



SPEC® MPIM2007 Result

Copyright 2006-2010 Standard Performance Evaluation Corporation

Intel Corporation

Endeavor (Intel Xeon Gold 6148, 2.40 GHz, DDR4-2666 MHz, SMT on, Turbo on)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 13.7

MPI2007 license: 13

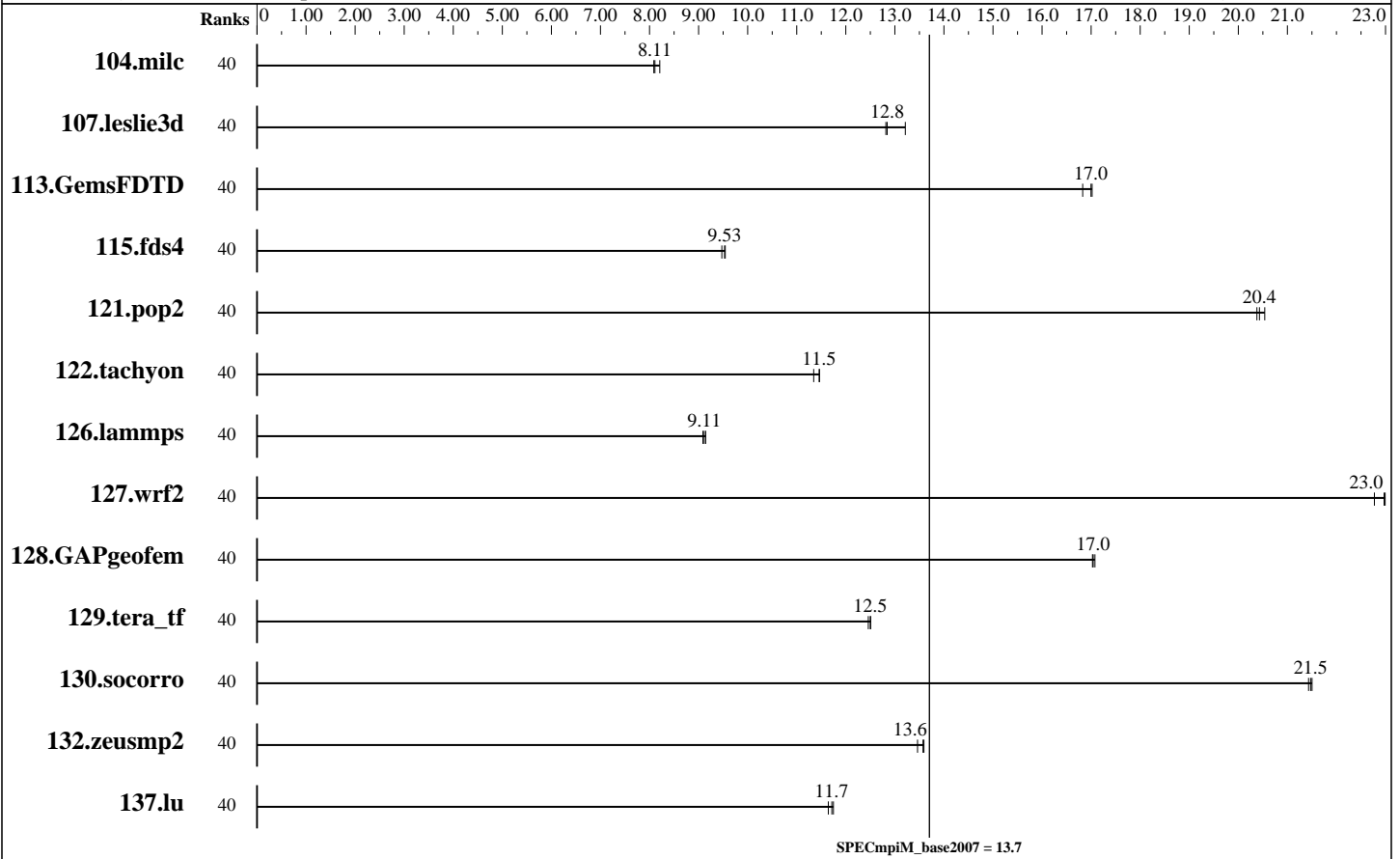
Test sponsor: Intel Corporation

Tested by: Intel Corporation

Test date: Aug-2018

Hardware Availability: Aug-2018

Software Availability: Nov-2018



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	40	194	8.09	191	8.21	<u>193</u>	<u>8.11</u>							
107.leslie3d	40	<u>406</u>	<u>12.8</u>	395	13.2	407	12.8							
113.GemsFDTD	40	375	16.8	<u>371</u>	<u>17.0</u>	371	17.0							
115.fds4	40	204	9.54	<u>205</u>	<u>9.53</u>	206	9.47							
121.pop2	40	203	20.4	<u>202</u>	<u>20.4</u>	201	20.5							
122.tachyon	40	247	11.3	244	11.5	<u>244</u>	<u>11.5</u>							
126.lammps	40	321	9.09	319	9.14	<u>320</u>	<u>9.11</u>							
127.wrf2	40	342	22.8	339	23.0	<u>339</u>	<u>23.0</u>							
128.GAPgeofem	40	<u>121</u>	<u>17.0</u>	121	17.0	121	17.1							
129.tera_tf	40	221	12.5	222	12.5	<u>221</u>	<u>12.5</u>							

