



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2022 Standard Performance Evaluation Corporation

GIGA-BYTE TECHNOLOGY CO., LTD.

R263-Z30-AAC1-000  
(AMD EPYC 9654, 2.4GHz)

SPECrate®2017\_int\_base = 852

SPECrate®2017\_int\_peak = 917

CPU2017 License: 9082

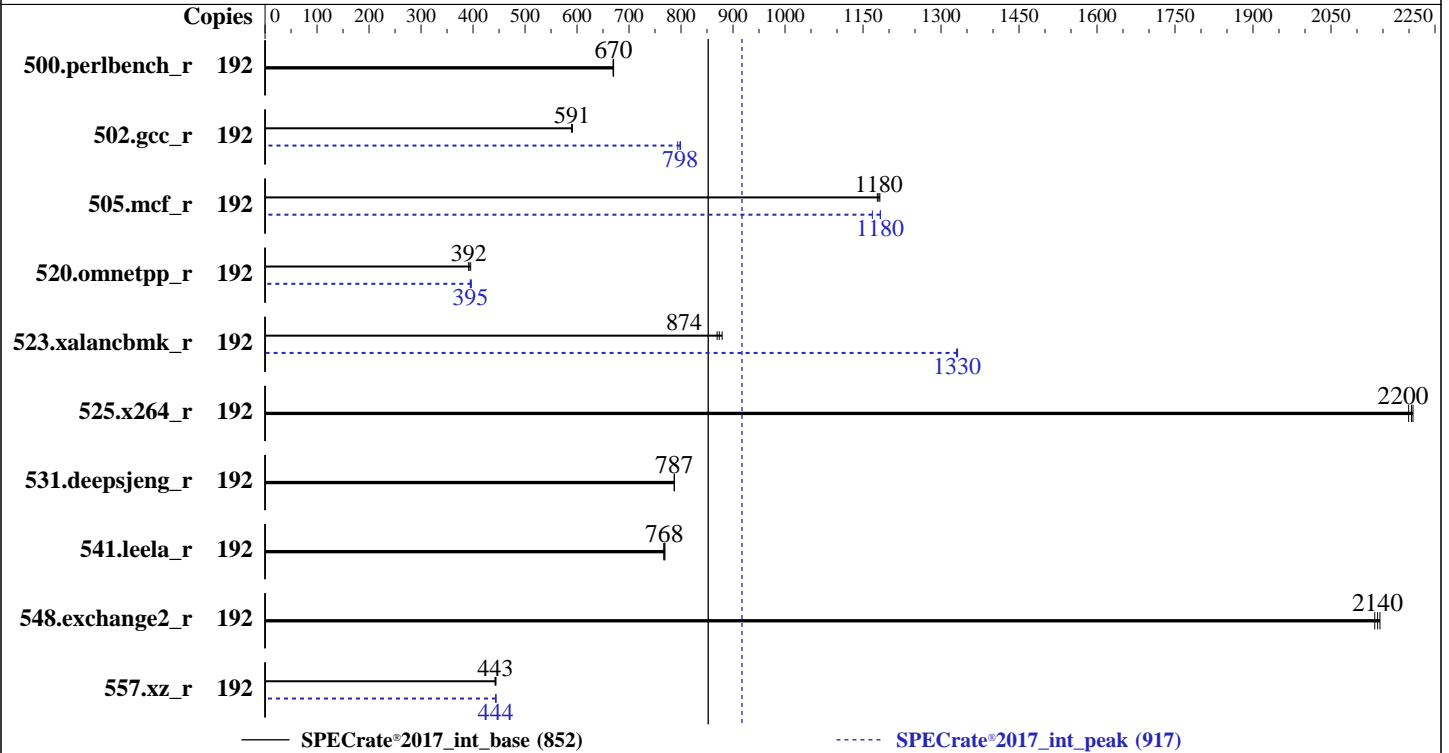
Test Sponsor: GIGA-BYTE TECHNOLOGY CO., LTD.

Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.

Test Date: Nov-2022

Hardware Availability: Nov-2022

Software Availability: Nov-2022



## Hardware

CPU Name: AMD EPYC 9654  
 Max MHz: 3700  
 Nominal: 2400  
 Enabled: 96 cores, 1 chip, 2 threads/core  
 Orderable: 1 chip  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 384 MB I+D on chip per chip, 32 MB shared / 8 cores  
 Other: None  
 Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 3.2 TB PCIE NVME SSD  
 Other: None

## Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86\_64) 5.14.21-150400.22-default  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: No  
 Firmware: Version D10 released Sep-2022  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other: None  
 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 | 192    | <b>456</b> | <b>670</b>  | 456        | 670         | 457     | 669   | 192    | <b>456</b> | <b>670</b>  | 456        | 670         | 457        | 669         |
| 502.gcc_r       | 192    | 460        | 591         | <b>460</b> | <b>591</b>  | 461     | 589   | 192    | <b>341</b> | <b>798</b>  | 343        | 794         | 340        | 799         |
| 505.mcf_r       | 192    | <b>263</b> | <b>1180</b> | 262        | 1180        | 263     | 1180  | 192    | 266        | 1170        | 262        | 1180        | <b>262</b> | <b>1180</b> |
| 520.omnetpp_r   | 192    | <b>642</b> | <b>392</b>  | 637        | 395         | 643     | 392   | 192    | 638        | 395         | 635        | 397         | <b>637</b> | <b>395</b>  |
| 523.xalancbmk_r | 192    | <b>232</b> | <b>874</b>  | 231        | 879         | 233     | 869   | 192    | <b>152</b> | <b>1330</b> | 152        | 1330        | 152        | 1330        |
| 525.x264_r      | 192    | 152        | 2210        | <b>152</b> | <b>2200</b> | 153     | 2200  | 192    | 152        | 2210        | <b>152</b> | <b>2200</b> | 153        | 2200        |
| 531.deepsjeng_r | 192    | 280        | 787         | <b>280</b> | <b>787</b>  | 279     | 787   | 192    | 280        | 787         | <b>280</b> | <b>787</b>  | 279        | 787         |
| 541.leela_r     | 192    | 413        | 769         | <b>414</b> | <b>768</b>  | 415     | 767   | 192    | 413        | 769         | <b>414</b> | <b>768</b>  | 415        | 767         |
| 548.exchange2_r | 192    | <b>235</b> | <b>2140</b> | 236        | 2130        | 235     | 2140  | 192    | <b>235</b> | <b>2140</b> | 236        | 2130        | 235        | 2140        |
| 557.xz_r        | 192    | 469        | 442         | <b>468</b> | <b>443</b>  | 467     | 444   | 192    | <b>467</b> | <b>444</b>  | 468        | 443         | 467        | 444         |

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

## Compiler Notes

The AMD64 AOCC Compiler Suite is available at  
<http://developer.amd.com/amd-aocc/>

## Submit Notes

The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores.  
See the configuration file for details.

## Operating System Notes

'ulimit -s unlimited' was used to set environment stack size limit  
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty\_ratio=8' run as root.  
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.  
To free node-local memory and avoid remote memory usage,  
'sysctl -w vm.zone\_reclaim\_mode=1' run as root.  
To clear filesystem caches, 'sync; sysctl -w vm.drop\_caches=3' run as root.  
To disable address space layout randomization (ASLR) to reduce run-to-run  
variability, 'sysctl -w kernel.randomize\_va\_space=0' run as root.

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## Operating System Notes (Continued)

To enable Transparent Hugepages (THP) only on request for base runs,  
'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled' run as root.  
To enable THP for all allocations for peak runs,  
'echo always > /sys/kernel/mm/transparent\_hugepage/enabled' and  
'echo always > /sys/kernel/mm/transparent\_hugepage/defrag' run as root.

