Apple’s new M3 chips have big GPU upgrades focused on gaming and pro apps

Apple is unveiling its new M3 processors today, and all three include big improvements to the GPU side of the chips. The M3, M3 Pro, and M3 Max will all offer faster CPU performance, but crucially, the M3 family of chips will include significant changes to the GPU to improve professional apps and gaming performance. All three M3 chips will debut in new MacBook Pro models, with the M3 also part of a new 24-inch iMac.

The base M3 includes an eight-core CPU with four performance cores and four efficiency cores, and Apple claims it’s up to 35 percent faster than the M1 for CPU performance. We don’t know exactly how the M3 compares to the M2, but when Apple announced the M2 last year, it said it had 18 percent faster CPU performance over the M1. The M3 also has a 10-core GPU with a next-gen architecture that is said to be 65 percent faster than the M1 for graphics performance. The M3 supports up to 24GB of unified memory and one external display (in addition to the one built into iMacs and MacBooks).

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The M3 Pro has an improved 12-core CPU with six performance cores and six efficiency cores, plus an 18-core GPU that’s up to 40 percent faster than the M1 Pro. Apple says the CPU performance is up to 30 percent faster than the M1 Pro for single-threaded tasks, once again avoiding a direct M2

comparison. The M3 Pro supports up to 36GB of unified memory.

The M3 Max has a 16-core GPU with 12 performance cores and four efficiency cores and a 40-core GPU that is said to be up to 50 percent faster than the M1 Max. The M3 Max supports up to 128GB of unified memory. Apple says the GPU performance on the M3 Max is up to 80 faster than the M1 Max. That sounds like a big improvement, particularly as Apple claimed the M2 Max was up to 30 percent faster than the M1 Max in graphics earlier this year.

If it wasn't obvious from the raw specs already, there's a big focus on GPU improvements here and a next-gen architecture for graphics and pro apps. The M3 chips include hardware-accelerated ray tracing and mesh shading — both firsts for Apple Silicon.

We're used to seeing full support for hardware-based ray tracing on Nvidia's and AMD's latest GPUs, but having this built into Apple's M3 chips means game developers will be able to enable the improved shadows and reflections typically only found on the latest consoles, PC gaming rigs, and Windows-based laptops. Hardware-accelerated mesh shading makes things more flexible for developers to improve complex scenes in games and even GPU-intensive apps.

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Apple is also introducing a new Dynamic Caching feature on its M3 chips, which will only allocate the exact amount of memory, dynamically in hardware, needed for each task using the GPU. Apple claims this is an industry first and that developers won't need to have to build around it because it's a transparent and automatic process. It should boost the performance of professional apps and games, improving the average utilization of the GPU.

How this all translates into the state of gaming on the Mac is unclear, but improved performance, hardware-accelerated ray tracing, and a new Dynamic Caching feature all sound like big benefits to game developers and potential M3 Mac owners. We're still waiting to see more games appear on the Mac, though. Apple dropped a Proton-like tool on developers earlier this year, encouraging them to bring Windows games to Macs.

Mac owners have been using Apple's Game Porting Toolkit to run a variety of DirectX 12 games on M1 and M2 chips. While performance isn't always the best using Apple's own translation layer, it feels like we're getting closer than ever before to the Mac being a viable gaming platform.

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Apple's new M3, M3 Pro, and M3 Max also have an improved Neural Engine inside to accelerate machine learning models. Apple is also, for the first time, shipping an AV1 decoder with its M3 family of chips so owners will benefit from more power-efficient playback of AV1 content.

Speaking of power efficiency, Apple is moving to a 3nm process with the M3 family — much like the A17 Pro inside the iPhone 15 Pro. We're expecting to see some power efficiency improvements on the M3 chips that will all debut inside new models of the MacBook Pro. Apple is promising the same multithreaded performance on the M3 as the M1 at half the power usage. This also translates into the new MacBook Pro lasting up to 22 hours on battery life, the longest ever in a Mac, if Apple's claims are accurate.

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Apple compared its latest M3 CPU and GPU performance against a 12-core PC laptop, the $1,299 MSI Prestige 13Evo A13M-050US. It ships with Intel’s Core i7 1360P processor and Iris Xe graphics. Apple claims its M3 provides the same relative CPU performance as the MSI laptop at a quarter of the power draw and the same relative GPU performance at one-fifth of the power usage.

Apple is shipping its M3 chip inside a 24-inch iMac on November 7th, and the M3 and M3 Pro will be available in new 14- and 16-inch MacBook Pro models on November 7th. The M3 Max will start shipping later in November.

https://www.theverge.com/2023/10/30/23938676/apple-m3-chip-gpu-upgrade-hardware-accelerated-ray-tracing-gaming-specs-release-date