



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

## Dell Inc.

SPECrate®2017\_fp\_base = 801

PowerEdge R6625 (AMD EPYC 9334 32-Core Processor)

SPECrate®2017\_fp\_peak = Not Run

CPU2017 License: 6573

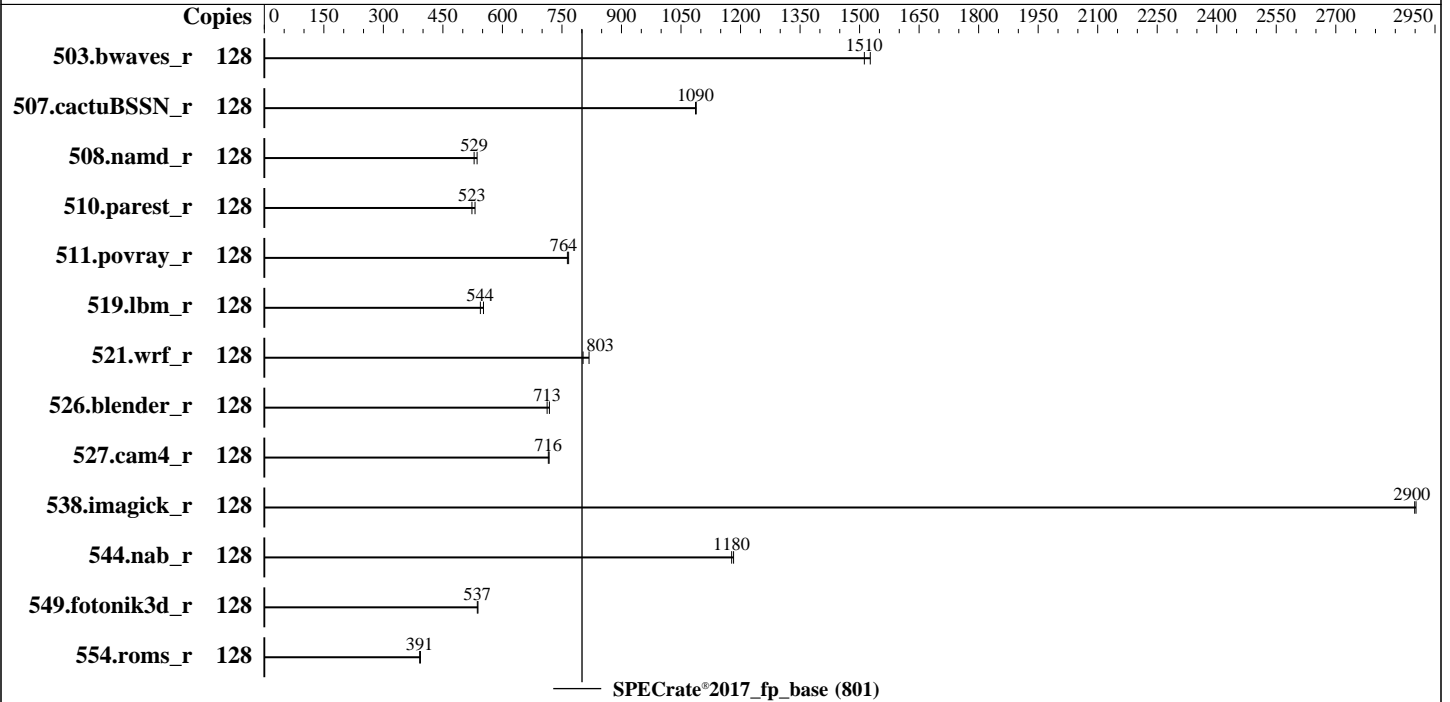
Test Date: Dec-2022

Test Sponsor: Dell Inc.

Hardware Availability: Feb-2023

Tested by: Dell Inc.

