

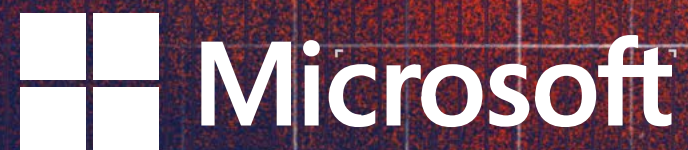


Welcome to the Copilot+ PC Generation

Powered by AMD Ryzen AI
300 Series Processors

Ryan Shrout

COMMISSIONED BY

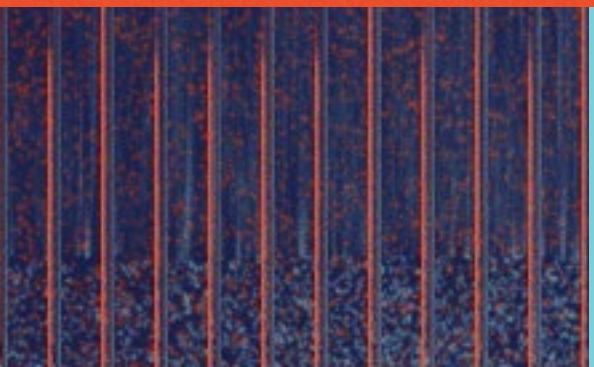


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Introduction

Copilot+ PCs are the fastest, most intelligent Windows PCs ever.



Microsoft is ushering in the next generation of Windows devices this year with the launch of the Copilot+ PC category. By partnering with a broad ecosystem of system integrators, silicon and technology providers, and software vendors, they are establishing a new paradigm in personal computing. With Windows 10 support ending on October 14th, 2025, now is the perfect time to consider upgrading. Copilot+ PCs provide cutting-edge AI capabilities, delivering unmatched power and performance that push the boundaries of what users can expect from their devices, making them an excellent choice for forward-thinking consumers and businesses.

Featuring powerful new silicon that delivers over 40 TOPS (trillion operations

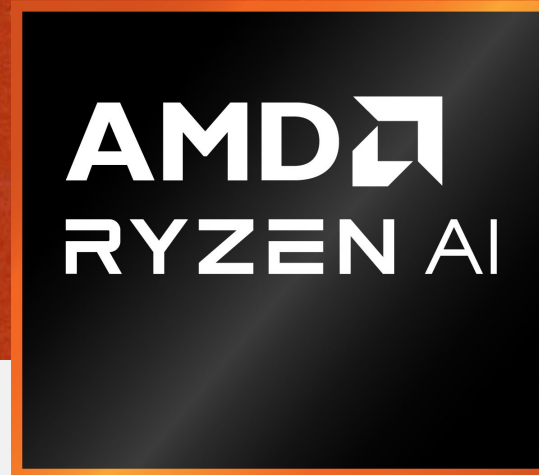
per second), they offer all-day battery life and access to the most advanced AI models. These innovations enable you to accomplish tasks previously impossible on any other PC. With Recall (Preview), effortlessly find and remember content you've viewed on your PC; generate and refine AI images almost instantly using Cocreator directly on your device; and break down language barriers with Live Captions, translating audio from more than 40 languages into English; utilize Windows Studio Effects to add creative and high quality processing to your conference calls.

This new category also extends the boundaries of standard computing performance and battery life. Collaborating with silicon partners like AMD, Microsoft is delivering systems with enhanced power

efficiency. As a result, consumers using Copilot+ PCs can generally anticipate longer battery life than previous Windows laptops and even competing MacBook Air models. Alongside impressive longevity, the performance across both traditional and new AI-enabled applications will set a new benchmark for how laptops on both Windows and Mac platforms are evaluated moving forward.

Copilot+ PCs are now available from every major system OEM and come in a wide range of form-factors, price points, and screen sizes. This report will look at the latest offerings powered by the new AMD Ryzen AI family of processors.

The New Ryzen AI 300 Processor Family



AMD's newest family of processors for Windows laptops sees dramatic improvements over previous generation products in several key areas, offering class-leading multi-threaded performance, improved power efficiency and battery life, and the company's first Copilot+ PC ready NPU with a rated 50 TOPs of performance. The AMD Ryzen™ AI family of processors offers a compelling mix of CPU, GPU, and NPU performance profiles.

The flagship parts in this group, the Ryzen AI 9 HX 375 and HX 370, offer 12 Zen 5 based cores (4x Zen 5 cores and 8x Zen 5c cores), 24 threads, with clock speeds up to 5.1 GHz. The Ryzen AI 9 HX 365 brings a total of 10 cores (4x Zen 5, 6x Zen 5c) and

a maximum clock speed of 5.0 GHz. All three of these provide users with amazing general-purpose performance in a Copilot+ PC design and will be among the fastest laptops available, anywhere.

AMD is known for its capable and performant integrated GPUs and the upgraded graphics engine on the Ryzen AI family provides a great experience for gamers with updated drivers and advanced features like frame generation and image upscaling. And on the neural processing unit (NPU), AMD has drastically increased performance over the previous generation, offering up to 50 TOPS on the Ryzen AI 9365 and Ryzen AI 9 HX 370, and peaking at 55 TOPS on the Ryzen AI 9 HX 375. All

are more than capable of meeting the performance requirements of Microsoft and the Copilot+ PC feature set.

AMD has continuously focused on high performance computing across its range of products, going from the consumer space to the data center. In the laptop segment that translates to high core counts and frequencies, enabling best-in-class multi-threaded performance for this segment of laptop, which gives user more performance when multi-tasking or running concurrent workloads. While Microsoft believes that all of its Copilot+ partners provide a baseline of general purpose performance, it's likely that the Ryzen AI systems are top performers, creating a more competitive

option for Windows against other options like the MacBook Air.

Systems powered by the AMD Ryzen AI processors will span various price points and segments, with laptops starting around \$1200. You will also find Ryzen AI based machines that are paired with high performance discrete graphics solutions, up to the GeForce RTX 4070, enabling Copilot+ PC users with systems that are both AI-enabled and capable of high-end gaming at the same time. This combination means consumers can find the perfect system for their needs without giving up any of the Copilot+ features and capabilities that Microsoft has brought to market.



Testing Comparison

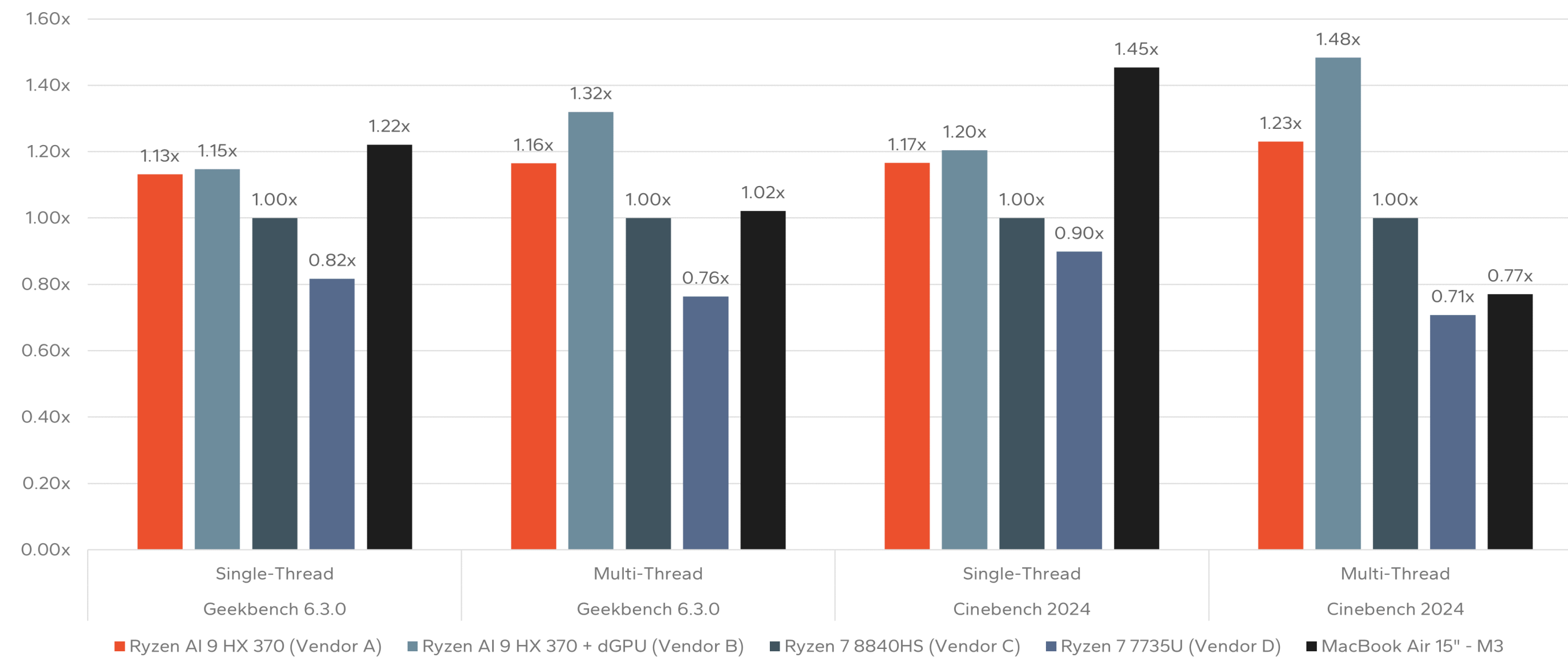
For our system testing comparison we are looking at two different laptops using the new AMD Ryzen AI processors, one in a thin and light form factor and another with a slightly larger build that includes a discrete GPU. This comparison will allow us to see performance differences with the Ryzen AI parts across laptops that have different thermal designs. To show the generational performance improvement that comes with this new Copilot+ PC line we have included results from a Hawk Point-based Ryzen 7 8840HS laptop and a Rembrandt Refresh-based Ryzen 7 7735U laptop. Finally, to highlight how this segment of PCs compares to the Apple MacBook line we have performance from the 15” M3-based MacBook Air running the latest MacOS Sequoia update.

