SPEC® MPIM2007 Result
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Lenovo Global Technology

ThinkSystem SR665
(AMD EPYC 7H12, 2.6 GHz)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 =   60.4

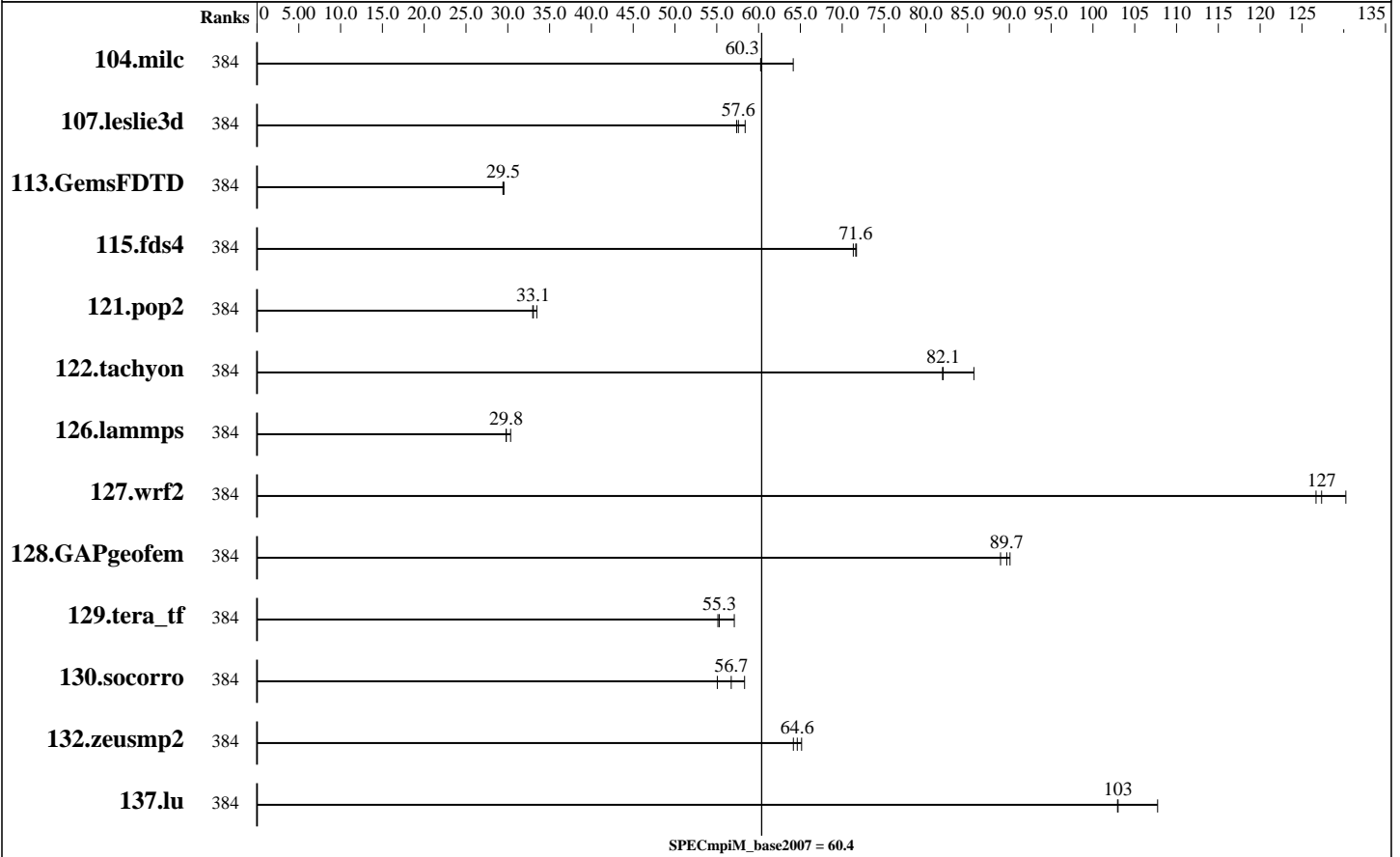|	
MPI2007 license: 28	**Test date:** Jan-2020
Test sponsor: Lenovo Global Technology	**Hardware Availability:** Jun-2020
Tested by: Lenovo Global Technology	**Software Availability:** Jun-2020

