



SPEC[®] MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

Intel Corporation

SPECmpiM_peak2007 = Not Run

Intel Server System S9248WK1HLC (Intel Xeon 9242 Platinum, 2.30 GHz, DDR4-2993 MHz, Turbo on)

SPECmpiM_base2007 = 104

MPI2007 license: 13

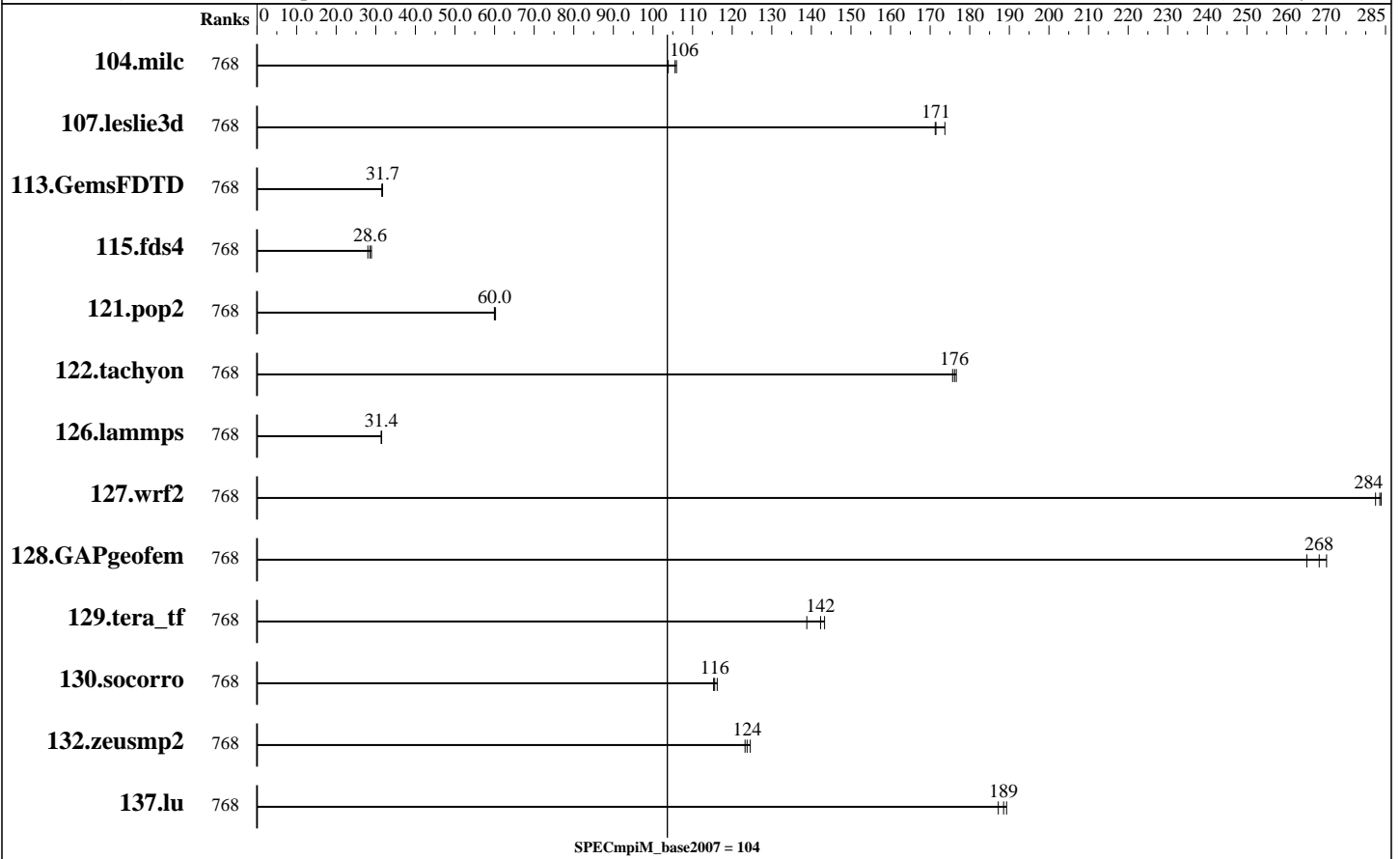
Test date: Jun-2019

Test sponsor: Intel Corporation

Hardware Availability: Jul-2019

Tested by: Intel Corporation

Software Availability: May-2019



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	768	15.1	104	14.8	106	<u>14.8</u>	<u>106</u>							
107.leslie3d	768	30.5	171	<u>30.4</u>	<u>171</u>	30.0	174							
113.GemsFDTD	768	<u>199</u>	<u>31.7</u>	200	31.5	199	31.7							
115.fds4	768	67.5	28.9	69.7	28.0	<u>68.3</u>	<u>28.6</u>							
121.pop2	768	68.9	59.9	68.5	60.2	<u>68.8</u>	<u>60.0</u>							
122.tachyon	768	15.8	177	15.9	176	<u>15.9</u>	<u>176</u>							
126.lammps	768	92.9	31.4	92.6	31.5	<u>92.8</u>	<u>31.4</u>							
127.wrf2	768	27.6	282	<u>27.5</u>	<u>284</u>	27.5	284							
128.GAPgeofem	768	<u>7.70</u>	<u>268</u>	7.65	270	7.79	265							
129.tera_tf	768	<u>19.4</u>	<u>142</u>	19.3	143	19.9	139							

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	768	32.8	116	33.1	115	33.0	116							
132.zeusmp2	768	25.2	123	<u>25.1</u>	<u>124</u>	24.9	125							
137.lu	768	<u>19.5</u>	<u>189</u>	19.6	187	19.4	189							

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: Intel Server System S9248WK1HLC
 Interconnect: Intel Omni-Path 100 series
 File Server Node: Lustre FS 2.10.4
 Total Compute Nodes: 8
 Total Chips: 16
 Total Cores: 768
 Total Threads: 1536
 Total Memory: 3 TB
