SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9454P 48 -Core Processor)

$SPECspeed^{®}2017\_fp\_base = 265$

$SPECspeed^{®}2017\_fp\_peak = 266$

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Aug-2024

Hardware Availability: Jun-2024

Software Availability: Jun-2023

Threads

Benchmark	Threads	base	peak
603.bwaves_s	48	794	
607.cactuBSSN_s	48	437	
619.lbm_s	48	143	143
621.wrf_s	48	227	
627.cam4_s	48	178	
628.pop2_s	48	99.9	101
638.imagick_s	48	335	336
644.nab_s	48	500	
649.fotonik3d_s	48	149	
654.roms_s	48	336	347

—— SPECspeed®2017_fp_base (265)   ------ SPECspeed®2017_fp_peak (266)

Hardware

CPU Name: AMD EPYC 9454P
Max MHz: 3800
Nominal: 2750
Enabled: 48 cores, 1 chip
Orderable: 1 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 / 6 cores
Other: None
Memory: 768 GB (12 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: Yes
Firmware: Version 4.3.4a released May-2024
File System: btrfs
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.

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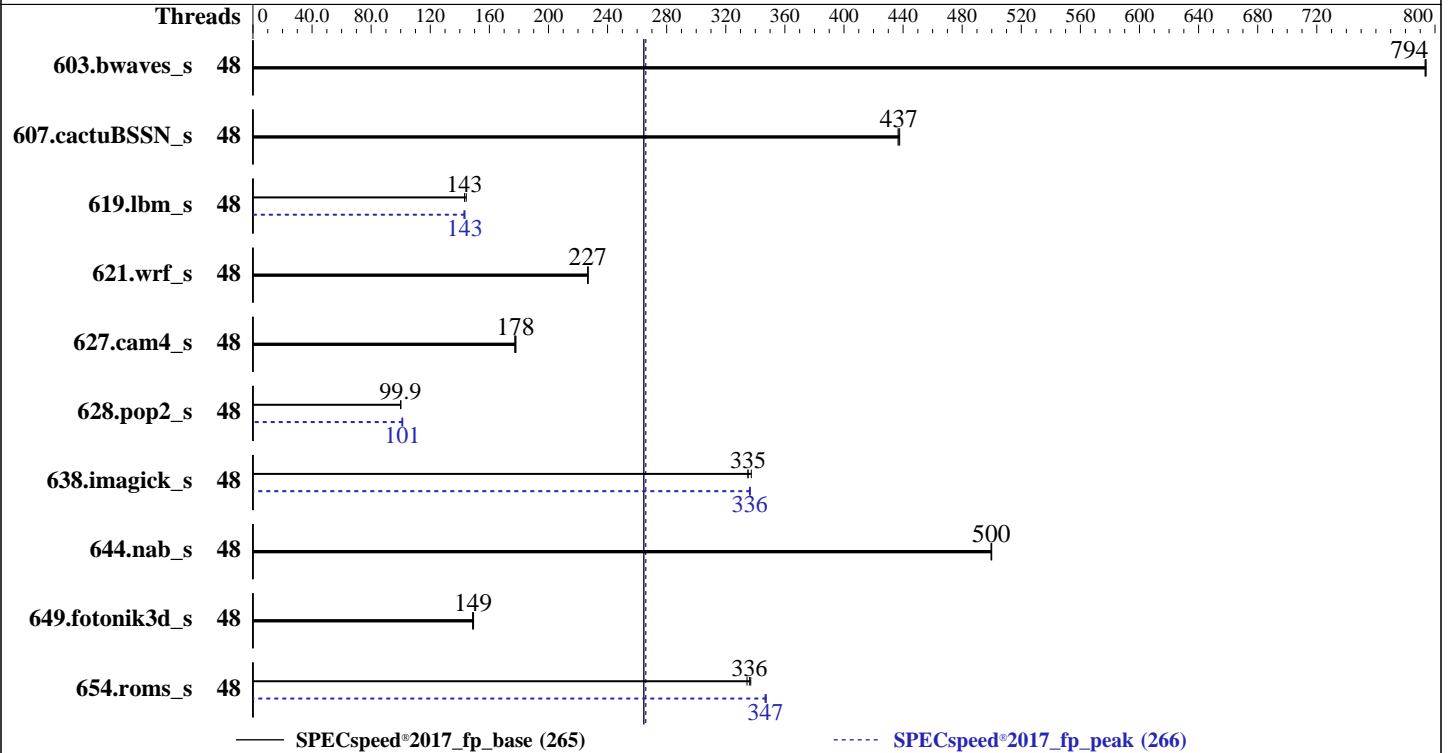
SPECspeed®2017_fp_peak = 266

