



# SPEC CPU®2017 Floating Point Rate Result

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## Huawei

(Test Sponsor: Peng Cheng Laboratory)

### Huawei TaiShan 200 Server (Model 2280)

(2.6 GHz, Huawei Kunpeng 920 7260)

SPECrate®2017\_fp\_base = 263

SPECrate®2017\_fp\_peak = Not Run

CPU2017 License: 5036

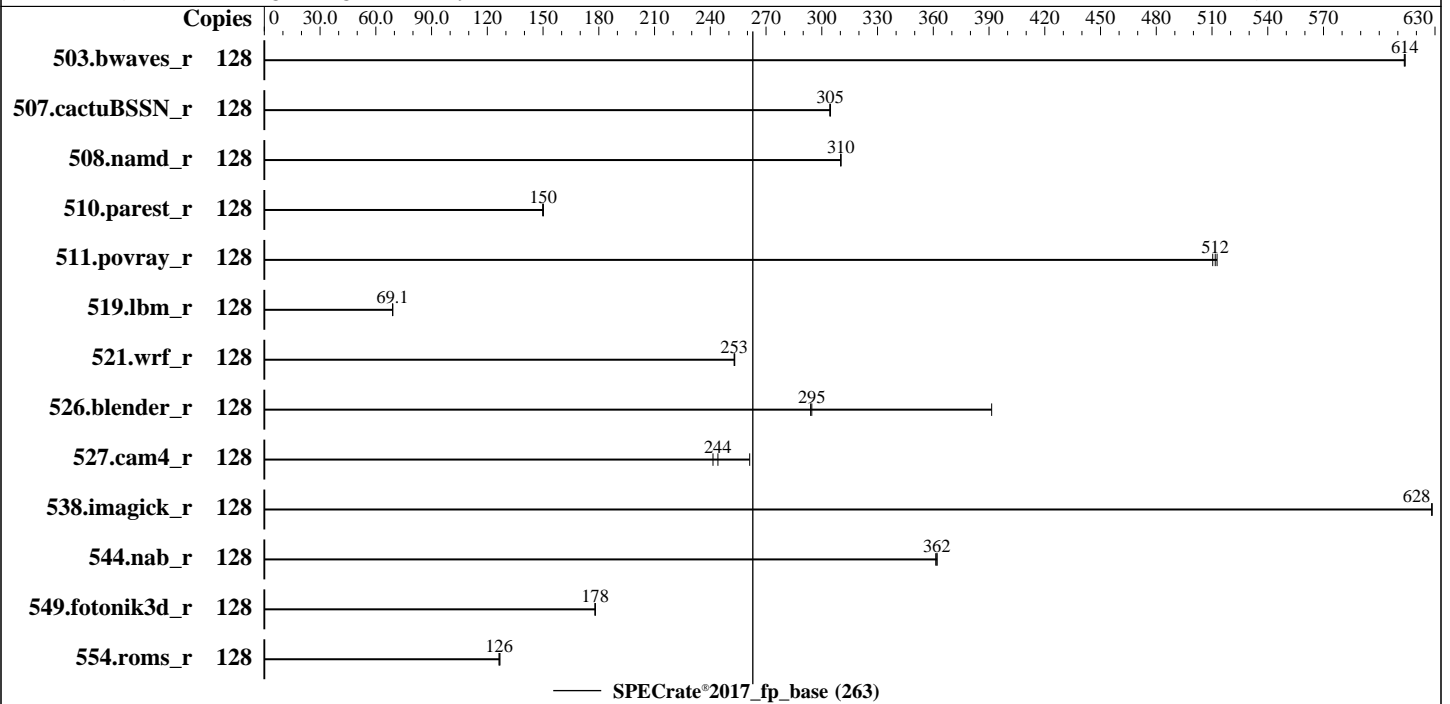
Test Sponsor: Peng Cheng Laboratory

Tested by: Peng Cheng Laboratory

Test Date: May-2020

Hardware Availability: Jun-2019

Software Availability: Jul-2020



### Hardware

CPU Name: Huawei Kunpeng 920 7260  
 Max MHz: 2600  
 Nominal: 2600  
 Enabled: 128 cores, 2 chips  
 Orderable: 1,2 chips  
 Cache L1: 64 KB I + 64 KB D on chip per core  
 L2: 512 KB I+D on chip per core  
 L3: 64 MB I+D on chip per chip  
 Other: None  
 Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2933Y-R)  
 Storage: 1 x 1.92 TB SAS SSD  
 Other: None

