

PRIVATE SEARCH: SWITCHING FROM GOOGLE TO DUCKDUCKGO

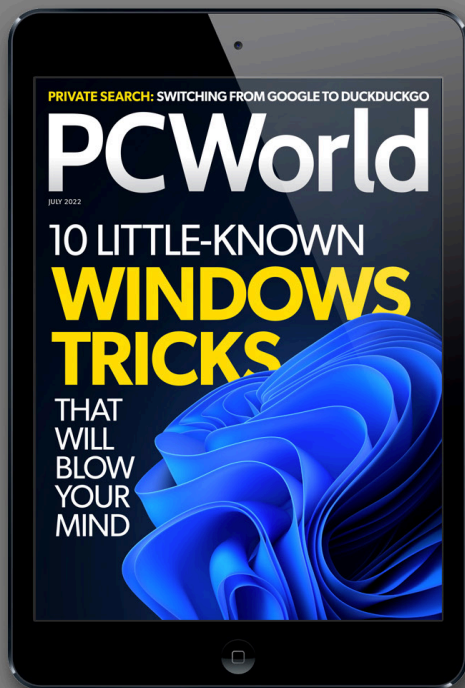
PCWorld

JULY 2022

10 LITTLE-KNOWN **WINDOWS TRICKS**

THAT
WILL
BLOW
YOUR
MIND



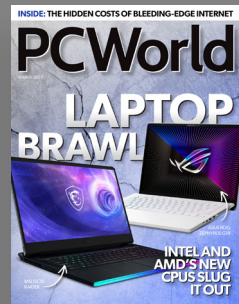


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PUBLICATION INFORMATION

Volume 40, number 7

PCWorld™ (ISSN 0737-8939) is published monthly at \$24.95 for one year (12 issues) by Foundry (formerly IDG Communications, Inc.) ©2022, Foundry (formerly IDG Communications, Inc.). All rights reserved. *PCWorld* and Consumer Watch are registered trademarks of International Data Group, Inc., and used under license by Foundry. Published in the United States.



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Internet Explorer dies today, but its spirit lives on in Microsoft Edge

If you're still using Internet Explorer, here's what you need to do. **BY MARK HACHMAN**

The day has finally arrived: Microsoft has killed off Internet Explorer. Or has it? The answer to that is: well, sort of. Microsoft has said (fave.co/3u4urtZ) for years that it plans to replace the venerable Internet Explorer browser in favor of a more secure option: Microsoft Edge (fave.co/3tjldC2). Today, Internet Explorer 11 ends support for most users, which means the browser won't receive any additional support or patches going forward. If Internet Explorer is discovered to be vulnerable to malware, for example, you're on your own.

But who will be affected by Microsoft's decision, and what can you do about it? We have the answers below.

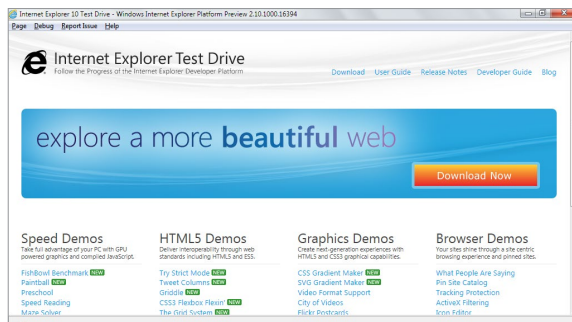
Here's the big picture: For years, Microsoft has maintained Internet Explorer alongside Microsoft Edge. But just as in the tale of the three pigs, some of the pigs have lived in the house of straw (Internet Explorer), while others have lived in the house of bricks (Microsoft Edge). Like a good landlord, Microsoft has continually patched Internet Explorer, sealing up the cracks and shoring up

the foundation. But no matter what, Internet Explorer will always be a house of straw. All Microsoft is doing is evicting its residents to something it believes will be safer to live in. That's essentially the same rationale it used to establish the hardware requirements for Windows 11 (fave.co/3C7aDbn), incidentally.

The vast majority of Windows PCs do not use Internet Explorer, so most people won't be affected whatsoever by its death. In the United States, just 1.98 percent of American PCs used it in May, according to Statcounter (fave.co/3Hwb2ax). Still, with an estimated installed base of roughly 400 million to 450 million PCs, about 9 million PCs will be affected by Microsoft's decision—equal to roughly the population of New York.

WHAT'S HAPPENING TO INTERNET EXPLORER

Internet Explorer's desktop application will be retired on Windows 10 PCs beginning today, June 15, 2022. Essentially, that means Microsoft is killing it on the vast majority of consumer PCs. (Internet Explorer is not available on Windows 11.) But Microsoft is not ending support for Internet Explorer on Windows 8.1, Windows 7's Extended Security Updates for businesses, and the business versions of Windows 10 and Windows Server. It's likely (if not certain) that Microsoft will end support for Internet Explorer



Internet Explorer is the past.

for those operating systems at some point in the future, but not now.

If your PC is affected, does that mean Internet Explorer will immediately stop working? No, it does not. Instead, Microsoft will retire it in two phases: first, devices will be “progressively redirected” from Internet Explorer to Microsoft’s built-in browser, Microsoft Edge, over the next few months. (Microsoft says [fave.co/3N0uSvG] that won’t happen for all devices all at once, though its guidance is geared toward businesses.) That will mean two things, according to Microsoft (fave.co/3Ohsemo). First, your taskbar’s Internet Explorer icon will instead redirect to Microsoft Edge; and second, a “reload in IE Mode” button will be added to the taskbar.

Following that, however, Microsoft will permanently disable the Internet Explorer application via a normal Windows Update. When that occurs, it will be the final nail in the coffin for the browser. However, Microsoft isn’t saying when that will happen.

MEET EDGE'S IE MODE

There is a stopgap: IE Mode for Microsoft Edge, which can be accessed via the Settings menu within Microsoft Edge (fave.co/3HAjRAq). Essentially, IE Mode places a secure, sandboxed version of Internet Explorer within Edge, which can be used by corporations and consumers alike to access sites in Explorer, either because of corporate requirements or just plain familiarity. But Microsoft basically feels that Edge is a better tool to access those sites, anyway.

IE MODE FOR EDGE WILL BE PHASED OUT, TOO

What's somewhat new is that Microsoft plans to end support for Edge's IE Mode in the future. We don't have a comprehensive picture of how this all works, but here's what we do know: Microsoft will end support for IE Mode within Windows 10 2019 LTSC on January 9, 2029; for Windows 8.1 on January 10, 2023; and Windows 7 (Extended Support) on January 15, 2023. However, since Microsoft has not given a timeline for phasing out the Internet Explorer 11 app for both Windows 8.1 and Windows 10, we can't be absolutely certain that you won't be able to access Internet Explorer on Windows 7 and 8.1 after those cutoff dates, too.

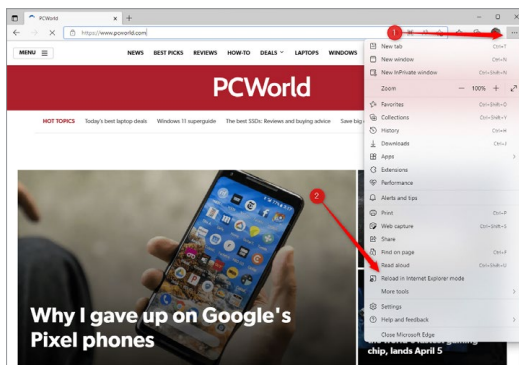
Microsoft's support page says that it will withdraw IE Mode support for Windows 10 when support for the operating system ends.

In this case, Windows 10's consumer version should end support on October 14, 2025.

Microsoft will also announce an end of support about a year before the support timeframe expires.

The bottom line? Microsoft wants you to move to a safer browser. Naturally, it would prefer that you adopt Microsoft Edge instead.

The reality, however, is that virtually all modern browsers are free, safe, and convenient to adopt. Many include procedures to migrate bookmarks, passwords, and more from an older browser like Internet Explorer to a new browser like Google Chrome, Firefox, Vivaldi, Brave, and others (fave.co/3DOPmn4). We've been encouraging you (fave.co/3xz10kt) to switch browsers (fave.co/3QrFw1B) for a while now (fave.co/3tJldC2), and the imminent demise of Internet Explorer is just another great reason to switch. 🔌



Internet Explorer mode for Edge is accessible via the Microsoft Edge Settings menu.

Mozilla Firefox locks its browser's cookie jar

Total Cookie Protection is being deployed today for all Firefox users, and is on by default.

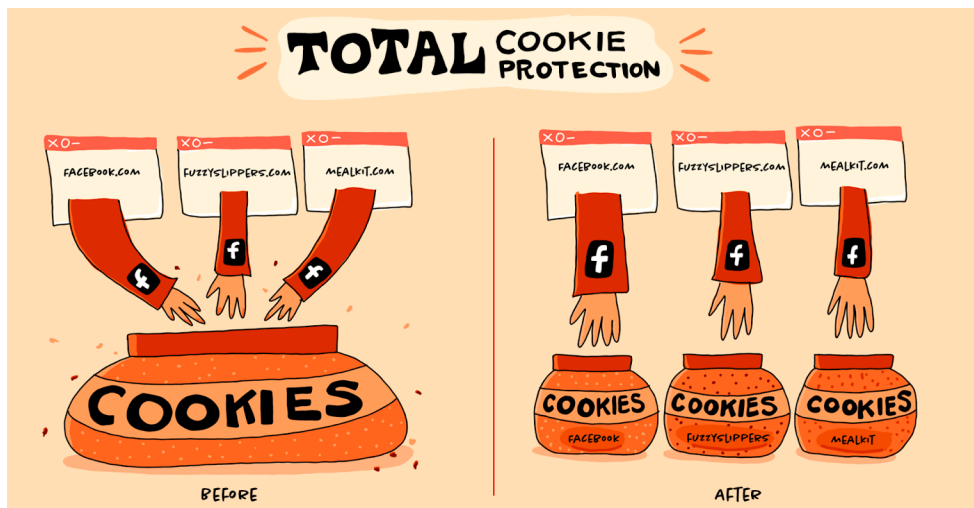
BY MARK HACHMAN



On Tuesday, Mozilla and its Firefox browser announced Total Cookie Protection, a powerful way for Firefox to preserve your privacy while allowing websites to recognize you and provide customized experiences.

Total Cookie Protection is rolling out to all Firefox users worldwide, the company announced on Tuesday (fave.co/3xCHpA5). It will be on by default.

Here's how Total Cookie Protection works: Websites place cookies in your browser, small identifying bits of code that



Here's how Total Cookie Protection works, according to Mozilla.

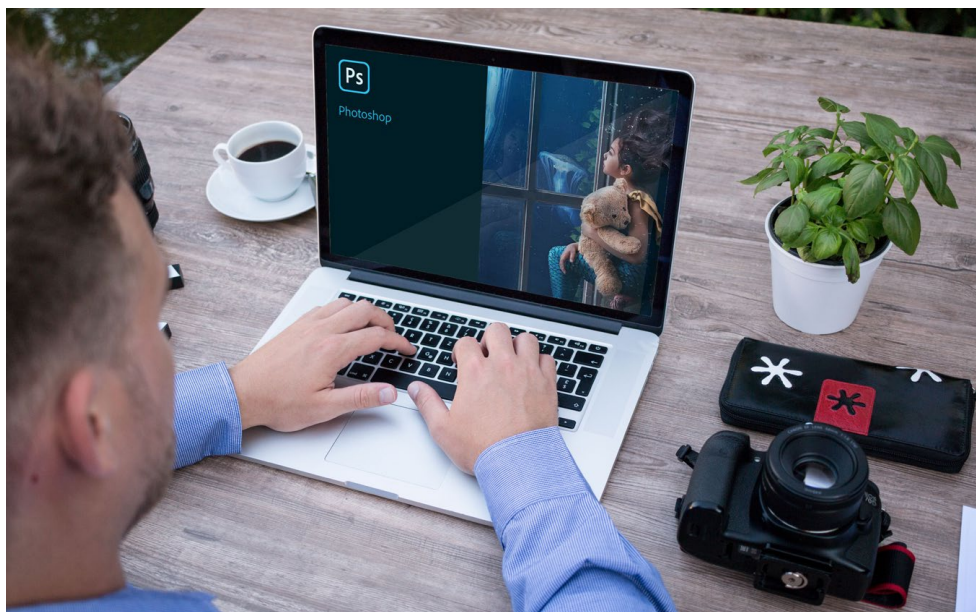
allow the website to “know” that your browser represents you, a unique individual. But those websites can also track you across the web, either by reading the contents of other cookies stored within your browser or by using other sites to host the site’s code—such as in the code used by a website’s comments system, for example. Either way, those sites use that information to build a profile of who you are and what you do on the web, and they rely on that to show you advertising.

Mozilla said Tuesday that it recognizes a website may want to identify you as *you*, either to log you in or to show you a customized experience. But what Mozilla and Firefox will not do, via Trusted Cookie Protection, is allow those cookies to be read

by other websites. Trusted Cookie Protection essentially builds a separate “cookie jar” for each site, and only for that site.

“This approach strikes the balance between eliminating the worst privacy properties of third-party cookies—in particular the ability to track you—and allowing those cookies to fulfill their less invasive use cases (e.g. to provide accurate analytics),” Mozilla wrote. “With Total Cookie Protection in Firefox, people can enjoy better privacy and have the great browsing experience they’ve come to expect.”

Firefox continues to be ranked highly among PCWorld’s best browsers ([fave.co/3DOPmn4](https://www.pcworld.com/3DOPmn4)) due to its strong privacy protections, and Total Cookie Protection should only continue that trend. 🔌



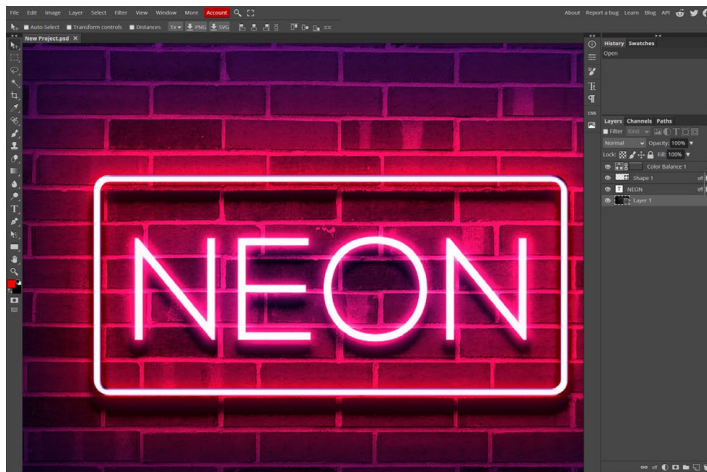
Adobe's web-based Photoshop will soon be free for everyone

Adobe says the online version of its ubiquitous photo editor will soon have a "freemium" version. **BY MICHAEL CRIDER**

Photoshop is the indisputable industry standard for photo editing and image generation. It's also indisputably expensive. After coming in the Creative Suite for \$700+ for years, Adobe now sells it only in Creative Cloud subscription form starting at \$120 a year (fave.co/3DkLt9y). That's not the most effective way to get new users—in fact, it's a great way to make people search for some

free alternatives (fave.co/3o2ggIX). But it looks like Adobe is getting a little more consumer-savvy with its recent web-based version of the tool, and plans to make it free for everyone.

If you're not familiar with the web version of Photoshop, it's effective if somewhat stripped-down in terms of features. As a Photoshop user of nearly 20 years, I'd say the online version is somewhere between




There's a wide range of free Photoshop alternatives, including Photopea (fave.co/3kCAVeJ), pictured here.

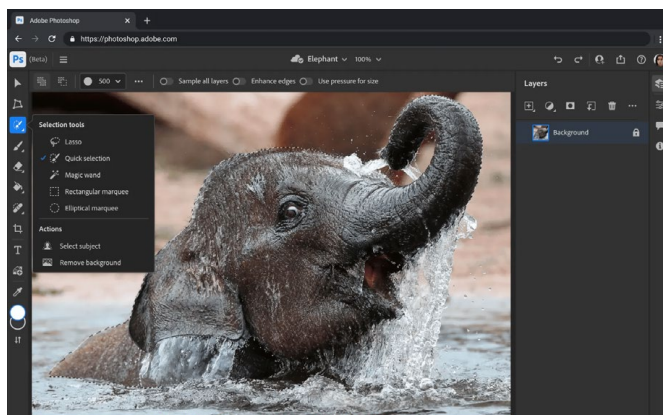
Photoshop Elements and the full Creative Suite, though Adobe has been adding more complex tools since the version launched in October last year (fave.co/3zL2zyu).

"Free Photoshop" is enough to make any cash-strapped graphic designer and/or prolific meme poster salivate. But of course there will be limits. The Verge reports (fave.co/39xHJb2) that the free version of web-based Photoshop is currently available to users in Canada, where all one needs is a free Adobe account to access it. The

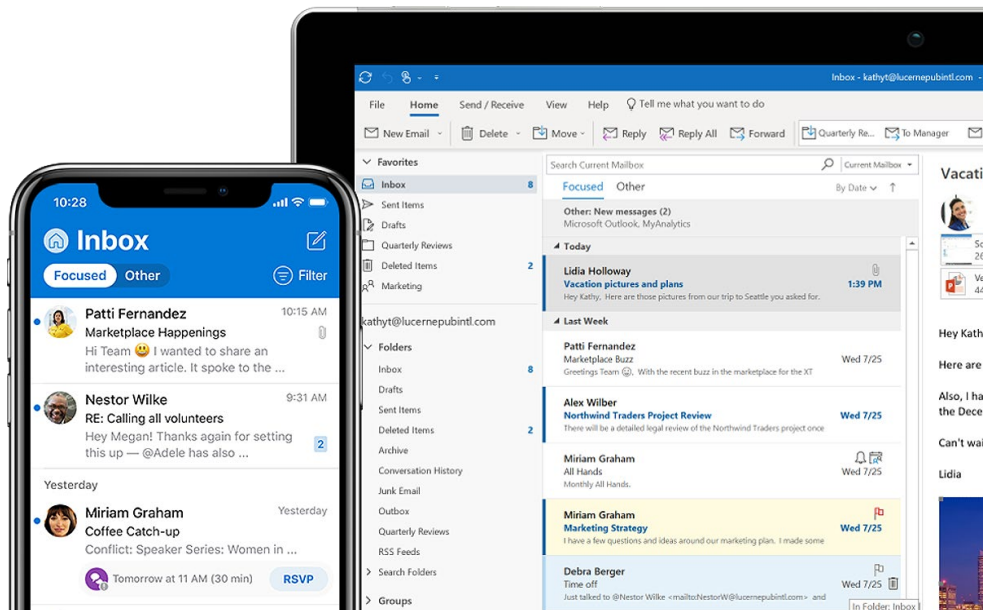
current version of the tool is wide open, but it won't stay that way. Adobe says in the future it will allow users to access most of Photoshop's standard editing tools while locking some more advanced features (time-savers like content-aware fill, for example?) behind a subscription.

Exactly when the web version of

Photoshop will become free outside Canada wasn't mentioned, but I know a few million Chromebook users who can't wait for it to arrive. 



Some of Photoshop's more advanced features won't be available in the free online version.



Microsoft unveils the future of Outlook, and you can try it now

A new Loop interface, easier document attachments, a more integrated To Do—these are all part and parcel of the new Outlook. **BY MARK HACHMAN**

The future of Outlook is here, albeit with some caveats.

Microsoft has officially released the new Outlook for Windows, with features that integrate Microsoft's futuristic Loop interface as well as more practical innovations such as quick document attachments, a My Day summary, and reminders to respond to important email. For now, though, the new features are only

available to members of the Office Insiders program (fave.co/3zNtBVV), specifically the Beta Channel.

We've seen the "future of Outlook" many times over the years, from 2015's simple, effective Outlook apps for iOS and Android, to 2017's more cohesive approach toward unifying Outlook (fave.co/3y0IMuX) across various platforms. We're also seeing the first fruits of Project Cortex (fave.co/3mWSOFH)



The new features are currently only available to members of Microsoft's Office Insiders Program.

in how Microsoft (and its rival Google) are blurring the lines between various applications. But Microsoft has also been working to clean up the various versions (the Web, Office 365, Web apps and so on) and provide a unified version of Outlook for the PC. That leaked out earlier ([fave.co/3mWSOFH](#)), and it's here now.

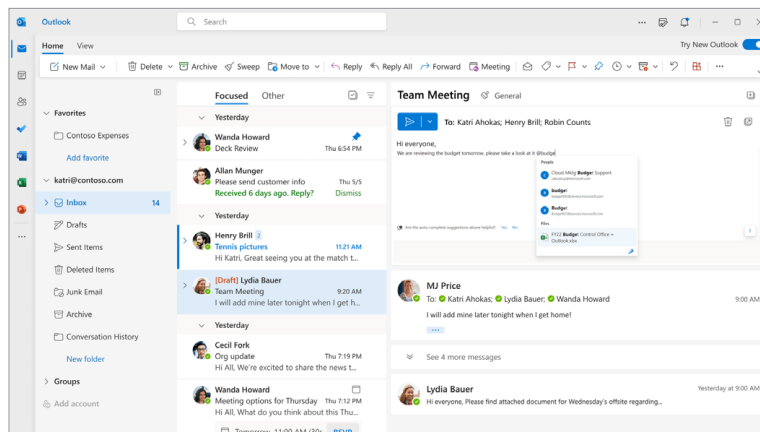
Microsoft designed Outlook to look familiar, and it does—especially if you're used to the Outlook web app. Unfortunately, it's not available to many users. To be a member of the Office Insider program, you must either be subscribed to Microsoft 365's consumer edition or ask your corporate administrator to enable it. Consumers can easily switch to the Insider program (from any Office app on Windows, click File > Account > Office Insider > Join Office Insider, then

agree to the checkbox next to "Sign me up for early access to new releases of Office"). But you'll need to also use a paid commercial or education account as your primary email to try the new Outlook, which can complicate the process.

Here are the new Outlook features that Microsoft says you'll want:

"Namechecking" documents:

Within Outlook, you can quickly type an @ symbol (@) and then the name of a person, and it will be called out in their email. You can quickly "call out" files by using the same @ symbol in front of file and document names. They need to be stored in the cloud, however. Unfortunately, to attach a file in this way, that probably means you'll need to search the full name of, say, SalesPresentationMarch2022final3really.



Note the list of files that pops up when you begin typing an @ in Outlook.

Respond to requests: We've seen Microsoft's AI in Cortana and the like "sniff" your inbox for what it considers important messages, such as a request to respond to a customer. If Outlook thinks it has found such an email, that message will be pinned to the top of your inbox until dismissed. You can also manually pin an email message to the top of your inbox by clicking the pin icon.

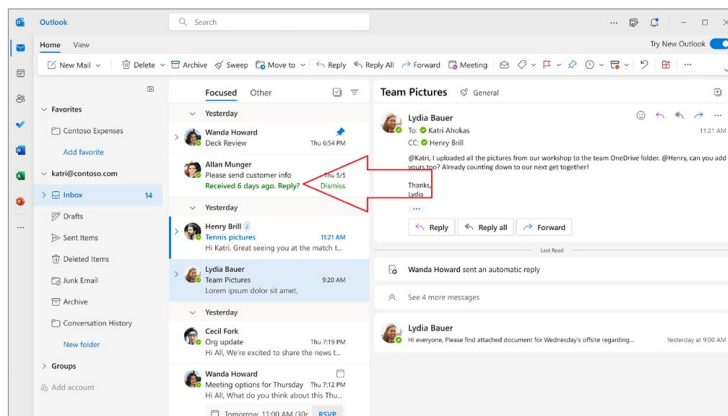
My Day and To Do: You should start seeing a more visible To Do column, also referred to as My Day, to the right of your inbox. You'll be able to use this space as a location to drag

emails into, which will become tasks that you can check off.

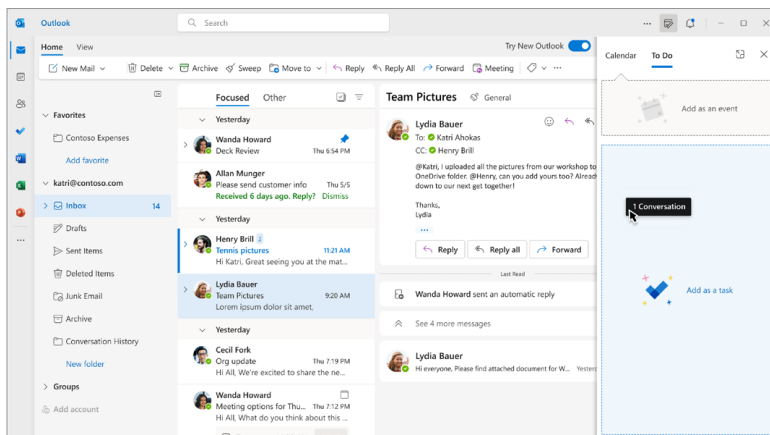
An updated Calendar:

It appears that while the Calendar will remain largely unchanged, a new Board view will essentially turn your

Calendar into a bulletin board, where you can add your work calendar as a card alongside tasks, important documents, and tips. You'll also be able to reserve space on your calendar and let people know that you'll attend their meeting either in person or virtually.



Important messages will be pinned to your Outlook inbox by default.



Expect more prominent placement of the To Do section of Outlook.

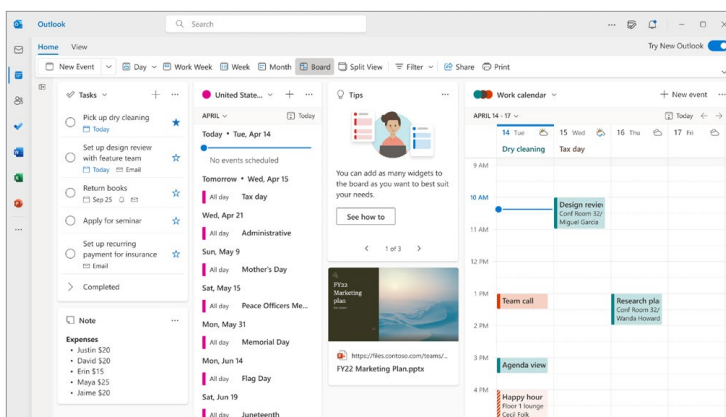
Sweep up the clutter: Microsoft is also encouraging you to use tools we've described before, such as Rules, to automatically manage and control email messages as they flow into your inbox. Microsoft calls this Sweep.

