



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244, 3.60GHz)

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 104

CPU2017 License: 9019

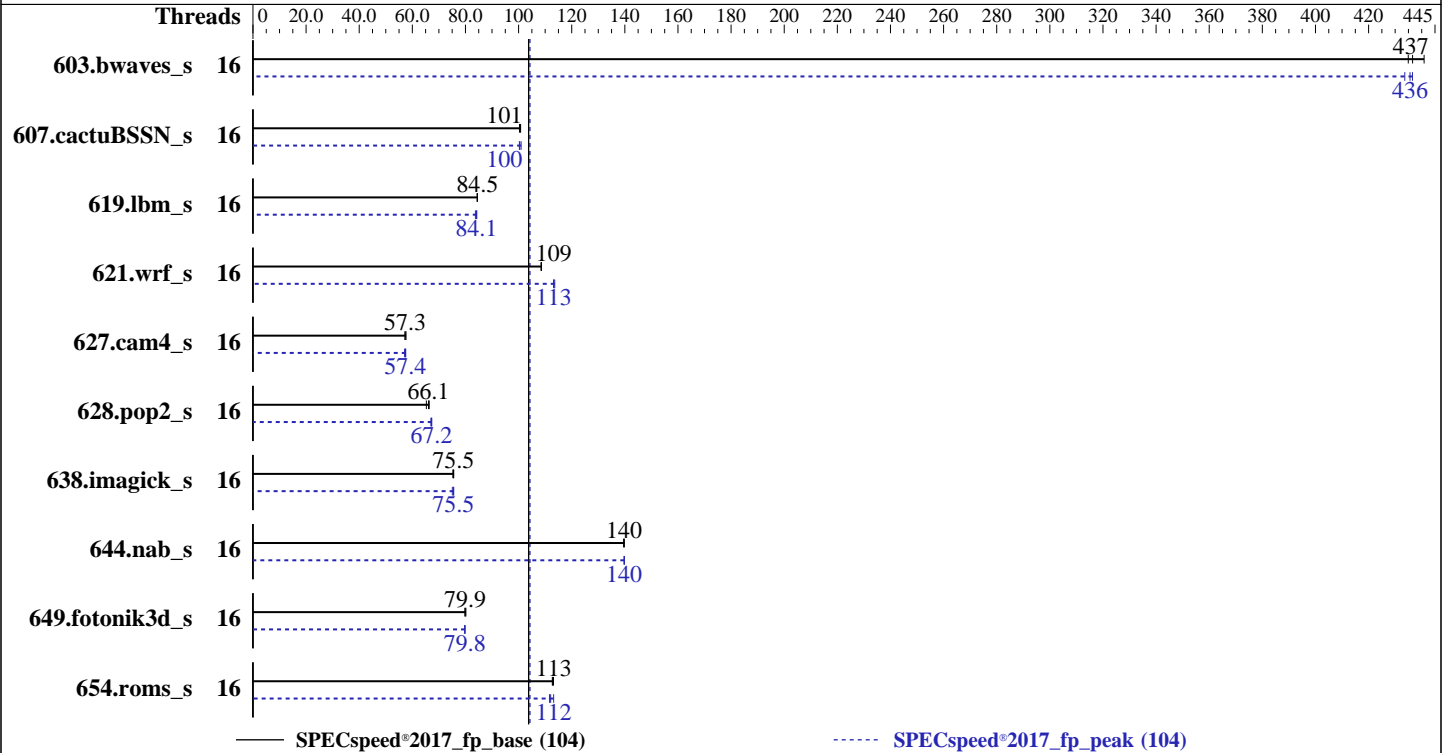
Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Sep-2019

Hardware Availability: Apr-2019

Software Availability: May-2019



Hardware

CPU Name: Intel Xeon Gold 6244
 Max MHz: 4400
 Nominal: 3600
 Enabled: 16 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: 24.75 MB I+D on chip per chip
 Other: None
 Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933V-R)
 Storage: 1 x 1.9 TB SSD SAS
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64) 4.12.14-23-default
 Compiler: C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux;
 Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux
 Parallel: Yes
 Firmware: Version 4.0.4g released Jul-2019
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: None
 Power Management: --



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244, 3.60GHz)

