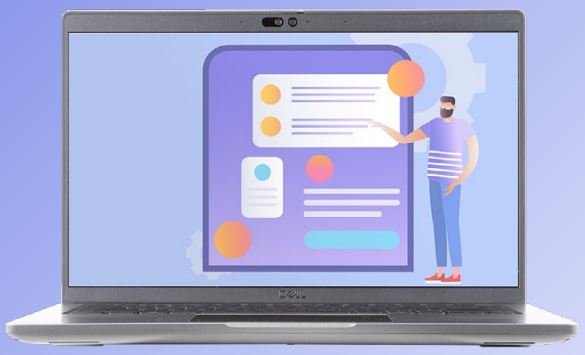


Refresh for...

Higher system performance based on 77.7% higher Procyon AI Computer Vision Benchmark and 49.2% higher SYSmark 30 scores

Greater system efficiency based on up to 49.2% better min/Whr in four battery life evaluations

Built-in security including Dell SafeID and SafeBIOS protection, Intel Threat Detection Technology, and Dell Optimizer intelligent privacy features

Embrace a new era of computing with a Dell Latitude 5450 AI PC

In our tests, a Dell Latitude 5450 AI PC powered by an Intel Core Ultra 5 processor 135U provided faster performance and greater system efficiency than its legacy counterpart

Chances are, your company is one of the 95 percent of businesses already using or planning to adopt AI before 2025.[1] To fuel your company's transformation in the AI era, Dell Technologies™ recently introduced next-gen Latitude™ AI PCs with "groundbreaking AI experiences for the modern workplace."[2] Latitude AI PCs are powered by Intel® Core™ Ultra, a multi-processor package built on the new Intel 4 process technology with integrated central processing unit (CPU), graphics processing unit (GPU), and neural processing unit (NPU) architectures.[3] This report delves into the myriad benefits Dell™ Latitude AI 5450 PCs bring to the table for companies ready to embrace a new era of computing.

We benchmarked standard and AI-related system performance, measured battery life in four real-world scenarios, hand-timed day-in-the-life workflows, assessed user comfort, and compared a 14-inch Dell Latitude 5450 AI PC powered by Intel vPro® with an Intel Core Ultra 5 processor 135U to a three-year-old version of the same laptop. We found that the Dell Latitude 5450 AI PC was well-equipped to boost productivity, handle AI-based tasks, improve the end-user experience, and provide strong security.

Dell Latitude 5450 AI PC

- Intel vPro with an Intel Core Ultra 7 processor 165U
- 32 GB of DDR-5 memory
- 512 GB of NVMe® storage
- 57-Whr battery

Dell Latitude 5420 laptop

- Intel Core i7-1185G7 (CPU) processor
- 32 GB of DDR-4 memory
- 512 GB of NVMe storage
- 63-Whr battery

How we tested

To evaluate the benefits of a PC refresh to the latest generation of 14-inch Dell Latitude 5000 series AI PCs powered by Intel vPro with Intel Core Ultra processors, we compared a new Dell Latitude 5450 AI PC's performance, battery life, features, and real-world user experience to those of a three-year-old version of the same laptop:

Dell Latitude 5450 AI PC powered by Intel vPro with an Intel Core Ultra 5 processor 135U (CPU) with integrated Intel Graphics (GPU) and Intel AI Boost (NPU), 16 GB of DDR-5 memory, 512 GB of NVMe® storage, and a 51-Whr battery

Dell Latitude 5420 laptop powered by an Intel Core i5-1145G7 (CPU) processor with integrated Intel Iris® Xe Graphics (GPU) and no NPU, 16 GB of DDR 4 memory, 512 GB of NVMe storage, and a 63-Whr battery

To assess standard and AI-related **system performance**, we ran these industry-standard benchmarks:

- CrossMark®
- Procyon® AI Computer Vision Benchmark
- Procyon Office Productivity Benchmark
- PugetBench for DaVinci Resolve
- PugetBench for Premiere Pro
- SYSmark® 30
- WebXPRT 4

To see how long users could complete office productivity tasks, such as writing marketing material or performing calculations, while working unplugged, we ran Procyon and MobileMark **battery life** benchmarks. Then, to see how long the batteries would last while handling resource-intensive activities, such as security scans or video-conferencing calls, we conducted Microsoft Teams and Zoom meetings on battery.

