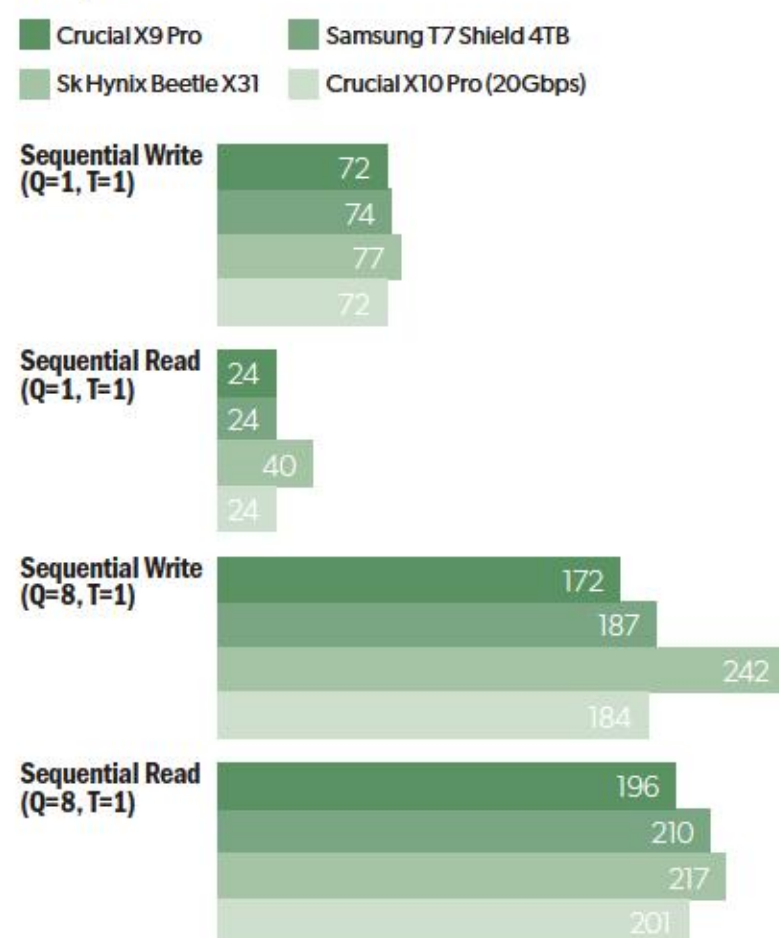
Crucial has promised a utility for September 2023 that will allow you to lock and unlock data on the X9 Pro.

PERFORMANCE

The X9 Pro didn't place first in the synthetic benchmarks (CrystalDiskMark 8/AS SSD), but it wasn't far off and led the 10 Gbps pack in our

CrystalDiskMark 8 Random Performance

MBps



LONGER BARS INDICATE BETTER PERFORMANCE

While the X9 Pro turned in good random numbers, the Beetle X31 ruled this test.

real-world 48GB and 450GB transfers. The 20 Gbps shows what you get for an extra \$40.

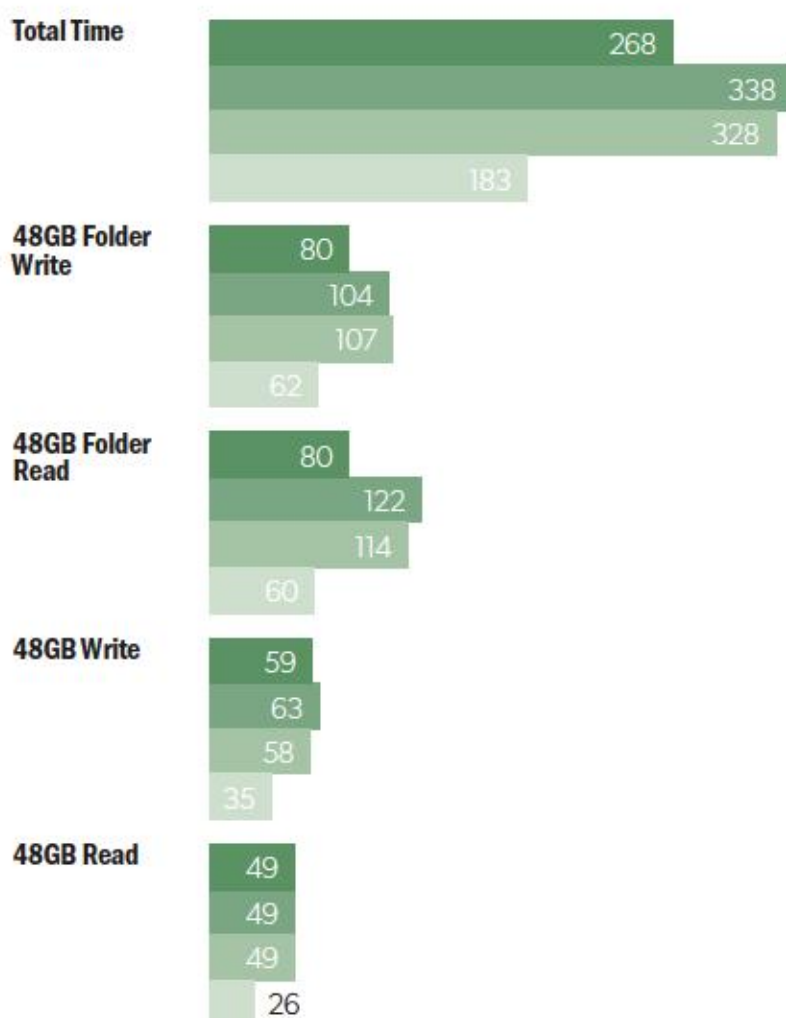
As you can see above, CrystalDiskMark 8 rated the X9 Pro as merely average for a 10Gbps USB SSD. Random performance was also rather average. The SK Hynix Beetle X31 (fave.co/3PmVIRV) rules in this department, which does have some effect if you're running an operating system off the drive.

Where the X9 Pro really shone was in the 48GB transfers, easily outpacing both 10

48GB Copies

Seconds

Crucial X9 Pro Samsung T7 Shield 4TB
Sk Hynix Beetle X31 Crucial X10 Pro (20Gbps)



SHORTER BARS INDICATE BETTER PERFORMANCE

Crucial's X9 Pro smoked the 10 Gbps competition in our 48GB transfers. This is as close to real world as tests get.

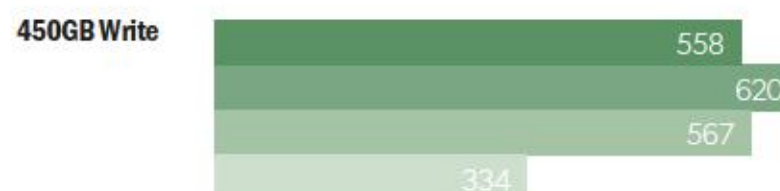
Gbps competitors. It's not as fast as the X10 Pro, but that's to be expected given its 20 Gbps bandwidth.

The X9 Pro shaved a couple of seconds off the Beetle X31's 450GB write time, making it the second-fastest 10 Gbps USB SSD we've tested at this task, behind only OWC's dual-interface (10 Gbps/Thunderbolt 3) Envoy Pro FX (fave.co/3PrDNK4).

450GB Write

Seconds

Crucial X9 Pro Samsung T7 Shield 4TB
Sk Hynix Beetle X31 Crucial X10 Pro (20Gbps)



SHORTER BARS INDICATE BETTER PERFORMANCE

The X9 Pro was a bit faster than the 10 Gbps competition in our 450GB write.

BOTTOM LINE

Overall, you can't ask much more from a 10Gbps USB SSD than you get with the Crucial X9 Pro. The average user will be more than adequately served by this drive, which delivers good performance at a cheaper price point than the X10 Pro. We do, however, recommend the latter for video mavens and prosumers because of its significantly faster transfers. Time is money. 🔌

Crucial X9 Pro



PROS

- Super-small form factor.
- Great 10 Gbps performance.
- Handsome design.

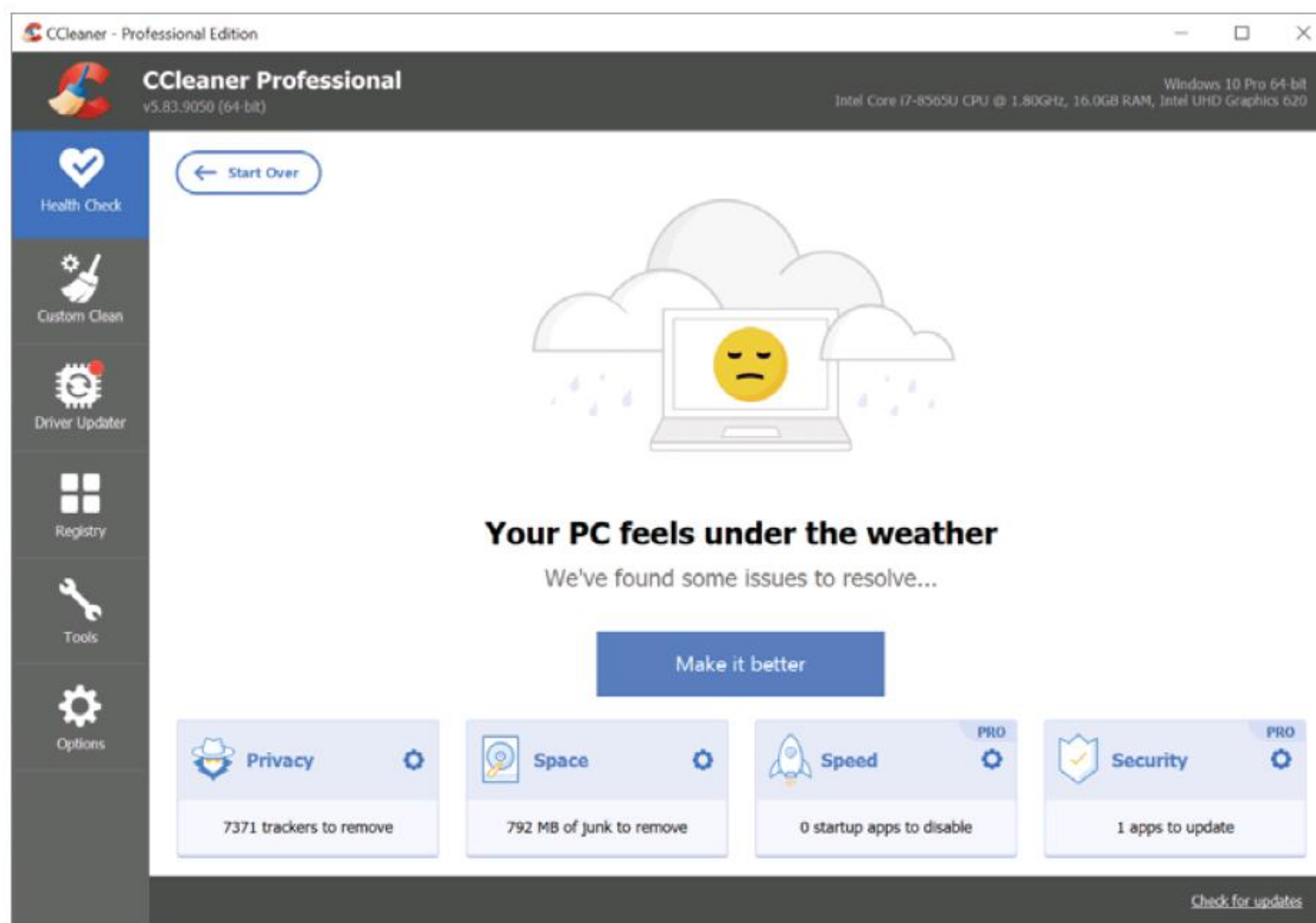
CONS

- Not the least expensive 10 Gbps SSD available.

BOTTOM LINE

Marrying good looks, great performance, and affordability, the X9 Pro is one of the top 10 Gbps USB SSDs on the market.

From \$79



CCleaner Professional: Top-notch PC maintenance

A tune-up stalwart, but still a solid choice? **BY ADRIAN SOBOLEWSKI KIWERSKI & CHRIS MARTIN**



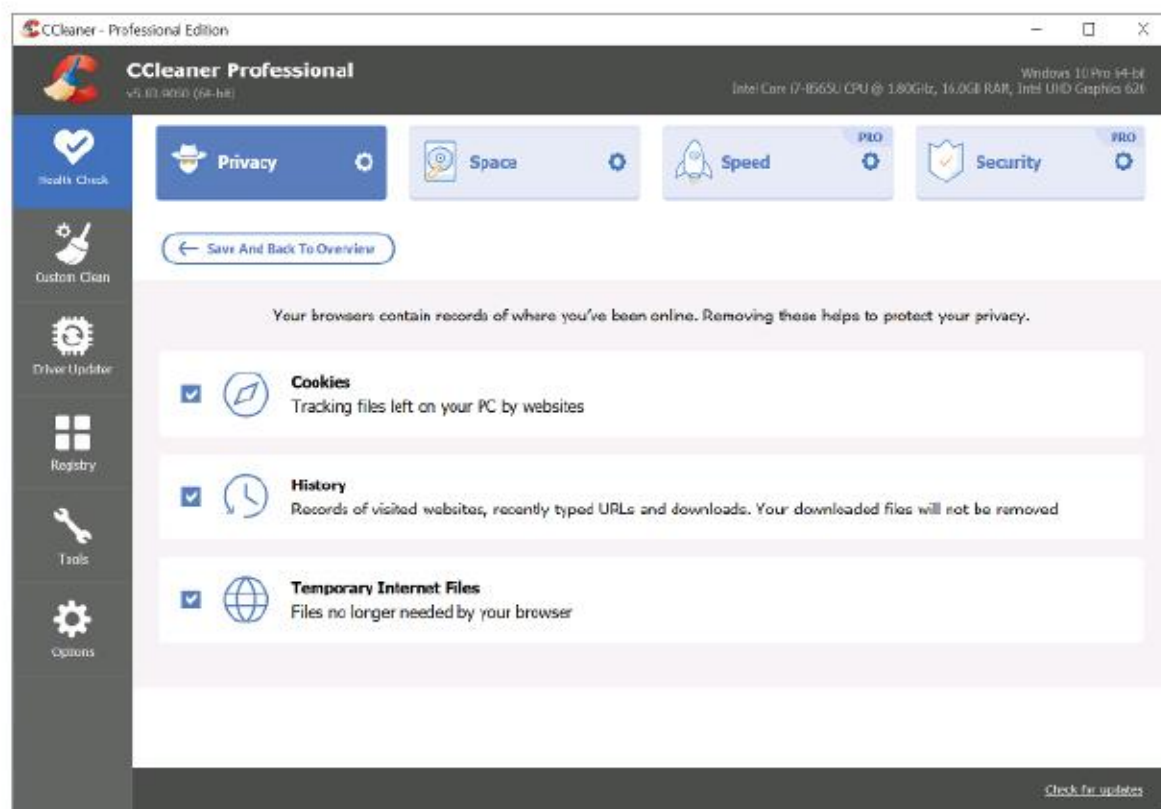
CCleaner has been around since 2004, so for many it is the PC cleaner software they use. But is it still the best?

As with many Windows applications, there's a free version of CCleaner but it's limited to standard privacy protection (tracking files and browsing data) and cleaning. I'm testing the paid-for Professional version here,

which unlocks a range of additional features such as the Speed and Security sections of the software, plus the ability to schedule cleaning and monitor your computer.

FEATURES AND PERFORMANCE

Like most tune-up software, CCleaner Professional is a simple and easy download



CCleaner Professional's Health Check highlights privacy trackers and junk that needs removing.

followed by a quick installation. It's 112MB in size and is compatible with Windows 7 and later versions.

After a short intro explaining the features, CCleaner carries out a Health Check in a matter of seconds, highlighting privacy trackers and junk to remove along with startup apps to disable and apps to update.

On my test laptop, the search found 7,371 trackers, 792MB of junk, and a single app to update—Audacity, in this case. You can select which junk to remove, but only in groups of different types like Recycle Bin, Temporary Application Files and Temporary System Files.

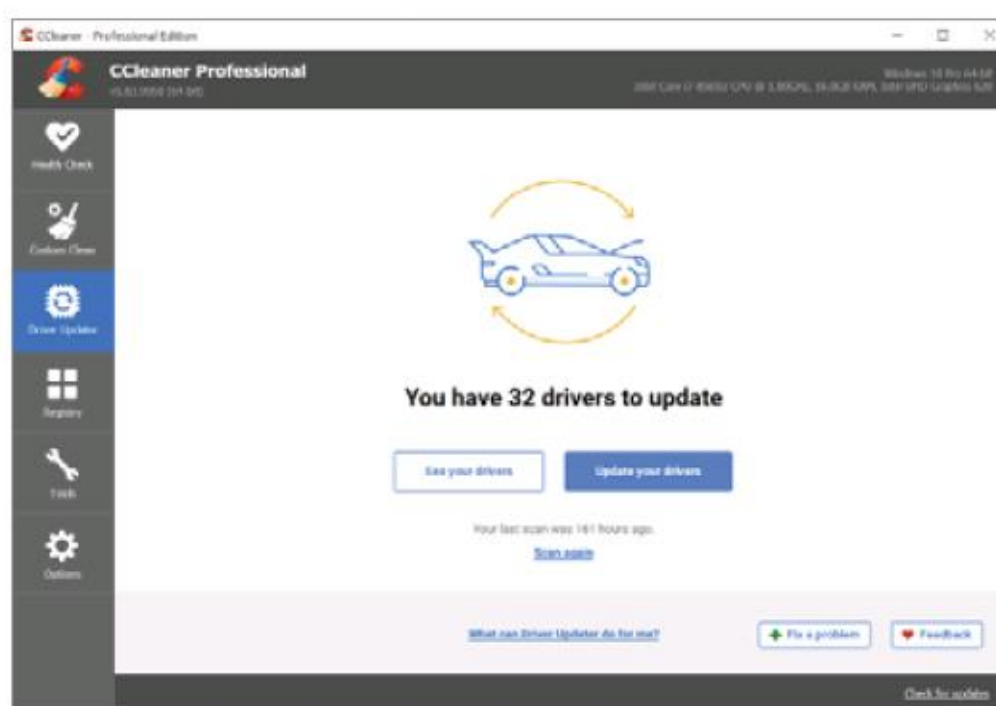
There's a Custom Clean option, which can analyze Windows and

Applications. Again, this took a matter of seconds (2.79, according to the application) and found 1.9GB to remove, mainly cache files. Although that's a good amount of space to free up, remember that cache files are there to make things like web browsing faster. So, removing them could slow down certain things.

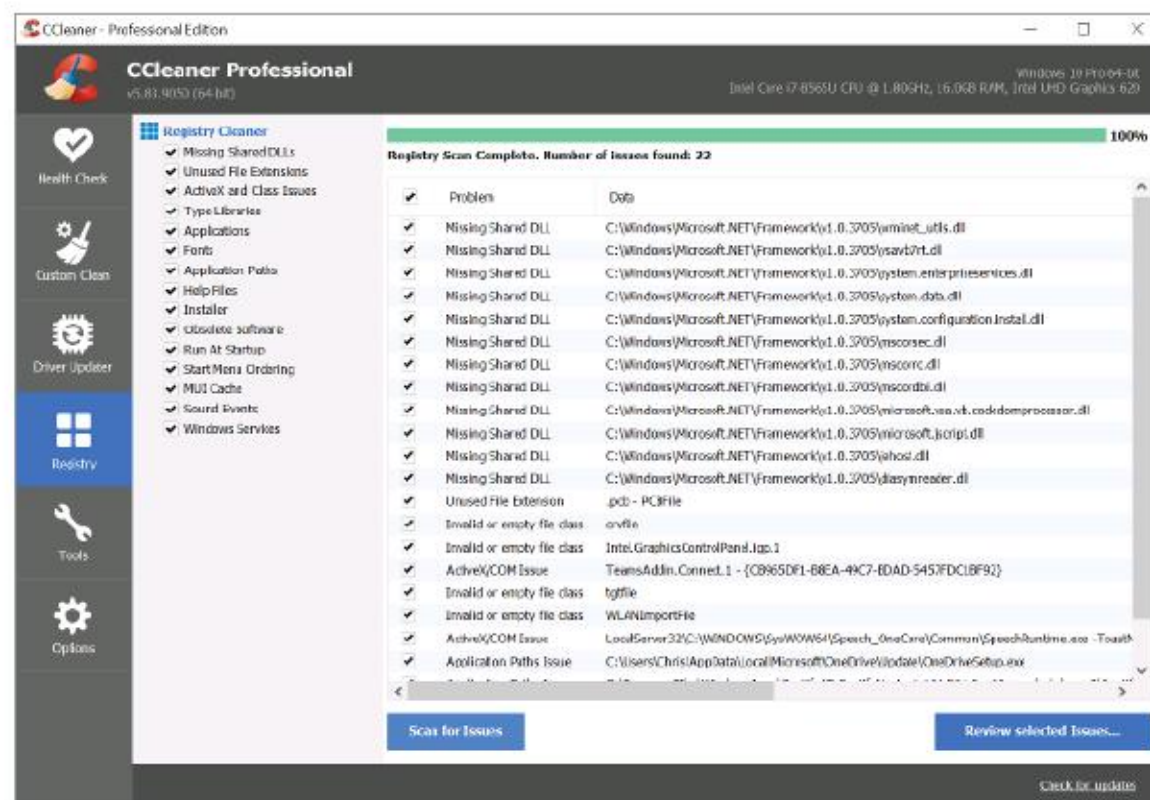
In total, CCleaner was able to free up 3.09GB of space. For comparison, MacPaw CleanMyPC managed just

1.68GB. Note that the Professional version allows you to schedule cleaning, while SmartCleaning will clean when you hit a certain amount of junk (500MB by default).

