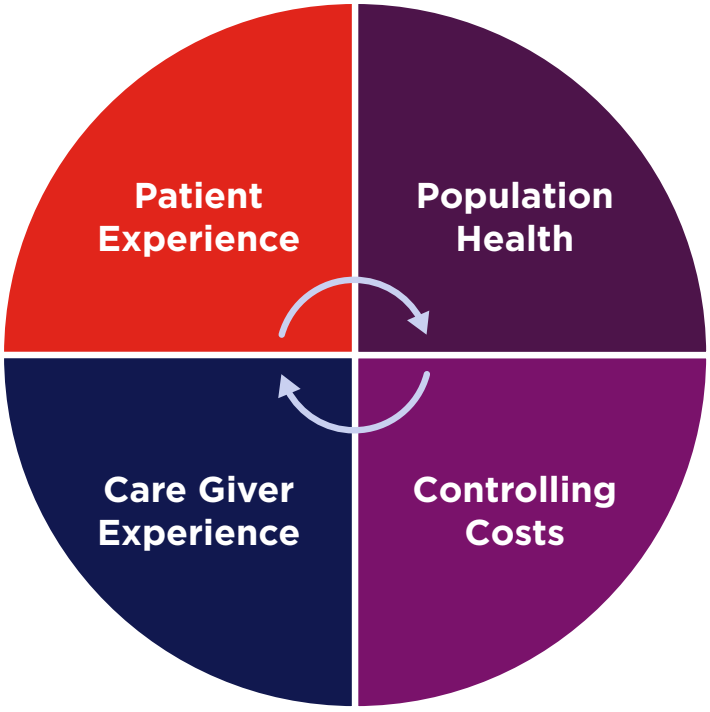
Powering electronic healthcare record (EHR) architecture with AMD EPYC™ processor-based Lenovo ThinkSystem servers

The healthcare industry is in a period of intense digital transformation, using technology to deliver better patient experiences and clinical outcomes and reduce administrative burdens. In this changing landscape, healthcare providers are dealing with larger and more complex systems of data, heightening regulatory and legal requirements, and increasing documentation requirements for care teams' communication with their patients. As costs rise, organizations and clinicians are under more pressure than ever to stay efficient, drive revenue, and continue to maintain a high quality of care.

To answer these challenges, electronic health record (EHR) systems have become standard for healthcare providers. EHRs offer patients a convenient way to access medical records, schedule appointments, receive test results, and communicate with their care providers. Healthcare providers, meanwhile, are using EHRs to more easily access centralized patient data, share and receive critical health data from across healthcare organizations, and improve patient interactions and research insights.

EHR systems are mission-critical elements of healthcare organizations' digital infrastructure. It's crucial that providers choose systems that can sustain their patient load both today and tomorrow. AMD EPYC™ processors in Lenovo ThinkSystem servers provide an excellent option for healthcare providers seeking to balance availability, scalability, and costs for their current and future EHR deployments.

As the amount of clinical data continues to grow in size and scope, clinical platforms must be able to deliver low-latency performance (reducing time to access data), robust scalability (the ability to expand as data grows), and high availability. AMD EPYC™ processor-powered Lenovo servers can do just that: A recent study names Lenovo as an industry leader in availability, with 78% of Lenovo server respondents saying they posted between six and seven nines of uptime, the highest reliability score among all x86 hardware vendors for the tenth consecutive year.[1] With two-socket Lenovo ThinkSystem servers with AMD EPYC™ processors validated to host EHR deployments, healthcare providers can leverage this availability, scalability, and performance to provide a better experience for their patients and gain valuable efficiencies for their staff.



Proven Scalability Strengths for EHR on AMD EPYC™ Processor-Powered Lenovo ThinkSystem Servers

Lenovo ThinkSystem servers with AMD EPYC™ processors provide healthcare organizations reliable, scalable performance at a low total cost of ownership (TCO). These advanced clinical platforms make the move from four-socket to two-socket systems possible, enabling organizations to:

- **Reduce operational complexity** by moving from four-socket to two-socket systems
- **Reduce costs** by achieving the scalability of a four-socket server at a two-socket price
- **Boost energy efficiency** with two-socket AMD EPYC™ processor-powered systems that are more energy-efficient per transaction per U of rack space
- **Improve scalability** with higher clock speeds, better latency, and more interconnect bandwidth, delivering two-socket SMP scalability rivaling that of more expensive four-socket systems

Figure 1 highlights the relative scalability, in terms of database references per second, that two-socket servers with various AMD EPYC™ processor models can deliver for the operational database (ODB) tier of Epic EHR deployments.[2] (Note that Figure 1 is normalized to the lowest-bin processor.)

