



SPEC® MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR665
(AMD EPYC 7763, 2.45 GHz)

SPECmpiM_peak2007 = 72.3

SPECmpiM_base2007 = 72.3

MPI2007 license: 28

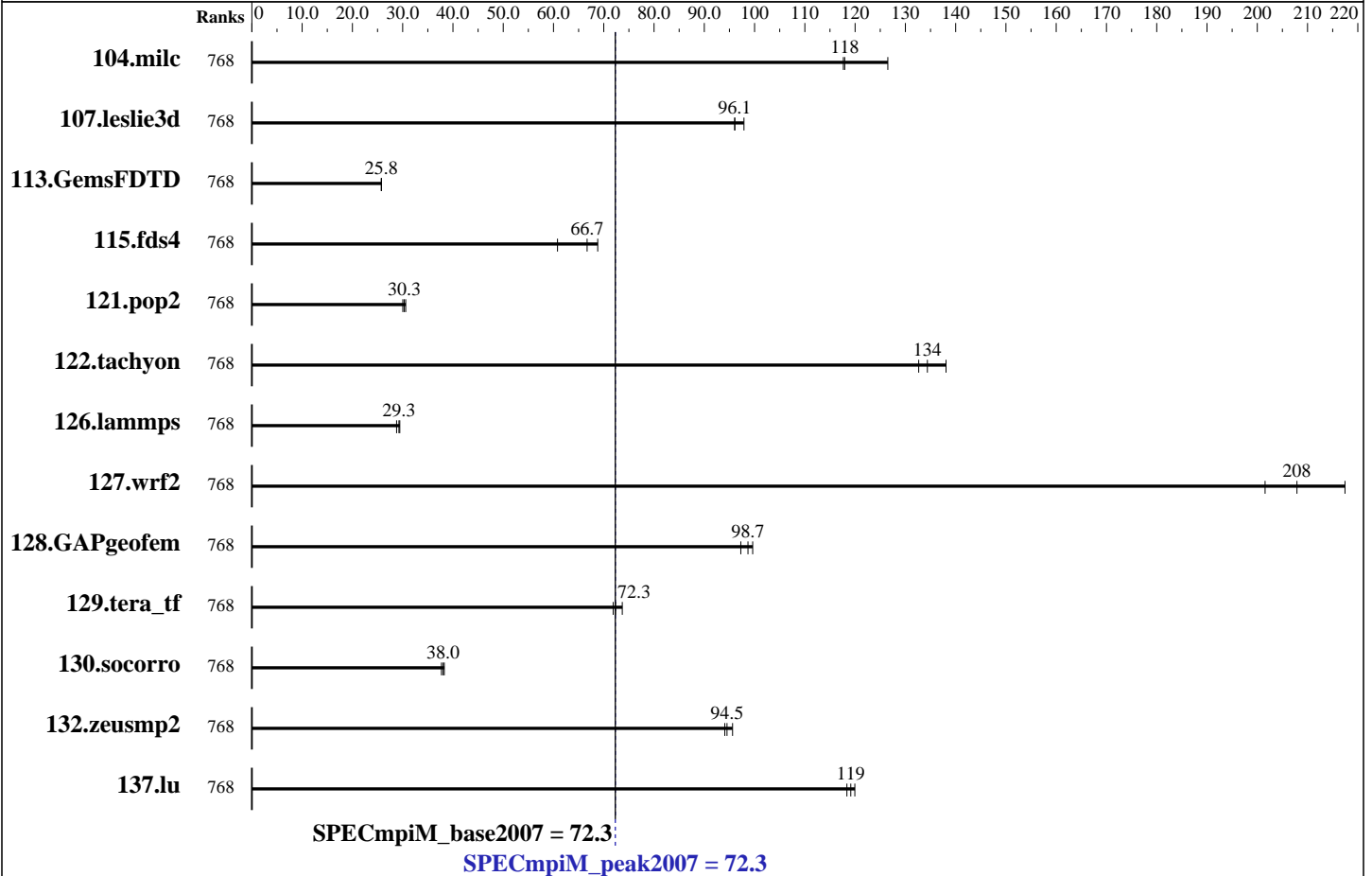
Test sponsor: Lenovo Global Technology

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	768	12.4	127	<u>13.3</u>	<u>118</u>	13.3	118	768	12.4	127	<u>13.3</u>	<u>118</u>	13.3	118
107.leslie3d	768	54.3	96.1	53.3	97.9	<u>54.3</u>	<u>96.1</u>	768	54.3	96.1	53.3	97.9	<u>54.3</u>	<u>96.1</u>
113.GemsFDTD	768	245	25.8	<u>245</u>	<u>25.8</u>	245	25.8	768	245	25.8	<u>245</u>	<u>25.8</u>	245	25.8
115.fds4	768	28.4	68.8	32.1	60.8	<u>29.3</u>	<u>66.7</u>	768	28.4	68.8	32.1	60.8	<u>29.3</u>	<u>66.7</u>
121.pop2	768	135	30.6	<u>136</u>	<u>30.3</u>	137	30.0	768	135	30.6	<u>136</u>	<u>30.3</u>	137	30.0
122.tachyon	768	20.3	138	21.1	133	<u>20.8</u>	<u>134</u>	768	20.3	138	21.1	133	<u>20.8</u>	<u>134</u>
126.lammps	768	99.1	29.4	<u>99.7</u>	<u>29.3</u>	101	28.8	768	99.1	29.4	<u>99.7</u>	<u>29.3</u>	101	28.8
127.wrf2	768	<u>37.5</u>	<u>208</u>	35.9	217	38.7	202	768	<u>37.5</u>	<u>208</u>	35.9	217	38.7	202
128.GAPgeofem	768	<u>20.9</u>	<u>98.7</u>	20.7	99.6	21.2	97.3	768	<u>20.9</u>	<u>98.7</u>	20.7	99.6	21.2	97.3
129.tera_tf	768	37.6	73.7	<u>38.3</u>	<u>72.3</u>	38.5	71.9	768	37.6	73.7	<u>38.3</u>	<u>72.3</u>	38.5	71.9

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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Software Availability: Mar-2021

Results Table (Continued)

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
130.socorro	768	<u>100</u>	<u>38.0</u>	99.7	38.3	101	37.7	768	<u>100</u>	<u>38.0</u>	99.7	38.3	101	37.7
132.zeusmp2	768	33.0	94.1	<u>32.8</u>	<u>94.5</u>	32.4	95.6	768	33.0	94.1	<u>32.8</u>	<u>94.5</u>	32.4	95.6
137.lu	768	30.6	120	<u>30.9</u>	<u>119</u>	31.1	118	768	30.6	120	<u>30.9</u>	<u>119</u>	31.1	118

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: 6
 Total Chips: 12
 Total Cores: 768
 Total Threads: 768
 Total Memory: 6 TB
 Base Ranks Run: 768
 Minimum Peak Ranks: 768
 Maximum Peak Ranks: 768

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: 6
 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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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	
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

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
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	
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

Software

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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.

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: -DMPICH_IGNORE_CXX_SEEK

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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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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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