SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9534 64-Core Processor)

$SPECrate^{®}2017\_fp\_base = 1140$

$SPECrate^{®}2017\_fp\_peak = 1140$

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

Copies

- 503.bwaves_r 128 1740
- 507.cactuBSSN_r 128 1370
- 508.namd_r 128 849 / 851
- 510.parest_r 128 1220 / 1220
- 511.povray_r 128 1160 / 1160
- 519.lbm_r 128 559
- 521.wrf_r 128 1070 / 1080
- 526.blender_r 128 1050
- 527.cam4_r 128 1150 / 1150
- 538.imagick_r 128 4240
- 544.nab_r 128 1690
- 549.fotonik3d_r 128 579
- 554.roms_r 128 630 / 638

—— SPECrate®2017_fp_base (1140)   ----- SPECrate®2017_fp_peak (1140)

Hardware

CPU Name: AMD EPYC 9534
 Max MHz: 3700
 Nominal: 2450
Enabled: 128 cores, 2 chips
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 256 MB I+D on chip per chip, 32 MB shared / 8 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-5600B-R, running at 4800)
Storage: 1 x 1.6 TB NVME 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 4.0.0 of AOCC
Parallel: No
Firmware: Version 4.3.4a released May-2024
File System: xfs
System State: Run level 3 (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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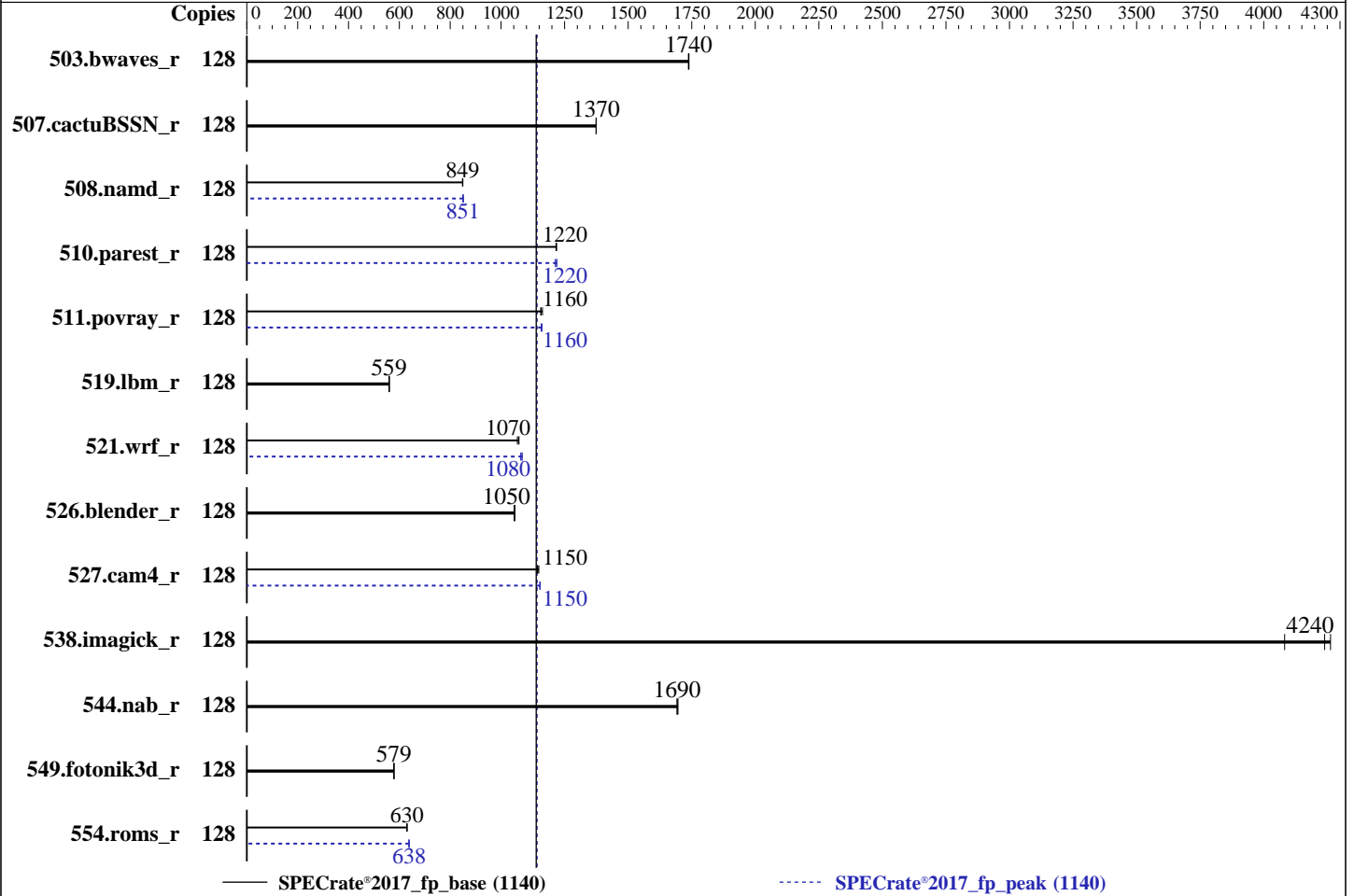
SPECrate®2017_fp_peak = 1140

