



Finish resource-intensive tasks in less time

with 31% or higher CPU performance vs. Intel Core Ultra competitor systems*



Get answers from AI apps in less time

with 33% or higher on-device AI performance vs. Intel Core Ultra competitor systems**



Stay whisper-quiet under pressure

with up to 61.9% higher CPU performance vs. Intel Core Ultra competitor systems at 27.66 dBA under load***

*Based on Cinebench 2024 CPU multi-core results

**Based on Geekbench AI CPU (Half Precision) results

***while running a sustained Cinebench 2024 workload for 30 minutes

This project was commissioned by HP and AMD.

Forge a new path with an HP EliteBook 6 G1a Notebook AI PC

We compared CPU and NPU performance of an AMD Ryzen™ AI 7 PRO 350 processor-powered HP EliteBook 6 G1a to that of Intel Core Ultra 7 268V with Intel vPro competitor systems

As AI becomes more commonplace in business software and workflows, investing in AI PCs for your team becomes more of an imperative. That's because AI PCs contain neural processing units (NPU) as well as the traditional CPU and GPU architecture. NPUs accelerate AI tasks and free up the CPU and GPU so they can focus on what they do best.

We evaluated CPU and NPU performance on three AI PCs:

- HP EliteBook 6 G1a powered by an AMD Ryzen™ AI 7 PRO 350 processor
- Dell™ Pro 14 Plus powered by an Intel® Core™ Ultra 7 268V with Intel vPro® processor
- Lenovo® ThinkPad® T14 Gen 6 powered by an Intel® Core™ Ultra 7 268V with Intel vPro® processor

We found that the AMD Ryzen™ AI 7 PRO 350 processor-powered HP EliteBook 6 G1a achieved higher CPU and NPU performance than either Intel Core Ultra processor-based AI PC. Better CPU and NPU performance translate to a more responsive device when working on resource-intensive tasks or incorporating on-device AI features into daily routines.

Our testing approach

We equipped each PC with Windows 11 Pro, 32 GB of memory, and 1 TB of SSD storage:*

HP EliteBook 6 G1a Notebook AI PC

- AMD Ryzen™ AI 7 PRO 350 (CPU)
- AMD Radeon™ 860M graphics (GPU)
- AMD Ryzen™ AI (NPU) at up to 50 trillion operations per second (TOPS)
- 56-Whr battery

Dell Pro 14 Plus

- Intel® Core™ Ultra 7 268V with Intel vPro® (CPU)
- Intel Arc™ 140V graphics (GPU)
- Intel AI Boost (NPU) at up to 48 TOPS
- 55-Whr battery

Lenovo ThinkPad T14 Gen 6

- Intel® Core™ Ultra 7 268V with Intel vPro® (CPU)
- Intel Arc™ 140V graphics (GPU)
- Intel AI Boost (NPU) at up to 48 TOPS
- 57-Whr battery

*The results we report reflect the specific configurations we tested. Any difference in the configurations—as well as screen brightness, network traffic, and software additions—can affect these results. For a deeper dive into our testing parameters and procedures, see the [science behind the report](#).

To help you better understand the CPU and NPU performance capabilities of each AI PC, we ran these industry-leading benchmarks:

- Cinebench 2024
- Geekbench 6
- Geekbench AI
- LM Studio
- Procyon® Computer Vision Benchmark

We also tested multitasking capabilities by running the Procyon Office Productivity Benchmark in the foreground and conducting a Microsoft Teams video-conferencing meeting in the background. To see how the NPUs affected performance, we ran this test twice, once with Windows Studio Effects on during the video-conferencing meeting and again with it off.

Finally, we collected performance scores and measured temperature (or heat) and noise output while the AI PCs ran a sustained Cinebench 2024 workload.

Note: The graphs in this report use different scales to keep a consistent size. Please be mindful of each graph's data range as you compare.



Powerful CPU and AI Acceleration for Modern Workflows

To evaluate processor performance for resource-intensive tasks, we used Cinebench 2024. Cinebench 2024 renders a 3D scene with CPU-intensive Redshift for Cinema 4D software.¹ Higher CPU multi-core performance scores indicate that investing in AMD Ryzen™ 7 350 processor-powered HP EliteBook 6 G1a Notebook AI PCs would help users finish resource-intensive tasks in less time than the Intel Core Ultra 7 268V with Intel vPro processor-based Dell and Lenovo AI PCs we tested.

