ThinkSystem SR675 V3 Sets 20 World Records with New SPEChpc 2021 Benchmark Result
## Performance Benchmark Result

The Lenovo ThinkSystem SR675 V3 has set twenty new 2-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 SR675 V3 continues Lenovo's leadership with outstanding performance for the server industry.

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, 2 socket, 1 GPU base and peak score as follows:

- **SPEChpc_2021_tny_base = 17.7**
- **SPEChpc_2021_tny_peak = 17.9**
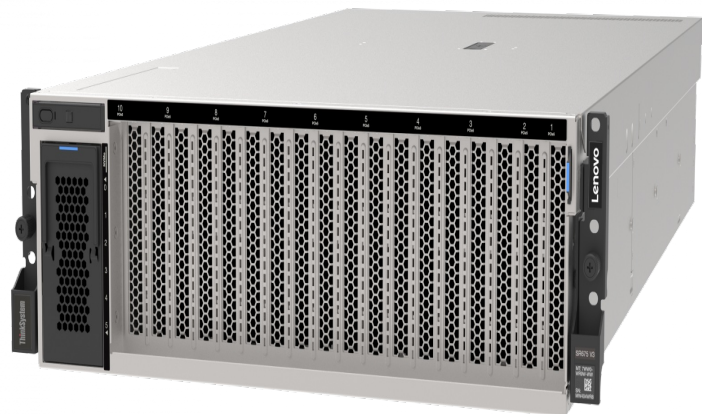
The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, 2 socket, 2 GPU base and peak score as follows:

- **SPEChpc_2021_tny_base = 32.3**
- **SPEChpc_2021_tny_peak = 32.6**

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, 2 socket, 3 GPU base and peak score as follows:

- **SPEChpc_2021_tny_base = 45.7**
- **SPEChpc_2021_tny_peak = 46.1**

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, 2 socket, 4 GPU base and peak score as follows:

- **SPEChpc_2021_tny_base = 57.8**
- **SPEChpc_2021_tny_peak = 58.3**

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, 2 socket, 5 GPU base and peak score as follows:

- **SPEChpc_2021_tny_base = 58.9**
- **SPEChpc_2021_tny_peak = 59.3**

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, 2 socket, 6 GPU base and peak score as follows:

- **SPEChpc_2021_tny_base = 68.7**
- **SPEChpc_2021_tny_peak = 69.3**

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, socket, 7 GPU base and peak score as follows:

- **SPEChpc_2021_tny_base = 69.2**
- **SPEChpc_2021_tny_peak = 69.4**

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, 2 socket, 8 GPU base and peak score as follows:

- **SPEChpc_2021_tny_base = 79.9**
- **SPEChpc_2021_tny_peak = 80.4**

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, Base and Peak ACC score as follows:

- **SPEChpc_2021_tny_base = 79.9**
- **SPEChpc_2021_tny_peak = 80.4**

The SR675 V3, using OpenACC as node-level parallelization model, has achieved the best 1 node, 2 socket, 7 GPU base and peak score as follows:

- **SPEChpc_2021_sml_base = 11**
- **SPEChpc_2021_sml_peak = 11.1**

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 SR675 V3 server was configured as follows:

- 2x AMD EPYC 9654 processors (96 cores, 2.40 GHz)
- 768 GB memory (24x 32GB RDIMMs at 4800MHz)
- 8x NVIDIA H100 PCIe 80GB GPUs
- 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 OpenACC model 1 node, 2 socket, 1 GPU base and peak:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230822-00248.html

SPEChpc using the OpenACC model 1 node, 2 socket, 2 GPU base and peak:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230822-00247.html

SPEChpc using the OpenACC model 1 node, 2 socket, 3 GPU base and peak:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230822-00246.html

SPEChpc using the OpenACC model 1 node, 2 socket, 4 GPU base and peak:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230822-00245.html

SPEChpc using the OpenACC model 1 node, 2 socket, 5 GPU base and peak:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230822-00244.html

SPEChpc using the OpenACC model 1 node, 2 socket, 6 GPU base and peak:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230822-00243.html

SPEChpc using the OpenACC model 1 node, 2 socket, 7 GPU base and peak:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230822-00242.html

SPEChpc using the OpenACC model 1 node, 2 socket, 8 GPU base and peak and 1-node, base and peak ACC:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230822-00241.html

SPEChpc using the OpenACC model 1 node, 2 socket, 7 GPU base and peak Small:
https://spec.org/hpc2021/results/res2023q4/hpc2021-20230905-00256.html

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

About the ThinkSystem SR675 V3

The Lenovo ThinkSystem SR675 V3 is a powerful and versatile server designed to meet the demands of modern data center environments. The server delivers optimal performance for Artificial Intelligence (AI), High Performance Computing (HPC) and graphical workloads across an array of industries. The SR675 V3 is a versatile GPU-rich 3U rack server that supports eight double-wide GPUs including the new NVIDIA H100 and L40S Tensor Core GPUs, or the NVIDIA HGX H100 4-GPU offering with NVLink and Lenovo Neptune hybrid liquid-to-air cooling.

The server is based on the new 5th Gen AMD EPYC 9005 Series processors (formerly codenamed "Turin") and on the AMD EPYC 9004 Series processors (formerly codenamed "Genoa", "Genoa-X" and "Bergamo") with up to 160 PCIe lanes and up to 3TB of the latest DDR5 memory. Multiple drive options using SAS/SATA and NVMe with hot-swap capabilities and XClarity system management software enable changes to be made quickly with ease. The versatile design doesn't stop at storage; the SR675 V3 includes support for multiple options for GPU and PCIe to satisfy graphics, speed, and budget requirements.

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 SR675 V3 server, visit the SR675 V3 product web page: https://www.lenovo.com/us/en/p/servers-storage/servers/racks/thinksystem-sr675-v3/7d9r1000na

Related product families

Product families related to this document are the following:

- 2-Socket Rack Servers
- AI Servers
- SPEChpc Benchmark Results
- ThinkSystem SR675 V3 Server

Notices

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