Driver Update does what it says and aims to make sure everything is up to date and



Driver Update makes sure everything is up to date and running as well as it can be.



The Registry tool quickly identifies issues, which you can go through individually or fix as a group with a single click.

therefore running as well as it can be. It found 32 drivers to update across audio, Bluetooth, biometrics, and more (152 were up to date).

The Registry tool quickly found 271 issues, and you can go through them individually or simply fix all with a single click. The typical solution is to delete the registry value or key.

Finally, the Tools section is where various other options are tucked away, including the usual list of applications and browser plugins to uninstall.

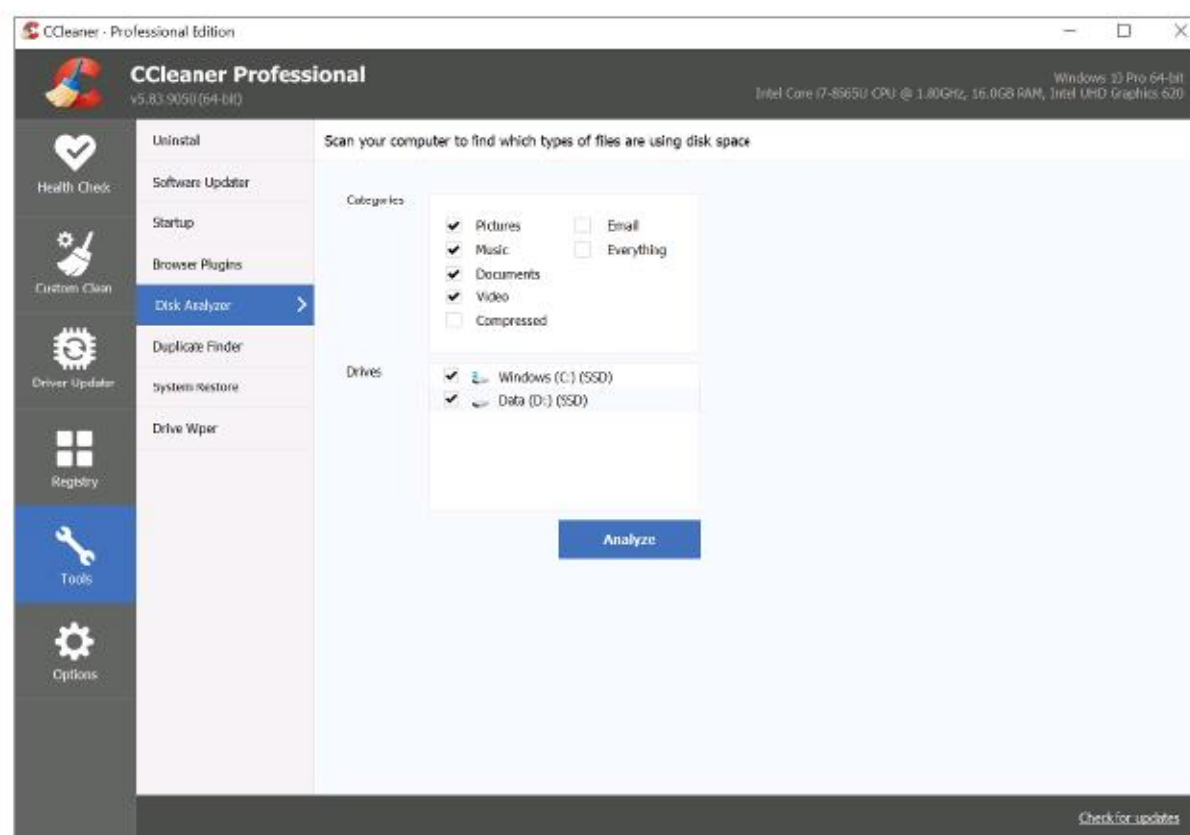
However, there's not much more information here than

Windows or your web browser will give you anyway.

The Duplicate Finder and Disk Analyzer are more likely to be useful. Note that the former can't determine which files are needed and which can be safely deleted, so you're best off sticking to deleting media such as photos and videos. While this found many files, I couldn't see a way to select them all for deletion in one go.

The latter can help you figure out what's taking up

space on your machine, perhaps without your realizing it. For example, the test laptop contained nearly 7GB of pictures, so moving them to an external drive or cloud



Disk Analyzer helps you work out what's taking up the most space on your computer.

storage would be an easy way to free up some space.

With the new CCleaner 6.0 there is one more interesting feature—Performance Optimizer. It helps you keep your background programs in check and allows you to freeze them so they do not hog your resources, then wake them up as soon as they are needed.

This means that not only is your PC faster, as all its power is focused on tasks at hand, but also your battery life might get much better. CCleaner says you can get an average productivity boost of 34% if you have an older machine from 2015 and newer PCs can see up to 30% longer battery life. Furthermore, boot times are increased 72% for the 2015 PC and 40% for a 2021 laptop.

Version 6.0 also adds 50 new programs (with 200 more coming in 2023) to the Software Updater, helping you get the latest versions with less hassle. These include KMplayer, WinZip, Box Drive, Foxit Reader, Adobe Reader, and Nitro Pro.

PRICE

As mentioned earlier, there is a free option for CCleaner, but the Professional edition I've tested costs from \$29.95 ([fave.co/3rlBG2k](https://www.ccleaner.com/3rlBG2k)) for a single PC license for one year, making it one of the cheapest PC cleaners around.

You can also opt for Professional Plus, which includes the Deffragler, Recuva, and Speccy applications. It's priced at


£49.95/\$49.95 for three PCs for one year, or £99.95/\$99.95 for two years.

As is the case with most software, there are often sales available that lower prices, so it's likely you'll pay less.

BOTTOM LINE

CCleaner remains one of the best cleaning software options around, not only at one of the lowest prices but with top-notch performance.

The interface might not be the most user-friendly you'll find, but there's a great selection of tools if you spend some time to get to know what is where.

It's more important that the app does the job you're paying hard-earned money for, and that's certainly the case in our testing (although many people will get decent usage from the free version). We'd just like a little more control over what gets deleted. 

CCleaner Professional



PROS

- Affordable.
- Solid performance.
- Plenty of tools.

CONS

- Medium control of file removal.
- Not the best user interface.

BOTTOM LINE

Still one of the best PC cleaner applications, offering excellent value for money and performance, albeit not with the most user-friendly interface of the bunch.

\$30

Anker 511 PowerCore Fusion 5K: A power bank made for travel

When space is a premium, the Anker 511 is an ideal companion. **BY ALAINA YEE**



As someone whose clothing regularly has wimpy, tiny pockets (through no fault of my own), I prefer to carry a slim hybrid power bank when I'm out. I get the best of both worlds—a little extra juice for my phone, plus the ability to charge at the wall. And the \$30 Anker 511 PowerCore Fusion 5K (fave.co/46IEb3F) fits that bill nicely.

SPECS AND DESIGN

The Anker 511 has a 5,000 mAh battery providing a total of 18Wh of power. Anker claims the battery will maintain a maximum capacity of 90 percent for almost two years (20 months), based on a recharging cycle of every two days. You get a two-year warranty as well.

This power bank is compact, measuring 4.38×1.19×1.19 inches (11.12×3.02×3.02

cm) and weighing 6 ounces (170g). Its housing is made with two plastic finishes—glossy on the upper half and matte on the bottom half. I would have preferred an all-matte finish, as any scratches it gets wouldn't be as visible.

The Anker 511's design is simple. There's just one charging port (USB-C) at the bottom, and a battery status button with four indicator lights on the front. Each light represents 25 percent of the battery life. When you're recharging the power bank, the lights all go dark when it reaches a 100 percent charge.

The USB-C port delivers a max of 20W power (9V/2.25A). It also supports 5V/3A (15W) charging.

PERFORMANCE

On the back of the Anker 511 is a set of flip-out charging prongs, which can be used to recharge the battery or to pass electricity through to a connected device. It can't do simultaneous charging. You can recharge the battery from empty to full in about 2.5 hours.

On top is a tiny built-in carry strap. It's very short, measuring just 2 inches long, and is made from thick ribbon.

The Anker 511 is 89.8 percent efficient. You'll get about 3,200mAh when charging a device at 5 volts (5V). On a phone like the Pixel 7 Pro, which has a 5,000mAh battery, that works out to about 64 percent charge. So it's not enough for a full charge, but


enough to decently stretch its life when away from a wall outlet.

Currently, the average efficiency for all portable batteries we've tested is 83 percent.

This power bank does have one notable drawback: If you use it as a wall charger, it will take up an entire electrical outlet. Because its USB-C port is near the prongs, attaching a cable will block the other socket in the outlet.

If you're only recharging the power bank, you won't have this issue.

BOTTOM LINE

Overall, the Anker 511 FusionCore 5K is ideal for traveling light, particularly if you're wandering within a city. You'll stretch your phone's battery life by a decent amount while out, and if you still need more juice, you can always plug it into a wall to keep your device alive—all while it occupies very little space in a pocket or purse. 

Anker 511 PowerCore Fusion 5K



PROS

- Efficient.
- Slim, compact size.
- Both a battery and a wall charger.

CONS

- Charging a device at the wall takes up the whole outlet.

BOTTOM LINE

The 511 FusionCore 5K is a great travel companion, particularly when you're out and about in a city. Its hybrid design makes it ideal if you don't like to carry much but always want an adequate phone charge.

\$30

50

PROGRAMS THAT **FIX** **WINDOWS** **PROBLEMS** WITH JUST A FEW CLICKS

ALL YOU NEED IS THE RIGHT
SOFTWARE TO QUICKLY FIX
COMMON WINDOWS HEADACHES.
HERE ARE 50 ULTRA-HANDY TOOLS.

BY PETER STELZEL-MORAWIETZ



No matter how much experience you have with Microsoft's Windows, it can still be improved by turning to software and tools that can make the operating system that much better.

Take Windows 11, for example: When Microsoft introduced it with extremely strict system requirements in autumn 2021, it was only a matter of time before those barriers could be circumvented.

In order to install the new operating system on older PCs, the registry first had to be changed manually. Later, this could be simplified with a batch file, and now even that is superfluous thanks to **Rufus** (fave.co/3PKgDQq), a small tool for creating bootable USB sticks. Now, with just a few additional clicks, you can run Windows 11 on almost any computer around.

Let's start this look at helpful, dead simple Windows software with that very program, before we take a deeper dive into several different categories.

1. WINDOWS INSTALLATION, UPDATES, AND HELP TOOLS DURING BOOTING

Download the installation file for Windows 11 from Microsoft (fave.co/3ZsFE5U) via the option "Download a Windows 11 disk image (ISO)."

Now insert a flash drive with at least 8GB of storage space into the computer. Start

Rufus, click on Select in the interface, select the Windows 11 ISO file, and then click Start. The "Customize installation" dialog box then appears, giving you an option to avoid Windows 11's obligation to set up an online account. Follow the setup process until Windows 11 is installed.

This Rufus-loaded flash drive will not only reinstall Windows 11 on any PC, but also upgrade any Windows 10 installation via the setup.exe file!

If you want to move an older Windows 10 system in its entirety to a new PC, we recommend **Easeus Todo Backup** (fave.co/3ZxqEnq). With it, you create an image of your old computer's storage, from which you restore your system with all settings, programs, and data on your new PC. In addition, Windows 10 can then be upgraded to Windows 11 without any problems.

To install an older Windows version—for example, Windows 8.1, 10, or 11 version 21H2—save it to your storage with **Windows ISO Downloader** (fave.co/4531pKT) and create a setup flash drive from it with Rufus.

Depending on the Windows version, the hardware, and the history of the PC, you may need a product key to activate the operating system for the new installation. You can read this key on your existing system with **Showkeyplus** (fave.co/3Rswbti).

Reset Windows Update Tool (fave.co/3Rpmv2M) solves various update problems: Almost 20 features are available

after you start the program with administrator rights.

If you have installed several versions of Windows, Linux, or other operating systems on your computer, you can use **Easy BCD** (fave.co/46owDND) to adjust the boot entries and their prioritization.

Creating a flash drive as a multiboot system for booting different live systems was a complex matter for a long time. **Ventoy** (fave.co/45Z5mBv) fundamentally changes that. With this tool, all you have to do is make the flash drive bootable by clicking on Install, and then simply save the ISO files on the stick within Windows. After booting from the flash drive, you select the desired live system via the Ventoy interface. The key benefit here is

you don't need to create a new bootable flash drive when a new system version appears—you simply replace the older one with the new ISO file. Another plus: You can continue to use free space on the USB stick to save and transport your data.

2. PC START-UP, ERROR ANALYSIS, OPTIMIZATION, HARDWARE, AND DRIVERS

The promise of one-click maintenance is hit or miss on the PC. The causes of possible errors are too varied and the solutions too complex. That said, **Ccleaner** (fave.co/3EO4Kmo) and **Glary Utilities** (fave.co/3PWwmMx) are always worth a try. You can start the system analysis and the subsequent problem

elimination with a single click.

Bootracer (fave.co/46m15Yq) requires a few more clicks. The program analyzes the start-up process and breaks it down into individual segments. This shows at a glance which process or autostart program has a problem. You can choose to start the boot analysis as a normal complete Windows start, or limited to the system without



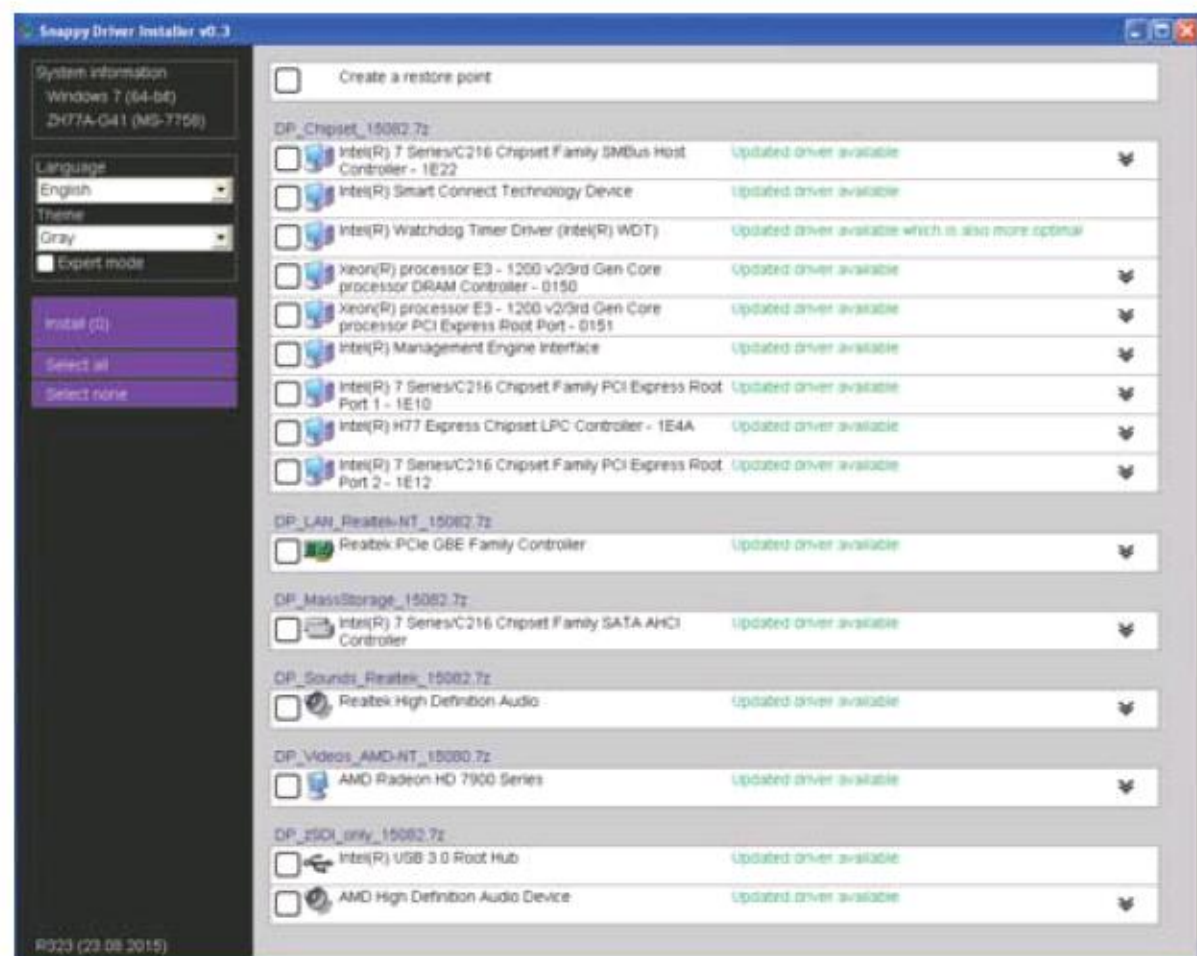
Glary Utilities makes both problem analysis and their elimination possible with a single click; everything else is done automatically by the software in the background.

autostarting software. The wizards make it easy to use Bootracer, including the necessary restarts. You can see in the details where and why your start-up may take an unusually long time. These limitations help you get to the bottom of the cause or, if it makes sense, exclude the software in question from autostarting when Windows loads.

The analysis tools **Hwinfo** (fave.co/46kj7FP) and **Speccy** (fave.co/3rjBOzr) show whether something is wrong with your hardware. Both programs provide a wealth of information and sensor measurement data. Even more information on your processor is provided by **CPU-Z** (fave.co/46oFezP) and **Core Temp** (fave.co/46eF7GI), while GPU-Z (fave.co/3EOEtEu) digs deep into graphics card details.

Unknown Device Identifier (fave.co/3PLZHjh) is helpful in identifying unknown components; the tool shows many more different components than the native Windows device manager.

Memtest86 (fave.co/3EKIb1K) tests the main memory for errors, while **Crystaldiskinfo** (fave.co/453qKEa) analyzes SSDs and magnetic hard drives by reading out the SMART parameters. A look



Snappy Driver Installer recognizes outdated hardware drivers and automatically updates them with the latest versions if desired.

at the overall status shows whether everything is OK. The tool sounds an alarm in the event of abnormal values, which is very important for drives full of personal data.

Snappy Driver Installer (fave.co/4614UT6) checks whether your installed hardware drivers are up to date. The tool starts without installation. Click on the option “Download indices only” and wait until the system analysis is complete. Now, if desired, activate the “Restore point” field. To replace all obsolete drivers, continue by clicking on “Select all—Install” at the top left. Alternatively, check the obsolete entries individually. Due to the file sizes of some drivers, downloading and installing may take some time.

3. WINDOWS EXPLORER, DESKTOP TOOLS, AND REMOTE MAINTENANCE

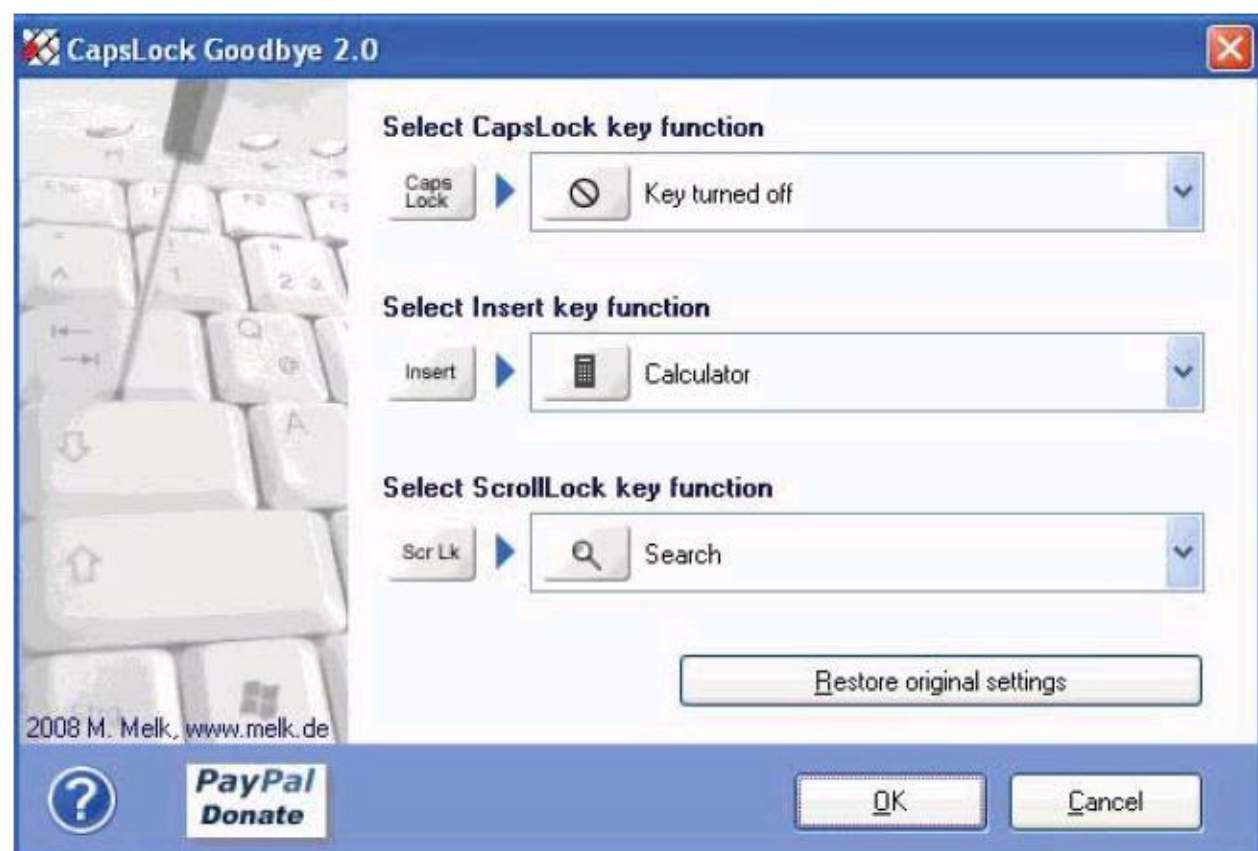
Windows Explorer and the desktop are always used on a computer—even if mostly unconsciously. While Microsoft has equipped the file manager with tabs in Windows 11, you have to retrofit the file explorer tabs into Windows 10. To do this, install **Qttabbar** (fave.co/3ZpE8kU), restart the PC, open Explorer, and click on the down arrow in the View tab under the Options symbol on the right. There, you activate the list entry Qttabbar to show the new tab bar.