## Environment Variables Notes

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

```
LD_LIBRARY_PATH =  
    "/home/cpu2017_rB1/amd_rate_aocc400_genoa_B_lib/lib:/home/cpu2017_rB1/am  
    d_rate_aocc400_genoa_B_lib/lib32:"  
MALLOC_CONF = "retain:true"
```

Environment variables set by runcpu during the 523.xalancbmk\_r peak run:

```
MALLOC_CONF = "thp:never"
```

## General Notes

Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

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.  
Yes: 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 settings:  
SEV Control = Disable  
TSME = Disabled  
Determinism Control = Manual  
Determinism Enable = Power  
TDP Control = Manual  
TDP = 400  
PPT Control = Manual  
PPT = 400

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## Platform Notes (Continued)

sysinfo program /home/cpu2017\_rB1/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d  
running on localhost Sat Nov 5 09:37:42 2022

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

```
model name : AMD EPYC 9654 96-Core Processor
 1 "physical id"s (chips)
192 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 96
siblings  : 192
physical 0: cores 0 1 2 3 4 5 6 7 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
26 27 28 29 30 31 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 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
```

From lscpu from util-linux 2.37.2:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:          52 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 192
On-line CPU(s) list:   0-191
Vendor ID:              AuthenticAMD
Model name:             AMD EPYC 9654 96-Core Processor
CPU family:             25
Model:                  17
Thread(s) per core:    2
Core(s) per socket:    96
Socket(s):              1
Stepping:               1
Frequency boost:        enabled
CPU max MHz:            3707.8120
CPU min MHz:            1500.0000
BogoMIPS:               4800.00
Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr
pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt
pdpe1gb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
aperfmpperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a
misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb
bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs
```

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## Platform Notes (Continued)

ibpb stibp vmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt\_a avx512f  
avx512dq rdseed adx smap avx512ifma clflushopt clwb avx512cd sha\_ni avx512bw  
avx512vl xsaveopt xsavec xgetbv1 xsaves cqm\_llc cqm\_occup\_llc cqm\_mbm\_total  
cqm\_mbm\_local avx512\_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd\_ppin arat npt  
lbrv svm\_lock nrip\_save tsc\_scale vmcb\_clean flushbyasid decodeassists pausefilter  
pfthreshold avic v\_vmsave\_vmload vgif v\_spec\_ctrl avx512vbmi umip pku ospke  
avx512\_vbmi2 gfni vaes vpclmulqdq avx512\_vnni avx512\_bitalg avx512\_vpopcntdq la57  
rdpid overflow\_recov succor smca fsrm flush\_lli

Virtualization:

AMD-V

L1d cache: 3 MiB (96 instances)  
L1i cache: 3 MiB (96 instances)  
L2 cache: 96 MiB (96 instances)  
L3 cache: 384 MiB (12 instances)

NUMA node(s):

12

NUMA node0 CPU(s): 0-7,96-103  
NUMA node1 CPU(s): 24-31,120-127  
NUMA node2 CPU(s): 48-55,144-151  
NUMA node3 CPU(s): 72-79,168-175  
NUMA node4 CPU(s): 8-15,104-111  
NUMA node5 CPU(s): 32-39,128-135  
NUMA node6 CPU(s): 56-63,152-159  
NUMA node7 CPU(s): 80-87,176-183  
NUMA node8 CPU(s): 16-23,112-119  
NUMA node9 CPU(s): 40-47,136-143  
NUMA node10 CPU(s): 64-71,160-167  