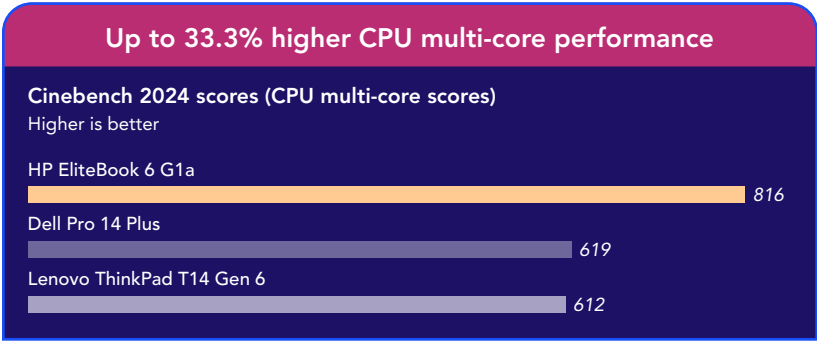


Figure 1: Cinebench 2024 CPU multi-core scores. Source: PT.

To stress the processors from another angle, we ran the Geekbench 6 benchmark. Geekbench 6 executes multiple CPU-intensive tasks simultaneously.²

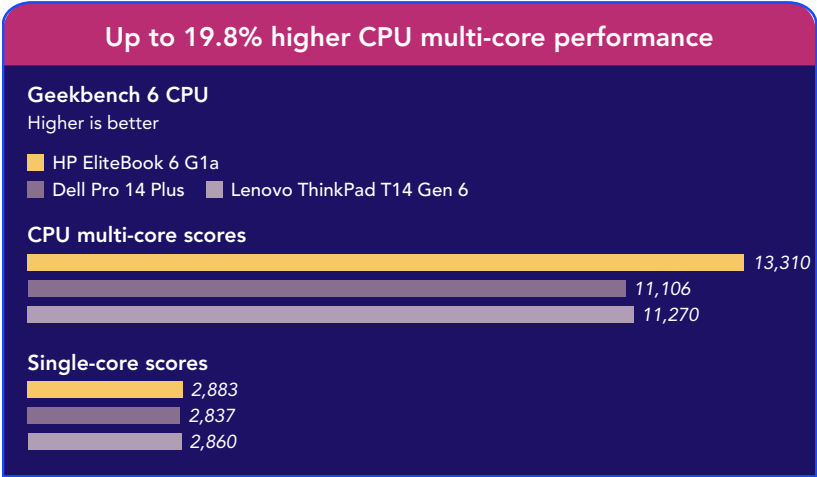


Figure 2: Geekbench 6 CPU scores. Source: PT.

About the AMD and Intel processors

The AMD Ryzen™ AI 7 PRO 350 processor is built on AMD “Zen 5” architecture, delivering enterprise-strength computing plus serious AI acceleration. It has 8 cores and 16 threads, runs at a base clock of 2.0 GHz, and can turbo up to 5.0 GHz while keeping power consumption flexible (15 to 54 W depending on load). It includes integrated AMD Radeon™ 860M graphics, supports fast DDR5 or LPDDR5X memory, and is capable of up to 50 TOPS NPU.³

The Intel Core™ Ultra 7 268V with Intel vPro® is part of the Intel Core™ Ultra Series 2 product collection. With four performance-cores and four low-power efficient-cores, this processor has a total of eight CPU cores and eight threads. It has a max turbo frequency of 5 GHz and has integrated Intel Arc 140V graphics. It also contains Intel AI Boost, which has the ability to process up to 48 TOPS (INT8) NPU.⁴

About the AI PCs

The HP EliteBook 6 G1a Notebook AI PC we tested is a Copilot+ PC powered by an AMD Ryzen™ AI processor. Tech specs: 14-inch diagonal WUXGA display, two speaker and camera options, up to 48 GB of DDR5-5600 SO-DIMM memory, and up to 1 TB of PCIe® NVMe® storage.⁵

The Dell Pro 14 Plus we tested is a Copilot+ PC with AI powered by an Intel Core Ultra processor. Tech specs: 14-inch touch, FHD+ display, 5 MP + IR cam, up to 32 GB of LPDDR5x-8533 memory, and up to 512 GB of SSD storage.⁶

The Lenovo ThinkPad T14 Gen 6 we tested is an AI performance laptop powered by an Intel Core Ultra processor. Tech specs: 14-inch touch WUXGA display, 5 MP + IR cam, up to 32 GB of DDR5-5600 memory, and up to 1 TB of PCIe Gen 4 SSD storage.⁷

To see how each AI PC handled machine learning (ML) workloads, we ran Geekbench AI, which uses real-world ML apps to provide a multidimensional picture of on-device AI performance.⁸ For this test, we used the Open Neural Network Exchange (ONNX) open-source AI framework and DirectML AI backend for ML on Windows.

