SPEC CPU®2017 Floating Point Rate Result

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Dell Inc.

PowerEdge XE7745 (AMD EPYC 9575F 64-Core Processor)

SPECrate®2017_fp_base = 1660

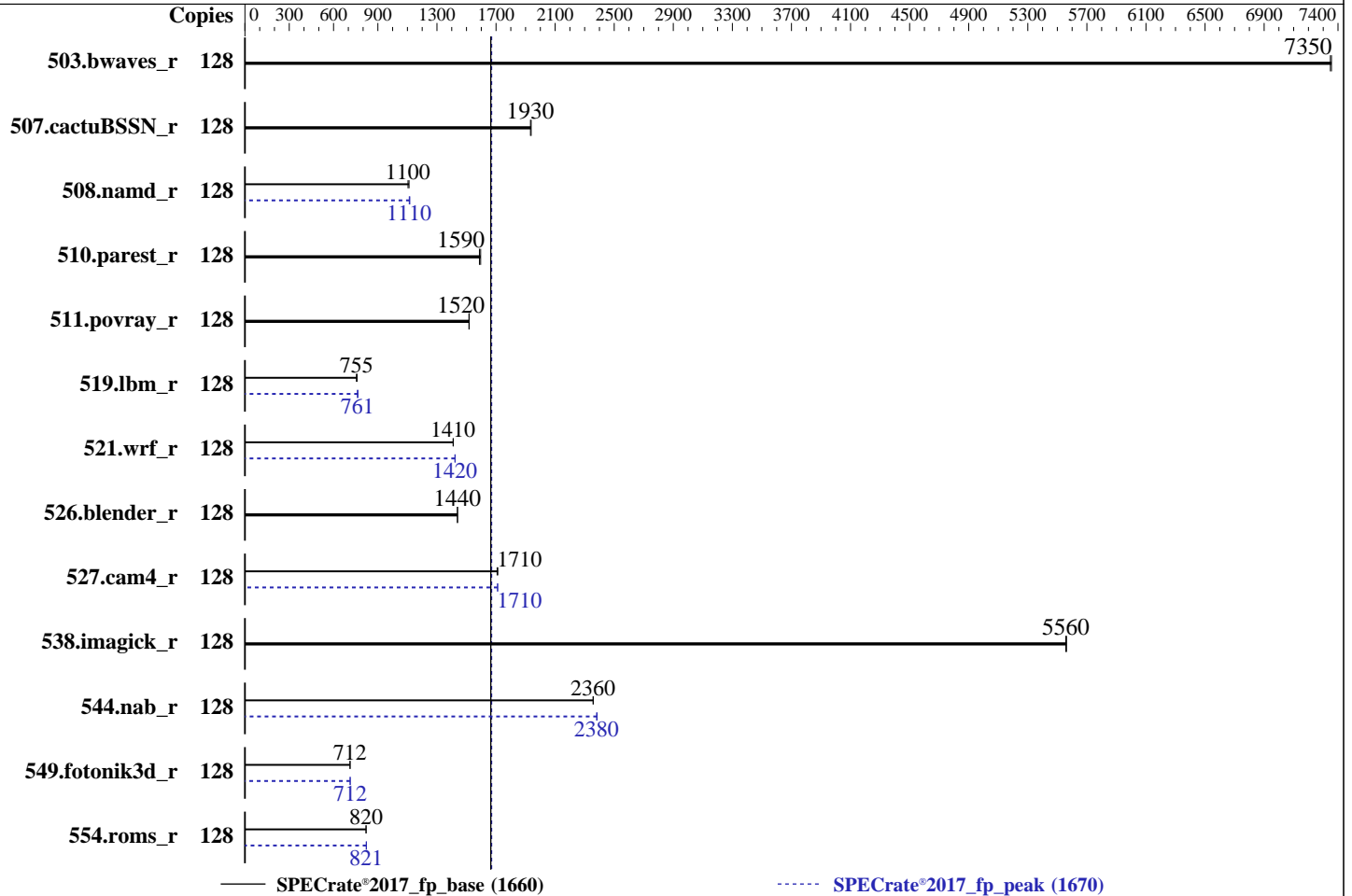SPECrate®2017_fp_peak = 1670

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

Test Date: Feb-2025
Hardware Availability: Feb-2025
Software Availability: Jan-2025

