



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2025 Standard Performance Evaluation Corporation

## Dell Inc.

SPECrate®2017\_fp\_base = 1990

SPECrate®2017\_fp\_peak = 2000

PowerEdge M7725 (AMD EPYC 9655 96-Core Processor)

CPU2017 License: 6573

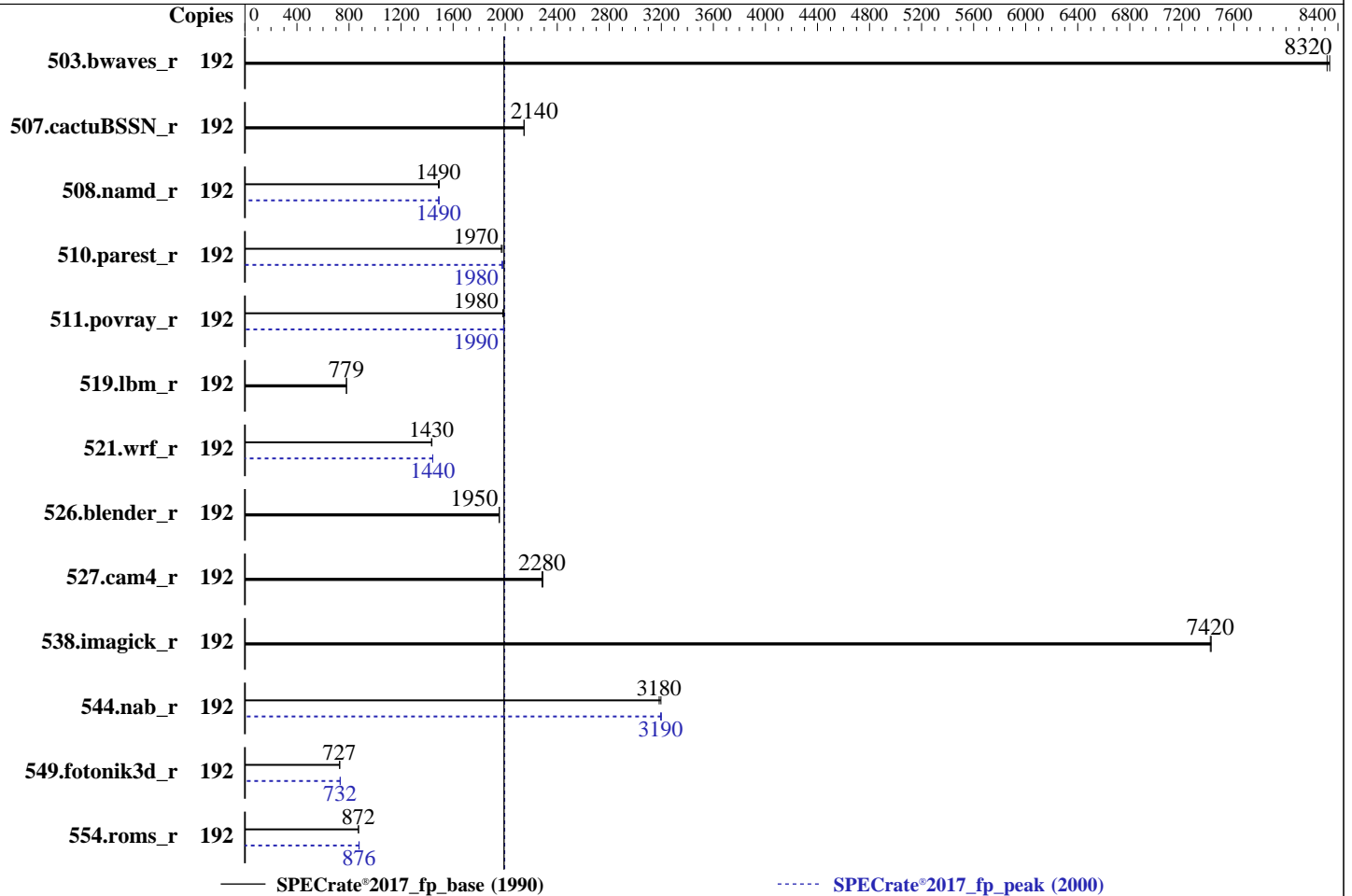
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Feb-2025

Hardware Availability: Mar-2025

Software Availability: Feb-2025



**Hardware**

CPU Name: AMD EPYC 9655  
 Max MHz: 4500  
 Nominal: 2600  
 Enabled: 192 cores, 2 chips  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 384 MB I+D on chip per chip, 32 MB shared / 8 cores  
 Other: None  
 Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-6400B-R)  
 Storage: 110 GB on tmpfs  
 Other: CPU Cooling: DLC

