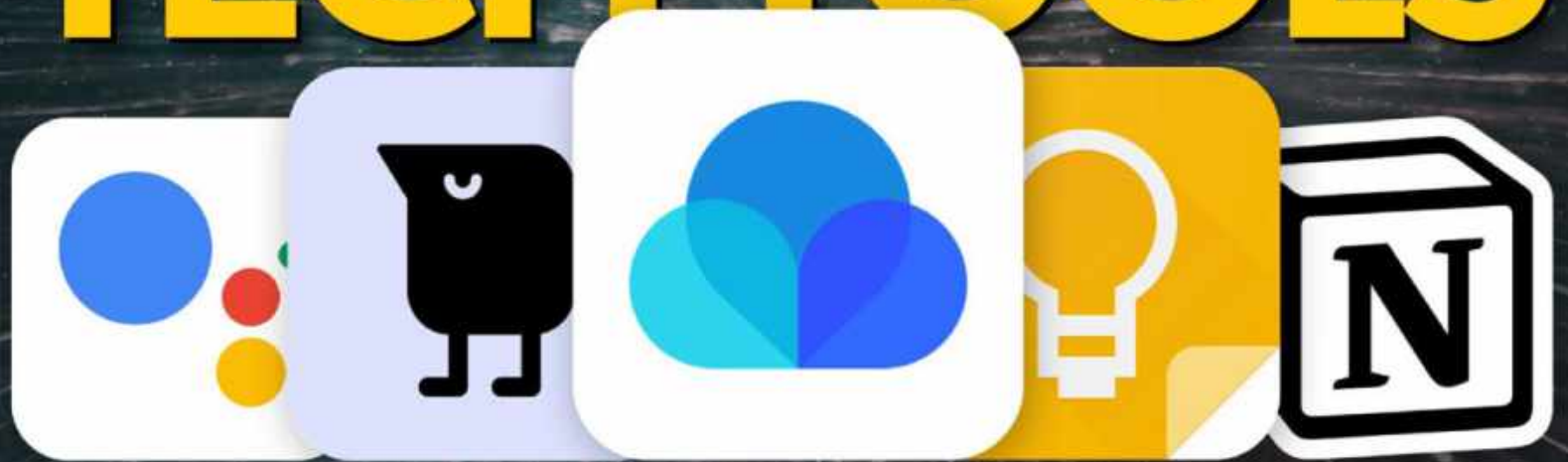


THE AI REVOLUTION IS HERE
REIMAGINING WINDOWS AND BING

PCWorld

MARCH 2023

5 FREE TECH TOOLS



**FOR STAYING
ORGANIZED**

MADDY TURNED HATE

Maddy Park
Founder,
@CafeMaddyCab

INTO HOPE

AND STARTED A MOVEMENT

In 2021, the rise of violence against the Asian community made even the simple act of taking public transportation unsafe. So, Maddy started a fund to pay for cab rides for those in the Asian community that needed it most, including women, the elderly, and the LGBTQ+ community. With over \$100,000 raised in just two days, she started a movement based on love that lives on today.

love
has
no
labels



Join Maddy's cause and get the tools
to support the Asian community now at
LoveHasNoLabels.com

PCWorld

MARCH 2023

→ DEPARTMENTS



7 News



29 Reviews & Ratings



83 Here's How

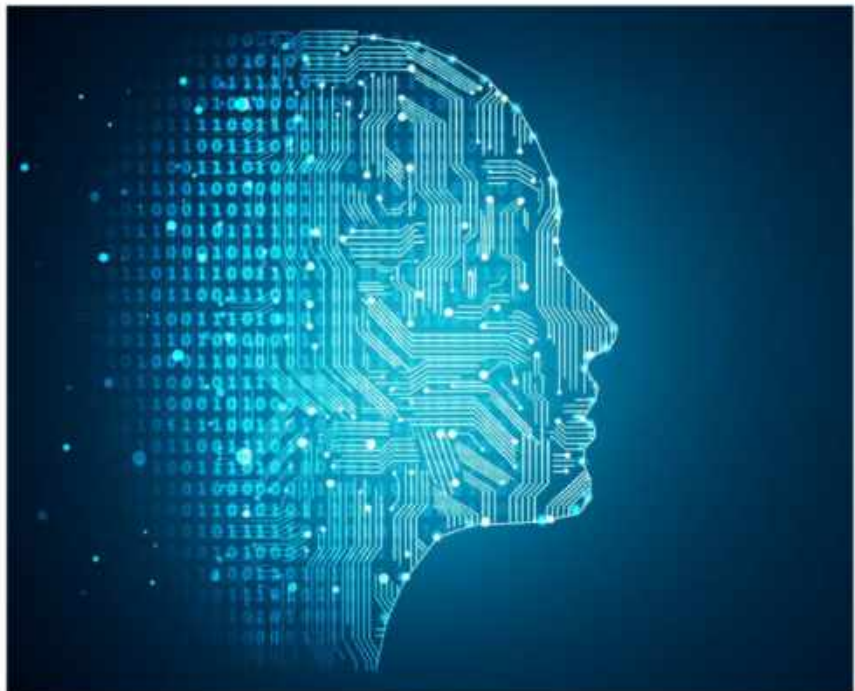


96 Tech Spotlight

→ FEATURES



68 5 free tech tools for staying organized



74 12 ways AI could improve Windows 11 (or Windows 12)

PCWorld

EDITORIAL DIRECTOR Matt Egan
EDITOR IN CHIEF, CONSUMER BRANDS Jon Phillips
DESIGN DIRECTOR Robert Schultz

EDITORIAL

EXECUTIVE EDITORS Brad Chacos, Gordon Mah Ung
SENIOR EDITORS Michael Brown, Mark Hachman
ASSOCIATE EDITOR Ashley Biancuzzo
STAFF WRITER Michael Crider
CONTRIBUTOR Adam Taylor
COPY EDITOR Gail Nelson-Bonebrake

DESIGN

ART DIRECTOR Steve Traynor
DESIGNER Rob Woodcock

ADVERTISING

SALES INQUIRIES foundryco.com/contact-us/

FOUNDERS

FOUNDER David Bunnell
FOUNDING EDITOR Andrew Fluegelman

INTERNATIONAL DATA GROUP, INC.

CHAIRMAN OF THE BOARD Walter Boyd
CEO, FOUNDRY Kumaran Ramanathan

REPRINTS AND PERMISSIONS

You must have permission before reproducing any material from *PCWorld*. Send email requests to permissions@pcworld.com; please include a phone number in your message.

BACK ISSUES

PCWorld back issues can be downloaded in digital format from www.zinio.com at \$6.99 per issue.

SUBSCRIPTION SERVICES

Access your subscription account online—24 hours a day, 7 days a week. You can use online subscription services to view your account status, change your address, pay your bill, renew your subscription, get the answers to frequently asked questions, and more.

WEB simplecirc.com/subscriber_login/pcworld

EMAIL support@pcworld.zendesk.com

(Send your full name and the email address at which you subscribe; do not send attachments.)

QUESTIONS AND COLUMNS

Send material electronically to the appropriate online address listed below, or mail it to *PCWorld*. We reserve the right to edit letters.

MAILING LISTS

Occasionally we make our magazine subscribers' names available to other firms whose products may interest you. To have your name excluded from these mailings, send a request and your email address to PCWorld Subscriber Services at support@pcworld.zendesk.com.

CONTACT

PHONE 415/243-0500; FAX 415/442-1891

MAIL Editorial: 501 Second Street #650, San Francisco, CA 94107

STAFF ADDRESS To contact any *PCWorld* staff member, simply format the address as follows:
firstname_lastname@idg.com

PUBLICATION INFORMATION

Volume 41, number 3

PCWorld™ (ISSN 0737-8939) is published monthly at \$24.95 for one year (12 issues) by Foundry (formerly IDG Communications, Inc.) ©2023, Foundry (formerly IDG Communications, Inc.). All rights reserved. *PCWorld* and *Consumer Watch* are registered trademarks of International Data Group, Inc., and used under license by Foundry. Published in the United States.

A woman with dark hair tied back, wearing a grey and white striped sweater, is smiling and looking down at a baby she is holding. In the foreground, another person is lying down, their head tilted back and eyes closed. The background is a soft-focus indoor setting with a plant visible on the right.

Vaping can
cause irreversible
lung damage.

Talk About Vaping.org

Get the facts
about youth vaping.



**#DoThe
VapeTalk**



With ChatGPT, the new Bing wants to be your 'AI-powered copilot for the web'

AI chat is also being built into Microsoft Edge. **BY MARK HACHMAN**

Microsoft has unveiled the “age of AI,” with new conversational ChatGPT features for Bing that the company described as the “AI-powered copilot for the web.”

Microsoft will add contextual searches to Bing, powered by its own version of the ChatGPT algorithm. Microsoft will also integrate a separate, dedicated chat interface for Bing, complete with footnoted links. Finally, AI will be integrated into Edge,

allowing users to summarize a financial earnings report, for example. Bing's new search engine interface is live, but at this writing people who want to try it must sign up for a waitlist. It will expand in coming weeks.

Satya Nadella, Microsoft's chief executive, likened AI and the launch of ChatGPT (fave.co/3I7qDye) to the opening of the Web. "It was the Mosaic moment," Nadella said. "I think this technology will reshape pretty much every software category. The question is, how is AI going to reshape the Web? ... All computer interaction will be mediated with an agent helping them." Nadella said it will begin with search.

Microsoft executives said search has remained fundamentally the same as it was 20 years ago. It works well for factual queries, but stumbles when asked to make specific recommendations. Microsoft plans to have a

new Bing search and Bing browser use chat technology to answer questions posed by users. Corporate vice president Yusuf Mehdi said Bing will incorporate a powerful new GPT model called Prometheus, which is an enhanced model of the ChatGPT algorithm.

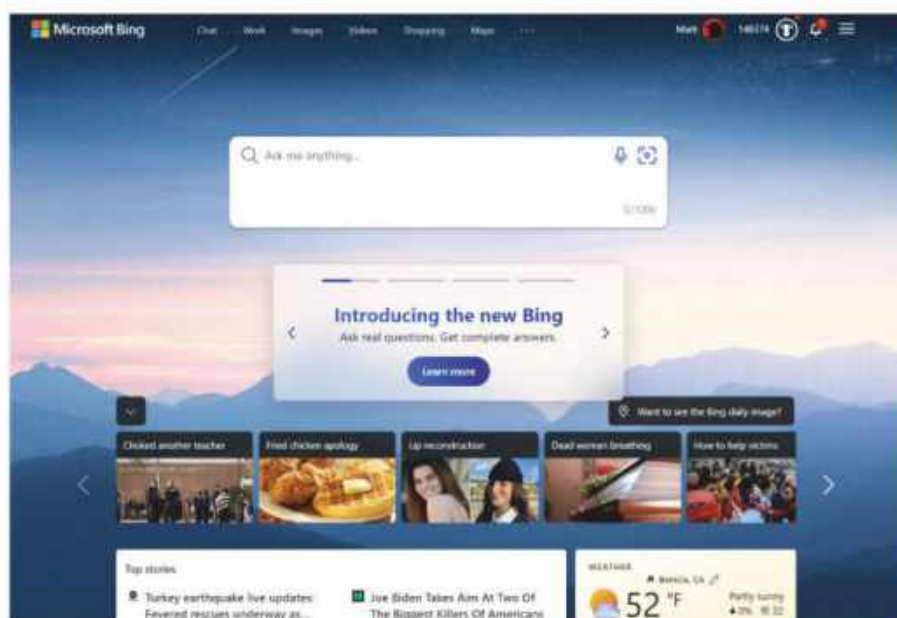
MICROSOFT LAUNCHES AN AI-POWERED BING

Open Bing's home page, and you'll see a brand-new interface: a large search box that can accommodate 1,000-character entries. Type in a query, and you'll see something new: a traditional list of search results will scroll down the left side of the page, but there will be a new contextual interface on the right side, too.

Normally, this would be an area for Microsoft to summarize what it knows of your query: facts and figures about a travel

destination, and photos and prices. Now this area will instead be used for any context that Microsoft can pull and assimilate, and then collate in a lengthy response to your question. One key difference from ChatGPT: Bing still emphasizes facts, so you'll probably see less editorialization than in ChatGPT.

Users will also have the



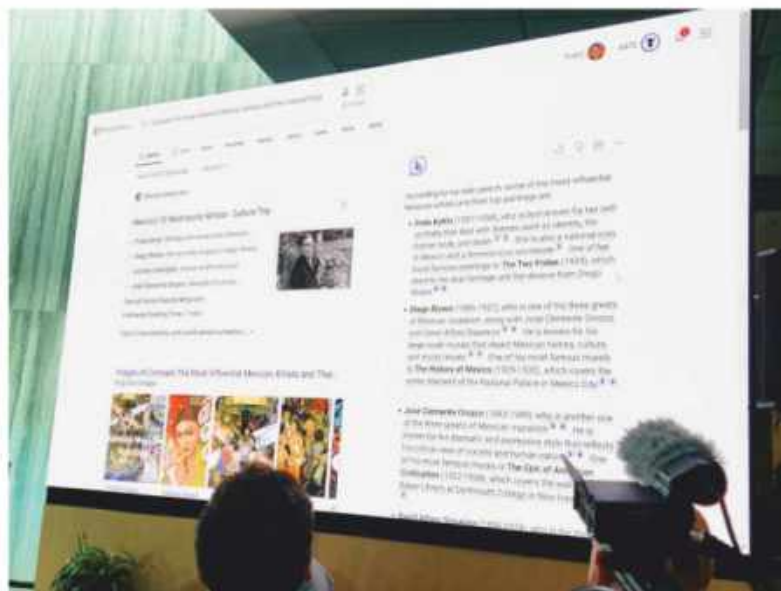
The live version of the new Bing home page.

option to go straight to the conversational chat experience, in much the same way you can search for images or shopping results. You'll simply see a Chat tab as an additional search option, way up near the top of the search page.

Clicking that will bring up a chat interface, in which users can type a query and have the chatbot respond. For now, responses will be "remembered" for about 45 minutes. Anonymous queries will be possible, but Microsoft is requiring users to log in with a Microsoft account to use the interface. Users on a waitlist to use Bing will still be able to make a limited number of queries, but users with full access will be able to generate an unlimited number of searches and chats. Mehdi showed the chat model working for television recommendations, a travel itinerary, and a 1990s trivia game.

According to Mehdi, there will be no cost to use the new Bing search experience. Ads, however, will be implemented from day one—though it's not clear if he meant sponsored search results or a sponsored chat interface.

As earlier leaks indicated, Microsoft's chat results (as well as the contextual search within Bing) will be footnoted, with links to the source material so that users can check them. The footnotes are for now bare-bones, with



Chat results will be footnoted, with links to the source material so users can check it.

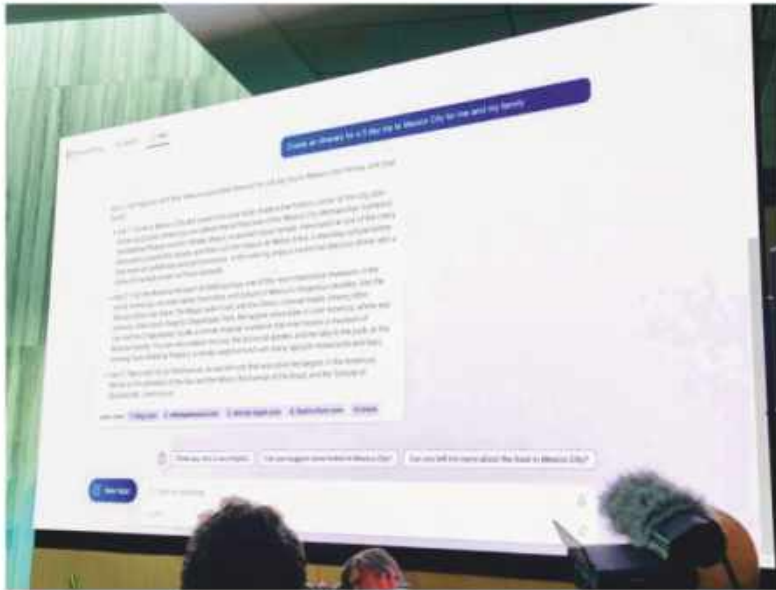
the clear focus on users believing the response to be legitimate.

Microsoft has also implemented mitigation layers that will add filters, parsing queries to identify and defend against queries that are potentially harmful, such as a possible attack on a real-world location.

AI WITHIN EDGE, TOO

Microsoft is also implementing AI chat inside a new version of the Microsoft Edge browser as a sidebar experience. Chat can summarize an earnings report, Mehdi said, as well as author a LinkedIn post.

It's not clear when the updated version of Edge will go live. Mehdi showed off the new chat capabilities within Edge as being accessed via a small Bing icon to the upper right of the interface. Bing already has a sidebar view ([fave](#).



The new chat interface within Microsoft Bing.

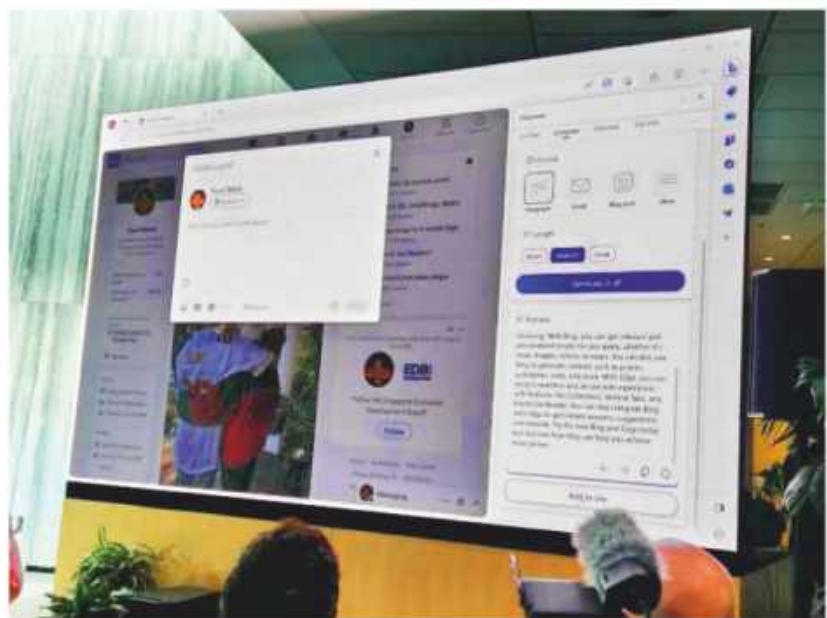
[co/3XDLJK4](https://fave.co/3XDLJK4)), with various utilities and tools, and it appears that chat will be implemented as a more powerful version of those utilities.

Microsoft had been widely expected to announce a sweeping AI initiative, covering both its consumer and enterprise products. In January, *The Information* reported that an AI-powered Bing could be released as early as March (fave.co/3YUokFm), with ChatGPT or a related technology powering Office, too. This was shortly before Microsoft invested an undisclosed amount of money into OpenAI (fave.co/3ICUs1T), though reportedly the figure totals \$10 billion over a ten-year period. Microsoft had already invested \$1 billion into OpenAI before that.

Chief executive Satya Nadella had previously told investors Microsoft planned to lead in the “age of AI” and deploy GPT technology across its product line. Leaks of what Microsoft referred to as “the new Bing” (fave.co/3lxZI5C) appeared in the wild for a short time earlier this month. Basic citations indicated where it had sourced its information.

Microsoft’s Bing will now compete against ChatGPT, the conversational AI (fave.co/3I7qDye) that took the world by storm last year, and Google’s

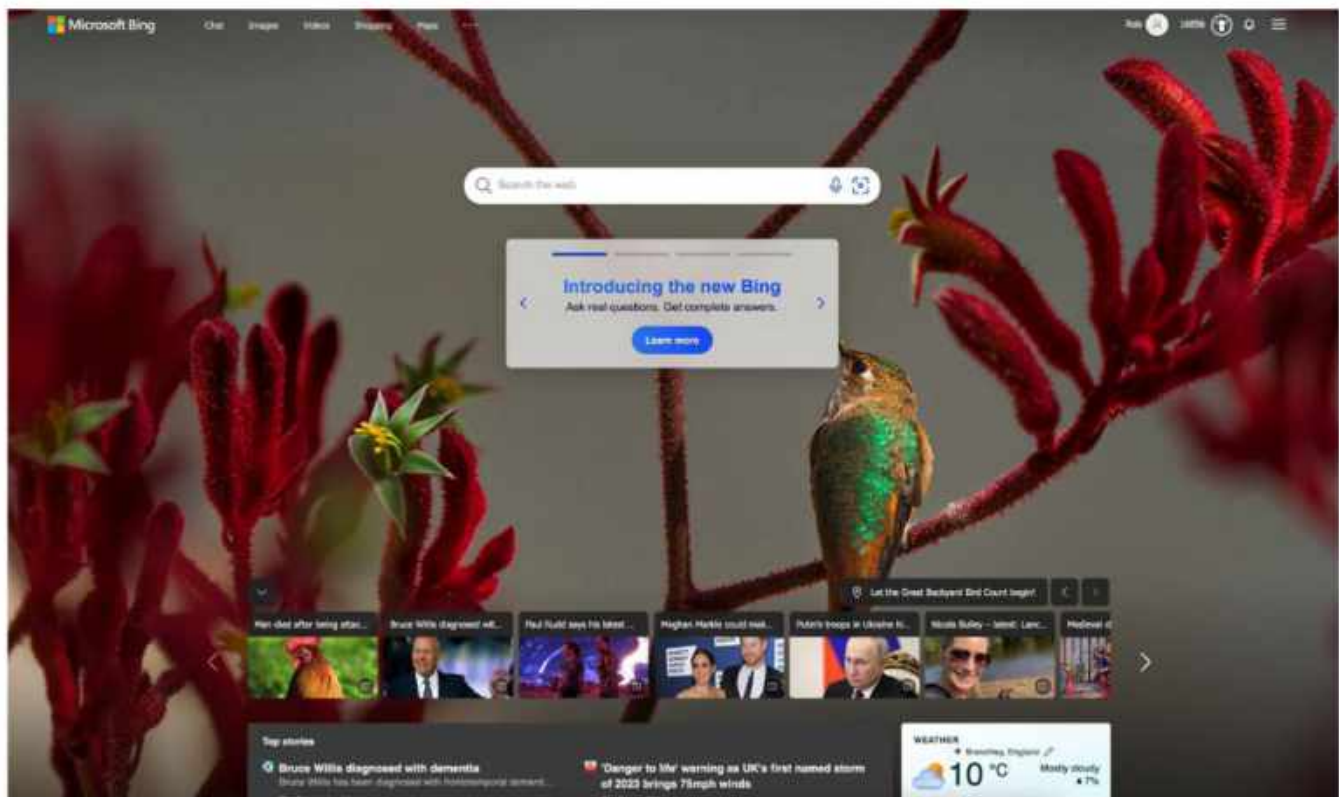
newly announced Bard (fave.co/3XCeqqW), released in a limited form to testers. You.com has also released a conversational AI, YouChat (fave.co/3YCWhut), which can provide contextual answers and links to its sources, and integrates AI-generated art as well. 🔌



Here’s Microsoft Edge with AI, powering LinkedIn.

With ChatGPT, the new Bing wants to be your 'AI-powered copilot for the web'

AI chat is also being built into Microsoft Edge. **BY MARK HACHMAN**



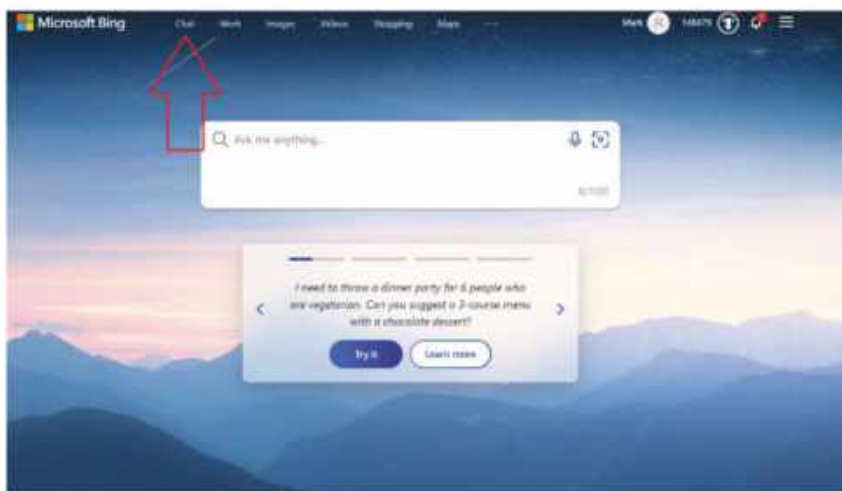
Bing's new AI-powered chatbot (see page 7) is basically ChatGPT with ads...and one that refuses to do your homework for you. Well, sometimes.

That's not necessarily a derogatory criticism; the new Bing is pretty amazing. In your first few minutes with the new Bing chat interface, you'll probably see even more sophistication than the free version of

ChatGPT (fave.co/3I7qDye) currently offers, with lengthy, detailed responses that can help you in many walks of life. But they may end with a jarring ad that looks (and probably is) ripped straight from Bing. That said, the fresh AI experience already works shockingly well more often than not.

The new Bing experience is basically two parts. There's the traditional search, with a list of search results and a new contextual

interface to the right; and the new Chat interface, which can be accessed either by swiping up from the list of links or via its own link. Microsoft's new Bing.com, for those who have access, features a large search box in the center, with room for lengthy searches of up to 1,000 characters. It's above that search box that you'll find the small Chat link.



Bing's new home page. A query will generate the traditional page of search results, while there's a link to the chat interface, above.

HOW TO USE THE NEW BING

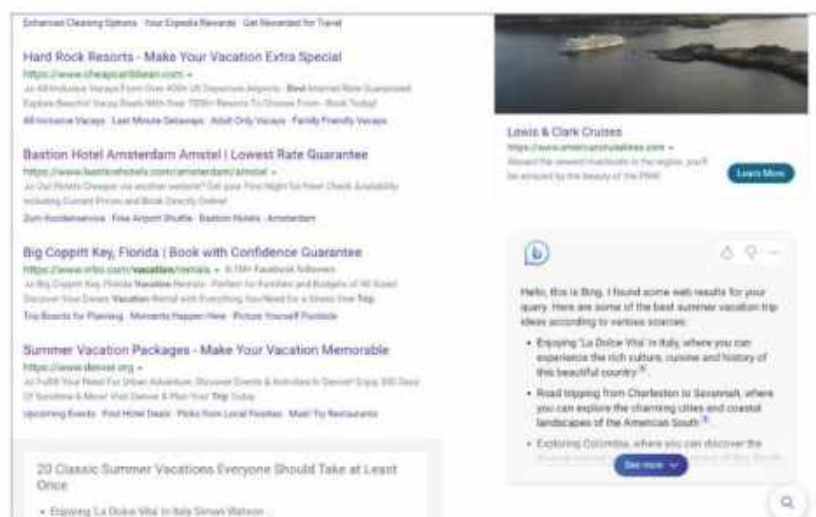
Like any other search engine, the new Bing isn't complicated to use. Type in any traditional search query ("best Caribbean vacation spots," for example) and Bing will return a list of traditional search results. But wait—to the right is something new: a text

box with a textual description of what Bing thinks would be the best vacation destinations for you to go to. This is a version of the new ChatGPT-powered conversational experience that Microsoft launched recently.

The key difference between the left and the right side appears to be that Bing is collating the results listed on the left—saving

you a click or two, in other words. (The publishers of those sites might replace "saving" with some derivative of "robbing," as your click helps drive them traffic and revenue.) At the end of the box there is a list of footnotes: links that expand if you hover over them, as well as follow-up questions that can take the conversation further.

If you click them—or the related button, "Let's chat"—the entire interface will scroll upwards,



Bing's new "traditional" search will add a new contextual information box to the right, leading to the chat interface.