 Base Ranks Run: 768
 Minimum Peak Ranks: --
 Maximum Peak Ranks: --

Software Summary

C Compiler: Intel C++ Composer XE 2019 Update 3 for Linux
 Version 19.0.3.199 20190206
 C++ Compiler: Intel C++ Composer XE 2019 Update 3 for Linux
 Version 19.0.3.199 20190206
 Fortran Compiler: Intel Fortran Composer 2019 Update 3 for Linux
 Version 19.0.3.199 20190206
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 MPI Library: Intel MPI Library 2018 Update 4 Build 20180823
 Other MPI Info: libfabric-1.7.0
 Pre-processors: No
 Other Software: None

Node Description: Intel Server System S9248WK1HLC

Hardware

Number of nodes: 8
 Uses of the node: Compute
 Vendor: Intel
 Model: Intel Server System S9248WK1HLC
 (2 x Intel Xeon 9242 Platinum,
 Turbo ON)
 CPU Name: Intel Xeon Platinum 9242
 CPU(s) orderable: 1,2 chips
 Chips enabled: 2
 Cores enabled: 96
 Cores per chip: 48
 Threads per core: 2
 CPU Characteristics: Intel Turbo Boost Technology up to 3.8 GHz
 CPU MHz: 2200
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 1 MB I+D on chip per core
 L3 Cache: 71.5 MB I+D on chip per chip,
 35.75 MB shared / 24 cores
 Other Cache: None
 Memory: 384 GB (24 x 16 GB 2Rx8 DDR4-2993Y-R)
 Disk Subsystem: N/A
 Other Hardware: None
 Adapter: Intel Omni-Path Edge Switch 100 series
 Number of Adapters: 2

Software

Adapter: Intel Omni-Path Edge Switch 100 series
 Adapter Driver: IFS 10.9.0.0.210
 Adapter Firmware: 1.27.0
 Operating System: Oracle Linux Server release 7.6
 Local File System: Linux/xfs
 Shared File System: Lustre FS 2.10.4
 System State: Multi-User
 Other Software: IBM Platform LSF Standard 9.1.1.1

