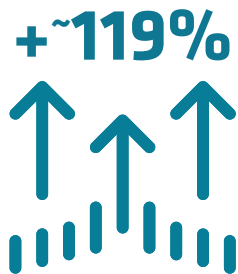


ACCELERATE YOUR DATA CENTER WORKLOADS WITH AMD EPYC™ 7003 SERIES PROCESSORS

3rd Gen AMD EPYC™ processors are recognized for delivering unmatched workload performance that helps drive faster time to results, provide more and better data for decisions, and achieve better business outcomes. The AMD family of EPYC processors has set over 250 world records for x86 server performance¹. Now, with the addition of 3rd Gen AMD EPYC processors with AMD 3D V-Cache™ technology, AMD raises the bar again, with exceptional gains for several technical computing workloads³. With our leadership approach and AMD Infinity Architecture, we continue to deliver innovation: high core counts, large L3 cache sizes, synchronized fabric and memory clock speeds designed for improved performance, plus hardware and virtual security features to help safeguard your business—right out of the box.

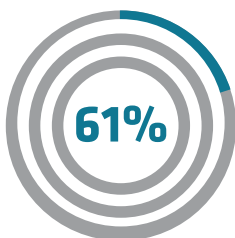
ADD ZIP TO YOUR CAE APPLICATIONS

- Gain exceptional performance from CFD, EDA, and FEA with AMD EPYC 7003 Series CPUs with AMD 3D V-Cache technology.
- Gain up to 119% max (69% avg) faster ANSYS® LS-DYNA® performance with servers based on 2x EPYC 7773X compared to 2x Intel® Xeon® Platinum 8380^{MLNX-009A}



PROPEL YOUR HCI PRIVATE CLOUD

- Virtualization is how you deploy and scale your private cloud applications quickly and easily
- Support 54% more virtual machines and gain 61% better performance with servers running VMware® VMmark® vSAN™ 3.1 equipped with 2x EPYC 7763 compared to 2x Xeon 8380^{MLN-129}



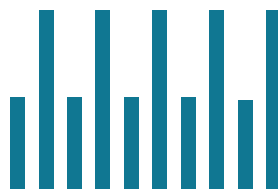
RESPOND FASTER TO MARKET CHANGES WITH LOWER COST PER QUERY

- Gain knowledge from data and use insights to make data-driven market decisions faster
- Achieve 14% higher 10-TB TPC-H decision support query performance and 21% better price/performance comparing servers based on 2x EPYC 7763 with 4x Xeon 8280^{MLN-068}



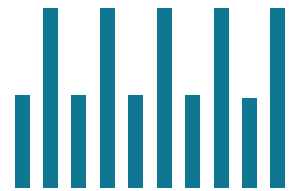
IMPROVE REMOTE USER EXPERIENCES

- The world has transitioned to remote work, making virtual desktop environments more important than ever
- Support up to 31% more "knowledge worker" desktop sessions running VMware Horizon® while meeting Login VSI™ rating of "very good" QoS response times with servers based on 2x EPYC 7713 compared to 2x Xeon 8380^{MLN-160}



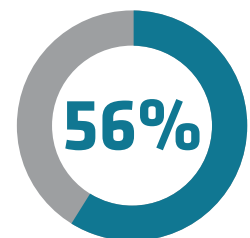
SPEED APPS YOUR USERS CARE ABOUT

- Web and mobile apps are the face of your company, and many of them run on Java® enterprise middleware.
- Gain 47% more SPECjbb®2015 MultiJVM Critical performance comparing servers based on 2x EPYC 7763 with 2x Xeon 8380^{MLN-092B}



ACCELERATE YOUR SUPPLY CHAIN

- Enterprise resource planning systems keep your supply chain moving products to customers.
- Support spiky and seasonal business demands with 56% more SAP® Enterprise Resource Planning (ERP) users for supply-chain logistics comparing servers based on 2x EPYC 7763 with 2x Xeon 8380^{MLN-101}



