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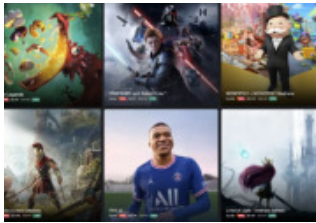
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Microsoft is ready to leave Windows 8 behind, just like everyone else

Windows 8.1 support will officially end next year, with notifications starting in July.

BY MICHAEL CRIDER

Windows releases have a lot in common with Star Trek movies: They seem to alternate between positive and negative in terms of reception. Windows 7 was generally well regarded at launch back in 2009, as was Windows 10 in 2015. Windows 8, the awkward middle child that tried some huge user interface changes in

2012, was not. Windows 8.1, the last major update to the OS, will officially end support early next year. And Microsoft can't wait to tell you about it.

As The Verge reports (fave.co/3Pzsjj), anyone still using Windows 8.1 will get notifications about the end of software updates sometime next month. They'll have until January 10 to find a new operating system or

face the web without any backup in the way of security updates. It might be an awkward transition: PCs still running Windows 8.1 might not be able to meet the minimum requirements of Windows 11, as Microsoft fully admits (fave.co/3PcqsDU) in another support document. The company is still selling Windows 10, which is notably less picky about low-powered hardware (and needs no Trusted Platform Module [fave.co/3RyJ0Qp]), but which will officially end its support life in 2025.

Windows 8 was immediately divisive when it launched, mostly because of the radical Metro user interface (fave.co/3P8QY1d) departure that borrowed heavily from

Windows Phone, emphasizing touchscreen functionality long before most users were ready to embrace it on PC. Microsoft was attempting to create a unified system that integrated both conventional desktop applications and mobile apps, and it didn't work. Windows 8.1 was a sizable patch released the following year meant to address some of these issues (fave.co/3z8ntXD), notably a more flexible home screen with easier access to the more conventional Windows desktop. But by then public opinion had soured, and huge amounts of users had resolved to stick with Windows 7. Windows 8 technically ended support way

back in 2016, as Microsoft pushed people to apply the 8.1 functionality and security patches (fave.co/3aj8PN9).

As of February 2022, StatCounter reports (fave.co/3o6LOGS) that Windows 8 and Windows 8.1 combine for just 4.42% of worldwide Windows users. The older Windows 7, which ended support more than two years ago (fave.co/3o5MCvW), still has almost three times as many users. While not quite as big a blunder, Windows 11 is drawing comparisons to 8 as users hesitate to upgrade. It's currently holding just over 10 percent of the userbase...slightly less than Windows 7. Ouch. 📴



Windows 8's Metro interface was divisive when it launched. In Internet Explorer, for example, the address bar and window tabs were removed.

Brave's privacy-focused Google alternative lets you customize your search rankings

The firm's latest product gives you greater control over your search results. **BY ALAIN YEE**



Brave is probably best known among hardcore geeks as one of Chrome's challengers. But for a while now, the company has offered more than just a privacy-minded browser (fave.co/3RBtCTy). A year ago, it launched the beta for a search engine, too—and recently, on its first anniversary,

Brave Search (fave.co/3cjDLnm) hit a milestone of 2.5 billion queries, with a peak of 14.1 million queries in one day.

For a nascent search engine, these numbers are big. As Brave claims in a blog post, it's won this achievement faster than Google (who took over a year to meet the same goal), plus run circles around

DuckDuckGo (fave.co/3yF3COs). Its privacy-oriented rival took four years to cross the same threshold. Brave Search is now the default search engine for the company's Brave browser.

In addition to exiting its beta phase, Brave Search is also launching a new feature called Goggles (fave.co/3cdDhzh). (Cue many future typos.) It joins another recently announced feature, Discussions (fave.co/3IEAfQG), to provide a larger swath of information available online. But while Discussions are supplemental search results that show posts from forum sites like Reddit, Goggles hands users direct control over search results. You can apply your own rules and filters to queries for more flexibility and better tailoring of what gets served in response.

For example, you can narrow the scope of what's searched or influence the order of

the results—you're not bound by Brave Search's algorithms. In theory, Goggles should help when performing niche searches that can be overrun by general, popular results or when intentionally isolating content with certain tones (for example, left- or right-leaning news sources).

This feature could bolster Brave Search's appeal among people who'd normally never go beyond Google. It offers a broader, more independent look at what exists on the web—after all, what a search engine serves you is based on its opinion of relevancy as dictated by its algorithms. Just as you might solicit multiple opinions on a topic, the ability to manually seek different takes on search results via Goggles can help you gain a wider range of perspectives. Brave Search also provides a sense of higher quality, more curated results—you don't need to learn the little search term tricks that

force Google to filter out SEO garbage or to actually pull in Reddit posts.

But you can see it for yourself—just pop on over to fave.co/3cjDLnm, run a search, and then click on Goggles (Beta) at the top of the results to apply a filter. You can also read more about the Brave Search's approach to indexing the web and its anniversary milestone in its blog post (fave.co/3o2D7NR). 🔌

- Tech blogs—Rerank results to boost content found on technical blogs.
- Hacker News—Prioritizes domains popular with the Hacker News community, minus those that would rank among the top 1000 most-viewed websites.
- No Pinterest—Rerank results to remove pages / threads hosted on Pinterest.
- Rust programming—Rerank results to boost content related to the Rust programming language.
- Copycats removal—Rerank results to remove "copycat" content (e.g. StackOverflow threads or GitHub translations).
- 1k short—Rerank results to remove pages found on the top 1,000 most-viewed websites.
- The lists of tech blogs are drawn from multiple sources, including blogsurf.io and refined.blog, and not vetted by Brave. The list of top sites in the "1k short" Goggle are drawn from tranco-list.eu. Newly up-ranked sites are not vetted by Brave.

Brave's initial set of Goggles, which will be deleted once users begin creating and contributing their own.



Google's password manager gets killer upgrades for Chrome, Android, and iOS

The password security updates to Chrome and Android will roll out over the coming months. **BY MARK HACHMAN**

Google recently strengthened its ambitions to become your only password manager (fave.co/3lRkfrz) with several security updates across the Chrome and mobile, including iOS. Google said it will administer site logins on Android, create

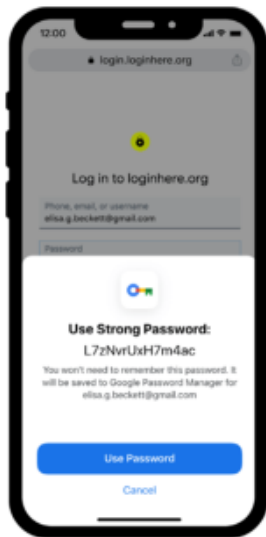
new passwords for those that may have been compromised, and more. Google declined to offer a timetable for these changes to be implemented, saying that they would roll out over the next couple of months.

Interestingly, Google said it would step

in to manage passwords on iPhones. You can already authorize Google to manage and store passwords on Android devices, of course, but Google said it will offer iPhones the same capability. With Apple's tendency to strictly manage apps and their implementation on iOS, Google seems to be sidestepping Apple by moving some of this functionality to its browser.

Android, though, remains Google's playground, and you'll see several password-specific improvements arriving on Android phones. For one, Google today offers the capability to autofill passwords for various sites by taking your username and autofilling the password. Google said it will add an improvement called touch-to-fill over the coming months, automatically logging you in via just a touch, that will simplify the process slightly further.

If you'd like to manage your existing passwords, Google will allow that, too:




Chrome automatically saves your passwords.

You'll be able to add a shortcut to your stored passwords on your Android phone's homescreen—though not in iOS, Google said. Google is also improving its automated password checker. Google already periodically looks at your passwords and determines if they're on a list of breached credentials ([fave.co/3cgALrU](https://www.fave.co/3cgALrU)). If so, it recommends that you change them. The improved Password Checkup feature will now allow you to change those passwords without going through the site's password update process, which usually relies on emailing passcodes back and forth. Warnings about



Google will add touch-to-fill capabilities to Android in coming months.

compromised passwords will now be sent to Chrome users on Android, Chrome OS, iOS, Linux, and Windows.

Users will also be able to manually add their own existing passwords to Google's password manager, too, Google said. 

AMD's Pro-only Threadripper shift leaves HEDT enthusiasts in the cold

The cheapest Threadripper Pro 5000 chip is \$1,000 more expensive than the last-gen version. **BY MICHAEL CRIDER**



Since the introduction of the AM4 socket, AMD's Threadripper ultra-high-end CPUs have been coveted as the very top of the consumer chip market. But AMD skipped Threadripper releases beyond the Ryzen 3000-based series released in early 2020,

and as Ryzen 5000 bows out of the marketplace, the company is only releasing Pro variants of Threadripper 59XX chips (fave.co/3ID9JY5). With pricing announced for these industrial-grade chips, and with AMD confirming that non-Pro Threadripper chips are going the way of the dodo, that leaves

AMD RYZEN™ THREADRIPPER™ PRO 5000 WX-SERIES FEATURES

AMD RYZEN™ THREADRIPPER™ PRO 3000 SERIES	CORES/ THREADS	FREQUENCY (BOOST™ BASE)	TDP	AMD RYZEN™ THREADRIPPER™ PRO 5000 SERIES	CORES/ THREADS	FREQUENCY (BOOST™ BASE)	TDP
AMD RYZEN™ THREADRIPPER™ PRO 3995WX	64 / 128	UP TO 4.2 / 3.7 GHz	280W	AMD RYZEN™ THREADRIPPER™ PRO 5995WX	64 / 128	UP TO 4.5 / 3.7 GHz	280W
AMD RYZEN™ THREADRIPPER™ PRO 3975WX	32 / 64	UP TO 4.2 / 3.5 GHz	280W	AMD RYZEN™ THREADRIPPER™ PRO 5975WX	32 / 64	UP TO 4.5 / 3.5 GHz	280W
AMD RYZEN™ THREADRIPPER™ PRO 3955WX	16 / 32	UP TO 4.3 / 3.9 GHz	280W	AMD RYZEN™ THREADRIPPER™ PRO 5965WX	24 / 48	UP TO 4.5 / 3.8 GHz	280W
AMD RYZEN™ THREADRIPPER™ PRO 3945WX	12 / 24	UP TO 4.3 / 4.0 GHz	280W	AMD RYZEN™ THREADRIPPER™ PRO 5945WX	16 / 32	UP TO 4.5 / 4.0 GHz	280W

16 | AMD RYZEN™ THREADRIPPER™ PRO 5000 WX-SERIES PROCESSORS | MARCH 2022 | AMD.COM/PRO5000 | ©2022 AMD

consumers wanting to build high-powered machines in a lurch.

The cheapest of the confirmed Threadrippers, the 24-core, 48-thread Threadripper Pro 5965 WX, will cost an incredible \$2,399 when it's made available to end users. That's \$1,000 more than the cheapest high-end desktop Threadripper of the previous generation, the 3960X. Other new entries are even more costly: The 32-core Threadripper Pro 5975WX is \$3,399, and the 64-core Threadripper Pro 5995WX is \$6,499. That's about the going rate for a 2005 Ford F-150. The updated pricing for the new chips was spotted by Tom's Hardware ([fave.co/3z7Y1BD](https://www.tomshardware.com/news/amd-ryzen-threadripper-pro-5000-wx-series)). (There are 12- and 16-core versions of these chips too, but there are no prices for them yet.)

Even the base model Threadripper CPUs were never cheap, but they were at least somewhat attainable for home system

builders and enthusiasts. With the HEDT division of Ryzen chips removed from AMD's catalog, only the wealthiest of gamers and performance junkies will be able to put

AMD's high-end power in their builds. The rest of us will have to hope our job application to Pixar gets some eyes on it, so we can use their latest workstations and render farms to make *Toy Story 5: It's OK, Buzz Is a Toy Again*.

All this might be more or less moot. Standard high-end CPUs have become so powerful ([fave.co/3z549dR](https://www.fave.co/3z549dR)) that graphics cards are easily the biggest bottleneck for gaming, and so insane CPU power is only really attractive for those looking for niche intense operations like video processing. Home builders are already looking forward to the new Zen 4 platform and Ryzen 7000 desktop chips later this year, and AMD has confirmed that its HEDT division will return sometime in 2023 ([fave.co/3cjTYZK](https://www.fave.co/3cjTYZK)).

Hopefully that will mean super-high-end AMD CPUs could return to the sub-\$2,000 price range. Whether fans will stay loyal to AMD meantime remains to be seen. 🔌



Why you don't need to splurge on a cutting-edge SSD

More important is simply having an SSD as your boot drive. **BY ALAINA YEE**

All the talk right now is about hardware capable of faster and faster speeds. PCIe 5.0 in particular has gotten a lot of attention with Intel's 12th-generation Alder Lake (fave.co/3O9nvTp) and AMD's upcoming Ryzen 7000 processors (fave.co/3zNDByr) often in the news as of late. These next-gen CPUs bring support for the cutting-edge specification to mainstream PCs.

Such widespread adoption can put pressure on to get the fastest model possible when buying an SSD, especially in the wake of recent announcements of consumer PCIe 5.0 drives (fave.co/39AsU7F) that are face-meltingly fast. But as exciting as new tech is, you can still live a very speedy digital life with a less cutting-edge SSD (fave.co/2Z26gQg), without giving up too much responsiveness in the process. In fact, waiting for high-end

specs to trickle down to a mid-range budget can be advantageous on multiple fronts.

Here's why.

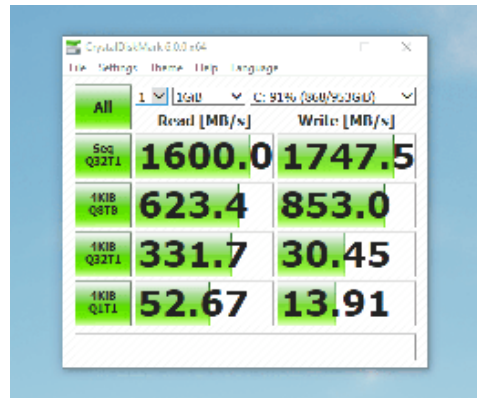
IT'S NOT JUST A NUMBERS GAME

Solid state drives are so life-altering compared to mechanical hard-disk drives (HDD) that even the slowest of them makes world of difference. Raw speed matters, of course. A humble SATA SSD can read and write data up to four times faster than a 7200 RPM HDD. But an HDD's higher latency contributes to the night and day feel, too. HDDs take longer to retrieve information due to the mechanics of seeking data on the spinning platter inside. The delay adds to the feeling of sluggishness or slowness.

That circumstance isn't in play when comparing different classes of SSDs. You can feel the higher responsiveness and quicker transfer times of faster models, but the contrast is less profoundly stark. With an HDD, it's more like someone who has to wind themselves up every time before speaking—and they talk at a slower clip as well. With an SSD, you're immersed among speakers who respond instantly, but at varying paces.

NOT EVERYTHING DONE ON A PC REQUIRES BLISTERING SPEED

The need for speed scales depending on how you use your computer. The most



Test results in Crystal Disk Mark 6.0 for a 1TB Intel 660p PCIe 3.0 SSD.

common activities on a PC are office work, internet browsing, streaming media, and gaming—which don't hit a drive as hard. That allows the cheapest SSDs (SATA drives, which have maximum throughput of 600MB per second) to be zippy enough. A SATA SSD also unlocks the lightning-fast system boot speeds that all solid-state drives provide.

Add in file transfers and/or handling of large files to the mix, though, and faster read and write speeds do start to make a difference. The quicker the drive, the less time those tasks will take. But their frequency plays a role in the kind of SSD best suited for your PC. A good PCIe 3.0 SSD with a cap of 3,500MB per second is usually plenty for people with lighter workloads. You can step up to PCIe 4.0 SSDs (fave.co/3vs9d8j) and a max of 7,500MB per second or even an upcoming PCIe 5.0 drive and the promise of

up to 13,000MB per second as your situation (and budget) allow.

DATA ONLY MOVES AS FAST AS YOUR SLOWEST HARDWARE

Your habits aren't the only reason why you might not need a face-melting SSD. Another factor to consider is that not everyone buys an SSD for a brand-new PC. Plenty of folks pick one (or more) up as upgrades for their current system.

Such users are likely running a system that supports PCIe 4.0 at most—or even only PCIe 3.0 if your system is older. You could grab an SSD that surpasses your spec, since each successive generation is backward compatible. But you won't enjoy the full potential of the drive until you upgrade the rest of your system.



Older PCs won't support PCIe 5 and possibly not even PCIe 4 SSDs—so you can save some cash by buying an older-gen drive.

PCIe 3.0 IS A SWEET SPOT

Right now, PCIe 3.0 drives offer fantastic value. Not only are they fast, but they're usually just a few dollars more than a SATA SSD, too. Take for example two of our favorite recommendations, the SK Hynix S31 (fave.co/3IRPhZM) and the P31 (fave.co/3O8sZhi). The S31, a SATA drive, has a list price of \$98 for 1TB on Amazon. Meanwhile the P31, a PCIe 3.0 drive, sports a \$110 MSRP for 1TB. The \$12 difference is fairly negligible when you consider the tremendous jump in performance—in our hands-on tests, the P31 is over five times as fast as the S31 in large file transfers.

Sometimes PCIe 3.0 SSDs can be *cheaper* than a SATA equivalent. Deals are fairly commonplace these days. In fact, at the time of this writing, the P31 cost less than the S31 (\$94 versus \$98) thanks to a random Amazon price cut.

Move up the scale in speed, and the prices shift more proportionately. Step up to the \$150 SK Hynix Platinum P41 (fave.co/3ObU9EO; a PCIe 4.0 SSD), and you're looking at a 36 percent increase in MSRP to get double the performance. For most people, putting that extra \$40 elsewhere into the PC (that is, cooling, graphics card, case, and so on) can yield a better overall experience.



When you compare a PCIe 3.0 SSD to a SATA SSD, you can get astoundingly fast speeds for about the same price.

WAITING LEADS TO BETTER VALUE

When the first PCIe 3.0 and 4.0 drives came out, they didn't reach the same speeds you see now. Those initial entries on to the market offered about two-thirds of the throughput you get today, and with far higher sticker prices.


Once we got a couple of years in, prices dropped dramatically and speeds went up. So you can roll with a respectably fast SSD now, enjoy it for all it's worth, and then later add a more searing drive to your PC down the road for far less.

So long as your CPU and motherboard can support faster PCIe specifications, you've got plenty of opportunity for exciting upgrades later on. These days, if you're building something that supports PCI 4.0 at minimum, then you should be well

situated for some time. You may find that several years from now, capacity will trump speed in your needs—and generally, that's the case for most people.

MORE ON SSDS

The takeaway here is that you can splurge on an ultra-fast SSD—but you don't *need* to. Still undecided on what to get? Our round-up of the best SSDs (fave.co/2Z26gQg) can help you narrow your specific

choices once you decide on the direction you want to go in. Once you pick a drive, use our guide to SSD installation (fave.co/3z58UEf) to make adding it to your PC a snap. And after that, keep your SSD happy and healthy with our SSD management tips (fave.co/3B0r23g)—proper care of a solid state drive differs a little from a hard-disk drive. (Drive defragging is a no-no.) 



The first PCIe 4.0 drives weren't capable of the speeds we see from current models.

Microsoft's Game Pass streaming looks worse on Linux—unless you use Edge

Browser tests show a drop in xCloud's visual quality when using Linux versus Windows.

BY MICHAEL CRIDER



The rise of game streaming is a godsend for PC gamers who prefer Linux to Windows, since the systems generally work just fine in any modern browser and don't require custom development for the operating system. But gamers on Linux who embraced Xbox Game Pass (fave.co/3vohwCj) and its streaming component aren't satisfied with the image quality they're getting. It's now been

verified that streaming Game Pass games to Linux results in poorer quality than Windows.

The difference isn't extreme, but it's noticeable enough that it caught the attention of Reddit users on the XCloud sub (fave.co/3uR1mm0). The Reddit user performed a few tests, which Ars Technica verified (fave.co/3lHePm6), by manually changing browser user agent strings to imitate running Linux on identical machines. Indeed, the resolution




Here you can see a distinct difference in quality between Windows (left) and Linux (right).

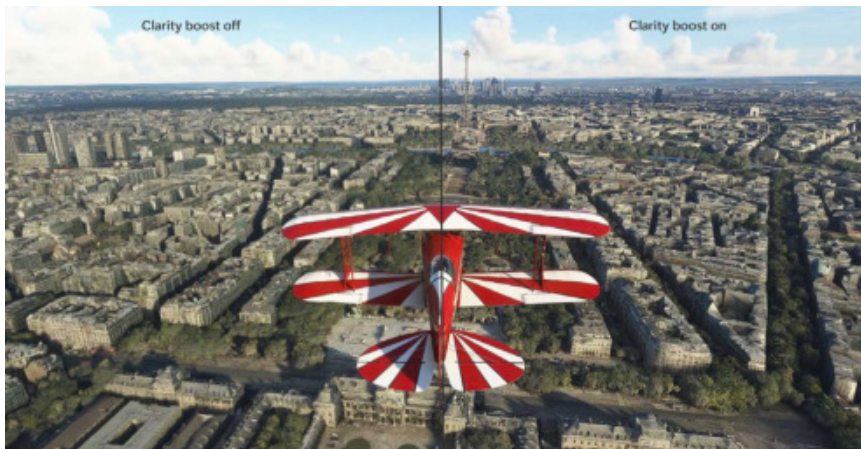
and sharpness for the “Linux” test was shown to be notably poorer. While this would be hard to spot during rapid motion, more subtle cutscenes and text will show a dramatic drop in quality.

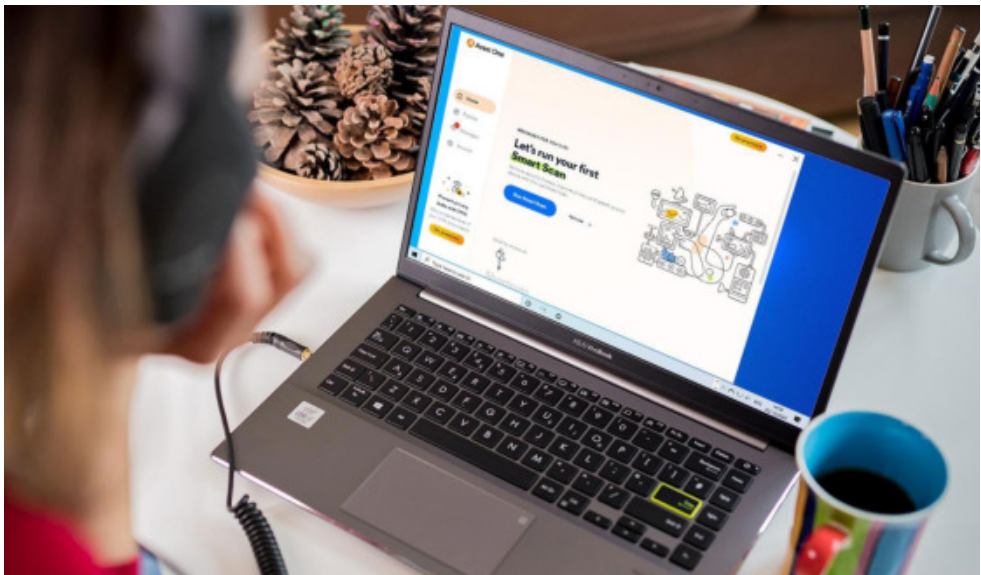
Exactly what’s causing the dip isn’t clear. It’s been speculated that Microsoft is assuming a Linux user agent string means someone’s using an Android device to stream Game Pass games, lowering the image quality because the change wouldn’t be noticeable on a smaller phone or tablet screen. Some are

guessing that Microsoft is reserving the best quality for its Edge browser, where enabling the exclusive Clarity Boost feature (fave.co/3PyjkBN) cleans up the image even when reporting a Linux user agent.

And of course, it’s always possible that the behavior is unintentional, caused by some sort of bug. Until a more general solution is created, Linux users can download Edge (fave.co/3PvXSgB) and make sure Clarity Boost is enabled to get the best image quality when streaming Game Pass games. 

Microsoft Edge’s Clarity Boost feature could be used to clean up an image.





Is Windows antivirus software still necessary in 2022?

Why Microsoft's built-in virus scanner is probably good enough (and why you might still look elsewhere). **BY JARED NEWMAN**

For years, I've assumed that most people don't need third-party antivirus tools and have passed this suggestion along to others.

After all, Microsoft's Windows Security suite (fave.co/3tXSvPP), also known as Windows Defender or Microsoft Defender, provides built-in virus protection for your PC, and it's free. I've been using it for years, and the last time I can recall having virus problems on my PC was well over a decade ago.

And yet, looking around for confirmation of this long-held belief quickly turns up an alternate universe, full of experts who insist that everyone should be paying for antivirus software. This advice comes not just from the companies that sell antivirus suites, but from reputable sites that perform antivirus software reviews (PCWorld included [fave.co/3CnDHuk]).

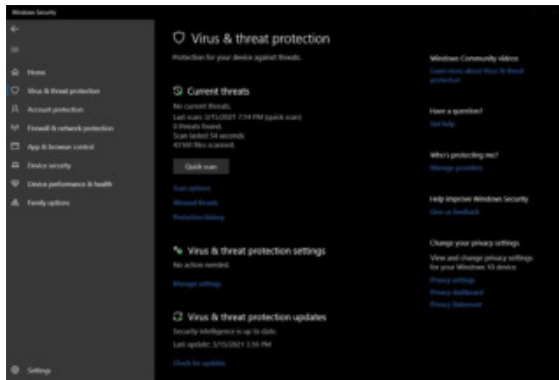
On top of that, nearly every laptop I've reviewed for PCWorld (fave.co/3qL4oHf) has

come with some form of antivirus trialware from companies like McAfee and Norton. Those companies pay PC makers for placement, which wouldn't make sense if no one bought the products, right?

At this point, I've heard enough questions from readers—and family members—that I decided to dig a little deeper. What I've learned is that my initial assumptions were mostly correct: Most people can indeed skate by without extra antivirus software. But that doesn't mean everyone should, or that you shouldn't take any extra precautions to stay safe.

THE CASE AGAINST EXTRA ANTIVIRUS SOFTWARE

As an initial sanity check on my antivirus assumptions, I did the most obvious thing possible and put out the question on Twitter ([fave.co/3PvsWx3](https://t.co/3PvsWx3)): Does Microsoft's built-in Windows Security software ([fave](https://t.co/fave).



Windows Security in Windows 10.

[co/3tXSvPP](https://t.co/3tXSvPP)) provide enough protection for typical PC users?

The consensus answer was *yes, with some caveats*.

