SPEC CPU®2017 Floating Point Speed Result

Cisco Systems

Cisco UCS B200 M5 (Intel Xeon Platinum 8170, 2.10 GHz)

$SPECspeed^{®}2017\_fp\_base = 121$

$SPECspeed^{®}2017\_fp\_peak = 122$

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: May-2018

Hardware Availability: Aug-2017

Software Availability: Mar-2018

Threads		Results
603.bwaves_s	52	base 494 / peak 495
607.cactuBSSN_s	52	base 177 / peak 179
619.lbm_s	52	base 44.0 / peak 44.0
621.wrf_s	52	base 82.5 / peak 85.7
627.cam4_s	52	base 95.8 / peak 95.5
628.pop2_s	52	base 55.0 / peak 54.8
638.imagick_s	52	base 134 / peak 136
644.nab_s	52	base 257 / peak 257
649.fotonik3d_s	52	base 80.4 / peak 82.1
654.roms_s	52	base 141 / peak 144

SPECspeed®2017_fp_base (121) ——— SPECspeed®2017_fp_peak (122) - - - - -

Hardware

CPU Name: Intel Xeon Platinum 8170

  Max MHz: 3700

  Nominal: 2100

Enabled: 52 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: 35.75 MB I+D on chip per chip

  Other: None

Memory: 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R)

Storage: 1 x 240 GB M.2 SATA SSD

Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.103-92.56-default

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 3.2.3c released Mar-2018

File System: xfs

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: 64-bit

Other: None

Power Management: --

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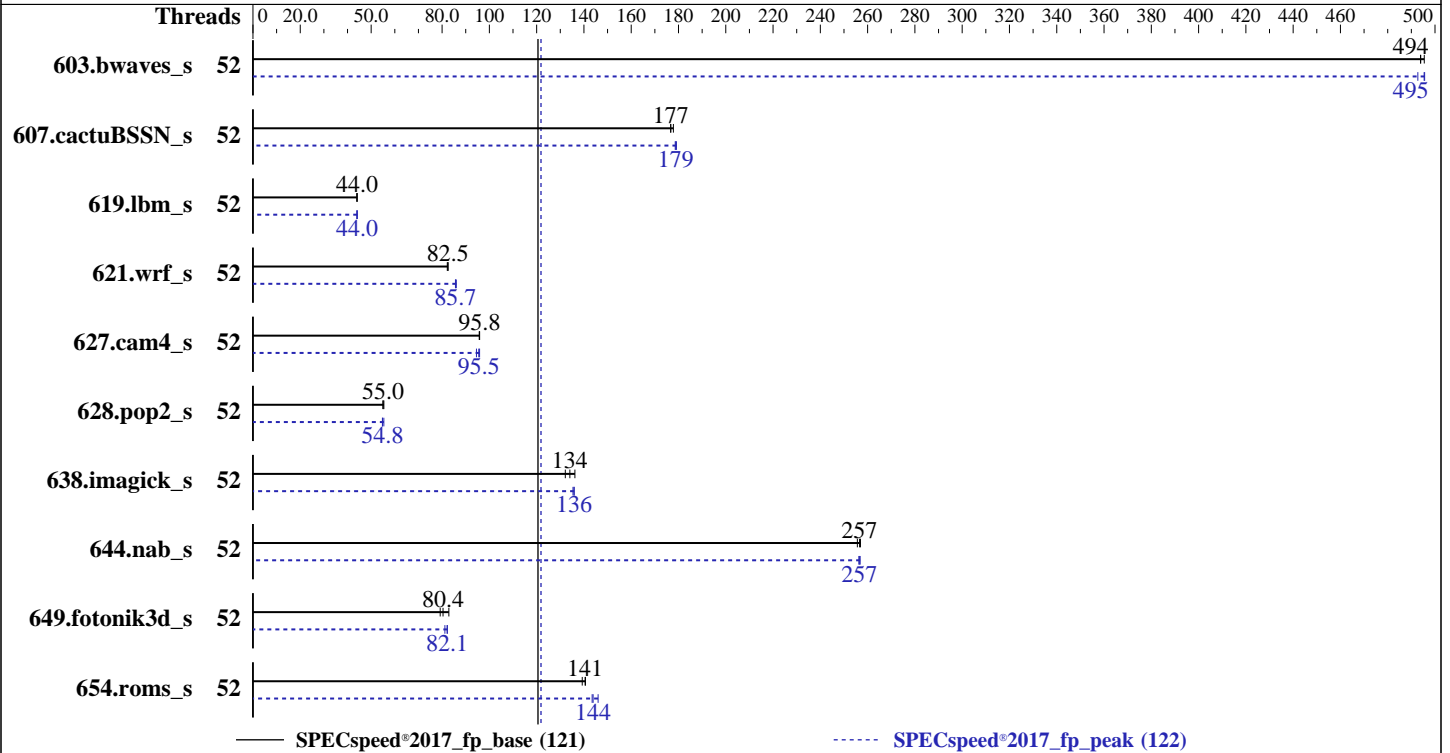SPECspeed®2017_fp_peak = 122

