SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9124 16-Core Processor)

$SPECspeed^{\circledR}2017\_fp\_base = 232$

$SPECspeed^{\circledR}2017\_fp\_peak = 235$

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	32	1030	
607.cactuBSSN_s	32	321	
619.lbm_s	32	173	
621.wrf_s	32	197	208
627.cam4_s	32	126	
628.pop2_s	32	72.7	73.1
638.imagick_s	32	224	224
644.nab_s	32	344	345
649.fotonik3d_s	32	176	177
654.roms_s	32	325	334

SPECspeed®2017_fp_base (232)   SPECspeed®2017_fp_peak (235)

Hardware

CPU Name: AMD EPYC 9124
  Max MHz: 3700
  Nominal: 3000
Enabled: 32 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: 64 MB I+D on chip per chip, 16 MB shared / 4 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: 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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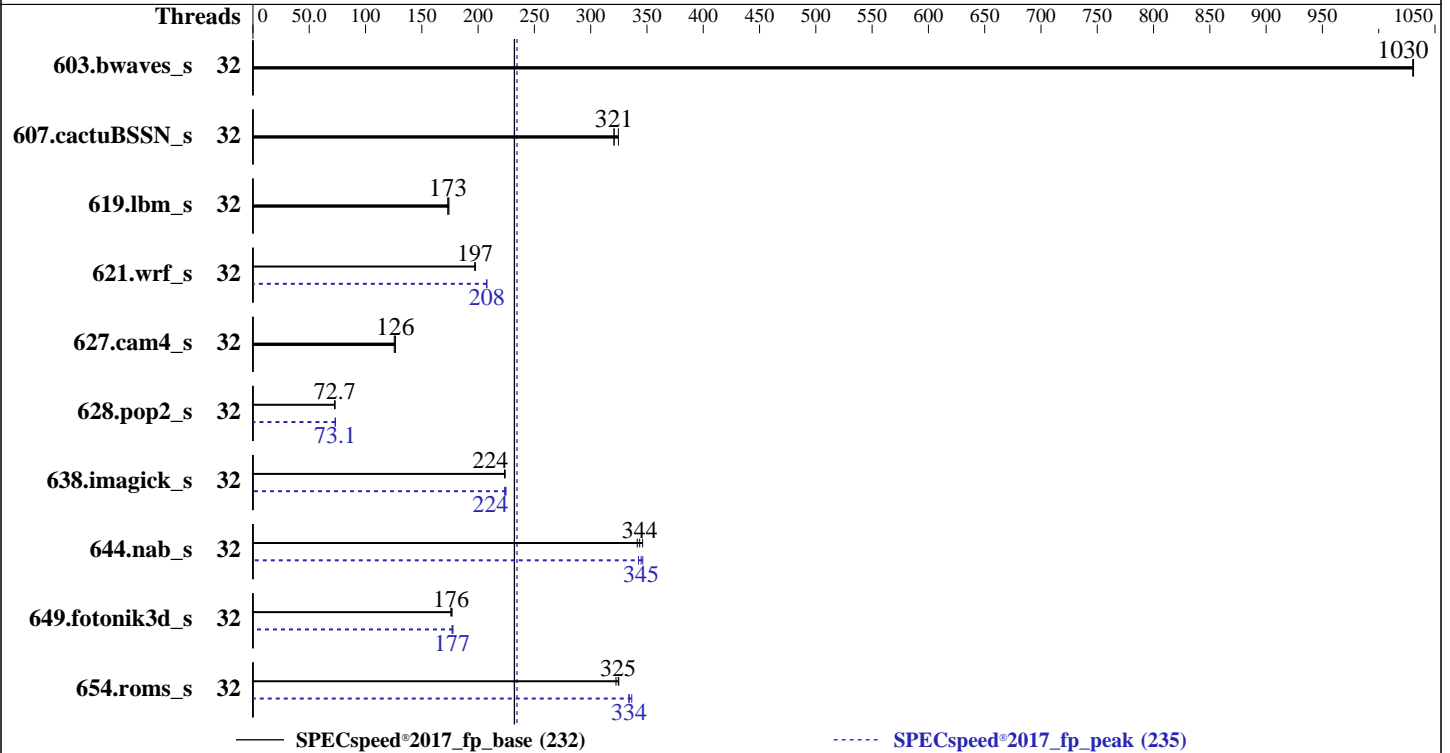
CPU2017 License: 9019
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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	32	57.2	1030	**57.3**	**1030**	57.3	1030	32	57.2	1030	**57.3**	**1030**	57.3	1030
607.cactuBSSN_s	32	51.4	325	52.0	321	**52.0**	**321**	32	51.4	325	52.0	321	**52.0**	**321**
619.lbm_s	32	30.1	174	30.3	173	**30.2**	**173**	32	30.1	174	30.3	173	**30.2**	**173**
621.wrf_s	32	67.0	197	67.1	197	**67.0**	**197**	32	63.7	208	**63.7**	**208**	63.7	208
627.cam4_s	32	70.6	125	**70.1**	**126**	70.1	127	32	70.6	125	**70.1**	**126**	70.1	127
628.pop2_s	32	**163**	**72.7**	163	72.9	164	72.6	32	**162**	**73.1**	162	73.3	162	73.1
638.imagick_s	32	64.4	224	**64.5**	**224**	64.6	223	32	64.5	224	**64.3**	**224**	64.2	225
644.nab_s	32	50.5	346	51.2	341	**50.9**	**344**	32	51.0	342	50.5	346	**50.7**	**345**
649.fotonik3d_s	32	**51.7**	**176**	51.5	177	51.8	176	32	**51.5**	**177**	51.3	178	51.5	177
654.roms_s	32	48.5	325	48.8	322	**48.5**	**325**	32	**47.1**	**334**	46.8	336	47.2	334
SPECspeed®2017_fp_base =	**232**													
SPECspeed®2017_fp_peak =	**235**													