The precision level scores below reflect different AI model requirements: Full Precision (FP32) is the most accurate and the most resource-intensive, Half Precision (FP16) is less accurate but more efficient, and Quantized (INT8) is the most resource-efficient and least accurate of all.⁹ These machine learning results indicate the AMD Ryzen™ AI 7 PRO processor-powered HP EliteBook 6 G1a offers high CPU performance for AI apps that don't yet utilize the NPU.

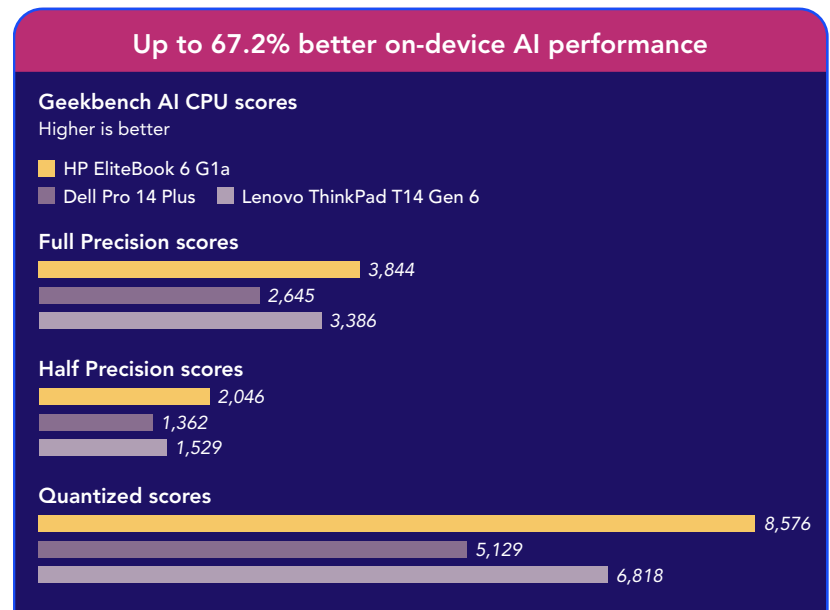


Figure 3: Geekbench AI CPU scores Source: PT.

To measure CPU performance for on-device AI Chat models, we ran LM Studio, which uses local large language models (LLMs) to capture token metrics.¹⁰ According to Microsoft, LLM tokens are “words, character sets, or combinations of words and punctuation.”¹¹ In these tests, we ran the Meta-Llama-3.1-8B-Instruct-Q4_K_M. This LLM model predicts what the person typing the query is going to type next based on what they’ve already input.

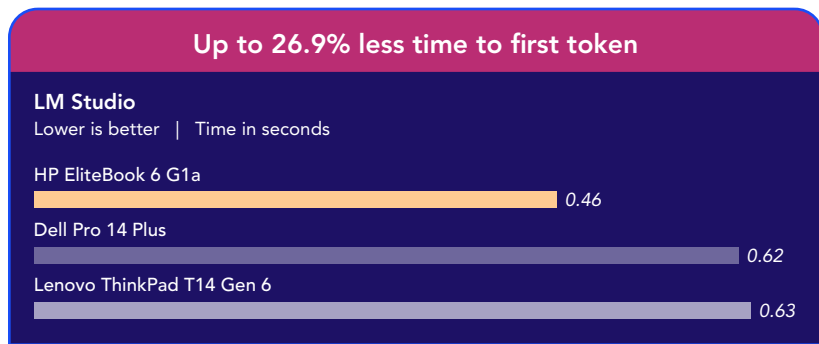


Figure 4: LM Studio results. Source: PT

Finally, to measure NPU performance for AI inference engine models, we used the UL Procyon AI Computer Vision Benchmark.¹² In our integer-optimized (INT8) testing, we used the API optimized for each AI PC’s NPU: the AMD Ryzen™ AI API on the HP EliteBook 6 G1a and the Intel OpenVINO™ inference API for the Dell and Lenovo AI PCs. We tested the following AI inference engines:

- **MobileNetV3, ResNet-50, and Inception-v4:** Convolutional neural networks (CNNs) widely used for image recognition, object detection, and image classification tasks. Essential for research institutions, tech companies, and individuals.^{13,14,15}
- **YOLOv3:** A deep neural network (DNN) that distinguish between different objects and features within images and videos. Used by healthcare providers, manufacturers, and video surveillance companies.¹⁶

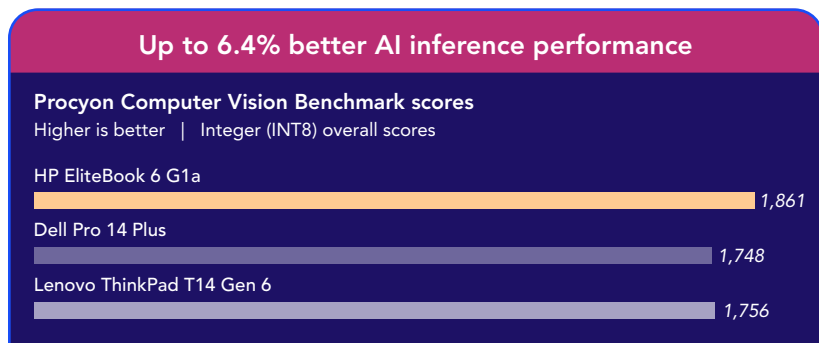


Figure 5: Procyon Computer Vision Benchmark results. Source: PT

Multitasking performance

To see what users juggling many tasks or screens at once could expect from each AI PC, we ran a productivity benchmark that stresses the CPU in the foreground and conducted a 10-person video-conferencing meeting with and without Windows Studio Effect turned on in the background. Procyon® Office Productivity Benchmark, which we ran in the foreground, is designed to mimic a typical day at work, even leaving Microsoft 365 apps “running in the background as the focus moves from one task to another.”¹⁷ For multitasking with NPU testing, we ran Microsoft Teams and Windows Studio Effects in the background. For multitasking without NPU testing, we ran only Microsoft Teams in the background.

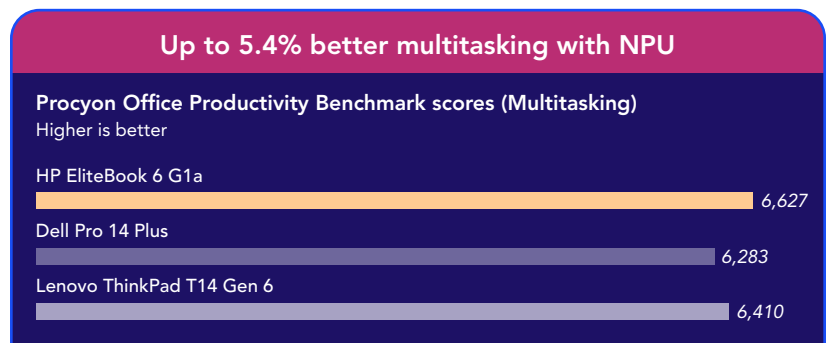


Figure 6: Procyon Office Productivity Benchmark overall rating while multitasking with NPU. Source: PT.

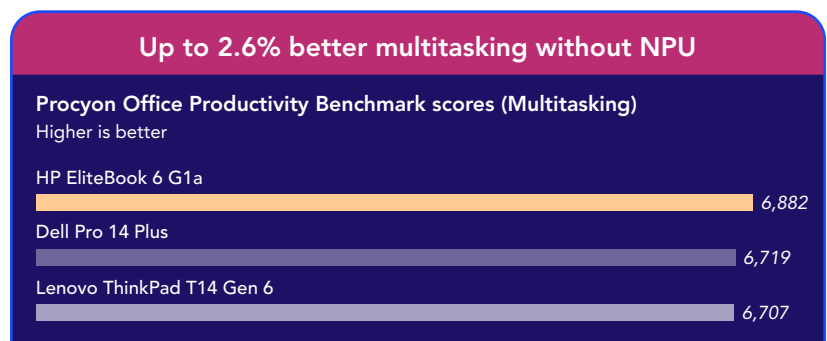


Figure 7: Procyon Office Productivity Benchmark overall rating while multitasking without NPU. Source: PT.

Consistent Power for Demanding Workloads

AI PCs and the high-performance processors that power them can produce heat and noise during sustained workloads. Before we started testing, we turned on HP Smart Sense, which, according to HP, automatically balances performance, power consumption, fan noise, and heat output for a quieter and more comfortable user experience.¹⁸ We also turned on the built-in intelligent features for the other AI PCs: Dell Optimizer for the Dell Pro 14 Plus and Lenovo Intelligent Cooling for the ThinkPad T14 Gen 6. Our engineer then ran all three AI PCs full tilt for 30 minutes under a Cinebench 2024 workload. The performance scores and heat and noise output show you how each AI PC handled the load with built-in AI system optimization technology turned on.