CPU2017 License:	9019	**Test Date:**	Jun-2024
Test Sponsor:	Cisco Systems	**Hardware Availability:**	Jun-2024
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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	739	1740	**738**	**1740**	738	1740	128	739	1740	**738**	**1740**	738	1740
507.cactuBSSN_r	128	118	1370	118	1370	**118**	**1370**	128	118	1370	118	1370	**118**	**1370**
508.namd_r	128	143	850	143	848	**143**	**849**	128	143	851	143	852	**143**	**851**
510.parest_r	128	275	1220	**275**	**1220**	275	1220	128	**275**	**1220**	276	1210	275	1220
511.povray_r	128	257	1160	259	1160	**258**	**1160**	128	257	1160	258	1160	**258**	**1160**
519.lbm_r	128	240	561	**241**	**559**	241	559	128	240	561	**241**	**559**	241	559
521.wrf_r	128	268	1070	**268**	**1070**	269	1060	128	266	1080	**265**	**1080**	265	1080
526.blender_r	128	185	1050	185	1050	**185**	**1050**	128	185	1050	185	1050	**185**	**1050**
527.cam4_r	128	**195**	**1150**	195	1150	196	1140	128	194	1150	194	1150	**194**	**1150**
538.imagick_r	128	**75.1**	**4240**	74.7	4260	78.0	4080	128	**75.1**	**4240**	74.7	4260	78.0	4080
544.nab_r	128	127	1700	127	1690	**127**	**1690**	128	127	1700	127	1690	**127**	**1690**
549.fotonik3d_r	128	862	578	**862**	**579**	862	579	128	862	578	**862**	**579**	862	579
554.roms_r	128	323	630	**323**	**630**	323	630	128	**319**	**638**	319	638	319	639
SPECrate®2017_fp_base =	**1140**												
SPECrate®2017_fp_peak =	**1140**												

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_aocc400_znver4_A_lib/lib:/home/cpu2017/amd_rate_aocc400_znver4_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 NPS4
Determinism Slider set to Power
DF C-States set to Disabled
TDP set to 400
PPT set to 400
SMT Mode set to Disabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Sun Jun 30 04:22:26 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
```

(Continued on next page)

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Platform Notes (Continued)

```
   13. Linux kernel boot-time arguments, from /proc/cmdline
   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
      04:22:26 up 2 min,  1 user,  load average: 0.14, 0.03, 0.01
      USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
      root     tty1     -                04:21   18.00s  1.20s  0.14s /bin/bash ./amd_rate_aocc400_znver4_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) 6191219
     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) 6191219
     virtual memory          (kbytes, -v) unlimited
     file locks                      (-x) unlimited