The free version of **Tidy Tabs** (fave.co/48pd2yr) allows up to three tabs in a window, across programs—for example, an Excel sheet, a Word document, and Outlook. It makes it easier to view pictures with a large preview you start and close by pressing the space bar.

Treesize Free (fave.co/3PM04Ub) shows you at a glance which files are eating up space on your hard drive. The already mentioned Ccleaner also offers a quick search function for duplicate files (“Extras - Duplicate Finder”). Other tools, like Anti-Twin, offer more options, but are more complicated to use.

Master (fave.co/3PLBJOb) can do more and is more convenient than the Windows clipboard. If you’re annoyed by accidental clicks of the caps lock key, **Capslock Goodbye** (fave.co/3Rrpdoj) is the tool for you. The software deactivates the key or assigns an alternative function to it. **Desktop OK** (fave.co/3rdMLTf) restores the icon placement on the desktop if it has been mixed up.

Three other programs provide more order (and more space on the hard disk): **Should I Remove It?** (fave.co/3rqgR5R) shows which pre-installed software you can safely delete on new computers. **O&O Appbuster** (fave.co/3EMMflv) makes it easier to remove Windows apps that hardly anyone needs. **Unchecky** (fave.co/3r3i7sP) prevents the secret installation of unwanted programs and toolbars. It’s a godsend.



Small intervention, big effect: Capslock Goodbye prevents you once and for all from accidentally pressing the Caps Lock key again.

Remote help—that is, taking over a remote computer via the internet—is not only efficient, but also very simple with just one click in **TeamViewer Quicksupport** (fave.co/46IRWiu). The person who needs help starts the tool and gives their displayed ID and password to the helper. The helper takes care of the rest with the fully comprehensive **Teamviewer software** (fave.co/3HTEYjo), which is also free for private use.

4. DATA MEDIA, FORMATTING, AND ACCESS TO CLOUD STORAGE

Changes to hard drives and partitions have a profound effect on your system and are often not easy to reset. Smaller tools can cause much less damage: **Superdiskformatter** (fave.co/3rmCO0N), for example, allows you to change the file system (FAT32, NTFS, and so on)—except for the Windows partition. **Fat32formatter** (fave.co/3RqyJlv) formats almost arbitrarily large data media as a FAT32 system, and **Drive Letter Changer** (fave.co/3PrFsPR) is used to assign fixed drive letters to USB drives.

Raidrive (fave.co/46IPlp8) assigns a drive letter to cloud storage devices such as Dropbox, Google Drive, and OneDrive for quick 1-click access in Explorer. To do this, select a storage service and a letter via Add, log in with your

login data, and allow Raidrive to access the cloud. Done!

Cloudevo (fave.co/3EOFAEa) also simplifies the handling of online storage by combining diverse cloud storage pools into a single drive with theoretically unlimited capacity. This is also possible with several free accounts from the same provider. While you as a user only see your Cloudevo drive, the service behind it automatically distributes the stored data to the various cloud storage providers.

Drive pooling with local drives—for example, with several USB drives—can be done with **Liquesce** (fave.co/3Lyopdz). Data that is too large to be sent by email can be forwarded with **O&O FileDirect** (fave.co/3RvZb3w). The software creates an access link to your PC, which the recipient can use to transfer the shared data. Your



Cloudevo combines several cloud storages under Windows into one drive. This is convenient and allows you to store even oversize files on the internet.

computer must be switched on and online during the transfer.

If Windows blocks access to certain files, thus preventing deletion, renaming, or copying, **Lock Hunter** (fave.co/4514BGD) releases them again. You can change other permissions of folders and files with **Attribute Changer** (fave.co/3PKilRQ).

5. SECURITY, DATA PROTECTION, AND PRIVACY

Have I been pwned? (fave.co/3EMeE7P) and **HPI Identity Leak Checker** (fave.co/48incB7) are not programs to install, but a simple click is enough here too. Just type in your email address, and you'll know whether your account has been affected by one of the countless account and password hacks. If so, please make sure to change the corresponding password.

Defender UI (fave.co/3LsCXeT) provides a new, easier-to-use interface for all Microsoft security features than the integrated Windows Defender offers. The software contains four predefined security profiles and clearly groups together many security features and settings otherwise scattered throughout the operating system.

Virustotal Uploader (fave.co/45Z6Yv3) simplifies the process of uploading potentially dangerous files to the **Virustotal** (fave.co/3LwgFsw) scanning platform. Instead of manually calling up the website, selecting the file, and uploading it, this free app works

much faster via the Windows context menu. The browser plug-in **I don't care about cookies** (fave.co/45Ykgbe) eliminates the hassle of deselecting cookies on many websites by blocking or hiding the usual pop-up dialogs. It is best to combine the add-on with the automatic deletion of all cookies when you close your browser.

Wipe (fave.co/46icetw) is suitable as a supplement for removing online traces. The software not only deletes browser data, but also temporary files and more.

You can securely delete data from your hard drive with **Eraser** (fave.co/3lznuWg): The name says it all.

Ungoogled Chromium (fave.co/3Prqc5l) is a special fork of the free Chromium browser, on which Google Chrome is also based. Unlike Chrome, Ungoogled Chromium does without any Google services for more privacy.

Simple Code Generator (fave.co/3ZqMs3W) creates QR codes for private information that you wouldn't want to entrust to an online QR generator, such as mail addresses, Wi-Fi access information, Outlook or personal contacts, and the like.

Last but not least is **USB-Logon** (fave.co/45XpVyB). It lets you create a USB stick for fast and secure Windows logon without a password. USB-Logon is a good alternative for PCs that don't have a Windows Hello-enabled webcam (fave.co/3ImacXy) or fingerprint sensor. 





GREAT **ZOOM** **FEATURES** YOU (PROBABLY) DON'T **KNOW** **ABOUT**



MAKE YOUR
ZOOM
EXPERIENCE
MORE FUN AND
ENGAGING.
**BY ANYRON
COPEMAN**

When Zoom exploded in popularity in 2020 because of the pandemic, many people installed and used it for the first time. This necessity led to almost everyone sticking to the basics of virtual meetings. But if you're still only using the core Zoom features, you're missing out. There are loads of ways to make your calls much more fun and useful, though it's not always obvious that they exist.

That's why we've highlighted eight of the best here. If you want to improve your video-calling experience without buying a new webcam or microphone, we've got tips to help.

Crucially, all these features are available on the free version of Zoom. Removing the

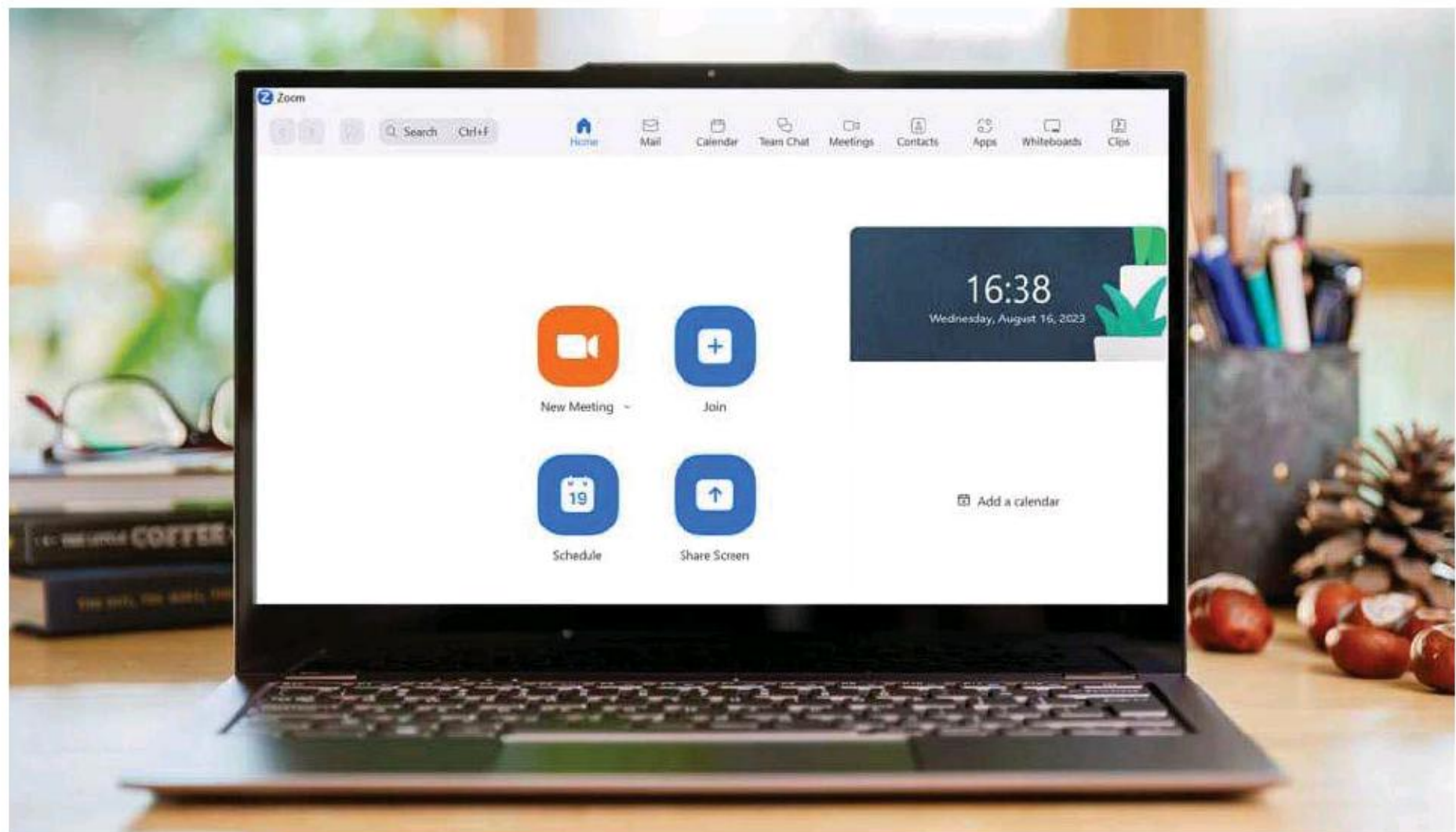
40-minute limit is the main perk of paid plans (fave.co/44ZQFga, from \$149.90 per year).

1. STOP LOOKING AT YOURSELF

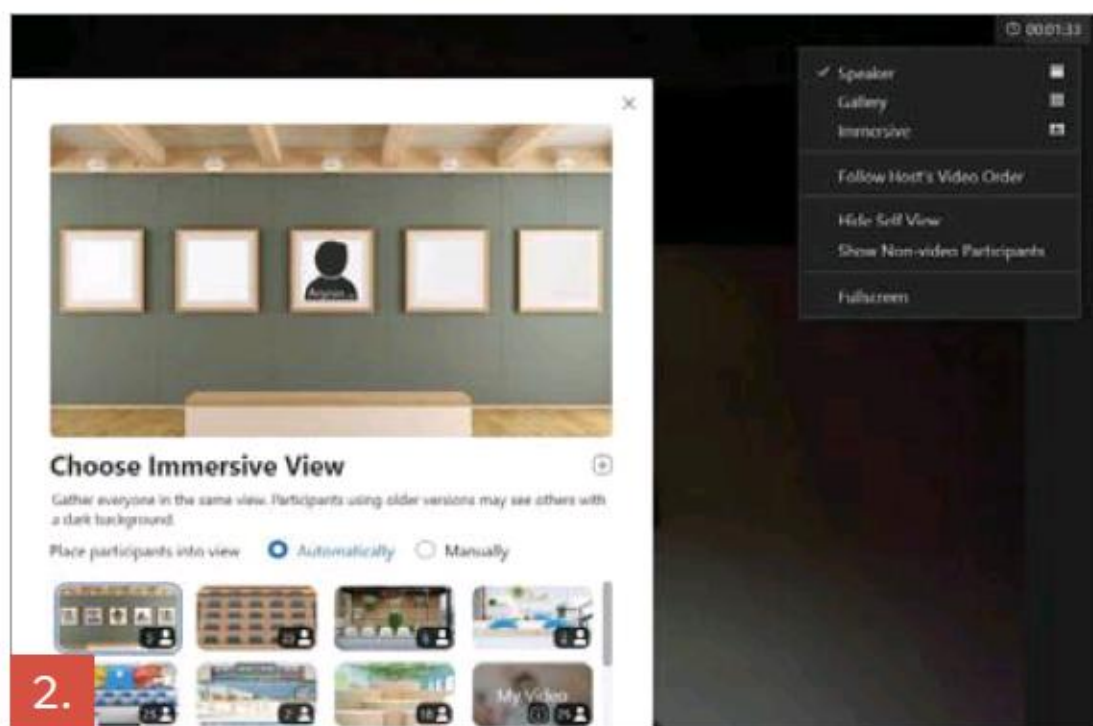
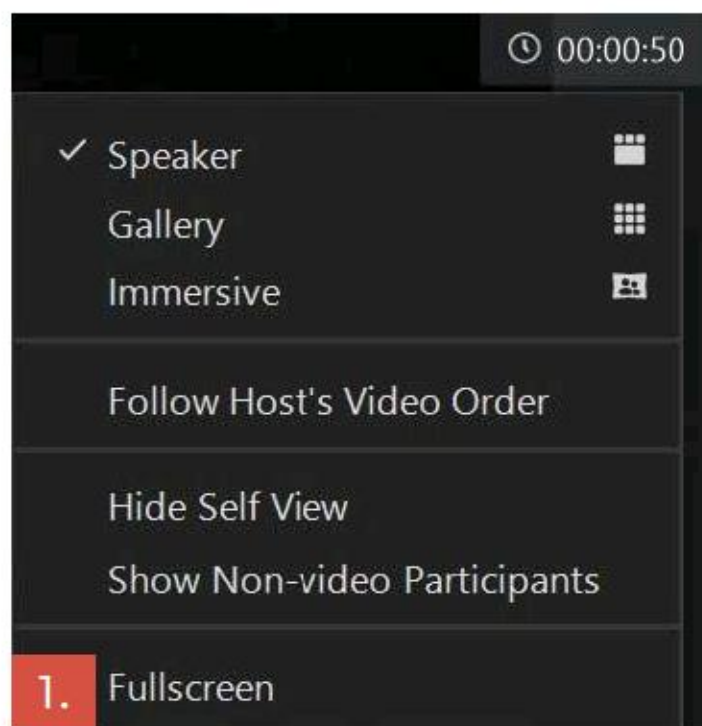
We all want to look presentable on video calls, but it's not a good idea to keep looking at yourself during a meeting. Instead, once you're happy with the lighting and framing, click the View button in the top-right corner and click Hide Self View (1).

2. USE IMMERSIVE VIEW

Rather than just looking at the person speaking or a grid of all participants, how about something that makes it at least seem like you're in the same room?



Zoom's popularity exploded at the start of the Covid-19 pandemic.



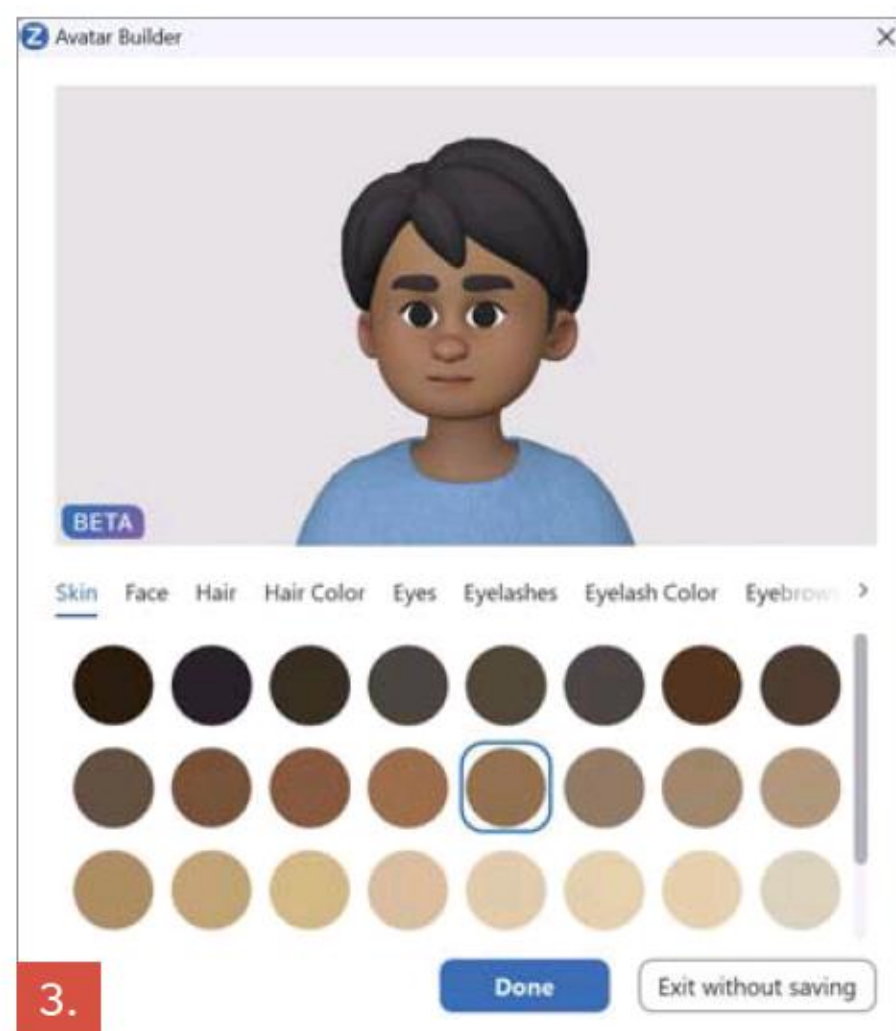
Immersive View (2) is as close as it gets, allowing you to place up to 25 participants on a single virtual background. There are plenty to choose from, including a classroom, an auditorium, or even an art gallery.

To get started, create or join a call with two or more participants. Click the View button in the top-right corner, then select Immersive. From the window that appears, choose which of the virtual environments you'd like to use—some will take a few seconds to download.

Decide whether to automatically or manually add participants, then click Start. Immersive View will only apply to your own view, even if you're the host, and won't force everyone else to see what you're seeing.

3. CREATE AN AVATAR

If you'd prefer not to show your video at all, how about an avatar instead? While appropriate for casual meetings and probably



not when others need to see the real you, avatars can be a fun way to add some personality to your video calls.

From the main Zoom home screen, click the Settings cog in the top-right corner, just below your profile icon. Choose Background

& Effects from the left side, then Avatars (still in beta at the time of writing).

