



SPEC® MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR665
(AMD EPYC 7763, 2.45 GHz)

SPECmpiM_peak2007 = 74.3

SPECmpiM_base2007 = 73.7

MPI2007 license: 28

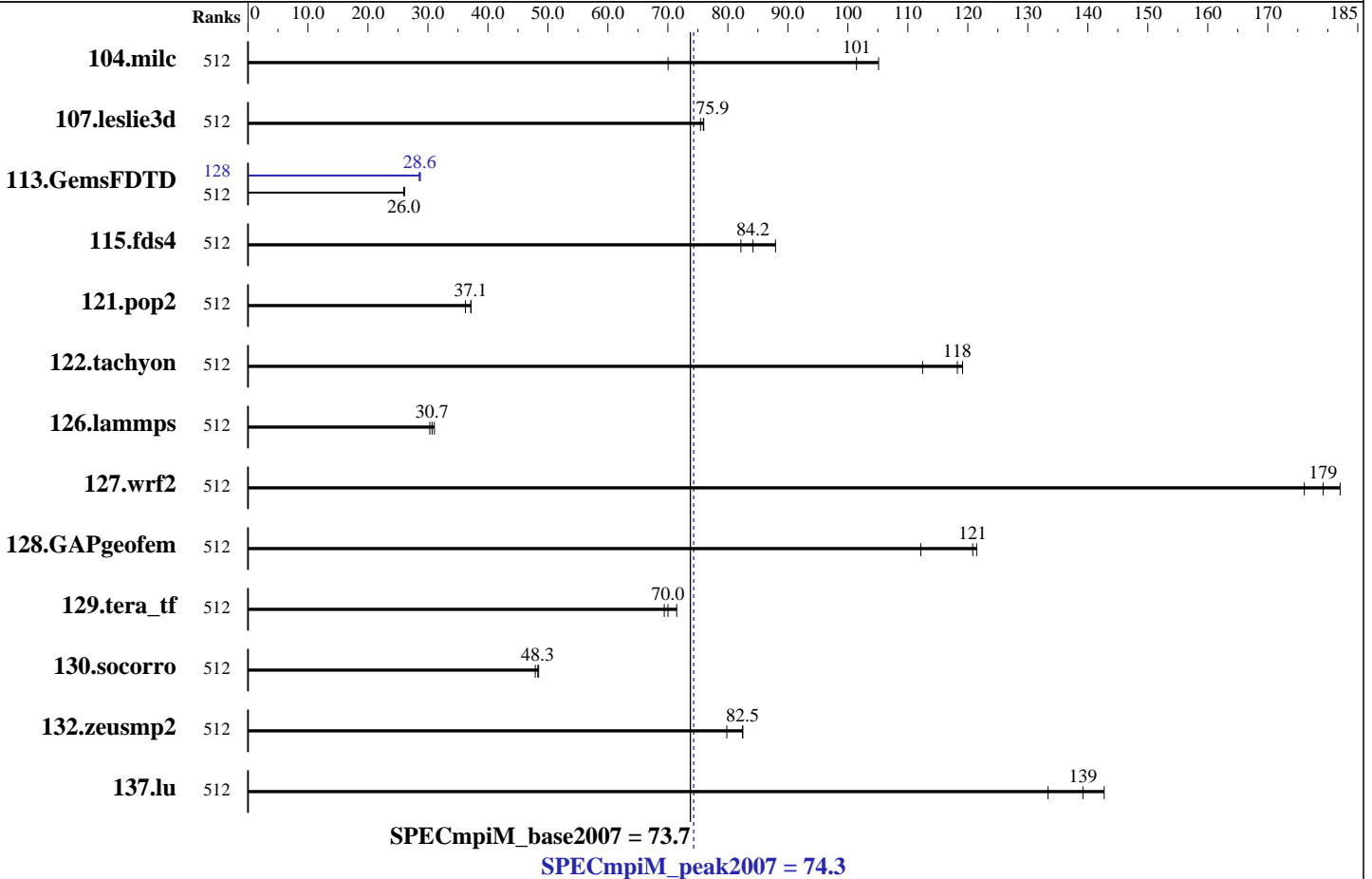
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Mar-2021

Hardware Availability: Mar-2021

Software Availability: Mar-2021



Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
104.milc	512	22.3	70.0	<u>15.4</u>	<u>101</u>	14.9	105	512	22.3	70.0	<u>15.4</u>	<u>101</u>	14.9	105		
107.leslie3d	512	69.2	75.4	68.7	76.0	<u>68.8</u>	<u>75.9</u>	512	69.2	75.4	68.7	76.0	<u>68.8</u>	<u>75.9</u>		
113.GemsFDTD	512	243	26.0	242	26.1	<u>243</u>	<u>26.0</u>	128	220	28.7	<u>220</u>	<u>28.6</u>	221	28.5		
115.fds4	512	23.7	82.2	22.2	87.9	<u>23.2</u>	<u>84.2</u>	512	23.7	82.2	22.2	87.9	<u>23.2</u>	<u>84.2</u>		
121.pop2	512	111	37.2	<u>111</u>	<u>37.1</u>	114	36.3	512	111	37.2	<u>111</u>	<u>37.1</u>	114	36.3		
122.tachyon	512	<u>23.7</u>	<u>118</u>	23.5	119	24.9	112	512	<u>23.7</u>	<u>118</u>	23.5	119	24.9	112		
126.lammps	512	93.8	31.1	96.2	30.3	<u>95.0</u>	<u>30.7</u>	512	93.8	31.1	96.2	30.3	<u>95.0</u>	<u>30.7</u>		
127.wrf2	512	<u>43.5</u>	<u>179</u>	42.8	182	44.3	176	512	<u>43.5</u>	<u>179</u>	42.8	182	44.3	176		
128.GAPgeofem	512	17.0	121	<u>17.1</u>	<u>121</u>	18.4	112	512	17.0	121	<u>17.1</u>	<u>121</u>	18.4	112		
129.tera_tf	512	39.9	69.4	<u>39.5</u>	<u>70.0</u>	38.7	71.5	512	39.9	69.4	<u>39.5</u>	<u>70.0</u>	38.7	71.5		

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	512	78.8	48.5	<u>79.0</u>	<u>48.3</u>	79.7	47.9	512	78.8	48.5	<u>79.0</u>	<u>48.3</u>	79.7	47.9
132.zeusmp2	512	<u>37.6</u>	<u>82.5</u>	38.9	79.8	37.6	82.5	512	<u>37.6</u>	<u>82.5</u>	38.9	79.8	37.6	82.5
137.lu	512	<u>26.4</u>	<u>139</u>	25.8	143	27.6	133	512	<u>26.4</u>	<u>139</u>	25.8	143	27.6	133

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: 4
 Total Chips: 8
 Total Cores: 512
 Total Threads: 512
 Total Memory: 4 TB
 Base Ranks Run: 512
 Minimum Peak Ranks: 128
 Maximum Peak Ranks: 512

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: 4
 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

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Hardware Availability: Mar-2021

Tested by: Lenovo Global Technology

Software Availability: Mar-2021

Node Description: ThinkSystem SR665

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

Node Description: NFS

Hardware

Software

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

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

Software

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

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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

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

129.tera_tf: basepeak = yes

137.lu: basepeak = yes

Benchmarks using both Fortran and C:

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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

http://www.spec.org/mpi2007/flags/AMD_flags.20210315.html

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.

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