Loop and the future: Microsoft thinks the most important addition to the new Outlook client is Loop, which Microsoft described (fave.co/39xNaH6) as making your document a sort of widget. It blurs the line between a document and a shared workspace—which for

some users will be anathema and for others a natural extension of a close-knit team. We'll have to see how Loop evolves over the coming years and months.

For now, the new Outlook is in the hands of just a few, as Microsoft fixes

bugs and adds features. Unfortunately, some of the basic capabilities you'd expect aren't there (fave.co/3HzS8Qo): offline support, multiple accounts, and so on. Expect Microsoft to widen Outlook's audience as it improves the new Outlook client. 🛑



Microsoft will use tiles and cards as the new way of organizing your Calendar in Outlook's Board view.

Why are Thunderbolt docks so hard to find? Blame electric cars

There are only so many chips to go around. **BY MARK HACHMAN**



Simply testing Thunderbolt docks can be a challenge. But when even the best Thunderbolt docks suddenly vanish from store shelves, it can be like pulling teeth for vendors, retailers, journalists and consumers alike. Unfortunately, it's not getting better.

Plugable fights on the front lines of the skirmish between rival device makers, trying to find new supplies of key components—and

in times of need, the company redesigns its products to take advantage of what's available. At press time, the Plugable TBT3-UDZ is our pick for the best Thunderbolt dock (fave.co/3vtA0BE), and it's in stock, too.

That's not always the case. According to Bernie Thompson, the founder and chief technology officer of Plugable, three out of its five highest-selling Thunderbolt docks offering power delivery are sold out. (At

PCWorld, we recommend docks not only by performance, but by availability.)

"Basically, every electronics company in the world has been frantically trying to internally redesign their products to switch to chips that are available," Thompson said in a recent interview. "Tons of chips and tons of products have actually been discontinued over the last few years because the older chips are no longer available.

"We've basically just been working as fast and as hard as we can to redesign and align with the latest and most available chips, which actually has generated some bumps up in features in some cases, but also has resulted in long periods of being out of stock and increased prices too," Thompson said. "So, increased function, increased price and a lot of availability problems."

The problem isn't a simple one, Thompson said, as there are "availability problems all over the place." As a manufacturer like Plugable redesigns or launches products based on more available chips, the company has suddenly found itself competing with rivals for supply. "And then sometimes that causes a rush for the doors where a bunch of people all do the same thing, and then that thing that was

previously more available suddenly becomes unavailable."

The problem isn't that Plugable and other dock makers aren't just competing against one another, either. A year ago, competing for Ethernet PHYs (fave.co/3xxWZwz) was a huge problem, Thompson said (one that has since been alleviated). But a Thunderbolt dock that delivers power requires both a power delivery controller as well as DC-to-DC boost converters. Here, Plugable, is competing against the growing electric vehicle industry.

"And so these when you see these car factory shutdowns because they can't get chips, the same thing is affecting the kind of electronics like these that charge your laptop," Thompson said. DisplayLink chips, which are used by docks like Plugable's new UD-3900C4 USB-C Quad Display dock to compress video over a lower-bandwidth USB-C connection, also have "huge availability problems."



Thunderbolt docks from Plugable and its competitors have juggled ever-changing component availability to mix and match features.

So when will it all end? Thompson said he doesn't know for sure, but the company anticipates it will "selectively" get better in the second half of 2022. "But the chip shortage will not be over," Thompson continued. "There will be significant shortages into 2023."

MEET THE UD-3900C4, A QUAD-DISPLAY DOCK


Today, Plugable launches the \$349 UD-3900C4 (fave.co/3tl4pwi), which is interesting for two reasons. First, it's marketed as a "USB-C docking station," and secondly, it's one of the few docks that supports four displays. It's very similar to the existing VisionTek VT8000 (fave.co/3zJTdD9), which also includes four display ports,

and is marketed as a "USB-C docking station" as well. (Plugable will sell the UD-3900C4 docking station for \$349.00 on Amazon.)

That's significant, because normally USB-C docks (which use the typical 10Gbps USB-C connection) are quite different from the 40Gbps throughput underlying a Thunderbolt port. Unlike VisionTek, however, Plugable's playing it conservative: You should only expect four displays at 1080p and 60Hz (1080p60), rather than promising 4K output.

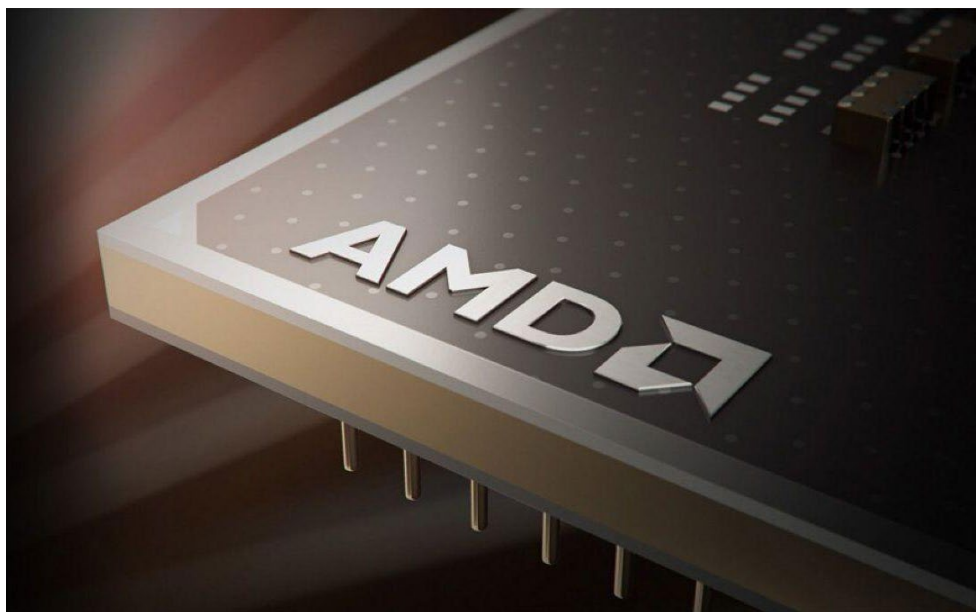
That's because two display ports on the UD-3900C4 dock use DisplayLink, a compression technology. DisplayLink isn't plug-and-play; it requires a driver, unlike a more conventional USB-C-driven display. The latency attached to DisplayLink doesn't make them suitable for gaming, but for office

work they should be just fine. The other two display ports use DisplayPort Alt Mode over USB-C, which many laptops support natively already.

Otherwise, you'll find a traditional mix of ports: a headphone and mic jack, an SD 4.0 card reader, a conventional 10Gbps USB-C port (with 20W of charging for smartphones), plus Gigabit Ethernet and four USB-A ports on the back. Finally, the powered dock supports 100W charging of your laptop. It's this last capability that Thompson and other dock makers are worried about—and hopefully any issue with it will be resolved soon. 



The Plugable UD-3900C4 docking station.



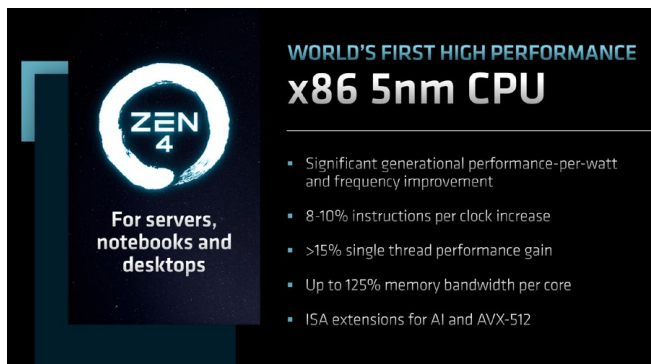
AMD's Ryzen 7000 and RDNA 3 chips are set to stun later this year

RDNA 4 also makes an official appearance on the road map. **BY MICHAEL CRIDER**

AMD's Financial Analyst Day is when it reveals a peek at its upcoming lineup for all the people who *really* matter in the world of consumer electronics: insanely rich investors. But fortunately we lowly consumers get to see the same info, which included details on upcoming plans for the Zen CPU line and RDNA3 graphics processors.

On the desktop side of things, we got more details on Zen 4 AKA Ryzen 7000 ([fave](#).

[co/3zNDByr](#)), which is already known to be coming later this year and will provide a single-thread performance boost of 15 percent over Zen 3. The new series of 5nm and 4nm chips will also feature higher clock speeds (which we've already seen hinted at in an earlier demo of a Ryzen 7000 chip hitting 5.5 GHz), plus boost instructions per clock by 8 to 10 percent and memory bandwidth per core by "up to 125 percent" for data center use. Efficiency gets a notable improvement,



ZEN 4

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- 8-10% instructions per clock increase
- >15% single thread performance gain
- Up to 125% memory bandwidth per core
- ISA extensions for AI and AVX-512

AMD's presentation during Analyst Day gave more insight into what to expect from Zen 4.

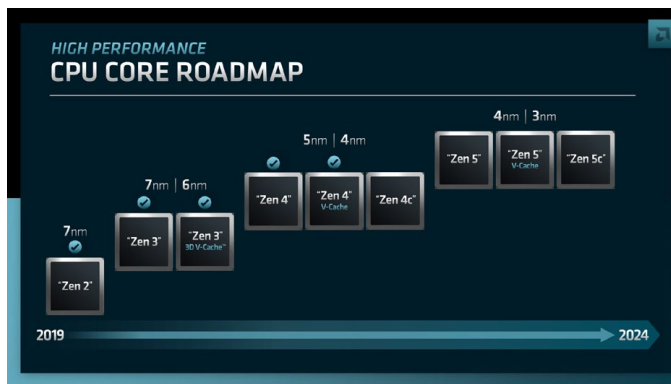
too: The company claimed Zen 4 CPUs will increase performance per watt by approximately 25 percent, with an overall performance improvement of 35 percent. That's with a 16-core, 32-thread Zen 4 CPU (the next-gen equivalent of the current Ryzen 9 5950X; fave.co/3caTZfh) running a Cinebench multicore test.

Beyond Zen 4 is (wait for it) Zen 5, pushing the manufacturing into 4nm and 3nm territory on the AM5 socket. AMD says these chips will arrive in 2024, "built from the ground up to deliver performance and efficiency leadership." More technical information on these Granite Ridge CPUs was

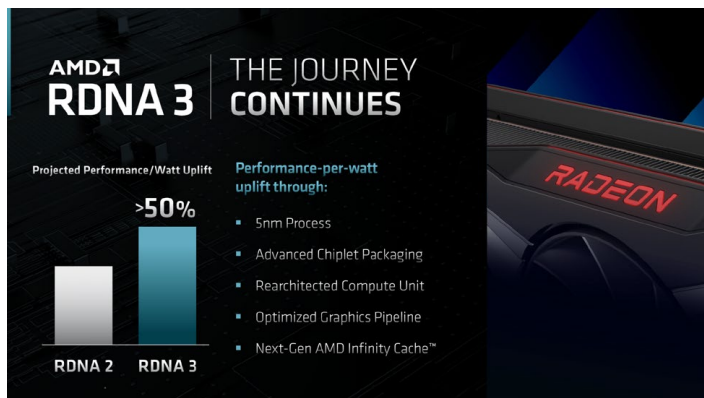
not provided. Both Zen 4 and Zen 5 chips will feature standard and 3D V-Cache equipped products, as well as a high-density C variant meant for servers.

On the GPU side of things, AMD says its next-gen RDNA 3 architecture (Radeon RX 7000 series, on the retail boxes) will be combined with 5nm and 6nm fabrication, advanced

chiplet architecture, and further enhancements of the Infinity Cache system (fave.co/3aRUJWc). This will deliver "50 percent greater performance-per-watt compared to the prior generation" when they begin to land later this year, but more raw performance comparisons were not presented. RDNA 4/Navi 4X GPU news was



The roadmap for AMD CPUs includes standard, 3D V-Cache, and high-density "C" variants of Zen 4 and Zen 5 chips.




It remains to be seen where RDNA's projected performance uplifts will apply—and if they meet this mark.

even more scant; AMD isn't saying yet what process node will be used for its 2024 GPUs.

AMD also hyped its next-gen laptop SoC designs, code-named Phoenix Point. These laptop boards will combine Zen 4 processors and RDNA 3 mobile GPUs, integrating a new image scale processors, more advanced refresh and response display capabilities, and "extreme power management." Considering the impressive results of the Ryzen 6000 series notebooks (fave.co/3zIHnsV), this is promising news indeed...even if it, too, is light on technical detail. Strix Point is the name for laptop SoCs planned for 2024.

Elsewhere in the presentation (fave.co/39DzWZj), AMD spoke about its AI software advancements, cloud computing hardware, and data center innovations. But for consumers, the action will truly begin at the end of 2022 and beginning of 2023. Naturally, the

competition isn't sitting around: That's when Nvidia's RTX 4000 series GPUs are expected, and Intel is boosting both its bread-and-butter processor tech and its incipient entry into the red-hot GPU market. 



We were impressed with the results produced by Ryzen 6000 series notebooks, such as the Asus ROG Zephyrus G14 (2022) shown here.

Microsoft honors the best Windows apps in its store (and they're all free)

The Microsoft Store isn't all bad. Check out the best free apps and tools, as chosen by Microsoft itself. **BY MICHAEL CRIDER**



The Microsoft Store is the butt of many a joke in the Windows community (fave.co/3tGjsBT), but that doesn't mean there's nothing worth downloading on it. Today Microsoft is honoring the best of the best applications you can get in the Store, and honestly, they're pretty dang good! The App Awards are worth a quick look if you're hunting for some high-quality tools to add to your PC.

Some of the choices are a bit rote—does anyone really need a dedicated app to watch

Disney+?—but there are some you might want to check into. It certainly helps that Microsoft chose high-quality applications that also happen to be free.

ShareX (fave.co/3zHU5YO): This robust alternative to Windows' built-in screenshot tool lets you automatically record screenshots or videos of your entire display, specific regions, or windows, or bind almost any recording action to a hotkey. I use it myself for quickly grabbing screenshots of live press conference videos.

Files App (fave.co/3bc2SZ7): This alternative to the default Windows Explorer file manager is open source and features tons of tools that aren't available by default. The customizable multi-pane interface is a particular highlight.

Rufus (fave.co/3mTHScb): It sounds like the name of a dog in an old Disney movie, but Rufus is a tiny little application that helps you quickly format disk drives, including an option to make bootable USB drives.

Auto Dark Mode (fave.co/3zKfsJh): Windows can already turn on the eye strain tool Night Light (fave.co/3tGJBFr) at specific times of the day. Auto Dark Mode gives the same flexibility to the light and dark modes of the interface itself for Windows 10 and 11.

EarTrumpet (fave.co/3HyxXSL): This tool replaces the default volume manager panel with something a lot more powerful, allowing the user to quickly manage volume on an app-by-app basis and switch inputs without opening a menu.


ModernFlyouts (fave.co/3tl9jcG): This tool replaces the default UI for changing volume, brightness, airplane mode, and others, allowing the users to move them around the screen to their liking.

Canva (fave.co/3zLqOg8): A web-based freeware publishing tool that mixes basic slideshow creation and visual layouts design, with pre-made templates for various web and mobile applications.

Paint.NET (fave.co/3xu751A): This app has been around for almost two decades. It's a fan favorite—a powerful alternative to the basic built application. Some users find that it's even good enough to handle some of the duties they formerly reserved for applications like Photoshop.

Wondershare Filmora (fave.co/3zllEjH): Windows technically includes a video editor, but it leaves a lot to be desired. This free alternative has a much cleaner and more flexible user interface. Just be aware that the free version has watermarks on published videos: you'll have to pay a hefty monthly subscription (or a more reasonable \$80 for a perpetual license) if you want to get rid of them.

LiquidText (fave.co/3b8ljN4): A popular notation app for the iPad, LiquidText also has a Windows version, which is most useful if you have a laptop with a touchscreen and stylus. This version can import and annotate PDF, Word, and PowerPoint documents, but you'll have to pay for the most powerful features.

We omitted several selections that are just packaged versions of web-based tools. If you'd like to see those, along with a few dozen runner-up apps, you can check out Microsoft's full list of awards here (fave.co/3N2dMOB). And if you're willing to cast your net outside of the confines of the official Microsoft Store, be sure to check out our list of the best free software for your PC (fave.co/3J9elFk). There's a lot of rad stuff out there! 



Amazon's massively upgraded Fire 7 tablet supports USB-C charging

The new and improved budget tablet is also a bit less "budget" at \$60. **BY MICHAEL CRIDER**

Lingering Micro-USB ports are the bane of consumer electronics. Every time I see an allegedly "new" gadget with one of those fragile, asymmetrical charging tips, I cringe. Following in the footsteps of its Kindle e-readers, Amazon is updating its phenomenally popular base model Fire Android tablet with new hardware, and a USB-C charging port is first on the list.

But it's far from the only change. The 7-inch standard Fire hasn't been updated since 2019, so the new model gets some dramatic refreshes. The new quad-core system-on-a-chip is allegedly 30 percent faster than the previous model, and perhaps more important, has 2GB of RAM instead of just one. That's still pretty sparse for any modern Android-powered device, but it should alleviate some of the multitasking and




Amazon says it's improved the battery life of the Fire 7 by 40 percent.

performance issues that are endemic to low-cost tablets.

Amazon says it's improved the battery life of the Fire 7 by 40 percent, up to 10 hours of video playback. With all those improvements (not to mention a pretty steep increase in component price and inflation over the last three years), it's no surprise that the base price is jumping from \$50 to \$60 in the U.S. The new Fire 7 launched on June 29 (fave.co/3tLaCrd) in black, blue, and pink hues. You can upgrade from 16GB to 32GB of storage for an extra \$20, and remove lockscreen ads for \$15 on top of that.

As with previous versions, the Fire 7 will also come in a Kid's Edition (fave.co/3MZOGcm), packed with a spongy

impact-resistant kickstand case in vibrant colors. The kid's version is also pre-loaded with a child-friendly interface and apps, and comes bundled with the Kids Plus service for streaming videos and games. This more protected model also comes with an expanded

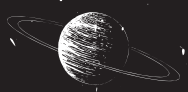
2-year warranty with a no-questions-asked replacement for broken tablets, if that case should prove to be less "kid-proof" than advertised. The standard Kids Edition costs \$110, but a 32GB storage upgrade is available for \$130. 



Amazon's Kid's Edition has a child-friendly interface.



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SARAH LAMAS - JAMPREZ.ORG





Tested: The Ryzen 7 5800X3D bookends an incredible era of AMD upgrades

Will we ever see four generations of compatibility with one socket again? Let's hope so.

BY **ALAINA YEE AND GORDON UNG**

AMD's AM4 socket has been around five years now, and what a run it's had. Since its launch alongside first-generation Ryzen CPUs, this socket has been a mainstay, with unprecedented support from Team Red that enables use of first-gen motherboards with

current processors (fave.co/38tNIT9). AM4 will soon cede center stage to AM5 (fave.co/3zNDByr) later this year, but not everyone



**VIDEO: FROM RYZEN 7
1800X TO 5800X3D**

Watch now at fave.co/3n76aiE

will need PCIe 5.0 (fave.co/39AsU7F) or want to shell out for expensive DDR5 memory. That means Ryzen 5000 chips—the final batch of AM4 processors—could prove to be a much more cost-effective upgrade for people who want better performance.

That makes the recent launch of the Ryzen 7 5800X3D, AMD's first CPU to boast its impressive new 3D V-Cache technology (fave.co/3owp5UE), a particularly tantalizing prospect. So when our sample crossed our desks, we decided to answer the question that many people would have. We cracked open our old Ryzen 7 1800X build, pulled the newer 3800X and 5800X off the shelf, and put them head to head with the 5800X3D, all to see just how much this new chip improves upon its predecessors—and to see how far AMD's

venerable AM4 has come since Ryzen's early days.

HOW WE TESTED

For our benchmarks, we repurposed and upgraded this Ryzen 7 1800X build from 2018 (fave.co/3Qwhfak). Its parts list is as follows:

CPU Cooler: Cooler Master MasterLiquid ML240L RGB

Motherboard: Asus ROG Crosshair VI Extreme X370

RAM: Corsair Dominator DDR4/3600 CL16 (2 x 16GB)

SSD: Corsair MP600 Pro XT PCIe 4.0 SSD

GPU: Nvidia GeForce RTX 3090 Founders Edition (driver ver. 512.15)

PSU: Corsair RM750i 750W 80+ Gold

Case: Cooler Master H500P White Mesh

OS: Windows 10 21H2



Our 2018 “Viva Las Vegas” build (shown here with four different lighting schemes) was repurposed for these benchmark comparisons.

The Asus X370 motherboard was updated to BIOS 8503 (Agesa v2 PI 1206), with PCIe Resizable BAR (fave.co/3aReZar) (aka AMD's Smart Access Memory) turned on. Core Performance Boost was on for the Ryzen 7 1800X, and Precision Boost Overdrive (PBO) was left on Auto for the 3800X, 5800X, and 5800X3D. The Cooler Master AIO

SPECIFICATIONS

	Cores	Threads	Base Clock	Boost Clock	L3 Cache	TDP
Ryzen 7 1800X	8	16	3.6 GHz	4 GHz	16 MB	95 W
Ryzen 7 3800X	8	16	3.9 GHz	4.5 GHz	32 MB	105 W
Ryzen 7 5800X	8	16	3.8 GHz	4.7 GHz	32 MB	105 W
Ryzen 7 5800X3D	8	16	3.4 GHz	4.5 GHz	96 MB	105 W

cooler had its fans and pump set to 100 percent. Memory was clocked down to DDR4/2933 CL20 for full compatibility across all CPU generations. Windows 10 used the Best Performance power mode, with VBS and GPU hardware accelerated scheduling turned off. No encryption was enabled.

Our CPU line-up encompassed the Ryzen 7 1800X, 3800X, 5800X, and 5800X3D. Second-generation Ryzen chips weren't included due to a lack of comparable part (AMD never produced a Ryzen 7 2800X) and a relatively mild difference between first- and second-gen Ryzen. We used the same build for all benchmarks, swapping the CPUs in and out of the motherboard to compile our set of benchmark results.

PERFORMANCE RESULTS

As made clear when the Ryzen 7 5800X3D's reviews published in late April, this processor has a clear, singularly defining purpose—gaming. (Not up to speed on the details? Here are 5 things you need to know about 5800X3D [fave.co/3biBFnC].) Compared to the standard Ryzen 7 5800X and contemporary Intel rivals like the Core

i7-12700K and Core i9-12900K, it has a tangible impact at 1080p. It also offers smoother performance at higher resolutions like 1440p and 4K, with higher frame rates when looking at the worst 1 percent of performance (aka 1 percent lows). However, the Ryzen 7 5800X3D is also weaker in productivity and content creation benchmarks thanks to clock speeds, which are slightly lower than the non-3D version.

That's when talking about its contemporary rivals, though—the standard 5800X and Intel's Core i7-12700K and Core i9-12900K. For these benchmarks, we're examining the boost to performance you get compared to a Ryzen 7 1800X or 3800X, because it makes more sense to think of the 5800X3D as an upgrade chip, rather than the go-to for a new build. And as you'll see, ditching an older Ryzen CPU can result in mammoth performance gains, and not just in gaming.

Production

We'll start with the production-oriented benchmarks, which are the 5800X3D's weak spot compared to contemporary rivals including its sibling, the standard 5800X. Just as in other

Cinebench R23 nT



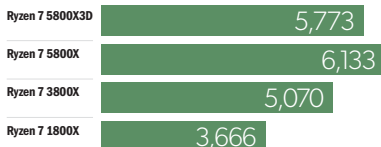
LONGER BARS INDICATE BETTER PERFORMANCE

Cinebench R23 1T



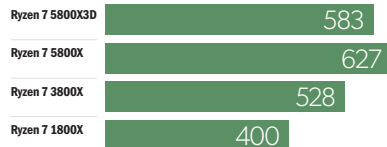
LONGER BARS INDICATE BETTER PERFORMANCE

Cinebench R20 nT



LONGER BARS INDICATE BETTER PERFORMANCE

Cinebench R20 1T



LONGER BARS INDICATE BETTER PERFORMANCE

5800X3D reviews, this chip trailed behind the 5800X and its faster clock speeds in rendering, video editing, and photo editing benchmarks.

But the slugfest between today's chips isn't the story we're after here. Instead, we're

Blender 3.1.2 Original Ryzen Demo

Seconds

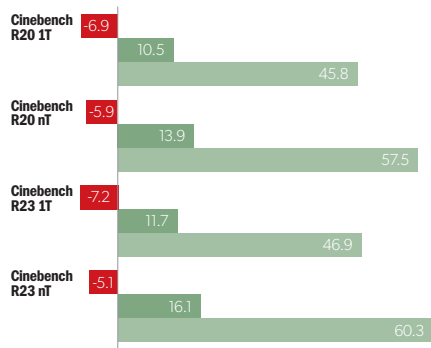


SHORTER BARS INDICATE BETTER PERFORMANCE

Cinebench Ryzen 7 5800X3D vs

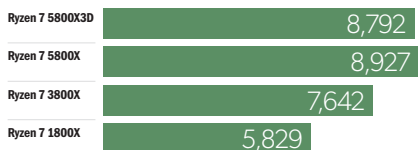
Percent

5800X 3800X 1800X



LONGER BARS INDICATE BETTER PERFORMANCE

Procyon 2.0 Photoshop 22.3.0/Lightroom Classic 11.3



LONGER BARS INDICATE BETTER PERFORMANCE

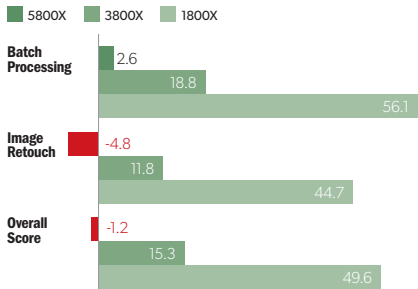
Pugetbench 0.95.4 Premiere Pro 22.3.0



LONGER BARS INDICATE BETTER PERFORMANCE

Procyon 2.0 Photoshop 22.3.0/Lightroom Classic 11.3 Ryzen 7 5800X3D

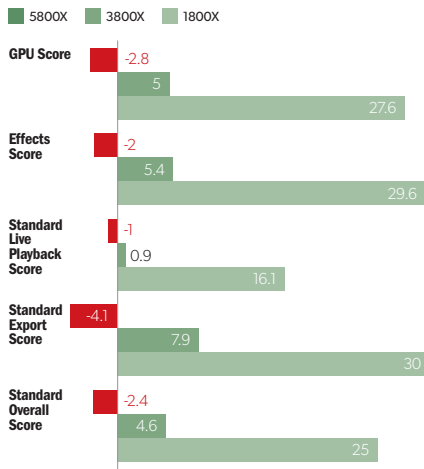
Percent



LONGER BARS INDICATE BETTER PERFORMANCE

Pugetbench 0.95.4 Premiere Pro 22.3.0 Ryzen 7 5800X3D

Percent



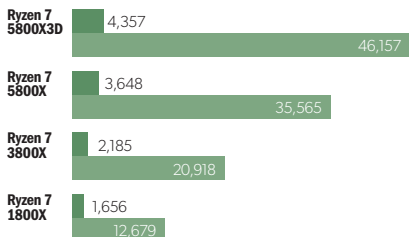
LONGER BARS INDICATE BETTER PERFORMANCE

looking at how much performance you gain if you've got an older Ryzen chip. The answer is *quite a dang lot* if you're a Ryzen 7 1800X owner. In test after test, you're looking at sizable double-digit gains—between 29 and 60 percent for rendering, 27 percent in Premiere Pro, 50 percent for Photoshop and Lightroom.

