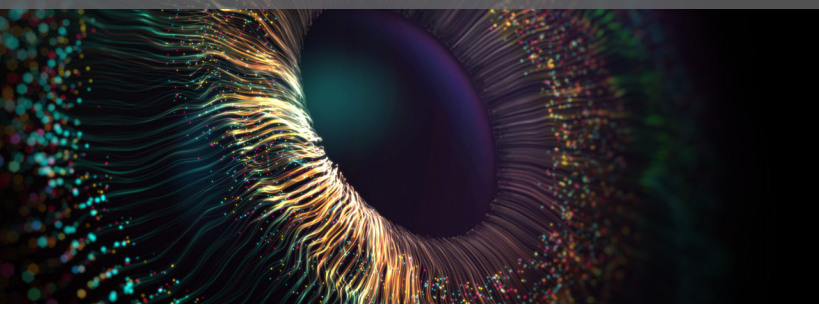


AMD THREADRIPPER PRO

PURPOSE-BUILT FOR FOR MEDIA AND ENTERTAINMENT

With its introduction of the AMD Ryzen™ Threadripper™ PRO processors in 2020, AMD ushered in the third wave of high-performance workstation computing, marrying the best of superscalar and multi-core CPU design with and AMD Infinity architecture. Now in its second generation, the Threadripper PRO processors provide unique access to dramatic performance scaling for the rapidly expanding range of modern professional workloads.

The first-generation AMD Ryzen™ Threadripper™ PRO processor family not only achieved breakthrough performance scaling with single-chip options of up to 64 cores, levels previously attainable only through the costly addition of a second socket, it did so with industry-leading base clock frequencies[1] to sustain the best possible overall throughput. Building on that initial synergy, and deploying AMD "Zen 3" microarchitecture, second generation Ryzen™ Threadripper™ PRO 5000 WX-Series processors drive aggregate performance even further, offering a workstation processor best equipped to accelerate modern M&E workloads.

AMD RYZEN™ THREADRIPPER™ PRO 5900 WX-SERIES PROCESSORS: RIDING THE THIRD WAVE OF WORKSTATION COMPUTING

AMD Ryzen™ Threadripper™ PRO processors manage to create this inflection point on the back of three key technologies, marking a new era – a third wave – in workstation CPUs: the "Zen" microarchitecture gains in superscalar throughput, a consistent progression in manufacturing to enable higher-density on-chip cores, and AMD's Infinity architecture, a novel chiplet approach that allows ease of performance scaling while mitigating challenges in thermal dissipation and product costs. The combination enables both the highest core count available[1], with the top-end Threadripper PRO 5995WX processor scaling up to a massive 64 cores, 26 more cores than the competing single-processor workstation CPU today[1].

