## SPEC® CPU2017 Floating Point Speed Result

**Huawei 2288H V5 (Intel Xeon Platinum 8156)**

<table>
<thead>
<tr>
<th><strong>CPU2017 License:</strong></th>
<th>3175</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test Sponsor:</strong></td>
<td>Huawei</td>
</tr>
<tr>
<td><strong>Tested by:</strong></td>
<td>Huawei</td>
</tr>
<tr>
<td>** SPECspeed2017_fp_base = 53.7**</td>
<td></td>
</tr>
<tr>
<td>** SPECspeed2017_fp_peak = 54.9**</td>
<td></td>
</tr>
<tr>
<td>** Hardware **</td>
<td></td>
</tr>
<tr>
<td><strong>CPU Name:</strong></td>
<td>Intel Xeon Platinum 8156</td>
</tr>
<tr>
<td><strong>Max MHz.:</strong></td>
<td>3700</td>
</tr>
<tr>
<td><strong>Nominal:</strong></td>
<td>3600</td>
</tr>
<tr>
<td><strong>Enabled:</strong></td>
<td>8 cores, 2 chips</td>
</tr>
<tr>
<td><strong>Orderable:</strong></td>
<td>1,2 chips</td>
</tr>
<tr>
<td><strong>Cache L1:</strong></td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td><strong>L2:</strong></td>
<td>1 MB I-D on chip per core</td>
</tr>
<tr>
<td><strong>L3:</strong></td>
<td>16.5 MB I-D on chip per chip</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Memory:</strong></td>
<td>384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)</td>
</tr>
<tr>
<td><strong>Storage:</strong></td>
<td>1 x 1200 GB SAS, 10000 RPM</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
</tr>
<tr>
<td><strong>OS:</strong></td>
<td>Red Hat Enterprise Linux Server release 7.3 (Maipo) 3.10.0-514.el7.x86_64</td>
</tr>
<tr>
<td><strong>Compiler:</strong></td>
<td>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</td>
</tr>
<tr>
<td><strong>Parallel:</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Firmware:</strong></td>
<td>Version 0.31 Released Sep-2017</td>
</tr>
<tr>
<td><strong>File System:</strong></td>
<td>ext4</td>
</tr>
<tr>
<td><strong>System State:</strong></td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>Base Pointers:</strong></td>
<td>64-bit</td>
</tr>
<tr>
<td><strong>Peak Pointers:</strong></td>
<td>64-bit</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

### SPECspeed2017_fp_base (53.7) vs SPECspeed2017_fp_peak (54.9)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>8</td>
<td>57.6</td>
<td>58.9</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>8</td>
<td>35.5</td>
<td>35.8</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>44.2</td>
<td>49.3</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>30.2</td>
<td>47.0</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>44.8</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>8</td>
<td>33.1</td>
<td>57.1</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>56.7</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>8</td>
<td>53.3</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>8</td>
<td>55.1</td>
<td></td>
</tr>
</tbody>
</table>
## SPEC CPU2017 Floating Point Speed Result

**Huawei**

Huawei 2288H V5 (Intel Xeon Platinum 8156)

---

### SPECspeed2017_fp_base = 53.7

### SPECspeed2017_fp_peak = 54.9

<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>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>8</td>
<td>208</td>
<td>284</td>
<td>208</td>
<td>284</td>
<td>208</td>
<td>284</td>
<td>208</td>
<td>284</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>8</td>
<td>291</td>
<td>57.3</td>
<td>289</td>
<td>57.6</td>
<td>290</td>
<td>57.6</td>
<td>284</td>
<td>58.6</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>147</td>
<td>35.6</td>
<td>147</td>
<td>35.5</td>
<td>158</td>
<td>33.1</td>
<td>146</td>
<td>35.8</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>299</td>
<td>44.2</td>
<td>305</td>
<td>43.3</td>
<td>298</td>
<td>44.4</td>
<td>271</td>
<td>48.8</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>293</td>
<td>30.2</td>
<td>294</td>
<td>30.2</td>
<td>293</td>
<td>30.2</td>
<td>293</td>
<td>30.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>8</td>
<td>263</td>
<td>45.1</td>
<td>265</td>
<td>44.8</td>
<td>266</td>
<td>44.7</td>
<td>253</td>
<td>47.0</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>436</td>
<td>33.1</td>
<td>436</td>
<td>33.1</td>
<td>436</td>
<td>33.1</td>
<td>436</td>
<td>33.1</td>
</tr>
<tr>
<td>644.roms_s</td>
<td>8</td>
<td>294</td>
<td>53.5</td>
<td>308</td>
<td>51.1</td>
<td>295</td>
<td>53.3</td>
<td>288</td>
<td>54.7</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"


OMP_STACKSIZE = "192M"

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:

csync; echo 3> /proc/sys/vm/drop_caches

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

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.

(Continued on next page)
Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8156)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>53.7</td>
<td>54.9</td>
</tr>
</tbody>
</table>

General Notes (Continued)

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

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 Efficiency Mode Set to Custom
Hyper-Threading Set to Disable
Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Sat Jan 13 16:23:29 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 8156 CPU @ 3.60GHz
  2 "physical id"s (chips)
  8 "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 : 4
  physical 0: cores 0 3 10 13
  physical 1: cores 5 8 10 11

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                8
On-line CPU(s) list:   0-7
Thread(s) per core:    1
Core(s) per socket:    4
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6

(Continued on next page)
Huawei

Huawei 2288H V5 (Intel Xeon Platinum 8156)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>53.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>54.9</td>
</tr>
</tbody>
</table>

CPU2017 License: 3175  
Test Date: Jan-2018  
Hardware Availability: Jul-2017  
Software Availability: Sep-2017