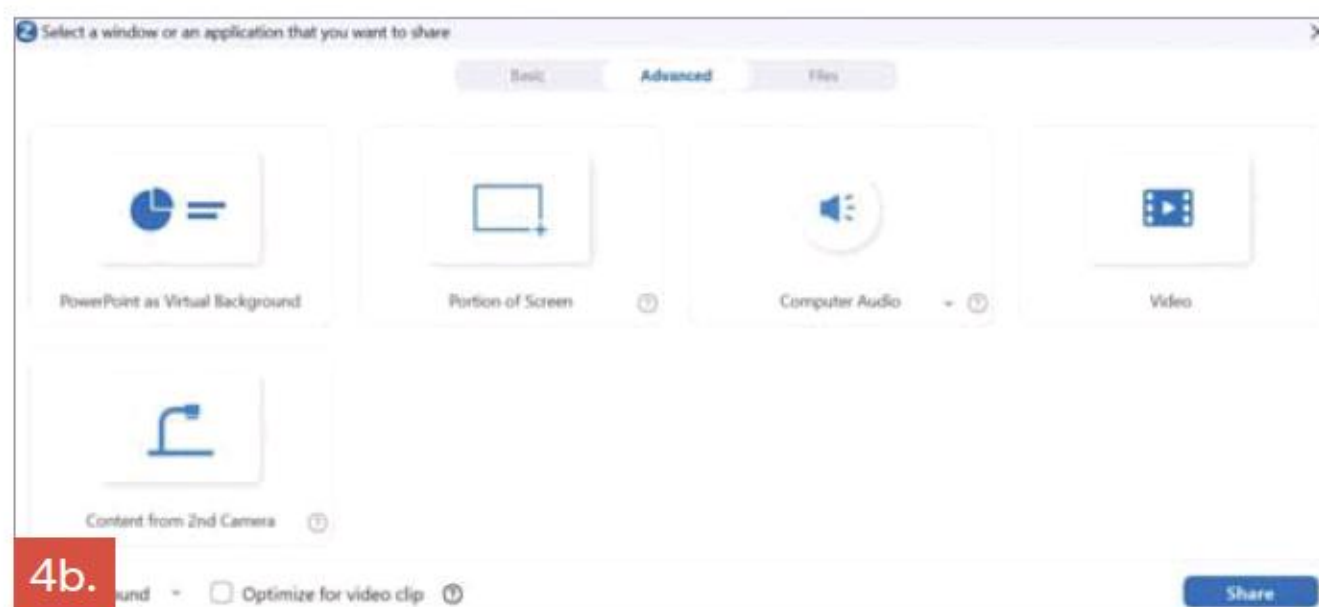
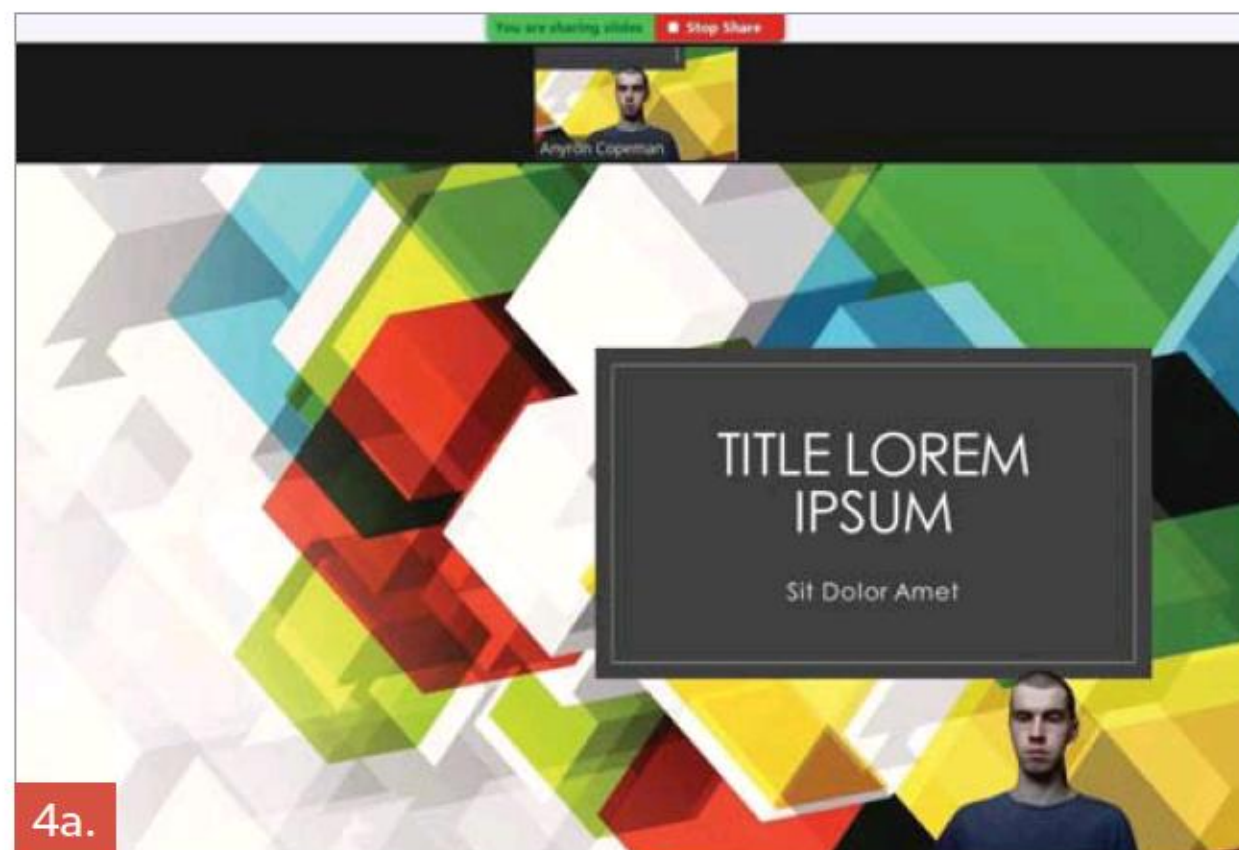
Click the plus-sign (+) icon to fully customize your own avatar, then click Done once finished (3).

Alternatively, simply click one of the preset animal versions.

Your avatar's head and face movements will mirror your own, so it's still easy to know when you're speaking.

4. USE POWERPOINT AS A VIRTUAL BACKGROUND

Adding blur or an image to your background is a popular feature on Zoom (4a). But how about a full PowerPoint presentation? It's a great option for



presenting to a group, but not something many people know about.

Provided the host has allowed it, anyone can present with a PowerPoint background. After joining the call, click the green Share Screen button, then select the Advanced tab (4b). Double-click PowerPoint as Virtual Background, then select your PowerPoint file.

By default, a small video feed will appear in the top-right corner. But you can resize and move this by clicking the three dots and choosing Resize My Video.

5. USE THE VANISHING PEN

You might be familiar with Zoom's annotating features, which allow participants to add notes and other information to a shared document from within the call.

But to get someone's attention about something,



you don't want to draw all over it. Instead, you can use the vanishing pen, which ensures that any drawings disappear after only a couple of seconds.

To use it, start a call and click the green Share Screen button and choose which window you'd like to share. Click the Annotate button from the toolbar at the top, then hover over Spotlight and select the icon, which looks like a dashed line below a pen—that's the Vanishing Pen (5).

6. TURN ON LIVE CAPTIONS

Live Captions (6a) is an excellent accessibility feature, allowing those who are hard of hearing to understand what's being said in a meeting. But it can be useful for everyone, especially if someone's audio is breaking up or their mic is too quiet.

To get started, open the Zoom website (fave.co/46mEmn) and

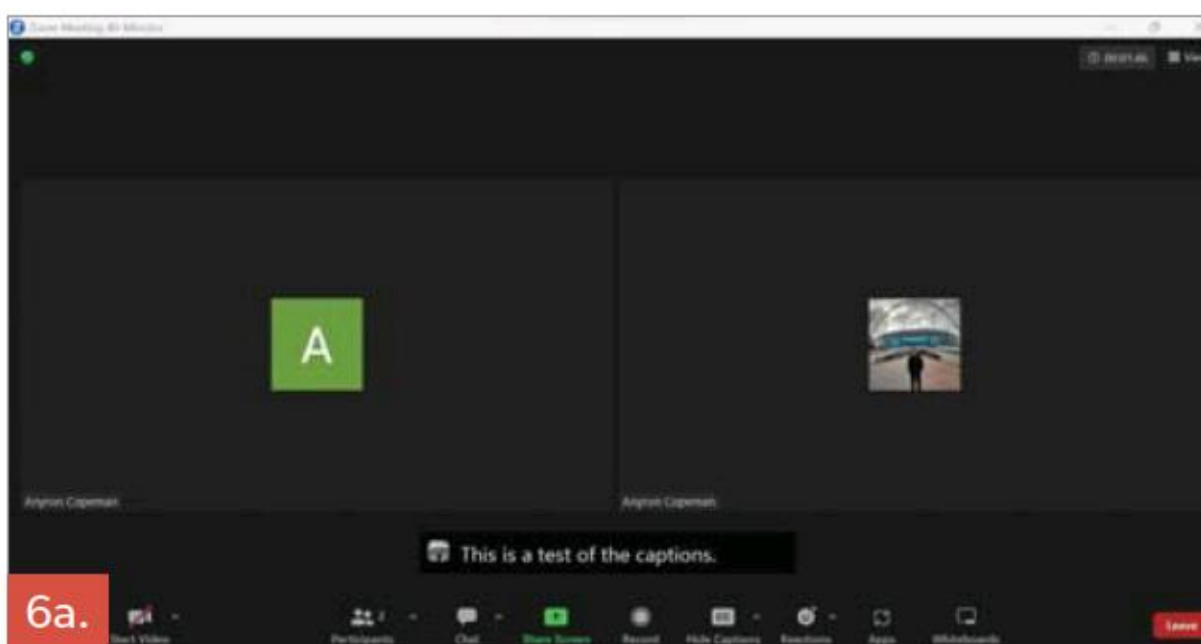
sign in. Click Settings from the left side, then Meeting and In Meeting (Advanced). Scroll down to "Automated captions" (6b), then click the toggle to turn it on.

Now open the Zoom app and click the Settings cog. Select accessibility, then check the box next to "Always show captions."

7. SEND VIDEO MESSAGES

As you might be aware, Zoom can be used for much more than just meetings. It can also work as a standalone messaging app, with channels, mentions, and chats making it a genuine Slack rival.

Alongside the usual text, emojis, GIFs, documents, and voice messages, you can



also send video messages. These are clearly more personal than the other forms of communication, and they mean you don't have to be in a call together to share information. But with access to all the usual virtual backgrounds and filters, they can also look very professional.

Simply open the Zoom app and click the Team Chat section at the top. Find someone you'd like to send a video message to, or click the blue compose button to start a new chat.

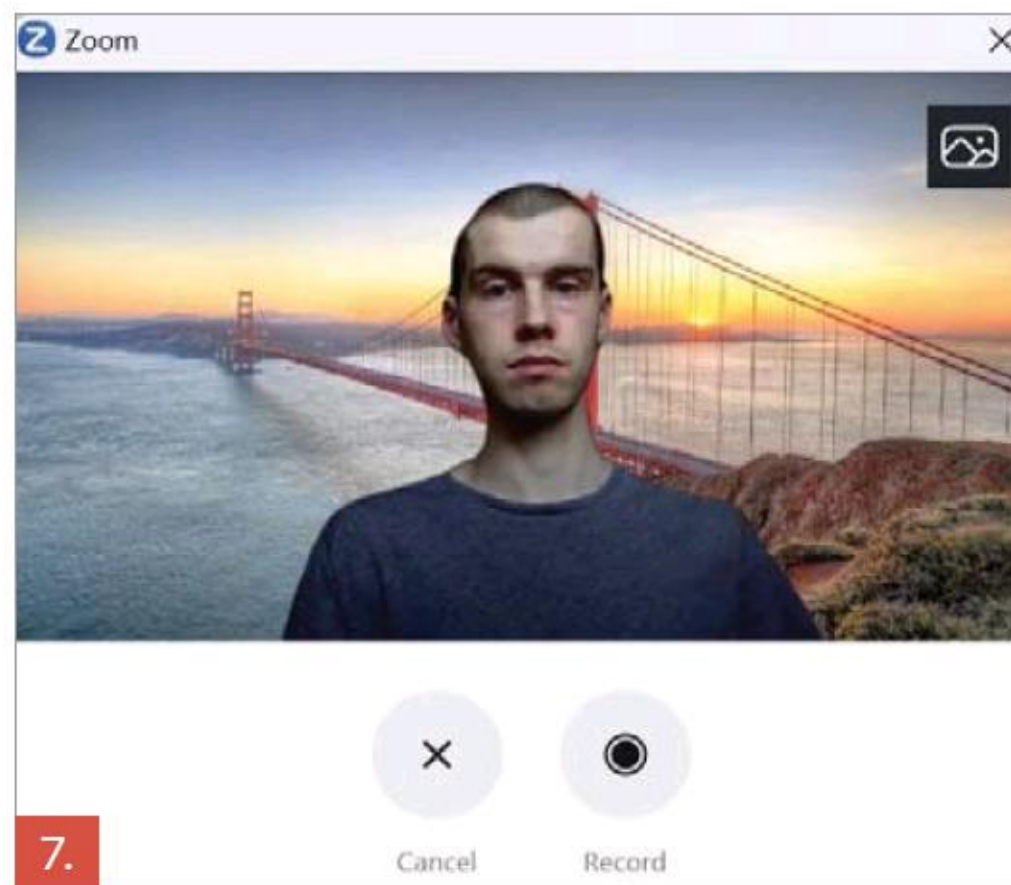
Then click the camcorder icon in the toolbar at the bottom of the screen. Click the image icon to choose a virtual background and/or filter (if you'd like), then click Record (7).

Each video message can last up to three minutes but won't be sent until you click the blue Send button.

8. GIVE NONVERBAL FEEDBACK

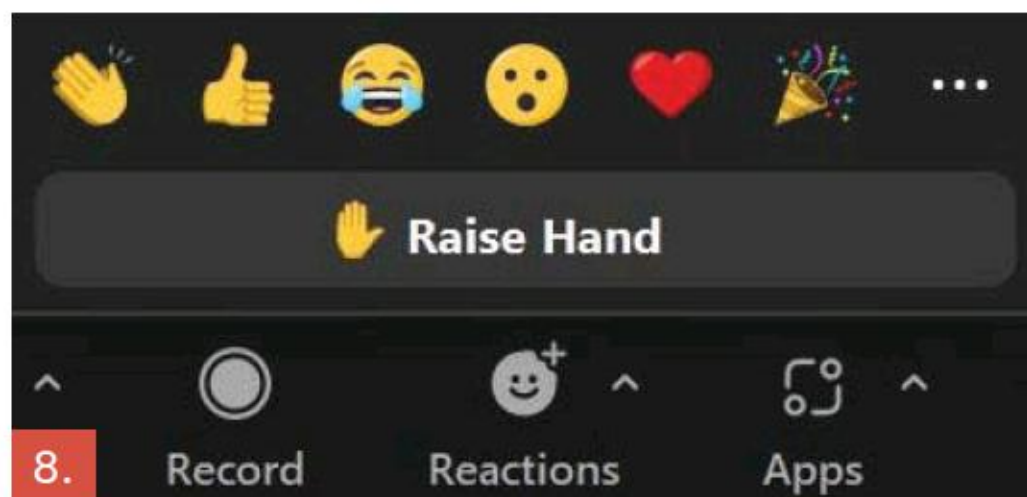
In large meetings, it's often not appropriate to just start talking when you want to give a response. Messaging in the chat is a better option, but it can easily be missed. Instead, how about raising a virtual hand? This flags to the host that you'd like to speak without interrupting what's currently being said.

To use it, simply join a meeting and click the Reactions button from



the toolbar at the bottom of the screen (if the host has made it available). Select Raise Hand (8), and a hand emoji will be displayed next to your name and video feed. Once you've finished speaking, simply click Lower Hand.

But if you'd like to respond without adding any comment, just use an emoji. Click Reactions, then one of the six most popular choices or the three dots and any emoji you'd like. Whichever you choose will stay on screen for a few seconds. 🔥





AMERICA'S DEADLIEST SHOOTINGS ARE ONES WE DON'T TALK ABOUT

On any given day in America, an average of 67 of our mothers, brothers, partners, and friends are taken from us by gun suicide. But tomorrow's deaths could be prevented. Store your guns safely: locked, unloaded, and away from ammo.



EndFamilyFire.org

BRADY
UNITED AGAINST GUN VIOLENCE



It's always been
easier for me to
help others

than to
help myself



As a Veteran, when someone raises their hand for help, you're often one of the first ones to respond. But it's also okay to get help for yourself. Maybe you want or need assistance with employment, stress, finances, mental health or finding the right resources. No matter what it is, you earned it. And there's no better time than right now to ask for it. **Don't wait. Reach out.**

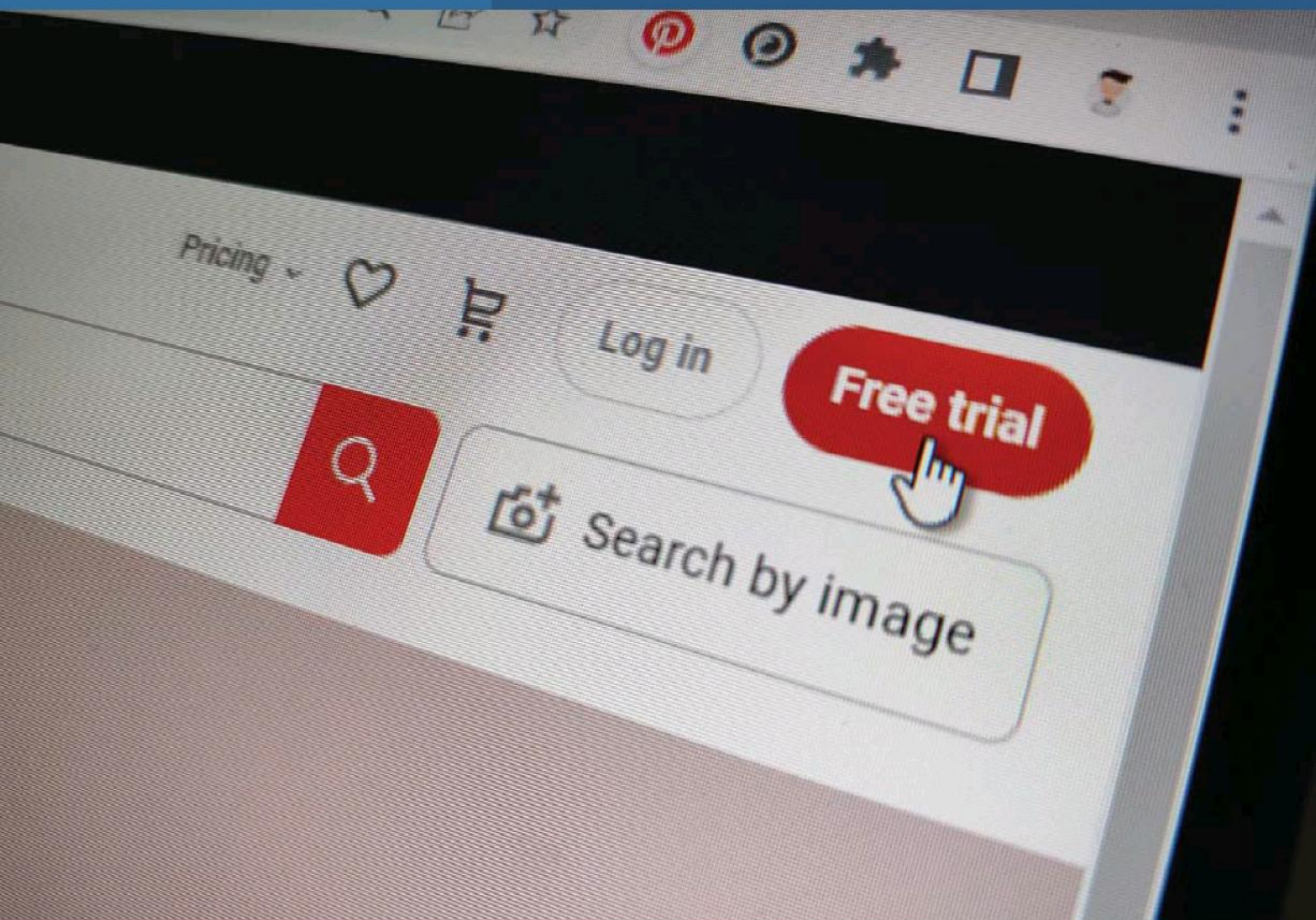


VA



U.S. Department
of Veterans Affairs

Find resources at [VA.GOV/REACH](https://www.va.gov/reach)



How to extend the trial period of software

Trials help you try out all the features before buying software. With a few tricks, you can even extend the test period. **BY FRANK MÜLLER**

Demo software helps you trial and test the tools available in the full version, often giving you access to all features for a limited time.

It can be helpful to use when you're exploring new software tools, but it can also

come in handy if you need a particular suite of tools for a short amount of time, and don't want to pay the full cost for professional or creative software.

This also applies to **beta versions**, which manufacturers offer free of charge in advance

on the internet. The incoming feedback on handling or possible bugs helps the companies. With the right knowledge, it's possible to extend the trial period for some demo software. Here's how.

EXTEND THE TRIAL PERIOD OF DEMO SOFTWARE

Many demo versions offer a test period of about 30 days. This is usually sufficient for a comprehensive check. But if you want to try out the full version for longer, you can try to extend the demo.

For a long time, a well-known trick to extend the duration of software trials was to reset the date with the internal Windows clock. These days, though, this technique often doesn't work. Software nowadays usually uses other mechanisms for the expiry of the trial period and does not rely on the system clock.