**Software**

OS: Ubuntu 24.04.2 LTS  
 6.8.0-53-generic  
 Compiler: C/C++/Fortran: Version 5.0.0 of AOCC  
 Parallel: No  
 Firmware: Version 1.0.0 released Jan-2025  
 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	192	<u>232</u>	<u>8320</u>	231	8340			192	<u>232</u>	<u>8320</u>	231	8340		
507.cactuBSSN_r	192	113	2150	<u>113</u>	<u>2140</u>			192	113	2150	<u>113</u>	<u>2140</u>		
508.namd_r	192	122	1490	<u>123</u>	<u>1490</u>			192	<u>123</u>	<u>1490</u>	122	1490		
510.parest_r	192	<u>255</u>	<u>1970</u>	254	1980			192	<u>254</u>	<u>1980</u>	254	1980		
511.povray_r	192	226	1990	<u>226</u>	<u>1980</u>			192	225	1990	<u>226</u>	<u>1990</u>		
519.lbm_r	192	259	781	<u>260</u>	<u>779</u>			192	259	781	<u>260</u>	<u>779</u>		
521.wrf_r	192	299	1440	<u>300</u>	<u>1430</u>			192	298	1440	<u>298</u>	<u>1440</u>		
526.blender_r	192	150	1960	<u>150</u>	<u>1950</u>			192	150	1960	<u>150</u>	<u>1950</u>		
527.cam4_r	192	<u>147</u>	<u>2280</u>	147	2290			192	<u>147</u>	<u>2280</u>	147	2290		
538.imagick_r	192	64.3	7430	<u>64.4</u>	<u>7420</u>			192	64.3	7430	<u>64.4</u>	<u>7420</u>		
544.nab_r	192	101	3200	<u>102</u>	<u>3180</u>			192	<u>101</u>	<u>3190</u>	101	3200		
549.fotonik3d_r	192	1026	729	<u>1029</u>	<u>727</u>			192	<u>1023</u>	<u>732</u>	1022	732		
554.roms_r	192	349	873	<u>350</u>	<u>872</u>			192	<u>348</u>	<u>876</u>	348	878		

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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,

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## 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-aocc500-znerv5_A1/amd_rate_aocc500_znver5_A_lib/lib:/mnt/ramdisk/cpu2017-1  
    .1.9-aocc500-znerv5_A1/amd_rate_aocc500_znver5_A_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 110 GB ramdisk created with the cmd: "mount -t tmpfs -o size=110G tmpfs /mnt/ramdisk"

## Platform Notes

BIOS Settings:

```
Logical Processor : Disabled  
Virtualization Technology : Disabled  
NUMA Nodes Per Socket : 4
```

```
System Profile : Custom  
C-States : Disabled  
Memory Patrol Scrub : Disabled  
PCI ASPM L1 Link Power Management : Disabled  
Periodic Directory Rinse Tuning : Blended  
Determinism Control : Manual  
Determinism Slider : Power Determinism  
Optimizer Mode : Enabled  
Adaptive Allocation : Enabled  
Dram Refresh Delay : Performance  
DIMM Self Healing -  
on Uncorrectable Memory Error : Disabled
```

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-aocc500-znerv5\_A1/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on M772501-M7725 Mon Feb 24 15:46:58 2025

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

-----  
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## Platform Notes (Continued)

```

-----
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-lubuntu8.5)
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 M772501-M7725 6.8.0-53-generic #55-Ubuntu SMP PREEMPT_DYNAMIC Fri Jan 17 15:37:52 UTC 2025 x86_64
x86_64 x86_64 GNU/Linux
-----

```

```

-----
2. w
 15:46:58 up 4 min,  3 users,  load average: 0.19, 0.05, 0.01
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU   WHAT
root      tty      10.168.103.74   15:42   4:15   0.00s  0.01s  sshd: root@notty
root      tty1     -               15:43   39.00s 1.19s  0.32s  /bin/bash ./amd_rate_aocc500_znver5_A1.sh
root      tty2     -               15:45   1:11   0.04s  ?      -bash
-----

```

```

-----
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            6189165
nofiles            1024
vmemory(kbytes)    unlimited
locks              unlimited
rtprio             0
-----

```

```

-----
5. sysinfo process ancestry
-----

```

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### Platform Notes (Continued)

```

/sbin/init
/bin/login -p --
-bash
/bin/bash /home/DellFiles/bin/DELL_rate.sh
/bin/bash /home/DellFiles/bin/dell-run-main.sh rate
/bin/bash /home/DellFiles/bin/dell-run-main.sh rate
/bin/bash /home/DellFiles/bin/AMD/dell-run-speccpu.sh rate --define DL-VERS=6.1a --output_format
html,pdf,txt
python3 ./run_amd_rate_aocc500_znver5_A1.py
/bin/bash ./amd_rate_aocc500_znver5_A1.sh
runcpu --config amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 2 --define DL-BIOS-NPS=4
--define DL-VERS=6.1a --output_format html,pdf,txt fprate
runcpu --configfile amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 2 --define
DL-BIOS-NPS=4 --define DL-VERS=6.1a --output_format html,pdf,txt --nopower --runmode rate --tune base:peak
--size test:train:refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /mnt/ramdisk/cpu2017-1.1.9-aocc500-znerv5_A1