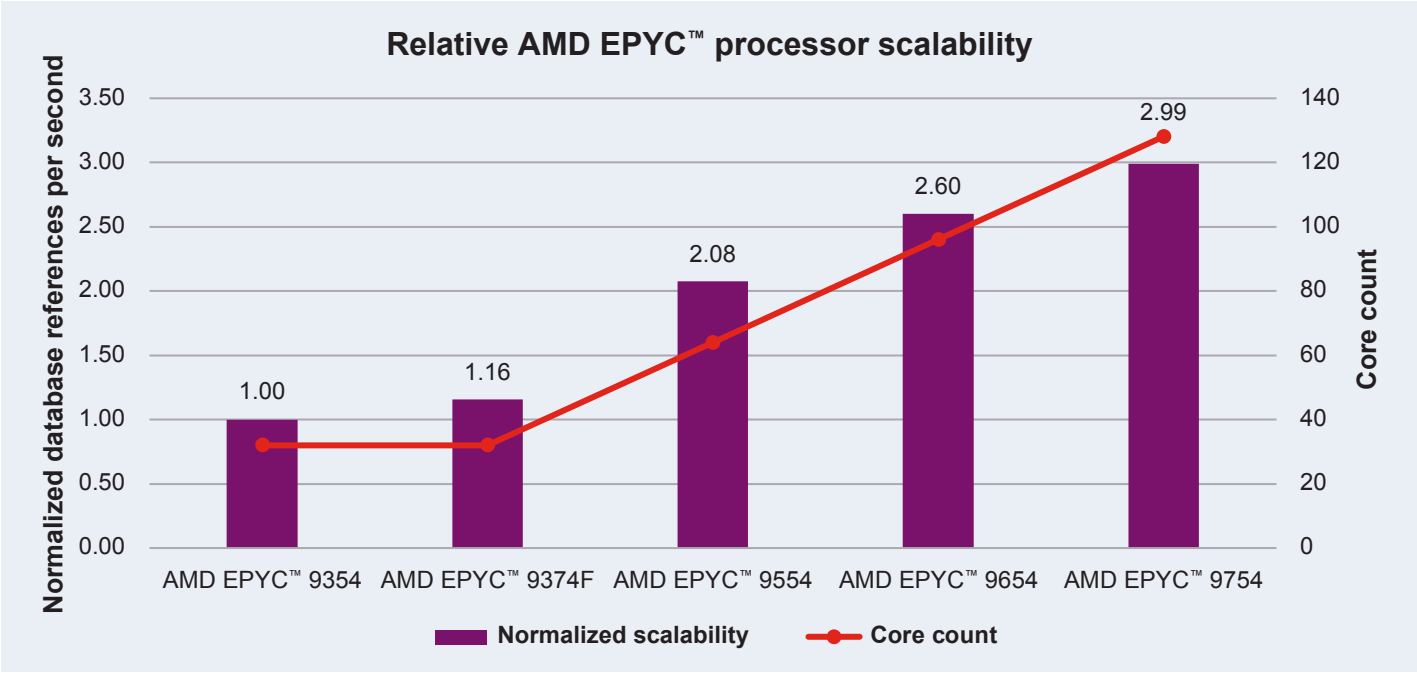


Figure 1: Relative AMD EPYC™ processor scalability. Higher is better.

But what do these numbers mean in the real world? According to Epic, all current customers could successfully deploy their EHR environment on servers powered by AMD EPYC™ processors, and the substantial majority could do so using a single-server SMP architecture.

4th Generation AMD EPYC™ Processors: Powering Healthcare Systems

4th Generation AMD EPYC™ 9004 Series processors bring the outstanding performance, high memory bandwidth and capacity, and application scalability necessary for demanding, mission-critical EHR systems. With the enhancements available in the latest AMD EPYC™ processor technology, customers can sustain more work per rack space unit ("U"). AMD EPYC™ platforms have maintained compatibility across multiple generations, which provides organizations with better platform continuity as infrastructure grows and ages.