	Ryzen AI Vendor A	Ryzen AI Vendor B	Ryzen AI Vendor C	Ryzen AI Vendor D	MacBook Air M3
CPU	Ryzen AI 9 HX 370	Ryzen AI 9 HX 370	Ryzen 7 8840HS	Ryzen 7 7735U	Apple M3
CPU Cores	4x Zen5 cores 8x Zen5c cores	4x Zen5 cores 8x Zen5c cores	8x Zen4 cores	8x Zen3 cores	4 P-cores 4 E-cores
CPU Clock	Up to 5.1 GHz	Up to 5.1 GHz	Up to 5.1 GHz	Up to 4.75 GHz	Up to 4.0 GHz
GPU	Radeon 890M	IGP: Radeon 890M GeForce RTX 4070	Radeon 780M	Radeon 680M	10-core
NPU	Up to 50 TOPS	Up to 50 TOPS	Up to 16 TOPS	N/A	18 TOPS
Memory	32GB	32GB	16GB	16GB	16GB
Screen Size	16”	16”			15”

High Performance CPU Cores

Building platforms that are power efficient doesn't mean that you have to sacrifice performance. In fact, the AMD Ryzen AI processor is one of the fastest laptop processors on the market and brings a new level of competition to the MacBook Air thanks to AMD's focus on performance. The Ryzen AI 9 HX 370 offers outstanding computing capability in both single threaded and multi-threaded workloads.

CPU Benchmarks



In this chart we compare performance on all platforms across the Geekbench and Cinebench family of tests. These help us understand the peak and sustained performance of the platforms, though of course more real-world application tests add to the clarity and focus of any comparisons. Scores are shown relative to the performance of the previous-generation Ryzen 7 8840HS (Hawk Point) system.

The AMD Ryzen AI 9 HX 370 looks strong in these benchmarks across both system configurations tested. The performance of the Vendor B system is able to exceed

that of Vendor A, even though both use the same chip, because of thermal design differences. The Vendor B system includes a large, discrete GPU (the GeForce RTX 4070) and thus requires a larger cooling configuration than the thin and light design from Vendor A. When users aren't running complex, GPU-heavy workloads, that cooling capability can be used to keep the CPU running at higher clock speeds for longer periods, even when fully saturated. The result is a few percentage point difference in the single threaded results, but a big advantage in multi-threaded workloads of 15-25%!

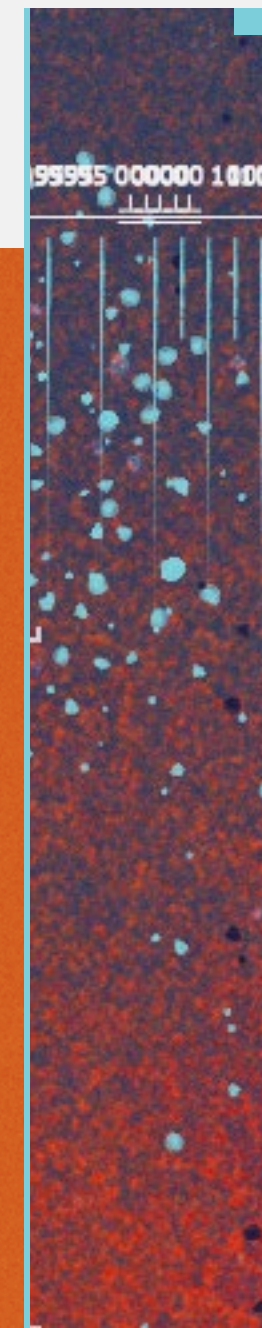
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High Performance CPU Cores

Looking at the performance between the new Ryzen AI 9 and the previous generation AMD processors, the new platforms are a big improvement. In single threaded performance the Ryzen AI 9 HX 370 is up to 20% faster than the 8840HS and in multi-threaded results it shows as nearly 50% faster! If you go just another generation back to the AMD Ryzen 7 7735U, part of the Rembrandt Refresh product line, these improvements for the current generation product improve to 40% on the single threaded scores and more than 2x on multi-threaded result of Cinebench 2024.

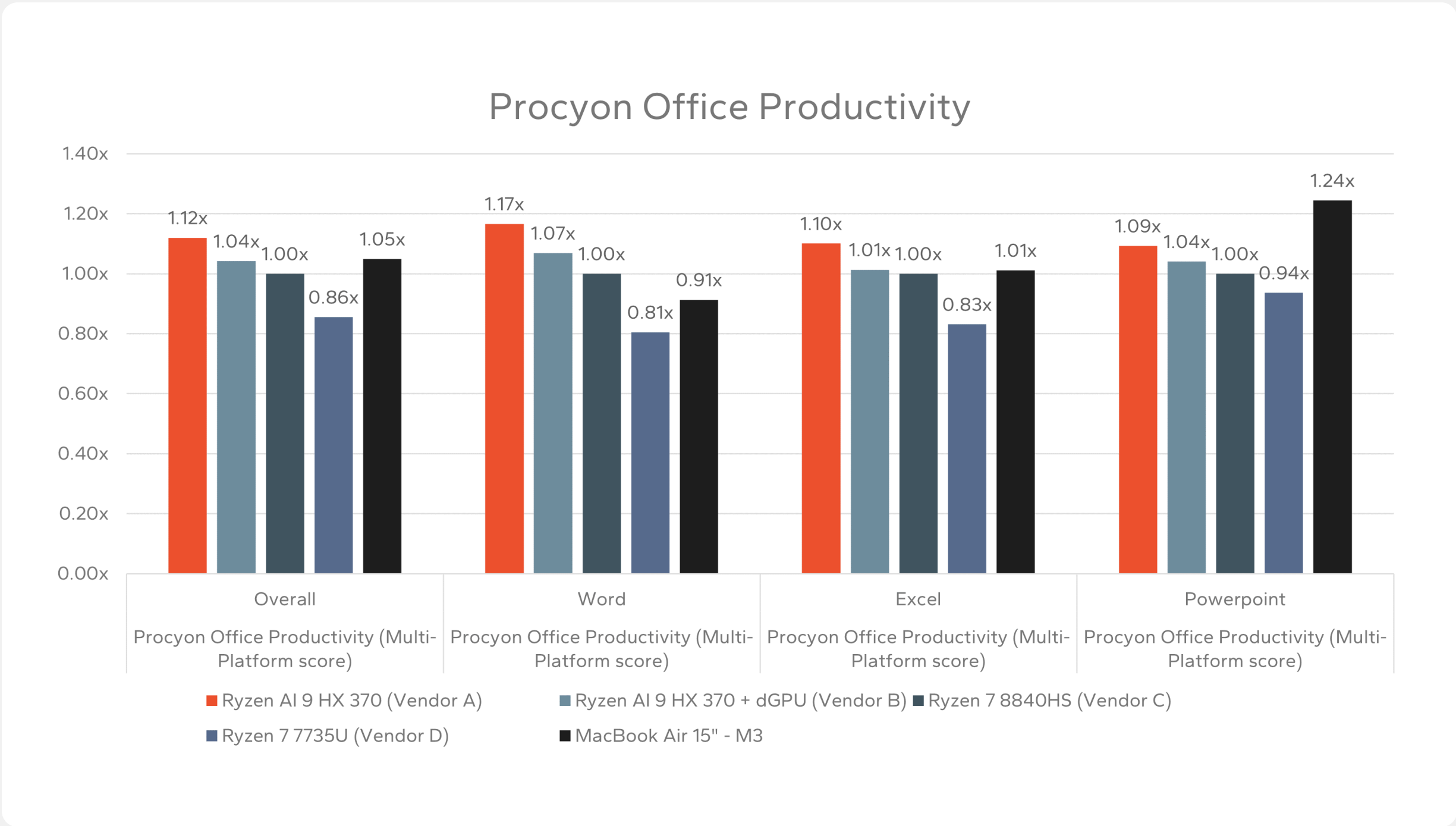
The M3-based MacBook Air has strong performance on the single threaded results in both tests but falls behind both the Ryzen AI 9 HX 370 platforms in the multi-threaded Geekbench and Cinebench 2024 score. Multi-threaded results are more indicative of heavy multi-tasking, using content creation tools, and just generally working on more items and applications at the same time and its impressive to see the AMD platform handily outpace the M3.