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Results Table

Benchmark	Base						Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	48	74.3	794	**74.3**	**794**	74.4	793	48	74.3	794	**74.3**	**794**	74.4	793
607.cactuBSSN_s	48	38.1	438	38.2	437	**38.1**	**437**	48	38.1	438	38.2	437	**38.1**	**437**
619.lbm_s	48	**36.6**	**143**	36.3	144	36.6	143	48	**36.5**	**143**	36.5	143	36.7	143
621.wrf_s	48	58.4	227	58.3	227	**58.4**	**227**	48	58.4	227	58.3	227	**58.4**	**227**
627.cam4_s	48	49.8	178	**49.9**	**178**	50.0	177	48	49.8	178	**49.9**	**178**	50.0	177
628.pop2_s	48	119	100	119	99.9	**119**	**99.9**	48	**117**	**101**	118	101	117	101
638.imagick_s	48	42.8	337	**43.0**	**335**	43.1	335	48	42.9	337	**42.9**	**336**	42.9	336
644.nab_s	48	34.9	500	**35.0**	**500**	35.0	500	48	34.9	500	**35.0**	**500**	35.0	500
649.fotonik3d_s	48	**61.2**	**149**	61.1	149	61.3	149	48	**61.2**	**149**	61.1	149	61.3	149
654.roms_s	48	46.7	337	**46.8**	**336**	47.1	334	48	45.4	347	45.3	347	**45.4**	**347**
SPECspeed®2017_fp_base =		**265**												
SPECspeed®2017_fp_peak =		**266**												

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,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
To always enable THP for peak runs of:
603.bwaves_s, 607.cactuBSSN_s, 619.lbm_s, 627.cam4_s, 628.pop2_s, 638.imagick_s, 644.nab_s, 649.fotonik3d_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
```

(Continued on next page)

Cisco Systems

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Operating System Notes (Continued)

```
run as root.
To disable THP for peak runs of 621.wrf_s:
'echo never > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
To enable THP only on request for peak runs of 654.roms_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo madvise > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-47"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocc400_znver4_A_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "48"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 24 1 25 2 26 3 27 4 28 5 29 6 30 7 31 8 32 9 33 10 34 11 35 12 36 13 37 14 38 15 39
      16 40 17 41 18 42 19 43 20 44 21 45 22 46 23 47"
```

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:
SMT Mode set to Disabled
NUMA nodes per socket set to NPS1
Determinism Slider set to Power
DF C-States set to Disabled
```

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Platform Notes (Continued)

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Wed Aug 21 12:31:15 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
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
   12:31:15 up  7:45,  1 user,  load average: 0.00, 0.00, 0.00
  USER      TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root      tty1     -                04:54   27.00s  1.02s  0.09s /bin/bash ./amd_speed_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) 3093329
  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
```

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Platform Notes (Continued)

```
  real-time priority            (-r) 0
  stack size          (kbytes, -s) unlimited
  cpu time           (seconds, -t) unlimited
  max user processes            (-u) 3093329
  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_speed_aocc400_znver4_A1.py -b fpspeed
 /bin/bash ./amd_speed_aocc400_znver4_A1.sh
 runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fpspeed
 runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.fpspeed.001.0.log --lognum 001.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017


  ------------------------------------------------------------
6. /proc/cpuinfo
    model name       : AMD EPYC 9454P 48-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        : 48
    siblings         : 48
    1 physical ids (chips)
    48 processors (hardware threads)
    physical id 0: core ids 0-5,16-21,32-37,48-53,64-69,80-85,96-101,112-117
    physical id 0: apicids 0-5,16-21,32-37,48-53,64-69,80-85,96-101,112-117
  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):                    48
  On-line CPU(s) list:       0-47
  Vendor ID:                 AuthenticAMD
  Model name:                AMD EPYC 9454P 48-Core Processor
  CPU family:                25
  Model:                     17
  Thread(s) per core:        1
  Core(s) per socket:        48
  Socket(s):                 1
  Stepping:                  1
  Frequency boost:           enabled
  CPU max MHz:               3810.7910
```

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Platform Notes (Continued)