For 3800X owners, an upgrade to the 5800X3D offers more modest gains—the biggest increases top out around the 15 percent mark. That's not bad, but for most people who focus on this kind of use, not

WinRAR 11

■ 1T ■ nT



LONGER BARS INDICATE BETTER PERFORMANCE

enough to compel a switch. A different, more affordable Ryzen 5000 series chip will be a better option.

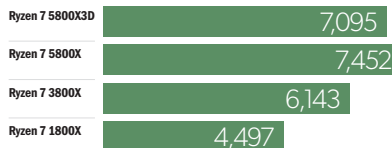
Office productivity

Most people don't think much about performance in apps like Microsoft Word, but your processor can make a difference when creating slideshows, editing documents, or replying to email. And that's what the aggregated scores for Procyon Office revealed. This benchmark, which measures performance in Word, Excel, PowerPoint, and Outlook, showed a whopping 57 percent improvement stepping up from an 1800X to a 5800X3D.

That said, those who push Excel to the max won't see as much of a gain, as shown in the benchmark created for us by Excel eSports competitor Jason Moore (fave.co/3s77ICg). But the 5800X3D was never

the right chip for that kind of core-hungry work—as just seen above in the production benchmark results. Also similar to the production benchmarks, going from a 3800X to a 5800X3D offers a far more modest increase in performance. Procyon Office posts an 15 percent uptick in its aggregated score.

Procyon 2.0 Office 365 Performance

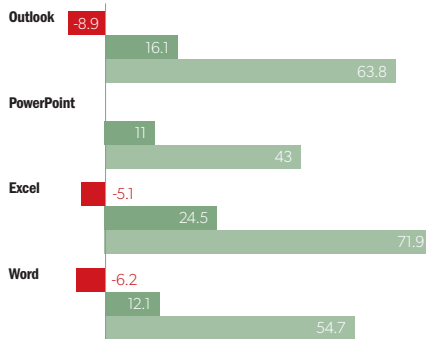


LONGER BARS INDICATE BETTER PERFORMANCE

Procyon 2.0 Office 365 Sub-Scores

Percent

■ 5800X ■ 3800X ■ 1800X



LONGER BARS INDICATE BETTER PERFORMANCE

Excel eSports Performance

Seconds



LONGER BARS INDICATE BETTER PERFORMANCE

Would you upgrade a chip solely for Microsoft Office? Possibly, but the \$450 5800X3D wouldn't be the best choice for that. But these results certainly contribute to enhancing the chip's appeal.

Web browsing

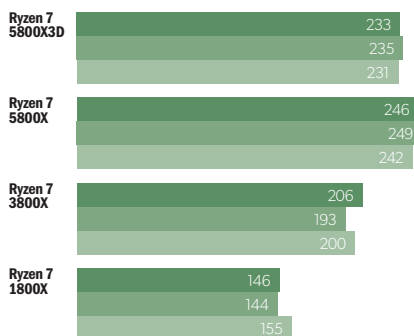
Speaking of benchmarks that further the 5800X3D's appeal—web browsing benchmarks aren't the numbers that turn heads, but this kind of computer use is the practical stuff no one talks about but affects everyone. You're going to use your PC to browse the web for at least some portion of your day.

Upgrading from an 1800X to a 5800X3D will make your time spent in Chrome, Edge, or Firefox all but sing. The results in Speedometer, Jetstream, and WebXPRT 4 show performance increases ranging from about 50 to 60 percent. Switching from a 3800X to a 5800X3D isn't as dramatic, with gains between 13 and 22 percent.

Again, you won't be buying this chip to surf the web (well, perhaps you are, but most of us aren't rolling in that kind of dough). But

Browsing Performance Chrome 100.0.4987.127

Speedometer Jetstream WebXPRT 4

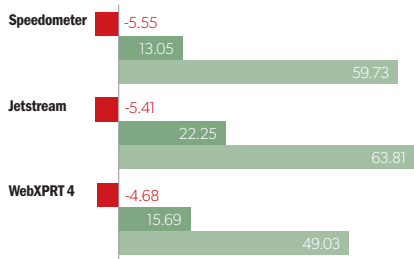


LONGER BARS INDICATE BETTER PERFORMANCE

Browsing Performance Chrome 100 Ryzen 7 5800X3D

Percent

5800X 3800X 1800X



LONGER BARS INDICATE BETTER PERFORMANCE

it's nice to see that despite the lower performance in production tasks, the 5800X3D offers tangible benefits in other, more common types of PC use.

Gaming

You probably already guessed—the 5800X3D slays the 1800X in gaming, too. But the older 3800X sees more sizable gains in this area as well.

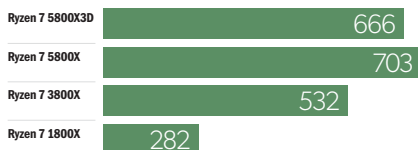
When looking at the average of the 17

games we benchmarked, the 5800X3D offers a staggering 72 percent performance increase compared to the 1800X at 1080p. For the 3800X, you'll see a 38 percent bump. This outcome isn't a total surprise if you've already read up on the 5800X3D—it clearly has an edge in gaming, even when pitted against contemporaries. (Note how it outdoes the standard 5800X by 9 percent in those 17 games.)

You don't lose this uptick immediately as

Counter Strike: Global Offensive (2012) 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Ashes of the Escalation: Singularity (2016) 19x10 GPU Biased

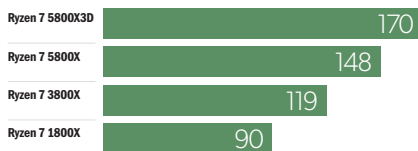
Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Deus Ex Mankind United (2016) Ultra Quality DX12 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Ashes of the Escalation: Singularity (2016) 19x10 CPU Biased

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

you scale up in resolution, too. At 1440p, the 5800X3D still notably improved on the 1800X. In *Shadow of the Tomb Raider*, it was a 40 percent gain, while in *Tom Clancy's Rainbow Six Siege* it was 101 percent. For the 3800X, it was 15 percent for *Shadow of the Tomb Raider* and nearly 40 percent for *Rainbow Six Siege*.

Once you become GPU bound, the 1800X does begin to hold its own in some games. Moving up to a 5800X3D at 4K resolution is a mere 2 percent improvement in

Strange Brigade (2018) Ultra Quality Vulkan 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Horizon Zero Dawn (2017) Ultra Quality 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Assassins Creed Odyssey (2018) Ultra Quality 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Middle-earth: Shadows of War (2017) Ultra Quality 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Rise of the Tomb Raider (2019) Very High Quality DX12 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Shadow of the Tomb Raider. (For the 3800X, it's a scant 1 percent.)

But as you can tell from the discussion

of individual benchmarks, results can vary, and wildly at that. Switching from an 1800X to a 5800X3D in Metro Exodus at 1080p

Metro Exodus (2019) Extreme Quality no RTX 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Hitman III (2021) Ultra Quality 19x10

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Dirt 5 (2020) Ultra Quality no RTX

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

World War Z (2021) Ultra Quality 19x10 Vulkan

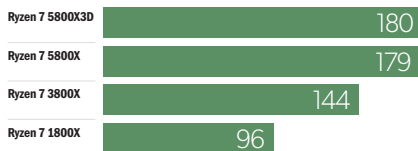
Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Gears Tactics (2020) 19x10

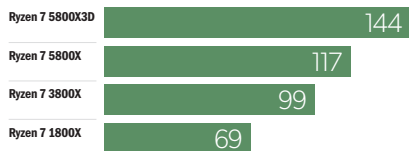
Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Far Cry 6 (2021) Ultra Quality 19x10

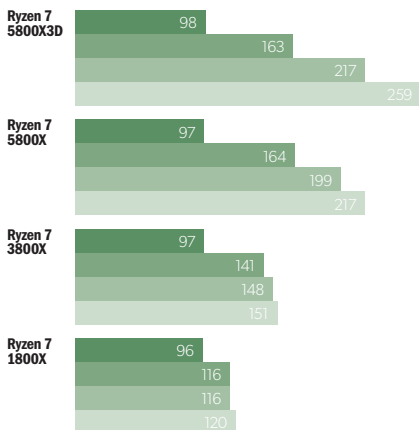
Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Shadow of the Tomb Raider Highest Quality No RTX GeForce RTX 3090 FE

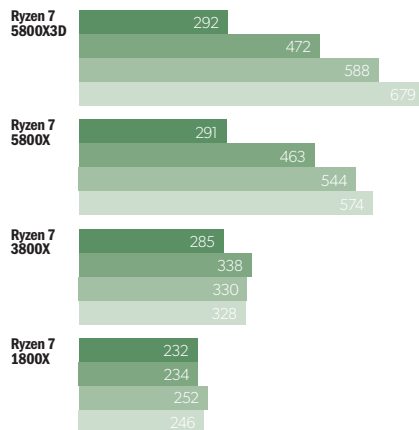
■ 4K ■ 1440p ■ 1080p ■ 720p



LONGER BARS INDICATE BETTER PERFORMANCE

Tom Clancy's Rainbow Six Siege Ultra GeForce RTX 3090

■ 4K ■ 1440p ■ 1080p ■ 720p



LONGER BARS INDICATE BETTER PERFORMANCE

only nets a relatively mild improvement of 13 percent. But in Rainbow Six Siege at 4K it's 26 percent.

So while replacing an 1800X with a 5800X3D will supercharge your 1080p gaming on average, gamers who play just a few games (or the same game regularly) should pay attention to individual benchmark results. That's especially the case if you play more often at higher resolutions.

Power draw

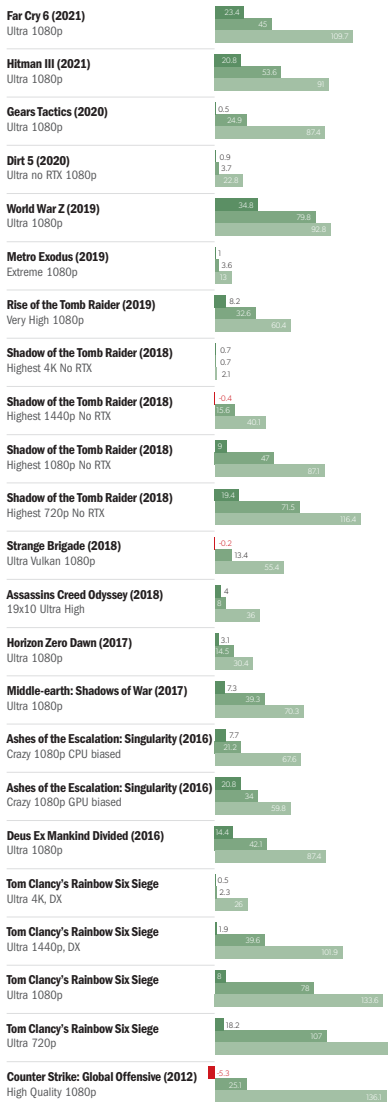
We'll take a quick look at power draw before wrapping up these benchmark results. This

information is important if you care about how much electricity your system consumes and/or heat it generates. The former matters if you live somewhere with expensive rates, and the latter is relevant if you live in a warm climate or have a PC case with limited cooling.

For this test, we ran Cinebench R23 on its default setting, which is a 10 minute loop of the render. Of the chips in our lineup, the 5800X3D and 3800X drew a bit less power than the 1800X, which still came in under the 5800X's demands. The 5800X3D did have a few more spikes than the 3800X in the single-core benchmark, but not many overall.

Ryzen 7 5800X3D

Percent



LONGER BARS INDICATE BETTER PERFORMANCE

BOTTOM LINE

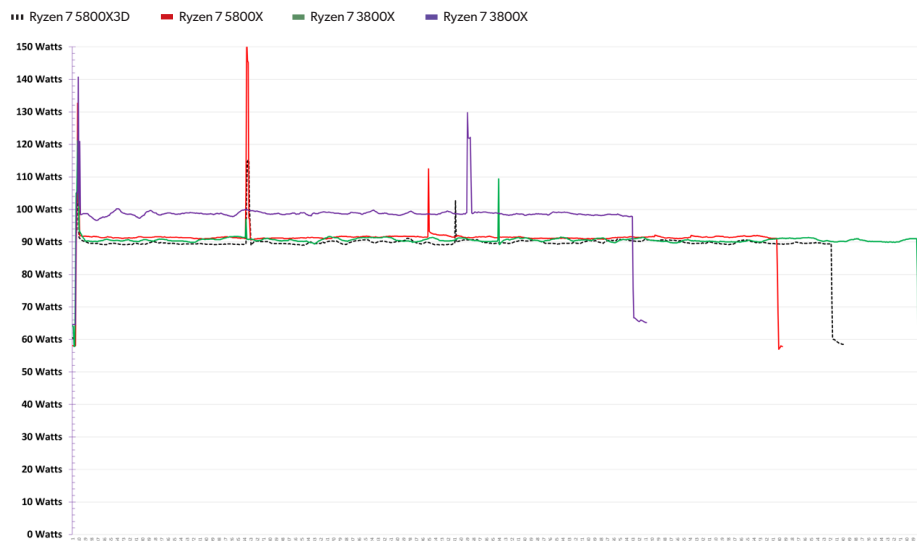
As we just saw, Ryzen 5000 smokes first-generation Zen. It posts a decent boost over Zen 2 as well. But the 5800X3D doesn't settle the question of whether or not to upgrade on AM4. In fact, it actually complicates things a little more.

The Ryzen 7 1800X may seem pathetic based on some of the benchmark results above, but it still faithfully serves in a number of PCs, including the one still used by PCWorld's very own Brad Chacos. Most owners have only been curious about an upgrade—not desperate. They've wondered about switching to Intel, waiting for Ryzen 7000, and if they have a compatible motherboard, going with a Ryzen 5000 chip.

The 5800X3D and its \$450 price tag adds one more fork to the Ryzen 5000 decision tree, rather than being a solution that overwrites the existing 5600X, 5800X, and 5900X. You have to really think about your budget and how you use your PC. Performance isn't the issue. Rather, if the point of dropping in a new AM4 CPU into your system is to boost performance while saving cash, another Ryzen 5000 chip could offer you more bang for your buck. A 5600X (\$200 street price) could make more sense for a 4K gamer, while a 5900X (\$390 street price) offers considerably more firepower for content creators.

That said, choosing the 5800X3D is still

Total System Power: Ryzen running Cinebench R23, one core



more cost-effective than replacing your processor, motherboard, and possibly also

memory—as you’d have to do with an upgrade involving an Intel processor or

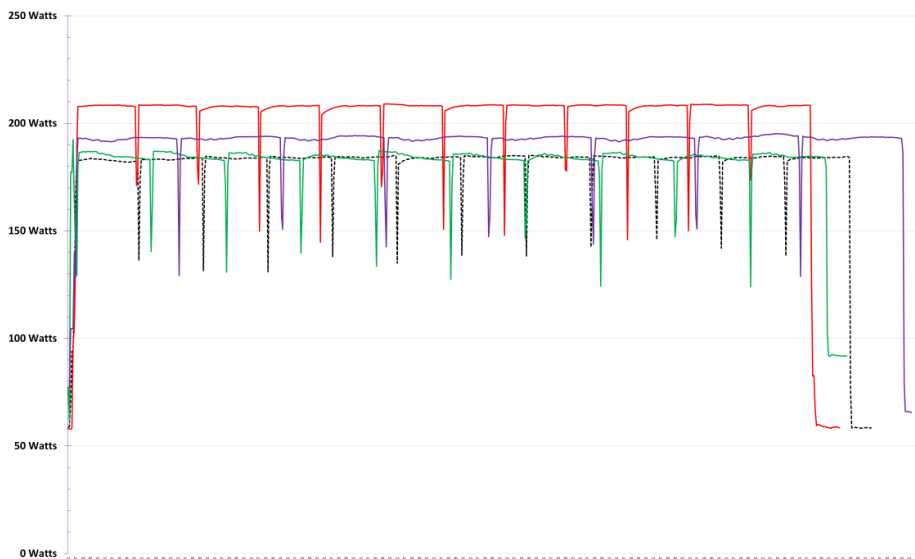


The two CPUs that bookend the AM4 era: the Ryzen 7 1800X (left) and the Ryzen 7 5800X3D (right).


Ryzen 7000. Moreover, the fact that you even have these granular choices is incredible. AM4 has lasted *four* CPU generations with full backward compatibility. Meanwhile, the competition can’t always be relied upon to last two generations. To go from a Ryzen 7 1800X and its early democratization of core count to a Ryzen 7 5800X3D and its face-melting performance in

Total System Power: Running Ryzen 7's running Cinebench R23, all cores

■ Ryzen 7 5800X3D (11 frames) ■ Ryzen 7 5800X (11 frames) ■ Ryzen 7 3800X (11 frames) ■ Ryzen 7 3800X (11 frames)



games is a simple CPU replacement. That's it. You don't have to swap anything immediately, either—you'll probably be able to snag the 5800X3D for less once Ryzen 7000 launches later this year. PC building has never been like this before.

Speaking of Ryzen 7000, AM5 will be around for a while, too. During a CES 2022 interview, AMD CEO Dr. Lisa Su said that as with AM4, we should expect AM5 to be a long-lived platform as well. No exact number of years were given, but with the precedent set, here's to hoping for a continued legacy of generous support. 



The street price for the 12-core, 24-thread Ryzen 9 5900X is currently \$390—or \$60 less than the 5800X3D, which just launched and thus still goes for MSRP.

SK Hynix Platinum P41 SSD: The pursuit of affordable speed

This top-tier PCIe 4 SSD performs on par with the best around, and is nicely affordable.

BY JON L. JACOBI



The SK Hynix Platinum P41 was a pleasant surprise. With many upper crust PCIe 4.0-based 2TB NVMe drives still going for \$300 plus, the \$260 price tag for the P41 had me thinking it would be an overpriced mid-tier SSD. Instead it turned out to be a

nicely priced, top-shelf drive with exceptional performance. My bad. Good on ya, SK Hynix!

DESIGN, PRICE, SPECS

As stated, the 2TB Platinum P41 I tested retails for \$260, while the 1TB costs \$150, and the 500GB, \$105. Those are relatively



SK Hynix's Platinum P41 doesn't share its metal namesake's price. It's the most affordable top performer we've had our hands on.

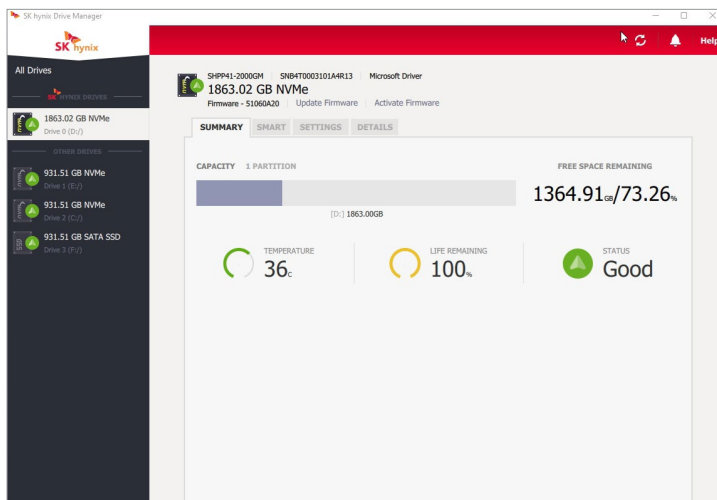
low prices, representing a clear savings over the Seagate FireCuda 530 (fave.co/3vs8HYI), one of the ultra-fast PCIe 4.0 drives I tested it against. The other rival, Kingston's KC3000 (fave.co/3OtXILH), is another bargain of a top-tier drive and one of our favorites because of it.

As to the specs:

The Platinum P41 is a standard 2280 (22 mm wide, 80 mm long) form factor, M.2 connected, PCIe 4x4 NVMe SSD utilizing 176-layer TLC NAND and SK Hynix's Aries controller. There's also 1GB of DRAM per 1TB of capacity of primary cache. Secondary cache is TLC as SLC and allotted. The drive is warrantied for 5 years,

or 1200 TBW (TeraBytes that can be Written) for the 2TB model, 750 TBW for the 1TB, and 500 TBW for the 500GB drive.

Why the reverse slope on the rating, we can't say. But TBW generally correlates to price. Unless the company specifically disables writes once the limit is reached (as Apple does), then



SK Hynix's Drive Manager software can be used to update firmware and other tasks. We were unable to complete the download from the company's site and had to look elsewhere for it.

you might get a considerably longer lifespan.

Keep in mind that those TBW ratings represent far more data than the average user will write in five years, and more likely a decade (assuming that you're not constantly manipulating 8K video or something like that). Remember also that reads don't count.

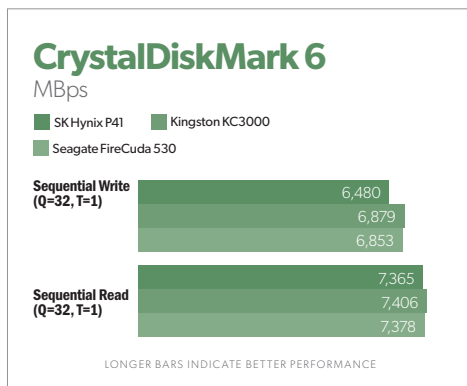
SK Hynix also provides its Drive Manager software for firmware upgrades and the like. Shown is the older version, 2.4, as we were unable to complete a download from the company's website. It kept stalling at approximately 15MB of the 63MB download. Bummer.

PERFORMANCE

While the P41 is fast, it fell just shy of the fastest PCIe 4 NVMe SSDs we've tested as you'll see in the charts below. When I say "just," I mean it. It isn't a difference worth fretting over. You'd never be able to tell the Platinum P41 from the highly ranked Kingston KC3000 (fave.co/3OtXILH) and Seagate FireCuda 530 (fave.co/3vs8HYI), at least not subjectively.

Note that these are new tests run under Windows 11, and the numbers for the Kingston and Seagate will vary from those found in the original reviews.

The P41 finished slightly behind its rivals in CrystalDiskMark 8's sustained write tests. The reads were nearly equal, and are within the margin of error for the test. The P41 was



Though it was a tad shy of the other two drives in sustained write performance under CrystalDiskMark 8, the P41's write performance was within the test's margin of error. This is a very good performance.

also a few seconds off the pace in our real-world 48GB transfers, but we're talking a mere 1.5 percent deficit. Again, it was subjectively unnoticeable, though just outside the margin of error.

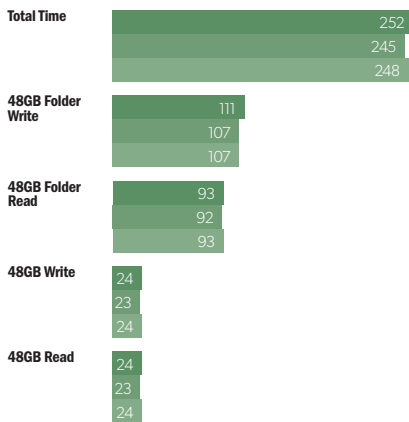
In our 450GB write test, designed to test the drive's secondary cache, the P41 finished in a dead heat with the Kingston, and a mere 6 seconds behind the FireCuda 530. Second-tier drives will take 400 to 600 seconds to complete the test, and the slowest SSDs saddled with poor caching algorithms can take over 1,000 seconds. In other words, 223 seconds is a really fantastic score.

As you can see from the results above, the Platinum P41 can hold its own with the best PCIe 4 NVMe SSDs.

48GB Transfers

Seconds

SK Hynix P41 Kingston KC3000
Seagate FireCuda 530



SHORTER BARS INDICATE BETTER PERFORMANCE

The Platinum P41 was a touch off the pace in our 48GB transfers, but only a touch. This is an excellent performance by any standard.

PCIe 4 SSD tests currently utilize Windows 11 64-bit running on an MSI MEG X570/AMD Ryzen 3700X combo with four 16GB Kingston 2666MHz DDR4 modules, a Zotac (Nvidia) GT 710 1GB x2 PCIe graphics card, and an Asmedia ASM3242 USB 3.2x2 card. Copy tests utilize an ImDisk RAM disk using 58GB of the 64GB total memory. The SSD is reformatted and optimized (TRIM'd) before every test.

Note: Performance will drop as the drive fills up and smaller-capacity drives may

450GB Single File Write

Seconds

SK Hynix P41 Kingston KC3000
Seagate FireCuda 530



SHORTER BARS INDICATE BETTER PERFORMANCE

There's little to choose between in our 450GB write when it comes to these three top-performing drives.

not write as quickly, especially on long writes due to less primary and secondary cache.

BOTTOM LINE

Though this isn't the fastest SSD we've tested, it's darn close. With an ultra-competitive price and exceptional performance, the SK Hynix Platinum P41 should be on your short list when shopping for a top-tier NVMe SSD with PCIe 4 chops. Highly recommended. 🔥

SK Hynix Platinum P41 SSD

★★★★★

PROS

- Excellent everyday performance.
- Sustains performance during long writes.
- Priced low for a top-tier PCIe 4 SSD.

CONS

- No 4TB capacity.

BOTTOM LINE

The Platinum P41 is a top-tier PCIe 4 NVMe SSD at a very nice price point. Highly recommended.