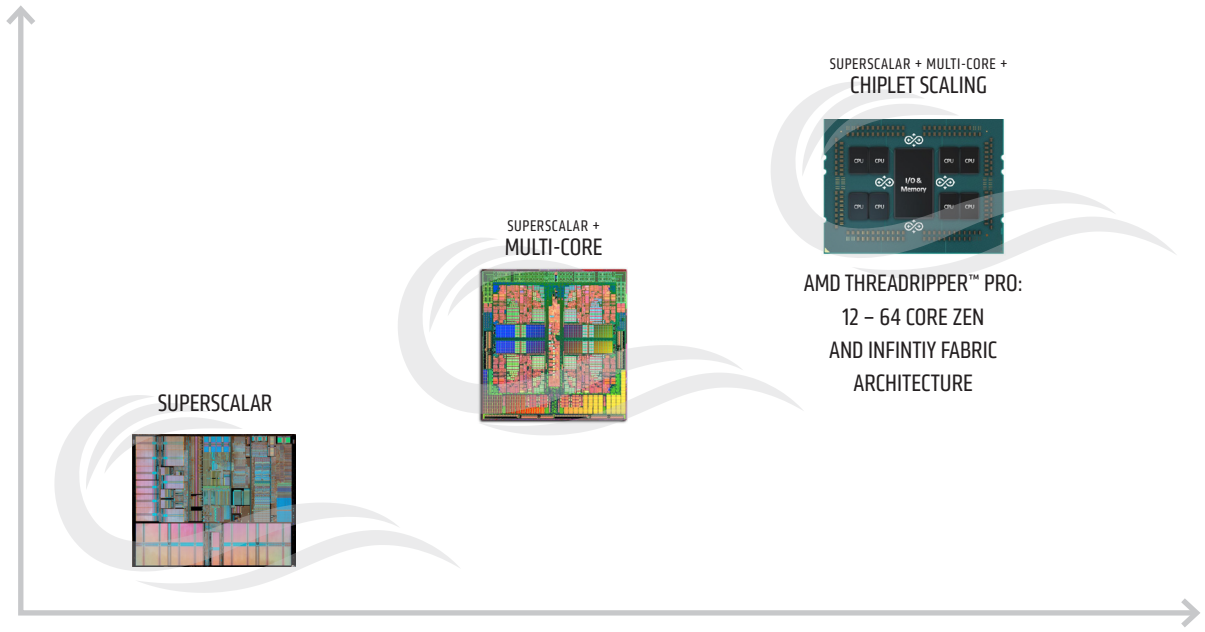


FIGURE 1: THREADRIPPER™ PRO PROCESSORS ARE PIONEERING A THIRD WAVE IN HIGH-PERFORMANCE WORKSTATION COMPUTING

PROCESSOR	CORES / THREADS	BASE / TURBO FREQUENCY[2] (GHZ)	L2+L3 CACHE (MB)	GEN 4 PCIE® LANES	MEMORY CHANNELS
Ryzen™ Threadripper™ PRO 5995WX	64 / 128	2.7 / up to 4.5	288	128	8
Ryzen™ Threadripper™ PRO 5975WX	32 / 64	3.6 / up to 4.5	144	128	8
Ryzen™ Threadripper™ PRO 5965WX	24 / 48	3.8 / up to 4.5	140	128	8
Ryzen™ Threadripper™ PRO 5955WX	16 / 32	4.0 / up to 4.5	72	128	8
Ryzen™ Threadripper™ PRO 5945WX	12 / 24	4.1 / up to 4.5	70	128	8

FIGURE 2: THE AMD RYZEN™ THREADRIPPER™ PRO 5900 WX-SERIES WORKSTATION PROCESSORS (SOURCE: AMD)

Regardless of performance, no workstation platform will get far without as much attention given to reliability and availability as to throughput. Threadripper™ PRO processors check those boxes and more, with hardware security features with AMD PRO technologies – including the AMD Security Processor (ASP), Memory Guard[2] and Secure Boot – with support for Microsoft Endpoint Manager and Windows Defender Application Guard to help with malware prevention.