### Software

OS: kylin release 10 (Azalea)  
 4.19.90-5.ky10.aarch64  
 Compiler: C/C++/Fortran: Version 9.1.0 of GCC, the GNU Compiler Collection  
 Parallel: No  
 Firmware: Huawei Corp. Version 1.16 released Feb-2020  
 File System: xfs  
 System State: Run level 5 (multi-user graphical)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None  
 Power Management: BIOS set to prefer performance at the cost of additional power usage



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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	128	<u>2091</u>	<u>614</u>	2092	613	2091	614							
507.cactuBSSN_r	128	532	305	<u>532</u>	<u>305</u>	532	304							
508.namd_r	128	392	310	<u>392</u>	<u>310</u>	392	310							
510.parest_r	128	2230	150	<u>2232</u>	<u>150</u>	2235	150							
511.povray_r	128	<u>584</u>	<u>512</u>	583	513	586	510							
519.lbm_r	128	1954	69.0	1953	69.1	<u>1954</u>	<u>69.1</u>							
521.wrf_r	128	1134	253	1133	253	<u>1133</u>	<u>253</u>							
526.blender_r	128	<u>662</u>	<u>295</u>	663	294	498	391							
527.cam4_r	128	927	241	857	261	<u>917</u>	<u>244</u>							
538.imagick_r	128	<u>507</u>	<u>628</u>	507	628	507	628							
544.nab_r	128	<u>595</u>	<u>362</u>	595	362	596	361							
549.fotonik3d_r	128	2802	178	<u>2802</u>	<u>178</u>	2801	178							
554.roms_r	128	<u>1609</u>	<u>126</u>	1609	126	1604	127							

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

## Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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"

## Environment Variables Notes

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

LD\_LIBRARY\_PATH =

"/usr/local/gcc-9.1.0/lib64:/usr/local/gcc-9.1.0/lib:/lib64:"

## General Notes

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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

(Continued on next page)



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## General Notes (Continued)

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.

NA: 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 Performance

Custom Refresh Rate Set to 64ms

CPU Prefetcher Set to Enabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011

running on localhost.localdomain Fri Jun 19 18:35:47 2020

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

\*

\* Did not identify cpu model. If you would like to write your own sysinfo program, see [www.spec.org/cpu2017/config.html#sysinfo](https://www.spec.org/cpu2017/config.html#sysinfo)

\*

\*

\* 0 "physical id" tags found. Perhaps this is an older system, or a virtualized system. Not attempting to guess how to count chips/cores for this system.

\*

128 "processors"

cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

From lscpu:

Architecture:	aarch64
CPU op-mode(s):	64-bit
Byte Order:	Little Endian
CPU(s):	128
On-line CPU(s) list:	0-127
Thread(s) per core:	1
Core(s) per socket:	64
Socket(s):	2
NUMA node(s):	4

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## Platform Notes (Continued)

```

Vendor ID:                HiSilicon
Model:                    0
Model name:               Kunpeng-920
Stepping:                 0x1
BogoMIPS:                 200.00
L1d cache:                8 MiB
L1i cache:                8 MiB
L2 cache:                 64 MiB
L3 cache:                 256 MiB
NUMA node0 CPU(s):       0-31
NUMA node1 CPU(s):       32-63
NUMA node2 CPU(s):       64-95
NUMA node3 CPU(s):       96-127
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:       Not affected
Vulnerability Mds:        Not affected
Vulnerability Meltdown:   Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1:  Mitigation; __user pointer sanitization
Vulnerability Spectre v2:  Not affected
Vulnerability Tsx async abort: Not affected
Flags:                    fp asimd evtstrm aes pmull sha1 sha2 crc32 atomics fphp asimdhp cpuid asimdrdm jscvt fcma dcpop asimddp asimdfhm ssbs

```

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

```

From /proc/meminfo
MemTotal:      535431808 kB
HugePages_Total:    100000
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
kylin-release: kylin release 10 (Azalea)
os-release:
NAME="kylin"
VERSION="10 (Azalea)"
ID="kylin"
VERSION_ID="10"
PRETTY_NAME="kylin 10 (Azalea)"
ANSI_COLOR="0;31"

