



# SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

## Huawei

SPECrate2017\_fp\_base = 298

## Huawei 2488H V5 (Intel Xeon Gold 6126)

SPECrate2017\_fp\_peak = Not Run

CPU2017 License: 3175

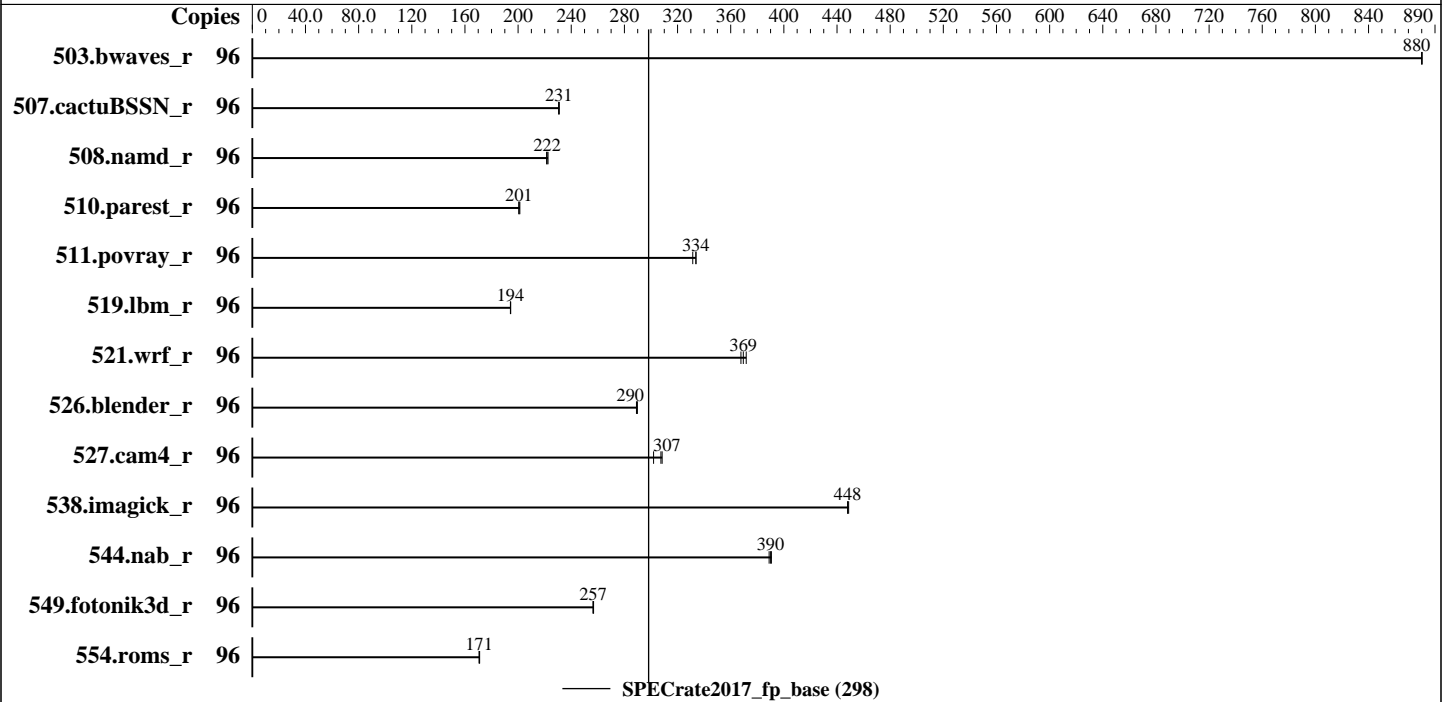
Test Sponsor: Huawei

Tested by: Huawei

Test Date: Jun-2018

Hardware Availability: May-2018

Software Availability: Mar-2018



### Hardware

CPU Name: Intel Xeon Gold 6126  
 Max MHz.: 3700  
 Nominal: 2600  
 Enabled: 48 cores, 4 chips, 2 threads/core  
 Orderable: 2,4 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 19.25 MB I+D on chip per chip  
 Other: None  
 Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)  
 Storage: 1 x 900 GB SAS HDD 10K RPM, RAID 0  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP2  
 4.4.120-92.70-default  
 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: No  
 Firmware: Version 0.84 released Mar-2018  
 File System: ext4  
 System State: Run level 5 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None