Ryzen AI 300 series
processors offer up to
93% faster multi-threaded
performance than Apple
MacBook Air



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High Performance CPU Cores



The Procyon Office Productivity performance data is measured while looping through some easy-to-moderate workloads using the Microsoft Office suite of applications, focused on the time to complete the functions and observed performance of each system.

The first observation to note is that the generation-on-generation advantage that the new Copilot+ PC systems have over the older Ryzen 7 7735U laptop are significant, more than 30%, and indicates to consumers that even your day-to-day productivity tasks can be improved and sped up with this new generation of Copilot+ PCs. It is also worth pointing out that the Vendor A system with the HX 370 is outperforming the larger Vendor B design since this is not a heavy, multi-threaded workload.

The comparisons to the MacBook Air show decent performance for the M3-based system, though the HX 370 based laptop from Vendor A is still able to own the overall top score.

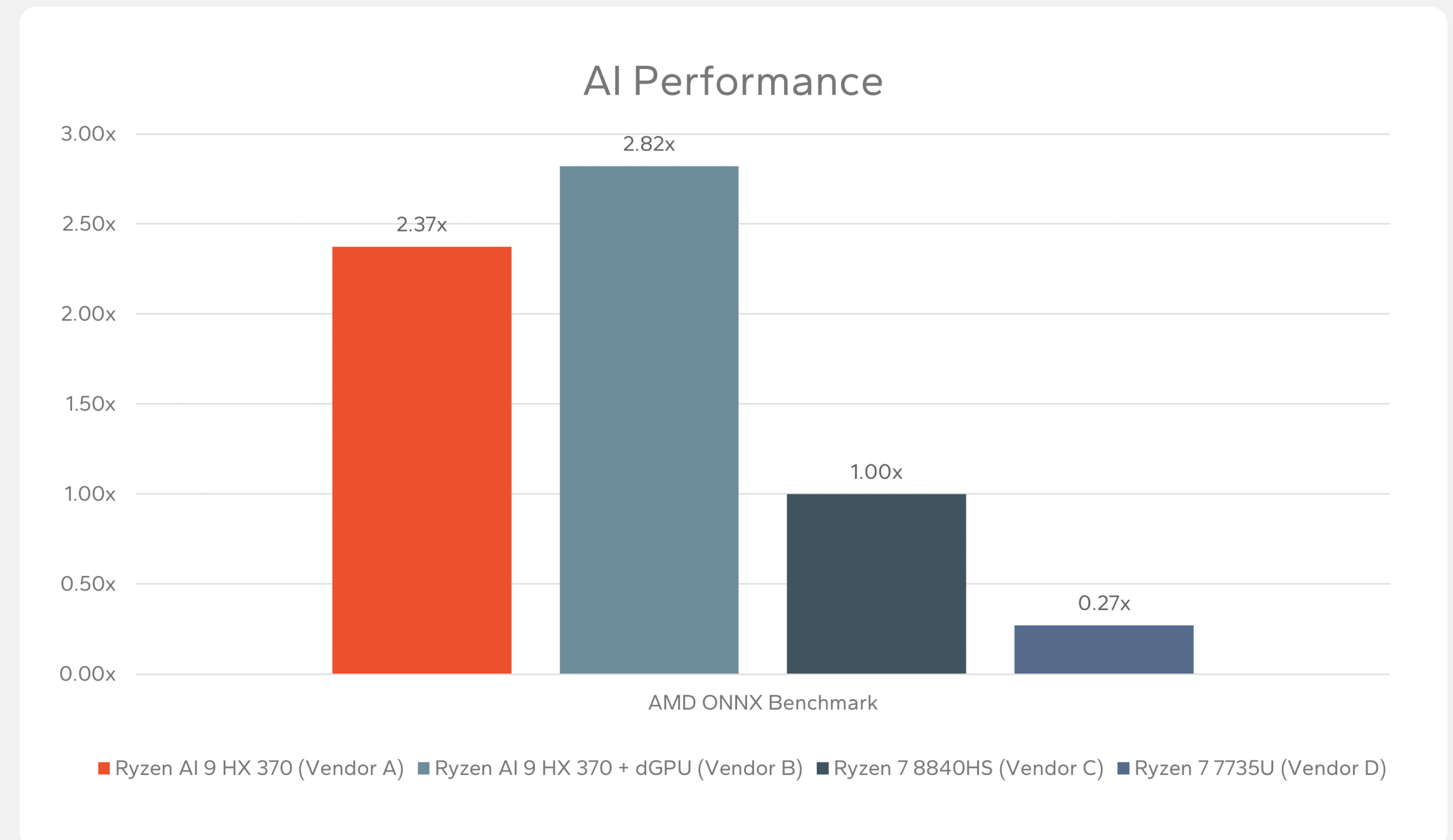
Summary

The general performance of the new Copilot+ PCs based on the AMD Ryzen AI processors is a significant improvement over the previous generation chips while providing leadership performance in key tests against the fastest MacBook Air available today. For Windows users that want the absolute highest performing multi-threaded capabilities in a thin and light design, the new Ryzen AI machines fit the bill!

NPU AI Performance

The NPU on the AMD Ryzen AI 300 series of processors is one of the most critical new features that offers and provides the capabilities not just for the wide array of Copilot+ PC features but also enables a new generation of AI application developer to take advantage of the performance and efficiency it provides. Microsoft has been incredibly bullish on the NPU as an accelerator for the PC space and its value for AI PCs that want to both operate in a high-performance manner, but also do so with extreme efficiency to not impact battery life and user experience.

Measuring performance of the NPU can be a complicated process as there are few benchmarks and still a small (but growing) number of real-world applications. For our quick analysis we utilized an AMD-built ONNX benchmark that runs a version of ResNet-50 on the NPU directly, allowing us to compare the NPU performance between the new Ryzen AI (Strix Point) platform and the previous generation Ryzen 8040-series (Hawk Point).



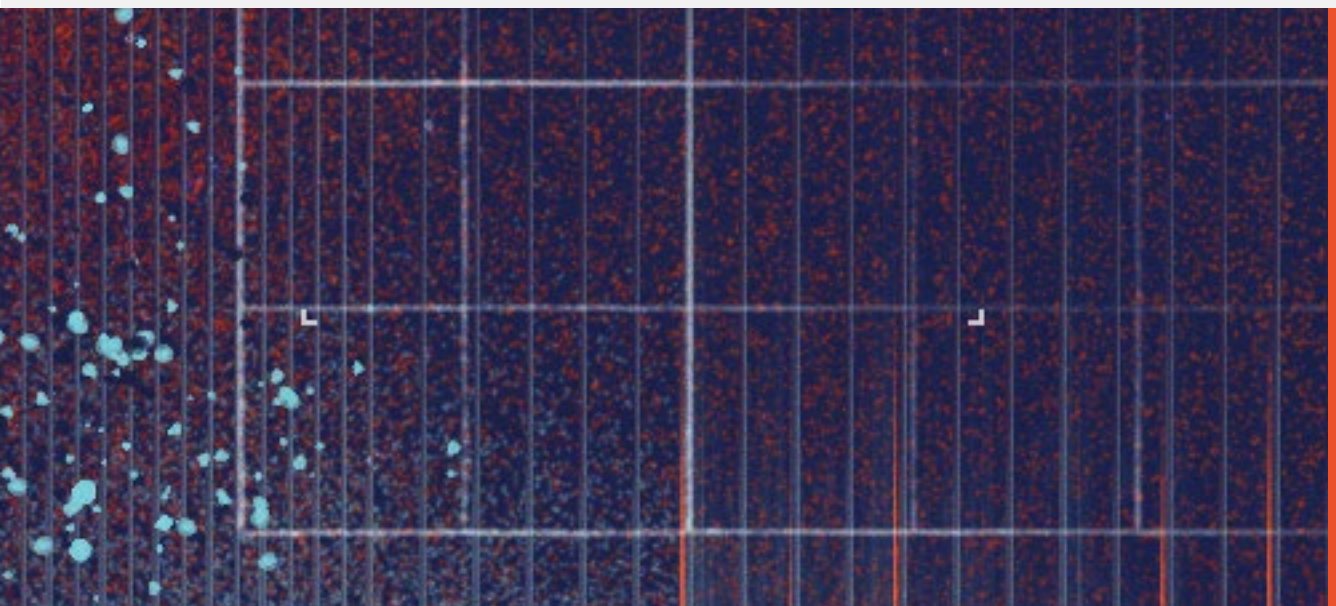
The new Ryzen AI 9 HX 370 system from Vendor A is able to operate on this image classification model at nearly 2.4x the performance of the previous generation system from Vendor C. On the Vendor B machine that has the more substantial thermal design with the HX 370, that advantage increases to 2.8x. While the NPU performance is likely nearly identical between the two systems, there is still a heavy CPU dependency for this benchmark, so that added performance increases the relative delta notably.