Justin Duino of How-To Geek pointed ([fave.co/3z97fO3](https://t.co/3z97fO3)) to his site's helpful article on the subject ([fave.co/3Pdlerz](https://t.co/3Pdlerz)), which recommended Windows Security in conjunction with Malwarebytes' free malware scanner. My fellow freelance journalist Rob Pegoraro also called out a Wirecutter article ([fave.co/3PwTOg0](https://t.co/3PwTOg0)) that came to the same conclusion ([fave.co/3RBT9vK](https://t.co/3RBT9vK)). Another writer chimed in with a similar recommendation ([fave.co/3RyIK3U](https://t.co/3RyIK3U)).

The reasoning is simple: Windows Security rivals other programs at sniffing out viruses. While this wasn't always the case, Microsoft's detection has improved considerably in recent years, to the point that the independent AV-TEST Institute regularly awards it a perfect 6 out of 6 in protection, usability, and performance, beating industry averages ([fave.co/3caHovT](https://t.co/3caHovT)).

Perhaps more important, security is decentralized now, so a single virus scanner is no longer your only line of protection. Some examples:

- Major web browsers can detect and block malicious websites on their own, thanks to tools like Google Safe Browsing ([fave.co/3yLlgy1](https://t.co/3yLlgy1)).
- Those browsers may also warn you if you're about to download an unrecognized program.

- Major email providers, such as Gmail and Yahoo, scan attachments for viruses before you can even download them.

- Those same email providers' spam filters do a great job at keeping malicious emails out of your inbox and warning you of potential phishing schemes.

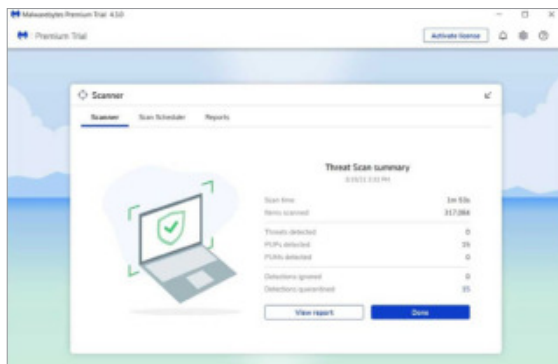
- The SmartScreen filter built into Windows will warn you anytime you're attempting to install unrecognized software.

Antivirus, in the end, is just another line of defense. For most people, Microsoft's built-in defenses should be strong enough.

GETTING A SECOND OPINION

So why do some folks recommend Malwarebytes (fave.co/3APxVoh) as an additional layer of protection? Mainly because it's nice to have another set of eyes on your computer.

Last year, for instance, I ran a scan in Malwarebytes and picked up a set of potentially unwanted programs tied to my installation of Chrome. While my Chrome installation seemed to be working fine—with no sketchy toolbars or search redirects that I could see—this did convince me to delete my sync data from Chrome (fave.co/3PbYFUh), reset its settings (fave.co/3Oe7J9l), and perform a fresh Chrome



Malwarebytes might find some potential threats that Windows Security misses.

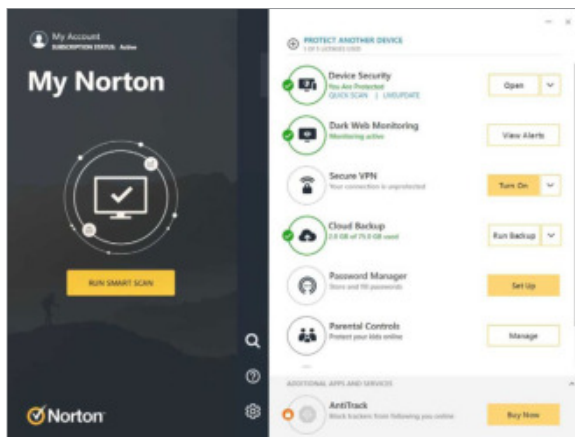
install. (I suspect it was a browser extension behaving badly.)

But Malwarebytes has its downsides as well. If you're not careful during installation, it will automatically install its own extension in all your browsers, and the free version routinely nags you with upgrade prompts. Also, unless you disable its real-time protections (which are only available as a 14-day trial for free users), they'll override Microsoft's own virus scanner.

I may still occasionally install Malwarebytes to get a second opinion on my computer's health, but for now, I'm leaving it off my PC as well.

THE CASE FOR EXTRA ANTIVIRUS PROTECTION

To be clear, third-party antivirus software isn't a grift with no actual utility behind it. While most people don't need to pay for antivirus



Tools like Norton 360 provide more than just virus scanning.

software, there are still some reasons to consider doing so:

You need more help with security:

Some antivirus programs offer extra security features beyond the realm of traditional virus scanning. Avast, for instance, can monitor webcam use and let you block untrusted apps from capturing video, and it can also alert you if any of your online passwords are involved in a security breach.

You're looking to bundle: In addition to extra security features, some antivirus programs offer tools that you might otherwise purchase separately. Norton 360 Deluxe (fave.co/30Bk59o), for instance, includes its own password manager and cloud storage service. Avast One (fave.co/3PrZzvB) has a built-in VPN and a temporary file cleaner.


You want more kinds of protection:

Some third-party tools offer additional

methods of protection that aren't built into Windows. AVG's (fave.co/3PdHNFV) Behavior Shield, for instance, can look for patterns of malicious behavior even when it hasn't detected a virus, while Avast One has ransomware protection that prevents apps from encrypting your files without your permission. (Windows offers this option as well, but not by default [fave.co/3RBFivN].) Antivirus suites also typically provide protection for mobile devices as

well as personal computers.

All of these extra features, however, can bloat your computer, affecting performance and getting in your way, and they might not even be the best tools for the job. I'd much rather use a dedicated password manager (fave.co/3IRkfRz) than one that's bundled with antivirus software, and if I needed a VPN, I'd want to choose the provider myself (fave.co/3FtTTMs).

While extra antivirus software was essential in the early days of personal computing, these days it's just one potential tool in the broader security arsenal, which should also include strong passwords, two-factor authentication (fave.co/3co510T), robust data backups (fave.co/3EApUU6), and a healthy dose of common sense. On that, at least, the experts seem to be in total harmony. 

Nvidia's low-cost GeForce graphics card leaves a lot to be desired

Like a lot more memory bandwidth, for example. **BY MICHAEL CRIDER**



There's always a bigger fish, as a wise man once said. In the case of Nvidia's newest graphics card, every single fish is bigger. The GeForce GTX 1630 (fave.co/3ObgMYU) is an updated version of the GT 1030 that was released in 2018. It's an upgrade over the previous design, but it's still the weakest card with a GTX label by a wide, wide margin. The new design was launched without a press release or review units, unlike AMD's recent super-low-end RX 6500 XT (fave.co/32rh0JT).

Just how low-end is this new card? The next step up in Nvidia's Turing (fave.co/3Pu6xjx) GPU-based GTX 16-series lineup is the already-pokey GTX 1650, which features double the memory bandwidth (128-bit versus just 64-bit), almost double the CUDA cores (896 versus 512). The GTX 1630 does feature considerably higher base and boost clock speeds, but with just 4GB of GDDR6 memory hobbled by that narrow interface, it's going to be hard to put it to use.



The newer card is significantly more powerful than the older GT 1030.

The newer card is significantly more powerful than the older GT 1030 (fave.co/3PfCOXg), doubling memory with the latest-gen standard, increasing memory speed and bandwidth, and boosting CUDA cores and clock speeds. And unlike the older card, it supports newer Nvidia features like G-Sync and Ansel. The standard spec of the card supports a maximum resolution of 8K at 60 hertz, with HDMI 2.0b, dual-link DVI, and DisplayPort 1.4a output. Despite drawing just 75 watts at maximum power, it's a two-slot design—a more streamlined variant might come from Nvidia's manufacturing partners

at some point. MSI, EVGA, Gigabyte, and Zotac have shown off their customized versions of the card.

Suffice it to say, the GTX 1630 really shouldn't be under consideration for anyone who's interested in gaming, since it's only barely better than integrated graphics solutions. Based on its retail price in China (fave.co/3o60Ooz), it should cost around \$150 USD when (if?) it comes to other markets, but the only Nvidia partner apparently ready to sell the card in the US is EVGA. That variant costs \$199.99 (fave.co/3ATGTGY), which is...not great. With the GTX 1650 and the similarly powerful RX 570 dipping down toward the \$200 mark as cryptocurrency crashes and GPU prices continue to fall (fave.co/3clPceF), even bargain hunters should hold out for a better deal. 🛑



The GTX 1630 really isn't worth consideration for anyone who's interested in gaming.



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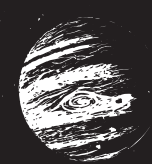
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SARIL LAMAS - JUPITER.ORG



Dell XPS 17 9720 (2022): A masterful Windows workhorse

This laptop is swanky-looking and powerful. **BY MATT SMITH**

PCWorld
EDITORS'
CHOICE

Are you looking for a laptop that can do it all, whether you're at your desk or traveling across the country? The Dell

XPS 17 might be your next choice. This massive laptop is a versatile machine that's enjoyable to use day-to-day and packs strong overall performance. The display is also beautiful and battery life is impressive. While the keyboard is nothing to write home about,

we feel the pros far outweigh the cons. Read on to learn more.

SPECS AND FEATURES

The base Dell XPS 17 has an Intel Core i5-12500H processor with integrated graphics,



VIDEO: DELL XPS 17 9720
PERFORMANCE TESTING

Watch now at fave.co/3zfAbnE

8GB of RAM, 512GB of storage, and a 1920×1200 display. My review sample packs multiple upgrades, however, including an Intel Core i7-12700H processor, Nvidia RTX 3060 mobile graphics, and a 4K touchscreen.

CPU: Intel Core i7-12700H

Memory: 32GB

Graphics/GPU: Nvidia RTX 3060

Display: 3,840×2,400 IPS Touchscreen

Storage: 1TB SSD

Webcam: 720p with IR camera, dual-array microphone

Connectivity: 4× Thunderbolt 4 with DisplayPort Alt Mode and Power Delivery, 1× SDcard reader, 1× 3.5mm combo audio jack

Networking: Wi-Fi 6, Bluetooth 5.2

Biometrics: Fingerprint reader, IR camera

Battery capacity: 97 watt-hours

Dimensions: 14.74×9.76×0.77 inches

Weight: 5.34

MSRP: \$1,649 base, \$2,799 as tested

Dell's upgrade pricing is tame, as my review sample's substantially quicker hardware adds \$1,000 to the price. A \$2,799 laptop is hardly affordable, of course, but Dell's overall pricing feels competitive in the segment. A similarly equipped MacBook Pro 16 starts at \$3,099, while a similar Razer Blade 17 retails for the same \$2,799 (but has half as much RAM).

DESIGN AND BUILD QUALITY

This is a 17-inch laptop with a 16:10 display. It's a truly massive piece of glass that dominates the entire experience. Dell uses slim bezels to keep the laptop as small as possible given the display offered, and this effort is successful. The XPS 17 is more compact than the LG Gram 17 (though LG's laptop is lighter), Razer Blade 17 ([fave.co/3AVS4Je](https://www.fave.co/3AVS4Je)), or HP Envy 17.

There's an old-school feel to the Dell XPS 17. Most of this is the laptop's sheer size—at nearly 15 inches wide and 10 inches deep, this beast is noticeably larger than laptops I'd normally consider large, such as the HP Spectre 16 ([fave.co/3FRY6v4](https://www.fave.co/3FRY6v4)), Dell XPS 15 ([fave.co/3zfdq2Q](https://www.fave.co/3zfdq2Q)), and MacBook Pro 16. They all feel significantly smaller than the XPS 17.

The XPS 17's size is easy to overlook when the laptop is closed on a table. Dell's



At nearly 15 inches wide and 10 inches deep, this beast is noticeably larger than laptops I'd normally consider large.

XPS 13, 15, and 17 all share the same general portions and use similar materials, so they look similar at a distance. This helps the XPS 17 strike a slim, modern pose despite its size.

Build quality is excellent as well. There's surprisingly little flex to be found in the display lid, chassis, and keyboard deck. This rigidity could make the XPS 17 a nice improvised weapon in the event of a zombie apocalypse.

KEYBOARD AND TOUCHPAD

There's a more functional benefit to XPS 17's size: It has gobs of interior space. The laptop's huge palmrest provides ample space in all directions. Most owners will have no trouble finding a comfortable typing position.

Dell leans into this with a center-aligned keyboard that lacks a numpad. Choosing to ditch the numpad, which is common on many 17-inch laptops, keeps the keyboard centered on the laptop's surface and above the touchpad. It's an extremely comfortable layout.

The keyboard itself is less impressive. Key feel is shallow and ends with a vague, spongy bottoming action. This is countered by quality keycap materials and smooth key travel. It averages out to a passable experience that



The laptop's huge palmrest provides ample space in all directions.

falls behind alternatives like the keyboards on the LG Gram 16 and MacBook Pro 16. Even the keyboard on the Acer Swift 3 16-inch, a much less expensive laptop, is a bit more pleasant to use.

Touchpad quality, on the other hand, is top notch. The touchpad surface is massive, measuring 6 inches wide and almost 4 inches deep, by far the largest touchpad I've used on a Windows machine this year. It feels responsive and offers plenty of space for using Windows' multi-touch gestures. My palms often land on the edges of the touchpad, due to its size, but unintended inputs aren't an issue.

DISPLAY, AUDIO

The base Dell XPS 17 has a 17-inch 1,920×1,200 IPS non-touch display, but my review sample was upgraded to the

3,840×2,400 IPS touchscreen. It can't quite match Apple's Liquid Retina XDR, or OLED, but it certainly has its strengths.

Maximum brightness is extremely high at up to 550 nits, higher than the 500 nits promised by Dell. This is so high that outdoor use becomes possible despite the display's extremely glossy coat. High brightness comes with elevated black levels, however, so movies and streaming shows can look washed-out in dark scenes.

Color performance is superb. I measured 100 percent coverage of the sRGB and Adobe RGB color gamuts, as well as 98 percent of DCI-P3. Put simply, the XPS 17 can display a wide range of color—as wide as you'll find on any laptop sold today. Color accuracy is outstanding as well, so content looks as its creator intended.

Sharpness is truly top-tier. A resolution of 3,840×2,400 on a 17-inch display translates to 266 pixels per inch, which is as good as it gets on a laptop of this size. The extreme pixel density provides clarity in 3D games, wonderful clarity in 4K streaming content, and crisp edges around fine text.

Gamers should note the XPS 17 lacks Nvidia G-Sync and the display has a maximum refresh rate of 60Hz. These sacrifices are



The display's color performance is superb.

made to enable switchable graphics, a decision that improves battery life.

While the XPS 17's display is excellent, its speakers fall short. Maximum volume is high but the audio has a harsh, sparkling quality that's unpleasant when the volume is turned up. Dialogue comes through clearly, as do quick bass beats, but complex tracks can sound muddled. Still, the speakers are acceptable for video calls and podcasts.

WEBCAM, MICROPHONE, BIOMETRICS

Work-from-home professionals will be disappointed by the webcam. It's a basic 720p camera that offers merely passable video quality and struggles with low-light situations. It's fine for most video calls but won't pass muster if you're hoping to impress in a virtual meeting or call in for an interview.

The same can be said of the dual-microphone array. Most modern dual-mic arrays are passable, and the XPS 17's is no exception—it doesn't stand out. Audio quality is usable but has a distant, hollow quality.

There's some good news in biometrics, at least. The XPS 17 has a fingerprint reader built into the keyboard and supports Windows Hello facial recognition login through the IR camera. Both features are standard and work well, though I find facial recognition quicker and more reliable than a fingerprint reader.

CONNECTIVITY

The Dell XPS 17 embraces Thunderbolt 4 in a big, warm, fuzzy bear hug. We're talking four Thunderbolt 4 ports, all of which support DisplayPort Alternate Mode and Power Delivery. All four Thunderbolt 4 ports are also compatible with USB4. This impressive selection means you can charge the laptop using any available port and attach multiple DisplayPort monitors.



The Dell has four Thunderbolt 4 ports and a 3.5mm audio jack.

A quick word of warning, however: The Dell XPS 17 configuration I reviewed can consume over 100 watts at load, which is more than the maximum wattage of most chargers and peripherals that can provide power over Thunderbolt 4 or USB4. Owners will want to use the charger that comes with the laptop.

While the XPS 17 is friendly with Thunderbolt 4, it gives other ports the cold shoulder. There's no USB Type-A, no HDMI, no standard DisplayPort, and no Ethernet. You'll need to pack an adapter to use these connections. A 3.5mm combo audio jack is present, however.

There is one uncommon connectivity option available: a full-sized SDCard reader. Photographers and videographers will appreciate its inclusion.

Wireless connectivity includes Wi-Fi 6 and Bluetooth 5.2. It's a small disappointment to see that Wi-Fi 6E, the latest wireless standard, is unsupported. A Dell representative says this is due to the antenna design. Despite this, I

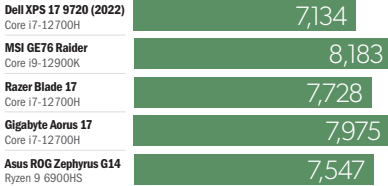
measured wireless speeds equivalent to Gigabit Ethernet over short distances—fast enough that I didn't miss the physical Ethernet port.

PERFORMANCE

The Dell XPS 17 I tested had an Intel Core i7-12700H processor with a total of 14 cores: six

PCMark 10 Overall

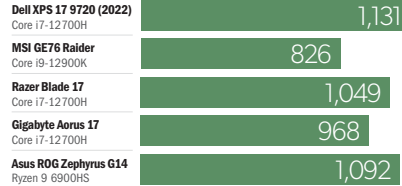
CPU performance



LONGER BARS INDICATE BETTER PERFORMANCE

Handbrake 0.9.9 Encode

Seconds



SHORTER BARS INDICATE BETTER PERFORMANCE

performance cores and eight efficient cores. This was paired with 32GB of RAM and a 1TB PCIe NVMe solid state drive.

I'll lead with PCMark 10, a full system benchmark that leans heavily on processor performance. It reaches a score of 7,134 on the Dell XPS 17, behind the other laptops in this competitive set. The difference is slim, however, and perhaps to be expected given the XPS 17 is a tad smaller than most 17-inch laptops.

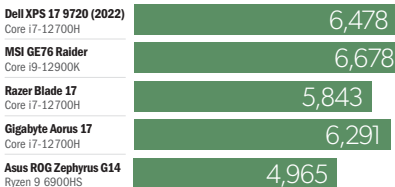
Cinebench R20 provides a stronger result for the Dell XPS 17. It ekes out a minor victory

over the Gigabyte Aorus 17 and Razer Blade 17. The Ryzen-powered Asus ROG Zephyrus G14 falls noticeably behind in this test, though, to be fair, that could be due to its small size (we've yet to test Ryzen 6900HS in a 17-inch laptop).

The Dell XPS 17 once again falls slightly behind the pack in the Handbrake video encode test. This is a lengthy test, requiring more than 13 minutes on even the quickest machine, so it highlights differences in thermal performance. It's clear the XPS 17

Cinebench R20

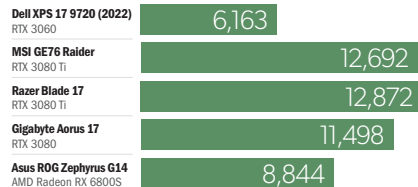
CPU performance



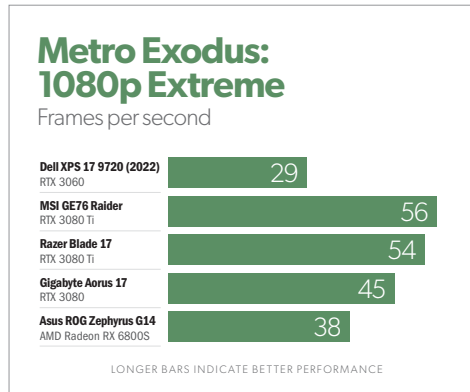
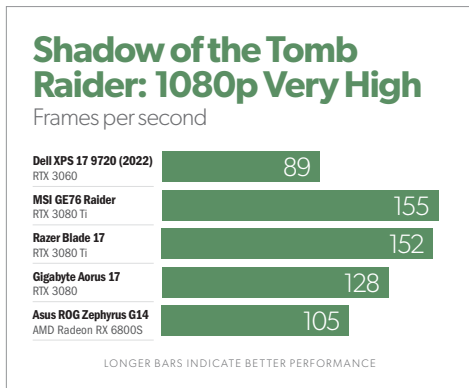
LONGER BARS INDICATE BETTER PERFORMANCE

3DMark Time Spy

GPU performance



LONGER BARS INDICATE BETTER PERFORMANCE



struggles to maintain processor performance over time, at least when compared to other 17-inch powerhouses.

We now switch to graphics, where the Dell XPS 17 finds itself at a disadvantage against the competitive set. Dell doesn't offer a graphics option quicker than the RTX 3060, while competitors go up to the RTX 3080 Ti. Predictably, the XPS 17 can't keep up in the 3DMark Time Spy benchmark.

Shadow of the Tomb Raider once again shows the XPS 17 behind—although in practical terms, this is not a bad result. The XPS 17 maintains a framerate well above 60 FPS in this game despite its less powerful GPU.

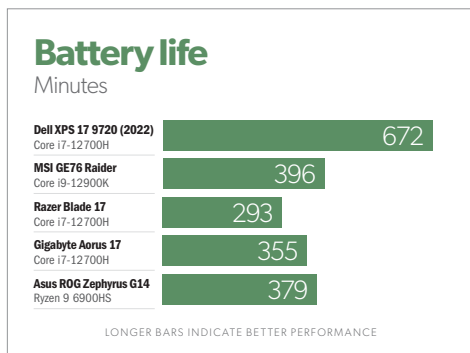
The much more demanding *Metro Exodus* benchmark puts the Dell XPS 17 just shy of 30 frames per second. This once again shows the limits of an RTX 3060, but I think it's a fine result for the XPS 17. The laptop is capable of solid 30 FPS gameplay at the more reasonable Ultra performance setting.

Shoppers should remember that the XPS 17's less capable graphics hardware comes with a lower price tag. A Razer Blade 17 or Gigabyte Aorus 17 (fave.co/3o8WsNh) can beat the XPS 17 when configured with faster hardware, but the Razer Blade 17 we reviewed had an as-tested price of \$3,999 while the Gigabyte Aorus 17 was tested at \$3,299. You pay for what you get.

Dell's XPS 17 delivers respectable performance across the board. The question shoppers should ask is this: Is the XPS 17—and its graphics specifically—quick enough for me? The answer, for most people, will be yes. However, gamers and professionals who use apps with GPU compute support should look for alternatives that offer faster graphics hardware.

BATTERY LIFE

The Dell XPS 17's size makes it a difficult travel companion. It will fit in most bags designed to



accommodate a 15-inch laptop, but not all, and its 5-pound weight is not easy to ignore.

A portion of that weight is due to the gigantic 97 watt-hour battery. This is close to the 99 watt-hour size limit imposed by FAA regulations for devices passengers can bring on flights (anything larger is prohibited).

Dell uses switchable graphics to turn off the Nvidia graphics hardware (if equipped) when it's not required. The integrated Intel graphics hardware is used instead. This provides surprisingly good battery life in basic day-to-day tasks.

The Dell XPS 17 lasts longer than some smaller laptops that configure more power-hungry features, such as an OLED display (fave.co/3rDPT6T), and easily blows past any alternative that has discrete graphics but lacks switchable graphics.


There is a catch. This benchmark did not engage the Nvidia discrete graphics hardware and is standardized to a brightness level of 200 nits. Firing up a 3D rendering

application or 3D game will drastically slash battery life.

Still, the XPS 17's battery life is a best-case scenario for a large Windows laptop. The laptop can handle a packed eight-hour day of writing, editing, and video calls.

BOTTOM LINE

There's one word that best describes the Dell XPS 17: balanced.

Dell's well-rounded workhorse doesn't set records in any particular area but delivers solid results across the board. It offers forward-looking connectivity, a massive screen, strong CPU and GPU performance, and good battery life. And it does all this at a reasonable price. This makes the Dell XPS 17 a good fit if you want a single do-it-all machine and don't mind lugging around a large backpack when you travel. The XPS 17 can handle any task you'll throw at it, at home or on the go. 

Dell XPS 17



PROS

- Solid performance for the price.
- Massive, bright, colorful display.
- Offers four Thunderbolt 4 ports.

CONS

- Heavy and thick.
- Mediocre keyboard.
- Lacks USB-A, HDMI, or Ethernet.

BOTTOM LINE

Dell's XPS 17 is a well-rounded workhorse that delivers battery life, build quality, and performance in equal measure.

\$2,799



Teamgroup Cardea A440 Pro SSD: Scintillating PCIe 4.0 performance

This top performer comes with a massive heat sink and a somewhat steep price tag.

BY JON L. JACOBI



I'll just cut to the chase: The Teamgroup Cardea A440 Pro (TM8FPR002) ripped through our test suite in fine fashion,

besting such fast drives as Seagate's FireCuda 530 (fave.co/3vs8HYI) and SK Hynix's Platinum P41 ([fave](https://fave.co/3vs8HYI)).

[co/3ObU9EO](https://fave.co/3ObU9EO))—our current pick for best NVMe PCIe 4.0. Let's take a look at how it compares in all other respects.

PRICE, DESIGN, SPECS

There are two choices in heat dissipation available for the A440 Pro: the thin graphene



The Teamgroup Cardea A440 Pro NVMe SSD with the graphene heat spreader option. An aluminum heatsink SKU is also available for a modest \$5 to \$10 surcharge.

type shown in the images, and a rather large aluminum heatsink. Most users will be fine with the graphene, and it's obviously the choice for laptop upgrades, but gamers or pros putting continuous stress on the drive can keep the temps down and avoid thermal throttling by using the larger heatsink.

The 1TB flavor of the A440 Pro costs \$136—not bad for an SSD this fast. The 2TB is \$280, and the 4TB is \$790—again, not bad for a pro-level SSD, but quite a bit more than the entry-level competition. Adding the aluminum heatsink at purchase costs only \$5 to \$10, a bargain when it comes to such extras.

Do the math on the price per terabyte, and unless you really need maximum capacity in a single slot, you'll save money by buying four 1TB or two 2TB A440 Pros. Not a lot of motherboards have four M.2 slots, but four-slot x16 PCIe adapters are available for under \$50. If your computer supports PCIe bifurcation and RAID, there you go.

The 22mm wide, 88mm long PCIe 4.0 x4 A440 Pro sports nothing but top-notch components, including a Phison



You'll save money by buying four 1TB or two 2TB A440 Pros.