FASTER PROCESSING FOR BETTER RESULTS

The AMD Infinity Architecture is what helps make everything run exceptionally well on servers with AMD EPYC processors. Whether you need to accelerate computation, speed access to data, or help defend against ever-changing security threats, 3rd Gen AMD EPYC processors have what it takes to get up and running quickly, to help drive better, energy-efficient business outcomes with the confidence of modern security features. Performance like this helps you:

- **DRIVE TECHNICAL COMPUTING APPLICATIONS.** You can get more done in a day using applications including CFD, EDA, and FEA with the new AMD EPYC 7003 Series with AMD 3D V-Cache technology. These processors are equipped with 3x the L3 cache of our main 3rd Gen CPUs to help propel data-hungry applications to newer heights. For example, the ANSYS® LS-DYNA® Explicit benchmark running on servers with 2x EPYC™ 7773X perform up to 119% max (~69% avg) faster than 2x Intel® Xeon® 8380^{MLNX-009A}
- **GET THE MOST OUT OF SOFTWARE LICENSES.** If your software licensing fees are on a per-core basis, use our high-frequency processors to gain excellent per-core performance to help maximize what you get out of your licenses. For example, you gain 19% better integer performance with servers based on a single 16-core EPYC 73F3 than two 8-core Xeon 6334 processors.^{MLN-127A}
- **ACCELERATE YOUR SUPPLY CHAIN.** Software such as the SAP® Sales and Distribution Benchmark require servers to do more activities in parallel. A high core count, improvements in the 'Zen3' core, and large cache and memory capacities help speed enterprise resource planning software.
- **MAKE MARKET-DRIVEN DECISIONS.** Data analytics software relies on massive in-memory databases and highly parallelized processing. With the powerful combination of 8 DDR-4 memory channels, up to 128 threads, and a large L3 cache, you can process more information faster. Servers with 2x EPYC 7763 processors running the TPC-H benchmark at the 10000 GB scaling factor can outperform 4x Intel Xeon 8280M processors with 14% more performance with 21% lower price/performance.^{MLN-068}
- **SPEED USER APPLICATIONS.** Java® software is highly parallelized, and can take advantage of 3rd Gen AMD EPYC processors. With its high thread count and larger L3 cache size, a server equipped with 2x AMD EPYC 7763 outperforms a server with 4x Intel Xeon Platinum 8380HL by 28% on the SPECjbb® 2015 MultijVM Critical benchmark.^{MLN-115A}
- **CREATE A BETTER PRIVATE CLOUD.** AMD EPYC processors deliver leadership virtualization performance. In a matched server pair VMware VMmark 3.1 comparison, 2x EPYC 7763 outperforms 2x Xeon 8380 by 52% and supports 71% more virtual machines.^{MLN-102}
- **DELIVER BETTER USER EXPERIENCES.** Virtual desktop infrastructure needs excellent response time. This is supported by a higher core count in AMD EPYC processors, more PCIe 4.0 lanes that deliver high throughput, and fast communication between the CPU and GPU that renders complex images.
- **GET READY FOR THE EXABYTE ERA.** Nearly every HPC workload can be propelled by the impressive features offered in AMD EPYC 7003 processors with AMD 3D V-Cache technology. Higher core counts and PCIe Gen4 I/O, improved 'Zen3' core performance,^{MLN-003} the world's largest L3 Cache,^{EPYC-024A} and industry-leading performance for technical computing workloads^{MLNX-032}

EFFICIENCY



Hybrid Multi-Die SoC Design

Optimized with CPU and memory clock synchronization
Great price/performance and compelling performance per watt

PERFORMANCE

Core Performance Upgrades

250+ world records on industry benchmarks¹
High frequencies for high performance



3RD GENERATION



INFINITY FABRIC™

SECURITY FEATURES



AMD Infinity Guard

Secure Nested Paging (SEV-SNP) added to AMD EPYC security features²

MEMORY

Breakthrough System Features

EPYC 7003 Series CPUs with AMD 3D V-Cache technology triple L3 cache per core to 96 MB compared to our main line 7003 Series CPUs



