



# SPEC CPU®2017 Integer 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\_int\_base = 389

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 5036

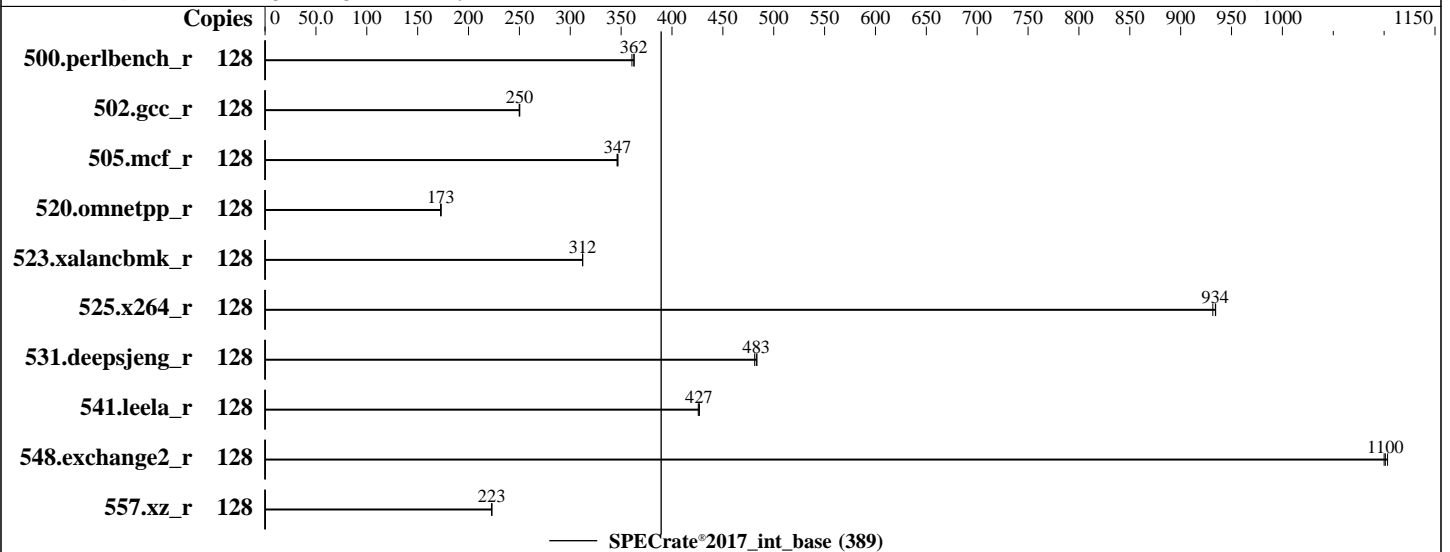
Test Sponsor: Peng Cheng Laboratory

Tested by: Peng Cheng Laboratory

Test Date: Sep-2021

Hardware Availability: Sep-2019

Software Availability: Jul-2021



### 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 2Rx8 PC4-2933P-R)  
 Storage: 15 TB LVM RAID-0 stripe on  
 4 x 3.638 TB SATA HDD, 7200 RPM  
 Other: None

### Software

OS: openEuler release 20.03 (LTS-SP2)  
 4.19.90-2106.3.0.0095.oe1.aarch64  
 Compiler: C/C++/Fortran: Version 1.3.3 of BiSheng  
 Parallel: No  
 Firmware: Huawei Corp. Version 1.80 released Sep-2021  
 File System: ext4  
 System State: Run level 3  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: jemalloc memory allocator V5.2.1  
 Power Management: BIOS and OS 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
500.perlbench_r	128	<b>562</b>	<b>362</b>	562	363	565	361							
502.gcc_r	128	724	250	726	250	<b>724</b>	<b>250</b>							
505.mcf_r	128	<b>597</b>	<b>347</b>	596	347	598	346							
520.omnetpp_r	128	<b>972</b>	<b>173</b>	971	173	973	173							
523.xalancbmk_r	128	<b>433</b>	<b>312</b>	433	312	433	312							
525.x264_r	128	<b>240</b>	<b>934</b>	240	934	241	932							
531.deepsjeng_r	128	305	481	<b>304</b>	<b>483</b>	303	484							
541.leela_r	128	<b>497</b>	<b>427</b>	498	426	497	427							
548.exchange2_r	128	305	1100	304	1100	<b>305</b>	<b>1100</b>							
557.xz_r	128	<b>620</b>	<b>223</b>	621	223	620	223							

