ThinkSystem SR950 Performance Leadership Continues
Article

The Lenovo ThinkSystem SR950 hold an impressive 77 Performance World Records as of September 14, 2018, more than any other server in the industry. These #1 World Record benchmarks are based on a variety of workloads and include Business Processing, Big Data Analytics, Infrastructure Virtualization, Server Side Java and General and Technical Computing. The SR950 uses the Intel Xeon Scalable Family of processors for each benchmark configuration.

The ThinkSystem SR950 is designed for performance. Several design factors and firmware went into the SR950 that helped achieve world records across a wide spectrum of well-known benchmarks.

This article summarizes these outstanding performance results. For links to the benchmark reports, see the Performance Benchmark Briefs section.

121 World Records: The 77 World Records set by the SR950 server listed in this article are a subset of the overall Lenovo 121 World Records as documented in article Lenovo Servers: 121 World Record Performance Benchmarks.

Figure 1. Lenovo ThinkSystem SR950

Understanding Performance Benchmarks

Benchmarks provide objective information that can be used to compare computer platforms, components, operating systems, and specific system configurations. Performance benchmarks provide impartial information that can be used to evaluate and compare the performance of computer systems.

Lenovo and the server industry promote objective and credible benchmarking in various ways, including participation in standards bodies such as the Transaction Processing Performance Council (TPC) and Standard Performance Evaluation Corporation (SPEC). The benchmarks produced by these and other groups help provide objective information that can be used to compare computer platforms, components, operating systems, and system configurations.

World Record Benchmarks by Workload

The Lenovo ThinkSystem SR950 currently holds 77 Performance World Records in the areas of Big Data Analytics. Server Side JAVA, General Computing, Infrastructure Virtualization, Business Processing and Technical Computing (as of September 14, 2018).
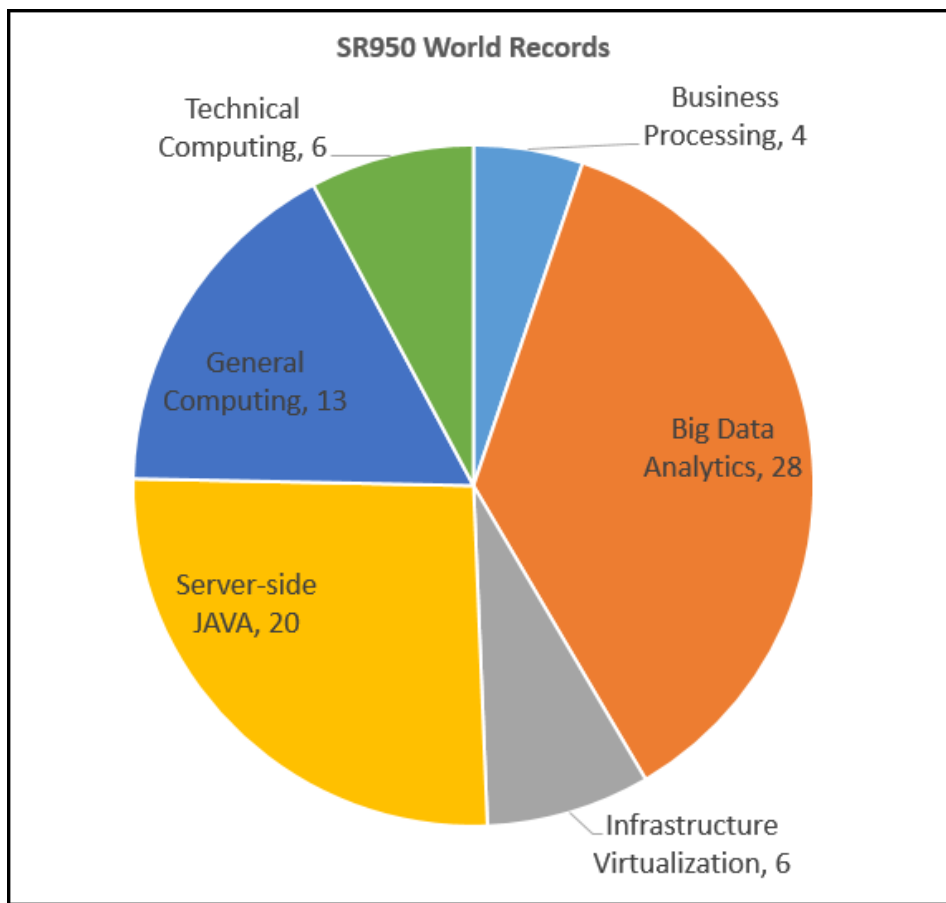

SR950 World Records

- Technical Computing, 6
- Business Processing, 4
- General Computing, 13
- Big Data Analytics, 28
- Server-side JAVA, 20
- Infrastructure Virtualization, 6

Figure 2. A breakdown of the world records that the SR950 has won

Business Processing – 4 world records

The Lenovo ThinkSystem SR950 has set four World Record benchmarks for Business Processing.

