



# SPEC® MPIM2007 Result

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## Lenovo Global Technology

ThinkSystem SR665  
(AMD EPYC 7763, 2.45 GHz)

SPECmpiM\_peak2007 = 35.0

SPECmpiM\_base2007 = 35.0

MPI2007 license: 28

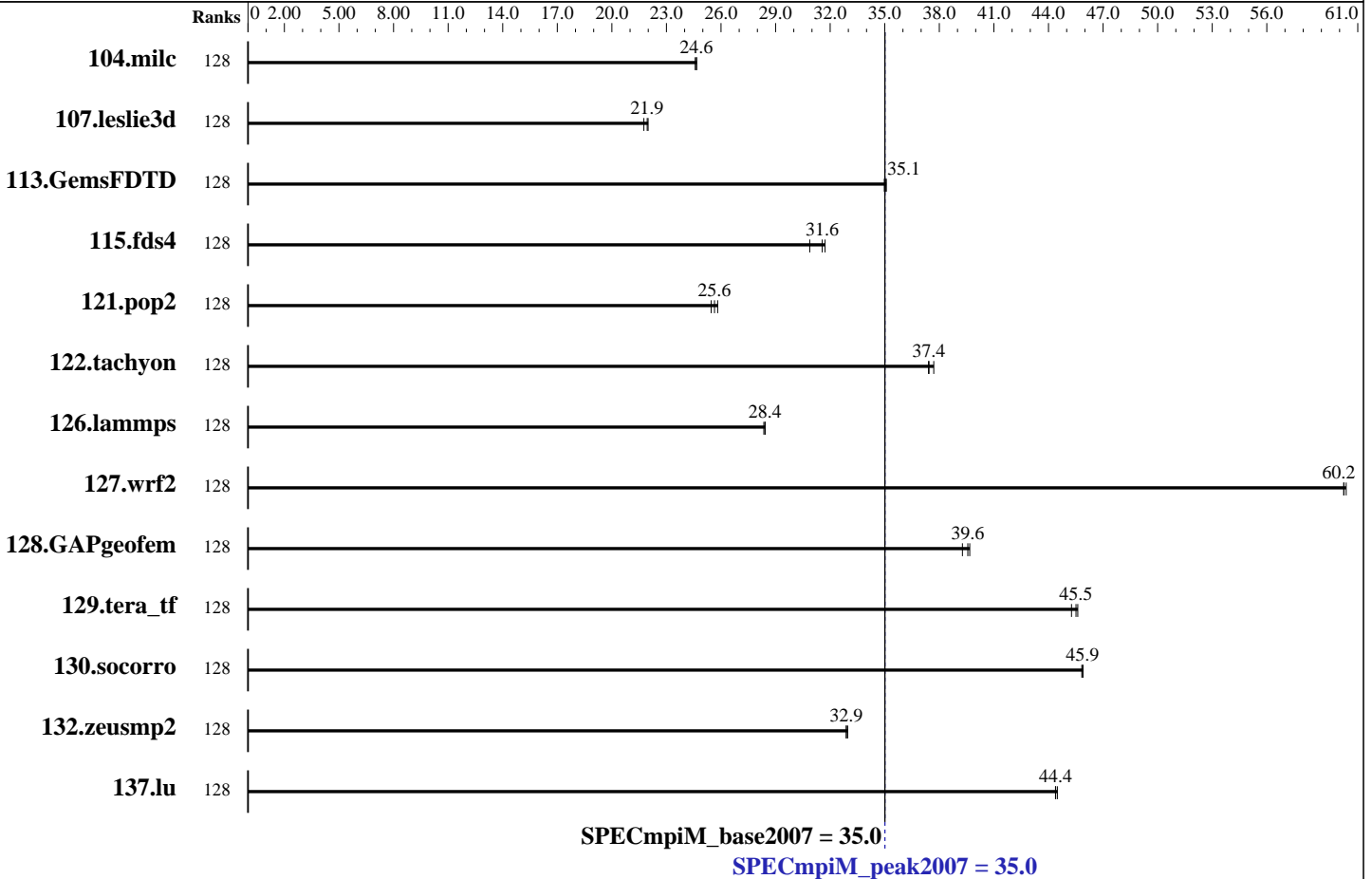
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Mar-2021

