SPEC® MPIM2007 Result
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Lenovo Global Technology

$SPECmpiM\_peak2007 =$ Not Run

ThinkSystem SR665
(AMD EPYC 7H12, 2.6 GHz)

$SPECmpiM\_base2007 =$ 31.5

MPI2007 license:	28	**Test date:**	Jan-2020
Test sponsor:	Lenovo Global Technology	**Hardware Availability:**	Jun-2020
Tested by:	Lenovo Global Technology	**Software Availability:**	Jun-2020

Ranks 0 2.00 4.00 6.00 8.00 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 32.0 34.0 36.0 38.0 40.0 42.0 44.0 46.0 48.0 50.0 54.0

- 104.milc 128 — 21.9
- 107.leslie3d 128 — 22.0
- 113.GemsFDTD 128 — 31.0
- 115.fds4 128 — 24.2
- 121.pop2 128 — 35.0
- 122.tachyon 128 — 32.6
- 126.lammps 128 — 27.4
- 127.wrf2 128 — 53.9
- 128.GAPgeofem 128 — 30.7
- 129.tera_tf 128 — 25.4
- 130.socorro 128 — 46.7
- 132.zeusmp2 128 — 30.7
- 137.lu 128 — 44.2

SPECmpiM_base2007 = 31.5

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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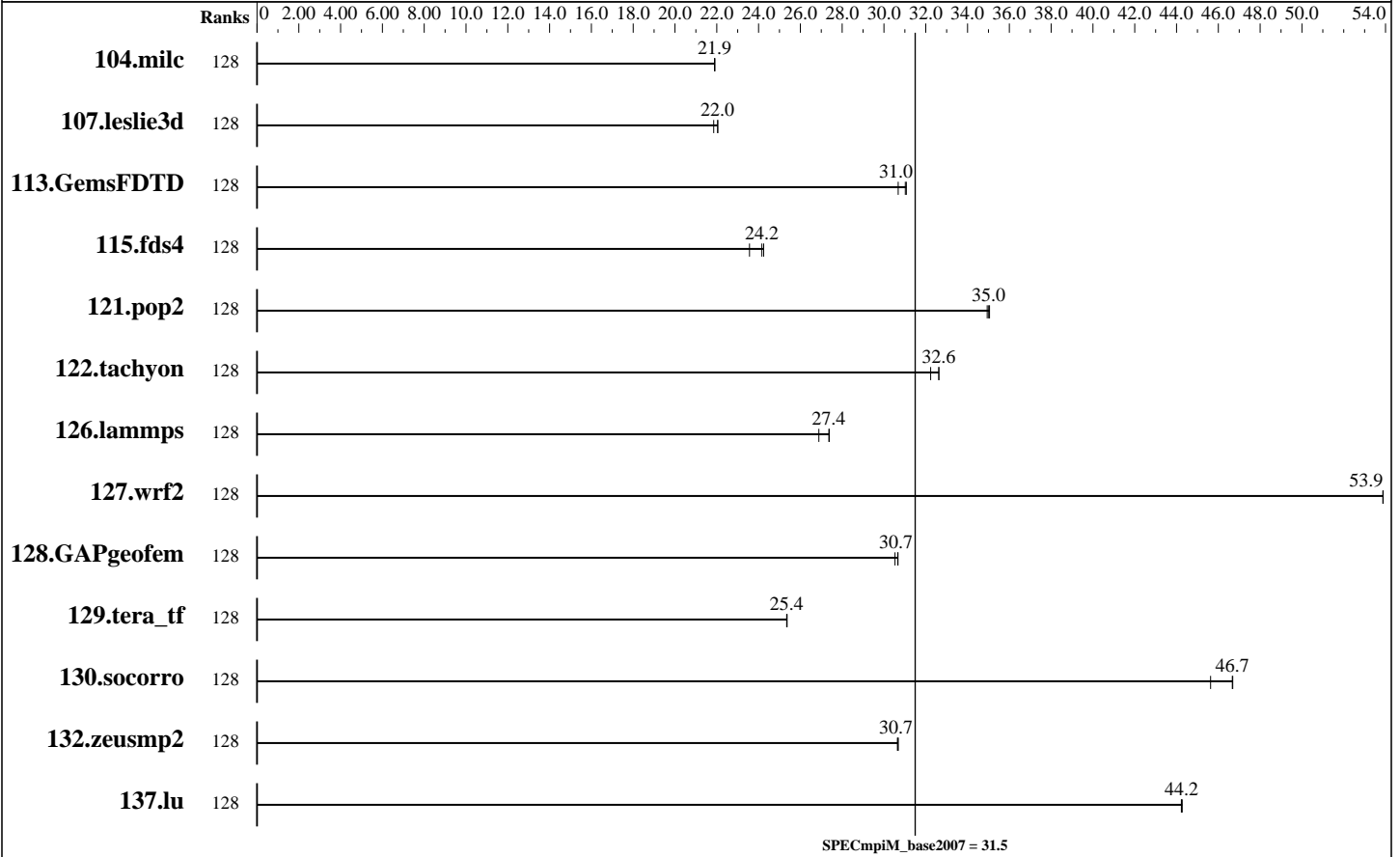|	
MPI2007 license: 28	**Test date:** Jan-2020
Test sponsor: Lenovo Global Technology	**Hardware Availability:** Jun-2020
Tested by: Lenovo Global Technology	**Software Availability:** Jun-2020

Results Table (Continued)

Benchmark	Ranks	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak 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

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

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Test sponsor:	Lenovo Global Technology	**Hardware Availability:**	Jun-2020
Tested by:	Lenovo Global Technology	**Software Availability:**	Jun-2020

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
```

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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

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

Tested with SPEC MPI2007 v2.0.1.
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