



# SPEC® MPIM2007 Result

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## Lenovo Global Technology

ThinkSystem SR860 V2  
(Intel Xeon Platinum 8380H CPU, 2.90 GHz)

SPECmpiM\_peak2007 = 66.6

SPECmpiM\_base2007 = 66.6

MPI2007 license: 28

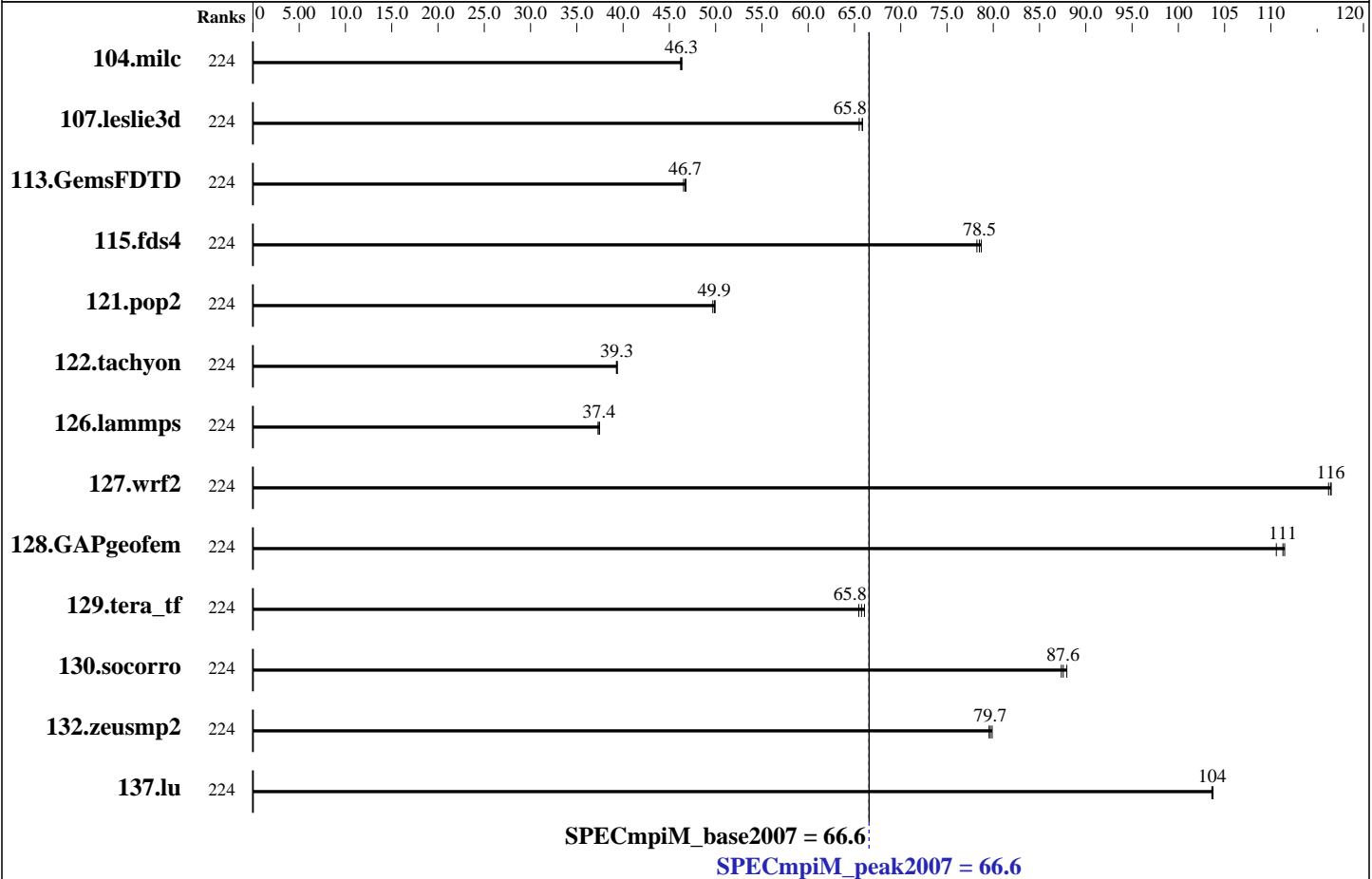
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Oct-2020