SAP Sales and Distribution (SAP SD) Benchmark

The Lenovo result:

- 4-Socket Performance – New World Record on Windows

  The Lenovo ThinkSystem SR950 delivered the best 4P performance result on Windows in the SAP Sales and Distribution Benchmark.

- 8-Socket Performance – New World Record on Windows

  The Lenovo ThinkSystem SR950 delivered the best 8P performance result on Windows in the SAP Sales and Distribution Benchmark.

About this benchmark: SAP Sales and Distribution (SD) Standard Application Benchmarks test the hardware and database performance of SAP applications and components. SAP Application Performance Standard (SAPS) is a hardware-independent unit of measurement that describes the performance of a system in creating the order, creating a delivery note for the order, displaying the order, changing the delivery, posting a goods issue, listing orders, and creating an invoice.

Why it matters? If you are running SAP Business Suite applications, a leadership benchmark score means this server is the highest performing server for processing business transaction workflows in an SAP environment.

TPC-E Benchmarks

The Lenovo result:

- Overall Performance and 4-Socket Price/Performance - Two maintained world records

  The Lenovo ThinkSystem SR950 holds the best performance result ever (all servers) and the best ever 4P price/performance TPC-E benchmark result.

About this benchmark: The TPC-E benchmark is designed to enable clients to more objectively measure and compare the performance and price of various OLTP systems. The TPC-E benchmark uses a database to model a brokerage firm with customers who generate transactions related to trades, account inquiries, and market research. Although the underlying business model of TPC-E is a brokerage firm, the database schema, data population, transactions, and implementation rules have been designed to be broadly representative of modern OLTP systems.

Why it matters: If you are running On-Line Transaction Processing or decision support workloads and databases, a leadership benchmark score means this server is the highest performing server for your data-intensive OLTP transactions or data intensive queries

Big Data Analytics – 28 world records

The Lenovo ThinkSystem SR950 has set 28 World Record Big Data Analytics benchmarks.

SAP HANA (BWoH)

The Lenovo result:

- 4-Socket Performance – 12 World Records (6 new and 6 maintained)

  The Lenovo ThinkSystem SR950 holds 12 performance world records with the 4 socket SAP HANA BWoH benchmark. This includes data load, query throughput and query runtime. Six of the records are new on the BWOH version 3 benchmark (1.3B and 5.2B records) and six are maintained on the BWOH version 1 benchmark (1.3B and 2.6B records).

About this benchmark: The SAP BW Edition for SAP HANA (BW/4HANA) Standard Application Benchmark is the latest addition to the list of SAP BW benchmarks and goes well beyond the scope and features used in the BW-AML benchmark. The new benchmark is designed to fully utilize the new capabilities of SAP HANA to process the benchmark workload. The benchmark consists of three phases data load, query throughput and query runtime.

Why it matters? If you are running SAP HANA, a leadership benchmark score means this server is the highest performing server specifically for your SAP HANA memory intensive database and analytics workloads.

STAC-M3 Shasta Suite

The Lenovo results:

- 4-Socket performance - 16 maintained World Records

  The Lenovo ThinkSystem SR950 holds 16 world records for the "big memory" STAC-M3 benchmark.

About this benchmark: The STAC-M3 Benchmark suite is the industry standard for testing solutions that enable high-speed analytics on time series data. The STAC-M3 benchmarks measures challenging areas such as time-series analytics, risk simulations, and processing of very high-speed data. The key metric is query response time. In particular, STAC benchmarks test high-speed analytics on time-series data -- tick-by-tick market data. The benchmark is used by large global banks, brokerage houses, exchanges, hedge funds, proprietary trading shops, and other market participants.

Why it matters: If you are processing high speed financial services or securities, a leadership benchmark score means this server is the highest performing server to process your high speed analytics and financial transactions.

Infrastructure Virtualization – 6 world records

The Lenovo ThinkSystem SR950 has set six World Record Infrastructure Virtualization benchmarks.

SPEC virt_sc 2013

The Lenovo results:

- 8-Socket performance - Three maintained world records

  The Lenovo ThinkSystem SR950 holds a world record performance, performance per watt and server performance per watt on the 8P SPEC virt_sc 2013 benchmark.

- 4-Socket performance - Three new world records

  The Lenovo ThinkSystem SR950 delivered three world record performance, performance per watt and server performance per watt on the 4P SPEC virt_sc 2013 benchmark.

About this benchmark: The SPEC virt_sc 2013 benchmark measures the end-to-end performance of all system components including the hardware, virtualization platform, and the virtualized guest operating system and application software. SPECvirt_sc2013 is the second-generation SPEC VIRT benchmark for evaluating the virtualization performance of datacenter server consolidation, including enterprise class workloads.

