Lenovo ThinkSystem Servers Continue to Lead the Industry in Performance and Customer Value

Positioning Information

For many customers, the performance of their servers is paramount, and as a result Lenovo strives to design its systems to maximize performance. The proof points to show the success we have achieved doing this are the #1 benchmarks we have achieved. We produce systems that cater across all workloads that our customers require, achieving #1 benchmarks across a broad range of applications types. We currently hold an incredible total of **242 world records** for performance.

This number consists of **62** #1 results set on systems equipped with third-generation Intel Xeon Scalable processors, **91** with second-generation Intel Xeon Scalable processors, **74** using second-generation AMD EPYC processors, **12** using first-generation Xeon Scalable processors, and **3** using the Intel Xeon E processor (as of March 1, 2021).

These results were achieved on a wide variety of workloads that include Applications, Data Management, Application Development and Testing, Infrastructure, and Engineering/Technical computing. Lenovo achieved these world-records across multiple ThinkSystem platforms ranging from single-socket to 8-socket, spanning Intel and AMD architectures. This demonstrates Lenovo's ability to design systems that create value for customers across architectures, workloads, and industries.

Many of the latest world record benchmark results were set by ThinkSystem SR950, SR670 and SR650 rack servers that incorporate the new second-generation Intel Xeon Scalable processors. They offer increased performance over the first generation processors, as well as support for faster 2933 MHz TruDDR4 memory. These servers also support Intel Optane DC persistent memory, which is designed specifically for data center workloads. Optane DC offers a new, flexible tier of memory that creates an unprecedented combination of high-capacity, affordability, and persistence.

Other #1 benchmark results were achieved by ThinkSystem SR665, SR655, SR645, and rack servers using second-generation AMD EPYC processors. The SR665 (2-socket) and SR655 (1-socket) are Lenovo's newest 2U rack servers. The SR645 (2S) is one of the newest 1U rack servers we have. AMD EPYC 7002 Series processors offer up to 64 cores each and 128 PCIe Gen 4 lanes, making them ideal for compute-intensive and I/O-intensive applications.

Additional #1 results were achieved using Lenovo SR850, SN850, SN550, and SD530 servers equipped with second-generation Intel Xeon Scalable Family processors, as well as the SR250 and ST250, that use the Intel Xeon E processor. As well as the HX7821 and SE350 with the Xeon SP first generation processor.

One of the latest servers to achieve new benchmarks is the SR860 V2 that has attained 58 new records, this is a 4U server that has highlights in areas of high memory, scalability, storage, GPUs and reliability. And debuting on this month´s benchmarks article is the SR850 V2 that achieved a world record on SPEC CPU.

While specific ThinkSystem models were used for these benchmark tests, much of the same technology and attention to detail is prevalent throughout the ThinkSystem product line, providing exceptional performance and reliability across the product line.

This article summarizes the outstanding performance of the world record ThinkSystem servers.

Applications — 36 Current World Records

Lenovo ThinkSystem SR950, SR860 V2, SR850 V2, SR665, SR655, SR645, ST250 and SR250 servers achieved **36** current world records in benchmarks designed to test system performance across a range of application workload types. Application types include Collaboration, Enterprise Resource Management, Supply Chain, Customer Resource Management, and other typical data center applications.

SAP Sales and Distribution (SAP SD 2T) Benchmark

The **1** ThinkSystem world record result on the SAP Sales and Distribution Benchmark is:

Performance

ThinkSystem SR950 (**1** current world record):

- 4-Socket (Windows)

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 system is the highest-performing server in the industry for processing your business transaction workflows in an SAP environment.

SPEC CPU 2017 Benchmark

The **35** ThinkSystem world record results on the SPEC CPU 2017 benchmark include:

SPEC CPU 2017 Performance

ThinkSystem SR950:

- 6-Socket — **1** current world record
- 3-Socket — **4** current world records

ThinkSystem SR860 V2

- 4-Socket – **6** current world record

ThinkSystem SR850 V2

- 4 Socket- **1** current world record

ThinkSystem SR665:

- 2-Socket — **6** current world records

ThinkSystem SR645:

- 2-Socket — **6** current world records

ThinkSystem SR655:

- 1-Socket — **8** current world records

ThinkSystem SR250:

- 1-Socket — **2** current world records

ThinkSystem ST250:
- 1 Socket – **1** current world record

About this benchmark: 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. CPU 2017 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.

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

Data Management — 77 current World Records

Lenovo ThinkSystem SR860 V2, SR950 and SR650 servers delivered **77** current world records on benchmarks designed to test the performance of servers performing Structured Data Management analysis, Structured Data Analytics, and Unstructured Data Analytics.

SAP HANA (BWoH) Benchmark

The **10** ThinkSystem world record results on the HANA BWoH benchmark in a single-node setup include:

Performance

ThinkSystem SR950:

- 4-Socket (10.4B Records v3) — **3** current world records
- 4-Socket (1.3B Records v3) — **1** current world records

ThinkAgile HX7821:

- 4 Socket – **3** current world records

ThinkSystem SR860 V2

- 4 Socket (1.3B Records v3) – **3** current world records

About this benchmark: The SAP BW Edition for SAP HANA (BW/HANA) 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 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.

