



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

## Dell Inc.

SPECspeed®2017\_fp\_base = 287

PowerEdge R6625 (AMD EPYC 9254 24-Core Processor)

SPECspeed®2017\_fp\_peak = 292

CPU2017 License: 6573

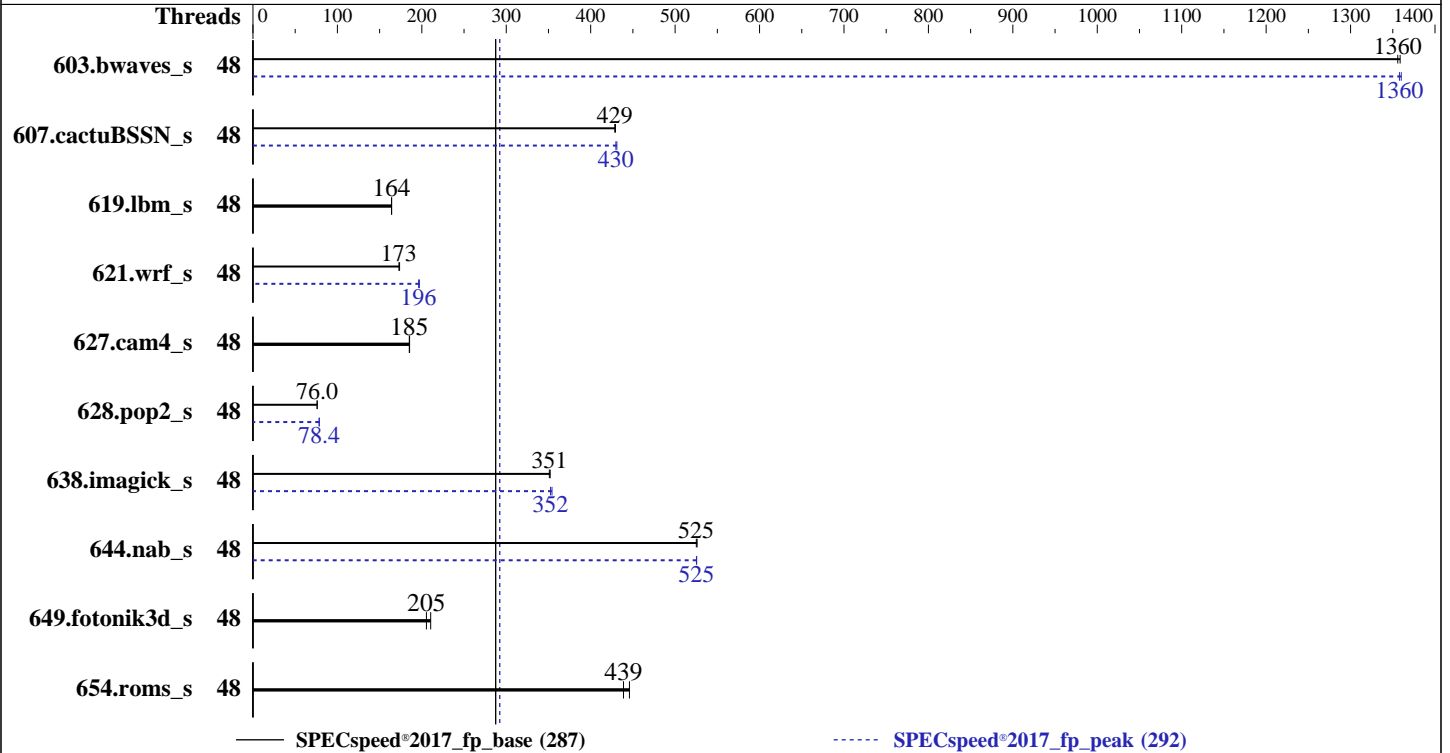
Test Date: Jan-2024

Test Sponsor: Dell Inc.

Hardware Availability: May-2023

Tested by: Dell Inc.

Software Availability: Sep-2023



### Hardware

CPU Name: AMD EPYC 9254  
 Max MHz: 4150  
 Nominal: 2900  
 Enabled: 48 cores, 2 chips  
 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 / 6 cores  
 Other: None  
 Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)  
 Storage: 50 GB on tmpfs  
 Other: None

### Software

OS: Ubuntu 22.04.3 LTS  
 5.15.0-84-generic  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: Yes  
 Firmware: Version 1.4.6 released Jul-2023  
 File System: tmpfs  
 System State: Run level 5 (graphical 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.



