



# SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Huawei

SPECrate2017\_fp\_base = 190

## Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

CPU2017 License: 3175

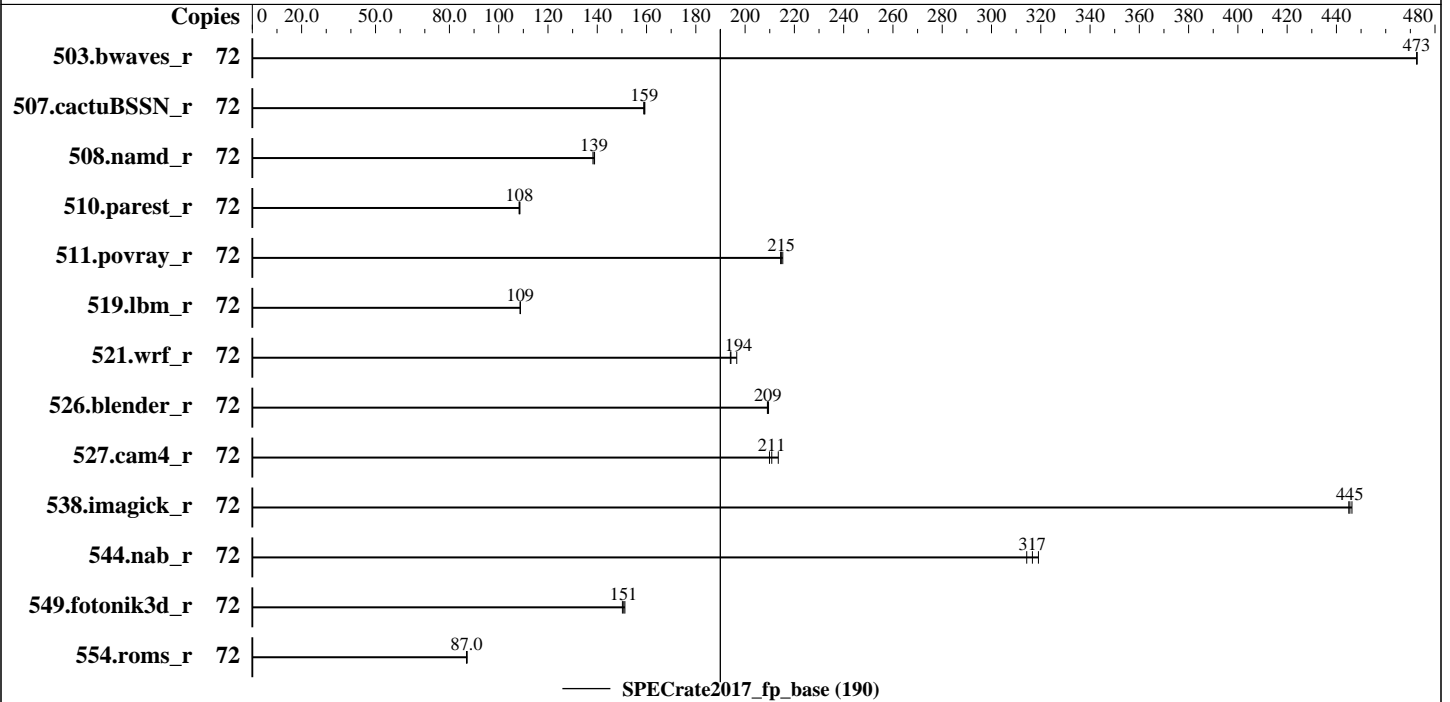
Test Date: Mar-2019

Test Sponsor: Huawei

Hardware Availability: Apr-2019

Tested by: Huawei

Software Availability: Dec-2018



### Hardware

CPU Name: Intel Xeon Gold 5220  
 Max MHz.: 3900  
 Nominal: 2200  
 Enabled: 36 cores, 2 chips, 2 threads/core  
 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: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)  
 Storage: 1 x 1200 GB SAS, 10000 RPM  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP4 (x86\_64) 4.12.14-94.41-default  
 Compiler: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux;  
 Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux  
 Parallel: No  
 Firmware: Version 6.52 Released Mar-2019  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None



# SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Huawei

SPECrate2017\_fp\_base = 190

## Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

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

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Dec-2018

### Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	72	1528	473	1527	473	<b><u>1528</u></b>	<b><u>473</u></b>							
507.cactuBSSN_r	72	572	159	<b><u>573</u></b>	<b><u>159</u></b>	574	159							
508.namd_r	72	<b><u>493</u></b>	<b><u>139</u></b>	492	139	495	138							
510.parest_r	72	1734	109	<b><u>1737</u></b>	<b><u>108</u></b>	1739	108							
511.povray_r	72	781	215	<b><u>783</u></b>	<b><u>215</u></b>	784	214							
519.lbm_r	72	698	109	<b><u>698</u></b>	<b><u>109</u></b>	697	109							
521.wrf_r	72	831	194	<b><u>830</u></b>	<b><u>194</u></b>	820	197							
526.blender_r	72	523	210	<b><u>524</u></b>	<b><u>209</u></b>	525	209							
527.cam4_r	72	590	213	<b><u>597</u></b>	<b><u>211</u></b>	600	210							
538.imagick_r	72	402	445	<b><u>402</u></b>	<b><u>445</u></b>	401	446							
544.nab_r	72	380	319	<b><u>383</u></b>	<b><u>317</u></b>	386	314							
549.fotonik3d_r	72	<b><u>1861</u></b>	<b><u>151</u></b>	1856	151	1868	150							
554.roms_r	72	<b><u>1316</u></b>	<b><u>87.0</u></b>	1312	87.2	1316	86.9							

SPECrate2017\_fp\_base = 190

SPECrate2017\_fp\_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### 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:  
LD\_LIBRARY\_PATH = "/spec/lib/ia32:/spec/lib/intel64"

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  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)



# SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Huawei

SPECrate2017\_fp\_base = 190

Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

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

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Dec-2018

## General Notes (Continued)

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 configuration:  
Power Policy Set to Performance  
SNC Set to Enabled  
IMC Interleaving Set to 1-way Interleave  
XPT Prefetch Set to Enabled  
Sysinfo program /spec/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on sles12sp4 Fri Mar 29 22:08:20 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 5220 CPU @ 2.20GHz  
2 "physical id"s (chips)  
72 "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 : 18  
siblings : 36  
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:  
Architecture: x86\_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 72  
On-line CPU(s) list: 0-71  
Thread(s) per core: 2  
Core(s) per socket: 18  
Socket(s): 2  
NUMA node(s): 4  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz  
Stepping: 6

(Continued on next page)



# SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Huawei

SPECrate2017\_fp\_base = 190

Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

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

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Dec-2018

## Platform Notes (Continued)

```

CPU MHz:                2200.000
CPU max MHz:            3900.0000
CPU min MHz:            1000.0000
BogoMIPS:                4400.00
Virtualization:         VT-x
L1d cache:              32K
L1i cache:              32K
L2 cache:               1024K
L3 cache:               25344K
NUMA node0 CPU(s):      0-2,5,6,9,10,14,15,36-38,41,42,45,46,50,51
NUMA node1 CPU(s):      3,4,7,8,11-13,16,17,39,40,43,44,47-49,52,53
NUMA node2 CPU(s):      18-20,23,24,27,28,32,33,54-56,59,60,63,64,68,69
NUMA node3 CPU(s):      21,22,25,26,29-31,34,35,57,58,61,62,65-67,70,71
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 cpuid
aperfmpperf pni pclmulqdq dtes64 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 ssbd
mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bml
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 xsave
cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke
avx512_vnni flush_lld arch_capabilities

