# SPEC® CPU2017 Floating Point Speed Result

**Huawei**

**Huawei XH628 V5 (Intel Xeon Gold 5120)**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s 28</td>
<td>39.7</td>
<td>75.0</td>
</tr>
<tr>
<td>607.cactuBSSN_s 28</td>
<td>66.1</td>
<td>71.4</td>
</tr>
<tr>
<td>619.lbm_s 28</td>
<td>60.7</td>
<td>54.8</td>
</tr>
<tr>
<td>621.wrf_s 28</td>
<td>53.4</td>
<td>74.7</td>
</tr>
<tr>
<td>627.cam4_s 28</td>
<td>60.8</td>
<td>96.5</td>
</tr>
<tr>
<td>628.pop2_s 28</td>
<td>52.8</td>
<td>60.7</td>
</tr>
<tr>
<td>638.imagick_s 28</td>
<td>75.0</td>
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</tr>
<tr>
<td>644.nab_s 28</td>
<td>149</td>
<td>54.8</td>
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<tr>
<td>649.fotonik3d_s 28</td>
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<td></td>
</tr>
<tr>
<td>654.roms_s 28</td>
<td>96.5</td>
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</tr>
</tbody>
</table>

## Hardware

- **CPU Name:** Intel Xeon Gold 5120
- **Max MHz.:** 3200
- **Nominal:** 2200
- **Enabled:** 28 cores, 2 chips
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 19.25 MB I+D on chip per core
- **Other:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 1800 GB SAS, 10000 RPM
- **Other:** None

## Software

- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo) 3.10.0-693.11.6.el7.x86_64
- **Compiler:** 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
- **Parallel:** Yes
- **Firmware:** Version 0.86 Released Aug-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
SPEC CPU2017 Floating Point Speed Result

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Huawei XH628 V5 (Intel Xeon Gold 5120)

SPECspeed2017_fp_base = 90.5
SPECspeed2017_fp_peak = 91.5

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 90.5
SPECspeed2017_fp_peak = 91.5

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.
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
Huawei XH628 V5 (Intel Xeon Gold 5120)

**SPECspeed2017_fp_base** = 90.5

**SPECspeed2017_fp_peak** = 91.5

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

Sysinfo program /spec2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc091c0f
running on localhost.localdomain Mon Aug 20 01:25:13 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 5120 CPU @ 2.20GHz
- 2 "physical id"s (chips)
- 28 "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: 14
  - siblings: 14
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 28
- On-line CPU(s) list: 0-27
- Thread(s) per core: 1
- Core(s) per socket: 14
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz
- Stepping: 4
- CPU MHz: 2201.000
- CPU max MHz: 2201.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 19712K

(Continued on next page)
Huawei

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**SPECspeed2017_fp_base** = 90.5

**SPECspeed2017_fp_peak** = 91.5

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

Platform Notes (Continued)

NUMA node0 CPU(s): 0-13
NUMA node1 CPU(s): 14-27
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 mce cfop mlrdcaption
kqm  cqm  cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

/cacheinfo cache data

```
cache size : 19712 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 4 5 6 7 8 9 10 11 12 13
node 0 size: 194741 MB
node 0 free: 189425 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
node 1 size: 196608 MB
node 1 free: 191568 MB
node distances:
node   0   1
0:  10  21
1:  21  10
```

From /proc/meminfo

```
MemTotal:       394174888 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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

```
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)
```

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SPECspeed2017_fp_peak = 91.5
SPECspeed2017_fp_base = 90.5

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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 19 19:41

SPEC is set to: /spec2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 553G 8.6G 544G 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, 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) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC   619.lbm_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC   607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

(Continued on next page)
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CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: Aug-2018
Hardware Availability: Aug-2018
Software Availability: Mar-2018

Compiler Version Notes (Continued)

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
-----------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

-----------------------------------------------------------------------------
FC   603.bwaves_s(peak) 649.fotonik3d_s(peak)
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ifort (IFORT) 18.0.2 20180210
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-----------------------------------------------------------------------------
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
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icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

-----------------------------------------------------------------------------
CC   621.wrf_s(peak) 628.pop2_s(peak)
-----------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
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icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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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Huawei

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**SPEC speed2017 fp_base = 90.5**

**SPEC speed2017 fp_peak = 91.5**

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**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
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -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:

-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -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 -qopenmp
-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 -qopenmp -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 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
Huawei XH628 V5 (Intel Xeon Gold 5120)

SPECspeed2017_fp_base = 90.5
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CPU2017 License: 3175
Test Sponsor: Huawei
Tested by: Huawei

Test Date: Aug-2018
Hardware Availability: Aug-2018
Software Availability: Mar-2018

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: basepeak = yes
644.nab_s: basepeak = yes

Fortran benchmarks:
603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes

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

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| SPEC Speed2017_fp_peak | 91.5 |
| SPEC Speed2017_fp_base | 90.5 |

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

**Peak Optimization Flags (Continued)**

```
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.cactusBSSN_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-ic18.0-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.

Tested with SPEC CPU2017 v1.0.2 on 2018-08-19 21:25:13-0400.
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