

TECH BRIEF

AMD RYZEN™ THREADRIPPER™ PRO 7000 WX-SERIES PROCESSORS: PURPOSE-BUILT FOR DIGITAL MEDIA AND ENTERTAINMENT (DME)

THE PREMIER NEXT-GENERATION WORKSTATION COMPUTING
PLATFORM, BUILT TO SERVE NEXT-GENERATION WORKFLOWS
IN DIGITAL MEDIA AND ENTERTAINMENT.

With its introduction of the first AMD Ryzen™ Threadripper™ PRO processors in 2020, AMD ushered in a new era of high-performance workstation computing, marrying the best of superscalar and multi-core CPU design with the proven multi-die integration capability of the AMD Infinity Fabric architecture. Now in its third generation, the AMD Threadripper PRO 7000 WX-Series processors have again achieved dramatic performance scaling to serve the rapidly expanding range of modern professional workloads.

The 7000 WX-Series retains the breadth of available CPU core counts of the preceding 5000WX line to serve the full range of workstation-caliber workloads and computing professionals' budgets: from the 12-core 7945WX to the 64-core 7985WX. And with the 7000 WX-Series generation, AMD Threadripper PRO expands the performance scaling envelope a significant step further, raising the industry bar to 96 cores with the 7995WX.

Processor	Cores / Threads	Base / Boost Frequency (GHz)	Total Cache	TDP
AMD Ryzen™ Threadripper™ PRO 7995WX	96 / 192	5.1 / 2.5	480 MB	350 W
AMD Ryzen™ Threadripper™ PRO 7985WX	64 / 128	5.1 / 3.2	320 MB	350 W
AMD Ryzen™ Threadripper™ PRO 7975WX	32 / 64	5.3 / 4.0	160 MB	350 W
	24 / 48	5.3 / 4.2	152 MB	350 W
AMD Ryzen™ Threadripper™ PRO 7955WX	16 / 32	5.3 / 4.5	80 MB	350 W
AMD Ryzen™ Threadripper™ PRO 7945WX	12 / 24	5.3 / 4.7	76 MB	350 W

Table 1: Primary specifications of AMD Ryzen Threadripper Pro 7000 WX-Series workstation CPUs (Source: AMD)

AMD Threadripper PRO 7000 WX-Series generation leverages a trio of key technologies: the “Zen 4” microarchitecture, with major advancements in superscalar processing and instructions per cycle (IPC); a consistent progression in leading-edge manufacturing to enable higher-density on-chip cores; and the AMD Infinity Fabric architecture, a novel and proven approach to multi-die processor implementation that opens the door to massive performance scaling and a broad range of core counts. “Zen 4” microarchitectural improvements lead to a substantial generational jump in IPC, up to 14% higher than previous generation “Zen 3” on the same workloads.

Boost and base clocks are cranked up significantly as well, the product of judicious design engineering coupled with a leading-edge 5 nm silicon process. AMD Threadripper PRO 7000 WX-Series manages boost clock rates on average 16.9% faster than previous-generation Threadripper PRO 5000WX , along with 13% faster base clocks. And finally, the combination of the 5 nm leap in transistor density, combined with the Infinity Architecture’s fine-tuned aptitude for multi-die implementation, once again allows Threadripper PRO to shatter the ceiling on CPU core counts available within a single processor socket.

NO SUBSTITUTE TO OFFERING THE MOST CORES WITH THE HIGHEST CLOCK RATES FOR DME WORKFLOWS

AMD Ryzen™ Threadripper™ PRO processors deliver on precisely the computing demands DME professionals face most often in day-to-day visual computing: from modeling, animation, motion capture and kinematics, to rendering of studio-grade content, to editing, encoding and transcoding digital video at resolutions now pushing 8K. Such heavily-threaded algorithms and massive data sets too often conspire to bottleneck productivity. Workflow penalties range from wasted man-hours and compromises on quality to slipped schedules – and in the case of must-have real-time video requirements – essentially failure.

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, abundant cache, memory, and bandwidth, and no-compromise clock frequencies. With a family that scales from 12 to a bar-raising 96 cores, coupled with up to 2 TB of memory accessed by eight DDR5-5600 channels and boasting more bandwidth and L3 cache than any single-socket workstation CPU available in the industry, the AMD Ryzen™ Threadripper™ PRO 7000 WX-Series delivers on all fronts.



