## SPEC® CPU2017 Floating Point Speed Result

### Huawei

#### Huawei XH628 V5 (Intel Xeon Gold 5122)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>55.9</td>
<td>57.0</td>
</tr>
</tbody>
</table>

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

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>8</td>
<td>62.7</td>
<td>62.7</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>8</td>
<td>34.0</td>
<td>34.0</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>49.4</td>
<td>49.4</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>30.2</td>
<td>30.2</td>
</tr>
<tr>
<td>627.cam4_s</td>
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<td>30.3</td>
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</tr>
<tr>
<td>628.pop2_s</td>
<td>8</td>
<td>45.2</td>
<td>45.2</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>33.1</td>
<td>33.1</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>8</td>
<td>66.4</td>
<td>66.4</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>8</td>
<td>61.4</td>
<td>61.4</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>8</td>
<td>55.8</td>
<td>55.8</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Gold 5122  
**Max MHz.:** 3700  
**Nominal:** 3600  
**Enabled:** 8 cores, 2 chips  
**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 (12 x 32 GB 2Rx4 PC4-2666V-R)  
**Storage:** 1 x 1800 GB SAS, 10000 RPM  
**Other:** None

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux Server release 7.4 (Maipo) 3.10.0-693.11.6.el7.x86_64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 0.86 Released Aug-2018</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1</td>
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<td>216</td>
<td>273</td>
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<td>273</td>
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<td>273</td>
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<td>8</td>
<td>266</td>
<td>62.7</td>
<td>264</td>
<td>63.2</td>
<td>271</td>
<td>61.5</td>
<td>266</td>
<td>62.7</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>154</td>
<td>34.0</td>
<td>154</td>
<td>34.1</td>
<td>154</td>
<td>33.9</td>
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<td>34.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>269</td>
<td>49.1</td>
<td>268</td>
<td>49.4</td>
<td>267</td>
<td>49.6</td>
<td>235</td>
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<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>293</td>
<td>30.2</td>
<td>293</td>
<td>30.2</td>
<td>292</td>
<td>30.3</td>
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<td>262</td>
<td>45.3</td>
<td>263</td>
<td>45.2</td>
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<td>45.1</td>
<td>248</td>
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<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>437</td>
<td>33.0</td>
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<td>280</td>
<td>56.1</td>
<td>285</td>
<td>55.3</td>
<td>279</td>
<td>56.4</td>
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**SPECspeed2017_fp_base = 55.9**

**SPECspeed2017_fp_peak = 57.0**

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 i7-6700K 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.

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**Huawei XH628 V5 (Intel Xeon Gold 5122)**

### SPECspeed2017 fp_base = 55.9

### SPECspeed2017 fp_peak = 57.0

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</table>

### Platform Notes

BIOS configuration:
- Power Policy Set to Load Balance
- Hyper-Threading Set to Disable
- XPT Prefetch Set to Enabled

Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on localhost.localdomain Tue Aug 28 00:42:01 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) Gold 5122 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 1 2 5 11
  - physical 1: cores 1 5 9 13

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
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz
- Stepping: 4
- CPU MHz: 3601.000
- CPU max MHz: 3601.0000
- CPU min MHz: 1200.0000
- BogoMIPS: 7200.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 16896K

(Continued on next page)
Huawei

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Tested by: Huawei

Platform Notes (Continued)

NUMA node0 CPU(s): 0-3
NUMA node1 CPU(s): 4-7
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clfflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good ntopology nonstop_tsc
aperfmpref perf eagerfpu pni pclmulqdq dtex64 monitor ds_cpl vmx smx est tm2 ssse3 fma
cx16 xtpr pdc轮流 pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_13 cdp_13 invpcid_single
intel_pt spec_ctrl ibpb_support tpr_shadow vmmi flexpriority ept vpid fsgsbase
tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm cpq mxr dt_a avx512f avx512dq
rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1
cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts

/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: 194741 MB
node 0 free: 189592 MB
node 1 cpus: 4 5 6 7
node 1 size: 196608 MB
node 1 free: 191604 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo

MemTotal: 3941748888 KB
HugePages_Total: 0
Hugepagesize: 2048 KB

From /etc/*release*/etc/*version*

os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.4 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.4"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
### Huawei

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---

### Platform Notes (Continued)

```
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

   uname -a:
   Linux localhost.localdomain 3.10.0-693.11.6.el7.x86_64 #1 SMP Thu Dec 28 14:23:39 EST 2017 x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Aug 27 19:03

   SPEC is set to: /spec2017
```

Filesystem Type  Size  Used Avail Use% Mounted on
/dev/sda4  xfs  553G  8.2G  545G  2% /

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. 0.86 08/06/2018
- Memory:
  - 4x NO DIMM NO DIMM
  - 12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

---

### Compiler Version Notes

```
==============================================================================
<table>
<thead>
<tr>
<th>CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>icc (ICC) 18.0.2 20180210</td>
</tr>
<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>CC  619.lbm_s(peak)</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>icc (ICC) 18.0.2 20180210</td>
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<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>FC  607.cactuBSSN_s(base, peak)</td>
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<td>------------------------------------------------------------------------------</td>
</tr>
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**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
```
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</table>

### Base Compiler Invocation (Continued)

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

### Base Portability Flags

- 603.bwaves_s: -DSPEC_LP64
- 607.cactuBSSN_s: -DSPEC_LP64
- 619.lbm_s: -DSPEC_LP64
- 621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl
- 627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- 628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- 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:**
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

**Fortran benchmarks:**
```
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

**Benchmarks using both Fortran and C:**
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

**Benchmarks using Fortran, C, and C++:**
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```
Huawei

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## Peak 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

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

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

644.nab_s: basepeak = yes

Fortran benchmarks:

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

649.fotonik3d_s: basepeak = yes

654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

(Continued on next page)
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Peak Optimization Flags (Continued)

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

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

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/Intel-lc18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Huawei-Platform-Settings-SKL-V1.9-revC.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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