

ThinkSystem SR665 V3 Sets 4 World Records with New SPECchpc 2021 Small Benchmark Result Performance Benchmark Result

The Lenovo ThinkSystem SR665 V3 has set four performance world records with new 2-socket results of the SPECchpc 2021 Small benchmark.

These new benchmark results, published in new SPEC reports on November 10, 2022, demonstrate that the ThinkSystem SR665 V3 continues Lenovo's leadership with outstanding performance for the server industry.



The SR665 V3, using pure MPI as node-level parallelization model, has achieved the following scores:

- **SPECchpc_2021_sml_base = 1.23**
- **SPECchpc_2021_sml_peak = 1.23**

The SR665 V3, using MPI+OpenMP as node-level parallelization model, has achieved the following scores:

- **SPECchpc_2021_sml_base = 1.45**
- **SPECchpc_2021_sml_peak = 1.45**

The SPECchpc 2021 Benchmark suite is the industry standard to evaluate hardware-based accelerator devices and the performance of parallel computing workloads. To support heterogeneity system architecture, the SPECchpc 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 SPECchpc 2021, hence the performance improvement.

The ThinkSystem SR665 V3 server was configured as follows:

- 2x AMD EPYC 9654 processors (96 cores, 2.40 GHz)
- 768 GB memory (24x 32GB RDIMMs at 4800MHz)
- 480 GB 2.5-inch SSD
- Red Hat Enterprise Linux 8.6

The results are current as of November 10, 2022.

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

SPECchpc using the pure MPI model:

<https://spec.org/hpc2021/results/res2022q4/hpc2021-20221016-00133.html>

SPEChpc using the MPI+OpenMP model:

<https://spec.org/hpc2021/results/res2022q4/hpc2021-20221010-00132.html>

To view all SPEChpc 2021 results, go to

<https://spec.org/hpc2021/results/>

About the ThinkSystem SR665 V3

The ThinkSystem SR665 V3 is a 2S 2U rack server built with the performance and flexibility to manage a complex set of workloads like data management, analytics, virtualization, cloud, and AI. The 256 cores of the dual 4th Gen AMD EPYC™ processors with up to 160 PCIe lanes and up to 6TB of the latest DDR5 memory, maximize the performance of this 2U server.

The SR665 V3 is designed to support today's infrastructure and easily scale to prepare for next gen workloads. 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 SR665 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 SR665 V3 server, visit the SR665 V3 product web page: <https://www.lenovo.com/us/en/p/servers-storage/servers/racks/thinksystem-sr645/77xx7sr352s>

Related product families

Product families related to this document are the following:

- [2-Socket Rack Servers](#)
- [SPEChpc Benchmark Results](#)
- [ThinkSystem SR665 V3 Server](#)

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
8001 Development Drive
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

© Copyright Lenovo 2024. All rights reserved.

This document, LP1657, was created or updated on November 10, 2022.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
<https://lenovopress.lenovo.com/LP1657>
- Send your comments in an e-mail to:
comments@lenovopress.com

This document is available online at <https://lenovopress.lenovo.com/LP1657>.

Trademarks

Lenovo and the Lenovo logo are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at <https://www.lenovo.com/us/en/legal/copytrade/>.

The following terms are trademarks of Lenovo in the United States, other countries, or both:

Lenovo®

ThinkSystem®

XClarity®

The following terms are trademarks of other companies:

AMD and AMD EPYC™ are trademarks of Advanced Micro Devices, Inc.

Linux® is the trademark of Linus Torvalds in the U.S. and other countries.

SPEC® and SPEChpc™ are trademarks of the Standard Performance Evaluation Corporation (SPEC).

Other company, product, or service names may be trademarks or service marks of others.