SPEC® MPIM2007 Result

Lenovo Global Technology

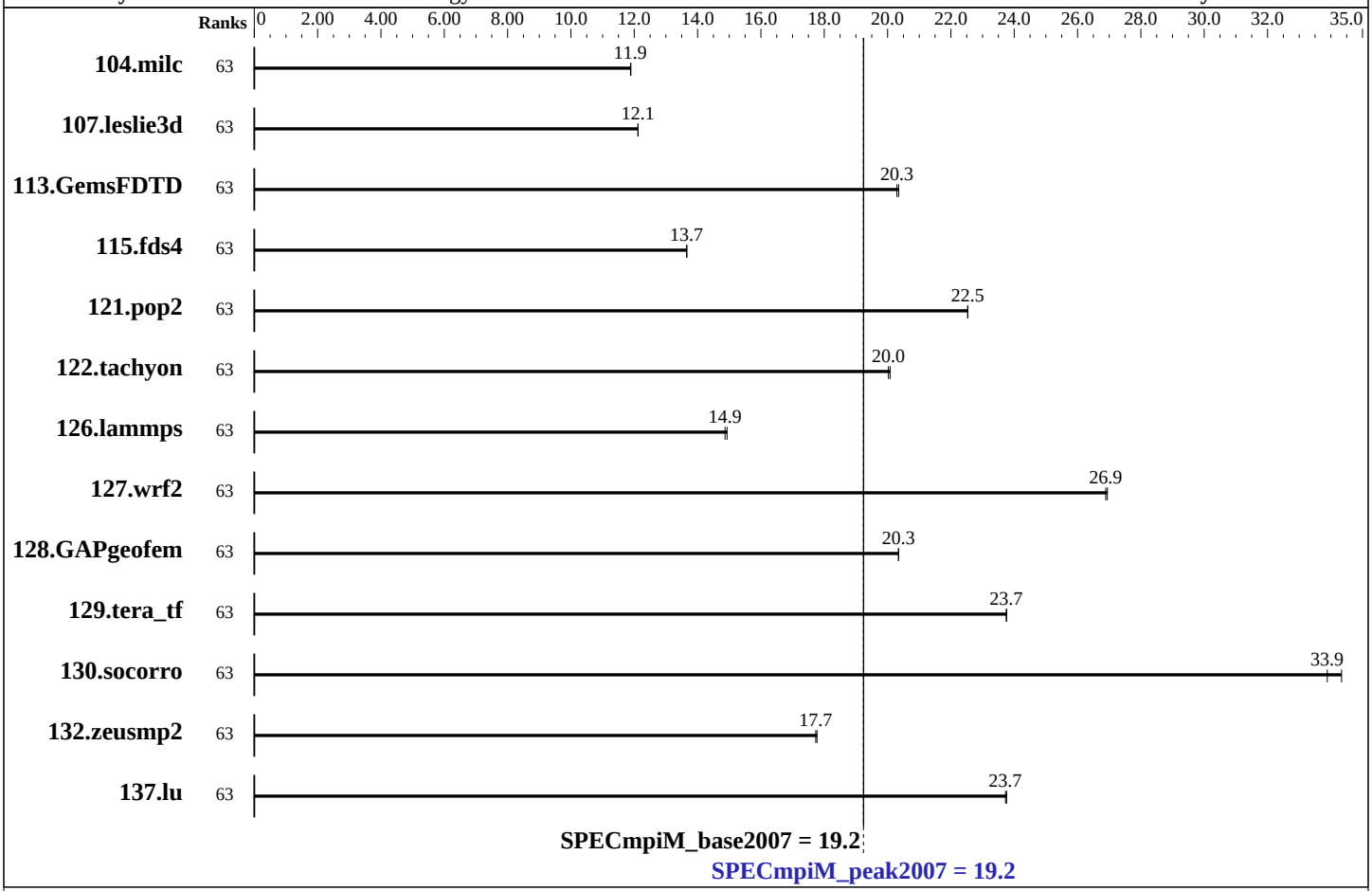
ThinkSystem SR655
(AMD EPYC 7763, 2.45 GHz)

SPECmpiM_peak2007 = 19.2

SPECmpiM_base2007 = 19.2

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

Test date: Mar-2021
Hardware Availability: Jun-2021
Software Availability: Jun-2021