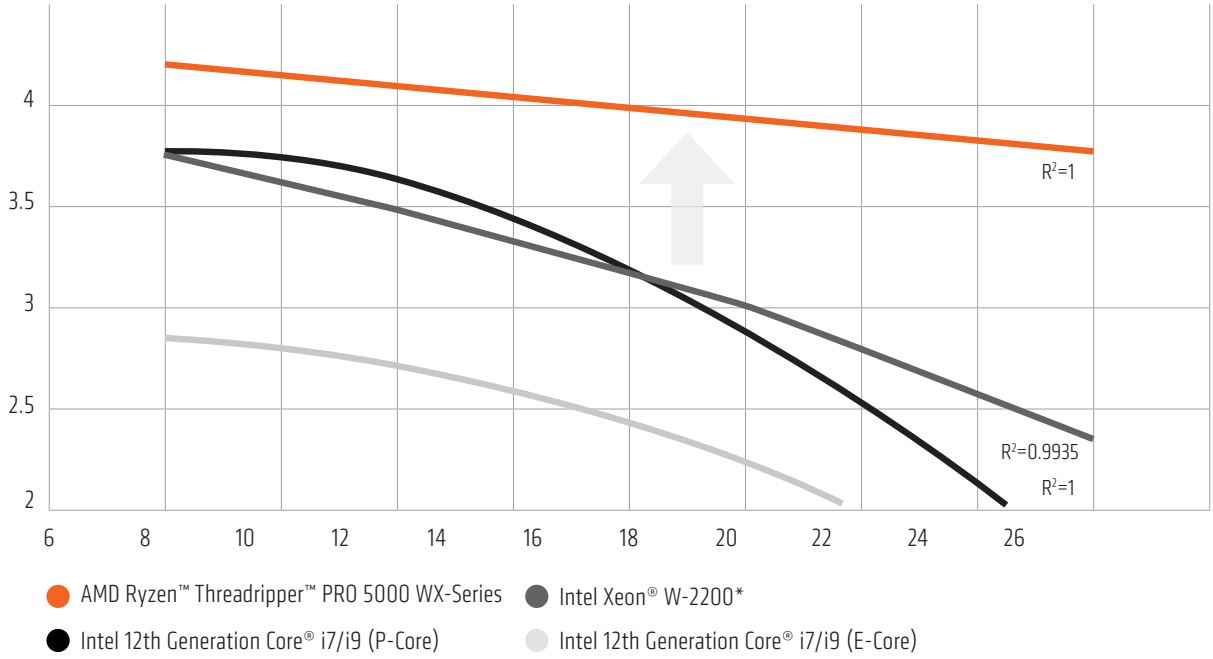
NO SUBSTITUTE TO HIGHEST CORE COUNTS AND FASTEST BASE FREQUENCIES FOR M&E WORKFLOWS

AMD Ryzen™ Threadripper™ PRO processor solutions specifically target the performance demands M&E professionals face in day-to-day visual computing. From modeling, animation and rendering of studio-grade content to editing, encoding and transcoding digital video at resolutions now pushing 8K, multi-threaded floating-point intensive algorithms working on large data sets often conspire to form costly bottlenecks in productivity. Clever processor engineering can mitigate performance penalties to some degree, but bottlenecks like these can ultimately be remedied only by a hefty dose of brute force – lots of processing cores, massive memory and cache size and bandwidth, and no-compromise clock frequencies. With a family that scales from 12 to an industry-leading 64 cores[1], coupled with up to 2 TB of memory accessed by 8 channels and boasting more bandwidth and L3 cache than any single-socket workstation CPU available in the industry[3], the AMD Ryzen™ Threadripper™ PRO 5000 WX-Series processors deliver on all counts.