Why it matters: If you are virtualizing multiple workloads, a leadership benchmark score means this server is the highest performing server for memory intensive virtualized environments.

Server-side Java - 20 world records

The Lenovo ThinkSystem SR950 has set 20 World Records for the SPECjbb Server-side Java benchmark.

SPECjbb 2015

The Lenovo results:

- 8-Socket performance - Four maintained world records

  The Lenovo ThinkSystem SR950 holds 4 world records for 8P performance results for the SPECjbb2015-MultiJVM and SPECjbb2015-Distributed benchmarks.

- 6-Socket performance - Four new world records

  The Lenovo ThinkSystem SR950 delivered 4 world records for 6P performance results for the SPECjbb2015-MultiJVM and SPECjbb2015-Distributed benchmarks.

- 4-Socket performance – Six world records (2 new and 4 maintained)

  The Lenovo ThinkSystem SR950 holds 6 world records for 4P performance results for the SPECjbb2015-MultiJVM and SPECjbb2015-Distributed benchmarks.

- 3-Socket performance – Six new world records

  The Lenovo ThinkSystem SR950 delivered 6 world records for 3P performance results for the SPECjbb2015-MultiJVM and SPECjbb2015-Distributed benchmarks.

About this benchmark: The SPECjbb2015 benchmark has been developed from the ground up to measure performance based on the latest Java application features. It is relevant to all audiences who are interested in Java server performance, including JVM vendors, hardware developers, Java application developers, researchers and members of the academic community.

Why it matters: If you are interested Java server performance, a leadership benchmark score means this server is the highest performing server for the latest Java application response time and throughput.

General Computing – 13 world records

The Lenovo ThinkSystem SR950 has set 13 World Records General Computing benchmarks.

SPEC CPU2006 and CPU2017

The Lenovo results:

- 8-Socket performance - Four world records (1 new and 3 maintained)

  The Lenovo ThinkSystem SR950 holds four 8P world records for compute-intensive applications with the SPEC CPU benchmarks. This include SPEC CPU 2017 and SPEC CPU 2006 benchmarks.

- 6-Socket performance - Four new world records

  The Lenovo ThinkSystem SR950 delivered four 6P world records for compute-intensive applications with the SPEC CPU 2017 benchmarks.

- 4-Socket performance - One new world record

  The Lenovo ThinkSystem SR950 delivered one 4P world records for compute-intensive applications with the SPEC CPU 2017 benchmark.

- 3-Socket performance - Four new world records

  The Lenovo ThinkSystem SR950 delivered four 3P world records for compute-intensive applications with the SPEC CPU 2017 benchmarks.

About these benchmarks:

SPEC CPU 2017 contains SPEC's next-generation, industry-standardized, CPU intensive suites for measuring and comparing compute intensive performance, stressing a system's processor, memory subsystem and compiler. CPU2017 has 43 sub-benchmarks, organized into four suites. SPEC designed these suites to provide a comparative measure of compute-intensive performance across the widest practical range of hardware using workloads developed from real user applications.

The **SPEC CPU 2006** benchmark is an older industry-standardized, CPU-intensive benchmark suite, stressing a system's processor, memory subsystem and compiler. It provides a comparative measure of compute-intensive performance across the widest practical range of hardware using workloads developed from real user applications. SPECfp is the floating point measurement of SPECcpu focusing on highly scientific workloads. SPECint is the integer component of SPECcpu focusing on integer-math based workloads.

Why it matters: If you are running compute-intensive workloads, a leadership benchmark score means this server is the highest performing server for how fast a server completes a task (speed) and/or how much a server can accomplish in a certain time (throughput or rate measurement).

Technical Computing – 6 world records

The Lenovo ThinkSystem SR950 set six World Record Technical Computing benchmarks.

SPECompG 2012

The Lenovo result:

- 3-Socket performance – New World record

  The Lenovo ThinkSystem SR950 delivered a world record for the SPEC OMP2012 benchmark.

- 4-Socket performance – New World record

  The Lenovo ThinkSystem SR950 delivered a world record for the SPEC OMP2012 benchmark.

About this benchmark: The SPECompG 2012 benchmark is designed for measuring performance using applications based on the OpenMP 3.1 standard for shared-memory parallel processing. The benchmark includes 14 scientific and engineering application codes, covering everything from computational fluid dynamics (CFD) to molecular modeling to image manipulation.

Why it matters: If you are running scientific or engineering applications, a leadership benchmark score means this server is the highest performing server for these workloads.

SPECmpiM

The Lenovo result:

- 3-Socket performance – One new World Record

  The Lenovo ThinkSystem SR950 delivered a new one-node 3S world record for the SPECmpiM benchmark.

- 4-Socket performance – One new World Record

  The Lenovo ThinkSystem SR950 delivered a new one-node 4S world record for the SPECmpiM benchmark.