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### Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	96	<b>1094</b>	<b>880</b>	1094	880	1094	880							
507.cactuBSSN_r	96	526	231	527	231	<b>527</b>	<b>231</b>							
508.namd_r	96	412	221	410	223	<b>411</b>	<b>222</b>							
510.parest_r	96	<b>1251</b>	<b>201</b>	1252	201	1247	201							
511.povray_r	96	671	334	676	331	<b>671</b>	<b>334</b>							
519.lbm_r	96	521	194	<b>521</b>	<b>194</b>	520	194							
521.wrf_r	96	585	368	<b>582</b>	<b>369</b>	579	372							
526.blender_r	96	<b>505</b>	<b>290</b>	506	289	505	290							
527.cam4_r	96	<b>546</b>	<b>307</b>	544	308	556	302							
538.imagick_r	96	532	449	533	448	<b>533</b>	<b>448</b>							
544.nab_r	96	414	391	<b>414</b>	<b>390</b>	415	389							
549.fotonik3d_r	96	1457	257	<b>1458</b>	<b>257</b>	1459	256							
554.roms_r	96	892	171	893	171	<b>893</b>	<b>171</b>							

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"  
Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa\_balancing"

### General Notes

Environment variables set by runcpu before the start of the run:

LD\_LIBRARY\_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

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  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

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## General Notes (Continued)

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:

Sub NUMA Cluster (SNC) set to enabled  
IMC (Integrated memory controller) Interleaving set to 1 way interleave  
Xtended Prediction Table (XPT) Prefetch set to Enable  
Memory Patrol Scrub set to Disable  
Last Level Cache (LLC) Prefetch set to Disable  
Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on linux-scjg Tue Jun 5 11:48:33 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 6126 CPU @ 2.60GHz
 4 "physical id"s (chips)
 96 "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 : 24
physical 0: cores 0 1 3 4 5 6 8 9 10 11 12 13
physical 1: cores 0 1 3 4 5 6 8 9 10 11 12 13
physical 2: cores 0 1 3 4 5 6 8 9 10 11 12 13
physical 3: cores 0 1 2 3 4 5 6 9 10 11 13 14
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 4
```

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### Platform Notes (Continued)

```

NUMA node(s):      8
Vendor ID:         GenuineIntel
CPU family:        6
Model:             85
Model name:        Intel(R) Xeon(R) Gold 6126 CPU @ 2.60GHz
Stepping:          4
CPU MHz:           2601.000
CPU max MHz:       2601.0000
CPU min MHz:       1000.0000
BogoMIPS:          5199.96
Virtualization:    VT-x
L1d cache:         32K
L1i cache:         32K
L2 cache:          1024K
L3 cache:          19712K
NUMA node0 CPU(s): 0-2,6-8,48-50,54-56
NUMA node1 CPU(s): 3-5,9-11,51-53,57-59
NUMA node2 CPU(s): 12-14,18-20,60-62,66-68
NUMA node3 CPU(s): 15-17,21-23,63-65,69-71
NUMA node4 CPU(s): 24-26,30-32,72-74,78-80
NUMA node5 CPU(s): 27-29,33-35,75-77,81-83
NUMA node6 CPU(s): 36-39,43,44,84-87,91,92
NUMA node7 CPU(s): 40-42,45-47,88-90,93-95
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 xtopology nonstop_tsc
aperfmpperf eagerfpu pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts dtherm
intel_pt rsb_ctxsw spec_ctrl stibp retpoline kaiser tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmil hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f
avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec
xgetbv1 cqm_llc cqm_occup_llc

```

```
/proc/cpuinfo cache data
cache size : 19712 KB
```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

```

available: 8 nodes (0-7)
node 0 cpus: 0 1 2 6 7 8 48 49 50 54 55 56
node 0 size: 191756 MB
node 0 free: 190275 MB
node 1 cpus: 3 4 5 9 10 11 51 52 53 57 58 59
node 1 size: 193524 MB
node 1 free: 192975 MB
node 2 cpus: 12 13 14 18 19 20 60 61 62 66 67 68

```

(Continued on next page)



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### Platform Notes (Continued)