* The current SAP BW edition for SAP HANA benchmark is version 3. Existing v1 and v2 results are still valid; however, SAP will no longer accept new benchmark results for versions v1 and v2.

Why it matters: If you are running SAP HANA, a #1 benchmark score means this server is the highest performing server in its class for processing SAP HANA memory-intensive database and analytics workloads.

STAC-M3 Benchmarks

The **60** ThinkSystem world record results on the STAC-M3 benchmark include:

STAC-M3

ThinkSystem SR950 (**21** current world records):

- 4-Socket (9 Antuco suite)
- 4-Socket (16 Shasta suite)
- 4-Socket (8 Kanaga suite, with a two-year data set size)

ThinkSystem SR860 V2 (**22** current world records)

- 4-Socket (14 Antuco suite)
- 4-Socket (8 Kanaga suite, with a two-year data set size)

ThinkSystem SR650 (**17** current world records):

- 2-Socket (Antuco suite)

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 running high-speed financial services or securities workloads, a #1 benchmark score means this server is the highest performing server in its class for processing high-speed analytics and financial transactions.

TPC-E Benchmark

The **5** ThinkSystem world record results on the TPC-E benchmark include:

TPC-E Performance

ThinkSystem SR860 V2 (**1** current world records):

- 4-Socket

ThinkSystem SR650 (**1** current world record):

- 2-Socket

ThinkSystem SR655 (**1** current world record):

- 1-Socket

TPC-E Price/Performance

ThinkSystem SR860 V2 (**1** current world record):

- 4-Socket

ThinkSystem SR655 (**1** current world record):

- 1-Socket

About this benchmark: The TPC-E benchmark is designed to enable users 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 that of a brokerage firm, the database schema, data population, transactions, and implementation rules have been designed to be broadly representative of modern OLTP systems in general.

Why it matters: If you are running On-Line Transaction Processing (OLTP) or decision-support workloads and databases, a #1 benchmark score means this server is the highest-performing server in its class for data-intensive OLTP transactions and data-intensive queries.

TPC-x BB

The **2** ThinkSystem world record results on the TPC-x BB benchmark:

Performance

ThinkSystem SR650 (**2** current world records at SF30000):

- 2-Socket (36+3 nodes)

About this benchmark: The TPCx-BB Express Benchmark BB (TPCx-BB) measures the hardware and software performance of systems running Hadoop. It runs 30 frequently performed analytical queries in the manner of retailers with physical and online store presences. It uses machine learning algorithms for semi-structured and unstructured data queries, and SQL queries for structured data.

Why it matters: If your data center runs Hadoop, a world-record benchmark score means the system is the highest performing server in its class for complex Big Data processing needs.

Application Development & Testing — 38 Current World Records

Lenovo ThinkSystem SR950, SR860 V2, SR665, and SR655, and SR645 servers hold **38** current world records in benchmarks designed to test server performance in a Java development and testing environment.

SPECjbb2015

The **38** ThinkSystem world record results on the SPECjbb2015 benchmark include:

Performance

ThinkSystem SR950:

- 8-Socket — **2** current world records (Windows)
- 6-Socket — **6** current world records (4 Linux / 2 Windows)
- 3-Socket — **6** current world records (Linux)

ThinkSystem SR860 V2

- 4-Socket – **4** current world record (Windows)

ThinkSystem SR665:

- 2-Socket — **7** current world record (4 Linux / 3 Windows)

ThinkSystem SR655:

- 1-Socket — **12** current world record (6 Linux / 6 Windows)

ThinkSystem SR645:

- 2-Socket — **1** current world record (Windows)

About this benchmark: The SPECjbb 2015 benchmark has been developed from the ground up to measure performance based on the latest Java application features. It is relevant to all audiences 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 world-record benchmark score means this server is the highest performing server in its class for Java application response time and throughput needs.

Infrastructure — 27 Current World Records

Lenovo ThinkSystem SR950, SR850, SR655, SR665, SR650, SR645, SN850, SN550, and SD530 servers earned **27** current world records on benchmarks designed to test the performance of servers utilized in an IT/Web infrastructure/AI role. Workload types include Networking, Systems Management, Virtual Desktop, File & Print, Media Streaming, and Web Serving.

