SPEC® MPIM2007 Result

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Lenovo Global Technology

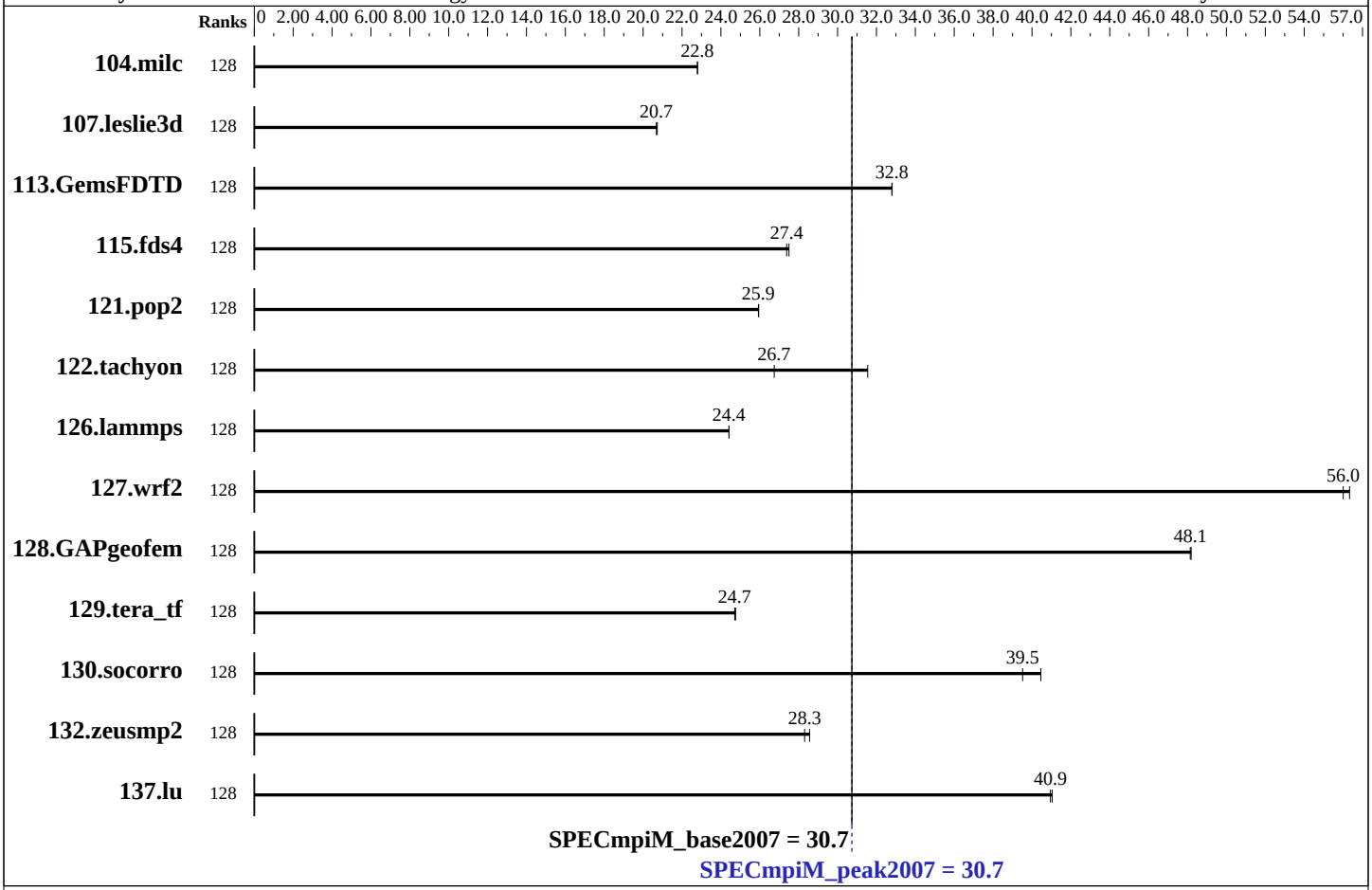
ThinkSystem SR655
(AMD EPYC 7763, 2.45 GHz)

SPECmpiM_peak2007 = 30.7

SPECmpiM_base2007 = 30.7

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	128	**68.7**	**22.8**	68.6	22.8			128	**68.7**	**22.8**	68.6	22.8		
107.leslie3d	128	252	20.7	**252**	**20.7**			128	252	20.7	**252**	**20.7**		
113.GemsFDTD	128	**192**	**32.8**	192	32.8			128	**192**	**32.8**	192	32.8		
115.fds4	128	70.9	27.5	**71.3**	**27.4**			128	70.9	27.5	**71.3**	**27.4**		
121.pop2	128	159	25.9	**159**	**25.9**			128	159	25.9	**159**	**25.9**		
122.tachyon	128	**105**	**26.7**	88.6	31.6			128	**105**	**26.7**	88.6	31.6		
126.lammps	128	119	24.4	**119**	**24.4**			128	119	24.4	**119**	**24.4**		
127.wrf2	128	**139**	**56.0**	138	56.3			128	**139**	**56.0**	138	56.3		
128.GAPgeofem	128	42.9	48.2	**42.9**	**48.1**			128	42.9	48.2	**42.9**	**48.1**		
129.tera_tf	128	**112**	**24.7**	112	24.8			128	**112**	**24.7**	112	24.8		

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	128	94.4	40.5	**96.6**	**39.5**			128	94.4	40.5	**96.6**	**39.5**		
132.zeusmp2	128	109	28.6	**110**	**28.3**			128	109	28.6	**110**	**28.3**		
137.lu	128	**89.8**	**40.9**	89.6	41.0			128	**89.8**	**40.9**	89.6	41.0		

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
Interconnect: Mellanox ConnectX-6 HDR
File Server Node: NFS
Total Compute Nodes: 2
Total Chips: 2
Total Cores: 128
Total Threads: 128
Total Memory: 512 GB
Base Ranks Run: 128
Minimum Peak Ranks: 128
Maximum Peak Ranks: 128

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: 2
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 sponsor: Lenovo Global Technology
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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`

Continued on next page

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

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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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