# SPEC CPU®2017 Floating Point Speed Result

**Cisco Systems**  
Cisco UCS C480 M5 (Intel Xeon Platinum 8170M, 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>177</td>
<td>177</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9019  
**Test Sponsor:** Cisco Systems  
**Test Date:** Dec-2017  
**Hardware Availability:** Aug-2017  
**Tested by:** Cisco Systems  
**Software Availability:** Sep-2017

## Threads

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base (177)</th>
<th>SPECspeed®2017_fp_peak (177)</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Specspeed</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td></td>
<td>104</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td></td>
<td>104</td>
</tr>
<tr>
<td>619.ibm_s</td>
<td>243</td>
<td>104</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>248</td>
<td>104</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>147</td>
<td>104</td>
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<tr>
<td>628.pop2_s</td>
<td>148</td>
<td>104</td>
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<tr>
<td>638.imagick_s</td>
<td>222</td>
<td>104</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>249</td>
<td>104</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>104</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>265</td>
<td>104</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8170M  
- **Max MHz:** 3700  
- **Nominal:** 2100  
- **Enabled:** 104 cores, 4 chips  
- **Orderable:** 2.4 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:** 768 GB (48 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)  
- **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:** Version 3.1.0 released May-2017  
- **File System:** xfs  
- **System State:** Run level 5 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None  
- **Power Management:** --
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td>603.bwaves_s</td>
<td>104</td>
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<td>104</td>
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<td>816</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>68.6</td>
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<td>619.ibm_s</td>
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<td>63.0</td>
<td>83.2</td>
<td>62.7</td>
<td>83.6</td>
<td><strong>62.8</strong></td>
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<td>104</td>
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<td><strong>82.7</strong></td>
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<td>621.wrf_s</td>
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<td><strong>173</strong></td>
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<td>76.9</td>
<td>173</td>
<td>76.4</td>
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<td>165</td>
<td>80.2</td>
<td>169</td>
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<td><strong>168</strong></td>
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<td>627.cam4_s</td>
<td>104</td>
<td>60.1</td>
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<td><strong>60.3</strong></td>
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<td>58.5</td>
<td><strong>201</strong></td>
<td><strong>59.2</strong></td>
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<td><strong>199</strong></td>
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<td><strong>441</strong></td>
<td><strong>396</strong></td>
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<td>104</td>
<td>80.4</td>
<td>113</td>
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<td>81.9</td>
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<td><strong>261</strong></td>
<td>59.0</td>
<td>267</td>
<td>62.0</td>
</tr>
</tbody>
</table>

*SPECspeed®2017_fp_base = 177*  
*SPECspeed®2017_fp_peak = 177*

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`

### Platform Notes

BIOS Settings:  
Intel HyperThreading Technology set to Disabled  
CPU performance set to Enterprise  
Power Performance Tuning set to OS  
SNC set to Disabled  
IMC Interleaving set to Auto  
Patrol Scrub set to Disabled  
Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f

(Continued on next page)
Platform Notes (Continued)

running on linux-g4f1 Sun Dec 24 02:08:37 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) Platinum 8170M CPU @ 2.10GHz
  4 "physical id"s (chips)
  104 "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
physical 2: 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 3: 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):                104
On-line CPU(s) list:   0-103
Thread(s) per core:    1
Core(s) per socket:    26
Socket(s):             4
NUMA node(s):          4
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8170M CPU @ 2.10GHz
Stepping:              4
CPU MHz:               2877.680
CPU max MHz:           3700.0000
CPU min MHz:           1000.0000
BogoMIPS:              4200.17
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              36608K

(Continued on next page)
Cisco Systems  
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SPECspeed®2017_fp_base = 177  
SPECspeed®2017_fp_peak = 177

Platform Notes (Continued)

NUMA node0 CPU(s):     0-25
NUMA node1 CPU(s):     26-51
NUMA node2 CPU(s):     52-77
NUMA node3 CPU(s):     78-103
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
                      pat pse36 clflush dts mmmx 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
                      aperfmpref perfsee pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
                      fma cx16 xtpr pdcm pcd cca 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 hwp
                      hwp_act_window hwp_epp hwp_pkg_req intel_pt tpr_shadow vnmi flexpriority ept vpid
                      fsbgbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f
                      avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaec
                      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: 4 nodes (0-3)
 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: 192014 MB
 node 0 free: 190559 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
 node 1 size: 193521 MB
 node 1 free: 191860 MB
 node 2 cpus: 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76
 node 2 size: 193521 MB
 node 2 free: 192201 MB
 node 3 cpus: 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101
 node 3 size: 193372 MB
 node 3 free: 188222 MB
 node distances:
 node 0  1  2  3
 0:  10 21 21 21
 1:  21 10 21 21
 2:  21 21 10 21
 3:  21 21 21 10

From /proc/meminfo
  MemTotal:       790968372 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

(Continued on next page)
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Platform Notes (Continued)

/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.
  # 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-g4f1 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
  x86_64 x86_64 x86_64 GNU/Linux

run-level 5 Dec 23 21:06

SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda6      xfs   871G  253G  618G  30% /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. C480M5.3.1.0.248.0518171057 05/18/2017
  Memory:
    48x 0xCE00 M393A2G40EB2-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>619.lbm_s(base, peak) 638.imagick_s(base, peak)</th>
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---

**Compiler Version Notes (Continued)**

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

```
C++, C, Fortran  
| 607.cactuBSSN_s(base, peak)
```

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

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

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

```
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)  
| 654.roms_s(base, peak)
```

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

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

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

```plaintext
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
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Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.ibm_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-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -03 -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 -03 -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 -03 -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

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Base Other Flags (Continued)

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

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

Peak 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`

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`

(Continued on next page)
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**CPU2017 License:** 9019  
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---

**Test Date:** Dec-2017  
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**Peak Optimization Flags (Continued)**

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 -n ostandard-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 -n ostandard-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 -qopenmp`  
- `-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -n ostandard-realloc-lhs`  
- `-align array32byte`

---

**Peak 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.html

Cisco Systems  
Cisco UCS C480 M5 (Intel Xeon Platinum 8170M, 2.10 GHz)  

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CPU2017 License: 9019  
Test Sponsor: Cisco Systems  
Tested by: Cisco Systems  
Test Date: Dec-2017  
Hardware Availability: Aug-2017  
Software Availability: Sep-2017

You can also download the XML flags sources by saving the following links:
- [http://www.spec.org/cpu2017/flags/Intel-iocl8.0-official-linux64.xml](http://www.spec.org/cpu2017/flags/Intel-iocl8.0-official-linux64.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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