With many products, you have to create a free account with the developer to start the demo. You then log in to the software with a user name and password, and the demo period is checked. After the trial period has expired, the program will contact you and ask you to buy the product. If you need more testing, you may be able to create an additional account with a new email address and simply start a new test period. Keep in mind that many developers do not like this method, and it may violate the terms of use for the software.

EXTENDING MICROSOFT OFFICE TRIAL PERIODS

Moving on, you can continue to use the popular Microsoft Office after the trial period has expired by extending the term with Microsoft's own **Rearm method**. You start the Rearm tool via the file `OsppRearm.exe`, which you will find in different folders depending on the installed Office version.

For exact information on the installed Office version you have and information on the Rearm attempts, open the command prompt by entering `cmd` in the Windows search bar, selecting it, and, if necessary, changing to the system directory with the following command:

`cd c:\Windows\System32`

Then type the following command:

`cscript slmgr.vbs /dlv all`

It takes a moment until all the information about the installed Office package, among other things, appears. There are many instructions on the internet for the different Office versions, in either 32- or 64-bit format. These show exactly how to enter the rearm command and extend the runtime of the demo. This works up to six times. With the trick, you have the chance to use the Microsoft package for free for up to 180 days.

Similar solutions exist for Microsoft 365 (formerly Office 365). Before installing the demo, you have to register with Microsoft using your real name and provide credit card information. When the 30-day trial period

expires, the first installment for use will be charged immediately—so you have to trigger the extension of the trial period before that occurs.

Alternatively, you can log in to fave.co/461xKD8 with a Microsoft account and use the online Office suite free of charge in the browser. It's good!

TEMPORARILY ACTIVATE A SOFTWARE SUBSCRIPTION AND BUY IT CHEAPLY

Many companies today offer the choice of buying standalone software or a subscription. The subscription is suitable for using a program only for a certain period of time.

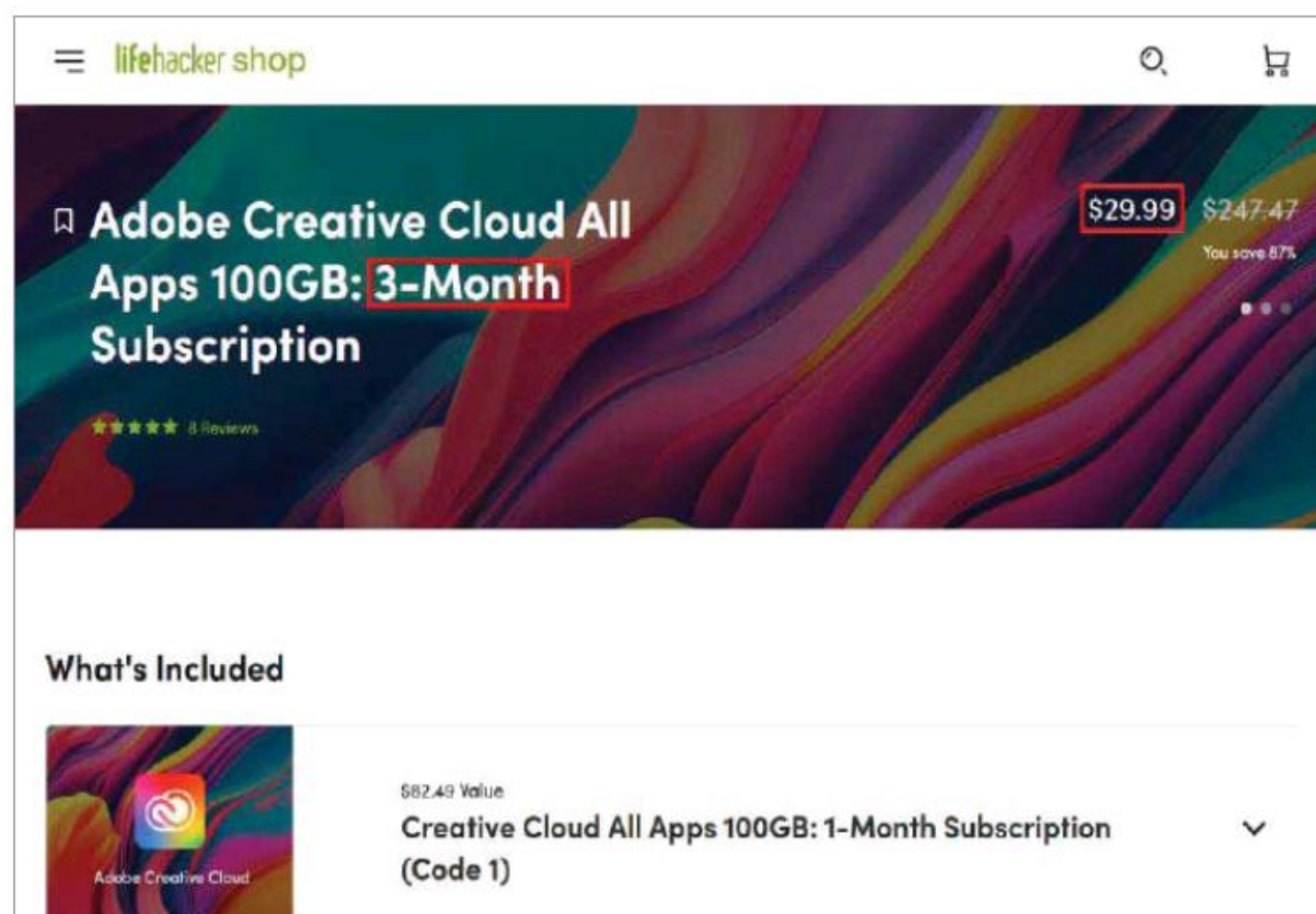
With a time-limited subscription license, you can use software flexibly without violating licensing conditions.

Tip: Subscribing for a full year is often much cheaper than paying monthly for the same period, if you use the software often.

Especially on Black Friday, Cyber Monday, and before Christmas, software companies often offer special deals. Programs or subscriptions are then heavily discounted, and many developers let you stack multiple years of software subscriptions even if you get them for cheap, as detailed below:

Another bargain opportunity is a software bundle: for example, when buying hardware, usually in the form of a voucher code. For

instance, when you buy a new computer, some manufacturers give you a free one-year license for Microsoft 365 or for an antivirus tool. Install the demo and extend the trial period as described above. Then activate the software with the PC manufacturer's code. 



The screenshot shows a product listing on the 'lifehacker shop' website. The main title is 'Adobe Creative Cloud All Apps 100GB: 3-Month Subscription'. The price is listed as \$29.99, with a crossed-out original price of \$247.47, indicating a discount of 87%. Below the title, there is a section titled 'What's Included' which lists 'Creative Cloud All Apps 100GB: 1-Month Subscription (Code 1)' with a value of \$82.49. The listing also features a 5-star rating and 8 reviews.

With a little searching and a little luck, you can find very cheap subscription offers for software packages on the Internet, such as this one for the professional applications in Adobe Creative Cloud.

12 secret Windows shortcuts you probably don't know

Nearly all of these were new to me. **BY ALAINA YEE**



You can be a seasoned Windows user, but you may still not know every shortcut that's available. For example, earlier this month I learned a new keyboard shortcut I hadn't known before. It was so simple and obvious, yet it felt like a complete secret until that very moment.

I also discovered that there are a *whole lot more* I've been sleeping on.

The original tip (fave.co/3ZtinRd) came via Twitter (now known as X) courtesy of Jen Gentleman, a Windows engineering team member at Microsoft. But the help doesn't stop there. She very generously has shared an entire list of such tricks (fave.co/451E8cf), pinned to the top of her feed. I eagerly jumped down that rabbit hole and came away with a solid list of new shortcuts to incorporate into daily use.

To save you time, I've shared my favorites below. They work in both Windows 10 and 11. If you like them, be sure to check out Gentleman's Twitter

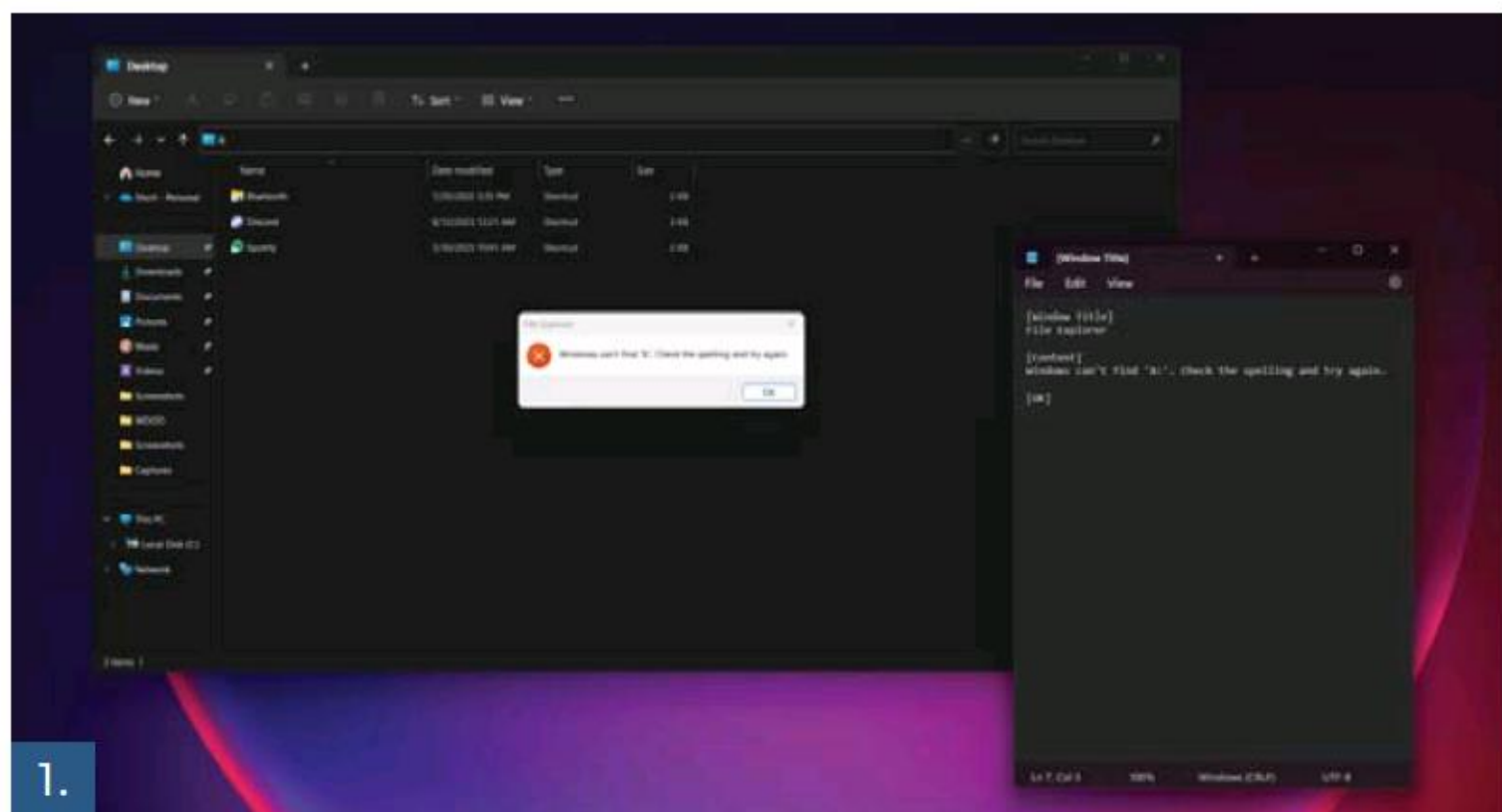
account—not only do you get helpful Windows tips, she posts spot-on internal monologues about video games, too. (I feel this one [fave.co/46hWnej] deep in my soul.)

1. COPY TEXT FROM A WINDOWS DIALOG WINDOW

Running up against an error message in Windows? No need to painstakingly transcribe the error code. Instead, when the pop-up is the active window, press **Ctrl + C** on your keyboard, and then paste the text into a document. The whole message is copied, so you can extract whatever parts of it you want from the text dump.

2. SWITCH TO THE CORRECT APP WINDOW FAST

If you have more than one window open for an app, you can hover your cursor over the program's icon in your taskbar, then choose



the correct window—provided you can make out which one it is from the tiny preview.

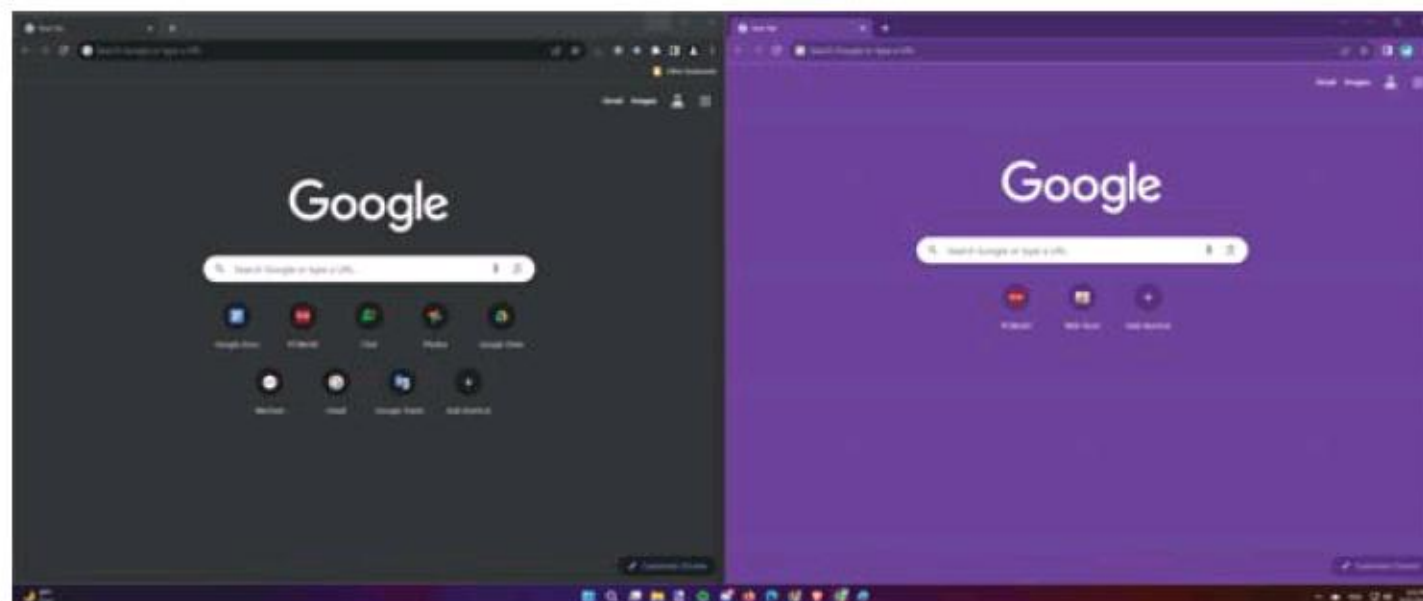
An alternative that's just as fast: Hold **Ctrl** and click on the app's icon to cycle through all its open windows. I now use this exclusively when flipping between two open windows. It's as efficient as Alt+Tab, but app-specific.

3. OPEN A NEW INSTANCE OF AN APP

Turns out if you hold **Shift** while clicking on a taskbar icon, that opens a new instance of the app. That is, you're running the program a second time or more. It's slightly different than opening a new window—for example, a second instance of Chrome lets you load a different profile while the first one is logged in. Or you can have two text files open at the same time in Notepad.

You can middle-click on your mouse to execute this same command—that's

Two different instances of Google Chrome open in Windows 11—the left is loaded with the main profile, and the right was started up with a secondary one.



probably your scroll wheel if you have a modern mouse.

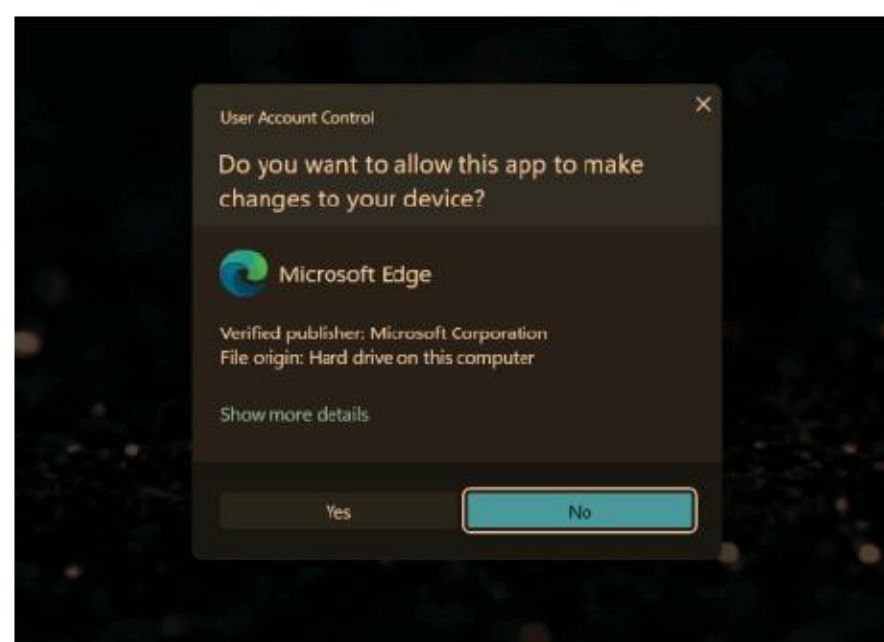
4. MAKE WINDOWS UWP APPS FULLSCREEN

While pressing Win + the up arrow key will maximize any window, it doesn't make the application full screen. For apps you install through the Microsoft Store app (aka Windows UWP apps), you can make them full screen by tapping three keys: **Win + Shift + Enter**.

5. RUN APPS WITH ELEVATED PERMISSIONS

By default, apps don't run with admin permissions, a security measure that restricts how a program can behave within Windows. For example, the KeePassXC password manager (fave.co/3ZtmgFN) can't access 2FA hardware keys (like a Yubikey) plugged into a PC when opened normally.

To quickly launch software with elevated permissions, just hold **Ctrl + Shift** while



You shouldn't ever need to run Edge with elevated permissions, but you *can*.

double-clicking the app to open it. There's no need to right-click the program's icon or shortcut and then choose to run as admin.

6. OPEN A NEW WINDOW FOR AN APP

Every app on your taskbar has a number assigned to its position—at least the first 10. You might already know this and make use of the keyboard shortcut that lets you open apps (or jump to them, if they're already open) pinned to your taskbar: the

Windows key plus a number from 0 through 9.

But did you know if you hold **Win + Shift** and then the number you want, a new window for that app will open? This shortcut isn't universal—applications have to support it, but for those that do, it's a fantastic time saver.

7. QUICK ACCESS TO EMOJI (AND KAOMOJI!)

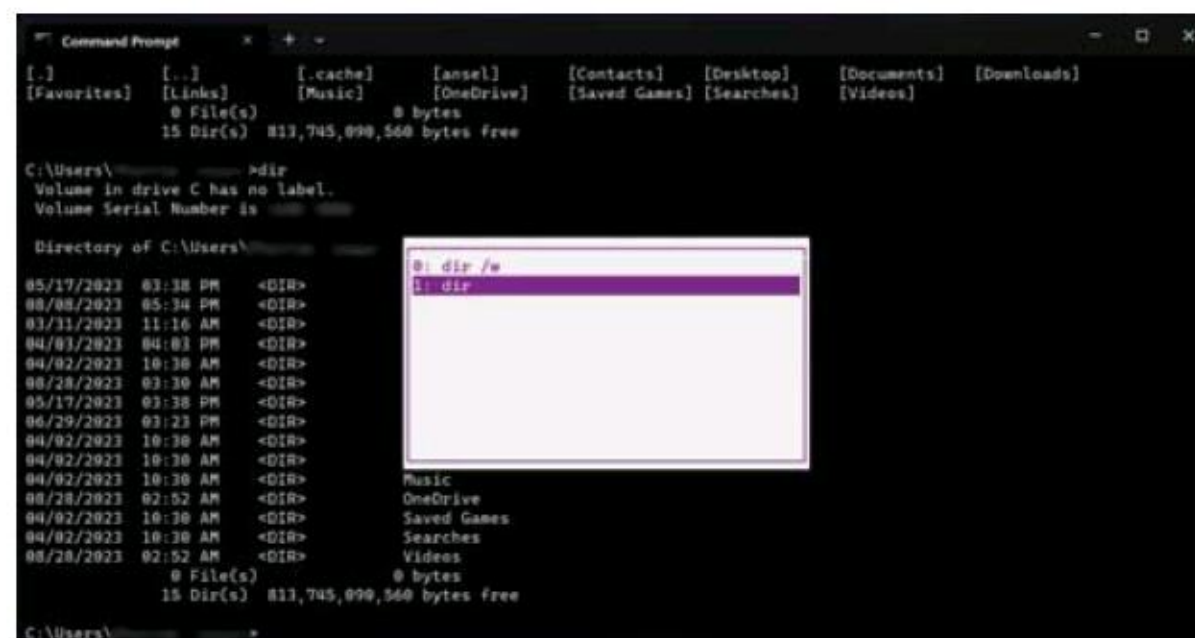
Want to insert an emoji (or more important, a kaomoji) into whatever you're typing? Skip the online search and instead press **Win + ;** or **Win + .** on your keyboard. It brings up Windows' on-screen emoji keyboard, which includes a kaomoji keyboard and special characters keyboard, too. Windows 11 also gets a GIF keyboard and direct access to the clipboard. ヽ(*o▽o*)

8. FIX A BLACK SCREEN

Did your screen suddenly go blank, even though your PC was behaving normally



immediately beforehand and still continues to run? You don't need to do a hard reboot right away. Instead, you should first try pressing **Win + Ctrl + Shift + B** on your keyboard. Windows will know you've encountered a black screen and will attempt to fix it for you.