\$260



EaseUS ToDo Backup 2022: New interface, same capabilities

Though it's sporting a new, more serious appearance, ToDo Backup remains the same highly competent backup program we've grown to appreciate. **BY JON L. JACOBI**

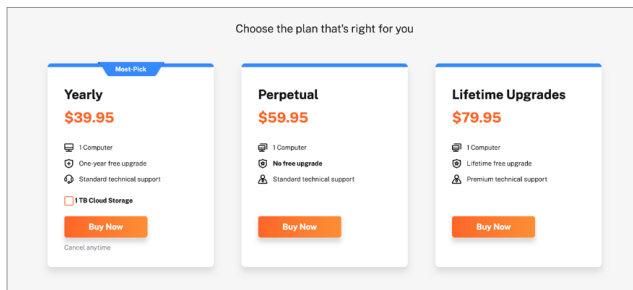


EaseUS ToDo Backup has long been one of our favorite backup programs for Windows. It's versatile, backs up reliably, and is very easy to use. The new version offers more of the same goodness,

but with a new look and, most saliently, cloud storage. Let's dive in to the specifics.

FEATURES

One of the great things about ToDo Backup is that it offers both file and folder backup and



These are the three basic end user flavors of ToDo Backup. The Yearly price will jump to \$59.95 with 1TB of cloud storage.

drive and partition imaging. The former is simply copying files and storing them in a container file (*.pbd), while the latter copies all the information on a disk or partition, for wholesale restores and recovery of your system.

Full (all data), incremental (all data since last backup), and differential (all changes since the initial full backup) backup options are all supported. If you're wondering about the advantages of each of the latter two types, incremental backups are generally much faster, while differential backups restore more quickly.

Both the Free and Home versions (\$39.95 annual or \$59.95 perpetual) offer all those basic features. The Home version, which I tested, goes even further with disk, partition, and system cloning, Outlook email backup, Security Zone (think restore OS partition), restore to different hardware and PCs, and for another \$20 (\$59.95 annually), 1TB of online storage.

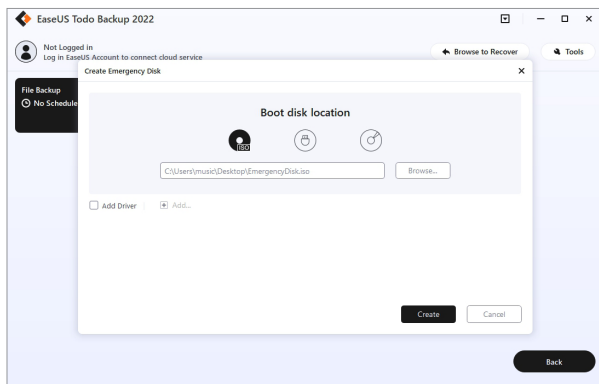
There's also, of course, the usual array of backup bells and whistles: scheduling

(including smart near-real-time backups), pre- and post-backup commands, raw or data-only images, password protection, file filtering, after-job email notifications, compression and CPU settings, and so on. You can also split backups to accommodate smaller target media such as optical discs.

The program also supports a wide variety of hardware backup media. LTO tape is supported on the \$49 Enterprise Workstation version, but that's not reviewed here. Optical is supported by all paid versions, along with most other removable media. You can, of course, back up to any type of storage that you can mount and assign a drive letter to.

EaseUS ToDo Backup can also be run from its own Windows PE (Pre-install Environment) boot disk (that is, an emergency disk), should your system crash and you need to restore it. This of course requires that you've imaged the drive previously, and the backup must be local. EaseUS told me that a system restore from the cloud will be supported within the coming year, but at the moment online storage isn't supported in any way from the boot disk.

You can also restore individual files from the boot disk, but you're likely better off reinstalling ToDo on your new OS install for



You can also run ToDo Backup from an emergency WinPE boot disc if you are unable to boot into your operating system. The only feature not available is access to the cloud backup.

that chore. The boot disk lacks access to your cloud storage.

DESIGN AND INTERFACE

I was impressed with the way ToDo Backup arranged functions and walked me through the backup and recovery processes. While I'm an old hand, it shouldn't tax the skills of new users—at least those with a basic understanding of computers and where files are stored.

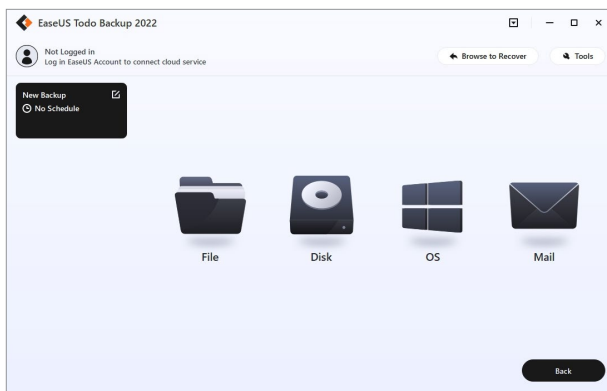
ToDo Backup makes it easy to select what you want to back up, and provides easy options (shown below) for the most common backup operations: your Outlook email and your operating system. The latter is simply imaging the entirety of the

disk that you boot your operating system from. If you use other email programs, use the file and folder backup for your email.

You can also back up your system with the more versatile disk backup, but the OS option simplifies a not necessarily intuitive process that includes several partitions and might fool less experienced users.

One thing to note is that while there's a large Browse to recover button, you're better off right-

clicking on the appropriate backup job in the list to the left of the interface and selecting Recovery. This takes you right to the backup even if you don't remember where it is. Also note that ToDo Backup places backups inside a subfolder labeled with your computer's



You can back up files and folders, partitions and disks, as well as just your email. The OS option images the entirety of the disk your operating system resides on.



ToDo Backup is a good performer and offers fun swirling graphics during backups—nice job by the GUI folks.

name—not at the root level of the destination you selected.

As I hinted, ToDo Backup's GUI is still basically wizard-driven, though the look has been revamped since our last review. The color motif is more serious, using shades of gray, and there's also some very nice animation. In particular, one animation shows data flowing like air from the source to the target location (see the image below). It's a bit of unexpected fun, if no more revelatory than the simple progress bar that's also present.

PERFORMANCE

I tested all the basic backup jobs, which proceeded largely at the pace dictated by the media involved. In other words, performance was about on par with that of most backup programs. I also checked out the program from an emergency USB stick (optical is also an option). The environment being Windows

PE, there was no significant difference in the interface or performance, though if you have special hardware, you'll need to add drivers when you create the emergency disk.

The exception to the "no significant difference" is the already discussed lack of cloud connectivity from the boot disk. You can back up and restore from local media or the network, but not from online. EaseUS says this

capability is in the works.

BOTTOM LINE

EaseUS ToDo Backup remains one of the top paid options for backing up your files and images. We like the improvements—especially the interface. The free version, for its part, is a real boon for those with minimal needs or cash. 🔌

EaseUS ToDo Backup 2022

★★★★★

PROS

- Free version for basic backup chores.
- Easy and attractive interface.
- File level and imaging backups.
- 1TB of online storage now available.

CONS

- Emergency disk lacks cloud connectivity.

BOTTOM LINE

ToDo Backup 2022 remains one of our favorite backup programs. We like the new interface, as well as the new S3-based online storage, and it's still bang-on with its file and folder and image backups.

\$39

Acer Nitro XV272: Top-tier gaming on a 1080p monitor

Though expensive for 1080p, the Acer Nitro XV272 delivers attractive image quality for both gamers and creators. **BY MATT SMITH**



1 080p resolution isn't cutting-edge, but it remains the most popular resolution among modern PC displays. This is often because of budget: There are dozens of cheap 1080p monitors. But what happens when a 1080p monitor makes image quality a priority?

SPECS

The Acer Nitro XV272 (LVbmiiprx) is a 27-inch, 1080p monitor with an IPS panel and a 165Hz refresh rate. This puts it smack-dab in the most crowded segment of the monitor market. Here are the XV272's most noteworthy specs.

Display size: 27-inch

Native resolution: 1920×1080

Panel type: IPS

Refresh rate: Up to 165Hz

Adaptive sync: AMD FreeSync Premium and G-Sync Compatible

Ports: 2x HDMI 2.0, 1x DisplayPort, 4x USB 3

Stand adjustment: Height, tilt, swivel, pivot

VESA mount: Yes, 100x100mm

Speakers: Yes

Price: \$349 MSRP, around \$279 typical

A few features help the Nitro XV272 stand out. It has a 165Hz refresh and is compatible with both AMD FreeSync and Nvidia G-Sync. It also has three video inputs, four USB ports, and a stand with numerous ergonomic adjustments. The Nitro XV272, though not expensive, is a cut above entry-level 1080p monitors.

DESIGN

The “Nitro” name might sound exciting, but the XV272, like all of these kinds of monitors from Acer, looks pretty plain.

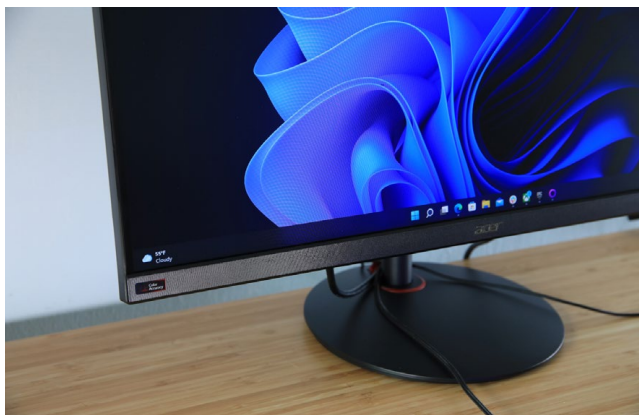
Acer’s Nitro sub-brand focuses on performance over design. Essentially all Nitro monitors use a simple, matte-black housing paired with a skinny stand and a round base. It’s dull but inoffensive.

The stand feels cheap when handled but offers plenty of ergonomic adjustment. This includes height, tilt, swivel, and even pivot. Swivel and pivot aren’t guaranteed at this price point, so it’s good to see them here. There’s also a 100x100mm VESA mount for attaching a third-party monitor arm or stand.

There is one problem with the stand: cable management. You won’t find a hole in the stand for routing cables. Instead, Acer uses a tiny clip on the base that does a terrible job of keeping cables bundled.

FEATURES AND MENU

Connectivity includes two HDMI 2.0 ports, plus one DisplayPort, and a total of four USB-A 3.0 ports for connecting wired peripherals. This makes the monitor a moderately useful USB hub, though it lacks more advanced features like USB-C



Cable management could be better—you get just a clip on the base for routing cables.



A nice selection of ports is located in the depression on the Nitro XV272's backside.

with Power Delivery. Still, the Acer Nitro XV272 has more ports than most 1080p gaming monitors.

The Nitro XV272's menu system could be better. It looks basic, with simple icons and unattractive fonts, and doesn't feel responsive while using the joystick to scroll through options. The joystick and select buttons are easy to use, but the power button is a bit too close to the select buttons. I accidentally turned off the monitor several times.

These issues hide a surprisingly robust slate of image-quality options. This includes precise gamma presets, several color temperature modes, and six-way adjustment of color saturation and hue. There's also a few gaming-centric features such as a frames-per-second counter and built-in aim points. The monitor lacks a black equalizer setting for

brightening dark areas, however, which might disappoint fans of competitive shooters.

The monitor includes a pair of two-watt speakers. They're not great but well suited for podcasts, YouTube, or games with less impressive audio. You'll want to put on a headset when sound quality matters.

SDR IMAGE QUALITY

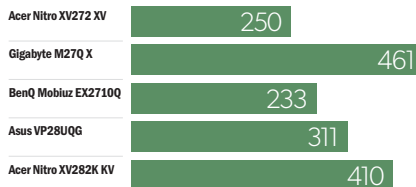
The Acer Nitro XV272 is toward the high end of pricing for a 27-inch 1080p display.

Gamers can snag a 1440p or 4K monitor for about the same price. Acer combats this with a vivid, accurate image.

SDR brightness comes in at about 250 nits. This is low but, as you'll see when I discuss HDR, it's not the monitor's true maximum brightness. Acer appears to be limiting the

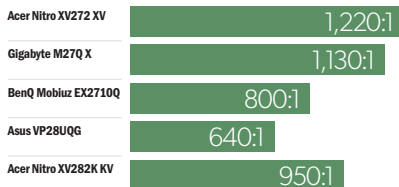
Maximum SDR brightness

Nits



LONGER BARS INDICATE BETTER PERFORMANCE

Contrast ratio



LONGER BARS INDICATE BETTER PERFORMANCE

monitor's maximum potential in SDR mode. That said, the monitor is still bright enough for use in nearly all situations. It will only appear dim if used opposite a sunlit window.

The Nitro XV272's modest contrast ratio is typical for a modern IPS gaming monitor without Mini-LED technology. Like its peers, the XV272 suffers from "IPS glow"—a hazy and blotchy appearance noticeable in dark scenes.

That said, the monitor's contrast ratio is good for the price. Aside from LG's new IPS Black panel technology, which is currently available in just a couple displays from Dell (fave.co/3y8gMnV), no IPS monitor without Mini-LED performs significantly better.

Color gamut is solid, covering the entire sRGB color space plus 88 percent of DCI-P3. The range of colors it can display is great for a mid-range gaming monitor and does provide an advantage over alternatives with a more narrow color space. The added color provides a vivid, saturated look that's attractive in games.

As for color accuracy, the Nitro XV272

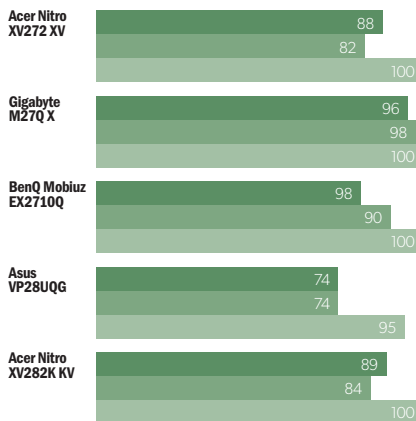
knocks it out of the park, with a default color accuracy more typical of a high-end professional monitor than a mid-range gaming monitor.

Acer doesn't sell the XV272 as a professional display, and its meager 1080p resolution will take it out of contention for many, but creators who stick to 1080p resolution will find this monitor surprisingly capable when they're editing photos, video, and digital art.

The monitor had an ideal gamma curve of 2.2, which means content looks about as bright as was intended. Default color temperature came in at 6200K, which is slightly warmer and more reddish than the typical temperature of 6500K. As mentioned

Color Gamut

■ % Adobe RGB ■ % DCI-P3 ■ % sRGB



LONGER BARS INDICATE BETTER PERFORMANCE

Acer Nitro XV272 XV	0.79
Gigabyte M27Q X	0.89
BenQ Mobiuz EX2710Q	3.33
Asus VP28UQG	4.32
Acer Nitro XV282K KV	0.71

SHORTER BARS INDICATE BETTER PERFORMANCE

But you don't need to—and that is the monitor's greatest strength. The XV272's decent contrast, accurate color, and lack of noticeable flaws make for a fantastic out-of-box experience. The SDR image is lively and inviting.

pixelation. This isn't a dealbreaker for me, but you should know what you're getting into. A 1440p alternative will look much sharper.

The Acer Nitro XV272 supports HDR and is VESA DisplayHDR 400 certified. HDR support is becoming common among gaming displays, but it still feels special at this price point. I measured a maximum HDR brightness of 450 nits, which is solid.

Though it supports HDR, the Nitro XV272 failed to automatically detect an HDR signal and turn on HDR mode. I had to select it manually. This is a minor annoyance but disappointing, as nearly all monitors I test have no problem detecting HDR automatically.

The Nitro XV272's HDR performance is

better than expected. It delivered performance that was superior to that of more expensive monitors, such as the Gigabyte M27Q X and Asus ProArt PA279CV, with better color gamut and accuracy in HDR.

Still, ultimately, this is a budget monitor that can't do HDR justice. HDR content can deliver a bit more detail in bright areas but otherwise isn't necessarily more colorful or rich than in SDR—it just looks slightly different.

MOTION PERFORMANCE

Acer's Nitro XV272 has a maximum refresh rate of up to 165Hz. This delivers smooth, fluid motion in games and a quicker, more responsive feel when using the desktop. The monitor officially supports AMD FreeSync Premium and Nvidia G-Sync, so you don't need to worry about whether the monitor will work with your particular video card.


Shoppers should remember this is a 1080p display, which is less demanding than 1440p or 4K resolution. Achieving a frame rate that fully uses the 165Hz refresh rate is possible in a wide range of titles. This is good news for gamers on a budget.

Motion clarity is good at the monitor's default response-time setting. The monitor has an OverDrive mode, which can be activated when using several gaming-oriented image-quality presets. This can improve clarity but also causes overshoot, an issue where a pixel moves beyond the intended color, resulting in

artifacts around high-contrast objects. Most owners should just leave OverDrive at the default setting of Normal.

BOTTOM LINE

The Acer Nitro XV272 LVbmiiiprx is a good monitor for gamers who want attractive image quality at a mid-range price. Resolution will be an obstacle for some, as it's possible to buy a 1440p monitor on the same budget, but the XV272's accurate image and great motion clarity makes up for the lack of sharpness.

The XV272 is also a good choice for content creators who want accurate color for less than \$300, making it a well-rounded, budget-friendly choice for those who work from home and want one display for both productivity and gaming. 

Acer Nitro XV272



PROS

- Very accurate color.
- Great out-of-box image quality.
- Good range of image adjustments.

CONS

- Expensive for a 1080p monitor.
- Bland, basic design.
- Modest SDR brightness.

BOTTOM LINE

Acer's Nitro XV272 costs more than a lot of 1080p monitors, but the IPS, 165Hz screen provides above-average image quality and motion performance, and a full range of monitor-stand adjustments and a generous array of ports make it worth the cost.

\$279

Logitech Lift: A smaller vertical wireless mouse for the masses

For people looking to avoid wrist and elbow discomfort, it's a good start. **BY ALAINA YEE**



PCWorld
EDITORS'
CHOICE

Ergonomic equipment can be expensive. I've cycled through many mice over the years—trackpads, trackballs, roller mice, vertical mice—with the price per mouse hitting over \$100 for the more specialized gear. If you don't work for a company that pays for it, taking care of your body costs a pretty penny.

The thing about ergonomic peripherals, though, is that everyone can benefit from it. Putting your body in a neutral position can

save you from the kind of pain that forces you to seek out the expensive gear. It's not just for people like me who must use funny-looking mice and keyboards (and regularly rotate through different styles, to boot) to keep from hurting.

So when Logitech announced the Lift, a \$70 vertical mouse made for small-to-medium hands (with a left-hand variation available!), I was genuinely excited. These days, you can find inexpensive variations from companies like Anker (fave.co/3Ocrbo2), but they're

sized for people with larger hands. They also often don't provide enough tilt to get your hand and elbow in a properly neutral position, nor do they provide a left-hand variant. So far, the best options for a compact wireless vertical mouse have been the Evoluent VerticalMouse 4 Small Wireless (\$110; fave.co/3HGBcri) or VerticalMouse D Small Wireless (\$115; fave.co/39EDwme).

Turns out, the Lift is a great balance between affordable and comfortable—but for folks like me who have existing issues, it can't quite fully replace an Evoluent.

THE SPECS

Connection type: Bluetooth and wireless

Max number of connected devices: 3

Sensor type: Optical

DPI range: 400 to 4,000 DPI (adjustable)

Nominal value: 1,000 DPI

Buttons: 6 total (left and right click, scroll wheel with click, middle button, and two thumb buttons)

Customizable: Yes, some buttons can be programmed for different actions

Tilt: 57 degrees

Dimensions: 108x70x71 mm (4.2x2.7x2.7 in)

Weight: 124g

Battery life: 2-year battery life (1 AA)

Warranty: 1 year (U.S.)

Materials: Partially made of post-consumer recycled plastic (70%

for graphite, 54% for rose and off-white)

For the full rundown of specs, including report rates, you can check out this Logitech Lift support page (fave.co/3QEd8cu).

DESIGN AND BUILD

The Logitech Lift comes in a two-tone design, with a plastic front half in one color and a darker, rubberized back half in another color. You can get it in black, off-white, and rose; our review model was off-white, which had a cool-toned white front and a light gray palm grip. The plastic has a smooth but soft-touch satin finish, as opposed to slick and shiny. The effect overall is quite nice, but that's only after just a few weeks of use. In general, I'm wary of



The Logitech Lift comes in three different colors: graphite, off-white, and rose.

rubberized materials—their longevity is questionable. Specific to mice, I stopped using my Evoluent VerticalMouse as often because its grip had deteriorated and become sticky to the touch.

Logitech offers six different buttons on this mouse—left and right click, plus a small round button just below those and two narrow ones on the thumb side of the mouse. The scroll wheel also serves as a button. You can customize the commands for all the buttons save the left and right click (for obvious reasons), which you do in Logitech’s Options+ software.

On the underside of the Lift is an on/off switch to preserve the mouse’s battery life, and a button to switch between connected devices (up to three total). You can connect to devices via Bluetooth or via the included 2.4GHz wireless dongle. A magnetic plate conceals access to the one AA battery that powers the mouse, as well as the 2.4GHz wireless receiver. It’s a good design choice—no plastic clips to accidentally break—but it pops off pretty easily even when the mouse drops onto carpet. (Shout-out to my jerk cat for taking it upon himself to test that repeatedly.)

One key difference exists between the Logitech Lift and its more expensive sibling,



I don’t have a particularly tiny hand (roughly 17.5mm long and 9.5mm wide), but the base on the Lift feels a smidge too large.

the MX Vertical—you can only connect to devices wirelessly. Unlike with the MX, you can’t use a USB-C cable to operate in a wired mode.

The Lift’s feel in the hand is decent, with a good weight, though it borders on being a smidge large. It flares a bit wider toward the base than feels completely comfortable. I prefer the sizing of my Evoluent vertical mouse, which has a narrower grip for curving my palm around. I also personally would prefer more of a vertical tilt—over time, I started to develop that familiar painful tightness near my elbow since the Lift doesn’t allow you to maintain a true handshake position. If you don’t have existing issues, you may not have the same complaint, but those with repetitive stress injuries and tendinitis may find the Lift won’t help with avoiding discomfort.

The button presses on this mouse feel a bit

mushy—Logitech aimed for “whisper-quiet” button presses, which it achieves, but they don’t feel as good if you like crisp clicks for feedback. But the size of the buttons are a good proportion for narrower fingers.

WIRELESS PERFORMANCE

First, a confession: I’m a savage who doesn’t use a mouse mat. (Though in full disclosure, my current ergo mouse is a Contour RollerMouse Free2, which doesn’t require movement on a desk surface.) But despite the lack of a mat and a slightly textured table surface, cursor tracking was very smooth with the Lift. I experienced no stutters or drop-outs while moving the mouse around the screen. You can change the tracking sensitivity (aka DPI settings) of the mouse very easily too, but be aware that upping the percentage doesn’t equate to linear

increases in DPI. The following chart provided by Logitech shows the logarithmic scaling you’ll be working with.

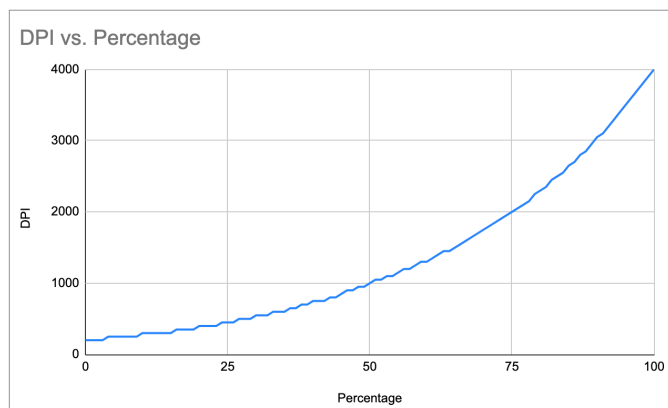
Switching between connected devices is also seamless, with instant switching to the PC or tablet you want to control. For my testing, I was connected to three different PCs—two desktops and a laptop. The first and third were via Bluetooth, while the second was via the 2.4GHz wireless dongle.

SOFTWARE

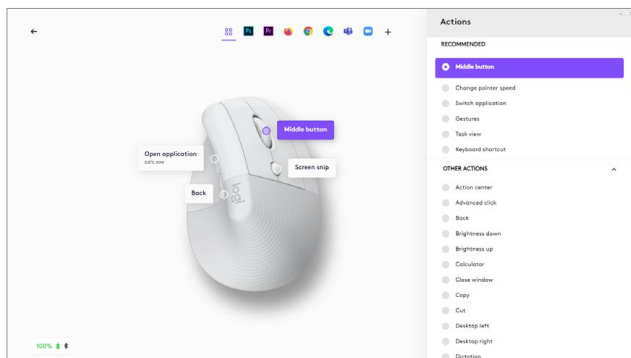
Out of the box, the Logitech Lift works well, but it shines best when you install its companion app, Logi Options+. Within the program, you can change settings and customize the mouse.

Particularly useful is the ability to customize button presses for specific apps, not just general use. Logi Options+ will start

you off with some presets for select programs already installed on your system, like Adobe Creative Cloud and popular Microsoft Office apps, Chrome, and Zoom. You can set up other apps in this way, too, as well as change the preset button presses. For example, in Chrome, I have one of the thumb buttons programmed for the keyboard shortcut for word



The Logi+ companion software shows DPI settings for the Logitech Lift as percentages, but the numbers correspond to a logarithmic scale, not a linear one.



You have many options for the commands you can assign to four of the Lift's buttons.

count in Google Docs.


If you move between computers often, you can choose to save the settings to a cloud-based account, which will allow you to download them elsewhere quickly. Logi Options+ also lets you set up Logi Flow, which enables you to seamlessly copy and paste between two different PCs.

For the most part, the customizations are great both in execution and their flexibility, though I did discover one small, odd quirk. As one of my general-use customizations, I chose to load the Calculator app in Windows...but it kept loading in the background when I'd press the button. I had to set up a manual customization and navigate to the same .exe file for it to work properly.

BOTTOM LINE

At \$70, the Logitech Lift is an affordable small wireless vertical mice that is also friendly to

left-handed folks. It stacks up well against rivals made by manufacturers that specialize in ergonomic gear, with smooth tracking and two types of connectivity. It also comes with a slick software interface and a lot of customization possibilities. However, because of its design, the Lift is better suited for people experiencing minor discomfort using regular mice or those

looking to avoid ever developing such problems. Such folks will save a decent chunk of cash—and they'll also end up with a mouse that has (shall we say) more conventional color options. 

