



MySQL performance on Lenovo ThinkSystem SR665 V3

Solution Brief

Managing Data Growth with MySQL

Modern enterprises face growing challenges in managing data-intensive workloads as digital transformation accelerates. To address these demands, Lenovo ThinkSystem SR665 V3 servers, powered by AMD EPYC™ 9004 (Genoa) and 9005 (Turin) processors, deliver exceptional compute density, memory bandwidth, and I/O performance.

This document evaluates MySQL performance on the Lenovo ThinkSystem SR665 V3 platform, comparing two generations of AMD EPYC processors using industry-standard benchmarks. The goal is to demonstrate how architectural advancements in Zen 5 improve throughput, scalability, and efficiency. This solution brief highlights performance testing of MySQL 8.0.93 on Lenovo ThinkSystem SR665 V3 servers equipped with AMD EPYC Genoa and Turin CPUs. Using HammerDB TPROC-C benchmarks, we measured throughput across varying user loads to assess scalability and efficiency. The server architecture supports AMD EPYC™ 5th Gen 9005 and 4th Gen 9004 series processors, delivering up to 192 cores and 384 threads per socket for increased parallelism in compute-intensive workloads. Memory performance is optimized with DDR5 DIMMs operating at speeds up to 6400 MT/s, enabling higher bandwidth and lower latency for demanding applications. It incorporates Compute Express Link (CXL) v1.1. For storage, the platform offers high-performance NVMe drives and a broad range of configurations to meet diverse capacity and throughput requirements. I/O performance is maximized through PCIe 5.0 support. Additionally, the integration of the OCP 3.0 NIC adapter delivers modular networking options with enhanced scalability and flexibility for evolving data center architectures.

This document aims to highlight the generational advancements in AMD's EPYC processor lineup by comparing two CPUs from the same family: one based on the Genoa architecture and the other on Turin. By analyzing performance metrics collected using hammerDB for MySQL TPROC-C, we demonstrate the increased computational power introduced with the new generation.

The Lenovo ThinkSystem SR665 V3 is designed as a storage-dense platform, supporting up to 40 hot-swap 2.5-inch SAS, SATA, or NVMe drive bays arranged across front (up to 24 bays), mid (8 bays), and rear (8 bays) access points. For larger capacity requirements, it accommodates up to 20 hot-swap 3.5-inch SAS/SATA/NVMe drives in a similar configuration (12 front, 4 mid, 4 rear). Additionally, the system provides M.2 drive support for OS boot or dedicated data storage, along with two 7mm hot-swap SAS/SATA/NVMe drives featuring optional RAID capability for enhanced redundancy and performance.

Business database solutions with faster time-to-value

Lenovo ThinkSystem SR665 V3 systems undergo extensive validation and performance tuning to eliminate the need for lengthy configuration, setup, and testing on your end. These servers deliver the following key benefits:

- The AMD EPYC 9004 series is built on the Zen 4 and Zen 4c architectures, while the AMD EPYC 9005 series is built on Zen 5 and Zen 5c architectures.
- By using the chiplet-based design they are achieving up to 192 cores and 384 threads per socket
- The supported DDR5 memory can be selected with up to 6400MT/s and it supports a total of 24 DIMM's and by using 256GB 3DS RDIMMs it can go as high as 6TB of system memory
- The combination of compute and storage makes this server an ideal choice for database consolidation and enhanced performance.

MySQL

MySQL is an open-source, SQL-based relational database management system (RDBMS) that stores data in tables with rows and columns. It supports the ACID properties (Atomicity, Consistency, Isolation, Durability), transaction-safe storage (InnoDB), multi-threaded and multi-user access, and is designed for high performance and scalability

It was released in 1995 by MySQL AB in Sweden and then it was acquired by Sun Microsystems, later by Oracle.

Some of the key features of MySQL are the following:

- SQL compliance, supporting tables, views, stored procedures, triggers
- Multiple storage engines, (InnoDB, MyISAM, etc.) plus JSON/NoSQL (not only SQL or non-relational) support
- Replication & clustering for high availability and scale-out
- Advanced indexing, (invisible, descending indexes), partitioning, and geo-spatial features
- Security, TLS/SSL, role-based access control
- Cross platform support (Windows, Linux, macOS, FreeBSD, etc.)

For more information about MySQL, you can access the following link:

<https://www.mysql.com/>

Lenovo ThinkSystem SR665 V3 hardware configuration

This configuration is tailored for small businesses seeking reliable, high-performance infrastructure for data-centric workloads.

