

WHAT TOPS MEANS

Understanding AI performance metrics for Copilot+ PCs



Copilot+ PCs are here, and they're powered exclusively by Snapdragon® X Series processors! That means more apps are executing AI models locally—rather than in the cloud—delivering better performance, accuracy, and privacy benefits.

Here's what you need to know about AI performance when matching users with equipment to meet their needs.

What is a Copilot+ PC?

In addition to CPUs and GPUs, Copilot+ PCs also have a Neural Processing Unit (NPU). This specialized processor enables apps to run AI workloads on the device, unlocking new experiences while keeping your company data safe.



What is an NPU?

An NPU is a specialized processor dedicated to handling AI workloads. Unlike traditional CPUs and GPUs, NPUs are uniquely designed to handle the complex mathematical computations required for AI tasks—offering unparalleled efficiency, performance, and power savings. When AI workloads are run on the NPU, the CPU and GPU remain available to handle other tasks.



What is TOPS?

TOPS, or trillions of operations per second, is the cornerstone performance metric for NPUs. It measures the number of operations (e.g., additions and multiples) that can be executed within one second. Exploring parameters of the TOPS equation like frequency and precision can offer a deeper understanding of an NPU's capabilities.

To learn more, check out our guide to AI TOPS and NPU performance metrics →

Why does 40 TOPS matter?

AI workloads consume massive amounts of power when executed on the CPU or GPU, but NPUs are designed to efficiently handle AI inferencing. Naturally, AI operations will run faster on devices with higher TOPS values.

That's especially true for concurrent app use, like when using Microsoft Copilot while video conferencing. In fact, some AI applications demand so much AI processing power that they may not work at all on devices with lower TOPS capacity.

Are 40 TOPS truly necessary?

Yes. Microsoft requires Copilot+ PCs to have at least 40 TOPS of NPU processing capacity. To ensure the most power and efficiency, the Snapdragon X Series processors go even further—setting a new performance standard at 45 TOPS.



Introducing Snapdragon® X Elite, the most powerful, intelligent, and efficient processor in its class for Windows.

With a powerful AI engine, including the world's fastest NPU for laptops, Snapdragon® X Elite enables AI-enhanced apps that unlock focus, flow and innovation. Because laptops powered by Snapdragon technology work equally well plugged-in or on battery, your employees can work from wherever they need to.

Up to
2x
FASTER NPU
than M3¹

Up to
5.4x
MORE EFFICIENT NPU
than Core Ultra 7²



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Copilot in Windows (in preview) is available in select global markets and will be rolled out to additional markets over time. Copilot with commercial data protection is available at no additional cost for users with an Entra ID with an enabled, eligible Microsoft 365 license.

AI inferencing performance is based on UL Solutions Procyon AI on Windows 11 OS and MacOS run in May 2024. Snapdragon X Elite was tested using a Qualcomm reference design on Windows 11 OS.

1. The Apple M3 was tested using an Apple MacBook Pro on MacOS. Maximum performance reflected by Intel Core Ultra 7 155H and the M3 represent maximum achievable results in given platforms under unconstrained PL1/PL2 settings and no thermal limitations. Power and performance comparison reflects results based on measurements and hardware instrumentation of given devices.
2. The Intel Core Ultra 7 155H (16 core) was tested using an Asus Zenbook 14 OLED (UX3405) laptop on Windows 11. The Apple M3 was tested using an Apple MacBook Pro on MacOS. Maximum performance reflected by Intel Core Ultra 7 155H and the M3 represent maximum achievable results in given platforms under unconstrained PL1/PL2 settings and no thermal limitations. Power and performance comparison reflects results based on measurements and hardware instrumentation of given devices.



Read about AI TOPS and NPU performance metrics