Logitech Lift



PROS

- Comfortable vertical grip.
- Left-hand option.
- Highly customizable buttons.
- Smooth tracking.

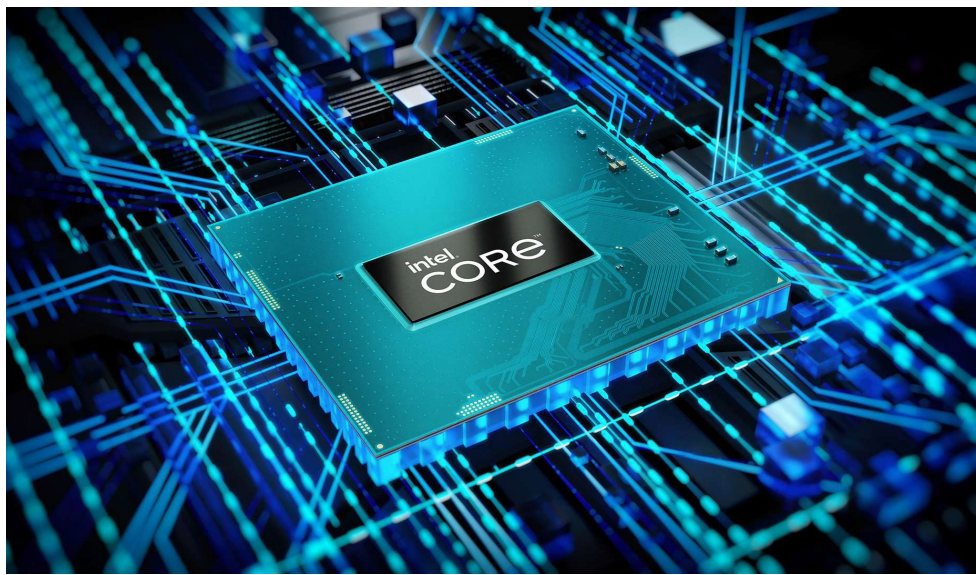
CONS

- Angle of mouse better suited for people preventing or reducing mild wrist and elbow discomfort.

BOTTOM LINE

At \$70, the Logitech Lift is an excellent affordable vertical wireless mouse for folks with smaller hands. It offers a comfortable grip, highly customizable buttons, and smooth tracking, and it's lefty-friendly too. However, it's best for people looking to prevent severe wrist and elbow pain during mouse use, rather than those hunting for a cheaper alternative to specialized ergonomic mice.

\$70



Tested: Intel's desktop-based Core i7-12800HX demolishes rivals

Desktop-based HX processors kick laptop chips to a clear second place, but not everyone will need one of these burly chips. **BY ALAINA YEE**

Earlier this month, Intel announced Alder Lake HX (fave.co/3OyEbnO), a new series of 12th-generation mobile processors. Well—not strictly mobile. These new work-focused laptop CPUs are based on the company's desktop Alder Lake chips, but in a BGA package. (That is, it's soldered onto the motherboard, rather than being in a standard socketed LGA package that you can swap out as in a desktop PC.)

As you might guess, these new 12th-gen Core HX chips are much beefier than their standard H-class siblings (fave.co/3sbkwCh), found in typical gaming laptops (fave.co/3n3aNKv). Alder Lake HX are 55W chips with a max turbo power rating of 157W, while Alder Lake H are 45W with 115W max turbo power.



**VIDEO: CORE i7 HX
FASTER THAN CORE i9 HK**
Watch now at fave.co/3tSxHlw

A black MSI Stealth 17 laptop is shown open on a white surface. The screen displays a dark background with a central shield logo containing a dragon, flanked by two sets of vertical, multi-colored (purple, blue, green, yellow) light bars that resemble the laptop's RGB lighting. The MSI logo is visible on the bezel below the screen. The background is a blurred workshop or office environment with various equipment and boxes.

We tested Intel's Core i7-12800HX on the new MSI GT77 Titan.

hyperthreading), with a maximum turbo clock speed of 4.8GHz on the performance cores and 3.40GHz on the efficiency cores. It's not the top of the stack—that distinction belongs to the Core i9-12950HX—but it still can deliver quite a punch.

Going up against this beastly processor were two other Intel mobile CPUs and one from AMD.

Going up against this beastly processor were two other Intel mobile CPUs and one from AMD.

For Mobile Workstations and Gaming Laptops

12th Gen Intel® Core™ HX Processors

	Processor Number	Processor Cores	Processor Threads	Performance Cores	Efficient Cores	L3 Cache	Max Turbo Frequency (1C)	Max Turbo Frequency (8C)	Base Frequency (8C)	Boost Frequency (8C)	Processor Graphics	Max Graphics Frequency	Processor Base Power	Max Turbo Power	Intel vPro®	ECC	Over Clock
Intel Core™ HX	P-12950HX	16C	24T	8P	16E	30 MB	5.0 GHz	3.6 GHz	2.3 GHz	17 GHz	32 EU	155 GHz	55 W	157 W	Eligible	Yes	🔥
	P-12900HX	16C	24T	8P	16E	30 MB	5.0 GHz	3.6 GHz	2.3 GHz	17 GHz	32 EU	155 GHz	55 W	157 W			🔥
Intel Core™ HX	T-12B55HX	16C	24T	8P	16E	20 MB	4.8 GHz	3.4 GHz	2.1 GHz	15 GHz	32 EU	145 GHz	55 W	157 W	Eligible	Yes	🔥
	T-12B35HX	16C	24T	8P	16E	20 MB	4.8 GHz	3.4 GHz	2.0 GHz	15 GHz	32 EU	145 GHz	55 W	157 W			🔥
	T-12B55HX	14C	20T	6P	14E	24 MB	4.7 GHz	3.3 GHz	2.0 GHz	15 GHz	32 EU	145 GHz	55 W	157 W			🔥
	T-12B55HX	14C	20T	6P	14E	24 MB	4.7 GHz	3.3 GHz	2.0 GHz	15 GHz	32 EU	145 GHz	55 W	157 W			🔥
Intel Core™ HX	S-12500HX	12C	16T	4P	12E	18 MB	4.6 GHz	3.3 GHz	2.5 GHz	18 GHz	32 EU	135 GHz	55 W	157 W	Eligible	Yes	🔥
	S-12450HX	8C	12T	4P	8E	12 MB	4.4 GHz	3.1 GHz	2.4 GHz	18 GHz	16 EU	130 GHz	55 W	157 W			🔥

Intel processor number is a measure of performance. Processor numbers differentiate future Intel processors lines, not across different processor families.

The frequency of Intel processors is based on Intel's Turbo Boost Technology. Actual frequency may vary due to workload and thermal conditions. Intel's Turbo Boost Technology is a dynamic frequency scaling technology that allows Intel processors to increase their frequency when needed to improve performance. For more information on Intel Turbo Boost Technology, visit www.intel.com/turbo-boost.

Intel vPro is a platform for enterprise security and management. For more information on Intel vPro, visit www.intel.com/vpro.

See www.intel.com/performance for more specification details.

Full Memory, Unlimited Core OC
 Full Memory, Limited Core OC

too. An MSI GE76 Raider (fave.co/3bdmxrr) with Intel's flagship Core i9-12900HK (fave.co/3sbkwCh; 6P/8E cores, 20 threads), an Nvidia GeForce RTX 3080 Ti, and 32GB DDR5/4800 memory served as the tribute for Alder Lake H. The 12900HK boasts a max turbo speed of 5.0GHz on the performance cores and 3.8GHz on the efficiency cores. Meanwhile, an older MSI GE76 Raider with an 11th-gen Core i9-11980HK, RTX 3080, and 32GB DDR4/3200 memory was brought out from mothballs to represent last-gen Tiger Lake H CPUs. Its chip sports 8 cores and 16 threads, with a max turbo speed of 5GHz.

As for our AMD representative, an Asus ROG Strix Scar G17 and its Ryzen 9 5900HX, RTX 3080, and 32GB DDR4/3200 memory was added to the mix. This chip is from AMD's 2021 mobile processor launch—the 6900HX is the most current offering from AMD, but unfortunately, the 5900HX is all we had on hand. The 5900HX has 8 cores and 16 threads, with a maximum boost clock of 4.6GHz.

THE LOWDOWN

Getting a true apples-to-apples comparison between laptops is difficult, especially when comparing processors from different classes. A laptop's size and specific design influence performance, so you can't make hard and fast statements based on benchmarks as when comparing desktop CPUs.

Still, the numbers can give you a general idea of what to expect, even in this preview look

at the HX series. Here are four quick takeaways to satiate your curiosity about Alder Lake HX.

(For a deeper dive into these results, check out the YouTube video on the first page—my colleague Gordon Mah Ung discusses the MSI GT77 and his benchmark findings in detail.)

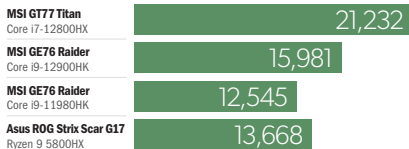
1. MIGHTY PERFORMANCE IN MULTITHREADED TASKS

Intel HX processors are clearly for when you need desktop PC power in a laptop body. The Core i7-12800HX tore through encoding, rendering, and other heavily multithreaded tasks at a pace that other laptop chips couldn't keep up with.

In Maxon's Cinebench R23 rendering benchmark, the Core i9-12800HX easily nabbed the top spot. It outperformed the runner-up, the Core i9-12900HK, by 32.23 percent. It also crushed the last-gen Core i9-11980HK and Ryzen 9 5900HX by 68.45 and 54.61 percent, respectively. The story's similar in our Handbrake encoding test, in which we have the program crunch down Blender.org's Tears of Steel 4K video (fave.co/3yaQSQn) into a smaller HEVC H.265 format. The 12800HX finishes the task about 30 percent faster than the 12900HK, 41 percent faster than the 5900HX, and 63 percent faster than the 11980HK (oof).

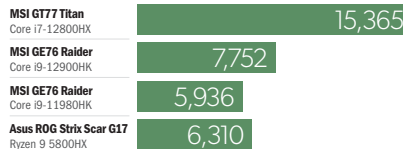
The results are even more stark in V-Ray 5, another rendering benchmark. Here the 12800HX stomps all over the laptop

Cinebench R23 nT



LONGER BARS INDICATE BETTER PERFORMANCE

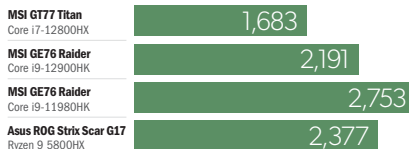
V-Ray 5 CPU



LONGER BARS INDICATE BETTER PERFORMANCE

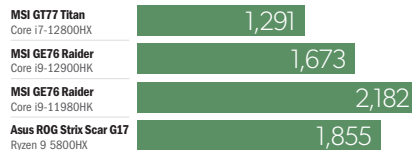
Handbrake 1.5.1 4K H.265 MKV 1260p CPU Encode

Seconds



LONGER BARS INDICATE BETTER PERFORMANCE

Blender 3.0 Barbership Interior Cycles Renderer



LONGER BARS INDICATE BETTER PERFORMANCE

processors. The improvement over the 12900HK is a whopping 98.21 percent, and it posts triple-digit percentage uplifts over the 11980HK and 5900HX.

2. A CPU ALONE CAN'T WIN ALL BATTLES

The Core i7-12800HX doesn't dominate in everything. A look at the results from Pugetbench's Premiere Pro benchmark show this outcome—and more specifically, how raw CPU firepower can't always win every round. In Premiere Pro, which makes use of both the CPU and GPU, the Core i9-12900HK and its faster RTX 3080 Ti took the top spot.

No surprises here, but it's a good reminder that a laptop's graphics can influence performance outcomes. Moreover, how much a discrete GPU can stretch its legs in a particular laptop makes a difference too. For example, the 12800HX's paired RTX 3070 Ti has a decently hefty 150W TGP, but the Ryzen 9 5900HX's RTX 3080 gets capped at just 130W TGP. That design has real-world repercussions, with that Asus Scar 17 sitting firmly at the bottom of the heap.

Incidentally, we chose to run this benchmark with the discrete graphics enabled to be more true to life. You'll never find these CPUs in a configuration lacking a dedicated GPU. However, if you're curious, switching off

the discrete graphics wouldn't have made for an even playing ground. The 12900HK's integrated graphics pack 96 execution units (EU), while the 12800HX sports just 32.

3. SIZE CAN MAKE UP FOR MIGHT

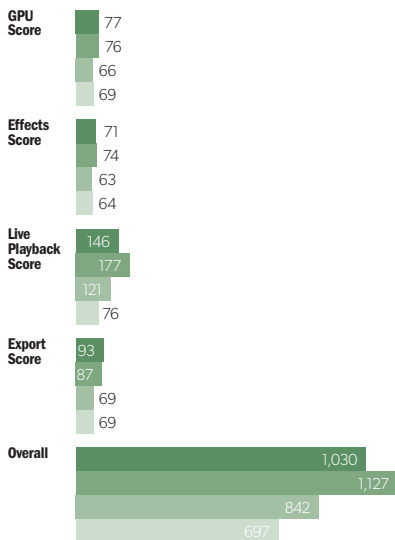
During the HX series announcement, Intel said the Core i9-12900HK would remain the top gaming CPU—but the HX chips would still be “great gaming processors as well.” Initial

test results bear that out, even given the disparity in our test laptops' specs. The 12800HX and its RTX 3070 Ti dipped below the 12900HK and its RTX 3080 Ti by only a handful of frames per second in two of our three gaming benchmarks, and it even took the lead in *Counter-Strike: Global Offensive* by about 5 percent. CS: GO tends to lean more on the CPU, which is likely how the 12800HX gains an advantage.

That said, recall what we said earlier about laptop size and design. We can be sure that *this* 12800HX + RTX 3070 Ti laptop only slightly underperforms the MSI GE76's 12900HK + RTX 3080 Ti, but for other laptops with similar configurations, you may not see the exact same outcome. The MSI GT77 Titan is a huge 7-pound laptop, while the MSI GE76 Raider is smaller at 6.4 pounds. Put the GE76's components into a larger notebook and you could see a wider performance gap. And it remains to be seen what an apples-to-apples 12900HX versus a 12900HK showdown will look like.

Pugetbench Premiere Pro 22.1.2

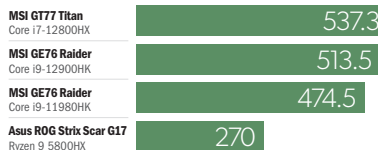
- MSI GT77 Titan (Core i7-12800HX)
- MSI GE67 Raider (Core i9-12900HK)
- MSI GE67 Raider (Core i9-11980HK)
- Asus ROG Strix SCAR G17 (Ryzen 9 5900HX)



LONGER BARS INDICATE BETTER PERFORMANCE

CS:GO 1080p

Frames per second



LONGER BARS INDICATE BETTER PERFORMANCE

Shadows of the Tomb Raider 1080p Highest Quality

Frames per second

MSI GT77 Titan Core i7-12800HX	151.7
MSI GE76 Raider Core i9-12900HX	159
MSI GE76 Raider Core i9-11980HK	135
Asus ROG Strix Scar G17 Ryzen 9 5800HX	122.3

LONGER BARS INDICATE BETTER PERFORMANCE

Ashes of the Singularity Escalation 1080p Crazy Preset CPU Focused

Frames per second

MSI GT77 Titan Core i7-12800HX	40.9
MSI GE76 Raider Core i9-12900HX	43.6
MSI GE76 Raider Core i9-11980HK	34.4
Asus ROG Strix Scar G17 Ryzen 9 5800HX	34.6

LONGER BARS INDICATE BETTER PERFORMANCE

4. LAPTOP HOUSING, DESKTOP POWER CONSUMPTION

Those who are familiar with processors already knew that the Core i9-12800HX was going to guzzle more electricity than the true laptop CPUs.

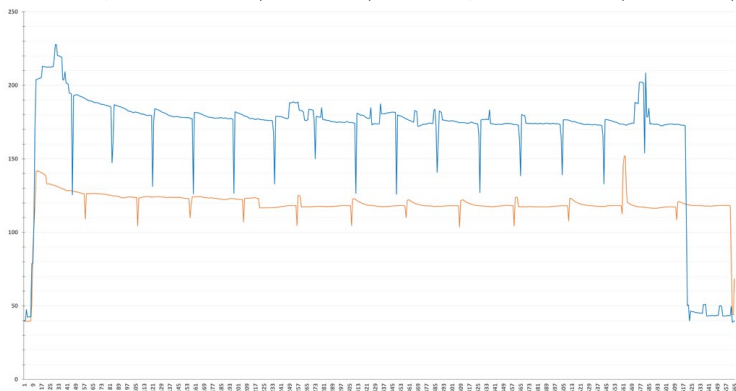
When we measured power consumption during Cinebench R23's default test, which takes 10 minutes to complete, the Core i9-12900HX hovered roughly between 120W and 130W for most of the

benchmark. The 12800HX hung out closer to 180W, but with bigger drops after finishing a frame compared to the 12900HX.

What's interesting here is seeing confirmation that 12800HX falls in line with what we usually see from more

Total laptop power consumption running Cinebench R23

— GE76 Raider / 14-core Core i9-12900HX (13 frames rendered) — GE77 Titan / 16-core Core i7-12800HX (16 frames rendered)



power-efficient desktop processors. (We don't currently have this exact data for Alder Lake chips, but you can have a peek at our recent Ryzen retrospective data; fave.co/3xN2Wpj.) And of course, with more power comes faster and higher performance—16 frames rendered versus the 12900HK's 13, and in less time.

FINAL THOUGHTS

Even without knowing what further hardware and software tuning could improve, this performance preview makes it clear that the Core i7-12800HX is a ferociously impressive CPU. Squishing a desktop Alder Lake processor into a laptop gives quite a boost to speed. Content creators and other users who need workstation-level performance should love what's on offer here.

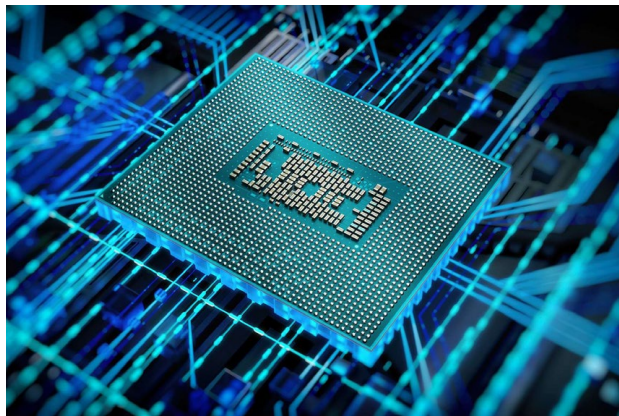
That doesn't necessarily make the HX series of chips the ideal for everyone, though. As fun

as high-powered hardware is, the different classes of processors exist for a reason. If your primary need revolves around portability, a featherlight PC with an Intel or AMD U-class processor (like the recently launched Ryzen 9 6800U; fave.co/3zIHnsV) is the right choice. Same for gamers—unless you're also often creating videos based on your gameplay, you can still get plenty of enjoyment out of a laptop with a standard H-series processor. What matters more is the top performers in that class, as well as the performance of the *specific* laptops you're considering.

Regardless of what you most need out of a laptop, the latest releases make choosing a new PC both easier and harder. Competition is currently so fierce between Intel and AMD that each new generation offers material benefits. Anyone trying to decide between future-proofing their purchase and saving money by going with the previous generation faces a tough call. At the

same time, CPUs that stink are far more rare. It's a good problem to have, all things considered.

If you're wondering which specific notebook is the best for your personal needs, be sure to check out our roundup of the best laptops (fave.co/3qL4oHf). It's loaded with concrete recommendations culled from dozens upon dozens of recent reviews, with picks for every user's needs and budget. 🔌



The Core i7-12800HX is a ferociously impressive CPU.

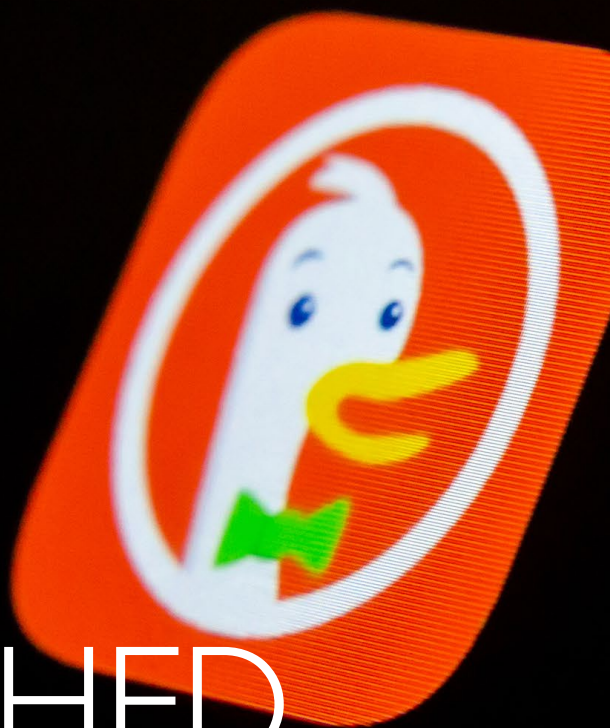


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I SWITCHED FROM **GOOGLE** **DUCKDUCKGO** PRIVATE SEARCH: **5 BIG TAKEAWAYS**

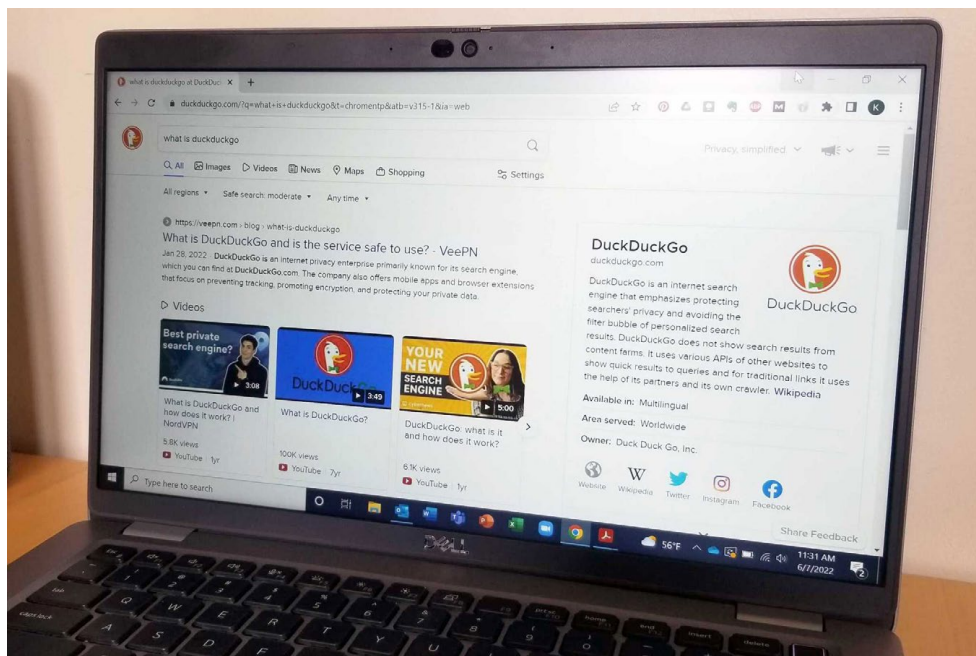
TO
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YS



Google

PROMISING UTMOST
PRIVACY, DUCKDUCKGO IS
THE ANTI-GOOGLE SEARCH
ENGINE. BUT WHAT'S IT
REALLY LIKE TO USE?

BY SAM SINGLETON



Google is far and away the most popular search engine—but sometimes it can feel more like Big Brother and less like a friendly assistant. Indeed, for those concerned about privacy, Google can overstep some boundaries by collecting your personal data and serving you ads based on what it collects. Google *does* allow you to disable some personalization and tracking settings, but it's ultimately up to the user to change them. Enter DuckDuckGo (fave.co/3ba86Er), a privacy-focused search engine with its own desktop extension and mobile browser app.

DuckDuckGo touts itself as the anti-Google, promising not to track or collect your data from the start. It offers a clean interface and familiar layout, and provides many of the features you've come to expect from a search engine—but without those invasive data trackers. (If privacy is a concern of yours, also consider switching from Google Chrome to Firefox [fave.co/3xz10kt].)

On paper, DuckDuckGo seems like a worthy competitor. But how does it really stack up to Google? To find out, I switched to DuckDuckGo and used the service exclusively for a week. Here are my five key takeaways.

1. DUCKDUCKGO IS REFRESHING

DuckDuckGo's privacy features surprised me with how liberating they feel. The service insists that it doesn't collect user data or track you across different websites. It also doesn't associate your browsing with your IP address, and it won't save your search history.

For someone who has used Google most of his adult life, this feels oddly refreshing. I barely remember a time when my every move wasn't tracked, analyzed, and then marketed back to me through targeted suggestions and ads. Google has taken steps to address the issue by allowing you to disable search personalization under settings ([fave.co/3nbB8qg](https://www.google.com/settings/ads/afak)), but I suspect many users are still unaware of this option.

Using DuckDuckGo brought me back to a simpler time when a search engine was only there to answer questions like, "What is the best laptop under \$1,000?" or "What was Tim Robbins' character's nickname in Top Gun?" (It was Merlin.)

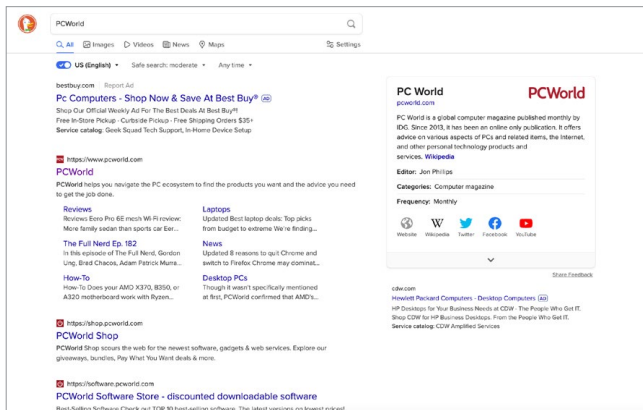
Privacy is the biggest draw of DuckDuckGo, and it applies it in a way that doesn't feel restricting. The entire time I was using the search engine, I didn't feel inconvenienced by the lack of personalization. Google's (admittedly handy)

Autocomplete prediction works by reflecting both real searches done by other users on Google and your own past searches. If you don't like this, however, you can change these settings by turning off personal results. Unlike Google, DuckDuckGo doesn't auto-suggest new searches because it never collects your search history to begin with—this felt like a small price to pay for more private browsing.

