SPEC CPU®2017 Floating Point Rate Result

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Huawei

(Test Sponsor: Peng Cheng Laboratory)

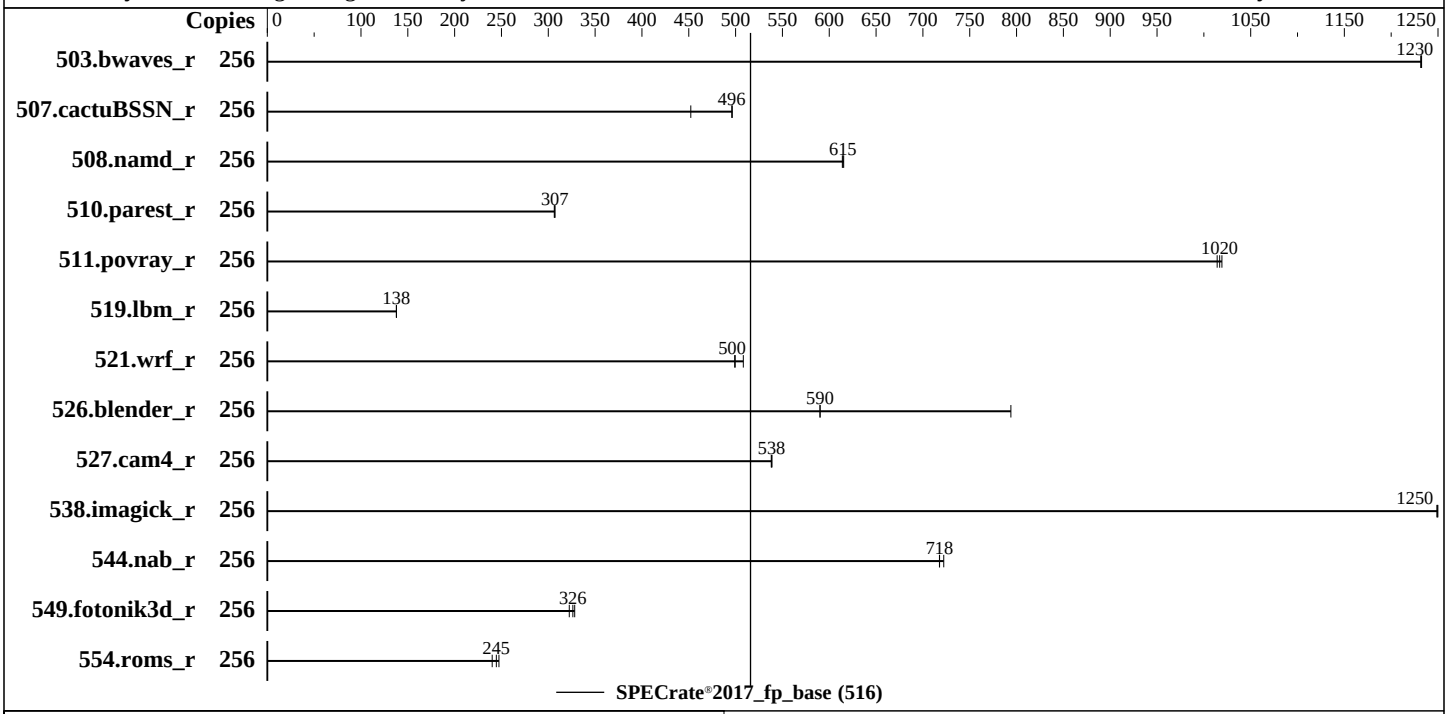
Huawei TaiShan 200 Server (Model 2480)
(2.6 GHz,Huawei Kunpeng 920 7260)

SPECrate®2017_fp_base = 516

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: Jan-2020
Software Availability: Jul-2020



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

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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	256	2083	1230	2084	1230	**2084**	**1230**							
507.cactuBSSN_r	256	717	452	**654**	**496**	653	496							
508.namd_r	256	395	615	396	614	**396**	**615**							
510.parest_r	256	2181	307	**2182**	**307**	2186	306							
511.povray_r	256	589	1010	**588**	**1020**	586	1020							
519.lbm_r	256	1956	138	**1957**	**138**	1958	138							
521.wrf_r	256	1128	508	1149	499	**1148**	**500**							
526.blender_r	256	491	794	**661**	**590**	661	590							
527.cam4_r	256	**832**	**538**	832	538	831	539							
538.imagick_r	256	510	1250	509	1250	**510**	**1250**							
544.nab_r	256	**600**	**718**	600	718	597	722							
549.fotonik3d_r	256	**3058**	**326**	3040	328	3094	322							
554.roms_r	256	1645	247	1694	240	**1664**	**245**							

SPECrate®2017_fp_base = 516

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)
```

(Continued on next page)

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 Sat Jun 20 17:45:02 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
```

(Continued on next page)

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"
```

(Continued on next page)

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.
```

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
```

(Continued on next page)

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
```

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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

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

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

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