Ranks | 0 5.00 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 55.0 60.0 65.0 70.0 75.0 80.0 85.0 90.0 95.0 100 105 110 115 120 125   135

104.milc 384 — 60.3

107.leslie3d 384 — 57.6

113.GemsFDTD 384 — 29.5

115.fds4 384 — 71.6

121.pop2 384 — 33.1

122.tachyon 384 — 82.1

126.lammps 384 — 29.8

127.wrf2 384 — 127

128.GAPgeofem 384 — 89.7

129.tera_tf 384 — 55.3

130.socorro 384 — 56.7

132.zeusmp2 384 — 64.6

137.lu 384 — 103

SPECmpiM_base2007 = 60.4

Results Table

Benchmark	Base						Peak					
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	384	24.4	64.1	26.0	60.3	**26.0**	**60.3**					
107.leslie3d	384	91.0	57.4	**90.6**	**57.6**	89.4	58.4					
113.GemsFDTD	384	214	29.4	**214**	**29.5**	214	29.5					
115.fds4	384	27.2	71.7	**27.2**	**71.6**	27.4	71.3					
121.pop2	384	**125**	**33.1**	125	33.0	123	33.5					
122.tachyon	384	34.1	82.0	32.6	85.8	**34.1**	**82.1**					
126.lammps	384	96.1	30.3	**97.7**	**29.8**	97.8	29.8					
127.wrf2	384	**61.2**	**127**	59.9	130	61.5	127					
128.GAPgeofem	384	22.9	90.1	**23.0**	**89.7**	23.2	88.9					
129.tera_tf	384	50.2	55.1	**50.1**	**55.3**	48.5	57.1					

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	Ranks	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Ranks	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
130.socorro	384	**67.3**	**56.7**	69.3	55.1	65.4	58.3							
132.zeusmp2	384	**48.0**	**64.6**	48.4	64.2	47.6	65.1							
137.lu	384	**35.7**	**103**	34.1	108	35.7	103							

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:	3
Total Chips:	6
Total Cores:	384
Total Threads:	384
Total Memory:	3 TB
Base Ranks Run:	384
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:	3
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
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Node Description: ThinkSystem SR665

Data Rate: 200 Gbs/s
Ports Used: 1
Interconnect Type: Mellanox ConnectX-6 HDR Infiniband Adapter

Node Description: NFS

Hardware		**Software**	
Number of nodes:	1	Adapter:	Mellanox ConnectX-6 HDR Infiniband
Uses of the node:	Fileserver	Adapter Driver:	4.7-1.0.0.1.2
Vendor:	Lenovo Global Technology	Adapter Firmware:	20.25.2006
Model:	ThinkSystem SR665	Operating System:	Red Hat Enterprise Linux Server release 8.1
CPU Name:	AMD EPYC 7H12 CPU	Local File System:	None
CPU(s) orderable:	1-2 chips	Shared File System:	NFS
Chips enabled:	2	System State:	Multi-User, run level 3
Cores enabled:	128	Other Software:	None
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		

Interconnect Description: Mellanox ConnectX-6 HDR

Hardware		**Software**
Vendor:	Mellanox	
Model:	Infiniband EDR 100Gb/s Switch	
Switch Model:	SB7800 Series	
Number of Switches:	1	
Number of Ports:	36	
Data Rate:	100 Gb/s	
Firmware:	3.9.0300	
Topology:	Mesh	

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

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): 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/openmpi/O402_A21_H47_RH81/bin/mpicc

C++ benchmarks:

     126.lammps: /opt/openmpi/O402_A21_H47_RH81/bin/mpicxx

Fortran benchmarks:
     /opt/openmpi/O402_A21_H47_RH81/bin/mp ifort

Benchmarks using both Fortran and C:
     /opt/openmpi/O402_A21_H47_RH81/bin/mpicc
     /opt/openmpi/O402_A21_H47_RH81/bin/mp ifort

Base Portability Flags

     121.pop2: -DSPEC_MPI_CASE_FLAG

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Base Portability Flags (Continued)

```
126.lammps: -DMPICH_IGNORE_CXX_SEEK
127.wrf2: -DSPEC_MPI_CASE_FLAG -DSPEC_MPI_LINUX -Wno-return-type
```

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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