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Tested by: Intel Corporation

Software Availability: May-2019

Node Description: Intel Server System S9248WK1HLC

Slot Type:	PCI-Express x16
Data Rate:	2 x 12.5 GB/s
Ports Used:	1
Interconnect Type:	Intel Omni-Path Fabric 100 series

Node Description: Lustre FS 2.10.4

Hardware		Software	
Number of nodes:	11	Adapter:	Intel Omni-Path Fabric Adapter 100 series
Uses of the node:	Fileserver	Adapter Driver:	IFS 10.9.0.0.210
Vendor:	Intel	Adapter Firmware:	1.27.0
Model:	Intel Server System R2208GZ4GC4	Operating System:	Redhat Enterprise Linux Server Release 7.6
CPU Name:	Intel Xeon E5-2680	Local File System:	None
CPU(s) orderable:	1-2 chips	Shared File System:	Lustre FS 2.10.4 2.10.4
Chips enabled:	2	System State:	Multi-User
Cores enabled:	16	Other Software:	None
Cores per chip:	8		
Threads per core:	2		
CPU Characteristics:	Intel Turbo Boost Technology up to 3.5 GHz		
CPU MHz:	2700		
Primary Cache:	32 KB I + 32 KB D on chip per core		
Secondary Cache:	2 MB I+D on chip per chip		
L3 Cache:	20 MB I+D on chip per chip		
Other Cache:	None		
Memory:	64 GB per node (8*8GB 1600MHz Reg ECC DDR3)		
Disk Subsystem:	136 TB 3 RAID with 8 SAS/SATA		
Other Hardware:	None		
Adapter:	Intel Omni-Path Fabric Adapter 100 series		
Number of Adapters:	1		
Slot Type:	PCI-Express x16		
Data Rate:	12.5 GB/s		
Ports Used:	1		
Interconnect Type:	Intel Omni-Path Fabric 100 series		

Interconnect Description: Intel Omni-Path 100 series

Hardware		Software	
Vendor:	Intel		
Model:	Intel Omni-Path Fabric 100 series		
Switch Model:	Intel Omni-Path Edge Switch 100 series		
Number of Switches:	8		
Number of Ports:	48		
Data Rate:	2 x 12.5 GB/s		
Firmware:	1.27.0		
Topology:	Fat tree		

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Interconnect Description: Intel Omni-Path 100 series

Primary Use: MPI and I/O traffic

Submit Notes

The config file option 'submit' was used.

Platform Notes

The system used pre-release CPUs running at 2200 MHz instead of the nominal base frequency (2300 MHz).

General Notes

130.socorro (base): "nullify_ptrs" src.alt was used.
129.tera_tf (base): "add_rank_support" src.alt was used.
143.dleslie (base): "integer_overflow" src.alt was used.

MPI startup command:

```
mpiexec.hydra command was used to start MPI jobs.
export I_MPI_FABRICS=shm:ofi
export I_MPI_PIN_DOMAIN=core
export I_MPI_PIN_ORDER=bunch
export I_MPI_COMPATIBILITY=3
```

HFI driver parameters:

```
rcvhdrCnt = 4096
```

Spectre and Meltdown:

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.

Kernel & Microcode:

```
Kernel: 3.10.0-957.12.2.el7.crt1.x86_64
Microcode: 0x4000024
```

BIOS settings:

```
Version: SE5C620.86B.0D.01.0505.050820190224
Intel Hyper-Threading Technology (SMT) = Enabled (default is Enabled)
Intel Turbo Boost Technology (Turbo) = Enabled (default is Enabled)
```

Job placement:

Each MPI job was assigned to a topologically compact set of nodes.
IBM Platform LSF was used for job submission. It has no impact on performance.
Information can be found at: <http://www.ibm.com>



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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 -xCORE-AVX512 -no-prec-div -ipo

C++ benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

-O3 -xCORE-AVX512 -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_Intel140_flags.20190110.html

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

http://www.spec.org/mpi2007/flags/EM64T_Intel140_flags.20190110.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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