KEY FEATURES

- Improved 'Zen3' core delivers up to 19% more instructions per clock^{MLN-003}
- Largest available x86 Layer 3 cache, ^{EPYC-024A} up to 256 MB per processor in our main 7003 Series and 768 MB per processor in our EPYC 7003 Series CPUs with AMD 3D V-Cache technology
- High-frequency options to accelerate applications with limited scalability and help optimize license-constrained environments
- Enhanced memory performance with synchronized AMD Infinity Fabric and DRAM clocks
- Strong virtualization security features are enhanced with secure nested paging (SEV-SNP)²
- AMD EPYC processors power energy-efficient x86 servers, delivering exceptional performance and helping to reduce energy costs.
- 4-channel memory interleaving helps optimize low-core-count CPUs with lower memory costs for many workloads
- 6-channel memory interleaving provides efficient memory balance for mid and low core count CPUs
- 8-channel memory interleaving helps optimize core count with memory capacity and bandwidth for demanding workloads

NOTHING STACKS UP TO EPYC™

With 3rd Gen AMD EPYC processors, your decision makers can quickly access data in the cloud (on or off premises) or in containers, virtual machines, or bare-metal servers. Based on the innovative AMD Infinity Architecture, our approach to processor design means you can turbocharge applications with massive amounts of L3 cache, enabling you to get more work done in less time, and helping secure your critical data no matter where it resides.

The heart of the AMD Infinity Architecture is a leadership interconnect that supports extraordinary levels of scale at every layer. Components communicate using AMD Infinity Fabric™ technology—a connection that is used within cores, between cores, and with off-chip components—to connect 'Zen 3' processor cores, memory, bandwidth, and security mechanisms. As a result, the architecture offers breakthrough performance and efficiency and supports continual improvement of process technology to deliver on the promise of next-generation computing.

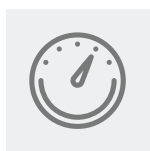
LEADING INNOVATION

Our revolutionary multi-die design uses 7nm and 14nm processes, providing independent paths for innovation. This allows AMD EPYC processors to leapfrog the industry by using a 7nm process for the CPU cores combined with a 14nm process for I/O, memory access, and security functions. Revolutionary AMD 3D V-Cache technology literally piggybacks additional cache onto each CPU die, delivering an unprecedented 768 MB of shared L3 cache per processor. By moving away from a monolithic design and decoupling development, we can use the best process and improve each part of the system in a way and a pace that helps ensure you get the newest technology into your data center first.

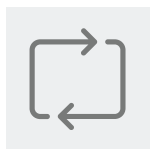
The use of multiple dies and a fast fabric interconnect allows for a system-on-chip (SoC) design that eliminates the need for many external support chips and the I/O latencies they induce. This balanced system approach gives you an abundance of resources so that you can match workloads and resources and make the best use of capital. You'll find that 1- and 2-socket servers with AMD EPYC processors satisfy most of your workload needs, helping you increase density, reduce capital, power, and cooling expenses, and help control your software licensing costs. Whether you need 8 cores per processor or 64, you'll get the same "all in" feature set—I/O, memory, memory bandwidth, and security capabilities—to accelerate workloads and help safeguard information.

OPTIMIZED PERFORMANCE

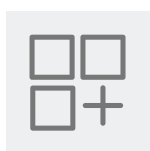
Whether you use enterprise applications, virtualized and cloud computing environments, software-defined infrastructure, high-performance computing, or data analytics applications, 3rd Gen AMD EPYC processors can help elevate your business productivity through fast application performance.



With up to 64 high-performance cores, fast execution pipelines, 4 MB L2 cache, up to 256 MB shared L3 cache in our main-line 7003 Series processors, and 768 MB with AMD 3D V-Cache technology, the AMD Infinity Architecture helps 3rd Gen EPYC Processors surpass previous-generation processors to deliver exceptional performance.



Eight memory channels and up to 128 lanes of PCIe Gen 4 I/O throughput per socket take performance beyond conventional constraints. High-speed connections between cores and memory, combined with a fabric clock that is coupled to run at maximum memory speeds, helping reduce memory latency to further accelerate data access and computation.



