# SPEC® MPIM2007 Result



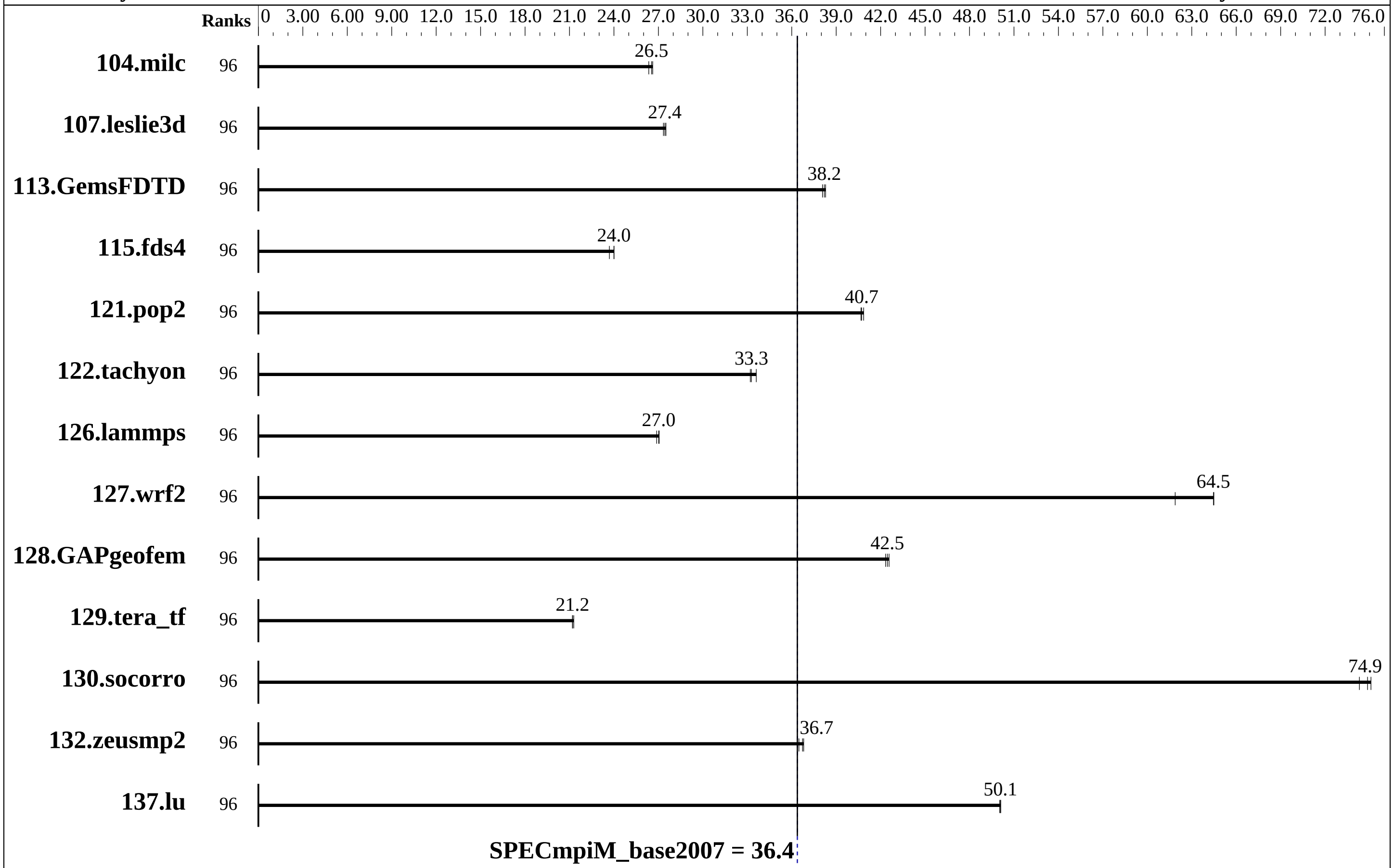
# Lenovo

## ThinkSystem SR655 V3 (AMD EPYC 9654P)

**SPECmpiM_peak2007 = 36.4**

**SPECmpiM_base2007 = 36.4**

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




## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 104.milc | 96 | 59.4 | 26.4 | 58.8 | 26.6 | **59.0** | **26.5** | 96 | 59.4 | 26.4 | 58.8 | 26.6 | **59.0** | **26.5** |
| 107.leslie3d | 96 | 190 | 27.5 | 191 | 27.3 | **190** | **27.4** | 96 | 190 | 27.5 | 191 | 27.3 | **190** | **27.4** |
| 113.GemsFDTD | 96 | 165 | 38.3 | 166 | 38.1 | **165** | **38.2** | 96 | 165 | 38.3 | 166 | 38.1 | **165** | **38.2** |
| 115.fds4 | 96 | **81.3** | **24.0** | 81.3 | 24.0 | 82.3 | 23.7 | 96 | **81.3** | **24.0** | 81.3 | 24.0 | 82.3 | 23.7 |
| 121.pop2 | 96 | 101 | 40.9 | **101** | **40.7** | 101 | 40.7 | 96 | 101 | 40.9 | **101** | **40.7** | 101 | 40.7 |
| 122.tachyon | 96 | 83.2 | 33.6 | **84.0** | **33.3** | 84.2 | 33.2 | 96 | 83.2 | 33.6 | **84.0** | **33.3** | 84.2 | 33.2 |
| 126.lammps | 96 | 108 | 27.1 | **108** | **27.0** | 108 | 26.9 | 96 | 108 | 27.1 | **108** | **27.0** | 108 | 26.9 |
| 127.wrf2 | 96 | 121 | 64.5 | **121** | **64.5** | 126 | 61.9 | 96 | 121 | 64.5 | **121** | **64.5** | 126 | 61.9 |
| 128.GAPgeofem | 96 | 48.8 | 42.3 | 48.5 | 42.6 | **48.6** | **42.5** | 96 | 48.8 | 42.3 | 48.5 | 42.6 | **48.6** | **42.5** |
| 129.tera_tf | 96 | 130 | 21.3 | 131 | 21.2 | **131** | **21.2** | 96 | 130 | 21.3 | 131 | 21.2 | **131** | **21.2** |

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

# Results Table (Continued)

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 130.socorro | 96 | 50.8 | 75.1 | 51.4 | 74.3 | **51.0** | **74.9** | 96 | 50.8 | 75.1 | 51.4 | 74.3 | **51.0** | **74.9** |
