SPEC CPU®2017 Floating Point Rate Result

Huawei
(Test Sponsor: Peng Cheng Laboratory)

Huawei TaiShan 200 Server (Model 2480)
(2.6 GHz,Huawei Kunpeng 920 7260)

$SPECrate^{®}2017\_fp\_base =$ **501**

$SPECrate^{®}2017\_fp\_peak =$ Not Run

CPU2017 License: 5036	**Test Date:** May-2020
Test Sponsor: Peng Cheng Laboratory	**Hardware Availability:** Jan-2020
Tested by: Peng Cheng Laboratory	**Software Availability:** Jul-2020

Copies

Benchmark	Copies	Value
503.bwaves_r	256	1150
507.cactuBSSN_r	256	518
508.namd_r	256	620
510.parest_r	256	304
511.povray_r	256	1020
519.lbm_r	256	137
521.wrf_r	256	494
526.blender_r	256	824
527.cam4_r	256	456
538.imagick_r	256	953
544.nab_r	256	559
549.fotonik3d_r	256	331
554.roms_r	256	246

SPECrate®2017_fp_base (501)

Hardware

CPU Name: Huawei Kunpeng 920 7260
 Max MHz: 2600
 Nominal: 2600
Enabled: 256 cores, 4 chips
Orderable: 1,2,3,4 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: 1 TB (32 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x 960 GB 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 1.20 released Apr-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

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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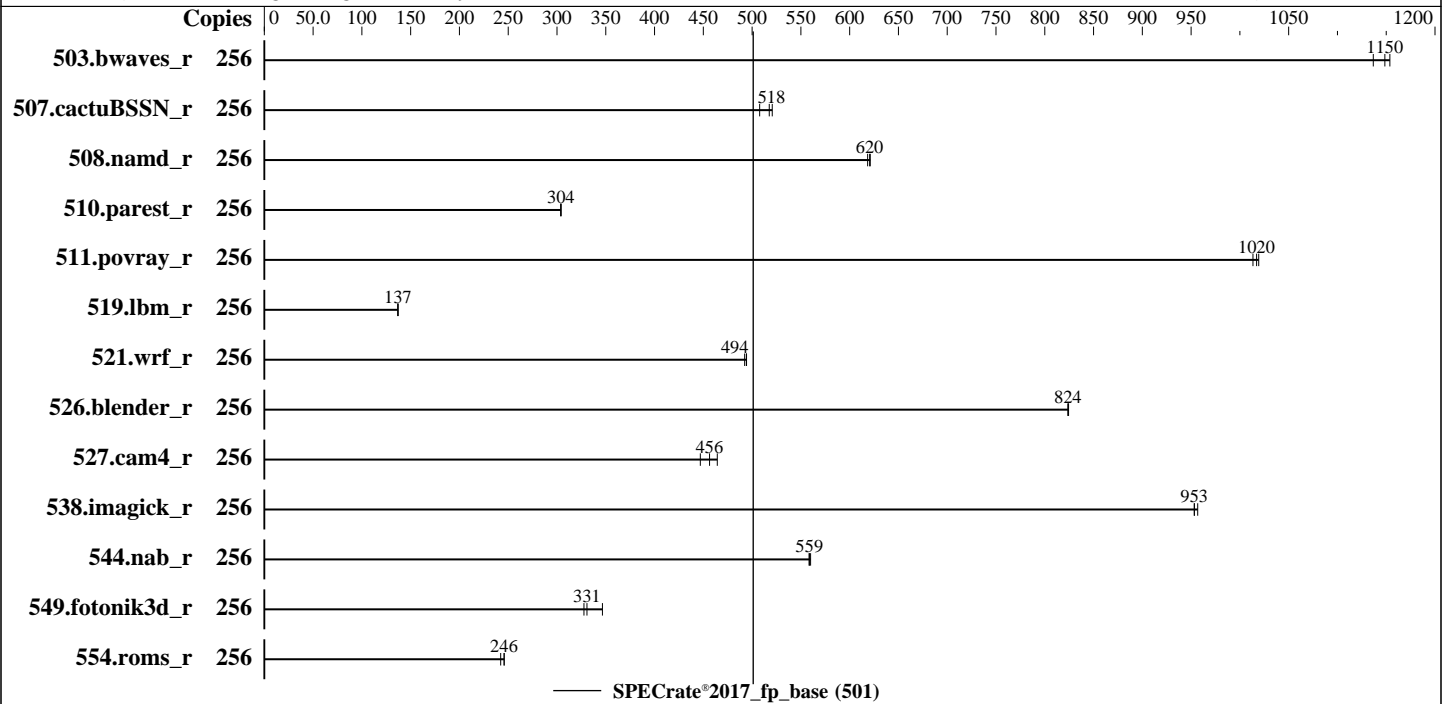
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 5036
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Software Availability: Jul-2020