SPEC Power

The **15** ThinkSystem world record results on the SPECpower_ssj2008 benchmark include:

Performance

ThinkSystem SR950 (**2** current world records):

- 8-Socket (1 Linux / 1 Windows)

ThinkSystem SR860 V2 (**1** current world record)

- 4-Socket (Linux)

ThinkSystem SR850 (**1** current world record):

- 4-Socket (Linux)

ThinkSystem SN850 (**2** current world records):

- 4-Socket/7-node (4S/7N, 1 Linux, 1 Windows)

ThinkSystem SN550 (**1** current world record):

- 14-node (14N, Windows)

ThinkSystem SD530 (**2** current world records):

- 2-Socket/4-node (2S/4N, 1 Linux / 1 Windows)

ThinkSystem SR665 (**2** current world records):

- 2-Socket/2U (1 Linux / 1 Windows)

ThinkSystem SR645 (**2** current world records):

- 2-Socket/1U (1 Linux / 1 Windows)

ThinkSystem SR655 (**2** current world record):

- 1-Socket (Linux)

About this benchmark: The SPECpower_ssj 2008 benchmark suite measures the power and performance characteristics of server-class computer equipment. It is used to compare power and performance among different servers and serves as a tool set for use in improving server efficiency.

Why it matters: The IT industry, computer manufacturers, and governments are increasingly concerned with the energy use of servers. This benchmark provides a means to measure power (at the AC input) in conjunction with a performance metric. This helps IT managers consider power characteristics along with other selection criteria to increase the efficiency of data centers. For those concerned about energy savings, a world-record benchmark score means the server provides the best performance in its class relative to power consumption.

SPEC VIRT_SC 2013

The **8** ThinkSystem world record results on the SPEC virt_sc 2013 benchmark include:

Performance

ThinkSystem SR950 (**2** current world records):

- 8-Socket
- 4-Socket

Performance-per-watt

ThinkSystem SR950 (**2** current world records):

- 8-Socket
- 4-Socket

ThinkSystem SR650 (**1** current world record):

- 2-Socket

Server Performance-per-watt

ThinkSystem SR950 (**2** current world records):

- 8-Socket
- 4-Socket

ThinkSystem SR650 (**1** current world record):

- 2-Socket

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. SPEC virt_sc 2013 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 virtualize multiple workloads, a world-record benchmark score means this system is the highest performing server in its class for memory-intensive virtualized environments.

VMmark 3.1

The **2** ThinkSystem world record result on the VMmark 3.1 benchmark:

Performance

ThinkSystem SR655 (**1** current world record):

- 1-Socket/2-node (1S/2N)

ThinkSystem SR665 (1 current world record)

- 2 Socket/2-node (2S/2N)

About this benchmark: The VMmark 3.1 benchmark measures the performance, scalability, and power consumption of multi-server virtualization platforms. It tests using real-world complex workloads, such as clone and deploy, virtual machine migration, storage migration operations, shared nothing migration, and snapshotting, as well as traditional application-level workloads.

Why it matters: Knowing how effectively and efficiently your servers operate is essential to maximizing performance and scalability while reducing energy costs. A world-record benchmark score means a system is the highest performing server in its class for cloud, OLTP, and other virtualization platform workloads.

TPC-x IoT

The **2** ThinkSystem world record results on the TPC-x IoT benchmark include:

Performance

ThinkSystem SR655 (**1** current world record):

- 1-Socket (4+1 nodes)

Price/Performance

ThinkSystem SR655 (**1** current world record):

- 1-Socket (4+1 nodes)

About this benchmark: The TPCx-IoT benchmark enables direct comparison of different software and hardware solutions for IoT gateways. TPCx-IoT measures the performance, price/performance, and availability IoT gateway systems that receive vast quantities of data from many devices and run real-time analytic queries on that data. The benchmark workload represents typical IoT gateway systems running on standard hardware and software platforms.

Why it matters: If you gather and process massive amounts of data via IoT devices and need to perform real-time analysis of that data, a world-record benchmark score means the system is the highest performing server in its class for performing analytic queries on IoT data.

Engineering/Technical — 64 Current World Records

Lenovo ThinkSystem SR950, SR860 V2, SR665, SR655 and SR650 servers earned **64** current world records in benchmarks designed to test a system's performance running various Engineering/Technical/HPC/ AI workloads.

SPEC OMP 2012

The **4** ThinkSystem world record results on the SPEC OMP 2012 benchmark include:

Performance

ThinkSystem SR950 (**1** current world record):

- 3-Socket

ThinkSystem SR860 V2 (**1** current world record)

- 4-Socket

ThinkSystem SR665 (**1** current world record):

- 2-Socket

ThinkSystem SR655 (**1** current world record):

- 1-Socket

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 system is the highest performing server in its class for these workloads.

SPECmpiM 2007

The **33** ThinkSystem world record results on the SPECmpiM 2007 benchmark include:

Performance

ThinkSystem SR950 (**3** current world records):

- 8-Socket (Medium Metric 1-node)
- 6-Socket (Medium Metric 1-node)
- 3-Socket (Medium Metric 1-node)

ThinkSystem SR860 V2 (**16** current world records)

- 4-Socket (Medium Metric 1-node)
- 4-Socket (Medium Metric1-node)
- 4-Socket (Medium Metric 2-node)
- 4-Socket (Medium Metric 2-node)
- 4-Socket (Medium Metric 3-node)
- 4-Socket (Medium Metric 3-node)
- 4-Socket (Medium Metric 4-node)
- 4-Socket (Medium Metric 4-node)
- 4-Socket (Large Metric 1-node)
- 4 Socket (Large Metric 1-node)
- 4-Socket (Large Metric 2-node)
- 4 Socket (Large Metric 2-node)
- 4-Socket (Large Metric 3-node)
- 4 Socket (Large Metric 3-node)
- 4-Socket (Large Metric 4-node)
- 4 Socket (Large Metric 4-node)