NUMA node11 CPU(s): 88-95,184-191

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 and seccomp

Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and \_\_user pointer sanitization

Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS\_FW, STIBP always-on, RSB filling

Vulnerability Srbds: Not affected

Vulnerability Tsx async abort: Not affected

From lscpu --cache:

| NAME | ONE-SIZE | ALL-SIZE | WAYS | TYPE        | LEVEL | SETS  | PHY-LINE | COHERENCY-SIZE |
|------|----------|----------|------|-------------|-------|-------|----------|----------------|
| L1d  | 32K      | 3M       | 8    | Data        | 1     | 64    | 1        | 64             |
| L1i  | 32K      | 3M       | 8    | Instruction | 1     | 64    | 1        | 64             |
| L2   | 1M       | 96M      | 8    | Unified     | 2     | 2048  | 1        | 64             |
| L3   | 32M      | 384M     | 16   | Unified     | 3     | 32768 | 1        | 64             |

/proc/cpuinfo cache data

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## Platform Notes (Continued)

cache size : 1024 KB

From numactl --hardware

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

available: 12 nodes (0-11)

node 0 cpus: 0 1 2 3 4 5 6 7 96 97 98 99 100 101 102 103

node 0 size: 64182 MB

node 0 free: 62775 MB

node 1 cpus: 24 25 26 27 28 29 30 31 120 121 122 123 124 125 126 127

node 1 size: 64501 MB

node 1 free: 64150 MB

node 2 cpus: 48 49 50 51 52 53 54 55 144 145 146 147 148 149 150 151

node 2 size: 64501 MB

node 2 free: 64328 MB

node 3 cpus: 72 73 74 75 76 77 78 79 168 169 170 171 172 173 174 175

node 3 size: 64501 MB

node 3 free: 64177 MB

node 4 cpus: 8 9 10 11 12 13 14 15 104 105 106 107 108 109 110 111

node 4 size: 64501 MB

node 4 free: 64341 MB

node 5 cpus: 32 33 34 35 36 37 38 39 128 129 130 131 132 133 134 135

node 5 size: 64501 MB

node 5 free: 64349 MB

node 6 cpus: 56 57 58 59 60 61 62 63 152 153 154 155 156 157 158 159

node 6 size: 64501 MB

node 6 free: 64382 MB

node 7 cpus: 80 81 82 83 84 85 86 87 176 177 178 179 180 181 182 183

node 7 size: 64501 MB

node 7 free: 63546 MB

node 8 cpus: 16 17 18 19 20 21 22 23 112 113 114 115 116 117 118 119

node 8 size: 64501 MB

node 8 free: 64342 MB

node 9 cpus: 40 41 42 43 44 45 46 47 136 137 138 139 140 141 142 143

node 9 size: 63989 MB

node 9 free: 63834 MB

node 10 cpus: 64 65 66 67 68 69 70 71 160 161 162 163 164 165 166 167

node 10 size: 64501 MB

node 10 free: 64368 MB

node 11 cpus: 88 89 90 91 92 93 94 95 184 185 186 187 188 189 190 191

node 11 size: 64501 MB

node 11 free: 64155 MB

node distances:

node 0 1 2 3 4 5 6 7 8 9 10 11

0: 10 12 12 12 11 12 12 12 11 12 12 12

1: 12 10 12 12 12 11 12 12 12 11 12 12

2: 12 12 10 12 12 12 11 12 12 12 11 12

3: 12 12 12 10 12 12 12 11 12 12 12 11

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## Platform Notes (Continued)

|     |    |    |    |    |    |    |    |    |    |    |    |    |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| 4:  | 11 | 12 | 12 | 12 | 10 | 12 | 12 | 12 | 11 | 12 | 12 | 12 |
| 5:  | 12 | 11 | 12 | 12 | 12 | 10 | 12 | 12 | 12 | 11 | 12 | 12 |
| 6:  | 12 | 12 | 11 | 12 | 12 | 12 | 10 | 12 | 12 | 12 | 11 | 12 |
| 7:  | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 10 | 12 | 12 | 12 | 11 |
| 8:  | 11 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 10 | 12 | 12 | 12 |
| 9:  | 12 | 11 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 10 | 12 | 12 |
| 10: | 12 | 12 | 11 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 10 | 12 |
| 11: | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 11 | 12 | 12 | 12 | 10 |

From /proc/meminfo