```

node 2 size: 193524 MB
node 2 free: 192825 MB
node 3 cpus: 15 16 17 21 22 23 63 64 65 69 70 71
node 3 size: 193524 MB
node 3 free: 193002 MB
node 4 cpus: 24 25 26 30 31 32 72 73 74 78 79 80
node 4 size: 193524 MB
node 4 free: 193080 MB
node 5 cpus: 27 28 29 33 34 35 75 76 77 81 82 83
node 5 size: 193524 MB
node 5 free: 193108 MB
node 6 cpus: 36 37 38 39 43 44 84 85 86 87 91 92
node 6 size: 193524 MB
node 6 free: 193089 MB
node 7 cpus: 40 41 42 45 46 47 88 89 90 93 94 95
node 7 size: 193365 MB
node 7 free: 192947 MB
node distances:
node  0  1  2  3  4  5  6  7
 0: 10 20 20 20 20 20 20 20
 1: 20 10 20 20 20 20 20 20
 2: 20 20 10 20 20 20 20 20
 3: 20 20 20 10 20 20 20 20
 4: 20 20 20 20 10 20 20 20
 5: 20 20 20 20 20 10 20 20
 6: 20 20 20 20 20 20 10 20
 7: 20 20 20 20 20 20 20 10

```

```

From /proc/meminfo
MemTotal:      1583378416 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2

```

```

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"
VERSION="12-SP2"
VERSION_ID="12.2"

```

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### Platform Notes (Continued)

```
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```
uname -a:
Linux linux-scjg 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 5 Jun 4 18:43
```

```
SPEC is set to: /home/cpu2017
Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/sda4       btrfs    717G      23G   693G   4% /home
```

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. 0.84 03/26/2018
Memory:
48x Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666
```

(End of data from sysinfo program)

### Compiler Version Notes

```
=====
CC 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
-----
```

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

```
=====
CXXC 508.namd_r(base) 510.parest_r(base)
-----
```

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

```
=====
CC 511.povray_r(base) 526.blender_r(base)
-----
```

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

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## Compiler Version Notes (Continued)

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

=====  
FC 507.cactuBSSN\_r(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 503.bwaves\_r(base) 549.fotonik3d\_r(base) 554.roms\_r(base)

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

=====  
CC 521.wrf\_r(base) 527.cam4\_r(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.

## Base Compiler Invocation

C benchmarks:  
icc

C++ benchmarks:  
icpc

Fortran benchmarks:  
ifort

Benchmarks using both Fortran and C:  
ifort icc

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## Base Compiler Invocation (Continued)

Benchmarks using both C and C++:

icpc icc

Benchmarks using Fortran, C, and C++:

icpc icc ifort

## Base Portability Flags

503.bwaves\_r: -DSPEC\_LP64  
507.cactuBSSN\_r: -DSPEC\_LP64  
508.namd\_r: -DSPEC\_LP64  
510.parest\_r: -DSPEC\_LP64  
511.povray\_r: -DSPEC\_LP64  
519.lbm\_r: -DSPEC\_LP64  
521.wrf\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian  
526.blender\_r: -DSPEC\_LP64 -DSPEC\_LINUX -funsigned-char  
527.cam4\_r: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG  
538.imagick\_r: -DSPEC\_LP64  
544.nab\_r: -DSPEC\_LP64  
549.fotonik3d\_r: -DSPEC\_LP64  
554.roms\_r: -DSPEC\_LP64

## Base Optimization Flags

C benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3

C++ benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3

Fortran benchmarks:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-align array32byte

Benchmarks using both Fortran and C:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-align array32byte

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## Base Optimization Flags (Continued)

Benchmarks using both C and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-align array32byte
```

## Base Other Flags

C benchmarks:

```
-m64 -std=c11
```

C++ benchmarks:

```
-m64
```

Fortran benchmarks:

```
-m64
```

Benchmarks using both Fortran and C:

```
-m64 -std=c11
```

Benchmarks using both C 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-V1.7.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-V1.7.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

Tested with SPEC CPU2017 v1.0.2 on 2018-06-04 23:48:32-0400.

Report generated on 2018-10-31 17:34:19 by CPU2017 PDF formatter v6067.

Originally published on 2018-06-26.