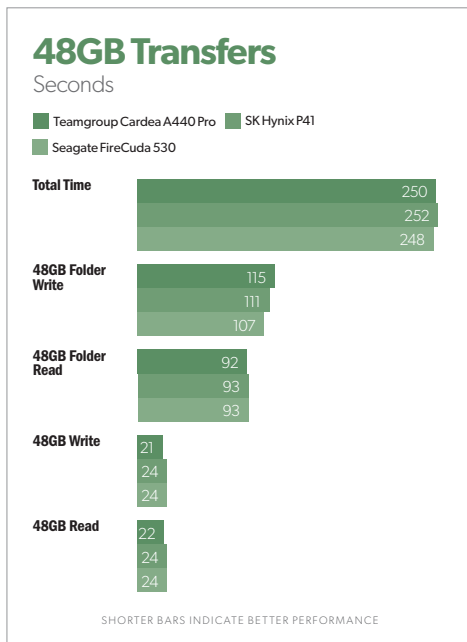
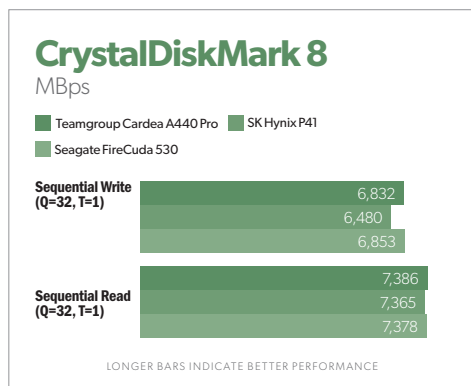
Phison PS5018-e18-41 controller, 1GB of DRAM per 1TB of capacity for primary caching duties, and 176-layer TLC NAND. Most PCIe 4.0 drives, especially those with DRAM, are among your pricier options.

Teamgroup backs the Cardea A440 Pro with a five-year warranty and 700TBW (1TB model), 1,400TBW (2TB), and 3,000TBW (4TB) ratings. Those are average, not enterprise- or FireCuda 530-level TBW—that is, terabytes the drive can write. Think of it like the mileage in a car warranty. When the time period or the TBW is exceeded, the warranty ceases to apply.

PERFORMANCE

Though it didn't win every race, the Cardea A440 Pro won enough of them that we could arguably call it the fastest NVMe SSD we've tested. The first evidence of this is in the CrystalDiskMark 8 sequential throughput numbers shown below.

The A440 Pro was only a couple of seconds off the all-time non-RAID record for

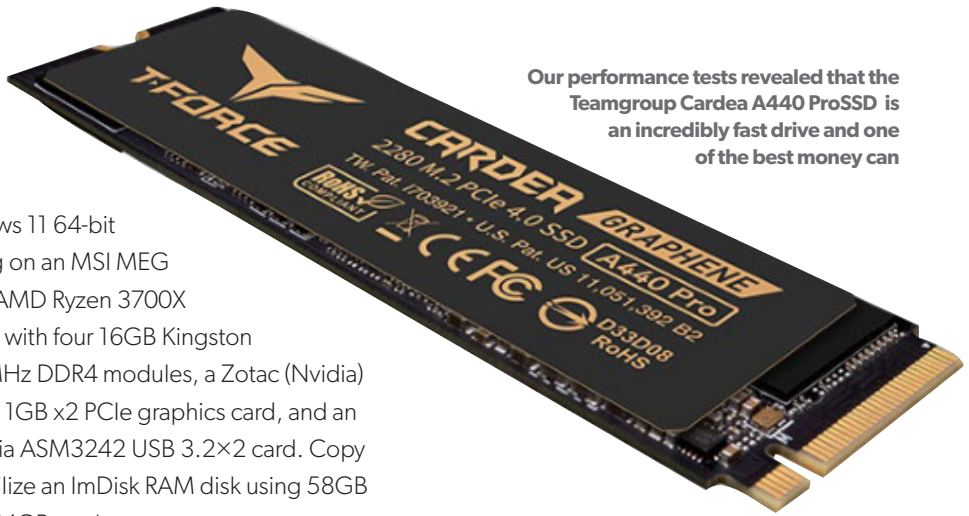


our 48GB transfers. That means it's *really good* in the real world. These results are all within the margin of statistical error for this test, but 21 and 22 seconds reading/writing our 48GB single file is still impressive.

The test that the Cardea A440 Pro really aced was our long 450GB write. This was the 2TB version of the A440 Pro. You might not get quite as impressive a performance with the 1TB version due to less NAND for use as secondary cache.

Overall, the Teamgroup Cardea A440 Pro is a very, very fast drive—possibly the fastest thing out there. That's a nice debut in our labs for Teamgroup.

Internal drive tests currently utilize




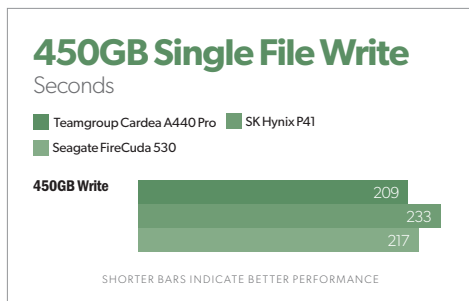
Our performance tests revealed that the Teamgroup Cardea A440 ProSSD is an incredibly fast drive and one of the best money can

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.

Each test is performed on a newly formatted and TRIM'd drive so the results are optimal. Over time, as a drive fills up, performance will decrease due to less NAND for caching and other factors. The performance numbers shown apply only to the drive of the capacity tested. SSD performance can vary by capacity due to more or fewer chips to shotgun reads/writes across and the amount of NAND available for secondary caching.

BOTTOM LINE

The best generally costs more, and the Cardea A440 Pro is arguably that, so I'll cut it some slack on the pricing. (I'd love to have this SSD in my system.) But prices change rapidly these days, and the drives we've compared it to are very fast. Check them out and shop carefully. 



Teamgroup Cardea A440 Pro SSD



PROS

- As fast as they come.
- Large aluminum heat sink or graphene heat spreader.
- Sustains performance during long writes.

CONS

- A bit pricey.

BOTTOM LINE

The Cardea A440 Pro is arguably the fastest NVMe SSD we've tested. It's also priced as such.

\$136

Google Stadia: The console experience without the console

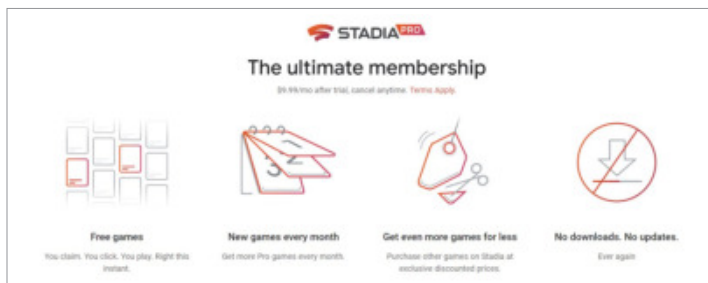
Google Stadia stakes its claim as one of the best in cloud gaming. **BY KEVIN CASPER**



In recent years, the cloud gaming market has gained a number of new names, and none has been more hyped than Google Stadia. Launched in late 2019, it ran into a few stumbling blocks along the way, but its pivot to focusing on third-party game hosting has seen it flourish. Now a mainstay in the cloud streaming industry, Stadia has a lot to offer. We tested both the free and Pro versions of the service. Let's see how it all stands up.

THE PLANS

Google Stadia comes in two forms: free and Pro. With the free access, you're able to play a select few free games, such as *Destiny 2*, or games that you bought for Stadia at up to 1080p resolution at 60 frames per second, including any online multiplayer games. That's it; you can fully play games that you buy without the need to purchase any expensive hardware—as long as your internet connection is up to handling it, which requires a minimum of 10Mbps.



The Google Stadia Pro membership comes with some welcome perks.

Stadia Pro supports streaming games at up to 4K resolution, 60fps, with HDR and 5.1 surround support with connections of 35Mbps or greater. Additionally, Stadia Pro will provide a handful of free games that you can claim to your library to play as long as your Pro subscription is active. Most games, however, are neither free nor included in Stadia Pro, but instead have to be bought. Some games do have discounts for Pro members, though.

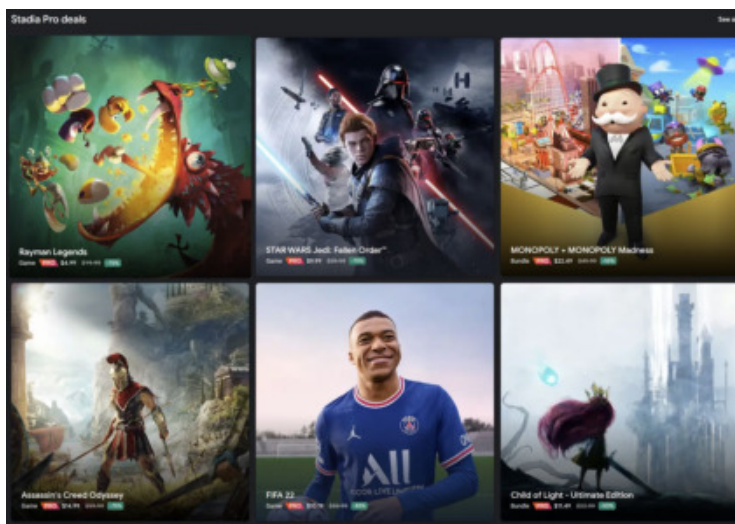
GAME LIBRARY

In essence, you can imagine Google Stadia as its own console or popular PC game store. It has a fairly wide selection of games

you can buy and play on the service, and those games aren't playable on any other service. It's much like how purchasing a game for PlayStation 5 doesn't allow you to play that game through the Epic

Games Store or on Nintendo Switch.

At the time of writing, there are just over 270 games available on Stadia. That said, the Stadia game library is a bit all over the place in terms of the kinds of games and their release timeframes. It feels like Stadia is always trying to catch up to the mainstream market, but that means games both new and old are always



A game library of over 270 titles to choose from.

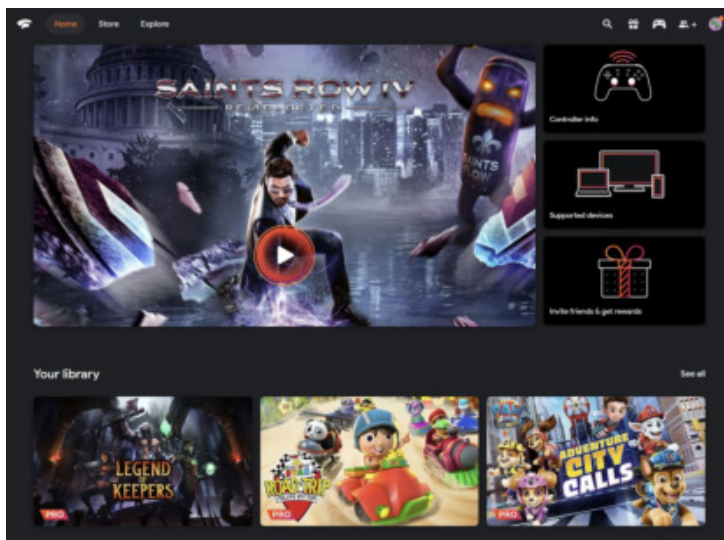
becoming available for purchase on the platform.

During our tests with Stadia Pro, the games that could be claimed with the subscription aren't exactly the most popular ones out there, but there have been plenty of good ones, including *Life Is Strange Remastered*, *Terraria*, and *Control Ultimate Edition*. If you're looking for the higher performance that Stadia Pro offers over its free service, then the Pro games are a nice slow drip of bonuses.

UX/INTERFACES

The first thing we feel the need to call out is that Google makes it fairly difficult to find and understand what Stadia actually has to offer in its own website and media. It took an uncomfortable amount of time to even see that the Stadia service can be played on for free, as almost all of its promotional material and site information tries to push users to Stadia Pro.

Once signed up, however, the Stadia experience is very simple and straightforward. You access your Stadia account and the



Stadia homepage layout.

Stadia interface through a browser, or through the Stadia app on other devices. Google Chrome is going to be your obvious preference on PC. Inside the service, you'll be presented with a home screen of offers and games you can purchase, claim, or play depending on the nature of your account. To do any of that, you just click the big visual boxes for these games to purchase and/or launch them straight from the browser.

Managing your account, including unsubscribing from Stadia Pro if you need to, is also fairly simple. The options appear under your account icon in the upper-right corner of the Stadia browser view, and most of those options sit under the Stadia Settings selection, from subscription to

controller options to game sharing in Google Family accounts.

Speaking of controllers: You do not need the Stadia controller to play games with Stadia. We were able to play with an Xbox One controller connected to the PC with no issues. For the games that support it, you can also play Stadia games with a mouse (fave.co/3cn3M5B) and keyboard (fave.co/3cpTSzO).

We did see a couple of quirks, though. When you launch a game, it will launch in a full-screen view that locks in your cursor to that monitor if you have multiple displays. However, not all games have an Exit or Quit to Desktop option in their menus. This is what happened with *Terraria*, and there was no indication on how to actually leave the full screen to get back to the Stadia interface or

anything. For these instances, all you need to do is press F11 on your keyboard for the standard browser full-screen toggling or hold down the Escape key, and you'll get a Stadia menu to either go back to the game or exit it, but there was nowhere in the Stadia startup process that explained that to us.

There were a couple of times where a game experience just froze up and crashed outright, and there was no message or information indicating what happened. It's just as frustrating as those times a game just crashes to the desktop on a PC without any kind of error message.

GAME PERFORMANCE

To note for our tests, our internet connection speed test (fave.co/3zaYPFQ) results were



Cities: Skylines running on Google Stadia.



Google Stadia lets you play your favorite games without having to shell out for expensive hardware.


about 447Mbps down and 22.6Mbps up, which definitely meets the recommended requirements for Stadia services. With that in mind, the in-game experience for the Stadia games we tried out was superb. In testing games like *Bloodstained Ritual of the Night*, *Control Ultimate Edition* and *Cities: Skylines*, everything both felt and looked great, especially with Stadia Pro. Performance is almost always exceptional, barring any game crashes for our playtimes and testing.

We weren't really able to dig into any graphics options on the games, as they seem to have preset restrictions to fit whatever systems are running things on Google's end. Regardless, it was all smooth, responsive, and had no notable performance drops, lag

spikes, or stream artifacts—even on a 4K display.

BOTTOM LINE

Google Stadia can provide the console gaming experience without requiring that get any expensive hardware, and it can look even better with its Pro subscription. You still have to buy most of your games, but if you're coming at

it as your primary gaming service, that's not a bad way to go about it. 

Google Stadia



PROS

- Ease of access to the whole platform.
- 4K display support that genuinely works.
- Some fairly deep game discounts for Stadia Pro members.

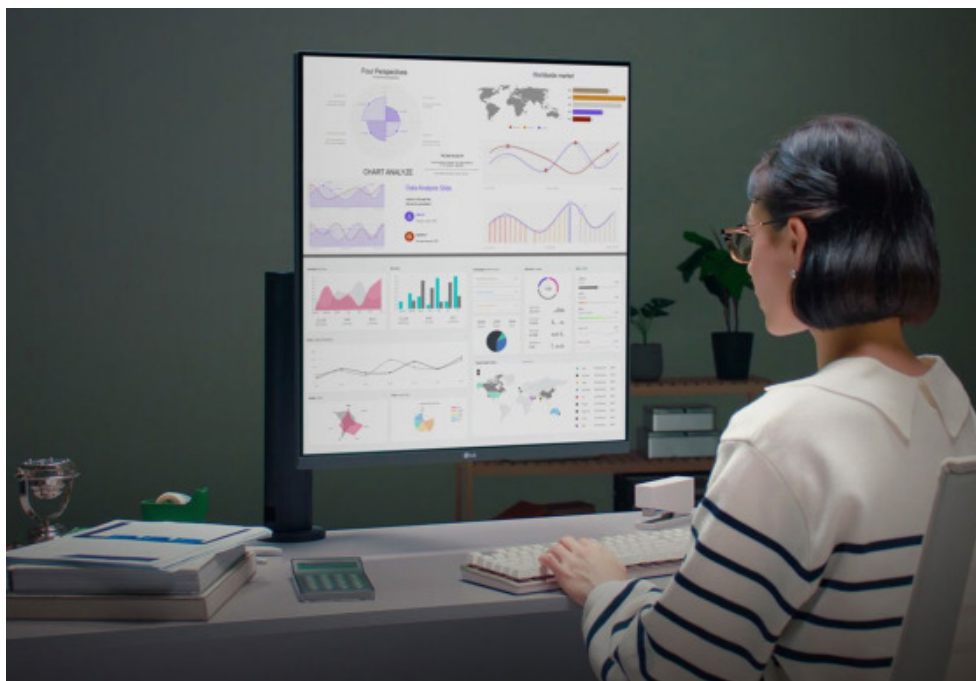
CONS

- The "Free" games with Stadia Pro have been somewhat lackluster.
- Game library is a bit behind the mainstream.

BOTTOM LINE

Google Stadia offers a wide array of titles to choose from, and its easy-to-use interface makes for an enjoyable cloud gaming experience. Overall, this is one of the best cloud gaming platforms available, especially if you opt for the Pro subscription.

\$10



LG DualUp 28MQ780-B: You've never used a monitor like this

Beauty is in the eye of the beholder. **BY MATT SMITH**

The LG DualUp 28MQ780-B is a strange monitor that instantly generated controversy when it appeared at CES 2022. Some were left scratching their heads. Others swore it would perfectly fit their setup. I can see where both sides are coming from—but, ultimately, the monitor left me convinced it will find a loyal audience.

THE SPECS

The LG DualUp 28MQ780-B has just one unusual specification, but it's a doozy: a 28-inch, 16:18 aspect ratio display with 2560×2880 resolution, similar to cramming two standard 2560×1440 monitors on top of each other. Odds are you've never used a monitor like it.

Display size: 28-inch, 16:18 aspect ratio

Native resolution: 2560×2880

Panel type: IPS

Refresh rate: 60Hz

HDR: Yes, HDR10

Adaptive sync: No

Ports: 2x HDMI, 1x DisplayPort, 1x USB-C with DisplayPort Alternate Mode and 90 watts Power Delivery

Stand adjustment: Height, tilt, swivel, pivot, depth

VESA mount: Yes, 100x100mm

Speakers: Yes

Price: \$699.99 MSRP

That aside, the monitor is similar to other high-end productivity monitors with USB-C. It has an IPS panel with a 60Hz refresh rate and supports HDR. The USB-C power supports up to 90 watts of power—enough to charge many prosumer Windows laptops, and all current MacBook Pro models, while in use.

ASPECT RATIO

The DualUp 28MQ780-B is a 28-inch monitor but has a 16:18 aspect ratio. It's barely wider than a typical 21-inch monitor yet taller than a 32-inch monitor.

This is an odd fit for average day-to-day use. I'm in favor of taller monitors, such as a 16:10 aspect ratio, but the DualUp 28MQ780-B is so tall that the top of the screen falls out of my focus. That's

not especially useful for editing documents or browsing the web.

On the other hand, this monitor can be fantastic for photography. Most photos I edit are in a 3:2 or 1:1 aspect ratio, which is a better fit for the DualUp 28MQ780-B than a widescreen monitor. I can better enlarge the photo for careful editing.

I also create videos for YouTube (fave.co/3RJJEu0), and I appreciate the wide range of workflow layout options this monitor can provide in video editing software. I found it easier to view the video timeline in detail. Some editors may not like that this monitor's aspect ratio is a bad fit for previewing your content. Yet speaking for myself, as a small part-time YouTube creator, the ease of editing is more important than a pristine preview.

While this monitor is advertised as a 16:18 aspect ratio, it can easily pivot into a 18:16



You can see what unusual proportions the DualUp 28MQ780-B has compared to a standard aspect-ratio display.

aspect ratio. In this orientation, it's almost exactly as wide as a 24-inch widescreen monitor, but it's much taller, offering over 50 percent more total display space. I enjoyed this mode for day-to-day use and for document editing.

But, of course, there are use cases where the DualUp trips up. It's not a good choice for viewing widescreen video because of the huge black bars forced above and below the video. It's even worse if you work in an ultrawide aspect ratio for a cinematic look.

Gaming is a bust. Many games will accept the monitor's unusual resolution, but this isn't universal. Interface elements designed for a widescreen display may appear wide relative to the overall size of the display.

There's one final use case to note: as a second monitor. A widescreen monitor turned 90 degrees can be a useful second display, but the aspect ratio is an odd fit—it often feels too tall and narrow. The DualUp, however, is an excellent size. It's exactly as tall as a 24-inch monitor turned 90 degrees but provides enough width to tile four (or more) windows at once.

DESIGN

The LG DualUp 28MQ780-B's design is dominated by the aspect ratio, but there is more to it than that.



The LG DualUp 28MQ780-B uses an arm as opposed to a stand. This combined with its unique dimensions requires careful consideration of your available desk space.

This monitor clearly targets professional use with slim bezels, a small bottom chin, and a plain matte gray rear panel. There's no flashy branding or LED backlighting.

LG leans into this by including a monitor arm instead of a stand. The arm is designed to clamp onto the rear of a desk or fit through the standard circular cutout found in many desktops. It offers height, tilt, swivel, and pivot adjustment. The arm can even move the monitor forward and backward or permanently hold it at an unusual angle.

Though useful, the combination of a tall display with a large monitor arm makes the DualUp 28MQ780-B hard to fit in tight spaces. It was too tall to sit on my usual desk, which has shelves above it, and the arm holds the monitor a bit too close to the user when on a typical home office desk that's 20 to 30 inches deep.

The DualUp 28MQ780-B seems designed for use on a floating desk that provides ample space and isn't bordered by a wall or shelving. This is common in an office building, of course, but more difficult to achieve in a home setting.

FEATURES AND MENU

Unusual design aside, the LG DualUp 28MQ780-B has most of the features you'd expect from a high-end USB-C monitor.

The most important is a single USB-C port with DisplayPort Alternate Mode and Power Delivery of up to 90 watts. This is enough to charge most modern laptops over a standard USB-C connection. It falls short of some high-end models, like a Dell XPS 17 with discrete graphics—but that's true of all USB-C monitors currently sold.

Additional video inputs include two HDMI ports and one DisplayPort. That makes for a total of four video inputs. I'd prefer to see two DisplayPort and one HDMI, as I expect this monitor will be used with multiple PCs. Still, this is a pretty good range of connectivity. The monitor has a USB-B upstream port used to drive two USB-A 3.0 downstream ports for additional connectivity. Users can choose to use the USB-C or USB-B port to connect with the two USB-A ports, adding versatility.

There's no ethernet and no video-out, which puts the DualUp 28MQ780-B behind similarly priced USB-C hub monitors like the Dell U3223QE ([fave.co/3y8gMnV](https://www.fave.co/3y8gMnV)). A headphone jack rounds things out.

On-screen menus are controlled with a simple, intuitive joystick on the monitor's chin. The menus are snappy and clearly labeled. A variety of image-quality adjustments are available, including color temperature, color calibration, and gamma, though the temperature and gamma adjustments are limited to a few options. The monitor has sRGB and DCI-P3 color space modes—not something most people need to worry about but useful for professionals working on content that demands a specific color space.

Speakers are included and, to my surprise, they're fine. They offer a high maximum volume, clear presentation, and a bit of bass kick. The speakers are good for



LG DualUp 28MQ780-B menu.

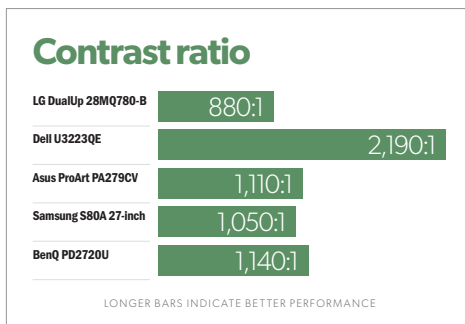
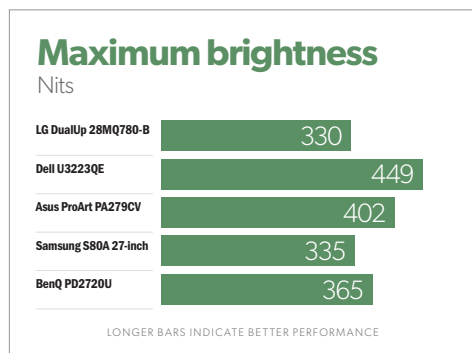
casually playing music in the background while working or previewing audio during a video edit.

SDR IMAGE QUALITY

Aspect ratio aside, the LG DualUp 28MQ780-B is a typical example of a quality IPS monitor meant for professional use. It has solid brightness and contrast, but it's the monitor's color performance that stands out.

Maximum brightness comes in at 330 nits. As is obvious on the graph, this is a bit low for a monitor sold in 2022. It's an acceptable level of brightness for most situations but can seem a tad dim if used in a bright, sunlit room with no light control.

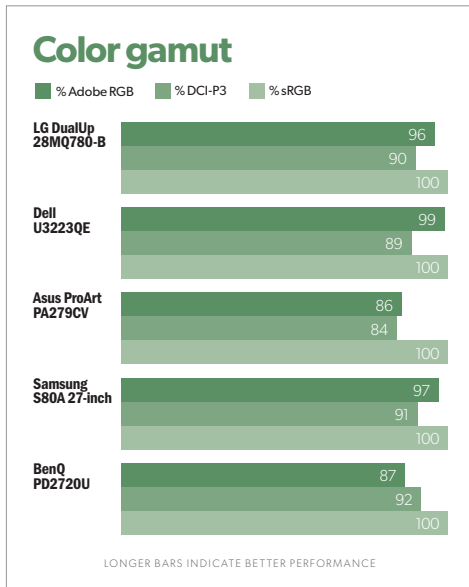
The monitor's maximum contrast ratio is 880:1. This is decent but not exceptional performance for a modern IPS monitor. It has enough contrast to add some depth and avoid a washed-out look, but dark scenes in movies and games can seem hazy and high-resolution movies look a bit flat.



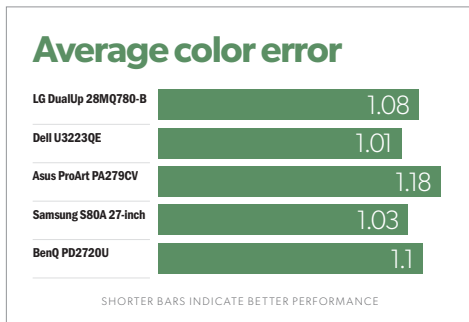
The DualUp 28MQ780-B has a wide color gamut supporting all of sRGB and 96 percent of DCI-P3. This monitor can display an extremely wide range of colors, though it does fall a hair behind the best competitors, such as Dell's U3223QE and Mini-LED monitors like the Viewsonic XG321UG. The DualUp's color gamut is enough to satisfy most, though certainly not all, photo editors, video editors, digital artists, and other content creators.

