Lenovo Global Technology
ThinkSystem SR665
(AMD EPYC 7763, 2.45 GHz)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Ranks</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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</table>

**Results Table**

- **SPECmpiM_peak2007** = 52.6
- **SPECmpiM_base2007** = 52.6

Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
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ThinkSystem SR665
(AMD EPYC 7763, 2.45 GHz)

SPECmpiM_peak2007 = 52.6
SPECmpiM_base2007 = 52.6

Results Table (Continued)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Ranks</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>80.7</td>
<td>45.6</td>
<td>80.5</td>
<td>44.7</td>
<td>82.2</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Hardware Summary

Type of System: Homogeneous
Compute Node: ThinkSystem SR665
Interconnect: Mellanox ConnectX-6 HDR
File Server Node: NFS
Total Compute Nodes: 2
Total Chips: 4
Total Cores: 256
Total Threads: 256
Total Memory: 2 TB
Base Ranks Run: 256
Minimum Peak Ranks: 256
Maximum Peak Ranks: 256

Software Summary

C Compiler: AMD Optimizing C Compiler for Linux
Version 3.0.0 Build 2020_12_10
C++ Compiler: AMD Optimizing C++ Compiler for Linux
Version 3.0.0 Build 2020_12_10
Fortran Compiler: AMD Optimizing Fortran Compiler for Linux
Version 3.0.0 Build 2020_12_10
Base Pointers: 64-bit
Peak Pointers: Not Applicable
MPI Library: Open MPI Library
Version 4.1.0
Other MPI Info: None
Pre-processors: No
Other Software: None

Node Description: ThinkSystem SR665

Hardware

Number of nodes: 2
Uses of the node: compute
Vendor: Lenovo Global Technology
Model: SR665
CPU Name: AMD EPYC 7763
CPU(s) orderable: 1-2 chips
Chips enabled: 2
Cores enabled: 128
Cores per chip: 64
Threads per core: 1
CPU Characteristics: None
CPU MHz: 2450
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 512 KB I+D on chip per core
L3 Cache: 256 MB I+D on chip per chip
Other Cache: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
Disk Subsystem: 1 x 480 GB SATA 2.5" SSD
Other Hardware: None
Adapter: Mellanox ConnectX-6 HDR Infiniband
Number of Adapters: 1
Slot Type: PCI-Express 4.0 x16

Software

Adapter: Mellanox ConnectX-6 HDR Infiniband
Adapter Driver: 5.2-1.0.4
Adapter Firmware: 20.25.2006
Operating System: Red Hat Enterprise Linux Server release 8.3 4.18.0-240.el8.x86_64
Local File System: xfs
Shared File System: None
System State: Multi-user, run level 3
Other Software: None
**Lenovo Global Technology**

**ThinkSystem SR665**
(AMD EPYC 7763, 2.45 GHz)

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**Node Description: ThinkSystem SR665**

<table>
<thead>
<tr>
<th>Data Rate:</th>
<th>200 Gbs/s</th>
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</thead>
<tbody>
<tr>
<td>Ports Used:</td>
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</tr>
<tr>
<td>Interconnect Type:</td>
<td>Mellanox ConnectX-6 HDR Infiniband Adapter</td>
</tr>
</tbody>
</table>

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**Node Description: NFS**

**Hardware**

- Number of nodes: 1
- Uses of the node: Fileserver
- Vendor: Lenovo Global Technology
- Model: ThinkSystem SR665
- CPU Name: AMD EPYC 7763 CPU
- CPU(s) orderable: 1-2 chips
- Chips enabled: 2
- Cores enabled: 128
- Cores per chip: 64
- Threads per core: 1
- CPU Characteristics: None
- CPU MHz: 2450
- Primary Cache: 32 KB I + 32 KB D on chip per core
- Secondary Cache: 512 KB I+D on chip per core
- L3 Cache: 256 MB I+D on chip per chip
- 32 MB shared / 8 cores
- Other Cache: None
- Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
- Disk Subsystem: 1 x 480 GB SATA 2.5” SSD
- Other Hardware: None
- Adapter: Mellanox ConnectX-6 HDR Infiniband
- Number of Adapters: 1
- Slot Type: PCI-Express 4.0 x16
- Data Rate: 200 Gb/s
- Ports Used: 1
- Interconnect Type: Mellanox ConnectX-6 HDR Infiniband