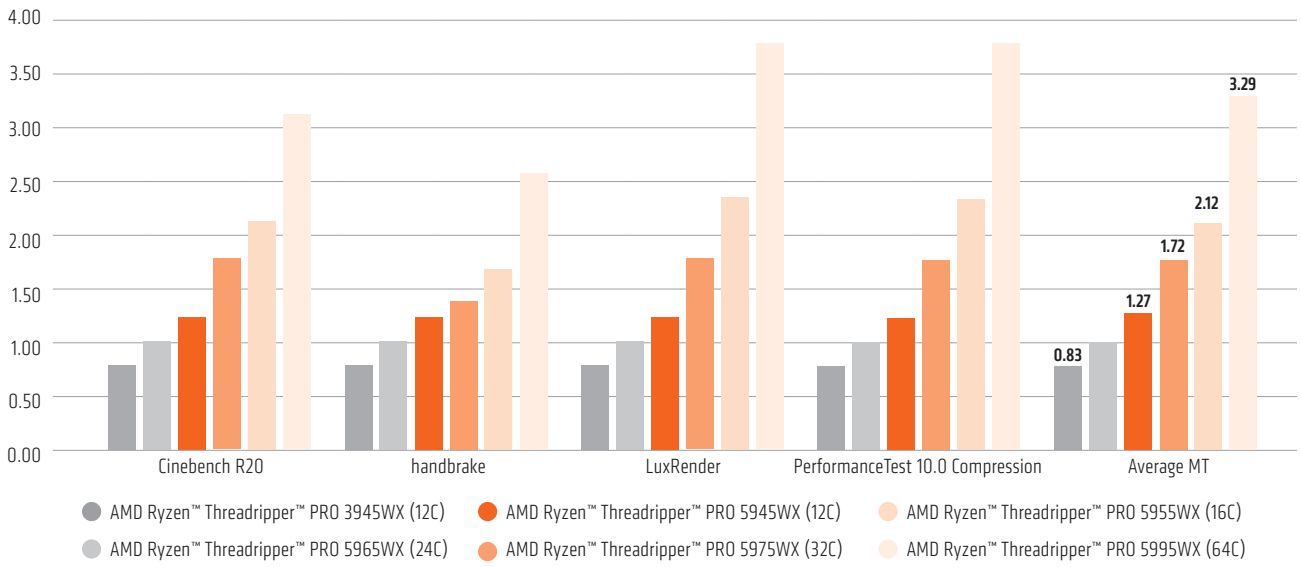
ANIMATION AND EVER-HIGHER RESOLUTION VIDEO WILL LONG REMAIN VORACIOUS CONSUMERS OF HEAVILY-THREADED COMPUTATION.

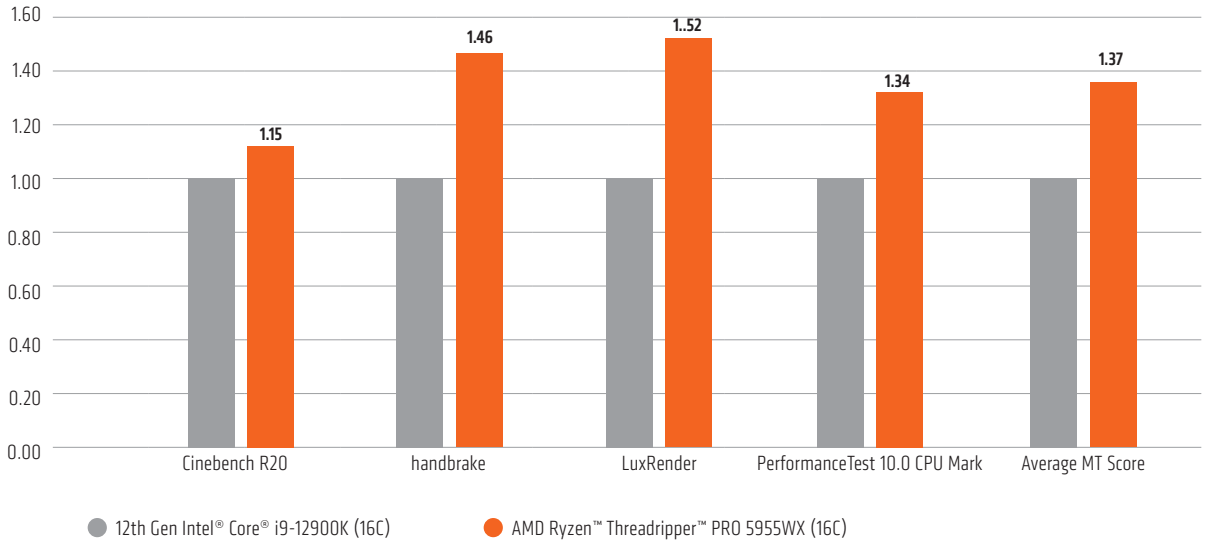
A sea of compute cores wouldn't amount to much if constrained by inadequate core clock rates, specifically base frequencies. CPU's overdriven turbo or boost clock rates are a clever and rewarding tool to temporarily crank up throughput exploiting short-term available thermal power, particularly for single-to-few threaded workloads. But when it comes to running the long-term, heavy-duty, multi-threaded computation prevalent in digital animation, video and special effects, boost rates are no longer practical. Eventually, electrical and thermal constraints tighten and boost rates must drop, ultimately leaving the base rate to count on for constant levels of throughput.

