



# SPEC® MPIL2007 Result

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## Lenovo Global Technology

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

SPECmpiL\_peak2007 = 14.2

SPECmpiL\_base2007 = 14.2

MPI2007 license: 28

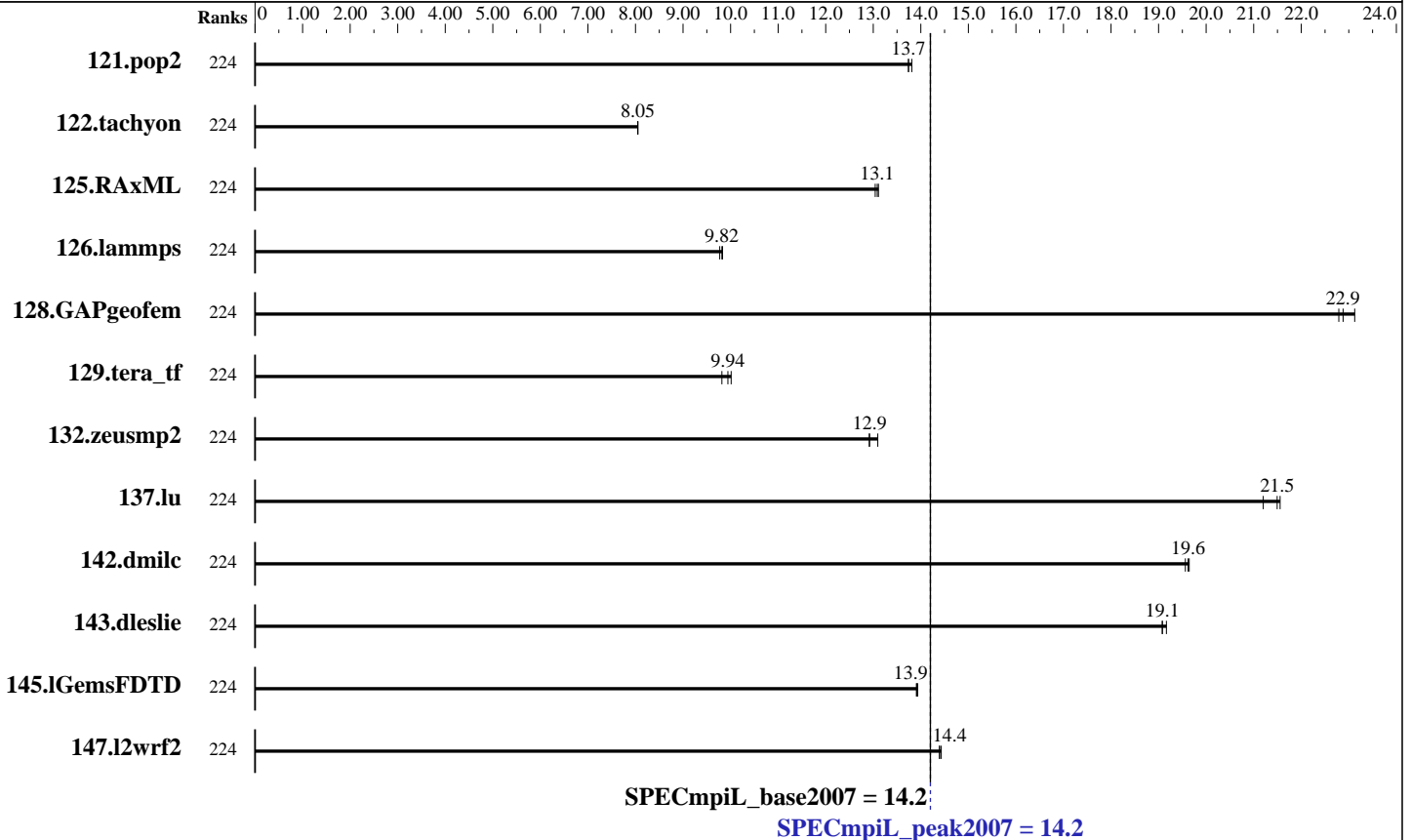
Test sponsor: Lenovo Global Technology

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
121.pop2	224	<b>283</b>	<b>13.7</b>	282	13.8	283	13.7	224	<b>283</b>	<b>13.7</b>	282	13.8	283	13.7
122.tachyon	224	<b>242</b>	<b>8.05</b>	241	8.05	242	8.05	224	<b>242</b>	<b>8.05</b>	241	8.05	242	8.05
125.RAxML	224	<b>223</b>	<b>13.1</b>	224	13.0	223	13.1	224	<b>223</b>	<b>13.1</b>	224	13.0	223	13.1
126.lammps	224	252	9.77	250	9.83	<b>250</b>	<b>9.82</b>	224	252	9.77	250	9.83	<b>250</b>	<b>9.82</b>
128.GAPgeofem	224	257	23.1	260	22.8	<b>259</b>	<b>22.9</b>	224	257	23.1	260	22.8	<b>259</b>	<b>22.9</b>
129.tera_tf	224	110	10.0	<b>111</b>	<b>9.94</b>	112	9.82	224	110	10.0	<b>111</b>	<b>9.94</b>	112	9.82
132.zeusmp2	224	164	12.9	<b>164</b>	<b>12.9</b>	162	13.1	224	164	12.9	<b>164</b>	<b>12.9</b>	162	13.1
137.lu	224	<b>196</b>	<b>21.5</b>	195	21.6	198	21.2	224	<b>196</b>	<b>21.5</b>	195	21.6	198	21.2
142.dmilc	224	188	19.6	188	19.6	<b>188</b>	<b>19.6</b>	224	188	19.6	188	19.6	<b>188</b>	<b>19.6</b>
143.dleslie	224	162	19.2	162	19.1	<b>162</b>	<b>19.1</b>	224	162	19.2	162	19.1	<b>162</b>	<b>19.1</b>
145.lGemsFDTD	224	317	13.9	<b>317</b>	<b>13.9</b>	317	13.9	224	317	13.9	<b>317</b>	<b>13.9</b>	317	13.9
147.l2wrf2	224	570	14.4	<b>570</b>	<b>14.4</b>	569	14.4	224	570	14.4	<b>570</b>	<b>14.4</b>	569	14.4

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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**Hardware Availability:** Oct-2020

**Tested by:** Lenovo Global Technology

**Software Availability:** Oct-2020

### 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  
 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  
