SPEC® CPU2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(2.10 GHz, Intel Xeon Silver 4110)

SPECspeed2017_fp_base = 60.2
SPECspeed2017_fp_peak = Not Run

<table>
<thead>
<tr>
<th>Threads</th>
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</tr>
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<tbody>
<tr>
<td>16</td>
<td>603.bwaves_s</td>
</tr>
<tr>
<td>16</td>
<td>607.cactuBSSN_s</td>
</tr>
<tr>
<td>16</td>
<td>619.lbm_s</td>
</tr>
<tr>
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<td>621.wrf_s</td>
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<td>627.cam4_s</td>
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<tr>
<td>16</td>
<td>638.imagick_s</td>
</tr>
<tr>
<td>16</td>
<td>644.nab_s</td>
</tr>
<tr>
<td>16</td>
<td>649.fotonik3d_s</td>
</tr>
<tr>
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<td>654.roms_s</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Silver 4110
Max MHz.: 3000
Nominal: 2100
Enabled: 16 cores, 2 chips
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 11 MB I+D on chip per chip
Other: None
Memory: 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)
Storage: 1 x 960 GB SATA SSD, RAID 0
Other: None

Software
OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
Kernel 4.4.73-5-default
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux;
Fortran: Version 18.0.0.128 of Intel Fortran
Compiler for Linux
Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Dec-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Results Table

<table>
<thead>
<tr>
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<th>Base Ratio</th>
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<th>Base Ratio</th>
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SPECspeed2017_fp_base = 60.2
SPECspeed2017_fp_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
irqbalance disabled with "systemctl stop irqbalance"
tuned profile set with "tuned-adm profile throughput-performance"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=core,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4

Platform Notes

BIOS Configuration:
Intel Hyperthreading set to Disabled
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
Memory Patrol Scrubbing set to Disabled
Workload Profile set to General Peak Frequency Compute
Energy/Performance Bias set to Maximum Performance

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SPECCPU2017 Floating Point Speed Result
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Platform Notes (Continued)

Workload Profile set to Custom
NUMA Group Size Optimization set to Flat
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-b7s1 Mon Dec 4 20:46:20 2017

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Silver 4110 CPU @ 2.10GHz
  2 "physical id"s (chips)
  16 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4110 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2095.098
BogoMIPS: 4190.19
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp

(Continued on next page)
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Platform Notes (Continued)

/proc/cpuinfo cache data
cache size : 11264 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7
node 0 size: 96349 MB
node 0 free: 91327 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 96766 MB
node 1 free: 95385 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 197750952 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP3

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.

os-release:
NAME="SLES"
VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"

(Continued on next page)
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Platform Notes (Continued)

uname -a:
    Linux linux-b7s1 4.4.73-5-default #1 SMP Tue Jul 4 15:33:39 UTC 2017 (b7ce4e4) x86_64
    x86_64 x86_64 GNU/Linux

run-level 3 Dec 4 17:28

SPEC is set to: /home/cpu2017

Additional information from dmidecode follows. WARNING: Use caution when you interpret
this section. The 'dmidecode' program reads system data which is "intended to allow
hardware to be accurately determined", but the intent may not be met, as there are
frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
BIOS HPE U30 10/11/2017
Memory:
24x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

CC 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 607.cactuBSSN_s(base)

(Continued on next page)
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Compiler Version Notes (Continued)

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------------------------------------------------------------------------------
==============================================================================
CC 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64
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**Base Optimization Flags**

C benchmarks:
- -xCORE-AVX2
- -ipo -O3
- -no-prec-div
- -qopt-prefetch
- -ffinite-math-only
- -qopt-mem-layout-trans=3
- -qopenmp
- -DSPEC_OPENMP

Fortran benchmarks:
- -DSPEC_OPENMP
- -xCORE-AVX2
- -ipo -O3
- -no-prec-div
- -qopt-prefetch
- -ffinite-math-only
- -qopt-mem-layout-trans=3
- -qopenmp
- -nostandard-realloc-lhs
- -align array32byte

Benchmarks using both Fortran and C:
- -xCORE-AVX2
- -ipo -O3
- -no-prec-div
- -qopt-prefetch
- -ffinite-math-only
- -qopt-mem-layout-trans=3
- -qopenmp
- -DSPEC_OPENMP
- -nostandard-realloc-lhs
- -align array32byte

Benchmarks using Fortran, C, and C++:
- -xCORE-AVX2
- -ipo -O3
- -no-prec-div
- -qopt-prefetch
- -ffinite-math-only
- -qopt-mem-layout-trans=3
- -qopenmp
- -DSPEC_OPENMP
- -nostandard-realloc-lhs
- -align array32byte

**Base Other Flags**

C benchmarks:
- -m64
- -std=c11

Fortran benchmarks:
- -m64

Benchmarks using both Fortran and C:
- -m64
- -std=c11

Benchmarks using Fortran, C, and C++:
- -m64
- -std=c11

The flags files that were used to format this result can be browsed at:

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml
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Tested with SPEC CPU2017 v1.0.2 on 2017-12-04 21:46:20-0500.  