Hardware Availability: Oct-2020

Software Availability: Oct-2020



## Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
104.milc	224	33.9	46.2	33.8	46.4	<u>33.8</u>	<u>46.3</u>	224	33.9	46.2	33.8	46.4	<u>33.8</u>	<u>46.3</u>		
107.leslie3d	224	79.7	65.5	79.2	65.9	<u>79.3</u>	<u>65.8</u>	224	79.7	65.5	79.2	65.9	<u>79.3</u>	<u>65.8</u>		
113.GemsFDTD	224	136	46.5	135	46.8	<u>135</u>	<u>46.7</u>	224	136	46.5	135	46.8	<u>135</u>	<u>46.7</u>		
115.fds4	224	24.9	78.2	24.8	78.7	<u>24.9</u>	<u>78.5</u>	224	24.9	78.2	24.8	78.7	<u>24.9</u>	<u>78.5</u>		
121.pop2	224	82.7	49.9	83.1	49.7	<u>82.8</u>	<u>49.9</u>	224	82.7	49.9	83.1	49.7	<u>82.8</u>	<u>49.9</u>		
122.tachyon	224	<u>71.1</u>	<u>39.3</u>	71.0	39.4	71.2	39.3	224	<u>71.1</u>	<u>39.3</u>	71.0	39.4	71.2	39.3		
126.lammps	224	77.8	37.5	<u>77.9</u>	<u>37.4</u>	78.2	37.3	224	77.8	37.5	<u>77.9</u>	<u>37.4</u>	78.2	37.3		
127.wrf2	224	<u>66.9</u>	<u>116</u>	66.9	117	67.1	116	224	<u>66.9</u>	<u>116</u>	66.9	117	67.1	116		
128.GAPgeofem	224	18.5	111	18.7	111	<u>18.6</u>	<u>111</u>	224	18.5	111	18.7	111	<u>18.6</u>	<u>111</u>		
129.tera_tf	224	42.3	65.5	<u>42.1</u>	<u>65.8</u>	41.9	66.1	224	42.3	65.5	<u>42.1</u>	<u>65.8</u>	41.9	66.1		

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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Software Availability: Oct-2020

### Results Table (Continued)

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
130.socorro	224	43.7	87.4	43.4	87.9	<b>43.6</b>	<b>87.6</b>	224	43.7	87.4	43.4	87.9	<b>43.6</b>	<b>87.6</b>
132.zeusmp2	224	39.0	79.6	38.8	79.9	<b>38.9</b>	<b>79.7</b>	224	39.0	79.6	38.8	79.9	<b>38.9</b>	<b>79.7</b>
137.lu	224	<b>35.5</b>	<b>104</b>	35.5	104	35.4	104	224	<b>35.5</b>	<b>104</b>	35.5	104	35.4	104

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 SR860 V2  
 Interconnect: Nvidia Mellanox ConnectX-6 HDR Infiniband  
 File Server Node: NFS  
 Total Compute Nodes: 2  
 Total Chips: 8  
 Total Cores: 224  
 Total Threads: 224  
 Total Memory: 3 TB  
 Base Ranks Run: 224  
 Minimum Peak Ranks: 224  
 Maximum Peak Ranks: 224

#### Software Summary

C Compiler: Intel Parallel Studio C Compiler 20 Update 2 for Linux  
 Version 19.1.2.254 Build 20200623  
 C++ Compiler: Intel Parallel Studio C++ Compiler 20 Update 2 for Linux  
 Version 19.1.2.254 Build 20200623  
 Fortran Compiler: Intel Parallel Studio Fortran Compiler 20 Update 2 for Linux  
 Version 19.1.2.254 Build 20200623  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 MPI Library: Intel Parallel Studio MPI Library for Linux\* OS  
 Version 2020 Update 2 Build 20200624  
 Other MPI Info: None  
 Pre-processors: No  
 Other Software: None

### Node Description: ThinkSystem SR860 V2

#### Hardware

Number of nodes: 2  
 Uses of the node: compute  
 Vendor: Lenovo Global Technology  
 Model: ThinkSystem SR860 V2  
 CPU Name: Intel Xeon Platinum 8380H  
 CPU(s) orderable: 2,4 chips  
 Chips enabled: 4  
 Cores enabled: 112  
 Cores per chip: 28  
 Threads per core: 1  
 CPU Characteristics: Intel Turbo Boost Technology up to 4.3 GHz  
 CPU MHz: 2900  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 1 MB I+D on chip per core  
 L3 Cache: 39424 KB I+D on chip per chip  
 Other Cache: None  
 Memory: 1536 GB (48 x 32 GB 2Rx8 PC4-3200AA-R)  
 Disk Subsystem: 1 x 1 TB SATA 2.5" SSD  
 Other Hardware: N/A  
 Adapter: Nvidia Mellanox ConnectX-6 HDR Infiniband  
 Number of Adapters: 1

