**Lenovo Global Technology**

ThinkSystem SR665  
(AMD EPYC 7763, 2.45 GHz)

**SPECmpiM Peak2007** = 62.6  
**SPECmpiM Base2007** = 62.1

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

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Ranks</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
Lenovo Global Technology
ThinkSystem SR665
(AMD EPYC 7763, 2.45 GHz)

SPECmpM_peak2007 = 62.6
SPECmpM_base2007 = 62.1

Results Table (Continued)

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<th>Ranks</th>
<th>Seconds</th>
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<td>111</td>
<td>33.3</td>
<td>110</td>
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</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: 3
- Total Chips: 6
- Total Cores: 384
- Total Threads: 384
- Total Memory: 3 TB
- Base Ranks Run: 384
- Minimum Peak Ranks: 128
- Maximum Peak Ranks: 384

Software Summary

- C Compiler: AMD Optimizing C Compiler for Linux Version 2.3.0 Build 2020_11_10
- C++ Compiler: AMD Optimizing C++ Compiler for Linux Version 2.3.0 Build 2020_11_10
- Fortran Compiler: AMD Optimizing Fortran Compiler for Linux Version 2.3.0 Build 2020_11_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: 3
- 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
- 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

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)

<table>
<thead>
<tr>
<th>SPECmpiM_peak2007</th>
<th>62.6</th>
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<td>SPECmpiM_base2007</td>
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**MPI2007 license:** 28

**Test sponsor:** Lenovo Global Technology

**Test date:** Mar-2021

**Hardware Availability:** Mar-2021

**Tested by:** Lenovo Global Technology

**Software Availability:** Mar-2021

## Node Description: ThinkSystem SR665

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

## 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

### Software

- **Continued on next page**
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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.

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

Portability Flags
121.pop2: -DSPEC_MPI_CASE_FLAG
126.lammps: -DMPICH_IGNORE_CXX_SEEK

Continued on next page
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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=znver2 -mno-avx2
-1/L/home/amd-libm/lib -lamdlibm

C++ benchmarks:
126.lammps: -Ofast -flto -ffast-math -march=znver2 -mno-avx2
-1/L/home/amd-libm/lib -lamdlibm

Fortran benchmarks:
-Ofast -flto -ffast-math -march=znver2 -mno-avx2 -funroll-loops
-1/L/home/amd-libm/lib -lamdlibm

Benchmarks using both Fortran and C:
-Ofast -flto -ffast-math -march=znver2 -mno-avx2 -funroll-loops
-1/L/home/amd-libm/lib -lamdlibm

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: -Ofast -flto -ffast-math -march=znver2 -mno-avx2
-funroll-loops -1/home/amd-libm/lib -lamdlibm
129.tera_tf: basepeak = yes
137.lu: basepeak = yes

Benchmarks using both Fortran and C:

Continued on next page
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Peak Optimization Flags (Continued)

115.fds4: basepeak = yes
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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