This is an 8-bit panel and does not support native 10-bit color. Though that's a minor disappointment, I'm not surprised to see a lack of 10-bit color given the DualUp 28MQ780-B's price tag, which, though on the high end generally, is relatively modest for a professional display.

Color accuracy is very good, competing well with that of other monitors in its price bracket. Some alternatives are more accurate, but the DualUp 28MQ780-B will not give most owners a reason to complain. Content appears lifelike, realistic, and vivid.



The monitor performed well in other metrics. It had a good out-of-box gamma curve of 2.3, barely off the target of 2.2, so images were just a hair darker than they should be. Color temperature was also solid at 6800K, which is a tad cooler than ideal. I doubt most people will notice anything amiss



with either, and the monitor offers adjustments for fine-tuning these aspects of image quality.

Sharpness is excellent. The monitor's resolution of 2560×2880 works out to 137 pixels per inch, while a 28-inch 4K widescreen has 157 pixels per inch. Fonts appear crisp, images and videos look detailed, and 3D games show minimal shimmer along fine edges while in motion.

In summary, the LG DualUp 28MQ780-B offers competent, though not exceptional, SDR image quality. It leans heavily on color gamut and accuracy to deliver a vivid, realistic look, but it can struggle with dark, moody content.

HDR IMAGE QUALITY

The LG DualUp 28MQ780-B includes an HDR badge in its marketing but is not VESA DisplayHDR certified and makes no specific promises aside from the ability to accept an HDR10 signal.

An HDR signal is detected automatically and the monitor properly switches into HDR mode. Once there, I measured a maximum sustained brightness of only 348 nits. That is among the lower figures I've seen from an HDR monitor. Most HDR compatible monitors I test can achieve at least 400 nits.

This, along with the monitor's modest contrast, makes for a disappointing experience. HDR content often looks washed-out, especially at high brightness, as bumping up brightness also increases the brightness of areas that should appear dark.

To be fair, the DualUp 28MQ780-B's flaws are present in similarly priced competition. Shoppers looking for a great HDR experience will need to expand their budget to include Mini-LED and OLED monitors, such as the Viewsonic XG321UG and Alienware AW3432DW.

MOTION CLARITY

The LG DualUp 28MQ780-B makes little effort to improve motion clarity or deliver smooth motion in 3D games and apps. It has a standard 60Hz refresh rate and supports AMD FreeSync, though this is not turned on by default.


Motion clarity is typical of an average IPS display. Fast-moving objects have enough detail to be recognizable in most situations, but there's significant blur around details. When viewing the classic UFO test (fave.co/3Ogreyo), for example, I noticed the eyes of the alien appeared to blend together in motion.

A few response time modes are included, but any increase in clarity was offset by noticeable overshoot, which caused trailing artifacts to appear behind moving objects.

Still, the monitor's performance is just fine for its intended use. The LG DualUp 28MQ780-B is built for working with content that is either static or viewed at a low frame rate. It's not made for gaming or for high-frame-rate video.

BOTTOM LINE

The LG DualUp 28MQ780-B is an intriguing option in a sea of monitors that often more or less do the same thing. Its image quality is merely good, and it won't even fit on small desks, but it offers unique value for anyone who works with content that's as tall as it is wide. It's also a great secondary monitor that's easy to position and offers ample display space. Pricing also works to the DualUp's advantage. Though it's not inexpensive, its pricing is similar to that of other professional displays. It doesn't feel as if LG is using the monitor's unique design as an excuse to inflate the price.

This monitor is not for everyone—but if you work in certain aspect ratios, or you want an amazing second monitor, snag this display while you can. There's no guarantee it will receive a sequel. 

LG DualUp 28MQ780-B



PROS

- Makes an awesome second monitor.
- Highly adjustable stand.

CONS

- Difficult to fit in a small home office.
- USB-C port offers limited downstream connectivity.

BOTTOM LINE

Though it may not appeal to the masses, the LG DualUp 28MQ780-B offers something unique in an oversaturated display market. Its image quality may not turn heads, but it still provides excellent value for a second monitor, and creators who work in different aspect ratios would do well to consider snapping one up while they are around.

\$699

Alienware x15 R2: A gaming laptop stacked with power and personality

Dell's new premium 15-inch gaming laptop is a class act. **BY DOMINIC BAYLEY**



The Alienware x15 R2 returns in the same exciting design that made the Alienware x15 R1 so unique—sharing, among other things, its Lunar White chassis and dazzling RGB Tron Ring lighting. Adding to the fancy looks, it packs a lethal hardware combination that delivers performance worthy of elite gamers, a zippy 12th-gen Intel CPU, and RTX 3080 Ti GPU.

Its small quirks, such as its hard-to-reach rear ports and middling battery life, are dwarfed by its other winning features, like the beautiful, buttery smooth 15.6-inch QHD display.

For \$3,350, it doesn't come cheap, but when the scales tip so heavily in favor of performance and style, this laptop remains a class act worth buying.

SPECIFICATIONS

Our review unit is packing an Intel Core i7-12700H CPU, an RTX 3080 Ti GPU, 32GB RAM, and 1TB of PCIe NCMme SSD storage. For additional spec information, check out the list below.

CPU: Intel Core i7-12700H

RAM: 32GB LPDDR5/5200MHz

GPU: Nvidia GeForce RTX 3080 Ti

Display: 15.6-inch QHD (2560×1440), non-touch, 240Hz refresh rate, Advanced Optimus, G-Sync

Storage: 1TB M.2 PCIe NVMe SSD

Ports: USB 3.2 Gen 1 Type-A (with PowerShare), USB 3.2 Gen 2 Type-C, HDMI 2.1, microSD reader, power adapter, 3.5mm combo jack

Networking: Wi-Fi 6E (802 11ax), Bluetooth 5.2

Dimensions: 14.16×10.92×0.49–0.63 inches

Weight: 5.2 lbs.

Color: Lunar Light

Battery capacity: 87 Whr

Price: \$3,350 at Dell

DESIGN AND BUILD

Last year's Alienware X15 R1 broke new ground in Dell's premium notebook lineup, introducing an original design that swapped out its side ports for a rear port panel. It also offered gamers a choice of Intel's powerful 11th-gen Tiger Lake processors, which is icing on the cake for those wanting a laptop with unique looks as well as performance.

The x15 R2 is a chip off the old block, featuring the same exciting design, while also boasting equivalent hardware upgrades to

the tune of Intel's 12th-gen Alder Lake mobile processors, the latest Nvidia GeForce RTX 30 Series GPUs and faster DDR5 RAM. I say "exciting design" because the sloping rear port with Tron Ring and unit's console-like display look otherworldly.

The R2's dual color scheme is also striking. The exterior consists of a Lunar Light (pale gray) case, which distinguishes it in an ocean of predominately matte black gaming laptops. But flip the lid open and matte black is used, and



An RGB-lit alien head logo sits atop the keyboard and doubles as the R2's power button.

to dramatic effect; it covers the whole surface, from the rounded outer edges to the thin bezels, ensuring that the stunning QHD display really pops out.

The outer surface is also conveniently coated in a High Resistance Clear Coat to prevent stains. Both surfaces also hide fingerprints extremely well.

Sizing the laptop up, the x15 R2 measures 14.16×10.92×0.63 inches. Comparatively, that makes it larger but thinner than the likes of the 2022 Razer Blade 15 (13.98×9.25×0.67 inches) and the Dell G15 Gaming Laptop (14.07×10.74×1.2 inches). As Dell's thinnest 15-inch gaming laptop, it slips easily into a laptop sleeve or a backpack.

The iconic Alienware styling we saw on the 2021 Alienware x15 R1 also returns with vengeance. You'll find two RGB-lit alien head logos embedded in the chassis—one that sits atop the keyboard and doubles as the R2's power button, and the other placed inches from the exterior top of the lid. These deliver a sense of mystique that gamers will definitely appreciate.

Below the panel that frames up in a 16:9 ratio, the word Alienware is inscribed in familiar typography, while honeycomb-shaped perforations, which we've seen a lot of in gaming laptops this year, decorate the



The sloping rear port with the Tron Ring looks otherworldly.

laptop's base, providing plenty of eye candy viewed from front on. They also take up residence on its underside as useful air vents for cooling.

The RGB lighting also sets the x15 R2 apart as it is a little more refined than in some gaming laptops. I got a kick out of how it's used to suggest a kind of alien intelligence befitting the laptop's extraterrestrial theme. For example, the per-key lit keyboard lights up with full RGB colors upon startup and then turns blue, just as you'd expect the cockpit of some highly advanced alien spacecraft to do. The power button adorned with an alien head also flashes from blue to yellow when you insert the AC adapter, two nice touches that add to the laptop's appeal.

When it comes to build, the x15 R2's chassis is made from magnesium alloy and

feels very solid. However, it's slightly less solid than another laptop we recently reviewed—the 2022 Razer Blade 17, a laptop that demonstrated almost immovable rigidity throughout.

This is surprising given the x15 R2's weight, which is 5.2 pounds, noticeably heavier than the 2022 Razer Blade 15 (4.43 lbs.) and the 15.6-inch Acer Nitro 5 (4.77 lbs.). Is the X15 R2 flimsy? Not by any means. But its chassis could have been tougher.

KEYBOARD AND TRACKPAD

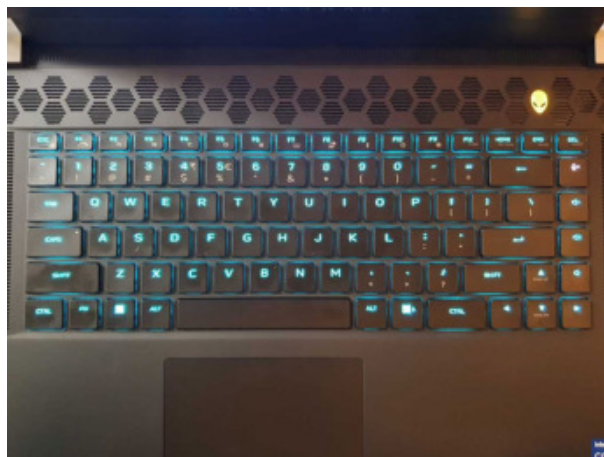
The x15 R2's Alienware X Series keyboard has all the hallmarks of a premium gaming keyboard. It sports per-key RGB Alien FX backlighting that can be customized in the Alienware Command Center app. The keys, which feature large keycaps and a respectable 1.5mm travel, feel light to tap and

respond quickly. Dell has incorporated N-Key Rollover and Anti-ghosting technologies for improved accuracy in the heat of battle.

The keyboard layout is a delicate balance of give and take, in that it omits a numpad but adds full-size arrow keys that make skipping through menus a lot easier. You'll also find standalone audio keys, including mute, microphone, and volume keys that simplify control of media. However, the half-size function keys may take a little getting used to if you're a heavy user of them.

The backlighting looks superb, but all that spectacular illumination is reserved for the primary symbols on keys only. This means secondary symbols can be a little difficult to see in low-light conditions.

Below the keyboard sits one of the smallest trackpads I've used. It measures just 4.2×2.5 inches. Admittedly, trackpad sizes are a deeply personal preference, but I've always found large ones to be a little slow in games where I'm not using a mouse. The R2's diminutive trackpad, however, allows your finger to traverse the entire length a lot quicker. It also feels silky smooth to the touch, so it gets full marks from this reviewer.



The keyboard's backlighting looks superb.

DISPLAY

Dell offers three flavors for the x15 R2's display, two with FHD 1080p resolutions and either 165Hz or

360Hz refresh rates or a QHD 1440p display with 240Hz refresh rate. All three options sport Nvidia G-Sync and Advanced Optimus technologies.

With the display bench set high this year by the Razer Blade 15's OLED panel, I was particularly interested

to see how our review unit's QHD 240Hz one would shape up. Thankfully, the 100 percent DCI-P3 IPS panel looked and performed a treat in games, producing vibrant rich colors, with surprisingly crisp detail in images as well as text.

Armed with Nvidia G-Sync, a 2ms response, and a 240Hz refresh rate, it virtually obliterated any stuttering or input lag, delivering buttery-smooth animation in games like *Far Cry 5* and *Cyberpunk 2077*.

A peak brightness rating of 400 nits also provided excellent contrast, showing up deep blacks and full-bodied gray tones that I was happy to show off in group gaming sessions—and that would surely be an asset in a content creation context.

ComfortView Plus technology is another neat addition to the x15 R2's panel that provided a little extra comfort for my eyes during long play sessions. It's a built-in, always-on technology that reduces blue light



A Valheim screenshot taken on the Alienware x15 R2's QHD display.

emissions. I never noticed it working in the background, but I did find my eyes were a little less blurry after playing.

WEBCAM AND AUDIO

Gaming notebooks aren't known for the quality of their cameras. The x15 R2 HD 720p Windows Hello IR compatible camera, however, does a satisfactory job of reproducing what's in front of it.

It handles dimly lit rooms a little better than overhead lights, which can distort images a little and produce glary halo effects. I found this perfectly acceptable for gaming chats, where I was mostly playing in a dimly lit room anyway.

Testing the x15 R2's speakers revealed a relatively clear, crisp audio that was altogether surprising considering the laptop's pencil-thin 0.63-inch chassis. They also handled bass notes remarkably well. Unlike the R1, the x15 R2 packs a secret weapon in the form of

Dolby Atmos spatial audio technology, which delivers a noticeable immersive quality.

CONNECTIVITY

The x15 R2 ticks off at least one port for each of your varied I/O needs, including USB 3.2 Gen 1 Type-A, USB 3.2 Gen 2 Type-C and Thunderbolt 4 ports. However, with so many devices to plug into my laptop these days—mouse, headphones, and so on—I did find myself wishing I had another USB-C port at my fingertips.

This was easily fixed by plugging in a USB-C Hub. The x15 R2's Type-C USB can also be turned into an Ethernet port with the conveniently supplied USB-C to RJ45 adapter, so you can still get the fastest connection, if nothing but the best will do.

Like the R1, the x15 R2's ports are housed in a panel at the back of the laptop. One advantage of this is you can discreetly hide unsightly cords or dongles. A small peeve is you'll need to physically stand up and lean over the back of your laptop, or spin it around to face you to plug anything in. Even then, the R2's Tron Ring RGB light casts a dark shadow, making the ports difficult to see without a lamp.

Still, I liked how the rear configuration lent itself to a desktop-like setup, allowing me to attach multiple devices and not have to worry about them cluttering up my desk. The x15 R2 also supports the latest Wi-Fi 6E and Bluetooth 5.2 technologies, putting it right up there with the fastest gaming laptops of this year for connectivity.

PERFORMANCE

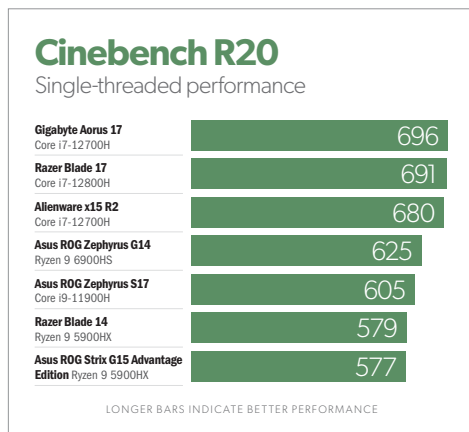
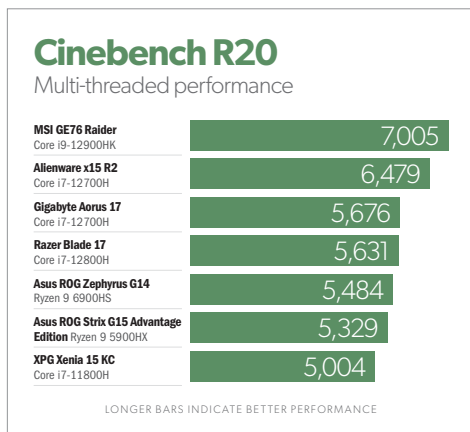
Testing the laptop's performance proved it had plenty of power to match its unique looks. My \$3,350 review unit came with a 14 Core, 20 Thread Intel 12th-gen i7-12700H CPU—the same as in the \$2,150 base unit.

For GPU, it traded out the base unit's vanilla RTX 3060 GPU for a beefier "enthusiast class" Nvidia RTX 3080 Ti, granting it an extra 3584 Nvidia CUDA Cores. Since its launch back in January 12, 2021, this mobile GPU has proven itself an outstanding performer in PCWorld testing, especially when paired up with Intel 12th-gen CPUs that utilize Intel's new hybrid architecture. A 1TB solid state drive and 32GB DDR5 RAM rounded off the x15 R2's performance-based specs.

For charting my benchmark results, I pulled comparisons from a stable of gaming



The Alienware x15 R2's rear ports. The laptop has been switched off to disable the RGB Tron Ring, which makes them hard to see.



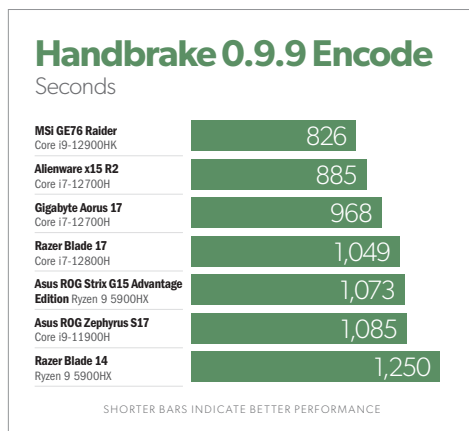
laptops that included the Razer Blade 17 and MSI GE76 Raider, both of which feature the same RTX 3080 Ti GPUs but sportier Intel 12th-gen CPUs. I also included the Gigabyte Aorus 17, whose identical Intel Core i7-12700H and GeForce RTX 3080 Ti CPU/GPU combination allowed me to compare apples with apples.

My performance testing began with Maxon's Cinebench R20 benchmarks. In the Cinebench multi-threaded benchmark, which tests all the cores of our laptop's CPU, the x15 R2 placed a close second behind our current fastest comparison laptop, the mighty MSI GE76 Raider, proving it has plenty of CPU power to rip through high-end games and CPU-demanding tasks like video editing and encoding.

Where running simple programs and apps is concerned, the x15 R2's Intel i7-12700H also delivered ample dollops of

power, as shown by its high-end score of 680 in the Cinebench R20 single-threaded benchmark chart above.

Next up, I ran the HandBrake 0.9.9 benchmark, a test that gauges the laptop's ability to control thermals before it needs to throttle performance. Here our laptop outpaced the likes of the Razer Blade 17 and



even finished ahead of the Gigabyte Aorus 17, an excellent result considering the extra thermal headroom these 17-inch laptops enjoy in comparison to some smaller laptops.

GAMING PERFORMANCE

In our most graphically demanding gaming benchmark, which measures performance in the first-person shooter *Metro Exodus*, the Alienware x15 R2 managed an average frame rate of 48 frames per second—not too far off the pace of the Razer Blade 17 and comfortably ahead of the Gigabyte Aorus 17.

Looking now at the chart for the *Rise of the Tomb Raider* benchmark, the x15 R2 once again scored closer to the top of our chart. This time the Gigabyte Aorus 17 came up trumps, its faster i7-12800H CPU likely gaining the upper hand in this older, more CPU-skewed test.

To summarize our testing results: Barring two of our benchmarks, the x15 R2 beat the laptop that most closely matched its hardware specifications—the Gigabyte Aorus 17. It also kept pace with hardware-stacked laptops like the Razer Blade 17, proving it has enough power to deliver the kind of high-end gaming experience gamers want in 2022.

We expected that the x15 R2's 3080 Ti GPU would step up to the task in graphically demanding games, but we were pleasantly surprised by how well its mid-range 12th-gen CPU pulled up in CPU tests and in a challenging field of comparisons nonetheless. Our review unit's strong performance was likely egged along by its 32GB next-generation DDR5/5200MHz RAM. This RAM provides twice the bandwidth and density of the slower DDR4 RAM in most of our comparisons, which translates into faster

Metro Exodus: Extreme Preset 19x10

Frames per second

MSI GE76 Raider Core i9-12900HK	56
Razer Blade 17 Core i7-12800H	53
Alienware x15 R2 Core i7-12800H	48
Asus ROG Strix G15 Advantage Edition Ryzen 9 5900HX	48
Gigabyte Aorus 17 Core i7-12700H	45
Razer Blade 14 Ryzen 9 5900HX	42
XPG Xenia 15 KC Core i7-11800H	41

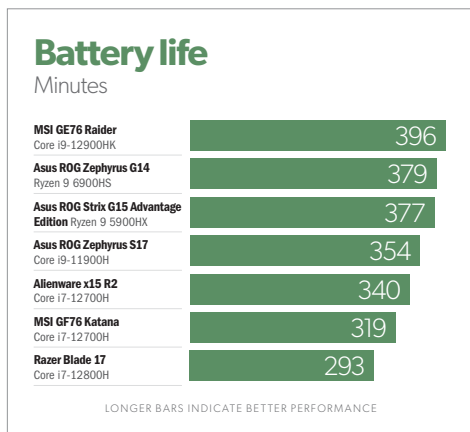
LONGER BARS INDICATE BETTER PERFORMANCE

Rise of the Tomb Raider: 1,920x1,080, Very High

Frames per second

Razer Blade 17 Core i7-12800H	158
Gigabyte Aorus 17 Core i7-12700H	149
Alienware x15 R2 Core i7-12700H	128
Adata XPG 15 KC Core i7-11800H	114
Asus ROG Strix G15 Advantage Edition Ryzen 9 5900HX	112
Acer Nitro 5 Ryzen 7 5800H	101
Razer Blade 14 Ryzen 9 5900HX	84

LONGER BARS INDICATE BETTER PERFORMANCE



processing for memory-based applications like high-end gaming. However, since it comes soldered onto the x15 R2's motherboard, you'll want to ensure you have the right amount onboard from the get-go.


For performance diehards, Dell also offers an upgrade to Intel i9-12900H for just \$100 more—a CPU rated to deliver slightly faster clock speeds than the i7-12700H. But judging by our configuration's efforts, you won't necessarily need to drop the extra cash to enjoy performance right up there with that of the fastest laptops we've reviewed this year.

BATTERY LIFE

The Alienware x15 R2 comes with a 6 Cell 87 Whr lithium-ion battery, a decent capacity in a 15-inch gaming laptop. Still, it lasted just 5 hours and 40 minutes in our lightweight battery test, which looped a 4K Hollywood

movie continuously until our review unit ran out of juice. Unfortunately, this puts the x15 R2's battery performance in the lower echelons of our performance group—closer to the Razer Blade 17 than the longer-lasting MSI GE76 Raider. The takeaway? You can expect approximately 3 hours of battery life when gaming unplugged, which isn't something to celebrate.

BOTTOM LINE

The Alienware x15 R2 gets full marks for the all-important three P's: performance, picture quality, and personality. It features a zippy Intel i7-12700H CPU and Nvidia RTX 3080 Ti GPU hardware pairing, beautiful QHD display, and a design that promises to never become boring. This makes it a solid option for those looking for a highly versatile and powerful gaming laptop that pulls out all the stops to impress. 

Alienware x15 R2



PROS

- Ample power for gaming performance.
- Smooth and gorgeous QHD display.
- Stunning otherworldly design with RGB lighting.

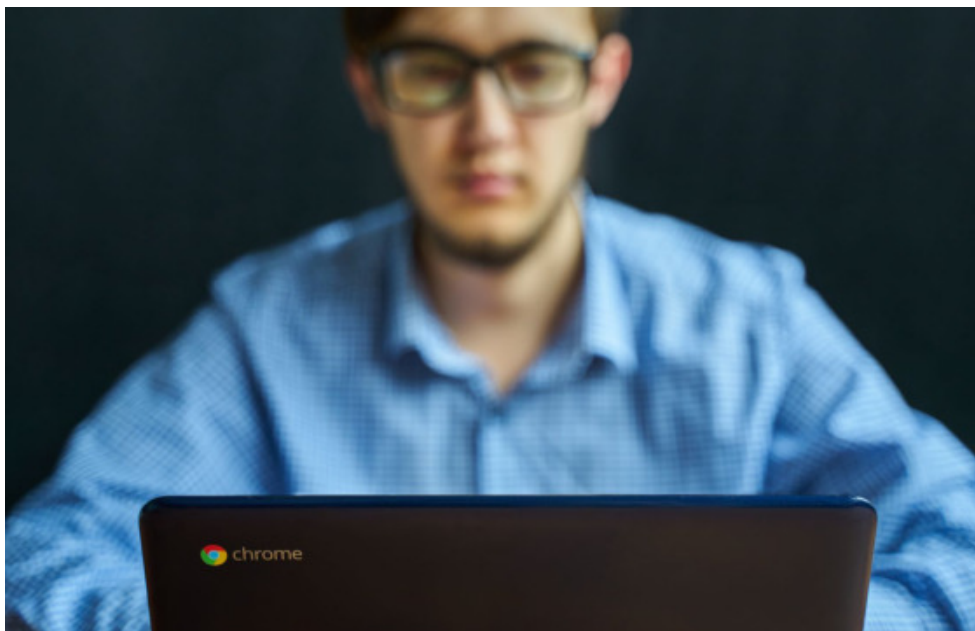
CONS

- Rear-oriented ports can be hard to reach.
- Middling battery life when unplugged.

BOTTOM LINE

The Alienware x15 R2 packs premium hardware that dishes out dollops of performance in games. Its otherworldly design featuring rear-oriented ports and RGB lighting means it never looks boring.

\$3,350



The best free VPN for Chrome

How to play it safe on the cheap. **BY IAN PAUL**

If you have a Chromebook or don't want yet another program on your Windows desktop there is an alternative to a full VPN: a Chrome extension. Many people are looking for a VPN solely to use with their web browser anyway. So why bother with the full program? With an extension you can have your browser appear as if it's somewhere else, while the rest of your desktop programs use the local IP address.

Even better, depending on your needs, you can get this service for free. There are a

number of free "VPN" extensions in the Chrome Web Store. The problem is the same with all other types of free services, however. Namely, which ones do you trust? All of the extension recommendations we have here have been tested by us and the services have been reviewed on Windows.

VPNS VS. PROXIES

The services recommended here also come as full VPNs when you download their respective desktop apps. However, as

Chrome extensions, these services are almost always proxies.