Animation, rendering, and motion capture/kinematics: examples of voracious heavily-threaded DME computation.

¹ Up to 480 MB, more than any competing Intel CPU provides in a single socket.

Exploiting those advances in “Zen 4” IPC, 5 nm improvements in silicon density, power efficiency and speed, along with the 3rd Gen Infinity Architecture’s proven high-performance scaling, AMD Threadripper PRO 7000 WX-Series checks the usual boxes and more. Single-thread performance climbs up dramatically from the 5000WX generation, up 28%ⁱⁱⁱ on average running single-thread (1T) workloads and 41%^{iv} on common workstation-caliber multi-thread (MT) computation.

Moreover, the 7000 WX-Series performance shines bright when compared to the industry’s current alternative, the Intel Xeon W-3400 processor family. On average, comparing each 7000 WX-Series SKU with the same – or next lower – core-count SKU of the Intel Xeon W-3400 family, the 7000 WX-Series manages up to 47%ⁱⁱⁱ faster rendering, and up to 41%ⁱⁱⁱ higher performance running some of the most common MT tasks DME professionals face in their core day-to-day workflows. Even when comparing each 7000 WX-Series SKU with the same or next higher core count Intel Xeon W-3400 SKU, AMD Threadripper PRO processors still manages up to 16%ⁱⁱⁱ more throughput, meaning the former can deliver DME creators better performance with fewer cores.

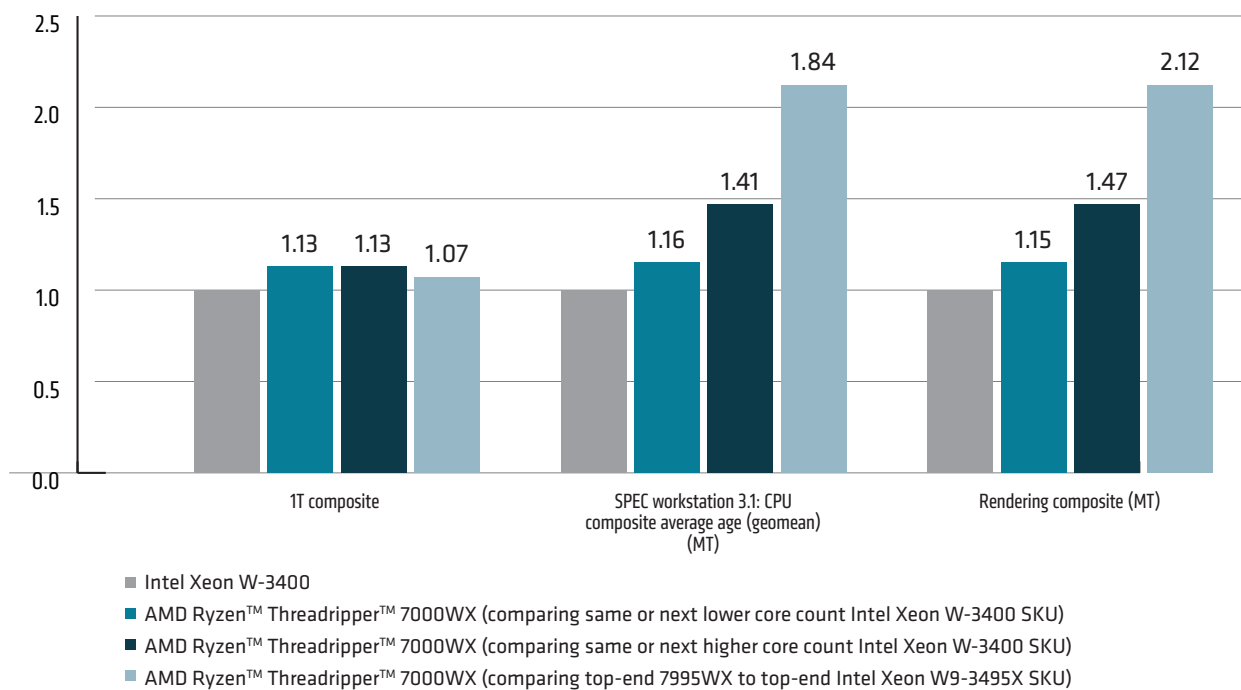


Figure 1: Aggregate performance advantage of AMD Ryzen Threadripper PRO 7000 WX-Series CPUs, normalized to the Intel Xeon W-3400 product line^v

And for those who simply can’t afford to skimp on MT performance with maximum core counts, consider the AMD Threadripper PRO 7995WX, with 96 cores that literally put it in a class of its own. Comparing the top-end members of the two competing product lines, the superior multi-threaded performance of the 7995WX is both clear and dramatic, achieving up to 112% higher performanceⁱⁱⁱ than the 56-core Intel Xeon W-3400 SKU, the w9-3495X.