We also hand-timed general and AI-related **day-in-the-life workflows**—the general ones we timed center around Microsoft 365 and Adobe® Creative Cloud® tasks, and the AI-related workflow centers around content creation. For **user comfort**, we measured heat and noise output while running a resource-intensive Cinebench 2024 workload.

About the Intel Core Ultra 5 processor 135U

The Intel Core Ultra series of mobile processors is built on integrated CPU, GPU, and NPU architectures. The Intel Core Ultra 5 processor 135U CPU architecture has two performance-cores, eight efficient-cores, and two low power efficient-cores. The GPU architecture has four Xe cores and ray-tracing capabilities. The NPU architecture (Intel AI Boost) supports OpenVINO™, WindowsML, DirectML, and ONNX RT AI software.[4] Learn more at: https://www.intel.com/content/www/us/en/products/sku/237328/intel-core-ultra-5-processor-135u-12m-cache-up-to-4-40-ghz/specifications.html.

About the Dell Latitude 5450 AI PC

This redesigned 5000 series Latitude PC delivers built-in innovative technologies to improve work experiences:

- **Copilot key:** This button activates an AI assistant, which can generate emails and summaries, search for information, and create unique images from text prompts. Microsoft says this evolving AI tool can help users "be more productive, boost creativity, and stay connected to the people and things in your life."[5]
- **Layered security:** These Windows 11 Pro laptops come with supply chain assurances from Dell and Intel, tamper-evident packaging, Dell SafeID and Dell SafeBIOS protections, fingerprint readers, Control Vault 3+, AI-enhanced cybersecurity, and more.[6]
- **Network Optimization:** This feature automatically connects to the strongest available signal and intelligently prioritizes the most critical features when bandwidth is low.[7]
- **HDR technology:** This AI-based feature makes you camera-ready by taking several multi-exposure high dynamic range (HDR) pictures at once and blending them to "accurately capture image detail in challenging lighting conditions, such as windowed offices and conference rooms."[8]
- **Privacy:** Optional Dell Optimizer intelligent privacy features help keep sensitive data private no matter where you're working. Onlooker Detection notices when there are people behind you and texturizes the screen. Look Away Dim notices when you shift your focus away from the screen and, to protect privacy and save battery life, darkens the screen.[9]

The Latitude 5450 AI PC we tested was powered by an Intel Core Ultra 5 processor 135U, which directs low-latency AI tasks to the CPU element, media and visual AI rendering tasks to the GPU element, and sustained AI and offload AI tasks to the NPU element of the three-part multi-processing unit.[10] Note that while we did not test Microsoft Copilot capabilities, using on-device AI tools instead of cloud-based AI tools may help your company avoid security and compliance issues around sensitive information.

Improve the work experience with more responsive technology

The less time users must wait for webpages to load, spreadsheets to open, or videos to render, the fewer micro-frustrations they'll likely experience. Higher benchmark scores, no matter which aspect of performance that benchmark measures, can translate to smoother performance and faster system responsiveness in that arena.

Refresh for better general system responsiveness

For end users across any industry, higher general benchmark scores provide a good overview of how a device will handle the tasks you encounter daily.

CrossMark models diverse tasks such as applicant and file launches; multitasking; web browsing; document, photo, and video editing; and scientific simulation, forecasting, modeling within a spreadsheet application.[11] The **Procyon Office Productivity Benchmark** uses Microsoft 365 applications to measure system performance in office productivity tasks.[12] **PugetBench for Premiere Pro** is a content-creation benchmark that measures video encoding, processing, and GPU effects performance in frames per second (FPS).[13] **SYSmark 30** uses real applications and simulated user input to measure the response times of business-oriented workflows, media-centric tasks, and multitasking.[14] Finally, **WebXPRT 4** is a browser benchmark that mirrors day-to-day online activities, including online homework, photo manipulation, face detection, and image classification.[15]

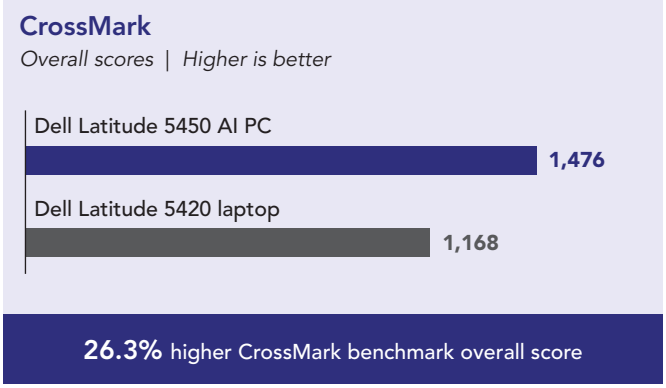


Figure 1: CrossMark benchmark overall scores. Higher is better. Source: Principled Technologies.

