POWERING ELECTRONIC HEALTHCARE SOFTWARE
ELECTRONIC HEALTH RECORDS
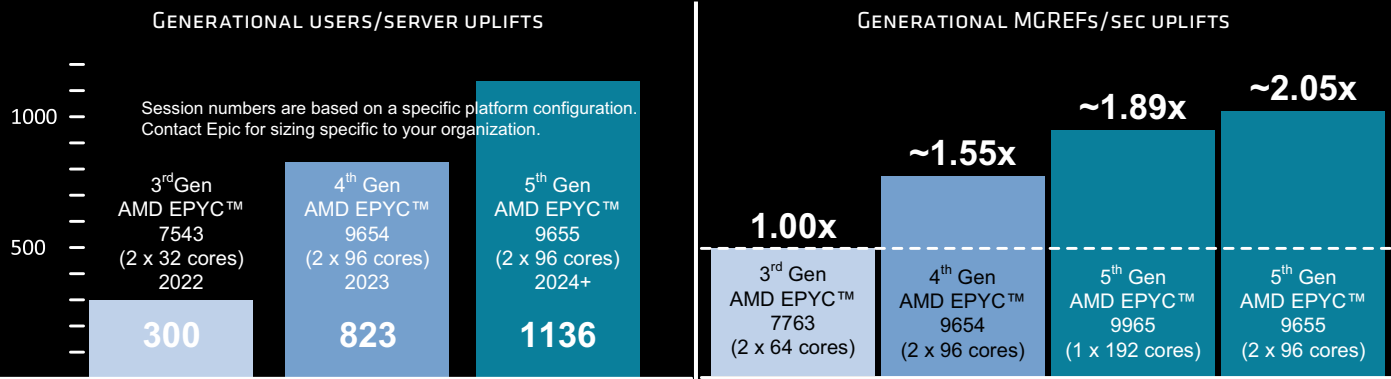
Powered by 5th Gen AMD EPYC™ Processors

October 2024

AT A GLANCE

Independent testing performed by Epic Corporation shows 5th Gen AMD EPYC™ general purpose processors delivering strong generational performance uplifts on their electronic health records software application.[1]

PERFORMANCE HIGHLIGHTS

Epic testing showed 2P 96c 5th Gen AMD EPYC CPUs handling ~4.53x more users/server vs. 2P 64c 3rd Gen AMD EPYC 7753 CPUs for client tier Hyperdrive sessions. 96c 5th Gen AMD EPYC 9655 CPUs outperform 64c 3rd Gen AMD EPYC 7763 CPUs by ~2.05x in MGREFs/s.

GENERATIONAL USERS/SERVER UPLIFTS

Session numbers are based on a specific platform configuration. Contact Epic for sizing specific to your organization.

- 3rd Gen AMD EPYC™ 7543 (2 x 32 cores) 2022 — **300**
- 4th Gen AMD EPYC™ 9654 (2 x 96 cores) 2023 — **823**
- 5th Gen AMD EPYC™ 9655 (2 x 96 cores) 2024+ — **1136**

GENERATIONAL MGREFs/SEC UPLIFTS

- 3rd Gen AMD EPYC™ 7763 (2 x 64 cores) — **1.00x**
- 4th Gen AMD EPYC™ 9654 (2 x 96 cores) — **~1.55x**
- 5th Gen AMD EPYC™ 9965 (1 x 192 cores) — **~1.89x**
- 5th Gen AMD EPYC™ 9655 (2 x 96 cores) — **~2.05x**

KEY TAKEAWAYS

Epic develops an integrated platform of modular electronic health records software that addresses multiple mission-critical aspects of healthcare systems. Epic testing showed 2P 96-core 5th Gen AMD EPYC 9655 processors supporting up to ~3.79x more users per server for the client tier Hyperdrive sessions compared to 3rd Gen AMD EPYC 7763 processors and has 15% improvement per core efficiency generationally over 2P 96- core 4th Gen AMD EPYC 9654 processors. 2P 96-core 5th Gen AMD EPYC 9655 deliver ~1.32x and ~2.05x more MGREFS/s than 2P 96-core 4th Gen AMD EPYC processors and 2P 64-core 3rd Gen AMD EPYC processors, respectively. 5th Gen AMD EPYC processors are available in 1P and 2P configurations and feature:

- Up to 128 "Zen 5" or 192 "Zen5c" cores.
- Up to 512 MB L3 cache in "Zen 5" AMD EPYC processors.
- Up to 4 links of Gen 3 Infinity Fabric™ at up to 32 Gbps.
- 12 memory channels that support up to 9 TB of DDR5-6000 memory.

- Support for PCIe® Gen 5 at up to 32 Gbps.
- AVX-512 instruction support for enhanced HPC and ML performance.
- AMD Infinity Guard technology to defend your data.[2]

IN THIS BRIEF

AMD EPYC 9005 PROCESSORS

5th Gen AMD EPYC processors are the newest generation of the powerful and efficient AMD EPYC processor family for servers that have set hundreds of world records for performance and efficiency. The AMD EPYC 9005 processor family is built on the breakthrough high performance, highly efficient "Zen 5" processor core architecture and advanced microprocessor process technologies to better meet the needs of the modern AI-enabled data center. The complete line of 5th Gen AMD EPYC processor offerings include a wide range of core counts (up to 192 cores and 384 threads per processor), max boost frequencies up to 5 GHz[3], generous L3 cache capacities, high energy efficiency, and competitive cost points. These cutting-edge technologies and features are all backed by the familiar x86 software compatibility that allows servers powered by AMD EPYC 9005 processors to readily support almost any business need.

