THE FOUNDATION OF DATA CENTER MODERNIZATION

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Companies need to reduce data center costs while workload demands continue to rise. 4th Gen AMD EPYC™ processors can solve both challenges by driving efficiency, performance, and consolidation in the data center.

ENERGY EFFICIENCY

Choose the right server CPU to optimize energy consumption and meet performance needs.

The Most Energy Efficient x86 servers[1]

AMD EPYC™ 9004 CPUs provide exceptional energy efficiency.

Older data center hardware can use more energy for less performance.

Higher Core Counts and Compute Density

More cores per server can mean less servers are needed for the same amount of performance, consolidating infrastructure and lowering OPEX.

35%

To run 2000 virtual machines, you need 35% fewer AMD EPYC™ 9654-based servers when compared to equivalent Intel 8490H-based servers.[2]

PERFORMANCE

Servers and tech-enabled devices have made every company a high-performance computing company.

PROCESSOR CHOICE IS CENTRAL TO HIGH PERFORMANCE

Transaction Processing

A server powered by a 4th Gen AMD EPYC™ 9654 compared to the Intel Xeon 8380 delivers

2.3x

Approximate performance advantage for online business transactions.[3]

2.7x

Improvement for query performance.[4]

Virtualization Performance

In a head-to-head comparison between 2P servers, the 4th Gen AMD EPYC™ processors outscored the Intel Xeon-based solution by

1.7x

Using VMmark Benchmark.[5]

CONSOLIDATION

Straining IT budgets and data center space constraints are making it difficult for CIOs and IT leaders to add critical new tools and features to their environments. Consolidating existing infrastructure paves the way for new advancements.

Data Center Space is Finite

Increasing the physical data center footprint to expand existing infrastructure can be costly, time-consuming, and inviable based on location.

Reclaim Space and Performance with AMD EPYC™ Processors

Data center consolidation can save costs and free up space. When upgrading from Intel Xeon Gold 6143 to 4th Gen AMD EPYC™ 9334

70%

Fewer racks required by organizations.

65%

Less power over 3 years for the same workload output.[6]

