Huawei

Huawei CH225 V5 (Intel Xeon Silver 4116)

SPECrate2017_fp_base = 127
SPECrate2017_fp_peak = 130

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Sep-2018
Hardware Availability: Jul-2017
Tested by: Huawei
Software Availability: Mar-2018

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECrate2017_fp_base (127)</th>
<th>SPECrate2017_fp_peak (130)</th>
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<tr>
<td>Hardware</td>
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<tr>
<td>503.bwaves_r</td>
<td>103</td>
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<tr>
<td>507.cactuBSSN_r</td>
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<td>508.namd_r</td>
<td>83.1</td>
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<td>510.parest_r</td>
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<td>519.lbm_r</td>
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<td>526.blender_r</td>
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<td>527.cam4_r</td>
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<td>538.imagick_r</td>
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<td>544.nab_r</td>
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<td>549.fotonik3d_r</td>
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<tr>
<td>554.roms_r</td>
<td>66.6</td>
<td>68.5</td>
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<table>
<thead>
<tr>
<th>Hardware</th>
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<tbody>
<tr>
<td>CPU Name: Intel Xeon Silver 4116</td>
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<tr>
<td>Max MHz.: 3000</td>
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<tr>
<td>Nominal: 2100</td>
</tr>
<tr>
<td>Enabled: 24 cores, 2 chips, 2 threads/core</td>
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<tr>
<td>Orderable: 1.2 chips</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
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<tr>
<td>L3: 16.5 MB I+D on chip per chip</td>
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<tr>
<td>Other: None</td>
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<tr>
<td>Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)</td>
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<tr>
<td>Storage: 1 x 1200 GB SAS, 10000 RPM</td>
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<td>Other: None</td>
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<table>
<thead>
<tr>
<th>Software</th>
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<tr>
<td>OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)</td>
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<tr>
<td>Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux</td>
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<tr>
<td>Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux</td>
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<td>Parallel: No</td>
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<td>Firmware: Version 0.80 Released Jun-2018</td>
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<tr>
<td>File System: xfs</td>
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<td>System State: Run level 3 (multi-user)</td>
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<tr>
<td>Base Pointers: 64-bit</td>
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<tr>
<td>Peak Pointers: 64-bit</td>
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<td>Other: None</td>
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SPEC CPU2017 Floating Point Rate Result

Huawei

Huawei CH225 V5 (Intel Xeon Silver 4116)

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

Test Date: Sep-2018
Hardware Availability: Jul-2017
Software Availability: Mar-2018

Results Table

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</tbody>
</table>

SPECrate2017_fp_base = 127
SPECrate2017_fp_peak = 130

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:

Binaries compiled on a system with 1x Intel Core i7-6700K 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.:
umactl --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)
Huawei

Huawei CH225 V5 (Intel Xeon Silver 4116)

**SPECrate2017_fp_base = 127**

**SPECrate2017_fp_peak = 130**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3175</th>
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<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Huawei</td>
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<tr>
<td>Tested by:</td>
<td>Huawei</td>
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<tr>
<td>Test Date:</td>
<td>Sep-2018</td>
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<td>Hardware Availability:</td>
<td>Jul-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

**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 /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Tue Sep 18 04:05:22 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) Silver 4116 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 : 12
  siblings : 24
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
```

From lscpu:

