SPEC® MPIM2007 Result

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Lenovo Global Technology

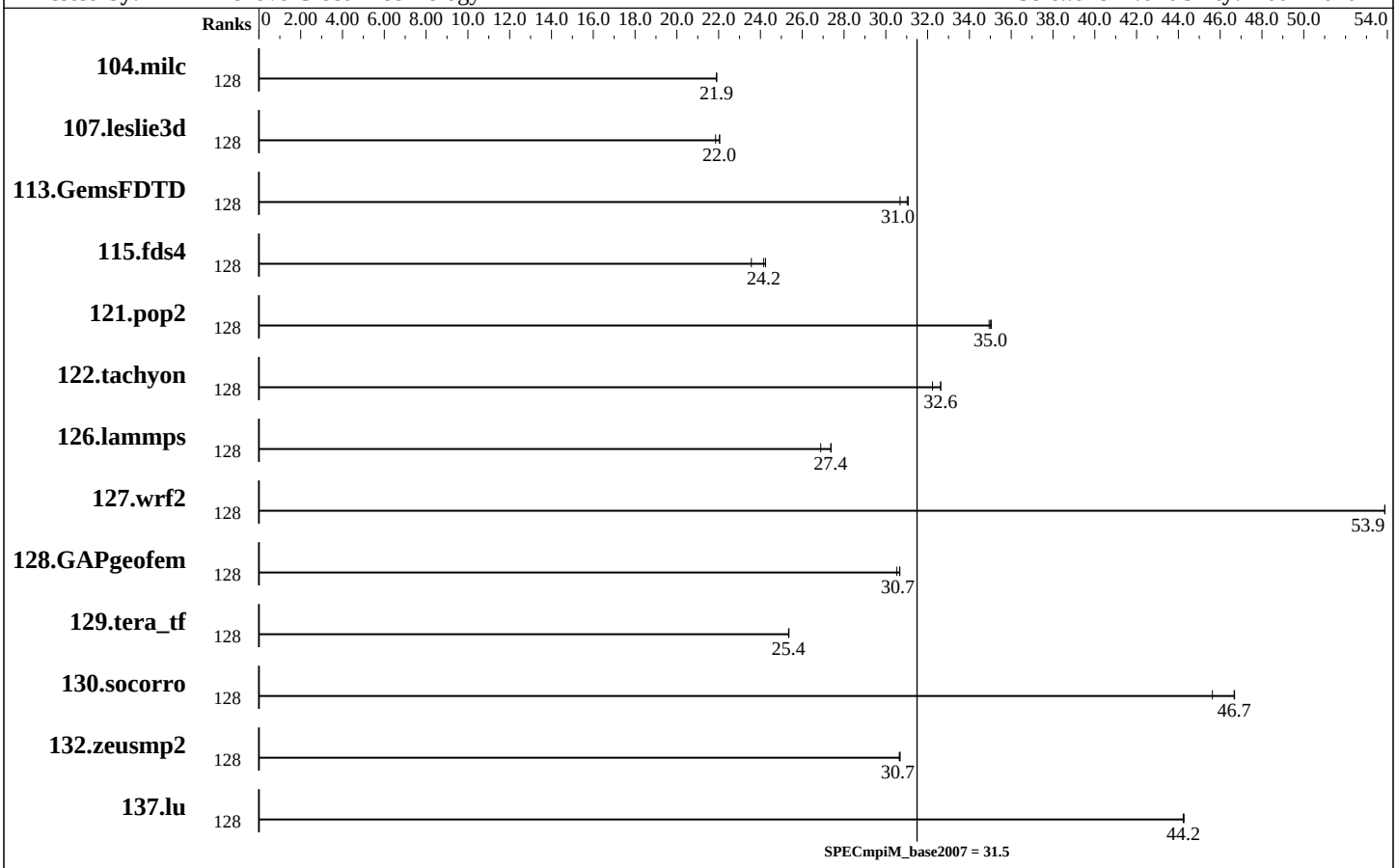
ThinkSystem SR665
(AMD EPYC 7H12, 2.6 GHz)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 31.5

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

Test date: Jan-2020
Hardware Availability: Jun-2020
Software Availability: Jun-2020



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	128	71.4	21.9	**71.5**	**21.9**	71.5	21.9							
107.leslie3d	128	**237**	**22.0**	239	21.9	237	22.0							
113.GemsFDTD	128	206	30.7	**203**	**31.0**	203	31.1							
115.fds4	128	82.8	23.6	**80.8**	**24.2**	80.5	24.2							
121.pop2	128	118	35.1	118	34.9	**118**	**35.0**							
122.tachyon	128	85.7	32.6	**85.7**	**32.6**	86.8	32.2							
126.lammps	128	108	26.9	**107**	**27.4**	106	27.4							
127.wrf2	128	145	53.9	145	53.9	**145**	**53.9**							
128.GAPgeofem	128	67.6	30.5	**67.3**	**30.7**	67.3	30.7							
129.tera_tf	128	109	25.4	109	25.3	**109**	**25.4**							

