## Huawei

### Huawei 2288H V5 (Intel Xeon Gold 5122)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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<tbody>
<tr>
<td>71.3</td>
<td>73.4</td>
</tr>
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</table>

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

### Hardware

- **CPU Name:** Intel Xeon Gold 5122  
  - **Max MHz.:** 3700  
  - **Nominal:** 3600  
  - **Enabled:** 8 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:** 16.5 MB I+D on chip per chip  
  - **Other:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 1 x 1200 GB SAS, 10000 RPM  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.3 (Maipo)  
  - 3.10.0-514.el7.x86_64  
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux  
- **Parallel:** No  
- **Firmware:** Version 0.31 Released Sep-2017  
- **File System:** ext4  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None

### Test Data

- **503.bwaves_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 51.8  
  - SPECrate2017_fp_peak: 51.8
- **507.cactuBSSN_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 42.9  
  - SPECrate2017_fp_peak: 42.9
- **508.namd_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 59.4  
  - SPECrate2017_fp_peak: 59.4
- **510.parest_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 69.4  
  - SPECrate2017_fp_peak: 69.4
- **511.povray_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 81.0  
  - SPECrate2017_fp_peak: 81.0
- **519.lbm_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 48.0  
  - SPECrate2017_fp_peak: 48.0
- **521.wrf_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 86.2  
  - SPECrate2017_fp_peak: 86.2
- **526.blender_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 59.9  
  - SPECrate2017_fp_peak: 59.9
- **527.cam4_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 72.2  
  - SPECrate2017_fp_peak: 72.2
- **538.imagick_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 73.8  
  - SPECrate2017_fp_peak: 73.8
- **544.nab_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 74.3  
  - SPECrate2017_fp_peak: 74.3
- **549.fotonik3d_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 75.3  
  - SPECrate2017_fp_peak: 75.3
- **554.roms_r**  
  - Copies: 16  
  - SPECrate2017_fp_base: 52.2  
  - SPECrate2017_fp_peak: 52.2
# SPEC CPU2017 Floating Point Rate Result

**Huawei**

Huawei 2288H V5 (Intel Xeon Gold 5122)

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

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</table>

**SPECrate2017_fp_base =** 71.3  
**SPECrate2017_fp_peak =** 73.4

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 i7-4790 CPU + 32GB RAM

Memory using Redhat Enterprise Linux 7.4

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>
```

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
### General Notes (Continued)

- No: 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.
- No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, [http://www.spec.org/osg/policy.html](http://www.spec.org/osg/policy.html)

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

### 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 96c45e4568ad54c135fd618bccc091c0f
- running on localhost.localdomain Tue Dec 26 08:10:09 2017

- 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

From `/proc/cpuinfo`

- model name : Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz
- 2 "physical id"s (chips)
- 16 "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 : 4
- siblings : 8
- physical 0: cores 1 3 4 10
- physical 1: cores 0 5 9 13

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

**Huawei**

**Huawei 2288H V5 (Intel Xeon Gold 5122)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>SPEC CPU2017 fp_base</td>
<td>71.3</td>
</tr>
<tr>
<td>SPEC CPU2017 fp_peak</td>
<td>73.4</td>
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</tbody>
</table>

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

### Platform Notes (Continued)

From `lscpu`:

```plaintext
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 16  
On-line CPU(s) list: 0-15  
Thread(s) per core: 2  
Core(s) per socket: 4  
Socket(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz  
Stepping: 4  
CPU MHz: 3600.000  
BogoMIPS: 7206.32  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 16896K  
NUMA node0 CPU(s): 0,3,8,11  
NUMA node1 CPU(s): 1,2,9,10  
NUMA node2 CPU(s): 4,6,12,14  
NUMA node3 CPU(s): 5,7,13,15
```

/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: 4 nodes (0-3)
node 0 cpus: 0 3 8 11
node 0 size: 96405 MB
node 0 free: 93291 MB
node 1 cpus: 1 2 9 10
node 1 size: 98304 MB
node 1 free: 95457 MB
node 2 cpus: 4 6 12 14
node 2 size: 98304 MB
node 2 free: 95505 MB
node 3 cpus: 5 7 13 15
node 3 size: 98304 MB
node 3 free: 95565 MB
node distances:
node 0 1 2 3
```

