SPEC® MPIM2007 Result

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Lenovo Global Technology

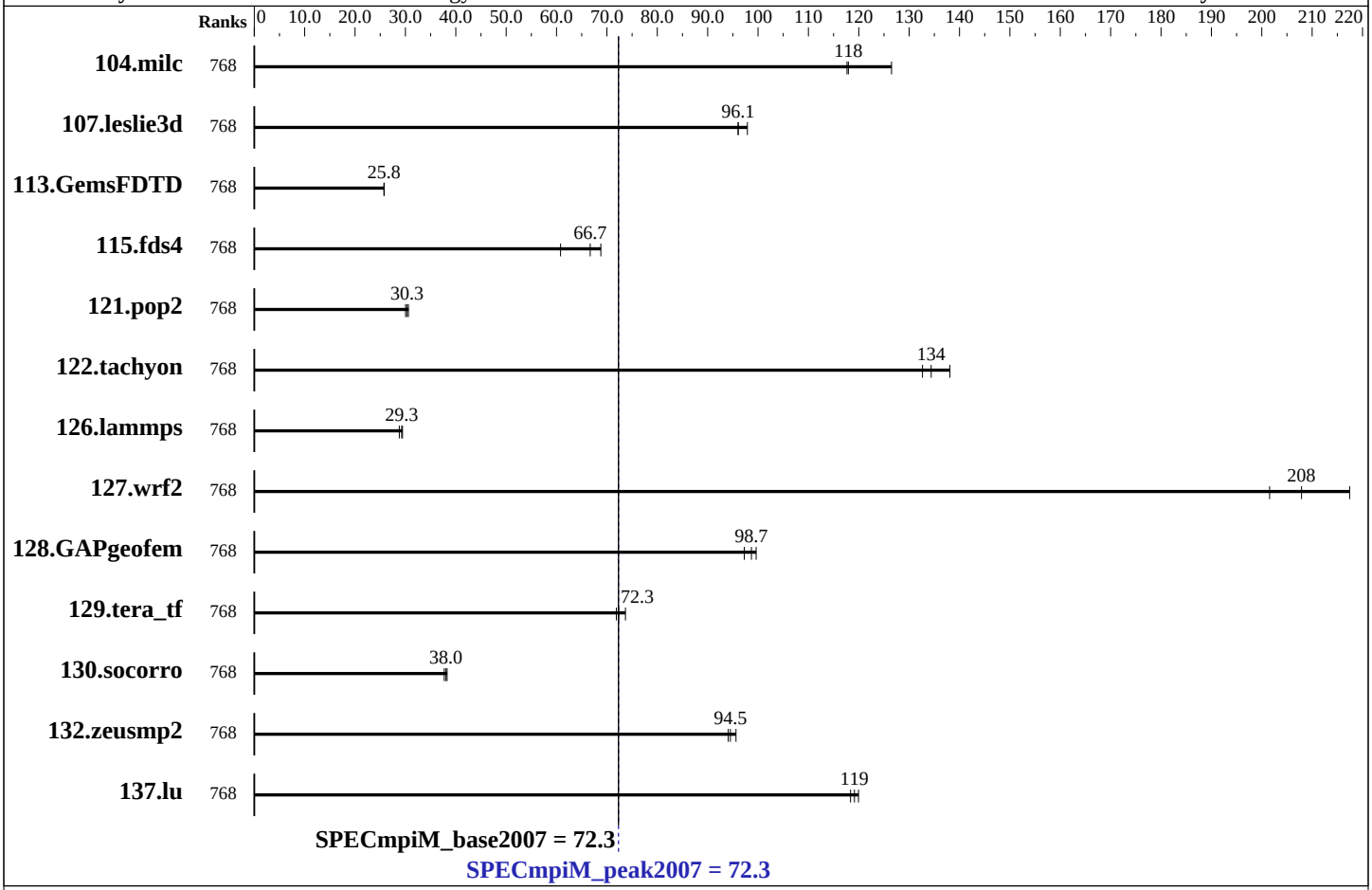
ThinkSystem SR665
(AMD EPYC 7763, 2.45 GHz)

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	**13.3**	**118**	13.3	118	768	12.4	127	**13.3**	**118**	13.3	118
107.leslie3d	768	54.3	96.1	53.3	97.9	**54.3**	**96.1**	768	54.3	96.1	53.3	97.9	**54.3**	**96.1**
113.GemsFDTD	768	245	25.8	**245**	**25.8**	245	25.8	768	245	25.8	**245**	**25.8**	245	25.8
115.fds4	768	28.4	68.8	32.1	60.8	**29.3**	**66.7**	768	28.4	68.8	32.1	60.8	**29.3**	**66.7**
121.pop2	768	135	30.6	**136**	**30.3**	137	30.0	768	135	30.6	**136**	**30.3**	137	30.0
122.tachyon	768	20.3	138	21.1	133	**20.8**	**134**	768	20.3	138	21.1	133	**20.8**	**134**
126.lammps	768	99.1	29.4	**99.7**	**29.3**	101	28.8	768	99.1	29.4	**99.7**	**29.3**	101	28.8
127.wrf2	768	**37.5**	**208**	35.9	217	38.7	202	768	**37.5**	**208**	35.9	217	38.7	202
128.GAPgeofem	768	**20.9**	**98.7**	20.7	99.6	21.2	97.3	768	**20.9**	**98.7**	20.7	99.6	21.2	97.3
129.tera_tf	768	37.6	73.7	**38.3**	**72.3**	38.5	71.9	768	37.6	73.7	**38.3**	**72.3**	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	**100**	**38.0**	99.7	38.3	101	37.7	768	**100**	**38.0**	99.7	38.3	101	37.7
132.zeusmp2	768	33.0	94.1	**32.8**	**94.5**	32.4	95.6	768	33.0	94.1	**32.8**	**94.5**	32.4	95.6
137.lu	768	30.6	120	**30.9**	**119**	31.1	118	768	30.6	120	**30.9**	**119**	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

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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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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

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 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`

Continued on next page

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:

Continued on next page

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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