# SPEC® MPIM2007 Result

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## Lenovo Global Technology

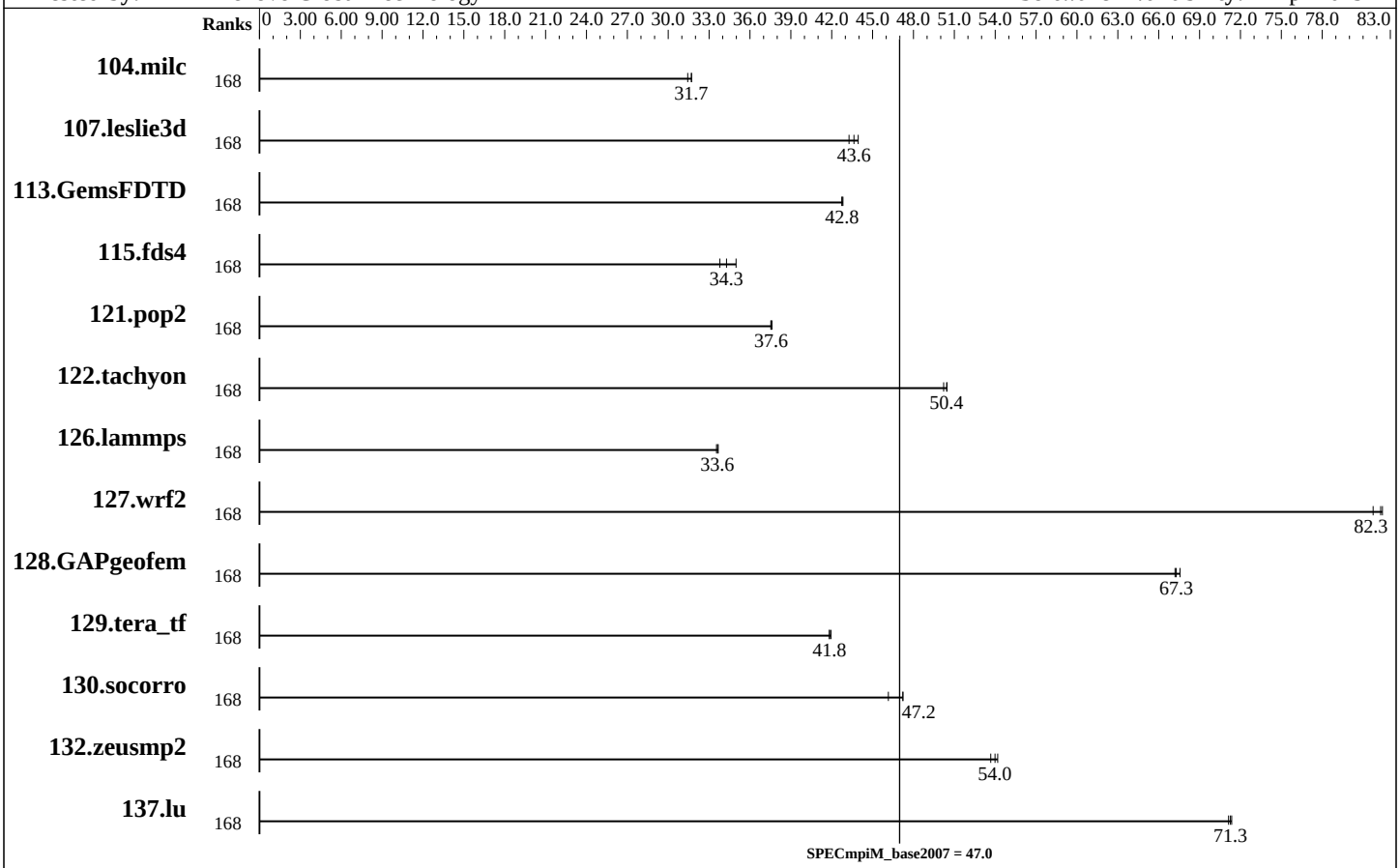
ThinkSystem SR650
(Intel Xeon Platinum 8280 CPU, 2.70 GHz)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 47.0

**MPI2007 license:** 28
**Test sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology

**Test date:** Mar-2019
**Hardware Availability:** Apr-2019
**Software Availability:** Apr-2019




## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 104.milc | 168 | **49.4** | **31.7** | 49.4 | 31.7 | 49.8 | 31.4 | | | | | | | |
| 107.leslie3d | 168 | **120** | **43.6** | 121 | 43.3 | 119 | 43.9 | | | | | | | |
| 113.GemsFDTD | 168 | 147 | 42.8 | **147** | **42.8** | 148 | 42.7 | | | | | | | |
| 115.fds4 | 168 | 57.7 | 33.8 | **56.9** | **34.3** | 55.8 | 35.0 | | | | | | | |
| 121.pop2 | 168 | 110 | 37.6 | **110** | **37.6** | 110 | 37.5 | | | | | | | |
| 122.tachyon | 168 | **55.5** | **50.4** | 55.4 | 50.5 | 55.7 | 50.2 | | | | | | | |
| 126.lammps | 168 | **86.7** | **33.6** | 86.6 | 33.7 | 86.9 | 33.5 | | | | | | | |
| 127.wrf2 | 168 | 94.6 | 82.4 | **94.7** | **82.3** | 95.4 | 81.7 | | | | | | | |
| 128.GAPgeofem | 168 | 30.6 | 67.6 | 30.7 | 67.2 | **30.7** | **67.3** | | | | | | | |
| 129.tera_tf | 168 | 66.0 | 41.9 | **66.2** | **41.8** | 66.2 | 41.8 | | | | | | | |