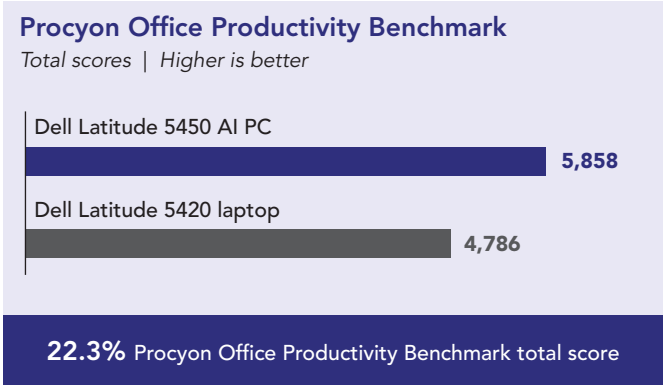


Figure 2: Procyon Office Productivity Benchmark total scores. Higher is better. Source: Principled Technologies.

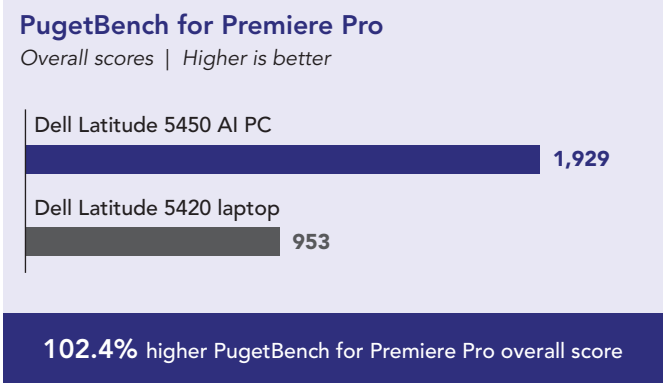
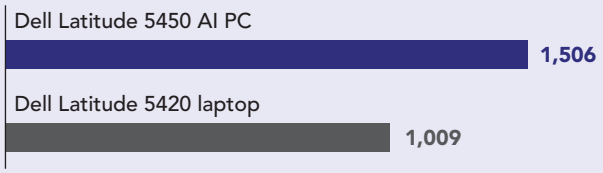


Figure 3: PugetBench for Premiere Pro benchmark overalll score (FPS) results. Higher is better. Source: Principled Technologies.

SYSmark 30

Overall ratings | Higher is better

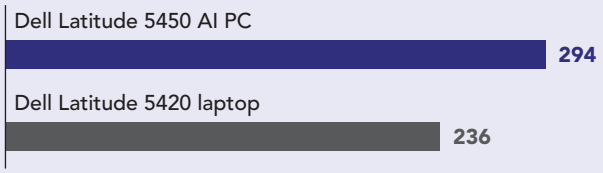


49.2% higher SYSmark 30 benchmark overall rating

Figure 4: SYSmark 30 benchmark overall ratings. Higher is better. Source: Principled Technologies.

WebXPRT 4

Overall scores | Higher is better



24.5% higher WebXPRT 4 benchmark overall score

Figure 5: WebXPRT 4 benchmark overall scores. Higher is better. Source: Principled Technologies.

About the CPU, GPU, and NPU

The use cases for generative artificial intelligence (GenAI) are developing rapidly.

According to Intel, Core Ultra processors, with their integrated CPU, GPU, and NPU architectures, are designed to enhance Dell Latitude 5450 AI PC experiences by optimizing "the performance and power efficiency of AI software."[16] The GPU splits up individual computer-vision-based tasks across multiple processors—enabling parallel computing and speedy graphics output. If you add an NPU to the mix, you can reduce the AI load on the CPU and GPU.

CPU is optimal for AI tasks that are time sensitive, such as identifying incoming mail as spam or speech-to-text translation.

GPU is best for AI-enhanced content creation and data-filtering tasks, including media, 3D, and rendering use cases.

NPU is great for AI-based tasks such as facial or fingerprint recognition, and blurring backgrounds during video-conferencing meetings.

