SPEC® MPIM2007 Result

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Intel Corporation

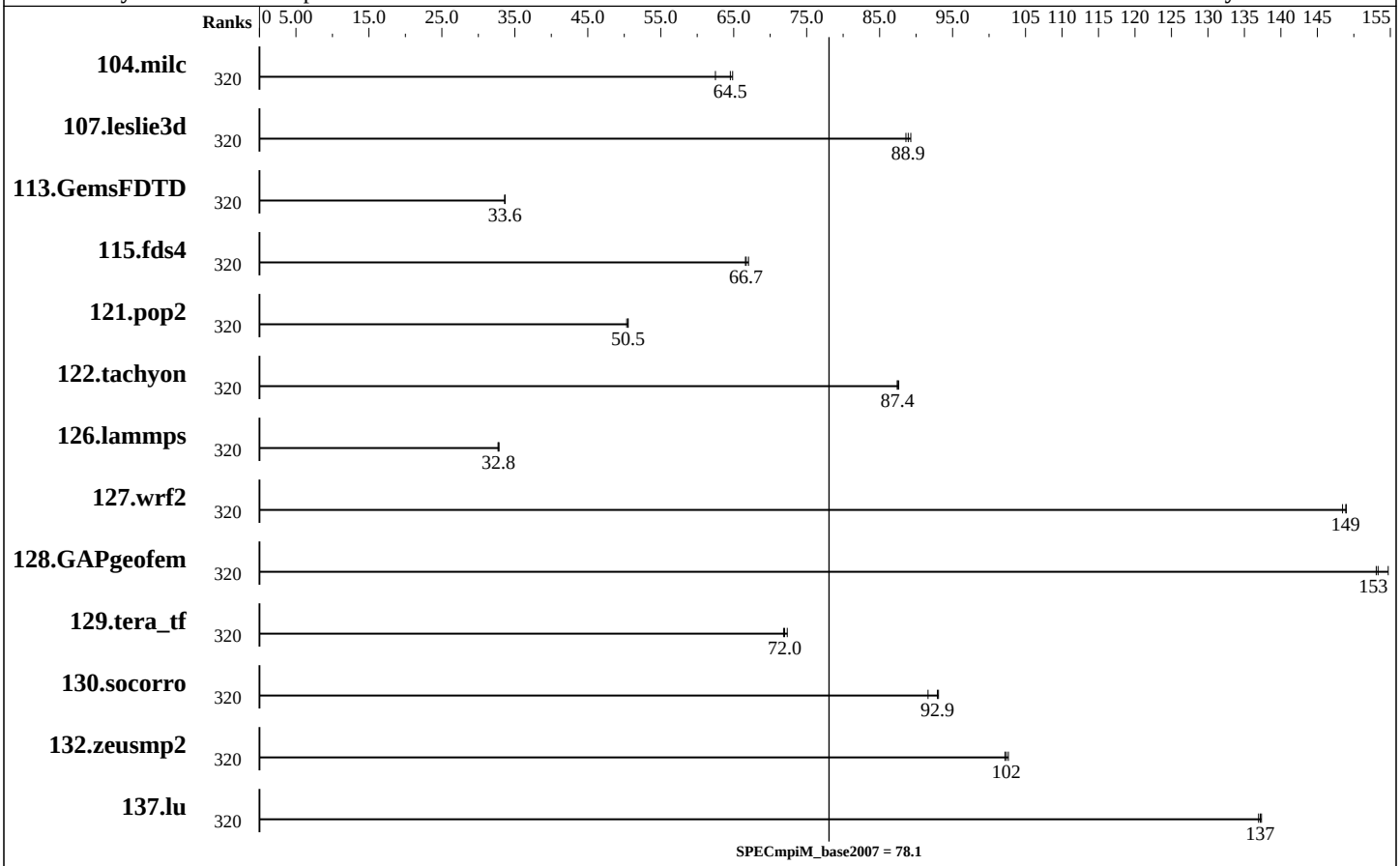
Endeavor (Intel Xeon Gold 6148, 2.40 GHz,
DDR4-2666 MHz, SMT on, Turbo on)

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

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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/xfs
Shared File System:	Lustre FS
System State:	Multi-User
Other Software:	IBM Platform LSF Standard 9.1.1.1

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Test date: Aug-2018
Hardware Availability: Aug-2018
Software Availability: Nov-2018

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

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
   l1tf: 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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