```
MemTotal:      791741784 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

/sys/devices/system/cpu/cpu\*/cpufreq/scaling\_governor has performance

/usr/bin/lsb\_release -d

SUSE Linux Enterprise Server 15 SP4

From /etc/\*release\* /etc/\*version\*

```
os-release:
NAME="SLES"
VERSION="15-SP4"
VERSION_ID="15.4"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp4"
```

uname -a:

```
Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18
UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

|   |   |
|---|---|
| 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): | Mitigation: Speculative Store Bypass disabled via prctl and seccomp |
| CVE-2017-5753 (Spectre variant 1):        | Mitigation: usercopy/swaps barriers and __user pointer sanitization |

(Continued on next page)



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## Platform Notes (Continued)

CVE-2017-5715 (Spectre variant 2):

Mitigation: Retpolines, IBPB: conditional, IBRS\_FW, STIBP: always-on, RSB filling

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected

CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Nov 5 09:01

SPEC is set to: /home/cpu2017\_rBl

| Filesystem     | Type | Size | Used | Avail | Use% | Mounted on |
|----------------|------|------|------|-------|------|------------|
| /dev/nvme0n1p3 | xf   | 2.2T | 5.2G | 2.2T  | 1%   | /home      |

From /sys/devices/virtual/dmi/id

```
Vendor:          GIGABYTE
Product:         R263-Z30-AAC1-000
Product Family: Server
Serial:          01234567890123456789AB
```

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:

12x Micron Technology MTC40F2046S1RC48BA1 64 GB 2 rank 4800

BIOS:

```
BIOS Vendor:     GIGABYTE
BIOS Version:    D10
BIOS Date:       09/15/2022
BIOS Revision:   5.27
```

(End of data from sysinfo program)

## Compiler Version Notes