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 104

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	16	134	441	136	435	<u>135</u>	<u>437</u>	16	136	434	<u>135</u>	<u>436</u>	135	437
607.cactuBSSN_s	16	<u>166</u>	<u>101</u>	165	101	166	100	16	<u>166</u>	<u>100</u>	166	100	165	101
619.lbm_s	16	<u>62.0</u>	<u>84.5</u>	62.0	84.5	62.0	84.4	16	<u>62.2</u>	<u>84.1</u>	62.2	84.3	62.5	83.7
621.wrf_s	16	122	108	122	109	<u>122</u>	<u>109</u>	16	116	114	<u>117</u>	<u>113</u>	117	113
627.cam4_s	16	155	57.3	154	57.6	<u>155</u>	<u>57.3</u>	16	154	57.5	<u>154</u>	<u>57.4</u>	155	57.1
628.pop2_s	16	182	65.3	<u>180</u>	<u>66.1</u>	179	66.3	16	<u>177</u>	<u>67.2</u>	177	67.0	176	67.3
638.imagick_s	16	<u>191</u>	<u>75.5</u>	191	75.6	192	75.3	16	192	75.1	191	75.5	<u>191</u>	<u>75.5</u>
644.nab_s	16	125	140	<u>125</u>	<u>140</u>	125	140	16	125	140	<u>125</u>	<u>140</u>	125	140
649.fotonik3d_s	16	<u>114</u>	<u>79.9</u>	114	80.2	114	79.8	16	<u>114</u>	<u>79.8</u>	114	79.7	114	79.8
654.roms_s	16	139	113	<u>140</u>	<u>113</u>	140	113	16	139	113	<u>140</u>	<u>112</u>	141	112

SPECspeed®2017_fp_base = **104**

SPECspeed®2017_fp_peak = **104**

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/intel64"
OMP_STACKSIZE = "192M"
```

Binaries compiled on a system with 1x Intel Core i9-7900X 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

NA: 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
CPU performance set to Enterprise

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244, 3.60GHz)

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 104

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Sep-2019

Hardware Availability: Apr-2019

Software Availability: May-2019

Platform Notes (Continued)

Power Performance Tuning set to OS Controls
 SNC set to Disabled
 Patrol Scrub set to Disabled
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-3yo3 Sat Sep 28 18:06:59 2019

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 6244 CPU @ 3.60GHz
 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 2 17 18 19 20 24 25
  physical 1    : cores 2 3 4 8 9 11 17 27
```

```
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) Gold 6244 CPU @ 3.60GHz
Stepping:          6
CPU MHz:           3600.000
CPU max MHz:       4400.0000
CPU min MHz:       1200.0000
BogoMIPS:          7200.00
Virtualization:    VT-x
L1d cache:         32K
L1i cache:         32K
L2 cache:          1024K
L3 cache:          25344K
NUMA node0 CPU(s): 0-7
```

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244, 3.60GHz)

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 104

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

```
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 pdpelgb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpperf tsc_known_freq 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 cpuid_fault
epb cat_l3 cdp_l3 invpcid_single intel_ppin mba tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmil hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
ibpb ibrs stibp dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku
ospke avx512_vnni arch_capabilities ssbd
```

```
/proc/cpuinfo cache data
cache size : 25344 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: 385636 MB
node 0 free: 385153 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 387029 MB
node 1 free: 379523 MB
node distances:
node  0  1
  0:  10  21
  1:  21  10
```

```
From /proc/meminfo
MemTotal:      791209664 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="/o:suse:sles:15"
```

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244, 3.60GHz)

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 104

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

```
uname -a:
Linux linux-3yo3 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation,
IBPB, IBRS_FW
```

```
run-level 3 Sep 28 13:57
```

```
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda1       xfs   224G   26G  198G  12% /
```

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. C220M5.4.0.4g.0.0712190011 07/12/2019
Memory:
24x 0xCE00 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934
```

(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)  
-----
```

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
-----
```

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

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416
```

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244, 3.60GHz)

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 104

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Compiler Version Notes (Continued)

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 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
```



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244, 3.60GHz)

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 104

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Sep-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

Fortran benchmarks:

```
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

Peak Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

Fortran benchmarks:

```
ifort -m64
```

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244, 3.60GHz)

SPECSpeed®2017_fp_base = 104

SPECSpeed®2017_fp_peak = 104

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Sep-2019

Hardware Availability: Apr-2019

Software Availability: May-2019

Peak Compiler Invocation (Continued)

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:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

Fortran benchmarks:

```
603.bwaves_s: -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=4  
-qopenmp -nostandard-realloc-lhs
```

649.fotonik3d_s: Same as 603.bwaves_s

```
654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4  
-qopenmp -nostandard-realloc-lhs
```

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=4 -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -nostandard-realloc-lhs
```

```
627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-DSPEC_OPENMP -nostandard-realloc-lhs
```

628.pop2_s: Same as 621.wrf_s

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C220 M5 (Intel Xeon Gold 6244,
3.60GHz)

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 104

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Sep-2019

Hardware Availability: Apr-2019

Software Availability: May-2019

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-nostandard-realloc-lhs
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html>
<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revJ.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml>
<http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-V1.2-revJ.xml>

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.0.5 on 2019-09-28 08:36:58-0400.
Report generated on 2020-07-13 19:33:21 by CPU2017 PDF formatter v6255.
Originally published on 2019-11-04.