Refresh for superior responsiveness on AI tasks

The Intel Core Ultra 5 processor 135U in the Dell Latitude 5450 AI PC we tested splits AI tasks between the integrated CPU, GPU, and NPU architectures. How can this innovative multi-processor platform help your company fuel transformation in the AI era? The results of our AI-related performance tests paint a clear picture. The new Dell Latitude 5450 AI PC, enabled by an Intel Core Ultra 5 processor 135U, scored significantly better on two benchmarks that include AI tasks versus the three-year-old PC we tested.

The **Procyon AI Computer Vision Benchmark** provides insights into how well on-device AI inference engines can tackle computer vision scanning and identification activities such as language translation, facial and object recognition, inventory management, and medical imaging.[17,18] **PugetBench for DaVinci Resolve** uses 4K and 8K video samples to measure GPU, video processing, and AI-based content creation features performance.[19]

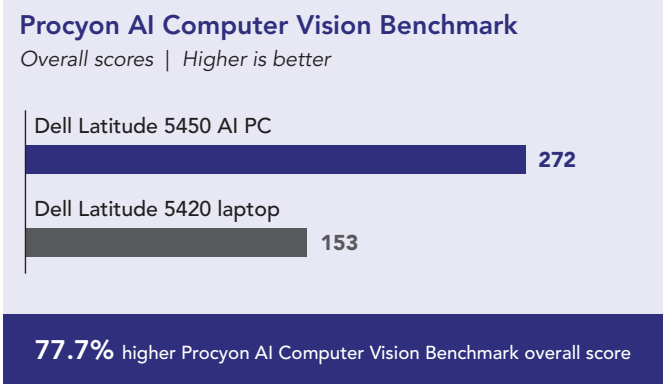


Figure 6: Procyon AI Computer Vision Benchmark Intel OpenVINO overall scores. Higher is better. Source: Principled Technologies.

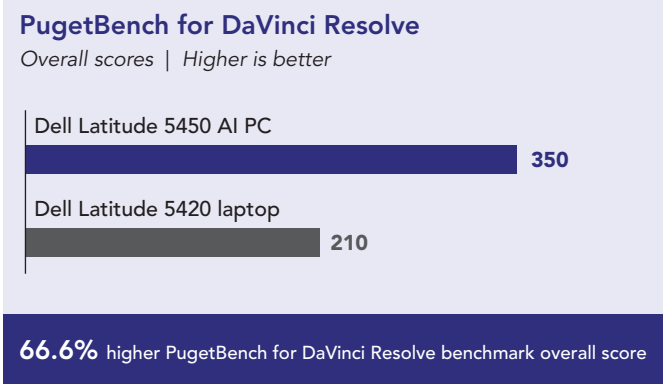
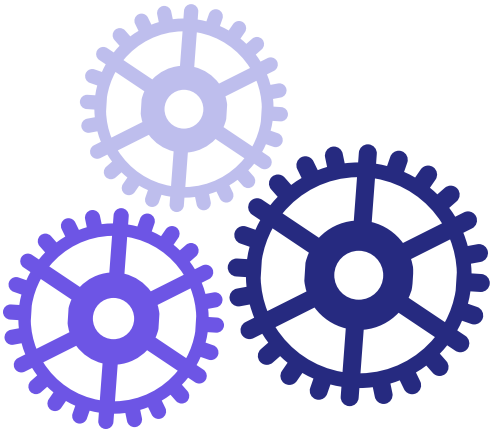


Figure 7: PugetBench for DaVinci Resolve benchmark overall scores. Higher is better. Source: Principled Technologies.



Refresh for longer battery life and greater system efficiency

We conducted multiple different battery life comparisons: two based on general use and two based on remote collaboration scenarios. Notably, the Latitude 5450 AI PC contained a much lower capacity battery than its predecessor: 51-Whr versus 63-Whr. We calculated system efficiency by dividing the battery life (H:MM) by the battery capacity (Whr).

To measure general-use battery life, we ran **MobileMark 30** and **Procyon Battery Life Benchmark** tests, which use real-world applications to gauge battery life in office productivity and video playback situations.[20,21] For these tests, we set both PCs to "Best performance" power plan mode—not "Best power efficiency" power plan mode.