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	81.8	46.7	83.7	45.6	**81.8**	**46.7**							
132.zeusmp2	128	101	30.7	101	30.6	**101**	**30.7**							
137.lu	128	83.1	44.2	**83.1**	**44.2**	83.0	44.3							

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
File Server Node: NFS
Total Compute Nodes: 1
Total Chips: 2
Total Cores: 128
Total Threads: 128
Total Memory: 1 TB
Base Ranks Run: 128
Minimum Peak Ranks: --
Maximum Peak Ranks: --

Software Summary

C Compiler: AMD Optimizing C Compiler for Linux Version 2.1 Build 1030.2019_11_12
C++ Compiler: AMD Optimizing C++ Compiler for Linux Version 2.1 Build 1030.2019_11_12
Fortran Compiler: AMD Optimizing Fortran Compiler for Linux Version 2.1 Build 1030.2019_11_12
Base Pointers: 64-bit
Peak Pointers: Not Applicable
MPI Library: OpenMPI MPI Library Version 4.0.2
Other MPI Info: None
Pre-processors: No
Other Software: None

Node Description: ThinkSystem SR665

Hardware

Number of nodes: 1
Uses of the node: compute
Vendor: Lenovo Global Technology
Model: SR665
CPU Name: AMD EPYC 7H12
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: 2600
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
16 MB shared / 4 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

Continued on next page

Software

Adapter: Mellanox ConnectX-6 HDR Infiniband
Adapter Driver: 4.7-1.0.0.1.2
Adapter Firmware: 20.25.2006
Operating System: Red Hat Enterprise Linux Server release 8.1, 4.18.0-147.el8.x86_64
Local File System: xfs
Shared File System: None
System State: Multi-user, run level 3
Other Software: None

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 7H12 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:	2600
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 16 MB shared / 4 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:	4.7-1.0.0.1.2
Adapter Firmware:	20.25.2006
Operating System:	Red Hat Enterprise Linux Server release 8.1
Local File System:	None
Shared File System:	NFS
System State:	Multi-User, run level 3
Other Software:	None

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:
```

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General Notes (Continued)

```
    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:
```
/opt/OMPI/O402_A21_H47_R81/bin/mpicc
```

C++ benchmarks:

126.lammps: `/opt/OMPI/O402_A21_H47_R81/bin/mpic++`

Fortran benchmarks:
```
/opt/OMPI/O402_A21_H47_R81/bin/mp ifort
```

Benchmarks using both Fortran and C:
```
/opt/OMPI/O402_A21_H47_R81/bin/mpicc /opt/OMPI/O402_A21_H47_R81/bin/mp
ifort
```

Base Portability Flags

104.milc: `-DSPEC_LP64`
107.leslie3d: `-DSPEC_LP64`
113.GemsFDTD: `-DSPEC_LP64`
115.fds4: `-DSPEC_LP64`
121.pop2: `-DSPEC_MPI_CASE_FLAG -DSPEC_LP64`
122.tachyon: `-DSPEC_LP64`
126.lammps: `-DMPICH_IGNORE_CXX_SEEK -DSPEC_LP64`
127.wrf2: `-DSPEC_MPI_CASE_FLAG -DSPEC_MPI_LINUX -Wno-return-type -DSPEC_LP64`
128.GAPgeofem: `-DSPEC_LP64`
129.tera_tf: `-DSPEC_LP64`
130.socorro: `-DSPEC_LP64`
132.zeusmp2: `-DSPEC_LP64`
137.lu: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-Ofast -flto -ffast-math -march=znver2 -mavx2
-L/home/AMD_FFTW/amd-fftw/lib -lfftw3 -L/home/AMD_libm/amd-libm/lib
-lamdlibm -L/home/AMD_blis/amd-blis/lib
```

C++ benchmarks:

126.lammps:
```
-Ofast -flto -ffast-math -march=znver2 -mavx2
-L/home/AMD_FFTW/amd-fftw/lib -lfftw3
-L/home/AMD_libm/amd-libm/lib -lamdlibm
-L/home/AMD_blis/amd-blis/lib
```

Fortran benchmarks:
```
-Ofast -flto -ffast-math -march=znver2 -funroll-loops -mavx2
-L/home/AMD_FFTW/amd-fftw/lib -lfftw3 -L/home/AMD_libm/amd-libm/lib
-lamdlibm -L/home/AMD_blis/amd-blis/lib
```

Benchmarks using both Fortran and C:
```
-Ofast -flto -ffast-math -march=znver2 -mavx2 -funroll-loops
-L/home/AMD_FFTW/amd-fftw/lib -lfftw3 -L/home/AMD_libm/amd-libm/lib
-lamdlibm -L/home/AMD_blis/amd-blis/lib
```

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

You can also download the XML flags source by saving the following link:
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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