SPEC® CPU2017 Floating Point Speed Result

Huawei

Huawei XH628 V5 (Intel Xeon Gold 6128)

$SPECspeed2017\_fp\_base = 73.4$

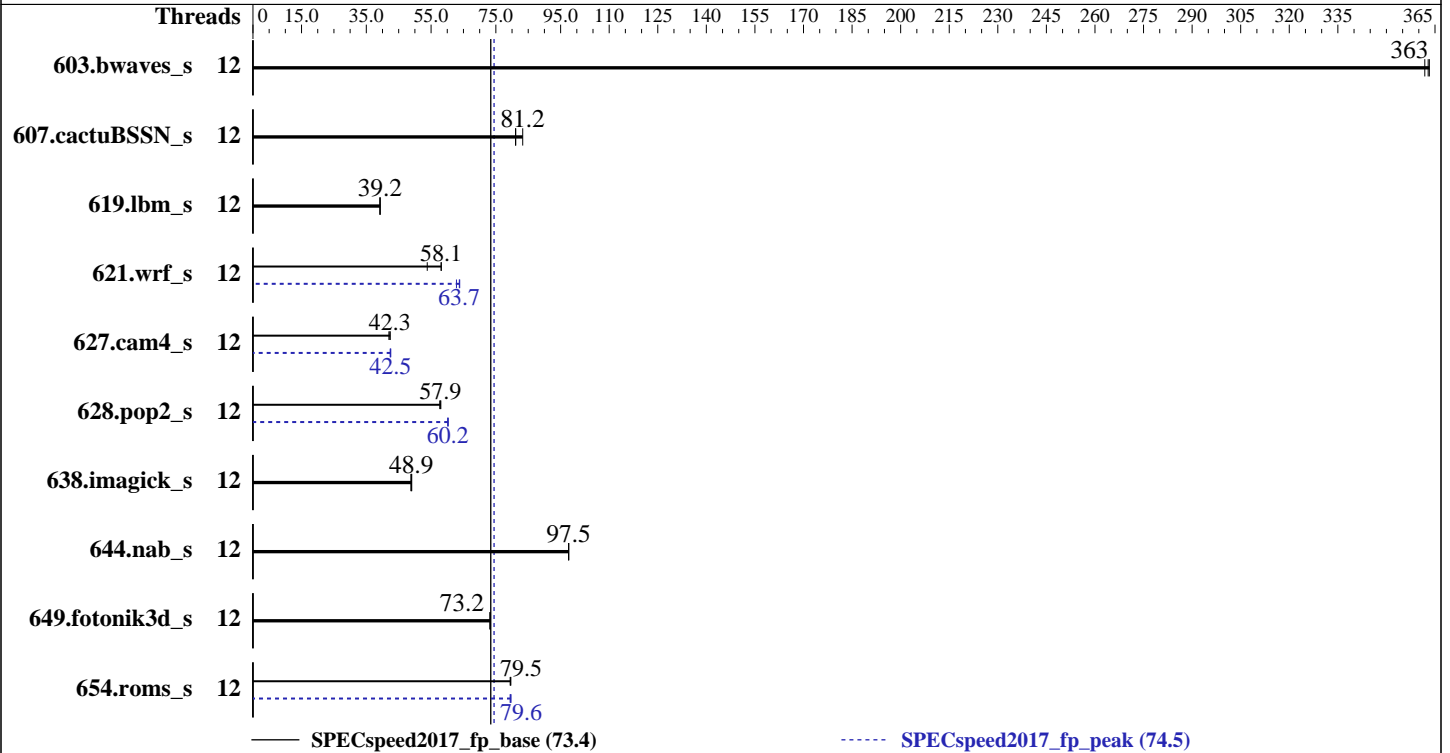$SPECspeed2017\_fp\_peak = 74.5$

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: Aug-2018
Hardware Availability: Aug-2018
Software Availability: Mar-2018

Threads

Benchmark	Threads	Base	Peak
603.bwaves_s	12	363	
607.cactuBSSN_s	12	81.2	
619.lbm_s	12	39.2	
621.wrf_s	12	58.1	63.7
627.cam4_s	12	42.3	42.5
628.pop2_s	12	57.9	60.2
638.imagick_s	12	48.9	
644.nab_s	12	97.5	
649.fotonik3d_s	12	73.2	
654.roms_s	12	79.5	79.6

—— SPECspeed2017_fp_base (73.4)   ----- **SPECspeed2017_fp_peak (74.5)**

Hardware

CPU Name: Intel Xeon Gold 6128
 Max MHz.: 3700
 Nominal: 3400
Enabled: 12 cores, 2 chips
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 19.25 MB I+D on chip per chip
 Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 1800 GB SAS, 10000 RPM
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)
3.10.0-693.11.6.el7.x86_64
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
Parallel: Yes
Firmware: Version 0.86 Released Aug-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1