The AMD Infinity architecture chiplet approach helps reduce thermal density and minimize hot spots, allowing Threadripper PRO processors to run all cores indefinitely at the highest base frequencies available in comparable CPUs currently available 1. For example, a 12 core Threadripper™ PRO 5945WX processor can sustain an operating base frequency of 4.1 GHz, well in excess of competing workstation-caliber CPUs with the same core counts, charted below.



But of course, metrics like core counts and clock frequencies mean nothing if they don't contribute to ultimate goal of MT performance. In the case of an AMD Ryzen™ Threadripper™ PRO 5945WX processor performance, running typical M&E workloads, performance comes in spades. The 12-core 5945WX processor outperformed its predecessor, a Threadripper PRO 3945WX processor, on M&E relevant benchmarks by up to 20%, while the rest of the family scales up smoothly and substantially, all the way up to the 64-core Threadripper PRO 5995WX processor, achieving up to 229% faster throughput than the base 12C Threadripper Pro 5945WX[4]. Moreover, the 16-core Threadripper PRO 5955WX processor managed up to 37% better performance than Intel's most recent, comparable 16-core workstation-caliber CPU, the 12th Gen Intel Core i9-12900K[4].





PERFORMANCE SCALING IDEAL FOR DIGITAL MEDIA AND ENTERTAINMENT PROFESSIONALS

There is no such thing as a perfect one-size-fits-all hardware solution to any professional's computing needs. But particularly in BaM&E applications, the proliferation of highly-threaded workloads has moved CPU bottlenecks from limits on core counts. For workflows in animation, special effects and digital video, there simply is no substitute for having the most processing cores available – cores also capable of the highest sustained base frequencies.

The AMD Ryzen™ Threadripper™ PRO 5000 WX-Series processors are now available in premium workstation models from leading workstation vendors, including Lenovo and Dell. For a deeper dive into Threadripper PRO's novel architectural approach to workstation computing, refer to the main whitepaper (link here).

1. Based on AMD internal analysis, October 2022, comparing Threadripper PRO 5000 WX-Series processors to Intel Xeon W-3300 Series processors, the Threadripper PRO processors offer both the highest core count available and higher base frequencies at the same core count.

   https://ark.intel.com/content/www/us/en/ark/products/series/125035/intel-xeon-w-processor.html

   https://www.amd.com/en/processors/ryzen-threadripper-pro

2. Full system memory encryption with AMD Memory Guard is included in AMD Ryzen PRO, AMD Ryzen Threadripper PRO, and AMD Athlon PRO processors. Requires OEM enablement. Check with the system manufacturer prior to purchase. GD-206.

3. Based on AMD internal analysis, October 2022, comparing the max memory capacity and L3 cache sizes of Threadripper PRO 5000 WX-Series processors versus Intel Xeon W-3300 Series processors, using publicly available data listed on:

   https://ark.intel.com/content/www/us/en/ark/products/series/125035/intel-xeon-w-processor.html and

   https://www.amd.com/en/processors/ryzen-threadripper-pro.

Intel® Xeon® W-2200 series and[1] Intel® 12th Generation Core® i9 SKUs selected for highest base frequency at given core count (8 cores and higher) from among SKUs offered by workstation OEMs Dell, HP, and Lenovo as of 6/10/2022, in models Dell Precision 5820, Lenovo ThinkStation P520, and HP Z4 G4.

Intel® Xeon® W-2200 series SKU	# Cores	Base frequency (GHz)
Xeon® W-2245	8	3.9
Xeon® W-2255	10	3.7
Xeon® W-2265	12	3.5
Xeon® W-2255	10	3.8
Xeon® W-2265	12	3.5
Xeon® W-2275	14	3.3
Xeon® W-2295	18	3.0

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