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NPU AI Performance

Measured results on the Ryzen 7 7735U are using the CPU only for the AI testing, and as a result we found the Ryzen AI 9 HX 370 to run up to 10x faster!

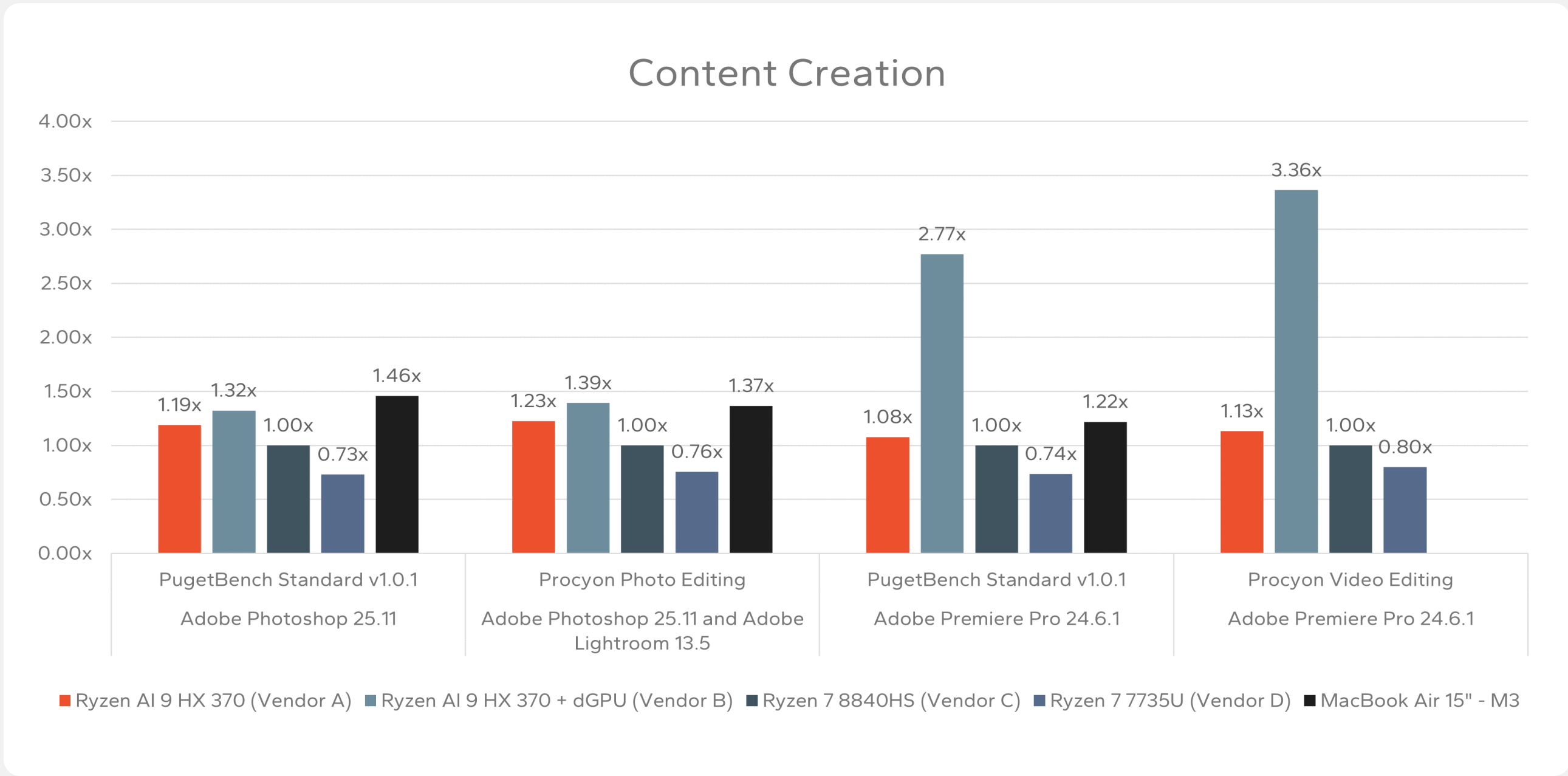
The NPU on the 8840HS (that isn't Copilot+ enabled) is rated at roughly 15-17 TOPS while the new Ryzen AI 9 HX 370 is rated at 50 TOPS, a 2.9x increase; we are seeing a solid utilization of this additional compute capability. This kind of performance increase is what Microsoft has built its strategy for the Copilot+ PC category around in order to enable the unique and experience-changing AI capabilities and features for this segment.



Laptops with Ryzen AI 9 HX 370 offer up to 10x more AI performance than first generation AI PCs

Content Creation Performance

For users that are looking for a laptop with the ability to handle content creation tasks in a thin and light form factor, the AMD Ryzen AI 300 series of processors provides the kind of performance needed to get the job done.

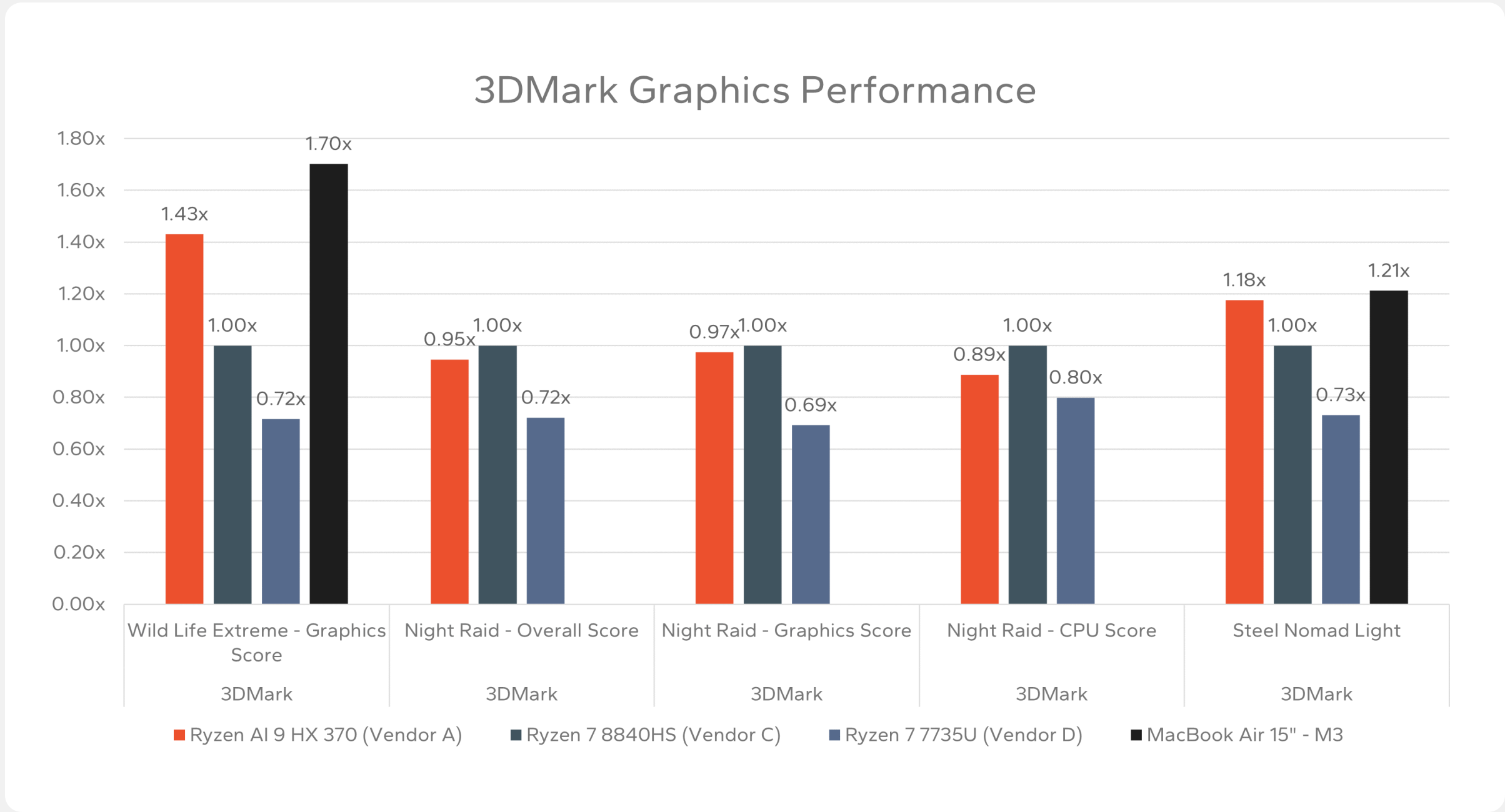


Using two common benchmark suites for looking at system performance across Adobe Photoshop and Adobe Lightroom applications, the two machines based on the Ryzen AI 9 HX 370 show impressive generational increases compared to the Ryzen 7 8840HS and the Ryzen 7 7735U. With the added thermal headroom and discrete GPU, the laptop from Vendor B offers up to 32% more performance in the PugetBench testing and 39% more performance on the Procyon-based creation tests. That advantage increases to up 84% when you look at the upgrade from the Vendor D laptop with the 7735U to the new Ryzen AI hardware.