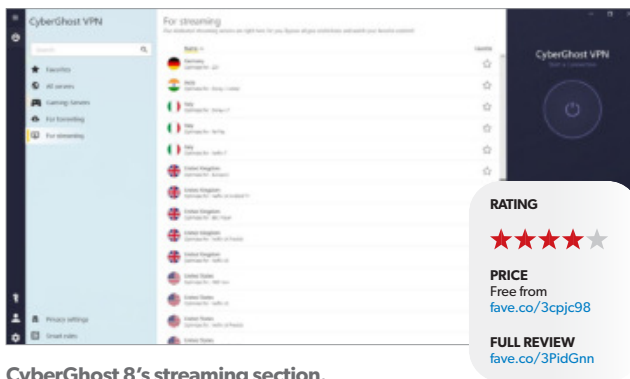
What's the difference? A VPN connects *all* of your computer's traffic to its servers. When that happens, no matter whether you're connecting with Chrome or the Epic Games Launcher, your computer programs believe they are in whatever location you selected in the VPN app.

A proxy via a Chrome extension, meanwhile, only tunnels the traffic for the

browser it's running in. The only exception to this is on Chrome OS, where Google provides an API that allows Chrome extensions to function as a VPN. That API is not available on other operating systems such as Windows or macOS. In this article, however, we won't worry about that distinction. Nearly all of the extensions identify themselves as proxies with the exception of ZenMate. We've asked ZenMate to clarify its status on Chrome OS, but we have yet to hear back.

1. CYBERGHOST

CyberGhost offers good speeds, and, as is the case with some others on this list, it doesn't require an account to use its free service on Chrome. CyberGhost's free proxy offers four locations, and that's about all there is to it. It doesn't offer any settings or extra features. What makes this extension our top choice is that it has no bandwidth limits or usage caps. Even though there are no settings to speak of, it



CyberGhost 8's streaming section.

does show a small advertisement for upgrading to its paid service at the bottom of the extension window.

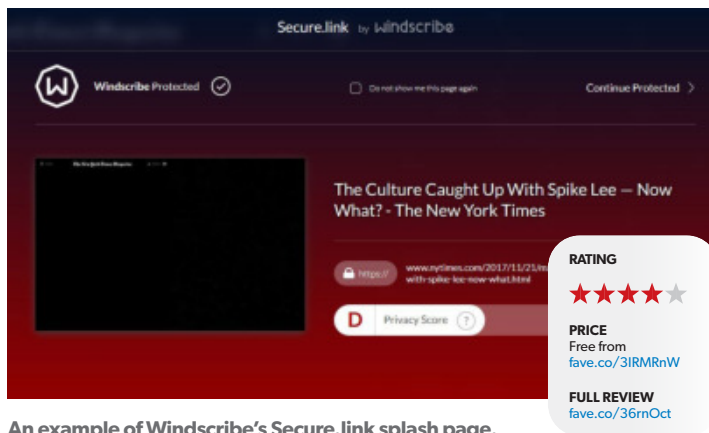
2. WINDSCRIBE

Even though Windscribe isn't at the top of any of our other best VPN lists, we really like this service. It has good speeds and a nice free offering.

Usage is limited to 2GB per month, which is pretty good for everyday web browsing. It won't be as good for streaming at 1080p or higher—you'd max out your bandwidth in less than an hour. You get 14 virtual locations to

choose from, but not any of the Netflix streaming specialty servers. Free users can also use Windscribe's ad-blocking features, which includes a number of helpful additions like dismissing all those cookie notification banners (not on by default), as well as

blocking social networking widgets and buttons (also not on by default). You don't have to give Windscribe your email address, but you do need to create an account with a



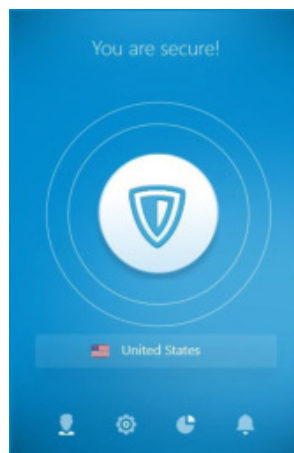
An example of Windscribe's Secure.link splash page.

username and password. The downside is you'll need to remember them both as there will be no hope of account recovery without an email address.

3. ZENMATE

Another worthy choice is ZenMate. We haven't looked at it in quite some time, but we hope to rectify that soon. ZenMate on Chrome is fairly simple. It offers four locations for free including the U.S. As with Windscribe, the free servers don't include any of the specialty streaming servers.

ZenMate also has a number of security features you can activate, including tracker, cookie, and malware blocking. There's also a protection feature for when you enter credit cards. ZenMate's free service doesn't require a login, but it does have ads encouraging you to upgrade to its paid service. It also doesn't



ZenMate
with an active
connection.

RATING
★★★★☆

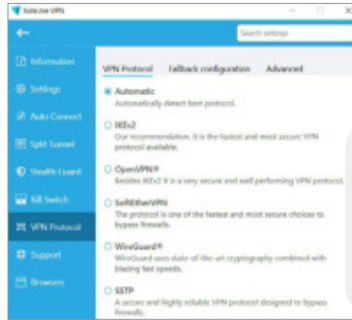
PRICE
Free from
fave.co/3AY1V1h

FULL REVIEW
fave.co/3AY1OCT

have usage limitations, but speeds are capped at 2 megabytes per second.

4. HIDE.ME

Hide.me is another good choice for a free proxy Chrome extension. It doesn't state that it has any bandwidth limits—though the free service for Windows maxes out at 10GB—and it doesn't require an email address. Hide.me offers three server choices as well as protection from WebRTC IP leaks in this free offering.



Hide.
me's VPN
protocols.

RATING



PRICE
Free from
fave.co/37otvbj

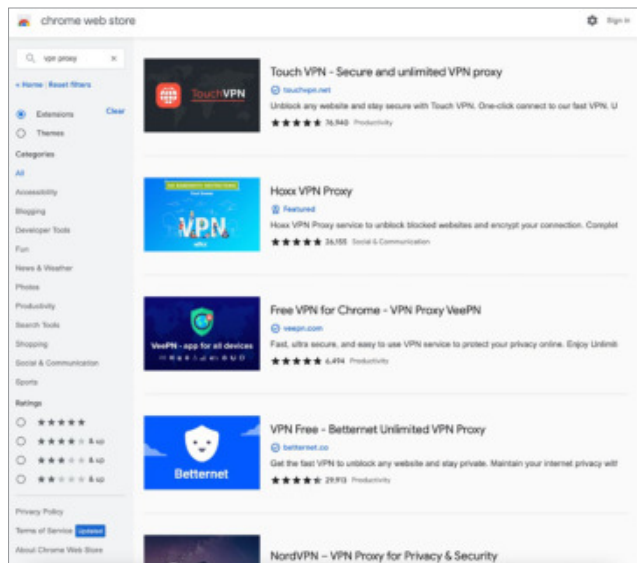
FULL REVIEW
fave.co/3MdnjSu

WHAT TO LOOK FOR IN A FREE CHROME VPN/PROXY EXTENSION

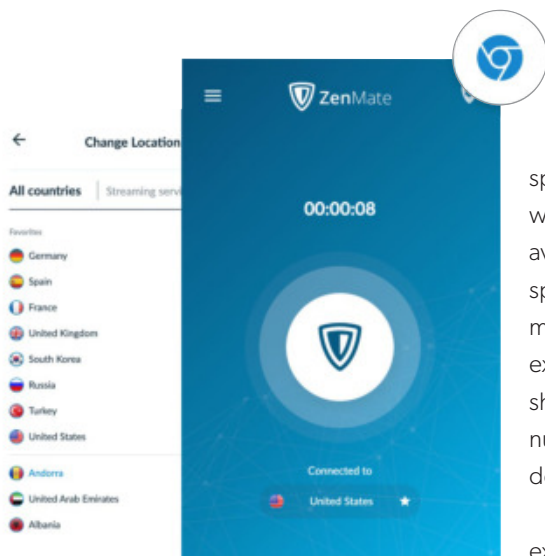
The first thing we'd strongly suggest is downloading an extension from a well-known service. Even with proxies, little-known services may be up to no good, and there's less chance of that coming from known quantities. Also, watch out for unofficial apps from known VPNs. These are easy to identify if you look carefully at the "Offered by" line underneath the extension title in the Chrome Web Store. You can also verify whether it's the real deal by checking out the downloads page on the website of your VPN of choice.

If you just want to use something short term, we'd also recommend going for a

service that doesn't require a login. That said, don't let the account requirement hold you back from using Windscribe's extension if you like the extra features. Speeds may also be a consideration, but all



When deciding upon a VPN proxy, we recommend that you opt for one from a well-known service.



Even ZenMate will be fast enough if all you want to do is surf the web and stream video.

the VPNs mentioned here are fast enough for uses like web browsing and video streaming, so that shouldn't be an issue—even with ZenMate's limits.


HOW WE TESTED

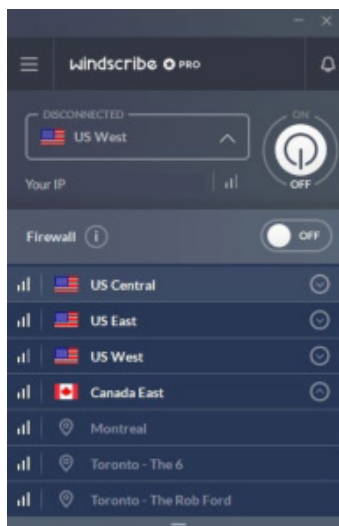
We didn't consider speeds as strongly as we have in other articles. That's because the uses for the browser are more limited. That said, speeds were still a factor and we relied on the results from our Windows app testing as a guide. For Windows testing, we test each service over the course of three separate days. During each test day we select five country locations spread throughout the world and test each location three times. We also take the base

speed—that is, the speed without a VPN—on each testing day.

We then average the testing speeds and the base speeds to come up with a global average. We express that average as a percentage of the base speed. The idea is to show about how much of a reduction in speed you can expect from a VPN as opposed to showing hard megabytes-per-second numbers that can vary based on ISP, devices, and other factors.

During our look at the Chrome extensions we also considered the number of locations, extension design, and extra features.

There are a number of other free VPN Chrome extensions available, but if you ask us, these four are your best bets. 



During testing we considered features such as the number of locations. Here's Windscribe's country list.



YOU MAKE MONEY.

NOW MAKE IT
WORK FOR YOU.

Learn how to save for your
retirement at [WeSaySaveIt.org](https://www.wesaysaveit.org).





A close-up, warm-toned photograph of a person's hands. One hand is holding a credit card, and the other is typing on a laptop keyboard. The background is softly blurred, showing a desk and a chair.

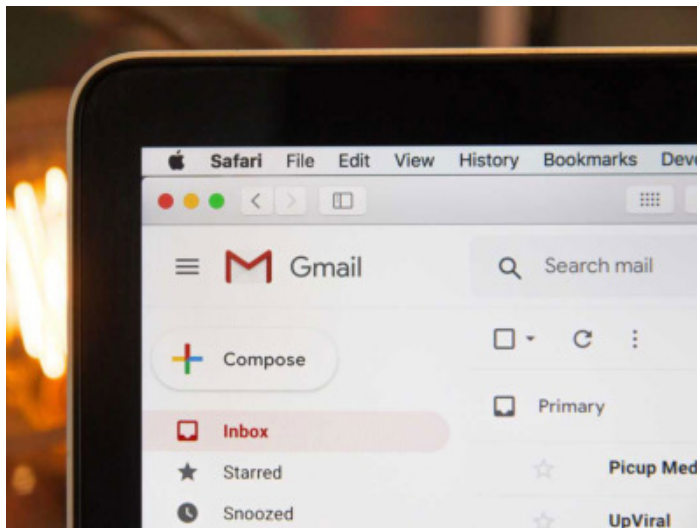
SOFTWARE SUBSCRIPTION OVERLOAD: WHICH SERVICES ARE WORTH PAYING FOR?

YOU CAN TRY TO GO
FREE ON EVERYTHING,
BUT YOU CAN MISS
OUT ON SOME VITAL
FEATURES THAT WAY.

BY ALAINA YEE

I used to pay nothing for the software services I rely on—email, password manager, cloud storage, and more. And those I did need upgraded features for, I could pay once and be set for awhile.

But the bar for privacy and security has risen (an unfortunate side effect of modern tech life), and most companies have ditched one-and-done software licenses in favor of paid subscriptions. Weaving together a comprehensive set of basics can add up fast, especially given all the other subscriptions in our lives. The good news is, you don't have to shell out cash for everything. Some free options cover enough to be more than adequate. The trick is knowing when to scrimp and when to splurge.



Free email services always have some kind of limitation or hidden price, whether that's a restrictive storage cap or use of data collected about you.

This guide will help you wrap your head around free versus premium considerations for the most significant tech subscription types you're likely to use on a phone or computer—and maybe help you save some cash in the process. We didn't wade into entertainment subscriptions (like Netflix or gaming) because that's highly subjective. Let's dig in!

EMAIL

So many people use a free email service that you're probably wondering who bothers with a paid plan. Your typical Gmail or Outlook.com account still has a price, though—not only do you have to endure ads, but data about you is being gathered for use.

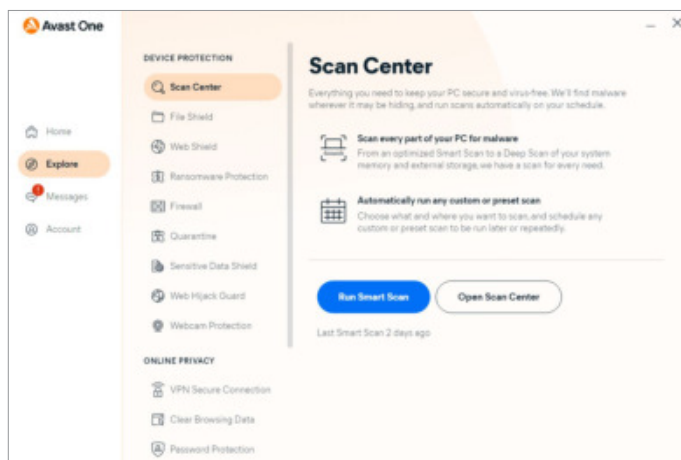
Paying for email keeps you from being the product and, depending on your chosen service, provides stronger security protocols and encryption options, too. You also get a broader range of features included, like support for custom domains (fave.co/3v3KRDd) and masked email (fave.co/3aS7pzQ).

But do you need paid email? Some

people can't see the downside to ads or having their habits recorded for other people's use, after all. It's a personal choice, but ultimately comes down to how much control you want. Consider how often you use email, the amount of email you prefer to keep, the types of features you need, and your general preferences surrounding privacy and security. You can find free plans with stronger privacy and security (always a good thing)—services like Proton (fave.co/3v7X2ij) or Tutanota (fave.co/3zkQwXV) provide them, though with a strict cap on storage (1GB). Paid services with a full set of features run about \$36 to \$48 USD per year, and should ideally include custom domain support, additional email aliases, 10GB to 15GB of storage, and calendars.

ANTIVIRUS

Free antivirus software (fave.co/3RKZ7ut) can work very well—in fact, we're fans of Windows Defender, which does an excellent job at basic protection. But paid antivirus programs (fave.co/3CnDHuk) have their purpose, and the feature enhancements you get (like scheduled scans, deeper control over



Paid antivirus programs are worth the cash, particularly if you have riskier internet surfing habits.

settings, phishing and ransomware protection, and more) can be worth the cash, particularly if you have riskier internet surfing habits.

Risk isn't related to how savvy you are with computers, by the way. You can know plenty about PCs and still engage in activities that can increase your risk of exposure to viruses and malware. Maybe you often hit websites off the beaten path, or you have a job that involves a lot of email with attachments or links. Or you have a relative that's constantly asking you to vet sites, links, and files they're uncertain about. Paid software can help add an extra layer of backup for when you accidentally visit the wrong site or download and open something you shouldn't have. (Yes, virtual machines help with this too, but not everyone has the system resources or interest to be running those.)

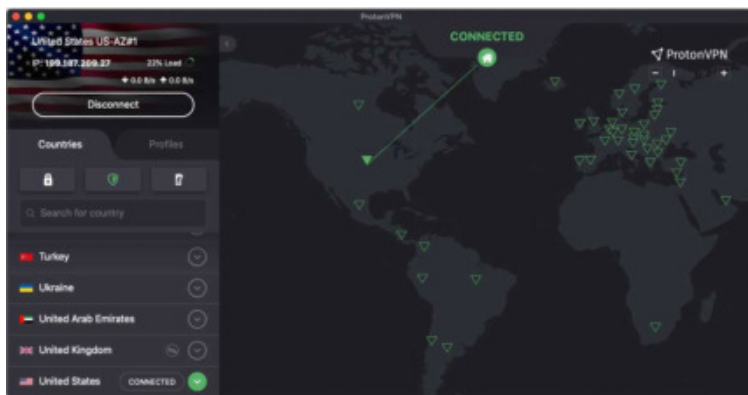
If all you do is check your email, you never click on links, and you mostly visit established sites like Amazon and Facebook with ad blocking turned on, you're probably fine with free antivirus software. But if you know you might stray beyond those borders, paid software is a good call to cover your butt.

VPN

A lot of people don't use a VPN, but those who do typically appreciate the privacy, security, and speed it offers. It's hard to find a free VPN that can compete with paid services.

With speed in particular, you'll see a notable disparity when comparing the top picks in our roundups of the best paid VPNs (fave.co/3FtTtMs) and the best free VPNs (fave.co/3wWhXfp). The paid services blow free ones out of the water. They also have many more worldwide servers—important if you're using a VPN for circumventing geo-targeting or when you're traveling and need a local server.

Paid services also don't allow you to become the product, in which identifying information about you (such as an email



Unless you only engage in very light use, a paid VPN is the way to go for the best security, privacy, and speed.

address) is kept or, worse, your internet browsing habits are monitored in order to sell the data. Nor do they have restrictions on data usage. This is one of the few services where you're better off going paid, unless your need for a VPN is truly minimal. You can save money by waiting for deals (timing your initial purchase around Black Friday is usually a good strategy), or finding a plan that offers a bundled discount with other services you use (for instance, Proton's Unlimited plan includes both the highest tier of VPN service and its mail and storage drive service).

PASSWORD MANAGER

With password managers, a good free service or app (fave.co/3nT9nDq) will cover all the fundamentals. Just protect your account with a strong main password and two-factor authentication, as well as safeguard browser

extensions and apps with a PIN code or password, and you're good to go. You'll be able to easily generate strong unique passwords (and with some free password managers, unique user names and masked email addresses), and then quickly autofill them whenever logging into accounts.

So why use a paid password manager (fave.co/3lRkfRz)? Paid plans offer additional valuable features like more robust sharing options, more sophisticated methods of two-factor authentication, and specialized features such as the ability to hide some of your passwords while traveling. Think of it like the difference between a four-star hotel and a two-star hotel—the latter is usually more than adequate for a comfortable trip, but the former can really improve the travel experience thanks to better amenities, a concierge service, and so on.

Incidentally, if you don't have a password

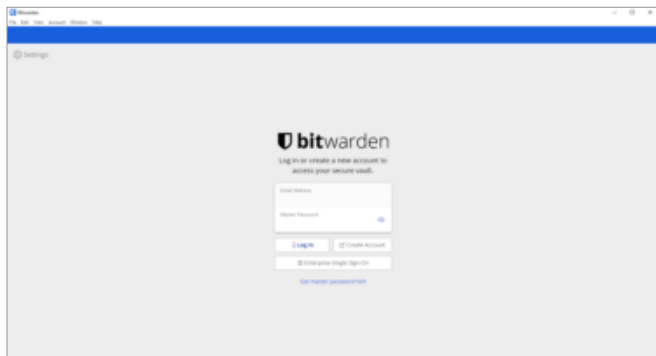
manager yet, it's time to get one. There's an option for everyone out there (fave.co/3aXB0gj).

CLOUD STORAGE

Folks who kick it old school may be able to get away with backing up everything on local storage, but many of us these days find ourselves inevitably drawn into some form of cloud storage. Often the choice is influenced by the ecosystem our phone belongs to.

If you don't take a lot of photos or create a lot of large documents, you might be able to get by fine with a free service. Google, for example, offers 15GB of space with all accounts. But if you've really committed to the cloud, you'll run through that quickly. To keep your costs down, think broadly about your options—depending on your storage needs, you might save some cash by going outside the ecosystem you're already in. Microsoft's

Office 365 plan is one of the cheapest ways to get 1TB of space, for example (and here's a trick to get Office 365 for even cheaper: fave.co/35ogFZm). You may also already have access to storage through other plans you're subscribed to. Amazon Prime members have access to Amazon Photos (fave.co/3BabUAY), which offers unlimited photo



Good free password managers exist (and you should be using one!). The reason to go paid is for features that improve convenience or further strengthen security.



Cloud storage helps with photo backup and document collaboration, and for many of us, it's hard to avoid needing the storage space of a paid plan.

toward actual backups. You'll download and install software that handles backing up your device to the storage service automatically, with the ability to save and track different versions of backups. With regular cloud storage, you have just one version of your file that syncs across all devices. Cloud backup plans also offer more

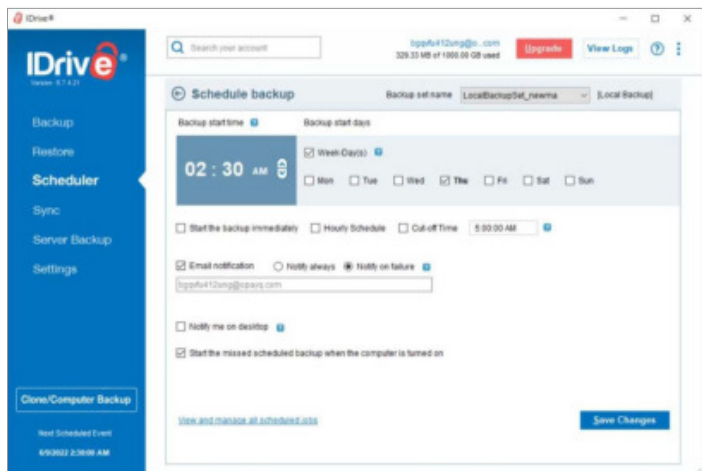
and 5GB of video storage to Prime members.

Don't forget that cloud storage isn't a backup of your data if it's the only copy you have. You'll want to have a second copy elsewhere, whether that's on a local PC or external drive (fave.co/3n5NIMC), or with a second cloud storage service.

CLOUD BACKUPS

Why have both cloud storage *and* a cloud backup service? They're slightly different in concept. Cloud backup services are geared

storage space; it's an easy way to have an offsite copy of your files, and less hassle than continually backing up on local drives to stash



Cloud backups are an easy way to keep offsite copies of your files. Unfortunately, free plans usually don't offer much in the way of storage space. iDrive offers just 10GB to gratis accounts.

with trusted friends or family (or in a safe deposit box). Think of the two as complementary services rather than redundant ones.

The thing with backups is that few people have just a handful of files they want to save, meaning a free service won't provide enough storage space.

You'll have to go with a paid service if you want the convenience and peace of mind that cloud backups offer. Our recommendations for the best cloud backup services (fave.co/3FWaMk6) is a good starting point to find a plan that will suit you and your needs.

OTHER SERVICES


Other services and subscriptions exist beyond the six mentioned here—web hosting, for example, is another common one. When trying to figure out which way to go when it comes to free versus paid, ask yourself these questions:

1. What are the features I get with a paid service?
2. Can I find the key features I need in a free service?



By using free software such as Microsoft's PowerToys suite, you can free up funds for a subscription service.

3. Are the limitations of a free plan workable?
4. What are the hidden gotchas of a free plan?
5. How much time and hassle does a paid plan save me?

Don't forget to also do your research to look for more alternatives to the services you're considering, or to see whether you can gain access to the feature you need through another kind of service. (For example, maybe your email service doesn't offer email aliases, but you can link a masked email service to your password manager and generate logins through that one interface.) You can also save cash by using free software (fave.co/3J9eIFk) for other things you do, thus freeing up funds for a subscription elsewhere. 



HOW TO MAKE DALL-E MINI, AI AND MORE



MAKE AI ART: DUNGEON,

DALL-E MINI IS THE EASIEST WAY TO TRY OUT AI ART FOR YOURSELF—BUT WE'VE FOUND A BETTER SOLUTION THAT'S PUBLICLY ACCESSIBLE, TOO.

BY MARK HACHMAN



Not all of us have the talent to whip up a piece of art at a moment's notice. But algorithms using machine learning are learning how to create "AI art" based on text prompts—and you can use them, too. It's fantastically fun.

Algorithms like DALL-E (and eventually, DALL-E 2), DALL-E mini, Craiyon, Midjourney, Meta's Make-A-Scene, and more are learning how to examine publicly available art and learn what makes them art—or at least digest the various elements and style of a photo or artistic work and recombine them into something new. Sure, you can argue whether they're, in fact, making "art," but the creations are unique, original, and compelling.

Simply put, AI art uses a text prompt: something specific like *McDonalds at the bottom of the sea*, for example, or something a bit more generic like *the castle of time*—the prompt that generated the art at the top of this story. The AI then uses what it has found on the web and what it knows of the query to custom-create an artistic rendering that matches the description.

Because of the computational requirements of training and using the algorithms, many of the most powerful ones are still locked inside beta tests, where only a few lucky participants are able to try them out. One notable exception is DALL-E mini (fave.co/3cw2SUn), a public test of the AI that's available for you to try and is

migrating to Craiyon (fave.co/3v54uLc). That's good news; the DALL-E Mini developers are migrating to Craiyon for trademark reasons, but DALL-E Mini's popularity swamped the site. But we've also found an even better one called Latitude's Voyage (fave.co/3zl4sBi), which you can try out for free.

DALL-E mini, Craiyon, and its competitors will generate art from just about any idea you have, and the results can be weird, whimsical, or anything in between. AI art does have some limitations, though: It's not great with text or pictures of actual people, and NSFW topics appear to be off limits. And you'll quickly discover that the computational power and sophistication of the model the art service uses makes a significant difference, which is why Voyage is a superior solution. Most everything else, however, appears to be fair game. Your imagination is the only limit.

A QUICK, SIMPLE INTRODUCTION TO AI

In general, artificial intelligence works in a fairly simple manner. An algorithm "learns" by being presented with multiple pictures of a cat, say, without being told what



AI art can lean toward the strange and grotesque, as users try out new unusual queries. This scene, posted by Jeff Han on Twitter (fave.co/3lXADu0), appears to have used "McDonald's in underwater" as a text prompt.

characteristics define the cat. It's up to the algorithm to define these rules, in a process sometimes called "machine learning." The algorithm is then "tested" with pictures of cats mixed in with photos of dogs, birds, and so on. If the algorithm has been trained enough, it will then be able to recognize "cats" in the real world.

Those are the basics. The algorithms used here, however, are far more sophisticated.

