SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

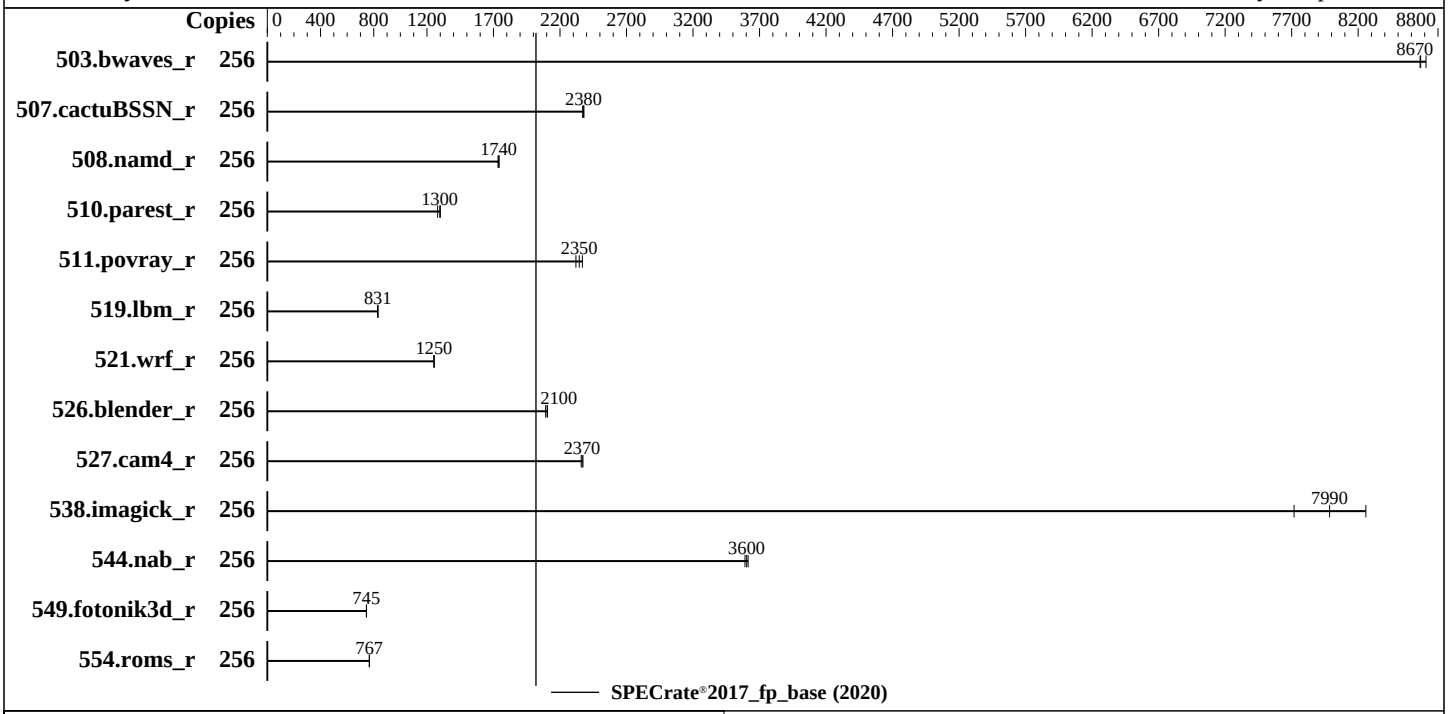
HPE Cray XD225v Gen11
(2.40 GHz, AMD EPYC 9745)

SPECrate®2017_fp_base = 2020

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jul-2025
Hardware Availability: Mar-2025
Software Availability: Apr-2025



Hardware

CPU Name:	AMD EPYC 9745
Max MHz:	3700
Nominal:	2400
Enabled:	256 cores, 2 chips, 2 threads/core
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 / 16 cores
Other:	None
Memory:	768 GB (24 x 32 GB 2Rx8 PC5-6400B-R)
Storage:	1 x 222 GB NVME SSD
Other:	CPU Cooling: DLC

Software

OS:	Red Hat Enterprise Linux release 9.4 (Plow) kernel version 5.14.0-427.13.1.el9.x86_64
Compiler:	C/C++/Fortran: Version 5.0.0 of AOCC
Parallel:	No
Firmware:	Version CA2K_5.35_v5.40 released Mar-2025
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None
Power Management:	BIOS and OS set to prefer performance at the cost of additional power usage.