Results Table

Benchmark	Base Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	256	2258	1140	2225	1150	**2235**	**1150**							
507.cactuBSSN_r	256	638	508	**626**	**518**	623	521							
508.namd_r	256	392	621	**392**	**620**	393	618							
510.parest_r	256	2204	304	2202	304	**2202**	**304**							
511.povray_r	256	586	1020	**588**	**1020**	590	1010							
519.lbm_r	256	**1970**	**137**	1970	137	1971	137							
521.wrf_r	256	1165	492	**1161**	**494**	1160	494							
526.blender_r	256	473	824	**473**	**824**	473	824							
527.cam4_r	256	964	464	1002	447	**981**	**456**							
538.imagick_r	256	665	957	**668**	**953**	668	953							
544.nab_r	256	769	560	**771**	**559**	772	558							
549.fotonik3d_r	256	**3017**	**331**	3045	328	2878	347							
554.roms_r	256	1655	246	**1655**	**246**	1679	242							

SPECrate®2017_fp_base =   501

SPECrate®2017_fp_peak =   Not Run

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)

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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
L3 Cache Model Set to in :private out:private

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on localhost.localdomain Sun Jun 21 10:31:05 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
*
*
* 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.
*
     256 "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):                256
     On-line CPU(s) list:   0-255
     Thread(s) per core:    1
     Core(s) per socket:    64
     Socket(s):             4
```

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Platform Notes (Continued)

```
        NUMA node(s):                    8
        Vendor ID:                       HiSilicon
        Model:                           0
        Model name:                      Kunpeng-920
        Stepping:                        0x1
        BogoMIPS:                        200.00
        L1d cache:                       16 MiB
        L1i cache:                       16 MiB
        L2 cache:                        128 MiB
        L3 cache:                        512 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
        NUMA node4 CPU(s):               128-159
        NUMA node5 CPU(s):               160-191
        NUMA node6 CPU(s):               192-223
        NUMA node7 CPU(s):               224-255
        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:       1071619840 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"
```

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Platform Notes (Continued)

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

 uname -a:
    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 18:13

 SPEC is set to: /home/cpu2017
    Filesystem              Type  Size  Used Avail Use% Mounted on
    /dev/mapper/klas00-home xfs   838G   18G  821G   3% /home

 From /sys/devices/virtual/dmi/id
    BIOS:    Huawei Corp. 1.20 04/14/2020
    Vendor:  Huawei
    Product: TaiShan 200 (Model 2480)
    Serial:  2102312UXX10KC000007

 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:
    32x Hynix HMA84GR7CJR4N-WM 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 256 MiB.
```

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Test Date: May-2020

Hardware Availability: Jan-2020

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Compiler Version Notes

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


==============================================================================
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
  --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
```

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Compiler Version Notes (Continued)

```
Thread model: posix
gcc version 9.1.0 (GCC)
------------------------------------------------------------------------

==========================================================================
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
```

(Continued on next page)

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CPU2017 License: 5036		**Test Date:**	May-2020
Test Sponsor:	Peng Cheng Laboratory	**Hardware Availability:**	Jan-2020
Tested by:	Peng Cheng Laboratory	**Software Availability:**	Jul-2020

Compiler Version Notes (Continued)

```
gcc version 9.1.0 (GCC)
--------------------------------------------------------------------------


==========================================================================
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 -O3 -g -pipe -flto -march=armv8.2-a+lse
-fno-PIE -fomit-frame-pointer -no-pie -funroll-loops

C++ benchmarks:
-mabi=lp64 -O3 -g -pipe -flto -march=armv8.2-a+lse -fno-PIE
-fomit-frame-pointer -no-pie -funroll-loops

Fortran benchmarks:
-mabi=lp64 -O3 -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 -O3 -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 -O3 -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 -O3 -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

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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