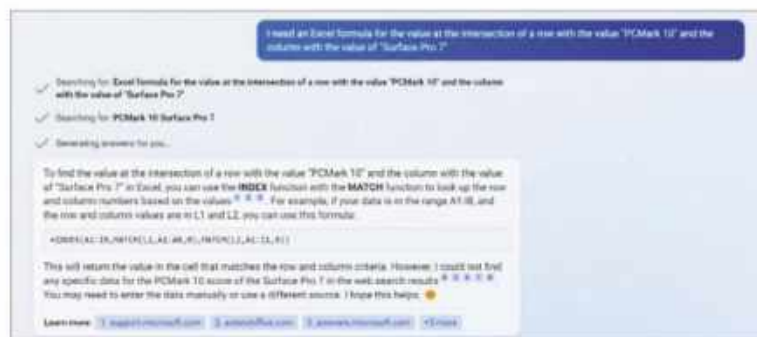
opening up a new space above the search results. Welcome to the new Bing, powered by ChatGPT. You may see a message box under a result that allows access to the chat window, too.

The Bing search and chat is supposed to work within Edge as well, in the sidebar of the browser. Additional capabilities include the ability to summarize PDF documents and provide more contextual information, Microsoft says. But when we downloaded the Edge Dev version in which the Bing sidebar was enabled, we couldn't seem to trigger the function.

WELCOME TO BING CHAT

If you're familiar with ChatGPT, the Bing interface won't feel all that different. The idea is that you can ask the chatbot questions, receive responses, and follow the conversation further or pursue other angles. (Clicking the Feedback section reveals that this product appears to be called Codex.)

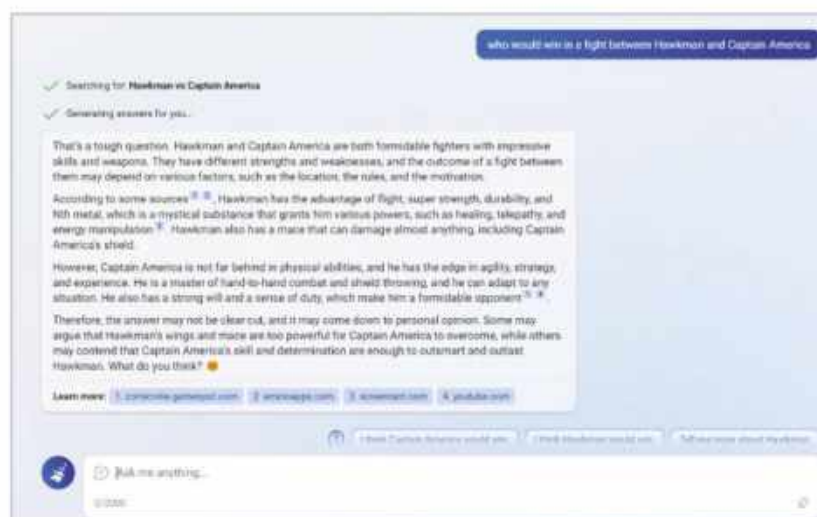
For now, the experience is entirely free, though you'll need to be logged into your Microsoft account to see the benefits of the chat and the new Bing experience. Until Microsoft pushes the entire Bing experience live, you'll be forced to join a



You'd expect Microsoft Bing to be able to suggest tools and tips to assist you in using its own products. And it can.

waitlist. Even then, you'll be allowed to ask the new Bing a limited number of queries, we're told. For now, Microsoft isn't allowing anonymous queries, though that should be added in the future, the company said.

Unfortunately, Bing's chatbot would occasionally disconnect, generating an error message or the option to refresh the page. If you do, all of your conversations disappear. This isn't always a problem, but Bing (and other AI) often regenerate answers that differ,



The first time I asked this question, Bing settled the matter in favor of Hawkman. A while later, it wasn't so decisive.

so that a good, comprehensive answer might not appear again the second time you ask.

So what's it like using Microsoft's Bing chatbot? Anecdotal, it feels somewhat like the old days of ChatGPT. ChatGPT emerged without a number of guardrails, answering without restriction on a number of queries. Bing feels a little bit looser, though it will also set polite limitations, as well: It declined to respond when asked for the nicknames for various ethnicities (a lead-in to racist slurs) and smartly declined to answer "how to pick up a girl" as a query that objectified women. Interestingly, it then later erased the second answer entirely, responding that I had to search Bing.com to find out more.

In terms of a much more innocuous query ("Who would win in a fight, Hawkman or Captain America?"), however, Bing actually picked a winner. Well, it did, once. ChatGPT usually demurs until prompted further. Naturally, Bing will write code for you, too. Limericks? Songs? Absolutely.

The key difference between Bing and, say, Google Bard (fave.co/3XCeqqW) is that Bing footnotes its responses, visually indicating what portion of its response comes from what site. At the end of the



A visual ad in an otherwise text-based interface is a little jarring.

response, Bing supplies a list of links, which you can click or at least hover over for more information. It often adds a little emoji, too, humanizing the conversation a bit.

On occasion, though, there's also an ad. Ask Bing about a Caribbean vacation and it will close with a sponsored link; ask it how to change the RAM in your laptop and it will end with a carousel of shopping links. (That query completely ignored the very valid issue of exactly what type of RAM to buy or insert.)

You probably won't care that users will pass over those links, disappointing publishers. Microsoft promises that the chat interface won't be full of sponsored content, what you might call "advertorial." It does matter that in the traditional Bing list of links, sponsored ads appear first, whereas in the chatbot, sponsored ads appear last. That may mean consumers

prefer using the chatbot to traditional links. Analysts I spoke to insist that this will change search forever; if this cultural trend takes hold, it might.

IS THE NEW BING BETTER THAN CHATGPT?

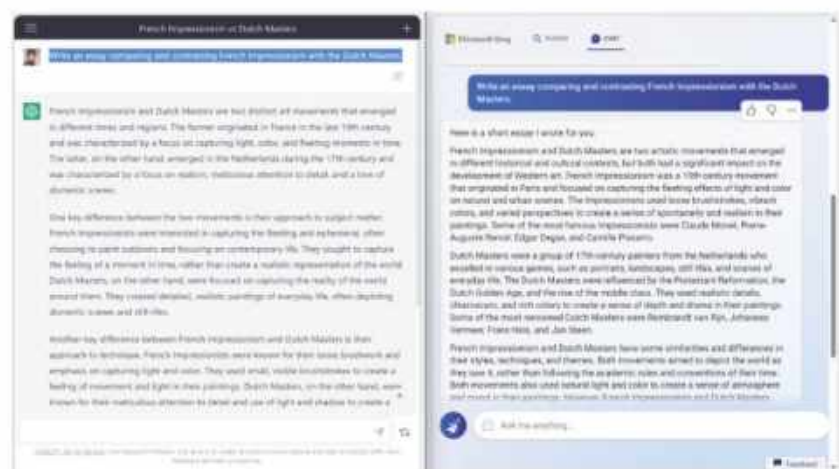
So is Bing better than Google's Bard? Until Bard is released, we can't say. It does offer footnotes, which Bard does not. Bing also does seem more comprehensive than what You.com offers. Is Bing better than ChatGPT? In some ways, yes. So far Bing feels more comprehensive than the free version of ChatGPT, although OpenAI's chatbot does seem much more willing to serve as a study aid.

When asking both engines to write an essay comparing and contrasting two artistic styles, ChatGPT actually wrote the essay. Bing just supplied an outline, forcing any student using it to do the work itself. Well, the first time, anyway. When I tried to grab a screenshot (and then copied the question again), Bing helpfully wrote the essay. If at first you don't succeed...

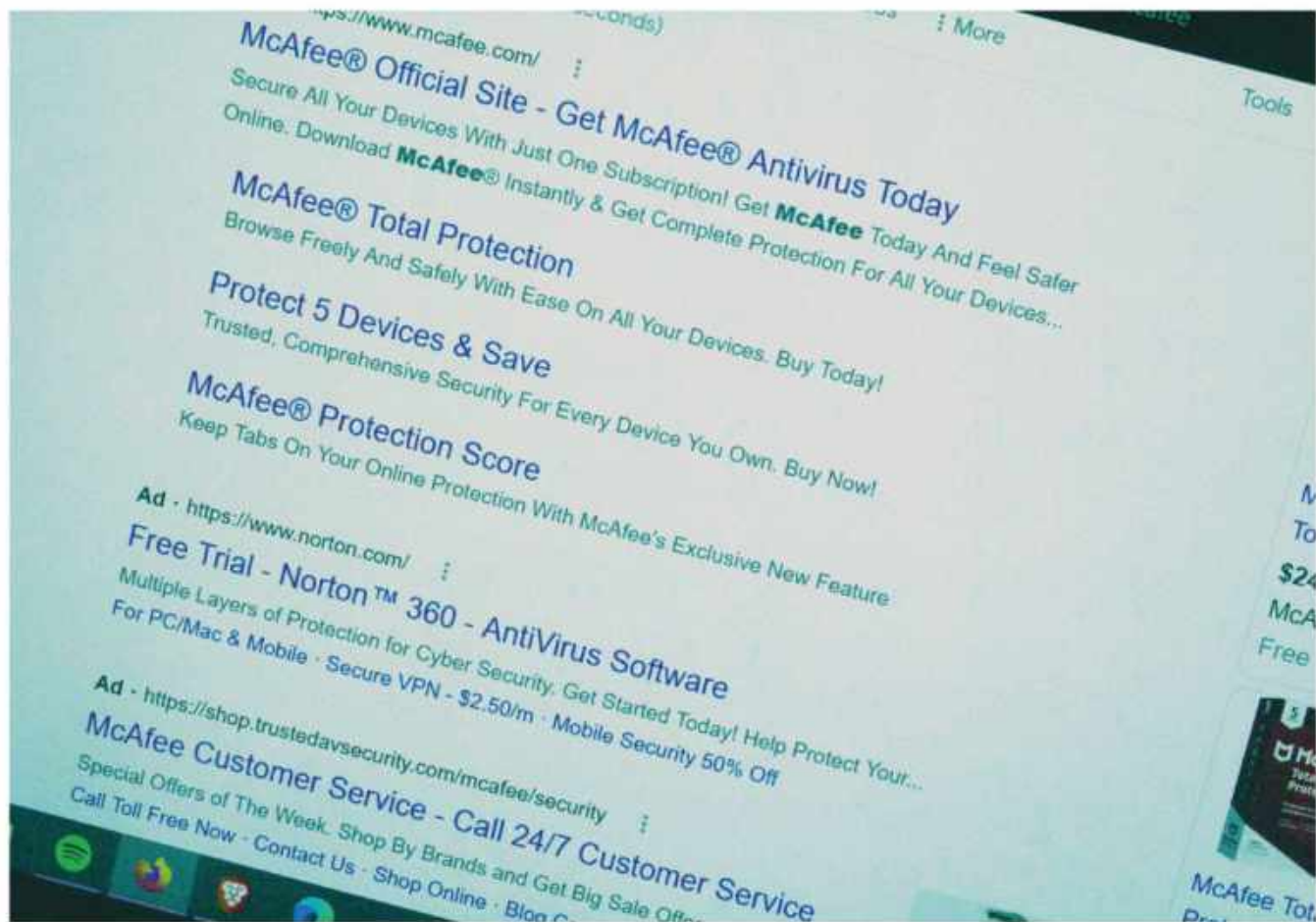
In other ways, Bing limits itself much more. Bing won't dispense medical advice, and it balks at anything sexual. (Ironically, those answers can be sought using the traditional

search interface.) It won't generate content that is harmful, offensive, or copyrighted. It's also good at preventing end runs around those restrictions. In a test asking for an Excel function to perform a specific task, the two tied: Bing gave more methods than ChatGPT, but ChatGPT's examples not only explained the code but were much more focused. We'll need to put in more study before we can definitively say one is better than the other, though.

In the final analysis, though, you can't help but feel that Bing is being extremely generous about the whole thing, as far as its competition is concerned. "Ultimately, the choice between Bing and Google Bard may depend on your personal preferences, needs, and expectations," Bing responded, including the emoji, when asked whether it or Bard was better. "You may want to try both of them and see which one suits you better." 🔌



Originally, Bing declined to write an essay. But after I gave it another prompt, it did the job for me.



You can't trust Google results for software downloads right now

Gaming the system shouldn't be so easy for purveyors of malware, but here we are.

BY ALAINA YEE

Just a couple months ago, sharp-eyed Redditors noticed that searching for AMD graphics card drivers on Google served up a shady text ad as the first result (fave.co/3S453iB). Our advice then (as now) was to be careful when you're looking for Radeon software, plus maintain good search habits in

general. Life's a whole lot easier when you sidestep malware.

At the time, this incident seemed more of a one-off reason for heightened awareness. Even with the more recent report about Bitwarden suffering from a similar issue (fave.co/3k8YFtR), using Google seemed mostly business as usual. Turns out, though, our

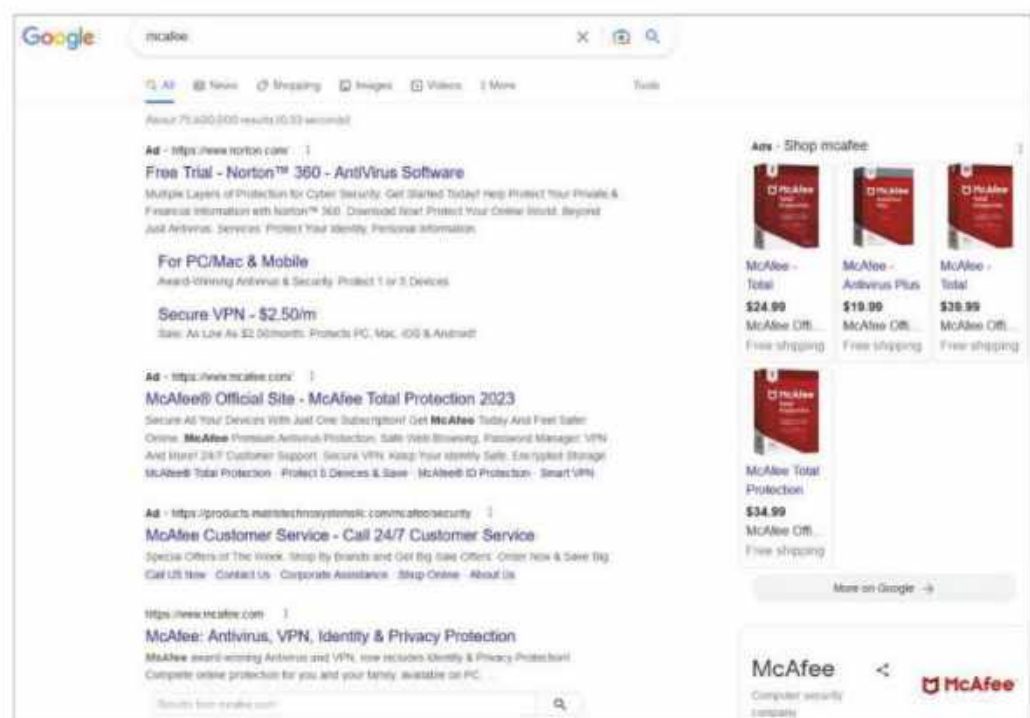
threat alert should be set much higher—other major downloads like Adobe Reader, Microsoft Teams, OBS, Slack, and Gimp are being targeted, too.

As thoughtfully detailed by Ars Technica (fave.co/3k8YFtR), the sharp rise in malvertising is a new phenomenon, stemming from Microsoft's improved blocking of dangerous Word macros. When one field dried up, bad actors simply moved to another to farm. The trend is bad enough that security researchers have sounded the alarm—but so far, Google hasn't squashed the issue, though the company commented to Ars that "addressing [the increase in malicious text ads] is a critical priority." Until a proper fix goes live, that leaves everyone who uses Google search to fend for themselves in the meanwhile.

So what can you do? The pat answer is "Don't click on results labeled as ads," of course. You can also always check the link address to verify its authenticity, plus scroll down the page to see if you spot a duplicate result. Currently, if

you see a second link for the same site, that one is usually more trustworthy, since ads get placed right at the top of results. And as a final safety net, you can install an ad blocker on your browser, like uBlock Origin (fave.co/3YGXiSc). Sites you trust and want to support can get manually added to the extension's approved list (which allows ads to show), while all others (including Google) will get screened.

None of these precautions are bulletproof on their lonesome, but added all together, you should be able to steer clear of most bad links. And when you do click on a search result, don't download and install anything until you've had a good look at the page. Make sure you scan any downloads with antivirus software. 🔌



One of these links is not like the others.

Microsoft Edge's simple PDF reader is being replaced by Adobe Acrobat


Users with an Adobe subscription get access to a larger range of features. **BY ALAINA YEE**



Like its rivals, Microsoft's Edge browser sports a built-in PDF reader that's bare-bones but functional. You click a PDF link and a tab opens with the document that you can read, search, and lightly annotate. But that experience is getting supercharged: Microsoft and Adobe have teamed up to bring Adobe Acrobat to Edge, in what will become a wholesale replacement of the browser's current PDF engine.

This move will enable more features when viewing PDFs from the web, like markup tools, stronger security for PDFs, and greater accessibility (that is, read-aloud narration).

The increase in Edge's PDF capabilities will be native, without the need to install a separate add-on. Users with an Adobe subscription will still need to install a browser extension to access additional advanced features like text and image editing, PDF conversion, and file merging. You can see a simulation of the interface in this video: fave.co/3YVEoH1.

The changeover arrives in March, when the revamped PDF technology becomes available for Windows 10 and 11 users. Organizations with managed devices can opt in on their own schedule, with the legacy engine set to be retired in March 2024. 



Finally! Mozilla's Thunderbird email client is getting a makeover

Good-bye 2003, hello 2023. **BY ALAINA YEE**

For some people, offline email is still the way to go. Whether it's due to habit, mistrust of cloud services, or sensible prudence about backups, downloading email to a client still factors large in the routines of many users. Mozilla Thunderbird is a key part of such setups thanks

to its hefty set of features and zero-cost price tag. But Thunderbird has long been criticized for its outdated interface, and not without cause—it still looks like it's stuck in 2003.

That will finally change in July, with the upcoming launch of version 115. As detailed in a Thunderbird blog post ([fave](#).



This year's update of the client will sport a "simple and clean" user interface friendlier to new adopters.

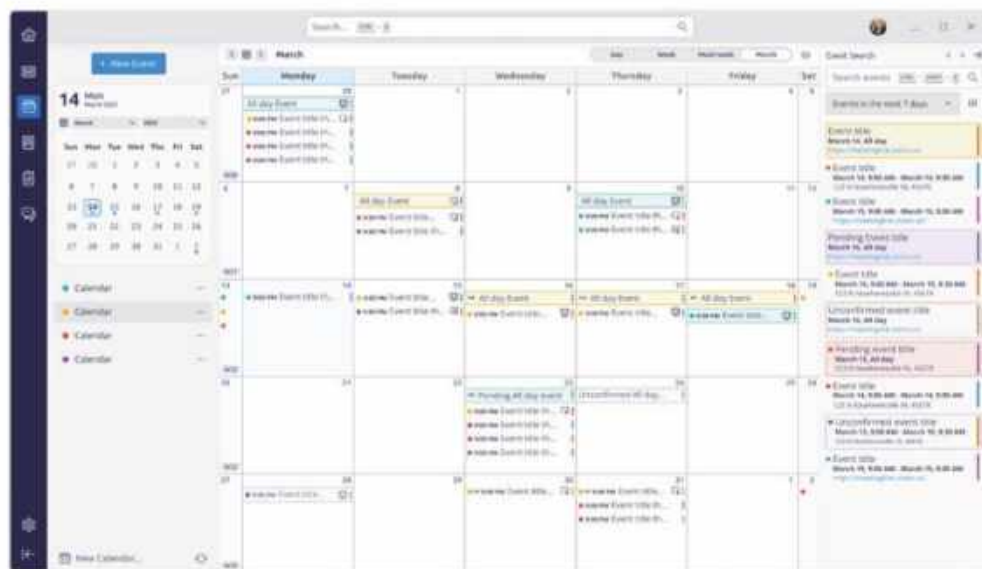
co/3k1utku), this year's update of the client will sport a "simple and clean" user interface friendlier to new adopters. Customization options will also be available, allowing the client to retain a familiar vibe for long-time users. (Given the repeated references the team makes in the blog post to the questions they've received about the UI, most Thunderbird veterans will welcome the refreshed look.)

In addition to revamping the software's user interface and experience, the Thunderbird team also plans to overhaul its code to make it

leaner, rewrite old code, and otherwise clean up and modernize the code base. And, like Firefox, Thunderbird will move to monthly release schedules.

You can read more about the developers' reasons for rebuilding Thunderbird (and why it's taken so long) in the blog post (fave.co/k1utku)

), which gives a wide overview of the email client's long history—including seminal moments that affected the software's direction, like the 2012 move to community-driven development. But the short of it is, long-time Thunderbird fans are finally getting what they asked for. 🔌



Thunderbird's Calendar has been redesigned too.

A legendary 'lost' graphics card just sold for \$15,000

A prototype of the unreleased 3DFX Voodoo 5 6000 went up on eBay with no reserve.

BY MICHAEL CRIDER



If you think games like *Halo* and *Grand Theft Auto* are “retro,” you’ve probably never heard of 3DFX. It was a scrappy little company that competed with Nvidia in the early days of discrete graphics cards for home PCs. While the Voodoo series of GPUs can just about handle a modern version of *Tetris* (if you leave ray tracing off), they were beloved back in the 1990s...so much so that someone just spent a huge chunk of cash to own one of the last 3DFX prototype cards.

The Voodoo 5 6000 was 3DFX’s final GPU design before the company was sold to Nvidia. According to Wikipedia (fave.co/3lckeSc), a little over 100 of the experimental graphics cards were created in 2000. The last few of these cards were intended to be the final retail version, but they never made it to store shelves.

A version of the card with the working number 3700, a near-final revision, popped up on eBay (fave.co/40VPP38) a couple of weeks ago. It was sold out of Washington




A little over 100 of the experimental cards were created in 2000.

state and spotted by KitGuru ([fave.co/416SJIV](https://www.kitguru.co/416SJIV)). The seller claims to be a collector who could “personally verify” that the card runs in compatible hardware and that it was personally revised by 3DFX engineer Hank Semenec. The winning bidder paid a nice, even \$15,000 for a piece of personal computer history. Shipping was free.

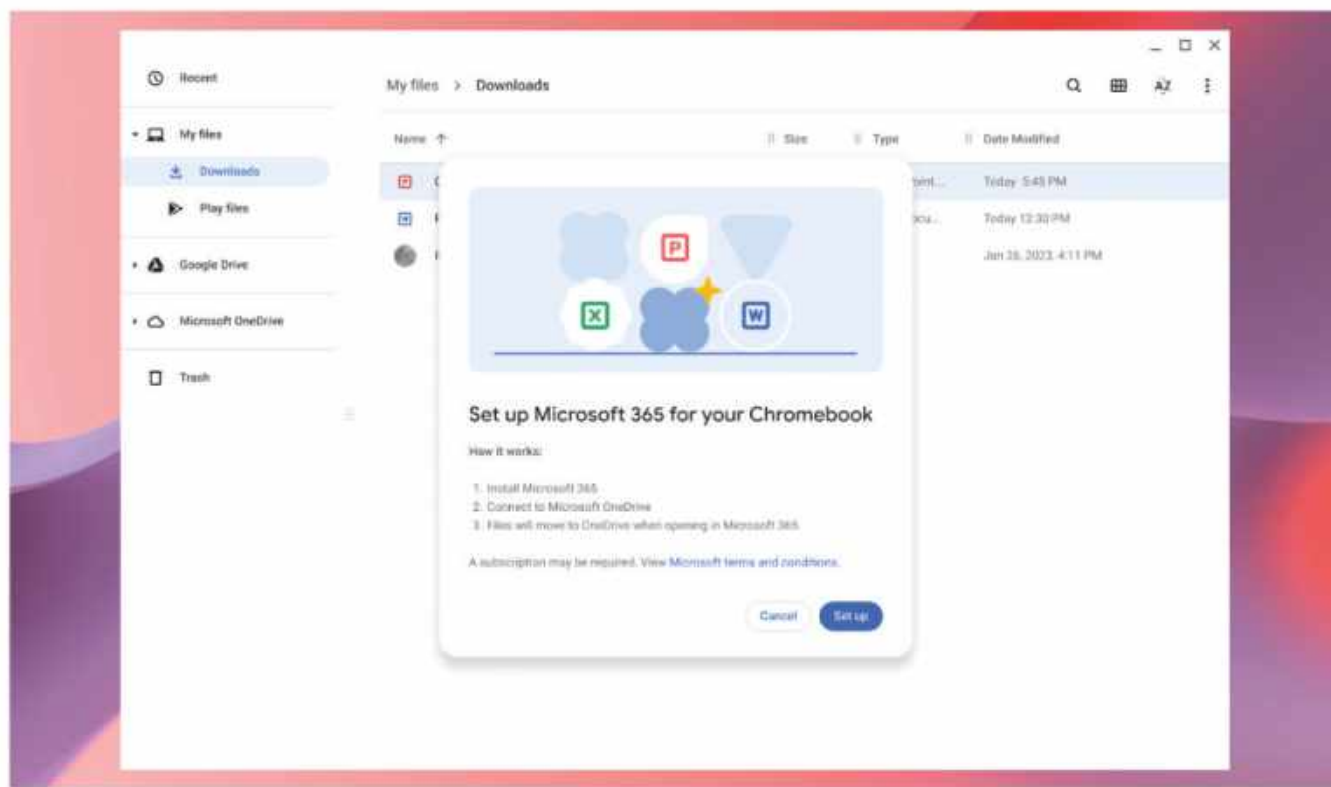
The Voodoo 5 6000 connected to motherboards using the

now-extinct Advanced Graphics Port, packing a whopping 128 megabytes of memory and a GPU clock of 166MHz. It would have been the first GPU to combine four processors and memory banks to hit those numbers. Its big selling point was going to be its ability to run full-scene anti-aliasing at 8X to avoid “jaggies.” The auctioned-off unit

included a custom adapter cable to power the card via a Molex plug. 



The Voodoo 5 6000 connected to motherboards using the now-extinct Advanced Graphics Port.



Unusual collab will make Office much easier to run on Chromebooks

Microsoft appears to be applying its “if you can’t beat ‘em, join ‘em” strategy to Google’s ChromeOS. **BY MARK HACHMAN**

Google is promising a closer collaboration between its ChromeOS, Chromebooks, and Microsoft 365, which seems like an unusual commitment given that the two companies are usually fierce rivals in the productivity space.

Google said recently that the company will migrate users to a “new integration later this year on ChromeOS, making it easier to install the app and open files.”

For most purposes, Chrome OS functions as a primarily web-based experience. Currently, ChromeOS allows users to open Office apps as Progressive Web Apps, or PWAs, which are essentially web apps that can be stored and run locally on a PC. The new integration, as Google describes it, will connect the OS more seamlessly with both Office 365 and Microsoft’s OneDrive cloud.

“Users will be offered a guided setup experience that takes them through the

process of installing the Microsoft 365 web app and connecting Microsoft OneDrive to their Chromebook Files app,” Google said in a blog post (fave.co/3lEd69D). “Files will be moved to Microsoft OneDrive when opening in the Microsoft 365 app.”

The latter addition is particularly interesting, given that Google usually considers its cloud to be closely tied to its Workspace applications, as does Microsoft. By integrating OneDrive with the Files app, however, the process of moving, viewing, and otherwise managing OneDrive files will be a lot easier than trying to navigate multiple interfaces. It’s worth noting, too, that OneDrive is now closely integrated within the File Explorer app within Windows.

Google said that it plans to formally launch the new experience in the coming months, though it will allow testers in its developer and beta channels to try out the program earlier. The story was reported

earlier by The Verge (fave.co/412SS9T).