Benchmark	Copies	Result
503.bwaves_r	128	7350
507.cactuBSSN_r	128	1930
508.namd_r	128	1100 (base) / 1110 (peak)
510.parest_r	128	1590
511.povray_r	128	1520
519.lbm_r	128	755 (base) / 761 (peak)
521.wrf_r	128	1410 (base) / 1420 (peak)
526.blender_r	128	1440
527.cam4_r	128	1710 (base) / 1710 (peak)
538.imagick_r	128	5560
544.nab_r	128	2360 (base) / 2380 (peak)
549.fotonik3d_r	128	712 (base) / 712 (peak)
554.roms_r	128	820 (base) / 821 (peak)

SPECrate®2017_fp_base (1660)
SPECrate®2017_fp_peak (1670)

Hardware

CPU Name: AMD EPYC 9575F
 Max MHz: 5000
 Nominal: 3300
Enabled: 128 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: 256 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, running at 6000)
Storage: 80 GB on tmpfs
Other: CPU Cooling: Air

Software

OS: Ubuntu 24.04 LTS
 6.8.0-52-generic
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: No
Firmware: Version 1.0.3 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.

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

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CPU2017 License: 6573	**Test Date:**	Feb-2025
Test Sponsor: Dell Inc.	**Hardware Availability:**	Feb-2025
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Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	**175**	**7350**	175	7360			128	**175**	**7350**	175	7360		
507.cactuBSSN_r	128	**83.8**	**1930**	83.6	1940			128	**83.8**	**1930**	83.6	1940		
508.namd_r	128	109	1110	**110**	**1100**			128	109	1120	**109**	**1110**		
510.parest_r	128	**211**	**1590**	210	1600			128	**211**	**1590**	210	1600		
511.povray_r	128	197	1520	**197**	**1520**			128	197	1520	**197**	**1520**		
519.lbm_r	128	**179**	**755**	178	759			128	176	765	**177**	**761**		
521.wrf_r	128	**203**	**1410**	203	1410			128	**202**	**1420**	202	1420		
526.blender_r	128	135	1440	**136**	**1440**			128	135	1440	**136**	**1440**		
527.cam4_r	128	131	1710	**131**	**1710**			128	**131**	**1710**	131	1710		
538.imagick_r	128	57.2	5560	**57.3**	**5560**			128	57.2	5560	**57.3**	**5560**		
544.nab_r	128	**91.4**	**2360**	91.4	2360			128	90.4	2380	**90.5**	**2380**		
549.fotonik3d_r	128	701	712	**701**	**712**			128	700	713	**700**	**712**		
554.roms_r	128	**248**	**820**	248	820			128	247	823	**248**	**821**		
SPECrate®2017_fp_base =		**1660**												
SPECrate®2017_fp_peak =		**1670**												

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 80 GB ramdisk created with the cmd: "mount -t tmpfs -o size=80G 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
                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 1234567-XE7745 Fri Feb 21 04:02:20 2025

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
```

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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 (255.4-1ubuntu8)
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 1234567-XE7745 6.8.0-52-generic #53-Ubuntu SMP PREEMPT_DYNAMIC Sat Jan 11 00:06:25 UTC 2025 x86_64
  x86_64 x86_64 GNU/Linux


-------------------------------------------------------------
2. w
  04:02:20 up  1:59,  1 user,  load average: 76.04, 114.31, 122.34
  USER     TTY       FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1      -               02:05    1:56m  1.27s  0.45s /bin/bash ./amd_rate_aocc500_znver5_A1.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              6189327
  nofiles              1024
  vmemory(kbytes)      unlimited
  locks                unlimited
  rtprio               0


-------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
 /bin/login -f --
```