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	256	296	8670	**296**	**8670**	295	8710							
507.cactuBSSN_r	256	136	2380	**136**	**2380**	137	2370							
508.namd_r	256	**140**	**1740**	140	1740	140	1730							
510.parest_r	256	523	1280	515	1300	**517**	**1300**							
511.povray_r	256	252	2370	**255**	**2350**	258	2320							
519.lbm_r	256	**325**	**831**	325	830	325	831							
521.wrf_r	256	**458**	**1250**	458	1250	458	1250							
526.blender_r	256	186	2090	185	2110	**185**	**2100**							
527.cam4_r	256	190	2360	189	2370	**189**	**2370**							
538.imagick_r	256	82.5	7720	77.1	8260	**79.7**	**7990**							
544.nab_r	256	120	3590	119	3610	**120**	**3600**							
549.fotonik3d_r	256	**1339**	**745**	1338	746	1339	745							
554.roms_r	256	530	767	**530**	**767**	530	768							

SPECrate®2017_fp_base = 2020

SPECrate®2017_fp_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

```
The AMD64 AOCC Compiler Suite is available at
http://developer.amd.com/amd-aocc/
```

Submit Notes

```
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.
```

Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,
```

(Continued on next page)

Operating System Notes (Continued)

```
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/tmp/cpu2017-1.1.9/amd_rate_aocc500_znver5_A_lib/lib:/tmp/cpu2017-1.1.9/amd_rate_aocc500_znver5_A_lib
     /lib32:/home/users/jsouthern/lib:/opt/cray/pe/papi/7.2.0.1/lib64"
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.
```

Platform Notes

```
BIOS Configuration
 Determinism Control set to Manual
 Determinism Enable set to Power
 NUMA nodes per socket set to NPS4

 Sysinfo program /tmp/cpu2017-1.1.9/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on cn51 Tue Jul  1 08:13:14 2025

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 252 (252-32.el9_4)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
```

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Platform Notes (Continued)

```
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 warning
23. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux cn51 5.14.0-427.13.1.el9.x86_64 #1 SMP PREEMPT_DYNAMIC Mon Dec 2 16:59:18 CST 2024 x86_64 x86_64
  x86_64 GNU/Linux

------------------------------------------------------------
2. w
   08:13:14 up 5 days, 22:31,  0 users,  load average: 200.42, 240.27, 246.25
  USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT

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

------------------------------------------------------------
4. ulimit -a
  real-time non-blocking time  (microseconds, -R) unlimited
  core file size              (blocks, -c) 0
  data seg size               (kbytes, -d) unlimited
  scheduling priority                 (-e) 0
  file size                   (blocks, -f) unlimited
  pending signals                     (-i) 3091720
  max locked memory           (kbytes, -l) 2097152
  max memory size             (kbytes, -m) unlimited
  open files                          (-n) 16384
  pipe size                (512 bytes, -p) 8
  POSIX message queues         (bytes, -q) 819200
  real-time priority                  (-r) 0
  stack size                  (kbytes, -s) unlimited
  cpu time                   (seconds, -t) unlimited
  max user processes                  (-u) 3091720
  virtual memory              (kbytes, -v) unlimited
  file locks                          (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
 /opt/pbs/sbin/pbs_mom
 -bash
 /bin/bash /var/spool/pbs/mom_priv/jobs/11559[36].janus2-login.SC
 python3 ./run_amd_rate_aocc500_znver5_A1.py -b specrate -s refrate -i 3 -thp always -rc 256 --reportable
 /bin/bash ./amd_rate_aocc500_znver5_A1.sh
 runcpu --config amd_rate_aocc500_znver5_A1.cfg --tune base --reportable --iterations 3 fprate
 runcpu --configfile amd_rate_aocc500_znver5_A1.cfg --tune base --reportable --iterations 3 --nopower
   --runmode rate --tune base --size test:train:refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /tmp/cpu2017-1.1.9