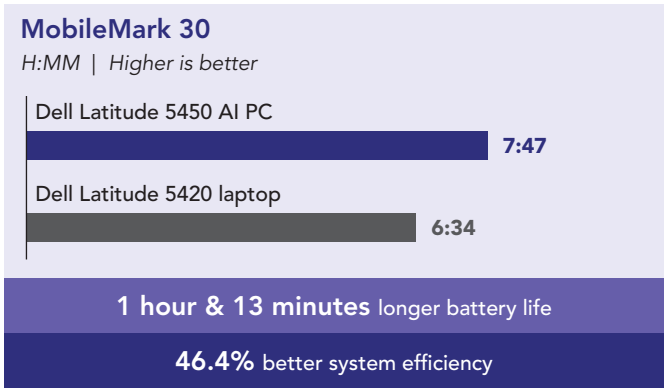


Figure 8: Battery life, in hours and minutes, according to the MobileMark 30 benchmark. More time is better. Source: Principled Technologies.

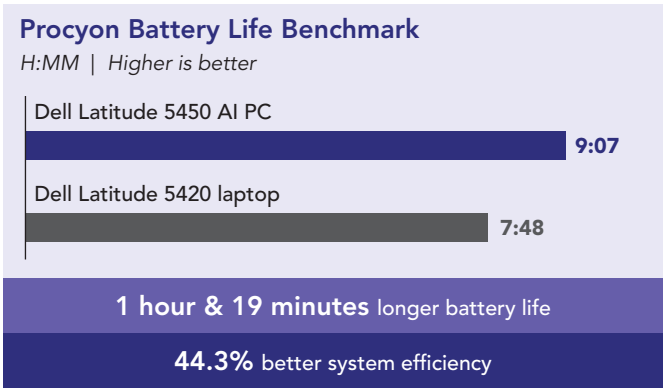


Figure 9: Battery life, in hours and minutes, according to the Procyon Battery Life Benchmark. More time is better. Source: Principled Technologies.

To measure video-conferencing battery life, we tracked battery consumption while running Microsoft Teams and Zoom applications. For these tests, we set both PCs to "Balanced" power plan mode.

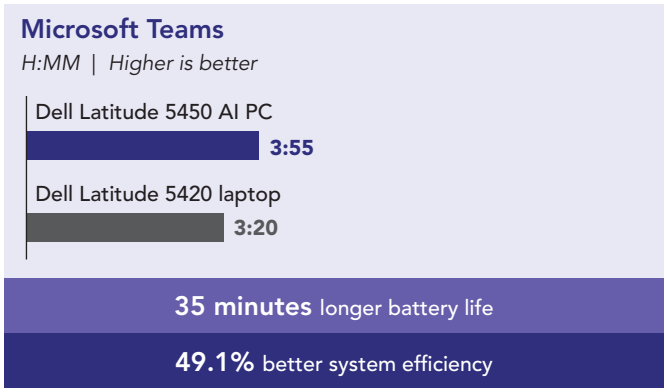


Figure 10: Battery life, in hours and minutes, while running Microsoft Teams. More time is better. Source: Principled Technologies.

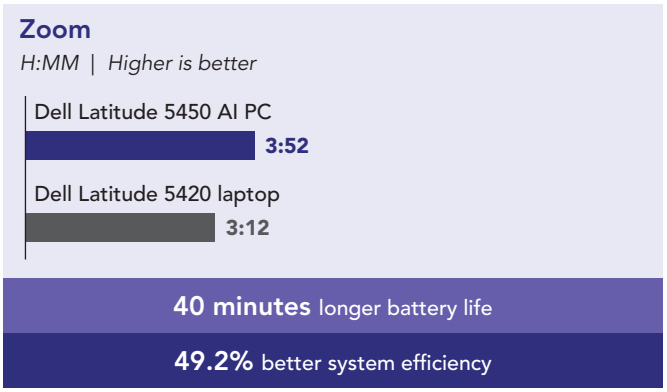


Figure 11: Battery life, in hours and minutes, while running Zoom. More time is better. Source: Principled Technologies.

In all four battery life tests, we found that the Intel Core Ultra 5 processor 135U-powered Latitude 5450 AI PC with its 51-Whr battery was significantly more power-efficient than the Intel Core i5-1145G7 processor-powered Latitude 5420 with its 63-whr battery.