```

```

-----
6. /proc/cpuinfo
model name      : AMD EPYC 9655 96-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 26
model         : 2
stepping      : 1
microcode     : 0xb00211e
bugs          : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 192 4K pages
cpu cores     : 96
siblings      : 96
2 physical ids (chips)
192 processors (hardware threads)
physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
physical id 1: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
physical id 1: apicids
256-263,272-279,288-295,304-311,320-327,336-343,352-359,368-375,384-391,400-407,416-423,432-439
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:          52 bits physical, 57 bits virtual
Byte Order:             Little Endian
CPU(s):                 192
On-line CPU(s) list:   0-191
Vendor ID:              AuthenticAMD
BIOS Vendor ID:        AMD
Model name:             AMD EPYC 9655 96-Core Processor
BIOS Model name:       AMD EPYC 9655 96-Core Processor           CPU @ 2.6GHz
BIOS CPU family:       107
CPU family:            26
Model:                  2
Thread(s) per core:    1
Core(s) per socket:    96

```

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### Platform Notes (Continued)

```

Socket(s):                2
Stepping:                 1
Frequency boost:         enabled
CPU(s) scaling MHz:      59%
CPU max MHz:             4509.3750
CPU min MHz:             1500.0000
BogoMIPS:                5191.79
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 pcid
                        sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm
                        cmp_legacy extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
                        osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpeext
                        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 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 amd_ppin cppc arat npt lbrv svm_lock
                        nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                        pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl vmmi
                        avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
                        avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdpid bus_lock_detect
                        movdiri movdir64b overflow_recov succor smca avx512_vp2intersect
                        flush_lld debug_swap
L1d cache:                9 MiB (192 instances)
L1i cache:                6 MiB (192 instances)
L2 cache:                 192 MiB (192 instances)
L3 cache:                 768 MiB (24 instances)
NUMA node(s):            8
NUMA node0 CPU(s):       0-23
NUMA node1 CPU(s):       24-47
NUMA node2 CPU(s):       48-71
NUMA node3 CPU(s):       72-95
NUMA node4 CPU(s):       96-119
NUMA node5 CPU(s):       120-143
NUMA node6 CPU(s):       144-167
NUMA node7 CPU(s):       168-191
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit:       Not affected
Vulnerability Lltf:                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/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:          Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                        disabled; RSB filling; PBRSE-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	9M	12	Data	1	64	1	64
L1i	32K	6M	8	Instruction	1	64	1	64

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### Platform Notes (Continued)

L2	1M	192M	16 Unified	2	1024	1	64
L3	32M	768M	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: 0-23
node 0 size: 192785 MB
node 0 free: 186922 MB
node 1 cpus: 24-47
node 1 size: 193524 MB
node 1 free: 193201 MB
node 2 cpus: 48-71
node 2 size: 193524 MB
node 2 free: 193196 MB
node 3 cpus: 72-95
node 3 size: 193465 MB
node 3 free: 193096 MB
node 4 cpus: 96-119
node 4 size: 193524 MB
node 4 free: 193159 MB
node 5 cpus: 120-143
node 5 size: 193524 MB
node 5 free: 193166 MB
node 6 cpus: 144-167
node 6 size: 193524 MB
node 6 free: 193166 MB
node 7 cpus: 168-191
node 7 size: 193489 MB
node 7 free: 193129 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

```

9. /proc/meminfo

MemTotal: 1584501032 kB

10. who -r

run-level 5 Feb 24 15:42

11. Systemd service manager version: systemd 255 (255.4-lubuntu8.5)

Default Target	Status
graphical	running

12. Services, from systemctl list-unit-files

STATE	UNIT FILES
enabled	ModemManager apparmor appport blk-availability cloud-config cloud-final cloud-init cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager

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### Platform Notes (Continued)

```

enabled-runtime grub-common grub-initrd-fallback keyboard-setup lm-sensors lvm2-monitor multipathd
disabled networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db setvtrgb
systemd-timesyncd systemd-networkd systemd-networkd-wait-online systemd-pstore systemd-resolved
systemd-timesyncd thermald tuned ua-reboot-cmds ubuntu-advantage udisks2 ufw vgauth
netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
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-sysex
systemd-time-wait-sync upower
indirect systemd-sysupdate systemd-sysupdate-reboot uuid
masked cryptdisks cryptdisks-early hwclock multipath-tools-boot screen-cleanup sudo x11-common