**Huawei 2288H V5 (Intel Xeon Platinum 8156)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>53.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>54.9</td>
</tr>
</tbody>
</table>

CPU2017 License: 3175  
Test Date: Jan-2018  
Hardware Availability: Jul-2017  
Software Availability: Sep-2017

---

**Platform Notes (Continued)**

- Model: 85
- Model name: Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz
- Stepping: 4
- CPU MHz: 3601.000
- BogoMIPS: 7206.38
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 16896K
- NUMA node0 CPU(s): 0-3
- NUMA node1 CPU(s): 4-7

/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: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3
  node 0 size: 194709 MB
  node 0 free: 189524 MB
  node 1 cpus: 4 5 6 7
  node 1 size: 196608 MB
  node 1 free: 191634 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 394144876 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)

(Continued on next page)
Huawei 2288H V5 (Intel Xeon Platinum 8156)

SPECspeed2017_fp_base = 53.7
SPECspeed2017_fp_peak = 54.9

Huawei

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

**Platform Notes (Continued)**

```
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 Jan 13 00:23

SPEC is set to: /spec2017
```

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 689G 25G 629G 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. 0.31 09/29/2017
Memory:
24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

**Compiler Version Notes**

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

intel (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.
```
Huawei 2288H V5 (Intel Xeon Platinum 8156)

**SPECspeed2017_fp_base** = 53.7
**SPECspeed2017_fp_peak** = 54.9

**CPU2017 License:** 3175
**Test Sponsor:** Huawei
**Tested by:** Huawei
**Test Date:** Jan-2018
**Hardware Availability:** Jul-2017
**Software Availability:** Sep-2017

---

**Compiler Version Notes (Continued)**

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

---

FC 607.cactuBSSN_s(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 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)

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

---

FC 603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)

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

---

CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)

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.

---

CC 621.wrf_s(peak) 628.pop2_s(peak)

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.

---
**Huawei**

Huawei 2288H V5 (Intel Xeon Platinum 8156)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 53.7</th>
<th>SPECspeed2017_fp_peak = 54.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 3175</td>
<td>Test Date: Jan-2018</td>
</tr>
<tr>
<td>Test Sponsor: Huawei</td>
<td>Hardware Availability: Jul-2017</td>
</tr>
<tr>
<td>Tested by: Huawei</td>
<td>Software Availability: Sep-2017</td>
</tr>
</tbody>
</table>

### Base Compiler Invocation

- C benchmarks: `icc`
- Fortran benchmarks: `ifort`
- Benchmarks using both Fortran and C: `ifort icc`
- Benchmarks using Fortran, C, and C++: `icpc icc ifort`

### Base Portability Flags

- **C benchmarks:**
  - `-DSPEC_LP64`  
  - `-DSPEC_CASE_FLAG`  
  - `-convert big_endian`
  
- **Fortran benchmarks:**
  - `-DSPEC_LP64`  
  - `-DSPEC_CASE_FLAG`  
  - `-convert big_endian`  
  - `-assume byterecl`
  
- **Base Optimization Flags:**
  - `-xCORE-AVX2`  
  - `-ipo`  
  - `-no-prec-div`  
  - `-qopt-prefetch`  
  - `-ffinite-math-only`  
  - `-qopt-mem-layout-trans=3`  
  - `-qopenmp`  
  - `-nostandard-realloc-lhs`  
  - `-align array32byte`

### Base Optimization Flags (Continued on next page)
Huawei 2288H V5 (Intel Xeon Platinum 8156) | SPECspeed2017_fp_base = 53.7
| SPECspeed2017_fp_peak = 54.9

**Base Optimization Flags (Continued)**

Benchmarks using Fortran, C, and C++:
- `-xCORE-AVX2`
- `-ipo`
- `-no-prec-div`
- `-qopt-prefetch`
- `-ffinite-math-only`
- `-qopt-mem-layout-trans=3`
- `-qopenmp`
- `-DSPEC_OPENMP`
- `-nostandard-realloc-lhs`
- `-align array32byte`

**Base Other Flags**

C benchmarks:
- `-m64`
- `-std=c11`

Fortran benchmarks:
- `-m64`

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

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

**Peak Compiler Invocation**

C benchmarks:
- `icc`

Fortran benchmarks:
- `ifort`

Benchmarks using both Fortran and C:
- `ifort icc`

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

**Peak Portability Flags**

Same as Base Portability Flags
Huawei 2288H V5 (Intel Xeon Platinum 8156)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>53.7</td>
<td>54.9</td>
</tr>
</tbody>
</table>

**Peak Optimization Flags**

C benchmarks:

- `619.lbm_s`: `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP`

- `638.imagick_s`: `basepeak = yes`

- `644.nab_s`: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`

Fortran benchmarks:

- `603.bwaves_s`: `-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs -align array32byte`

- `649.fotonik3d_s`: `basepeak = yes`

- `654.roms_s`: Same as `603.bwaves_s`

Benchmarks using both Fortran and C:

- `621.wrf_s`: `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte`

- `627.cam4_s`: `basepeak = yes`

- `628.pop2_s`: Same as `621.wrf_s`

Benchmarks using Fortran, C, and C++:

- `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte`
Huawei 2288H V5 (Intel Xeon Platinum 8156)  

**SPECspeed2017_fp_base = 53.7**  
**SPECspeed2017_fp_peak = 54.9**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3175</th>
<th>Test Date:</th>
<th>Jan-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Huawei</td>
<td>Hardware Availability:</td>
<td>Jul-2017</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Huawei</td>
<td>Software Availability:</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

Peak Other Flags

C benchmarks:
- `-m64 -std=c11`

Fortran benchmarks:
- `-m64`

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

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)
- [http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.7.xml](http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.7.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 2018-01-13 16:23:29-0500.  
Originally published on 2018-02-27.