   -----------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize 34
    login -- root
    -bash
    python3 ./run_amd_rate_aocc400_znver4_A1.py -b fprate
    /bin/bash ./amd_rate_aocc400_znver4_A1.sh
    runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fprate
    runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
      --runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
    $SPEC = /home/cpu2017
```

(Continued on next page)

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Platform Notes (Continued)

```
   ----------------------------------------------------------
   6. /proc/cpuinfo
      model name        : AMD EPYC 9534 64-Core Processor
      vendor_id         : AuthenticAMD
      cpu family        : 25
      model             : 17
      stepping          : 1
      microcode         : 0xa101148
      bugs              : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
      TLB size          : 3584 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 2.37.4:
     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):                  128
     On-line CPU(s) list:     0-127
     Vendor ID:               AuthenticAMD
     Model name:              AMD EPYC 9534 64-Core Processor
     CPU family:              25
     Model:                   17
     Thread(s) per core:      1
     Core(s) per socket:      64
     Socket(s):               2
     Stepping:                1
     Frequency boost:         enabled
     CPU max MHz:             3718.0659
     CPU min MHz:             1500.0000
     BogoMIPS:                4892.60
     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 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 avx512_bf16 clzero irperf xsaveerptr rdpru
                              wbnoinvd amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale
                              vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic
                              v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku ospke avx512_vbmi2
                              gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdpid
                              overflow_recov succor smca flush_l1d
```

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Platform Notes (Continued)

```
  Virtualization:              AMD-V
  L1d cache:                   4 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 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       32K       4M    8 Data            1     64        1             64
      L1i       32K       4M    8 Instruction     1     64        1             64
      L2         1M     128M    8 Unified         2   2048        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: 0-15
  node 0 size: 193228 MB
  node 0 free: 192588 MB
  node 1 cpus: 16-31
  node 1 size: 193531 MB
  node 1 free: 193097 MB
  node 2 cpus: 32-47
  node 2 size: 193531 MB
  node 2 free: 193146 MB
  node 3 cpus: 48-63
  node 3 size: 193531 MB
  node 3 free: 193103 MB
  node 4 cpus: 64-79
  node 4 size: 193497 MB
  node 4 free: 193057 MB
  node 5 cpus: 80-95
  node 5 size: 193531 MB
  node 5 free: 193113 MB
  node 6 cpus: 96-111
  node 6 size: 193531 MB
  node 6 free: 193054 MB
  node 7 cpus: 112-127
```

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Platform Notes (Continued)

```
   node 7 size: 193449 MB
   node 7 free: 193017 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:       1584982888 kB


   --------------------------------------------------------------
 10. who -r
    run-level 3 Jun 30 04:19


   --------------------------------------------------------------
 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 issue-generator
                    kbdsettings klog 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 ebtables exchange-bmc-os-info
                    firewalld gpm grub2-once haveged haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                    issue-add-ssh-keys kexec-load ksm kvm_stat lunmask man-db-create multipathd nfs nfs-blkmap
                    rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd svnserve
                    systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                    systemd-time-wait-sync systemd-timesyncd udisks2
    indirect        wickedd

   --------------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
    root=UUID=185bd913-afd4-4bd7-b92d-ac5ed4a95cce
    splash=silent
    mitigations=auto
    quiet
    security=apparmor

   --------------------------------------------------------------
 14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 1.50 GHz and 2.45 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes
```

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Platform Notes (Continued)

```
     ----------------------------------------------------------
     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
       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/sdc2      xfs   892G  8.0G  884G   1% /


     ----------------------------------------------------------
     20. /sys/devices/virtual/dmi/id
         Vendor:        Cisco Systems Inc
         Product:       UCSC-C245-M8SX
         Serial:        WZP2750Z162


     ----------------------------------------------------------
     21. dmidecode
       Additional information from dmidecode 3.4 follows.  WARNING: Use caution when you interpret this section.
```

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Platform Notes (Continued)

```
    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:
       12x 0xCE00 M321R8GA0PB0-CWMCH 64 GB 2 rank 5600, configured at 4800
       3x 0xCE00 M321R8GA0PB0-CWMJH 64 GB 2 rank 5600, configured at 4800
       9x 0xCE00 M321R8GA0PB0-CWMKJ 64 GB 2 rank 5600, configured at 4800