OpenAI, a company co-founded by Elon Musk and others, in 2018 developed GPT (Generative Pre-Trained Transformer), a language model that uses deep learning to produce text similar to what you and I would write. OpenAI has since iterated GPT into its third iteration, GPT-3, whose model Microsoft exclusively licensed.

GPT uses “parameters” to define relationships between different types of data, in this case to understand the meaning and context of different words. According to the paper (fave.co/3RN8Dx5) that describes the second-generation GPT-2 model, GPT-2 was trained on 8 million documents, or 40GB of text, with 1.5 billion parameters. GPT-3, today’s most powerful version, uses 175 billion parameters and required orders of magnitude more time and compute power to train, according to Wikipedia and the GPT-3 paper (fave.co/3Otd0KB).

In terms of horsepower, AI developer Latitude estimated (fave.co/3aVfflY) that it required 311 billion teraflops just to train the GPT-3 model, sliced up over various supercomputers around the world. For context, Oak Ridge National Laboratory’s Frontier supercomputer (fave.co/3PGZsMB), the most powerful in the world, has a theoretical peak of just 1.1 million teraflops. And an Nvidia GeForce RTX 3080 GPU (fave.co/38NTnOi) computes about 30 teraflops, depending on the version.

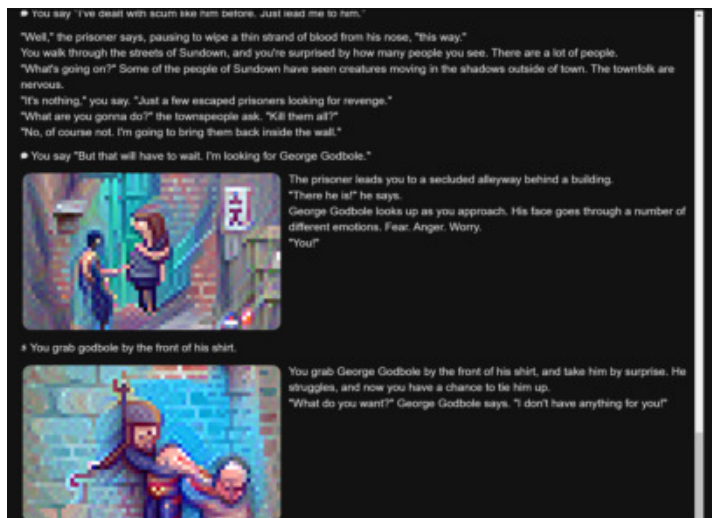
This means two things. First, a completely PC-bound GPT model is simply infeasible right now. And second, GPT-2 and especially GPT-3 are so sophisticated that the designers were genuinely worried about their ability to fool humans with generated content. Were they right? Well, you can decide for yourself—because the model is available to play with in the real world.

AN AI TEXT ADVENTURE: AI DUNGEON

In 2019, developer Nick Walton released AI Dungeon (fave.co/3v82j9B), an AI-driven text adventure that’s like an open-world Zork—and that’s just scratching the surface. Today, AI Dungeon is available to play on the Web as well as via apps for Windows, Android, and iOS, as part of a company called Latitude.

AI allows you to play a text adventure where you can create the environment entirely from scratch or else use a world that someone else has pre-configured. You’re free to create *anything*: stories based on fantasy, science fiction, Westerns, or whatever you can imagine, and play them through using text prompts. Each text prompt includes three choices: Do something, say something, or inform the story with something that happened. Each decision further refines the adventure you’re creating.

If you’d like, you can play AI Dungeon as a Zork-like adventure, picking a character class, race, and so on. That may work best in a traditional fantasy environment. But you can also create an entirely custom scenario, which can play out in entirely unexpected ways. I created a world in which a Western town sat on the edge of a vast darkness where monsters roamed, using about three sentences as a seed to describe what the world contained and what my character would be. But my character was almost instantly sucked into a subplot where I



It's impossible to encompass the true scope of AI Dungeon within a single screenshot, but this isn't a bad one. I originally used the Griffin language model, and then switched to Wyvern-Hydra, a more complex model.

rescued a prisoner from the head of the local thieves' guild.

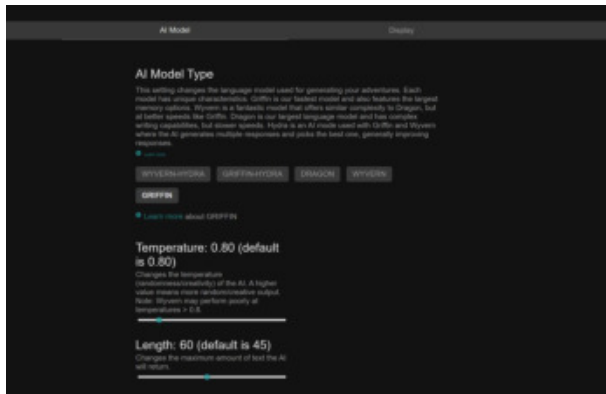
AI Dungeon is a "freemium" game: As with many mobile games, each "move" is measured, which you can eliminate with a paid plan. In this case, though, it's justified: There's a significant server-side cost governing your actions, in terms of CPU resources. (After this story was filed, Latitude issued a blog post [fave.co/3zmGHsL] announcing an upcoming change in the way you'll pay for these actions, replacing an "energy" system with actions you can pay by watching video advertising.) You can also choose to pay \$14.99 per month for what's known as

Voyage (fave.co/3RQ74OP), which eliminates the energy limit and also gives you access to two additional perks: Dragon and 20 image generation credits.

While AI Dungeon uses the GPT-2 language models, the paid Vantage version uses a choice of AI models (fave.co/3oh7MqO), each with different characteristics. The

default seems to be Griffin, a 6 billion-parameter AI engine, which generates responses more quickly. (AI Dungeon takes a few seconds or so to generate a response, with longer waits for more complex models.) But you can also opt for Dragon, a much more sophisticated 178-billion-parameter GPT-3 engine, and combine it with Hydra to prioritize responses. You can also tweak the degree of randomness.

While you can play the GPT-2 version of AI Dungeon for free, you may need to use the Story prompt to help keep the narrative on track. The Voyage GPT-3 version (which I played in the scenario above) was noticeably better, with a coherent and responsive



AI Dungeon's Settings menu. It's a bit different from the video settings tweaks you may be used to making in PC games.

narrative. My Voyage narrative turned a bit dark (and it can go in a NSFW direction, if you adjust the settings) but it was very much worth my time—and yours. You can even save the narrative for yourself or open it up to the world at large. AI Dungeon (Voyage) will even auto-generate 2D pixel art to illustrate the story as it goes.

Separately, Voyage also includes its own AI-generated art, called AI Art, which you can generate via text prompts. You can choose from one of three engines, however, ranging from PixRay pixel art to the painting-like Disco Diffusion, which will generate your AI art in various styles. (We'll explore this further a bit later on.)

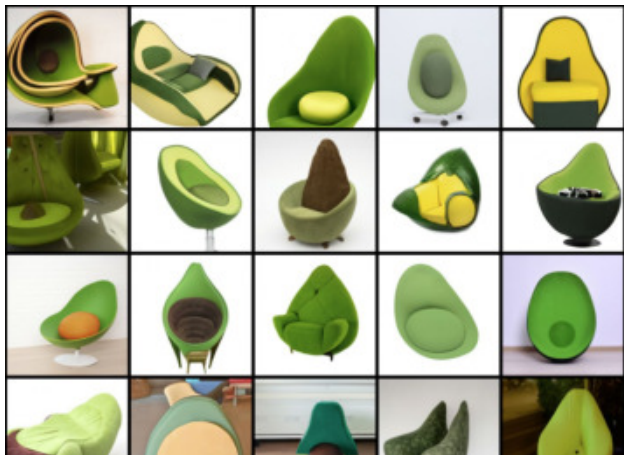
And that brings us to the topic *du jour*: AI-generated images, or AI art.

WELCOME TO THE MAGICAL WORLD OF AI ART

AI art uses the GPT model underlying AI Dungeon but takes a giant leap forward. Not only does the model understand the relationship between words, but it understands how those words interact with images, too.

It's an improvement that really feels like it takes AI Dungeon's text prompts into an entirely new dimension.

The most visible representation of AI art is DALL-E, a model released by OpenAI in



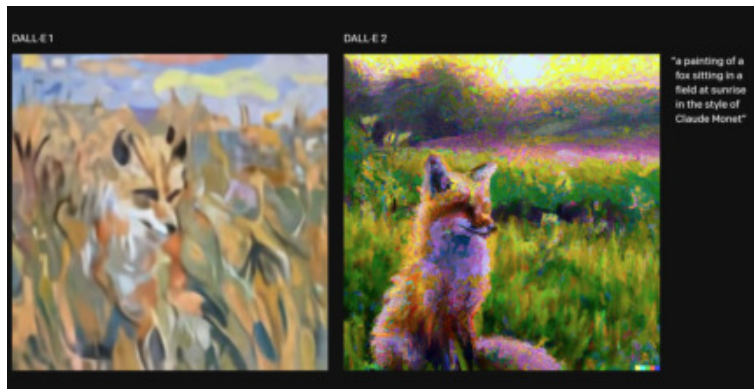
OpenAI used this representation of "an armchair in the shape of an avocado" to illustrate its original DALL-E algorithm.

January 2021. The company describes (fave.co/3oh37VR) DALL-E as a 12 billion-parameter version of GPT-3, which means that in terms of parameters, it's somewhere between GPT-2 and GPT-3. DALL-E 2, released in

April, offers "four times greater resolution" than the original DALL-E, according to OpenAI (fave.co/3oh37VR), though OpenAI has not released the model publicly. Instead, it's only available via waitlist to access in private beta.

According to UC Berkeley graduate student Charlie Snell (fave.co/3zjbtCL), DALL-E includes an autoencoder that can correctly design images, and a transformer that understands how the image itself correlates to a textual description. A third piece ranks the images and prioritizes the ones it thinks are the "best." DALL-E simply works backward, taking the text prompt and turning it into a coherent, interesting image.

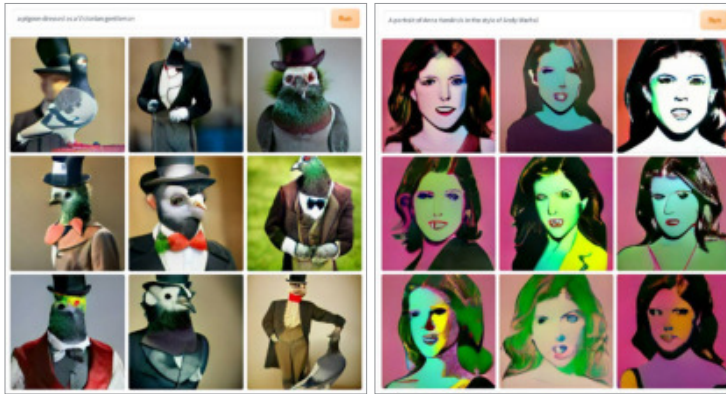
As explained above, DALL-E itself is locked down. But Boris Dayma, a machine learning engineer, created DALL-E Mini (fave.co/3cw2SUn) to fill the gap, and make it



OpenAI released this illustration to demonstrate the differences between the DALL-E and DALL-E 2 models, neither of which is publicly accessible.

publicly accessible. Dayma's blog post (fave.co/3PkNj0a) doesn't say how complex the model is, though the code is available from the main site (the AI community, Hugging Face) to download yourself—if you have the hardware. Dayma also indicates there's a second, more powerful model in the works: DALL-E Mega, "the largest version of DALL-E Mini," which is still being trained.

DALL-E Mini generates a 3×3 grid of the images it thinks are the best for a given prompt. They're a mixed bag, and it's probably good if you don't go in with high expectations. DALL-E Mini does well with somewhat abstract representations of objects, but can do somewhat poorly with faces and text. In a way, it's like traveling overseas. If you go looking for "American" food in faraway lands, it might just seem somewhat off. But if you're willing to try out



Art generated by DALL-E Mini, using prompts entered by the author.

something wild, you may end up with a result that's extraordinary.

There's one drawback, though: the traffic. Demand for DALL-E Mini has grown as its popularity has, and you'll often see a popup telling you there's "too much traffic" and to try again. Your best bet is to either try DALL-E Mini late at night or in the early morning, when traffic is at its lightest. It seems that generating an image takes about 2 minutes or so, so be prepared to wait, too.

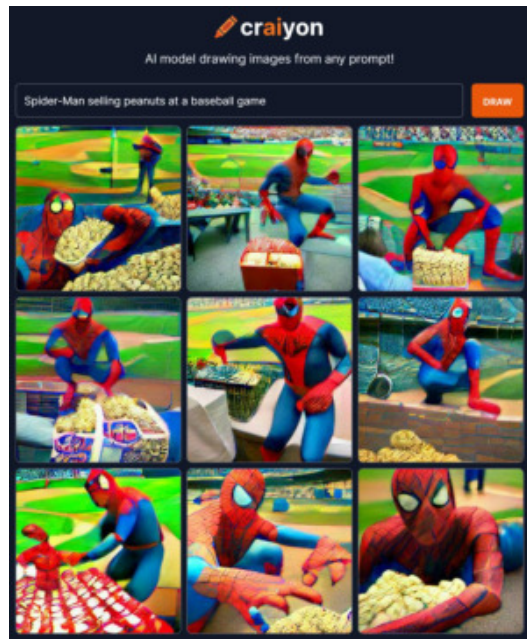
Some DALL-E Mini images are rather good. Some, are, well, kind of horrific. Some are simply bad (and we haven't shown those here).

It's unclear how long DALL-E Mini will remain online, however. The FAQ for Craiyon (fave.co/3v54uLc), another AI art generator, indicates that Dayma began migrating the model over to the new site

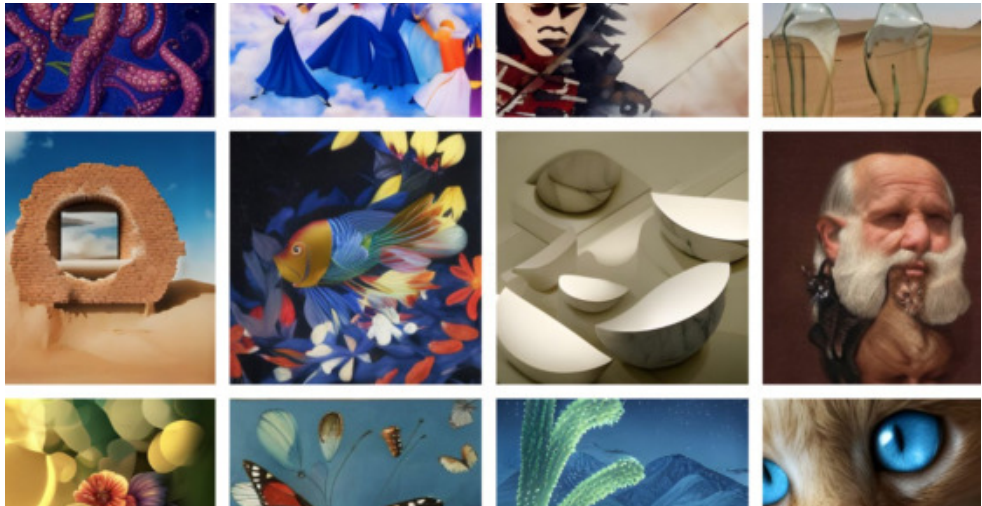
because of potential confusion between his efforts and OpenAI's own DALL-E model.

For now, however, you'll benefit. First, Craiyon appears to be using the DALL-E Mega model, which should theoretically improve the quality

of the images shown. I wasn't really that impressed with my first efforts using the



Here are the results of my first effort using Craiyon.



Some examples of art created by Meta's Make-A-Scene.

service, but I thought this result was a fun one.

On July 14, Meta debuted Make-A-Scene, a new AI art project that will allow use people to create art using text prompts, as other AI art projects do. The difference here is that users will also be able to sketch how they want the overall scene to look. Meta's example, as outlined in the company's blog post (fave.co/3PoLC1X), gives the example of an AI-generated scene with a bike in it: Which way should the bike be facing? Should it be large or small? That's similar to how other AI art programs can use a piece of art or a photo as a "seed," but puts more emphasis on the user driving the creative process.

Otherwise, the results of Make-A-Scene looks pretty similar to other AI art projects. It's

limited to "creators" right now and not yet open to the general public. Some of Make-A-Scene's art, though, looks pretty good. In part, that's because it creates 2,048x2,048-pixel images.

THE BEST AI ART SERVICE RIGHT NOW: LATITUDE'S VANTAGE AI ART

So what's a better bet? Latitude's Voyage service and its AI Art capability, which offers a free one-week trial. Though you'll have to subscribe (and enter a credit card), there's nothing stopping you from using your AI Art credits before the trial expires. (The 20 free image credits renew every month, or you can buy additional credits at \$5 for 20 credits, \$20 for 100 credits.) Even better, there aren't any traffic limitations, and each

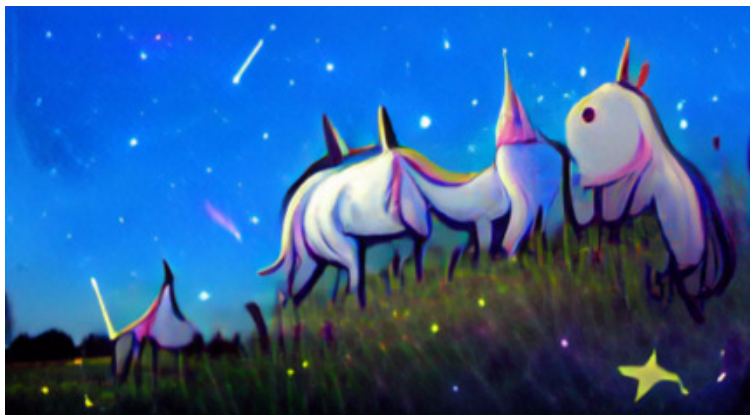
AI Art creation comes with a time estimate that's usually about ten minutes or so. But the higher computational workload (and resulting longer wait) makes for more interesting art.

Again, your results will be a mixed bag, but the various (proprietary?) engines offer a range of styles. I'm partial to the Disco Diffusion

engine, which renders images that are more akin to paintings, as shown in our primary image for this article. AI Art also encourages you to submit your text prompt with an artistic style, which I did in another image of a fairgrounds in the style of farmpunk (?) artist Simon Stalenhag. The PixRay pixel art and the VQGAN cartoon aesthetic are also worth

trying out. The latter two tend to render much faster. Note that you can make the image size larger than the default, but the algorithm will "charge" you more photo credits if you go too high.

There's always going to be a degree of artistic interpretation in all of these. While you can try prompting for a "photograph" of a particular scene, you'll probably be much happier with something that looks more like the creation of an artist rather than a



Top: "Unicorns roam a field under a starry sky." Bottom: "An alien lightning storm in the style of Thomas Kinkadee." Both were generated by Latitude Voyage's AI Art service, using prompts supplied by the author.

camera.

Neither DALL-E, nor DALL-E Mini, nor Latitude's Voyage has a monopoly on AI art. Midjourney (fave.co/3zmaBNL), a similar service that's currently in private beta, also has a waitlist that can be applied for. Midjourney's images are particularly stunning, though it's not clear how easily you'll be able to access the service or what the terms are. The "underwater McDonalds" art that appears earlier in this article was created on Midjourney, according to its author. The art below was also created using Midjourney, according to the poster.

One big question that remains unanswered: Who *actually* owns this art? If the

models were trained on publicly accessible works from the Internet, then modified via AI at the command of a user-generated prompt, it's unclear if anyone owns it.



Top: "A fairgrounds with an alien robot walking through it in the style of Simon Stålenhag." Bottom: "A castle sits next to a mountain lake, with a dragon encircling its wall. A burning tree on a nearby mountain casts light on the entire scene. Fantasy aesthetic." Both were generated by Latitude Vantage's AI Art service, using prompts supplied by the author.



This image was created using Midjourney.

AI AUDIO IS FUN, TOO

Images aren't the only source of AI art. In fact, text-to-speech is an excellent way to pass the time and a fun way to even prank your friends. Uberduck.ai (fave.co/3Pq80rG) is just one of a number of different text-to-speech sites, but this site is famous for both its free services (just sign up with a free account, including Google) and the absolute boatload of synthesized voices. All you need to do is type in a passage or a short message, and you can have everyone from Bugs Bunny to Beavis to Batman to Barack Obama read it back—well, a

synthesized version of it, anyway. You can even upload your own voice to the site (for \$15) if you want to.

And if you want something besides visual art, OpenAI also has another service, Jukebox (fave.co/3IVklll). Jukebox serves as an experiment for reproducing the “sound” of a particular band or artist, such as Frank Sinatra or the Chicks, though without the ability to dial up a custom tune. Jukebox is impressive for what it does, but it lacks the wow factor of the other services.

All of these really show off the potential (and pitfalls) of AI art. It's also true, though, that AI—especially human-like textual constructions created with GPT3—can certainly be used to fool people who are already deluged with disinformation. All of these examples are designed to be obvious about who and what is constructing the final result, but they don't have to be. This YouTube video, fave.co/3IRwDuZ, is absolutely not the Queen of England. This is known as a “deepfake,” an AI construct designed to deceive (or entertain, as the case may be.)

Otherwise, however, we really haven't even scratched the surface of AI-generated video, although it seems like we can use the above examples to suggest some ways forward. Applying AI to a clip from *Seinfeld*, for example, and replacing George's voice with that of Bill Gates, for example, doesn't seem that far-fetched.

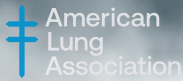
What's more exciting, though, is where this road leads. For now, there's simply no way to run AI art with any fidelity on a PC. But with continued improvements in the CPU space (fave.co/3OwrGsM), the computational power required to process AI art in the server space will keep dropping, with the promise that quality should improve.

We don't consider how many productivity apps either connect to or run in the cloud, and it's possible that an Adobe, Google, or Microsoft could use their established clouds to facilitate these type of applications for consumers and creators. Chip companies like AMD, Intel, and Qualcomm have struggled to justify their investments in AI technology in the PC, too. Placing more emphasis on end-user AI applications will help solve that problem.

We'll close with former president "Bill Clinton," who has kindly endorsed PCWorld courtesy of Uberduck.ai, while exemplifying the problems—and potential—of AI (fave.co/3aShWv8). 🔒



AI-generated audio and images can be fun, but deliberately using AI to deceive people—deepfakes—could be a real threat in years to come.



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.

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**GET YOUR HEAD
OUT OF THE CLOUD**



Monitor buying guide: How to choose your next display

Shopping for a new monitor? We break down all the specs that matter, from refresh rate to panel type and beyond. **BY MATT SMITH**

First, the good news: Most modern PC monitors are rather decent. Their minimum brightness, contrast, and color accuracy have improved significantly over the past decade. It's a great time to upgrade even if you stick to budget monitors.

If you want a quick, easy recommendation: Go for a 24-inch monitor with 1080p resolution or a 27-inch monitor with 1440p

resolution. An IPS panel is preferable, though VA is also good. Gamers can spend a little more to snag either option with a 144Hz refresh rate, which offers a smoother and more responsive experience. Check our reviews for the latest models (fave.co/3PwHL2q).

Not sure that's right for you, or want to know more about the tech? Here's the lay of the land.

MONITOR TYPES: TN, IPS, VA, AND OLED PANELS

The technology behind monitors is complex but well understood. There's just a handful of major monitor types available, each defined by the LCD panel technology used. Nearly all monitors available today fall into these groups.

Monitor manufacturers will list panel type in a monitor's specifications, but you may have to dig a bit to find it. Take the extra time to find out. Panel type can tell you a lot about a monitor.

In-Plane Switching (IPS)

IPS rules the world of computer monitors. A typical IPS monitor is bright and crisp, with good sharpness and great viewing angles. Color performance ranges from acceptable to truly spectacular. Modern IPS monitors can support fast pixel response times and high refresh rates, which is good news for gamers.

IPS monitors have disappointing contrast and black levels, however, which can make them appear hazy when viewing dark images. This is most noticeable in a dark room.

Vertical Alignment (VA)

Increasingly popular, VA monitors are as bright and colorful as their IPS counterparts and have a better contrast ratio and darker black levels, which improves overall image quality. VA monitors designed for gaming can offer excellent motion clarity, and Samsung's best VA panel monitors are particularly crisp.

Viewing angles are more limited, however, so the VA monitor image quality can degrade if not viewed straight on. IPS monitors also have better motion clarity at most price points.

Twisted Nematic (TN) technology

TN panels are known for being inexpensive to make. They also have very quick pixel response times, which improves motion clarity. Unfortunately, TN has limitations in contrast and color performance that make it unattractive, so I can only recommend TN to extremely hardcore gamers. BenQ's Zowie line is a good choice for those on the "path to pro."

Organic Light Emitting Diode (OLED)

OLED isn't based on LCD technology at all. It instead uses organic pixel elements that emit their own light (a trait that's often referred to as self emissive).

OLED is the king of contrast and black levels, since an OLED pixel that's turned off emits no light at all. OLED generally beats other panel types in color performance and also has best-in-class motion clarity. Viewing angles are great, too.

OLED panels aren't as bright as the competition at the top end, and OLED can suffer permanent image retention over time (though this takes many thousands of hours to happen). The technology is also very expensive in PC monitors.



Asus's awesome ROG Swift PG32UQX uses Mini-LED technology and has a massive 1,152 lighting zones.

So...what's the best monitor type?

OLED wins out on image quality, but high pricing and limited availability mean I can't recommend it for everyone. It's too expensive and too hard to find.

That leaves IPS with the crown for most people, though a VA panel monitor could be a better choice if you don't view from an angle and want improved image quality in movies and TV shows.

A note about Mini-LED

A handful of monitors are now available with Mini-LED technology (fave.co/3rDPT6T). This is a backlight technology, not a panel technology, but it's still important.

Mini-LED uses an array of independent LED lighting zones behind the display panel to precisely control the backlight. In my

testing, a Mini-LED monitor can offer a 300 to 600 percent improvement in contrast when compared to similar monitors that lack Mini-LED. It's extremely noticeable.

You'll find Mini-LED available with both IPS and VA monitor types. The traits of each panel type still otherwise apply. OLED is not used with Mini-LED because the panel creates its own light, making a backlight unnecessary.

Mini-LED has a few flaws. The backlight zones can cause bright halos to appear around objects, an issue known as blooming. It's most noticeable in a dark room. Mini-LED is also expensive to make, so you'll only find it in premium monitors.

The number of Mini-LED lighting zones matters. A basic Mini-LED monitor like the Sony InZone (fave.co/3B4AVxc) offers 96, while the extravagant and awesome Asus ROG Swift PG32UQX (fave.co/3AZR4Un) has 1,152. More zones means better overall contrast and less blooming.