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

## Compiler Notes

The BiSheng Compiler Suite is available at.  
<https://www.hikunpeng.com/en/developer/devkit/compiler>

## Submit Notes

The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores.  
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 =  
"/root/install\_dir/bisheng-compiler-1.3.3-aarch64-linux/lib:"  
PATH =  
"/root/install\_dir/bisheng-compiler-1.3.3-aarch64-linux/bin:/home/spec2017/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/root/bin"



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## General Notes

Binaries were compiled on a system with 2x ARM Kunpeng 920 7260 CPU + 512M memory using 16x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

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
```

jemalloc: configured and built at default for 64bit targets

jemalloc: built with the openEuler V20.03, and the system compiler gcc 7.3.0

jemalloc: sources available via jemalloc.net

NA: 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.

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/spec2017/bin/sysinfo

Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d

running on localhost.localdomain Tue Oct 12 19:21:47 2021

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.
*
    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.)

```

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## Platform Notes (Continued)

From lscpu from util-linux 2.35.2:

```

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
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:               128 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: Not affected
Vulnerability Spectre v1: Mitigation; __user pointer sanitization
Vulnerability Spectre v2: Not affected
Vulnerability Srbds:   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

```

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	64K	8M	4	Data	1	256		64
L1i	64K	8M	4	Instruction	1	256		64
L2	512K	64M	8	Unified	2	1024		64
L3	32M	128M	15	Unified	3	2048		128

From numactl --hardware

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

available: 4 nodes (0-3)

```

node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
28 29 30 31

```

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## Platform Notes (Continued)

```

node 0 size: 130329 MB
node 0 free: 101996 MB
node 1 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
57 58 59 60 61 62 63
node 1 size: 130937 MB
node 1 free: 110916 MB
node 2 cpus: 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88
89 90 91 92 93 94 95
node 2 size: 130937 MB
node 2 free: 114246 MB
node 3 cpus: 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114
115 116 117 118 119 120 121 122 123 124 125 126 127
node 3 size: 129912 MB
node 3 free: 113872 MB
node distances:
node  0  1  2  3
  0:  10  16  32  33
  1:  16  10  25  32
  2:  32  25  10  16
  3:  33  32  16  10

```

```

From /proc/meminfo
MemTotal:      534648768 kB
HugePages_Total:      0
Hugepagesize:    524288 kB

```

```

/sbin/tuned-adm active
Current active profile: throughput-performance

```

```

From /etc/*release* /etc/*version*
openEuler-release: openEuler release 20.03 (LTS-SP2)
os-release:
NAME="openEuler"
VERSION="20.03 (LTS-SP2)"
ID="openEuler"
VERSION_ID="20.03"
PRETTY_NAME="openEuler 20.03 (LTS-SP2)"
ANSI_COLOR="0;31"

```

```

system-release: openEuler release 20.03 (LTS-SP2)
system-release-cpe: cpe:/o:openEuler:openEuler:20.03LTS_SP2:ga:server

```

```

uname -a:
Linux localhost.localdomain 4.19.90-2106.3.0.0095.oe1.aarch64 #1 SMP Wed Jun 23
14:51:58 UTC 2021 aarch64 aarch64 aarch64 GNU/Linux

```

Kernel self-reported vulnerability status:

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## Platform Notes (Continued)

CVE-2018-12207 (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):	Not affected
CVE-2017-5753 (Spectre variant 1):	Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling):	Not affected
CVE-2019-11135 (TSX Asynchronous Abort):	Not affected

run-level 3 Oct 9 12:48

SPEC is set to: /home/spec2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/openeuler-home	ext4	15T	134G	14T	1%	/home

From /sys/devices/virtual/dmi/id

Vendor:	Huawei
Product:	TaiShan 200 (Model 2280)
Serial:	2102312PRNN0KC001136

Additional information from dmidecode 3.2 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

BIOS:

BIOS Vendor:	Huawei Corp.
BIOS Version:	1.80
BIOS Date:	09/23/2021
BIOS Revision:	1.80

(End of data from sysinfo program)

The sysinfo is missing the cpu name, the processor under test is Huawei Kunpeng 920 7260.