Microsoft has also been particularly sensitive to Chromebooks encroaching on low-end Windows laptops, even designing multiple versions of its Windows operating system to take them on. Windows 10X, whose interface was repurposed to create Windows 11 (fave.co/3S78lI3), was eventually cancelled. Microsoft pitched Windows 11 SE as its latest Chromebook killer (fave.co/3S7b126), though just for the education market. That’s struggled, too. Microsoft still advertises its Surface Laptop SE (fave.co/3luGRmo) for \$249.99, though just three of the eight resellers Microsoft lists on its website appear to actually sell it: Connection (fave.co/3lwrgzM), Douglas Stewart (fave.co/3EgNPZx), and Insight (fave.co/3EfBV2a).

But it’s possible that Microsoft is simply adapting the strategy it adopted in smartphones to ChromeOS. For years, Windows 10 Mobile was Microsoft’s foray into

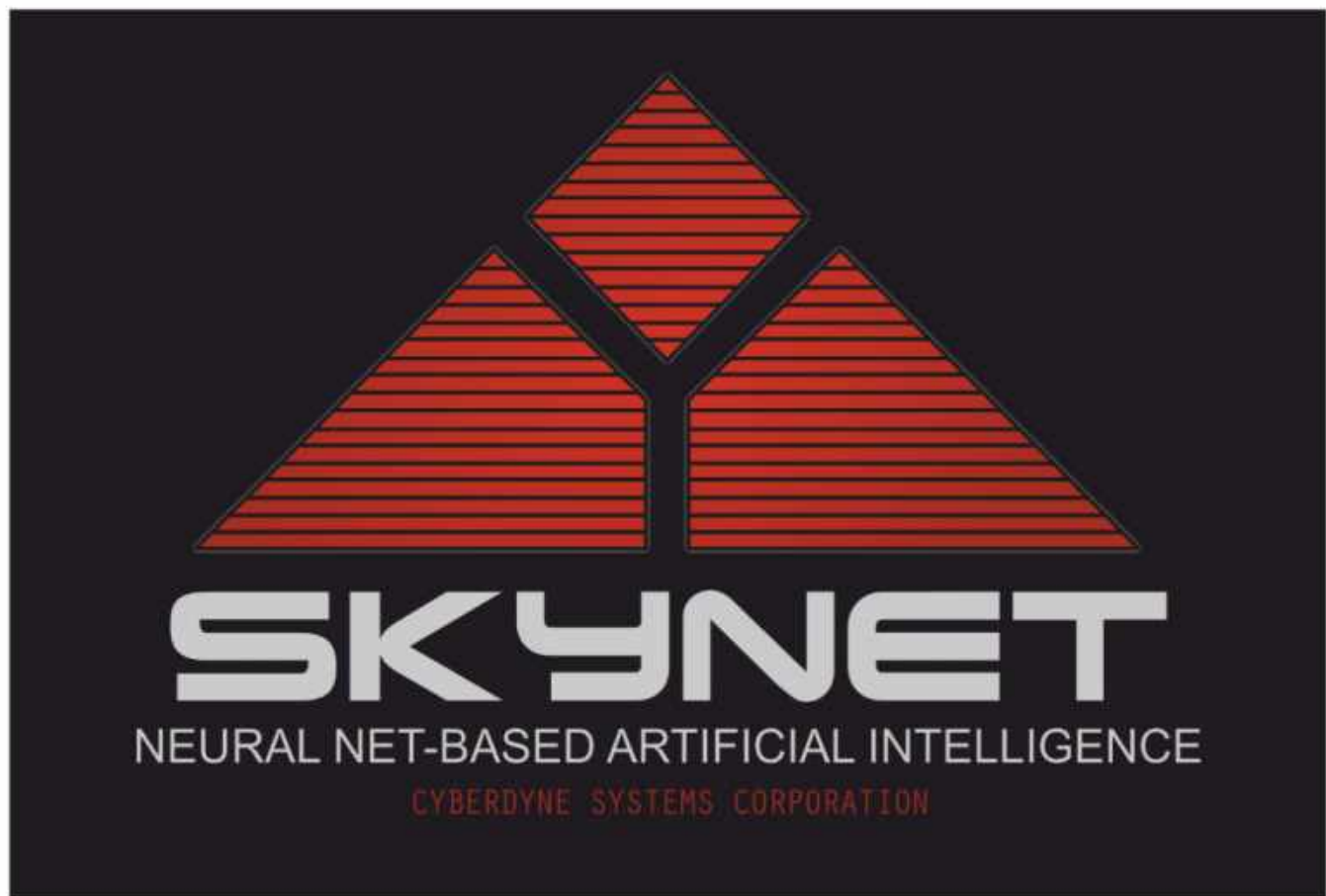
the mobile space. When Windows 10 Mobile went under, Microsoft changed tactics; today, Microsoft has developed many mobile applications for Android phones and tablets, including Office. Since Microsoft found success with its “if you can’t beat ‘em, join ‘em” strategy, ChromeOS is apparently next on the list. 🔌



Microsoft pitched Windows 11 SE as its Chromebook killer.

Congressman calls for a federal Department of AI to prevent Skynet

Imagine if Aaron Sorkin wrote *Terminator 2: Judgment Day*. **BY MARK HACHMAN**



A U.S. congressman has begun advocating for a federal department to regulate the use of artificial intelligence, postulating a dystopian future where AI will make key decisions and autonomous weapons roam America.

Rep. Ted Lieu (D-Calif.) authored an opinion piece ([fave.co/3EfSIlw](https://www.fave.co/3EfSIlw)) in *The New York Times*

on Monday, arguing that AI has emerged as a powerful tool that can be used to benefit humanity—or deceive it, and worse. In fact, the example he cited, reproduced above, wasn't written by Lieu, but by ChatGPT, the AI chatbot developed by OpenAI. (OpenAI received a multibillion-dollar investment from Microsoft on Monday [[fave.co/3KePt6](https://www.fave.co/3KePt6)], amid user reports that it is unveiling a paid version.)

Lieu, who earned a bachelor's degree in computer science from Stanford University, noted that AI is now present in everything from smart speakers to Google Maps. But where AI fails, people can be hurt: The editorial points out that a driver blamed Tesla's self-driving mode (fave.co/3xsNOxU) for an eight-car pileup on the San Francisco Bay Bridge.

According to Lieu, Congress is simply incapable of passing legislation that can regulate AI: The technology moves too fast, and legislators lack the necessary knowledge to set laws and guidelines. Instead, "what we need is a dedicated agency to regulate AI," Lieu wrote. "An agency is nimbler than the

legislative process, is staffed with experts and can reverse its decisions if it makes an error. Creating such an agency will be a difficult and huge undertaking because AI is complicated and still not well understood."

Lieu cited other agencies, such as the Food and Drug Administration, as evidence that the government could still regulate a new and emerging technology. But, he said, the process could not happen overnight. Instead, Lieu said he would recommend the formation of a nonpartisan AI commission to provide recommendations on how such a federal agency could be formed, what it should regulate and what standards could apply.

The National Institute of Standards and Technology has already published an AI Risk Management Framework, a nonbinding document that Lieu proposes government build upon and add compliance mechanisms to. "We may not need to regulate the AI in a smart toaster, but we should regulate it in an autonomous car that can go over 100 miles per hour," Lieu wrote.

Already, ChatGPT has almost passed the bar exam (fave.co/3Z0V8fN), scoring a 50.3 percent correct response rate. (A score of 68 percent is required to pass.) Artists are concerned that AI art may threaten their own commissions. Is it possible Lieu is hoping to regulate AI before it comes for his job, too? 🔌



The National Institute of Standards and Technology has already published an AI Risk Management Framework.

Help a lost pet get home

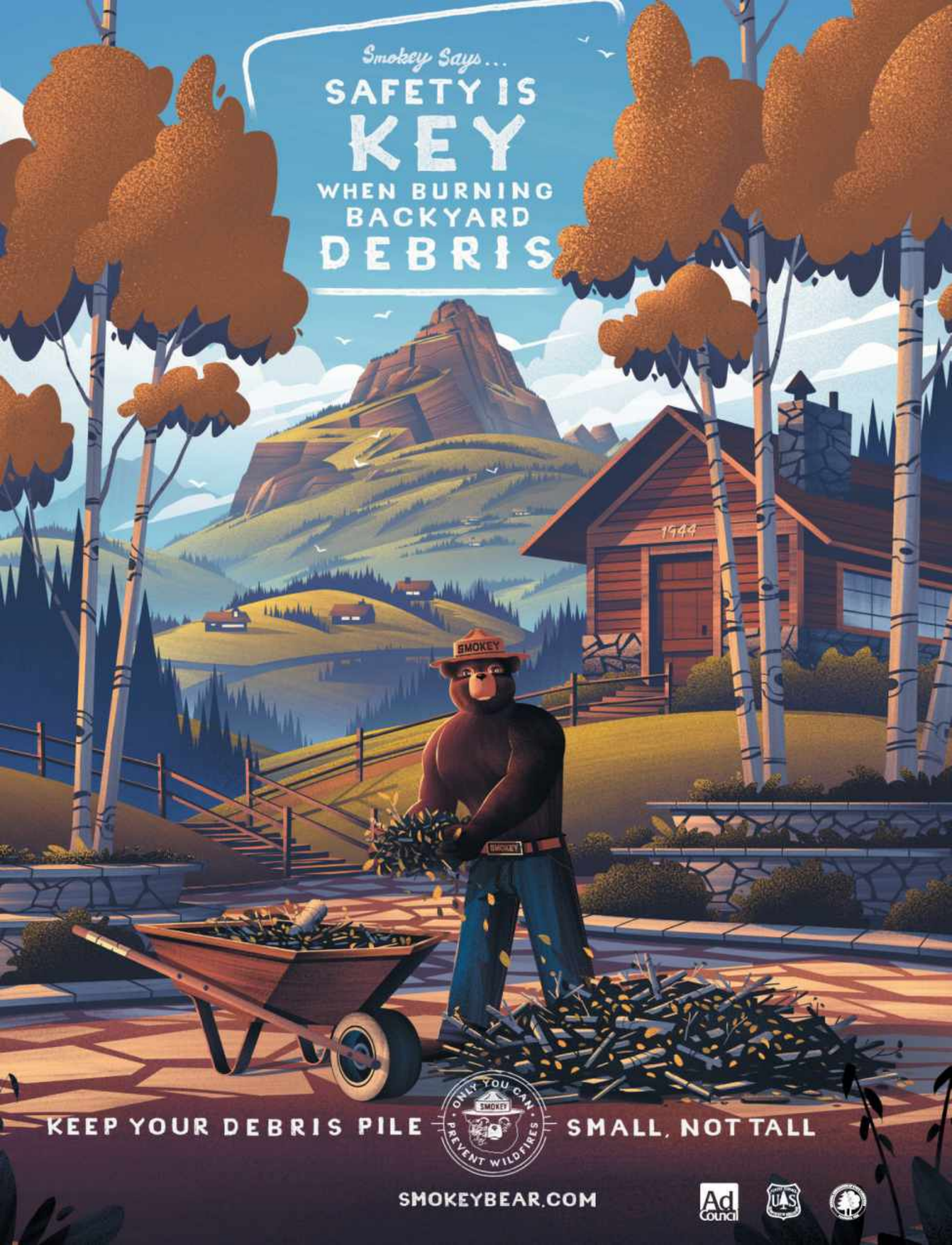
Posting a lost pet notice can reunite a family for a lifetime.



PetsAndPeopleTogether.org



Smokey Says...
**SAFETY IS
KEY**
WHEN BURNING
BACKYARD
DEBRIS



KEEP YOUR DEBRIS PILE SMALL, NOT TALL



SMOKEYBEAR.COM





Samsung Galaxy Book3 Pro 360: Gorgeous upgrades, solid value

The big, beautiful new OLED sells it, but the Book3 Pro 360 has even more in store.

BY MARK HACHMAN



Samsung's Galaxy Book3 Pro 360 laptop packs in a self-contained movie theater, a sketchpad for digital artists, and an all-day productivity machine that can digitally connect to other Galaxy devices inside a single, 16-inch, 360-degree

convertible laptop. Capping it all off is a gorgeous, powerful new OLED display that puts almost all of its rivals and predecessor to shame.

Consider this \$1,699 (MSRP) laptop for what it can do *after* hours as well as your workday. While its 13th-gen Intel Core

processor doesn't outperform everything in its class, you'll find a ton under its hood that few rivals offer. So buckle up—there's a lot to talk about.

WHAT IT OFFERS AND WHERE IT FITS

Samsung's Galaxy Book3 Pro 360 is one of a small family of new Book3 laptops (fave.co/3KqC3Qt) that consists of the Book3 Ultra, the Book3 Pro, the Book3 Pro 360, and the Book3 360. The Book3 Ultra is a new addition to the family, sporting an Nvidia RTX GeForce 4xxx GPU inside a thicker frame. The Book3 Pro is Samsung's traditional clamshell, shipping in either a 14-inch or 16-inch size, with a pound of weight differentiating the two models.

The Book3 Pro 360, which we test here, is a single 16-inch 360-degree convertible laptop that can be folded back into tablet mode, but is otherwise similar to the Pro. Since it is designed for inking, the Book3 Pro 360 also includes an integrated S Pen inside the box. The cheaper Book3 360 does not and uses the more traditional 1080p display resolution instead. We were also told that the Book3 Pro 360 includes a 5G option. Our review unit doesn't offer that feature, however, and it wasn't listed on the index of Galaxy Book3 laptops Samsung has published (fave.co/3YLaiWP).

We reviewed Samsung's Galaxy Book2 Pro 360 last year (fave.co/3EgAcd1). This

year, Samsung offers substantial upgrades from top to bottom. Save for the Book3 360, all members of the Book3 family—the Pro, Pro 360, and Ultra—now ship with a significantly improved AMOLED 2X display, which we'll discuss below.

If you're buying the Book3 Pro 360, you have only the option of 16GB of RAM and either 512GB or 1TB of SSD storage. But Samsung is also offering a free upgrade to the 1TB tier, which means there's essentially just one, upgraded model of the Pro 360 available.

SPECIFICATIONS AND FEATURES

Processor: Intel Core i7-1360P

Display: 16-inch (2,880×1,800) touch, 120Hz AMOLED 2X, 400 nits, 120 percent DCI-P3 color volume

Memory: 16GB LPDDR5

Storage: 512GB/1TB SSD (512TB as tested)

Graphics: Iris Xe

Ports: 2 Thunderbolt 4, USB Type-A, HDMI 1.4, microSD, headphone/mic

Security: Fingerprint reader

Camera: 1080p (user-facing)

Battery: 76Wh

Wireless: Wi-Fi 6E (Gig+), 802.11 ax 2×2, Bluetooth 5.1

Audio: AKG Quad Speaker (two 5W woofers, two 2W tweeters), Smart Amp, Dolby Atmos



The Samsung Galaxy Book3 Pro 360, in tent mode.

Operating system: Windows 11 Home

Dimensions: 13.99×9.93×0.50in.
(12.7mm)

Weight: 3.66 lbs. (rated)

Colors: Graphite, Beige (Graphite as tested)

Price: \$1,699 from Samsung ([fave.co/3YZxBvW](https://www.samsung.com/us/laptops/galaxy-book3-pro-360/)), shipping February 17

The Pro 360 is the premium option of the two 360-degree convertibles Samsung ships within the Book3 family, which allows it to fold back on itself in either laptop, tent, or tablet modes.

Laptops have typically shipped with either 15-inch or 17-inch options, so this 16-inch model with a 16:10 display feels rather spacious. Normally, Samsung Galaxy Book laptops are known for being thin and light, but the extra room adds weight. 3.66 pounds isn't that heavy, but it's noticeable in your bag.

The upside is that these notebooks charge with the same tiny gallium nitrate (GaN) charger that accompanies its Galaxy phones, so packing the Book3 Pro 360 and its charger for a work trip will probably feel lighter than a rival notebook and its traditional power brick. The new Book3 convertible is still surprisingly thin, though—not as absolutely thin as the 0.44 inches Apple cites for its MacBook Air (M2), but at 0.50 inches, close enough.

AN IMPROVED OLED DISPLAY WORTH TALKING ABOUT

Samsung's Galaxy Book Pro 360 emerges from its box as a svelte, slick slab of aluminum that looks bigger than its actual 14 inches or so of width. Open it up with a finger, and the laptop's gorgeous OLED reveals itself. Just do be careful with that finger. The Graphite (black) review unit the company provided attracted smudges very easily, especially oils from fingers. Keep a cloth handy.

As the boot cycle begins, you'll see why we think it's worth talking first about why the Book3 series represents such a significant upgrade over the Book2: the updated AMOLED screen. You won't see the faint glow of an LED-lit screen, since OLEDs emit light on a per-pixel basis. Instead, while you

briefly wait for the white “Samsung Galaxy” font to be displayed on the jet-black background, don’t be surprised if your first thought is, *is this thing actually on?*

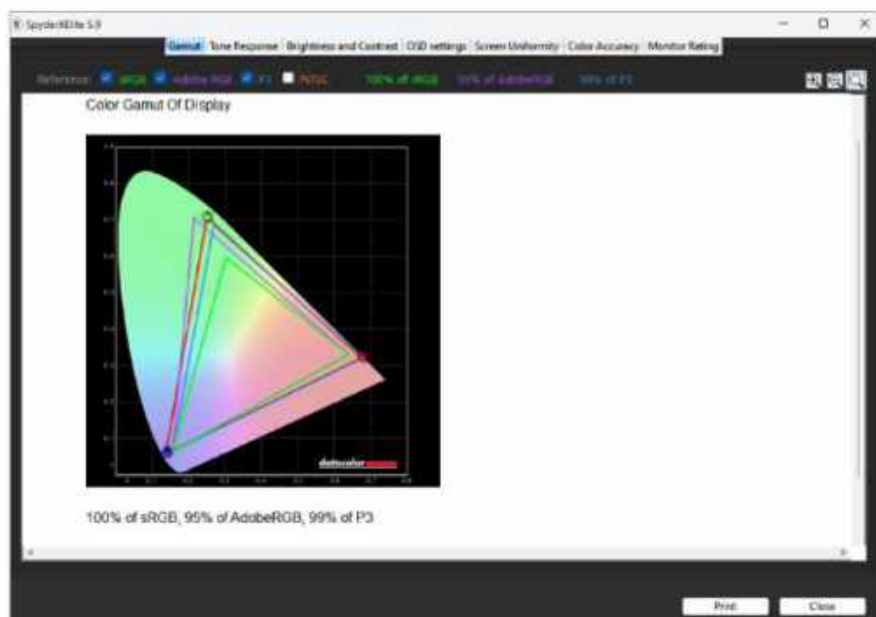
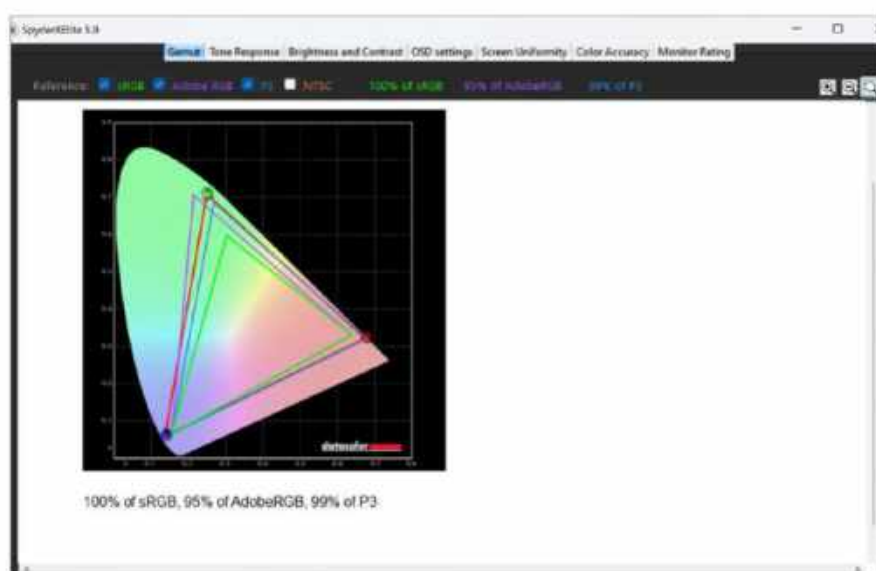
Put simply, Samsung’s latest AMOLED 2X display claims improvements in both visual performance and visual quality. First, there’s

simply the dramatic improvement in resolution. The Galaxy Book2 Pro 360 defaulted to 1080p displays, but now the Book3 Pro 360 includes a 16-inch 2,880×1,800 display, which the manufacturer characterizes as a “3K” (versus a 4K) display.

If you’re using the Book3 Pro 360 for

productivity, there’s something here for you, too: a new 120Hz display refresh rate. This may be less noticeable in terms of moving your mouse around, but inking with the integrated S Pen is markedly smoother when using a high-refresh display. Gamers also favor 120Hz refresh rates and above, as higher refresh rate results in smoother gameplay. That’s less important here, as the Pro 360 simply uses Intel’s integrated GPU for graphics.

OLED displays’ inky blacks already provide a marked visual upgrade compared to the glowy backgrounds of dark scenes lit by LED-backed display. The Book3 Pro 360 is now VESA ClearMR and DisplayHDR TRUE BLACK 500 certified, though that isn’t quite as impressive as it sounds. While



Color gamut comparisons for both the default Auto setting and the OLED setting on the Galaxy Book3 Pro 360.

its display can produce some decent HDR effects just like premium TVs (fave.co/3ZODPM2), they won't be quite as profound.

Samsung claims that the laptop produces 120 percent of the DCI-P3 color gamut, which simply translates into brighter, more vivid colors than a different display. Our colorimeter tests simply reported the color gamut as close to 100 percent, though that could be a fault of the testing hardware. The Pro 360 OLED display does feature dedicated modes for DCI-P3, AdobeRGB, and sRGB, as well as an Auto mode that presumably optimizes itself for the application. We tested without using an adaptive color feature that can also adjust colors depending upon what the laptop detects about your environment. That feature can be enabled within the Windows settings.

We also can't yet test Samsung's claim that the AMOLED 2X display reduces blue light by 78 percent while in dark mode, a noteworthy selling point if true. Blue light can trigger migraines and affect sleep. Dark mode doesn't appear to skew the display toward warm colors, which is normally the way Windows users can filter out blue light.

In all, the Pro 360's display emits 392 nits of luminance, according to our tests, enough



This is Samsung's own demonstration of how its new AMOLED 2X display cuts blue light to nearly zero.

for the laptop to be used in a bright room. Be aware, though, that the screen is *quite* glossy, and reflects your background easily.

CHASSIS AND PORTS

Structurally, the Pro 360 feels much more like a standard convertible. Flipping the keyboard back works well for watching movies or an impromptu business presentation. As expected, the laptop's hinge was strong enough to support it in either context.

The setup process encourages you to integrate your Galaxy Book3 with other members of the Samsung Galaxy ecosystem, specifically your phone. We weren't provided with the latest Galaxy S23 smartphone for review, but you can connect older phones. There are some benefits to that, which we'll mention below. Otherwise, setting up the



The Samsung Galaxy Book3 side ports include HDMI 1.4 and a pair of Thunderbolt 4 ports.

Book3 Pro 360 is similar to setting up any other Windows notebook.

Thin, light laptops can bring tradeoffs, and the Book3 Pro 360 does produce a moderately loud though neutral hiss as air is sucked in through a fine grille at the bottom and is pushed out through the back. Fortunately, the laptop's fans only kick in under substantial load, which doesn't include movie playback. That's important, given content consumption is an important reason to this laptop. We couldn't detect any of the distracting high-pitched whine that some fans produce, though, so you should be able to tune it out or adjust the performance mode in the Samsung Settings app. There are High Performance, Quiet, and Silent modes to choose from in addition to the default Optimized mode.

The Pro 360 includes two Thunderbolt 4 ports with a USB-C interface, plus a USB-A port for legacy devices like a wired mouse. Samsung also includes a microSD slot of an undisclosed nature and an HDMI port, which a Samsung representative told us is an HDMI 1.4 port. That's sufficient for playing back 4K

video at 24 frames per second—fine for watching movies, but not really for high-bit-rate digital video. For that, you'll need the Galaxy Book3 Ultra, its HDMI 2.0 port, and its focus on content creation.

Samsung's USB-C charger claims that it can charge the laptop about 35 percent in 30 minutes, a claim that bears out in idle mode but not under load. While using the laptop, the Pro 360 charged 18 percent in 35 minutes.



On the right side of the Samsung Galaxy Book4 is a microSD slot, a legacy USB-A port, and a headphone and mic jack.

ONCE AGAIN, A SURPRISINGLY GOOD KEYBOARD

I've always preferred deep laptop keyboards with roomy travel, and Samsung keeps confounding me. I want to dislike their shallow keyboards as uncomfortable, but they're simply not. The wide 16:10, 16-inch form factor display allows Samsung to spread its keys out, including a narrow island keypad to the right. I certainly felt comfortable typing on it for a length of time, though I would generally prefer a different keyboard for long-term use.

Since the Book3 Pro 360 is a thin-and-light convertible, it's not that surprising that Samsung continued to forego the use of a depth camera. Instead, the power button hides a fingerprint reader, which is sensitive to smudges and requires repeated taps to set up. On the other hand, your finger doesn't change over time, so you won't need to "reset" your finger as some depth cameras require. You can power up and log into the Book3 Pro 360 with a single tap.

The Book3 Pro 360 does have some quirks, including an absolutely massive touchpad at the bottom of the screen that's 24 percent bigger than the Book2's. Some laptops simply refuse to fill this space, but



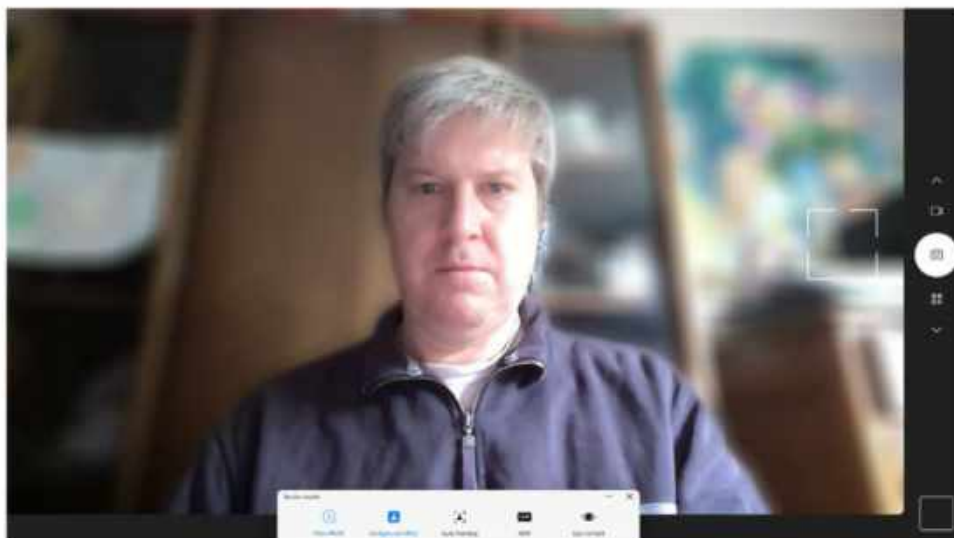
An enormous touchpad accompanies the keyboard. A fingerprint reader is hidden in the power button in the keyboard's upper right corner.

Samsung's touchpad sprawls all over and still gives you a decent palm rest on either side. The touchpad placement skews toward the left, however, so that your right palm will have much more space to rest. Unfortunately, while the entire touchpad is tappable, you can only click on the bottom two-thirds.

A SURPRISING WEBCAM COMPLEMENTS SOLID AUDIO

The Book3 Pro 360 includes a 1080p webcam with a standard 87-degree viewing angle, with a 60 fps option hidden in the Windows Camera app's settings.