Yesssss.

9. ACCESS YOUR COMMAND PROMPT HISTORY

Turns out the Command Prompt (aka Cmd) keeps a history, and you can call it up to see what commands you've run—and rerun them from that menu. All you do is tap **F7** on your keyboard.

No lie, my face rivaled that meme of Chris Pratt's astonished look (fave.co/46jmPV2) in *The Office* when I tried this one out. *I love it.*

10. OPEN FILE PROPERTIES INSTANTLY

You could right-click on a file to access its properties, but why go through all that trouble? Instead, hold down **Alt** while double-clicking on it. It's lightning fast.

11. REBOOT STRAIGHT TO THE WINDOWS TROUBLESHOOTING MENU

Sometimes your PC acts up, and you need to use Windows' heavy-hitting troubleshoot options, like safe mode, startup repair, and system recovery. You can access them during boot by pressing **F8** during startup—or more simply, holding **Shift** before choosing to restart your PC from the Windows power menu.

12. REORDER ITEMS IN A LIST

This one is a bit of a cheat—it's a Microsoft Word shortcut, though Google Docs also supports it. But as someone who uses bulleted lists in documents often, I couldn't resist highlighting this one from Jen Gentleman's list. To reorder items in a bulleted or numerical list, just highlight it, then hold **Shift + Alt** while using the Up or Down arrow key.

So efficient.

BONUS: 7 ADDITIONAL HELPFUL WINDOWS SHORTCUTS

As mentioned, a whole slew of Windows shortcuts exists. You'll see some of the keyboard variety get mentioned often in best Windows keyboard shortcut roundups (fave.co/48nVWRx), but lots of people still don't use them daily.

Several of these popped up among Jen Gentleman's tips, and they're worth calling attention to yet again—a lot of people I know don't use them regularly. Memorize them, and you'll save even more time and hassle while navigating Windows.

Win + Shift + S: Opens the Windows Snipping Tool for easy screenshots

Win + I: Opens the Settings app


Win + X: Opens the Quick Link menu (it's the same as right-clicking the Start button)

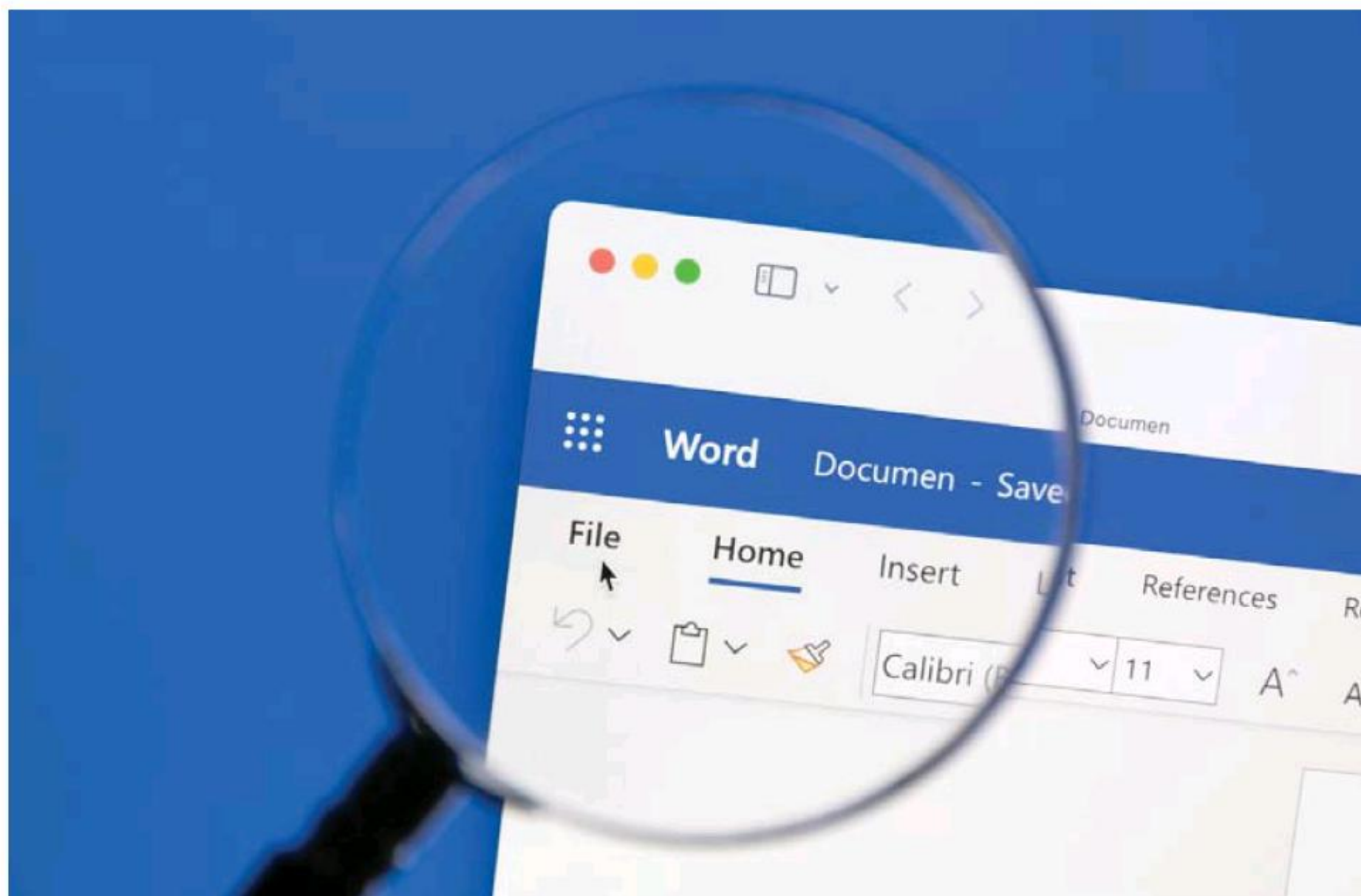
Win + E: Opens a File Explorer window

Win + Home: Minimizes all windows but the active one

Win + Tab: Shows all of the open windows per monitor

Win + H: Opens the Windows dictation menu

Hungry for yet more Windows keyboard shortcuts? You can make your own! Just install PowerToys (fave.co/3OoQQKX), a set of advanced utilities you can use to supercharge Windows. It includes a module called Keyboard Manager that lets you remap keys and create custom shortcuts. 



Microsoft Word: 9 tricks and hidden features

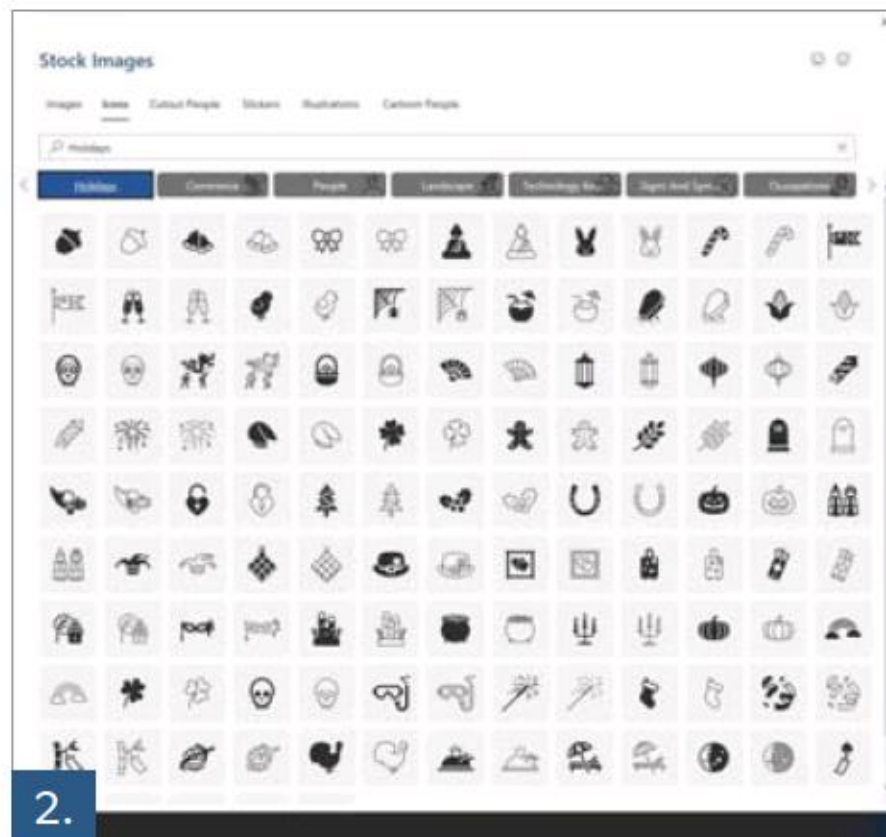
Word is the most widely used word processor, but it's not perfect. **BY ANDREAS DUMONT**

If you've been using Microsoft Word for years, you probably think you have a pretty good grasp of its capabilities. But you might be missing out on their full extent, or worse, making do with unnecessary minor irritations that could be improved with the right know-how. Don't believe me? Read on to see if any of the following tricks and hidden functions could improve your own workflow.

1. FINDING ELEMENTS, SPECIAL CHARACTERS, AND FORMATS

Problem: Word's search function only finds text. How can you find other elements such as tables, graphics, footnotes, and even formatting?

Solution: All this is hidden in Word's search dialogue. First call up the search input field with **Ctrl+F**. Then click on the



Under Insert, choose Icons to find various images to add to your document.

magnifying glass. Then click on the magnifying glass symbol. Here you will already find the functions with which you can rummage in graphics, tables, comments, formulae, or footnotes. You can go even deeper by clicking on *Advanced find...* and then *More >>*.

Under Format you can search for fonts or format templates, and under Special you can search for paragraph marks and spaces. Many elements can also be entered as placeholders in the search field. For example, ^p searches for paragraphs. The latest Word 2021 and Microsoft 365 also have a search field above the ribbon.

2. EMOJIS LIKE IN WHATSAPP

Problem: In apps like WhatsApp, for example, you have a wide range of emojis, icons, and symbols at your disposal. Does Word offer something similar?

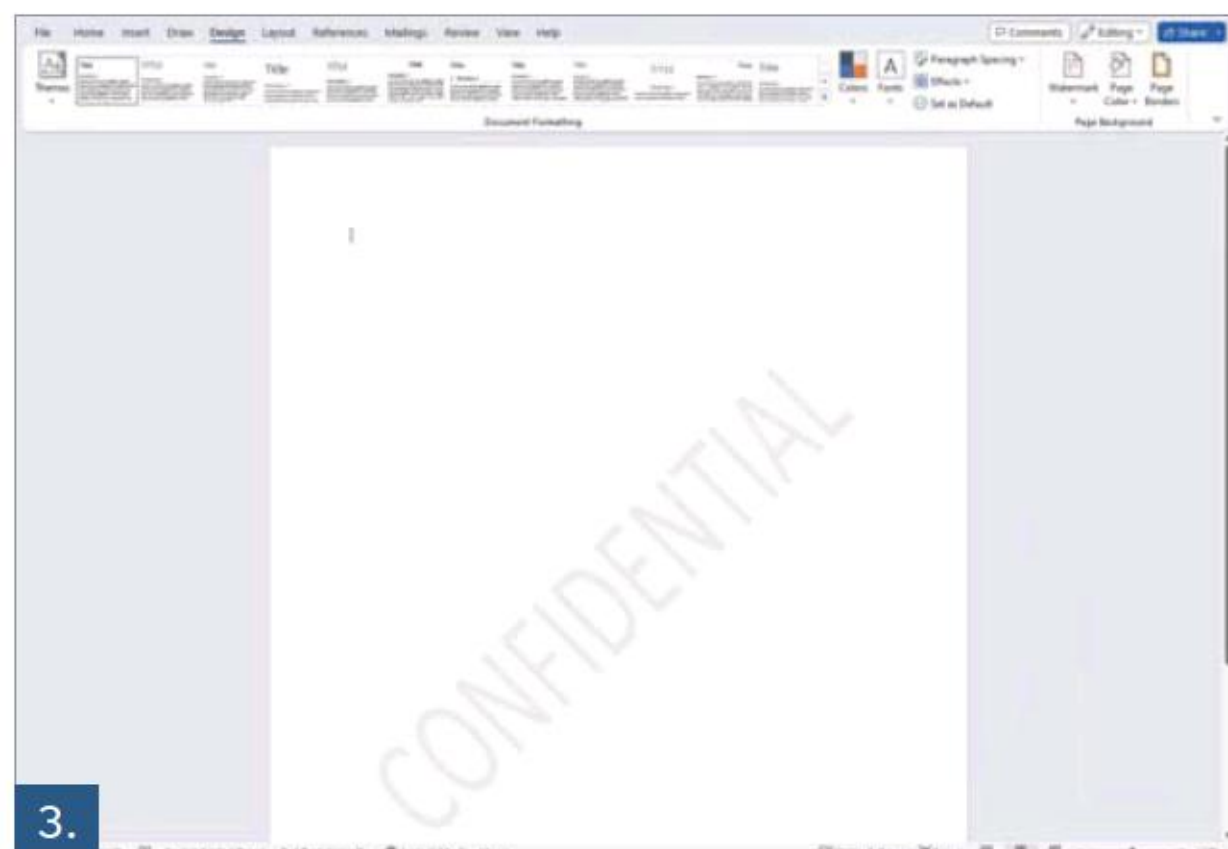
Solution: Such little pictures are located in the ribbon under Insert > Icons.

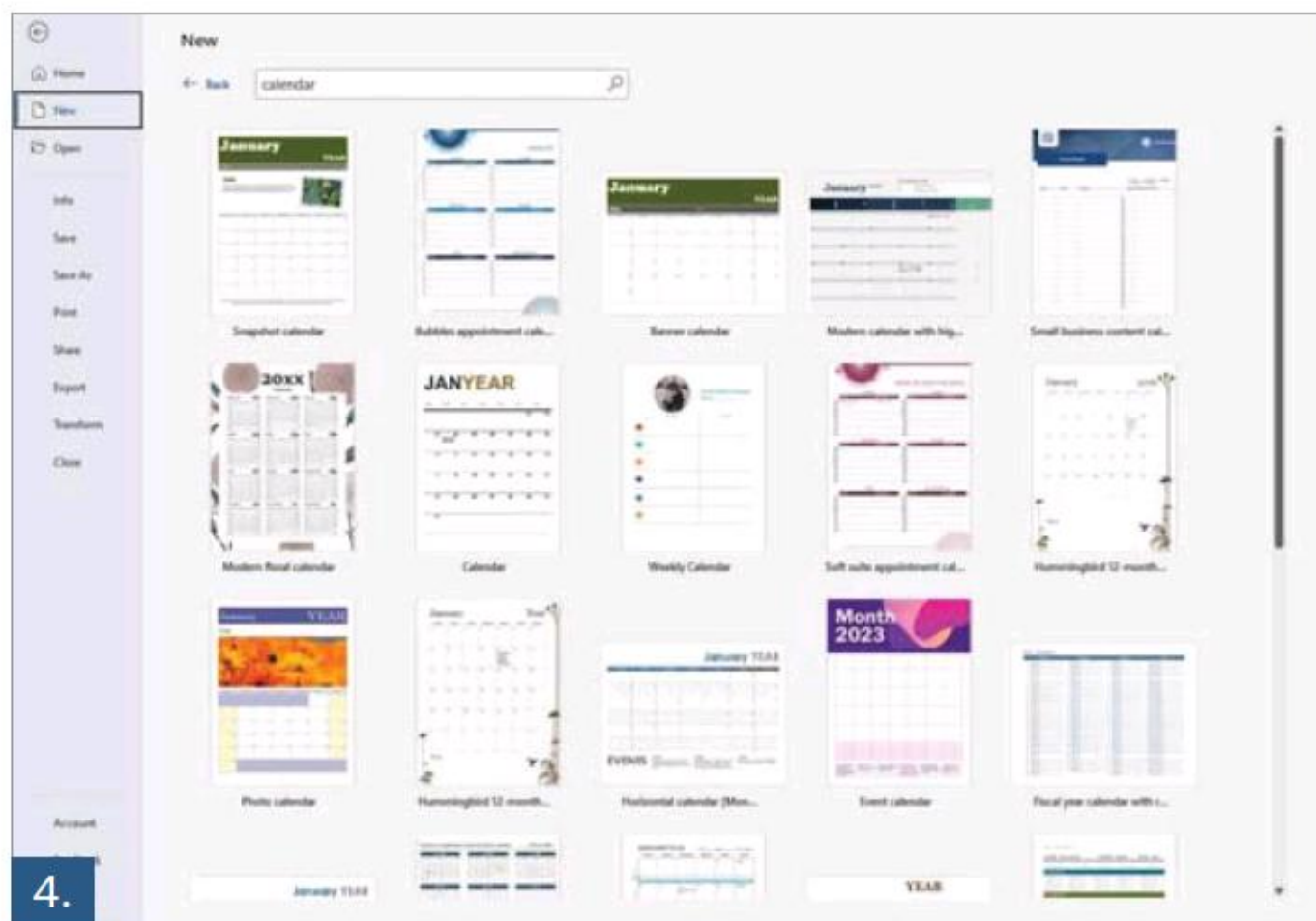
Here you can see literally hundreds of little pictures, which can also be searched via the search field. The icon categories ranges from Analysis to Holidays, with the smileys in the Faces section.

3. CREATE YOUR OWN WATERMARK

Problem: Watermarks are a common method of making it clear who owns the copyrights to a document or preventing unwanted use of copies. Can Word do this too?

Solution: Microsoft has hidden the





In addition to the locally installed Word templates, more are available online. The illustration shows this using the example of various calendar layouts.

function for inserting a watermark in its word processor: It's in the menu bar under the Design tab—select Watermark on the far right. Here the watermark menu offers some ready-made watermarks such as “Confidential” or “Do not copy.” To use your own design, click on *Custom watermark...* and add the logo or text you want.

4. TEMPLATES AND DESIGNS: INTEGRATED LAYOUT AIDS

Problem: With ordinary text, you just start writing, but when it comes to sophisticated layouts such as calendars, invitations, or CVs, designing with Word quickly becomes tedious. Can't you get help so that you don't have to start from scratch every time?

Solution: Word helps on two levels. The first is when you create a new document. In addition to Blank Document, there are numerous templates available, such as letterheads, certificates, and brochures. If the selection is not sufficient, simply enter a keyword for the required template in the search field. The search term “calendar,” for example, brings up dozens of online templates that you can use as the basis for your own works.

The second level, on the other hand, is more concerned with the appearance of documents. The corresponding function can be found under Design in the Themes menu. Here Microsoft combines coordinated fonts, colors, and font sizes. If you move the mouse pointer over a design, you can see how your document would look with it before you select it with a click.

5. MICROSOFT 365: INSERT TEXT CONTENT WITHOUT FORMATTING

Problem: Instead of inserting texts in the font and with the formatting of the target document, Word insists on copying texts in the source format, but this often ruins the layout and requires time-consuming corrections. Is there a way to insert texts without taking over their formatting?

Solution: Windows has actually known a solution to this problem for a long time: The key combination Ctrl-Shift-V copies pure text information in many programs. But Microsoft's Office package, of all things, cannot do this. Instead, users have to remove the formatting from texts inserted with Ctrl-V in a second

step. Simply paste your text into the target document using Ctrl+V, then from the little paste menu that appears, choose the third option for text-only.

