SPEC CPU®2017 Floating Point Speed Result
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Cisco Systems

Cisco UCS B200 M5 (Intel Xeon Platinum 8160M, 2.10 GHz)

$SPECspeed®2017\_fp\_base = 119$
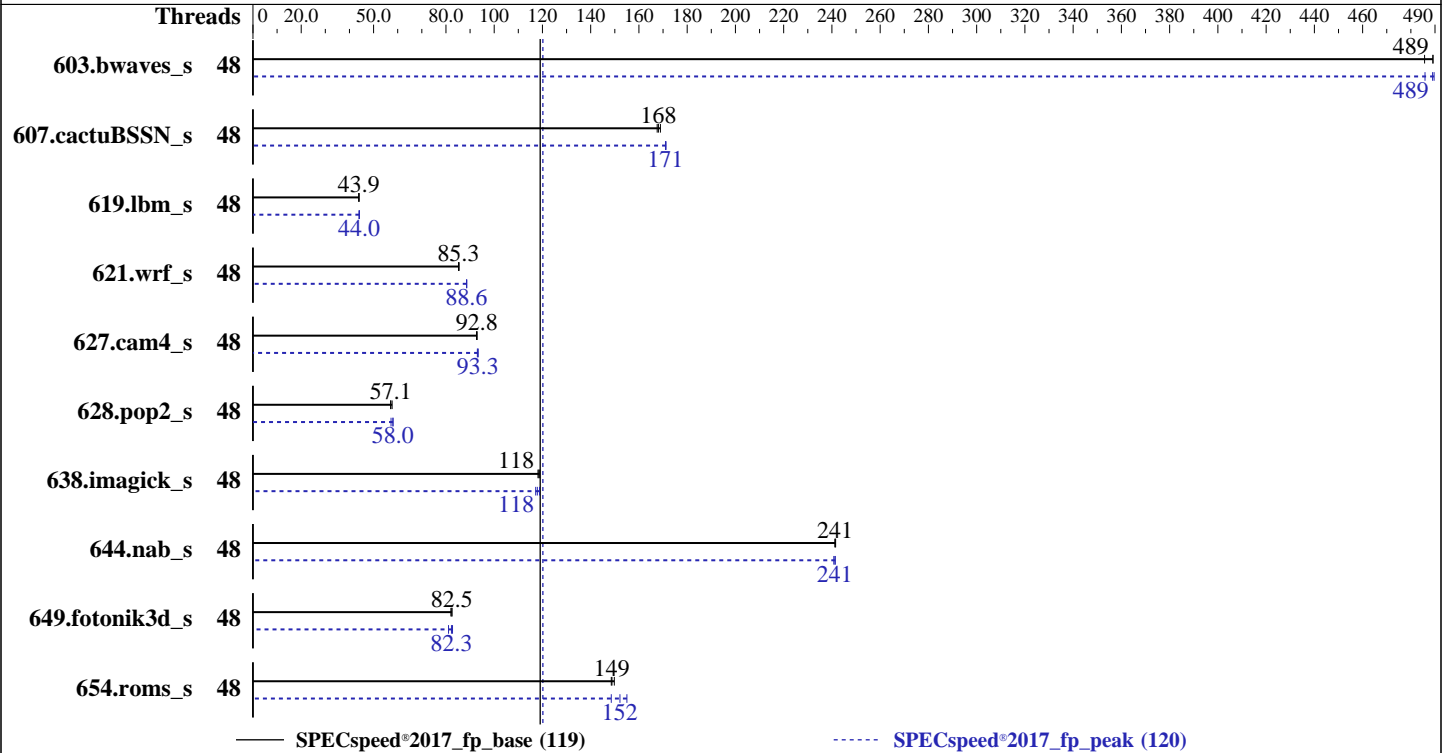
$SPECspeed®2017\_fp\_peak = 120$

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Jun-2018

Hardware Availability: Aug-2017

Software Availability: Mar-2018

Threads

Benchmark	Threads	base	peak
603.bwaves_s	48	489	489
607.cactuBSSN_s	48	168	171
619.lbm_s	48	43.9	44.0
621.wrf_s	48	85.3	88.6
627.cam4_s	48	92.8	93.3
628.pop2_s	48	57.1	58.0
638.imagick_s	48	118	118
644.nab_s	48	241	241
649.fotonik3d_s	48	82.5	82.3
654.roms_s	48	149	152