ThinkSystem SR665 (**11** current world records):

- 2-Socket (Large Metric 6-node 33.1)
- 2-Socket (Large Metric 5-node 29.1)
- 2-Socket (Large Metric 4-node 24.8)
- 2-Socket (Large Metric 3-node 18.9)
- 2-Socket (Large Metric 2-node 13.6)
- 2-Socket (Large Metric 1-node 6.02)
- 2-Socket (Medium Metric 6-node 74.0)
- 2-Socket (Medium Metric 5-node 71.4)
- 2-Socket (Medium Metric 3-node 60.4)
- 2-Socket (Medium Metric 2-node 52.1)
- 2-Socket (Medium Metric 1-node 34.1)

ThinkSystem SR655 (**3** current world records):

- 1-Socket (Large Metric 2-node)
- 1-Socket (Large Metric 1-node)

- 1-Socket (Medium Metric 1 node)

About this benchmark: The SPECmpiM 2007 benchmark suite is used to evaluate 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 in its class, taking into account the CPUs, MPI library, communication interconnect, memory architecture, compilers, and file system performance.

SPEC ACCEL

The **12** ThinkSystem world record results on the SPEC ACCEL benchmark include:

ThinkSystem SR665 (**5** current world records):

- 2-Socket/1-Node (2S/1N) 3 records
- 1-Socket/1-Node (1S/1N) 2 records

ThinkSystem SR655 (**1** current world record):

- 1-Socket/1-Node (1S/1N)

Think System SR860 V2 (**6** records)

- SR860V2 4S (1 record)
- SR860V2 4S (1 record)
- SR860V2 4S (1 record)
- SR860V2 4S (1 record)
- SR860V2 4S (1 record)
- SR860V2 4S (1 record)

About this benchmark: The SPEC ACCEL benchmark suite tests performance with computationally intensive parallel applications running under the OpenCL, OpenACC, and OpenMP 4 target offloading APIs. The suite exercises the performance of the accelerator, host CPU, memory transfer between host and accelerator, support libraries and drivers, and compilers.

Why it matters: If you are running servers with accelerators (GPUs, coprocessors), a #1 benchmark score means a solution incorporating this server (equipped with a specific accelerator and supporting software) is the highest performing solution in its class.

MLPerf

Lenovo ThinkSystem SR670 and SE350 servers delivered **15** current world records on MLPerf Inference v0.7 benchmarks designed to test Artificial Intelligence inference performance, that is, to measure how fast systems can process inputs and produce results using a trained model.

MLPerf is a consortium of industry-leading Artificial Intelligence organizations who share the goal of creating fair and meaningful benchmarks for measuring performance of Machine Learning hardware, software and services. Due to it's extensive support, MLPerf is fast becoming the machine learning benchmark of choice for the industry.

The world record results on the MLPerf benchmark include:

ThinkSystem SR670

- 2 processors, 4 NVIDIA A100-PCIe GPUs (6 world records)

- Medical Imaging task, 99.0% Accuracy, Offline Scenario
- Medical Imaging task, 99.9% Accuracy Offline Scenario
- Speech-to-text task, 99.0% Accuracy Offline Scenario
- NLP task, 99.9% Accuracy, Server Scenario
- Recommendation task, 99.0% Accuracy, Server Scenario
- Recommendation task, 99.9% Accuracy ,Server Scenario

ThinkSystem SE350

- 1 processor, 1 NVIDIA T4 (9 world records)
    - Medical Imaging task, BraTS 2019 dataset, 3D-UNet model, 99% accuracy target, SingleStream scenario
    - Medical Imaging task, BraTS 2019 dataset, 3D-UNet model, 99% accuracy target, Offline scenario
    - Medical Imaging task, BraTS 2019 dataset, 3D-UNet model, 99.9% accuracy target, SingleStream scenario
    - Medical Imaging task, BraTS 2019 dataset, 3D-UNet model, 99.9% accuracy target, Offline scenario
    - Image Classification task, ImageNet dataset, ResNet model, 99% accuracy, Multiple Stream scenario
    - Speech-to -text task, Librispeech dataset, RNN-T model, 99% accuracy, Single Stream scenario
    - Object detection (large) task, COCO dataset, SSD-Large model, 99% accuracy, Multiple Stream scenario
    - Object detection (small) task, COCO dataset, SSD-small model, 99% accuracy, Multiple Stream scenario
    - Object detection (small) task, COCO dataset, SSD-small model, 99% accuracy, Single Stream scenario

About this benchmark: The MLPerf inference benchmark measures how fast a system can perform machine learning (ML) inference using a trained model. The MLPerf inference benchmark is intended for a wide range of systems from mobile devices to servers. MLPerf Inference is a benchmark suite for measuring how fast systems can process inputs and produce results using a trained model.