Software Availability: Nov-2022



### Hardware

CPU Name: AMD EPYC 9334  
 Max MHz: 3900  
 Nominal: 2700  
 Enabled: 64 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 128 MB I+D on chip per chip, 32 MB shared / 8 cores  
 Other: None  
 Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 125 GB on tmpfs  
 Other: None

### Software

OS: Ubuntu 22.04.1 LTS  
 5.15.0-46-generic  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: No  
 Firmware: Version 1.1.0 released Nov-2022  
 File System: tmpfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 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 |
| 503.bwaves_r    | 128    | <b>849</b> | <b>1510</b> | 841        | 1530        |         |       |        |         |       |         |       |         |       |
| 507.cactuBSSN_r | 128    | <b>149</b> | <b>1090</b> | 149        | 1090        |         |       |        |         |       |         |       |         |       |
| 508.namd_r      | 128    | 227        | 536         | <b>230</b> | <b>529</b>  |         |       |        |         |       |         |       |         |       |
| 510.parest_r    | 128    | 631        | 531         | <b>640</b> | <b>523</b>  |         |       |        |         |       |         |       |         |       |
| 511.povray_r    | 128    | <b>391</b> | <b>764</b>  | 390        | 767         |         |       |        |         |       |         |       |         |       |
| 519.lbm_r       | 128    | <b>248</b> | <b>544</b>  | 244        | 552         |         |       |        |         |       |         |       |         |       |
| 521.wrf_r       | 128    | 350        | 818         | <b>357</b> | <b>803</b>  |         |       |        |         |       |         |       |         |       |
| 526.blender_r   | 128    | <b>274</b> | <b>713</b>  | 271        | 718         |         |       |        |         |       |         |       |         |       |
| 527.cam4_r      | 128    | 312        | 718         | <b>313</b> | <b>716</b>  |         |       |        |         |       |         |       |         |       |
| 538.imagick_r   | 128    | 110        | 2900        | <b>110</b> | <b>2900</b> |         |       |        |         |       |         |       |         |       |
| 544.nab_r       | 128    | <b>183</b> | <b>1180</b> | 182        | 1180        |         |       |        |         |       |         |       |         |       |
| 549.fotonik3d_r | 128    | <b>929</b> | <b>537</b>  | 927        | 538         |         |       |        |         |       |         |       |         |       |
| 554.roms_r      | 128    | 517        | 393         | <b>520</b> | <b>391</b>  |         |       |        |         |       |         |       |         |       |

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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.

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## Operating System Notes (Continued)

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.