Another refreshing privacy feature: DuckDuckGo actively blocks external trackers from following you around online. So not only does the service itself keep your browsing private, it also prevents third parties from tracking you as well.

2. DUCKDUCKGO HAS A GOOD USER INTERFACE

Before I started using DuckDuckGo, I had this image of a bare-bones search engine, à



DuckDuckGo's user interface is clean, minimal, and familiar.

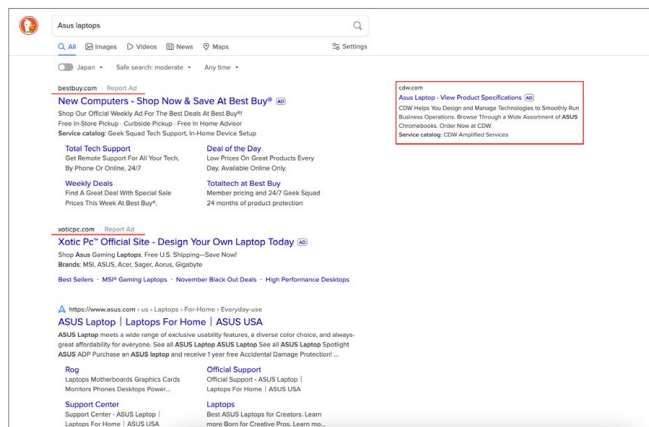
In the early 2000s Google. It proved me wrong. Very wrong. The DuckDuckGo designers have put a lot of thought into usability, and it really shows. The interface is aesthetically pleasing, with a clean and simple layout that doesn't try to reinvent the wheel.

Make no mistake, DuckDuckGo has a similar feel to Google (but then again, so do all modern search engines). Elements such as ad placements and knowledge panels are ripped straight from Google. This isn't necessarily a knock on DuckDuckGo, however. The engine's "if it ain't broke, don't fix it" approach to design works perfectly well.

They've even cleaned it up a bit and added some welcome changes. For instance, DuckDuckGo doesn't split results across pages. Rather, when you reach the bottom of a page, you can just click "See more results" in an endless scroll. This is a minor tweak, but it felt better than clicking back and forth through pages and pages.

3. YES, YOU CAN ESCAPE FROM ADS

This kind of goes along with the first point on this list: Since DuckDuckGo doesn't track your browsing history, it cannot provide you



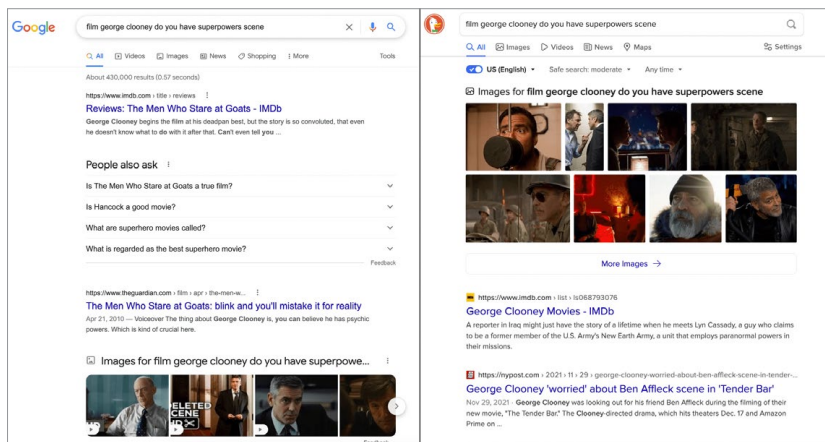
Ads along the top and right side can be seen after a search (highlighted in red to make my point).

with targeted personalized ads.

As you use its services, Google creates a profile on you based on personal data, such as your search habits and purchasing history. It then applies this data to ad targeting, leading to highly specific ads popping up on seemingly every website you visit.

For example, when I searched Google for stuffed toys to buy for my young nephew's birthday, every website I visited for the next few weeks kept showing me Pokémon plushies in their banner advertisements. Google does allow you to control the personalization of ads under Ad Settings ([fave.co/3OBxCRC](https://www.google.com/settings/ads)), but the onus is on users to make the adjustments themselves.

I had none of those plushie advertisement hauntings while using DuckDuckGo. When I searched for something, the results page would show only a few related advertisements



Google shows it on the first hit. DuckDuckGo, not so much.

along the right side or above the first results. These ads were only relevant to what I was searching, and never followed me around while browsing other websites. In fact, while using DuckDuckGo, I noticed fewer advertisements in general. In a day and age when we're constantly bombarded with flashing ads and pop-ups, this made for a really pleasant browsing experience.

4. YOU'LL TRADE SOME SEARCH SMARTS FOR PRIVACY

Google is great for finding things I just can't quite remember. I enter a few random facts that I do remember, and it will usually give me the answer. When I tried these same types of searches with DuckDuckGo, it just didn't have the algorithms (or data?) to deliver.

In the screenshot below, you can see that I was looking for the name of a movie (*Men Who*

Stare at Goats) based on a random scene. Since I didn't know the movie's name, I instead searched using "film george clooney do you have superpowers scene." Google returned the movie I was looking for on the first result, while DuckDuckGo simply couldn't find it. Now this is a rather specific example, but users have come to rely on Google delivering great results with relatively sparse inputs.

Of course, one of the main reasons Google is so effective is that it collects and stores user data, and then tailors it for personalization. Without tapping into a massive library of contextual data, DuckDuckGo will continue to fall behind Google in returned result accuracy.

5. I REALLY MISS GOOGLE MAPS

After exclusively using DuckDuckGo for a week, I can say that I officially miss the way

Google search seamlessly hooks into Google maps. Sure, DuckDuckGo has a maps feature provided by Apple, but it isn't the same. Just like when I'm using an iPhone, I prefer to use

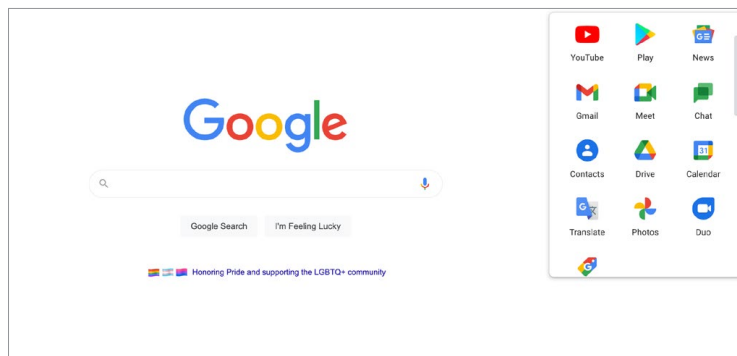
Google Maps rather than the pre-

installed Apple Maps. It just feels better in terms of the available data and its reliability.

Something else I missed is direct access to the entire Google ecosystem. Both in my personal and professional life, I have come to rely on Google apps such as Drive and Google Workspaces. Google has done a great job connecting all of its features seamlessly together. Not being able to integrate these with my search engine experience felt like I was missing a piece of the puzzle.

WILL I SWITCH TO DUCKDUCKGO PERMANENTLY? AND SHOULD YOU?

Should you switch to DuckDuckGo? It depends on what you want from your search engine. Do you value privacy above all else? Then go ahead and make the switch. Do you want the most accurate results and most advanced features? Then you'll want to stick with Google.



The Google ecosystem offers a wide variety of features.

As for me, I plan to continue using DuckDuckGo. I'm a jaded millennial and I grew up in the age of internet data tracking. I had long ago accepted that my privacy would be sacrificed for more accurate results. But what I found from this little experiment was that for the most part, what we're all searching for online is pretty simple and straightforward.

While Google is able to accurately guess what you're looking for, a bit more hand-holding is required with DuckDuckGo. This doesn't mean that DuckDuckGo can't find what you're after. It just means that you may have to modify your search parameters. The streamlined Google web browsing I've become accustomed to via cookies, auto-fill, and personalization are of course a convenience. But without these bells and whistles, the results are largely the same.

And I figure, if the results are the same, why not err on the side of privacy? 🔌

A woman with short grey hair and a gentle smile, wearing a blue textured sweater, is the central figure of the advertisement. The background is a soft, out-of-focus indoor setting.

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**NEVER GIVE UP
UNTIL THEY BUCKLE UP.**



VISIT SAFERCAR.GOV/KIDSBUCKLEUP





THIS HANDY
GUIDE WILL
HELP YOU
UNDERSTAND
ALL OF THE
LAPTOP PORTS,
PAST AND
PRESENT.

BY SAM SINGLETON

LAPTOP PORTS EXPLAINED: EVERY SYMBOL AND CONNECTOR IDENTIFIED



Modern laptops come with a dizzying array of ports—or maybe only one. But how can you know what they all do or what you might want in a new system? Below we explain every single laptop port, past and present, along with providing photos to help you identify their symbols.

Usually located along the sides or back of a laptop, these ports help expand functionality and provide connection points for input devices, external drives, networking, and more. Understanding these ports and knowing which of your peripherals will connect easily—and which will require adapters—will help you make better-informed decisions when looking for the perfect laptop to suit your needs.

In our coverage of the best laptops you can buy today (fave.co/3qL4oHf), we're careful to note which ports are available.

AUDIO JACK

The 3.5mm audio jack, also known as a headphone jack, is the most common

audio port on modern laptops. Along with inputting and outputting audio, it also allows for connections to the majority of wired headphones and speakers. Some older laptops have two audio jacks that split mic and audio, but current models use the same port for both.

Some laptop manufacturers have opted not to include the audio jack in recent models. If this is the case, you will need a USB wireless dongle to connect to your wireless headphones and speakers, or you'll need to connect via Bluetooth if your audio gear supports that. Conversely, many wired



Audio jack laptop port.

headphones work via USB rather than via analog 3.5mm jacks, and those could also be an option. If you only have wired 3.5mm headphones but no 3.5mm audio jack in your laptop, you'll need to get a USB or USB Type-C to 3.5mm adapter.

DISPLAYPORT/ MINI DISPLAYPORT

DisplayPort is a digital display connection used to output video and audio from your laptop to a video display, such as a monitor. While some TVs come with DisplayPort connections, it is more commonly found on PCs and PC monitors. Originally designed to replace VGA and DVI connections between computers and monitors, it has become the most advanced display connection available on laptops today.

The latest iteration is DisplayPort 2.0, released in 2019, which has an increased bandwidth up to 77.37Gbps. Unlike other connections, DisplayPort allows multiple monitors to run off a single connection.

Additionally, DisplayPort supports both AMD's FreeSync and Nvidia's G-Sync technology, allowing for so-called "tear-free gaming" (fave.co/3OhPdOu) (so long as your monitor supports these technologies as well). Each iteration of DisplayPort has seen improvements in data rate as well as higher resolution and higher refresh rates:



Mini DisplayPort laptop port.

DisplayPort 1.2: Supports up to 4K resolutions at 60Hz

DisplayPort 1.3: Supports up to 4K resolutions at 120Hz or 8K resolutions at 30Hz

DisplayPort 1.4: Supports up to 8K resolutions at 60Hz and supports HDR

DisplayPort 2.0: Supports 16K resolutions (with HDR) at 60Hz and 10K resolutions (without HDR) at 80Hz

Most laptops nowadays use the smaller, mini DisplayPort connection or use USB Type-C ports to send out DisplayPort signals. Unlike regular DisplayPorts, mini DisplayPorts will need a multi-stream Transport (MST) hub to output to more than one display.

DVI

DVI (Digital Visual Interface) is used to connect a video source, such as a laptop, to a display, such as an external monitor. It was



DVI laptop port.

developed in the late 1990s with the aim of replacing analog VGA technology with lossless digital video.

While it's not such a common port on modern laptops, it is still found on many external monitors with full-HD resolutions or lower. A single DVI connection can output up to UXGA 1920×1200 resolutions at 60Hz but needs a special dual-link DVI connection to output at higher resolutions.

DVI is often your best option to output video from your laptop to external budget displays that lack more-recent connections such as HDMI or DisplayPort. One thing to note, however: DVI connections only support video signals and do not output audio. If you have a laptop with no DVI port, but you want to connect to an external display using DVI, you will need an HDMI-to-DVI or DisplayPort-to-DVI cable.

ETHERNET

Ethernet ports allow laptops to connect directly into wired networks. While Ethernet ports are becoming less common on laptops due to the proliferation of Wi-Fi, a wired connection via Ethernet is still the most reliable way to connect to high-speed internet. In areas where wireless signals may be weaker, Ethernet allows you to overcome this through a direct physical connection.

Today's Ethernet is also known as Gigabit Ethernet, meaning the connection speeds are rated at 1Gbps or higher. Ethernet connections are rated by Category (or Cat) type, and the latest Cat 8 standard connection allows for max speeds of up to 40Gbps while maintaining backward compatibility with older category types.

Many newer and slimmer consumer laptop models no longer have Ethernet ports,



Ethernet laptop port.

but they can still be found in many business laptops. If your laptop doesn't have an Ethernet port built in, you can purchase a USB-to-Ethernet adapter, or alternatively you can use a docking station.

HDMI

HDMI (High Definition Multimedia Interface) is the most common way to connect your laptop to a video display or home entertainment device. Many TVs, external computer monitors, and projectors also have HDMI ports. HDMI connections can transfer both high-definition video and audio digitally from your laptop to an external display.

Over the years, several versions of HDMI have been rolled out, and despite their differences in capabilities, the physical ports themselves have remained the same between versions. The latest version, HDMI 2.1, released in 2017, allows for a 48Gbps transmission bit rate and supports 4K resolutions at 120Hz or 8K resolutions at 60Hz.

HDMI 2.1 also offers backward compatibility, meaning it can be used with HDMI ports on older devices without the new 2.1 features.

Due to HDMI's widespread use, many inexpensive adapters are available to connect HDMI and other ports, such as DVI and USB Type-C.



HDMI laptop port.

HDMI cannot output to dual displays from a single port, and some laptops are now sold with mini HDMI ports, meaning you will need an adapter if you wish to use them with regular HDMI (pictured above).

KENSINGTON LOCK SLOT

Also known as a K-lock or K-slot, Kensington Lock Slots are small, reinforced holes commonly found on laptops that are used to



Laptop lock slot.

attach a physical security lock to your device. It was implemented in consumer laptops beginning in the year 2000. Depending on the laptop model, this lock slot can be found on either the side or the back of your laptop.

While many laptops have a Kensington lock slot built-in, they seldom come with the cable locking mechanism itself. Using a compatible cable lock inserted into the lock slot, the other end of the cable can be attached to a secure location, thereby anchoring the laptop and preventing theft. The lock slot is often marked with a small lock icon next to the opening.

SD CARD READER

The SD card reader slot is primarily used to read memory cards from digital cameras. SD Cards can be hot-plugged and hot-swapped, meaning you can insert and remove them without restarting your laptop. Data transfer speeds vary widely, and depend on what SD cards the reader supports.

UHS-III SD Cards can theoretically transfer data at rates of up to 624Mbps, but if your SD reader only supports the earlier UHS-I version, you will only be able to transfer your data at the maximum UHS-I speed of 104MBps.

SD card readers are not available in all laptops, and as modern laptops have



SD Card Reader laptop port.

become thinner, they are being phased out. However, you can still find new laptops built for photo and video editing (fave.co/39LsbRb) with SD Card Reader slots installed. If your laptop does not have an SD card reader slot, you can easily buy an inexpensive USB adapter.

MICROSD CARD READER

MicroSD cards and card readers were introduced by SanDisk in 2005 to



microSD Card Reader laptop port.

accommodate smaller memory cards in mobile phones. Similar to the larger SD card reader, the microSD card reader can read the smaller memory cards now most commonly used for external storage in smartphones. MicroSD cards are also hot-pluggable and hot-swappable, just like the larger SD cards.

Laptops with limited onboard storage, such as some Chromebooks (fave.co/3HbcehN), sometimes utilize microSD cards for additional storage capacity. Every year the storage size of SD and microSD cards increases, with the current largest available consumer models sitting at 1TB.

MicroSD cards are electrically compatible with large SD cards and, with the help of a simple adapter, can be used in laptops that accept SD cards as well. If your laptop does not have a microSD card reader or an SD card reader, you can use a USB adapter.

USB

USB (Universal Serial Bus) is the most common expansion port on modern laptops and dates back to 1996. It typically has a rectangular shape and connects to a vast universe of peripherals, such as keyboards, mice,

printers, and external hard drives. USB ports come in a variety of different types, and each has its own distinctive functionalities and characteristics.

USB Type-A is the original 4-pin connector and is differentiated by its generations. Each subsequent generation saw an improvement in both power management and data transfer



USB 2.0 laptop port.



USB 3.0 laptop port.

speeds. All newer generations are backward compatible with older generations.

USB 2.0 is usually distinguished by black or gray port colors and offers data transfer speeds of up to 480 Mbps.

USB 3.0 (now known as USB 3.1 Gen 1) usually sports blue- or turquoise-colored ports and can reach a theoretical maximum transfer rate of 5Gbps, which is 10 times faster than USB 2.0.

The latest standard of USB Type-A ports is USB 3.1 Gen 2. It looks the same as USB 3.1 Gen 1 but provides a significant increase in data transfer rates of up to 10Gbps.

Unlike Type-A, USB Type-B ports and connectors are square-shaped. They are not commonly found on laptops, but many printers, scanners, docking stations, and hubs use these as an input port. While adapters are available, most USB Type-B cables already come with a USB Type-B connector on one end and a USB Type-A on the other.

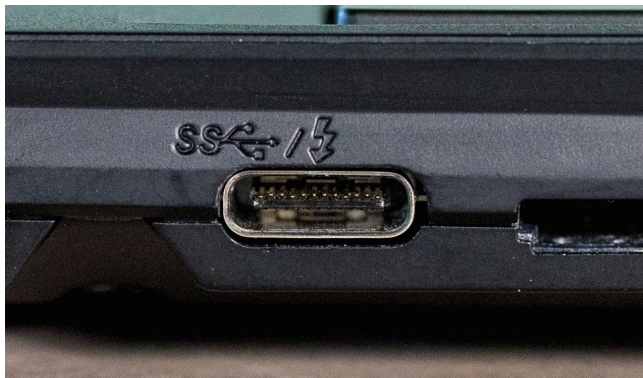
USB TYPE-C

USB Type-C is the newly adopted standard connector for most modern laptops and devices, and deserves its own distinct place on this list due to its unique functionality. Owing to its small and narrow footprint, the USB Type-C port can fit on most ultra-thin laptops

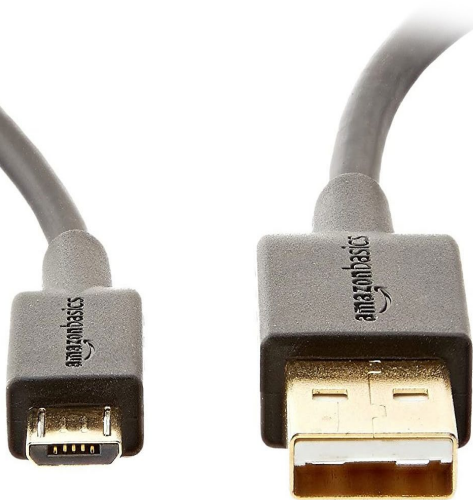
being manufactured in today's market. This, along with the fact that USB Type-C can accept Thunderbolt connections in the same port, gives it the edge over other USB types.

USB Type-C ports can support a variety of different standards. Unlike the rectangular-shaped Type-A with a 4-pin connection, the USB Type-C comes with a 24-pin connector allowing it to handle higher currents and faster transfer speeds. The ability to handle higher currents allows for devices to charge in less time using a Type-C connection by providing up to 100W of power.

Furthermore, Type-C devices can support USB 3.1 Gen 2 transfer rates of 5Gbps. If it doubles as a Thunderbolt port (a feature recognizable by the lightning bolt icon next to the port), Type-C connections can even produce lightning-fast speeds of up to 40Gbps. Furthermore, it can allow for video-out DisplayPort signals if equipped with alt-mode functionality.



USB Type-C laptop port.



Micro-USB cables.

Adapters are readily available for connections between USB Type-C and other USB types. While these connections are backward compatible, they will reduce the functionality and transfer rates between USB types.

MICRO-USB

You're not likely to see the micro-USB port (and the slightly larger mini-USB port) in modern laptops, but they can still be found in many peripherals and accessories. In fact, not a single laptop in PCWorld's vast inventory of machines is equipped with this port, so we're using a photo of a micro-USB B cable instead.

Micro-USB is generally used for legacy smartphones, low-power tablets such as

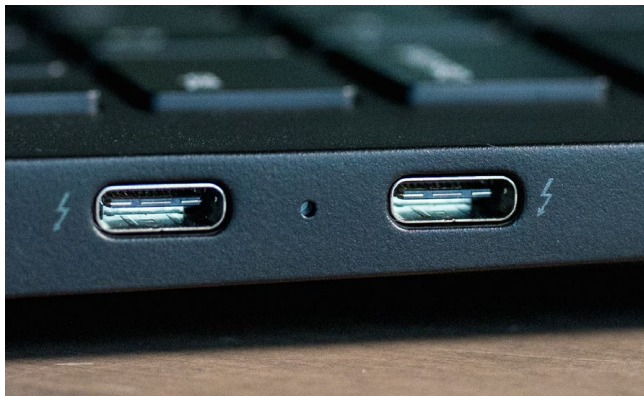
Amazon Kindles, some external hard drives, and random electronic devices. They most often support USB 2.0 speeds of up to 480 Mbps, but occasionally support USB 3.0, and micro-USB connections can be used interchangeably in both supported ports. USB Type-A and Type-C to micro-USB adapters are available if you wish to connect your supported device to a laptop without a micro-USB port.

THUNDERBOLT

Thunderbolt is the fastest connection available in today's market. It combines PCIe, DisplayPort, serial signals, and DC power altogether in one port. This allows the Thunderbolt connection to be deployed for a variety of purposes, ranging from peripheral connections to laptop power charging. Thunderbolt ports can often be identified by a small lightning bolt icon next to the port.

The latest versions, Thunderbolt 3 and Thunderbolt 4, can transfer data at a blazingly fast rate of 40Gbps, which is four times faster than the USB 3.1 generation 2. Even legacy versions such as the original Thunderbolt have transfer rates as high as 10Gbps or Thunderbolt 2 at 20Gbps.

A single Thunderbolt 3 or 4 connection is also capable of outputting to two 4K monitors at once, thanks to its usage of dual DisplayPort signals. Some newer external graphics cards even come equipped with Thunderbolt ports, allowing the connection



Thunderbolt laptop port.

of laptops for high-end gaming.

From Thunderbolt 3 onward, the port uses USB Type-C connections and therefore can double as a USB Type-C port. Thunderbolt and Thunderbolt 2 ports use mini DisplayPort connections, so you will need an adapter if you wish to attach any legacy Thunderbolt devices you have to Thunderbolt 3 or higher ports.

VGA

VGA (Video Graphics Array) is a legacy analog video port dating back to 1987. It is the main interface between computers and older CRT monitors and even more modern projectors. Since

it is analog, VGA is susceptible to signal degradation over longer cable distances and only has a maximum resolution of 640×480 with a 60Hz refresh rate.

Due to the larger size of the 15-pin VGA port and the increase in the use of digital video, these ports are mostly being phased out. Laptop manufacturers are producing

slimmer laptops nowadays and using HDMI or DisplayPort connections in place of VGA. While you cannot convert VGA to any other display standard (HDMI, DVI, DisplayPort), you can convert any of them to VGA (with a subsequent drop in quality) by simply using the proper cable or adapter. 🖱️



VGA laptop port.



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I think it's just vapor. It won't hurt my kid like cigarettes, right?

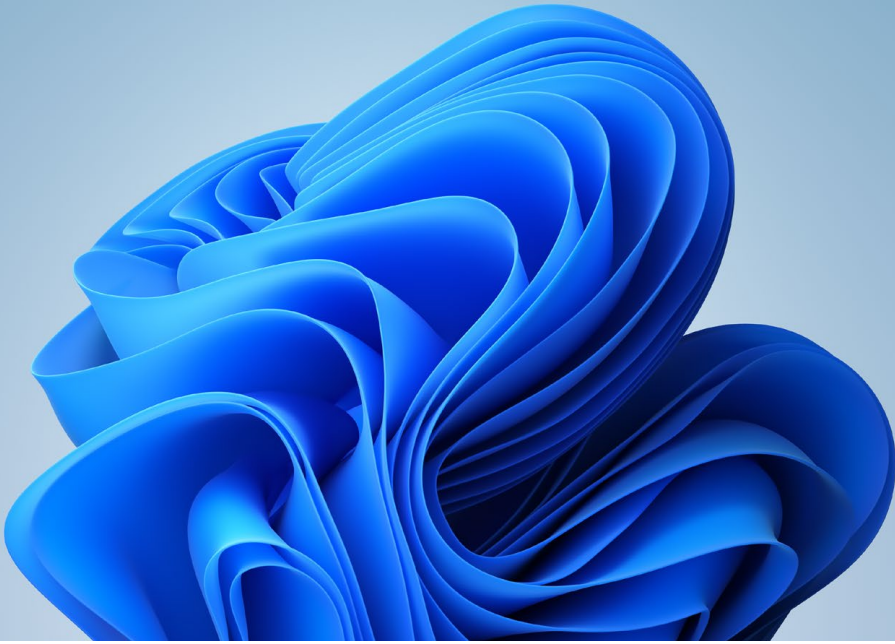
The vapor that's inhaled from e-cigarettes contains harmful chemicals that can cause irreversible lung damage.

And e-cigarettes have nicotine, a toxin that's addictive and can change your kid's brain. Those are the facts.

Talk to your kid about vaping. Get the facts at

TalkAboutVaping.org

**GET YOUR HEAD
OUT OF THE CLOUD**



10 little-known Windows features that will blow your mind

These quick tips will help you save time and get organized. **BY MICHAEL CRIDER**

Even if you've been using Windows for decades, it's big and complex enough that there might be features that can still surprise you.