SPECspeed®2017_fp_base (119)   SPECspeed®2017_fp_peak (120)

Hardware
CPU Name: Intel Xeon Platinum 8160M
 Max MHz: 3700
 Nominal: 2100
Enabled: 48 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: 33 MB I+D on chip per chip
 Other: None
Memory: 384 GB (24 x 16 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 1 TB SAS HDD, 7.2K RPM
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 = 120

CPU2017 License: 9019	**Test Date:** Jun-2018
Test Sponsor: Cisco Systems	**Hardware Availability:** Aug-2017
Tested by: Cisco Systems	**Software Availability:** Mar-2018

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	48	121	486	121	489	**121**	**489**	48	120	490	121	486	**121**	**489**
607.cactuBSSN_s	48	99.5	168	98.7	169	**99.2**	**168**	48	97.5	171	97.3	171	**97.5**	**171**
619.lbm_s	48	119	43.9	**119**	**43.9**	119	43.9	48	119	44.1	119	44.0	**119**	**44.0**
621.wrf_s	48	**155**	**85.3**	155	85.2	155	85.5	48	**149**	**88.6**	149	88.5	149	88.6
627.cam4_s	48	**95.5**	**92.8**	95.6	92.7	95.4	92.9	48	95.0	93.3	95.3	93.0	**95.0**	**93.3**
628.pop2_s	48	**208**	**57.1**	206	57.7	208	57.1	48	207	57.2	204	58.1	**205**	**58.0**
638.imagick_s	48	121	119	122	118	**122**	**118**	48	123	117	**122**	**118**	121	119
644.nab_s	48	**72.4**	**241**	72.3	242	72.4	241	48	72.4	241	**72.4**	**241**	72.6	241
649.fotonik3d_s	48	**111**	**82.5**	111	82.5	111	82.0	48	112	81.1	**111**	**82.3**	110	82.7
654.roms_s	48	**106**	**149**	106	149	105	150	48	**103**	**152**	106	149	102	155
SPECspeed®2017_fp_base =		**119**												
SPECspeed®2017_fp_peak =		**120**												

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-uezu Sun Jun  3 01:27:42 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 8160M CPU @ 2.10GHz
       2  "physical id"s (chips)
       48 "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 : 24
       siblings  : 24
       physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
       physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 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):                48
      On-line CPU(s) list:   0-47
      Thread(s) per core:    1
      Core(s) per socket:    24
      Socket(s):             2
      NUMA node(s):          2
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 85
      Model name:            Intel(R) Xeon(R) Platinum 8160M CPU @ 2.10GHz
      Stepping:              4
      CPU MHz:               3603.028
      CPU max MHz:           3700.0000
      CPU min MHz:           1000.0000
      BogoMIPS:              4200.01
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              33792K
```

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Platform Notes (Continued)

```
     NUMA node0 CPU(s):       0-23
     NUMA node1 CPU(s):       24-47
     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 : 33792 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
   node 0 size: 192074 MB
   node 0 free: 188266 MB
   node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
   node 1 size: 193504 MB
   node 1 free: 189573 MB
   node distances:
   node   0   1
     0:  10  21
     1:  21  10

 From /proc/meminfo
    MemTotal:       394832424 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 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.
      # 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"
```

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Platform Notes (Continued)

```
        ID="sles"
        ANSI_COLOR="0;32"
        CPE_NAME="cpe:/o:suse:sles:12:sp2"

  uname -a:
     Linux linux-uezu 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 Jun 2 23:32

  SPEC is set to: /home/cpu2017
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda1       xfs   894G  111G  784G  13% /

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


==============================================================================
```

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Test Sponsor:	Cisco Systems	**Hardware Availability:**	Aug-2017
Tested by:	Cisco Systems	**Software Availability:**	Mar-2018

Compiler Version Notes (Continued)

```
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`
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`

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Base Portability Flags (Continued)

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

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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

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

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