To enable Transparent Hugepages (THP) for all allocations, '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 =
"/mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b/amd_rate_aocc400_genoa_B_lib/lib
:/mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b/amd_rate_aocc400_genoa_B_lib/lib
32:"
MALLOC_CONF = "retain:true"
```

## 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.

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

## Platform Notes

BIOS settings:  
DRAM Refresh Delay : Performance  
DIMM Self Healing on  
Uncorrectable Memory Error : Disabled  
Logical Processor : Enabled  
Virtualization Technology : Disabled  
L1 Stride Prefetcher : Disabled  
NUMA Nodes per Socket : 4  
L3 Cache as NUMA Domain : Enabled

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## Platform Notes (Continued)

System Profile : Custom  
 Memory Patrol Scrub : Disabled  
 PCI ASPM L1 Link  
 Power Management : Disabled  
 Determinism Slider : Power Determinism

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-aocc400-Blb/bin/sysinfo  
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d  
 running on amd-sut Fri Dec 9 19:14:18 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 9334 32-Core Processor  
 2 "physical id"s (chips)  
 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.)  
 cpu cores : 32  
 siblings : 64  
 physical 0: cores 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  
 physical 1: cores 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

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): 128  
 On-line CPU(s) list: 0-127  
 Vendor ID: AuthenticAMD  
 Model name: AMD EPYC 9334 32-Core Processor  
 CPU family: 25  
 Model: 17  
 Thread(s) per core: 2  
 Core(s) per socket: 32  
 Socket(s): 2  
 Stepping: 1  
 Frequency boost: enabled  
 CPU max MHz: 3911.0000  
 CPU min MHz: 400.0000  
 BogoMIPS: 5401.12

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## Platform Notes (Continued)

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 pdpelgb rdtscp lm constant\_tsc rep\_good nopl nonstop\_tsc cpuid extd\_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4\_1 sse4\_2 x2apic movbe popcnt aes xsave avx fl6c rdrand lahf\_lm cmp\_legacy svm extapic cr8\_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr\_core perfctr\_nb bpxt perfctr\_llc mwaitx cpb cat\_l3 cdp\_l3 invpcid\_single hw\_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt\_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb avx512cd sha\_ni avx512bw avx512v1 xsaveopt xsavec xgetbv1 xsaves cqm\_llc cqm\_occup\_llc cqm\_mbm\_total cqm\_mbm\_local avx512\_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd\_ppin cppc 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\_lld

Virtualization: AMD-V  
 L1d cache: 2 MiB (64 instances)  
 L1i cache: 2 MiB (64 instances)  
 L2 cache: 64 MiB (64 instances)  
 L3 cache: 256 MiB (8 instances)  
 NUMA node(s): 8  
 NUMA node0 CPU(s): 0-7,64-71  
 NUMA node1 CPU(s): 16-23,80-87  
 NUMA node2 CPU(s): 24-31,88-95  
 NUMA node3 CPU(s): 8-15,72-79  
 NUMA node4 CPU(s): 32-39,96-103  
 NUMA node5 CPU(s): 48-55,112-119  
 NUMA node6 CPU(s): 56-63,120-127  
 NUMA node7 CPU(s): 40-47,104-111  
 Vulnerability Itlb multihit: Not affected  
 Vulnerability L1tf: Not affected  
 Vulnerability Mds: Not affected  
 Vulnerability Meltdown: Not affected  
 Vulnerability Mmio stale data: Not affected  
 Vulnerability Retbleed: 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      | 2M       | 8    | Data | 1     | 64   | 1        | 64             |

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## Platform Notes (Continued)

|     |     |      |               |   |       |   |    |
|-----|-----|------|---------------|---|-------|---|----|
| L1i | 32K | 2M   | 8 Instruction | 1 | 64    | 1 | 64 |
| L2  | 1M  | 64M  | 8 Unified     | 2 | 2048  | 1 | 64 |
| L3  | 32M | 256M | 16 Unified    | 3 | 32768 | 1 | 64 |

/proc/cpuinfo cache data  
cache size : 1024 KB

From numactl --hardware

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

available: 8 nodes (0-7)

node 0 cpus: 0 1 2 3 4 5 6 7 64 65 66 67 68 69 70 71

node 0 size: 193077 MB

node 0 free: 188736 MB

node 1 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87

node 1 size: 193496 MB

node 1 free: 192692 MB

node 2 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95

node 2 size: 193531 MB

node 2 free: 192732 MB

node 3 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79

node 3 size: 193515 MB

node 3 free: 192678 MB

node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103

node 4 size: 193531 MB

node 4 free: 192740 MB

node 5 cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119

node 5 size: 193531 MB

node 5 free: 192754 MB

node 6 cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127

node 6 size: 193531 MB

node 6 free: 192739 MB

node 7 cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111

node 7 size: 193505 MB

node 7 free: 192722 MB

node distances:

|      |    |    |    |    |    |    |    |    |
|------|----|----|----|----|----|----|----|----|
| node | 0  | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| 0:   | 10 | 12 | 12 | 12 | 32 | 32 | 32 | 32 |
| 1:   | 12 | 10 | 12 | 12 | 32 | 32 | 32 | 32 |