These general-purpose processors offer up to 128 cores, up to 256 threads, and up to 384MB L3 cache while reducing energy consumption for more sustainable—and less costly—data center operations.

Learn more about 4th Generation AMD EPYC™ processors at https://www.amd.com/en/products/processors/server/epyc/4th-generation-9004-and-8004-series.html.

Table 1 presents how many current Epic customers each processor model can support using a single-server SMP architecture. Approximately 85% of current customers can fit their EHR operational database on an AMD EPYC™ two-socket server with this architecture, including room for growth, by using the highest bin AMD EPYC™ processor, and AMD EPYC™-based solutions using an ECP multi-server architecture can support the remaining 15%. Of course, every healthcare organization has its own specific requirements. Contact your Epic and Lenovo representatives to discuss how to size a deployment and the optimal platform for your specific organizational needs.

Table 1: Estimates of real-world healthcare metrics that AMD EPYC™ processor-based servers can support.

Processor	Percentage of customers live today expected to fit in two years
AMD EPYC™ 9354	55%
AMD EPYC™ 9374F	60%
AMD EPYC™ 9554	75%
AMD EPYC™ 9654	80%
AMD EPYC™ 9754	85%

By investing in servers with 4th Gen AMD EPYC™ processors from 32 to 128 cores, customers from small clinics to large hospital systems can account for growth for years to come, ensuring future-proofed platforms, system scalability, and budget stability to ease CAPEX expenditure planning. Some organizations may choose Lenovo's TruScale as-a-service offering to control budgeting stability, increase operational flexibility, and maintain current generation technologies.

Note that every healthcare organization has its own specific requirements, and the systems represented in this testing may not fit your needs. Contact your Lenovo representative to discuss how to size a deployment and the optimal platform for your specific organizational needs.

Lenovo ThinkSystem Servers Powered by 4th Generation AMD EPYC™ Processors for Healthcare

Two-socket Lenovo ThinkSystem rack servers featuring AMD EPYC™ processors include the ThinkSystem SR655 V3, ThinkSystem SR665 V3, ThinkSystem SR635 V3, and ThinkSystem SR645 V3. Customers looking to leverage their EHR data as they begin their AI journey should consider the ThinkSystem SR675 v3. Lenovo also supports AMD EPYC™ processor-powered systems designed for software-defined infrastructure via ThinkAgile platforms: ThinkAgile VX for VMware vSAN, ThinkAgile HX for Nutanix, and ThinkAgile MX for Microsoft Azure Stack HCI.

Learn more about Lenovo ThinkSystem servers powered by AMD EPYC™ processors at https://www.lenovo.com/us/en/c/servers-storage/servers-amd/.

Lenovo ThinkSystem SR645 V3

Why Choose Lenovo ThinkSystem Servers with AMD EPYC™ Processors for EHR

If you're part of an IT team for a healthcare provider that currently runs your EHR on servers from several generations ago, you may be starting to consider your next server purchase. To keep costs low, choose performant and supported solutions that will deliver the scalability necessary to support your environment for several years. 4th Generation AMD EPYC™ processor-based Lenovo ThinkSystem servers provide the following benefits for customer ODB environments:

- **Strong performance:** AMD EPYC™ processor-powered Lenovo systems have proven performance and scalability—critical in an environment where data volumes and patient numbers will only continue to grow.[4,5]
- **Savings:** Economical Lenovo ThinkSystem two-socket servers with AMD processors pack a great deal of power into just 1U or 2U of rack space. By replacing older, lower-performing four-socket servers with newer two-socket Lenovo systems powered by AMD EPYC™ processors, you can do the same amount of work in less space, saving on data center administration, power, and cooling costs. Plus, Lenovo XClarity Systems Management reduces monitoring and patching complexity while facilitating open standards-based management simplicity and capability.
- **Energy efficiency and sustainability:** Many organizations across industries have developed environmental, social, and governance (ESG) goals to boost sustainability. Healthcare providers are uniquely positioned to both make and benefit from improvements: Hospitals "use significant amounts of energy," per a 2024 Cochrane Review article, but "energy efficiency measures have been shown to save hospitals over USD 55,000 annually."[6] 4th Generation AMD EPYC™ processors boast enhanced energy efficiency that can help organizations boost performance per watt, thus reducing energy consumption and therefore power costs. Figure 2 shows the power efficiency, in terms of performance per watt, that two-socket servers with various AMD EPYC™ processor models can deliver.