```

```

/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: 4 nodes (0-3)
node 0 cpus: 0 1 2 5 6 9 10 14 15 36 37 38 41 42 45 46 50 51
node 0 size: 95185 MB
node 0 free: 87330 MB
node 1 cpus: 3 4 7 8 11 12 13 16 17 39 40 43 44 47 48 49 52 53
node 1 size: 96743 MB
node 1 free: 90690 MB
node 2 cpus: 18 19 20 23 24 27 28 32 33 54 55 56 59 60 63 64 68 69
node 2 size: 96743 MB
node 2 free: 90914 MB
node 3 cpus: 21 22 25 26 29 30 31 34 35 57 58 61 62 65 66 67 70 71
node 3 size: 96502 MB
node 3 free: 90693 MB
node distances:
node  0  1  2  3
 0:  10  11  21  21
 1:  11  10  21  21

```

(Continued on next page)



# SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Huawei

SPECrate2017\_fp\_base = 190

Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

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

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Dec-2018

## Platform Notes (Continued)

```
2: 21 21 10 11
3: 21 21 11 10
```

From /proc/meminfo

```
MemTotal: 394420372 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

From /etc/\*release\* /etc/\*version\*

SuSE-release:

```
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 4
```

```
# 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-SP4"
VERSION_ID="12.4"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp4"
```

uname -a:

```
Linux sles12sp4 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
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 Mar 29 02:43

SPEC is set to: /spec

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 849G 38G 812G 5% /
```

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. 6.52 03/16/2019
Memory:
```

(Continued on next page)



# SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Huawei

SPECrate2017\_fp\_base = 190

Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

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

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Dec-2018

## Platform Notes (Continued)

24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)

## Compiler Version Notes

=====  
CC 519.lbm\_r(base) 538.imagick\_r(base) 544.nab\_r(base)  
=====

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====  
CXXC 508.namd\_r(base) 510.parest\_r(base)  
=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====  
CC 511.povray\_r(base) 526.blender\_r(base)  
=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====  
FC 507.cactuBSSN\_r(base)  
=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)



# SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Huawei

SPECrate2017\_fp\_base = 190

Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

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

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Dec-2018

## Compiler Version Notes (Continued)

=====  
FC 503.bwaves\_r(base) 549.fotonik3d\_r(base) 554.roms\_r(base)  
=====

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====  
CC 521.wrf\_r(base) 527.cam4\_r(base)  
=====

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

## Base Compiler Invocation

C benchmarks:

icc -m64 -std=c11

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:

icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:

icpc -m64 icc -m64 -std=c11 ifort -m64

## Base Portability Flags

503.bwaves\_r: -DSPEC\_LP64

(Continued on next page)



# SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Huawei

SPECrate2017\_fp\_base = 190

Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

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

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: Dec-2018

## Base Portability Flags (Continued)

507.cactuBSSN\_r: -DSPEC\_LP64  
508.namd\_r: -DSPEC\_LP64  
510.parest\_r: -DSPEC\_LP64  
511.povray\_r: -DSPEC\_LP64  
519.lbm\_r: -DSPEC\_LP64  
521.wrf\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian  
526.blender\_r: -DSPEC\_LP64 -DSPEC\_LINUX -funsigned-char  
527.cam4\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG  
538.imagick\_r: -DSPEC\_LP64  
544.nab\_r: -DSPEC\_LP64  
549.fotonik3d\_r: -DSPEC\_LP64  
554.roms\_r: -DSPEC\_LP64

## Base Optimization Flags

### C benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4

### C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4

### Fortran benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte

### Benchmarks using both Fortran and C:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte

### Benchmarks using both C and C++:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4

### Benchmarks using Fortran, C, and C++:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte





# SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Huawei

SPECrate2017\_fp\_base = 190

Huawei 5288 V5 (Intel Xeon Gold 5220)

SPECrate2017\_fp\_peak = Not Run

**CPU2017 License:** 3175

**Test Date:** Mar-2019

**Test Sponsor:** Huawei

**Hardware Availability:** Apr-2019

**Tested by:** Huawei

**Software Availability:** Dec-2018

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.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-linux64.2019-04-02.xml>

<http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.xml>

SPEC is a registered trademark 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](mailto:info@spec.org).

Tested with SPEC CPU2017 v1.0.5 on 2019-03-29 22:08:20-0400.

Report generated on 2019-05-15 13:22:18 by CPU2017 PDF formatter v6067.

Originally published on 2019-05-14.