   -----------------------------------------------------------
    22. BIOS
    (This section combines info from /sys/devices and dmidecode.)
       BIOS Vendor:        Cisco Systems, Inc.
       BIOS Version:       C245M8.4.3.4a.0.0520240849
       BIOS Date:          05/20/2024
       BIOS Revision:      5.27
```

Compiler Version Notes

```
==============================================================================================
C             | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C++           | 508.namd_r(base, peak) 510.parest_r(base, peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C++, C        | 511.povray_r(base, peak) 526.blender_r(base, peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
```

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9534 64-Core Processor)

SPECrate®2017_fp_base = 1140

SPECrate®2017_fp_peak = 1140

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

Compiler Version Notes (Continued)

```
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------

==========================================================================================
Fortran       | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------

==========================================================================================
Fortran, C    | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
clang
```

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
```

SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9534 64-Core Processor)

SPECrate®2017_fp_base = 1140

SPECrate®2017_fp_peak = 1140

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

Test Date: Jun-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

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 -flto -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=znver4 -fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -lflang
```

C++ benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang
```

Fortran benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang
```

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9534 64-Core Processor)

SPECrate®2017_fp_base = 1140

SPECrate®2017_fp_peak = 1140

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Jun-2024

Hardware Availability: Jun-2024

Software Availability: Feb-2024

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

Benchmarks using both C and C++:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -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 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -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 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

Base Other Flags

C benchmarks:
```
-Wno-unused-command-line-argument
```

C++ benchmarks:
```
-Wno-unused-command-line-argument
```

Fortran benchmarks:
```
-Wno-unused-command-line-argument
```

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SPEC CPU®2017 Floating Point Rate Result

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9534 64-Core Processor)

SPECrate®2017_fp_base = 1140

SPECrate®2017_fp_peak = 1140

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Jun-2024

Hardware Availability: Jun-2024

Software Availability: Feb-2024

Base Other Flags (Continued)

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
```

Peak Compiler Invocation

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

Benchmarks using both Fortran and C:
```
flang clang
```

Benchmarks using both C and C++:
```
clang++ clang
```

Benchmarks using Fortran, C, and C++:
```
clang++ clang flang
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
 519.lbm_r: basepeak = yes
```

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

Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9534 64-Core Processor)

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SPECrate®2017_fp_peak = 1140

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

Test Date: Jun-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

Peak Optimization Flags (Continued)

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc

510.parest_r: -m64 -flto -Wl,-mllvm -Wl,-suppress-fmas
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -lflang

Benchmarks using both Fortran and C:

521.wrf_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc

Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9534 64-Core Processor)

SPECrate®2017_fp_base = 1140

SPECrate®2017_fp_peak = 1140

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

Peak Optimization Flags (Continued)

521.wrf_r (continued):
`-lflang`

527.cam4_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`
`-fremap-arrays -mllvm -reduce-array-computations=3 -zopt`
`-Kieee -Mrecursive -funroll-loops`
`-mllvm -lsr-in-nested-loop`
`-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc`
`-lflang`

Benchmarks using both C and C++:

511.povray_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`
`-fremap-arrays -mllvm -reduce-array-computations=3 -zopt`
`-mllvm -unroll-threshold=100 -finline-aggressive`
`-mllvm -loop-unswitch-threshold=200000 -lamdlibm`
`-lamdalloc`

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`

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Cisco UCS C245 M8 (AMD EPYC 9534 64-Core Processor)

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CPU2017 License: 9019
Test Sponsor: Cisco Systems
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Test Date: Jun-2024
Hardware Availability: Jun-2024
Software Availability: Feb-2024

Peak Other Flags (Continued)

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/aocc400-flags.html`
`http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-AMD-v3-revA.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc400-flags.xml`
`http://www.spec.org/cpu2017/flags/Cisco-Platform-Settings-AMD-v3-revA.xml`

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

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