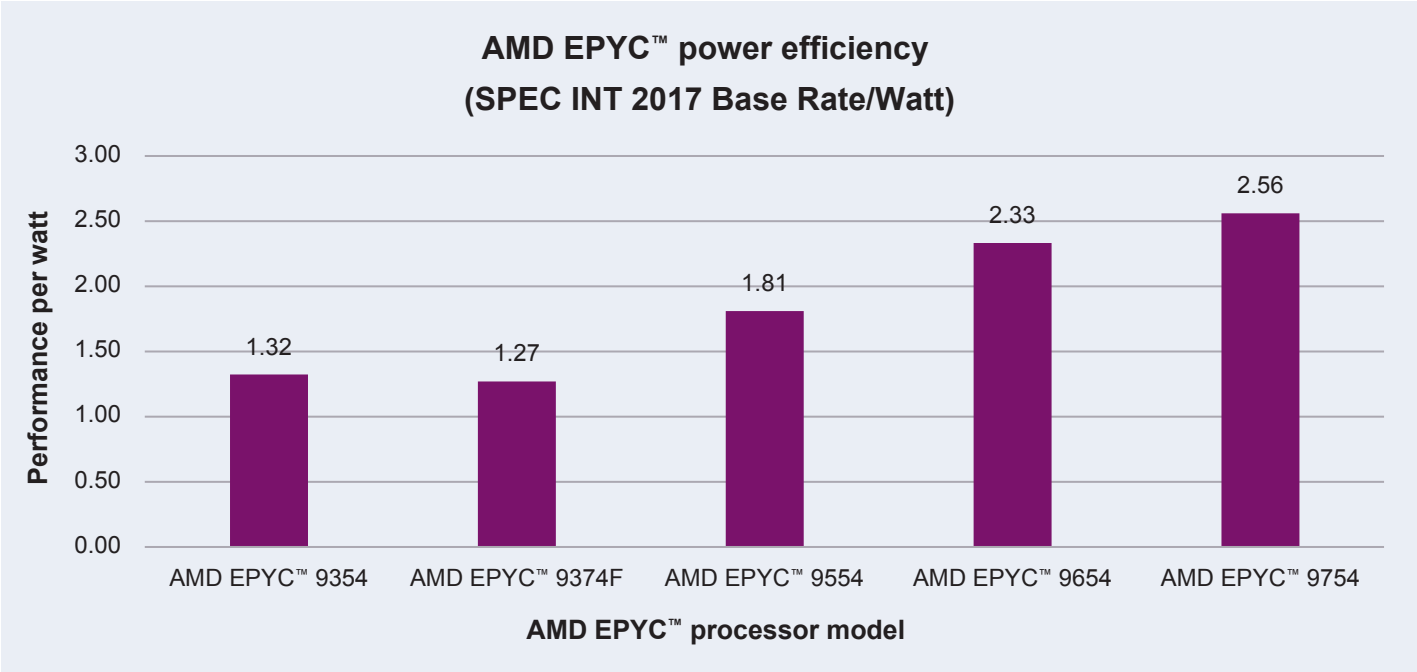


Figure 2: Power efficiency, in performance/watt, that various AMD EPYC™ processors can support. Higher is better.[7,8,9,10,11,12,13,14,15,16]

Robust Security for Critical Health Records

Security is a serious concern for any healthcare provider. On top of meeting the demands of patient health data regulations, such as HIPAA and GDPR, healthcare organizations must reckon with costly data breaches, ransomware, and other cyberattacks. To address these issues, Lenovo builds security into its servers from the beginning, from a secure supply chain and development lifecycle through to an immutable hardware Root of Trust and Lenovo System Guard monitoring. The results speak for themselves. According to the ITIC 2023 Global Server HW, Server OS Reliability Report, Lenovo ThinkSystem servers provide the “best x86 server security for the last five years.”[17]

Lenovo Infrastructure Solutions Group’s (ISG) security program (ThinkShield) has a long heritage, with its roots in System x security foundations. With a goal of being our customers’ most trusted partner, Lenovo ISG equips our customers with secure solutions from edge to cloud. We build security into our products from development through delivery. In a world where bad actors are constantly attacking servers and networks and seeking to steal critical data, Lenovo ISG is committed to programs and actions which will minimize security risks in our products and to our customers. Our award-winning supply chain is ranked by Gartner as the #3 High Tech Supply Chain for 2023 (in the Top 7 since 2015), the #8 Global Supply Chain (in the Top 35 since 2013), and the #1 supply chain in AP (2023). This ranking is across all firms and industries evaluated by Gartner.