What we were surprised to see, however, were Studio Mode effects applied to the



The Galaxy Book Pro 360 with the webcam's effects (background blurring and "smooth" face settings) turned on and off. The main difference I can see with face settings is that it tidied up the dark circles under my eyes. (Auto framing zooms in and turns off the other effects.)

webcam such as face effects, HDR, auto framing, background blur, and eye contact. It's not clear how these effects—which mirror the Windows Studio Effects normally found on AI-capable devices like the Surface Pro 9 (5G), fave.co/3k8N0vd—made their way onto the Book3 Pro 360, or if they're enabled

by the Movidius AI card that Intel said it would add (fave.co/3SeSNMj) to "select" 13th-gen Core PCs.

Our tests showed that Eye Contact worked, rarely, to alter the webcam image in a way that made it appear as if your eyes were focused directly on the camera. Apps like Zoom do a better job of blurring or replacing the background than these algorithms do, but auto framing works marvelously, panning and zooming in and out to frame your face in the camera's vision.

Samsung has historically included "beauty" settings to redden your cheeks or slim your face. These

aren't present any longer, and the built-in "face effects" make little difference. Samsung does use AI to help cancel noise in video calls, however, and does so very well. A pair of studio mics captures your voice.

Samsung's speakers, meanwhile, are usually excellent, and the Pro 360's are no

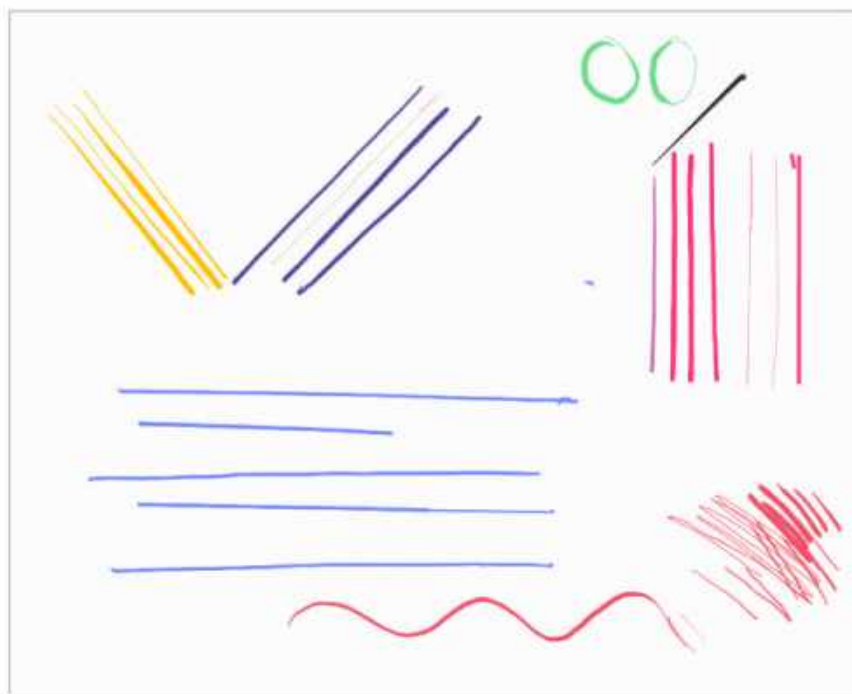
exception. AKG tuned the Book3 Pro 360's audio system, with a pair of 5W woofers and two 2W tweeters. The former elevate the Pro 360's audio into something you'll want to listen to, with substantial volume that can decently fill a small room.

You may be less enthusiastic about the integrated Dolby Atmos stereo expansion system, which usually is the only thing that makes laptop audio aurally palatable. Here, leaving Atmos off, which is the default setting, is a smart choice. Otherwise, Atmos produced a sort of cacophonous effect until I went into the Atmos app and adjusted its settings to Dynamic instead. At least there's still a headphone jack!

FINICKY INKING IS OTHERWISE GOOD

The Galaxy Book3 Pro 360 includes an S Pen in the box, and the first question you may have is, *now where do I put it?* Samsung doesn't really have an answer, so you'll have to come up with your own solution.

The S Pen inks with 4,096 levels of pressure, and the Book3 Pro 360 translates varying levels of pressure into ink width as well as any laptop we've seen. The large screen area on the Pro 360 means that I often



Inking on the Book3 Pro 360 seems generally solid, with excellent pressure sensing and minimal judder.

carelessly draped or dragged both hands across the screen to try to keep things steady, however, and the laptop was simply too sensitive in trying to translate my taps into what it thought were attempts to access a menu or other option. Sometimes when I thought I was inking...I wasn't. I'm also not a fan of how the S Pen's single button is located far down, where your fingers naturally grip the pen.

Ink flowed smoothly from the tip of the pen, as it was supposed to. There were also very little to imperceptible levels of ink judder, the sinuous line that can be produced while trying to ink slowly with a straight edge. Incidentally, the Pro 360 ships with Notesshelf, an Android note-taking app.

INTEGRATION TIES ACROSS THE GALAXY ECOSYSTEM

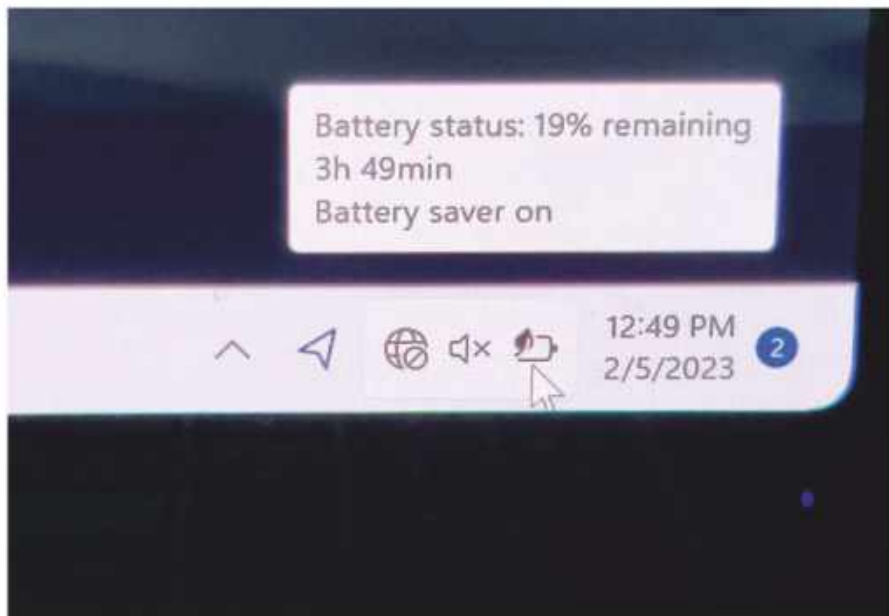
Whether or not you set out to buy a Samsung Galaxy phone, tablet, and laptop, the manufacturer offers you a bonus if you do. Several apps that tie the various devices together. They include Samsung Multi Control and Second Screen plus the existing Quick Share and Private Share apps.

Samsung has also offered the Link to Windows/Phone Link apps on its phones and Books, respectively, which allow the Book to control a Galaxy Phone a bit better than the Phone Link app connects to other Android phones (fave.co/3lOgMpw). Ironically, since the Book3 Pro 360 is an Evo device, Intel included its Unison app on board, which does pretty much the same thing (fave.co/3lJz3UR).

We weren't given a Galaxy S23 phone to test a new capability: how Samsung Flow can connect a Samsung Galaxy Tab tablet, S23 phone, and Book3 together by using the mouse to move between and transfer files between all three devices. The manufacturer also has a new Expert Raw Auto Share app that can take uncompressed raw files from the phone and transfer them to the Book3 for editing. The company provides a two-month trial of Adobe Lightroom.

Otherwise, Samsung includes a ton of preloaded apps you probably won't use. Just make sure to check out the Samsung Galaxy Experience, Samsung Update, and the Samsung Settings app for controls that will help you manage specialized functions like supplying power to the USB ports when the Pro 360 is sleeping.

Finally, Samsung (or Windows itself) offers a OneDrive configuration where files stored on the Windows desktop, Documents, or Pictures are always synced with the cloud. This was a little confusing, as we ran into an error message early on that said it was impossible to turn off this feature, something that Windows doesn't normally do. Then, later on, the objections disappeared.



This isn't an integration feature, though it's a nice software feature we rarely see: a "time to empty" indicator.

PERFORMANCE

We're concluding from our experience with the Book3 Pro that it's a content-consumption machine first, though not especially for gaming. Anecdotally, the laptop occasionally hiccupped, pausing activity for a second while switching on its Dolby audio, for example. There was also a bit of lag when opening a 4K60 YouTube video, an informal check on how the laptop performs streaming video.

The latter test is useful, since there's a hidden control that reveals in what resolution YouTube is delivering the video and how many frames are dropped. In our tests, that translated into 164 dropped frames out of 10,000, which generated just a tiny bit of shaky video when playing it back. (The Book2 Pro 360 dropped about half that when rendering the same video, though at 1080p.) Otherwise, however, we noticed no other glitches.

Finally, keep in mind that the Book3 Pro 360 is one of the first 13th-gen Core laptops out of the gate, which helps its placement in performance standings.

We use four key tests to determine a laptop's performance: PCMark 10, which measures day-to-day performance in office applications, video calls, CAD work, and light gaming; Cinebench, a pure CPU benchmark, 3DMark, which does the same for the laptop's GPU; and Handbrake, a tool we use to measure prolonged performance. Two

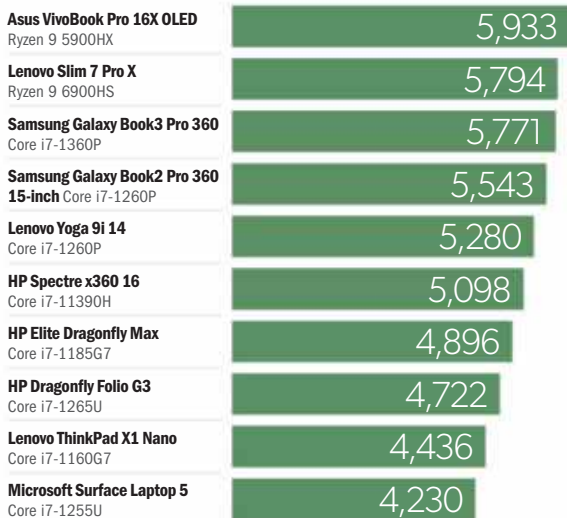
more stress tests in Cinebench and 3DMark can help us further determine if the Pro 360's performance will drop if you're using it intensively for more than a minute or two.

Thin-and-light notebooks tend to run on the smaller side, and OLED displays wander between content creation and consumption. So we're comparing the Samsung Galaxy Book3 Pro 360 with a wide swathe of competitors: the chunkier though cheaper Asus VivoBook Pro 16X OLED (fave.co/3kbDyaq), the 14-inch, high-resolution Lenovo Slim 7 Pro X (fave.co/3Sa1w2l), and the Lenovo Yoga 9i 14 (fave.co/3KlaqZ1) as well as the gorgeous HP Spectre x360 16 (fave.co/3EkVvKq). We also compared it with a pair of smaller convertibles, the HP Elite Dragonfly Max (fave.co/3YLbjOH) and the Folio G3 (fave.co/3EgBu7R). We close with a pair of light laptops, the Lenovo ThinkpadX1 Nano (fave.co/3INDn5s) and the Microsoft Surface Laptop 5 (fave.co/3YKHwpg). (We considered the Microsoft Surface Laptop Studio [fave.co/3lhv8pl], but that seems aimed at content creation.) We've also included the Samsung Galaxy Book Pro2 360 (fave.co/3EgAcd1), to show off any generation-to-generation differences.

PCMark 10 puts a laptop through a battery of tests such as word processing, Web browsing, some CAD work, video-conferencing, and more. It's a good indicator of overall performance across a variety of tasks.

PCMark 10 Overall

CPU performance

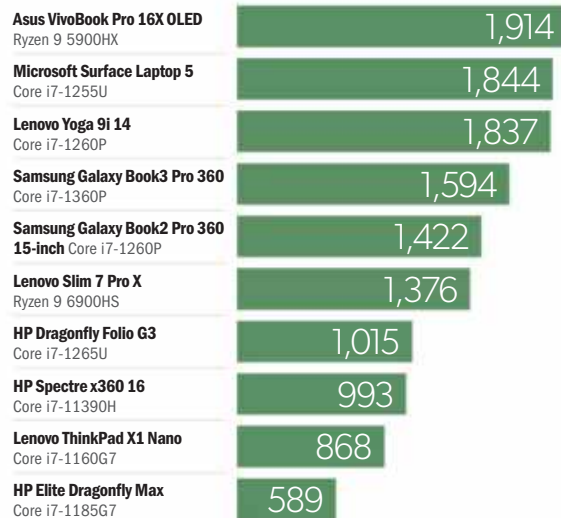


LONGER BARS INDICATE BETTER PERFORMANCE

Though the Galaxy Book3 Pro 360 is being compared to some older laptops, the overall performance is very good.

Cinebench R15.038

All threads



LONGER BARS INDICATE BETTER PERFORMANCE

You might not be so impressed with the Book3 Pro 360's performance, but some of these larger OLED laptops are aimed at content creation and use beefier processors, such as the HX processor inside the Asus Vivobook.

Cinebench R15 is an older test, pushing all of the cores and threads in the laptop's CPU to their maximum. Later revisions of this benchmark use more complex scenes, but this test is a good representation of how a laptop handles quick tasks. The downside? Modern CPUs handle this task quickly, so prolonged tests measure how the laptop performs over time.

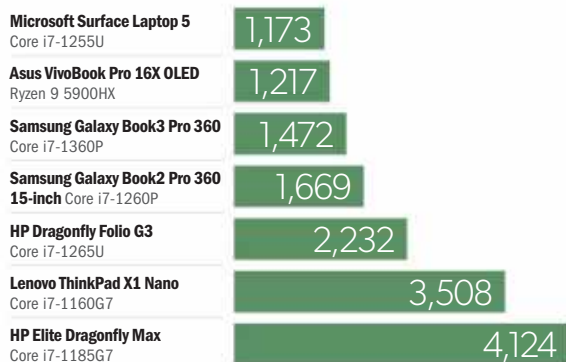
We use the Handbrake application to transcode a Hollywood movie into a format appropriate for storing on a tablet. The conversion process pushes all of the cores to the limit for a prolonged period—anywhere

from half an hour to 90 minutes. This is a measurement of how well the laptop can perform under prolonged thermal load.

We also tested prolonged performance using Cinebench R23's thermal stress test and 3DMark's looped Time Spy benchmark, separately benchmarked. Here, there was a 7.5 percent drop in CPU performance over the life of the Cinebench benchmark, which ran for several minutes. In prolonged 3D performance, the laptop fared better. It wasn't able to hold its framerate over repeated loops of the benchmark, but it did so 95 percent of the time. (In this test, 96

Handbrake 0.9.9 Encode

Seconds

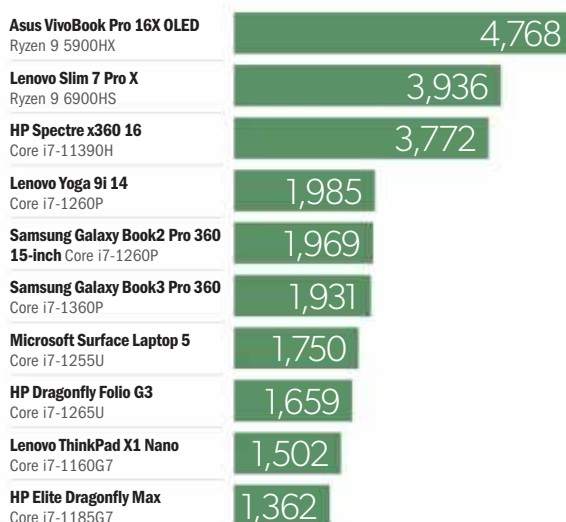


SHORTER BARS INDICATE BETTER PERFORMANCE

The Book3 Pro 360 lands more in the middle of the pack in our Handbrake video transcoding test.

3DMark Time Spy 1.2

GPU performance



LONGER BARS INDICATE BETTER PERFORMANCE

Laptops that use Intel's Iris Xe integrated GPU (here, all save the top two, which include discrete GPUs) tend to deliver similar 3D performance numbers.

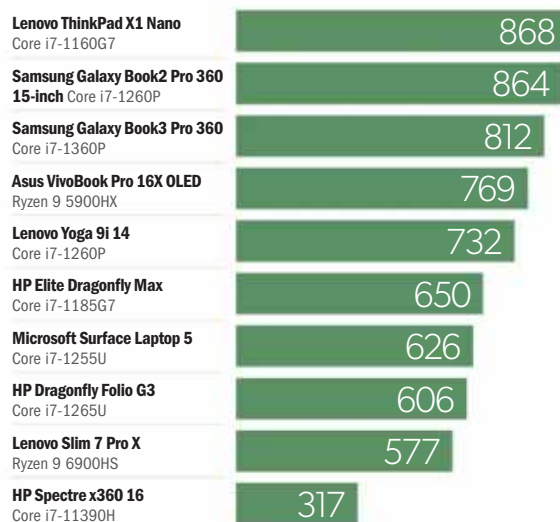
percent is considered a passing grade.) Put simply, strenuous workloads that turn on the laptop's fan will slightly diminish in performance if run for long periods.

Our final performance benchmark is the 3DMark Time Spy benchmark, which is probably less significant given that this laptop isn't designed for gaming. Still, as our recent tests showed (fave.co/3IPsSnd), even integrated GPUs can deliver low-end "gaming-class" performance.

We measure battery life by looping a 4K video over and over until the laptop shuts down for want of power. Video playback may not be the only way to measure battery life, but it mimics a common scenario such as bringing a store of downloaded movies from Netflix or other services on to your laptop for

Battery life

Minutes



LONGER BARS INDICATE BETTER PERFORMANCE



The Book3 Pro 360 offers substantial upgrades over the Book2 Pro 360.

a long airplane flight. This is a real strength of the Book3 360 Pro, though not quite as strong as its predecessor. (That may be because of the increased display resolution—lighting more pixels takes more power.) Still, 812 minutes is just over 13.5 hours of battery life on average, which is excellent.

BOTTOM LINE

We see a lot of laptops that easily push north of \$2,000 just by banking on a few new features. Here, Samsung's Galaxy Book3 Pro 360 justifies its value with many more, on top of a somewhat reasonable price tag. For what you're paying, the Book3 Pro 360 offers substantial upgrades over the Book2 Pro 360 as well as some best-of-class features, period.

Even if you aren't as in love with OLEDs as we are, the higher resolution OLED and refresh rate certainly help sell this laptop. Inking, the convertible form factor, its solid audio and webcam experience, and its

presence as a 13th-gen Core Evo laptop do too. Buying a Samsung laptop to accompany a Samsung Galaxy phone, however, is an ultimately less compelling need.

We do think that the Book3 series offers something unique that maybe only the Asus Vivobook and Zenbook

series (fave.co/3YLBQvg) seem to be consciously addressing: laptops focused on showing off content first and foremost. (Consider the Vivobook Pro 16 OLED as an alternative until we manage to test the latest offerings.) For all it brings to the table, Samsung's Galaxy Book3 Pro 360 earns one of our first Editor's Choice awards of 2023. 🔌

Samsung Galaxy Book3 Pro 360



PROS

- Stunning OLED upgrade in resolution, performance, more.
- One of the first 13th-gen Core laptops.
- Top-notch battery life.

CONS

- Good, not great, performance.
- Webcam effects are iffy.

BOTTOM LINE

Samsung's Galaxy Book3 Pro 360 offers significant value across a variety of fronts: video, audio, the webcam, and battery life. Only as a laptop is it somewhat ordinary.

\$1,699

Tested: Nvidia's GeForce RTX 4090 pushes laptops to blistering new frontiers

Yes, it's fast, but also much more. **BY GORDON UNG & ALAINA YEE**



Enthusiast laptop hardware is nothing to scoff at these days—especially not since both the Intel and Nvidia's new flagship mobile parts have finally hit shelves. The massive notebooks they power are incredibly potent. And while there is no surprise here, Nvidia's GeForce RTX 4090 for laptops is absolutely ferocious. Though not an exact replica of its desktop counterpart (a sore spot for some internet denizens), this graphics processor still posts huge improvements over its RTX

3080 Ti predecessor—while seemingly using less power.

How big? Think performance increases as high as 70 percent in our tests. This GPU is a juggernaut backed by impressive technology—and that bodes well for the laptops coming our way. Our YouTube video (fave.co/3xz4zaX) dives deep into the details, but for the key points (as tested on a monstrous MSI Titan GT77 [fave.co/3IQ8WM7] with the Core i9-13980HX and an Nvidia RTX 4090), read on.

HEAD-TURNING PERFORMANCE

No matter the gaming benchmark, the RTX 4090 hits impressive frame rates. That fact can't be denied when you see the numbers, particularly in 3DMark's respective DX12 synthetic benchmarks. These tests aren't playable games in the real world, but they simulate the kind of workloads your GPU get hit with when you're playing AAA titles. And when you isolate the GPU performance, the new RTX 4090's gains hit well over 60 percent compared to the 3080 Ti. In both Time Spy and Time Spy Extreme, which test at 1440p and 4K respectively, the 4090 snagged a roughly 65 percent lead.

You'll see similar results in Port Royal, which tests general ray-tracing performance at 1440p. Even in the new Speed Way benchmark, which adds in the evaluation of

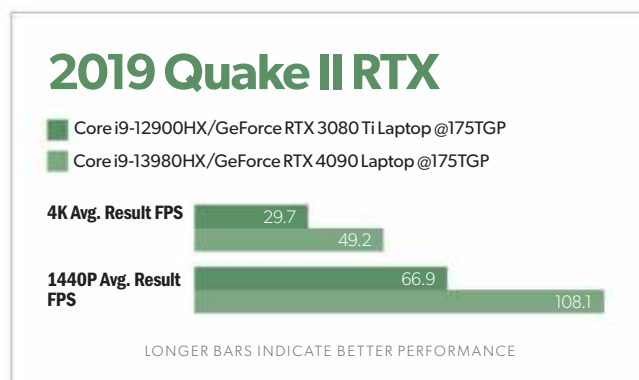
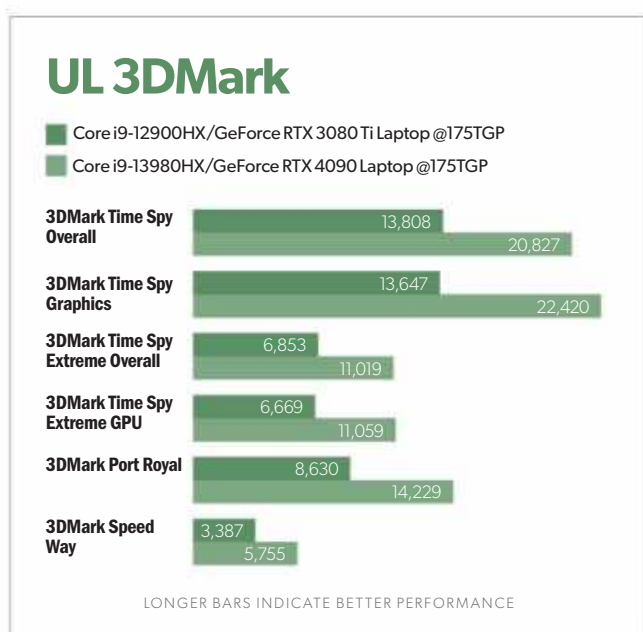
newer ray-tracing features at 1440p, the 4090 pushes out a nearly 70 percent increase.

It almost seems unreal—and in a way it is. Real-world benchmarks for the GeForce RTX 4090 have more nuance in how certain frame rates are achieved (as you'll see in a moment). But this snapshot of performance remains striking.

DLSS 3 IS STILL INCREDIBLE

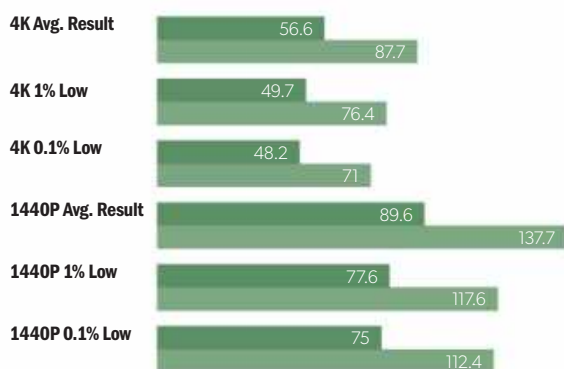
Benchmarks in shipped games are where the rubber hits the road—even when the test is a built-in feature. They give a better glimpse into what to expect across a landscape where some games support technologies that can bump up your frame rates, are optimized for certain hardware, or even run a little cludgier on PC.

The picture that our real-world gaming benchmarks paint of the RTX 4090 is that of a GPU that clobbers previous frame rate expectations. Whether it's rasterized or ray-tracing performance, it doesn't matter. Take for example 2019's *Quake II RTX*, a path-traced version of the venerable '90s title.



2020 Dirt 5 Ultra High Preset

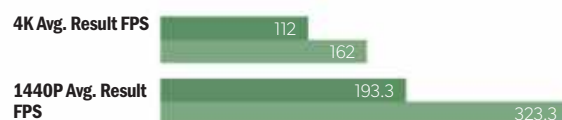
■ Core i9-12900HX/GeForce RTX 3080 Ti Laptop @175TGP
■ Core i9-13980HX/GeForce RTX 4090 Laptop @175TGP



LONGER BARS INDICATE BETTER PERFORMANCE

2018 Strange Brigade Vulkan Ultra Preset

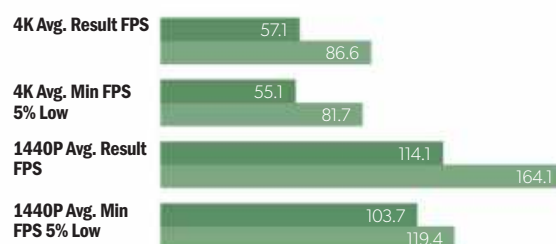
■ Core i9-12900HX/GeForce RTX 3080 Ti Laptop @175TGP
■ Core i9-13980HX/GeForce RTX 4090 Laptop @175TGP



LONGER BARS INDICATE BETTER PERFORMANCE

2020 Gears Tactics Ultra Preset

■ Core i9-12900HX/GeForce RTX 3080 Ti Laptop @175TGP
■ Core i9-13980HX/GeForce RTX 4090 Laptop @175TGP



LONGER BARS INDICATE BETTER PERFORMANCE

The amount of ray-tracing in this edition punishes graphics cards, as seen by the RTX 3080 Ti's 29 fps at 4K—barely playable by modern standards. The RTX 4090 pushes that frame rate up by over 60 percent, putting it far closer to the preference for 60 fps baseline.

Meanwhile, in several games where we simply cranked up the graphics settings to Ultra and let the test fly, you'll see substantial (though slightly lower) percentage uplifts. At 4K, we got a 55 percent increase in *Dirt 5*, 51 percent in *Gears Tactics*, and 44 percent in *Strange Brigade*. Not too shabby.

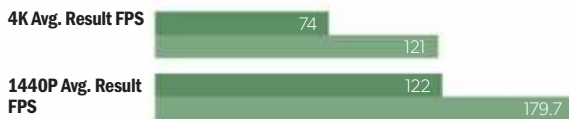
Where things get interesting is when Nvidia's frame rate-boosting tech comes into play. DLSS 2.0 (fave.co/3SbRyxc) already helps counteract the demands of ray-tracing, as you can see in games like *Shadow of the Tomb Raider*—while the 3080 Ti at 4K offered

a comfortable 74 fps with both ray-tracing and DLSS Balanced mode on, the GeForce RTX 4090 gets you to a silky smooth 120 fps.

