## SPEC® CPU2017 Floating Point Rate Result

**Huawei CH121 V5 (Intel Xeon Platinum 8280)**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3175</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Huawei</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Huawei</td>
</tr>
</tbody>
</table>

### SPECrate2017_fp_base = 148

### SPECrate2017_fp_peak = Not Run

#### Hardware

- **CPU Name:** Intel Xeon Platinum 8280
- **Max MHz.:** 4000
- **Nominal:** 2700
- **Enabled:** 28 cores, 1 chip, 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:** 38.5 MB I+D on chip per chip
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
- **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 6.36 Released Feb-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None

---

**Copies**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>148</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**Test Date:** Feb-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Dec-2018
Huawei

Huawei CH121 V5 (Intel Xeon Platinum 8280)

SPECrate2017_fp_base = 148
SPECrate2017_fp_peak = Not Run

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

Results Table

<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>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>56</td>
<td>1985</td>
<td>283</td>
<td>1990</td>
<td>282</td>
<td>1989</td>
<td>282</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>56</td>
<td>483</td>
<td>147</td>
<td>485</td>
<td>146</td>
<td>483</td>
<td>147</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>56</td>
<td>397</td>
<td>134</td>
<td>395</td>
<td>135</td>
<td>394</td>
<td>135</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>56</td>
<td>2074</td>
<td>70.6</td>
<td>2074</td>
<td>70.6</td>
<td>2068</td>
<td>70.8</td>
</tr>
<tr>
<td>511 povray_r</td>
<td>56</td>
<td>623</td>
<td>210</td>
<td>622</td>
<td>210</td>
<td>623</td>
<td>210</td>
</tr>
<tr>
<td>519 lbm_r</td>
<td>56</td>
<td>863</td>
<td>68.4</td>
<td>863</td>
<td>68.4</td>
<td>862</td>
<td>68.5</td>
</tr>
<tr>
<td>521 wrf_r</td>
<td>56</td>
<td>1008</td>
<td>124</td>
<td>1003</td>
<td>125</td>
<td>1002</td>
<td>125</td>
</tr>
<tr>
<td>526 blender_r</td>
<td>56</td>
<td>430</td>
<td>198</td>
<td>429</td>
<td>199</td>
<td>429</td>
<td>199</td>
</tr>
<tr>
<td>527 cam4_r</td>
<td>56</td>
<td>509</td>
<td>192</td>
<td>505</td>
<td>194</td>
<td>511</td>
<td>192</td>
</tr>
<tr>
<td>538 imagick_r</td>
<td>56</td>
<td>343</td>
<td>406</td>
<td>342</td>
<td>407</td>
<td>340</td>
<td>409</td>
</tr>
<tr>
<td>544 nab_r</td>
<td>56</td>
<td>309</td>
<td>305</td>
<td>306</td>
<td>308</td>
<td>310</td>
<td>304</td>
</tr>
<tr>
<td>549 fotonik3d_r</td>
<td>56</td>
<td>2400</td>
<td>90.9</td>
<td>2394</td>
<td>91.2</td>
<td>2397</td>
<td>91.1</td>
</tr>
<tr>
<td>554 roms_r</td>
<td>56</td>
<td>1620</td>
<td>54.9</td>
<td>1616</td>
<td>55.1</td>
<td>1619</td>
<td>55.0</td>
</tr>
</tbody>
</table>

SPECrate2017_fp_base = 148
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:

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 CH121 V5 (Intel Xeon Platinum 8280)

SPECrate2017_fp_base = 148
SPECrate2017_fp_peak = Not Run

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

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 linux-tr2u Tue Nov 13 23:00:34 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) Platinum 8280 CPU @ 2.70GHz
  1 "physical id"s (chips)
  56 "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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              56
On-line CPU(s) list: 0-55
Thread(s) per core:  2
Core(s) per socket:  28
Socket(s):           1
NUMA node(s):        2
Vendor ID:           GenuineIntel
CPU family:          6
Model:               85
Model name:          Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping:            6

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

**Huawei**

**Huawei CH121 V5 (Intel Xeon Platinum 8280)**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base = 148</th>
<th>SPECrate2017_fp_peak = Not Run</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU2017 License:</strong> 3175</td>
<td><strong>Test Date:</strong> Feb-2019</td>
</tr>
<tr>
<td><strong>Test Sponsor:</strong> Huawei</td>
<td><strong>Hardware Availability:</strong> Apr-2019</td>
</tr>
<tr>
<td><strong>Tested by:</strong> Huawei</td>
<td><strong>Software Availability:</strong> Dec-2018</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

- **CPU MHz:** 2700.000
- **CPU max MHz:** 4000.0000
- **CPU min MHz:** 1000.0000
- **BogoMIPS:** 5400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 39424K
- **NUMA node0 CPU(s):** 0-3,7-9,14-17,21-23,28-31,35-37,42-45,49-51
- **NUMA node1 CPU(s):** 4-6,10-13,18-20,24-27,32-34,38-41,46-48,52-55
- **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 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 bmi hle avx2 smep bmi2 erms invpcid rtm cqm mpx rd_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d arch_capabilities

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 7 8 9 14 15 16 17 21 22 23 28 29 30 31 35 36 37 42 43 44 45 49 50 51
- **node 0 size:** 191902 MB
- **node 0 free:** 190739 MB
- **node 1 cpus:** 4 5 6 10 11 12 13 18 19 20 24 25 26 27 32 33 34 38 39 40 41 46 47 48 52 53 54 55
- **node 1 size:** 193275 MB
- **node 1 free:** 192208 MB
- **node distances:**
  - node 0 1
  - 0: 10 11
  - 1: 11 10

From /proc/meminfo
- **MemTotal:** 394422700 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

(Continued on next page)
Huawei CH121 V5 (Intel Xeon Platinum 8280)

SPECrate2017_fp_base = 148
SPECrate2017_fp_peak = Not Run

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

Platform Notes (Continued)

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:
  x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Nov 13 18:51
SPEC is set to: /spec2017
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda3 xfs 882G 100G 783G 12% /

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. 6.36 02/15/2019
  Memory:
    12x NO DIMM NO DIMM
    12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(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.
==============================================================================

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

**Huawei**

**Huawei CH121 V5 (Intel Xeon Platinum 8280)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_base</td>
<td>148</td>
</tr>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### Compiler Version Notes (Continued)

```plaintext
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.

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
```

(Continued on next page)
Huawei

Huawei CH121 V5 (Intel Xeon Platinum 8280)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>148</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

**Compiler Version Notes (Continued)**

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.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 Platinum 8280)  

SPECrate2017_fp_base = 148  

SPECrate2017_fp_peak = Not Run  

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

**Base Optimization Flags**

C benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4

C++ benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4

Fortran benchmarks:
-xCORE-AVX2 -ipo -03 -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 -03 -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 -03 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -03 -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

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 v1.0.2 on 2018-11-13 23:00:34-0500.
Originally published on 2019-04-02.