Why it matters: If you are running machine learning (ML) or artificial intelligence (AI) workloads using trained models, a #1 benchmark score means this server is the highest performing server in its class for how fast systems can train models to a target quality metric.

Conclusion

The portfolio of Lenovo ThinkSystem servers continues its dominance of data center performance, with **242** world record benchmarks (as of March 1, 2021). This outstanding performance was achieved across multiple configurations and a variety of workloads and industry benchmarks.

To learn more about ThinkSystem servers, go to

Performance Benchmark Reports

Each ThinkSystem benchmark has a Lenovo Performance Benchmark Report. These Performance Benchmark Reports detail the specific benchmark, benchmark result, and hardware/software configuration used for that benchmark result. The reports also provide a link to the specific benchmark results page (e.g., SPEC, TPC, SAP, etc.). View all Performance Benchmark Reports.

The following Lenovo ThinkSystem benchmark world records are current as of March 1, 2021.

SAP SD 2T

- SR950 4S - https://www.sap.com/dmc/benchmark/2019/Cert19015.pdf

SAP BWoH

- SR950 4S 10.4B Records v3 - https://www.sap.com/dmc/benchmark/2019/Cert19014.pdf (3 records)
- SR950 4S 1.3B Records v3 - https://www.sap.com/dmc/benchmark/2021/Cert21010.pdf (1 record)
- SR860 V2 4S 1.3B Records v3 - https://www.sap.com/dmc/benchmark/2020/Cert20036.pdf (3 records)
- ThinkAgile HX7821 4S 24.7B Records v3 - https://www.sap.com/dmc/benchmark/2020/Cert20026.pdf (3 records)

[1] The current SAP BW edition for SAP HANA benchmark is version 3. SAP will no longer accept new benchmark results for versions 1 and 2.

TPC-E

- SR860 V2 4S -- http://tpc.org/4087 (2 records - performance and price/performance world records)
- SR650 2S - http://www.tpc.org/4084 (1 record - performance world record)
- SR655 1S - http://www.tpc.org/4085 (2 records - performance and price/performance world records)

SPECvirt_sc2013

Performance

- SR950 4S - http://www.spec.org/virt_sc2013/results/res2019q2/virt_sc2013-20190312-00118-perf.html
- SR950 8S - http://www.spec.org/virt_sc2013/results/res2019q2/virt_sc2013-20190611-00119-perf.html

Performance Per Watt

- SR650 2S - http://www.spec.org/virt_sc2013/results/res2017q4/virt_sc2013-20171018-00102-ppw.html
- SR950 4S - http://spec.org/virt_sc2013/results/res2019q2/virt_sc2013-20190312-00118-ppw.html
- SR950 8S - http://www.spec.org/virt_sc2013/results/res2019q2/virt_sc2013-20190611-00119-ppw.html

Server Performance Per Watt

- SR650 2S - http://www.spec.org/virt_sc2013/results/res2017q4/virt_sc2013-20171018-00102-ppws.html
- SR950 4S - http://www.spec.org/virt_sc2013/results/res2019q2/virt_sc2013-20190312-00118-ppws.html
- SR950 8S - http://www.spec.org/virt_sc2013/results/res2019q2/virt_sc2013-20190611-00119-ppws.html

VMmark 3.1

- SR655 1S 2-node - https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/vmmark/2019-09-17-Lenovo-ThinkSystem-SR655.pdf

- SR665 2S 2-node - https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/vmmark/2020-11-17-Lenovo-ThinkSystem-SR665.pdf

SPEC CPU 2017

- SR950 6S SPEC_speed_int_base2017 - http://spec.org/cpu2017/results/res2019q2/cpu2017-20190401-11612.html
- SR950 3S SPEC_speed_int_base2017 - http://spec.org/cpu2017/results/res2019q2/cpu2017-20190401-11610.html
- SR950 3S SPEC_speed_fp_base2017 - https://www.spec.org/cpu2017/results/res2019q2/cpu2017-20190319-11383.html
- SR950 3S SPEC_rate_int_base2017 - https://www.spec.org/cpu2017/results/res2019q2/cpu2017-20190319-11385.html
- SR950 3S SPEC_rate_fp_base2017 - https://www.spec.org/cpu2017/results/res2019q2/cpu2017-20190319-11381.html
- SR860 V2 4S SPECspeed_int_base2017 - https://spec.org/cpu2017/results/res2020q4/cpu2017-20201026-24274.html
- SR860 V2 4S SPECspeed_int_base_energy2017 - https://spec.org/cpu2017/results/res2020q4/cpu2017-20201026-24300.html
- SR860 V2 4S SPECspeed_fp_base2017 - https://spec.org/cpu2017/results/res2020q4/cpu2017-20201026-24276.html
- SR860 V2 4S SPECspeed_fp_base_energy2017 - https://spec.org/cpu2017/results/res2020q4/cpu2017-20201026-24299.html
- SR860 V2 4S SPECrate_int_base_energy2017 - https://spec.org/cpu2017/results/res2020q4/cpu2017-20201026-24302.html
- SR860 V2 4S SPECrate_fp_base_energy2017 - https://spec.org/cpu2017/results/res2020q4/cpu2017-20201026-24303.html
- SR850 V2 4S SPECspeed_int_base2017- https://spec.org/cpu2017/results/res2020q4/cpu2017-20201207-24526.html (Tie)
- SR665 2S SPEC_rate_Int_base_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200525-22554.html
- SR665 2S SPEC_rate_fp_peak_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21920.html
- SR665 2S SPEC_speed_fp_base_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21921.html
- SR665 2S SPEC_speed_fp_peak_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200525-22553.html
- SR665 2S SPEC_speed_fp_peak_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21921.html
- SR665 2S SPEC_rate_int_peak_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200525-22554.html
- SR645 2S SPEC_speed_int_base_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21925.html
- SR645 2S SPEC_speed_int_fp_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21925.html
- SR645 2S SPEC_rate_int_base_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21924.html