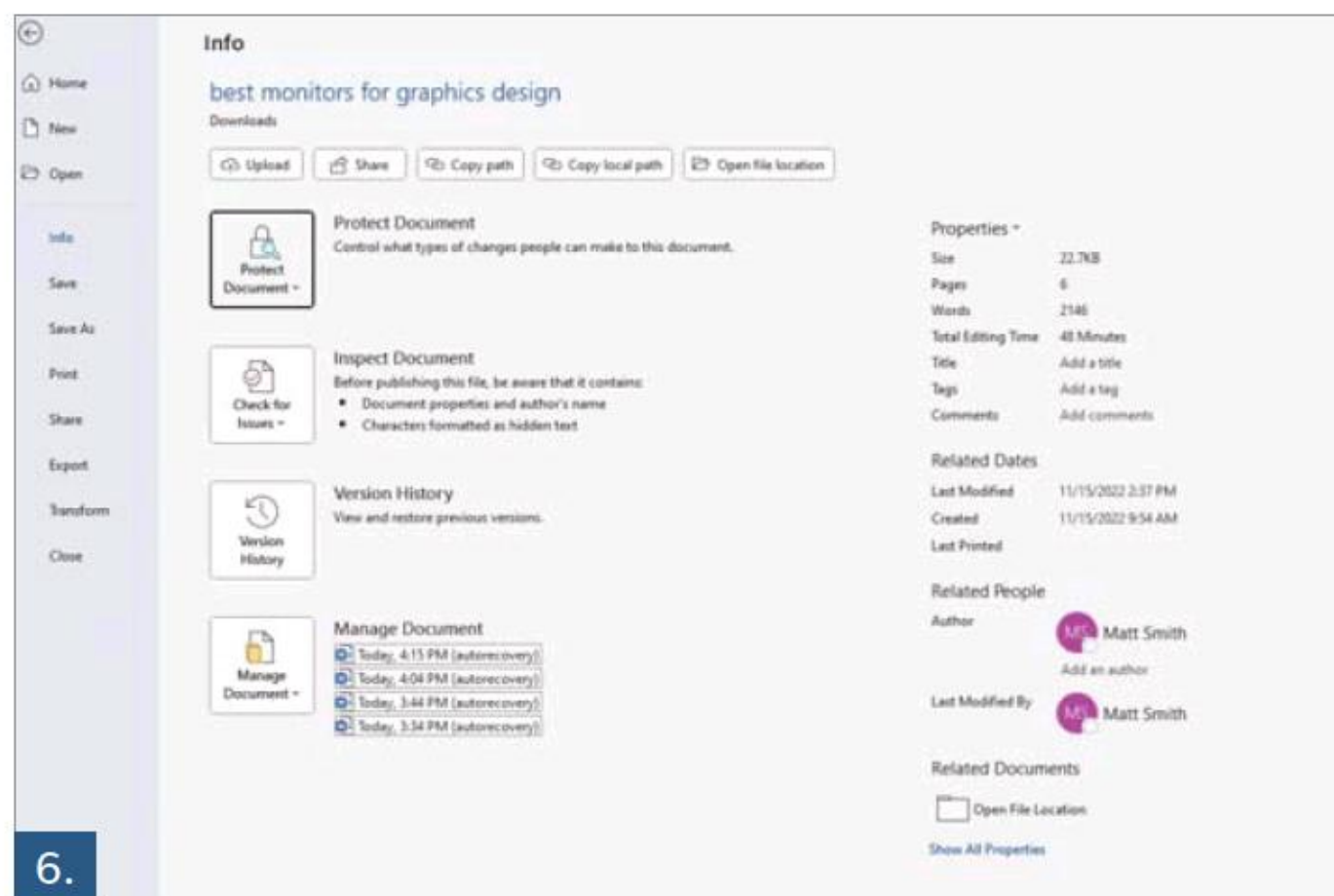
6. PROTECT DOCUMENTS WITH A PASSWORD

Problem: If you send private or confidential documents by email, for example, you should protect them from prying eyes with a password. How can this be done?

Solution: In the case of secret business documents or personal documents with private information, it makes sense to protect the contents of Word documents with a password. This makes the file worthless to outside eyes, because without entering the

correct password, the file can't be read, changed, or printed.

To password-protect a document, go to *File > Info > Protect document > Encrypt with password*. Here you enter the password twice and then save the document to activate the protection. The encryption also applies to alternative programs



You can protect Word documents from unauthorized access by entering a password. If they are protected in this way, they cannot be opened, changed, or printed by anyone who doesn't have that password.

such as Libre Office.

If you want to remove the password protection, click on Encrypt with password and remove all characters from the password field. After you click on OK, the password prompt is removed.

7. CREATE AN AUTOMATIC DIRECTORY

Problem: In long documents with numerous graphic elements, it is worthwhile to insert an automatic list of illustrations. How does this work?

Solution: The automatic list of illustrations requires two steps. In the first step, you provide all images with a caption. To do this, click on the first illustration and then go to the menu bar item References at the top—in some Word versions it is also called Links. Click on *Insert caption* and in the dialog window under Options set whether the selected object is an figure, equation, or table.

The Position tab determines whether the caption should appear above or below the image. Enter the caption text in the Caption field at the top and confirm by clicking on OK. Proceed in the same way with the other images. Word automatically recognizes the order of the pictures and assigns them the correct numbers.

In the second step, insert the list of illustrations. To do this, click on the place in the document where you want it to appear later and then click on *Insert Table of Figures* in the

References menu in the Captions section. Here you can again distinguish between figure, equation, and table in the General section and in this way also create an equation or table directory. Under Formats you can choose from several designs for the list of figures. Click on OK to complete the process.

If you want to update the list later—for example, because new illustrations have been added or the page numbers have changed in the meantime—simply click on it and in the menu click on the function *Update list of illustrations*.

8. TRANSCRIPTION OF AUDIO FILES INTO TEXT

Problem: In the age of videoconferencing, it is sometimes quite useful to transfer the content into a document. But listening and typing is tedious. Can such transcription be done automatically with Word?

Solution: The paid version of Microsoft 365 allows you to do just that—it transcribes texts from an audio or video file directly into a Word document. Microsoft 365 allows five hours of transcription per user account per month, whereas the locally installed Word version only offers the dictation function, not the transcription function.

This is how it works: Go to fave.co/461xKD8 in your browser and log in with your Microsoft 365 account. Create an empty document, open the microphone menu in the

Home menu, and switch to Transcribe.

A new column opens on the right-hand side. At the top, set the language in which the video or audio file is available. At the bottom of the column is the information on how many of the 300 free minutes you have already used in the current month. Then click on *Upload audio*. Word supports the audio formats WAV, MP4, M4A, and MP3 and file sizes up to 300MB.

The upload and transcription take a while, depending on the internet bandwidth. Word then displays the texts in the right-hand column with speaker number and time stamps. If you move the cursor over one of the entries, a pencil symbol appears for editing. Rough mistakes can be ironed out right here.


If you want to hear a text passage again in

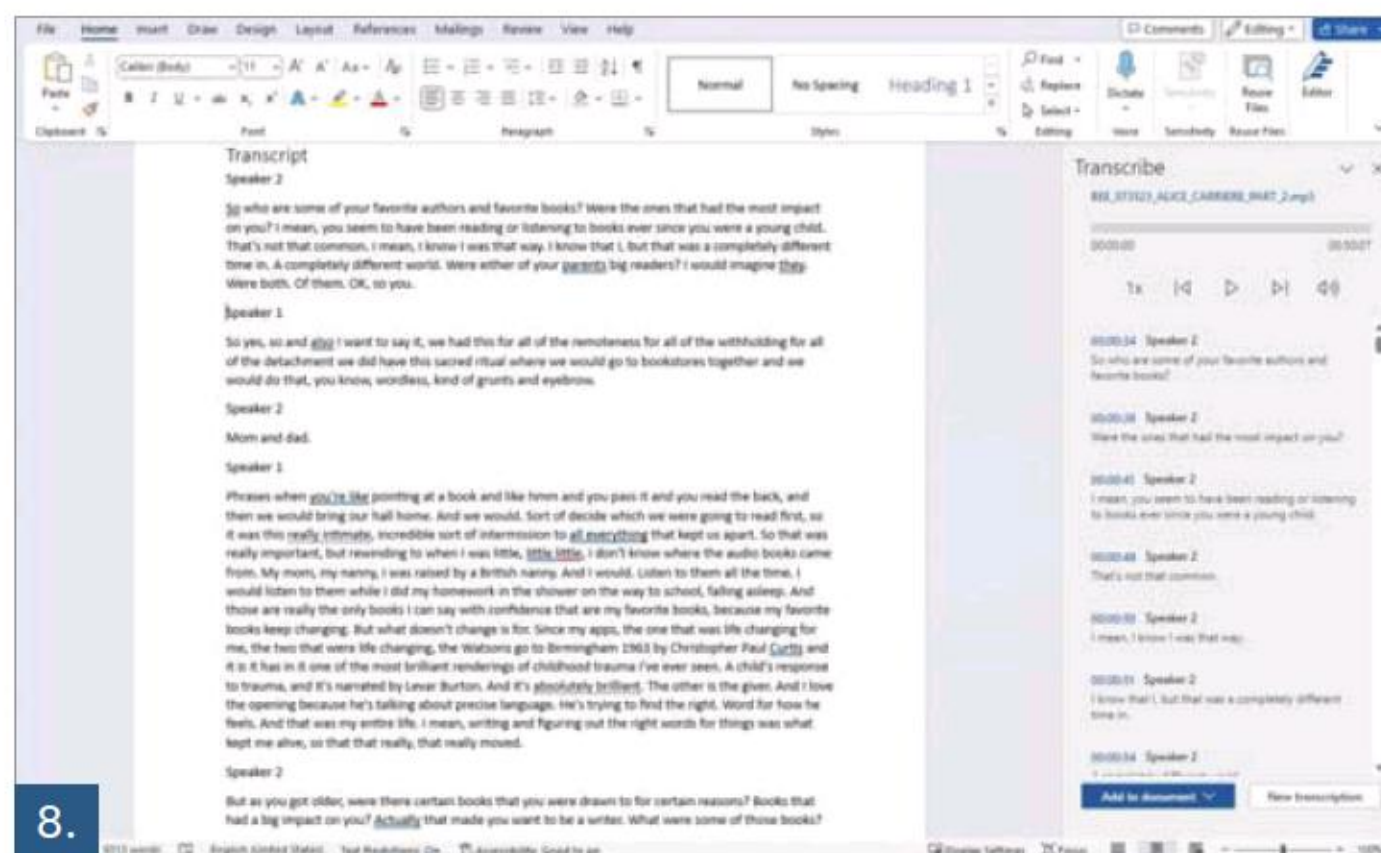
the original, simply click on the corresponding time stamp. Word will now play back the recording from this point. To add all paragraphs to the document, click on *Add to document*. In addition to the pure text, there is also the option to take over the speakers, the time stamps, or both.

9. FASTER WITH TEXT MODULES

Problem: Frequently used text modules, such as addresses, disclaimers, or greetings, have to be typed in again and again. Can't Word do the work?

Solution: Frequently used text modules can be stored as so-called autotext. For example, instead of typing "Yours sincerely" over and over again, select the words and press the key combination **Alt+F3**. The

window *Create a New Building Block* appears. In the Name field, enter an abbreviation for the text module, such as "ys" in our example. To insert the greeting formula later, just enter "ys" and press the F3 key. Word usually saves the text modules in the file normal.dotm. 



The automatic transcription of an audio file into text works quite well in practice, but has limitations with certain dialects and languages.

How to use SyncThing to sync files without the cloud

Even if you use cloud storage, SyncThing can still be a useful tool. **BY JARED NEWMAN**



If you're looking for a free way to sync files across all your devices—and you don't mind putting a little work into it—SyncThing (fave.co/3KBFIId9) might be your answer.

Compared to cloud storage services such as OneDrive (see page 45) and Dropbox (fave.co/3PPy8Pu), SyncThing isn't the

easiest service to set up. Its interface is unintuitive, and even figuring out what to install can lead to confusion. But when everything clicks, it's fantastic. Because it's not dependent on remote servers, SyncThing can transfer files faster than cloud-based services. It's also more flexible, with an array of granular controls over what gets synced

where. Even cloud storage users might find utility in SyncThing as a supplemental tool after getting past its setup hurdles.

Let's dig into how you can do that. And did I mention SyncThing is free?

WHAT IS SYNCTHING?

SyncThing is a peer-to-peer file sync service, meaning that your devices form a direct connection instead of storing files on someone else's servers. If all those devices are on the same network, your files never leave that network (though SyncThing can work remotely as well). Most cloud storage providers don't offer this kind of local connection, Dropbox being a notable exception (fave.co/3LxjOZO).

SyncThing also offers extensive controls over syncing. Instead of being limited to a single folder, you can pair any folder on one device with any folder on another, both on internal and external hard drives. You can also set folders as Send Only or Receive Only so that deleting files on one device doesn't affect the other. The software even lets you customize version histories for each device and set rules for how often to run the sync operation.

This leads to a lot of neat possibilities, which may be difficult or impossible to set up with cloud storage. For instance:

- Quickly syncing large files, such as video or audio files, either immediately or on a set schedule.

- Syncing files that can't be moved into your cloud storage folder, such as game saves in the Windows user directory.

- Syncing files to a device that you'd rather not connect to cloud storage for security reasons, such as a Steam Deck (fave.co/3MHHL1c).

- Using one-way sync to push files from an internal drive on one device to an external drive on another.

- Sharing files with a friend or colleague without affecting each other's cloud storage limits.

HOW TO INSTALL SYNCTHING

Installation is usually the easy part when it comes to computer software, but SyncThing's a bit more complicated.

While SyncThing offers a basic app (fave.co/48o63FR) for Windows, Mac, and Linux, it does not load at startup by default or include a system tray utility for easy access. Those are pretty important features, so you'll likely want a third-party app to handle them:

- For Windows, consider SyncTrazor (fave.co/3rdlteB). It will automatically install SyncThing and run at startup, plus it includes a system tray icon and sync notifications.

- For MacOS, SyncThing-MacOS (fave.co/48rlbRN) is an excellent client for accessing SyncThing from the menu bar. It includes its own SyncThing installation as well.

- Linux users can grab SyncThing-GTK (fave.co/45ZjmGG). It's available through Flathub, making installation easy on devices like the Steam Deck.

- Android users can install SyncThing from the Google Play Store (fave.co/462qyqc).

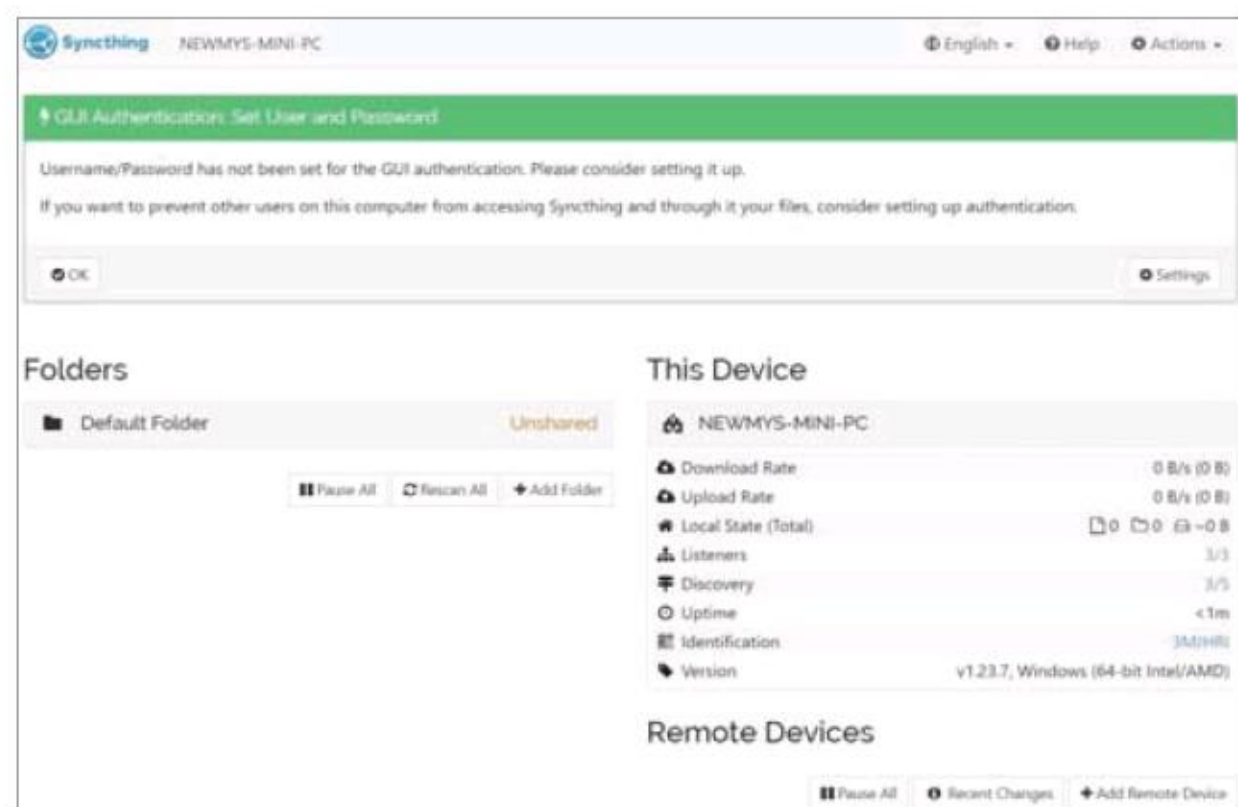
- For the iPhone, the only option is Möbius Sync (fave.co/3RuA4y3), which is free to try but costs \$5 after transferring 20 MB of data. It also has one major limitation: You can't use it to transfer photos from the iPhone's Camera Roll.

To get started with SyncThing, you'll need to **install it on two devices**. Any combination of platforms will work, so you can sync across Windows, Mac, Linux, and so on.

Also, before you go any further: **Make a temporary copy of the data you plan to sync between devices**, storing it outside the folders where you'll do the syncing. That way you'll have a backup if anything goes wrong during the setup.

SYNCTHING SETUP: CONNECT YOUR DEVICES

SyncThing doesn't offer any kind of setup wizard, so once you've installed the program, you'll be looking at a bare-bones dashboard



Once you've installed SyncThing, you'll see a bare-bones dashboard.

with information about your device, plus a prompt to set up a GUI username and password. (The latter is only necessary if you're sharing a device with someone you don't trust and don't want them messing with your SyncThing settings.)

Start by pairing the two devices where you installed SyncThing:

- On the first device, click Add Remote Device.
- **If both machines are on the same Wi-Fi network:** Choose your other device from the device list. It will have a unique code and symbol associated with it (1).
- **For pairing over the internet:** Click the code under Identification on your other device. You'll need to copy the unique ID from here and paste it into the Device ID field on your first device.
- Click Save.