We've tracked down ten little-known Windows tools and tips that might just improve your efficiency, your comfort, or possibly even your fun while using your PC.

Here they are, in no particular order. All of them should work on both Windows 10 and 11. If you're looking to go even further down this rabbit hole, check out our roundup of 10 truly helpful

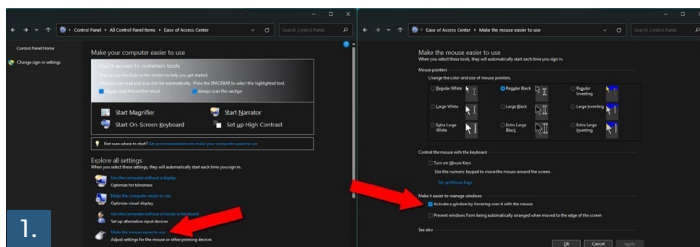
Windows tools you might not know about (fave.co/3yjdj8ID) and how to tune Windows for laser-focused productivity (fave.co/3ObQCGD).

1. CURSOR HOVER WINDOW ACTIVATION

Whenever I use a new PC, this is the very first feature I enable. Technically it's part of the accessibility tools, but many users might find it useful no matter what their level of mobility. This setting allows you to activate a window by moving your cursor over it, instead of requiring

an extra click before interacting with the program. It's a tiny change but makes a big difference, especially on a laptop trackpad.

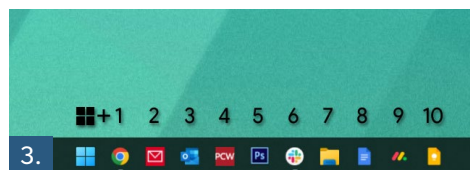
To change this setting, go to Control Panel, then click the Ease of Access Center. Click "Make the mouse easier to use." Under "Make it easier to manage windows," select "Activate a window by hovering over it with the mouse." Click Okay to enable the setting.



2. EASY WINDOW ARRANGEMENT

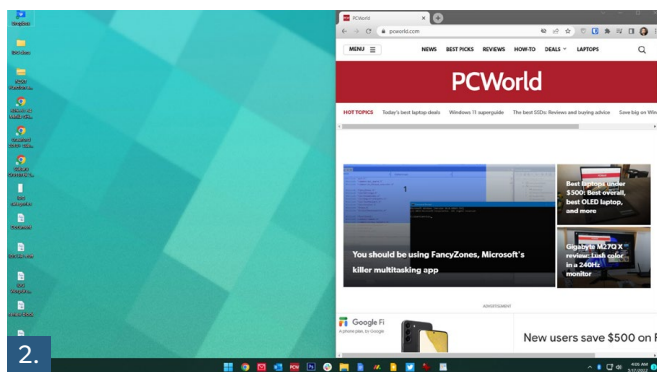
With newer versions of Windows, it's easy to move windows (sorry) around your screen. Hold down the Windows key on your keyboard, then press the arrow keys. Pressing left or right will instantly move the window to the corresponding half of the screen. Pressing up or down will alternate between halving the

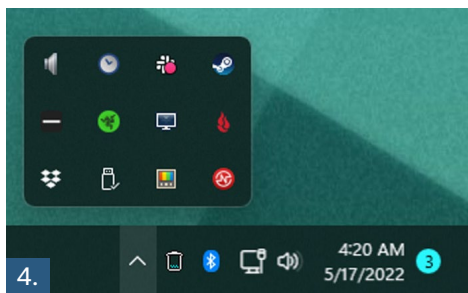
window in the upper or lower portion of the screen, maximizing it, or minimizing it to the toolbar. These shortcuts even work across multiple monitors. It's a great way to quickly arrange your windows across screens and monitors with minimal effort.



3. QUICK TASKBAR LAUNCHING

If you want to quickly manage windows, you probably pin your most-used programs and tools to the taskbar. If you want to get at them even faster, simply hold down the Windows button and press the number on your keyboard that corresponds to their spot on the taskbar. On mine, opening Chrome is Win + 1, opening Photoshop is Win + 5, and so on.





4. REARRANGE YOUR SYSTEM TRAY

Speaking of the taskbar, the system tray (the little mini-icons on the right side) can often get crowded if you're using a lot of software. That's doubly true if you run a lot of programs at startup. But if it's cluttered, you don't have to keep it that way. Click and drag any of the icons around to rearrange them. You can put them in the drop-down menu to hide them (just click the arrow to

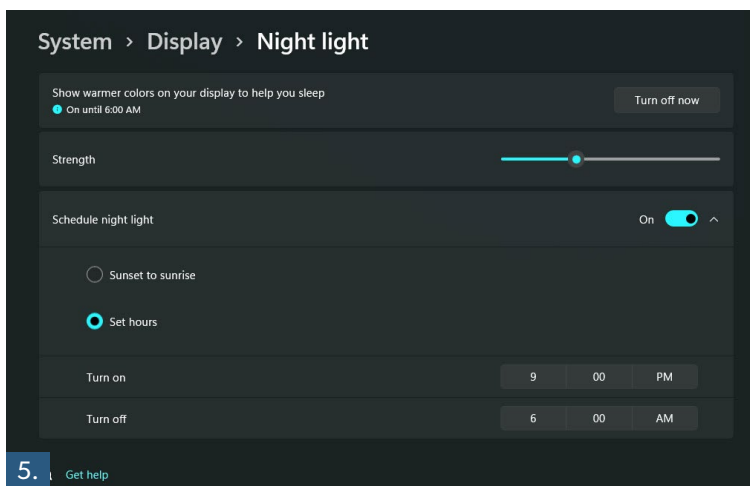
show them again), or set them to the right to make them permanently visible.

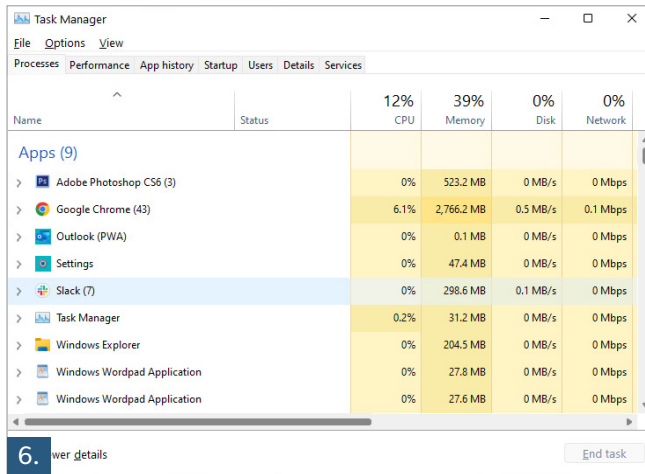
5. NIGHT LIGHT

Those of us who have less than healthy computing habits tend to use our PCs late into the evening. You should probably cut it out, but if not, using the built-in night light feature couldn't hurt. Simply search the Start menu for "Night light" to find the setting that will dim your computer's screen and lower its blue light output. Once it's set up, you can toggle this anytime in the quick settings menu (Win + A) or have it turn on and off automatically at specific times of the evening and morning.

6. INSTANTLY BRING UP THE TASK MANAGER

This is an old trick, but with the expanded functions of the Task Manager in Windows 10 and 11, it's become more useful. From any screen in any program, press Ctrl+Shift+Escape to open the Task Manager. From here you can manually close programs, quickly access the Run

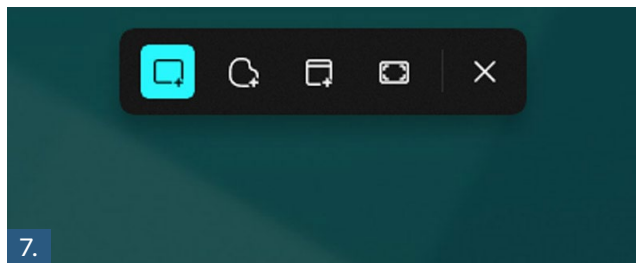




command, or click the Startup tab to track down programs that are sneaking along with Windows.

7. SCREENSHOT TRICKS

If you haven't done so yet, you really need to start using the official (but obscure) Windows Snipping Tool (fave.co/3HGUT24), which expands the operating system's rather basic screenshot tool (tied to the Print Screen button) with all sorts of new goodies. Press Win + Shift + S simultaneously to see options



to instantly screenshot your entire workspace, just one window, or a freeform selection drawn with your mouse. Your screenshot is then copied and ready to be pasted into a web form or image editor.

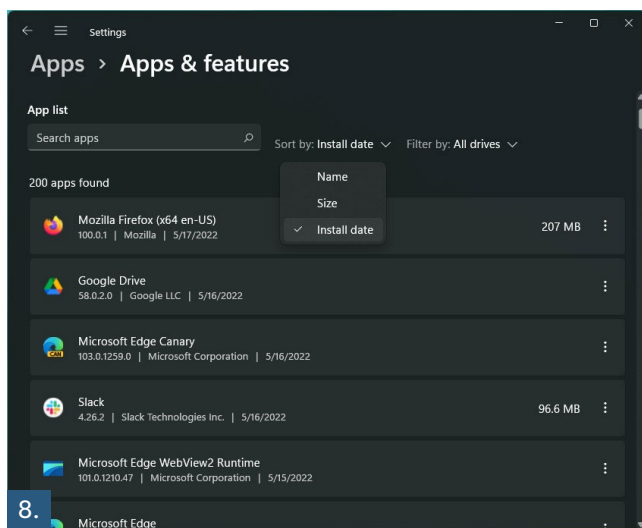
In a hurry? You can still access the old screenshot functionality (which saves a full image file in your Pictures > Screenshots folder) by pressing Win + Print Screen.

Alternately, you can copy the full screenshot instead with Ctrl + Print Screen, or copy a selection of just your currently active program with Alt + Print Screen.

8. SEARCH BY MOST RECENTLY INSTALLED PROGRAMS

One of the smallest changes in Windows that I've gotten the most use out of is this tweak to the way you search through programs for uninstallation. It makes it easy

to find the most recent program you installed, and get rid of it if you want to. Press the Windows key, search for "Add or remove programs," and click it to open the Settings menu. You'll see a list of every



program installed on your computer.

In previous versions of Windows, you'd have to hunt through this long list alphabetically. Now you can search for it, but what if it's not listed under the same name? Just click Name, then "Install date." The list is now in reverse chronological order, showing your most recently installed programs. Click the three-dot menu on the right to get rid of any entry. Super easy!

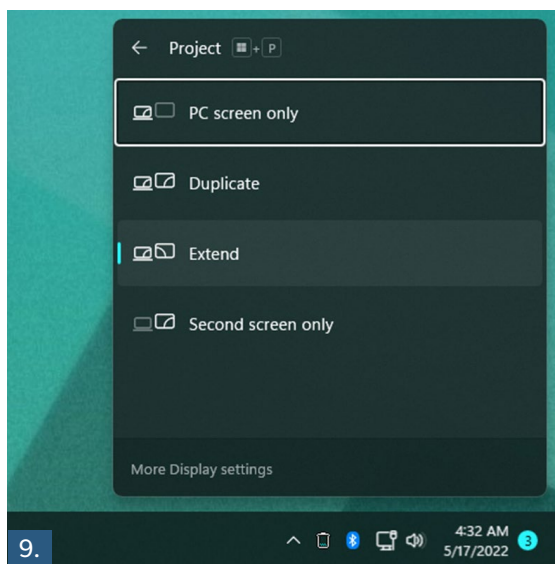
9. QUICKLY CONNECT TO NEW SCREENS

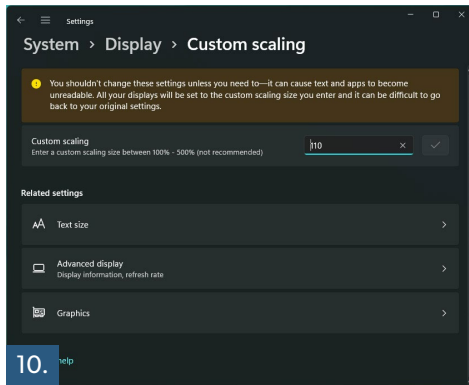
Most of the time Windows will automatically enable a new monitor or screen when you plug it in. But if it doesn't, there's a quick way to adjust

your display setup. Just press Win + P to open the Project menu. From this pop-out you can select Duplicate (mirror your primary screen to your secondary), Extend (use more than one screen at once), or Second screen only (handy for using just a monitor and not your laptop screen).

This menu is great if you're using a multi-monitor setup and you want to quickly disable secondary

screens, such as for watching a movie or playing a game, then enable them again when you're done without diving into menus.





10. ADJUST TEXT AND ELEMENT SIZES


You probably know that you can adjust the size of what you see in Windows by changing your resolution. But unlike in the days of CRTs, your laptop screen or monitor has a very specific resolution it's meant to run at. Changing that value isn't a great idea; it can result in a stretched or pixelated image, and video won't look its best.

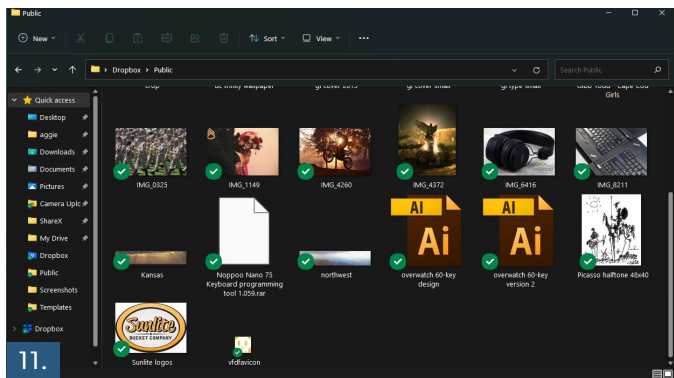
Instead of changing the resolution, go to Display Settings, scroll down a bit and change the Scale setting. This can make text and images look bigger or smaller on your screen without changing the resolution of the image itself. Preset values come in 25 percent increments, but you can set a custom value if you prefer (with a system reset). There's also an option that will adjust just the text size.

Many programs come with their own scaling and text settings, especially text-heavy apps like browsers and text editors. Tweak them to your liking to find the most comfortable combination.

11. QUICKLY ADJUST ICON SIZES IN EXPLORER

If you need to see icons better in an Explorer window specifically, try this quick trick. Hold down the Ctrl button and scroll your mouse wheel up and down. Thumbnail images will get bigger or smaller in response. Scroll far enough and the view will actually change from thumbnails to lists with mini-icons. This works even on the Windows desktop, with no Explorer window in use.

Explorer isn't the only program to use the Ctrl + mouse wheel shortcut to change the view. Browsers, email clients, image editors, and text editors often use it to zoom in or out or quickly change text scaling. It's a common tool worth learning. 



iDrive quietly made a great local backup tool, and it's free

Here's how to make regular backups to an external drive without paying a penny.

BY JARED NEWMAN

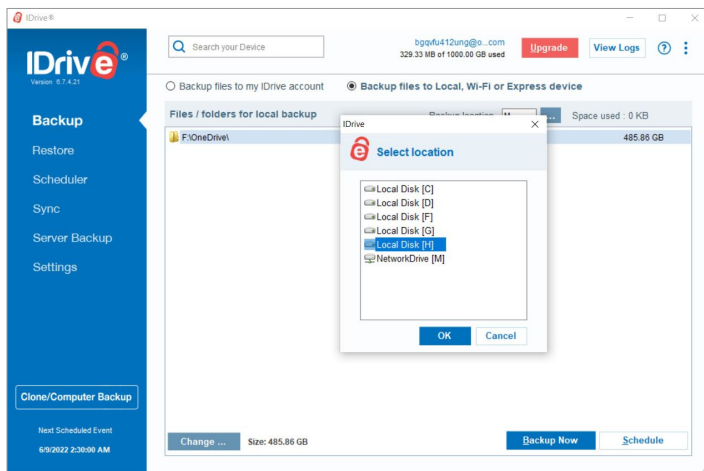


Oddly enough, one of the best ways to back up your data to an external hard drive comes from a cloud storage company. I'm referring to iDrive (fave.co/3QEr2vq), which offers a free local backup utility inside its Windows and Mac apps.

While iDrive is better-known for offering cheap cloud storage (fave.co/3HQAasY), its local backup tool doesn't require a

subscription and is only limited by the amount of space on your storage drives.

Although I personally still prefer Microsoft OneDrive as my cloud storage service—mainly because of its tighter Windows integration and bundling with Microsoft 365—iDrive's local backup tool is a straightforward and effective way to make copies of your important data onto storage drives that you have control of. Here's how to use it.



Selecting a backup drive in iDrive.

SETTING UP iDRIVE

iDrive requires an account to use its Windows and Mac apps, but you can just use iDrive's free tier (with 10 GB of cloud storage) to access the local backup tools.

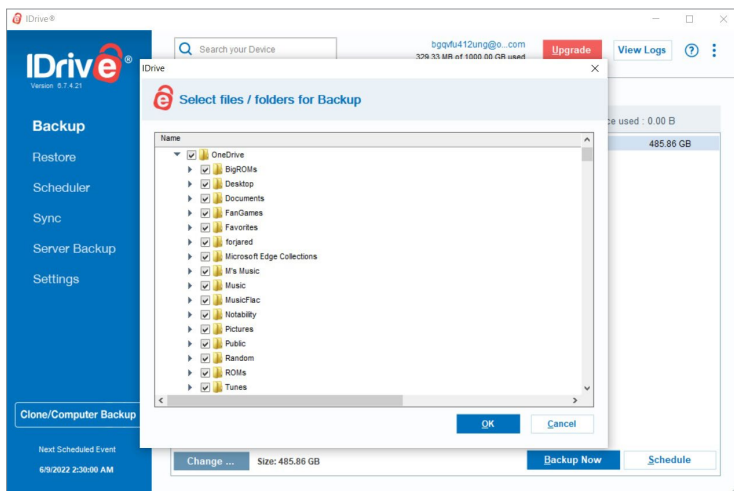
Create your free account (fave.co/3HKroN9) first, then use it to log in after installing the iDrive desktop app (fave.co/3QErpWQ).

When you first launch the iDrive app, you'll be looking at the Backup tab, and the

default option will be "Backup files to my iDrive account." If any of your folders are listed in this section, right-click and select "Remove all items" so that iDrive doesn't attempt to store your files in the cloud.

Next, click the button for "Backup files to Local, Wi-Fi, or Express devices."

Directly beneath this button, click the ellipsis (...) next to "Backup location," then choose your external drive from the list. (If you don't have an external drive already, PCWorld has some



Choosing folders to back up in iDrive.

recommendations
[fave.co/3n5NIMC].

Now it's time to choose which computer folders you'd like to back up. Near the bottom of the iDrive app, click Change, then check off all the storage drives or folders you want to include. They should now appear under "Files / folders for local backup."

Once everything's ready, click "Backup Now" to make your first backup. This can take minutes, hours, or even days depending on how much data you're storing and the speed of your external drive, so be patient.

SCHEDULING ROUTINE BACKUPS

Backing up your data only works if you do it on a regular basis. To that end, iDrive also offers a scheduler for making routine backups automatically.

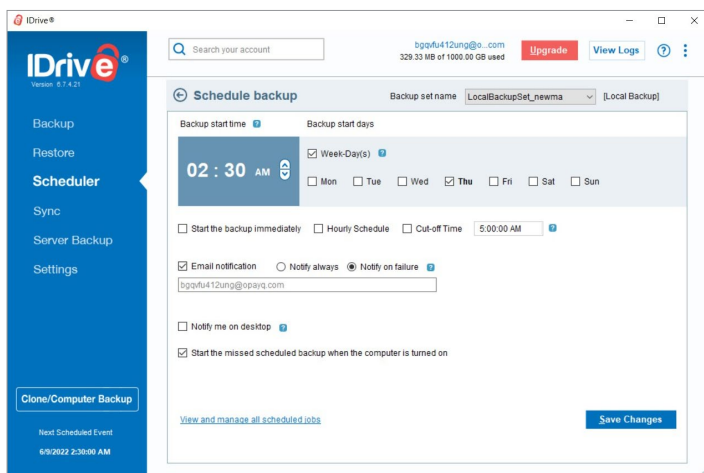
From the Backup tab, click Schedule, then check off the days of the week on which you'd like to run the backup, along with the time of day to start. With an always-on desktop PC, you'll most likely want to schedule the backup for the middle of the night. Otherwise, set it for a time of

day when your computer is likely to be up and running.

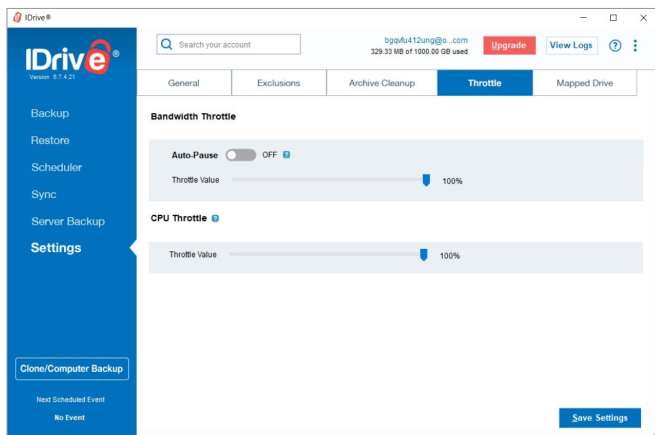
You can also set up email notifications to confirm that the backup succeeded (or failed), or get notifications through the desktop app. If your computer's off during the scheduled backup time, iDrive will resume it by default once the computer back on, but you can disable this if you wish. Click "Save Changes" to begin the schedule.

If you're not using iDrive's online backup service, you should also disable scheduled online backups from this menu. Select "Default BackupSet" from the drop-down list at the top, then uncheck the daily scheduling settings.

One last useful option to note: Under Settings, you can click the Throttle tab and set a limit on CPU use for your backups. That may



Scheduling a local backup in iDrive.



Throttling CPU in iDrive.

be helpful if you have a lightweight PC and the backup operation is hindering your work.

RESTORING YOUR DATA

Note that iDrive doesn't simply mirror your files onto an external drive. Instead, it creates an encrypted copy of your data, so if you navigate to the backup location in File Explorer, you won't find anything usable. To restore your files to their original, unencrypted form, you'll need to use the iDrive app's Restore function.

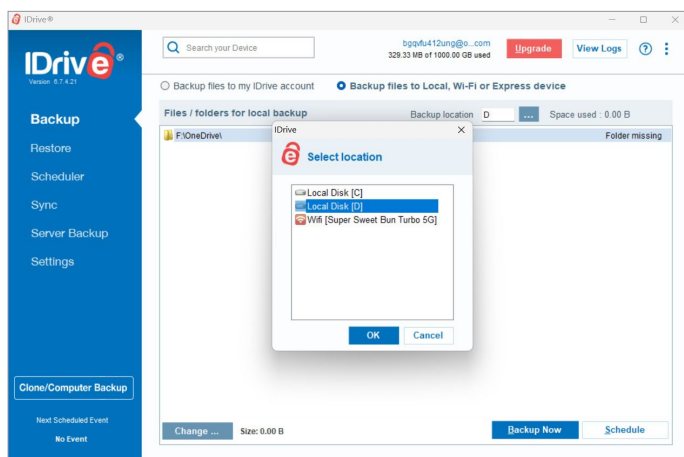
This is important: If you're restoring data to a different computer than the one that made the

backup, you must first head the Backup tab, click "Backup files to Local, Wi-Fi, or Express device," then select your external drive under "Backup location." Otherwise, you won't be able to find your backup data in the steps below.

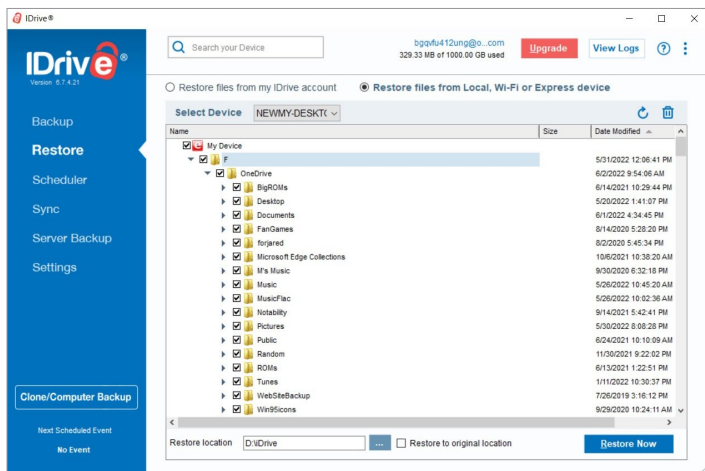
Now head to the Restore tab and select "Restore files from Local, Wi-Fi, or Express device." If you're on a new computer,

you need to use the Select Device box to choose the computer where you originally created the backup.

Check off the files you want to restore, and at the bottom of the app, choose where you want to restore them. You can



Selecting a drive to restore from in iDrive.



Restoring files in iDrive.

either select the original location or choose another destination on any drive connected to your computer.

Finally, click Restore Now to begin the process. As with the original backup, this can take a while if you've stored a lot of data.

OTHER OPTIONS

As I mentioned earlier, I personally use OneDrive as my main cloud storage service, and I have only been using iDrive for my local backups.

But if you aren't invested in a cloud storage provider already, iDrive's online service may be worth considering as an additional backup source. The iDrive Photos tier (fave.co/3NdFLuv) only costs \$10 per year (and \$1 for the first year), and in addition to backing up unlimited photos from your

phone, it can store up to 1 TB of data from your computer. That should be plenty unless you have a huge photo and video library. (The next step up is \$80 per year for 5 TB of cloud storage.) iDrive also provides a Sync folder separate from its main backup service, letting you easily access files across all your devices.