| 132.zeusmp2 | 96 | 85.0 | 36.5 | 84.3 | 36.8 | **84.5** | **36.7** | 96 | 85.0 | 36.5 | 84.3 | 36.8 | **84.5** | **36.7** |
| 137.lu | 96 | **73.4** | **50.1** | 73.4 | 50.1 | 73.5 | 50.0 | 96 | **73.4** | **50.1** | 73.4 | 50.1 | 73.5 | 50.0 |

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 SR655 V3 |
| Total Compute Nodes: | 1 |
| Total Chips: | 1 |
| Total Cores: | 96 |
| Total Threads: | 96 |
| Total Memory: | 768 GB |
| Base Ranks Run: | 96 |
| Minimum Peak Ranks: | 96 |
| Maximum Peak Ranks: | 96 |

## 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 SR655 V3

## Hardware

| | |
|---|---|
| Number of nodes: | 1 |
| Uses of the node: | compute |
| Vendor: | Lenovo |
| Model: | ThinkSystem SR655 V3 |
| CPU Name: | AMD EPYC 9654P |
| CPU(s) orderable: | 1 chip |
| Chips enabled: | 1 |
| Cores enabled: | 96 |
| Cores per chip: | 96 |
| Threads per core: | 1 |
| 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 |

Continued on next page

## 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 |

## Node Description: ThinkSystem SR655 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`

(*) Indicates an optimization flag that was found in a portability variable.

# 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`

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## Peak Optimization Flags (Continued)

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`

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
http://www.spec.org/mpi2007/flags/amd2021_flags.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/mpi2007/flags/amd2021_flags.xml



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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