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	40	178	21.4	178	21.5	<u>178</u>	<u>21.5</u>									
132.zeusmp2	40	228	13.6	230	13.5	<u>229</u>	<u>13.6</u>									
137.lu	40	313	11.7	<u>314</u>	<u>11.7</u>	316	11.6									

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 R2208WFTZS
 Interconnect: Intel Omni-Path 100 series
 File Server Node: Lustre FS
 Total Compute Nodes: 1
 Total Chips: 2
 Total Cores: 40
 Total Threads: 80
 Total Memory: 192 GB
 Base Ranks Run: 40
 Minimum Peak Ranks: --
 Maximum Peak Ranks: --

Software Summary

C Compiler: Intel C++ Composer XE 2018 for Linux
 Version 18.0.0 Build 20170811
 C++ Compiler: Intel C++ Composer XE 2018 for Linux
 Version 18.0.0 Build 20170811
 Fortran Compiler: Intel Fortran Composer XE 2018 for Linux
 Version 18.0.0 Build 20170811
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 MPI Library: Intel MPI Library 2019 Build 20180829
 Other MPI Info: libfabric-1.6.1
 Pre-processors: No
 Other Software: None

Node Description: Intel Server System R2208WFTZS

Hardware

Number of nodes: 1
 Uses of the node: Compute
 Vendor: Intel
 Model: Intel Server System R2208WFTZS
 CPU Name: Intel Xeon Gold 6148
 CPU(s) orderable: 1-2 chips
 Chips enabled: 2
 Cores enabled: 40
 Cores per chip: 20
 Threads per core: 2
 CPU Characteristics: Intel Turbo Boost Technology up to 3.7 GHz
 CPU MHz: 2400
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 1 MB I+D on chip per core
 L3 Cache: 27.5 MB I+D on chip per chip
 Other Cache: None
 Memory: 192 GB (16 x 12 GB 2Rx4 DDR4-2666)
 Disk Subsystem: ATA INTEL SSDSC2BA80
 Other Hardware: None
 Adapter: Intel Omni-Path Edge Switch 100 series
 Number of Adapters: 1
 Slot Type: PCI-Express x16
 Data Rate: 12.5 GB/s
 Ports Used: 1

Software

Adapter: Intel Omni-Path Edge Switch 100 series
 Adapter Driver: IFS 10.7
 Adapter Firmware: 1.26.1
 Operating System: Oracle Linux Server release 7.4
 Local File System: Linux/xfst
 Shared File System: Lustre FS
 System State: Multi-User
 Other Software: IBM Platform LSF Standard 9.1.1.1

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Node Description: Intel Server System R2208WFTZS

Interconnect Type: Intel Omni-Path Fabric 100 series

Node Description: Lustre FS

Hardware

Number of nodes: 11
 Uses of the node: Fileserver
 Vendor: Intel
 Model: Intel Server System R2208GZ4GC4
 CPU Name: Intel Xeon E5-2680
 CPU(s) orderable: 1-2 chips
 Chips enabled: 2
 Cores enabled: 16
 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: None
 Other Cache: None
 Memory: 64 GB per node (8 x 8 GB 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

Software

Adapter: Intel Omni-Path Fabric Adapter 100 series
 Adapter Driver: IFS 10.7
 Adapter Firmware: 1.26.1
 Operating System: Redhat Enterprise Linux Server Release 7.4
 Local File System: None
 Shared File System: Lustre FS
 System State: Multi-User
 Other Software: None

Interconnect Description: Intel Omni-Path 100 series

Hardware

Vendor: Intel
 Model: Intel Omni-Path Fabric 100 series
 Switch Model: Intel Omni-Path Edge Switch 100 series
 Number of Switches: 24
 Number of Ports: 48
 Data Rate: 12.5 GB/s
 Firmware: 1.26.1
 Topology: Fat tree
 Primary Use: MPI and I/O traffic

Software



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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.
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 FI_PSM2_INJECT_SIZE=8192
export I_MPI_PIN_DOMAIN=core
export I_MPI_PIN_ORDER=bunch
export FI_PSM2_DELAY=0
export FI_PSM2_LAZY_CONN=1
export I_MPI_COMPATIBILITY=3
```

Spectre & Meltdown:

```
Kernel: 3.10.0-862.11.6.el7.crt1.x86_64
Microcode: 0x200004d
lltf: Mitigation: PTE Inversion
meltdown: Mitigation: PTI
spec_store_bypass: Mitigation: Speculative Store Bypass disabled via prctl and seccomp
spectre_v1: Mitigation: Load fences, __user pointer sanitization
spectre_v2: Mitigation: IBRS (kernel)
```

BIOS settings:

```
Intel Hyper-Threading Technology (SMT) = Enabled (default is Enabled)
Intel Turbo Boost Technology (Turbo) = Enabled (default is Enabled)
```

RAM configuration:

Compute nodes have 2x16-GB RDIMM on each memory channel.

Network:

Endeavour Omni-Path Fabric consists of 48-port switches = 24 core switches connected to each leaf of the rack switch.

HFI driver parameters:

```
cache_size = 1024
rcvhdrCnt = 4096
```

Job placement:

Each MPI job was assigned to a topologically compact set of nodes, i.e. the minimal needed number of leaf switches was used for each job = 1 switch for 40/80/160/320/640 ranks, 2 switches for 1280 and 1980 ranks.

IBM Platform LSF was used for job submission. It has no impact on performance. Information can be found at: <http://www.ibm.com>

Base Compiler Invocation

C benchmarks:
mpiicc

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Base Compiler Invocation (Continued)

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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