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1. SP5-072A: SP5-072A: As of 6/13/2023, a 4th Gen EPYC 9754 powered server has highest overall scores in key industry-recognized energy efficiency benchmarks SPECpower_ssj®2008, SPECrate®2017_int_energy_base, SPECrate®2017_fp_energy_base and VMmark® Server-Power-Performance. See details at https://www.amd.com/en/claims/epyc4#SP5-072A
2. SP5-011E: SP5-011E: SPECpower_ssj®2008 comparison based on published 2P server results as of 6/13/2023. Configurations: 2P AMD EPYC 9654 (30,602 overall ssj_ops/W, 2U, https://spec.org/power_ssj2008/results/res2022q4/power_ssj2008-20221204-01204.html) is 1.81x the performance of best published 2P Intel Xeon Platinum 8490H (16,902 overall ssj_ops/W, 2U, https://spec.org/power_ssj2008/results/res2023q2/power_ssj2008-20230507-01251.html). SPEC® and SPECpower_ssj® are registered trademarks of the Standard Performance Evaluation Corporation. See www.spec.org for more information.
3. SP5-071A: MySQL® 8.0.17 OLTP comparison based on AMD measured median scores on 2P EPYC 9654 compared to 2P Xeon Platinum 8380 running virtualized HammerDB TPROC-C (KVM Hypervisor Virtualization server environment with 400 WH and 64 users) as of 12/10/2022.
   System configurations:
   2P AMD EPYC 9654 96-Core Processor, 24 x 32GB DDR5-4800, 8 x 3.2TB (Production platform), 1 x 25GBE Mellanox Technologies MT27710 Family [ConnectX-4 Lx], BIOS RTI1002E, AMD Titanite
   2P Intel(R) Xeon(R) Platinum 8380 CPU @ 2.30GHz, 16 x 32 GB DDR4-3200, 8 x 3.84TB (Kioxia KCD6XLUL3T84), 1 x 25GBE Mellanox Technologies MT27710 Family [ConnectX-4 Lx], BIOS 1.1a Supermicro SYS-620U-TNR
   Both systems used Ubuntu® 22.04.1, SMT ON, 1 container per VM, 10 VMs, each 16 vCPUs, 32GB ram, 100GB disk, HammerDB Version 4.5, MySQL Version 8.0.17, Hypervisor QEMU KVM .
   Results: 2x AMD EPYC 9654 (~4,851,655 TPROC-C tpm/~2,087,994 NOPM) vs. 2x Xeon Platinum 8380 (~1,788,730 TPROC-C tpm/~770,179 NOPM) for ~2.71x the tpm/NOPM performance. Results may vary.
4. SP5-070: MySQL® 8.0.17 DSS comparison based on AMD measured median scores on 2P 96-core EPYC 9654 compared to 2P 40-core Xeon Platinum 8380 running virtualized HammerDB TPROC-H SF1 (KVM Hypervisor Virtualization server environment with 4 streams, 4 virtual units, calculating throughput with 4 streams x 22 queries x 3600 divided by the slowest VU completion time in seconds) as of 11/10/2022. Configurations: 2x AMD EPYC 9654 (~126,980 TPROC-H queries/hour) vs. 2x Xeon Platinum 8380 (~47452 TPROC-H queries/hour) for ~2.68x the tpm performance.
5. SP5-049C: VMmark® 3.1.1 matched pair comparison based on published results as of 6/13/2023. Configurations: 2-node, 2P 96-core EPYC 9654 powered server running VMware ESXi 8.0b (40.66 @ 42 tiles/798 VMs, https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/vmmark/2023-06-13-Lenovo-ThinkSystem-SR665V3.pdf) versus 2-node, 2P 60-core Xeon Platinum 8490H running VMware ESXi 8.0 GA (23.38 @ 23 tiles/437 VMs, https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/vmmark/2023-03-21-Fujitsu-PRIMERGY-RX2540M7.pdf) for 1.74x the score and 1.75x the tile (VM) capacity. 2-node, 2P EPYC 7763-powered server (23.33 @ 24 tiles/456 VMs, https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/vmmark/2022-02-08-Fujitsu-RX2450M1.pdf) shown at 0.98x performance for reference. VMmark is a registered trademark of VMware in the US or other countries.
6. SP5TCO-055: This scenario contains many assumptions and estimates and, while based on AMD internal research and best approximations, should be considered an example for information purposes only, and not used as a basis for decision making over actual testing. The Bare Metal Server Greenhouse Gas Emissions TCO (total cost of ownership) Estimator Tool – v9.37 Pro Refresh, compares the selected AMD EPYC™ and Intel® Xeon® CPU based server solutions required to deliver a TOTAL_PERFORMANCE of 80,000 units of integer performance based on the published scores for these specific Intel Xeon and AMD EPYC CPU based servers as of June 1, 2023. This estimation reflects a 3-year time frame with a PUE of 1.7 and a power US power cost of $0.128 / kWh. This analysis compares a 2P AMD 32 core EPYC 9334 CPU powered server with a SPECrate®2017_int_base a score of 725, https://spec.org/cpu2017/results/res2023q1/cpu2017-20230102-33282.pdf; to a 2P Intel Xeon 16 core Gold_6143 based server with a SPECrate®2017_int_base score of 197, https://spec.org/cpu2017/results/res2017q4/cpu2017-20171114-00863.pdf. Due to the wide variation of costs for real estate or admins, this TCO does not include their costs in this analysis. New AMD powered server OpEx consists of power only. The OpEx for the legacy install base of servers with Intel CPUs consists of power plus the extended warranty costs. Cost to extend the server warranty support is calculated to be 20% annually of the initial purchase price which is calculated using 2023 costs. Using this and the power costs mean that the AMD solution for a 3yr TCO is more than $2.5 million less (62% less) and has a $1.2 million or 93% lower annual OpEx. Environmental impact estimates made leveraging this data, using the Country / Region specific electricity factors from the '2020 Grid Electricity Emissions Factors v1.4 – September 2020', and the United States Environmental Protection Agency 'Greenhouse Gas Equivalencies Calculator'. For more detail see https://www.amd.co/en/claims/epyc4#SP5TCO-055

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