```

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/vmlinuz-6.8.0-53-generic
root=/dev/mapper/ubuntu--vg-ubuntu--lv
ro

```

```

-----
14. cpupower frequency-info
analyzing CPU 116:
current policy: frequency should be within 1.50 GHz and 2.60 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: 2600MHz

```

```

-----
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

```

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### Platform Notes (Continued)

```
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 24.04.2 LTS
```

```
-----
20. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-aocc500-znerv5_A1
Filesystem      Type  Size  Used Avail Use% Mounted on
tmpfs           tmpfs 110G  3.3G 107G   3% /mnt/ramdisk
```

```
-----
21. /sys/devices/virtual/dmi/id
Vendor:         Dell Inc.
Product:        PowerEdge M7725
Product Family: PowerEdge
Serial:         M772501
```

```
-----
22. 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:
7x 802C0000802C MTC40F2046S1RC64BD1 64 GB 2 rank 6400
9x 80AD000080AD HMC94AHBRA277N 64 GB 2 rank 6400
2x 80AD000080AD HMC94AHBRA480N 64 GB 2 rank 6400
6x 80CE000080CE M321R8GA0PB2-CCPKC 64 GB 2 rank 6400
```

```
-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      Dell Inc.
BIOS Version:     1.0.0
BIOS Date:        01/23/2025
BIOS Revision:    1.0
```

### Compiler Version Notes

```
=====
C | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)
```

(Continued on next page)



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SPECrate®2017\_fp\_peak = 2000

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Feb-2025

Hardware Availability: Mar-2025

Software Availability: Feb-2025

## Compiler Version Notes (Continued)

```
-----
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++          | 508.namd_r(base, peak) 510.parest_r(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       | 511.povray_r(base, peak) 526.blender_r(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
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 | 507.cactuBSSN_r(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
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
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      | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(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   | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
-----
```

```
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
-----
```

(Continued on next page)



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Test Date: Feb-2025

Hardware Availability: Mar-2025

Software Availability: Feb-2025

## 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
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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
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

```



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Tested by: Dell Inc.

Test Date: Feb-2025

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Software Availability: Feb-2025

## Base Optimization Flags

### C benchmarks:

```
-m64 -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=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang -ldl
```

### C++ benchmarks:

```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100 -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang -ldl
```

### Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-aggressive-gather=true
-Wl,-mllvm -Wl,-enable-masked-gather-sequence=false -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang -ldl
```

### 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
-Wl,-mllvm -Wl,-enable-aggressive-gather=true
-Wl,-mllvm -Wl,-enable-masked-gather-sequence=false -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang -ldl
```

### Benchmarks using both C and C++:

```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
```

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## Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):

```
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie
-flto -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
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
-ldl
```

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie
-flto -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
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang -ldl
```

## 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



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**Tested by:** Dell Inc.

**Test Date:** Feb-2025

**Hardware Availability:** Mar-2025

**Software Availability:** Feb-2025

## Peak 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

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

519.lbm\_r: basepeak = yes

538.imagick\_r: basepeak = yes

544.nab\_r: -m64 -flto -Wl,-mllvm -Wl,-ldist-scalar-expand  
-fenable-aggressive-gather -Ofast -march=znver5  
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7  
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000  
-mllvm -reduce-array-computations=3 -zopt -lamdlibm  
-landalloc -ldl

C++ benchmarks:

508.namd\_r: -m64 -std=c++14  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

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## Peak Optimization Flags (Continued)

508.namd\_r (continued):

```
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc -ldl
```

510.parest\_r: -m64 -std=c++14 -flto -Wl,-mllvm -Wl,-suppress-fmas

```
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc -ldl
```

Fortran benchmarks:

503.bwaves\_r: basepeak = yes

549.fotonik3d\_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-Mrecursive -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -fvector-transform
-fscalar-transform -lamdlibm -lamdalloc -ldl -lflang
```

554.roms\_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-Mrecursive -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -ldl -lflang
```

Benchmarks using both Fortran and C:

521.wrf\_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-ldl -lflang
```

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## Peak Optimization Flags (Continued)

527.cam4\_r: basepeak = yes

Benchmarks using both C and C++:

```

511.povray_r: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100
-mllvm -loop-unswitch-threshold=200000 -lamdlibm
-lamdalloc -ldl

```

526.blender\_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN\_r: basepeak = yes

## Peak 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





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

<http://www.spec.org/cpu2017/flags/aocc500-flags.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.8.html>

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

<http://www.spec.org/cpu2017/flags/aocc500-flags.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.8.xml>

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