While all three AI PCs put out similar heat and were quieter than a soft whisper (30 dBA),¹⁹ the AMD Ryzen™ AI 7 PRO 350 processor-powered HP EliteBook 6 G1a beat out its Intel Core Ultra processor-powered competitors in the sustained performance arena.

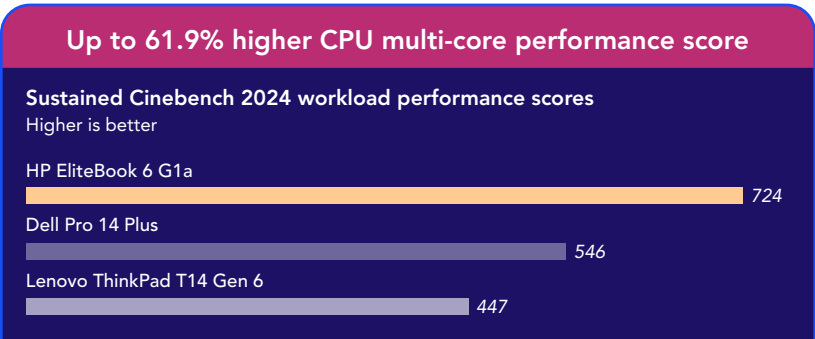


Figure 8: Median performance scores while the AI PCs were plugged in and running the Cinebench 2024 benchmark for 30 minutes. Source: PT.

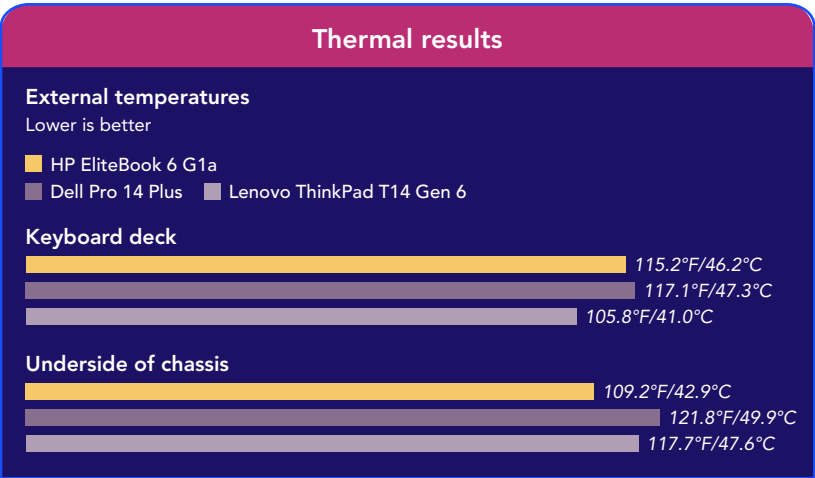


Figure 9: Median thermal results while the PCs were plugged in and running the Cinebench 2024 benchmark for 30 minutes. Source: PT.

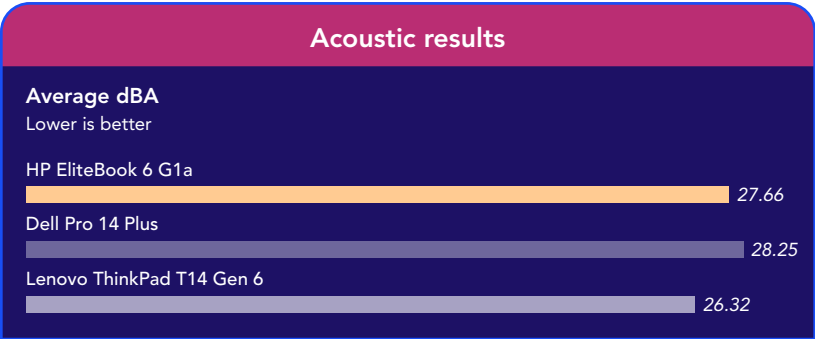


Figure 10: Median acoustic results while the PCs were plugged in and running the Cinebench 2024 benchmark for 30 minutes. Source: PT.