- 6-Socket performance – One new World Record

  The Lenovo ThinkSystem SR950 delivered a one-node 6S world record for the SPECmpiM benchmark.

- 8-Socket performance – One new World Record

  The Lenovo ThinkSystem SR950 delivered a one-node 8S world record for the SPECmpiM benchmark.

About this benchmark: The SPECmpiM 2007 benchmark suite is for evaluating MPI-parallel, floating point, compute intensive performance across a wide range of cluster and SMP hardware. This suite gives users the most objective and representative benchmark suite for measuring and comparing high-performance computer systems.

Why it matters: If you are running compute intensive technical workloads, a leadership benchmark score means this server is the highest performing server measuring the CPUs, MPI library, communication interconnect, memory architecture, compilers and file system.

Conclusion

The Lenovo ThinkSystem SR950 continues its dominance of data center performance by increasing the total #1 World Record benchmarks to 77 (as of September 14, 2018). This outstanding performance is achieved with multiple configurations and a variety of workloads and benchmarks.

Performance Benchmark Briefs

The following links take you to the Performance Benchmark Reports for each benchmark result.

TPC-E Benchmarks

- TPC-E 4S Performance Report - maintained

SAP Sales and Distribution (SAP SD) Benchmark

- SAP Sales and Distribution 4S Report - new
- SAP Sales and Distribution 8S Report - new

SAP HANA (BWoH)

- SAP HANA BWOH 4S 1.3B v3 - new
- SAP HANA BWOH 4S 5.2B v3 - new
- SAP HANA BWoH 4S 1.3B v1 - maintained
- SAP HANA BWoH 4S 2.6B v1 - maintained

STAC-M3 Shasta Suite

- 4S STAC-M3 - maintained

SPECvirt_sc2013

- 4S SPEC virt 2013 - new
- 8S SPEC virt 2013 - maintained

SPECjbb 2015

- 6S SPECjbb 2015 - new
- 4S SPECjbb 2015 - new
- 3S SPECjbb 2015 - new
- 8S SPECjbb 2015 - maintained
- 4S SPECjbb 2015 - maintained

SPEC CPU2006 and CPU2017

- 8S SPECcpu2017 - new
- 6S SPECcpu2017 - new
- 4S SPECcpu2017 - new
- 3S SPECcpu2017 - new
- 8S SPECfp_base2006 - maintained
- 8S SPECint_base2006 - maintained
- 8S SPECspeed_int_base2017 - maintained

SPECompG 2012

- SPECompG 2012 3S - new
- SPECompG 2012 4S - new

SPECmpiM

- SR950 SPECmpiM 1-node 3S - new
- SR950 SPECmpiM 1-node 4S - new
- SR950 SPECmpiM 1-node 6S - new
- SR950 SPECmpiM 1-node 8S - new

Further reading

For further reading, see these resources

- SR950 product web page
- SR950 Product Guide

This article is one in a series on the ThinkSystem SR950 and SR850 servers:

- Five Highlights of the ThinkSystem SR950
- Five Highlights of the ThinkSystem SR850
- Choosing between Lenovo ThinkSystem SR850 and SR950
- Workloads for 4-Socket and 8-Socket Servers
- Usability in the Design of the ThinkSystem SR950
- The Value of Refreshing Your 4-Socket Servers with the ThinkSystem SR950
- ThinkSystem SR950 Memory Decisions
- ThinkSystem SR950 Server Configurations
- The Value of Refreshing Your 8-Socket Servers with the ThinkSystem SR950
- Lenovo ThinkSystem SR950 New Options and Features - December 2017
- ThinkSystem SR950 Performance Leadership
- Lenovo Servers for Mission Critical Workloads
- Microsoft and Lenovo ThinkSystem SR950 – A Perfect Match
- Accelerate Your 4- and 8-Socket Server Refresh Cycle
- SAP Business Process Applications and Lenovo ThinkSystem SR950 – A Perfect Match
- ThinkSystem SR950 New Options - March 2018
- SAP HANA and Lenovo ThinkSystem SR950 – A Perfect Match
- **ThinkSystem SR950 Performance Leadership Continues**
- New Solution for SAP HANA - Lenovo ThinkAgile HX
- The Advantages of Keeping Mission Critical Workloads On-Premises vs Going to the Cloud
- SQL Server Migration and Lenovo ThinkSystem SR950

About the Author

Randall Lundin is a Senior Product Manager in the Lenovo Infrastructure Solution Group. He is responsible for planning and managing ThinkSystem servers. Randall has also authored and contributed to numerous Lenovo Press publications on ThinkSystem products.

Related product families

Product families related to this document are the following:

- 4-Socket Rack Servers
- 8-Socket Rack Servers
- Mission Critical Servers
- ThinkSystem SR950 Server

Notices

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