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

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Platform Notes (Continued)

```
6. /proc/cpuinfo
     model name      : AMD EPYC 9745 128-Core Processor
     vendor_id       : AuthenticAMD
     cpu family      : 26
     model           : 17
     stepping        : 0
     microcode       : 0xb101047
     bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size        : 192 4K pages
     cpu cores       : 128
     siblings        : 256
     2 physical ids (chips)
     512 processors (hardware threads)
     physical id 0: core ids 0-127
     physical id 1: core ids 0-127
     physical id 0: apicids 0-255
     physical id 1: apicids 256-511
   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 2.37.4:
   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):                               512
   On-line CPU(s) list:                  0-511
   Vendor ID:                            AuthenticAMD
   Model name:                           AMD EPYC 9745 128-Core Processor
   CPU family:                           26
   Model:                                17
   Thread(s) per core:                   2
   Core(s) per socket:                   128
   Socket(s):                            2
   Stepping:                             0
   Frequency boost:                      enabled
   CPU(s) scaling MHz:                   65%
   CPU max MHz:                          3707.8120
   CPU min MHz:                          1500.0000
   BogoMIPS:                             4792.83
   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 svm
                                         extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit
                                         wdt tce topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb
                                         cat_l3 cdp_l3 hw_pstate ssbd mba perfmon_v2 ibrs ibpb stibp
                                         ibrs_enhanced vmmcall fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms
                                         invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
                                         clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec
                                         xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                                         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
```

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Platform Notes (Continued)

```
                                   bus_lock_detect movdiri movdir64b overflow_recov succor smca fsrm
                                   avx512_vp2intersect flush_l1d debug_swap
  Virtualization:                  AMD-V
  L1d cache:                       12 MiB (256 instances)
  L1i cache:                       8 MiB (256 instances)
  L2 cache:                        256 MiB (256 instances)
  L3 cache:                        512 MiB (16 instances)
  NUMA node(s):                    8
  NUMA node0 CPU(s):               0-31,256-287
  NUMA node1 CPU(s):               32-63,288-319
  NUMA node2 CPU(s):               64-95,320-351
  NUMA node3 CPU(s):               96-127,352-383
  NUMA node4 CPU(s):               128-159,384-415
  NUMA node5 CPU(s):               160-191,416-447
  NUMA node6 CPU(s):               192-223,448-479
  NUMA node7 CPU(s):               224-255,480-511
  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 rstack overflow: Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:        Mitigation; Enhanced / Automatic IBRS, IBPB conditional, STIBP
                                   always-on, RSB filling, PBRSB-eIBRS Not affected
  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      12M   12 Data            1    64        1             64
     L1i       32K       8M    8 Instruction     1    64        1             64
     L2         1M     256M   16 Unified         2  1024        1             64
     L3        32M     512M   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: 0-31,256-287
  node 0 size: 95860 MB
  node 0 free: 86519 MB
  node 1 cpus: 32-63,288-319
  node 1 size: 96752 MB
  node 1 free: 88146 MB
  node 2 cpus: 64-95,320-351
  node 2 size: 96752 MB
  node 2 free: 89101 MB
  node 3 cpus: 96-127,352-383
  node 3 size: 96752 MB
  node 3 free: 88995 MB
  node 4 cpus: 128-159,384-415
  node 4 size: 96752 MB
  node 4 free: 84563 MB
  node 5 cpus: 160-191,416-447
  node 5 size: 96710 MB
  node 5 free: 88979 MB
```

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Platform Notes (Continued)

```
  node 6 cpus: 192-223,448-479
  node 6 size: 96752 MB
  node 6 free: 89096 MB
  node 7 cpus: 224-255,480-511
  node 7 size: 96647 MB
  node 7 free: 88315 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:       791529692 kB

------------------------------------------------------------
10. who -r
  run-level 3 Jun 25 09:46

------------------------------------------------------------
11. Systemd service manager version: systemd 252 (252-32.el9_4)
  Default Target  Status
  multi-user      degraded

------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
    UNIT                                LOAD   ACTIVE SUB    DESCRIPTION
  * NetworkManager-wait-online.service loaded failed failed Network Manager Wait Online
  * rc-local.service                   loaded failed failed /etc/rc.d/rc.local Compatibility

------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE           UNIT FILES
  enabled         NetworkManager NetworkManager-dispatcher NetworkManager-wait-online after-local array
                  atomd auditd chronyd cm-configuration cm-slingshot-ama cm-slingshot-bonding
                  cm-slingshot-ifroute cm_cpe cpuset_cpunodemap cpuset_memory_spread crond dbus-broker
                  getty@ irqbalance kdump lldpad low-memory-monitor mdmonitor microcode nis-domainname
                  oddjobd openibd palsd pbs pe postfix procset rpcbind rsyslog rtkit-daemon
                  selinux-autorelabel-mark smartd sshd sssd systemd-boot-update systemd-network-generator
                  tempohb-client upower
  enabled-runtime rc-local rpc-statd systemd-fsck-root systemd-remount-fs
  disabled        arp-ethers canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot
                  chrony-wait chronyd-restricted clmgr-health-boot cm-slingshot-ama@ collectl console-getty
                  cpupower debug-shell dnf-system-upgrade filebeat firewalld gssproxy hpcm-ldms-lead ibacm
                  kvm_stat lnet man-db-restart-cache-update munge named nfs-blkmap nfs-server nftables
                  opensmd opensmd@ pbs@ rdisc rpmdb-rebuild selinux-check-proper-disable sshd-keygen@
                  sysstat systemd-boot-check-no-failures systemd-pstore systemd-sysext
  indirect        serial-getty@ sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
                  systemd-sysupdate systemd-sysupdate-reboot
  masked          plymouth-start

------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  vmlinuz-5.14.0-427.13.1.el9.x86_64
```

