SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

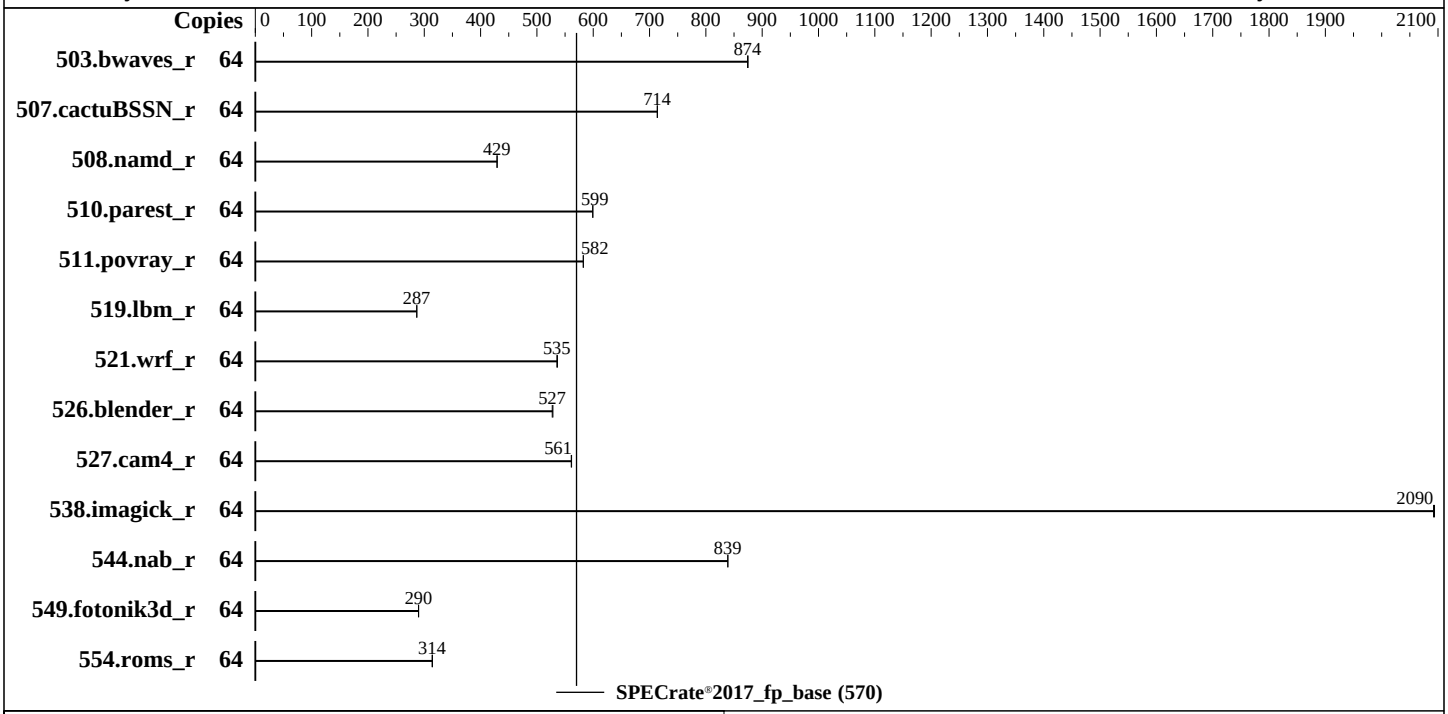
PowerEdge R6615 (AMD EPYC 9534 64-Core Processor)

SPECrate®2017_fp_base = 570

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Mar-2023
Hardware Availability: Mar-2023
Software Availability: Nov-2022



Hardware

CPU Name:	AMD EPYC 9534
Max MHz:	3700
Nominal:	2450
Enabled:	64 cores, 1 chip
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:	256 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:	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 1.3.7 released Mar-2023
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	64	734	875	**734**	**874**									
507.cactuBSSN_r	64	**114**	**714**	113	714									
508.namd_r	64	142	430	**142**	**429**									
510.parest_r	64	279	599	**280**	**599**									
511.povray_r	64	**257**	**582**	257	582									
519.lbm_r	64	235	287	**235**	**287**									
521.wrf_r	64	**268**	**535**	267	536									
526.blender_r	64	**185**	**527**	184	528									
527.cam4_r	64	199	562	**200**	**561**									
538.imagick_r	64	76.0	2090	**76.1**	**2090**									
544.nab_r	64	128	839	**128**	**839**									
549.fotonik3d_r	64	**861**	**290**	860	290									
554.roms_r	64	323	315	**324**	**314**									

