# SPEC CPU®2017 Floating Point Speed Result



## ASRock Rack Inc.

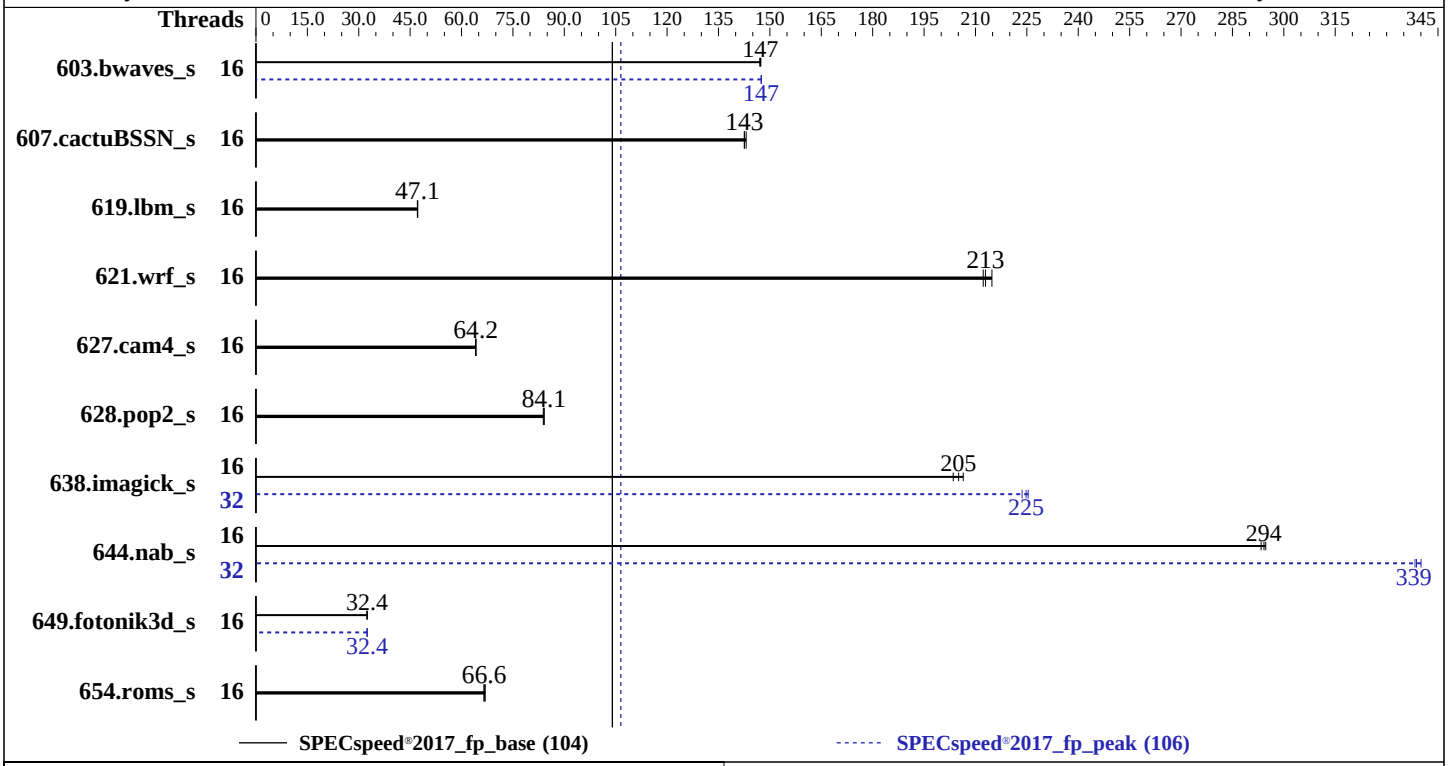
1U4LW-B650/2L2T
AMD EPYC 4565P

SPECspeed®2017_fp_base = 104

SPECspeed®2017_fp_peak = 106

**CPU2017 License:** 5416
**Test Sponsor:** ASRock Rack Inc.
**Tested by:** ASRock Rack Inc.

**Test Date:** Apr-2025
**Hardware Availability:** Feb-2025
**Software Availability:** Mar-2025




## Hardware

| | |
|---|---|
| CPU Name: | AMD EPYC 4565P |
| Max MHz: | 5700 |
| Nominal: | 4300 |
| Enabled: | 16 cores, 1 chip, 2 threads/core |
| Orderable: | 1 chip |
| Cache L1: | 32 KB I + 48 KB D on chip per core |
| L2: | 1 MB I+D on chip per core |
| L3: | 64 MB I+D on chip per chip, 32 MB shared / 8 cores |
| Other: | None |
| Memory: | 64 GB (2 x 32 GB 2Rx8 PC5-5600B-R) |
| Storage: | 1 x 930 GB NVMe M.2 |
| Other: | CPU Cooling: Air |

## Software

| | |
|---|---|
| OS: | Ubuntu 24.04.2 LTS kernel version 6.8.0-57-generic |
| Compiler: | C/C++/Fortran: Version 5.0.0 of AOCC |
| Parallel: | Yes |
| Firmware: | Version 21.06 released Mar-2025 |
| File System: | ext4 |
| System State: | Run level 5 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Other: | None |
| Power Management: | BIOS and OS set to prefer performance at the cost of additional power usage. |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 603.bwaves_s | 16 | **401** | **147** | 401 | 147 | 400 | 147 | 16 | 400 | 148 | **400** | **147** | 400 | 147 |