- SR645 2S SPEC_rate_int_peak_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21924.html
- SR645 2S SPEC_rate_fp_base_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21926.html
- SR645 2S SPEC_rate_fp_peak_energy_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200413-21926.html
- SR655 1S SPEC_rate_int_peak_2017 - http://spec.org/cpu2017/results/res2020q1/cpu2017-20200217-20914.html
- SR655 1S SPEC_rate_int_base_energy_2017 - http://spec.org/cpu2017/results/res2019q4/cpu2017-20190926-18527.html
- SR655 1S SPEC_rate_int_peak_energy_2017 - http://spec.org/cpu2017/results/res2019q4/cpu2017-20190926-18527.html
- SR655 1S SPEC_rate_fp_base_energy_2017 - http://spec.org/cpu2017/results/res2019q4/cpu2017-20190926-18529.html
- SR655 1S SPEC_rate_fp_peak_energy_2017 - http://spec.org/cpu2017/results/res2019q4/cpu2017-20190926-18529.html
- SR655 1S SPEC_speed_int_peak_energy_2017 - http://spec.org/cpu2017/results/res2019q4/cpu2017-20190926-18526.html
- SR655 1S SPEC_speed_fp_base_energy_2017 - http://spec.org/cpu2017/results/res2019q4/cpu2017-20190926-18528.html
- SR655 1S SPEC_speed_fp_peak_energy_2017 - http://spec.org/cpu2017/results/res2019q4/cpu2017-20190926-18528.html
- SR250 1S SPECspeed_int_base_energy_2017 - http://spec.org/cpu2017/results/res2020q1/cpu2017-20200217-20920.html
- SR250 1S SPECspeed_int_base_2017 - http://spec.org/cpu2017/results/res2020q2/cpu2017-20200608-22814.html
- ST250 1S SPECspeed_int_base - http://spec.org/cpu2017/results/res2020q3/cpu2017-20200622-23130.html

SPECpower_ssj2008

- SD530 2S 4-node - https://www.spec.org/power_ssj2008/results/res2018q3/power_ssj2008-20180828-00857.html (Windows)
- SD530 2S 4-Node - https://www.spec.org/power_ssj2008/results/res2019q3/power_ssj2008-20190623-00977.html (Linux)
- SN850 4S 7-node - https://www.spec.org/power_ssj2008/results/res2018q3/power_ssj2008-20180828-00852.html (Windows)
- SN550 14 nodes - https://www.spec.org/power_ssj2008/results/res2017q4/power_ssj2008-20171011-00794.html (Windows)
- SR860 V2 4S https://spec.org/power_ssj2008/results/res2020q4/power_ssj2008-20201201-01059.html (Linux) 4S4U
- SR655 1S - https://www.spec.org/power_ssj2008/results/res2019q3/power_ssj2008-20190717-00987.html (Linux Jv 1.7.0_80)
- SR655 1S - https://www.spec.org/power_ssj2008/results/res2020q3/power_ssj2008-20200714-01039.html (Windows)
- SR850 4S 7-node - https://www.spec.org/power_ssj2008/results/res2019q3/power_ssj2008-20190731-00999.html (Linux)
- SR850 4S - https://www.spec.org/power_ssj2008/results/res2019q3/power_ssj2008-20190626-

00978.html (Linux)

- SR950 8S - https://www.spec.org/power_ssj2008/results/res2018q3/power_ssj2008-20180828-00853.html (Windows)
- SR950 8S - https://www.spec.org/power_ssj2008/results/res2019q2/power_ssj2008-20190312-00928.html (Linux)

STAC-M3

- SR950 4S - https://stacresearch.com/KDB171024 combined with https://stacresearch.com/KDB170629 (**16** records)
- SR950 4S - www.stacresearch.com/KDB190322b (**4** records)
- SR950 4S - https://stacresearch.com/KDB190322a (**1** record Antuco Suite)
- SR860 V2 4S - https://stacresearch.com/KDB201109 (Antuco **14** records, 2 yr Kanaga **8** records)
- SR650 2S - https://stacresearch.com/KDB170703 combined with https://stacresearch.com/KDB171010 (**6** records)
- SR650 2S - https://stacresearch.com/KDB190320b (**11** records)