```

```

system-release: kylin release 10 (Azalea)
system-release-cpe: cpe:/o:kylin:kylin:10:ga:server

```

uname -a:

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## Platform Notes (Continued)

Linux localhost.localdomain 4.19.90-5.ky10.aarch64 #1 SMP Wed Apr 8 09:34:13 CST 2020  
aarch64 aarch64 aarch64 GNU/Linux

Kernel self-reported vulnerability status:

itlb_multihit:	Not affected
CVE-2018-3620 (L1 Terminal Fault):	Not affected
Microarchitectural Data Sampling:	Not affected
CVE-2017-5754 (Meltdown):	Not affected
CVE-2018-3639 (Speculative Store Bypass):	Mitigation: Speculative Store Bypass disabled via prctl
CVE-2017-5753 (Spectre variant 1):	Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Not affected
tsx_async_abort:	Not affected

run-level 5 Jun 19 18:22

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/klas00-home	xfs	1.5T	33G	1.4T	3%	/home

```

From /sys/devices/virtual/dmi/id
BIOS:      Huawei Corp. 1.16 02/28/2020
Vendor:    Huawei
Product:   TaiShan 200 (Model 2280)
Serial:    2102312PRNN0KC001136

```

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.

```

Memory:
16x NO DIMM NO DIMM
16x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

```

(End of data from sysinfo program)  
The sysinfo is missing the cpu name, the processor under test is Huawei Kunpeng 920 7260. The L3 capacity is 64MB per processor for Huawei Kunpeng 920 7260 processor for a SUT total of 128 MiB.

## Compiler Version Notes

```

=====
C          | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
=====

```

Using built-in specs.

(Continued on next page)



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## Compiler Version Notes (Continued)

```
COLLECT_GCC=/usr/local/gcc-9.1.0/bin/gcc
COLLECT_LTO_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper
Target: aarch64-unknown-linux-gnu
Configured with: ../configure --enable-checking=release
--enable-languages=c,c++,fortran --disable-multilib
--prefix=/usr/local/gcc-9.1.0
Thread model: posix
gcc version 9.1.0 (GCC)
```

```
=====  
C++ | 508.namd_r(base) 510.parest_r(base)  
=====
```

Using built-in specs.

```
COLLECT_GCC=/usr/local/gcc-9.1.0/bin/g++
COLLECT_LTO_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper
Target: aarch64-unknown-linux-gnu
Configured with: ../configure --enable-checking=release
--enable-languages=c,c++,fortran --disable-multilib
--prefix=/usr/local/gcc-9.1.0
Thread model: posix
gcc version 9.1.0 (GCC)
```

```
=====  
C++, C | 511.povray_r(base) 526.blender_r(base)  
=====
```

Using built-in specs.

```
COLLECT_GCC=/usr/local/gcc-9.1.0/bin/g++
COLLECT_LTO_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper
Target: aarch64-unknown-linux-gnu
Configured with: ../configure --enable-checking=release
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--prefix=/usr/local/gcc-9.1.0
Thread model: posix
gcc version 9.1.0 (GCC)
```

Using built-in specs.

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COLLECT_GCC=/usr/local/gcc-9.1.0/bin/gcc
COLLECT_LTO_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper
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## Compiler Version Notes (Continued)

=====  
C++, C, Fortran | 507.cactuBSSN\_r(base)  
-----

Using built-in specs.

COLLECT\_GCC=/usr/local/gcc-9.1.0/bin/g++

COLLECT\_LTO\_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper

Target: aarch64-unknown-linux-gnu

Configured with: ../configure --enable-checking=release

--enable-languages=c,c++,fortran --disable-multilib

--prefix=/usr/local/gcc-9.1.0

Thread model: posix

gcc version 9.1.0 (GCC)

Using built-in specs.

COLLECT\_GCC=/usr/local/gcc-9.1.0/bin/gcc

COLLECT\_LTO\_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper

Target: aarch64-unknown-linux-gnu

Configured with: ../configure --enable-checking=release

--enable-languages=c,c++,fortran --disable-multilib

--prefix=/usr/local/gcc-9.1.0

Thread model: posix

gcc version 9.1.0 (GCC)

Using built-in specs.