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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	48	43.4	1360	<b><u>43.5</u></b>	<b><u>1360</u></b>			48	43.4	1360	<b><u>43.4</u></b>	<b><u>1360</u></b>		
607.cactuBSSN_s	48	<b><u>38.9</u></b>	<b><u>429</u></b>	38.8	429			48	<b><u>38.8</u></b>	<b><u>430</u></b>	38.7	431		
619.lbm_s	48	<b><u>31.9</u></b>	<b><u>164</u></b>	31.9	164			48	<b><u>31.9</u></b>	<b><u>164</u></b>	31.9	164		
621.wrf_s	48	<b><u>76.5</u></b>	<b><u>173</u></b>	76.2	174			48	67.1	197	<b><u>67.4</u></b>	<b><u>196</u></b>		
627.cam4_s	48	<b><u>47.9</u></b>	<b><u>185</u></b>	47.8	186			48	<b><u>47.9</u></b>	<b><u>185</u></b>	47.8	186		
628.pop2_s	48	<b><u>156</u></b>	<b><u>76.0</u></b>	156	76.1			48	<b><u>152</u></b>	<b><u>78.4</u></b>	151	78.5		
638.imagick_s	48	41.0	352	<b><u>41.1</u></b>	<b><u>351</u></b>			48	<b><u>40.9</u></b>	<b><u>352</u></b>	40.7	354		
644.nab_s	48	33.2	526	<b><u>33.3</u></b>	<b><u>525</u></b>			48	<b><u>33.3</u></b>	<b><u>525</u></b>	33.2	526		
649.fotonik3d_s	48	43.3	210	<b><u>44.4</u></b>	<b><u>205</u></b>			48	43.3	210	<b><u>44.4</u></b>	<b><u>205</u></b>		
654.roms_s	48	35.3	446	<b><u>35.9</u></b>	<b><u>439</u></b>			48	35.3	446	<b><u>35.9</u></b>	<b><u>439</u></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.  
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.

To always enable THP for peak runs of:  
603.bwaves\_s, 607.cactuBSSN\_s, 619.lbm\_s, 627.cam4\_s, 628.pop2\_s, 638.imagick\_s, 644.nab\_s, 649.fotonik3d\_s:  
'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled; echo always > /sys/kernel/mm/transparent\_hugepage/defrag'  
run as root.

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## Operating System Notes (Continued)

To disable THP for peak runs of 621.wrf\_s:  
'echo never > /sys/kernel/mm/transparent\_hugepage/enabled; echo always > /sys/kernel/mm/transparent\_hugepage/defrag'  
run as root.  
To enable THP only on request for peak runs of 654.roms\_s:  
'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled; echo madvise > /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 = "0-47"  
LD\_LIBRARY\_PATH = "/mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1.1/amd\_speed\_aocc400\_znver4\_A\_lib/lib:"  
LIBOMP\_NUM\_HIDDEN\_HELPER\_THREADS = "0"  
MALLOC\_CONF = "oversize\_threshold:0,retain:true"  
OMP\_DYNAMIC = "false"  
OMP\_SCHEDULE = "static"  
OMP\_STACKSIZE = "128M"  
OMP\_THREAD\_LIMIT = "48"

Environment variables set by runcpu during the 603.bwaves\_s peak run:  
GOMP\_CPU\_AFFINITY = "0-47"

Environment variables set by runcpu during the 607.cactuBSSN\_s peak run:  
GOMP\_CPU\_AFFINITY = "0-47"

Environment variables set by runcpu during the 621.wrf\_s peak run:  
GOMP\_CPU\_AFFINITY = "0-47"

Environment variables set by runcpu during the 628.pop2\_s peak run:  
GOMP\_CPU\_AFFINITY = "0-47"

Environment variables set by runcpu during the 638.imagick\_s peak run:  
GOMP\_CPU\_AFFINITY = "0-47"

Environment variables set by runcpu during the 644.nab\_s peak run:  
GOMP\_CPU\_AFFINITY = "0-47"

## 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 50 GB ramdisk created with the cmd: "mount -t tmpfs -o size=50G tmpfs /mnt/ramdisk"

## Platform Notes

BIOS settings:

(Continued on next page)



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## Platform Notes (Continued)

DRAM Refresh Delay : Performance  
DIMM Self Healing on  
Uncorrectable Memory Error : Disabled

Logical Processor : Disabled  
Virtualization Technology : Disabled  
NUMA Nodes per Socket : 1

