## SPEC® CPU2017 Floating Point Speed Result

### Huawei

**Huawei 5288 V5 (Intel Xeon Silver 4210)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>82.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3175  
**Test Date:** Mar-2019  
**Test Sponsor:** Huawei  
**Tested by:** Huawei  
**Hardware Availability:** Apr-2019  
**Software Availability:** Dec-2018

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>20</td>
<td>89.4</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>20</td>
<td>70.7</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>20</td>
<td>74.4</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>20</td>
<td>46.8</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>20</td>
<td>55.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>20</td>
<td>59.5</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>20</td>
<td>107</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>20</td>
<td>66.6</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>20</td>
<td>74.8</td>
</tr>
</tbody>
</table>

---

### Hardware

**CPU Name:** Intel Xeon Silver 4210  
**Max MHz.:** 3200  
**Nominal:** 2200  
**Enabled:** 20 cores, 2 chips  
**Orderable:** 1,2 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**Cache L2:** 1 MB I+D on chip per core  
**Cache L3:** 13.75 MB I+D on chip per chip  
**Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)  
**Storage:** 1 x 1200 GB SAS, 10000 RPM  
**Other:** None

### Software

**OS:** SUSE Linux Enterprise Server 12 SP4 (x86_64)  
**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:** Yes  
**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
Huawei
Huawei 5288 V5 (Intel Xeon Silver 4210)

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

SPECspeed2017_fp_base = 82.0
SPECspeed2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>20</td>
<td>166</td>
<td>356</td>
<td>166</td>
<td>356</td>
<td>168</td>
<td>352</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>20</td>
<td>187</td>
<td>89.3</td>
<td>186</td>
<td>89.4</td>
<td>186</td>
<td>89.7</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>20</td>
<td>74.0</td>
<td>70.7</td>
<td>74.1</td>
<td>70.7</td>
<td>74.1</td>
<td>70.7</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>20</td>
<td>178</td>
<td>74.4</td>
<td>178</td>
<td>74.2</td>
<td>175</td>
<td>75.4</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>20</td>
<td>189</td>
<td>46.8</td>
<td>190</td>
<td>46.8</td>
<td>190</td>
<td>46.7</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>20</td>
<td>216</td>
<td>54.9</td>
<td>215</td>
<td>55.2</td>
<td>214</td>
<td>55.6</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>20</td>
<td>242</td>
<td>59.5</td>
<td>242</td>
<td>59.5</td>
<td>243</td>
<td>59.4</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>20</td>
<td>163</td>
<td>107</td>
<td>163</td>
<td>107</td>
<td>163</td>
<td>107</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>20</td>
<td>137</td>
<td>66.6</td>
<td>137</td>
<td>66.6</td>
<td>136</td>
<td>67.0</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>20</td>
<td>210</td>
<td>74.8</td>
<td>210</td>
<td>74.8</td>
<td>210</td>
<td>74.8</td>
</tr>
</tbody>
</table>

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 = "/spec/lib/ia32:/spec/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
Yes: 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 configuration:
Power Policy Set to Load Balance
Hyper-Threading Set to Disable

(Continued on next page)
Huawei

Huawei 5288 V5 (Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>82.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

Platform Notes (Continued)

XPT Prefetch Set to Enabled
Sysinfo program /spec/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on sles12sp4 Tue Mar 26 10:31:01 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) Silver 4210 CPU @ 2.20GHz
- 2 "physical id"s (chips)
- 20 "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 : 10
  - 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): 20
- On-line CPU(s) list: 0-19
- Thread(s) per core: 1
- 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) Silver 4210 CPU @ 2.20GHz
- Stepping: 6
- CPU MHz: 2200.000
- CPU max MHz: 3200.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 14080K
- NUMA node0 CPU(s): 0-9
- NUMA node1 CPU(s): 10-19
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

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

Huawei

Huawei 5288 V5 (Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3175</th>
<th>Test Date:</th>
<th>Mar-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Huawei</td>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Huawei</td>
<td>Software Availability:</td>
<td>Dec-2018</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base = 82.0**

**SPECspeed2017_fp_peak = Not Run**

**Platform Notes (Continued)**

pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtex64 monitor ds_cpl vmx smx est tm2 sse3 sdbg fma cx16
xtrr 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 vnumi flexpriority ept vpid
fsnsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mx px rd_t_a
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsavesopt xsavec xgetbv1 xsaves cqm_l1c cqm_occup_l1c cqm_mbm_total cqm_mbm_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d 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
  node 0 size: 191905 MB
  node 0 free: 188276 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19
  node 1 size: 193280 MB
  node 1 free: 187426 MB
  node distances:
    node  0   1
    0: 10  21
    1: 21  10

From /proc/meminfo
  MemTotal:       394430504 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"

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

## Huawei

### Huawei 5288 V5 (Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>82.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3175  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Test Sponsor:** Huawei  
**Tested by:** Huawei  
**Software Availability:** Dec-2018

### Platform Notes (Continued)

```
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 26 03:08

SPEC is set to: /spec
```

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>xfs</td>
<td>849G</td>
<td>16G</td>
<td>834G</td>
<td>2%</td>
<td>/</td>
</tr>
</tbody>
</table>

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:**  
24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2400

(End of data from sysinfo program)

### Compiler Version Notes

```
==============================================================================
  CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(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  607.cactuBSSN_s(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,
```

(Continued on next page)
Huawei

Huawei 5288 V5 (Intel Xeon Silver 4210)

SPECspeed2017_fp_base = 82.0
SPECspeed2017_fp_peak = Not Run

Copyright 2017-2019 Standard Performance Evaluation Corporation

Compiler Version Notes (Continued)

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  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(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  621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(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

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64

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

Huawei
Huawei 5288 V5 (Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>82.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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)

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

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>
<tr>
<th>Huawei 5288 V5 (Intel Xeon Silver 4210)</th>
<th>SPECspeed2017_fp_base = 82.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huawei</td>
<td>SPECspeed2017_fp_peak = Not Run</td>
</tr>
</tbody>
</table>

| CPU2017 License: 3175 | Test Date: Mar-2019 |
| Test Sponsor: Huawei  | Hardware Availability: Apr-2019 |
| Tested by: Huawei     | Software Availability: Dec-2018 |

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.

Tested with SPEC CPU2017 v1.0.5 on 2019-03-26 10:31:01-0400.