| 607.cactuBSSN_s | 16 | 117 | 143 | **117** | **143** | 117 | 143 | 16 | 117 | 143 | **117** | **143** | 117 | 143 |
| 619.lbm_s | 16 | **111** | **47.1** | 111 | 47.1 | 111 | 47.2 | 16 | **111** | **47.1** | 111 | 47.1 | 111 | 47.2 |
| 621.wrf_s | 16 | 61.6 | 215 | 62.3 | 212 | **62.1** | **213** | 16 | 61.6 | 215 | 62.3 | 212 | **62.1** | **213** |
| 627.cam4_s | 16 | **138** | **64.2** | 138 | 64.1 | 138 | 64.2 | 16 | **138** | **64.2** | 138 | 64.1 | 138 | 64.2 |
| 628.pop2_s | 16 | 142 | 83.9 | **141** | **84.1** | 141 | 84.1 | 16 | 142 | 83.9 | **141** | **84.1** | 141 | 84.1 |
| 638.imagick_s | 16 | 69.9 | 206 | **70.3** | **205** | 70.9 | 204 | 32 | 64.0 | 225 | **64.2** | **225** | 64.5 | 224 |
| 644.nab_s | 16 | **59.4** | **294** | 59.3 | 295 | 59.6 | 293 | 32 | 51.4 | 340 | **51.6** | **339** | 51.6 | 338 |
| 649.fotonik3d_s | 16 | 281 | 32.4 | 281 | 32.4 | **281** | **32.4** | 16 | 281 | 32.4 | **281** | **32.4** | 281 | 32.5 |
| 654.roms_s | 16 | 235 | 66.9 | **236** | **66.6** | 237 | 66.5 | 16 | 235 | 66.9 | **236** | **66.6** | 237 | 66.5 |

**SPECspeed®2017_fp_base =** **104**

**SPECspeed®2017_fp_peak =** **106**

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.