| 2:   | 12 | 12 | 10 | 12 | 32 | 32 | 32 | 32 |
| 3:   | 12 | 12 | 12 | 10 | 32 | 32 | 32 | 32 |
| 4:   | 32 | 32 | 32 | 32 | 10 | 12 | 12 | 12 |
| 5:   | 32 | 32 | 32 | 32 | 12 | 10 | 12 | 12 |
| 6:   | 32 | 32 | 32 | 32 | 12 | 12 | 10 | 12 |
| 7:   | 32 | 32 | 32 | 32 | 12 | 12 | 12 | 10 |

From /proc/meminfo

MemTotal: 1584866492 kB

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## Platform Notes (Continued)

HugePages\_Total: 0  
Hugepagesize: 2048 kB

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

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

/usr/bin/lsb\_release -d  
Ubuntu 22.04.1 LTS

From /etc/\*release\* /etc/\*version\*  
debian\_version: bookworm/sid  
os-release:  
PRETTY\_NAME="Ubuntu 22.04.1 LTS"  
NAME="Ubuntu"  
VERSION\_ID="22.04"  
VERSION="22.04.1 LTS (Jammy Jellyfish)"  
VERSION\_CODENAME=jammy  
ID=ubuntu  
ID\_LIKE=debian  
HOME\_URL="https://www.ubuntu.com/"

uname -a:  
Linux amd-sut 5.15.0-46-generic #49-Ubuntu SMP Thu Aug 4 18:03:25 UTC 2022 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  |
| mmio_stale_data:                                       | Not affected  |
| retbleed:  | 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/swapgs barriers and __user pointer sanitization              |
| 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  |

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## Platform Notes (Continued)

run-level 3 Dec 9 17:33

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b  
Filesystem Type Size Used Avail Use% Mounted on  
tmpfs tmpfs 125G 3.4G 122G 3% /mnt/ramdisk

From /sys/devices/virtual/dmi/id  
Vendor: Dell Inc.  
Product: PowerEdge R6625  
Product Family: PowerEdge  
Serial: BGP4023

Additional information from dmidecode 3.3 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:  
24x 80CE000080CE M321R8GA0BB0-CQKDG 64 GB 2 rank 4800

BIOS:  
BIOS Vendor: Dell Inc.  
BIOS Version: 1.1.0  
BIOS Date: 11/25/2022  
BIOS Revision: 1.1

(End of data from sysinfo program)

## Compiler Version Notes

=====  
C | 519.lbm\_r(base) 538.imagick\_r(base) 544.nab\_r(base)  
-----  
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++ | 508.namd\_r(base) 510.parest\_r(base)  
-----  
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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## Compiler Version Notes (Continued)

Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

=====  
C++, C | 511.povray\_r(base) 526.blender\_r(base)  
-----

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

=====  
C++, C, Fortran | 507.cactuBSSN\_r(base)  
-----

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

=====  
Fortran | 503.bwaves\_r(base) 549.fotonik3d\_r(base) 554.roms\_r(base)  
-----

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## Compiler Version Notes (Continued)

-----  
=====  
Fortran, C | 521.wrf\_r(base) 527.cam4\_r(base)  
-----

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

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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

Benchmarks using both Fortran and C:

flang clang

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Base Portability Flags

503.bwaves\_r: -DSPEC\_LP64

507.cactuBSSN\_r: -DSPEC\_LP64

508.namd\_r: -DSPEC\_LP64

510.parest\_r: -DSPEC\_LP64

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# SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

SPECrate®2017\_fp\_base = 801

PowerEdge R6625 (AMD EPYC 9334 32-Core Processor)

SPECrate®2017\_fp\_peak = Not Run

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Dec-2022

Hardware Availability: Feb-2023

Software Availability: Nov-2022

## Base Portability Flags (Continued)

```

511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -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:

```

-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 -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 -lamdalloc -lflang

```

### C++ benchmarks:

```

-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang

```

### Fortran benchmarks:

```

-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang

```

### Benchmarks using both Fortran and C:

```

-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7

```

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## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

Benchmarks using both C and C++:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

## Base Other Flags

C benchmarks:

```
-Wno-unused-command-line-argument
```

C++ benchmarks:

```
-Wno-unused-command-line-argument
```

Fortran benchmarks:

```
-Wno-unused-command-line-argument
```

Benchmarks using both Fortran and C:

```
-Wno-unused-command-line-argument
```

Benchmarks using both C and C++:

```
-Wno-unused-command-line-argument
```

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## Base Other Flags (Continued)

Benchmarks using Fortran, C, and C++:

-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/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.0.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/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.0.xml>

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