```
=====
C      | 502.gcc_r(peak)
-----
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
=====
```

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## Compiler Version Notes (Continued)

C | 500.perlbench\_r(base, peak) 502.gcc\_r(base) 505.mcf\_r(base, peak)  
| 525.x264\_r(base, peak) 557.xz\_r(base, peak)

-----  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#389 2022\_10\_07) (based on  
LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin  
-----

=====  
C | 502.gcc\_r(peak)

-----  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#389 2022\_10\_07) (based on  
LLVM Mirror.Version.14.0.6)  
Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin  
-----

=====  
C | 500.perlbench\_r(base, peak) 502.gcc\_r(base) 505.mcf\_r(base, peak)  
| 525.x264\_r(base, peak) 557.xz\_r(base, peak)

-----  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#389 2022\_10\_07) (based on  
LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin  
-----

=====  
C++ | 523.xalanbmk\_r(peak)

-----  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#389 2022\_10\_07) (based on  
LLVM Mirror.Version.14.0.6)  
Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin  
-----

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

-----  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#389 2022\_10\_07) (based on  
LLVM Mirror.Version.14.0.6)

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# SPEC CPU®2017 Integer Rate Result

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GIGA-BYTE TECHNOLOGY CO., LTD.  
R263-Z30-AAC1-000  
(AMD EPYC 9654, 2.4GHz)

SPECrate®2017\_int\_base = 852  
SPECrate®2017\_int\_peak = 917

CPU2017 License: 9082

Test Sponsor: GIGA-BYTE TECHNOLOGY CO., LTD.

Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.

Test Date: Nov-2022

Hardware Availability: Nov-2022

Software Availability: Nov-2022

## Compiler Version Notes (Continued)

Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

=====  
C++ | 523.xalancbmk\_r(peak)

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#389 2022\_10\_07) (based on LLVM Mirror.Version.14.0.6)  
Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

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

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#389 2022\_10\_07) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

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

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#389 2022\_10\_07) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

## Base Compiler Invocation

C benchmarks:  
clang

C++ benchmarks:  
clang++

Fortran benchmarks:  
flang



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## Base Portability Flags

500.perlbench\_r: -DSPEC\_LINUX\_X64 -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:

-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather  
-z muldefs -O3 -march=znver4 -fveclib=AMDLIBM -ffast-math  
-fstruct-layout=7 -mllvm -unroll-threshold=50  
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining  
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang  
-lamdalloc

### C++ benchmarks:

-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3  
-march=znver4 -fveclib=AMDLIBM -ffast-math  
-mllvm -unroll-threshold=100 -finline-aggressive  
-mllvm -loop-unswitch-threshold=200000  
-mllvm -reduce-array-computations=3 -zopt  
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm -lflang  
-lamdalloc-ext

### Fortran benchmarks:

-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop  
-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver4  
-fveclib=AMDLIBM -ffast-math -fepilog-vectorization-of-inductions  
-mllvm -optimize-strided-mem-cost -floop-transform  
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm  
-lflang -lamdalloc



# SPEC CPU<sup>®</sup>2017 Integer Rate Result

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SPECrate<sup>®</sup>2017\_int\_base = 852

SPECrate<sup>®</sup>2017\_int\_peak = 917

CPU2017 License: 9082

Test Sponsor: GIGA-BYTE TECHNOLOGY CO., LTD.

Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.

Test Date: Nov-2022

Hardware Availability: Nov-2022

Software Availability: Nov-2022

## Base Other Flags

C benchmarks:

-Wno-unused-command-line-argument

C++ benchmarks:

-Wno-unused-command-line-argument

Fortran benchmarks:

-Wno-unused-command-line-argument

## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

## Peak Portability Flags

500.perlbench\_r: -DSPEC\_LINUX\_X64 -DSPEC\_LP64

502.gcc\_r: -D\_FILE\_OFFSET\_BITS=64

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

## Peak Optimization Flags

C benchmarks:

500.perlbench\_r: basepeak = yes

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CPU2017 License: 9082

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Test Date: Nov-2022

Hardware Availability: Nov-2022

Software Availability: Nov-2022

## Peak Optimization Flags (Continued)

```
502.gcc_r: -m32 -flto -z muldefs -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline
-lamdalloc
```

```
505.mcf_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc
```

525.x264\_r: basepeak = yes

557.xz\_r: Same as 505.mcf\_r

C++ benchmarks:

```
520.omnetpp_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext
```

```
523.xalancbmk_r: -m32 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-fno-loop-reroll -Ofast -march=znver4 -fveclib=AMDLIBM
-ffast-math -finline-aggressive
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdalloc-ext
```

531.deepsjeng\_r: basepeak = yes

541.leela\_r: basepeak = yes

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## Peak Optimization Flags (Continued)

Fortran benchmarks:

548.exchange2\_r: basepeak = yes

## Peak Other Flags

C benchmarks (except as noted below):

-Wno-unused-command-line-argument

502.gcc\_r: -L/usr/lib32 -Wno-unused-command-line-argument

-L/home/work/cpu2017/v118/aocc4/b1/rate/amd\_rate\_aocc400\_genoa\_B\_lib/lib32

C++ benchmarks (except as noted below):

-Wno-unused-command-line-argument

523.xalancbmk\_r: -L/usr/lib32 -Wno-unused-command-line-argument

-L/home/work/cpu2017/v118/aocc4/b1/rate/amd\_rate\_aocc400\_genoa\_B\_lib/lib32

Fortran benchmarks:

-Wno-unused-command-line-argument

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

<http://www.spec.org/cpu2017/flags/aocc400-flags.html>

<http://www.spec.org/cpu2017/flags/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.1-Genoa.html>

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

<http://www.spec.org/cpu2017/flags/aocc400-flags.xml>

<http://www.spec.org/cpu2017/flags/GIGA-BYTE-Platform-SPECcpu2017-Flags-V1.1-Genoa.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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