#### Software

Adapter: Nvidia Mellanox ConnectX-6 HDR Infiniband  
 Adapter Driver: 5.1-0.6.6  
 Adapter Firmware: 20.25.2006  
 Operating System: SUSE Linux Enterprise Server 15 SP2  
 5.3.18-22-default  
 Local File System: xfs  
 Shared File System: None  
 System State: Multi-user, run level 3  
 Other Software: None

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Hardware Availability: Oct-2020

Tested by: Lenovo Global Technology

Software Availability: Oct-2020

### Node Description: ThinkSystem SR860 V2

Slot Type:	PCI-Express 3.0 x16
Data Rate:	200 Gb/s
Ports Used:	1
Interconnect Type:	Nvidia Mellanox ConnectX-6 HDR Infiniband

### Node Description: NFS

#### Hardware

Number of nodes:	1
Uses of the node:	Fileserver
Vendor:	Lenovo Global Technology
Model:	ThinkSystem SR860 V2
CPU Name:	Intel Xeon Platinum 8380H
CPU(s) orderable:	2,4 chips
Chips enabled:	4
Cores enabled:	112
Cores per chip:	28
Threads per core:	1
CPU Characteristics:	Intel Turbo Boost Technology up to 4.3 GHz
CPU MHz:	2900
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core
L3 Cache:	39424 KB I+D on chip per chip
Other Cache:	None
Memory:	1536 GB (48 x 32 GB 2Rx8 PC4-3200AA-R)
Disk Subsystem:	1 x 1 TB SATA 2.5" SSD
Other Hardware:	None
Adapter:	Nvidia Mellanox ConnectX-6 HDR Infiniband
Number of Adapters:	1
Slot Type:	PCI-Express 3.0 x16
Data Rate:	200 Gb/s
Ports Used:	1
Interconnect Type:	Nvidia Mellanox ConnectX-6 HDR Infiniband

#### Software

Adapter:	Nvidia Mellanox ConnectX-6 HDR Infiniband
Adapter Driver:	5.1-0.6.6
Adapter Firmware:	20.25.2006
Operating System:	SUSE Linux Enterprise Server 15 SP2
Local File System:	None
Shared File System:	NFS
System State:	Multi-User, run level 3
Other Software:	None

### Interconnect Description: Nvidia Mellanox ConnectX-6 HDR Infiniband

#### Hardware

Vendor:	Nvidia
Model:	Nvidia Mellanox ConnectX-6 HDR Infiniband
Switch Model:	Nvidia Mellanox QM8700
Number of Switches:	1
Number of Ports:	40
Data Rate:	200 Gb/s
Firmware:	3.9.0606
Topology:	Mesh

#### Software

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Software Availability: Oct-2020

## Interconnect Description: Nvidia Mellanox ConnectX-6 HDR Infiniband

Primary Use: MPI and I/O 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 2 x 32 GB RDIMM on each memory channel.

BIOS settings:  
Operating Mode : Maximum Performance Mode  
Intel Hyper-Threading Technology (SMT): Disabled  
SNC (Sub-NUMA Cluster): Enable

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



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## 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 -xCORE-AVX512 -no-prec-div

C++ benchmarks:  
126.lammps: -O3 -ipo -xCORE-AVX512 -no-prec-div

Fortran benchmarks:  
-O3 -ipo -xCORE-AVX512 -no-prec-div

Benchmarks using both Fortran and C:  
-O3 -ipo -xCORE-AVX512 -no-prec-div

## 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

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**Software Availability:** Oct-2020

## Peak Optimization Flags (Continued)

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/EM64T\\_Intel121\\_flags.20201007.html](http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.20201007.html)

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

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

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel121\\_flags.20201007.xml](http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.20201007.xml)

[http://www.spec.org/mpi2007/flags/Lenovo-SPECmpiM\\_Platform\\_Flags.xml](http://www.spec.org/mpi2007/flags/Lenovo-SPECmpiM_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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