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 DME applications, the proliferation of highly-threaded workloads mean CPU bottlenecks will stem from limits on both per-core throughput and total available core counts. For workflows in animation, special effects and digital video, AMD Threadripper PRO 7000 WX-Series processors' ability to squeeze more performance from fewer cores pays off across the DME computing spectrum. And for those with absolute no-compromise demands – like extensive studio-quality production of real-time broadcast and streaming – AMD Threadripper PRO 7995WX offers up to and more than double the throughput of the most comparable industry alternative.

The AMD Ryzen™ Threadripper™ PRO 7000 WX-Series processors are now available in premium workstation models from leading workstation OEM partners, including Dell, HP and Lenovo. For a deeper dive into Threadripper PRO's novel architectural approach to workstation computing, refer to the white paper [AMD Ryzen™ Threadripper™ PRO 7000 WX-Series Processors: Raising the Bar on Workstation Performance](#).

ⁱ Based on AMD internal testing as of 09/19/2022, geometric performance improvement at the same fixed-frequency on a 4th Gen AMD EPYC™ 9554 CPU compared to a 3rd Gen AMD EPYC™ 7763 CPU using a select set of workloads (33) including est.SPECrate®2017_int_base, est.SPECrate®2017_fp_base, and representative server workloads.

ⁱⁱ Average boost clock gain for each of the 12C, 16C, 24C, 32C and 64C SKUs in the Threadripper PRO 7000 WX-Series line relative to the boost clock of the matching core-count SKU in the Threadripper PRO 5000 WX family.

ⁱⁱⁱ Comparing average of Cinebench R23 (single thread mode) and PerformanceTest 11 CPU Single Threaded for each of the 12C, 16C, 24C, 32C and 64C SKUs in the Threadripper PRO 7000WX line normalized to the same scores of matching core-count SKU in the Threadripper PRO 5000 WX family.

Comparing average of SPECworkstation 3.0.4, PerformanceTest 10.2 and Cinebench R20 scores for each of the 12C, 16C, 24C, 32C and 64C SKUs in the Threadripper PRO 7000WX line normalized to the same scores of matching core-count SKU in the Threadripper PRO 5000 WX family.

^v Compares each of the four tested CPU SKU in the Intel Xeon W-3400 family with the comparable AMD Ryzen Threadripper PRO 7900WX SKUs. Where the 7900WX family has a core count that exactly matches one of the W-3400 SKUs, the comparison 7900WX SKUs include both the matching core count model as well as the SKU with the next fewer core count. Where the 7900WX family does not have a core count that exactly matches one of the W-3400 SKUs, the comparison 7900WX SKUs include both the next higher core count model as well as the model with the next fewer core count. In each of the four comparisons, scores for the W-3400 SKU and the comparable 7900WX SKU's scores are calculated from an average of the following tests, then normalized to the W-3400 SKU's scores:

SPECworkstation 3.1: Product Development

Rendering composite (average of normalized results for Cinebench R23) and Blender Cycles 3.0.6 (geometric mean of all scenes)

Run with respective system specifications:

	Intel® Xeon® W-3400	AMD Ryzen™ Threadripper™ PRO 7900WX
SKUs tested	W9-3495X / W7-3465X W7-3445X / W5-3435X	7945WX / 7955WX / 7965WX 7975WX / 7985WX / 7995WX
Memory DIMMs	DDR5-4800 with ECC	DDR5-5600 with ECC
Memory capacity (channels x rank x DIMM capacity)	128 GB (8ch x 1r x 16 GB)	512 GB (8ch x 1r x 64 GB)
Storage	(4) PCIe NVMe M.2 SSD (1 TB)	(1) PCIe 4.0 NVMe M.2 SSD (1 TB)
Operating system	Microsoft Windows 10 Professional	
Chassis volume (liters)	30.8	65.0
Cooling	Conventional air-cooling	