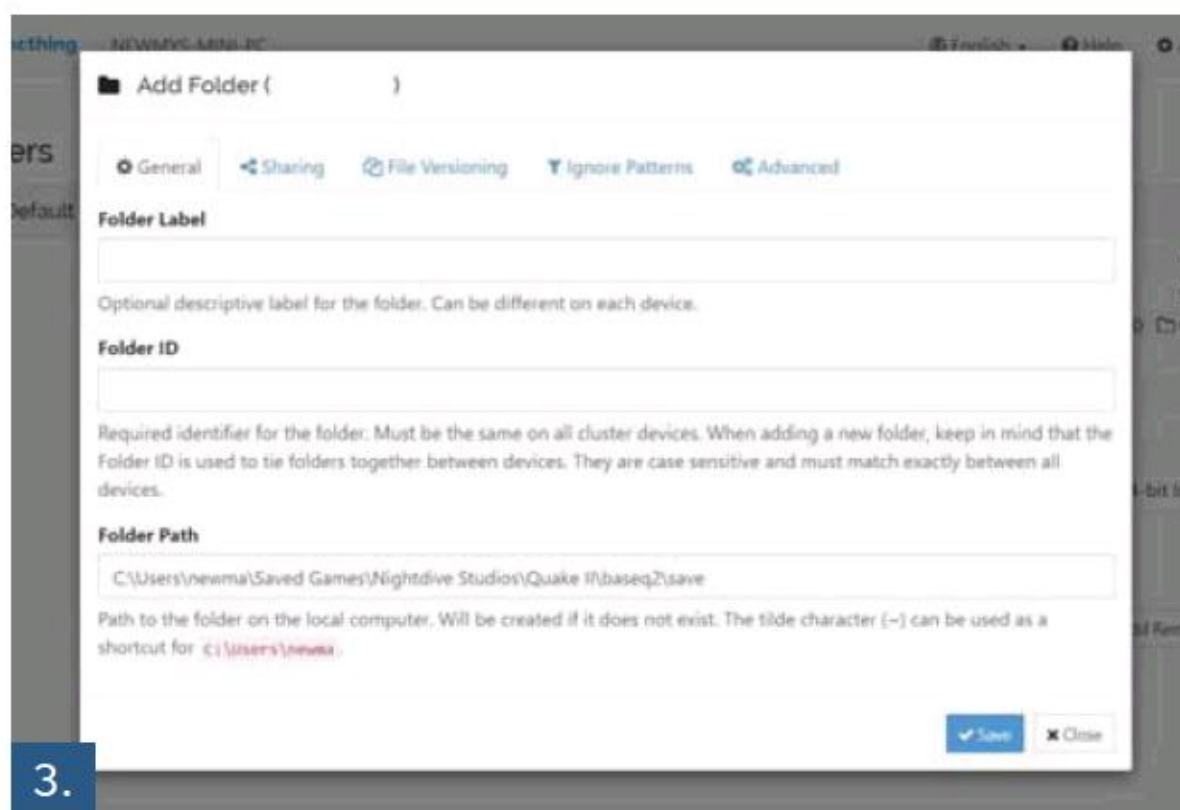
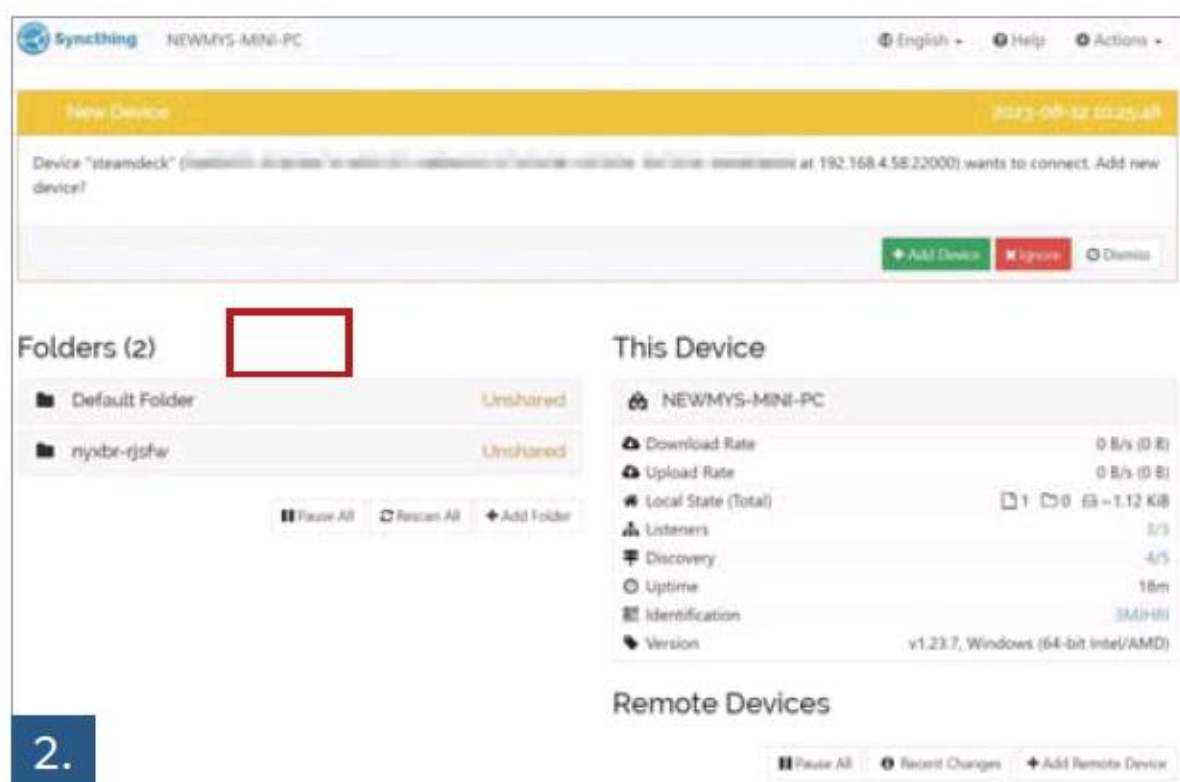
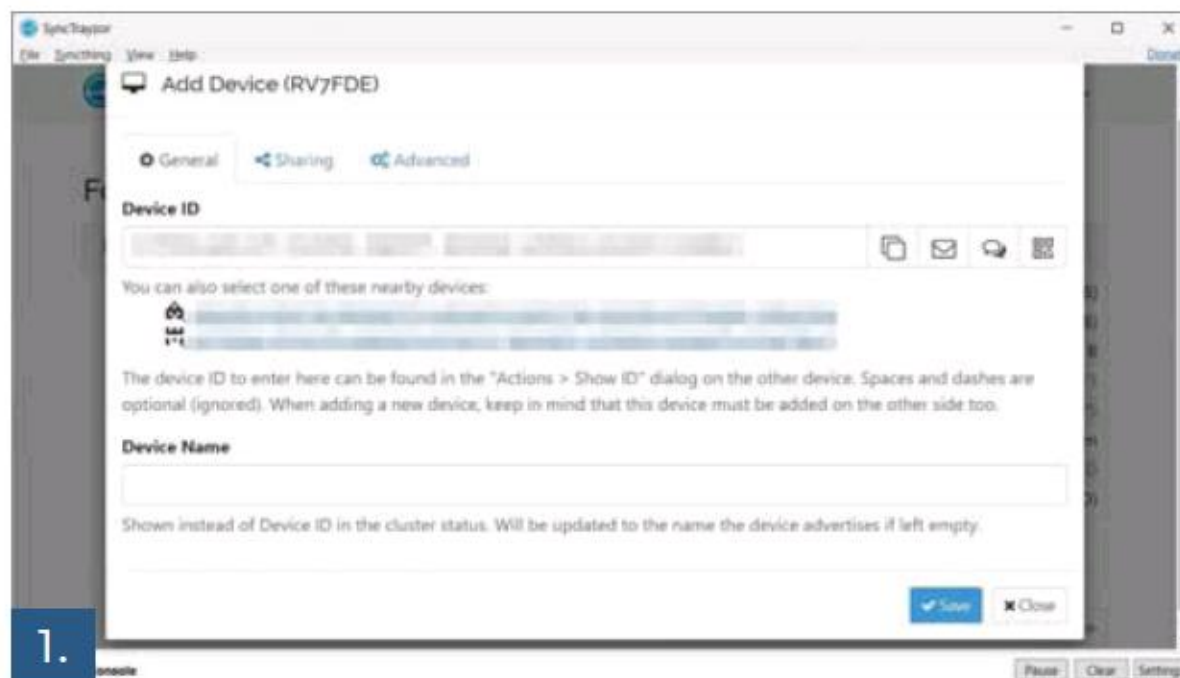
- Jump onto your other device, and you'll see a request to add your first device. Click the green Add Device button (2), then click Save.

Note that even if you pair two devices over Wi-Fi, the connection will persist even over the internet. That means you can move to another Wi-Fi network and continue to sync your files.

CREATE YOUR SYNCTHING FOLDER PAIRS

The next step is to choose which folders to sync between devices. SyncThing offers a default folder in your user directory, but you can also sync any folder, anywhere on your computer:

- Click Add Folder.
- In the General tab (3), under Folder Label, choose a recognizable name for what you're syncing or leave it blank. Each device can have different labels for the same synced folder.
- Under Folder ID, choose a recognizable name or leave



it blank. This ID must be the same across all devices.

- Under Folder Path, specify the folder's location on your storage drive. (You can retrieve this by right-clicking a folder in File Explorer and selecting "Copy as Path," but you'll have to remove the quotes after pasting it into this field.)

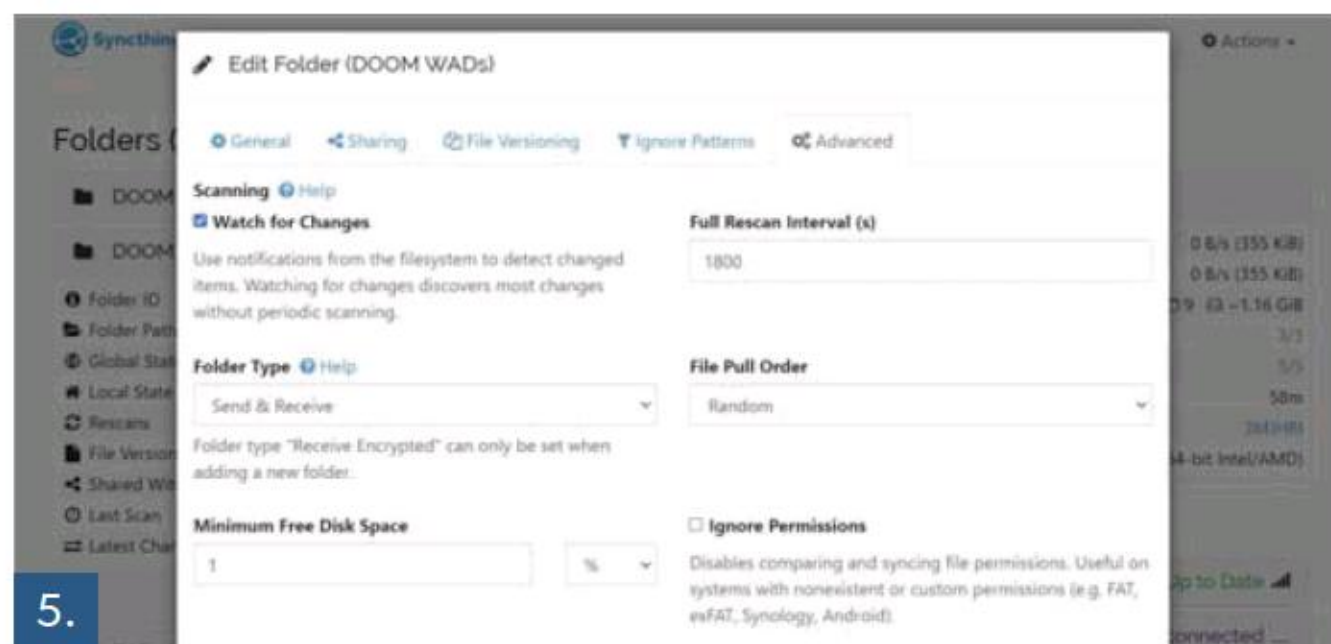
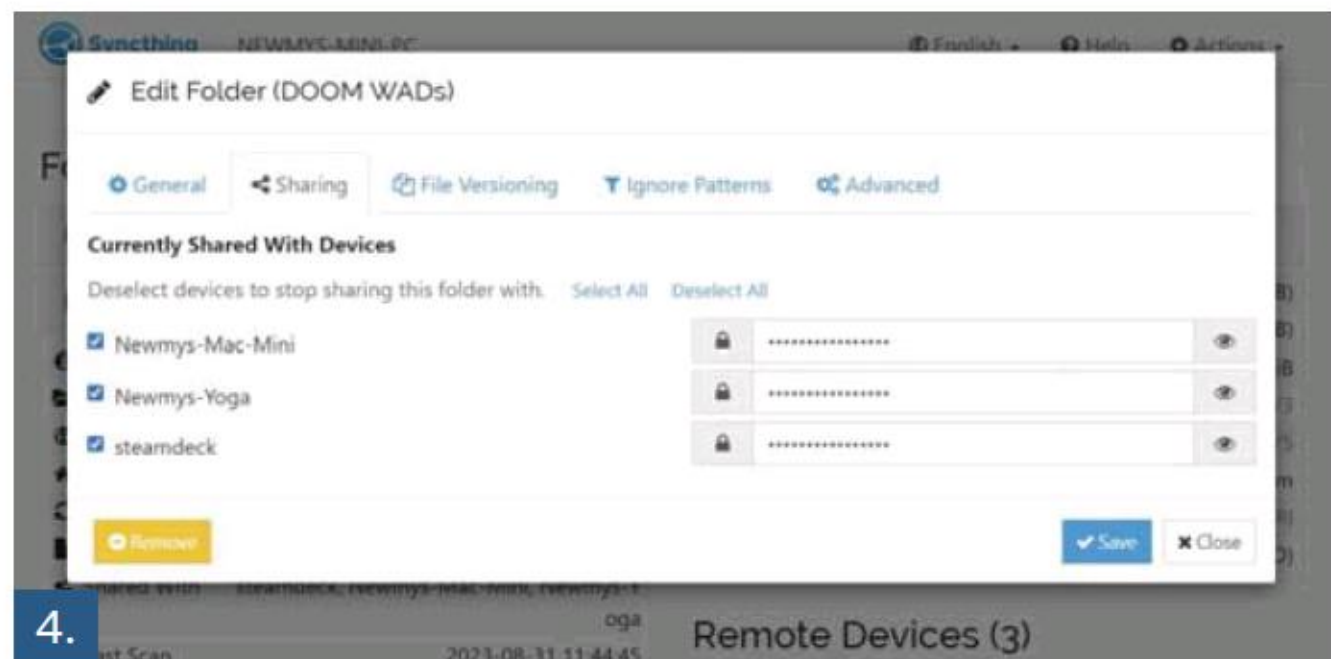
- In the Sharing tab (4), select your other device under "Unshared devices." Optionally enter a password if you're sharing with another

person's computer and want them to verify the pairing operation with a password.

- In the File Versioning tab, choose whether to keep a version history when files are updated. Read about these options for more details: SyncThing Advanced sharing options (fave.co/46hqZg2).

- In the Advanced tab (5), choose how often to monitor for changes (or select "Watch for Changes").

- By default, the folder will send and receive files from other devices. You can change this in the Advanced tab under

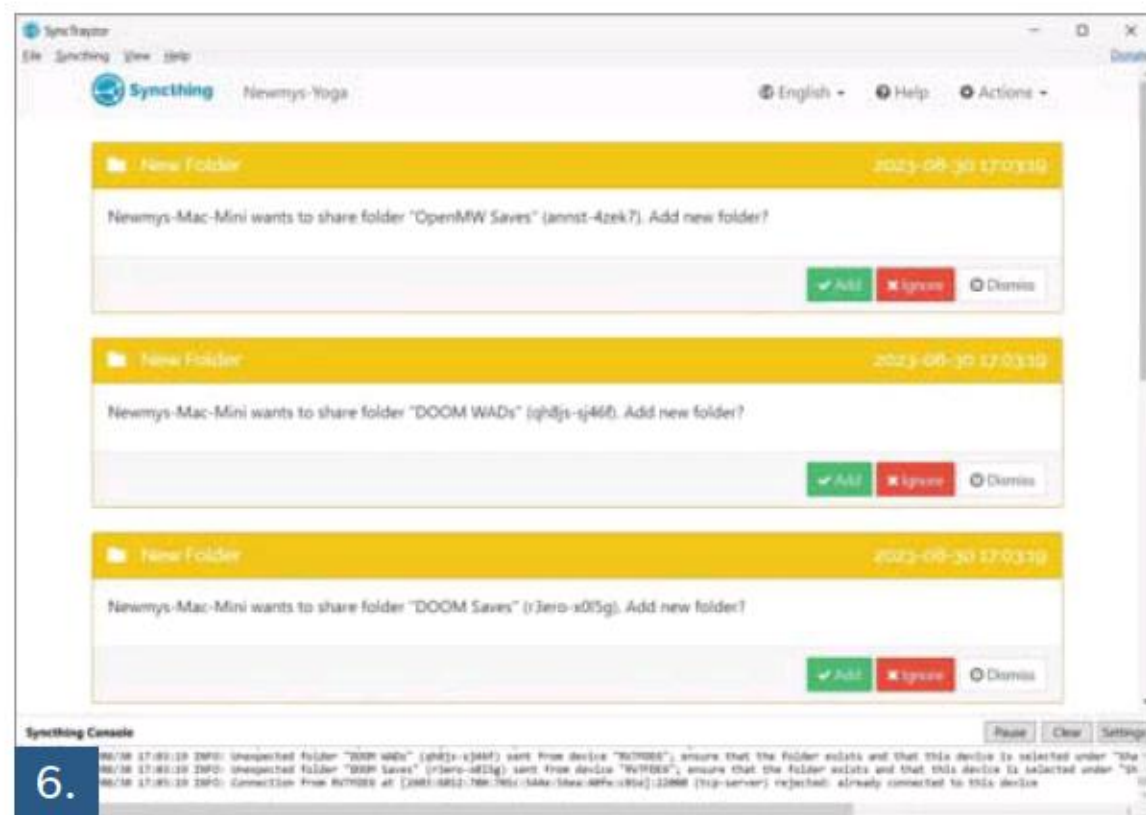


Folder Type.

- Click Save.

Now jump onto your other device, and you should see a request there to add the folder (6):

- Click the green Add Folder button.
- In the General tab, add a recognizable name under Folder Label.
 - Under Folder Path, choose where you'd like to store the contents being synced from the other devices. This can be a new folder or an existing one.
- Use the File Versioning and Advanced



tabs just as you did on the other device.

- When everything looks good, click Save to start syncing.

Want to add more folders? Just repeat the steps in this section. Need to change the sync location for an existing folder? Remove it from the device you want to change, then add the folder again in your new desired location.

ADD MORE DEVICES TO SYNCTHING

Once you've set up a couple of devices in SyncThing, you can start adding more:

- Install SyncThing on the new device.
- Click the Add Device button, then choose your device from the list. (Note that it will have a unique symbol and identifier code, which you can look up on the original device.)
- Jump onto the other device and click the green Add Device button.
- Under the Sharing tab, choose which

folders you'd like to sync with the new device.

- Hop back to your new device and add each folder, just as in the section above.


To make things a bit easier, SyncThing also has a concept called Introducer, which you can choose whenever you're pairing a new device. If you mark an existing device as an Introducer, it will automatically pair any other devices that you've connected to

it. That way, you don't have to repeat the entire pairing process for every device.

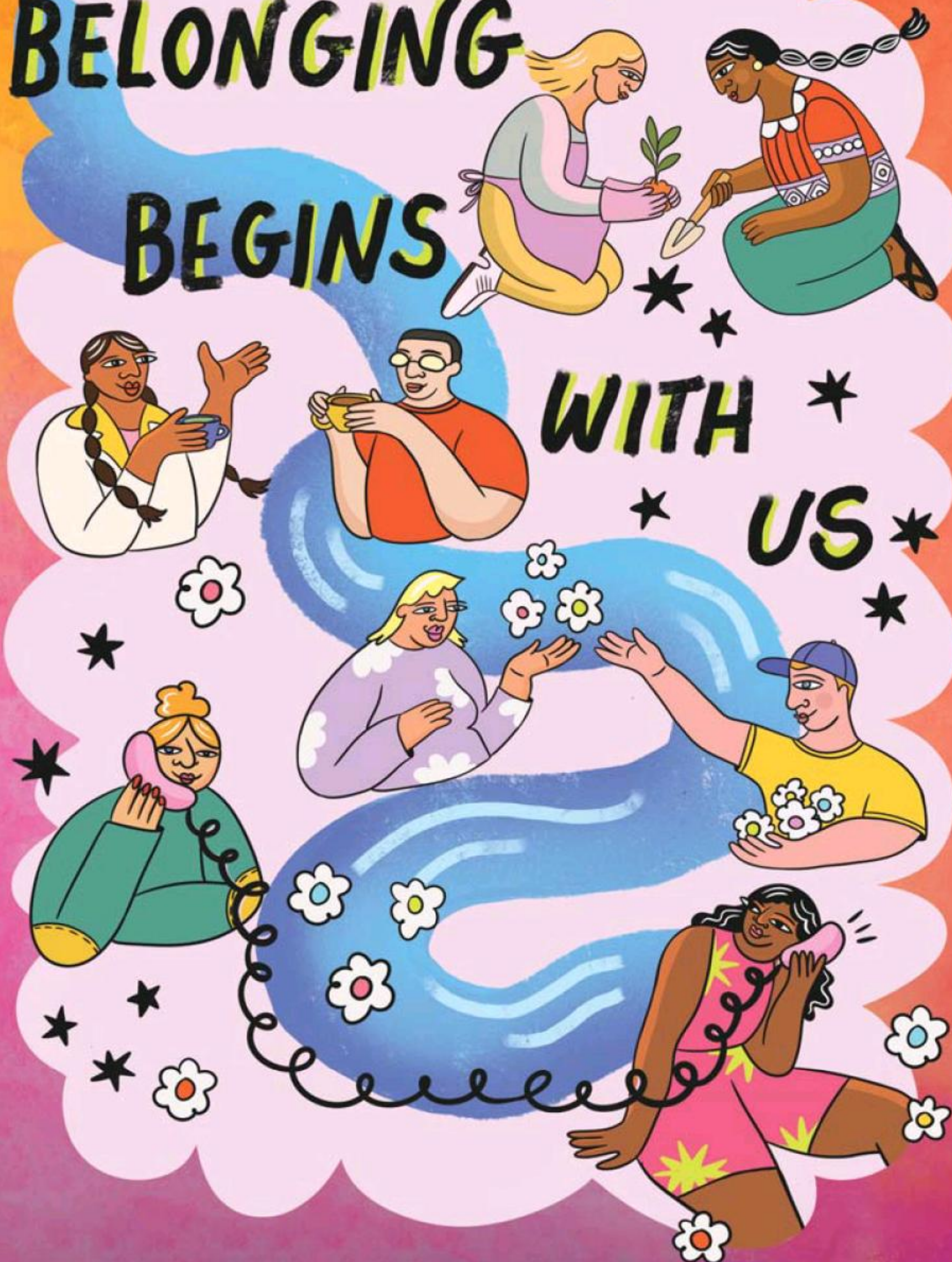
OTHER CONSIDERATIONS

SyncThing works best when you have at least one always-on computer in the mix, such as a desktop PC or Raspberry Pi that doesn't go into sleep mode. This will effectively serve as the bridge between all your other devices, ensuring that your folders stay in sync.

SyncThing also has lots of other knobs to tweak, well beyond what's described here. While its documentation (fave.co/3LUgUOz) can get a bit dense, it's a valuable resource for answer questions as you poke around.

Once you've mastered the basics, though, seeing everything sync across your devices can feel a bit like magic—especially when it's something you couldn't accomplish with cloud storage alone. 

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How MSI Graphics Cards Have Evolved Over The Years

→ Gordon got a special behind the scenes look at how MSI's graphics card industrial designs have evolved over the years. From Twin Frozr to dragon scales and Armor, MSI's graphics cards have been through many iterations and include many design cues you might have missed.