 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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### Node Description: NFS

Hardware		Software	
Number of nodes:	1	Adapter:	Nvidia Mellanox ConnectX-6 HDR Infiniband
Uses of the node:	Fileserver	Adapter Driver:	5.1-0.6.6
Vendor:	Lenovo Global Technology	Adapter Firmware:	20.25.2006
Model:	ThinkSystem SR860 V2	Operating System:	SUSE Linux Enterprise Server 15 SP2
CPU Name:	Intel Xeon Platinum 8380H	Local File System:	None
CPU(s) orderable:	2,4 chips	Shared File System:	NFS
Chips enabled:	4	System State:	Multi-User, run level 3
Cores enabled:	112	Other Software:	None
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		

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

Hardware		Software	
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		
Primary Use:	MPI and I/O traffic		

### Submit Notes

The config file option 'submit' was used.



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## 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`

## Base Portability Flags

`121.pop2: -DSPEC_MPI_CASE_FLAG`

`126.lammps: -DMPICH_IGNORE_CXX_SEEK`

## Base Optimization Flags

C benchmarks:

`-O3 -ipo -xCORE-AVX512 -no-prec-div`

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## Base Optimization Flags (Continued)

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:

122.tachyon: basepeak = yes

125.RAxML: basepeak = yes

142.dmilc: basepeak = yes

C++ benchmarks:

126.lammps: basepeak = yes

Fortran benchmarks:

129.tera\_tf: basepeak = yes

137.lu: basepeak = yes

143.dleslie: basepeak = yes

145.lGemsFDTD: basepeak = yes

Benchmarks using both Fortran and C:

121.pop2: basepeak = yes

128.GAPgeofem: basepeak = yes

132.zeusmp2: basepeak = yes

147.l2wrf2: 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)



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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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