Refresh for better real-world experiences

While speedy performance and long battery life are critical, anyone who treats their laptop as their constant companion should also consider that laptop's ability to handle video-conferencing meetings and provide a comfortable experience when running heavy workloads. The tasks in the following day-in-the-life workflows are representative of a sequence of typical tasks your team might tackle and not necessarily to flow from one task to another. We hand-timed all tasks as part of each workflow and report the total time elapsed. You can check the breakout times of each individual task in the science behind the report.

General day-in-the-life workflows

A typical workday for various members of your team involves hundreds of tasks, such as launching applications, opening browser tabs, and, for many, accessing and editing project files. We hand-timed a series of four common tasks in Microsoft 365 apps to create a productivity workflow and three common tasks in Adobe Creative Cloud apps to create a content creation workflow. The new Dell Latitude 5450 AI PC, enabled by an Intel Core Ultra 5 processor 135U, shaved noticeable time off both workflows. And this is just for a single series of events—imagine these time savings repeated multiple times per day, per week, per month.

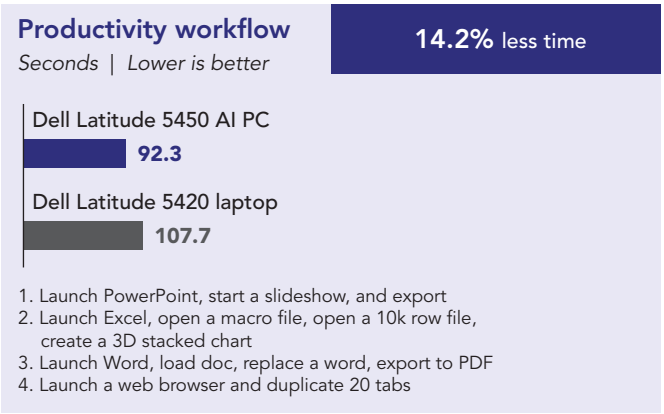


Figure 12: Time to complete common tasks in a Microsoft 365 workflow. Time in seconds. Less time is better. Source: Principled Technologies.

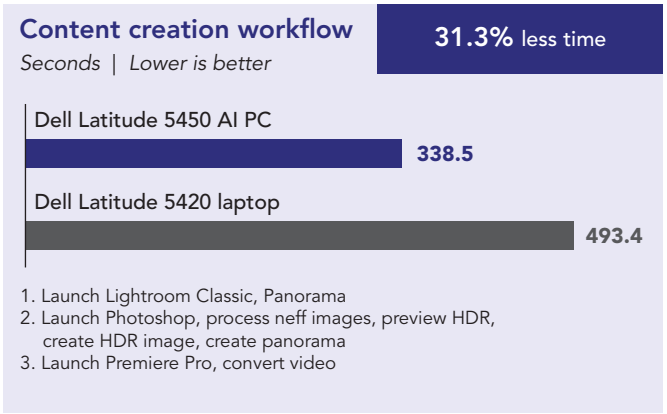


Figure 13: Time to complete three common tasks in an Adobe Creative Cloud workflow. Time in seconds. Less time is better. Source: Principled Technologies.

AI-related day-in-the-life workflow

Using AI tools can empower both newbies and professionals to explore new worlds and stretch their horizons. Investing in a powerful laptop will help make sure new and emerging AI-enhanced content creation workloads don't bog users down. We tested three AI-powered content creation tools to see which laptop could handle the content creation workflow faster.

Audacity software enables users to record and edit audio.[22] We used the Audacity Generator to generate audio into a new track. Generative Expand in Photoshop uses AI to extend images, create a bigger background, and increase aspect ratio.[23] GNU Image Manipulation Program (GIMP) enables users to create original artwork.[24]

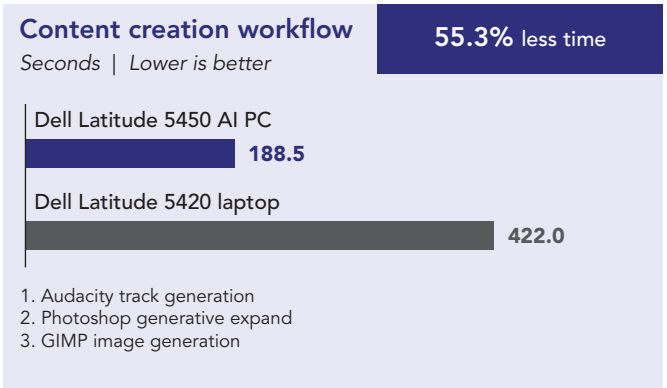


Figure 14: Time to complete three common tasks in an AI-related content creation workflow. Time in seconds. Less time is better. Source: Principled Technologies.

