



# SPEC® CPU2017 Floating Point Speed Result

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## Huawei

SPECspeed2017\_fp\_base = 71.2

### Huawei 1288H V5 (Intel Xeon Silver 4114)

SPECspeed2017\_fp\_peak = 72.7

CPU2017 License: 3175

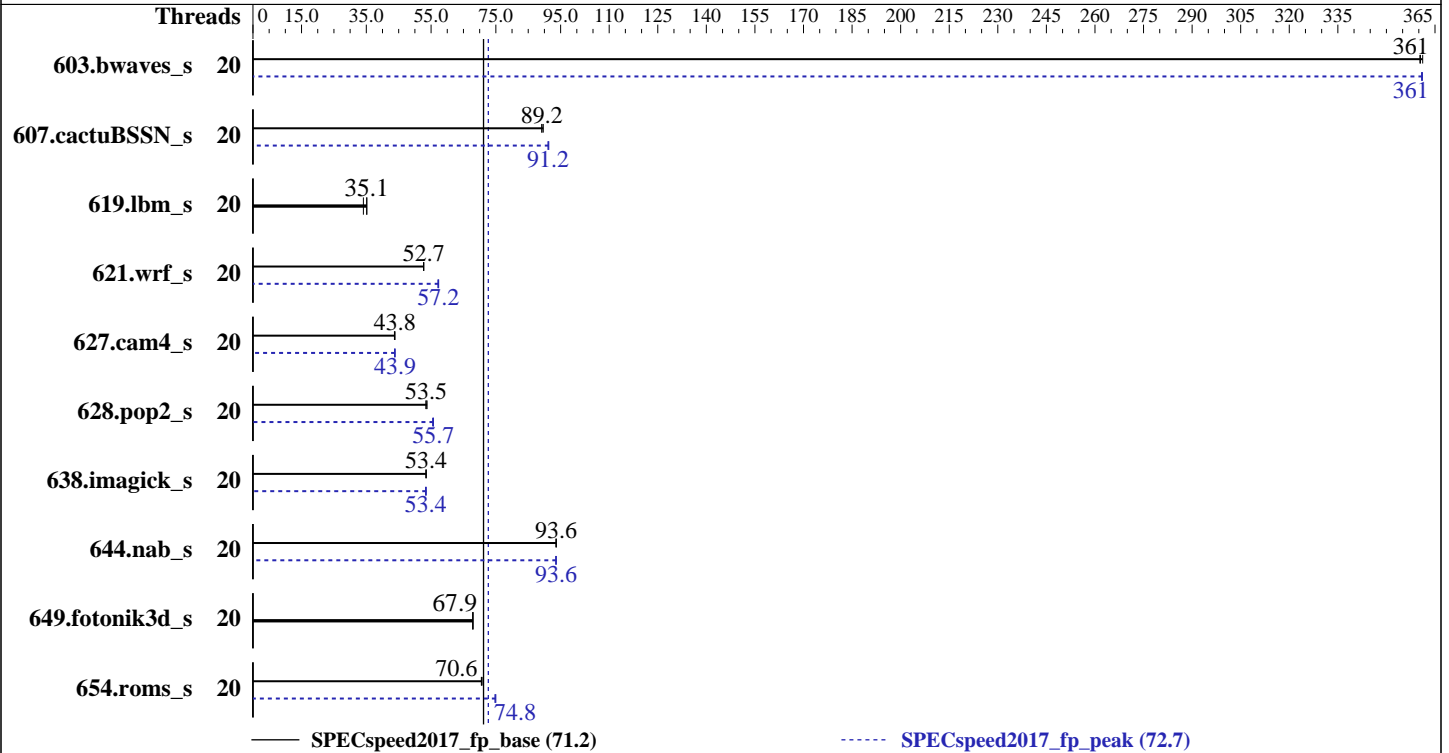
Test Sponsor: Huawei

Tested by: Huawei

Test Date: Jun-2018

Hardware Availability: Jul-2017

Software Availability: Jan-2018



### Hardware

CPU Name: Intel Xeon Silver 4114  
 Max MHz.: 3000  
 Nominal: 2200  
 Enabled: 20 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: 13.75 MB I+D on chip per chip  
 Other: None  
 Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
 Storage: 1 x 1200 GB SAS, 10000 RPM  
 Other: None

### Software

OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)  
 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 0.62 Released Mar-2018  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: None