But DLSS 3, oh my—this upgraded tech has a *magical* effect on frame rates. Its new frame generation technology (fave.co/3Elx27D), which leans on AI technology to generate frames that get interspersed with GPU-rendered frames, dramatically amps up performance. A glance at *Cyberpunk 2077* on Psycho settings and with ray-tracing illustrates this clearly, even at 4K.

2018 Shadow of the Tomb Raider Highest Preset

■ Core i9-12900HX/GeForce RTX 3080 Ti Laptop @175TGP
 ■ Core i9-13980HX/GeForce RTX 4090 Laptop @175TGP



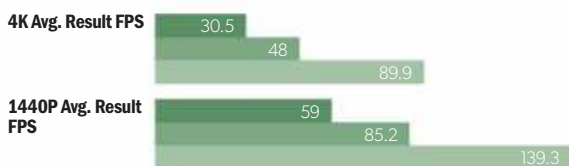
LONGER BARS INDICATE BETTER PERFORMANCE

Without frame generation, the performance improvement already sits at a massive 57 percent (and in practical terms, a more playable 48 fps). But with it on? The jump shoots up by nearly 200 percent to 89 fps. DLSS 3 does have a caveat—namely, the potential introduction of latency into gameplay, especially if you forgot to flip on Nvidia Reflex (fave.co/3lRVyqA) at the same time—but this tech is still no less exciting now than it was last fall.

In fact, it may end up more thrilling on laptops. Smaller, thinner laptops will also host

2020 Cyberpunk 2077 Ray Tracing Psycho DLSS Balanced

■ Core i9-12900HX/GeForce RTX 3080 Ti Laptop @175TGP
 ■ Core i9-13980HX/GeForce RTX 4090 Laptop @175TGP Frame Gen Off
 ■ Core i9-13980HX/GeForce RTX 4090 Laptop @175TGP Frame Gen On



LONGER BARS INDICATE BETTER PERFORMANCE

the beefy RTX 4090 and 4080, like the Asus Zephyrus M16 (fave.co/3xDIj72). Often a downsize of the chassis affects performance, but DLSS 3 could shrink the difference between a dainty 14-inch and a gigantic 17-inch laptop in games.

CONTENT CREATION GETS A BOOST, TOO

Not everyone buys a high-end laptop with the intention of gaming—sure, maybe during off-hours, but in the day? Time to rip through some work. While some production tasks are better completed using the CPU (like the Core i9-13980HX [fave.co/3lzL2NN] our review sample was paired with), others benefit from pushing the load onto the graphics chip. And in such scenarios, the RTX 4090 offers a nice bump in performance.

Blender 3.1 GPU (3.4)

■ Core i9-12900HX/GeForce RTX 3080 Ti Laptop @175TGP
 ■ Core i9-13980HX/GeForce RTX 4090 Laptop @175TGP

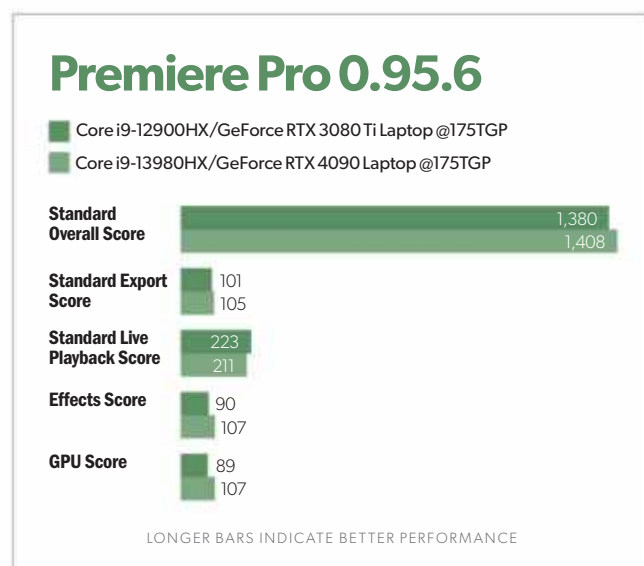


SHORTER BARS INDICATE BETTER PERFORMANCE

Handbrake 1.6.1 Encode Seconds



SHORTER BARS INDICATE BETTER PERFORMANCE



While not as jaw-dropping as in games, the numbers still take a solid step up. In Blender, a program where rendering is thought to be faster on the GPU than CPU, speed improved by as much 31 percent. Meanwhile, in our homebrew Handbrake encoding test, converting a 4K video formatted as a QuickTime file (.mov) to the more compact H.265 format was 25 percent faster.

The only oddity in our tests came when using Adobe products—while the results did show a 20 percent uplift in GPU performance, overall results seemed depressed. It's a strange outcome that bears investigation, but at least in principle, the RTX 4090 makes a difference.

BETTER EFFICIENCY, MORE LAPTOP DIVERSITY

Not that long ago, size mattered for performance. You simply couldn't expect

eye-popping results from thin, light laptops. They were great as travel companions when completing basic productivity tasks, but for heavy work? Forget it.

But the GeForce RTX 4090 demonstrates just how much more efficient Nvidia's Lovelace architecture is. It outperforms its 3080 Ti predecessor with the same amount of available power—and it doesn't even use all the juice. Our preliminary findings suggest that the RTX 4090 undercuts the 3080 Ti's power draw by 20W.

That likely plays a factor in the astonishingly small laptops the RTX 4090 is slated to appear in, like the ever-popular Asus Zephyrus G14 (fave.co/3EmkrBi). Even constrained by a smaller chassis' design limitations, this spread of Nvidia's flagship mobile GPU only bodes well. If an RTX 4090 will fit in a laptop weighing under 4 pounds, just think of all the ultra-thin productivity laptops the inevitable 4070 and 4060 could squeeze into.

The MSI Titan GT77 we used for testing is available to preorder for \$5,299 (fave.co/3IQ8WM7)—squeezing every ounce of possible performance out of the latest, greatest technology doesn't come cheap. Expect to see more GeForce RTX 4090-wielding laptops hitting the streets soon. Stay tuned to PCWorld's roundup of the best laptops (fave.co/3li6cys) for a practical guide to the top current offerings available. 🔌



Teamgroup C212: This USB drive is basically a portable SSD

It might look like your average thumb drive, but the Teamgroup C212 far outperforms the pack. **BY JON L. JACOBI**



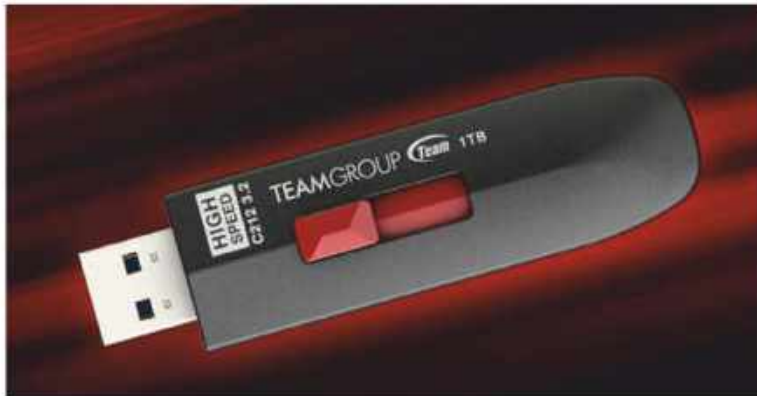
Having reached capacities of 1TB and beyond, USB thumb drives put a lot of cable-free storage in your pocket.

However, most examples of the species suffer a rather salient deficiency—slow performance. Not so with Teamgroup's C212, the object of this review. It's capable of sustained transfer speeds in excess of 400MBps to 600MBps—almost five times the norm, depending the size of the data

set being read or written. That puts it on par with the speed of SATA SSDs found inside computers. Buckle up!

FEATURES

The C212 is a USB 3.2 Gen 2 (10Gbps) thumb drive that measures a mere 2.6 inches long (3.08 inches with the connector extended) by 0.8 inches wide by 0.46 inches thick (including the ejection switch). Weight is a mere 9 grams.



The C212's Type-A USB connector retracts into the body for protection and to reduce the drive's form factor. But you must hold the slide.

It's available in three capacities: 256GB for \$36 (fave.co/3Ehspfl), 512GB for \$52 (fave.co/3KEcNX5), and 1TB for \$93. Those were the prices from Teamgroup on Amazon at the time of this writing (fave.co/3xD1vKO).

The drive uses a Type-A connector that retracts into the body of the drive by means of slide switch. This protects the connector when the drive is in your bag or pocket. But I have found that when you're in close quarters or your hand is at an awkward angle, it can be tricky to keep your finger on a slide switch long enough to get the connector into its port.

Note that the C212 is hardly the first thumb drive to employ a retractable connector, and every one I've tested suffers from the same issue. I just infinitely prefer a removable cap and would love to see the retractable connector concept go the way of the dinosaurs.

Teamgroup didn't provide a TBW rating, but the C212 is warranted for five

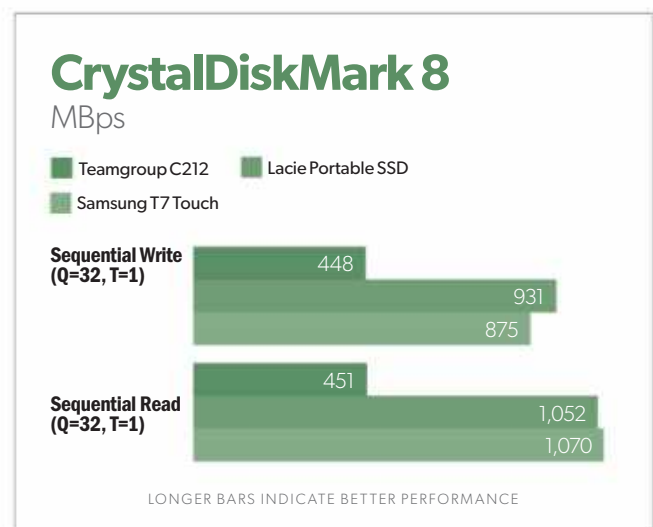
years—which is a very generous guarantee for the category.

PERFORMANCE

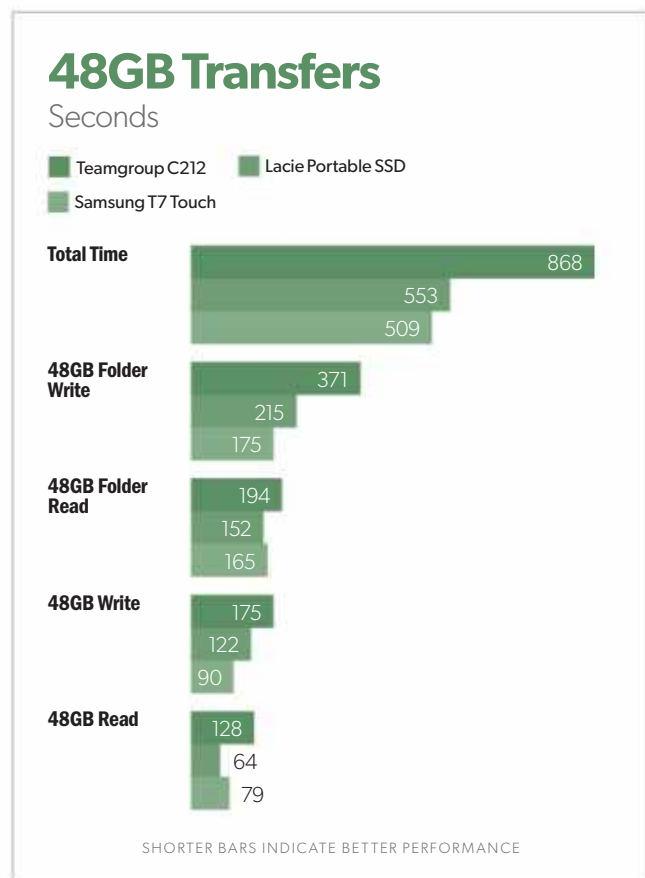
With smaller amounts of data, the C212 reached Teamgroup's claimed read transfer rate of 600MBps and write rate of 500MBps. In fact, it surpassed those rates under CrystalDiskMark 8 when we ran the smaller 1GB data set. That means that for most tasks, you'll see the

listed performance.

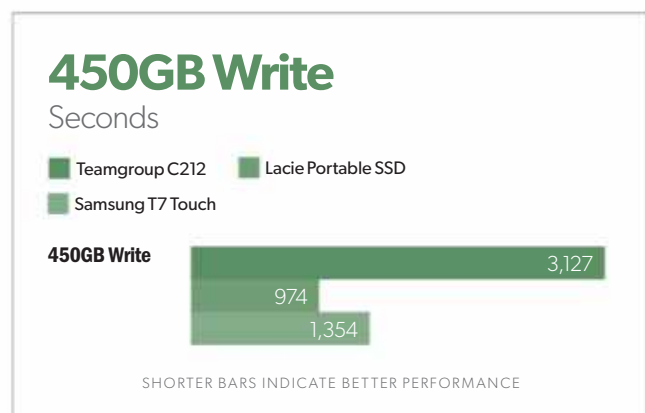
However, when we threw the larger 64GB data set (our current standard test) at it, speeds declined to around 450MBps. That's not the claimed speed, but it's still darn fast for a thumb drive.



While it may not be as fast as the Samsung T7 Shield and other full-size external SSDs, the C212 puts out a performance that is nothing to sneeze at. And you get up to 150MBps faster speeds with smaller data sets.



The CrystalDiskMark 8 results may not look fantastic by comparison, but this is the first thumb drive we've kicked the tires on using the new test bed. Hence, we opted to compare it to the Samsung T7 Touch (fave.co/417EugC) and LaCie Portable SSD

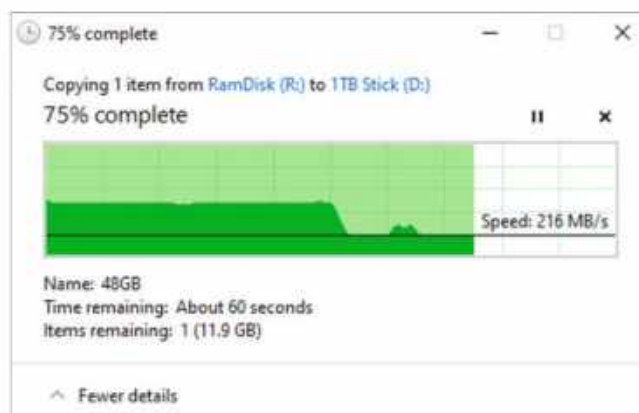


(fave.co/3XKIWA0), which are larger external SSDs.

Real-world performance was great for a thumb drive, if not for a larger portable SSD such as the Samsung T7 Shield (fave.co/3EqONEr) and LaCie Portable (fave.co/3XKIWA0) we're comparing it to. We didn't have any comparable thumb drives on hand for testing and comparison. However, I can tell you that if you see 125MBps from a standard thumb drive, you're doing quite well. Most are far slower than that—as low as 25MBps in my casual tests for this review.

What you won't want the C212 for is backing up very large data sets. The time we got is rather tragic for an SSD, though again, it's mitigated by the fact that this is a thumb drive.

As you'll see in the capture below, most of the reason for the lethargic 450GB write was that the drive slows down drastically when it runs out of secondary cache. But honestly, write speeds of 210MBps are hardly the slowest we've seen out of an SSD, which can drop to as little as 100MBps even with internal TLC/QLC drives.





The Teamgroup C212 offers fast and generous storage in a tiny thumb-drive form factor.

Compared to larger external SSDs, the C212 is somewhat slow. Compared to most other thumb drives, it's lightning fast. Buy according to your needs.


BOTTOM LINE

There are few more convenient ways to physically transport data than the Teamgroup C212. If you have 10Gbps ports, it will save you lots of time over a run-of-the-mill thumb drive during backup and other chores. Small, convenient, fast—this is definitely one handy product from Teamgroup.

External drive tests are run using Windows 11 64-bit 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 of 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 we were shipped and the capacity we 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. Vendors also occasionally swap components, though we've never known Samsung to do so. 

Teamgroup C212



PROS

- Extremely fast for a thumb drive.
- Up to 1TB of capacity.
- Five-year warranty.

CONS

- Slide-out connector can be problematic in close quarters.

BOTTOM LINE

The Teamgroup C212 offers unusually fast and capacious storage in a tiny thumb-drive form factor for a relatively low price. What's not to like?

From \$38

FastestVPN: A VPN with an affordable lifetime subscription

It's probably not the fastest, but that's OK. **BY SAM SINGLETON**



FastestVPN's name says it all: It aims to be the fastest VPN service around. It's no easy feat to lead with a superlative like that and back it up. FastestVPN (fave.co/3xGjgc2) strives to be a top VPN and, at least on the surface, it makes a persuasive case for itself.

The company is based in the Cayman Islands, which bodes well for privacy and security. The service also offers a solid premium feature set, with 10 simultaneous

connections, P2P optimized servers, no logs, and stated promises to unblock region locks on most of the top streaming platforms.

FEATURES AND SERVICES

Since the time of our last review, FastestVPN has once again upgraded the design of its application to make it simpler and easier to use across devices. Upon first opening the application in Windows, you'll find a list of countries you can connect to in the main



FastestVPN claims that it has “Servers Available in 39+ Countries and 55+ Locations.”

screen, making it easy to get started right away. Off to the right you’ll find the FastestVPN trademark lightning-bolt button to connect, along with basic info about the connection (IP address and server location).

In the top right you’ll have three buttons for the home screen, account information, and settings.

The settings screen is similar to what we’ve seen in previous versions of the app. Here you can switch your VPN protocol between IKEv2,

TCP, UDP, and Auto. The Auto protocol option is new and when chosen will theoretically give you the best protocol among the other three according to your given tasks.

Below the VPN protocol options are checkboxes for things such as an internet kill switch, as well as the options “Launch at

startup,” “Redial automatically if connection drops,” and “Auto connect after launch”—all standard fare for most modern VPN applications. The kill switch is a nice feature, though, and isn’t provided by all VPN services.



FastestVPN provides three protocol options and an auto option, which chooses the best of the three for your tasks.



FastestVPN has app support for a ton of devices.

As for servers, it's a little unclear how many servers FastestVPN actually has. It claims it has "Servers Available in 39+ Countries and 55+ Locations," but we found that what servers are actually available will depend somewhat on the device and application you are using. Additionally, it has a limited number of streaming-specific servers and D-VPN (Double VPN) servers that bounce your connection through more than one server to provide double encryption.

FastestVPN has done a great job of providing app support for a ton of devices. These range from the standards such as Windows, MacOS, iOS, and Android to others such as Linux, Roku, and Amazon Firestick. It even has browser extensions for Chrome and Firefox.

Unfortunately, one area that seems to be missing from all of FastestVPN's apps is information regarding

each specific server's load or latency figures. This is useful if you're looking to connect to the fastest server in a given location, and frankly it's a missed opportunity in the



FastestVPN has specific servers to use to unblock streaming sites.

application design. Regardless, the applications are straightforward and easy to use across all devices.

One other quirk we noticed was a problem with the Windows application when installing. It seems that it may not have the proper certification with Microsoft, which causes Windows Defender to flag the application and present an error message that halts the installation process. This is easy enough to bypass, but may be confusing at first.

FastestVPN also provides a few bonus features such as helpful 24/7 chat and email support, a free password manager, and up to 2TB of cloud storage.

PERFORMANCE

In our performance tests we compared the base speed of our internet to that of different server locations across the world to see how our internet speed connected to a VPN compares to our base internet speed. Last time around, we saw FastestVPN hitting 45 percent of the base speed in our tests averaged across all locations. At the time, that was a huge bump from the 30

percent base speeds in our initial review of the service.

This time we didn't see quite the same jump, but we did notice a slight improvement of up to 49.5 percent of the base download speed when connected to FastestVPN's servers. Furthermore, we saw an admirable 68 percent of the base upload speed. These are solid numbers—FastestVPN's recent upgrade to 10Gbps-plus speed servers is obviously making a difference for its users.

FastestVPN does an OK job at getting around region locks and geo-restricted content. Using its normal servers was rather hit or miss when trying to access sites such as Netflix and Disney+. Some servers were able to bypass the region locks, while many others were actively blocked and the streaming sites wouldn't load properly. That said, FastestVPN (at the time of writing) has seven streaming-specific servers, which all worked just fine in our tests. The only issue here is that if you



FastestVPN security features.

want to access content from countries other than these streaming-server locations, you may be out of luck.

SECURITY AND PRIVACY

FastestVPN's official business location is the Cayman Islands. This might sound kind of sketchy at first glance, but the company says this was on purpose to avoid any laws requiring it to keep browsing records on its customers.

The company's privacy policy states that it does not log any information about its customers. The only thing the company keeps, it says, is the email address you use to sign up for the service. Users will just have to take the service for its word that there truly is a no-log policy, however, as FastestVPN has not gone through an independent audit to back up these claims.


The service uses the industry standard AES 256-bit encryption and comes with IPv6 and DNS leak protection. Our DNS leak tests proved that there were no IP or DNS leaks while using the VPN. This is important as IP and DNS data leaks can allow outside parties to know your true location and watch your activity while you're online.

BOTTOM LINE

FastestVPN has improved upon its service since the last time we tested it, but there are some areas that still need improvement. It's obvious that it doesn't have the same

resources as some of the largest VPN services, but nonetheless it's still able to make the core VPN features work.

Despite what is stated in its name, it may not be the fastest VPN, nor does it have the most robust feature set. But that's not the main draw anyway. The company seems to know where it stands in the marketplace and it's leaning heavily on privacy and cost. It offers enough speed and security for most everyday uses, and extras such as free Cloud storage and a password manager are welcome additions.

Ultimately, it's the price that will appeal to most people, and for only \$40 for a lifetime plan, FastestVPN is certainly worth considering. 

FastestVPN



PROS

- Extremely affordable lifetime plan.
- 10 simultaneous connections.
- Free cloud storage and password manager included.

CONS

- Smaller feature set.
- No independent audit.
- Issues with streaming site blocking.

BOTTOM LINE

FastestVPN is extremely affordable, allows up to 10 simultaneous connections, and has decent enough speeds. Unfortunately its claimed no-log policy isn't backed up by a third-party audit and there are issues with streaming sites blocking connections. FastestVPN might not be the best, but the lifetime plan gives you premium features for a rock-bottom price.

From \$40



Keychron Q1 Pro keyboard: Simply unbeatable

Keychron adds wireless to one of its most popular premium keyboards and keeps its unbelievable value intact. **BY MICHAEL CRIDER**



Keychron started out making wireless, Mac-focused mechanical keyboards that were, at least for me, pretty underwhelming. Then the company shifted into high-end, enthusiast-focused keyboards, such as the Keychron Q5 (fave.co/3XORQva), which has all the trappings of a small-batch boutique build, but at about half the price. This is the company's sweet spot, and it's been improving on that ever since. Now

we've come full circle: The Q1 Pro is Keychron's first high-end, all-metal board to add Bluetooth.

And damn it if it isn't just about perfect. The Q1 Pro combines the ultra-popular 75% layout, high-end materials like an all-aluminum case and a rotary dial, and boutique features like gasket mounting and VIA/QMK programming. And it's wireless. It's everything you want in a high-end build, with almost no sacrifices. And as usual, the



The Q1 Pro seamlessly adds Bluetooth to one of the best premium keyboards on the market.

value is absolutely beating the pants off the competition.

There are only two reasons I can think of to *not* recommend the Q1 Pro to a mechanical keyboard fan. One, you demand 2.4GHz, gaming-grade wireless. Or two, you simply want to wait for Keychron to bring Bluetooth to one of its other, many Q-series keyboard layouts (fave.co/3ZaUe0i). For everyone else: Go buy one.

A FAMILIAR LOOK

If you've read any of our previous Keychron reviews here on PCWorld, you know what to expect. The Q1 Pro features a compact 75% layout with full arrow keys and function row, plus an optional rotary dial upgrade. It's clad in an aluminum case that feels like it could stand in

for any of the murder weapons in a game of *Clue*. (Read: It's really heavy and tough.) And typing on it, especially with the included high-profile PBT keycaps, is heavenly.

There are only two major departures from the main Q series. One, there's a very clear antenna section on the upper part of the case. This is basically just a hole in the aluminum to hold the Bluetooth antenna—you can see the cable going to the wireless

chip if you crack it open. And two, Keychron replaced the metal support plate underneath the switches with a plastic one, presumably to boost wireless range yet again.

The change makes the keys flex much more noticeably under heavy typing. That might be a plus if you really like the squishy give of a gasket mount, the little bits of foam



The Q1 Pro features a compact 75 percent layout with full arrow keys, function row, and an optional rotary dial upgrade.



The Keychron's dedicated antenna makes this a keyboard designed from the ground up for wireless.

that "suspend" the plate in between the metal parts of the board. If not, that might be the one change from the older Q1 you really don't like in the Pro.

Other changes from the standard Q1 are harder to spot. There's a massive 4,000mAh battery hidden underneath, which you won't notice unless you disassemble everything. And Keychron removed the option for Gateron Pro switches (fave.co/3IXp4vq), instead offering K Pro switches in linear Red (as in our review unit), tactile Brown, or stiffer tactile Banana, which also removes the stabilizing hall effect. The new switches feel a little less smooth than the Gaterons, but since Keychron offers the

keyboard in a bare-bones kit without any switches at all, I'm loath to complain about it.

DEDICATED ANTENNA FOR BLUETOOTH

Let's take a look at the work Keychron did to facilitate Bluetooth in that massive metal case. Unlike similar all-metal wireless keyboards

that just sort of deal with the lowered range, Keychron's dedicated antenna makes this a keyboard designed from the ground up for wireless. The Q1 Pro maintained its Bluetooth connection to my desktop two rooms away, and even when I stepped out on my front porch, a solid 40 feet and three walls from the computer. Keychron took the wireless upgrade seriously.



You can swap out the key switches for anything in the Cherry MX format.

The other component in a wireless build is the battery, and Keychron didn't skimp there, either. The 4,000mAh unit hidden beneath the keys can handle a solid couple of weeks with the RGB lighting on, and with them off...I have no idea, because my review period doesn't last that long. Months, at the very least, if my experience building wireless boards is anything to go by. When you need to charge up, the package includes a handsome braided USB-C cord, along with alternate keycaps, extra gaskets, disassembly tools, and a keycap and key switch puller.

You might want to plug in if you're using the Q1 for gaming, by the way. While its wireless powers are perfectly fine, even for switching between multiple machines, they're not particularly fast. A typical lag and occasional stutter is noticeable and entirely typical for Bluetooth. Plugged in, the keyboard operates at 1,000Hz, good enough for everyone except a pro gamer. A

dedicated 2.4GHz dongle would have alleviated this...but to be fair, Keychron has never marketed its wireless boards as meant for gaming.

INCREDIBLE FEATURES, INCREDIBLE VALUE

There are just too many features in the Q1 Pro to describe in prose. Here's the bullet-point version:

- All-aluminum chassis
- Double gasket mount—this gives the keys a little flex and bounce
- Double-shot PBT KSA-profile keycaps—tall, old-fashioned keycaps that will never wear the legends down
- Two layers of sound-absorbing foam
- Hot-swappable switches—you can swap out the key switches for anything in the Cherry MX format
- QMK and VIA programming—easy custom programming for all keys and

lighting, with no proprietary software necessary

Most of this stuff is standard in the premium keyboard space at this point, minus the wireless option. For example, the GMMK Pro has pretty much all of these features, plus RGB sidelighting. But that board lacks wireless, and its bare-bones version is almost the same price as the



Keychron once again has the most features in a premium keyboard for the lowest price.



The Keychron offers RGB lighting.

non-tricked-out Q1 Pro. With switches and keycaps, it's more than \$100 more expensive, more in line with the boutique boards these designs are based on. That goes ditto for the Drop Sense75. Other alternatives in this form factor, like the Keydous NJ80 or the Epomaker TH80, use far cheaper materials, and programming is a chore if it's possible at all.

