SPEC CPU®2017 Floating Point Rate Result

Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9845
2.10 GHz Processor)

SPECrate®2017_fp_base = 2080

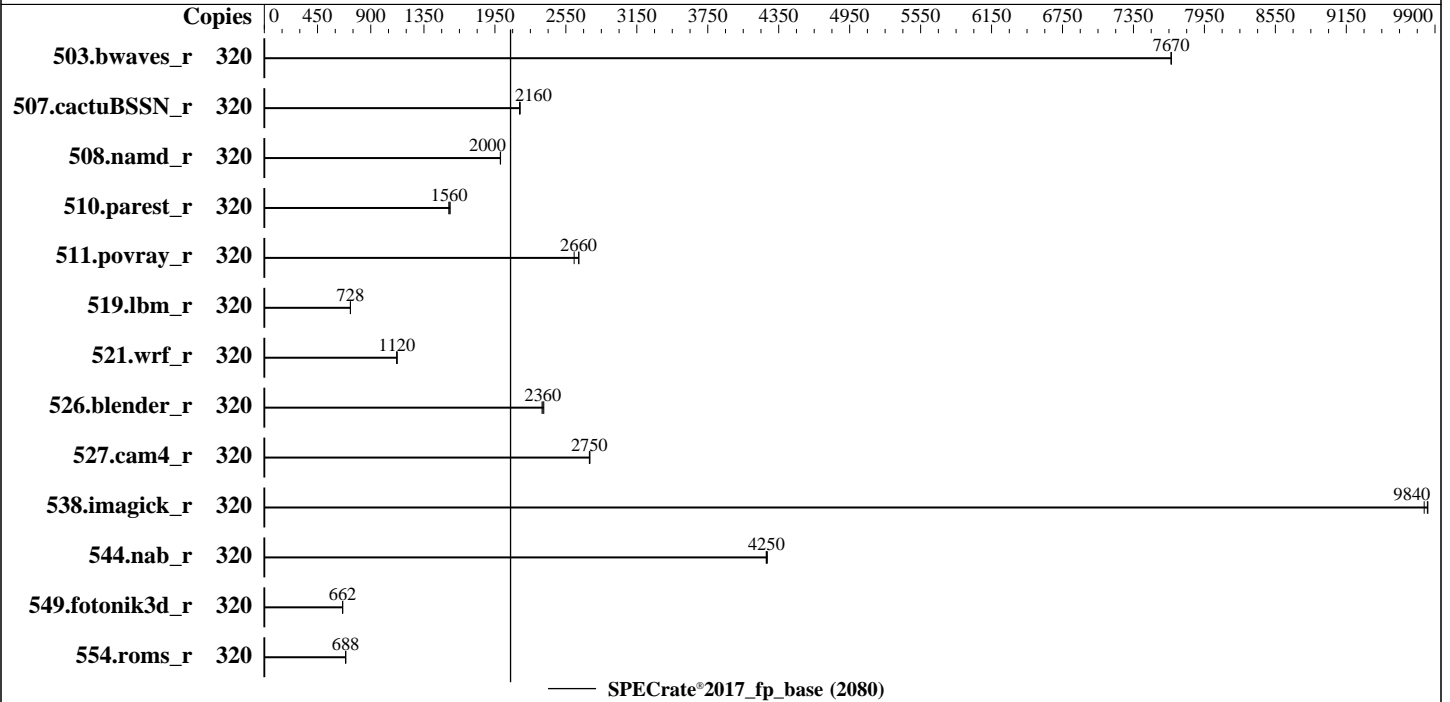SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9019
Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Oct-2024
Hardware Availability: Oct-2024
Software Availability: Sep-2024

Benchmark	Copies	Result
503.bwaves_r	320	7670
507.cactuBSSN_r	320	2160
508.namd_r	320	2000
510.parest_r	320	1560
511.povray_r	320	2660
519.lbm_r	320	728
521.wrf_r	320	1120
526.blender_r	320	2360
527.cam4_r	320	2750
538.imagick_r	320	9840
544.nab_r	320	4250
549.fotonik3d_r	320	662
554.roms_r	320	688

Scale: Copies axis 0 to 9900.

