



# SPEC® MPIL2007 Result

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## Lenovo Global Technology

ThinkSystem SR655  
(AMD EPYC 7H12 CPU, 2.6 GHz)

SPECmpiL\_peak2007 = Not Run

SPECmpiL\_base2007 = 6.08

MPI2007 license: 28

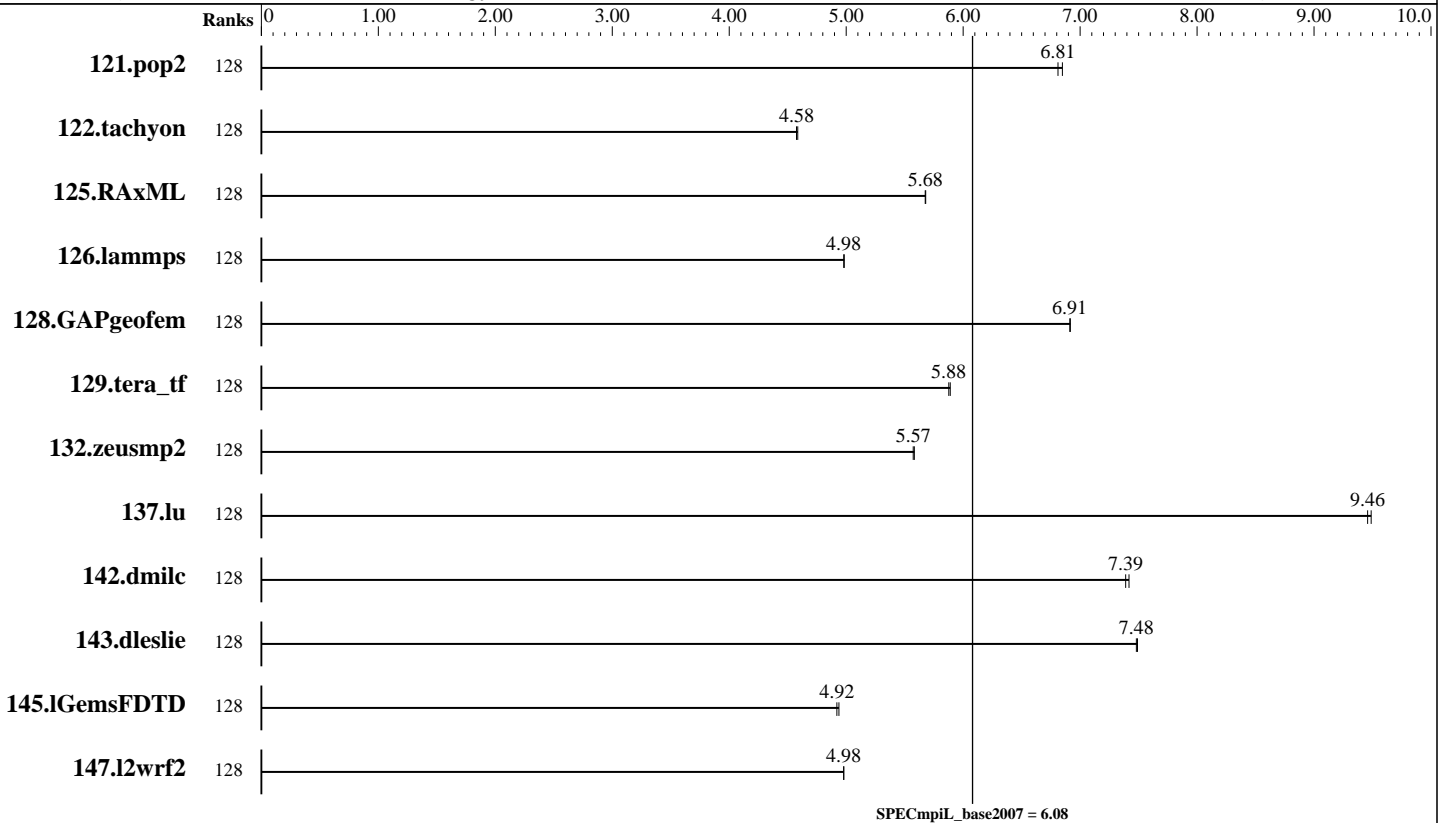
Test sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test date: Jan-2020