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Platform Notes (Continued)

```
   initrd=initramfs-5.14.0-427.13.1.el9.x86_64.img
   ROOTFS=disk
   IMAGE_PENDING=1
   IMAGE=rhel94-amd-turin-hpe-gbc-pe-25.3.3
   SLOT=3
   console=ttyS0,115200n8
   NODETYPE=service
   NODE_ID=service3101160003
   HOSTNAME=cn51
   SLOTCOUNT=4
   MONITOR_CONSOLE=yes
   ro
   root=dhcp
   selinux=0
   biosdevname=0
   numa_balancing=disable
   net.naming-scheme=v239
   systemd.unified_cgroup_hierarchy=0
   TRANSPORT=rsync
   IMAGESERVER=172.23.0.1
   TTL=2
   MCAST_RDV_ADDR=239.255.255.1
   FLAMETHROWER_DIRECTORY_PORTBASE=9000
   START_TIMEOUT=0
   RECEIVE_TIMEOUT=15
   crashkernel=410M
   net.ifnames=1
   MGMT_BONDING_TYPE=active-backup
   RW_SPARSE_PERHOST_SIZE=500M
   MAC=b4:7a:f1:b4:18:fc

------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 451:
    current policy: frequency should be within 2.40 GHz and 2.40 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: no

------------------------------------------------------------
16. sysctl
  kernel.numa_balancing               0
  kernel.randomize_va_space           2
  vm.compaction_proactiveness        20
  vm.dirty_background_bytes           0
  vm.dirty_background_ratio          10
  vm.dirty_bytes                      0
  vm.dirty_expire_centisecs        3000
  vm.dirty_ratio                     20
  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                      60
  vm.watermark_boost_factor       15000
```

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Platform Notes (Continued)

```
  vm.watermark_scale_factor          10
  vm.zone_reclaim_mode                3

------------------------------------------------------------
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               Red Hat Enterprise Linux 9.4 (Plow)
  hpe-mpi-release          HPE MPI 1.9.7, Build 731.0940.250418T1930.r.rhel94hpe
  redhat-release           Red Hat Enterprise Linux release 9.4 (Plow)
  sgi-service-node-release Cluster Manager Service Node 1.12, Build
  730.0940.240930T1930.r.rhel94hpe-240930T1930
  system-release           Red Hat Enterprise Linux release 9.4 (Plow)

------------------------------------------------------------
20. Disk information
SPEC is set to: /tmp/cpu2017-1.1.9
  Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p33 xfs   222G   62G  161G  28% /

------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         HPE
    Product:        HPE Cray XD225v
    Product Family: Cray

------------------------------------------------------------
22. dmidecode warning
  Cannot run dmidecode; consider saying (as root)
   chmod +s /usr/sbin/dmidecode


------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       American Megatrends International, LLC.
   BIOS Version:      CA2K_5.35_v5.40
   BIOS Date:         03/20/2025
```

Compiler Version Notes

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

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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) 510.parest_r(base)
------------------------------------------------------------------------------------------------------------------------
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) 526.blender_r(base)
------------------------------------------------------------------------------------------------------------------------
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)
------------------------------------------------------------------------------------------------------------------------
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) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------------------------------------------------
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) 527.cam4_r(base)
------------------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
```

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Compiler Version Notes (Continued)

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

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-XD225v-AMD-Turin-rev1.2.html
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-XD225v-AMD-Turin-rev1.2.xml
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml

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