Hardware Availability: Mar-2021

Software Availability: Mar-2021



## Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
104.milc	128	63.5	24.7	63.7	24.6	<b>63.5</b>	<b>24.6</b>	128	63.5	24.7	63.7	24.6	<b>63.5</b>	<b>24.6</b>		
107.leslie3d	128	<b>238</b>	<b>21.9</b>	240	21.8	237	22.0	128	<b>238</b>	<b>21.9</b>	240	21.8	237	22.0		
113.GemsFDTD	128	<b>180</b>	<b>35.1</b>	180	35.1	180	35.0	128	<b>180</b>	<b>35.1</b>	180	35.1	180	35.0		
115.fds4	128	63.2	30.9	61.5	31.7	<b>61.8</b>	<b>31.6</b>	128	63.2	30.9	61.5	31.7	<b>61.8</b>	<b>31.6</b>		
121.pop2	128	162	25.5	<b>161</b>	<b>25.6</b>	160	25.8	128	162	25.5	<b>161</b>	<b>25.6</b>	160	25.8		
122.tachyon	128	74.2	37.7	<b>74.7</b>	<b>37.4</b>	74.8	37.4	128	74.2	37.7	<b>74.7</b>	<b>37.4</b>	74.8	37.4		
126.lammps	128	<b>103</b>	<b>28.4</b>	103	28.4	103	28.4	128	<b>103</b>	<b>28.4</b>	103	28.4	103	28.4		
127.wrf2	128	<b>129</b>	<b>60.2</b>	129	60.4	129	60.2	128	<b>129</b>	<b>60.2</b>	129	60.4	129	60.2		
128.GAPgeofem	128	<b>52.2</b>	<b>39.6</b>	52.6	39.3	52.1	39.7	128	<b>52.2</b>	<b>39.6</b>	52.6	39.3	52.1	39.7		
129.tera_tf	128	<b>60.8</b>	<b>45.5</b>	61.2	45.3	60.7	45.6	128	<b>60.8</b>	<b>45.5</b>	61.2	45.3	60.7	45.6		

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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Software Availability: Mar-2021

### Results Table (Continued)

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
130.socorro	128	83.2	45.9	83.3	45.8	<b>83.2</b>	<b>45.9</b>	128	83.2	45.9	83.3	45.8	<b>83.2</b>	<b>45.9</b>
132.zeusmp2	128	<b>94.3</b>	<b>32.9</b>	94.1	33.0	94.4	32.9	128	<b>94.3</b>	<b>32.9</b>	94.1	33.0	94.4	32.9
137.lu	128	82.8	44.4	82.6	44.5	<b>82.8</b>	<b>44.4</b>	128	82.8	44.4	82.6	44.5	<b>82.8</b>	<b>44.4</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  
 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: 128  
 Maximum Peak Ranks: 128

#### Software Summary

C Compiler: Intel C Compiler 20.2 for Linux  
 Version 19.1.2.254 Build 20200623  
 C++ Compiler: Intel C++ Compiler 20.2 for Linux  
 Version 19.2.254 Build 20200623  
 Fortran Compiler: Intel Fortran Compiler for Linux  
 Version 19.2.254 Build 20200623  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 MPI Library: Intel MPI Library for Linux  
 Version 19.2.254 Build 20200623  
 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 7763  
 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: 2450  
 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  
 32 MB shared / 8 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: 5.2-1.0.4  
 Adapter Firmware: 20.25.2006  
 Operating System: Red Hat Enterprise Linux Server release 8.3,  
 4.18.0-240.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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Software Availability: Mar-2021

### 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 7763 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: 2450  
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  
32 MB shared / 8 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: 5.2-1.0.4  
Adapter Firmware: 20.25.2006  
Operating System: Red Hat Enterprise Linux Server release 8.3  
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 64 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:

mpiicc

C++ benchmarks:

126.lammps: mpiicpc

Fortran benchmarks:

mpiifort

Benchmarks using both Fortran and C:

mpiicc mpiifort

## Base Portability Flags

121.pop2: -DSPEC\_MPI\_CASE\_FLAG  
126.lammps: -DMPICH\_IGNORE\_CXX\_SEEK  
127.wrf2: -DSPEC\_MPI\_CASE\_FLAG -DSPEC\_MPI\_LINUX  
130.socorro: -assume nostd\_intent\_in

## Base Optimization Flags

C benchmarks:

-O3 -ipo -march=core-avx2 -no-prec-div

C++ benchmarks:

126.lammps: -O3 -ipo -march=core-avx2 -no-prec-div

Fortran benchmarks:

-O3 -ipo -march=core-avx2 -no-prec-div

Benchmarks using both Fortran and C:

-O3 -ipo -march=core-avx2 -no-prec-div



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## Peak Optimization Flags

C benchmarks:

104.milc: basepeak = yes

122.tachyon: basepeak = yes

C++ benchmarks:

126.lammps: basepeak = yes

Fortran benchmarks:

107.leslie3d: basepeak = yes

113.GemsFDTD: basepeak = yes

129.tera\_tf: basepeak = yes

137.lu: basepeak = yes

Benchmarks using both Fortran and C:

115.fds4: basepeak = yes

121.pop2: basepeak = yes

127.wrf2: basepeak = yes

128.GAPgeofem: basepeak = yes

130.socorro: basepeak = yes

132.zeusmp2: basepeak = yes

The flags files that were used to format this result can be browsed at

[http://www.spec.org/mpi2007/flags/AMD\\_flags.html](http://www.spec.org/mpi2007/flags/AMD_flags.html)

[http://www.spec.org/mpi2007/flags/Lenovo\\_Platform\\_Flags.html](http://www.spec.org/mpi2007/flags/Lenovo_Platform_Flags.html)

You can also download the XML flags sources by saving the following links:

[http://www.spec.org/mpi2007/flags/AMD\\_flags.xml](http://www.spec.org/mpi2007/flags/AMD_flags.xml)

[http://www.spec.org/mpi2007/flags/Lenovo\\_Platform\\_Flags.xml](http://www.spec.org/mpi2007/flags/Lenovo_Platform_Flags.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).

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