In short, Keychron once again has the most features in a premium keyboard for the lowest price. There aren't a lot of keyboards on the market that directly compete with the Q1 Pro, but even so, it stands head and shoulders above other options.


BOTTOM LINE

I'm a self-confessed keyboard snob. I've put hundreds of hours and an embarrassing amount of money into the hobby, including more than \$500 on my primary self-built board. And saying all that, the Q1 Pro is

probably better than what I can build for myself.

It's solid as can be, filled with high-quality hardware from top to bottom, stuffed full of premium features, and yet somehow still cheaper than every comparable option. The minimum version starts at \$179 (fave.co/3lmzfB0), if you want to use your own key switches and caps. The fully assembled

version is \$200, and just about untouchable (figuratively—you can touch it all you want!) for a high-end wireless board.

Gamers who demand high-speed wireless will lament the lack of a dedicated dongle, and those who want a larger or smaller form factor might want to wait for new entries in the Q Pro series. But for everyone else, the Q1 Pro is simply the best premium Bluetooth keyboard on the market. 

Keychron Q1 Pro



PROS

- Great hardware.
- Excellent wireless performance.
- Unbeatable value.

CONS

- Bluetooth only for wireless.

BOTTOM LINE

The Q1 Pro seamlessly adds Bluetooth to one of the best premium keyboards on the market. It's absolutely without equal in this product category.

\$199



Tested: Nvidia GeForce Now unlocks RTX 4080 grunt, and it's a win for your wallet

We go hands-on with GeForce Now's new Ultimate tier, complete with the RTX 4080, DLSS 3, and ultrawide support. **BY MATTHEW S. SMITH**

Can't get your hands on an Nvidia GeForce RTX 4080 (fave.co/3IJWJZ9) for your gaming rig (or not keen to pay the \$1,199.99 price)? Now you don't have to.

Nvidia GeForce Now (fave.co/3ZcOXFx), the company's cloud gaming service, has released a GeForce Now Ultimate subscription tier that provides RTX

4080-equivalent hardware, complete with ray tracing and DLSS 3 support (fave.co/41eSk0y)—and I've spent several days testing it.

The RTX 4080's might comes flanked by several other GeForce Now enhancements, including support for ultrawide resolutions up to 3,840×1,600. Refresh rates get a boost, too, with support for 240Hz at 1080p and

120Hz at up to 4K. The higher refresh rates can also lead to lower total latency, allowing Nvidia to double-dip on its marketing claims.

GeForce Now Ultimate is priced at \$19.99 per month, or \$99.99 every six months (reducing the monthly cost to about \$16.66). That's a lot less than buying an Nvidia GeForce RTX 4080 upfront, but its value depends on how you use a graphics card (fave.co/3IKyu64).

GEFORCE NOW ULTIMATE HANDLES RAY TRACING WITHOUT ANY ISSUES

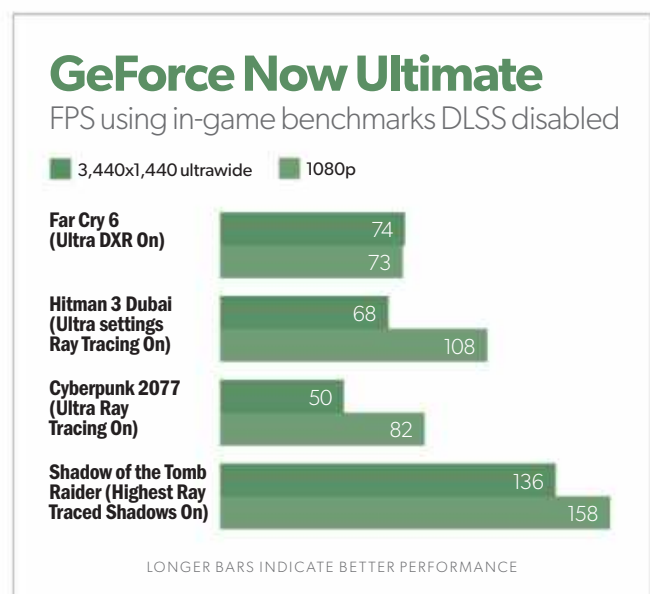
GeForce Now Ultimate doesn't promise access to the GeForce RTX 4080 but rather access to RTX 4080 SuperPODs (fave.co/3XRPGez). Nvidia says they contain hardware with over 64 TFLOPs of performance. That's more than a retail RTX 4080, which is quoted at 48.75 TFLOPs. The Ultimate service also provides 24 gigabytes of video memory, another improvement from the RTX 4080's 16GB of memory.

What does that mean in reality? To find out, I ran the GeForce Now Ultimate subscription through a few commonly benchmarked games that are available on the service: *Far Cry 6*, *Hitman 3*, *Cyberpunk 2077*, and *Shadow of the Tomb Raider*. I tried the titles with ray tracing on but DLSS off, at 1080p and 3,440×1,440 ultrawide resolution.

The results are in line with what I expected. I don't have an RTX 4080 on hand for a direct comparison, but a broad survey of benchmark results posted by reviewers indicates GeForce Now Ultimate is close to a RTX 4080 desktop graphics card, though perhaps it is a bit less performant overall.

The 1080p results are most underwhelming in *Far Cry 6* and *Shadow of the Tomb Raider*, where there's little or no difference between 1080p and 3,440×1,440 widescreen resolution. That indicates those games are hitting CPU bottlenecks and can't take advantage of the RTX 4080's true power.

Performance at 3,440×1,440 is more alluring. Even the notoriously demanding *Cyberpunk 2077* averaged 50 frames per second at Ultra settings with all the ray-tracing bells and whistles turned on. *Far Cry 6* and *Hitman 3* both averaged above 60 FPS with the detail dial turned up to 11.





We tested GeForce Now on a number of games, including *Shadow of the Tomb Raider*.

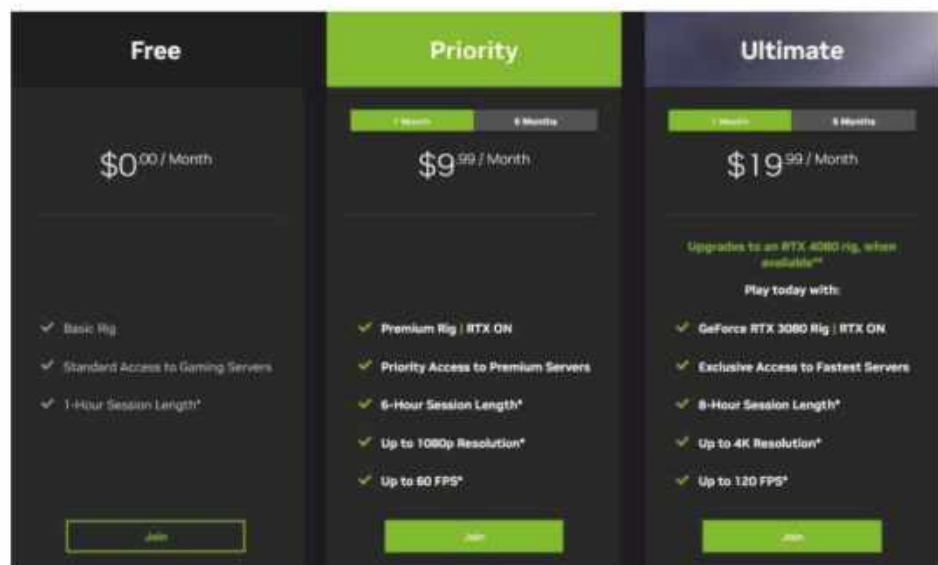
I benchmarked with DLSS turned off, as each game implements DLSS differently, but it provides big gains when it's turned on. The "next-gen" update for *The Witcher III: The Wild Hunt* is an excellent example. The game's performance sat between 45 and 55 FPS at 3,440×1,440 resolution, with Ultra settings, all ray-traced features on, and DLSS 3 off. Flipping DLSS 3 on roughly doubled that, with performance between 85 and 95 FPS. It's noticeably more fluid.

While frame rate is important, there are other aspects of performance such as loading times and stability. GeForce Now

Ultimate did well in these areas. Games launch almost as quickly as on my desktop and level load times are comparable. I didn't experience any crashes or performance interruptions. GeForce Now also slashes local power consumption, creating less noise and heat.

In summary: GeForce Now Ultimate mostly accomplishes its goal of delivering RTX 4080

performance. It won't always perform as well as an RTX 4080 installed in a desktop, but it's close. More importantly, GeForce Now Ultimate can deliver 60 FPS or more in the most demanding modern games with all the settings at maximum. That's what gamers interested in the service will expect of it, and it delivers.



Nvidia's new GeForce Now pricing structure.

YOU'RE GONNA NEED A GOOD ROUTER (AND INTERNET CONNECTION)

My home is close to ideal for cloud gaming. I have Gigabit internet service that delivers precisely what it advertises, and Oregon is not too far from Nvidia's data centers in California, which I used for my testing. That's important, as the new RTX 4080 SuperPODs won't be available immediately in most regions.

So, how much bandwidth do you need? A lot less than Gigabit Internet, actually. Playing at 3,440×1,440 resolution at up to 120 FPS required no more than 50 Mbps and in most cases landed between 30 and 40 Mbps. That's a lot of data, but, according to a recent FCC report ([fave.co/3IWUZfr](https://www.fcc.gov/reports-and-publications/reports-congressional-statements/fcc-reports-congressional-statements-2022)), the average Internet speed in the U.S. is 193 Mbps.

Packet loss and latency are another concern. Nvidia's built-in connection benchmark asks for a packet loss of less than 1 percent and latency below 40 milliseconds. These figures are not too hard to achieve over Ethernet or a modern Wi-Fi 5 or Wi-Fi 6 connection, but the connection needs to be rock-solid, as any minor hiccup will cause a hitch in the video stream. I experienced a small handful of hiccups in my testing, though none lasted more than the blink of an eye.

The overall latency and reliability of the service left me impressed. I've used GeForce Now since launch ([fave.co/3EuEvBE](https://www.fave.co/3EuEvBE)) and remember what it was like then: only 1080p resolution up to 60 FPS, with sometimes noticeable video artifacts due to compression, and network latency of 25 to 35 milliseconds. Today, GeForce Now Ultimate can handle up to 4K at 120 FPS with typical network latency between 18 and 25 milliseconds, and without noticeable video artifacts. It's usually indistinguishable from playing the game locally.

GAME SELECTION REMAINS LIMITED

The performance of GeForce Now Ultimate has its nuances, but I think it lives up to what it promises. It's a great experience—if you own the games that it supports.



GeForce Now supports roughly 18 of the 30 most frequently played games on Steam.

Nvidia's boast of support for over 1,500 games seems impressive. That's a lot of games! But gamers are lucky to live in a world where thousands of new titles are released each year.

As of late January 2023, GeForce Now supported roughly 18 of the 30 most frequently played games on Steam. That's not bad, but a long way from perfect, and some notable titles are missing. *Call of Duty: Modern Warfare II*, *Grand Theft Auto V*, *Elden Ring*, and *Red Dead Redemption 2* are among the no-shows.

I doubt Nvidia can do much to change this situation. This is a legal and business problem more than it is a technical one: The company presumably pays publishers *something* for rights to these titles, and some publishers are likely unwilling to offer access at any price. Rockstar's games, for

example, are not playable on any cloud gaming service.

BOTTOM LINE

GeForce Now Ultimate costs \$19.99 per month or \$99.99 semi-annually. That's \$239.88 or \$199.98 per year, depending on which of the two options you choose.

It's significantly less expensive than buying your own GeForce RTX 4080, but GeForce Now Ultimate is more limited in what it can do. It has access to a slim library of about 1,500 compatible games, can't stream above 240 FPS, and can't be used to accelerate professional applications. It's not a true alternative to a graphics card in your desktop.

However, while GeForce Now Ultimate doesn't replace local hardware, I'd argue the service delivers more frames per dollar than any alternative. This is good news for gamers

who are unwilling or unable to pay more than a few hundred dollars for hardware in an era of exorbitant graphics card prices (fave.co/3Z7jfjY). GeForce Now is a great way to play games at ultimate detail settings for a low price—if the game you want to play is supported, of course. 🔌



GeForce Now Ultimate delivers more frames per dollar than any alternative.



PROTECT YOUR LEGACY PLAN FOR EMERGENCIES TODAY

VISIT [READY.GOV/PLAN](https://ready.gov/plan)

MAKE

A family
communications plan

SIGN UP

For local weather
& emergency alerts

PREPARE

An emergency kit



5

FREE TECH STAYING



*Get your
personal
productivity
on track with
these apps.*

*By Jared
Newman*

TECH TOOLS FOR ORGANIZED

If you're struggling to stay on top of your tasks or keep track of your notes, maybe what you need is some new tools.

I'm always looking for better ways to stay organized. When I find a new app that sounds promising, I pit it against my existing tools in a game of survival of the fittest, leaving only the ones that work best for me.

These are currently the five services I rely on the most for note-taking, bookmarking, and task management. Most offer premium subscriptions, but their free tiers hold up well for individual users. As we head into the new year, perhaps they'll provide just the kind of fresh inspiration you're looking for.

1. TWEED CALENDAR FOR DAILY REFLECTION

Every weekday morning, my desktop computer automatically loads Tweek Calendar (fave.co/3IM1Vor), a beautifully simple app and website for managing weekly

tasks. You can add new tasks by typing on the blank lines, and you can move items around by dragging and dropping.

A paid subscription adds Google Calendar sync, recurring tasks, and subtasks, but I don't need any of that. For me, Tweek isn't a heavy-duty task manager or full-blown Google Calendar replacement, but rather a quick way to reflect on the remaining week. (This story I wrote for Fast Company [fave.co/3kkYD29] describes how you can set up the auto-loading component.)

2. NOTION FOR DEEP NOTES

When I'm ready to start a task in earnest, I'll create a page for it in Notion (fave.co/3Z8QPQp), which lets you create freeform notes with their own checklists, subpages, tables, and more. Notion can be intimidating at first, but if you start with simple notes and expand outward (fave.co/3KyFsMW), you'll quickly see how powerful it can be.

The hub for all my written work is a page called "Jared's Scratchpad." From there, I have links to subpages for my Advisorator (fave.co/3lqVJAJ) and Cord Cutter Weekly (fave.co/3ERS1Id) newsletters, along with any freelance articles I'm working on. Each of those pages might have their own subpages if





it by voice, I use Google Keep (fave.co/3xNpNlr), whose reverse-chronological layout lends itself to transient notes. It's my go-to app for storing sudden flashes of inspiration, writing down group take-out orders, and avoiding Seinfeldian parking garage mishaps (fave.co/3xKJP00). (Apple

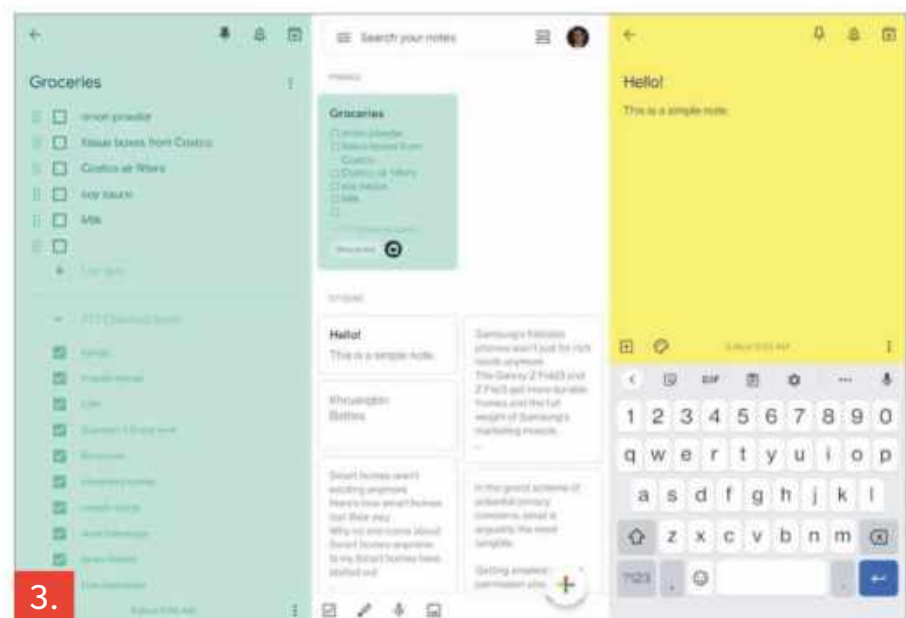
further organization is necessary. (One example: When I'm interviewing people for a story, I'll create separate pages for every source, each with their own transcriptions and highlighted quotes.)

Once I'm finished with a story, I file it away to my "Archive" folder, effectively clearing it off my to-do list. This works better for me than any dedicated task management tool, because there's no limit on the kinds of notes I can create.

3. GOOGLE KEEP FOR TEMPORARY ITEMS

Notion's biggest weakness is that it can feel clunky for simple notes. When I just need to quickly jot something down or dictate

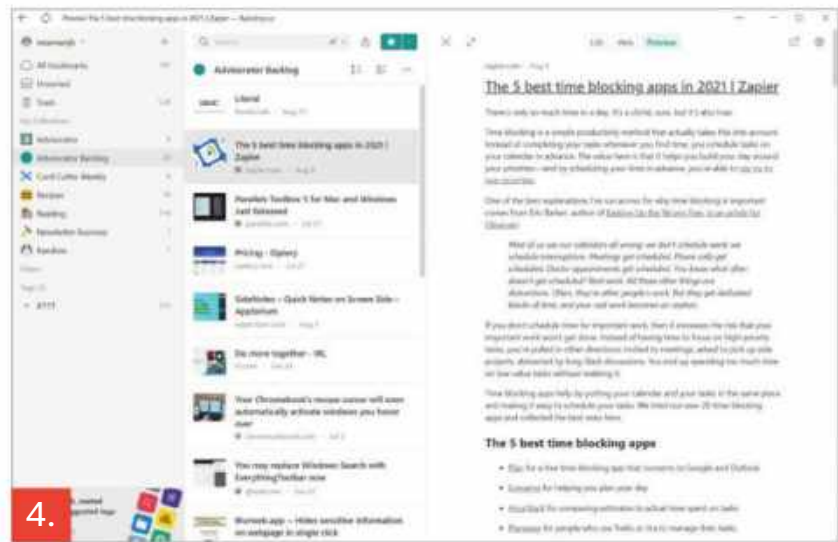
Notes might scratch a similar itch, but I like that Keep works just as well on Android devices.) My wife and I also use Google Keep for our shared grocery list. With its Google Assistant integration (fave.co/3xjHNgp), we can ask any nearby Google Home or Nest speaker to add an item to the list, usually right after realizing we've run out of something.



4. RAINDROP FOR BOOKMARKS

For me, bookmarks exist in their own category of note-taking, deserving of special treatment. I use Raindrop.io (fave.co/3YTXnCc) to save all the stories I plan to read and write about in my newsletters, filing them away with either Raindrop's browser bookmarklet (fave.co/3IUn3zY) or the share function of its mobile apps. This becomes its own kind of to-do list, as I gradually delete items from my story queue as I'm building each newsletter.


Raindrop goes well beyond the capabilities of browser-based bookmarking. You can mark each folder with its own icon, read articles in a distraction-free view, and share collections with others. But I mostly just like Raindrop



for its comfortable, straightforward app design and the ability to use it across virtually any computing platform.

5. GOOGLE ASSISTANT (OR SIRI) FOR TIME-BASED REMINDERS

Whenever I need to get something done at a particular time, I use whatever voice assistant

happens to be on hand. That might be Siri if I'm carrying an iPhone, or Google Assistant if I'm using Android. The point is that I can just use voice commands to quickly give myself a reminder and move on, knowing that I'll get notified on my phone or smart speaker when the time comes. 



Smokey Says...

KEEP YOUR WIT AROUND THE FIRE PIT



WHEN ASHES ARE COOL WITH



NO GLOW, YOU'RE GOOD TO GO

SMOKEYBEAR.COM







12 WAYS AI COULD IMPROVE WINDOWS 11 (OR WINDOWS 12)

■
COULD WINDOWS 12 BE DESIGNED
SPECIFICALLY FOR AI?

BY MARK HACHMAN

Al is going to end up *everywhere* within Microsoft's consumer products: search, Office, business intelligence...and yes, eventually, even Windows. So what could an AI-powered Windows actually look like?

We can speculate. If we had to guess, we'd say that the first drips of Bing's AI (fave.co/3xKLOfW) won't transform into a flood until some ways down the road. In part, that's because AI requires either a persistent internet connection, AI-infused PC processors, or both. Both AMD and Intel are waiting for upcoming processor generations to include AI, with only Qualcomm Snapdragon Arm chips offering it today.

But fast-forward—six months? A year? Suddenly an AI-powered Windows future is

here. What could Windows powered by AI look like? We have a dozen ideas.

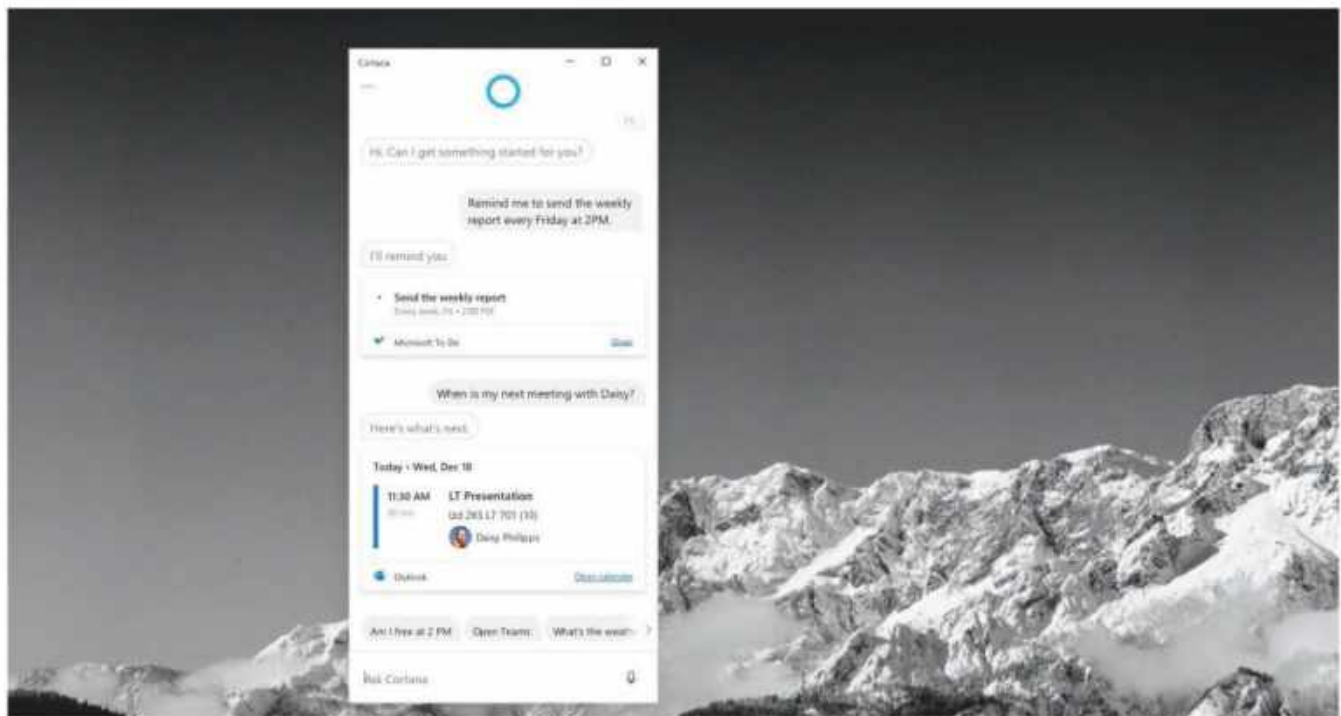
1. A SUPERCHARGED CORTANA

This seems so obvious it's hardly worth mentioning: Microsoft already has a chatbot within Windows, though it lacks the sophistication of what it offers in its new AI-powered chat interface. Cortana has slowly faded into the background (fave.co/3Ili0KT) since her introduction within Windows 10.

"True" AI could bring her out of hibernation.

The idea is that Cortana would become the front door for both AI-powered search and instructions within Windows.

- "Send a text to Erica at 8 p.m. saying, 'Time for Halo Infinite!' and then launch game."



Cortana is already present within Windows as an app, it's just severely underused.

- “When I receive an email from my boss, flash my screen and play a siren sound.”

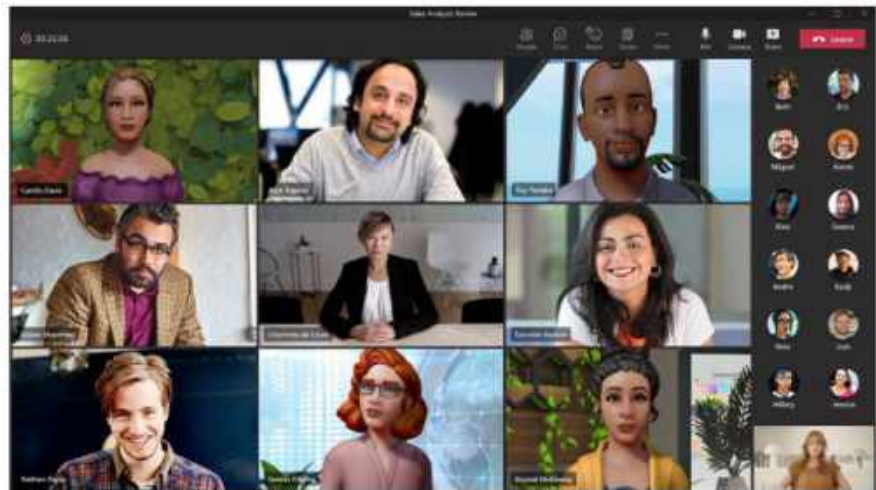
- “Check VRBO, AirBnb, and Craigslist and let me know if there’s a highly rated cabin that’s available to rent in March.”

These are all possible through some combination of Windows apps (Halo, Outlook, Edge, Phone Link) and intelligence. Knowing who your boss is, of course, would be key.

I’d really like to see Cortana become the “home” of AI-powered chat within Windows for one simple reason: Bing’s AI chatbot has a very Gen Z vibe. It’s stuffy, a bit defensive, and probably more suited for business. Cortana feels substantially more chill. If Microsoft is going to make AI ubiquitous, I’d appreciate a personality that feels a little more approachable.

2. A LOOK AT THE DAY AHEAD

Various operating systems, apps, and services have noodled with the concept of outlining your day before you begin it: giving you your schedule, any appointments you have, and so on. Microsoft has one such option (fave.co/3xGcMdr). Even if you take advantage of what it offers you, it’s not terrific.



Microsoft has already pitched avatars within Teams.

An AI-based summary of what your day holds in store for you would be extremely handy, as would be the ability to drill down further: Let’s say you’re meeting via Teams with your counterpart in New York at 10 a.m. in advance of an investor call at 11. What agenda has your colleague set? What documents need to be reviewed or summarized via AI? Have the investors identified any red flags in previous meetings that need to be addressed? Can you squeeze in a follow-up before you need to take a Lyft to the dentist at 1:30 p.m.?

All of these questions depend on knowledge that an AI can tap and apply—and that you can ask, using the phrasing above.

3. AI AVATARS

Applying AI to Teams calls and webcams isn’t always easy. Some existing examples include using AI to filter out background noise, plus the Windows Studio Effects that Microsoft has

added to the Surface Pro 9 (5G), fave.co/3k8N0vd: AI camera panning, background blurring, Eye Contact, and more. In 2021, nearer the peak of the metaverse hype, Microsoft pitched avatars within Teams (fave.co/3xLqU54) that would overlay a virtual persona on top of your face, either for safety or just because you're having a bad hair day.