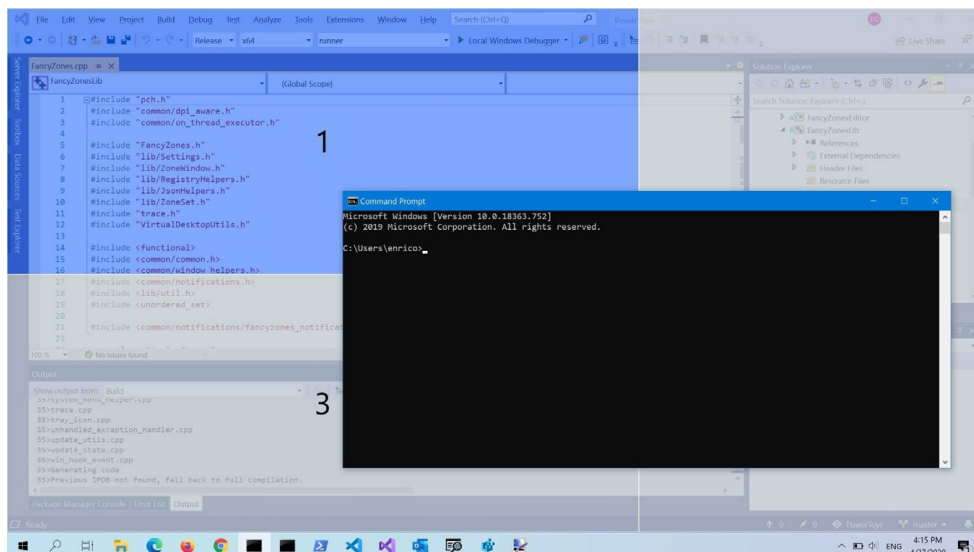
Of course, iDrive

isn't the only option for local backups.

Companies like EaseUS and Paragon also offer free local backup utilities, and Windows itself has an external drive backup tool built in.

But iDrive's software is more flexible than the built-in Windows option, and it doesn't have some of the limits that EaseUS and Paragon place on their free versions. (Both of them, for instance, require a paid upgrade to get status notifications for your backups, and EaseUS even limits backup speeds for free users.) iDrive also offers free disk-cloning tools that other companies charge for.

iDrive may be more generous with its local backup tools, perhaps because its business model revolves around selling cloud storage rather than packaged software. Still, you can use it to keep encrypted copies of your data without ever having to pay for it. 🔌



You should be using FancyZones, Microsoft's killer multitasking app

This free Windows add-on makes resizing windows so much easier. **BY JARED NEWMAN**

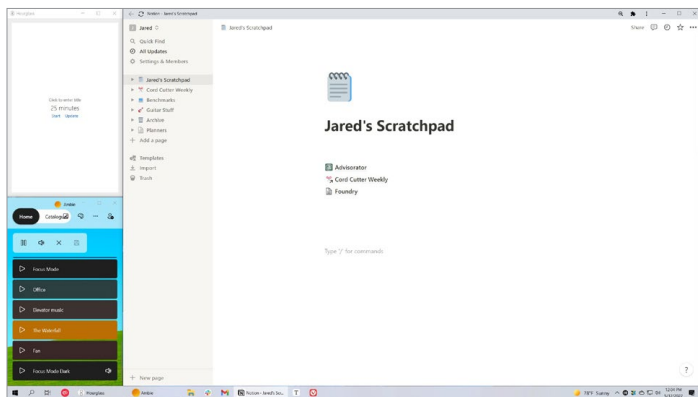
Every so often, a tool comes along that changes how you work and makes you wish you'd started using it sooner. For me, that tool is FancyZones (fave.co/3HgGulf), which is technically a feature of Microsoft's broader PowerToys app for Windows enthusiasts (fave.co/3OoQQKX).

FancyZones lets you drag and drop windows into customizable split-screen views so you can multitask more effectively. Just hold down Shift while dragging a window,

and you can instantly snap the window to a predefined portion of the screen.

While FancyZones has been around since 2019, when Microsoft first revived the PowerToys concept (fave.co/3n44Fl3), I initially dismissed it as too burdensome to set up. Only in recent weeks have I realized how powerful FancyZones can be once you get to know it.

Here's a screenshot of my go-to FancyZones layout, which I refer to as "widget mode":



My “widget mode” layout in FancyZones.

In this layout, most of my screen is occupied by the main app I’m using—usually Typora (fave.co/3blangj) for writing, Notion (fave.co/39FRjsj) for detailed notes, or Vivaldi (fave.co/39Mzhoz) for web browsing—but I reserve a narrow column for a pair of miniature apps. On top is Hourglass (fave.co/3n4NUqt), my favorite simple timer app, and at the bottom is an excellent ambient noise app, Ambie (fave.co/3Ozwg9O).

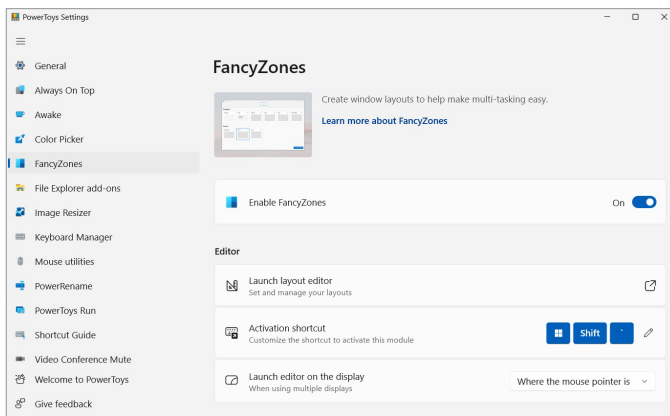
This setup has been a boon for productivity. While I write, I can launch a focus timer that stays in view, and I can quickly switch between background sounds or turn them off as needed. Even the improved Snap

function in Windows 11 (fave.co/3ybKU1F) would require a lot of fiddling to achieve this layout. FancyZones, however, lets me arrange all three windows in about three seconds. If this sounds intriguing, read on for how you can make FancyZones work for you.

HOW TO SET UP FANCYZONES

If you haven’t already, install PowerToys (fave.co/3n4OaFX) from the Microsoft Store (or from GitHub [fave.co/3QE9tLZ]). It’s available for both Windows 10 and Windows 11.

Next, launch the PowerToys Settings menu—you’ll find it by double-clicking the



The main settings menu in FancyZones.

app's icon in the system tray section of your taskbar—and head to the FancyZones tab. Make sure Enable FancyZones is toggled on.

To snap an app into one of the predefined zones, hold Shift while dragging a window. A few translucent panels should appear on the screen while you drag, and you can snap the window by dropping it over any panel. You can also hold Ctrl+Shift while dragging to stretch the window across multiple zones.

While you're in this settings menu, I suggest tweaking a few settings:

- Check the box for "Restore the original size of windows when unsnapping." That way you don't have to waste time resizing apps after moving them out of snap view. (Leave this unchecked if you end up using Canvas layouts, which I'll explain shortly.)

- Turn on Override Windows Snap and set "Move windows based on" to "Relative position." This allows you to use Win+Arrow keys to move windows between zones.

- If you're using a mouse, definitely check off "Use a non-primary mouse button to toggle zone activation," which lets you

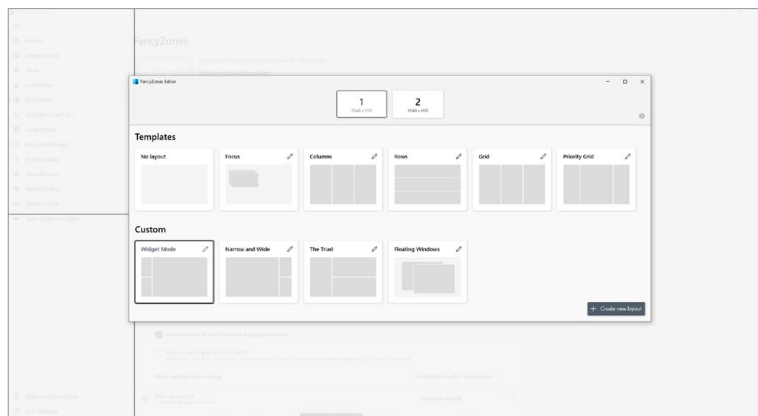
snap windows by holding the right mouse button instead of Shift.

CUSTOMIZING FANCYZONES

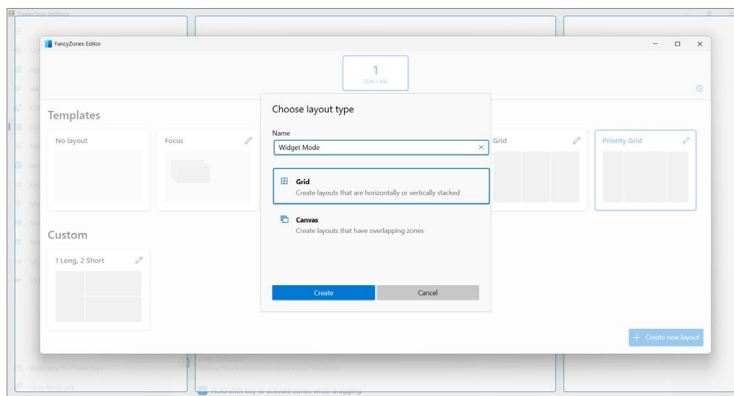
Now comes the fun part. Instead of sticking with FancyZones' default narrow-wide-narrow layout, you can choose from additional presets or create your own.

From the FancyZones settings menu, click on Launch Layout Editor, and you'll see a variety of templates. You can only have one active layout at a time, so click on the one you want to assign to the Shift key.

To create a new template, click the "+Create new layout" button in the bottom-right corner. Give your layout a name, then choose between Grid (which arranges windows in a tile view) or Canvas (which lets you snap free-floating windows into custom sizes).



Choosing a layout in FancyZones.



Creating a new layout in FancyZones.

The Grid layout screen is a bit confusing to navigate, so here's what you need to know:

- Click on any panel to split it into two smaller panels.
- Hold Shift while clicking to switch between vertical or horizontal splits.
- Drag the bar between any two panels to resize them.

• To recombine split panels, drag your cursor between them as if you were drawing a line, then select Merge Zones.

• The instruction box can't be dismissed during this process, but you can move it

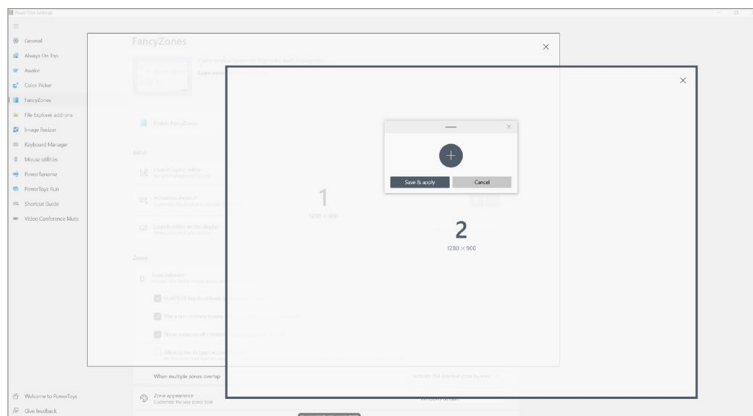
around. Click Save & Apply when you're finished.

Once you've set up your grid, click the pencil icon to modify it further. I suggest reducing the amount of space between zones, or, better yet, disabling the "space between zones" toggle

entirely to avoid wasting precious real estate. You can also click the blue pencil icon in this menu to modify the layout you've created.

Thankfully, the Canvas setup is simpler:

- Drag the middle of a window to move it.
- Drag the corners to resize it.
- Hit the plus (+) button to create a new window.



Creating a Canvas layout in FancyZones.

This can be useful if you want to quickly resize a free-floating window to a preset size. You can even have multiple window size presets as part of the same layout.

EXTRA LAYOUTS AND MULTIPLE MONITORS

Although FancyZones only lets you have one active layout at a time, you can use keyboard shortcuts to juggle multiple layouts.

To set this up, head back to the FancyZones settings menu and click on Launch Layout Editor. Hit the pencil icon above your favorite layout, then click the "Layout shortcut" drop-down menu. I suggest using "1."

Next, click the pencil icon for your secondary layout, and, in the "Layout shortcut" menu, choose a different number, such as "2." Repeat this process for however many layouts you want to use, assigning a different number to each.

Now, when you hold Shift to activate FancyZones, you can press "1" to switch to your favorite layout, "2" to switch to your secondary layout, and so on. You don't have to hold the number key the entire time; just pressing it will cause the active layout to switch.

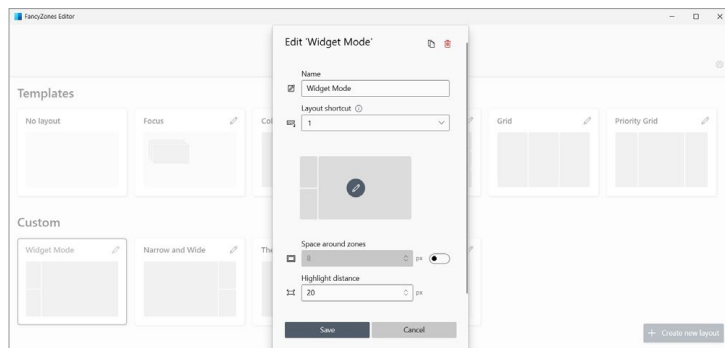
One last thing: If you have multiple monitors, each one can have its own layout. Just click your monitor at the top of the Layout Editor, then choose the layout you want to assign.

USE YOUR IMAGINATION

FancyZones only clicked for me when I started using it to leave miniature apps up on the screen. In addition to Hourglass and Ambie, I'll also occasionally use the space for Notepad, Calculator, or Plexamp (fave.co/3tUcQE9).

But you can also use FancyZones in all kinds of other ways. You might, for instance, give yourself a dashboard for

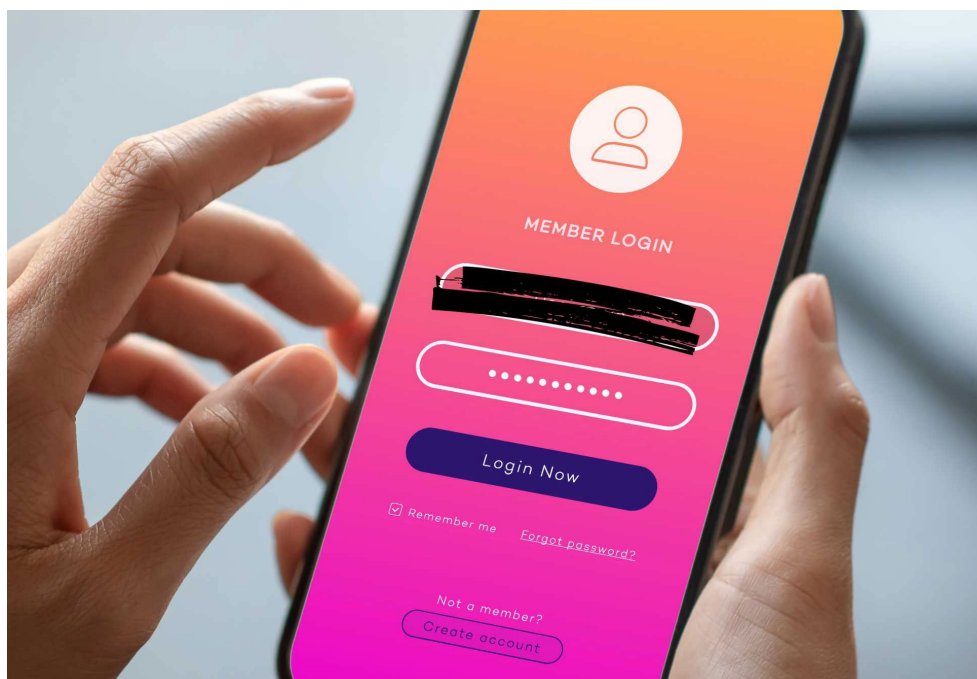
multiple messaging apps, or use it as a quick resize tool for floating windows. With a little experimentation, you might find that FancyZones changes the way you work as well—for the better. 🔌



Editing layout options in FancyZones.

What is masked email? This new spin on an old practice supercharges your security

Using unique login information is one way to make account takeovers harder for would-be criminals. Email masking adds another layer to that concept. **BY ALAINA YEE**



Online security used to be simple. All you needed was a good password, and in the early days, you didn't need a ton of characters to achieve that goal. Privacy also wasn't quite as fragile as it is today. Your

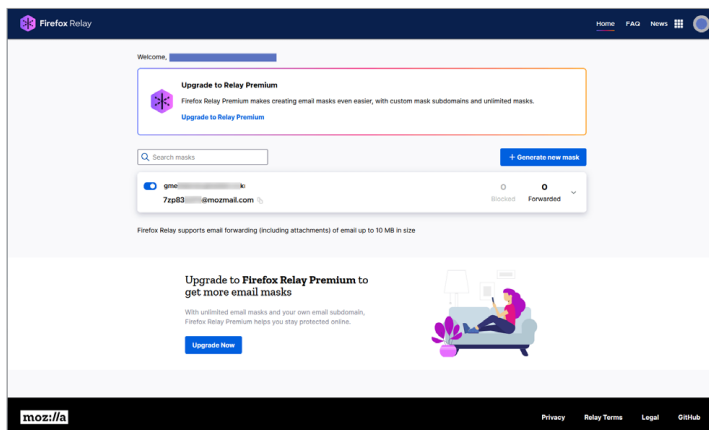
email wasn't constantly being lost to yet another data breach.

But as online hackers and criminals get more sophisticated, so have recommendations for best security practices. Currently experts recommend the use of

unique, random passwords ([fave.co/3IRkfRz](#))—and the more characters, the better—plus two-factor authentication as a strong baseline. But you can go further—and companies on the front lines of online security are trying to make that easier.

One such step is masked email. (You may also hear it referred to as email masks or email masking.) The practice formalizes a long-available feature known as email aliases as a privacy *and* security measure. A randomized email address is created to hide (aka mask) your true email address for an online account. Any correspondence sent to the masked email address gets forwarded to your actual inbox. The sender doesn't know the email's final destination. They'll only find out if you accidentally reply to a message as your main account.

The benefits are twofold. You get better privacy, because the more you use different masked email addresses (ideally, one per online account), the more you limit the potential fallout of the information leaking in a data breach. That email address won't work on other websites as a login ID or for a password reset. Nor can someone take over



Masked email is a more specific (and automated) take on email aliases.

the address like with an actual account. It's just a forwarding address, and a disposable one at that.

MASKED EMAIL VS. EMAIL ALIASES

If you already filter your incoming email and/or guard against spam by using email aliases, masked email may sound like an empty marketing term for a familiar feature. But there is a slight difference—email masking is a narrower use of email aliases, with a particular style in how the aliases are created.

With masked email, the focus is on auto-generated random, unique identifiers. Think [4k9xkeo@emailservice.com](#) or even [siftflask.3242@emailservice.com](#). You don't need to come up with your own aliases, thus streamlining their use. The suggested aliases also completely obscure your email address,

which inserting periods into your username (as in random.username@gmail.com) or adding a plus sign and an extra phrase (as in randomusername+alias@gmail.com) don't achieve. You should also get streamlined controls to block incoming mail or disable the forwarding address if it gets flooded with unwanted email.

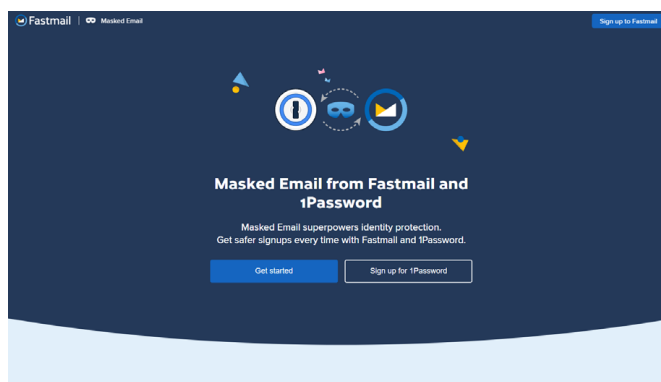
The result is a faster, easier way to maintain anonymity in your contact info—and for sites that default to email addresses as usernames, your login info too. With the added benefit of integration with some browsers and password managers, email masking saves time and reduces the hassles of the DIY route.

WAYS YOU CAN START USING MASKED EMAIL

Two common ways to get email masking is through an email provider or a dedicated service. Email providers offer the feature as an integrated part of the service. Access will likely cost you a little bit, though. At the moment, few providers offer masked email, and the well-known sites that do bundle it into paid plans (for instance, Apple iCloud+ [fave.co/39Out22] and Fastmail [fave.co/3ybstdC]). That said, prices can be as low as \$0.99 USD per month (iCloud+).

Dedicated services can be used with any site, main email address, browser, password manager, and so forth. You create an account using the email address you want to receive the forwarded email, and then create masks through the web interface or a browser extension. Some services also offer premium plans that allow sending and replying from an email mask, support larger file attachments, and generate email masks for multiple email addresses. All email masks are managed through the service, which is less convenient than with an email provider. You won't have a single repository for your direct and forwarded email.

To really simplify the incorporation of email masking into your daily flow, choose a service that integrates with a password manager. Once you connect your email account or masking service, you'll be able to



Some email providers offer masked email as part of their plans. Fastmail takes that one step further by offering integration with a password manager for super-simple creation and storing of aliases.

create the email masks directly within the password manager. That eliminates the need to copy and paste the new forwarding address when saving login info. Right now, 1Password (fave.co/3NeEdQQ) has a partnership with Fastmail, and Bitwarden just announced relationships (fave.co/3zWfleQ) with SimpleLogin (fave.co/3yecbk8), AnonAddy (fave.co/3bj7zjG), and Firefox Relay (fave.co/3A1TQYP). (When asked, Bitwarden said it intends to add more integrations over time, as well as expand them to products like Fastmail.) Apple users can use the company's Hide My Email feature; email masks

automatically save to iCloud Keychain if you actively use the latter.

FREE EMAIL MASKING SERVICES

While getting masked email through an email provider usually costs money, dedicated services usually offer a free plan. They're more limited in scope but still provide a great start.

AnonAddy allows you to create unlimited "standard" email masks. These are based on your AnonAddy (fave.co/3bj7zjG) username, however—so if you want more privacy, you can then use one of your 20 free shared domain email masks. You can send and reply from your aliases, too. The catch:

SimpleLogin		
Community · Pricing · Login · Sign Up		
<h3>Pricing</h3> <p>SimpleLogin is open-source, can be self-hosted and is 100% funded by the community. We do not use your data, track you or show you ads. SimpleLogin depends on your support to keep the service running and develop new features.</p>		
Free \$0	Premium \$30 billed yearly or \$4 billed monthly	Enterprise Dedicated server for your enterprise.
<ul style="list-style-type: none"> ✓ 15 aliases ✓ Unlimited bandwidth ✓ Unlimited reply/Send from alias ✓ 1 mailbox ✓ Browser extensions Chrome, Firefox and Safari ✓ iOS, Android App ✓ Secure your account with TOTP and/or WebAuthn (FIDO) ✓ Sign in with SimpleLogin 	<ul style="list-style-type: none"> ✓ Everything in the Free Plan ✓ Unlimited aliases ✓ Unlimited custom domains Link your own domain to create aliases like contact@your-domain.com ✓ Catch-all (or wildcard) domain ✓ Initiate a new email from your alias You can create a new alias to send an email to a new contact. ✓ 5 subdomains ✓ 50 directories/usernames ✓ Unlimited mailboxes ✓ PGP Encryption 	<ul style="list-style-type: none"> ✓ Dedicated Server & Database ✓ Dashboard to manage team accounts ✓ Single Sign-On (SAML or OAuth2)
Sign Up	Start Protecting your Email	Contact us

SimpleLogin is the most generous with the features available to free users.

You're limited to 10MB (yes, megabytes) of bandwidth *per month*. The company estimates that at roughly 140 emails max (fave.co/3ObHMbl). (Start adding in attachments and that number drops very, very fast.)

SimpleLogin (fave.co/3QGga03) offers 15 free forwarding addresses. There are no bandwidth limitations, and forwarded emails can be up to 25MB each. The service also allows you to send and reply email from an alias, too.

Firefox Relay (fave.co/3O18Mf) lets you create just five free forwarding addresses, with a 10MB size limit per email and no bandwidth limitations. It's the most

stripped-down of the freebie tiers, but it makes the list for a couple of reasons: It works across devices (and browsers—there’s a Chrome extension too [fave.co/3HJASrP]), and currently, upgrading to the paid tier with unlimited addresses and the ability to send email from aliases is just \$1 per month. (If you’re intensely focused on privacy, consider quitting Chrome and switching to Firefox [fave.co/3xz10kt] while you’re at it.)

Apple users also have an alternative option called Sign in with Apple (fave.co/3xRgfpf). For apps and websites that allow you to sign in with your Apple ID, you get access to a limited form of Hide My Email (fave.co/33PTZ3X), the company’s email masking service. Apple will generate a random forwarding email that will pass messages from the site or app to your Apple

ID’s linked email address. Unlike with the version of Hide My Email that comes with iCloud+, you can’t change the generated aliases or create ones independently. Also, as a general security note, signing in with this method can carry risk, since anyone with access to your Apple account could also then access linked services and apps, too.

P.S.—UNIQUE USER IDS HELP ONLINE PRIVACY AND SECURITY, TOO

The general concept behind masked email can be applied to creating user IDs, too. For sites that ask you to create a dedicated username (such as randomuser1), going with a new identifier each time makes it harder for people to track you across the web.

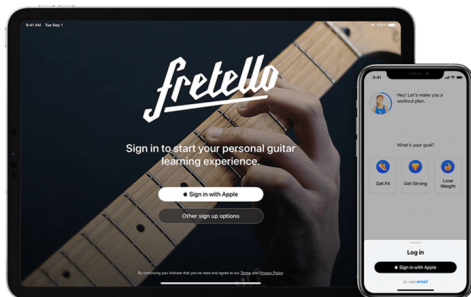
Unauthorized access to your other accounts is

less likely, too, when your username and password are different for every site and app. And you can combine masked email with a unique user ID so that you’re really hard to trace.

Sound complicated? This is why a password manager is so handy. It lets you continually level up your security with very little mental burden. Choose a paid password manager (fave.co/3IRkfRz) or a free one (fave.co/3nT9nDq)—either will both make life easy. 🔒

What is Sign in with Apple?

Sign in with Apple is the fast, easy, and more private way to sign in to third-party apps and websites using the Apple ID that you already have.



Live exclusively in Apple’s ecosystem? Signing in with Apple is a free way to get started with its take on email masking.

Tech Spotlight

A video showcase of the latest trends



Watch the
video at
[youtu.be/
OrCupnfr1Pc](https://youtu.be/OrCupnfr1Pc)

A Closer Look At Gigabyte's Project Stealth Motherboard

➔ Gigabyte's AORUS
Project Stealth is a forward-
thinking new cable-free
DIY PC design that aims to

builders of any skill range a chance at a clean-
looking PC. In this video Gordon gives you a tour of
the inside Project Stealth, focusing mostly on the
motherboard and it's unique design.