```
  CPU min MHz:              1500.0000
  BogoMIPS:                 5491.75
  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 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 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 fsrm flush_l1d
  Virtualization:           AMD-V
  L1d cache:                1.5 MiB (48 instances)
  L1i cache:                1.5 MiB (48 instances)
  L2 cache:                 48 MiB (48 instances)
  L3 cache:                 256 MiB (8 instances)
  NUMA node(s):             1
  NUMA node0 CPU(s):        0-47
  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     1.5M   8 Data            1    64      1            64
    L1i      32K     1.5M   8 Instruction     1    64      1            64
    L2        1M      48M   8 Unified         2  2048      1            64
    L3       32M     256M  16 Unified         3 32768      1            64

  ------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0-47
  node 0 size: 773362 MB
  node 0 free: 772159 MB
  node distances:
  node   0
    0:  10

  ------------------------------------------------------------
9. /proc/meminfo
  MemTotal:       791922824 kB
```

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Platform Notes (Continued)

```
        --------------------------------------------------------
        10. who -r
          run-level 3 Aug 21 04:46


        --------------------------------------------------------
        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 2.75 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           0
          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
```

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Platform Notes (Continued)

```
   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/sda2       btrfs  222G   11G  210G   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:
     2x 0xCE00 M321R8GA0PB0-CWMJH 64 GB 2 rank 5600, configured at 4800
     10x 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.
```

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Platform Notes (Continued)

```
        BIOS Version:      C245M8.4.3.4a.0.0520240849
        BIOS Date:         05/20/2024
        BIOS Revision:     5.27
```

Compiler Version Notes

```
==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(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, Fortran | 607.cactuBSSN_s(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
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         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(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      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(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
------------------------------------------------------------------------------
```

Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9454P 48 -Core Processor)

SPECspeed®2017_fp_base = 265

SPECspeed®2017_fp_peak = 266

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

Test Date: Aug-2024
Hardware Availability: Jun-2024
Software Availability: Jun-2023

Base Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

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

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

Base Portability Flags

603.bwaves_s: `-DSPEC_LP64`
607.cactuBSSN_s: `-DSPEC_LP64`
619.lbm_s: `-DSPEC_LP64`
621.wrf_s: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
627.cam4_s: `-DSPEC_CASE_FLAG -DSPEC_LP64`
628.pop2_s: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
638.imagick_s: `-DSPEC_LP64`
644.nab_s: `-DSPEC_LP64`
649.fotonik3d_s: `-DSPEC_LP64`
654.roms_s: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
```

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

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 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

Benchmarks using Fortran, C, and C++:
```
-m64 -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 -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

Base Other Flags

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

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

Benchmarks using both Fortran and C:
```
-Wno-return-type -Wno-unused-command-line-argument
```

Benchmarks using Fortran, C, and C++:
```
-Wno-return-type -Wno-unused-command-line-argument
```

SPEC CPU®2017 Floating Point Speed Result

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Cisco Systems

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Test Sponsor: Cisco Systems
Tested by: Cisco Systems

Test Date: Aug-2024
Hardware Availability: Jun-2024
Software Availability: Jun-2023

Peak Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

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

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

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
619.lbm_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

```
638.imagick_s: Same as 619.lbm_s
```

```
644.nab_s: basepeak = yes
```

Fortran benchmarks:

```
603.bwaves_s: basepeak = yes
```

```
649.fotonik3d_s: basepeak = yes
```

```
654.roms_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
```

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Hardware Availability: Jun-2024
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Peak Optimization Flags (Continued)

654.roms_s (continued):
```
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: basepeak = yes

628.pop2_s:
```
-m64 -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 -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

Peak Other Flags

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

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

Benchmarks using both Fortran and C:
```
-Wno-return-type -Wno-unused-command-line-argument
```

Benchmarks using Fortran, C, and C++:
```
-Wno-return-type -Wno-unused-command-line-argument
```

SPEC CPU®2017 Floating Point Speed Result

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9454P 48 -Core Processor)

$SPECspeed^{®}2017\_fp\_base = 265$

$SPECspeed^{®}2017\_fp\_peak = 266$

CPU2017 License: 9019		**Test Date:**	Aug-2024
Test Sponsor:	Cisco Systems	**Hardware Availability:**	Jun-2024
Tested by:	Cisco Systems	**Software Availability:**	Jun-2023

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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