SPECrate®2017_fp_base = 570

SPECrate®2017_fp_peak = Not Run

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,
```

(Continued on next page)

Operating System Notes (Continued)

```
'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/cpu2017-1.1.9-aocc400-B1e/amd_rate_aocc400_genoa_B_lib/lib:/mnt/ramdisk/cpu2017-1.1.9-ao
     cc400-B1e/amd_rate_aocc400_genoa_B_lib/lib32:"
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 : Disabled
     Virtualization Technology : Disabled
         L1 Stride Prefetcher: : Disabled
         NUMA Nodes per Socket : 4
       L3 Cache as NUMA Domain : Enabled

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

 Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-aocc400-B1e/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on amd-sut Mon Mar 27 21:22:25 2023

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

 ------------------------------------------------------------
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 ------------------------------------------------------------
  1. uname -a
```

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Platform Notes (Continued)

```
 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 249 (249.11-0ubuntu3.4)
12. Failed units, from systemctl list-units --state=failed
13. Services, from systemctl list-unit-files
14. Linux kernel boot-time arguments, from /proc/cmdline
15. cpupower frequency-info
16. tuned-adm active
17. sysctl
18. /sys/kernel/mm/transparent_hugepage
19. /sys/kernel/mm/transparent_hugepage/khugepaged
20. OS release
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. 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

------------------------------------------------------------
2. w
   21:22:25 up  1:18,  1 user,  load average: 48.38, 60.17, 61.70
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                20:06    1:15m  1.93s  0.40s /bin/bash ./amd_rate_aocc400_genoa_B1.sh

------------------------------------------------------------
3. Username
  From environment variable $USER:  root

------------------------------------------------------------
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              3093937
  nofiles              1024
  vmemory(kbytes)      unlimited
  locks                unlimited
  rtprio               0

------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
 /bin/login -p --
 -bash
 /bin/bash ./DELL_rate.sh
```

(Continued on next page)

Platform Notes (Continued)

```
 /bin/bash ./dell-run-main.sh rate
 /bin/bash ./dell-run-main.sh rate
 /bin/bash ./dell-run-specrate.sh --output_format csv,html,pdf,txt -define Dell-BIOS-inc=Dell-BIOS_EPYC-4.inc
   --define Dell-BIOS-LogProcD=1
 python3 ./run_amd_rate_aocc400_genoa_B1.py
 /bin/bash ./amd_rate_aocc400_genoa_B1.sh
 runcpu --config amd_rate_aocc400_genoa_B1.cfg --tune base --reportable --iterations 2 --output_format
   csv,html,pdf,txt -define Dell-BIOS-inc=Dell-BIOS_EPYC-4.inc --define Dell-BIOS-LogProcD=1 fprate
 runcpu --configfile amd_rate_aocc400_genoa_B1.cfg --tune base --reportable --iterations 2 --output_format
   csv,html,pdf,txt --define Dell-BIOS-inc=Dell-BIOS_EPYC-4.inc --define Dell-BIOS-LogProcD=1 --nopower
   --runmode rate --tune base --size test:train:refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /mnt/ramdisk/cpu2017-1.1.9-aocc400-B1e

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9534 64-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 17
    stepping        : 1
    microcode       : 0xa101116
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size        : 3584 4K pages
    cpu cores       : 64
    siblings        : 64
    1 physical ids (chips)
    64 processors (hardware threads)
    physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
    physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
  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 2.37.2:
  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):                          64
  On-line CPU(s) list:             0-63
  Vendor ID:                       AuthenticAMD
  Model name:                      AMD EPYC 9534 64-Core Processor
  CPU family:                      25
  Model:                           17
  Thread(s) per core:              1
  Core(s) per socket:              64
  Socket(s):                       1
  Stepping:                        1
  Frequency boost:                 enabled
  CPU max MHz:                     3719.0000
  CPU min MHz:                     400.0000
  BogoMIPS:                        4901.63
  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 aperfmperf rapl
                                   pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
```

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Platform Notes (Continued)

```
                        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 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 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 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_l1d
  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
  NUMA node1 CPU(s):    32-39
  NUMA node2 CPU(s):    16-23
  NUMA node3 CPU(s):    48-55
  NUMA node4 CPU(s):    24-31
  NUMA node5 CPU(s):    56-63
  NUMA node6 CPU(s):    8-15
  NUMA node7 CPU(s):    40-47
  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 disabled, 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
     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