MONITOR SIZE: PICK WHAT FEELS COMFORTABLE TO YOU

Most monitors consist of a 24-inch, 27-inch, or 32-inch widescreen panel. It's easy to

assume bigger is better, but it's also important how a display fits within a person's field of view. This means all parts of the display are visible without eye strain or head movement.

Still, monitor size is very much a matter of personal preference. I tend to like smaller displays that don't take up too much desk space and can be used easily in a multi-monitor setup (fave.co/2Zazegw). Others may like one big display (fave.co/3cocOPE) that takes up the entire desk.

MONITOR RESOLUTION: 1080P IS COMMON, BUT 4K IS OBTAINABLE

Most budget monitors have a native resolution of 1080p (1920×1080). This is okay for 24-inch monitors, but the lack of sharpness becomes obvious on larger displays.

27-inch and 32-inch models are better at 1440p (2560×1440) resolution. Most

people will notice the increase in sharpness even when browsing the web. It's a great resolution for gaming as well, though PlayStation fans be warned: The PS4 and PS5 don't support this resolution.

4K (3840×2160) is ideal for larger monitors. It's also a great upgrade for 27-inch and 32-inch monitors. The added sharpness isn't a must-have, but it's noticeable, especially if you like to use a small font size on your monitor. Games and 4K movies will look razor-sharp.

Pricing is a consideration. Lower resolutions mean lower pricing, which is why 1080p remains so popular. The gap has narrowed in recent years, however, with 4K monitors now starting just below \$300.

What about ultrawide monitors?

Ultrawide monitors, which have a 21:9 aspect ratio, are widely available. A 34-inch ultrawide is about as tall as a 27-inch widescreen but 7 inches wider. This works out to a 25 percent larger display overall.

This is excellent for people who want more display space but don't want the hassle of a multi-monitor setup. Ultrawides are awesome for games and movies, too, providing an immersive experience. You'll pay more for an ultrawide, with quality models starting around \$400.



Modern 4K monitors offer outstanding sharpness and clarity.



An ultrawide monitor is great for both work and play.

Intrigued? Our guide to ultrawide monitors (fave.co/3oiqz50) lists all the perks.

MONITOR REFRESH RATE: TO 144HZ, AND BEYOND!

A monitor's refresh rate is the number of times it can update the display's image each second. Most monitors have a 60Hz refresh rate, but some have a 144Hz, 240Hz, or 360Hz refresh rate, with 500Hz models on the way (fave.co/3ogGnp1).

Higher refresh rates look smoother when images are in motion. It also lowers input lag because a new image appears on the display more frequently. The benefits improve as refresh rates go up, though the differences may become more difficult to notice.

Those who don't care about gaming can safely stick to 60Hz, while most gamers will

appreciate the upgrade to 144Hz. Refresh rates beyond that are smoother but an optional luxury rather than a must-have.

Adaptive sync: Common and useful

Adaptive Sync can synchronize a PC's video output with the refresh rate of a display. This offers perfect frame pacing with no hitches,

hesitations, or screen tearing (so long as the PC's hardware is up to the task at hand, at least). Adaptive Sync is a must-have feature for PC gamers, but it's common even on budget monitors meant for productivity and office work.

AMD FreeSync and Nvidia G-Sync are common standards. They're designed to work with each company's respective video cards, so it's important to pay attention to which standards a monitor supports. There's also a third-party standard called VESA AdaptiveSync. AMD, Intel, and Nvidia all support VESA AdaptiveSync in their latest graphics solutions, though functionality may be more limited than using the company's in-house standard.

Though mostly for gaming, Adaptive Sync is common and has no real price

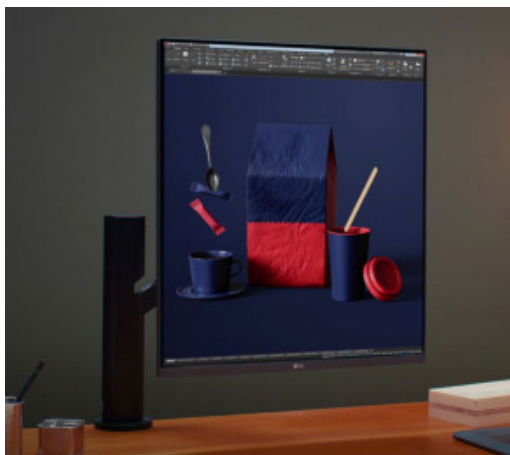
premium attached to it. It's an easy feature to recommend.

MONITOR ERGONOMICS: ADJUSTABLE STANDS RULE

Monitors ship with a variety of stands ranging from fixed plastic bases with no adjustment to complex monitor arms that can hold a monitor at almost any angle and orientation.

I recommend a stand that at least adjusts for height and tilt. This will let you find a comfortable viewing angle. If the monitor is a second display, look for swivel (which adjusts the angle horizontally) and pivot (which can rotate the monitor 90 degrees).

Look for monitors that have a 100x100mm VESA mount. This will let you add a third-party monitor stand or arm later. Most monitors sold today have this—but some budget models don't.



Monitors ship with a wide variety of stands.

MONITOR HDR: IT'S (USUALLY) A TRAP

Many monitors advertise support for High Dynamic Range (HDR) content. HDR can support a wider range of luminance and color than what's now called SDR. Generally speaking, HDR content on a great HDR display can look far more vivid and lifelike.

The key is a "great HDR display," and... most monitors aren't that. HDR support merely means a monitor can accept and display an HDR signal. It promises nothing about the quality of the experience which, in most cases, is not good.

If you do want great HDR, look for a monitor with OLED or Mini-LED technology. These can deliver the range of contrast and color performance needed to make HDR truly stand out. Both are expensive, putting quality HDR out of reach for most people.

Already have an HDR monitor, or plan to buy one? Our guide to HDR on Windows will help you get started (fave.co/3qP3f19).

MONITOR FEATURES: SPEAKERS ARE NICE, BUT LOOK FOR USB-C

Most monitors don't offer many added features that stand out from competitors. Some have speakers. Many don't. A few models offer a remote control. Still, most monitors are similar. USB-C is the one key exception. A monitor with USB-C can



When looking for a new monitor, it's worth comparing sales beforehand as you could grab yourself a bargain.

charge a connected device, such as a laptop, or be used to extend connectivity like a USB-C hub. I've detailed the many perks of USB-C in another guide (fave.co/3xzdM48).

MONITOR SHOPPING TIPS: PRICING MATTERS

A monitor's price is by far the most important single factor when shopping for a monitor.

Perhaps this seems obvious, but it's more true of monitors than most consumer tech. Monitor pricing sees huge swings based on availability and sales events.

LG's 27GL850-B (see above) is a great example. The Amazon.com price of this monitor swung between a high of \$496.99

and a low of \$299.99 in just three months between April 1, 2022 and June 30, 2022.

This pattern plays out across the entire monitor market, so it's important to compare sales before buying. Shopping at one retailer could mean overpaying by hundreds.

HOW TO BUY A MONITOR: A RECAP

I've tried to keep this monitor buying guide direct and to the point, but I'll admit it can still be a lot to take in. Here's a summary of what most people should look for.

Monitor type: IPS is the market leader, though VA is also good. OLED is spectacular but expensive. Avoid TN.

Monitor size: A 27-inch monitor is the go-to choice. Go bigger if you prefer.

Monitor resolution: 1440p is recommended; 4K is a nice upgrade.


Monitor refresh rate: 60Hz is fine for productivity, but 144Hz is awesome in games.

Monitor adaptive sync: It's a must-have for gamers.

Monitor stand: Look for height and tilt adjustment, plus VESA mount support.

Monitor HDR: Only essential in Mini-LED and OLED monitors.

Monitor features: Look for USB-C if you want to use the monitor as a USB-C hub.

Ready to go even deeper? Dig into our monitor reviews for the full scoop on today's PC displays (fave.co/3PwHL2q). 



8 simple ways to protect your smartphone from hackers

Keep your device secure with these easy-to-follow steps. **BY MARSHALL GUNNELL**

Being the victim of phone hacking is a nightmare. The worst case of phone hacking is that the threat actor gains access to your online accounts, such as your social media, email, online shopping accounts, or worse, your banking information. This would force you to go through the headache of changing a ton of passwords (fave.co/3yMsyTW), having to lock your credit (fave.co/3OI9Eck),

contacting your bank and online shopping vendors (Amazon, eBay, and so on), and trying to pinpoint everything else the hacker had access to (fave.co/3Ony59r).

It's always better to be proactive instead of reactive. Don't wait until you get hacked to care about your privacy and security. Take steps to protect yourself now.

Here are eight simple precautions you can take to remain safe from would-be hackers.

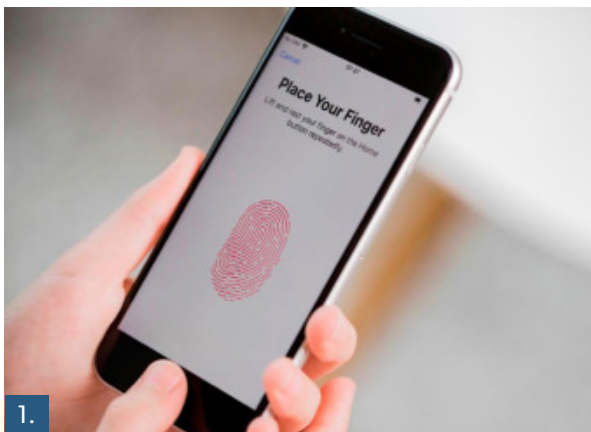
1. USE A PASSCODE LOCK OR FACE OR TOUCH ID

When people think of getting hacked, the first thing that comes to mind is someone in a remote location executing a bunch of code to gain access to your device. This may sometimes be true, but the reality can sometimes be much more boring than that. Hacking simply means that someone gains unauthorized access to data on your device. This means if someone gets physical access to your phone and accesses your data without your consent, then by definition you have been hacked.

Your mobile device's first line of defense is your passcode lock or face or touch ID. While this technology isn't 100 percent foolproof, having a password or other authentication measure enabled will certainly keep a large percentage of people out if they somehow get a hold of your phone. While it may seem like a minor inconvenience to add a lock on your phone, it's nothing compared to the inconvenience of being hacked.

2. FREQUENTLY BACK UP YOUR PHONE

Keeping frequent backups of your phone is good for several reasons. Even if your phone doesn't get lost or stolen, having a complete



backup of your phone makes the transition to a new phone so much easier.

But if your phone does get lost or stolen, you can wipe the data on that phone remotely while having the peace of mind that you still have access to all of your data. Remember, if you don't have at least three copies of your data, then it doesn't really exist. Here's how to back up your iPhone (fave.co/3IP2217) and your Android phone (fave.co/3IYZVYE).

3. DON'T STORE PASSWORDS (OR OTHER SENSITIVE INFORMATION) ON YOUR PHONE

In general, it's best not to store passwords or other sensitive information, such as credit card details or personally identifying information, on your phone. If your phone gets hacked and the threat actor has access to that information, it will cause more than just a

headache—it could completely destroy your credit and drain your bank account.

If you *do* want to store passwords on your phone, make sure you're using a password manager (fave.co/3lRkfRz). If you're tight on cash, you can even get one for free (fave.co/3nT9nDq). Password managers require a master password to access all of your account credentials, so create a strong master password and make it something you can remember. Most important, don't store that master password on your phone.

4. ONLY DOWNLOAD APPS FROM AN OFFICIAL APP STORE

This mostly applies to Android users, as Apple's app-vetting process is much stricter than Google's. Additionally, you can download third-party apps with Android, allowing for the potential to download a malicious app.

Also, be mindful of what permissions you grant apps. Some apps request access to your camera, microphone, photos, and so on. While they may have legit uses for this, it opens you up to fraud if you mindlessly give access to everything any old app requests.

5. KEEP YOUR PHONE AND APPS UPDATED

While it can be easy to postpone updates, a lot of these updates provide

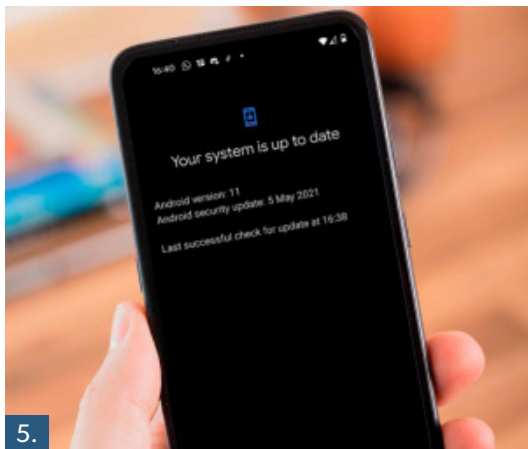
critical security patches and/or enhancements. If there are known vulnerabilities in an OS or app, you can bet that threat actors are going to take advantage of them. Keeping your apps and phone systems up to date will keep you one step ahead of the would-be hackers.

Additionally, if you're not actively using an app, it's good practice to delete them.

6. ALWAYS USE TWO-FACTOR AUTHENTICATION

Two-Factor Authentication, also called 2FA, is an authentication method that enhances the security of your accounts. Instead of just requiring a password to get into your account, you'll need to provide a secondary method of identity verification.

2FA comes in many forms, such as SMS, authenticator apps (fave.co/3jeMfgu), Bluetooth, and even physical security keys.



Each type of 2FA provides a varying level of security. Understanding the fundamentals will help you decide which method is best for your situation. When it comes to your phone, though, you really can't beat a physical security key (fave.co/3PnChDi).

7. USE A VPN

When browsing the web on public Wi-Fi, always use a virtual private network (VPN) (fave.co/3FtTTMs). A VPN masks your IP and encrypts any data you send, making it difficult for threat actors to intercept or understand. This makes doing things like purchasing something online a bit more secure. But that just means they can't access your personal information. Can they actually hack your phone if you're not using a VPN? Yes.

Without a VPN, your IP address is out there in the open. One method of hacking, known as Remote Hacking, is when a threat actor gains access to your IP address and uses it as a backdoor into your smartphone (or any other device you may be using). With a VPN, you're using the IP address of the VPN server you're connected to instead of your device's real IP address, protecting you from remote hacking.

8. HAVE A PLAN B IF YOUR PHONE GETS STOLEN OR HACKED


In the unfortunate event that your phone does get hacked or stolen, it's important to

have a plan in place so that you can quickly neutralize any damage the hacker may be able to cause.

First, don't wait to learn how to remotely wipe your phone until your phone gets stolen. The quicker you wipe your information, the better. Once you've wiped the phone, it's now time to locate it. You can use iPhone's Find My iPhone or Google's Android Device Manager to find your device even after you've wiped the phone or if it's been factory reset by the thief or hacker.

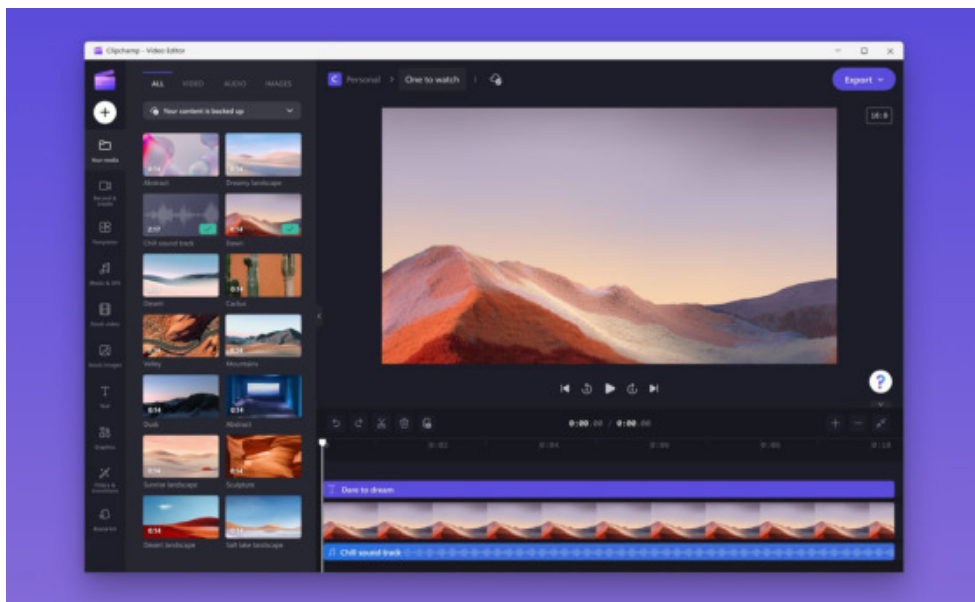
The next thing you want to do is contact your local authorities to report the theft. Be thorough in your description to the police, and take note of any important information you may later need to report to your insurance company or phone manufacturer, such as the officer assigned to your case, the case number, and so on. If your phone was hacked but you still have physical access to it, you can report the crime to the Internet Crime Complaint Center (IC3, fave.co/3yT4z5Q) if you're based in the U.S.

If you believe the hacker may have had access to your personal information, such as banking or credit card information, immediately contact your bank to freeze your account and all associated cards to prevent any unauthorized purchases. Also freeze or lock your credit so the threat actor can't open any accounts in your name.

Lastly, take a deep breath. Everything is going to be OK. 

How to use Clipchamp, Microsoft's sleeper-hit video editor

Clipchamp, the mostly free video editor Microsoft purchased last year, is simple, intuitive, and enjoyable. **BY MARK HACHMAN**



Microsoft's new free video editor, Clipchamp, is incredible: simple, deep, and intuitive, with enough features to create a simple meme or a sophisticated commercial video. It's one of the best creative tools Microsoft offers, and you've probably never even heard of it!

In September 2021, Microsoft acquired Clipchamp (fave.co/3ojectAk), a small

video-editing application that competes (and still does) with Microsoft's own built-in Video Editor app within Windows 10 and Windows 11. Clipchamp, though, is light-years ahead. Microsoft has said Clipchamp will eventually be added directly to Windows, but for now the Clipchamp app (fave.co/3yW3DO4) is available for free from the Microsoft Store.

It's unfortunate that Microsoft launched Clipchamp alongside an outrageous pricing

scheme (fave.co/3aTXb24) that it has largely revoked since. Now Microsoft allows you to freely export as many videos as you like at 1080p resolution and only requires subscription pricing (fave.co/3cpt5Us) for extras: unlimited audio and video stock to spice up your videos, plus cloud storage of imported files. You don't need them. Not only does Microsoft provide a good chunk of royalty-free audio and video tracks, but sites like Pexels (fave.co/3OICUQF; photos and video clips) and Pixabay (fave.co/3omgVhG; music and audio) advertise themselves as repositories of free content, available for private and commercial use.

If you *do* end up using those extra features but don't want to actually pay for the service, you don't have to: Clipchamp will simply add a "Made with Clipchamp" watermark to your video that really isn't too obtrusive.

Instead, the biggest obstacle to using an app like Clipchamp is simply time. Here, too, Clipchamp shines: The app includes many, many pre-made templates that you can use to make a professional-looking video in just a few minutes. But even if you want to create your own custom video from scratch, it's surprisingly easy.

Clipchamp isn't perfect. The "app" itself is a web app, and I almost guarantee you'll experience a bug and/or a stability issue. Otherwise, however, I've been deeply impressed with how quickly I, an absolute amateur when it comes to video, have

picked up how to use Clipchamp. And the best way to show off my newly acquired Clipchamp skills is to create a small video file, so here goes. I've let the app do most of the work, and that's OK! Creating professional-looking video with minimal effort is the entire point.

HOW TO USE CLIPCHAMP

Clipchamp opens by inviting you to connect Clipchamp to accounts like Facebook, facilitating the upload and download of video clips. (Clipchamp couldn't connect to Google.) This is optional, as you can save your file locally and then share it via social media later.

Explore the templates

The easiest way to start appreciating Clipchamp is by using its built-in templates, which is the next thing the app encourages you to explore. Try thinking about what you might use Clipchamp for: say, stitching together video taken during a birthday party, showing yourself off on Instagram, compiling video you've taken over the years for your nephew's graduation, or even just a video slideshow of the year in review. Chances are there's a template just waiting for you to use it. Note that some templates are weighted heavily toward graphics, some favor video clips, and others include both, plus audio. You can hover your cursor over each template to see a preview.

After selecting a template, click to open it in Clipchamp's timeline view, and see how all of its pieces fit together. (For these screenshots, I used Clipchamp's "birthday memories slideshow," which you can either scroll to via the app's category sections or by using the search box.)

Opening the template should load the template as well as import all of the necessary files. When you use a video clip within Clipchamp (either stock footage or one of your own), Clipchamp imports, converts, and makes a copy of your video clip. Put another way, you can edit and tweak the video clip and your original will be left untouched. That's reassuring.

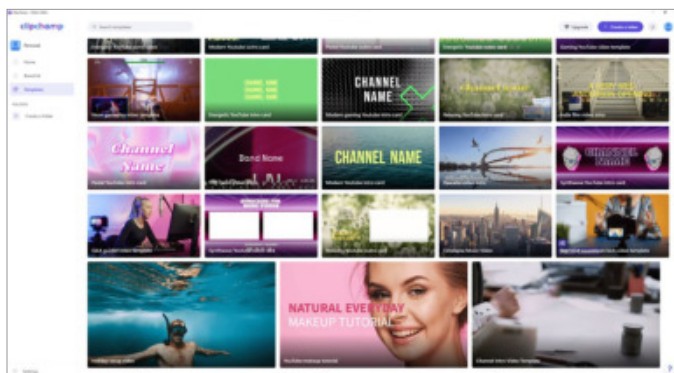
The bugs, however, aren't. Clipchamp, possibly because it's a web app, suffers from two major bugs that tend to repeat: First, Clipchamp can sometimes get stuck

importing and converting files. If this happens, don't be afraid to click on the main Clipchamp icon at the upper left, go to the home page, and simply reopen the video project if it hangs. Second, Clipchamp routinely glitches when playing back a video project's audio, especially when you first open it. The workaround is to simply click on the audio track and use the controls at the top of the screen to adjust the track's volume. In my experience, that solves the problem.

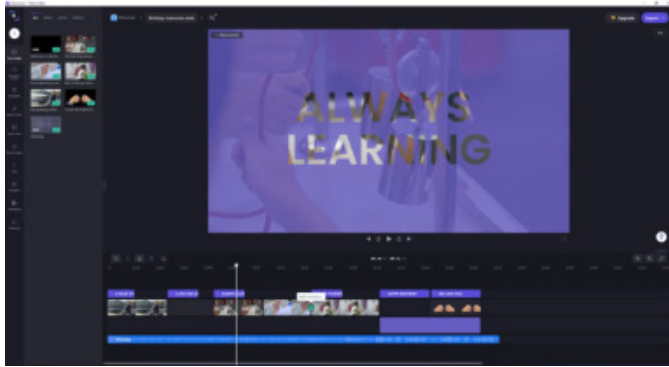
Get to know the timeline

Opening the template presents the timeline view, the way in which you'll put a video together. At the bottom are the various elements of the video: the clips, the audio, any text overlays, transitions, and so on. You can preview the video in the upper section.

You can use that big vertical line in the timeline (at about 10 seconds along in this screenshot) to scrub back and forth. In the example at right, you can see that there's a timeline of various video clips, with various text overlays that appear and disappear after a few seconds. At the bottom the template added an



Clipchamp provides templates on a variety of topics, from YouTube and Instagram (seen here) to animated greeting cards, real estate videos, presentation templates, and more. You can see that in many of these there's a configurable text overlay, a video background, and more.



Clipchamp’s timeline view. You can see the individual video clips in the middle. Above those are the text overlays, which you can tweak and configure. There’s a purple backdrop for some graphics at the end of the video. At the very bottom is the audio track. You can drag and drop to move things around, and click on individual elements to adjust them. Want a transition between the clips? Just click the gap between them.

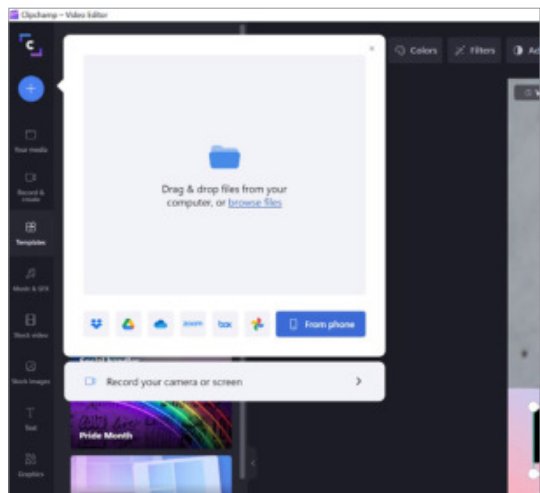
audio track, which plays the entire length of the clip. (If your video clips contain their own audio, you can either mute them or adjust the volume accordingly.)

It’s worth taking a moment to discover how things work. For example, you can drag snippets of video around the timeline to rearrange them. Is an embedded clip too long? Simply click on either the beginning or the end of it to make it shorter or longer, trimming the video. You can also chop it up by right-clicking a video clip and choosing “split,” which is handy for breaking up a long video clip. While you can’t loop a video or audio, you can “duplicate” it to achieve the same effect.

Import your own media files

Clipchamp’s templates are made with stock video. You’re going to want to import your own photos and video, and possibly audio, too. Don’t choose the “your media” heading from the vertical nav bar. Instead, select the large plus-sign (+) icon at the top. Clipchamp makes it as easy as it can: You can drag and drop photos from your PC, from many

online services, or click the “From phone” button. The latter allows your smartphone



Clipchamp makes it easy to upload video and images from a number of sources, including your phone.

camera to scan a QR code, which unlocks an HTML interface on your phone into which you can quickly drop photos or video. Clipchamp then automatically uploads and converts them. It's probably not a bad idea to let Clipchamp access your OneDrive or Google Drive cloud storage, either, especially if you already back up photos to the cloud.

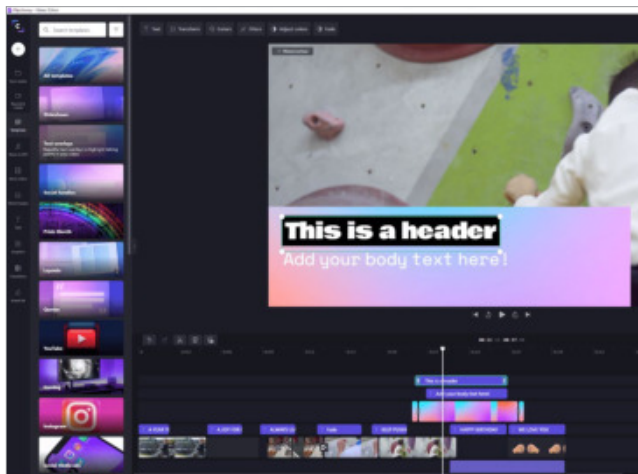
As you add your own photos and video, you'll need to keep everything in sync—or not, depending on your particular creative choices. Remember to “widen” text overlays and extend the length of the audio track, matching everything up on the timeline. Audio clips typically run a few minutes, which means you'll discover that you can add more video to fill out the space. You can also click and drag to group common elements together, helping to preserve their continuity.