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### Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	20	163	361	<b>164</b>	<b>361</b>	164	360	20	<b>163</b>	<b>361</b>	163	361	163	361
607.cactuBSSN_s	20	<b>187</b>	<b>89.2</b>	186	89.6	187	89.2	20	182	91.4	<b>183</b>	<b>91.2</b>	183	91.2
619.lbm_s	20	154	34.1	149	35.2	<b>149</b>	<b>35.1</b>	20	154	34.1	149	35.2	<b>149</b>	<b>35.1</b>
621.wrf_s	20	251	52.7	251	52.7	<b>251</b>	<b>52.7</b>	20	231	57.3	232	57.1	<b>231</b>	<b>57.2</b>
627.cam4_s	20	202	43.9	<b>203</b>	<b>43.8</b>	203	43.7	20	203	43.7	<b>202</b>	<b>43.9</b>	202	43.9
628.pop2_s	20	221	53.8	222	53.4	<b>222</b>	<b>53.5</b>	20	214	55.5	<b>213</b>	<b>55.7</b>	213	55.7
638.imagick_s	20	270	53.4	<b>270</b>	<b>53.4</b>	270	53.5	20	270	53.5	<b>270</b>	<b>53.4</b>	271	53.3
644.nab_s	20	<b>187</b>	<b>93.6</b>	187	93.6	187	93.7	20	<b>187</b>	<b>93.6</b>	187	93.5	187	93.7
649.fotonik3d_s	20	<b>134</b>	<b>67.9</b>	134	67.9	134	67.9	20	<b>134</b>	<b>67.9</b>	134	67.9	134	67.9
654.roms_s	20	223	70.5	223	70.7	<b>223</b>	<b>70.6</b>	20	210	75.0	<b>210</b>	<b>74.8</b>	211	74.7

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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"  
LD\_LIBRARY\_PATH = "/spec2017/lib/ia32:/spec2017/lib/intel64:/spec2017/je5.0.1-32:/spec2017/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 Efficiency Mode Set to Load Balance  
Hyper-Threading Set to Disable

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### Platform Notes (Continued)

XPT Prefetch Set to Enabled  
Sysinfo program /spec2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on localhost.localdomain Sun Jun 3 13:48:16 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) Silver 4114 CPU @ 2.20GHz  
2 "physical id"s (chips)  
20 "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 : 10  
siblings : 10  
physical 0: cores 0 1 2 3 4 8 9 10 11 12  
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:  
Architecture: x86\_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 20  
On-line CPU(s) list: 0-19  
Thread(s) per core: 1  
Core(s) per socket: 10  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz  
Stepping: 4  
CPU MHz: 2201.000  
CPU max MHz: 2201.0000  
CPU min MHz: 800.0000  
BogoMIPS: 4400.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 14080K  
NUMA node0 CPU(s): 0-9  
NUMA node1 CPU(s): 10-19  
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

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## Platform Notes (Continued)

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 xtopology nonstop\_tsc  
aperfmpperf eagerfpu pni pclmulqdq dtes64 monitor ds\_cpl vmx smx est tm2 ssse3 fma  
cx16 xtpr pdcm pcid dca sse4\_1 sse4\_2 x2apic movbe popcnt tsc\_deadline\_timer aes  
xsave avx fl6c rdrand lahf\_lm abm 3dnowprefetch epb cat\_l3 cdp\_l3 invpcid\_single  
intel\_pt spec\_ctrl ibpb\_support tpr\_shadow vnmi flexpriority ept vpid fsgsbase  
tsc\_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt\_a avx512f avx512dq  
rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1  
cqm\_llc cqm\_occup\_llc cqm\_mbm\_total cqm\_mbm\_local dtherm ida arat pln pts

```
/proc/cpuinfo cache data
cache size : 14080 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
node 0 size: 194741 MB
node 0 free: 189519 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19
node 1 size: 196608 MB
node 1 free: 191518 MB
node distances:
node  0  1
  0:  10  21
  1:  21  10
```

```
From /proc/meminfo
MemTotal:      394174584 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)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server
```

```
uname -a:
```

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### Platform Notes (Continued)

```
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 3 07:34
```

```
SPEC is set to: /spec2017
```

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4        xfs   700G   38G  663G   6% /
```

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. 0.62 03/26/2018

Memory:

24x Samsung M393A2K43BB1-CTD 16 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.  
-----
```

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### Compiler Version Notes (Continued)

=====  
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.  
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## 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

```
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:

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

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## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

```
-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
```

## 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





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## 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: Same as 638.imagick\_s

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 -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: -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

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## Peak Other Flags (Continued)

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/Huawei-Platform-Settings-SKL-V1.9-revC.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/Huawei-Platform-Settings-SKL-V1.9-revC.xml>

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