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0-7
  node 0 size: 96311 MB
  node 0 free: 95745 MB
  node 1 cpus: 32-39
  node 1 size: 96764 MB
  node 1 free: 96217 MB
  node 2 cpus: 16-23
  node 2 size: 96765 MB
  node 2 free: 96251 MB
  node 3 cpus: 48-55
```

(Continued on next page)

Platform Notes (Continued)

```
  node 3 size: 96764 MB
  node 3 free: 96257 MB
  node 4 cpus: 24-31
  node 4 size: 96765 MB
  node 4 free: 96232 MB
  node 5 cpus: 56-63
  node 5 size: 96764 MB
  node 5 free: 96262 MB
  node 6 cpus: 8-15
  node 6 size: 96730 MB
  node 6 free: 96233 MB
  node 7 cpus: 40-47
  node 7 size: 96726 MB
  node 7 free: 92706 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  11  12  12  12  12  12  12
    1:  11  10  12  12  12  12  12  12
    2:  12  12  10  11  12  12  12  12
    3:  12  12  11  10  12  12  12  12
    4:  12  12  12  12  10  11  12  12
    5:  12  12  12  12  11  10  12  12
    6:  12  12  12  12  12  12  10  11
    7:  12  12  12  12  12  12  11  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       792161856 kB

------------------------------------------------------------
10. who -r
  run-level 3 Mar 27 20:05

------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.4)
  Default Target  Status
  multi-user      degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT                                LOAD   ACTIVE SUB    DESCRIPTION
  * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured

------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          blk-availability console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                   grub-common grub-initrd-fallback irqbalance keyboard-setup lm-sensors networkd-dispatcher
                   open-iscsi open-vm-tools pollinate rsyslog secureboot-db setvtrgb ssh systemd-networkd
                   systemd-pstore systemd-resolved systemd-timesyncd thermald tuned ua-reboot-cmds
                   ubuntu-advantage udisks2 vgauth wpa_supplicant
  enabled-runtime  netplan-ovs-cleanup systemd-fsck-root systemd-networkd-wait-online systemd-remount-fs
  disabled         ModemManager apparmor console-getty debug-shell iscsid lvm2-monitor lxd-agent multipathd
                   nftables rsync serial-getty@ systemd-boot-check-no-failures systemd-network-generator
                   systemd-sysext systemd-time-wait-sync ufw upower wpa_supplicant-nl80211@
                   wpa_supplicant-wired@ wpa_supplicant@
  generated        apport
  indirect         uuidd
  masked           NetworkManager NetworkManager-dispatcher NetworkManager-wait-online cryptdisks
                   cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo x11-common
```

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Platform Notes (Continued)

```
------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-5.15.0-46-generic
  root=UUID=593ab29a-c8fe-4d75-821a-b60d5c945311
  ro

------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 400 MHz and 3.72 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes
      Boost States: 0
      Total States: 3
      Pstate-P0:  2450MHz

------------------------------------------------------------
16. tuned-adm active
  Current active profile: latency-performance

------------------------------------------------------------
17. sysctl
  kernel.numa_balancing              1
  kernel.randomize_va_space          0
  vm.compaction_proactiveness       20
  vm.dirty_background_bytes          0
  vm.dirty_background_ratio          3
  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

------------------------------------------------------------
18. /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

------------------------------------------------------------
19. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_shared           256
  max_ptes_swap              64
```

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Platform Notes (Continued)

```
   pages_to_scan             4096
   scan_sleep_millisecs     10000

------------------------------------------------------------
20. OS release
  From /etc/*-release /etc/*-version
  os-release Ubuntu 22.04.1 LTS

------------------------------------------------------------
21. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-aocc400-B1e
  Filesystem     Type   Size  Used Avail Use% Mounted on
  tmpfs          tmpfs  125G  3.5G  122G   3% /mnt/ramdisk

------------------------------------------------------------
22. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge R6615
    Product Family: PowerEdge
    Serial:         GLM4030

------------------------------------------------------------
23. dmidecode
  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:
    12x 80AD000080AD HMCG94MEBRA109N 64 GB 2 rank 4800


------------------------------------------------------------
24. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Dell Inc.
   BIOS Version:      1.3.7
   BIOS Date:         03/06/2023
   BIOS Revision:     1.3
```

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)
Target: x86_64-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++, 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
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
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++, 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
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
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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Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
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         | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_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
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
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
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
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

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Base Compiler Invocation (Continued)

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
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

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Base Optimization Flags (Continued)

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
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-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
-fremap-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
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
```

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-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

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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Tested with SPEC CPU®2017 v1.1.9 on 2023-03-27 17:22:24-0400.
Report generated on 2023-05-09 15:57:53 by CPU2017 PS formatter v6716.
Originally published on 2023-05-09.