



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 = 78.1

MPI2007 license: 13

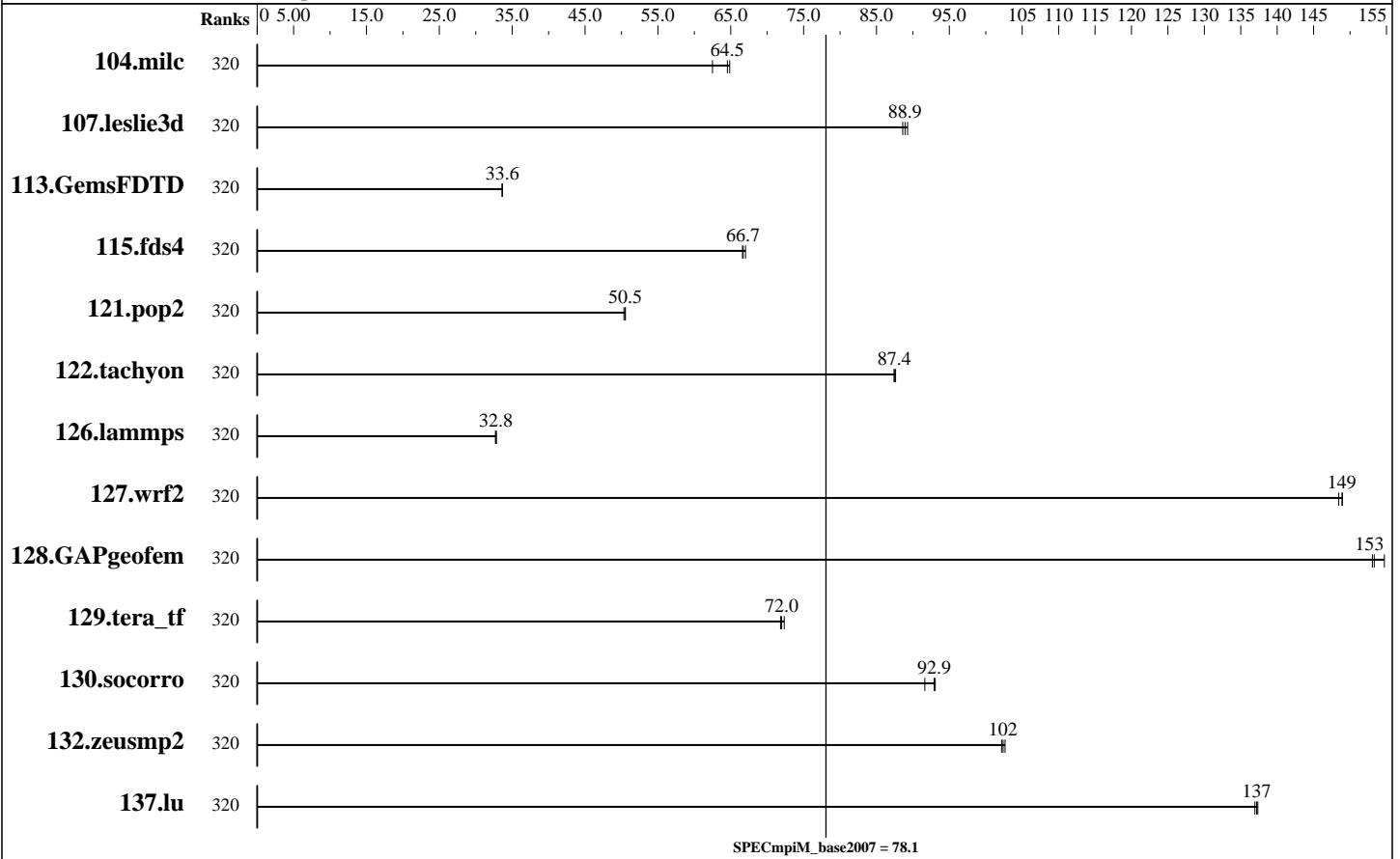
Test sponsor: Intel Corporation

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	320	25.0	62.5	<u>24.2</u>	<u>64.5</u>	24.1	64.9									
107.leslie3d	320	58.9	88.6	58.5	89.3	<u>58.7</u>	<u>88.9</u>									
113.GemsFDTD	320	<u>188</u>	<u>33.6</u>	187	33.6	188	33.6									
115.fds4	320	29.1	67.0	29.3	66.6	<u>29.2</u>	<u>66.7</u>									
121.pop2	320	82.0	50.3	81.7	50.5	<u>81.7</u>	<u>50.5</u>									
122.tachyon	320	32.0	87.4	31.9	87.6	<u>32.0</u>	<u>87.4</u>									
126.lammps	320	88.8	32.8	<u>88.9</u>	<u>32.8</u>	89.2	32.7									
127.wrf2	320	52.5	148	<u>52.4</u>	<u>149</u>	52.3	149									
128.GAPgeofem	320	13.3	155	<u>13.5</u>	<u>153</u>	13.5	153									
129.tera_tf	320	<u>38.5</u>	<u>72.0</u>	38.5	71.8	38.3	72.3									

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	320	41.7	91.6	41.0	93.1	41.1	92.9							
132.zeusmp2	320	30.2	103	30.4	102	30.3	102							
137.lu	320	26.8	137	26.8	137	26.8	137							

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: 8
 Total Chips: 16
 Total Cores: 320
 Total Threads: 640
 Total Memory: 1536 GB
 Base Ranks Run: 320
 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: 8
 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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