**Software**

- Adapter: Mellanox ConnectX-6 HDR Infiniband
- Adapter Driver: 5.2-1.0.4
- Adapter Firmware: 20.25.2006
- Operating System: Red Hat Enterprise Linux Server release 8.3
- Local File System: None
- Shared File System: NFS
- System State: Multi-User, run level 3
- Other Software: None

---

**Interconnect Description: Mellanox ConnectX-6 HDR**

**Hardware**

- Vendor: Mellanox
- Model: Infiniband HDR 200Gb/s Switch
- Switch Model: QM8700 Series
- Number of Switches: 1
- Number of Ports: 40
- Data Rate: 200 Gb/s
- Firmware: 3.9.0606
- Topology: Mesh

---

**SPEC mpiM_peak2007 = 52.6**

**SPEC mpiM_base2007 = 52.6**

---

**MPI2007 license:** 28

**Test date:** Mar-2021

**Test sponsor:** Lenovo Global Technology

**Hardware Availability:** Mar-2021

**Tested by:** Lenovo Global Technology

**Software Availability:** Mar-2021

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SPEC mpiM_peak2007 = 52.6
SPEC mpiM_base2007 = 52.6

MPI2007 license: 28
Test sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Interconnect Description: Mellanox ConnectX-6 HDR
Primary Use: MPI Traffic

Submit Notes
The config file option 'submit' was used.

General Notes
MPI startup command: mpiexec command was used to start MPI jobs.
RAM configuration: Compute nodes have 1 x 64 GB RDIMM on each memory channel.
Add "idle=poll" into grub
BIOS settings: Operating Mode: Maximum Performance Mode
Hyper-Threading Technology (SMT): Enabled
NPS4
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Base Compiler Invocation
C benchmarks: mpicc
C++ benchmarks: 126.lammps: mpicxx
Fortran benchmarks: mpifort
Benchmarks using both Fortran and C: mpicc mpifort

Base Portability Flags
121.pop2: -DSPEC_MPI_CASE_FLAG
126.lammps: -DMPICH_IGNORE_CXX SEEK

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SPECmpiM_peak2007 = 52.6
SPECmpiM_base2007 = 52.6

MPI2007 license: 28
Test sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test date: Mar-2021
Hardware Availability: Mar-2021
Software Availability: Mar-2021

Base Portability Flags (Continued)
127.wrf2: -DSPEC_MPI_CASE_FLAG -DSPEC_MPI_LINUX -Wno-return-type

Base Optimization Flags

C benchmarks:
-Ofast -flto -ffast-math -march=znver3 -mavx2 -lamdlibm

C++ benchmarks:

126.lammps: -Ofast -flto -ffast-math -march=znver3 -mavx2 -lamdlibm

Fortran benchmarks:
-Ofast -flto -ffast-math -march=znver3 -mavx2 -funroll-loops
-lamdlibm

Benchmarks using both Fortran and C:
-Ofast -flto -ffast-math -march=znver3 -mavx2 -lamdlibm
-funroll-loops

Peak Optimization Flags

C benchmarks:
104.milc: basepeak = yes
122.tachyon: basepeak = yes

C++ benchmarks:

126.lammps: basepeak = yes

Fortran benchmarks:
107.leslie3d: basepeak = yes
113.GemsFDTD: basepeak = yes
129.tera_tf: basepeak = yes
137.lu: basepeak = yes

Benchmarks using both Fortran and C:
115.fds4: basepeak = yes

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SPECmpiM_peak2007 = 52.6
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<tr>
<th>MPI2007 license:</th>
<th>Test date:</th>
<th>Lenovo Global Technology</th>
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<tr>
<td>Tested by:</td>
<td>Software Availability:</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

Peak Optimization Flags (Continued)

121.pop2: basepeak = yes
127.wrf2: basepeak = yes
128.GAPgeofem: basepeak = yes
130.socorro: basepeak = yes
132.zeusmp2: basepeak = yes

The flags file that was used to format this result can be browsed at

You can also download the XML flags source by saving the following link:
http://www.spec.org/mpi2007/flags/AMD_flags.20210315.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC MPI2007 v2.0.1.
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