COLLECT\_GCC=/usr/local/gcc-9.1.0/bin/gfortran

COLLECT\_LTO\_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper

Target: aarch64-unknown-linux-gnu

Configured with: ../configure --enable-checking=release

--enable-languages=c,c++,fortran --disable-multilib

--prefix=/usr/local/gcc-9.1.0

Thread model: posix

gcc version 9.1.0 (GCC)

=====  
Fortran | 503.bwaves\_r(base) 549.fotonik3d\_r(base) 554.roms\_r(base)  
-----

Using built-in specs.

COLLECT\_GCC=/usr/local/gcc-9.1.0/bin/gfortran

COLLECT\_LTO\_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper

Target: aarch64-unknown-linux-gnu

Configured with: ../configure --enable-checking=release

--enable-languages=c,c++,fortran --disable-multilib

--prefix=/usr/local/gcc-9.1.0

Thread model: posix

gcc version 9.1.0 (GCC)

(Continued on next page)



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## Compiler Version Notes (Continued)

Fortran, C | 521.wrf\_r(base) 527.cam4\_r(base)

-----  
Using built-in specs.

COLLECT\_GCC=/usr/local/gcc-9.1.0/bin/gfortran

COLLECT\_LTO\_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper

Target: aarch64-unknown-linux-gnu

Configured with: ../configure --enable-checking=release

--enable-languages=c,c++,fortran --disable-multilib

--prefix=/usr/local/gcc-9.1.0

Thread model: posix

gcc version 9.1.0 (GCC)

Using built-in specs.

COLLECT\_GCC=/usr/local/gcc-9.1.0/bin/gcc

COLLECT\_LTO\_WRAPPER=/usr/local/gcc-9.1.0/libexec/gcc/aarch64-unknown-linux-gnu/9.1.0/lto-wrapper

Target: aarch64-unknown-linux-gnu

Configured with: ../configure --enable-checking=release

--enable-languages=c,c++,fortran --disable-multilib

--prefix=/usr/local/gcc-9.1.0

Thread model: posix

gcc version 9.1.0 (GCC)

## Base Compiler Invocation

C benchmarks:

gcc

C++ benchmarks:

g++

Fortran benchmarks:

gfortran

Benchmarks using both Fortran and C:

gfortran gcc

Benchmarks using both C and C++:

g++ gcc

Benchmarks using Fortran, C, and C++:

g++ gcc gfortran





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## 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_CASE_FLAG -fconvert=big-endian -DSPEC_LP64
526.blender_r: -funsigned-char -DSPEC_LINUX -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
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:

```

-mabi=lp64 -std=c99 -Ofast -g -pipe -flto -march=armv8.2-a+lse
-fno-PIE -fomit-frame-pointer -no-pie -funroll-loops

```

C++ benchmarks:

```

-mabi=lp64 -Ofast -g -pipe -flto -march=armv8.2-a+lse -fno-PIE
-fomit-frame-pointer -no-pie -funroll-loops

```

Fortran benchmarks:

```

-mabi=lp64 -Ofast -g -pipe -flto -march=armv8.2-a+lse -fno-PIE
-fomit-frame-pointer -no-pie -funroll-loops

```

Benchmarks using both Fortran and C:

```

-mabi=lp64 -std=c99 -Ofast -g -pipe -flto -march=armv8.2-a+lse
-fno-PIE -fomit-frame-pointer -no-pie -funroll-loops

```

Benchmarks using both C and C++:

```

-mabi=lp64 -std=c99 -Ofast -g -pipe -flto -march=armv8.2-a+lse
-fno-PIE -fomit-frame-pointer -no-pie -funroll-loops

```

Benchmarks using Fortran, C, and C++:

```

-mabi=lp64 -std=c99 -Ofast -g -pipe -flto -march=armv8.2-a+lse
-fno-PIE -fomit-frame-pointer -no-pie -funroll-loops

```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/gcc.2020-06-30.html>

<http://www.spec.org/cpu2017/flags/PCL-Platform-Settings-Kunpeng-V1.0-revF.html>



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You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/gcc.2020-06-30.xml>

<http://www.spec.org/cpu2017/flags/PCL-Platform-Settings-Kunpeng-V1.0-revF.xml>

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