



# SPEC<sup>®</sup> MPIM2007 Result

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## Lenovo Global Technology

SPECmpiM\_peak2007 = Not Run

ThinkSystem SR665  
(AMD EPYC 7H12, 2.6 GHz)

SPECmpiM\_base2007 = 74.0

MPI2007 license: 28

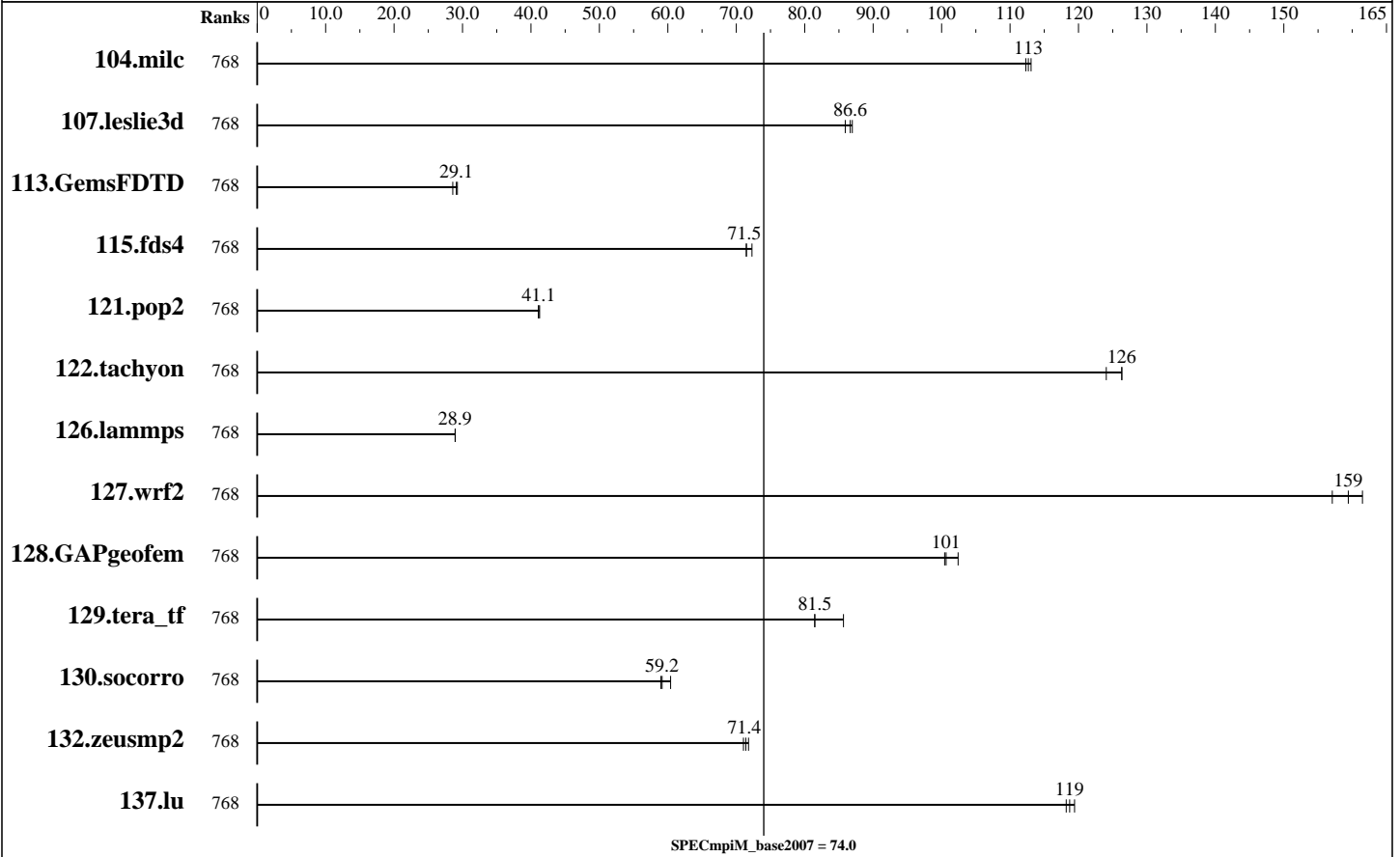
Test date: Jan-2020

Test sponsor: Lenovo Global Technology

Hardware Availability: Jun-2020

Tested by: Lenovo Global Technology

Software Availability: Jun-2020



## Results Table

Benchmark	Base								Peak					
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	768	13.9	112	13.8	113	<u>13.9</u>	<u>113</u>							
107.leslie3d	768	<u>60.2</u>	<u>86.6</u>	60.0	87.0	60.8	85.9							
113.GemsFDTD	768	221	28.6	216	29.3	<u>217</u>	<u>29.1</u>							
115.fds4	768	27.0	72.3	27.3	71.5	<u>27.3</u>	<u>71.5</u>							
121.pop2	768	<u>100</u>	<u>41.1</u>	100	41.1	100	41.3							
122.tachyon	768	22.1	126	<u>22.1</u>	<u>126</u>	22.5	124							
126.lammps	768	<u>101</u>	<u>28.9</u>	101	28.9	101	28.9							
127.wrf2	768	48.3	161	49.6	157	<u>48.9</u>	<u>159</u>							
128.GAPgeofem	768	20.2	102	<u>20.5</u>	<u>101</u>	20.6	100							
129.tera_tf	768	32.3	85.7	34.0	81.5	<u>34.0</u>	<u>81.5</u>							

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	768	<b>64.5</b>	<b>59.2</b>	64.7	59.0	63.2	60.4							
132.zeusmp2	768	<b>43.5</b>	<b>71.4</b>	43.2	71.8	43.7	71.0							
137.lu	768	30.8	119	31.1	118	<b>31.0</b>	<b>119</b>							

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: --  
 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: 6  
 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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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

### 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

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## 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/0402\_A21\_H47\_RH81/bin/mpicc

C++ benchmarks:

126.lammps: /opt/openmpi/0402\_A21\_H47\_RH81/bin/mpicxx

Fortran benchmarks:

/opt/openmpi/0402\_A21\_H47\_RH81/bin/mp ifort

Benchmarks using both Fortran and C:

/opt/openmpi/0402\_A21\_H47\_RH81/bin/mpicc

/opt/openmpi/0402\_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\_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](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](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](mailto:webmaster@spec.org).

Tested with SPEC MPI2007 v2.0.1.  
Report generated on Wed May 6 11:57:29 2020 by SPEC MPI2007 PS/PDF formatter v1463.  
Originally published on 6 May 2020.