TPCx-IOT

- SR655 1S 4+1 nodes- http://www.tpc.org/5756 (**2** world records - performance and price/performance)

TPCx-BB

- SR650 2S 36+3 nodes - http://www.tpc.org/3512 (**2** world records for performance @ SF30000; fence claim by Software = Cloudera and 78 CPUs)

SPEC ACCEL

- SR665 2S OpenMP - https://www.spec.org/accel/results/res2020q2/accel-20200416-00138.html
- SR665 2S OpenACC - https://www.spec.org/accel/results/res2020q2/accel-20200416-00137.html
- SR665 2S OpenCL - https://www.spec.org/accel/results/res2020q2/accel-20200505-00141.html
- SR665 1S OpenACC - https://www.spec.org/accel/results/res2020q2/accel-20200416-00139.html
- SR665 1S OpenCL - https://www.spec.org/accel/results/res2020q2/accel-20200505-00140.html
- SR655 1S OpenMP - https://www.spec.org/accel/results/res2019q3/accel-20190813-00129.html
- SR860 V2 4S OpenMP -- https://www.spec.org/accel/results/res2020q4/accel-20200917-00149.html (base)
- SR860 V2 4S OpenMP -- https://www.spec.org/accel/results/res2020q4/accel-20200917-00149.html (peak)
- SR860 V2 4S OpenCL -- https://www.spec.org/accel/results/res2020q4/accel-20200917-00148.html (base)
- SR860 V2 4S OpenCL -- https://www.spec.org/accel/results/res2020q4/accel-20200917-00148.html (peak)
- SR860 V2 4S OpenACC -- https://www.spec.org/accel/results/res2020q4/accel-20200917-00147.html (base)
- SR860 V2 4S OpenACC -- https://www.spec.org/accel/results/res2020q4/accel-20200917-00147.html (peak)

SPEC OMP2012

- SR950 3S - http://spec.org/omp2012/results/res2019q2/omp2012-20190312-00163.html
- SR665 2S - https://www.spec.org/omp2012/results/res2020q2/omp2012-20200421-00193.html
- SR655 1S - https://www.spec.org/omp2012/results/res2020q1/omp2012-20200219-00192.html
- SR860 V2 4S - https://www.spec.org/omp2012/results/res2020q4/omp2012-20200917-00194.html

SPEC MPI2007

- SR950 (Medium Metric) 8S - https://www.spec.org/mpi2007/results/res2019q2/mpi2007-20190312-00619.html
- SR950 (Medium Metric) 6S - https://www.spec.org/mpi2007/results/res2019q2/mpi2007-20190312-00618.html
- SR950 (Medium Metric) 3S - https://www.spec.org/mpi2007/results/res2019q2/mpi2007-20190312-00616.html
- SR860 V2 4S (Medium Metric 1-Node) - https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20200917-00662.html (base)
- SR860 V2 4S (Medium Metric 1-Node) -- https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20200917-00662.html (peak)
- SR860 V2 4S (Medium Metric 2-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00670.html (base)
- SR860 V2 4S (Medium Metric 2-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00670.html (peak)
- SR860 V2 4S (Medium Metric 3-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00665.html (base)
- SR860 V2 4S (Medium Metric 3-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00665.html (peak)
- SR860 V2 4S (Medium Metric 4-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00669.html (base)
- SR860 V2 4S (Medium Metric 4-Node) -- https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00669.html (peak)
- SR860 V2 4S (Large Metric 1-Node) -- https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20200917-00657.html (base)
- SR860 V2 4S (Large Metric 1-Node) -- https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20200917-00657.html (peak)
- SR860 V2 4S (Large Metric 2-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00667.html (base)
- SR860 V2 4S (Large Metric 2-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00667.html (peak)
- SR860 V2 4S (Large Metric 3-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00668.html (base)
- SR860 V2 4S (Large Metric 3-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00668.html (peak)
- SR860 V2 4S (Large Metric 4-Node) – https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00671.html (base)
- SR860 V2 4S (Large Metric 4-Node) -- https://www.spec.org/mpi2007/results/res2020q4/mpi2007-20201020-00671.html (peak)
- SR665 2S (Large Metric 6-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-

20200416-00641.html

- SR665 2S (Large Metric 5-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00646.html
- SR665 2S (Large Metric 4-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00645.html
- SR665 2S (Large Metric 3-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00644.html
- SR665 2S (Large Metric 2-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00643.html
- SR665 2S (Large Metric 1-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00642.html
- SR665 2S (Medium Metric 6-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00650.html
- SR665 2S (Medium Metric 5-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00649.html
- SR665 2S (Medium Metric 3-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00647.html
- SR665 2S (Medium Metric 2-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00654.html
- SR665 2S (Medium Metric 1-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200416-00653.html
- SR655 1S (Large Metric 2-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200324-00640.html
- SR655 1S (Large Metric 1-Node) - https://www.spec.org/mpi2007/results/res2020q2/mpi2007-20200324-00639.html
- SR655 1S (Medium Metric 1-Node) - https://www.spec.org/mpi2007/results/res2020q1/mpi2007-20200218-00638.html