In both tests the Ryzen AI 300 systems are competing strongly against the Apple MacBook Air using the latest Apple M3 processor, with the higher thermal design laptop besting the Mac in the Procyon Photo Editing test suite. These are impressive results for AMD in a field that is typically thought of as dominated by Apple.

3D Graphics Performance

While the NPU and the CPU get a lot of (well deserved) attention in the new Copilot+ PC families, the value of high-performance integrated graphics is another key element. This graphics performance is relevant to mainstream gaming capabilities of course, but also is used by some third-party applications for AI compute and for content and media creation tasks.

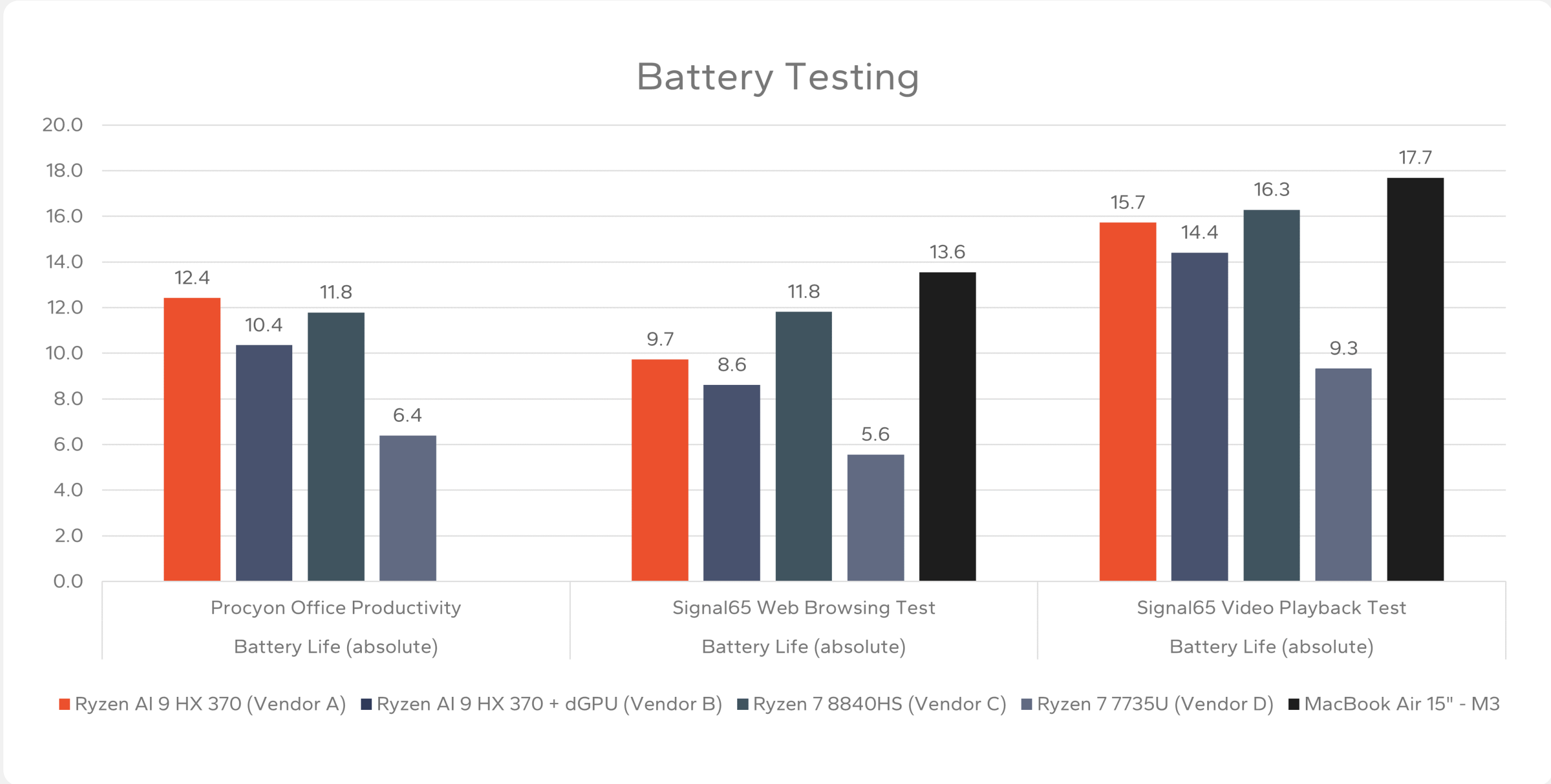


A quick check of graphics performance through a set of 3DMark benchmarks reveals that the Ryzen AI 9 HX 370 processors offer up to 43% more performance than the previous generation Hawk Point systems and nearly 2x the performance of the Ryzen 7 7735U. Even in a much more intense and modern benchmark like Steel Nomad the Ryzen AI 9 HX 370 is 18% faster than the previous generation AMD platform and 61% faster than the modern integrated graphics offered by AMD just 2 years ago.

Power Efficiency and Battery Life

One of the most important characteristics of picking a new PC is the real-world battery life you can expect from using the device day-in and day-out. All aspects of battery life are important: during active use in both high and low-performance workloads, while watching video or other passive activities, and the ability for the system to handle standby power so it's always ready when you pull it out of your bag, even if it has been a few days.

There are many considerations when looking at battery life of a laptop including battery capacity itself, but also screen size, screen technology, screen brightness, and of course the platform itself. Signal65 testing considers all of this in our analysis and testing, providing real-world results.



There are three different tests above. The first is the Procyon Office Productivity test that measures battery life while looping through some easy-to-moderate workloads using the Microsoft Office suite of applications. The Ryzen AI 300 series platforms provide up to 12.4 hours of battery life in this situation, more than enough for a full day's work, and then some. The Vendor B Ryzen AI Copilot+

PC with the discrete GeForce RTX 4070 GPU gets a couple hours less, at 10.4 hours. And while the Ryzen 7 8840HS system is very competitive with nearly 12 hours of usage in this test, you can see the massive upgrade against the Ryzen 7 7735U machine that only was able to produce 6.4 hours of measured battery life. The Apple MacBook Air systems do not support this benchmark, so results for it are not included.

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Power Efficiency and Battery Life

The second test looks at our custom Signal65 web browsing battery testing scenario, which uses Google Chrome and loops through different websites, scrolling, watching streaming video, all with multiple tabs open. At up to 9.7 hours, the Ryzen AI platforms offer enough browsing time to get any user through a full day of research and work. The previous generation from AMD, the Ryzen 7 7735U, was only able to hit 5.5 hours, giving the new Vendor A system a 75% increase in browsing battery life.

Finally, is the video playback test, where battery life is measured using an offline video, repeated for the duration of the test. The Ryzen AI-based Copilot+ PCs all resulted in at least 15.7 hours of usage – an impressive result! The MacBook Air M3 was just over 17.5 hours of usage in this scenario.

Summary

The battery and power efficiency results on the AMD Ryzen AI Copilot+ PCs clearly show that the Windows laptop market is taking battery life as a critical component of the experience for a laptop. One of Microsoft’s key drivers for the Copilot+ PC segment is to advance and improve the entire ecosystem of Windows PCs relative to previous generation products and the competitive landscape that Apple has changed. And in our battery testing results, this goal is achieved.

Windows Copilot+ Features and Capabilities

In addition to the emphasis on performance and battery life that Microsoft has put on this new laptop category, a brand-new set of features on Windows 11 will only work when you have a Copilot+ PC with a dedicated NPU.

Customers will begin to see Copilot+ PC experiences on AMD-powered devices later this year through free Windows updates but availability will vary by device and market.

Recall (Preview)

Recall (Preview) is a feature that allows you to find things on your computer that you have seen, viewed, or read previously. It works by monitoring activity on the PC, using AI language models to analyze the images and words to really understand them, then creates a highly secure on-device vector database of that content for easy searching later. It can be quite difficult to just describe the power of this kind of feature, so it's better to **look at a video** of Recall (Preview) in action. Recall (Preview) is shifting from a preview broadly available for Copilot+ PCs on June 18, 2024, to a preview available first to members of Microsoft's Windows Insider Program starting in October. After Microsoft gets feedback on Recall (Preview) from the Windows Insider community, they plan to make Recall (Preview) available more widely to customers with Copilot+ PCs through a post-launch Windows Update.

Did you happen to look at a pair of shoes on your social media browsing last week but can't remember the brand or the style?