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'
run as root.
To disable THP for peak runs of 621.wrf_s:
```

(Continued on next page)

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Operating System Notes (Continued)

```
'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 = "0-31"
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 = "32"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-31"
PGHPF_ZMEM = "yes"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 16 1 17 2 18 3 19 4 20 5 21 6 22 7 23 8 24 9 25 10 26 11 27 12 28 13 29 14 30 15 31"
```

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
```

(Continued on next page)

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Platform Notes (Continued)

```
Determinism Slider set to Power
DF C-States set to Disabled
TDP set to 400
PPT set to 400

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Aug  1 14:22:44 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
    14:22:44 up  7:05,  1 user,  load average: 0.00, 0.00, 0.00
   USER      TTY       FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1      -                07:18   20.00s  1.09s  0.11s /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) 6191448
```

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Platform Notes (Continued)

```
  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) 6191448
  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 9124 16-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       : 16
       siblings        : 16
       2 physical ids (chips)
       32 processors (hardware threads)
       physical id 0: core ids 0-3,16-19,32-35,48-51
       physical id 1: core ids 0-3,16-19,32-35,48-51
       physical id 0: apicids 0-3,16-19,32-35,48-51
       physical id 1: apicids 64-67,80-83,96-99,112-115
     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):                    32
     On-line CPU(s) list:       0-31
     Vendor ID:                 AuthenticAMD
     Model name:                AMD EPYC 9124 16-Core Processor
     CPU family:                25
```

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Platform Notes (Continued)

```
      Model:                      17
      Thread(s) per core:         1
      Core(s) per socket:         16
      Socket(s):                  2
      Stepping:                   1
      Frequency boost:            enabled
      CPU max MHz:                3711.9141
      CPU min MHz:                1500.0000
      BogoMIPS:                   5990.79
      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 MiB (32 instances)
      L1i cache:                  1 MiB (32 instances)
      L2 cache:                   32 MiB (32 instances)
      L3 cache:                   128 MiB (8 instances)
      NUMA node(s):               2
      NUMA node0 CPU(s):          0-15
      NUMA node1 CPU(s):          16-31
      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       1M    8 Data           1    64        1             64
      L1i       32K       1M    8 Instruction    1    64        1             64
      L2         1M      32M    8 Unified        2  2048        1             64
      L3        16M     128M   16 Unified        3 16384        1             64


  --------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 2 nodes (0-1)
    node 0 cpus: 0-15
    node 0 size: 773838 MB
```

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Platform Notes (Continued)

```
   node 0 free: 773023 MB
   node 1 cpus: 16-31
   node 1 size: 774053 MB
   node 1 free: 773123 MB
   node distances:
   node   0   1
     0:  10  32
     1:  32  10


  ------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1585041480 kB


  ------------------------------------------------------------
10. who -r
   run-level 3 Aug 1 07:17


  ------------------------------------------------------------
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 3.00 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/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.
```

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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:
     4x 0xCE00 M321R8GA0PB0-CWMJH 64 GB 2 rank 5600, configured at 4800
     20x 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              | 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
```

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9124 16-Core Processor)

SPECspeed®2017_fp_base = 232

SPECspeed®2017_fp_peak = 235

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

Compiler Version Notes (Continued)

```
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
```

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
```

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9124 16-Core Processor)

SPECspeed®2017_fp_base = 232

SPECspeed®2017_fp_peak = 235

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Aug-2024

Hardware Availability: Jun-2024

Software Availability: Jun-2023

Base Optimization Flags (Continued)

C benchmarks (continued):

```
-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
-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
```

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SPEC CPU®2017 Floating Point Speed Result

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9124 16-Core Processor)

SPECspeed®2017_fp_base = 232

SPECspeed®2017_fp_peak = 235

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

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

Base Other Flags (Continued)

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
```

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: basepeak = yes

638.imagick_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
```

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

Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9124 16-Core Processor)

SPECspeed®2017_fp_base = 232

SPECspeed®2017_fp_peak = 235

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

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

Peak Optimization Flags (Continued)

644.nab_s: -m64 -Wl,-mllvm -Wl,-region-vectorize -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

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_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
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -flto -Mrecursive
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang

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
-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: -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
-O3 -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

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

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Cisco Systems

Cisco UCS C245 M8 (AMD EPYC 9124 16-Core Processor)

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SPECspeed®2017_fp_peak = 235

CPU2017 License: 9019

Test Sponsor: Cisco Systems

Tested by: Cisco Systems

Test Date: Aug-2024

Hardware Availability: Jun-2024

Software Availability: Jun-2023

Peak Optimization Flags (Continued)

628.pop2_s (continued):
```
-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
```

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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