### Lenovo ThinkSystem SR665 V3 (AMD EPYC 9654)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Ranks</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>109</td>
<td>46.6</td>
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<tr>
<td>113.GemsFDTD</td>
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<td>121.pop2</td>
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<tr>
<td>122.tachyon</td>
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<td>27.6</td>
<td>101</td>
<td>27.5</td>
<td>102</td>
<td>27.8</td>
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<tr>
<td>126.lammps</td>
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<td>81.7</td>
<td>35.7</td>
<td>77.9</td>
<td>37.4</td>
<td>75.4</td>
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<td>225</td>
<td>53.3</td>
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<td>35.0</td>
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<td>134</td>
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<td>42.1</td>
<td>65.7</td>
<td>42.4</td>
<td>65.3</td>
<td>41.9</td>
<td>66.0</td>
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</table>

**Results Table**

Benchmark | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
----------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|
| 107.leslie3d | 384 | 47.7    | 109   | 46.6    | 112   | 47.1    | 111   | 47.1    | 111   | 47.1    | 111   | 47.1    | 111   |
| 113.GemsFDTD | 384 | 168     | 37.6  | 168     | 37.7  | 170     | 37.2  | 168     | 37.2  | 168     | 37.2  | 168     | 37.2  |
| 115.fds4 | 21.0  | 93.0    | 19.7  | 98.9    | 19.6  | 99.6    |       | 19.7    | 98.9  | 19.6    | 99.6  | 19.6    | 99.6  |
| 121.pop2 | 384   | 59.7    | 69.1  | 59.8    | 69.0  | 59.4    | 69.5  | 59.8    | 69.0  | 59.4    | 69.5  | 59.8    | 69.0  |
| 122.tachyon | 384 | 27.6    | 101   | 27.5    | 102   | 27.8    | 101   | 27.8    | 101   | 27.8    | 101   | 27.8    | 101   |
| 126.lammps | 384   | 81.7    | 35.7  | 77.9    | 37.4  | 75.4    | 38.6  | 75.4    | 38.6  | 75.4    | 38.6  | 75.4    | 38.6  |
| 127.wrf2 | 384   | 34.6    | 225   | 53.3    | 146   | 35.0    | 223   | 35.0    | 223   | 35.0    | 223   | 35.0    | 223   |
| 128.GAPgeofem | 384 | 15.5    | 134   | 15.1    | 137   | 15.6    | 132   | 15.1    | 137   | 15.6    | 132   | 15.1    | 137   |
| 129.tera_tf | 384   | 42.1    | 65.7  | 42.4    | 65.3  | 41.9    | 66.0  | 42.4    | 65.3  | 41.9    | 66.0  | 42.4    | 65.3  |

Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
Lenovo

ThinkSystem SR665 V3 (AMD EPYC 9654)  

SPECmpiM_peak2007 = 81.8  
SPECmpiM_base2007 = 81.8

MPI2007 license: 28  
Test date: Jan-2023  
Hardware Availability: Feb-2023  

Test sponsor: Lenovo  
Software Availability: Feb-2023  
Tested by: Lenovo

Results Table (Continued)

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<td>159</td>
<td>24.9</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 V3  
Total Compute Nodes: 2  
Total Chips: 4  
Total Cores: 192  
Total Memory: 1536 GB  
Base Ranks Run: 384  
Minimum Peak Ranks: 384  
Maximum Peak Ranks: 384

Software Summary

C Compiler: AMD Optimizing C/C++ and Fortran Compilers (AOCC)  
Version 4.0.0 Build 389 for Linux  
C++ Compiler: AMD Optimizing C/C++ and Fortran Compilers (AOCC)  
Version 4.0.0 Build 389 for Linux  
Fortran Compiler: AMD Optimizing C/C++ and Fortran Compilers (AOCC)  
Version 4.0.0 Build 389 for Linux  
Base Pointers: 64-bit  
Peak Pointers: 64-bit  
MPI Library: Open MPI Library for Linux  
Version 4.1.1  
Other MPI Info: None  
Pre-processors: No  
Other Software: None

