SPEC® CPU2017 Floating Point Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

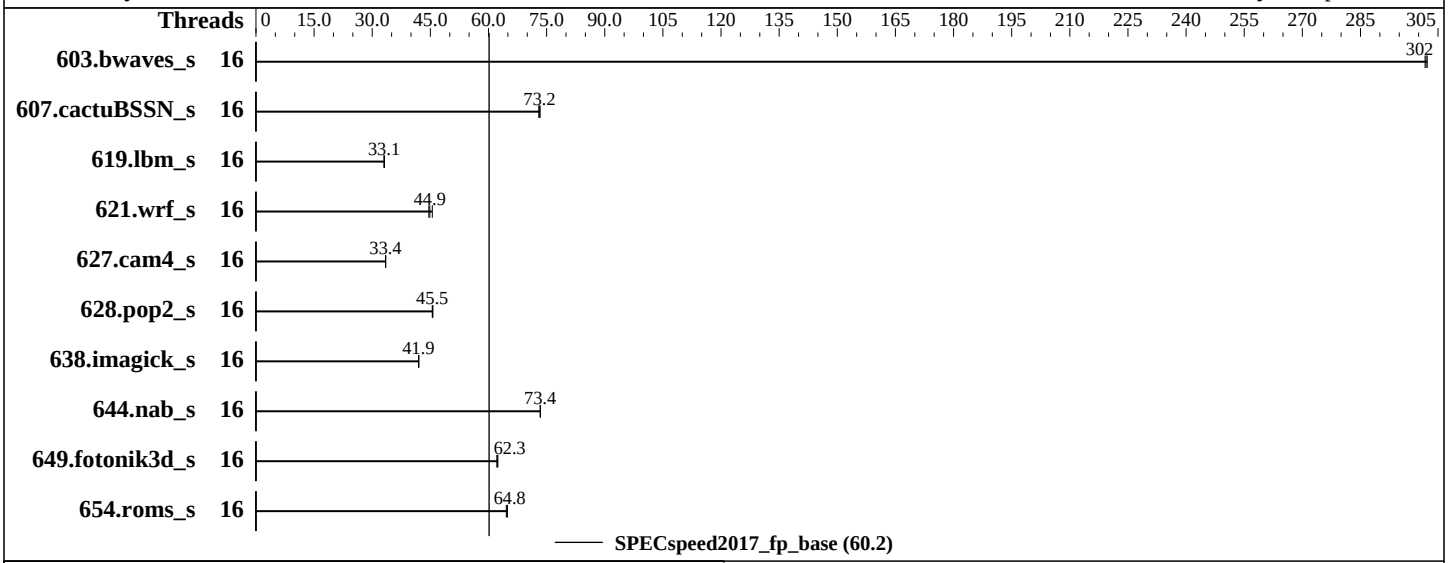
ProLiant DL380 Gen10
(2.10 GHz, Intel Xeon Silver 4110)

SPECspeed2017_fp_base = 60.2

SPECspeed2017_fp_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

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



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
Firmware:	HPE BIOS Version U30 released Oct-2017 (tested with U30 9/29/2017)
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	16	**195**	**302**	195	302	196	302							
607.cactuBSSN_s	16	227	73.3	**228**	**73.2**	228	73.0							
619.lbm_s	16	**158**	**33.1**	158	33.2	158	33.0							
621.wrf_s	16	297	44.6	**295**	**44.9**	291	45.5							
627.cam4_s	16	265	33.4	265	33.5	**265**	**33.4**							
628.pop2_s	16	260	45.7	**261**	**45.5**	261	45.5							
638.imagick_s	16	**344**	**41.9**	344	41.9	343	42.1							
644.nab_s	16	**238**	**73.4**	238	73.4	238	73.4							
649.fotonik3d_s	16	147	62.2	**146**	**62.3**	146	62.4							
654.roms_s	16	**243**	**64.8**	244	64.6	243	64.9							

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 wtih "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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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
```

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Platform Notes (Continued)

```
      lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
      aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
      fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
      xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt
      tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
      erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
      avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

 /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"
```

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Platform Notes (Continued)

```
      CPE_NAME="cpe:/o:suse:sles:12:sp3"

 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
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda4      xfs   852G   34G  819G   4% /home

 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.
------------------------------------------------------------------------------

==============================================================================
 FC  607.cactuBSSN_s(base)
------------------------------------------------------------------------------
icpc (ICC) 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.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
```

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Compiler Version Notes (Continued)

```
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 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

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/Intel-ic18.0-official-linux64.2017-10-19.html
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/Intel-ic18.0-official-linux64.2017-10-19.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2017-12-04 21:46:20-0500.
Report generated on 2018-10-31 17:12:24 by CPU2017 PS formatter v6067.
Originally published on 2018-01-14.