User comfort

Resource-intensive applications and processes, such as security scans, scientific simulations, and video-conferencing calls with shared screens, can make an under-powered laptop run hot to the touch or roar with fan noise during operation. The **Cinebench 2024** benchmark is a CPU- and GPU-intensive media-rendering benchmark that we consider a stand-in for these common tasks. While we ran this test with user comfort in mind, it is worth noting that the Dell Latitude 5450 AI PC received a Cinebench 2024 performance score that was over 2 times that of its predecessor. For our tests, the ambient temperatures in the room were between 70.3 and 71.3 degrees Fahrenheit, and ambient room noise was 23.8 decibels (dBA).

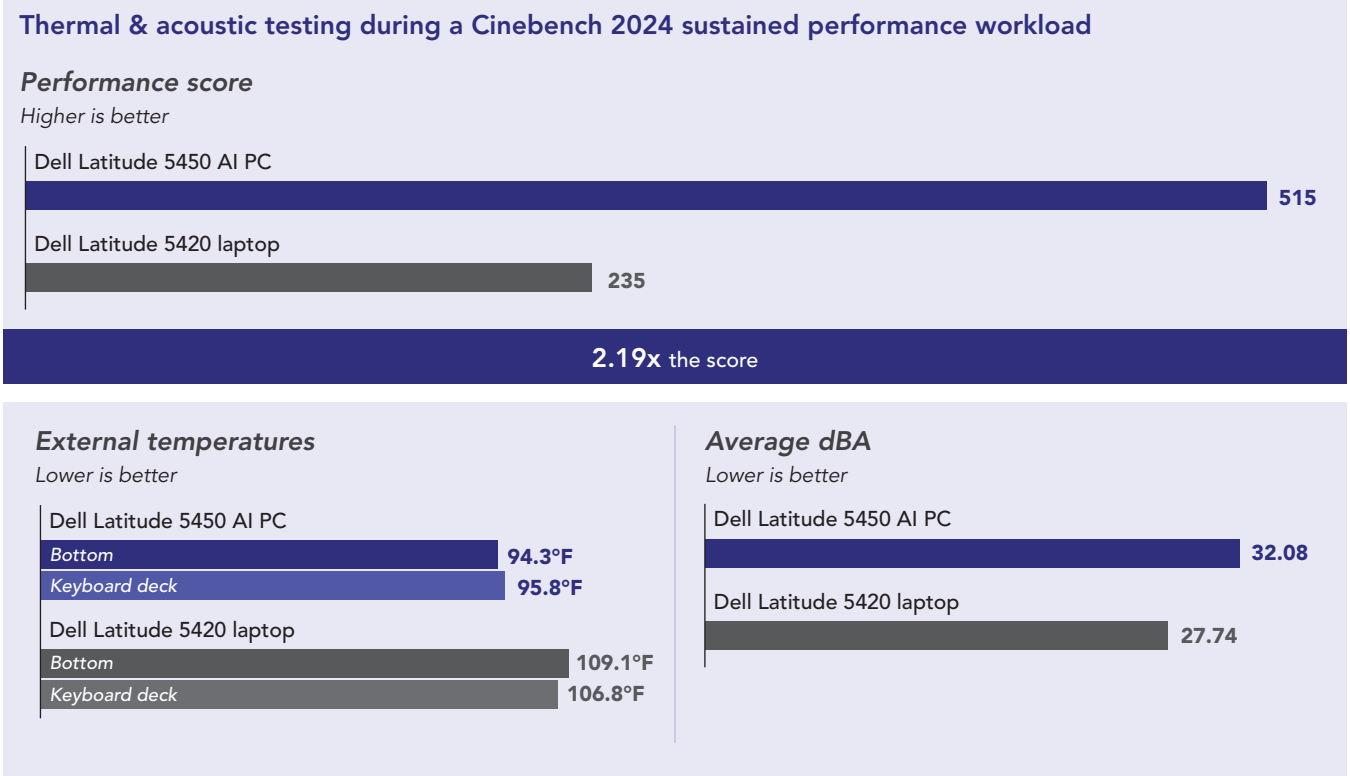


Figure 15: Median performance, thermal, and acoustic testing results while the systems were running the Cinebench 2024 benchmark for three 50-minute runs. Higher performance scores are better. Lower temperatures and decibels are better. Source: Principled Technologies.