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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	52	**119**	**494**	119	494	119	495	52	120	493	119	496	**119**	**495**
607.cactuBSSN_s	52	**94.3**	**177**	93.7	178	94.3	177	52	93.1	179	93.3	179	**93.2**	**179**
619.lbm_s	52	119	44.1	**119**	**44.0**	119	44.0	52	119	44.0	**119**	**44.0**	119	44.1
621.wrf_s	52	161	82.2	**160**	**82.5**	160	82.5	52	**154**	**85.7**	154	86.0	154	85.7
627.cam4_s	52	92.4	95.9	**92.5**	**95.8**	92.6	95.7	52	93.7	94.5	92.5	95.9	**92.8**	**95.5**
628.pop2_s	52	216	55.0	214	55.4	**216**	**55.0**	52	**217**	**54.8**	214	55.4	217	54.8
638.imagick_s	52	**108**	**134**	109	132	106	136	52	106	136	**106**	**136**	107	135
644.nab_s	52	68.0	257	68.3	256	**68.1**	**257**	52	68.0	257	**68.1**	**257**	68.2	256
649.fotonik3d_s	52	**113**	**80.4**	110	82.9	115	79.2	52	**111**	**82.1**	111	82.2	112	81.2
654.roms_s	52	**112**	**141**	113	139	112	141	52	**109**	**144**	110	143	108	146
SPECspeed®2017_fp_base =	**121**												
SPECspeed®2017_fp_peak =	**122**												

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 = "/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
 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.

Platform Notes

```
BIOS Settings:
Intel HyperThreading Technology set to Disabled
```

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Platform Notes (Continued)

```
CPU performance set to Enterprise
Power Performance Tuning set to OS Controls
SNC set to Disabled
Patrol Scrub set to Disabled
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-mys2 Sat May 19 06:26:02 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) Platinum 8170 CPU @ 2.10GHz
       2  "physical id"s (chips)
       52 "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 : 26
       siblings  : 26
       physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
       29
       physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
       29

 From lscpu:
      Architecture:          x86_64
      CPU op-mode(s):        32-bit, 64-bit
      Byte Order:            Little Endian
      CPU(s):                52
      On-line CPU(s) list:   0-51
      Thread(s) per core:    1
      Core(s) per socket:    26
      Socket(s):             2
      NUMA node(s):          2
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 85
      Model name:            Intel(R) Xeon(R) Platinum 8170 CPU @ 2.10GHz
      Stepping:              4
      CPU MHz:               1152.753
      CPU max MHz:           3700.0000
      CPU min MHz:           1000.0000
      BogoMIPS:              4199.98
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
```

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Platform Notes (Continued)

```
     L2 cache:             1024K
     L3 cache:             36608K
     NUMA node0 CPU(s):    0-25
     NUMA node1 CPU(s):    26-51
     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 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 invpcid_single pln pts
   dtherm hwp hwp_act_window hwp_epp hwp_pkg_req intel_pt spec_ctrl kaiser 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

 /proc/cpuinfo cache data
    cache size : 36608 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 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
   node 0 size: 192074 MB
   node 0 free: 189594 MB
   node 1 cpus: 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
   51
   node 1 size: 193504 MB
   node 1 free: 187982 MB
   node distances:
   node   0   1
     0:  10  21
     1:  21  10

 From /proc/meminfo
    MemTotal:       394832416 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12 SP2

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 2
       # This file is deprecated and will be removed in a future service pack or release.
```

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Platform Notes (Continued)

```
       # Please check /etc/os-release for details about this release.
    os-release:
       NAME="SLES"
       VERSION="12-SP2"
       VERSION_ID="12.2"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp2"

 uname -a:
    Linux linux-mys2 4.4.103-92.56-default #1 SMP Wed Dec 27 16:24:31 UTC 2017 (2fd2155)
    x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Jan 4 02:07

 SPEC is set to: /home/cpu2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda3       xfs   182G   52G  131G  29% /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 Cisco Systems, Inc. B200M5.3.2.3c.0.0307181316 03/07/2018
   Memory:
    24x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C                   | 619.lbm_s(base, peak) 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.
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 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
```

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Compiler Version Notes (Continued)

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


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


==========================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                | 628.pop2_s(base, 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
```

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
```

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Base Portability Flags (Continued)

```
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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
```

Fortran benchmarks:
```
-DSPEC_OPENMP -xCORE-AVX512 -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-AVX512 -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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte
```

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
```

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Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP
```

```
638.imagick_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP
```

```
644.nab_s: Same as 638.imagick_s
```

Fortran benchmarks:
```
-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:

```
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
```

```
627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
```

```
628.pop2_s: Same as 621.wrf_s
```

Benchmarks using Fortran, C, and C++:
```
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch
-ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs
-align array32byte
```

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

http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2018-06-13.html
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-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-linux64.2018-06-13.xml
http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revH.xml

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

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