— SPECrate®2017_fp_base (2080)

Hardware

CPU Name: AMD EPYC 9845
 Max MHz: 3700
 Nominal: 2100
Enabled: 320 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: 320 MB I+D on chip per chip, 32 MB shared / 16 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-6400B-R, running at 6000)
Storage: 1 x 240 GB SATA SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 kernel version
 5.14.21-150500.53-default
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: No
Firmware: Version 4.3.6.68 released Oct-2024
File System: btrfs
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	320	418	7670	**418**	**7670**	418	7670							
507.cactuBSSN_r	320	**188**	**2160**	188	2160	187	2160							
508.namd_r	320	**152**	**2000**	152	2000	152	2000							
510.parest_r	320	**535**	**1560**	536	1560	533	1570							
511.povray_r	320	**281**	**2660**	285	2620	281	2660							
519.lbm_r	320	463	728	**463**	**728**	463	728							
521.wrf_r	320	639	1120	640	1120	**639**	**1120**							
526.blender_r	320	206	2360	**207**	**2360**	208	2350							
527.cam4_r	320	203	2750	**204**	**2750**	204	2750							
538.imagick_r	320	**80.9**	**9840**	80.9	9840	81.1	9810							
544.nab_r	320	**127**	**4250**	127	4250	127	4240							
549.fotonik3d_r	320	1884	662	1883	662	**1884**	**662**							
554.roms_r	320	**739**	**688**	739	688	740	687							
SPECrate®2017_fp_base =	**2080**													
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)

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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 =
    "/home/cpu2017/amd_rate_aocc500_znver5_A_lib/lib:/home/cpu2017/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.
```

Platform Notes

```
BIOS settings:
NUMA nodes per socket set to NPS2
Determinism Slider set to Power
DF C-States set to Disabled
SMT Mode set to Disabled


 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Oct 31 17:50:03 2024

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
```

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Platform Notes (Continued)

```
   14. cpupower frequency-info
   15. sysctl
   16. /sys/kernel/mm/transparent_hugepage
   17. /sys/kernel/mm/transparent_hugepage/khugepaged
   18. OS release
   19. Disk information
   20. /sys/devices/virtual/dmi/id
   21. dmidecode
   22. BIOS
 ------------------------------------------------------------

 ------------------------------------------------------------
 1. uname -a
   Linux localhost 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
   x86_64 x86_64 x86_64 GNU/Linux

 ------------------------------------------------------------
 2. w
    17:50:03 up  5:28,  1 user,  load average: 0.07, 1.99, 61.38
   USER      TTY       FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1      -                12:24   23.00s  1.10s  0.13s /bin/bash ./amd_rate_aocc500_znver5_A1.sh

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

 ------------------------------------------------------------
 4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 6190258
   max locked memory       (kbytes, -l) 2097152
   max memory size         (kbytes, -m) unlimited
   open files                      (-n) 1024
   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) 6190258
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited

 ------------------------------------------------------------
 5. sysinfo process ancestry
  /usr/lib/systemd/systemd --switched-root --system --deserialize 30
  login -- root
  -bash
  python3 ./run_amd_rate_aocc500_znver5_A1.py -b fprate
  /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/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/cpu2017

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

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Platform Notes (Continued)

```
 6. /proc/cpuinfo
    model name        : AMD EPYC 9845 160-Core Processor
    vendor_id         : AuthenticAMD
    cpu family        : 26
    model             : 17
    stepping          : 0
    microcode         : 0xb101021
    bugs              : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size          : 192 4K pages
    cpu cores         : 160
    siblings          : 160
    2 physical ids (chips)
    320 processors (hardware threads)
    physical id 0: core ids 0-159
    physical id 1: core ids 0-159
    physical id 0: apicids 0-159
    physical id 1: apicids 256-415
  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):                       320
    On-line CPU(s) list:          0-319
    Vendor ID:                    AuthenticAMD
    Model name:                   AMD EPYC 9845 160-Core Processor
    CPU family:                   26
    Model:                        17
    Thread(s) per core:           1
    Core(s) per socket:           160
    Socket(s):                    2
    Stepping:                     0
    Frequency boost:              enabled
    CPU max MHz:                  3718.0659
    CPU min MHz:                  1500.0000
    BogoMIPS:                     4193.68
    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 invpcid_single hw_pstate ssbd mba perfmon_v2 ibrs ibpb stibp
                                  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 v_spec_ctrl 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 fsrm avx512_vp2intersect flush_l1d
```