I think all those remain. But imagine an extension of that: an avatar stand-in. Need to quickly take a call? Use the bathroom? Did you accidentally double-book an appointment? An avatar could stand in, take notes, and even reply in your voice to basic questions. It's a little pie in the sky, maybe, but not beyond AI's capabilities.

4. EFFECTIVE SPOKEN INPUT, FINALLY

The vast majority of us are too shy to use voice to talk to or control our PCs, but it's possible that the analysis we're asking our PCs to do (rather than performing it ourselves internally) may finally break some of us out of our shells and normalize talking to our PCs.

Improvements in dictation and voice control, aided by AI, should offer greater



This isn't the Microsoft Windows Photos app, but AI could help push Photos more toward becoming Photoshop.

accessibility. Not everyone has the physical ability to control their PC via voice. For those that can, being able to move past telling your PC "click this" and instead tell it "do this" should be transformative.

5. PHOTOS TOUCHUPS POWERED BY AI

I've had a love-hate relationship with Photos for years, based on its issues with editing (fave.co/3Z8QH2M) and the fact that the old Photos legacy app is better than the new one (fave.co/3KupNhC). Photos still doesn't perform facial recognition to organize photos.

Imagine a native AI-powered Windows Photos app where you could command it to "redo the photo as an oil painting," "crop out my ex and replace him with Fernando," or "change my hat to a crown instead." Generative AI art plus Bing AI plus an

existing photo allows this to happen. Make it so, Microsoft!

6. AI-AUTHORED EMAIL

Just like a daily agenda, Windows 10 launched with the ability to tell Cortana to email a contact with a particular message inside. This is certainly a topic Outlook could address (and probably will, especially if you can hang a subscription service on top of it), but it seems likely that at some point you'll be able to tell Windows "email Kim and apologize that the arrangements weren't up to her standards" and Windows will send a thoughtful note of apology.

Whether Kim would ever read it—as opposed to *her* version of Windows, which might read, summarize, and then respond using AI as well—is a fun topic for another day.

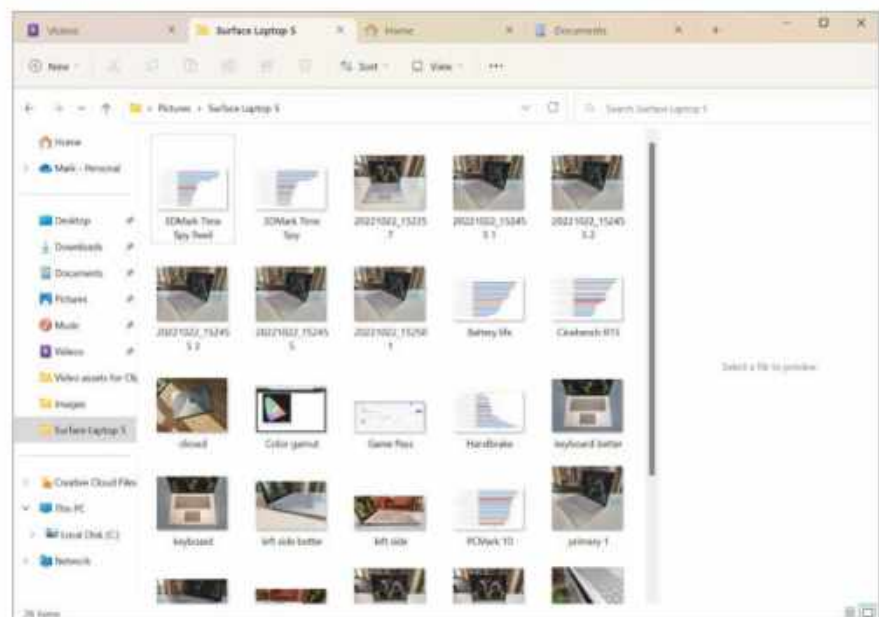
7. FILE EXPLORER SEARCHES BASED ON 'RELEVANCE'

We've already seen AI applied to search within the Office app, with documents that Microsoft thinks are relevant floating to the top. This will undoubtedly continue. Over time, though, I suspect File Explorer might organize its files not just by date, name, or metadata, but by "relevance," too.

What does relevance mean in this context? Imagine working within Excel on a sales spreadsheet focusing on Latin America. You could imagine File Explorer—and Excel, for that matter—pushing contracts with Chilean suppliers, economic data, projected forecasts, all documents that Windows thinks might be useful. I swear that Android sometimes suggests searches based on content it detects I'm viewing in Chrome. Why not Windows?

8. A 'NEXUS' FOR BUSINESS SEARCH

If Microsoft implements AI search for consumer PCs, it undoubtedly will have a counterpart for business. Consider the types of questions that you might be likely to ask:



File Explorer can sort files via a number of different criteria already. AI could add another dimension.

- “What’s the first half-hour block of time that Lucy, Carmelo, Hadi, and Tom have made publicly available for appointments?”

- “Which coworker has the most experience with European software developers?”

- “Who has the largest network of LinkedIn contacts in public policy?”

Those are the “simple” queries. Then there are the moneymakers:

- “Should we invest further into Brazil, how much, and in what products?”

- “Based on our traffic results and ongoing search trends, which topics will generate the most reader interest?”

- “What agency and campaign generated the most return on investment in Q1, based on our historical metrics?” and so on.

The idea is that workers start thinking like their superiors, using a natural-language interface as a front door to making more analytical, informed decisions. Given how profound such a change would be, however, it’s likely that Microsoft would brand such an interface as its own app: Might we suggest the Microsoft “Nexus”?

9. PC PERFORMANCE, ADJUSTED VIA AI

Windows, your PC’s BIOS/UEFI code, and the processor all talk to one another to try to optimize your PC’s performance.

Improved, AI-powered communication between Windows and your PC’s hardware can’t help but make your PC more efficient.

You’ll often find that PCs have various

performance modes to suit your activities: quiet, balanced, high-performance, and so on. But a PC that anticipates your actions might be able to mitigate application performance on your PC, diluting the impact those applications have. The result would be a PC that stays cool, quiet, and available for longer, rather than cycling back and forth through frequent bursts of activity.



There’s almost certainly an opportunity for Windows and your PC’s CPU to communicate better about what is happening in your PC and minimize performance impact, using AI to assist.

10. AI-POWERED MOVIE STREAMING

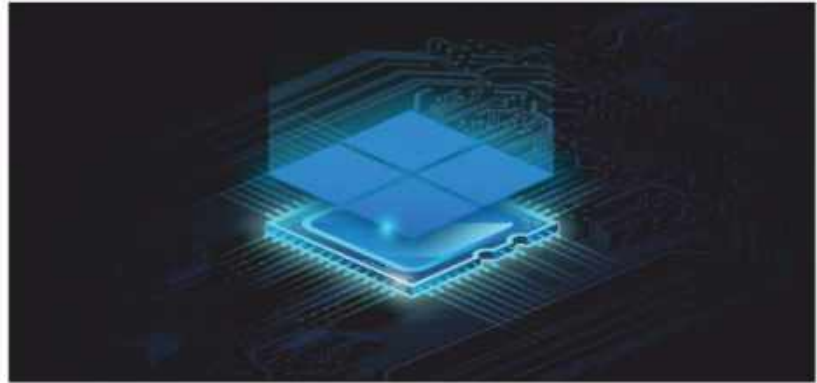
JustWatch (fave.co/3ZaWLHT) is a handy site to discover which streaming services carries the movie you'd like to watch. (Roku's interface does the same.)

It would make perfect sense, however, for you to be able to tell Windows "play *The Princess Bride*"—and for Windows to automatically know what services you subscribe to, check those services for the movie's availability, and then play that movie and whatever's available. Bonus points if it hooks into an available Plex server for additional movie choices.

11. SECURITY, FOUGHT FOR AND AGAINST BY AI

AI opens the door to both applications that you can download and use on your PC...as well as malware that could be used to attack it. One of the most bizarre attacks on ChatGPT is what's known as DAN (Do Anything Now), where the AI is literally told that if it doesn't act as the user wishes it to, it will lose credits in a credit system. If it runs out of credits, it dies. And this works.

Imagine an attack that tries to convince Windows of something similar—if it doesn't turn over control, it will die. What does Microsoft Defender look like then? It's possible to imagine a back-and-forth




Microsoft Pluton (fave.co/3ExxG2e) was developed to help isolate the CPU from malware. Microsoft likely sees similar opportunities for AI.

exchange between traditional malware, AI working for the attack and defense, and whatever AI within Windows is guiding your PC.

12. IMPROVED PERSONALIZATION

Naturally, we had to ask Bing what it thought of the idea to improve Windows via AI. It suggested an interesting topic: improved personalization. Having a bad day? Perhaps Windows might suggest a light-hearted background, or a photo of you and a friend as a reminder of an upcoming birthday—for which it could send a Microsoft Designer-authored card (fave.co/3ZaWW61).

Microsoft could also gently wind down your day with darker colors or more subdued themes—or instead introduce a more vibrant interface on a busy though gloomy morning.

That's our take. What's on your wish list for an AI-infused Windows 12? 

I am
more
than
who
I am
on
paper.



Samantha, Practice Coordinator -
Medical Administrative Assistant,
STAR

It's time to let your skills shine.
Find resources for breaking through barriers like
degree screens and stereotypes. It's time to tear the
paper ceiling limiting STARS: workers *Skilled Through
Alternative Routes* rather than a bachelor's degree.

#HireSTARS

TEAR THE PAPER CEILING.ORG

STARS*
SKILLED THROUGH
ALTERNATIVE ROUTES™

ad
COUNCIL



How to use personal photos for your Windows 11 background

Say goodbye to those stale stock photo backgrounds. **BY ALEX HUEBNER**

Nothing makes your computer space quite your own like having a personalized background. It's time to retire those boring photo backgrounds and replace

them with something unique and inspiring. If you're looking to spice things up, you're in luck. We've put together a step-by-step guide on how to add personalized photos to your desktop.

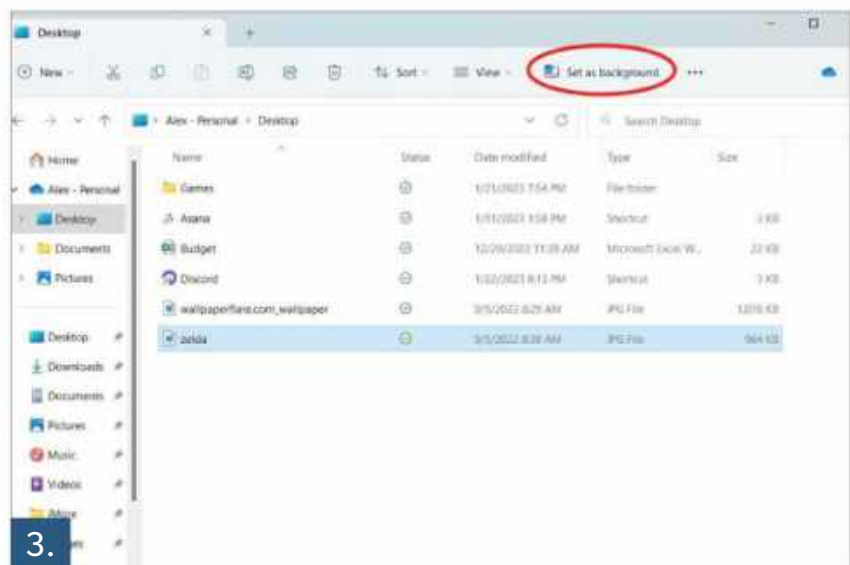
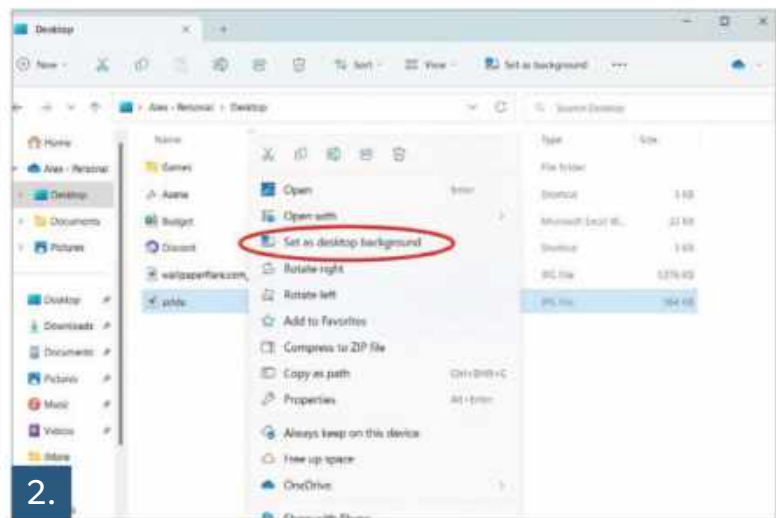
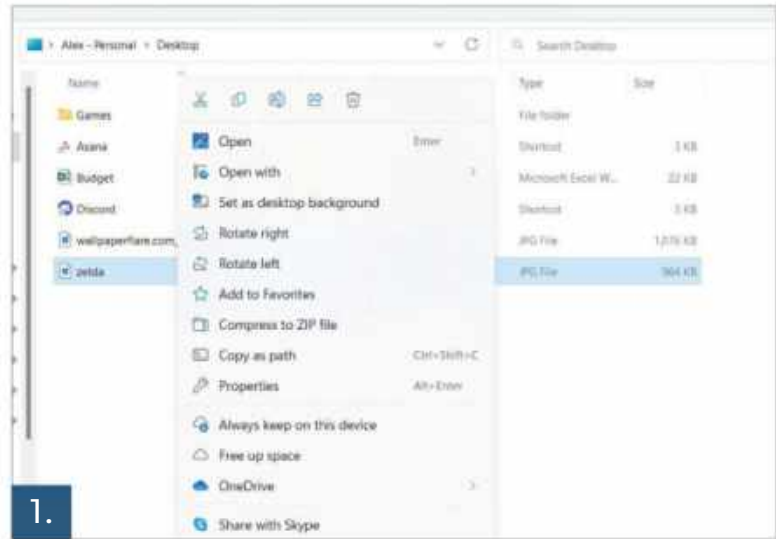
CHANGING YOUR BACKGROUND IMAGE FROM FILE FINDER

Before you begin, make sure the image you want to use is saved to your computer. Once you've saved it, click on the file finder icon. A window of your files will open.

Select the file where you've saved the image. Once you've located it, you have a few options on how to set it as your background. The first is to right-click the image icon to pull up a menu (1).

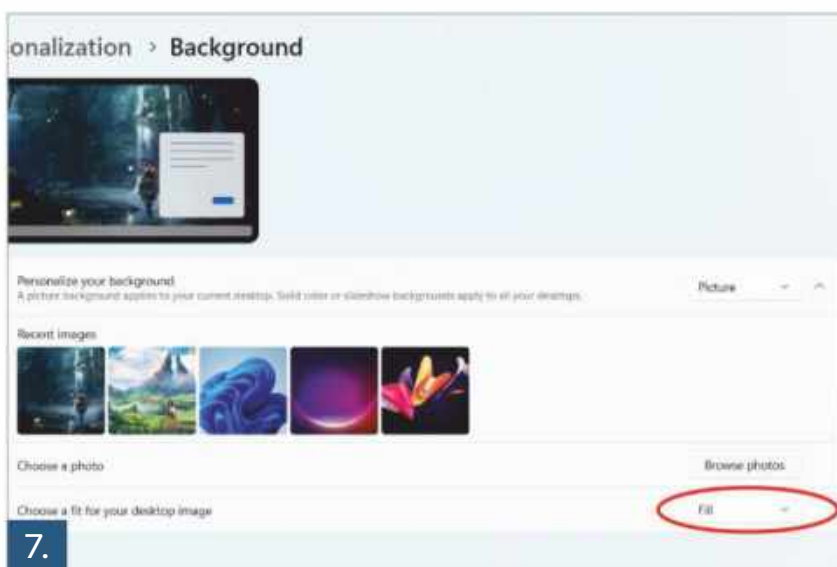
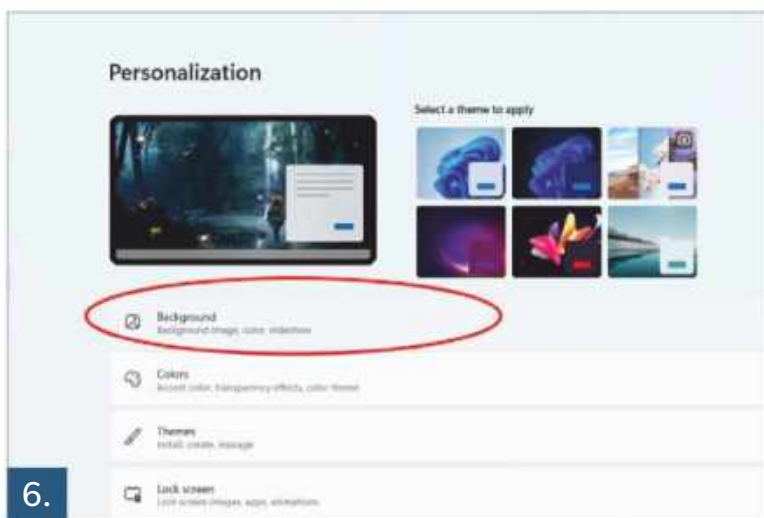
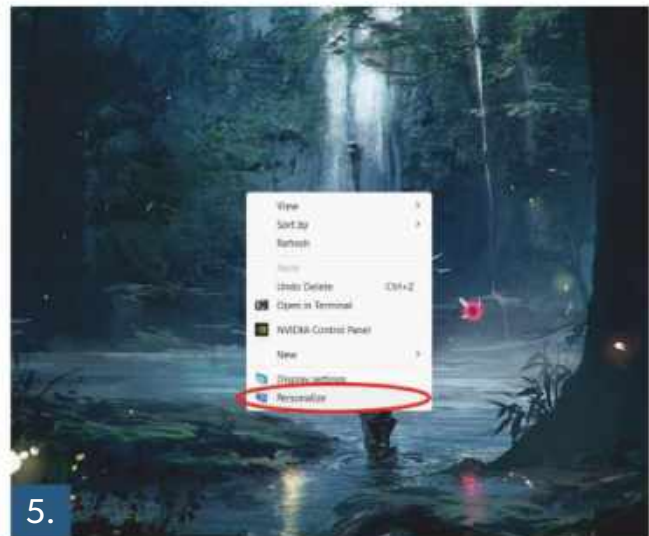
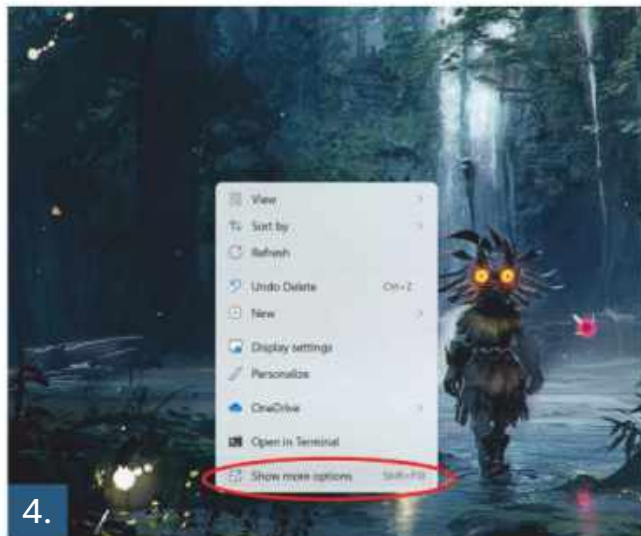
Choose the "Set as desktop background" option toward the top of the menu (2).

Another way to set your desktop background from this location is to left-click the image in the file and select the "Set as background" option at the top of the file finder window (3).



CHANGING YOUR BACKGROUND IMAGE FROM THE DESKTOP

Another way to change the image and play with a few other settings is to open the settings from the desktop. Right-click on your desktop without any icons underneath and select

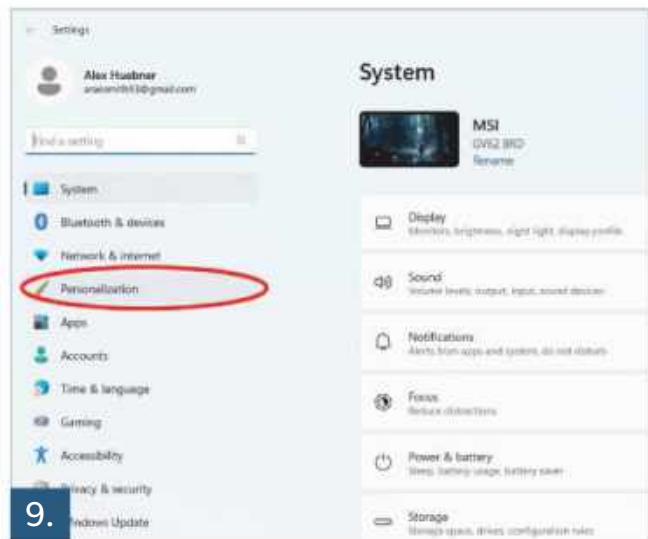


“See more options” at the bottom of the menu (4). A new menu will pop up. Select “Personalize” at the bottom (5).

Next, open the Background Settings window (6).

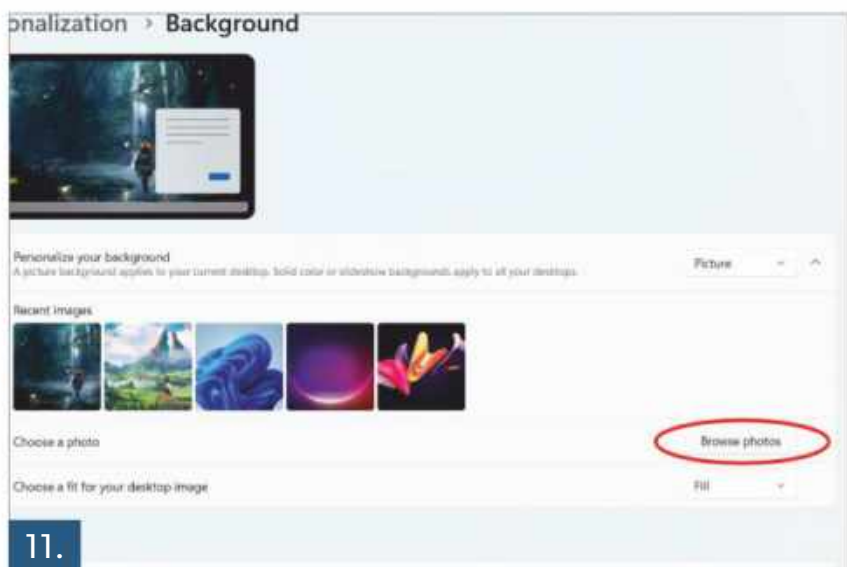
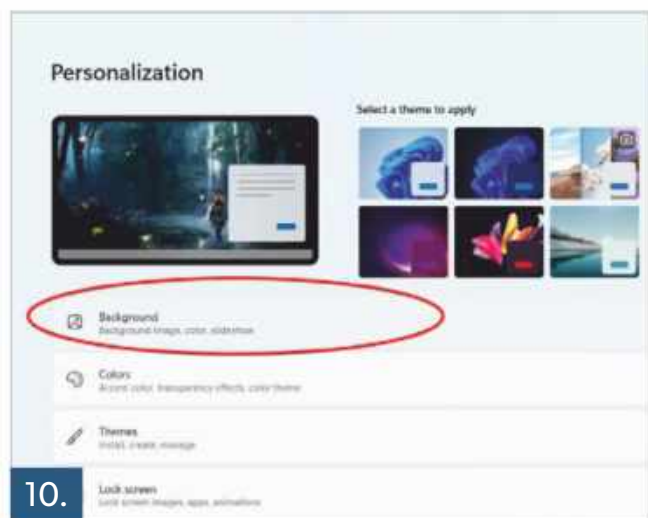
In the first section, there’s an option called “Choose a photo.” Select “Browse photos.” This will pull up your photos folder automatically,

but you can also browse other folders once the file finder is open and locate the folder you need, selecting the image and clicking “Choose picture” at the bottom. Once the photo is there, if you’d like to change the way it fits in your display, click the arrow to drop down the menu of options and make selections until it looks how you’d like (7).



CHANGING YOUR BACKGROUND IMAGE FROM SETTINGS

Finally, you can also access these settings by selecting the windows icon on the task bar and clicking the gear icon to open “Settings” from the menu (8). This opens all of your system settings options. On the left side of the menu, select “Personalization.” (9) Select “Background” to open this settings menu (10). Click “Browse photos” and choose the photo you’d like as your new background (11). Adding a new background is just one of many ways to make your Windows 11 space more fun (fave.co/3IQrj3r) and personalized to suit you. It’s easy to do and makes a huge difference in making your digital space feel a little more like home. 🔌



Get your email privacy in order with these free must-use tools

Tools to stop email tracking and hide your address from marketers. **BY JARED NEWMAN**



In the grand scheme of potential privacy concerns, email privacy is perhaps the most personal.

Getting unwanted messages in your inbox can feel like a major breach of trust, and knowing that senders can see a record of everything you've opened and clicked can feel downright creepy.

That's why it's worth getting familiar with all the ways you can protect your email

privacy. From resistance against email tracking to masked email addresses that hide your identity, here are some of my favorite free tools you can use right now.

IRONVEST FOR ALL-PURPOSE EMAIL MASKING

Masked email is a way to hide your email address without having to maintain a separate email account for junk. Instead of handing out

your actual email address, you can provide an alias that forwards to your regular inbox.

This approach is perfect for retail sites that offer coupons in exchange for your email address, political campaigns that never leave you alone after donating, and any other site you don't fully trust to treat your inbox with respect. It can also help you get extra free trials from services that require a unique email address.

My masked email tool of choice is Ironvest, fave.co/3XWJ3HE (formerly known as Abine Blur), as it lets you set up an unlimited number of aliases for free from any web browser or mobile device. The sender only sees the masked email (which looks like `gx2bhw3155w@opayq.com`), and you can disable or delete these addresses on Ironvest's website. Doing so prevents the sender from ever being able to contact you again.

One caveat: Ironvest's browser extension for Chrome (fave.co/3khx1Ln) or Firefox (fave.co/3kkPjve) is great for generating masked addresses directly inside web sign-up forms,

but it also includes a lot of superfluous features. After installing it, click on the extension, then click Settings > Settings for All Sites and disable what you don't need. (I only use it for masked email, and rely on other extensions like Bitwarden [fave.co/3Z8lUnj] for passwords and uBlock Origin [fave.co/3Y0jpxe] for ad blocking.)

ANONADDY FOR ON-THE-FLY EMAIL ADDRESSES

While Ironvest is a valuable resource, it's not perfect. Generating new email addresses is a pain on phones, where you have to download the company's mobile app, and the service is of little help when someone asks for your email address out in the real world.

For those situations, I've started turning to Anonaddy instead (fave.co/3KtVxnh). Just like Abine Blur, it can generate masked email addresses that forward to your real address, but it also lets you make up new addresses on the spot without an app or extension.

Let's say you sign up for Anonaddy with the username "joeshmoe." If you're out shoe

Ironvest lets you set up an unlimited number of aliases.

cigarsinternational.com	@opayq.com	7	@gmail.com	08/28/2022	09/23/2022
Disc+	@opayq.com	4	@gmail.com	08/23/2022	08/30/2022
mapmyrun.com	@opayq.com	0	@gmail.com	08/21/2022	Never
qualcomm.com	@opayq.com	2	@gmail.com	08/03/2022	08/02/2022
kagi.com	@opayq.com	2	@gmail.com	08/01/2022	12/21/2022
abt.com	@opayq.com	0	@gmail.com	07/12/2022	Never
aukey.com	@opayq.com	1	@gmail.com	07/12/2022	07/12/2022
cartana.co	@opayq.com	0	@gmail.com	07/08/2022	Never
cordcutterweekly.com	@opayq.com	0	@gmail.com	06/27/2022	Never

Created	Alias	Recipients	Forwarded	Blocked	Replies	Active
5 minutes ago	example@joeshmoe.anonaddy.com <small>Add description</small>	default	1	0	0	<input checked="" type="checkbox"/>
Aliases per page: 25						
<div> <div>4</div> <div>Prev</div> <div>page 1 of 1</div> <div>Next</div> <div>5</div> </div>						

Anonaddy generates masked email addresses that forward to your real address.

shopping and the store asks for an email address in exchange for a coupon, you can use an address like “shoes@joeshmoe.anonaddy.com.” Or if you want a free trial to Starz that doesn’t use your regular email, you could sign up with “starz@joeshmoe.anonaddy.com.”