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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	12	**163**	**363**	162	363	163	362	12	**163**	**363**	162	363	163	362
607.cactuBSSN_s	12	200	83.3	206	81.1	**205**	**81.2**	12	200	83.3	206	81.1	**205**	**81.2**
619.lbm_s	12	**134**	**39.2**	134	39.2	133	39.3	12	**134**	**39.2**	134	39.2	133	39.3
621.wrf_s	12	227	58.2	246	53.8	**228**	**58.1**	12	207	63.8	210	62.8	**208**	**63.7**
627.cam4_s	12	211	42.0	**210**	**42.3**	209	42.4	12	208	42.5	**209**	**42.5**	209	42.4
628.pop2_s	12	205	58.0	**205**	**57.9**	206	57.7	12	197	60.3	**197**	**60.2**	197	60.2
638.imagick_s	12	296	48.8	**295**	**48.9**	294	49.0	12	296	48.8	**295**	**48.9**	294	49.0
644.nab_s	12	179	97.5	179	97.5	**179**	**97.5**	12	179	97.5	179	97.5	**179**	**97.5**
649.fotonik3d_s	12	125	73.2	**124**	**73.2**	124	73.3	12	125	73.2	**124**	**73.2**	124	73.3
654.roms_s	12	198	79.5	198	79.6	**198**	**79.5**	12	198	79.7	**198**	**79.6**	198	79.4

SPECspeed2017_fp_base =	**73.4**	
SPECspeed2017_fp_peak =	**74.5**	

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"
```

General Notes

```
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/spec2017/lib/ia32:/spec2017/lib/intel64:/spec2017/je5.0.1-32:/spec2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

 Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.5
 Transparent Huge Pages enabled by default
 Prior to runcpu invocation
 Filesystem page cache synced and cleared with:
 sync; echo 3>        /proc/sys/vm/drop_caches
 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
 is mitigated in the system as tested and documented.
 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
 is mitigated in the system as tested and documented.
 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
 is mitigated in the system as tested and documented.
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

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Platform Notes

```
   BIOS configuration:
   Power Policy Set to Load Balance
   Hyper-Threading Set to Disable
   XPT Prefetch Set to Enabled
   Sysinfo program /spec2017/bin/sysinfo
   Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
   running on localhost.localdomain Mon Aug 20 00:54:29 2018

   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) Gold 6128 CPU @ 3.40GHz
         2  "physical id"s (chips)
         12 "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 : 6
         siblings  : 6
         physical 0: cores 0 6 9 10 11 13
         physical 1: cores 0 6 9 10 11 13

   From lscpu:
      Architecture:          x86_64
      CPU op-mode(s):        32-bit, 64-bit
      Byte Order:            Little Endian
      CPU(s):                12
      On-line CPU(s) list:   0-11
      Thread(s) per core:    1
      Core(s) per socket:    6
      Socket(s):             2
      NUMA node(s):          2
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 85
      Model name:            Intel(R) Xeon(R) Gold 6128 CPU @ 3.40GHz
      Stepping:              4
      CPU MHz:               3401.000
      CPU max MHz:           3401.0000
      CPU min MHz:           1200.0000
      BogoMIPS:              6800.00
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              19712K
```

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Platform Notes (Continued)

```
      NUMA node0 CPU(s):       0-5
      NUMA node1 CPU(s):       6-11
      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
   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 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 epb cat_l3 cdp_l3 invpcid_single
   intel_pt spec_ctrl ibpb_support tpr_shadow vnmi flexpriority ept vpid fsgsbase
   tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq
   rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1
   cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

 /proc/cpuinfo cache data
   cache size : 19712 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
   node 0 size: 194741 MB
   node 0 free: 189456 MB
   node 1 cpus: 6 7 8 9 10 11
   node 1 size: 196608 MB
   node 1 free: 191698 MB
   node distances:
   node   0   1
     0:  10  21
     1:  21  10

 From /proc/meminfo
   MemTotal:       394174888 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

 From /etc/*release* /etc/*version*
   os-release:
     NAME="Red Hat Enterprise Linux Server"
     VERSION="7.4 (Maipo)"
     ID="rhel"
     ID_LIKE="fedora"
     VARIANT="Server"
     VARIANT_ID="server"
     VERSION_ID="7.4"
     PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
   redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
```

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Platform Notes (Continued)

```
    system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

  uname -a:
     Linux localhost.localdomain 3.10.0-693.11.6.el7.x86_64 #1 SMP Thu Dec 28 14:23:39 EST
     2017 x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Aug 19 19:37

  SPEC is set to: /spec2017
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda4       xfs   553G  8.2G  545G   2% /

  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 INSYDE Corp. 0.86 08/06/2018
    Memory:
     4x NO DIMM NO DIMM
     12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

  (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
  CC   619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  CC   619.lbm_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  FC   607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
```

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Huawei

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CPU2017 License: 3175
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Tested by: Huawei

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Software Availability: Mar-2018

Compiler Version Notes (Continued)

```
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


==============================================================================
 FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


==============================================================================
FC   603.bwaves_s(peak) 649.fotonik3d_s(peak)
------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


==============================================================================
 CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


==============================================================================
CC   621.wrf_s(peak) 628.pop2_s(peak)
------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
icc -m64 -std=c11
```

Fortran benchmarks:
```
ifort -m64
```

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

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Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

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:
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:
```
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Benchmarks using both Fortran and C:
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Benchmarks using Fortran, C, and C++:
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

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Peak Compiler Invocation

C benchmarks:
```
icc -m64 -std=c11
```

Fortran benchmarks:
```
ifort -m64
```

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

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

654.roms_s: `-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs`

Benchmarks using both Fortran and C:

621.wrf_s: `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs`

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Test Sponsor:	Huawei	**Hardware Availability:**	Aug-2018
Tested by:	Huawei	**Software Availability:**	Mar-2018

Peak Optimization Flags (Continued)

627.cam4_s: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs`

628.pop2_s: `Same as 621.wrf_s`

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: `basepeak = yes`

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

`http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html`
`http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.html`

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

`http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml`
`http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.xml`

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 2018-08-19 20:54:28-0400.
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