Conclusion

In our hands-on tests, an HP EliteBook 6 G1a Notebook AI PC powered by an AMD Ryzen™ AI 7 PRO 350 processor delivered higher CPU and NPU performance compared to two Intel Core Ultra 7 268V processor-based AI PCs: a Dell Pro 14 Plus and a Lenovo ThinkPad T14 Gen 6. Better CPU and NPU performance indicates a more responsive AI PC for employees tackling resource-intensive tasks or incorporating on-device AI features into their daily routines.

1. Maxon, Cinebench," accessed October 13, 2025, https://www.maxon.net/en/cinebench?srltid=AfmBOoq3jePUR91HPyM-2RkVYTezcZaasjsWPmI9uITTC_EYQCB6TL6JC.
2. Geekbench, "Introducing Geekbench 6," accesses October 13, 2025, <https://www.geekbench.com>.
3. AMD, "AMD Ryzen™ AI 7 PRO 350," accessed October 13, 2025, <https://www.amd.com/en/products/processors/laptop/ryzen-pro/ai-300-series/amd-ryzen-ai-7-pro-350.html>.
4. Intel, "Intel® Core™ Ultra 7 Processor 268V," accessed October 13, 2025, <https://www.intel.com/content/www/us/en/products/sku/240958/intel-core-ultra-7-processor-268v-12m-cache-up-to-5-00-ghz/specifications.html>.
5. HP, "HP EliteBook 6 G1a 14-inch Notebook AI PC - Customizable," accessed October 13, 2025, <https://www.hp.com/us-en/shop/pdp/hp-elite-book-6-g1a-14-inch-next-gen-ai-customizable-b14f2av-mb>.
6. Dell Technologies, "Dell Pro 14 Plus Laptop or 2-in-1," accessed October 13, 2025, <https://www.dell.com/en-us/shop/dell-laptops/dell-pro-14-plus-laptop-or-2-in-1/spd/dell-pro-pb14250-2-in-1-laptop>.
7. Lenovo, "ThinkPad T14 gen 6 (14" Intel) Laptop," accessed October 13, 2025, <https://www.lenovo.com/us/en/p/laptops/thinkpad/thinkpadt/thinkpad-t14-gen-6-14-inch-intel/len101t0126?orgRef=https>.
8. Geekbench AI, "Introducing Geekbench AI," accessed September 29, 2025, <https://www.geekbench.com/ai/>.
9. Vishalindey, "Understanding FP32, FP16, and INT8 Precision in Deep Learning Models: Why INT8 Calibration is Essential," accessed September 29, 2025, <https://medium.com/@vishalindey/understanding-fp32-fp16-and-int8-precision-in-deep-learning-models-why-int8-calibration-is-5406b1c815a8>.
10. LM Studio, "Model Catalog," accessed September 29, 2025, <https://lmstudio.ai/models>.

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11. Microsoft Ignite, "Understanding tokens," accessed September 29, 2025, <https://learn.microsoft.com/en-us/dotnet/ai/conceptual/understanding-tokens>.
 12. UL Solutions, "Procyon® AI Computer Vision Benchmark," accessed September 29, 2025, <https://benchmarks.ul.com/procyon/ai-inference-benchmark-for-windows>.
 13. Activeloop, "MobileNetV3," accessed September 29, 2025, <https://www.activeloop.ai/resources/glossary/mobile-net-v-3/>.
 14. Petru P., "What is ResNet-50?" accessed September 29, 2025, <https://blog.roboflow.com/what-is-resnet-50/>.
 15. GeeksforGeeks, "Inception-V4 and Inception-ResNets," accessed September 29, 2025, <https://www.geeksforgeeks.org/machine-learning/inception-v4-and-inception-resnets/>.
 16. Petru P., "What is YOLOv3? An Introductory Guide," accessed September 29, 2025, <https://blog.roboflow.com/what-is-yolov3/>.
 17. UL Solutions, "Procyon® Office Productivity Benchmark," accessed October 13, 2025, <https://benchmarks.ul.com/procyon/office-productivity-benchmark>.
 18. Linsey Knerl, "What is HP Smart Sense and How It Will Make Your Life Easier," accessed October 13, 2025, <https://www.hp.com/gb-en/shop/tech-takes/what-is-hp-smart-sense#:~:text=Optimize%20power%20consumption,energy%20-%20helping%20you%20save%20power>.
 19. International Noise Awareness Day, "Common noise levels – How loud is too loud?" accessed October 13, 2025, <https://noiseawareness.org/info-center/common-noise-levels/>.

Read the science behind this report ►



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