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Platform Notes (Continued)

```
   -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/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /mnt/ramdisk/cpu2017-1.1.9-aocc500-znerv5_A1


 -----------------------------------------------------------
6. /proc/cpuinfo
    model name       : AMD EPYC 9575F 64-Core Processor
    vendor_id        : AuthenticAMD
    cpu family       : 26
    model            : 2
    stepping         : 1
    microcode        : 0xb00211a
    bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size         : 192 4K pages
    cpu cores        : 64
    siblings         : 64
    2 physical ids (chips)
    128 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 1: 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
    physical id 1: apicids 128-135,144-151,160-167,176-183,192-199,208-215,224-231,240-247
  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):                       128
  On-line CPU(s) list:          0-127
  Vendor ID:                    AuthenticAMD
  BIOS Vendor ID:               AMD
  Model name:                   AMD EPYC 9575F 64-Core Processor
  BIOS Model name:              AMD EPYC 9575F 64-Core Processor          CPU @ 3.3GHz
  BIOS CPU family:              107
  CPU family:                   26
  Model:                        2
  Thread(s) per core:           1
  Core(s) per socket:           64
  Socket(s):                    2
  Stepping:                     1
  Frequency boost:              enabled
```

(Continued on next page)

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Platform Notes (Continued)

```
   CPU(s) scaling MHz:               66%
   CPU max MHz:                      5008.0068
   CPU min MHz:                      1500.0000
   BogoMIPS:                         6591.40
   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 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 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 vnmi
                                     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_l1d debug_swap
   L1d cache:                        6 MiB (128 instances)
   L1i cache:                        4 MiB (128 instances)
   L2 cache:                         128 MiB (128 instances)
   L3 cache:                         512 MiB (16 instances)
   NUMA node(s):                     8
   NUMA node0 CPU(s):                0-15
   NUMA node1 CPU(s):                16-31
   NUMA node2 CPU(s):                32-47
   NUMA node3 CPU(s):                48-63
   NUMA node4 CPU(s):                64-79
   NUMA node5 CPU(s):                80-95
   NUMA node6 CPU(s):                96-111
   NUMA node7 CPU(s):                112-127
   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
                                     disabled; 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       6M   12 Data            1    64        1             64
     L1i       32K       4M    8 Instruction     1    64        1             64
     L2         1M     128M   16 Unified         2  1024        1             64
     L3        32M     512M   16 Unified         3 32768        1             64
```

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Platform Notes (Continued)

```
     -------------------------------------------------------------
     8. numactl --hardware
     NOTE: a numactl 'node' might or might not correspond to a physical chip.
       available: 8 nodes (0-7)
       node 0 cpus: 0-15
       node 0 size: 192797 MB
       node 0 free: 191829 MB
       node 1 cpus: 16-31
       node 1 size: 193528 MB
       node 1 free: 192358 MB
       node 2 cpus: 32-47
       node 2 size: 193528 MB
       node 2 free: 192582 MB
       node 3 cpus: 48-63
       node 3 size: 193469 MB
       node 3 free: 192521 MB
       node 4 cpus: 64-79
       node 4 size: 193528 MB
       node 4 free: 192580 MB
       node 5 cpus: 80-95
       node 5 size: 193528 MB
       node 5 free: 192574 MB
       node 6 cpus: 96-111
       node 6 size: 193528 MB
       node 6 free: 192687 MB
       node 7 cpus: 112-127
       node 7 size: 193493 MB
       node 7 free: 189216 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:       1584540352 kB


     -------------------------------------------------------------
     10. who -r
       run-level 5 Feb 21 02:05


     -------------------------------------------------------------
     11. Systemd service manager version: systemd 255 (255.4-1ubuntu8)
        Default Target  Status
        graphical       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
        Legend: LOAD   -> Reflects whether the unit definition was properly loaded.
                ACTIVE -> The high-level unit activation state, i.e. generalization of SUB.
                SUB    -> The low-level unit activation state, values depend on unit type.
        1 loaded units listed.
```

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Platform Notes (Continued)

```
        ----------------------------------------------------------
        13. 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 lm-sensors lvm2-monitor multipathd
                            networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db setvtrgb
                            sysstat systemd-networkd systemd-networkd-wait-online 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 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

        ----------------------------------------------------------
        14. Linux kernel boot-time arguments, from /proc/cmdline
          BOOT_IMAGE=/boot/vmlinuz-6.8.0-52-generic
          root=UUID=c11d653b-67c8-4409-a768-d0c38050c741
          ro

        ----------------------------------------------------------
        15. cpupower frequency-info
          analyzing CPU 71:
            current policy: frequency should be within 1.50 GHz and 3.30 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:  3300MHz

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

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Platform Notes (Continued)

```
   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
   pages_to_scan            4096
   scan_sleep_millisecs    10000


   ----------------------------------------------------------
20. OS release
   From /etc/*-release /etc/*-version
   os-release Ubuntu 24.04 LTS


   ----------------------------------------------------------
21. 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   80G  3.3G   77G   5% /mnt/ramdisk


   ----------------------------------------------------------
22. /sys/devices/virtual/dmi/id
   Vendor:         Dell Inc.
   Product:        PowerEdge XE7745
   Product Family: PowerEdge
   Serial:         1234567


   ----------------------------------------------------------
23. 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:
     1x 80AD000080AD HMCG94AHBRA277N 64 GB 2 rank 6400, configured at 6000
     19x 80AD000080AD HMCG94AHBRA480N 64 GB 2 rank 6400, configured at 6000
     4x 80CE000080CE M321R8GA0PB2-CCPEC 64 GB 2 rank 6400, configured at 6000



   ----------------------------------------------------------
24. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:    Dell Inc.
   BIOS Version:   1.0.3
   BIOS Date:      01/14/2025
   BIOS Revision:  1.0
```

SPEC CPU®2017 Floating Point Rate Result

Dell Inc.

PowerEdge XE7745 (AMD EPYC 9575F 64-Core Processor)

SPECrate®2017_fp_base = 1660

SPECrate®2017_fp_peak = 1670

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

Test Date: Feb-2025
Hardware Availability: Feb-2025
Software Availability: Jan-2025

Compiler Version Notes

```
==============================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_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++             | 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)
------------------------------------------------------------------------------
```

(Continued on next page)

Dell Inc.

PowerEdge XE7745 (AMD EPYC 9575F 64-Core Processor)

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SPECrate®2017_fp_peak = 1670

CPU2017 License: 6573
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Tested by: Dell Inc.

Test Date: Feb-2025
Hardware Availability: Feb-2025
Software Availability: Jan-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
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`

Dell Inc.

PowerEdge XE7745 (AMD EPYC 9575F 64-Core Processor)

SPECrate®2017_fp_base = 1660

SPECrate®2017_fp_peak = 1670

CPU2017 License: 6573		**Test Date:**	Feb-2025
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Feb-2025
Tested by:	Dell Inc.	**Software Availability:**	Jan-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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Standard Performance Evaluation Corporation (info@spec.org)

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SPEC CPU®2017 Floating Point Rate Result

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PowerEdge XE7745 (AMD EPYC 9575F 64-Core Processor)

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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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Test Date: Feb-2025
Hardware Availability: Feb-2025
Software Availability: Jan-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: -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
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc -ldl
```

```
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
```

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Dell Inc.

PowerEdge XE7745 (AMD EPYC 9575F 64-Core Processor)

SPECrate®2017_fp_base = 1660

SPECrate®2017_fp_peak = 1670

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Feb-2025

Hardware Availability: Feb-2025

Software Availability: Jan-2025

Peak Optimization Flags (Continued)

544.nab_r (continued):
```
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc -ldl
```

C++ benchmarks:

508.namd_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 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc -ldl
```

510.parest_r: `basepeak = yes`

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
-fremap-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
```

SPEC CPU®2017 Floating Point Rate Result

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Peak Optimization Flags (Continued)

521.wrf_r (continued):
```
-ldl -lflang
```

527.cam4_r: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
```
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-ldl -lflang
```

Benchmarks using both C and C++:

511.povray_r: `basepeak = yes`

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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CPU2017 License: 6573		**Test Date:**	Feb-2025
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Feb-2025
Tested by:	Dell Inc.	**Software Availability:**	Jan-2025

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-v1.4.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-v1.4.xml

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