Performance means nothing if applications can't take advantage of it. We work with the open source community and major software vendors to help ensure their applications work with and take advantage of our architecture. With a broad and growing ecosystem of open tools and libraries and x86-application compatibility, you can have confidence that your software will work and perform.



CPU AND GPU INNOVATION

AMD is the first vendor to create matched CPUs and GPUs. Both 3rd Gen AMD EPYC Processors and AMD Instinct™ MI100 and MI200 Series GPU accelerators feature multichip architectures based on 7nm process technology and PCIe Gen 4 support.

We continue establish new standards for performance and inter-GPU connectivity, starting with high-end OAM-form-factor designs and then bringing the same technology to help power workloads in standard PCIe Gen 4-based data-center servers.

Based on our 2nd Gen CDNA™ architecture, the AMD Instinct™ MI250X accelerator is the world's fastest HPC and AI accelerator.^{[MI200-01](#)} Extending access to this record-breaking technology to PCIe form-factor devices, the Instinct MI210 accelerator delivers the fastest double-precision (FP64) performance of any PCIe data center accelerator to power HPC workloads.^{[MI200-41](#)}

Our Infinity Fabric™ Link technology helps move data seamlessly between GPU peers, with up to 800 GB/s of total aggregate theoretical bandwidth in the MI250X^{[MI200-13](#)} and up to 600 GB/s in the PCIe form-factor MI210 accelerators.^{[MI200-43](#)}



FLEXIBLE MEMORY CONFIGURATIONS

Whether you need a little or a lot of memory, 3rd Gen EPYC processors provide options designed with your needs in mind.

- Support for up to 4 TB of DDR4 memory running at up to 3200MHz
- Support for 4, 6, and 8 memory channel configurations
- Up to 256MB of L3 cache per socket in our main-line processors, helping increase data analytic speeds
- 768MB of L3 cache per processor equipped with AMD 3D V-Cache technology, raising the bar for breakthrough performance on technical computing workloads
- Near line rate data transmission with synchronized clock speeds between the AMD Infinity Fabric and memory

MODERN SECURITY FEATURES THAT ARE “HARDENED AT THE CORE”

Physical and virtual threats pose a risk throughout your organization and extend to your customers. Putting up safeguards requires a comprehensive security foundation that isn't an afterthought but is an integral part of your infrastructure. Powered by a dedicated, embedded processor, AMD EPYC helps maintain a secure compute environment from power-on to run time.

The architecture is “hardened at the core”, with security features within the chip and system. The SoC's security processor scrutinizes the boot process and helps manage up to 509 unique encryption keys known only to the CPU. Combined, these technologies help decrease potential attack surfaces as software is booted and executed and processes your critical data.

When enabled, new Secure Encrypted Virtualization-Secure Nested Paging (SEV-SNP) adds strong memory integrity protection capabilities to help prevent malicious hypervisor-based attacks like data replay, memory re-mapping, and more, to create an isolated execution environment and help keep your virtualized data center safe.

READY TO MAKE THE SWITCH?

As an IT practitioner, you know how important it is to keep your workloads and IT infrastructure operating at peak efficiency and within budget constraints. With the revolutionary AMD Infinity Architecture that delivers efficiency, performance, memory, and security features, AMD can help you guard your most important assets, power your workloads, and modernize your data center so that you can move at the speed of your business.

FOOTNOTES

For details on the footnotes used in this document, visit amd.com/en/claims/epyc and amd.com/en/claims/epyc3x.

1. For a complete list of world records see amd.com/worldrecords.

2. GD-183: AMD Infinity Guard features vary by EPYC™ Processor generations. Infinity Guard security features must be enabled by server OEMs and/or Cloud Service Providers to operate. Check with your OEM or provider to confirm support of these features. Learn more about Infinity Guard at <https://www.amd.com/en/technologies/infinity-guard>.

3. “Technical Computing” or “Technical Computing Workloads” as defined by AMD can include: electronic design automation, computational fluid dynamics, finite element analysis, seismic tomography, weather forecasting, quantum mechanics, climate research, molecular modeling, or similar workloads. GD-204.

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