We found that the Dell Latitude 5450 AI PC powered by an Intel Core Ultra 5 processor 135U stayed cooler and still received a performance score that was over twice that of its predecessor. While the noise coming out of Latitude 5450 AI PC was slightly louder than that of the Latitude 5240 we tested, they were both still whisper-quiet under load. For reference, normal breathing is 10dBA, a soft whisper is 30dBA, and a quiet library is 40dBA.[25]

Dell, Intel, and Microsoft advancements

The new Latitude AI PCs are, according to Dell, designed to "use less power and improve battery life compared to traditional PCs."[26] But that's not all that's improved since the 2021 launch of the Latitude 5420 Laptop we tested.

ISV Certification According to Dell, the new Latitude AI PCs powered by Intel Core Ultra processors support more than 100 optimized AI apps and more than 300 AI-optimized experiences.[27]

Collaboration By offloading video-conferencing AI workloads, such as auto-framing, background blur, and eye-tracking to the NPU, there's a potential for longer battery life and greater system efficiency. The Dell Latitude 5450 AI PC FHD HDR camera options feature Temporal Noise Reduction (TNR) 3 technology designed to enhance video meeting image quality with greater resolution and clarity.[28] Plus, the Dell Optimizer Intelligent Audio feature automatically removes background noise and Dynamic Volume automatically adjusts PC speaker volume during calls.[29]

Built-in security Dell SafeID is a hardware-based security solution that protects user credentials against sophisticated threats.[30] The Latitude AI PCs also include a new built-in BIOS vulnerability detection feature that scans publicly reported security flaws and recommends remediation steps to your IT team.[31] Built-in privacy shutters and the optional ExpressSign-In feature help keep sensitive data safe.[32]

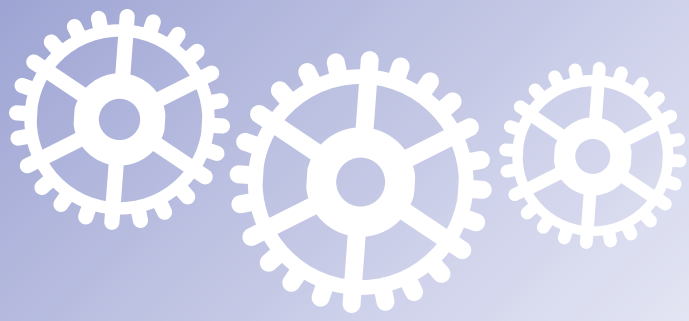
Dell Client Command Suite: According to Dell, IT teams can securely configure BIOS settings, manage BIOS configurations, and report BIOS configuration status natively in Microsoft Intune; manage and automate BIOS, firmware, drivers, and applications with Dell Trusted Update Experience; and find the correct drivers using Dell Command Deploy.[33]

According to Intel, another area of advancement is the "holistic approach to performance that powers AI workloads and new experiences" companies can unlock by choosing Latitude 5450 AI PCs powered by an Intel Core Ultra processor with Intel vPro.[34] Benefits include:

- **Intel Threat Detection Technology:** Intel vPro helps your IT team detect ransomware and cryptojacking threats as well as software supply chain attacks at the hardware level.[35]
- **Simplified fleet manageability:** Intel vPro enables your IT team to remotely discover, diagnose, repair, and retire PCs. [36]

Near-future capabilities In addition to Microsoft Copilot, which is now available in preview, Windows 11 Pro provides AI-enhanced efficiency, performance, and security features, such as:

- Intelligent suggestions and recommendation based on current activities
- A snipping and editing tool that allows users to copy or revise text, video, and audio
- AI-enhanced security through App Control for Business[37]



Conclusion

When we tested the Intel Core Ultra 5 processor 135U-powered Dell Latitude 5450 AI PC, we found a myriad of performance benefits for companies ready to embrace a new era of computing. Our hands-on testing included benchmarking standard and AI-related system performance, measuring battery life in four real-world scenarios, hand-timing day-in-the-life workflows, and assessing user comfort. Our test results showed that compared to its three-year-old predecessor, the Dell Latitude 5450 AI PC was well-equipped to boost productivity, handle AI-based tasks, and provide better built-in security.

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This project was commissioned by Dell Technologies.