To highlight the improvements introduced with the AMD EPYC Turin 9005 series, we selected the AMD EPYC 9175F CPU and compared it against the AMD EPYC 9174F, which is based on the previous Genoa architecture

The configuration features the following main components:

- **Server:** Lenovo ThinkSystem SR665 V3
- **Processor:** 2x AMD EPYC 9175F up to 5Ghz (4.2 Ghz base)/ 2 x AMD EPYC 9174F up to 4.4 Ghz (4.1 Ghz base) both with 16 cores and 32 threads
- **Memory:** 1.5 TB of DDR5 4800 MT/s memory/1.5 TB of DDR5 6000 MT/s memory
- **Storage pool:** 8x ThinkSystem 2.5" U.3 PM1743, 3.84TB Read Intensive NVMe PCIe
- **OS Storage:** 2x 240GB ThinkSystem Read Intensive SATA SSD (RAID 1)
- **Software:**
 - Ubuntu 24.04.3 LTS
 - MySQL 8.0.93



Figure 1. Lenovo ThinkSystem SR665 V3

To ensure optimal performance, the “High Performance Mode” profile was selected from the UEFI menu. Additionally, the determinism slider was set to “Power,” and both SMT (Simultaneous Multithreading) and CPPC (cooperative processor performance control) parameters were enabled

Lenovo ThinkSystem SR665 V3 software and storage configuration

For this performance evaluation, the Lenovo ThinkSystem SR665 V3 was deployed with a bare-metal installation of Ubuntu 24.04.3 LTS to minimize overhead and ensure maximum resource availability. MySQL 8.0.93 was installed on this platform and tuned specifically for high-performance transactional workloads. To achieve consistent throughput, the CPU governor was set to “performance” mode, allowing all processor cores to operate at their highest possible frequency. The database was hosted on four NVMe drives configured using Logical Volume Manager (LVM) striping. This configuration was chosen to maximize input/output throughput and reduce latency by distributing read and write operations across multiple drives. MySQL was configured with performance-oriented settings, including large InnoDB buffer pools to improve caching and reduce disk I/O, as well as optimized transaction log and concurrency parameters. These combined adjustments created an environment capable of handling high-concurrency, intensive transactional workloads, ensuring that the benchmark results accurately reflect real-world enterprise scenarios.

Performance Testing Details and Results

MySQL testing configuration

To evaluate the performance of the selected CPUs, we used the HammerDB TPROC-C benchmark, a widely recognized tool for simulating OLTP (Online Transaction Processing) workloads based on the industry-standard TPC-C specification.

The tests were conducted on a MySQL 8.0.93 environment running on Ubuntu 24.04.3 LTS to ensure consistency and applicability to production scenarios. The database schema was configured with 512 warehouses, representing a substantial dataset size that stresses both compute and storage subsystems. To assess scalability, we applied a variable user load ranging from 8 to 128 concurrent virtual users (VUs), simulating different levels of transactional concurrency. Each test scenario was executed three times per user count, and the average result was used for analysis to eliminate anomalies and ensure statistical reliability.

Two key performance metrics were captured: NOPM (New Orders Per Minute), which measures the number of new order transactions processed per minute and indicates transactional throughput, and TPM (Transactions Per Minute), which measures the total number of transactions processed per minute, providing an overall view of system capacity. In the following charts, the AMD EPYC 9174F (Genoa) serves as the baseline, while the performance of the AMD EPYC 9175F (Turin) is presented relative to that reference, highlighting generational improvements in CPU architecture