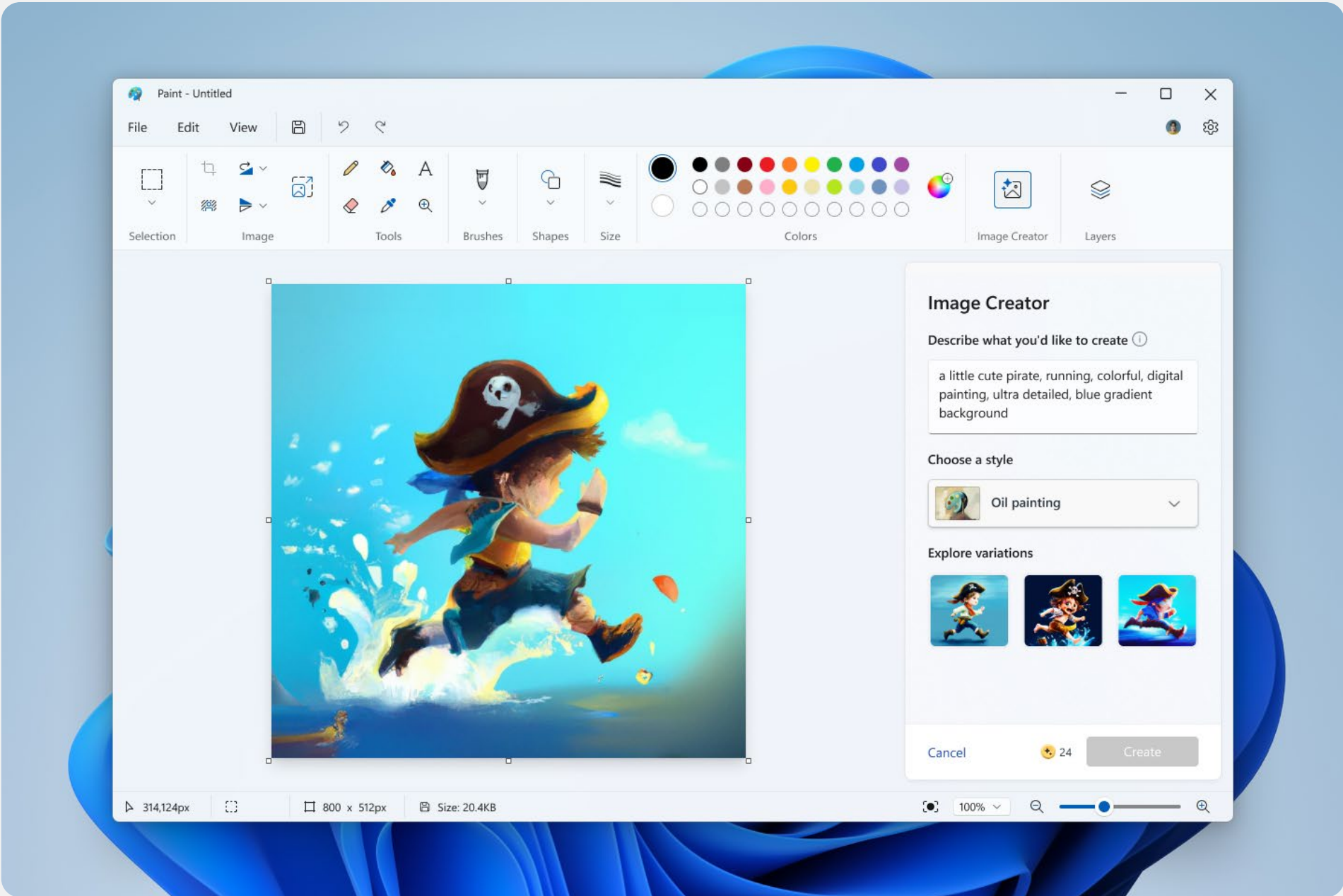
Using Recall (Preview) to search for “red shoes Instagram” utilizes the on-device AI engines to search that database and find what you were looking at, bringing it back on the screen so you can read the page and find all the information you need. Remember a video conference you had with a potential client that was wearing a black hat but not their name? Searching for “teams call man wearing black hat” can save you once again!

Recall (Preview) is a feature that has the power to fundamentally change how we interact with the data, ideas, and content that we use on our PC every day and it requires high performance, highly efficient AI processing on the NPU in the background to make this possible.

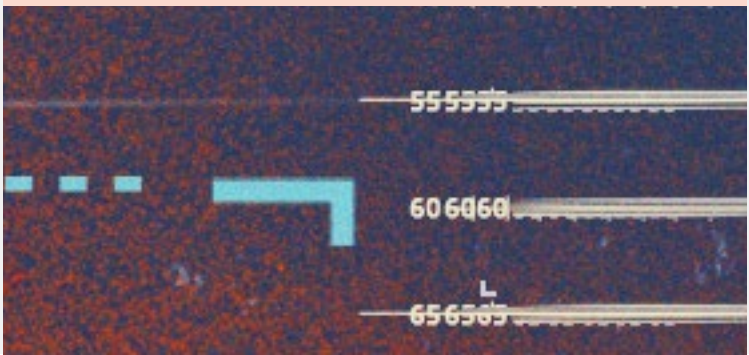
Windows Copilot+ Features and Capabilities

Cocreator

With an update to the Paint app on your Windows Copilot+ PC, Cocreator is multimodal with support for both text-to-image and image-to-image generation, and allows you to combine both an input field and a drawing pad input where you use your finger, mouse or cursor to roughly outline an idea, to create an AI-generated image. There is a slider that allows you adjust the level of ‘creativity’ – basically how much you want it to adhere to your original sketch or not – and some additional style options like 8-bit or watercolor, to add a specific tone.

