## SPEC® CPU2017 Floating Point Speed Result

Huawei

Huawei XH321 V5 (Intel Xeon Gold 5118)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>81.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>83.0</td>
</tr>
</tbody>
</table>

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

| Threads | 0 | 20 | 40 | 60 | 80 | 100 | 115 | 130 | 145 | 160 | 175 | 190 | 205 | 220 | 235 | 250 | 265 | 280 | 295 | 310 | 325 | 340 | 355 | 370 | 385 | 390 |
|---------|---|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 603.bwaves_s | 24 | 70.0 | 70.6 | 84.0 | 88.3 |
| 607.cactuBSSN_s | 24 | 36.0 | 36.1 | 53.9 | 57.6 |
| 619.lbm_s | 24 | 53.9 | 54.0 | 55.4 | 57.6 |
| 621.wrf_s | 24 | 62.4 | 67.8 | 70.0 | 74.1 |
| 627.cam4_s | 24 | 53.9 | 54.0 | 55.4 | 57.6 |
| 628.pop2_s | 24 | 62.4 | 67.8 | 70.0 | 74.1 |
| 638.imagick_s | 24 | 67.1 | 74.1 | 84.0 | 88.3 |
| 644.nab_s | 24 | 103 | 106 | 120 | 120 |
| 649.fotonik3d_s | 24 | 70.0 | 70.6 | 74.1 | 74.6 |
| 654.roms_s | 24 | 53.9 | 54.0 | 55.4 | 57.6 |

### Hardware

**CPU Name:** Intel Xeon Gold 5118  
**Max MHz.:** 3200  
**Nominal:** 2300  
**Enabled:** 24 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, running at 2400)  
**Storage:** 1 x 1200 GB SAS, 10000 RPM  
**Other:** None

### Software

**OS:** Red Hat Enterprise Linux Server release 7.3 (Maipo)  
**3.10.0-693.11.6.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:** Yes  
**Firmware:** Version 0.59 Released Feb-2018  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** None
Huawei

Huawei XH321 V5 (Intel Xeon Gold 5118)

SPECspeed2017_fp_base = 81.3
SPECspeed2017_fp_peak = 83.0

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<td>153</td>
<td>385</td>
<td>152</td>
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<td>386</td>
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<td>152</td>
<td>389</td>
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<tr>
<td>607.cactusBSSN_s</td>
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<td>67.8</td>
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<td>53.9</td>
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<td>180</td>
<td>87.5</td>
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</table>

SPECspeed2017_fp_base = 81.3
SPECspeed2017_fp_peak = 83.0

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=fin,compact"
LD_LIBRARY_PATH = "/spec/lib/ia32:/spec/lib/intel64:/spec/je5.0.1-32:/spec/je5.0.1-64"
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:
 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.

Platform Notes

BIOS configuration:
Power Policy Set to Custom
Hyper-Threading Set to Disable

(Continued on next page)
Huawei

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<table>
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CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Platform Notes (Continued)

ADDC Sparing Set to Disabled
Sysinfo program /spec/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0c910f
running on localhost.localdomain Fri Jun 8 08:44:05 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 5118 CPU @ 2.30GHz
  2 "physical id"s (chips)
  24 "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: 12
  siblings: 12
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From lscpu:
  Architecture:          x86_64
  CPU op-mode(s):        32-bit, 64-bit
  Byte Order:            Little Endian
  CPU(s):                24
  On-line CPU(s) list:   0-23
  Thread(s) per core:    1
  Core(s) per socket:    12
  Socket(s):             2
  NUMA node(s):          2
  Vendor ID:             GenuineIntel
  CPU family:            6
  Model:                 85
  Model name:            Intel(R) Xeon(R) Gold 5118 CPU @ 2.30GHz
  Stepping:              4
  CPU MHz:               2301.000
  BogoMIPS:              4605.76
  Virtualization:        VT-x
  L1d cache:             32K
  L1i cache:             32K
  L2 cache:              1024K
  L3 cache:              16896K
  NUMA node0 CPU(s):     0-11
  NUMA node1 CPU(s):     12-23

/proc/cpuinfo cache data
  cache size : 16896 KB

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**Platform Notes (Continued)**

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 10 11
node 0 size: 194741 MB
node 0 free: 189567 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
node 1 size: 196608 MB
node 1 free: 191451 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

From `/proc/meminfo`

- MemTotal: 394174996 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 3.10.0-693.11.6.el7.x86_64 #1 SMP Thu Dec 28 14:23:39 EST 2017 x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Jun 8 02:52
```

**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

(Continued on next page)
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**Platform Notes (Continued)**

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
BIOS INSYDE Corp. 0.59 02/24/2018
Memory:
4x NO DIMM NO DIMM
12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

**Compiler Version Notes**

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

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

```
CC  619.lbm_s(peak)
```

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

```
FC  607.cactuBSSN_s(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  607.cactuBSSN_s(peak)
```

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icpc (ICC) 18.0.0 20170811
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```

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Huawei XH321 V5 (Intel Xeon Gold 5118)

SPECspeed2017_fp_base = 81.3
SPECspeed2017_fp_peak = 83.0

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Compile Version Notes (Continued)

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
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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.

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
## Huawei
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### 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
- 627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
- 628.pop2_s: -DSPEC_LP64 -convert big_endian
- assume byterecl
- 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:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-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

(Continued on next page)
Base Other Flags (Continued)

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

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: -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

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**Peak Optimization Flags (Continued)**

Fortran benchmarks:
- `-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 -align array32byte`

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

- `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`

**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
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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)

---

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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 v1.0.2 on 2018-06-08 08:44:05-0400.  
Originally published on 2018-07-10.