INTERSYSTEMS IRIS® DATABASE TESTING RESULTS

The ODB server is the heart of the Epic product suite. Epic uses the InterSystems IRIS® Data Platform to store and distribute patient record information to the rest of the systems. Epic tested servers powered by various sizes of 3rd, 4th, and 5th AMD EPYC processors to verify their efficiency and performance and to determine the scalability of database operations. These tests measure millions of Global References per second (MGREFs/s), and the results show how AMD EPYC 9005 Series Processors deliver the excellent performance and scalability needed to successfully manage critical patient information. Table 1 shows systems tested by EPIC in their lab. Please contact Epic for your specific needs.

CPU	CORES	RAM	STORAGE	HOST OS	VM OS	ISC DB (IRIS) VER.	SIZING RESULT (MGREFS/S)	UPLIFT VS. 2P AMD EPYC 7763
2P 9354	64	1536 GB	SAN-based SSD	VMware ESXi 8.0	RHEL 8.10, 9.4 Ubuntu 22.04, 24.01	2024	18.0	~0.68x
2P 9554	128	1536 GB	SAN-based SSD	VMware ESXi 8.0	RHEL 8.10, 9.4 Ubuntu 22.04, 24.01	2024	38.0	~1.44x
2P 9654	192	1536 GB	SAN-based SSD	VMware ESXi 8.0	RHEL 8.10, 9.4 Ubuntu 22.04, 24.01	2024	47.0	~1.78x
2P 9754	256	1536 GB	SAN-based SSD	VMware ESXi 8.0	RHEL 8.10, 9.4 Ubuntu 22.04, 24.01	2024	54.0	~2.05x
2P 9355	64	1536 GB	SAN-based SSD	VMware ESXi 8.0	RHEL 8.10, 9.4 Ubuntu 22.04, 24.01	2024	22.0	~0.83x
2P 9655	192	1536 GB	SAN-based SSD	VMware ESXi 8.0	RHEL 8.10, 9.4 Ubuntu 22.04, 24.01	2024	54.0	~2.05x
1P 9755	256	1536 GB	SAN-based SSD	VMware ESXi 8.0	RHEL 8.10, 9.4 Ubuntu 22.04, 24.01	2024	39.0	~1.48x
1P 9965	384	1536 GB	SAN-based SSD	VMware ESXi 8.0	RHEL 8.10, 9.4 Ubuntu 22.04, 24.01	2024	50.0	~1.89x

Table 1: IRIS database performance comparing 5th Gen & 4th Gen vs. 3rd Gen AMD EPYC processors

FOR ADDITIONAL INFORMATION

Please see the following additional resources for more information about 5th Gen AMD EPYC features, architecture, and available models:

- AMD EPYC™ Processors
- AMD Documentation Hub

REFERENCES

1. Epic performed the testing using their proprietary test suite and test environments and recorded the results, providing them to AMD for publication. While the testing and results have not been independently verified by AMD, AMD engineers believe the results to be reasonable.
2. AMD Infinity Guard features vary by EPYC™ Processor generations and/or series. 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 http://www.amd.com/en/products/processors/server/epyc/infinity-guard.html. GD-183A
3. Maximum n for AMD EPYC processors is the maximum frequency achievable by any single core on the processor under normal operating conditions for server systems. EPYC-18

AUTHOR

Harini Malik contributed to this Performance Brief.

RELATED LINKS

- Epic*
- AMD
- AMD Documentation Hub

*Links to third party sites are provided for convenience and unless explicitly stated, AMD is not responsible for the contents of such linked sites and no endorsement is implied.

AMD EPYC 9005 FOR HEALTHCARE

5th Gen AMD EPYC CPUs deliver excellent per-core performance by taking advantage of fast CPU frequencies, low latency memory, and a unified cache structure. Strong performance plus robust security features make 5th Gen AMD EPYC processors the ideal choice for electronic healthcare systems and applications.

"ZEN 5" CORE & SECURITY FEATURES

AMD EPYC 9005 Series Processors support up to:

- 192 physical cores, 384 threads
- Up to 512 MB of L3 cache per CPU
- 32 MB of L3 cache per CCD
- 9 TB of DDR5-6000 memory
- Up to 128 (1P) or 160 (2P) PCIe® Gen 5 lanes

Infinity Guard security features[2]

- Secure Boot
- Encrypted memory with SME

AMD EPYC FOR EHR SOFTWARE

Epic has tested and validated 5th Gen AMD EPYC processors and added many of them to their list of recommended processors for use in its EHR software.

EPIC SYSTEMS CORPORATION

Epic Systems is one of the largest providers of health information technology, used primarily by large U.S. hospitals and health systems to access, organize, store and share electronic medical records. According to the company, hospitals that use its software held medical records of 78% of patients in the United States and over 3% of patients worldwide in 2022.

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