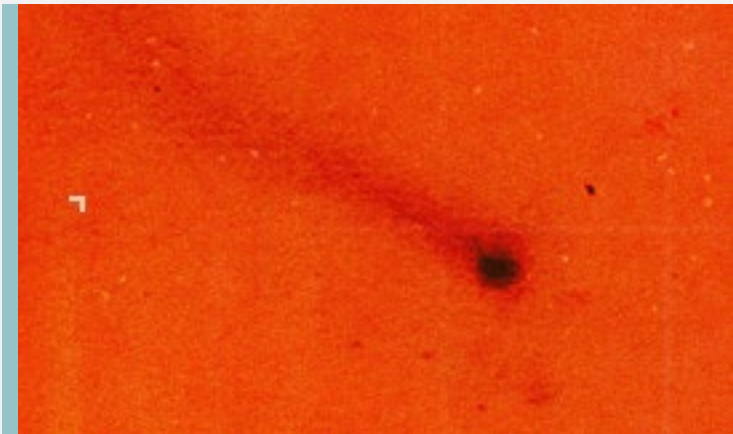
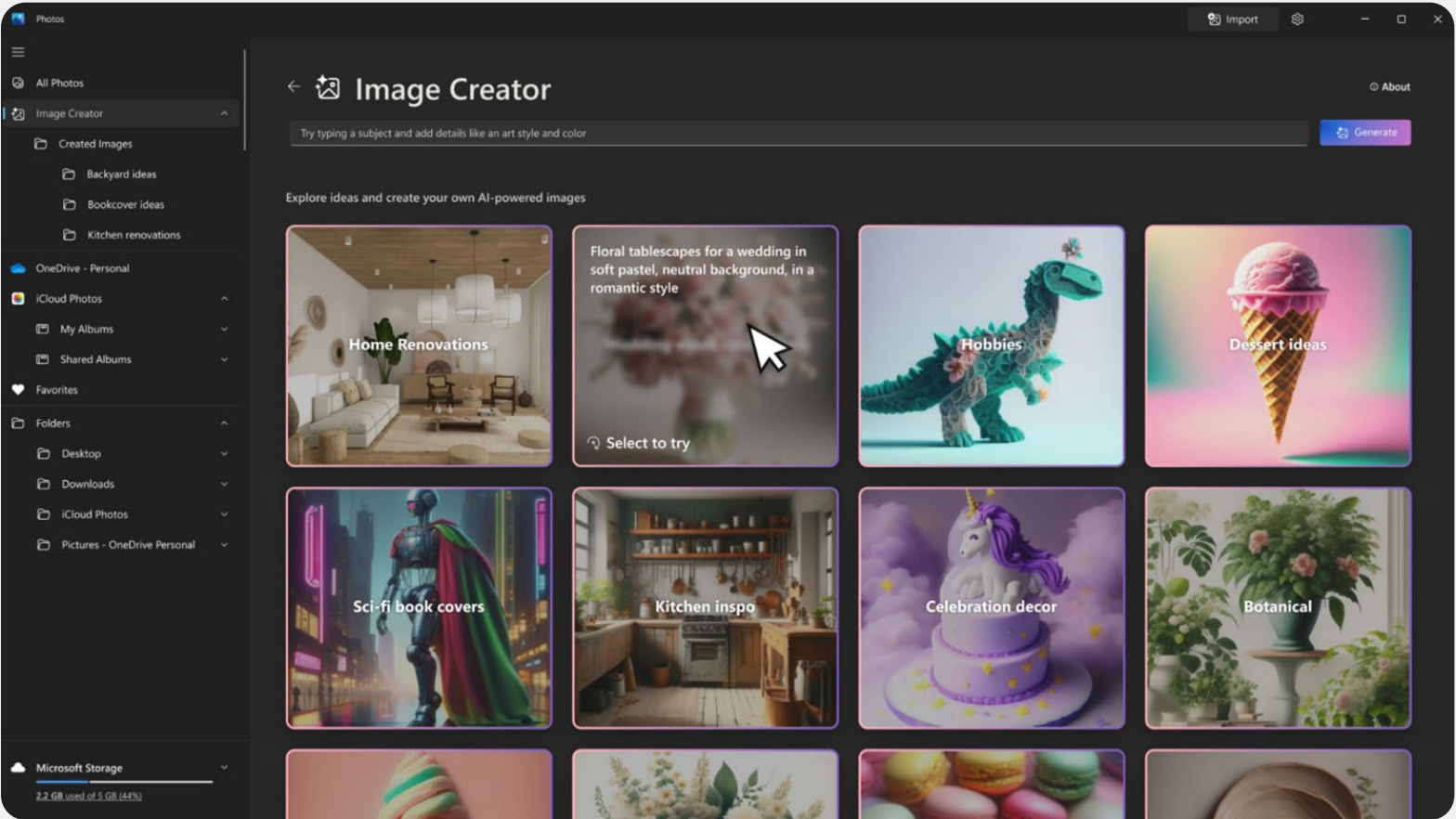
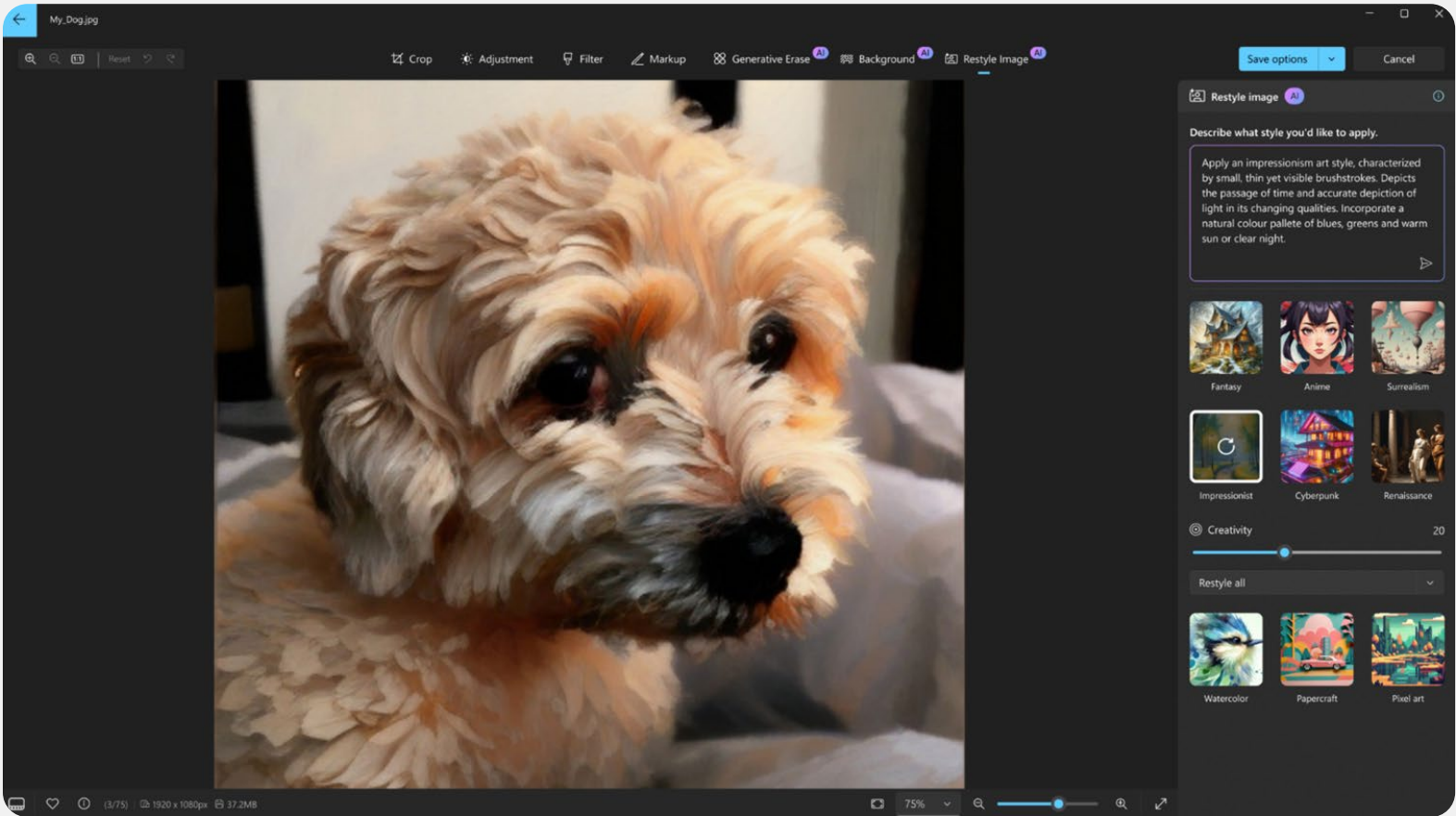


This function utilizes the NPU on the Copilot+ PC and you can see in the image above the activity running on that NPU when you move the slider position, change the text prompt, or change the drawing pad.



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Windows Copilot+ Features and Capabilities



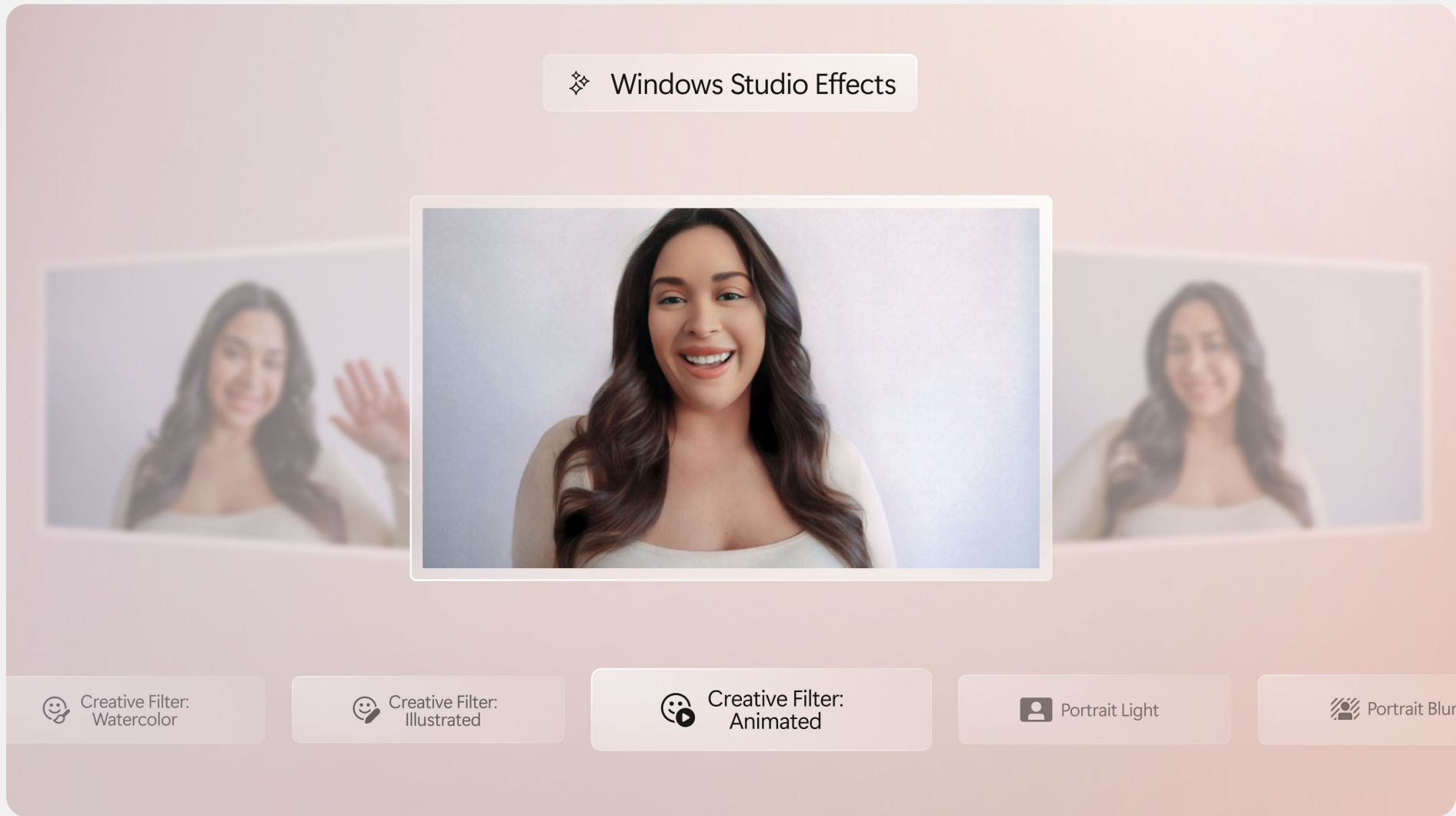
Photos Restyle Image and Image Creator

Restyle Image and Image Creator are features in the Microsoft Photos app, exclusive to Copilot+ PCs, that let you reimagine your photos or create new imagery with the help of AI. With Restyle Image you can add contextual AI-generated styles to your pictures, by choosing one of the curated, pre-built options and adjusting the creativity slider, or by creating your own custom style with a text prompt.