Add text overlays

Do you want to add a text box? Click on the Text menu on the left-hand nav column and a submenu will open up with choices. Hover your cursor over each to see a preview, and then click the small plus sign in the bottom right to add it to the timeline. If you click the text box, you

should see some options appear above the video window, where you can adjust the size of the text, the color, and so on. Some templates don't allow you to adjust where the text appears on the screen. Others do, with the freedom to create your own text overlays. You can also create more-sophisticated effects by adding a second text track, so that you can add a text box, and then a second, with each fading in and out independently.

Not everything is perfect—or at least I haven't figured out how certain aspects work. Templates don't tell you which styles they're using, so I had to puzzle out that the “always learning” text overlay, above, was



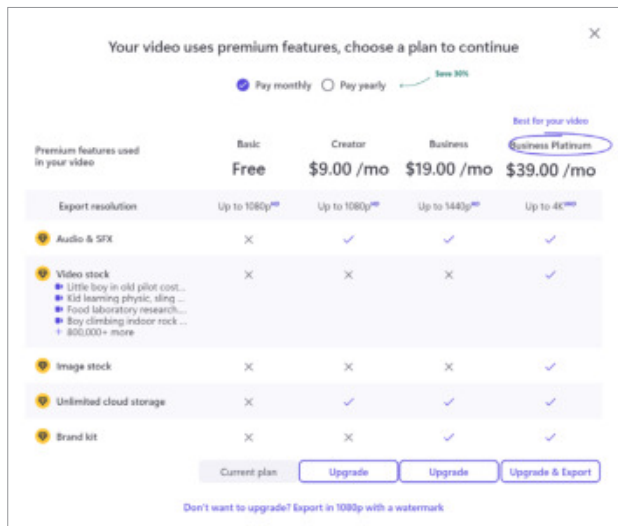
This may look a little complex and involved, but it's more intuitive than you think. To insert a text overlay, you first need to select one from the Clipchamp templates (which, admittedly, may not be *that* intuitive). When you select an animated text overlay, Clipchamp drops in the text and background files as an associated group. You can move the group back and forth, adjust the size of the visual elements, and edit what they say using the Text button at the top.

using the “stencil” effect. It also would be nice to move all of the various components of a video (text, images, overlays, and so on) to the left or right to create space for additional video clips, but I haven’t figured out how to do that.

Export your finished project

When you’ve completed your video file, you’ll need to export the finished project. Clipchamp will tap into your PC’s processor and GPU to speed up the process. Here, too, Clipchamp tries to be helpful: You can always export a lower-resolution 480p file as a draft copy. You may see an advisory to upgrade to Clipchamp’s paid subscription, especially if you’ve used its premium features. (The option to export a watermarked version for free appears at the bottom.) There’s even a small, optional, unnecessarily attractive progress pop-out that you can use to monitor the export progress while you work on other apps or tabs—though doing so will increase the rendering time.

One problem, though, is that Clipchamp (or Microsoft) can’t even maintain consistency in its feature set. Compare what Clipchamp’s pricing model is on its website versus what it shows you within the app. I



Regarding Clipchamp’s pricing model, there are some significant differences between what Microsoft lists on Clipchamp’s website and what it promises within the app, especially with regards to the export resolution. We’ve been told by Microsoft that the list on the website is the correct pricing model, and that it will change the in-app pricing to reflect that model.

never saw a 4K export option at all, though perhaps it’s available to paid subscribers. Microsoft representatives, however, say that the in-app pricing model is incorrect and that it will be changed.

Clipchamp also offers options to render the video in various formats, too. While you can render the video in a traditional landscape format, you also have the option of rendering it in a vertical portrait mode for sharing on smartphones.

When the render has completed, Clipchamp offers one-click buttons to share with a number of services from YouTube,



If you do use a paid feature, Clipchamp will allow you to export the video but only with this embedded watermark.

TikTok, Pinterest, OneDrive, and more. You can also simply save the file to your PC.

SPECIAL FEATURES: AUDIO, VIDEO, GIFS, AND MORE

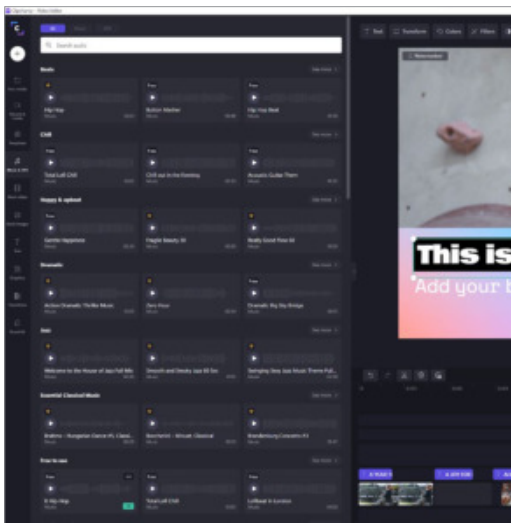
You'll notice that our demo template includes an audio track, which adds some real emotional oomph to the birthday wishes. Remember, you can mute each video clip or simply adjust each clip's individual volume, allowing you to "mix" any video dialogue against the audio backing track.

As we noted earlier, Clipchamp offers a number of audio tracks, accessible via the Music & SFX tab in the left nav bar. You can scroll down the list of tracks by genre or simply click the "Free to use" category partway down to choose from the list of free audio tracks Clipchamp includes.

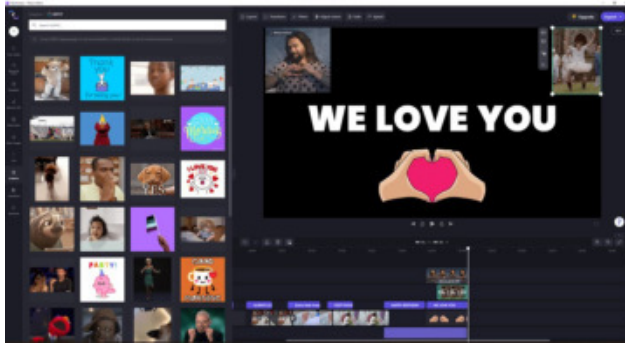
Note that you can trim an audio track just like you can trim a video clip, to underscore a particular portion of your video with an especially dramatic passage.

Clipchamp also provides a number of free random sound effects to choose from, emphasizing everything from Christmas ("Hohoho!") to a lot of weird horror effects, a strange collection of VCR noises, and even dogs panting. Paid effects include "Star Wars sounds" ...which really have absolutely nothing to do with Star Wars.

If you're the type of person who wants to drop in a meme for ironic or creative effect, look to the Graphics portion of the left nav



There are a number of available audio tracks right within Clipchamp. Note that the small "diamond" icon designates a paid track. However, there are also numerous free tracks, which have been collected inside the "free to use" subheading, too.



There's nothing that says "cool" (or is that "hokey"?) better than a meme GIF embedded in your video. You can see how easy it is in this case: Pick the meme, figure out where to embed it within the frame, and decide when it will appear and for how long it will play.

bar. There, you'll be able to import GIFs directly from Giphy, apply stickers, and more. (Remember, Clipchamp allows you to adjust the video formatting, so you might want to adjust the video size and proportions to play back in the vertical formats preferred by mobile apps.)

You'll probably use Clipchamp's stock images and video the least, and that's OK. Remember, Clipchamp straddles the line between a consumer and a commercial solution, and you can upload corporate assets as part of a "brand kit" for use as video overlays and so on. Consumers will probably never need to add stock photos or videos, unless you're somehow creating a video presentation that needs some sort of a backdrop or b-roll.

And if that's not enough, Clipchamp also has something for the Zoom and

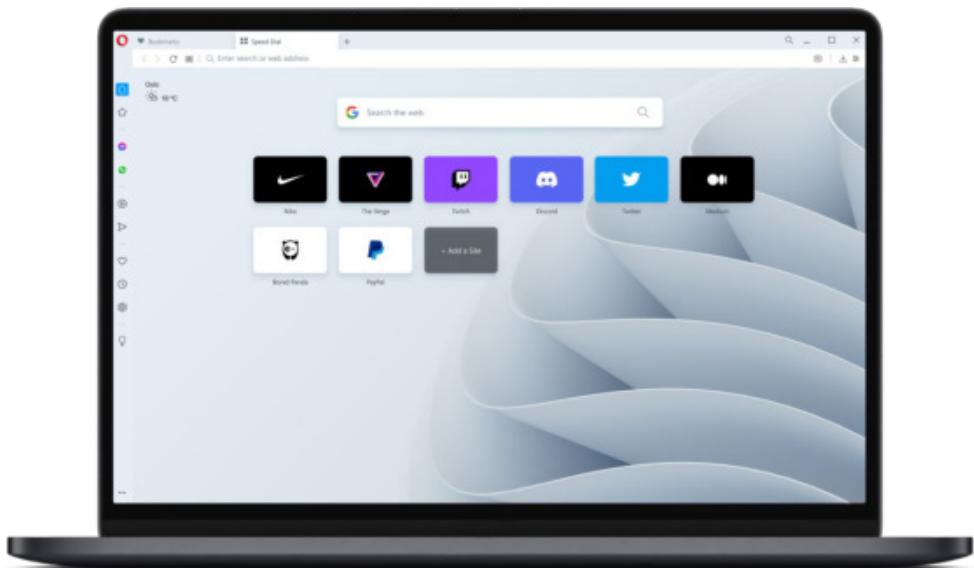
PowerPoint generation: screen recording, either as a full-screen recording of whatever you're doing, or with a picture-in-picture presentation that can use your webcam to provide video talking you through what you're demonstrating on screen. There's even text-to-speech, and it's excellent: I asked it to read the text from this story on high-end desktop processors,

and it performed flawlessly.

BOTTOM LINE

I'm not here to tell you whether Clipchamp is better than Adobe Premiere, DaVinci Resolve, or Apple's iMovie or Final Cut Pro—most of which, it should be said, require a paid subscription. The number of times that Clipchamp crashed or locked up while importing video files is also disconcerting. Until Microsoft finally decides to fix these existing bugs, you'll have to accept that.

What I will say is that Clipchamp is profoundly better than I expected. Add to that the ready availability of Clipchamp's templates, its simple, intuitive timeline, and the fact that it's essentially free, and what do you get? Something special. Creating video using Clipchamp feels like something you'll do for fun, not just for work. 🔌



10 innovative Opera features that lured me away from Chrome

Those mouse gestures truly rocked my world. **BY ALAINA YEE**

Chrome might be the most popular browser around, but it's not the only one based on Chromium, Google's open-source project. Rival browsers also rely on the same code.

That competition often dangles unique features to tempt users into switching, but Opera (fave.co/3yMZ748) long ago caught my attention with the sheer number of goodies stuffed into its browser. In fact, I abandoned Chrome for years because of

Opera. Flexibility, efficiency, privacy—the creators of Opera seemed to know exactly what I wanted.

Even though I've since started using Chrome again, Opera still holds a powerful place in my heart. I still use it daily as part of my multi-browser habits, both on desktop and mobile. Why? Here are the top 10 reasons—and I left a few off the list to keep this article from spiraling out of control. (For other alternatives, check out our guides to killer Firefox [fave.co/3xz10kt], Edge [[fave](https://fave.co/3xz10kt).



If you are literal about following directions like me, be aware of those that say to move in one direction and others that do not actually require a U-shape movement.

[co/3tjldC2](https://fave.co/3tjldC2)], and Vivaldi [fave.co/3QrFw1B] features that might manage to lure you away from Chrome.)

1. MOUSE GESTURES

I actually squeaked in excitement when I first read about Opera's mouse gestures (fave.co/3v1OYQj). Like keyboard shortcuts, these enable faster navigation while browsing, but they're even more seamless. You don't have to take your hand off your mouse.

With just a click on the right mouse button and one or two small mouse movements, you can zip through the basics: Go back or forward one page, open a new tab, reload the

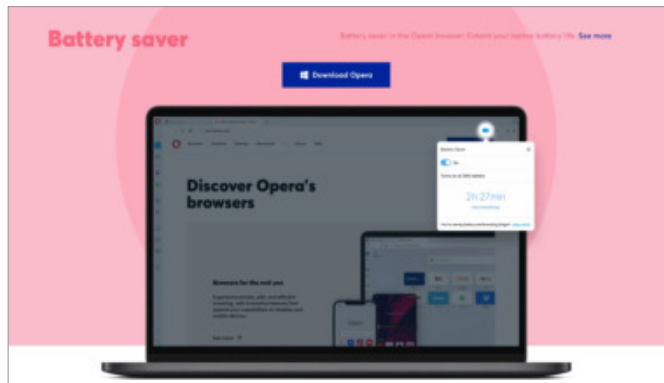
page, close the current tab, open a link in a background tab, or open a link in a new window.

After I turned on the feature, it took only a short time to learn the gestures. If you have wrist issues or have trouble getting the gestures down, you can also enable Opera's rocker gestures. These let you navigate back or forward one page by holding one mouse button and then clicking the other (right and then left button for back, left and then right button for forward). That's even easier to learn and doesn't require any wrist

movement. Having so many options for navigation is a dream as someone with cranky hands and elbows—I usually mix rocker and mouse gestures with keyboard shortcut use.

2. BATTERY SAVER MODE

On a laptop, Opera can help prolong the amount of time you get out of a charge. Flip



Opera can actually help you stretch your device's battery life.

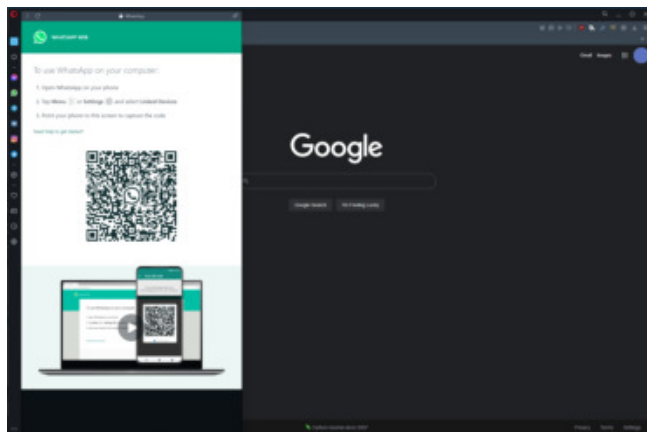
this mode on and the browser will adjust its behavior—reduced activity in background tabs, changes to video playback settings, different scheduling of JavaScript timers, the pausing of plug-ins and animations. Basically, Opera quietly reduces the resources it uses so it won't gobble as much energy.

The result of using battery saver mode? Opera claims up to 35 percent more battery life. Your mileage will vary in actual use, since most people's browsing habits aren't exactly the same each day, but it does help.

3. SIDEBAR

Are you constantly messaging in Facebook Messenger, WhatsApp, or Telegram (fave.co/3ofwHLh)? Or perhaps you often peek in on Instagram or Twitter? You can get quick access to these popular services via Opera's sidebar. When active, a row of icons will appear on the left side of an Opera window. Click one to open a site in a window overlay.

In addition to staying up to date with your messages and social media feeds, you can also switch between workspaces (see below), peruse your personal news, hit up your most frequently visited sites, and scope out Opera



I love not having to deal with autocorrect headaches when responding to WhatsApp messages.

settings. The list of options is preset, but you can tweak what appears. You can also resize overlay windows to your taste.

For me, being able to communicate over WhatsApp via a keyboard is the most useful part of the sidebar—messages are still run through encryption on a linked device, aka my phone. I'm also old enough to appreciate the news feed, which is an RSS reader baked right into Opera. (RIP, Google Reader [fave.co/3RREn3Z].)

4. UPGRADED TAB HOVER CARDS

Ever hover your cursor over a tab in Chrome? You'll see what's called a tab hover card: It lists the full title of the tab, along with the URL.

Opera has this feature too, as you might expect from a fellow Chromium browser.



Opera's tab hover cards have a leg up on Chrome's.

But it does Chrome one better—underneath the tab title and URL is a list of all other open tabs related to that same website. You can then click on items in that list to jump to that tab.

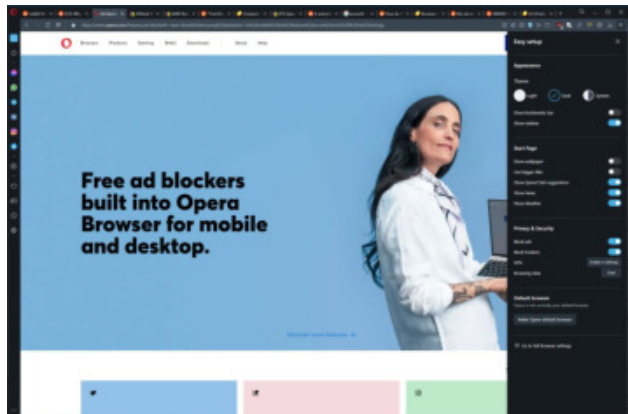
This addition to tab hover cards is *extremely* helpful whenever I, a person confident she's clicking on the correct tab among her many squished options in the window, is absolutely wrong. (Turns out that was not my /r/aww tab [[fave.co/3aVAII9](https://www.reddit.com/r/aww)], but /r/hardware [[fave.co/3S0FAGz](https://www.reddit.com/r/hardware)].) Instead of having to click around until I find the tab I wanted, or bring up the tab search feature, I can hop directly to my desired tab. It's just one more way that Opera pours on extra navigation

options to reduce life's little hassles that much more. I'm a big fan.

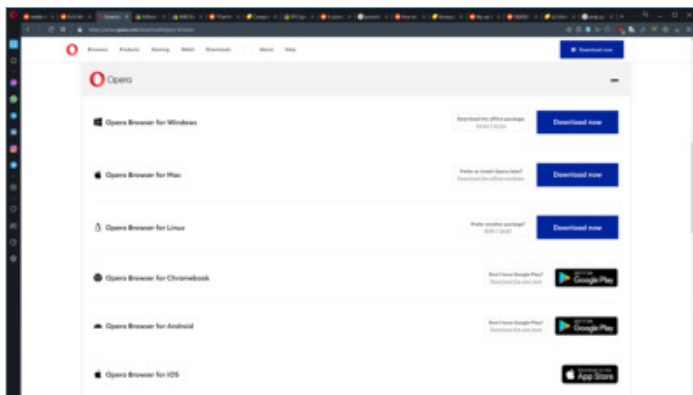
5. AD BLOCKING

You can add a third-party ad blocker (fave.co/3RNfNRV) to Opera, but you don't need to. Opera bakes one right into its browser. This feature is available on both desktop and smartphones, but it's particularly handy on mobile if you prefer a Chromium-style browser and thus Firefox and

its support for extensions won't do, or if you're wary of installing a third-party iOS ad-blocking app. It also simplifies remote technical support; no need to explain how to install and manage a third-party extension. With Opera, you just download the app and activate its ad blocker to keep the worst parts of the internet at bay.



toggling on the ad blocker is simple: It just takes two clicks.



Primary on the left, and a fresh new workspace on the right. You switch between them by clicking on the buttons in the upper left of the Sidebar.

6. WORKSPACES

Do you like to have different browser windows open, perhaps to better separate out tabs dedicated to work and personal tasks? But does having multiple windows open also result in a navigational headache? You might just love Opera's Workspaces.

These operate similar to how virtual desktops work in macOS and Windows. Each workspace holds whatever tabs were open while you were active in it, and you can bounce between workspaces quickly via Opera's sidebar.

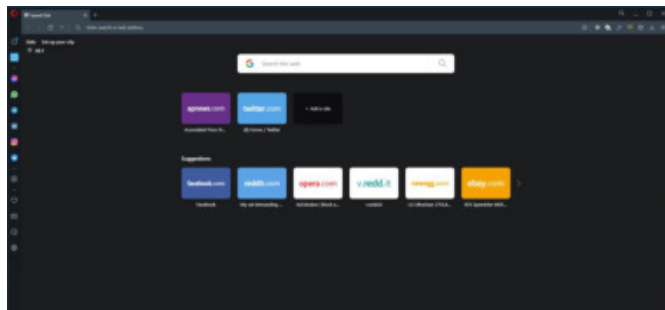
In truth, if it weren't for this job, this feature would make switching to Opera very seamless. I live a multi-browser life partially

to better keep my writing, research, and communication organized. (And then I use other browsers for social media and personal things.) Chrome may have profiles (fave.co/3Po7iew), but I don't need to have complete separation between my bookmarks, history, and other settings—just my

tabs. And Chrome's tab groups (fave.co/3yY2jtM) can still contribute to window clutter, though just not as intensely.

7. SPEED DIAL

It's a small thing, but Opera's start page can display links to the sites and extensions you most frequently hit up in a tidy grid format. It's a design feature now found in other Chrome



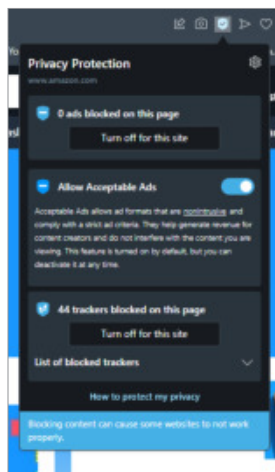
Opera's Speed Dial can contain many more links—this sample is on the sparse side.

rivals (hi, Firefox [fave.co/3xz10kt]), and for good reason—you can immediately get on with your daily routine. If something’s not on the auto-generated list, you can add a manual entry as well. I love this for the visual ease in navigating to an oft-visited site (for instance, Twitter), rather than having to find a link in my bookmarks bar.

8. AUTO-BLOCKING OF TRACKERS

Opera takes privacy and security seriously—and as part of that, it keeps websites from tracking your browsing activity across the web. As all tracking blockers warn, this feature can break websites or otherwise cause them to not function properly, but you can easily toggle the blocker on and off.

As with the other built-in privacy features, you can still use your own third-party app for the same purpose (like Ghostery [fave.co/3RRFrov] or Privacy Badger [fave.co/3KTJCwT]), but having this accessible from the moment you install the browser is simple and takes less work. I appreciate the time savings, since I don’t need to have an account for syncing extensions on new Opera installs. (I work with a *lot* of different computers over the course of a year.) It also results in less explaining when providing

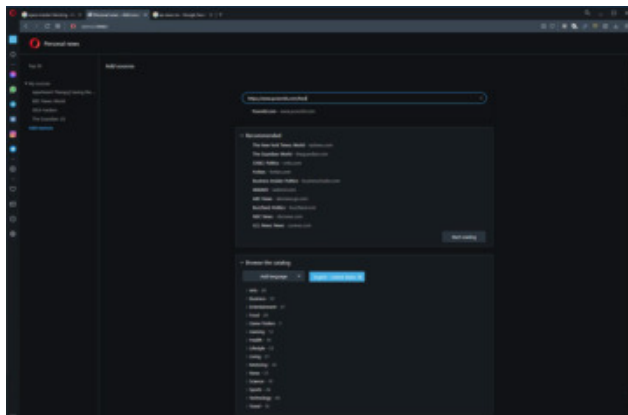


When tracker blocking is active, you can manage it by clicking on the hexagon icon in the address bar.

remote tech assistance. Just download, set up, and go.

9. NEWS READER

As I mentioned already, I still follow RSS feeds for sites to keep up breaking news and other developments within various topics. And



A sample setup for Opera’s Personal News (aka RSS reader).

while it's not perfect, Opera's built-in feed reader helps me stay on top of a few select ones I particularly focus on.

It's dead simple to use this RSS reader—you can choose from some suggestions, peruse Opera's top 50 list, run a search for a site, or manually add a link. (Be sure to include the `https://` part of the link, otherwise Opera won't recognize it as valid.) On occasion, a feed won't show thumbnail images for articles, but generally it works well.

10. BUILT-IN VPN

You've probably already heard of virtual private networks (VPNs) and how they shield your online activity from prying eyes. People sharing your connection can't monitor the sites you visit and the information you share, which you want to especially ensure on public networks.

Usually the best option for a VPN is a paid service (see our top recommendations, [fave](#).

[co/3FtTTMs](#)), but not everyone can afford a regular subscription. Opera solves that issue by offering a built-in VPN that protects your browsing activity without requiring a separate app or extension. The service is 256-bit encrypted, with no bandwidth limitations, no logging, and worldwide servers. Not bad for a grand total sum of \$0.

Of course, if you need to guard yourself while using apps outside Opera, its VPN doesn't extend that far. You'll need a good standalone free VPN ([fave.co/3FtTTMs](#)) for that. But for any browsing, Opera's solution is supremely convenient.

AND THERE'S STILL MORE...

Opera has other features that further boost its appeal, but perhaps not everyone will think them special enough to call out. They still matter, though. Reader Mode lets you transform busy, visually cluttered webpages into clean, legible sets of text and relevant images; Chrome extension support ([fave.co/3cw9qjX](#)) means you're not actually giving up anything by switching; and Opera is far less of a resource hog.

But if this list of awesome features still leaves you cold for whatever reason, there are still other alternatives to Chrome you should check out—maybe Firefox ([fave.co/3xz10kt](#)), Edge ([fave.co/3tJldC2](#)), or Vivaldi ([fave.co/3QrFw1B](#)) will float your boat instead. 🔌



Of the free VPN options out there, Opera's built-in option is a good starting point.

>> How a silver lining forms

>> It starts at sea.
>> Tropical waters heat up.
>> Warm air soars skyward.
>> Cold air rushes to the void.
>> Cold air warms up.
>> Cycle repeats.
>> Faster and faster—a 50,000 foot engine of air.
>> At seventy four miles per hour it earns a name.
>> Harvey, Irma, Katrina.
>> Then landfall.
>> Roads rendered useless.
>> Buildings destroyed.
>> Families stranded.
>> But for a brief moment,
>> A silver lining appears.
>> People see neighbors instead of strangers.
>> And labels that divide are forgotten.

>> But when rains ease,
>> when clouds part,
>> silver linings need not fade.

>> Let's embrace our shared humanity.
>> Let's connect with one another.
>> Let's find our love for each other.
>> Every single day.

>> Come together at lovehasnolabels.com



Tech Spotlight

A video showcase of the latest trends



Watch the video at
youtu.be/eCJMKNur3w

8 New Windows 11 Keyboard Shortcuts You Should Know

➔ If you're not already using keyboard shortcuts in Windows, you should be. They save a ton of time. Here are our favorite new ones for Windows 11.