Node Description: ThinkSystem SR665 V3

Hardware

Number of nodes: 2  
Uses of the node: compute  
Vendor: Lenovo  
Model: ThinkSystem SR665 V3  
CPU Name: AMD EPYC 9654  
CPU(s) orderable: 1, 2 chip  
Chips enabled: 2  
Cores enabled: 96  
Cores per chip: 96  
Threads per core: 2  
CPU Characteristics: Max. Boost Clock upto 3.7 GHz  
CPU MHz: 2400  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 1 MB I+D on chip per core  
L3 Cache: 384 MB I+D on chip per chip  
32 MB shared / 8 cores  
Other Cache: None  
Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)  
Disk Subsystem: 1x ThinkSystem 2.5" 5300 480GB SSD  
Other Hardware: None  
Adapter: Mellanox ConnectX-6 HDR  
Number of Adapters: 1  
Slot Type: PCIe Gen5 x16  
Data Rate: 200Gb

Software

Adapter: Mellanox ConnectX-6 HDR  
Adapter Driver: Mellanox  
Adapter Firmware: 20.28.1002  
Operating System: Red Hat Enterprise Linux Server release 8.6, Kernel 4.18.0-372.9.1.el8.x86_64  
Local File System: ext4  
Shared File System: None  
System State: Multi-user, run level 3  
Other Software: None

Continued on next page
**Lenovo**
ThinkSystem SR665 V3 (AMD EPYC 9654)  

**SPECmpiM_peak2007 = 81.8**  
**SPECmpiM_base2007 = 81.8**

**Node Description: ThinkSystem SR665 V3**

| Ports Used: | 1 |
| Interconnect Type: | Mellanox ConnectX-6 HDR |

**Submit Notes**

The config file option 'submit' was used.

**General Notes**

MPI startup command:  
 mpiexec command was used to start MPI jobs.
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: mpic++

Fortran benchmarks:  
mpif90

Benchmarks using both Fortran and C:  
mpicc mpif90

**Base Portability Flags**

104.milc: -DSPEC_MPI_LP64  
115.fds4: -DSPEC_MPI_LP64  
121.pop2: -DSPEC_MPI_CASE_FLAG -DSPEC_MPI_LP64  
122.tachyon: -DSPEC_MPI_LP64  
127.wrf2: -DSPEC_MPI_CASE_FLAG -DSPEC_MPI_LINUX -DSPEC_MPI_LP64  
128.GAPgeofem: -DSPEC_MPI_LP64  
130.socorro: -DSPEC_MPI_LP64  
132.zeusmp2: -DSPEC_MPI_LP64
## Base Optimization Flags

**C benchmarks:**
- `-Ofast -flto -ffast-math -march=znver4 -lamdlibm`

**C++ benchmarks:**
- `126.lammps: -Ofast -flto -ffast-math -march=znver4 -DMPICH_IGNORE_CXX_SEEK`

**Fortran benchmarks:**
- `-Ofast -flto -ffast-math -march=znver4 -funroll-loops`

**Benchmarks using both Fortran and C:**
- `115.fds4: -Ofast -flto -ffast-math -march=znver4 -funroll-loops`
- `121.pop2: Same as 115.fds4`
- `127.wrf2: Same as 115.fds4`
- `128.GAPgeofem: -Ofast -flto -ffast-math -march=znver4 -funroll-loops -lamdlibm`
- `130.socorro: Same as 115.fds4`
- `132.zeusmp2: Same as 115.fds4`

## Base Other Flags

**Benchmarks using both Fortran and C:**
- `127.wrf2: -Wno-return-type`

## Peak Optimization Flags

**C benchmarks:**
- `104.milc: basepeak = yes`
- `122.tachyon: basepeak = yes`

**C++ benchmarks:**
- `126.lammps: basepeak = yes`

**Fortran benchmarks:**

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Continued on next page
Lenovo

ThinkSystem SR665 V3 (AMD EPYC 9654)

**SPECmpiM_peak2007 = 81.8**  
**SPECmpiM_base2007 = 81.8**

**MPI2007 license:** 28  
**Test date:** Jan-2023  
**Test sponsor:** Lenovo  
**Hardware Availability:** Feb-2023  
**Tested by:** Lenovo  
**Software Availability:** Feb-2023

### Peak Optimization Flags (Continued)

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
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:

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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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