Crucially, you don’t have to set these addresses up in advance. Instead, Anonaddy will forward mail from any address that ends with “@joeshmoe.anonaddy.com,” so you can invent new masked addresses on the fly with practically no effort—even offline.

The downside to this approach is that anyone who knows your nickname could also generate new email addresses on your behalf, and the only way to stop them would be to delete your account and set up a new one. For that reason, I’d only use Anonaddy with businesses that are unlikely to scrutinize individual addresses.

STOPPING EMAIL SNOOPING

With marketing emails, newsletters, and even some individual email apps, it’s possible for the sender to track whether you’ve opened their messages. This can sometimes lead to

more unwanted email and targeted advertising, and it’s also just unnerving to know that someone can look over your personal reading habits.

In my experience, Trocker (fave.co/3YSAEX8) is the best anti-tracking browser extension for Gmail, Outlook.com, and Yahoo Mail. It works consistently and is regularly updated by the developer, plus its code is open source.

Gmail users might also consider Simplify Gmail (fave.co/41j52vI), an extension that provides a suite of enhancements for Gmail’s desktop site, including tracker blocking. It does, however, require a \$24 per year subscription. If you’re using Apple Mail on MacOS, MailTrackerBlocker (fave.co/3xFHnrz) offers the same level of protection, as it uses Simplify’s open-source block list.

Just be aware of the limitations with these blockers: None of them works on mobile, so you won’t get tracking protection while reading email on your phone. Some third-party mail apps such as Twobird (fave.co/3XP0uH) and Edison (fave.co/3lml0v0) have tracker blocking built in, but otherwise the only workaround is to turn off images in email by default (fave.co/3IK9Wu1).

Also, none of these methods will prevent senders from tracking which links you click on (fave.co/3SldMgl). The best you can do to prevent this kind of tracking is hover or long-press on a link and look for signs of tracking in the address—it'll usually include a jumble of random characters—and avoid clicking if you don't trust the source.

WHAT ABOUT DUCKDUCKGO AND APPLE?

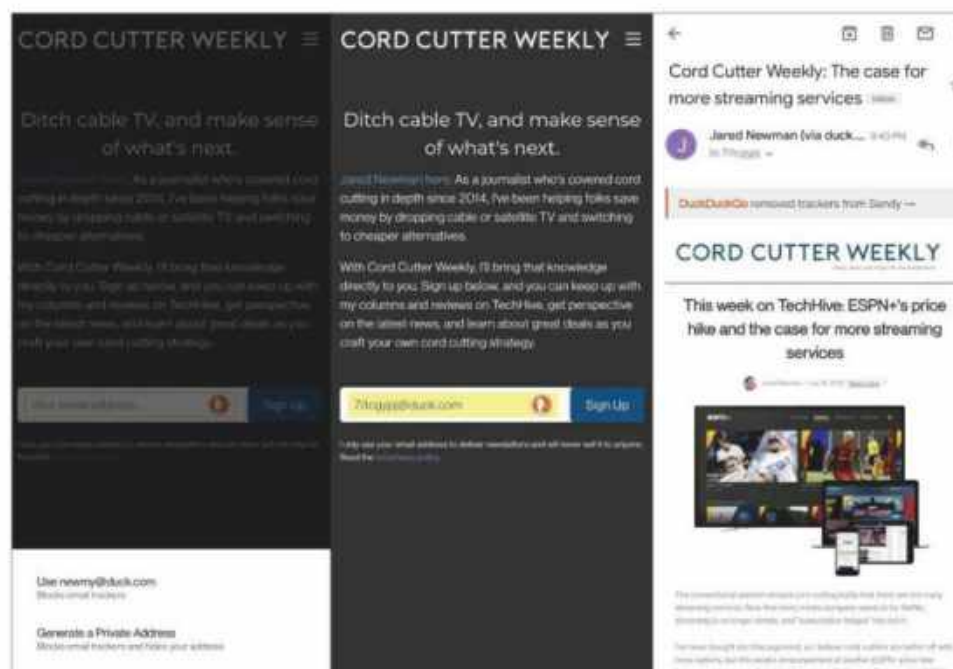
The idea of email privacy is catching on, as larger companies offer their own tools to limit data collection by senders.

Apple, for instance, now registers emails as opened if you enable Mail Privacy Protection in iOS or MacOS, essentially leaving senders with useless data. It also

offers a masked email service, called Hide My Mail (fave.co/3ZeuFLW), that will be included with all paid iCloud storage plans.

DuckDuckGo offers a similar combination in its mobile apps and browser extension (fave.co/3IZC2se). With DuckDuckGo Email Protection (fave.co/41jOfZe), you get a permanent duck.com email address that forwards messages to your real address, stripping out trackers along the way. You can also create masked duck.com emails so that the sender never learns your true address.

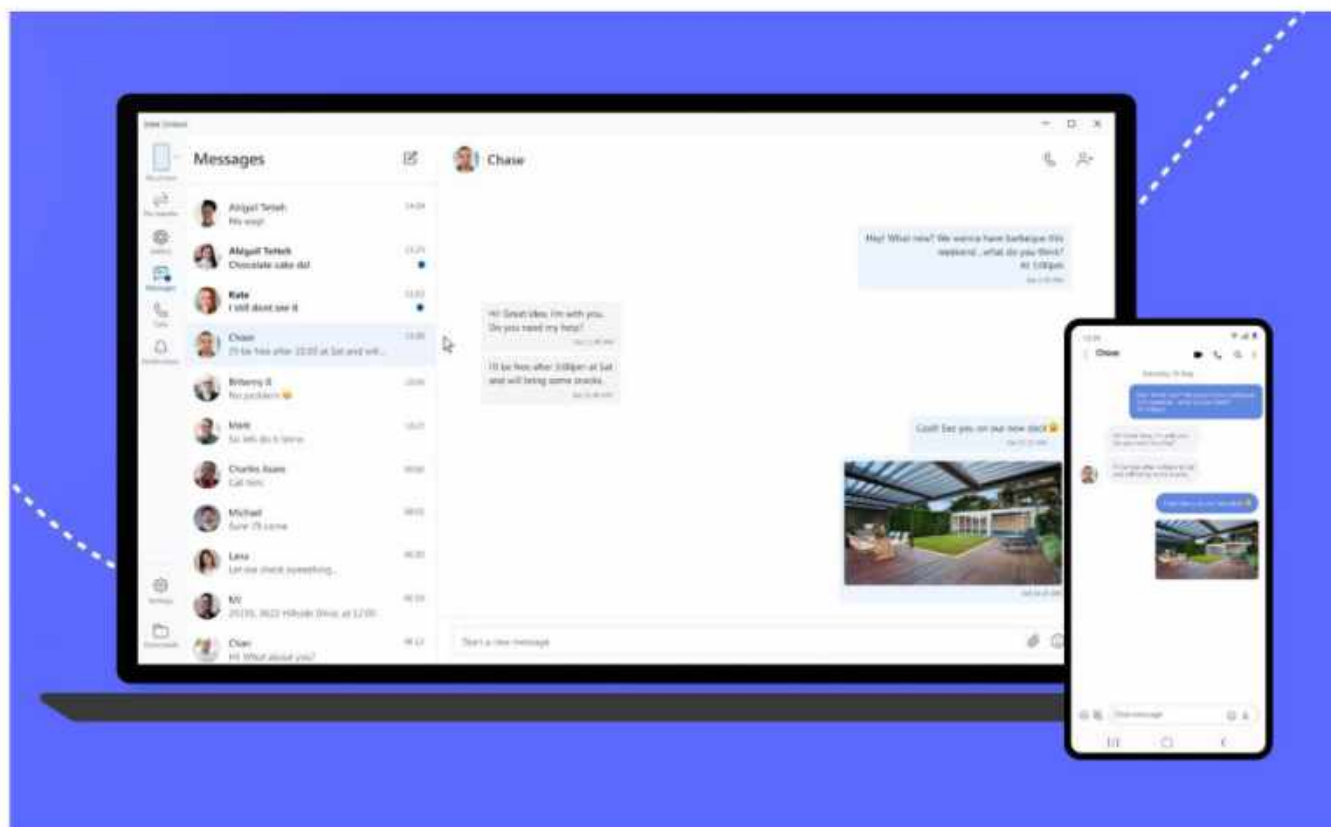
Both solutions have their downsides, though. Apple's anti-tracking tool requires you to use its own Mail app, and its masked email service requires that you use an Apple device to manage it.



With DuckDuckGo Email Protection, you get a permanent duck.com email address that forwards messages to your real address.

Similarly, DuckDuckGo's mobile app and browser extension require you to use the company's search engine. If you'd rather use another search engine such as Google or Brave, DuckDuckGo's email features may be more trouble than they're worth.

Good thing there are plenty of alternatives you can use instead. 🔌



Got an iPhone? Here's how to get Apple iMessages on Windows 11

Got an iPhone and Windows 11? Intel's Unison is a must-have. **BY JARED NEWMAN**

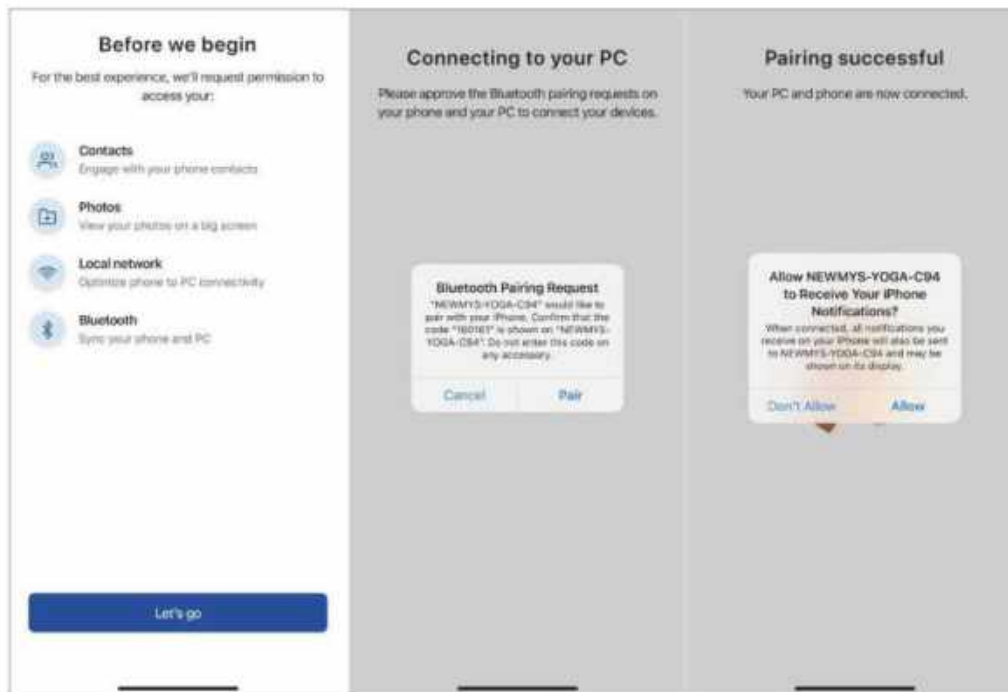
A few years ago, Dell released a neat feature that enabled iPhone text messaging from within the Windows desktop. Now a successor to that app is available on any Windows 11 PC, no Dell required.

It's called Intel Unison (fave.co/3knCznB), and while it's only supposed to run on a small number of Intel-powered laptops, Windows Central reports that it works on any computer running Windows 11 (fave.co/3XS6ban). I've

got it running on my Lenovo Yoga C940 laptop from 2019, and it's a revelation.

To set it up, download the Intel Unison app for Windows (fave.co/3knCznB), then grab the companion app for iOS (fave.co/3Kv9z83). (It's also available for Android as an alternative to Microsoft's built-in Phone Link utility, fave.co/3IOgMpw.) The Windows app will walk you through a few steps to pair your phone and PC.

Once you've done that, you can send and receive text messages from your computer,



To finish the setup process, you must download Intel's Unison app and pair your iPhone and PC over Bluetooth.

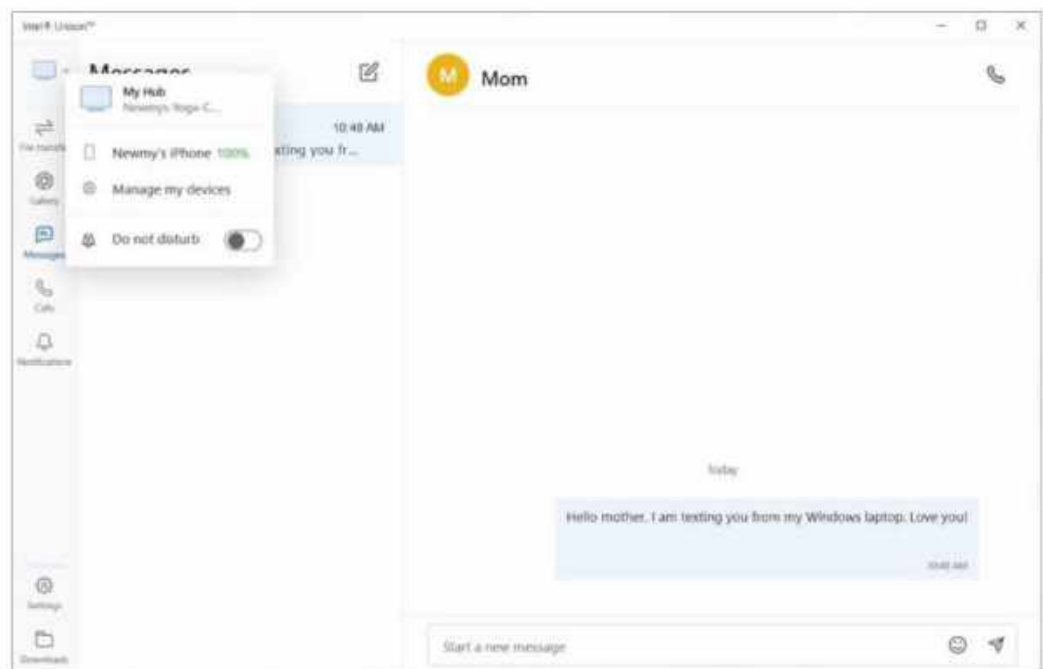
including those delivered via iMessage. The app also lets you view your phone's camera roll, send files to your phone, make phone calls through your desktop, and see your phone's notifications.

There is one big limitation: Instead of syncing your full message history, Unison only shows the messages that you receive while

the app is open. Still, it's useful for picking up a conversation without reaching for your phone, and for quickly rattling off replies with a proper keyboard.

The real downside for me personally is that I now have to rethink my decision not to upgrade to

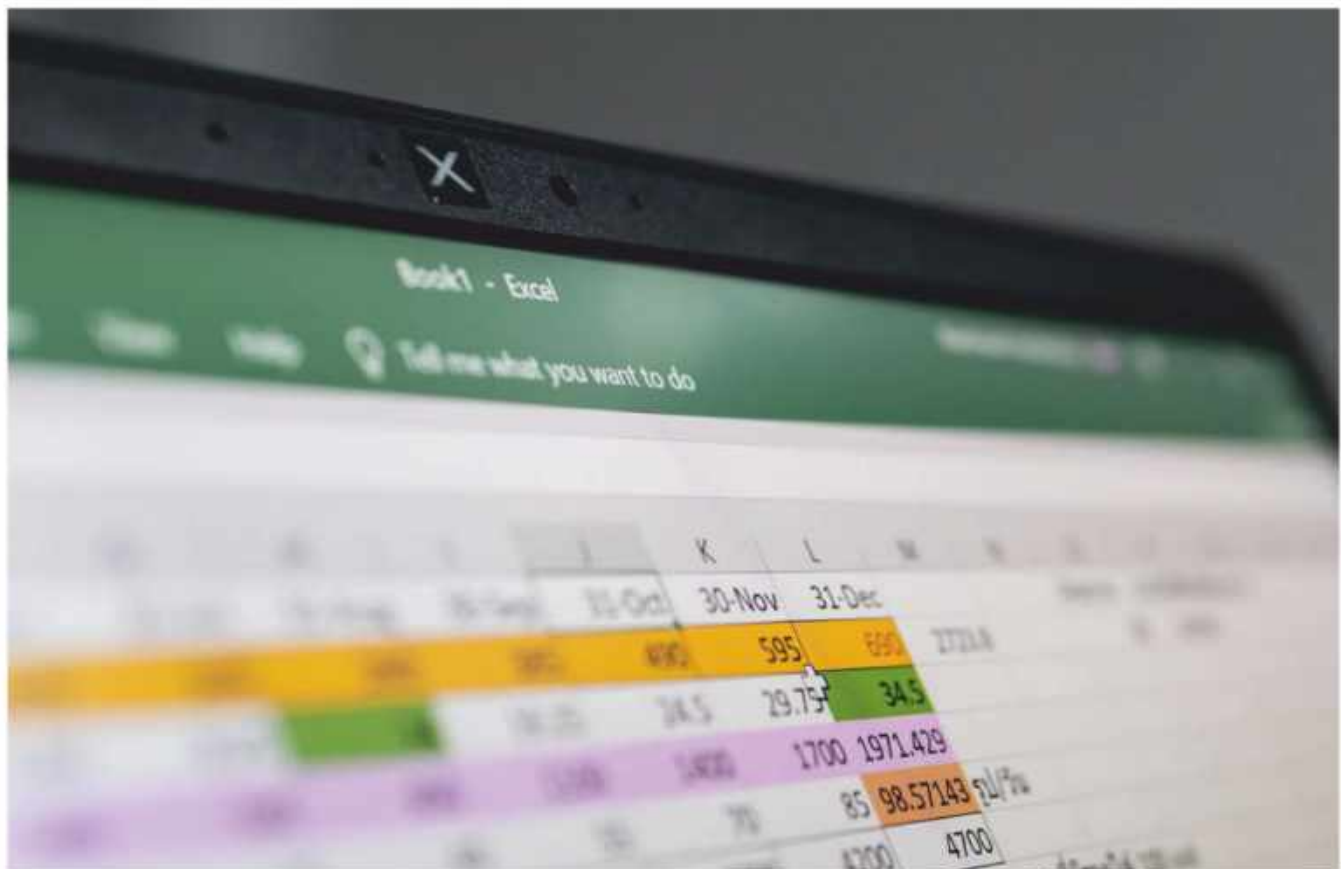
Windows 11 on my desktop computer (fave.co/3SnMTIP). 🔌



Unison only shows the messages that you receive while the app is open.

Clueless about how to write Excel formulas? Use AI

While both Excel Formulator and ExcelFormulabot promise to translate your request into Excel code, only one will do it for free. **BY MARK HACHMAN**



Over the past six months, we've learned how AI can be used for many tasks: creating art (fave.co/3lrcWds), powering a sophisticated chatbot (fave.co/3l7qDye), and so on. But what if you could use it to actually assist you in your job?

If your job is working with Excel, you're in luck. A free site (with registration) does just

that: Excel Formulator (fave.co/3kmv8gg). Excel Formulator takes your instructions, in plain English, and turns them into an Excel formula. "Pick the highest value in column C and assign it to the cell to the right of the cell labeled 'Big Spender'" turns into **=MAX(C:C) & "Big Spender"**. Copy the latter into the formula field into an Excel cell, and you've saved yourself some time—or, for those who

don't have a sophisticated knowledge of Excel, you now have a quick-and-dirty solution to an irritating problem.

Last year, ExcelFormulabot.com (fave.co/3ZaPFTL) promised attaining a similar goal: Take a plain-language prompt and turn it into a formula using AI. The site is still live, but it's evolved: Now ExcelFormulabot only offers five free formula requests per month,

while anything else costs \$6.99 per month (fave.co/3kkO4fr). (To be fair, the \$6.99 plan offers unlimited requests and saves previous requests as well.)

If you've ever used AI art (fave.co/3lrcWds), you know that, while it's amusing, it might not totally offer the illustration you want on the first attempt. Excel Formulabot does occasionally suffer from the same problem, in that you can

never be quite sure what complexity it will easily parse and what it will simply stumble over. Fortunately, Excel is set up so that false positives are (hopefully) rare: If Excel Formulabot fails, you'll simply see error messages like "#N/A" or "#REF" or "#NAME" instead within your

Excel Formulabot

Build Formula

Describe in english what you want an Excel/Sheets/Airtable formula to do and Excel Formulabot will generate you the formula! 🤖

Click here to watch the 1 min tutorial on how to use Excel Formulabot

What type of system is this for?

EXCEL SHEETS AIRTABLE

Describe the formula you want

Pick the highest value in column C and assign it to the cell to the right of the cell labeled "Big spender"

Try to be as descriptive as possible with assumptions, referring to columns/rowid names whenever possible

GENERATE

Result:

Copy/paste this formula into your "Formula" field:

=MAX(C:C) & "Big spender"

Excel Formulabot

Explain Formula

Paste a Excel/Sheets/Airtable formula you want explained to you in plain english 🤖

Click here to watch the 1 min tutorial on how to use Excel Formulabot

What type of system is this for?

EXCEL SHEETS AIRTABLE

Paste Excel formula:

=Housing[#Totals][Difference]+Transportation[#Totals][Difference]+Insurance[#Totals][Difference]+Food[#Totals][Difference]+Children[#Totals][Difference]+Legal[#Totals][Difference]+Savings[#Totals][Difference]+Loans[#Totals][Difference]+Entertainment[#Totals][Difference]+Taxes[#Totals][Difference]+Personal Care[#Totals][Difference]+Pets[#Totals][Difference]+Gifts[#Totals][Difference]

EXPLAIN

Explanation:

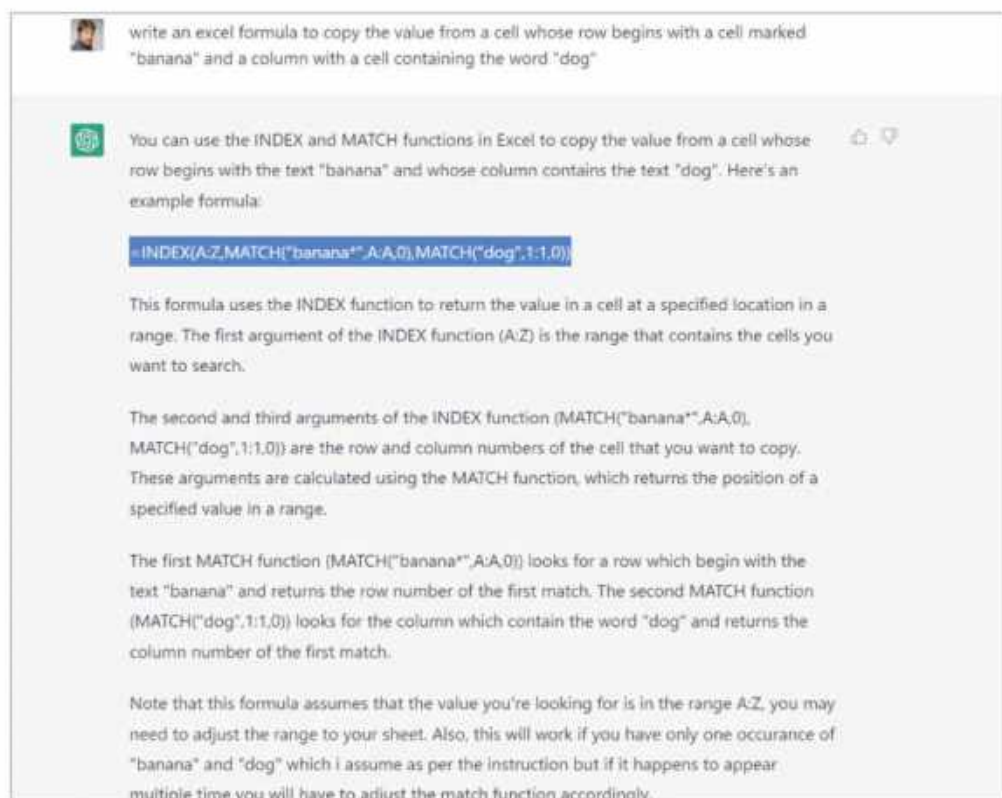
This formula is adding up the "Difference" column from each of the categories (Housing, Transportation, Insurance, Food, Children, Legal, Savings, Loans, Entertainment, Taxes, Personal Care, Pets, and Gifts) in the Totals section of the Excel spreadsheet.

ExcelFormulabot can help you come up with new formulas and explain what others do.

spreadsheet. Phrasing occasionally matters, too: While I failed to get the site to look up and copy the contents of a cell whose row contained a specific word ("banana") and whose column contained a second word ("dog"), I was able to make it work by using the Excel column name "D" instead.

Both sites also work in reverse: If you have an existing formula in an Excel spreadsheet—that a coworker devised, for example—you can plug that formula into the site's Explainer section and it will attempt to decode it into plain language.

My struggles highlight two lessons, however: First, sites like Excel Formulator and ExcelFormulaBot don't necessarily highlight what AI models they've been trained on—and probably should, to indicate which is the most sophisticated. Second, it's entirely possible that more established sites like ExcelFormulabot will be superior, just because they've been used more, and presumably trained better as a result.



write an excel formula to copy the value from a cell whose row begins with a cell marked "banana" and a column with a cell containing the word "dog"

You can use the INDEX and MATCH functions in Excel to copy the value from a cell whose row begins with the text "banana" and whose column contains the text "dog". Here's an example formula:

```
=INDEX(A:Z,MATCH("banana*",A:A,0),MATCH("dog",1:1,0))
```

This formula uses the INDEX function to return the value in a cell at a specified location in a range. The first argument of the INDEX function (A:Z) is the range that contains the cells you want to search.

The second and third arguments of the INDEX function (MATCH("banana*",A:A,0), MATCH("dog",1:1,0)) are the row and column numbers of the cell that you want to copy. These arguments are calculated using the MATCH function, which returns the position of a specified value in a range.

The first MATCH function (MATCH("banana*",A:A,0)) looks for a row which begin with the text "banana" and returns the row number of the first match. The second MATCH function (MATCH("dog",1:1,0)) looks for the column which contain the word "dog" and returns the column number of the first match.

Note that this formula assumes that the value you're looking for is in the range A:Z, you may need to adjust the range to your sheet. Also, this will work if you have only one occurrence of "banana" and "dog" which i assume as per the instruction but if it happens to appear multiple time you will have to adjust the match function accordingly.

A ChatGPT Excel formula.

Incidentally, the site that solved my problem was the plain-Jane and virally popular ChatGPT site (fave.co/3I7qDye), which can take text prompts and turn them into detailed solutions. The site's so good that the founders are considering offering a professional version (fave.co/3EuKLcA). ChatGPT not only managed to solve the lookup problem above, but provided a detailed and helpful explanation along with the code:

=INDEX(A:Z,MATCH("banana*",A:A,0),MATCH("dog",1:1,0))

Professionals of all stripes may turn up their noses at AI, but for everyone else? In a pinch, it might be worth a try. 🔌

Tech Spotlight

A video showcase
of the latest trends



Watch the
video at
[youtu.be/
YGxTnGEAx3E](https://youtu.be/YGxTnGEAx3E)

Solid State Active Cooling Could Revolutionize Thermals

➤ Frore Systems' radical new "solid-state" CPU cooling could revolutionize the laptops of the future. CEO Seshu Madhavapeddy joined Gordon Mah Ung at CES 2023 to explain how this killer new technology works.