With Image Creator, you can create new images by entering a text description of what you'd like to see. Both features use proprietary and open-source AI models that are finetuned by Microsoft. The models come with your Copilot+ PC

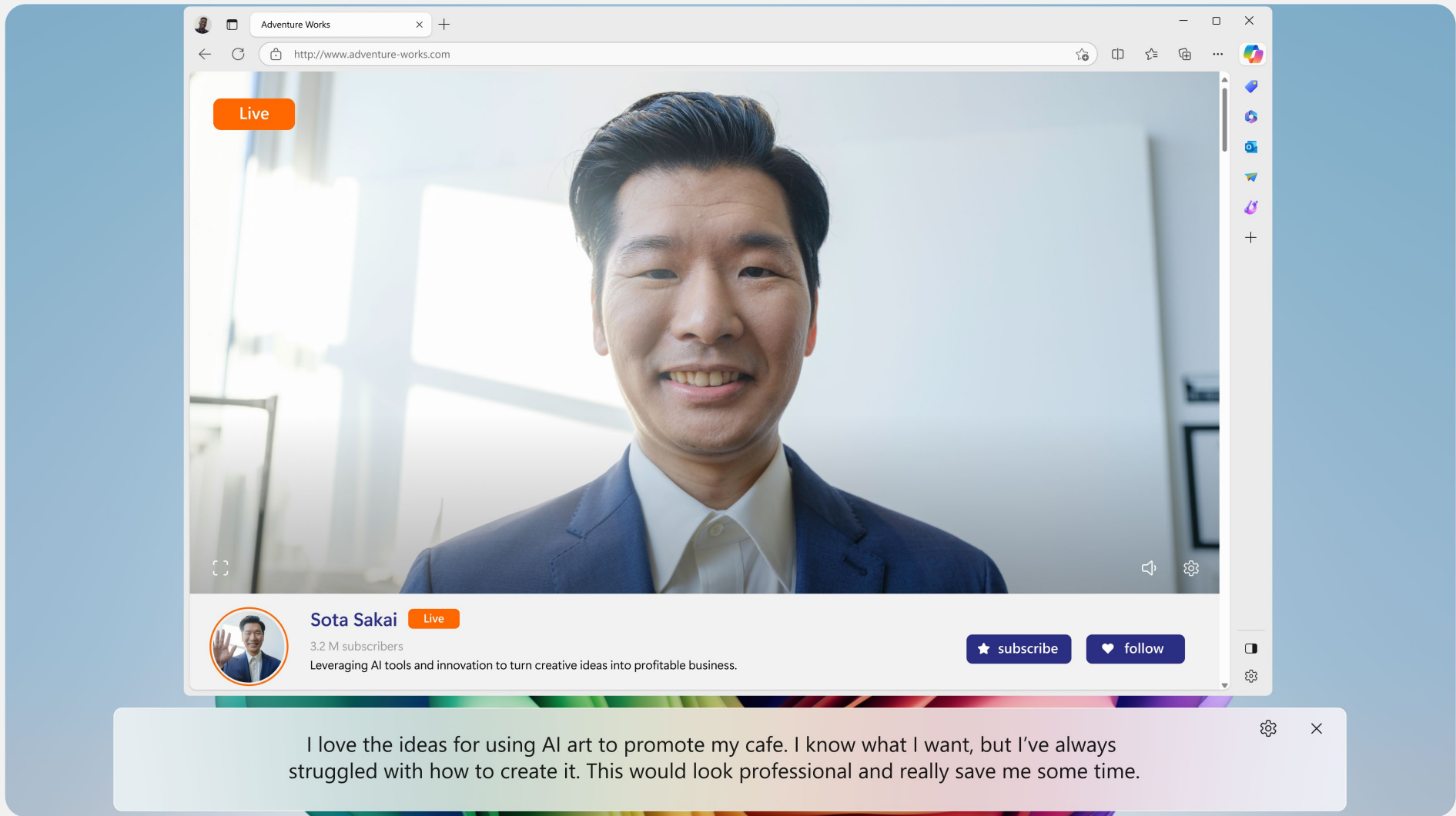
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Windows Copilot+ Features and Capabilities



Windows Studio Effects

Windows Studio Effects is the name for the AI-powered video and audio effects that are available on Copilot+ PCs with compatible NPUs. They include creative filters, portrait light & blur, eye contact adjustment, and voice focus. This works by modifying the outbound and inbound audio and video feed to enhance the conference call experience for users on both sides. Some Windows Studio Effects features, like creative filters, portrait light, and eye contact: teleprompter, are unique to Copilot+ PCs.



Live Captions

Live Captions can detect up to 44 different languages and handle real-time translations of that audio into English, making more content across the globe more accessible to users anywhere. And it works across any audio stream on your laptop without requiring any developer intervention.

Conclusion

The era of the Copilot+ PC is here now, and Microsoft has partnered with AMD to develop an amazing series of processors to power them. While the emphasis on the Copilot+ PC program is clearly around the adoption of AI-enabled Windows features and applications courtesy of the new NPU dedicated AI acceleration engine that is built into Ryzen AI 300 processors, that's not all the brand represents. Consumers buying a Copilot+ PC can be sure they are getting one of the fastest and most efficient laptops with some of the best performance on the market; and we aren't only referring to the Windows laptop market.

Our time with the AMD Ryzen AI 9 HX 370 powered laptops used in this report has been eye opening, resulting in several key findings.

First, the Ryzen AI 9 HX 300 parts have class-leading performance when it comes to multi-threaded benchmarks and applications. The results in both Geekbench and Cinebench show us that the 12-core designs that AMD has created provide performance headroom to spare, beating the previous generation parts by as much as 2x in some cases and running at up to 92% higher performance than the Apple M3.

Second, the Ryzen AI 300 family of parts offer this kind of performance and AI capability, and even a much more powerful GPU, without sacrificing battery life. In fact, the Ryzen AI 9 HX 370 systems that we tested for this paper offer up to 94% more battery life than leading AMD-based systems from just a couple of years ago. This means that a full day's worth of battery life is within reach, even when you need the performance for content creation or compute-intensive applications along the way.

Finally, the AI performance that Ryzen AI-based Copilot+ PCs bring to the table opens the door for a new era of the PC, with a dedicated 50 TOPS NPU across many versions of the Ryzen AI product line. And by offering up to 2.4x more AI performance than the previous generation of AI PCs from AMD, Copilot+ PCs with Ryzen AI in them will be at the forefront of that revolution for some time to come.

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Contact us if you would like to discuss this report and Signal65 will respond promptly.

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About Signal65

Signal65 exists to be a source of data in a world where technology markets and product landscapes create complex and distorted views of product truth. We strive to provide honest and comprehensive feedback and analysis for our clients in order for them to better understand their own competitive positioning and create optimal opportunities to market and message their devices and services.



System Configurations

	Ryzen AI 9 HX 370 (Vendor A)	Ryzen AI 9 HX 370 + dGPU (Vendor B)	Ryzen 7 8840HS (Vendor C)	Ryzen 7 7735U (Vendor D)	MacBook Air 15" - M3
CPU	AMD Ryzen AI 9 HX 370	AMD Ryzen AI 9 HX 370	AMD Ryzen 7 8840HS	AMD Ryzen 7 7735U	Apple M3
Graphics	AMD Radeon 890M	AMD Radeon 890M / NVIDIA RTX 4070	AMD Radeon 780M	AMD Radeon 680M	Integrated
NPU	AMD Ryzen AI	AMD Ryzen AI	AMD Ryzen AI	N/A	Apple Neural Engine
RAM	32GB LPDDR5X-7500	32GB LPDDR5X-7500	16GB LPDDR5X-7500	16GB LPDDR5-6400	16GB LPDDR5X-6400
Storage	Micron 1TB MTFDKBA1T0QFM-1BD1AABGB	Micron 2TB MTFDKBA2T0QFM-1BD1AABGB	Micron 1TB MTFDKBA1T0QFM-1BD1AABGB	1TB Micron 3400	256GB NVMe
OS Build	26100.1742	26100.1742	26100.1742	26100.1742	MacOS Sequoia 15.0
Windows Power Mode (Performance)	Best Performance	Best Performance	Best Performance	Best Performance	N/A
Windows Power Mode (Battery Tests)	Best Power Efficiency	Best Power Efficiency	Best Power Efficiency	Best Power Efficiency	N/A
OEM Power Settings (Performance)	Performance	Performance	Performance	Performance	N/A
OEM Power Settings (Battery Tests)	Whisper	Whisper	Whisper	Silent	N/A
Virtualization Based Security	Enabled	Enabled	Enabled	Enabled	N/A

Applications Used

Geekbench 6.3.0	Microsoft Office 365 2409
Cinebench 2024.0.1	Adobe Photoshop 25.12
3DMark 2.29.8294	Adobe Lightroom Classic 13.5.1
UL Procyon 2.8.1352	Adobe Premiere Pro 24.6.1



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