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:
GOMP_CPU_AFFINITY = "0-31"
LD_LIBRARY_PATH =
     "/home/amd/SPEED2017/amd_speed_aocc500_znver5_A_lib/lib:/home/amd/SPEED2017/amd_speed_aocc500_znver5_A
     _lib/lib32:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-15"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-15"
```

## General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9D64 CPU + 500GiB Memory using Ubuntu 22.04
```

## Platform Notes

```
BIOS setting:
     SoC/Uncore OC Mode : Enabled

 Sysinfo program /home/amd/SPEED2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on ryzen-grado-1 Sun Apr  6 20:46:44 2025

 SUT (System Under Test) info as seen by some common utilities.

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 255 (255.4-1ubuntu8.6)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. sysctl
```

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## Platform Notes (Continued)

```
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux ryzen-grado-1 6.8.0-57-generic #59-Ubuntu SMP PREEMPT_DYNAMIC Sat Mar 15 17:40:59 UTC 2025 x86_64
  x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   20:46:44 up 3 days,  2:34,  2 users,  load average: 7.94, 6.14, 3.88
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU  WHAT
  amd              10.252.54.9      18:35    2:10m  0.00s   ?    sshd: amd [priv]

------------------------------------------------------------
3. Username
  From environment variable $USER:  root
  From the command 'logname':       amd

------------------------------------------------------------
4. ulimit -a
  time(seconds)        unlimited
  file(blocks)         unlimited
  data(kbytes)         unlimited
  stack(kbytes)        unlimited
  coredump(blocks)     0
  memory(kbytes)       unlimited
  locked memory(kbytes) 2097152
  process              247244
  nofiles              1024
  vmemory(kbytes)      unlimited
  locks                unlimited
  rtprio               0

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --system --deserialize=125
 tmux
 -bash
 sudo ./run_amd_speed_aocc500_znver5_A1.py
 sudo ./run_amd_speed_aocc500_znver5_A1.py
 python3 ./run_amd_speed_aocc500_znver5_A1.py
 /bin/bash ./amd_speed_aocc500_znver5_A1.sh
 runcpu --config amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 fpspeed
 runcpu --configfile amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.002/templogs/preenv.fpspeed.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/amd/SPEED2017

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 4565P 16-Core Processor
    vendor_id       : AuthenticAMD
```

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## Platform Notes (Continued)

```
     cpu family      : 26
     model           : 68
     stepping        : 0
     microcode       : 0xb404023
     bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size        : 192 4K pages
     cpu cores       : 16
     siblings        : 32
     1 physical ids (chips)
     32 processors (hardware threads)
     physical id 0: core ids 0-15
     physical id 0: apicids 0-31
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems.  Use the above data carefully.

 ------------------------------------------------------------
 7. lscpu

 From lscpu from util-linux 2.39.3:
   Architecture:                         x86_64
   CPU op-mode(s):                       32-bit, 64-bit
   Address sizes:                        48 bits physical, 48 bits virtual
   Byte Order:                           Little Endian
   CPU(s):                               32
   On-line CPU(s) list:                  0-31
   Vendor ID:                            AuthenticAMD
   BIOS Vendor ID:                       Advanced Micro Devices, Inc.
   Model name:                           AMD EPYC 4565P 16-Core Processor
   BIOS Model name:                      AMD EPYC 4565P 16-Core Processor                Unknown CPU @ 4.3GHz
   BIOS CPU family:                      107
   CPU family:                           26
   Model:                                68
   Thread(s) per core:                   2
   Core(s) per socket:                   16
   Socket(s):                            1
   Stepping:                             0
   CPU(s) scaling MHz:                   30%
   CPU max MHz:                          5752.0000
   CPU min MHz:                          600.0000
   BogoMIPS:                             8583.31
   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 amd_lbr_v2 nopl nonstop_tsc cpuid
                                         extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16
                                         sse4_1 sse4_2 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 hw_pstate ssbd mba perfmon_v2
                                         ibrs ibpb stibp ibrs_enhanced vmmcall fsgsbase tsc_adjust 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 user_shstk avx_vnni avx512_bf16 clzero irperf
                                         xsaveerptr rdpru wbnoinvd cppc amd_ibpb_ret arat npt lbrv svm_lock
                                         nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                                         pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi
                                         avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
                                         avx512_vnni avx512_bitalg avx512_vpopcntdq rdpid bus_lock_detect
                                         movdiri movdir64b overflow_recov succor smca fsrm avx512_vp2intersect
                                         flush_l1d
```