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Platform Notes (Continued)

```
  Virtualization:              AMD-V
  L1d cache:                   15 MiB (320 instances)
  L1i cache:                   10 MiB (320 instances)
  L2 cache:                    320 MiB (320 instances)
  L3 cache:                    640 MiB (20 instances)
  NUMA node(s):                4
  NUMA node0 CPU(s):           0-79
  NUMA node1 CPU(s):           80-159
  NUMA node2 CPU(s):           160-239
  NUMA node3 CPU(s):           240-319
  Vulnerability Itlb multihit:   Not affected
  Vulnerability L1tf:            Not affected
  Vulnerability Mds:             Not affected
  Vulnerability Meltdown:        Not affected
  Vulnerability Mmio stale data: Not affected
  Vulnerability Retbleed:        Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:      Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:      Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB
                                 filling, 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      15M  12 Data            1    64        1             64
      L1i       32K      10M   8 Instruction     1    64        1             64
      L2         1M     320M  16 Unified         2  1024        1             64
      L3        32M     640M  16 Unified         3 32768        1             64

  --------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0-79
    node 0 size: 386633 MB
    node 0 free: 385010 MB
    node 1 cpus: 80-159
    node 1 size: 387051 MB
    node 1 free: 385719 MB
    node 2 cpus: 160-239
    node 2 size: 387017 MB
    node 2 free: 385765 MB
    node 3 cpus: 240-319
    node 3 size: 386891 MB
    node 3 free: 385679 MB
    node distances:
    node   0   1   2   3
      0:  10  12  32  32
      1:  12  10  32  32
      2:  32  32  10  12
      3:  32  32  12  10

  --------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       1584736736 kB

  --------------------------------------------------------------
  10. who -r
     run-level 3 Oct 31 12:21
```

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Platform Notes (Continued)

```
   ----------------------------------------------------------
   11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
     Default Target  Status
     multi-user      running

   ----------------------------------------------------------
   12. Services, from systemctl list-unit-files
     STATE            UNIT FILES
     enabled          YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ irqbalance iscsi
                      issue-generator kbdsettings klog libvirtd lvm2-monitor nscd postfix purge-kernels rollback
                      rsyslog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6
                      wickedd-nanny
     enabled-runtime  systemd-remount-fs
     disabled         autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                      chronyd console-getty cups cups-browsed debug-shell dnsmasq ebtables exchange-bmc-os-info
                      firewalld gpm grub2-once haveged haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                      iscsi-init iscsid issue-add-ssh-keys kdump kdump-early kexec-load ksm kvm_stat
                      libvirt-guests lunmask man-db-create multipathd nfs nfs-blkmap nfs-server nfsserver
                      rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd
                      strongswan strongswan-starter svnserve systemd-boot-check-no-failures
                      systemd-network-generator systemd-nspawn@ systemd-sysext systemd-time-wait-sync
                      systemd-timesyncd tcsd udisks2 virtinterfaced virtnetworkd virtnodedevd virtnwfilterd
                      virtproxyd virtqemud virtsecretd virtstoraged
     indirect         pcscd virtlockd virtlogd wickedd

   ----------------------------------------------------------
   13. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
     root=UUID=5eac0278-b5d7-4d70-9f22-3587a0d03dd8
     splash=silent
     mitigations=auto
     quiet
     security=apparmor

   ----------------------------------------------------------
   14. cpupower frequency-info
     analyzing CPU 0:
       current policy: frequency should be within 1.50 GHz and 2.10 GHz.
                       The governor "performance" may decide which speed to use
                       within this range.
       boost state support:
         Supported: yes
         Active: yes

   ----------------------------------------------------------
   15. sysctl
     kernel.numa_balancing          1
     kernel.randomize_va_space      0
     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                 8
     vm.dirty_writeback_centisecs   500
     vm.dirtytime_expire_seconds    43200
     vm.extfrag_threshold           500
     vm.min_unmapped_ratio          1
     vm.nr_hugepages                0
```

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Platform Notes (Continued)

```
  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


  ---------------------------------------------------------------
16. /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


  ---------------------------------------------------------------
17. /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


  ---------------------------------------------------------------
18. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP5


  ---------------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017
  Filesystem      Type   Size  Used Avail Use% Mounted on
  /dev/sda2       btrfs  222G   11G  211G   5% /home


  ---------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:        Cisco Systems Inc
    Product:       UCSC-C245-M8SX
    Serial:        WZP27360C65


  ---------------------------------------------------------------
21. dmidecode
  Additional information from dmidecode 3.4 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:
    24x 0xCE00 M321R8GA0PB2-CCPEC 64 GB 2 rank 6400, configured at 6000


  ---------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
  BIOS Vendor:      Cisco Systems, Inc.
  BIOS Version:     C245M8.4.3.6.68.1001241428
  BIOS Date:        10/01/2024
  BIOS Revision:    5.35
```

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Compiler Version Notes

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

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SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9845
2.10 GHz Processor)

SPECrate®2017_fp_base =   2080

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Oct-2024

Hardware Availability: Oct-2024

Software Availability: Sep-2024

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`

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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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CPU2017 License: 9019   **Test Date:**   Oct-2024
Test Sponsor: Cisco Systems   **Hardware Availability:** Oct-2024
Tested by: Cisco Systems   **Software Availability:** Sep-2024

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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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/Cisco-Platform-Settings-AMD-Turin-v1.0-revA.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/Cisco-Platform-Settings-AMD-Turin-v1.0-revA.xml

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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