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 | 168 | **80.8** | **47.2** | 82.7 | 46.2 | 80.8 | 47.2 | | | | | | | |
| 132.zeusmp2 | 168 | 57.3 | 54.2 | 57.8 | 53.7 | **57.5** | **54.0** | | | | | | | |
| 137.lu | 168 | 51.5 | 71.4 | **51.6** | **71.3** | 51.7 | 71.1 | | | | | | | |

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 SR650
Interconnect: Intel Omni-Path
File Server Node: NFS
Total Compute Nodes: 3
Total Chips: 6
Total Cores: 168
Total Threads: 168
Total Memory: 2304 GB
Base Ranks Run: 168
Minimum Peak Ranks: --
Maximum Peak Ranks: --

### Software Summary

C Compiler: Intel C++ Compiler 17.0 Update 7 for Linux Version 17.0.7 Build 20180403
C++ Compiler: Intel C++ Compiler 17.0 Update 7 for Linux Version 17.0.7 Build 20180403
Fortran Compiler: Intel Fortran Compiler 17.0 Update 7 for Linux Version 17.0.7 Build 20180403
Base Pointers: 64-bit
Peak Pointers: Not Applicable
MPI Library: Intel MPI Library for Linux* OS Version 2018 Update 3 Build 20180411
Other MPI Info: None
Pre-processors: No
Other Software: None

## Node Description: ThinkSystem SR650

### Hardware

Number of nodes: 3
Uses of the node: compute
Vendor: Lenovo Global Technology
Model: SR650
CPU Name: Intel Xeon Platinum 8280
CPU(s) orderable: 1-2 chips
Chips enabled: 2
Cores enabled: 56
Cores per chip: 28
Threads per core: 1
CPU Characteristics: None
CPU MHz: 2700
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 1 MB I+D on chip per core
L3 Cache: 38.5 MB I+D on chip per chip
Other Cache: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
Disk Subsystem: 1 x 1 TB 12 Gbps SAS 2.5" SSD (JBOD)
Other Hardware: ThinkSystem RAID 530-8i 2GB Flash
Adapter: Intel Omni-Path 100 Series Single-port PCIe 3.0 x16 HFA
Number of Adapters: 1
Slot Type: PCI-Express Gen3 x16
Data Rate: 100 Gb/s

Continued on next page

### Software

Adapter: Intel Omni-Path 100 Series Single-port PCIe 3.0 x16 HFA
Adapter Driver: IFS 10.9.1.0.15
Adapter Firmware: 10.9.0.1.0
Operating System: Red Hat Enterprise Linux Server release 7.6, Kernel 3.10.0-957.el7.x86_64
Local File System: xfs
Shared File System: nfs
System State: Multi-user, run level 3
Other Software: NONE

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**Test date:** Mar-2019
**Hardware Availability:** Apr-2019
**Software Availability:** Apr-2019

## Node Description: ThinkSystem SR650

| | |
|---|---|
| Ports Used: | 1 |
| Interconnect Type: | Intel Omni-Path Fabric 100 Series |

## Node Description: NFS

### Hardware

| | |
|---|---|
| Number of nodes: | 1 |
| Uses of the node: | Fileserver |
| Vendor: | Lenovo Global Technology |
| Model: | ThinkSystem SR650 |
| CPU Name: | Intel Xeon Platinum 8280 |
| CPU(s) orderable: | 1-2 chips |
| Chips enabled: | 2 |
| Cores enabled: | 56 |
| Cores per chip: | 28 |
| Threads per core: | 1 |
| CPU Characteristics: | None |
| CPU MHz: | 2700 |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 1 MB I+D on chip per core |
| L3 Cache: | 38.5 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R) |
| Disk Subsystem: | 1 x 1 TB 12 Gbps SAS 2.5" SSD (JBOD) |
| Other Hardware: | None |
| Adapter: | Intel Omni-Path 100 Series Single-port PCIe 3.0 x16 HFA |
| Number of Adapters: | 1 |
| Slot Type: | PCI-Express 3.0 x16 |
| Data Rate: | 100 Gb/s |
| Ports Used: | 1 |
| Interconnect Type: | Intel Omni-Path Fabric 100 series |

### Software

| | |
|---|---|
| Adapter: | Intel Omni-Path 100 Series Single-port PCIe 3.0 x16 HFA |
| Adapter Driver: | 10.9.1.0.15 |
| Adapter Firmware: | 10.9.0.1.0 |
| Operating System: | Red Hat Enterprise Linux Server release 7.6 |
| Local File System: | None |
| Shared File System: | NFS |
| System State: | Multi-User, run level 3 |
| Other Software: | None |

## Interconnect Description: Intel Omni-Path

### Hardware

| | |
|---|---|
| Vendor: | Intel |
| Model: | Intel Omni-Path Fabric 100 Series |
| Switch Model: | Intel Omni-Path Edge Switch 100 Series 48 Port 2 PSU |
| Number of Switches: | 1 |
| Number of Ports: | 48 |
| Data Rate: | 100 Gb/s |
| Firmware: | 10.3.0.0.60 |
| Topology: | Mesh |
| Primary Use: | MPI Traffic |

### Software

## Submit Notes

```
The config file option 'submit' was used.
```

## General Notes

```
130.socorro (base): "nullify_ptrs" src.alt was used.

129.tera_tf (base): "add_rank_support" src.alt was used.

 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`
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`

The flags files that were used to format this result can be browsed at
http://www.spec.org/mpi2007/flags/Lenovo-SPECmpiM_Platform_Flags.html
http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.20170711.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/mpi2007/flags/Lenovo-SPECmpiM_Platform_Flags.xml
http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.20170711.xml


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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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