Additionally, Lenovo XClarity Systems Management enhances Lenovo infrastructure with tools for increased system availability as well as greater management efficiency, which translates to stronger security. It simplifies crucial security-related tasks such as patching, ensuring that your systems are up to date to withstand the latest security vulnerabilities.

Conclusion

Constant innovation is part of modern healthcare, with healthcare providers from family clinics to hospital systems always seeking new ways to deliver exceptional patient experiences and drive revenue. A scalable, feature-rich EHR system can help organizations connect with their patients smoothly, expand visibility, grow efficiency, and save time and money.

Healthcare providers supporting EHR deployments can make these goals a reality by selecting two-socket Lenovo ThinkSystem servers powered by the latest AMD EPYC™ processors. Using these powerful new systems as the operational database layer for your EHR infrastructure can provide strong, predictable scalability as your organization expands while ensuring robust security for critical data and savings across your multi-year IT budget.

Visit www.lenovo.com/health to learn more about Lenovo Health and Life Sciences—and contact your Lenovo health account representative to size the optimal AMD EPYC™ processor-based Lenovo server platform for your EHR infrastructure needs.

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[1] "ITIC 2023 Global Server Hardware, Server OS Security Report," https://www.lenovo.com/us/en/resources/data-center-solutions/analyst-reports/itic-2023-global-server-hardware-server-os-security-report/.

[2] Epic is a trademark of Epic Systems Corporation.

[3] Performance needs will vary depending on each specific customer's use of their EHR. Alternate solutions available for the 15% of customers whose needs won't be met by systems we discuss in this solution brief.

[4] "ThinkSystem SR665 V3 Sets 2 World Records with New TPC-E Benchmark Result," https://lenovopress.lenovo.com/lp1958-sr665-v3-64c-genoa-tpc-e-benchmark-result-any-time.

[5] "ThinkSystem SD535 V3 Sets 6 World Records with New SPECjbb on Linux & on Windows Benchmark Result," https://lenovopress.lenovo.com/lp1960-sd535-v3-specjbb-on-linux-on-windows-benchmark-result-2024-05-02.

[6] "Interventions for increasing energy efficiency in hospitals," https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10913717/.

[7] "AMD EPYC™ 9354," https://www.amd.com/en/products/processors/server/epyc/4th-generation-9004-and-8004-series/amd-epyc-9354.html.

[8] "AMD EPYC™ 9374F," https://www.amd.com/en/products/processors/server/epyc/4th-generation-9004-and-8004-series/amd-epyc-9374f.html.

[9] "AMD EPYC™ 9554," https://www.amd.com/en/products/processors/server/epyc/4th-generation-9004-and-8004-series/amd-epyc-9554.html.

[10] "AMD EPYC™ 9654," https://www.amd.com/en/products/processors/server/epyc/4th-generation-9004-and-8004-series/amd-epyc-9654.html.

[11] "AMD EPYC™ 9754," https://www.amd.com/en/products/processors/server/epyc/4th-generation-9004-and-8004-series/amd-epyc-9754.html.

[12] "SPEC CPU(R)2017 Integer Rate Result," https://www.spec.org/cpu2017/results/res2023q1/cpu2017-20230227-34427.html.

[13] "SPEC CPU(R)2017 Integer Rate Result," https://www.spec.org/cpu2017/results/res2023q1/cpu2017-20230130-33901.html.

[14] "SPEC CPU(R)2017 Integer Rate Result," https://www.spec.org/cpu2017/results/res2023q1/cpu2017-20230116-33523.html.

[15] "SPEC CPU(R)2017 Integer Rate Result," https://www.spec.org/cpu2017/results/res2023q1/cpu2017-20230102-33310.html.

[16] "SPEC CPU(R)2017 Integer Rate Result," https://www.spec.org/cpu2017/results/res2023q2/cpu2017-20230605-37066.html.

[17] "ITIC 2023 Global Server Hardware, Server OS Security Report".