```
Architecture:   x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order:     LittleEndian
CPU(s):         48
On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID:      GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz
Stepping: 4
```

(Continued on next page)
Huawei

Huawei CH225 V5 (Intel Xeon Silver 4116)

SPEC CPU2017 Floating Point Rate Result

SPECrate2017_fp_base = 127
SPECrate2017_fp_peak = 130

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Sep-2018
CPU2017 License: 3175
Tested by: Huawei
Hardware Availability: Jul-2017
Software Availability: Mar-2018

Platform Notes (Continued)

CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-11,24-35
NUMA node1 CPU(s): 12-23,36-47
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 bs rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 fma cx16 xtpr
pcmc pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx
fl64c rdrand lahf_lm abm 3dnowprefetch epb cat_1 cdp_13 invpcid_single intel_pt
spec_ctrl ibpb_support tpr_shadow vmi flexpriority ept vpid fsgbase tsc_adjust
bm1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx
smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc
cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

/proc/cpuinfo cache data

cache size : 16896 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 24 25 26 27 28 29 30 31 32 33 34 35
node 0 size: 391349 MB
node 0 free: 369010 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 393216 MB
node 1 free: 370155 MB
node distances:
node 0 1
table: 10 21
1: 21 10

From /proc/meminfo

MemTotal: 790510872 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.4 (Maipo)"
ID="rhel"

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

Huawei

Huawei CH225 V5 (Intel Xeon Silver 4116)

SPECrate2017_fp_base = 127
SPECrate2017_fp_peak = 130

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Sep-2018
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Platform Notes (Continued)

ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.4"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
Linux localhost.localdomain 3.10.0-693.11.6.el7.x86_64 #1 SMP Thu Dec 28 14:23:39 EST 2017 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Sep 17 16:53

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 720G 91G 629G 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 INSYDE Corp. 0.80 06/27/2018
Memory:
24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

-----------------------------------------------------------------------------------
CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base, peak)
-----------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------------

-----------------------------------------------------------------------------------
CC  519.lbm_r(peak)
-----------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------------

(Continued on next page)
Huawei
Huawei CH225 V5 (Intel Xeon Silver 4116)

SPEC CPU2017 Floating Point Rate Result

Huawei
Huawei CH225 V5 (Intel Xeon Silver 4116)

SPECraten2017_fp_base = 127
SPECraten2017_fp_peak = 130

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Sep-2018
Hardware Availability: Jul-2017
Tested by: Huawei
Software Availability: Mar-2018

Compiler Version Notes (Continued)

CXXC 508.namd_r(base) 510.parest_r(base, peak)

icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

CXXC 508.namd_r(peak)
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

CC 511.povray_r(base) 526.blender_r(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.

CC 511.povray_r(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.

FC 507.cactuBSSN_r(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.

FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
Huawei

Huawei CH225 V5 (Intel Xeon Silver 4116)

SPECrate2017_fp_base = 127
SPECrate2017_fp_peak = 130

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

Test Date: Sep-2018
Hardware Availability: Jul-2017
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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
SPEC CPU2017 Floating Point Rate Result

Huawei
Huawei CH225 V5 (Intel Xeon Silver 4116)

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<th>SPECrate2017_fp_base = 127</th>
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</table>

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei
Test Date: Sep-2018
Hardware Availability: Jul-2017
Software Availability: Mar-2018

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
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_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=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
Huawei
Huawei CH225 V5 (Intel Xeon Silver 4116)

| SPECrate2017_fp_base | 127 |
| SPECrate2017_fp_peak | 130 |

CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei
Test Date: Sep-2018
Hardware Availability: Jul-2017
Software Availability: Mar-2018

Peak 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

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

538.imagick_r: basepeak = yes

544.nab_r -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

C++ benchmarks:
508.namd_r -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
### Huawei

**Huawei CH225 V5 (Intel Xeon Silver 4116)**

- **CPU2017 License:** 3175
- **TestCategory:** Huawei
- **Test Sponsor:** Huawei
- **Hardware Availability:** Jul-2017
- **Software Availability:** Mar-2018
- **Test Date:** Sep-2018

#### SPEC CPU2017 Floating Point Rate Result

- **SPECrate2017_fp_peak = 130**
- **SPECrate2017_fp_base = 127**

#### Peak Optimization Flags (Continued)

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -auto
-nostandard-realloc-lhs

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:

511.povray_r -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

526.blender_r -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

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


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

## Huawei

**Huawei CH225 V5 (Intel Xeon Silver 4116)**

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

**Test Date:** Sep-2018  
**Hardware Availability:** Jul-2017  
**Software Availability:** Mar-2018

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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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