## 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>
</tr>
</thead>
<tbody>
<tr>
<td>104.milc</td>
<td>640</td>
<td>16.3</td>
<td>96.3</td>
</tr>
<tr>
<td>107.leslie3d</td>
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<td>59.7</td>
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<td>113.GemsFDTD</td>
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<td>115.fds4</td>
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<td>83.1</td>
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<td>122.tachyon</td>
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<td>142</td>
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<td>126.lammps</td>
<td>640</td>
<td>94.4</td>
<td>30.9</td>
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<tr>
<td>127.wrf2</td>
<td>640</td>
<td>19.2</td>
<td>108</td>
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<td>128.GAPgeofem</td>
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<td>36.7</td>
<td>75.4</td>
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<tr>
<td>129.tera_tf</td>
<td>640</td>
<td>36.7</td>
<td>75.4</td>
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</table>

**SPECmpiM_base2007 = 74.5**  
**SPECmpiM_peak2007 = 74.5**
### Lenovo Global Technology

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

**SPECmpIM_peak2007 = 74.5**  
**SPECmpIM_base2007 = 74.5**

**MPI2007 license:** 28  
**Test date:** Mar-2021  
**Hardware Availability:** Mar-2021  
**Software Availability:** Mar-2021  
**Test sponsor:** Lenovo Global Technology

**Results Table (Continued)**

<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>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>130.sorroro</td>
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<td>97.6</td>
<td>39.1</td>
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<td>132.reusmp2</td>
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<td>137.lu</td>
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<td>25.8</td>
<td>142</td>
<td><strong>26.0</strong></td>
<td><strong>141</strong></td>
<td>26.4</td>
<td>139</td>
<td>640</td>
<td>25.8</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:** 5  
- **Total Chips:** 10  
- **Total Cores:** 640  
- **Total Memory:** 5 TB  
- **Base Ranks Run:** 640  
- **Minimum Peak Ranks:** 640  
- **Maximum Peak Ranks:** 640

### 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  
- **Pre-processors:** No  
- **Other Software:** None

### Node Description: ThinkSystem SR665

#### Hardware

- **Number of nodes:** 5  
- **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  
- **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

Continued on next page
**Lenovo Global Technology**

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

**SPECmpiM_peak2007 = 74.5**  
**SPECmpiM_base2007 = 74.5**

<table>
<thead>
<tr>
<th>MPI2007 license: 28</th>
<th>Test date: Mar-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Mar-2021</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Mar-2021</td>
</tr>
</tbody>
</table>

**Node Description: ThinkSystem SR665**

| Data Rate: | 200 Gbs/s |
| Ports Used: | 1 |
| Interconnect Type: | Mellanox ConnectX-6 HDR Infiniband Adapter |

**Node Description: NFS**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
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<tbody>
<tr>
<td>Number of nodes:</td>
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<td>Uses of the node:</td>
<td>Fileserver</td>
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<tr>
<td>Vendor:</td>
<td>Lenovo Global Technology</td>
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<tr>
<td>Model:</td>
<td>ThinkSystem SR665</td>
</tr>
<tr>
<td>CPU Name:</td>
<td>AMD EPYC 7763 CPU</td>
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<tr>
<td>CPU(s) orderable:</td>
<td>1-2 chips</td>
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<tr>
<td>Chips enabled:</td>
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</tr>
<tr>
<td>Cores enabled:</td>
<td>128</td>
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<tr>
<td>Cores per chip:</td>
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<tr>
<td>Threads per core:</td>
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</tr>
<tr>
<td>CPU Characteristics:</td>
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</tr>
<tr>
<td>CPU MHz:</td>
<td>2450</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>Secondary Cache:</td>
<td>512 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache:</td>
<td>256 MB I+D on chip per chip</td>
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<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)</td>
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<td>Disk Subsystem:</td>
<td>1 x 480 GB SATA 2.5” SSD</td>
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<td>Adapter:</td>
<td>Mellanox ConnectX-6 HDR Infiniband</td>
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<tr>
<td>Adapter Driver:</td>
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<td>None</td>
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<td>NFS</td>
</tr>
<tr>
<td>System State:</td>
<td>Multi-User, run level 3</td>
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<tr>
<td>Other Software:</td>
<td>None</td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor:</td>
<td>Mellanox</td>
</tr>
<tr>
<td>Model:</td>
<td>Infiniband HDR 200Gb/s Switch</td>
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<tr>
<td>Switch Model:</td>
<td>QM8700 Series</td>
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<tr>
<td>Number of Switches:</td>
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<tr>
<td>Number of Ports:</td>
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<tr>
<td>Data Rate:</td>
<td>200 Gb/s</td>
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<tr>
<td>Firmware:</td>
<td>3.9.0606</td>
</tr>
<tr>
<td>Topology:</td>
<td>Mesh</td>
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Continued on next page
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SPECmpimM_peak2007 = 74.5
SPECmpimM_base2007 = 74.5

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: -DMPI_ignore_CXX_SEEK

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SPECmpiM_peak2007 = 74.5
SPECmpiM_base2007 = 74.5

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=znver2 -mno-avx2
-L/home/amd-libm/lib -lamdlibm

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

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

Benchmarks using both Fortran and C:
-Ofast -flto -ffast-math -march=znver2 -mno-avx2 -funroll-loops
-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: basepeak = yes
129.tera_tf: basepeak = yes
137.lu: basepeak = yes

Benchmarks using both Fortran and C:

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- Lenovo Global Technology
- Mar-2021
- Lenovo Global Technology
- Mar-2021

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.
Originally published on 15 March 2021.