SPEC® MPIM2007 Result

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Lenovo Global Technology

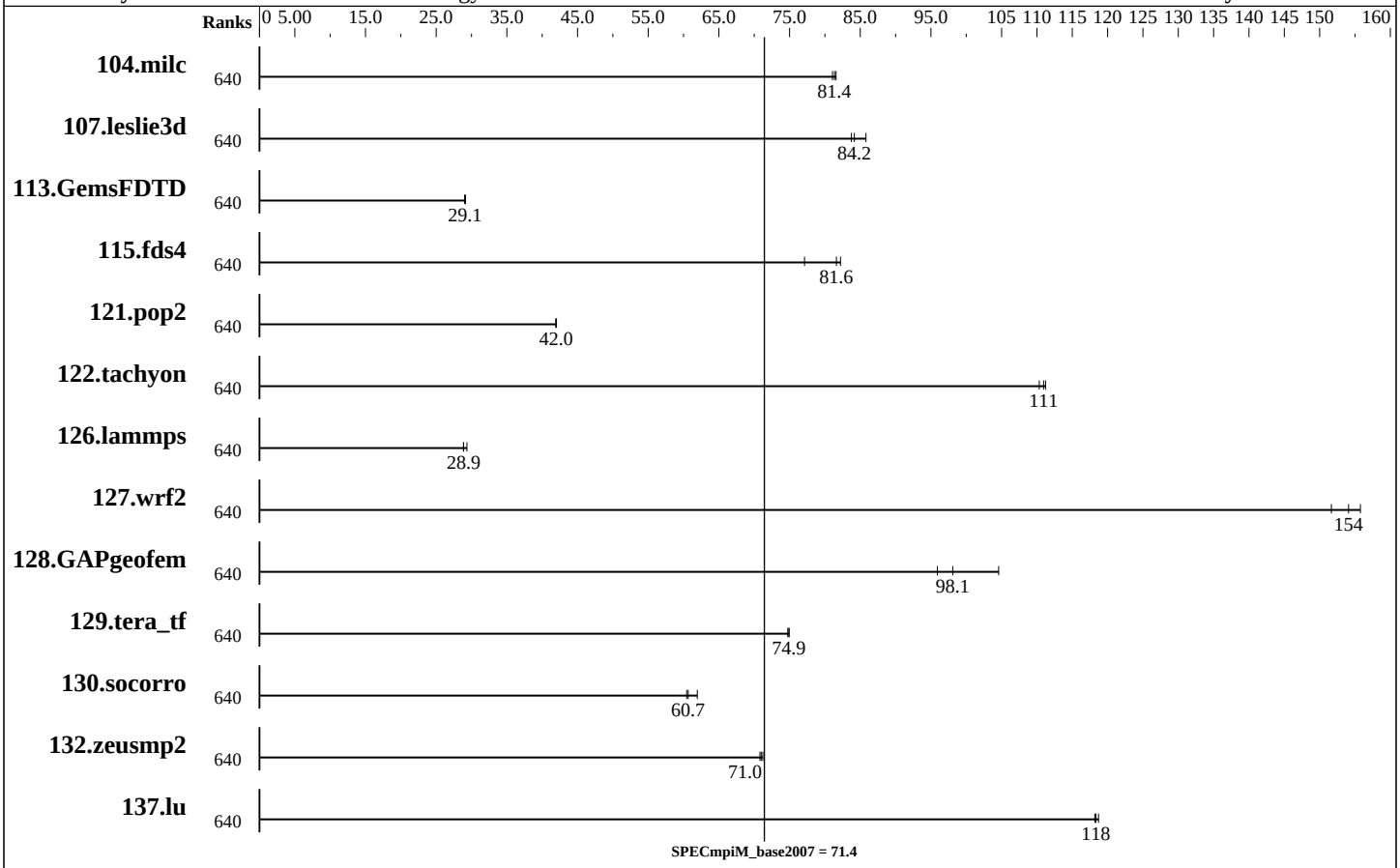
ThinkSystem SR665
(AMD EPYC 7H12, 2.6 GHz)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 71.4

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	640	**19.2**	**81.4**	19.2	81.6	19.3	81.1							
107.leslie3d	640	60.8	85.8	**62.0**	**84.2**	62.3	83.8							
113.GemsFDTD	640	217	29.0	216	29.2	**217**	**29.1**							
115.fds4	640	25.3	77.1	23.7	82.2	**23.9**	**81.6**							
121.pop2	640	98.2	42.0	**98.4**	**42.0**	98.5	41.9							
122.tachyon	640	**25.2**	**111**	25.4	110	25.1	111							
126.lammps	640	101	28.9	**101**	**28.9**	99.3	29.4							
127.wrf2	640	**50.6**	**154**	51.4	152	50.0	156							
128.GAPgeofem	640	**21.1**	**98.1**	21.5	95.9	19.7	105							
129.tera_tf	640	36.9	74.9	**37.0**	**74.9**	37.0	74.7							

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	640	**62.9**	**60.7**	61.6	61.9	63.2	60.4							
132.zeusmp2	640	43.6	71.2	**43.7**	**71.0**	43.8	70.8							
137.lu	640	31.0	119	**31.1**	**118**	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:	5
Total Chips:	10
Total Cores:	640
Total Threads:	640
Total Memory:	5 TB
Base Ranks Run:	640
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:	5
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

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

Interconnect Description: Mellanox ConnectX-6 HDR

Hardware

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

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): 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`

Continued on next page

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_libm/amd-libm/lib -lamdlibm

C++ benchmarks:

126.lammps: -Ofast -flto -ffast-math -march=znver2 -mavx2
-L/home/AMD_libm/amd-libm/lib -lamdlibm

Fortran benchmarks:
-Ofast -flto -ffast-math -march=znver2 -funroll-loops -mavx2
-L/home/AMD_libm/amd-libm/lib -lamdlibm

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

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.

Tested with SPEC MPI2007 v2.0.1.
Report generated on Wed May 6 11:57:27 2020 by SPEC MPI2007 PS/PDF formatter v1463.
Originally published on 6 May 2020.