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	63	**132**	**11.9**	132	11.9			63	**132**	**11.9**	132	11.9		
107.leslie3d	63	431	12.1	**431**	**12.1**			63	431	12.1	**431**	**12.1**		
113.GemsFDTD	63	**311**	**20.3**	310	20.3			63	**311**	**20.3**	310	20.3		
115.fds4	63	143	13.7	**143**	**13.7**			63	143	13.7	**143**	**13.7**		
121.pop2	63	**183**	**22.5**	183	22.5			63	**183**	**22.5**	183	22.5		
122.tachyon	63	**140**	**20.0**	139	20.1			63	**140**	**20.0**	139	20.1		
126.lammps	63	**196**	**14.9**	195	14.9			63	**196**	**14.9**	195	14.9		
127.wrf2	63	**290**	**26.9**	289	26.9			63	**290**	**26.9**	289	26.9		
128.GAPgeofem	63	101	20.3	**102**	**20.3**			63	101	20.3	**102**	**20.3**		
129.tera_tf	63	**117**	**23.7**	116	23.8			63	**117**	**23.7**	116	23.8		

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	63	**113**	**33.9**	111	34.3			63	**113**	**33.9**	111	34.3		
132.zeusmp2	63	**175**	**17.7**	175	17.8			63	**175**	**17.7**	175	17.8		
137.lu	63	155	23.8	**155**	**23.7**			63	155	23.8	**155**	**23.7**		

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
Interconnect:	Mellanox ConnectX-6 HDR
File Server Node:	NFS
Total Compute Nodes:	1
Total Chips:	1
Total Cores:	64
Total Threads:	64
Total Memory:	256 GB
Base Ranks Run:	63
Minimum Peak Ranks:	63
Maximum Peak Ranks:	63

Software Summary

C Compiler:	Intel C Compiler 20.4 for Linux Version 19.1.3.304 Build 20200925
C++ Compiler:	Intell C++ Compiler 20.4 for Linux Version 19.1.3.304 Build 20200925
Fortran Compiler:	Intel Fortran Compiler 20.4 for Linux Version 19.1.3.304 Build 20200925
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
MPI Library:	Intel MPI Library for Linux Version 2019 Update 11 Build 20210330
Other MPI Info:	None
Pre-processors:	No
Other Software:	None

Node Description: ThinkSystem SR655

Hardware

Number of nodes:	1
Uses of the node:	compute
Vendor:	Lenovo Global Technology
Model:	SR655
CPU Name:	AMD EPYC 7763
CPU(s) orderable:	1 chips
Chips enabled:	1
Cores enabled:	64
Cores per chip:	64
Threads per core:	1
CPU Characteristics:	Turbo up to 3.5 GHz
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:	256 GB (8 x 32 GB 2Rx8 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

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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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Test date: Mar-2021
Hardware Availability: Jun-2021
Software Availability: Jun-2021

Node Description: ThinkSystem SR655

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 SR655
CPU Name:	AMD EPYC 7763 CPU
CPU(s) orderable:	1 chips
Chips enabled:	1
Cores enabled:	64
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:	256 GB (8 x 32 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

Continued on next page

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 32 GB RDIMM on each memory channel.
Add "idle=poll" into grub
BIOS settings:
  Operating Mode : Maximum Performance Mode
  Hyper-Threading Technology (SMT): Disabled
  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:
`mpiicc`

C++ benchmarks:

126.lammps: `mpiicpc`

Fortran benchmarks:
`mpiifort`

Benchmarks using both Fortran and C:
`mpiicc mpiifort`

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`
130.socorro: `-assume nostd_intent_in`

Base Optimization Flags

C benchmarks:
`-O3 -march=core-avx2 -no-prec-div -ipo`

C++ benchmarks:

126.lammps: `-O3 -march=core-avx2 -no-prec-div -ipo`

Fortran benchmarks:
`-O3 -march=core-avx2 -no-prec-div -ipo`

Benchmarks using both Fortran and C:
`-O3 -march=core-avx2 -no-prec-div -ipo`

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:

115.fds4: `basepeak = yes`

121.pop2: `basepeak = yes`

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Peak Optimization Flags (Continued)

127.wrf2: basepeak = yes

128.GAPgeofem: basepeak = yes

130.socorro: basepeak = yes

132.zeusmp2: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/mpi2007/flags/Lenovo_Platform_Flags.html
http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.20200506.01.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/mpi2007/flags/Lenovo_Platform_Flags.xml
http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.20200506.01.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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