## Compiler Version Notes

```

=====
C      | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
      | 525.x264_r(base) 557.xz_r(base)
-----

```

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## Compiler Version Notes (Continued)

Bisheng Compiler 1.3.3.b023 clang version 10.0.1 (clang-e31092d4f8cd  
flang-3c92ea4b404f)

Target: aarch64-unknown-linux-gnu

Thread model: posix

InstalledDir: /root/install\_dir/bisheng-compiler-1.3.3-aarch64-linux/bin

Found candidate GCC installation: /usr/lib/gcc/aarch64-linux-gnu/7.3.0

Selected GCC installation: /usr/lib/gcc/aarch64-linux-gnu/7.3.0

Candidate multilib: .;@m64

Selected multilib: .;@m64

=====  
C++ | 520.omnetpp\_r(base) 523.xalancbmk\_r(base) 531.deepsjeng\_r(base)  
| 541.leela\_r(base)

Bisheng Compiler 1.3.3.b023 clang version 10.0.1 (clang-e31092d4f8cd  
flang-3c92ea4b404f)

Target: aarch64-unknown-linux-gnu

Thread model: posix

InstalledDir: /root/install\_dir/bisheng-compiler-1.3.3-aarch64-linux/bin

Found candidate GCC installation: /usr/lib/gcc/aarch64-linux-gnu/7.3.0

Selected GCC installation: /usr/lib/gcc/aarch64-linux-gnu/7.3.0

Candidate multilib: .;@m64

Selected multilib: .;@m64

=====  
Fortran | 548.exchange2\_r(base)

Bisheng Compiler 1.3.3.b023 clang version 10.0.1 (clang-e31092d4f8cd  
flang-3c92ea4b404f)

Target: aarch64-unknown-linux-gnu

Thread model: posix

InstalledDir: /root/install\_dir/bisheng-compiler-1.3.3-aarch64-linux/bin

Found candidate GCC installation: /usr/lib/gcc/aarch64-linux-gnu/7.3.0

Selected GCC installation: /usr/lib/gcc/aarch64-linux-gnu/7.3.0

Candidate multilib: .;@m64

Selected multilib: .;@m64

## Base Compiler Invocation

C benchmarks:

/root/install\_dir/bisheng-compiler-1.3.3-aarch64-linux/bin/clang

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## Base Compiler Invocation (Continued)

C++ benchmarks:

/root/install\_dir/bisheng-compiler-1.3.3-aarch64-linux/bin/clang++

Fortran benchmarks:

/root/install\_dir/bisheng-compiler-1.3.3-aarch64-linux/bin/flang

## Base Portability Flags

500.perlbench\_r: -DSPEC\_LINUX\_AARCH64 -DSPEC\_LP64

502.gcc\_r: -DSPEC\_LP64

505.mcf\_r: -DSPEC\_LP64

520.omnetpp\_r: -DSPEC\_LP64

523.xalancbmk\_r: -DSPEC\_LINUX -DSPEC\_LP64

525.x264\_r: -DSPEC\_LP64

531.deepsjeng\_r: -DSPEC\_LP64

541.leela\_r: -DSPEC\_LP64

548.exchange2\_r: -DSPEC\_LP64

557.xz\_r: -DSPEC\_LP64

## Base Optimization Flags

C benchmarks:

-flto=full -Wl, --build-id -z muldefs -Wl,-mllvm,  
-licm-safe-hoist=true -enable-diamond-load-hoist=true  
-enable-loop-load-widen=true  
-disable-extra-gate-for-loop-heuristic=false  
-aarch64-optimize-vector-mul=true -enable-struct-padding=false  
-enable-struct-repacking=true -ljemalloc -O3 -mcpu=native -mllvm  
-enable-loopinterchange-boole=true -fno-strict-aliasing -lmathlib

C++ benchmarks:

-std=c++03 -flto=full -Wl, --build-id -Wl,-mllvm,  
-licm-safe-hoist=true -ljemalloc -O3 -mcpu=native -mllvm  
-enable-loopinterchange-boole=true -lmathlib

Fortran benchmarks:

-Mallocatable=03 -flto=full -Wl, --build-id -Wl,-mllvm,  
-enable-large-loop-bp-enhancement=true -ljemalloc -O3 -mcpu=native  
-Kieee -mllvm -enable-loopinterchange-boole=true -lmathlib





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## Base Other Flags

C benchmarks:

-v -fuse-ld=lld

C++ benchmarks:

-v -fuse-ld=lld

Fortran benchmarks:

-v -fuse-ld=lld

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

<http://www.spec.org/cpu2017/flags/Bisheng-compiler-flags.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/Bisheng-compiler-flags.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](mailto:info@spec.org).

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