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Unlocking Cost and Efficiency Gains with Next-Generation Single-Socket Servers

Research by Prowess Consulting found that next-generation single-socket Dell™ PowerEdge™ servers powered by Intel® Xeon® processors can match or exceed the performance of prior-generation dual-socket systems while operating more efficiently.

Can consolidating from a prior-generation dual-socket server to a modern single-socket platform deliver meaningful performance and efficiency gains without compromising real-world workloads? Prowess Consulting set out to answer this question using the PowerEdge R740xd server (14th generation, dual-socket) and the PowerEdge R570 server (17th generation, single-socket), both powered by Intel Xeon processors. The goal was to assess whether modern single-socket architectures can deliver meaningful improvements without sacrificing performance in common enterprise workloads.

To reflect realistic enterprise conditions, we tested both systems in equivalent configurations and focused on workloads commonly deployed across small and medium-sized businesses (SMBs) and enterprise environments. These workloads included AI-powered speech-to-text and sentiment analysis, Apache HTTP Server™ web serving, and media caching with NGINX® and Redis®. Across all workloads, we measured performance, throughput, latency, and power efficiency to assess consolidation potential and operational impact.

Highlights

When consolidating from a prior-generation dual-socket platform, current-generation single-socket PowerEdge servers powered by Intel Xeon processors delivered the following results:¹

UP TO 2.36X HIGHER PERFORMANCE in AI-driven speech-to-text and sentiment analysis workloads using only 1.73x the power (449.74 W versus 259.73 W, for 1.34x higher performance per watt)

UP TO 2.65X MORE REQUESTS PER SECOND (RPS) in media caching workloads using NGINX, Redis, and OpenResty® at only 11% greater power-draw (447.03 W versus 384.00 W, for 2.32x higher performance per watt)

UP TO 1.82X HIGHER WEB-SERVING PERFORMANCE with lower latency in Apache® workloads at equivalent configurations with a lower power-draw (314.05 W versus 331.14 W, for 91% better performance per watt)

Across all tested workloads, the single-socket PowerEdge R570 server consistently delivered stronger results at comparable operating points. In addition to higher raw performance, the newer platform supported greater workload concurrency and achieved significantly better performance per watt. These gains indicate that organizations can consolidate workloads onto fewer servers while improving responsiveness and reducing energy consumption, which are key considerations for IT leaders managing rising power costs and infrastructure complexity. The findings also demonstrate that improved efficiency does not come at the expense of scalability. Instead, higher throughput and concurrency enable more effective use of available compute resources within existing power envelopes.

For CIOs, CTOs, and DevOps teams planning a server refresh, these findings highlight a practical modernization path. Modern single-socket servers can deliver higher compute density and more efficient resource utilization within a simpler architectural footprint. As a result, single-socket consolidation offers measurable performance and operational benefits while maintaining predictable performance for business-critical workloads.

Endnotes

¹For the full study details, read the full report, "Unlocking Cost and Efficiency Gains with Next-Generation Single-Socket Servers."



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