## SPEC® CPU2017 Floating Point Rate Result

### Huawei

<table>
<thead>
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<th>Huawei CH121 V5 (Intel Xeon Silver 4210)</th>
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<tr>
<td><strong>SPECrate2017_fp_base = 119</strong></td>
</tr>
<tr>
<td><strong>SPECrate2017_fp_peak = Not Run</strong></td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** Intel Xeon Silver 4210
- **Max MHz.:** 3200
- **Nominal:** 2200
- **Enabled:** 20 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:** 13.75 MB I+D on chip per chip
- **Other:** None
- **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:** 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

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

### Benchmark Results

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<tr>
<th>Benchmark</th>
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<td>503.bwaves_r</td>
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<tr>
<td>507.cactuBSSN_r</td>
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<td>554.roms_r</td>
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### SPECrate2017_fp_base (119)
SPEC CPU2017 Floating Point Rate Result
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Huawei
Huawei CH121 V5 (Intel Xeon Silver 4210)

SPECrate2017_fp_base = 119
SPECrate2017_fp_peak = Not Run

CPU2017 License: 3175
Test Date: Mar-2019
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Results Table

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<td>60.4</td>
</tr>
</tbody>
</table>

SPECrate2017_fp_base = 119
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)
Huawei

Huawei CH121 V5 (Intel Xeon Silver 4210)

**SPECrate2017_fp_base** = 119

**SPECrate2017_fp_peak** = Not Run

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**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 /spec/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on sles12sp4 Thu Mar 28 04:17:49 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)
  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) Silver 4210 CPU @ 2.20GHz
  Stepping: 6
  CPU MHz: 2200.000
  CPU max MHz: 3200.000

(Continued on next page)
Huawei CH121 V5 (Intel Xeon Silver 4210)

Huawei

SPECrate2017_fp_base = 119
SPECrate2017_fp_peak = Not Run

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

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): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39

Platform Notes (Continued)

/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: 191904 MB
  node 0 free: 182099 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: 193278 MB
  node 1 free: 185309 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 394426740 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)
## Huawei CH121 V5 (Intel Xeon Silver 4210)

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### SPECrate2017_fp_base = 119

### SPECrate2017_fp_peak = Not Run

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#### Platform Notes (Continued)

```plaintext
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:
    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 21:15

SPEC is set to: /spec
    Filesystem   Type  Size  Used  Avail  Use% Mounted on
    /dev/sda3       xfs   849G  30G   819G  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:
        24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2400
```

---

#### Compiler Version Notes

```plaintext
==============================================================================
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
```

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

## Huawei

**Huawei CH121 V5 (Intel Xeon Silver 4210)**

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**CPU2017 License:** 3175

**Test Sponsor:** Huawei

**Test Date:** Mar-2019

**Hardware Availability:** Apr-2019

**Tested by:** Huawei

**Software Availability:** Dec-2018

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### Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```
CXCC 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.

```
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)
Huawei

Huawei CH121 V5 (Intel Xeon Silver 4210)

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**Compiler Version Notes (Continued)**

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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:
```bash
icc -m64 -std=c11
```

C++ benchmarks:
```bash
icpc -m64
```

Fortran benchmarks:
```bash
ifort -m64
```

Benchmarks using both Fortran and C:
```bash
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:
```bash
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```bash
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.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
SPEC CPU2017 Floating Point Rate Result

Huawei
Huawei CH121 V5 (Intel Xeon Silver 4210)

<table>
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---

**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:

---

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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 2019-03-28 04:17:48-0400.