System Profile : Custom  
C-States : Disabled  
Memory Patrol Scrub : Disabled  
PCI ASPM L1 Link  
Power Management : Disabled  
Determinism Slider : Power Determinism  
Algorithm Performance  
Boost Disable (ApbDis) : Enabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1.1/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on amd-spa Mon Jan 15 17:04:45 2024

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 249 (249.11-0ubuntu3.10)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent\_hugepage
18. /sys/kernel/mm/transparent\_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

1. uname -a  
Linux amd-spa 5.15.0-84-generic #93-Ubuntu SMP Tue Sep 5 17:16:10 UTC 2023 x86\_64 x86\_64 x86\_64 GNU/Linux

2. w  
17:04:45 up 3:35, 1 user, load average: 5.68, 5.36, 3.23  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
root tty1 - 14:58 2:06m 1.82s 0.43s /bin/bash ./amd\_speed\_aocc400\_znver4\_A1.sh

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## Platform Notes (Continued)

### 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                3093894
nofiles                1024
vmemory(kbytes)        unlimited
locks                  unlimited
rtprio                 0

```

### 5. sysinfo process ancestry

```

/sbin/init
/bin/login -p --
-bash
/bin/bash ./DELL_speed.sh
/bin/bash ./dell-run-main.sh speed
/bin/bash ./dell-run-main.sh speed
/bin/bash ./dell-run-speccpu.sh speed --define DL-BIOSinc=Dell-BIOS_EPYC-4.inc --define DL-VERS=v4.8.1
--output_format html,pdf,txt
python3 ./run_amd_speed_aocc400_znver4_A1.py
/bin/bash ./amd_speed_aocc400_znver4_A1.sh
runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 2 --define
DL-BIOS-NPS=1 --define DL-BIOSinc=Dell-BIOS_EPYC-4.inc --define DL-VERS=v4.8.1 --output_format
html,pdf,txt fpspeed
runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 2 --define
DL-BIOS-NPS=1 --define DL-BIOSinc=Dell-BIOS_EPYC-4.inc --define DL-VERS=v4.8.1 --output_format
html,pdf,txt --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 = /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1.1

```

### 6. /proc/cpuinfo

```

model name      : AMD EPYC 9254 24-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
model          : 17
stepping       : 1
microcode      : 0xa10113e
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 3584 4K pages
cpu cores     : 24
siblings       : 24
2 physical ids (chips)
48 processors (hardware threads)
physical id 0: core ids 0-5,16-21,32-37,48-53
physical id 1: core ids 0-5,16-21,32-37,48-53
physical id 0: apicids 0-5,16-21,32-37,48-53

```

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### Platform Notes (Continued)

physical id 1: apicids 64-69,80-85,96-101,112-117  
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):                      48
On-line CPU(s) list:         0-47
Vendor ID:                   AuthenticAMD
Model name:                   AMD EPYC 9254 24-Core Processor
CPU family:                   25
Model:                        17
Thread(s) per core:          1
Core(s) per socket:          24
Socket(s):                    2
Stepping:                     1
BogoMIPS:                     5802.18
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 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 bmlil 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:                   1.5 MiB (48 instances)
L1i cache:                   1.5 MiB (48 instances)
L2 cache:                     48 MiB (48 instances)
L3 cache:                     256 MiB (8 instances)
NUMA node(s):                2
NUMA node0 CPU(s):           0-23
NUMA node1 CPU(s):           24-47
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 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, PBRSE-eIBRS Not affected
Vulnerability Srbds:         Not affected

```

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### Platform Notes (Continued)

Vulnerability Tsx async abort: Not affected

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	32K	1.5M	8	Data	1	64	1	64
L1i	32K	1.5M	8	Instruction	1	64	1	64
L2	1M	48M	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: 2 nodes (0-1)
node 0 cpus: 0-23
node 0 size: 386546 MB
node 0 free: 382203 MB
node 1 cpus: 24-47
node 1 size: 387040 MB
node 1 free: 385784 MB
node distances:
node  0  1
  0:  10  32
  1:  32  10

```

9. /proc/meminfo

MemTotal: 792153056 kB

10. who -r

run-level 5 Jan 15 13:29

11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.10)

```

Default Target  Status
graphical      running

```

12. Services, from systemctl list-unit-files

