# SPEC® CPU2017 Floating Point Rate Result

## Huawei

**Huawei XH321 V5 (Intel Xeon Gold 5215)**

**SPECrate2017_fp_base = 108**

**SPECrate2017_fp_peak = Not Run**

| Test Sponsor | Huawei |
| Hardware Availability | Apr-2019 |
| Software Availability | Dec-2018 |

| CPU2017 License | 3175 |
| Test Date | Nov-2018 |
| Tested by | Huawei |

## Hardware

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 5215</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>3400</td>
</tr>
<tr>
<td>Nominal</td>
<td>2500</td>
</tr>
<tr>
<td>Enabled</td>
<td>20 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>13.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)</td>
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<tr>
<td>Storage</td>
<td>1 x 1200 GB SAS, 10000 RPM</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
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</tbody>
</table>

## Software

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP4 (x86_64) 4.12.14-94.41-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>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</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Version 6.52 Released Mar-2019</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
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Huawei XH321 V5 (Intel Xeon Gold 5215)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>40</td>
<td>1595</td>
<td>251</td>
<td>1596</td>
<td>251</td>
<td>1595</td>
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<tr>
<td>507.cactuBSSN_r</td>
<td>40</td>
<td><strong>548</strong></td>
<td><strong>92.4</strong></td>
<td>548</td>
<td>92.4</td>
<td>548</td>
<td>92.4</td>
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<tr>
<td>508.namd_r</td>
<td>40</td>
<td>457</td>
<td>83.2</td>
<td><strong>457</strong></td>
<td><strong>83.2</strong></td>
<td>456</td>
<td>83.3</td>
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<tr>
<td>510.parest_r</td>
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<td>60.6</td>
<td>1721</td>
<td>60.8</td>
<td><strong>1725</strong></td>
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<td>511.povray_r</td>
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<td>129</td>
<td>722</td>
<td>129</td>
<td>726</td>
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<td>519.lbm_r</td>
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<td>733</td>
<td>57.5</td>
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<td><strong>57.5</strong></td>
<td>731</td>
<td>57.6</td>
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<tr>
<td>521.wrf_r</td>
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<td><strong>105</strong></td>
<td>836</td>
<td>107</td>
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<td>526.blender_r</td>
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<td>489</td>
<td>125</td>
<td>488</td>
<td>125</td>
<td><strong>489</strong></td>
<td><strong>125</strong></td>
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<tr>
<td>527.cam4_r</td>
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<td>576</td>
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<td>544.nab_r</td>
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<td>347</td>
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</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>40</td>
<td><strong>1989</strong></td>
<td><strong>78.4</strong></td>
<td>2028</td>
<td>76.9</td>
<td>1979</td>
<td>78.8</td>
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<tr>
<td>554.roms_r</td>
<td>40</td>
<td>1341</td>
<td>47.4</td>
<td><strong>1340</strong></td>
<td><strong>47.4</strong></td>
<td>1339</td>
<td>47.5</td>
</tr>
</tbody>
</table>

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 = "/spec2017/lib/ia32:/spec2017/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

Huawei

Huawei XH321 V5 (Intel Xeon Gold 5215)

SPECrate2017_fp_base = 108
SPECrate2017_fp_peak = Not Run

CPU2017 License: 3175
Test Sponsor: Huawei
Test Date: Nov-2018
Tested by: Huawei
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
XPT Prefetch Set to Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on spec1 Wed Nov 21 18:55:04 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) Gold 5215 CPU @ 2.50GHz
2 "physical id"s (chips)
40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5215 CPU @ 2.50GHz
Stepping: 6
CPU MHz: 2500.000
CPU max MHz: 3400.000

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

**Huawei**  
**Huawei XH321 V5 (Intel Xeon Gold 5215)**

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<th>CPU2017 License:</th>
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</tr>
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<td>Huawei</td>
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<tbody>
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</tr>
</tbody>
</table>

**Test Date:** Nov-2018  
**Hardware Availability:** Apr-2019  
**Software Availability:** Dec-2018

### Platform Notes (Continued)

- **CPU min MHz:** 1000.0000
- **BogoMIPS:** 5000.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 14080K
- **NUMA node0 CPU(s):** 0-9,20-29
- **NUMA node1 CPU(s):** 10-19,30-39
- **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 aperfmperf pni pclmulqdq dtst64 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtr 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 cat13 cdp13 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 umps invpcid rtm cqm mpx px rdt a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec x salv x sav es cqm_llc cqm_occup_llc cqm_mmb_total cqm_mmb_local dtherm ida arat pln pts pku ospke avx512_vnni flush_lld arch_capabilities

```
/proc/cpuinfo cache data  
cache size : 14080 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 20 21 22 23 24 25 26 27 28 29  
  - node 0 size: 192877 MB  
  - node 0 free: 185880 MB  
  - node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39  
  - node 1 size: 193248 MB  
  - node 1 free: 192280 MB  
  - node distances:  
    - node 0 1  
    - 0: 10 21  
    - 1: 21 10

From /proc/meminfo  
- MemTotal: 395392480 kB  
- HugePages_Total: 0  
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*  
**SuSE-release:**  
- SUSE Linux Enterprise Server 12 (x86_64)  
- VERSION = 12

(Continued on next page)
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Tested by: Huawei

Test Date: Nov-2018
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Software Availability: Dec-2018

Platform Notes (Continued)

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 spec1 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 Nov 21 14:22

SPEC is set to: /spec2017
    Filesystem   Type  Size  Used  Avail  Use% Mounted on
    /dev/sda2     xfs   300G  9.4G  291G   4%  /

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:
        4x NO DIMM NO DIMM
        12x Samsung M393A4K40CB2-CVF 32 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,

(Continued on next page)
Huawei
Huawei XH321 V5 (Intel Xeon Gold 5215)

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**CPU2017 License**: 3175
**Test Date**: Nov-2018

**Test Sponsor**: Huawei
**Hardware Availability**: Apr-2019

**Tested by**: Huawei
**Software Availability**: Dec-2018

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**Compiler Version Notes (Continued)**

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.

==============================================================================
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.

==============================================================================
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)

(Continued on next page)
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SPECrate2017_fp_base = 108
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CPU2017 License: 3175
Test Sponsor: Huawei
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Compiler Version Notes (Continued)

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
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.ibm_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

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Base Portability Flags (Continued)

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

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:
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.xml
<table>
<thead>
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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.5 on 2018-11-21 18:55:04-0500.