SPEC® MPIM2007 Result

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Intel Corporation

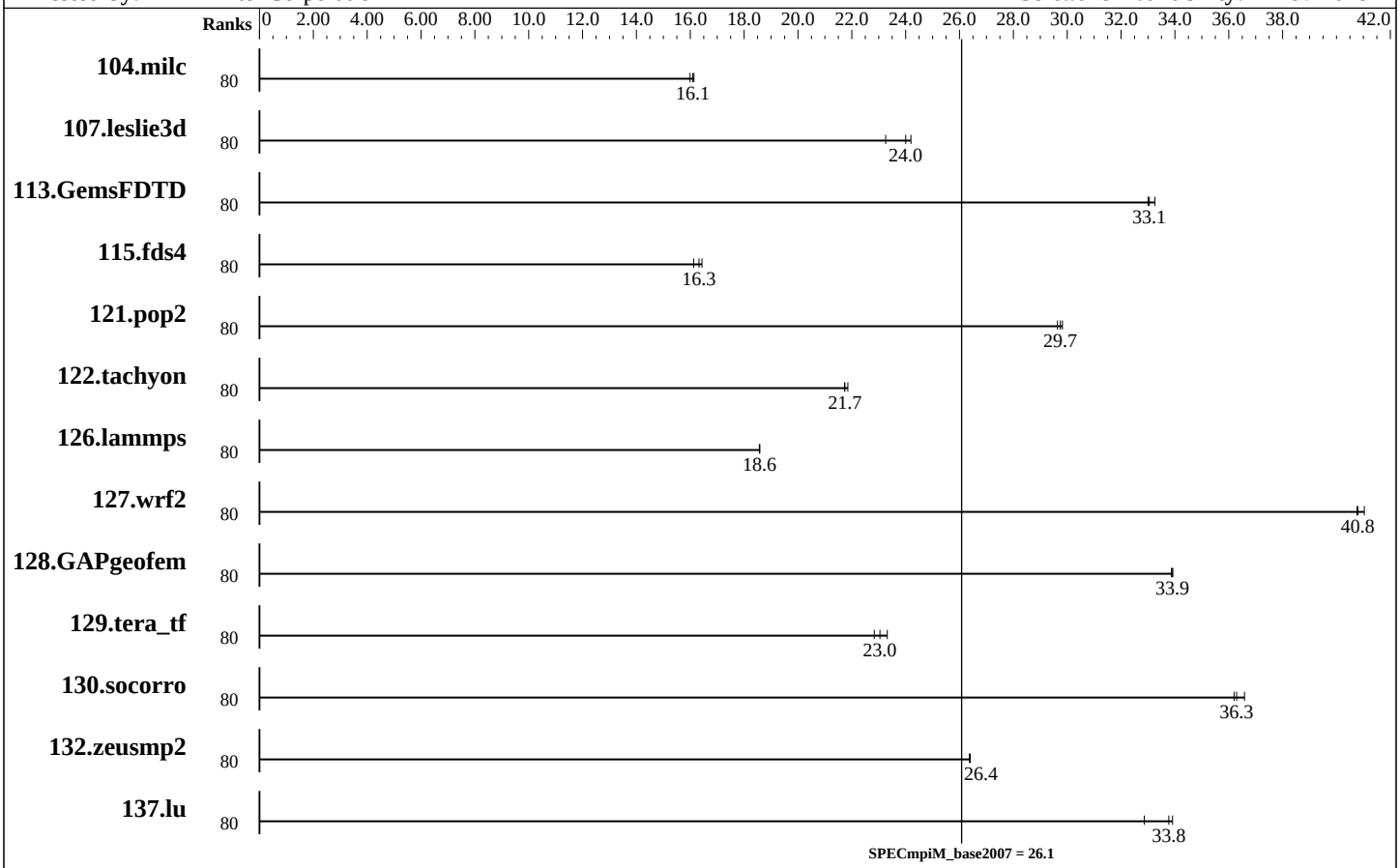
Endeavor (Intel Xeon Gold 6148, 2.40 GHz,
DDR4-2666 MHz, SMT on, Turbo on)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 26.1

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	80	97.9	16.0	**97.2**	**16.1**	97.0	16.1							
107.leslie3d	80	224	23.3	216	24.2	**217**	**24.0**							
113.GemsFDTD	80	191	33.0	190	33.3	**191**	**33.1**							
115.fds4	80	119	16.4	**120**	**16.3**	121	16.1							
121.pop2	80	138	29.8	**139**	**29.7**	139	29.6							
122.tachyon	80	129	21.7	**129**	**21.7**	128	21.9							
126.lammps	80	157	18.6	157	18.6	**157**	**18.6**							
127.wrf2	80	191	40.8	190	41.0	**191**	**40.8**							
128.GAPgeofem	80	60.9	33.9	**60.9**	**33.9**	61.0	33.9							
129.tera_tf	80	119	23.3	121	22.8	**120**	**23.0**							

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	80	105	36.2	**105**	**36.3**	104	36.6							
132.zeusmp2	80	118	26.4	**118**	**26.4**	118	26.4							
137.lu	80	112	32.9	108	33.9	**109**	**33.8**							

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:	2
Total Chips:	4
Total Cores:	80
Total Threads:	160
Total Memory:	384 GB
Base Ranks Run:	80
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:	2
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

Continued on next page

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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MPI2007 license: 13
Test sponsor: Intel Corporation
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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

Continued on next page

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.

Tested with SPEC MPI2007 v2.0.1.
Report generated on Thu Jan 10 13:17:49 2019 by SPEC MPI2007 PS/PDF formatter v1463.
Originally published on 10 January 2019.