```

STATE          UNIT FILES
enabled        ModemManager apparmor blk-availability console-setup cron dmesg e2scrub_reap finalrd
getty@ gpu-manager grub-common grub-initrd-fallback irqbalance keyboard-setup lm-sensors
lvm2-monitor lxd-agent multipathd networkd-dispatcher 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 ufw vgauth
enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
disabled       console-getty debug-shell iscsid nftables open-iscsi rsync serial-getty@
systemd-boot-check-no-failures systemd-network-generator systemd-sysext
systemd-time-wait-sync upower
generated      apport
indirect       uuid
masked         cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo
systemd-networkd-wait-online x11-common

```

13. Linux kernel boot-time arguments, from /proc/cmdline

```

BOOT_IMAGE=/vmlinuz-5.15.0-84-generic
root=/dev/mapper/ubuntu--vg-ubuntu--lv
ro

```

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## Platform Notes (Continued)

### 14. cpupower frequency-info

```

analyzing CPU 0:
  Unable to determine current policy
  boost state support:
    Supported: yes
    Active: yes
    Boost States: 0
    Total States: 3
    Pstate-P0: 2900MHz

```

### 15. tuned-adm active

Current active profile: latency-performance

### 16. 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

```

### 17. /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

```

### 18. /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

```

### 19. OS release

```

From /etc/*-release /etc/*-version
os-release Ubuntu 22.04.3 LTS

```

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## Platform Notes (Continued)

### 20. Disk information

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1.1  
Filesystem Type Size Used Avail Use% Mounted on  
tmpfs tmpfs 50G 3.4G 47G 7% /mnt/ramdisk

### 21. /sys/devices/virtual/dmi/id

Vendor: Dell Inc.  
Product: PowerEdge R6625  
Product Family: PowerEdge  
Serial: BGP4016

### 22. 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:  
10x 802C0000802C MTC20F2085S1RC48BA1 32 GB 2 rank 4800  
8x 80CE000080CE M321R4GA3BB0-CQKVG 32 GB 2 rank 4800  
6x 80CE000080CE M321R4GA3BB6-CQKVG 32 GB 2 rank 4800

### 23. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: Dell Inc.  
BIOS Version: 1.4.6  
BIOS Date: 07/06/2023  
BIOS Revision: 1.4

## Compiler Version Notes

C | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak) 644.nab\_s(base, peak)

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

C++, C, Fortran | 607.cactuBSSN\_s(base, peak)

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

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PowerEdge R6625 (AMD EPYC 9254 24-Core Processor)

SPECspeed®2017\_fp\_peak = 292

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Jan-2024

Hardware Availability: May-2023

Software Availability: Sep-2023

## Compiler Version Notes (Continued)

-----  
Fortran | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak) 654.roms\_s(base, peak)  
-----

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
-----

-----  
Fortran, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak) 628.pop2\_s(base, peak)  
-----

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/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

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## Base Portability Flags (Continued)

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=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -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=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-mllvm -reduce-array-computations=3 -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=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

Benchmarks using Fortran, C, and C++:

```
-m64 -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 -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
```

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## Base Optimization Flags (Continued)

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

-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



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Hardware Availability: May-2023  
Software Availability: Sep-2023

## 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=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

```
644.nab_s: -m64 -Wl,-mllvm -Wl,-region-vectorize -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-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=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

649.fotonik3d\_s: basepeak = yes

654.roms\_s: basepeak = yes

Benchmarks using both Fortran and C:

```
621.wrf_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-O3 -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
```

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## Peak Optimization Flags (Continued)

621.wrf\_s (continued):

-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

627.cam4\_s:basepeak = yes

628.pop2\_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

-Wl,-mllvm -Wl,-reduce-array-computations=3

-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast

-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp

-flto -fstruct-layout=9 -mllvm -unroll-threshold=50

-fremap-arrays -fstrip-mining

-mllvm -inline-threshold=1000

-mllvm -reduce-array-computations=3 -DSPEC\_OPENMP -zopt

-Mrecursive -fvector-transform -fscalar-transform

-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

Benchmarks using Fortran, C, and C++:

-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

-Wl,-mllvm -Wl,-reduce-array-computations=3

-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast -march=znver4

-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=9

-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining

-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3

-DSPEC\_OPENMP -zopt -finline-aggressive -mllvm -unroll-threshold=100

-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

## 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/aocc400-flags\\_A1.1.html](http://www.spec.org/cpu2017/flags/aocc400-flags_A1.1.html)

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.2.html>



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**Hardware Availability:** May-2023

**Software Availability:** Sep-2023

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

[http://www.spec.org/cpu2017/flags/aocc400-flags\\_A1.1.xml](http://www.spec.org/cpu2017/flags/aocc400-flags_A1.1.xml)

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.2.xml>

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