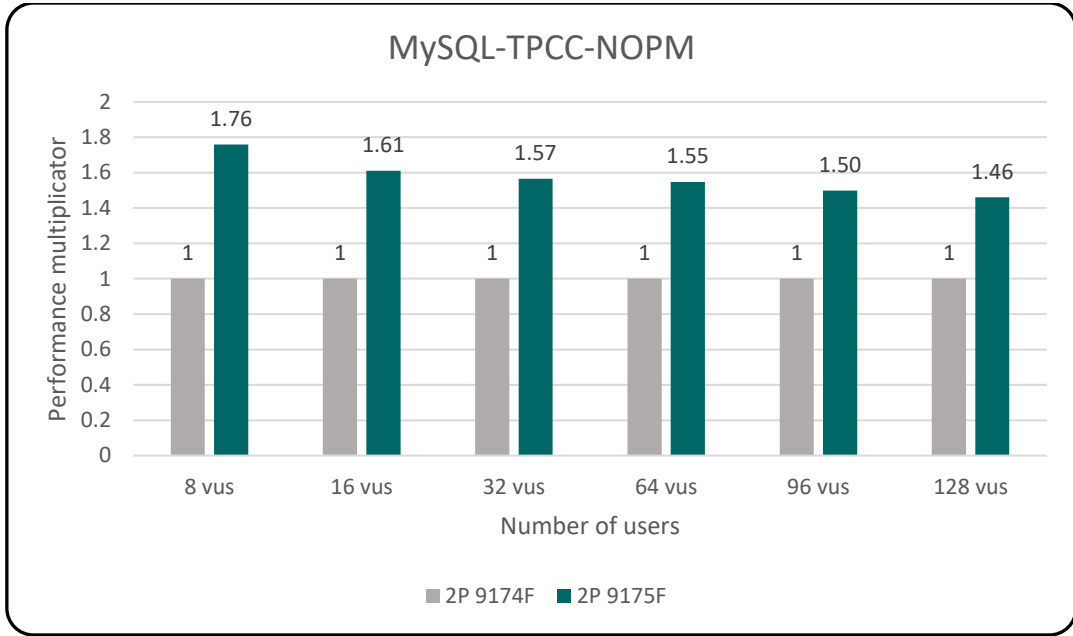


Figure 2 MySQL NOPM results normalized to the AMD Epyc 9174F CPU

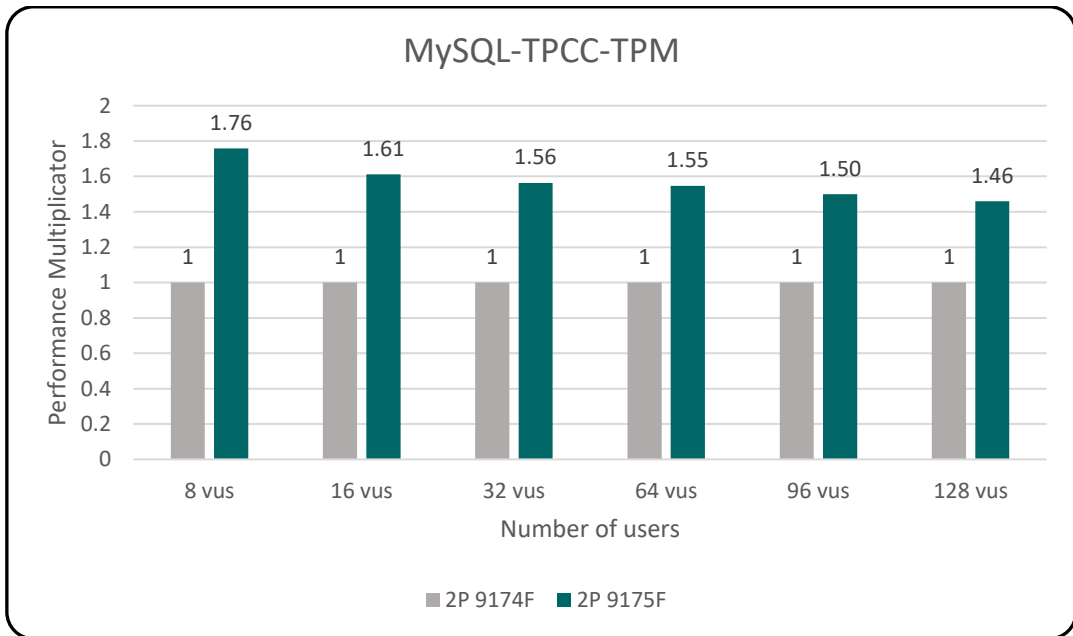


Figure 3 MySQL TPM normalized to the AMD Epyc 9174F CPU

The Lenovo ThinkSystem SR665 V3, featuring AMD EPYC 9175F or 9174F processors, delivers great performance and efficiency for modern enterprise workloads. Leveraging AMD's advanced Zen 4 (Genoa) and next-generation Zen 5 (Turin) architectures, these processors offer high core density, DDR5 memory support, and PCIe Gen5 connectivity—ideal for scalable, data-intensive applications such as MySQL. With Zen 5 introducing significant improvements in IPC (Instructions Per Cycle), memory bandwidth, and overall efficiency compared to Zen 4, the SR665 V3 provides a future-ready platform that enhances throughput, reduces latency, and optimizes power consumption for demanding data center environments.

Bill of Materials

Part Number	Product Description	Qty
7D9ACTO1WW	Server : ThinkSystem SR665 V3-3yr Warranty	1
C1XE	ThinkSystem V3 2U 24x2.5" Chassis	1
C2AR/BREJ	AMD EPYC 9175F 16C 320W 4.2GHz Processor/ AMD EPYC 9174F 16C 320W 4.1GHz Processor	2
C1XJ	ThinkSystem SR665 V3 2U Advanced Heatsink	2
BQ3D	ThinkSystem 64GB TruDDR5 4800MHz (2Rx4) 10x4 RDIMM-A	24
BTQ0	ThinkSystem 2.5" U.3 PM1743 3.84TB Read Intensive NVMe PCIe 5.0 x4 HS SSD	8
B8P9	ThinkSystem M.2 NVMe 2-Bay RAID Adapter	1
CAC9	ThinkSystem M.2 VA 240GB Read Intensive SATA 6Gb NHS SSD	2
BE4T	ThinkSystem Broadcom 57504 10/25GbE SFP28 4-Port OCP Ethernet Adapter	1
C0U4	ThinkSystem 750W 230V/115V Platinum Hot-Swap Gen2 Power Supply v3	2
7S0XCTO5WW	XClarity Controller Platin-FOD	1
SBCV	Lenovo XClarity XCC2 Platinum Upgrade (FOD)	1
5641PX3	XClarity Pro, Per Endpoint w/3 Yr SW S&S	1
1340	Lenovo XClarity Pro, Per Managed Endpoint w/3 Yr SW S&S	1
7Q01CTS4WW	SERVER PREMIER 24X7 4HR RESP	1

Table 2. Bill of Materials

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For More Information

To learn more about this Lenovo solution contact your Lenovo Business Partner or visit:

<https://www.lenovo.com/us/en/servers-storage/solutions/database/>

References:

Lenovo ThinkSystem SR665 V3 Server:

<https://lenovopress.lenovo.com/lp1608-thinksystem-sr665-v3-server>

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