SPECjbb2015 (Linux)

- SR655 1S MultiJVM Critical-jOPS - http://spec.org/jbb2015/results/res2020q1/jbb2015-20200227-00513.html
- SR655 1S Distributed Critical-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200325-00529.html
- SR655 1S MultiJVM Max-jOPS - http://spec.org/jbb2015/results/res2020q1/jbb2015-20200227-00512.html
- SR655 1S Distributed Max-jOPS - http://spec.org/jbb2015/results/res2020q1/jbb2015-20200227-00514.html
- SR655 1S Composite Max-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200416-00540.html
- SR655 1S Composite Critical-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200416-00539.html
- SR665 2S Distributed Max-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200408-00534.html
- SR665 2S Distributed Critical-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200423-00551.html
- SR665 2S MultiJVM Critical-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200423-00549.html

- SR665 2S Composite Max-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200416-00541.html
- SR950 3S Distributed Max-JOPS - http://spec.org/jbb2015/results/res2018q3/jbb2015-20180829-00315.html
- SR950 3S Distributed Critical - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00401.html
- SR950 3S MultiJVM Max-JOPS - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00415.html
- SR950 3S MultiJVM Critical - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00429.html
- SR950 3S Composite Max-JOPS - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00442.html
- SR950 3S Composite Critical - http://spec.org/jbb2015/results/res2018q3/jbb2015-20180829-00318.html
- SR950 6S Distributed Max-JOPS - http://spec.org/jbb2015/results/res2018q3/jbb2015-20180829-00311.html
- SR950 6S Distributed Critical - http://spec.org/jbb2015/results/res2018q3/jbb2015-20180829-00312.html
- SR950 6S MultiJVM Max-JOPS - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00421.html
- SR950 6S MultiJVM Critical - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00405.html

SPECjbb2015 (Windows)

- SR655 1S MultiJVM Max-jOPS - https://www.spec.org/jbb2015/results/res2020q1/jbb2015-20200227-00511.html
- SR655 1S MultiJVM Critical-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200326-00532.html
- SR655 1S Composite Max-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200325-00530.html
- SR655 1S Composite Critical-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200325-00530.html
- SR655 1S Distributed Max-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200506-00553.html
- SR655 1S Distributed Critical-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200506-00554.html
- SR645 2S MultiJVM Critical-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200408-00537.html
- SR665 2S Distributed Max-jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200408-00536.html
- SR665 2S MultiJVM MaxjOPS -http://spec.org/jbb2015/results/res2020q2/jbb2015-20200408-00538.html
- SR665 2S Distributed Critical jOPS - http://spec.org/jbb2015/results/res2020q2/jbb2015-20200408-00535.html
- SR860 V2 4S MultiJVM Max-JOPS: https://www.spec.org/jbb2015/results/res2020q4/jbb2015-20201202-00584.html
- SR860 V2 4S MultiJVM Critical-JOPS: https://www.spec.org/jbb2015/results/res2021q1/jbb2015-

20201216-00586.html

- SR860 V2 4S Distributed Max-JOPS: https://www.spec.org/jbb2015/results/res2021q1/jbb2015-20201216-00587.html
- SR860 V2 4S Distributed Critical JOPS: https://www.spec.org/jbb2015/results/res2021q1/jbb2015-20201216-00585.html
- SR950 6S MultiJVM Max-JOPS - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190313-00379.html
- SR950 6S MultiJVM Critical - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190313-00379.html
- SR950 8S MultiJVM Max-JOPS - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190314-00440.html
- SR950 8S MultiJVM Critical - http://spec.org/jbb2015/results/res2019q2/jbb2015-20190313-00380.html

MLPerf

- SR670 2 processors, 4 NVIDIA A100-PCIe GPUs https://mlperf.org/inference-results-0-7 (0.7-103) (6 records)
- SE350 1 processor, 1 NVIDIA T4 https://mlperf.org/inference-results-0-7 (0.7-145) (9 records)

Related product families

Product families related to this document are the following:

- ThinkSystem SR950 Server
- ThinkSystem SR860 V2 Server
- ThinkSystem SR860 Server
- ThinkSystem SR850 V2 Server
- ThinkSystem SR850 Server
- ThinkSystem SR670 Server
- ThinkSystem SR665 Server
- ThinkSystem SR655 Server
- ThinkSystem SR650 Server
- ThinkSystem SR645 Server
- ThinkSystem SR250 Server
- ThinkSystem SD530 Server
- ThinkSystem SN850 Server
- ThinkSystem SN550 Server
- ThinkSystem SE350 Edge Server

Notices

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