



# SPEC® MPIM2007 Result

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## Lenovo

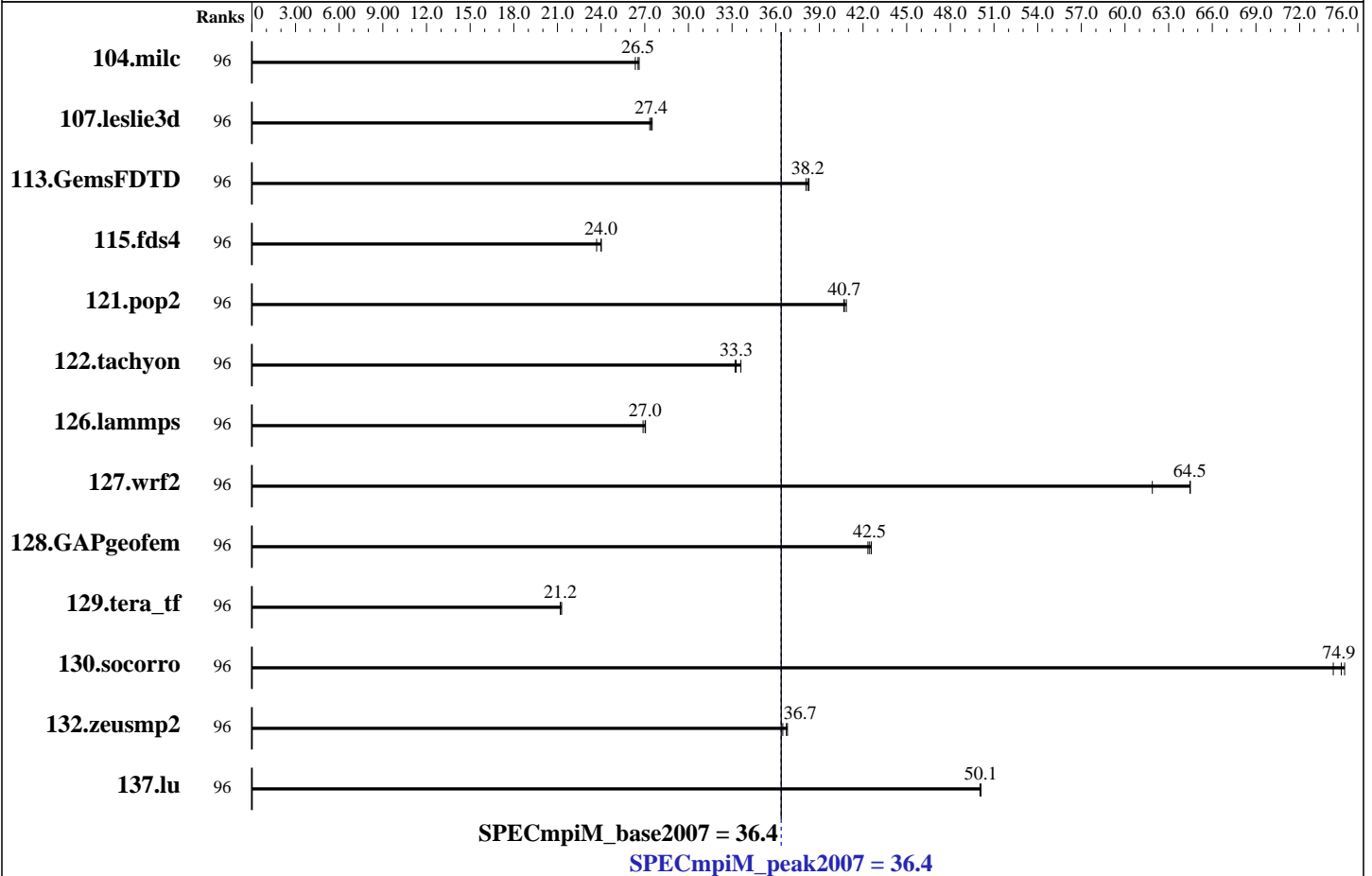
SPECmpiM\_peak2007 = 36.4

ThinkSystem SR655 V3 (AMD EPYC 9654P)

SPECmpiM\_base2007 = 36.4

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

Test date: Jan-2023  
Hardware Availability: Feb-2023  
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	<b>59.0</b>	<b>26.5</b>	96	59.4	26.4	58.8	26.6	<b>59.0</b>	<b>26.5</b>		
107.leslie3d	96	190	27.5	191	27.3	<b>190</b>	<b>27.4</b>	96	190	27.5	191	27.3	<b>190</b>	<b>27.4</b>		
113.GemsFDTD	96	165	38.3	166	38.1	<b>165</b>	<b>38.2</b>	96	165	38.3	166	38.1	<b>165</b>	<b>38.2</b>		
115.fds4	96	<b>81.3</b>	<b>24.0</b>	81.3	24.0	82.3	23.7	96	<b>81.3</b>	<b>24.0</b>	81.3	24.0	82.3	23.7		
121.pop2	96	101	40.9	<b>101</b>	<b>40.7</b>	101	40.7	96	101	40.9	<b>101</b>	<b>40.7</b>	101	40.7		
122.tachyon	96	83.2	33.6	<b>84.0</b>	<b>33.3</b>	84.2	33.2	96	83.2	33.6	<b>84.0</b>	<b>33.3</b>	84.2	33.2		
126.lammeps	96	108	27.1	<b>108</b>	<b>27.0</b>	108	26.9	96	108	27.1	<b>108</b>	<b>27.0</b>	108	26.9		
127.wrf2	96	121	64.5	<b>121</b>	<b>64.5</b>	126	61.9	96	121	64.5	<b>121</b>	<b>64.5</b>	126	61.9		
128.GAPgeofem	96	48.8	42.3	48.5	42.6	<b>48.6</b>	<b>42.5</b>	96	48.8	42.3	48.5	42.6	<b>48.6</b>	<b>42.5</b>		
129.tera_tf	96	130	21.3	131	21.2	<b>131</b>	<b>21.2</b>	96	130	21.3	131	21.2	<b>131</b>	<b>21.2</b>		

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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### 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	<b>51.0</b>	<b>74.9</b>	96	50.8	75.1	51.4	74.3	<b>51.0</b>	<b>74.9</b>
132.zeusmp2	96	85.0	36.5	84.3	36.8	<b>84.5</b>	<b>36.7</b>	96	85.0	36.5	84.3	36.8	<b>84.5</b>	<b>36.7</b>
137.lu	96	<b>73.4</b>	<b>50.1</b>	73.4	50.1	73.5	50.0	96	<b>73.4</b>	<b>50.1</b>	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

#### 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

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## 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



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## 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](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](http://www.spec.org/mpi2007/flags/amd2021_flags.xml)

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

Tested with SPEC MPI2007 v2.0.1.

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