Hardware Availability: Jun-2020

Software Availability: Dec-2018



## Results Table

Benchmark	Base						Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
121.pop2	128	<u>571</u>	<u>6.81</u>	568	6.85									
122.tachyon	128	<u>425</u>	<u>4.58</u>	424	4.59									
125.RAxML	128	<u>514</u>	<u>5.68</u>	514	5.68									
126.lammps	128	493	4.98	<u>494</u>	<u>4.98</u>									
128.GAPgeofem	128	<u>859</u>	<u>6.91</u>	858	6.92									
129.tera_tf	128	187	5.89	<u>187</u>	<u>5.88</u>									
132.zeusmp2	128	<u>380</u>	<u>5.57</u>	380	5.58									
137.lu	128	<u>444</u>	<u>9.46</u>	443	9.49									
142.dmilc	128	497	7.42	<u>499</u>	<u>7.39</u>									
143.dleslie	128	414	7.49	<u>414</u>	<u>7.48</u>									
145.lGemsFDTD	128	893	4.94	<u>896</u>	<u>4.92</u>									
147.l2wrf2	128	1648	4.98	<u>1648</u>	<u>4.98</u>									

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

Standard Performance Evaluation Corporation

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http://www.spec.org/



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### Hardware Summary

Type of System: Homogeneous  
 Compute Node: ThinkSystem SR655  
 Interconnect: Mellanox ConnectX-6 HDR Infiniband  
 File Server Node: NFS  
 Total Compute Nodes: 2  
 Total Chips: 2  
 Total Cores: 128  
 Total Threads: 256  
 Total Memory: 512 GB  
 Base Ranks Run: 128  
 Minimum Peak Ranks: --  
 Maximum Peak Ranks: --

### Software Summary

C Compiler: Intel C++ Compiler 20.0 for Linux  
 Version 19.1.0.166 Build 20191121  
 C++ Compiler: Intel C++ Compiler 20.0 for Linux  
 Version 19.1.0.166 Build 20191121  
 Fortran Compiler: Intel Fortran Compiler 20.0 for Linux  
 Version 19.1.0.166 Build 20191121  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 MPI Library: Open MPI Library  
 Version 4.0.2  
 Other MPI Info: None  
 Pre-processors: No  
 Other Software: None

## Node Description: ThinkSystem SR655

### Hardware

Number of nodes: 2  
 Uses of the node: compute  
 Vendor: Lenovo Global Technology  
 Model: SR655  
 CPU Name: AMD EPYC 7H12 CPU  
 CPU(s) orderable: 1 chip  
 Chips enabled: 1  
 Cores enabled: 64  
 Cores per chip: 128  
 Threads per core: 2  
 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: 256 GB (8 x 32 GB 2Rx8 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: 200G  
 Ports Used: 1  
 Interconnect Type: Mellanox ConnectX-6 HDR Infiniband VPI Adapter

### Software

Adapter: Mellanox ConnectX-6 HDR Infiniband  
 Adapter Driver: 4.7-1.0.0.1.2  
 Adapter Firmware: None  
 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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### Node Description: NFS

Hardware		Software	
Number of nodes:	1	Adapter:	Mellanox ConnectX-6 HDR Infiniband PCIe 4.0 x16
Uses of the node:	Fileserver	Adapter Driver:	4.7-1.0.0.1.2
Vendor:	Lenovo Global Technology	Adapter Firmware:	None
Model:	ThinkSystem SR655	Operating System:	Red Hat Enterprise Linux Server release 8.1
CPU Name:	AMD EPYC 7H12 CPU	Local File System:	None
CPU(s) orderable:	1 chip	Shared File System:	NFS
Chips enabled:	1	System State:	Multi-User, run level 3
Cores enabled:	128	Other Software:	None
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:	512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)		
Disk Subsystem:	1 x 480 GB SATA 2.5" SSD		
Other Hardware:	None		
Adapter:	Mellanox ConnectX-6 HDR Infiniband PCIe 4.0 x16		
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		

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

Hardware		Software	
Vendor:	Mellanox		
Model:	Mellanox ConnectX-6 HDR Infiniband		
Switch Model:	None		
Number of Switches:	0		
Number of Ports:	0		
Data Rate:	None		
Firmware:	None		
Topology:	Direct Attach		
Primary Use:	MPI 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 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/OMPI/O402_I20_H47_R81/bin/mpicc`

C++ benchmarks:

`126.lammps: /opt/OMPI/O402_I20_H47_R81/bin/mpicxx`

Fortran benchmarks:

`/opt/OMPI/O402_I20_H47_R81/bin/mpif90`

Benchmarks using both Fortran and C:

`/opt/OMPI/O402_I20_H47_R81/bin/mpicc`  
`/opt/OMPI/O402_I20_H47_R81/bin/mpif90`

## Base Portability Flags

`121.pop2: -DSPEC_MPI_CASE_FLAG`  
`126.lammps: -DMPICH_IGNORE_CXX_SEEK`



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## Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

```
126.lammps: -O3 -march=core-avx2 -no-prec-div -ipo -std=c11
```

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

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

The flags file that was used to format this result can be browsed at

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel121\\_flags.20200408.html](http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.20200408.html)

You can also download the XML flags source by saving the following link:

[http://www.spec.org/mpi2007/flags/EM64T\\_Intel121\\_flags.20200408.xml](http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.20200408.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.

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