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## Platform Notes (Continued)

```
  Virtualization:                    AMD-V
  L1d cache:                         768 KiB (16 instances)
  L1i cache:                         512 KiB (16 instances)
  L2 cache:                          16 MiB (16 instances)
  L3 cache:                          64 MiB (2 instances)
  NUMA node(s):                      1
  NUMA node0 CPU(s):                 0-31
  Vulnerability Gather data sampling: Not affected
  Vulnerability Itlb multihit:       Not affected
  Vulnerability L1tf:                Not affected
  Vulnerability Mds:                 Not affected
  Vulnerability Meltdown:            Not affected
  Vulnerability Mmio stale data:     Not affected
  Vulnerability Reg file data sampling: Not affected
  Vulnerability Retbleed:            Not affected
  Vulnerability Spec rstack overflow: Not affected
  Vulnerability Spec store bypass:   Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:          Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:          Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                     always-on; RSB filling; PBRSB-eIBRS Not affected; BHI Not affected
  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       48K     768K   12 Data            1    64        1             64
     L1i       32K     512K    8 Instruction     1    64        1             64
     L2         1M      16M   16 Unified         2  1024        1             64
     L3        32M      64M   16 Unified         3 32768        1             64

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0-31
  node 0 size: 61885 MB
  node 0 free: 61014 MB
  node distances:
  node   0
    0:  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       63370700 kB

------------------------------------------------------------
10. who -r
  run-level 5 Apr 3 18:12

------------------------------------------------------------
11. Systemd service manager version: systemd 255 (255.4-1ubuntu8.6)
  Default Target  Status
  graphical       running

------------------------------------------------------------
12. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          ModemManager apparmor apport blk-availability cloud-config cloud-final cloud-init
                   cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                   grub-common grub-initrd-fallback keyboard-setup lvm2-monitor multipathd
```

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## Platform Notes (Continued)

```
                  networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db setvtrgb
                  snapd sysstat systemd-networkd systemd-networkd-wait-online systemd-pstore
                  systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                  unattended-upgrades vgauth
  enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
  disabled        console-getty debug-shell iscsid nftables rsync serial-getty@ ssh
                  systemd-boot-check-no-failures systemd-confext systemd-network-generator
                  systemd-networkd-wait-online@ systemd-pcrlock-file-system systemd-pcrlock-firmware-code
                  systemd-pcrlock-firmware-config systemd-pcrlock-machine-id systemd-pcrlock-make-policy
                  systemd-pcrlock-secureboot-authority systemd-pcrlock-secureboot-policy systemd-sysext
                  systemd-time-wait-sync upower
  indirect        systemd-sysupdate systemd-sysupdate-reboot uuidd
  masked          cryptdisks cryptdisks-early hwclock multipath-tools-boot screen-cleanup sudo x11-common

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.8.0-57-generic
  root=UUID=d1c61924-c235-452d-89ab-0173748185ce
  ro

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 14:
    current policy: frequency should be within 600 MHz and 5.75 GHz.
                    The governor "powersave" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

------------------------------------------------------------
15. sysctl
  kernel.numa_balancing               0
  kernel.randomize_va_space           0
  vm.compaction_proactiveness        20
  vm.dirty_background_bytes           0
  vm.dirty_background_ratio          10
  vm.dirty_bytes                      0
  vm.dirty_expire_centisecs        3000
  vm.dirty_ratio                      8
  vm.dirty_writeback_centisecs      500
  vm.dirtytime_expire_seconds     43200
  vm.extfrag_threshold              500
  vm.min_unmapped_ratio               1
  vm.nr_hugepages                     0
  vm.nr_hugepages_mempolicy           0
  vm.nr_overcommit_hugepages          0
  vm.swappiness                       1
  vm.watermark_boost_factor       15000
  vm.watermark_scale_factor          10
  vm.zone_reclaim_mode                1

------------------------------------------------------------
16. /sys/kernel/mm/transparent_hugepage
  defrag          [always] defer defer+madvise madvise never
  enabled         [always] madvise never
  hpage_pmd_size  2097152
  shmem_enabled   always within_size advise [never] deny force

------------------------------------------------------------
```

