# SPEC CPU®2017 Integer Rate Result



## Huawei

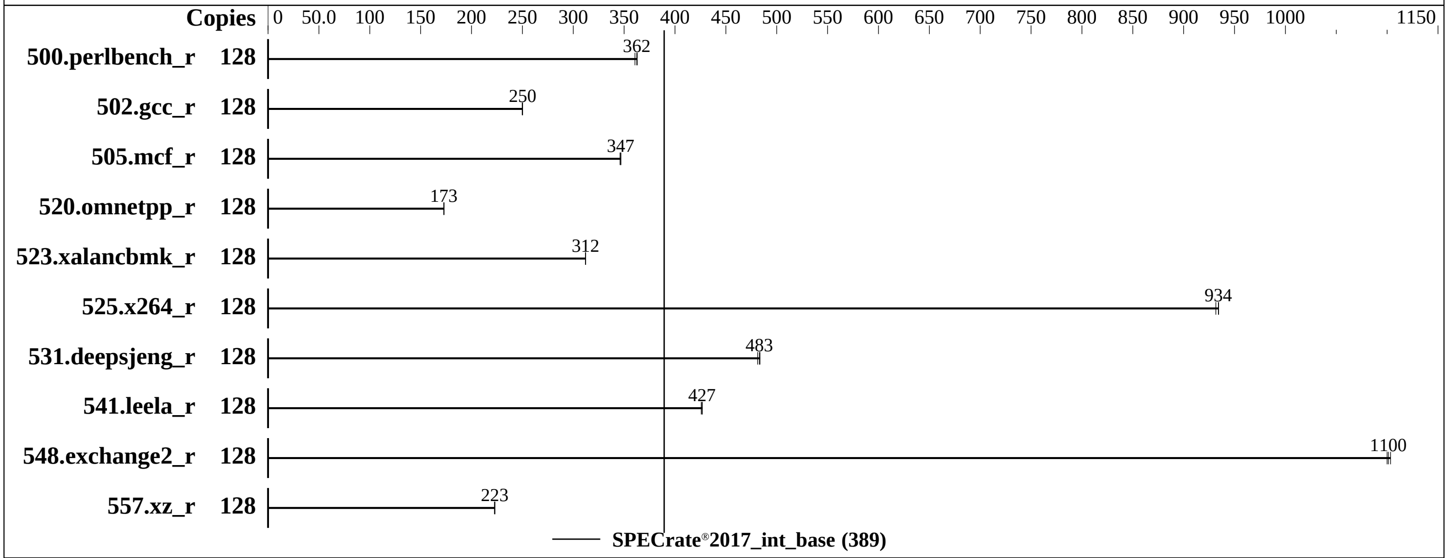
(Test Sponsor: Peng Cheng Laboratory)

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 Date:** | Sep-2021 |
| **Test Sponsor:** | Peng Cheng Laboratory | **Hardware Availability:** | Sep-2019 |
| **Tested by:** | Peng Cheng Laboratory | **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 |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 500.perlbench_r | 128 | **562** | **362** | 562 | 363 | 565 | 361 | | | | | | | |
| 502.gcc_r | 128 | 724 | 250 | 726 | 250 | **724** | **250** | | | | | | | |
| 505.mcf_r | 128 | **597** | **347** | 596 | 347 | 598 | 346 | | | | | | | |
| 520.omnetpp_r | 128 | **972** | **173** | 971 | 173 | 973 | 173 | | | | | | | |
| 523.xalancbmk_r | 128 | **433** | **312** | 433 | 312 | 433 | 312 | | | | | | | |
| 525.x264_r | 128 | **240** | **934** | 240 | 934 | 241 | 932 | | | | | | | |
| 531.deepsjeng_r | 128 | 305 | 481 | **304** | **483** | 303 | 484 | | | | | | | |
| 541.leela_r | 128 | **497** | **427** | 498 | 426 | 497 | 427 | | | | | | | |
| 548.exchange2_r | 128 | 305 | 1100 | 304 | 1100 | **305** | **1100** | | | | | | | |
| 557.xz_r | 128 | **620** | **223** | 621 | 223 | 620 | 223 | | | | | | | |

**SPECrate®2017_int_base = 389**

**SPECrate®2017_int_peak = Not Run**

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/spec20
     17/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/root/bin"
```

## 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
```

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 Date:** | Sep-2021 |
| **Test Sponsor:** | Peng Cheng Laboratory | **Hardware Availability:** | Sep-2019 |
| **Tested by:** | Peng Cheng Laboratory | **Software Availability:** | Jul-2021 |

# 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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