ThinkSystem SR860 V3 Sets 16 World Records with New SPEChpc 2021 Benchmark Result

Performance Benchmark Result

The Lenovo ThinkSystem SR860 V3 has set sixteen new 4-sockets performance world records with the SPEChpc_2021_tny_base, SPEChpc_2021_tny_peak, SPEChpc_2021_sml_base and SPEChpc_2021_sml_peak metric from the SPEChpc 2021 Benchmark.

These new benchmark results, published in new SPEC reports on November 1, 2023, demonstrate that the ThinkSystem SR860 V3 continues Lenovo's leadership with outstanding performance for the server industry.

The SR860 V3, using pure MPI as node-level parallelization model, has achieved both the best 1-node 4-CPU Base and Peak MPI score, and the best 1-node Base and Peak MPI scores, as follows:

- **SPEChpc_2021_tny_base = 13.7** (two records)
- **SPEChpc_2021_tny_peak = 13.7** (two records)
- **SPEChpc_2021_sml_base = 1.4** (two records)
- **SPEChpc_2021_sml_peak = 1.4** (two records)

The SR860 V3, using MPI+OpenMP as node-level parallelization model, has achieved both the best 1-node 4-CPU Base and Peak MPI score, and the best 1-node Base and Peak MPI scores, as follows:

- **SPEChpc_2021_tny_base = 17.2** (two records)
- **SPEChpc_2021_tny_peak = 17.6** (two records)
- **SPEChpc_2021_sml_base = 1.88** (two records)
- **SPEChpc_2021_sml_peak = 1.89** (two records)

The SPEChpc 2021 Benchmark suite is the industry standard to evaluate hardware-based accelerator devices and the performance of parallel computing workloads. In order to support heterogeneity system architecture, the SPEChpc 2021 benchmark supports multiple programming models:

- Pure MPI
- MPI+OpenMP
- MPI+OpenACC
- MPI+OpenMP with target offload

By properly configuring the CPU based system according to NUMA architecture, the MPI+OpenMP can reduce communication needs and memory consumption in some sub-benchmark of SPEChpc 2021, hence the performance improvement.

The ThinkSystem SR860 V3 server was configured as follows:

- 4x Intel Xeon Platinum 8490H processors (60 cores, 1.90GHz)
- 2 TB memory (32x 64GB RDIMMs at 4800MHz)
- Red Hat Enterprise Linux 8.6

The results are current as of November 1, 2023.

To view details of the results, see the following SPEC web pages:

SPEChpc using the pure MPI model Tiny Base and Peak:
https://spec.org/hpc2021/results/res2023q3/hpc2021-20230823-00252.html

SPEChpc using the pure MPI model Small Base and Peak:
https://spec.org/hpc2021/results/res2023q3/hpc2021-20230823-00249.html

SPEChpc using the MPI+OpenMP model Tiny Base and Peak:
https://spec.org/hpc2021/results/res2023q3/hpc2021-20230823-00251.html

SPEChpc using the MPI+OpenMP model Small Base and Peak:
https://spec.org/hpc2021/results/res2023q3/hpc2021-20230823-00250.html

To view all SPEChpc 2021 results, go to
https://spec.org/hpc2021/results/

About the ThinkSystem SR860 V3

The Lenovo ThinkSystem SR860 V3 mission-critical server provides the speed and reliability you require today with the scalability and workload versatility you'll need to manage the explosive growth of data for tomorrow. Purpose-built to deliver affordable scalability in an industry-standard x86 platform, the SR860 V3 is ideal for mission critical workloads such as SAP HANA in-memory computing, transactional databases, analytics, big data, and enterprise resource planning tasks.

The Lenovo ThinkSystem SR860 V3 is a 4-socket server that features a 4U rack design, providing technology advances, including 4th Gen Intel® Xeon® Scalable processors, 4800 MHz DDR5 memory, large internal storage, and PCIe Gen 5 slots with support for up to eight high-performance GPUs, offering considerable adaptability to match system configurations to projected workloads. The system has the capability to scale from two to four 4th Gen Intel® Xeon® Scalable processor family CPUs that offers a simple "pay as you grow" upgrade for both processors and memory, resulting in greater system performance to handle growing next-generation workloads.

Server reliability, availability, and serviceability (RAS) are crucial issues for modern enterprise IT shops that deliver mission-critical applications and services, and application delivery failures can be extremely costly per hour of system downtime. Intel Xeon Scalable processors running on ThinkSystem servers continue to be at the top of the industry in regards to RAS features. For further information on the importance of RAS and a comprehensive list of the key RAS features of the Lenovo ThinkSystem servers with Intel Xeon Scalable processors, read RAS Features of the Lenovo ThinkSystem Intel Servers .

About SPEChpc 2021

High Performance Computing (HPC) systems are getting built with an increased level of heterogeneity. The numerous types of accelerators bring in tremendous extra computing power, while at the same time introduce big challenges in performance evaluation and characterization. More complications are added to the problem when multiple parallel and accelerator programming models have been developed with each only supporting a subset of the computing devices.

The SPEChpc 2021 Benchmark Suite address these challenges by providing a set of application benchmark suites using a comprehensive measure of real-world performance for the state-of-the-art HPC systems. They offer well-selected science and engineering codes that are representative of HPC workloads and are portable across CPU and accelerators, along with certain fair comparative performance metrics.

SPEChpc 2021 focuses on compute intensive parallel performance across one or more nodes, which means these benchmarks emphasize the performance of the following components:

- Processors & GPUs - The CPU chips and optionally, an acceleration device such as a GPU
- Memory - The memory hierarchy, including caches and main memory
- Interconnects - The communication between nodes of a cluster
- Compilers - C, C++, and Fortran compilers, including optimizers
- MPI - The MPI implementation.

The SPEChpc 2021 benchmark suite is broken out into four workloads, Tiny, Small, Medium and Large:

- SPEChpc2021 Tiny workloads use up to 60 GB of memory and are intended for use on a single node using between 1 and 256 ranks.

- SPEChpc2021 Small workloads use up to 480 GB of memory and are intended for use on one or more nodes using between 64 and 1024 ranks

- SPEChpc2021 Medium workloads use up to 4 TB of memory and are intended for use on a mid-size cluster using between 256 and 4096 ranks

- SPEChpc2021 Large workloads use up to 14.5 TB of memory and are intended for use on a larger clusters using between 2048 and 32,768 ranks

Learn more

To learn more about solutions for HPC applications, contact your Lenovo Sales Representative or visit https://www.lenovo.com/us/en/servers-storage/solutions/hpc/

To find out more about SPEC, visit https://www.spec.org

To learn more about the Lenovo ThinkSystem SR860 V3 server, visit the SR860 V3 product web page: https://www.lenovo.com/us/en/p/servers-storage/servers/mission-critical/thinksystem-sr860-v3/7d931000na

Related product families

Product families related to this document are the following:

- 4-Socket Rack Servers
- SPEChpc Benchmark Results
- ThinkSystem SR860 V3 Server

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