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## Platform Notes (Continued)

```
17. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_shared           256
  max_ptes_swap              64
  pages_to_scan            4096
  scan_sleep_millisecs    10000

------------------------------------------------------------
18. OS release
  From /etc/*-release /etc/*-version
  os-release Ubuntu 24.04.2 LTS

------------------------------------------------------------
19. Disk information
SPEC is set to: /home/amd/SPEED2017
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p2 ext4  915G   34G  835G   4% /

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         AsrockRack
    Product:        1U4LW-B650/2L2T

------------------------------------------------------------
21. dmidecode
  Additional information from dmidecode 3.5 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:
    2x Micron Technology MTC20C2085S1EC56BD1 NC 32 GB 2 rank 5600


------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       American Megatrends International, LLC.
   BIOS Version:      21.06
   BIOS Date:         03/17/2025
   BIOS Revision:     5.35
```

## Compiler Version Notes

```
==============================================================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
```

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## Compiler Version Notes (Continued)

```
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
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AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
------------------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------------------------------------------------

==============================================================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
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AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
`clang`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

Benchmarks using Fortran, C, and C++:
`clang++ clang flang`

## Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64
628.pop2_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

## Base Optimization Flags

C benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
-fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -mrecip=none -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-Mrecursive -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang

Benchmarks using both Fortran and C:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
-fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -funroll-loops
-mllvm -lsr-in-nested-loop -Mrecursive -mrecip=none -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang

Benchmarks using Fortran, C, and C++:
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

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## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
-fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt
-mllvm -loop-unswitch-threshold=200000 -mllvm -unroll-threshold=100
-funroll-loops -mllvm -lsr-in-nested-loop -Mrecursive -mrecip=none
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

## Base Other Flags

C benchmarks:
-Wno-return-type -Wno-unused-command-line-argument

Fortran benchmarks:
-Wno-unused-command-line-argument

Benchmarks using both Fortran and C:
-Wno-return-type -Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:
-Wno-return-type -Wno-unused-command-line-argument

## Peak Compiler Invocation

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang

644.nab_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -mrecip=none
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

Fortran benchmarks:

603.bwaves_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver5 -fveclib=AMDLIBM -ffast-math
-fopenmp -fscalar-transform -fvector-transform
-mllvm -reduce-array-computations=3 -Mrecursive
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

649.fotonik3d_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver5 -fveclib=AMDLIBM -ffast-math
-fopenmp -flto -mllvm -reduce-array-computations=3
-Mrecursive -zopt -fopenmp=libomp -lomp -lamdlibm
-lamdalloc -lflang

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## Peak Optimization Flags (Continued)

654.roms_s: `basepeak = yes`

Benchmarks using both Fortran and C:

621.wrf_s: `basepeak = yes`

627.cam4_s: `basepeak = yes`

628.pop2_s: `basepeak = yes`

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: `basepeak = yes`

## Peak Other Flags

C benchmarks:
`-Wno-return-type -Wno-unused-command-line-argument`

Fortran benchmarks:
`-Wno-unused-command-line-argument`

Benchmarks using both Fortran and C:
`-Wno-return-type -Wno-unused-command-line-argument`

Benchmarks using Fortran, C, and C++:
`-Wno-return-type -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/ASRockRack-platform_AMD_setting_v1.0.html`
`http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/ASRockRack-platform_AMD_setting_v1.0.xml`
`http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml`



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

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