(Continued on next page)
Huawei

Huawei 2288H V5 (Intel Xeon Gold 5122)

SPECrate2017_fp_base = 71.3
SPECrate2017_fp_peak = 73.4

CPU2017 License: 3175
Test Sponsor: Huawei
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Platform Notes (Continued)

0:  10  11  21  21
1:  11  10  21  21
2:  21  21  10  11
3:  21  21  11  10

From /proc/meminfo
MemTotal:       394144364 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.3 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="7.3"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
    ANSI_COLOR="0;31"
    CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

uname -a:
Linux localhost.localdomain 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 25 00:20

SPEC is set to: /spec2017
  Filesystem    Type  Size  Used Avail Use% Mounted on
  /dev/sda2      ext4  689G  27G  628G  5% /

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. 0.31 09/29/2017
  Memory:
    24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)
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Hardware Availability: Jul-2017
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Compiler Version Notes

==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC   519.lbm_r(peak) 544.nab_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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CXXC 508.namd_r(base) 510.parest_r(base)
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icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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CXXC 508.namd_r(peak) 510.parest_r(peak)
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CC  511.povray_r(base) 526.blender_r(base)
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icpc (ICC) 18.0.0 20170811
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iccc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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CPU2017 License: 3175
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Tested by: Huawei
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Compiler Version Notes (Continued)

FC 507.cactuBSSN_r(base)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 507.cactuBSSN_r(peak)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)

ifort (IFORT) 18.0.0 20170811
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FC 554.roms_r(peak)

ifort (IFORT) 18.0.0 20170811
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CC 521.wrf_r(base) 527.cam4_r(base)

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icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CC 521.wrf_r(peak) 527.cam4_r(peak)

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** SPEC CPU2017 Floating Point Rate Result **

** SPECrate2017_fp_base = 71.3 **

** SPECrate2017_fp_peak = 73.4 **

Compiler Version Notes (Continued)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

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
Huawei

Huawei 2288H V5 (Intel Xeon Gold 5122)

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Huawei

Huawei 2288H V5 (Intel Xeon Gold 5122)

SPECrate2017_fp_base = 71.3
SPECrate2017_fp_peak = 73.4

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

Test Date: Dec-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2017

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 -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=3 -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=3

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using both C and C++:
-m64 -std=c11

Benchmarks using Fortran, C, and C++:
-m64 -std=c11
Huawei

Huawei 2288H V5 (Intel Xeon Gold 5122)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
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<tr>
<td>SPECrate2017_fp_peak</td>
<td>73.4</td>
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CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: Dec-2017
Hardware Availability: Jul-2017
Software Availability: Sep-2017

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

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

544.nab_r: Same as 519.lbm_r

C++ benchmarks:
-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

Fortran benchmarks:

(Continued on next page)
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SPECrate2017_fp_base = 71.3
SPECrate2017_fp_peak = 73.4

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Test Sponsor: Huawei
Tested by: Huawei

Peak Optimization Flags (Continued)

503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

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 -nostandard-realloc-lhs -align array32byte

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 -nostandard-realloc-lhs -align array32byte

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: basepeak = yes

Benchmarks using Fortran, C, and C++:
507.cactuBSSN_r: basepeak = yes

Peak Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using both C and C++:
-m64 -std=c11

(Continued on next page)
Huawei

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Peak Other Flags (Continued)

Benchmarks using Fortran, C, and C++:
- `m64 -std=c11`

The flags files that were used to format this result can be browsed at
- [http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html)

You can also download the XML flags sources by saving the following links:
- [http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml)