# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

Hyper A+ Server AS -2126HS-TN
(H14DSH , AMD EPYC 9655)

$SPECrate®2017\_fp\_base = 1900$
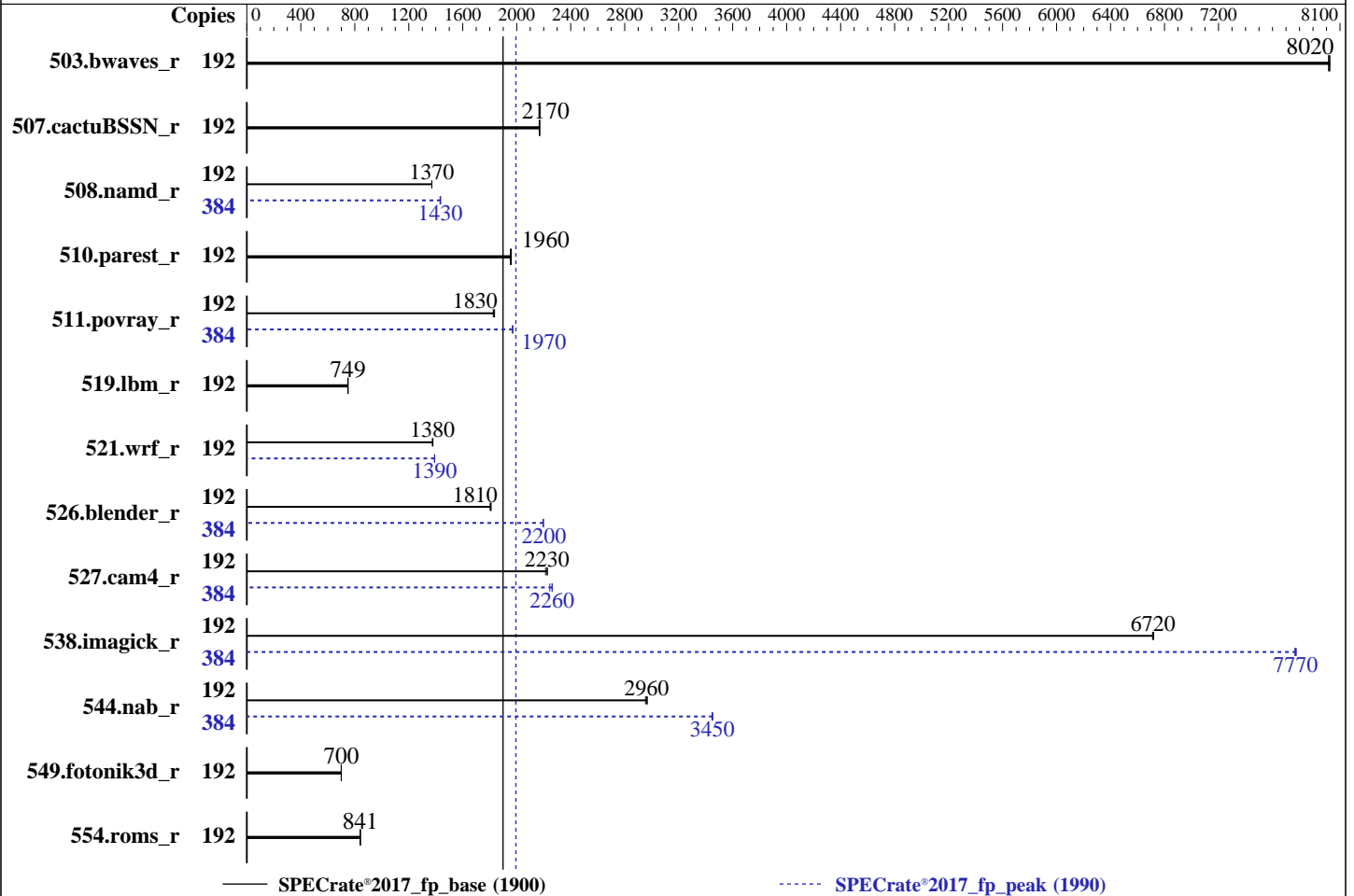
$SPECrate®2017\_fp\_peak = 1990$

**CPU2017 License:** 001176

**Test Sponsor:** Supermicro

**Tested by:** Supermicro

**Test Date:** Sep-2024

**Hardware Availability:** Oct-2024

**Software Availability:** Oct-2024

**Copies**

| Benchmark | Copies | Base | Peak |
|---|---|---|---|
| 503.bwaves_r | 192 | 8020 | |
| 507.cactuBSSN_r | 192 | 2170 | |
| 508.namd_r | 192 / 384 | 1370 | 1430 |
| 510.parest_r | 192 | 1960 | |
| 511.povray_r | 192 / 384 | 1830 | 1970 |
| 519.lbm_r | 192 | 749 | |
| 521.wrf_r | 192 / 384 | 1380 | 1390 |
| 526.blender_r | 192 / 384 | 1810 | 2200 |
| 527.cam4_r | 192 / 384 | 2230 | 2260 |
| 538.imagick_r | 192 / 384 | 6720 | 7770 |
| 544.nab_r | 192 / 384 | 2960 | 3450 |
| 549.fotonik3d_r | 192 | 700 | |
| 554.roms_r | 192 | 841 | |

SPECrate®2017_fp_base (1900)    SPECrate®2017_fp_peak (1990)

## Hardware

CPU Name: AMD EPYC 9655
 Max MHz: 4500
 Nominal: 2600
Enabled: 192 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 384 MB I+D on chip per chip, 32 MB shared / 8 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-6400B-R, running at 6000)
Storage: 1 x 3.5 TB NVMe SSD
Other: CPU Cooling: Air

## Software

OS: Ubuntu 24.04 LTS
 Kernel 6.8.0-41-generic
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: No
Firmware: Version 1.1 released Sep-2024
File System: ext4
System State: Run level 5 (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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| | |
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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 | 192 | 240 | 8020 | 240 | 8030 | **240** | **8020** | 192 | 240 | 8020 | 240 | 8030 | **240** | **8020** |
| 507.cactuBSSN_r | 192 | 112 | 2170 | **112** | **2170** | 112 | 2170 | 192 | 112 | 2170 | **112** | **2170** | 112 | 2170 |
| 508.namd_r | 192 | **133** | **1370** | 133 | 1370 | 133 | 1370 | 384 | 255 | 1430 | **255** | **1430** | 254 | 1440 |
| 510.parest_r | 192 | **257** | **1960** | 257 | 1950 | 256 | 1960 | 192 | **257** | **1960** | 257 | 1950 | 256 | 1960 |
| 511.povray_r | 192 | 245 | 1830 | 244 | 1840 | **245** | **1830** | 384 | 456 | 1970 | **455** | **1970** | 455 | 1970 |
| 519.lbm_r | 192 | 270 | 750 | 270 | 749 | **270** | **749** | 192 | 270 | 750 | 270 | 749 | **270** | **749** |
| 521.wrf_r | 192 | **313** | **1380** | 312 | 1380 | 313 | 1380 | 192 | 309 | 1390 | **309** | **1390** | 309 | 1390 |
| 526.blender_r | 192 | 162 | 1810 | 162 | 1800 | **162** | **1810** | 384 | 266 | 2200 | 266 | 2200 | **266** | **2200** |
| 527.cam4_r | 192 | 152 | 2210 | **151** | **2230** | 151 | 2230 | 384 | **297** | **2260** | 297 | 2260 | 299 | 2250 |
| 538.imagick_r | 192 | 71.1 | 6710 | **71.1** | **6720** | 71.1 | 6720 | 384 | 123 | 7780 | **123** | **7770** | 123 | 7770 |
| 544.nab_r | 192 | 109 | 2970 | **109** | **2960** | 109 | 2950 | 384 | **187** | **3450** | 187 | 3450 | 187 | 3450 |
| 549.fotonik3d_r | 192 | 1070 | 699 | **1069** | **700** | 1069 | 700 | 192 | 1070 | 699 | **1069** | **700** | 1069 | 700 |
| 554.roms_r | 192 | 363 | 839 | 363 | 842 | **363** | **841** | 192 | 363 | 839 | 363 | 842 | **363** | **841** |
| **SPECrate®2017_fp_base =** | **1900** | | | | | | | | | | | | |
| **SPECrate®2017_fp_peak =** | **1990** | | | | | | | | | | | | |

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 =
    "/spec/cpu2017aocc500zen5A1/amd_rate_aocc500_znver5_A_lib/lib:/spec/cpu2017aocc500zen5A1/amd_rate_aocc
    500_znver5_A_lib/lib32:"
MALLOC_CONF = "retain:true"
```

## General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
```

## Platform Notes

```
BIOS Settings:
NUMA Nodes Per Socket = NPS4
Determinism Control = Manual
Determinism Enable = Power
TDP Control = Manual
TDP = 400
Package Power Limit Control = Manual
Package Power Limit = 400

 Sysinfo program /spec/cpu2017aocc500zen5A1/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on smc9687turin-u2404 Sat Sep 14 20:40:21 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 255 (255.4-1ubuntu8)
 12. Failed units, from systemctl list-units --state=failed
```

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## Platform Notes (Continued)

```
 13. Services, from systemctl list-unit-files
 14. Linux kernel boot-time arguments, from /proc/cmdline
 15. cpupower frequency-info
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. BIOS
    ----------------------------------------------------------


    ----------------------------------------------------------
 1. uname -a
   Linux smc9687turin-u2404 6.8.0-41-generic #41-Ubuntu SMP PREEMPT_DYNAMIC Fri Aug  2 20:41:06 UTC 2024
   x86_64 x86_64 x86_64 GNU/Linux


    ----------------------------------------------------------
 2. w
    20:40:21 up 21:04,  2 users,  load average: 0.15, 0.03, 0.01
   USER     TTY       FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
   amd      tty1      -               Fri23   21:02m  0.03s  ?    -bash
   root               10.23.196.231   15:03    2:00m  0.00s  0.29s sshd: root@pts/2


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


    ----------------------------------------------------------
 4. ulimit -a
   time(seconds)         unlimited
   file(blocks)          unlimited
   data(kbytes)          unlimited
   stack(kbytes)         unlimited
   coredump(blocks)      0
   memory(kbytes)        unlimited
   locked memory(kbytes) 2097152
   process               6189887
   nofiles               1024
   vmemory(kbytes)       unlimited
   locks                 unlimited
   rtprio                0


    ----------------------------------------------------------
 5. sysinfo process ancestry
  /sbin/init
  sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
  sshd: root@pts/2
  -bash
  screen -S cpu
  SCREEN -S cpu
  /bin/bash
  python3 ./run_amd_rate_aocc500_znver5_A1.py
  /bin/bash ./amd_rate_aocc500_znver5_A1.sh
  runcpu --config amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 fprate
  runcpu --configfile amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
    --runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile
    $SPEC/tmp/CPU2017.003/templogs/preenv.fprate.003.0.log --lognum 003.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
```

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## Platform Notes (Continued)

```
  $SPEC = /spec/cpu2017aocc500zen5A1


   -------------------------------------------------------------
6. /proc/cpuinfo
   model name      : AMD EPYC 9655 96-Core Processor
   vendor_id       : AuthenticAMD
   cpu family      : 26
   model           : 2
   stepping        : 1
   microcode       : 0xb002116
   bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
   TLB size        : 192 4K pages
   cpu cores       : 96
   siblings        : 192
   2 physical ids (chips)
   384 processors (hardware threads)
   physical id 0: core ids 0-95
   physical id 1: core ids 0-95
   physical id 0: apicids 0-191
   physical id 1: apicids 256-447
  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 2.39.3:
  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):                 384
  On-line CPU(s) list:    0-383
  Vendor ID:              AuthenticAMD
  BIOS Vendor ID:         Advanced Micro Devices, Inc.
  Model name:             AMD EPYC 9655 96-Core Processor
  BIOS Model name:        AMD EPYC 9655 96-Core Processor          Unknown CPU @ 2.6GHz
  BIOS CPU family:        107
  CPU family:             26
  Model:                  2
  Thread(s) per core:     2
  Core(s) per socket:     96
  Socket(s):              2
  Stepping:               1
  Frequency boost:        enabled
  CPU(s) scaling MHz:     58%
  CPU max MHz:            4509.3750
  CPU min MHz:            1500.0000
  BogoMIPS:              5192.52
  Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
                          pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
                          rdtscp lm constant_tsc rep_good amd_lbr_v2 nopl nonstop_tsc cpuid
                          extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid
                          sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm
                          cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
                          osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext
                          perfctr_llc mwaitx cpb cat_l3 cdp_l3 hw_pstate ssbd mba perfmon_v2
                          ibrs ibpb stibp ibrs_enhanced vmmcall fsgsbase tsc_adjust bmi1 avx2
                          smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
                          avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
                         xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                         cqm_mbm_local user_shstk avx_vnni avx512_bf16 clzero irperf
                         xsaveerptr rdpru wbnoinvd amd_ppin cppc arat npt lbrv svm_lock
                         nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                         pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi
                         avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
                         avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdpid bus_lock_detect
                         movdiri movdir64b overflow_recov succor smca fsrm avx512_vp2intersect
                         flush_l1d debug_swap
    Virtualization:      AMD-V
    L1d cache:           9 MiB (192 instances)
    L1i cache:           6 MiB (192 instances)
    L2 cache:            192 MiB (192 instances)
    L3 cache:            768 MiB (24 instances)
    NUMA node(s):        8
    NUMA node0 CPU(s):   0-23,192-215
    NUMA node1 CPU(s):   24-47,216-239
    NUMA node2 CPU(s):   48-71,240-263
    NUMA node3 CPU(s):   72-95,264-287
    NUMA node4 CPU(s):   96-119,288-311
    NUMA node5 CPU(s):   120-143,312-335
    NUMA node6 CPU(s):   144-167,336-359
    NUMA node7 CPU(s):   168-191,360-383
    Vulnerability Gather data sampling:  Not affected
    Vulnerability Itlb multihit:         Not affected
    Vulnerability L1tf:                  Not affected
    Vulnerability Mds:                   Not affected
    Vulnerability Meltdown:              Not affected
    Vulnerability Mmio stale data:       Not affected
    Vulnerability Reg file data sampling: Not affected
    Vulnerability Retbleed:              Not affected
    Vulnerability Spec rstack overflow:  Not affected
    Vulnerability Spec store bypass:     Mitigation; Speculative Store Bypass disabled via prctl
    Vulnerability Spectre v1:            Mitigation; usercopy/swapgs barriers and __user pointer sanitization
    Vulnerability Spectre v2:            Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                         always-on; RSB filling; PBRSB-eIBRS Not affected; BHI Not affected
    Vulnerability Srbds:                 Not affected
    Vulnerability Tsx async abort:       Not affected

  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
      L1d      48K       9M  12 Data            1    64      1            64
      L1i      32K       6M   8 Instruction     1    64      1            64
      L2        1M     192M  16 Unified         2  1024      1            64
      L3       32M     768M  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: 0-23,192-215
    node 0 size: 193030 MB
    node 0 free: 191634 MB
    node 1 cpus: 24-47,216-239
    node 1 size: 193476 MB
    node 1 free: 192585 MB
    node 2 cpus: 48-71,240-263
    node 2 size: 193519 MB
    node 2 free: 192894 MB
    node 3 cpus: 72-95,264-287
```

(Continued on next page)

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```
   node 3 size: 193519 MB
   node 3 free: 192861 MB
   node 4 cpus: 96-119,288-311
   node 4 size: 193519 MB
   node 4 free: 192675 MB
   node 5 cpus: 120-143,312-335
   node 5 size: 193519 MB
   node 5 free: 192899 MB
   node 6 cpus: 144-167,336-359
   node 6 size: 193519 MB
   node 6 free: 192912 MB
   node 7 cpus: 168-191,360-383
   node 7 size: 193438 MB
   node 7 free: 192193 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:      1584683800 kB


   --------------------------------------------------------------
10. who -r
   run-level 5 Sep 13 23:37


   --------------------------------------------------------------
11. Systemd service manager version: systemd 255 (255.4-1ubuntu8)
   Default Target  Status
   graphical       degraded


   --------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
     UNIT                             LOAD   ACTIVE SUB    DESCRIPTION
   * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured
   Legend: LOAD   -> Reflects whether the unit definition was properly loaded.
           ACTIVE -> The high-level unit activation state, i.e. generalization of SUB.
           SUB    -> The low-level unit activation state, values depend on unit type.
   1 loaded units listed.


   --------------------------------------------------------------
13. Services, from systemctl list-unit-files
     STATE           UNIT FILES
     enabled         ModemManager apparmor apport blk-availability cloud-config cloud-final cloud-init
                     cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                     grub-common grub-initrd-fallback keyboard-setup lvm2-monitor multipathd
                     networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db setvtrgb
                     snapd sysstat systemd-networkd systemd-networkd-wait-online systemd-pstore
                     systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                     unattended-upgrades vgauth
     enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
     disabled        console-getty debug-shell ipmievd iscsid nftables rsync serial-getty@ ssh
                     systemd-boot-check-no-failures systemd-confext systemd-network-generator
```

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## Platform Notes (Continued)

```
                     systemd-networkd-wait-online@ systemd-pcrlock-file-system systemd-pcrlock-firmware-code
                     systemd-pcrlock-firmware-config systemd-pcrlock-machine-id systemd-pcrlock-make-policy
                     systemd-pcrlock-secureboot-authority systemd-pcrlock-secureboot-policy systemd-sysext
                     systemd-time-wait-sync upower
  generated          openipmi
  indirect           systemd-sysupdate systemd-sysupdate-reboot uuidd
  masked             cryptdisks cryptdisks-early hwclock multipath-tools-boot screen-cleanup sudo x11-common


  ----------------------------------------------------------------
  14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.8.0-41-generic
  root=UUID=4855288c-7dee-4103-a01d-3b4ca377e655
  ro


  ----------------------------------------------------------------
  15. cpupower frequency-info
  analyzing CPU 70:
     current policy: frequency should be within 1.50 GHz and 2.60 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
     boost state support:
       Supported: yes
       Active: yes
       Boost States: 0
       Total States: 3
       Pstate-P0:  800MHz


  ----------------------------------------------------------------
  16. 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


  ----------------------------------------------------------------
  17. /sys/kernel/mm/transparent_hugepage
  defrag          [always] defer defer+madvise madvise never
  enabled         [always] madvise never
  hpage_pmd_size  2097152
  shmem_enabled   always within_size advise [never] deny force


  ----------------------------------------------------------------
  18. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                   1
```

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(H14DSH , AMD EPYC 9655)

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SPECrate®2017_fp_peak = 1990

**CPU2017 License:** 001176
**Test Sponsor:** Supermicro
**Tested by:** Supermicro

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

## Platform Notes (Continued)

```
    max_ptes_none             511
    max_ptes_shared           256
    max_ptes_swap              64
    pages_to_scan            4096
    scan_sleep_millisecs    10000


    -------------------------------------------------------------
    19. OS release
      From /etc/*-release /etc/*-version
      os-release Ubuntu 24.04 LTS


    -------------------------------------------------------------
    20. Disk information
    SPEC is set to: /spec/cpu2017aocc500zen5A1
      Filesystem     Type  Size  Used Avail Use% Mounted on
      /dev/nvme1n1p2 ext4  3.5T   73G  3.2T   3% /


    -------------------------------------------------------------
    21. /sys/devices/virtual/dmi/id
        Vendor:         Supermicro
        Product:        AS -2126HS-TN
        Product Family: SMC H14
        Serial:         S920464X4819687


    -------------------------------------------------------------
    22. dmidecode
      Additional information from dmidecode 3.5 follows.  WARNING: Use caution when you interpret this section.
      The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
      determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
      "DMTF SMBIOS" standard.
      Memory:
        24x SK Hynix HMCG94AHBRA277N 64 GB 2 rank 6400, configured at 6000



    -------------------------------------------------------------
    23. BIOS
    (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:        American Megatrends International, LLC.
      BIOS Version:       1.1
      BIOS Date:          09/09/2024
      BIOS Revision:      5.35
```

## Compiler Version Notes

```
==============================================================================
C              | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
------------------------------------------------------------------------------


==============================================================================
C++            | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
```

## Supermicro

Hyper A+ Server AS -2126HS-TN
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## Compiler Version Notes (Continued)

```
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------


==============================================================================
C++, C         | 511.povray_r(base, peak) 526.blender_r(base, peak)
--------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
--------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------


==============================================================================
Fortran        | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
--------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------


==============================================================================
Fortran, C     | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
--------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------
```

# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

Hyper A+ Server AS -2126HS-TN
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**Test Date:** Sep-2024
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**Software Availability:** Oct-2024

## Base Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

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

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

## Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
526.blender_r: `-funsigned-char -DSPEC_LP64`
527.cam4_r: `-DSPEC_CASE_FLAG -DSPEC_LP64`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-DSPEC_LP64`
549.fotonik3d_r: `-DSPEC_LP64`
554.roms_r: `-DSPEC_LP64`

## Base Optimization Flags

C benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -O3
-march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
```

**(Continued on next page)**

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

## Supermicro

Hyper A+ Server AS -2126HS-TN
(H14DSH , AMD EPYC 9655)

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**Software Availability:** Oct-2024

# Base Optimization Flags (Continued)

C benchmarks (continued):
```
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang -ldl
```

C++ benchmarks:
```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100 -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang -ldl
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-aggressive-gather=true
-Wl,-mllvm -Wl,-enable-masked-gather-sequence=false -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang -ldl
```

Benchmarks using both Fortran and C:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-aggressive-gather=true
-Wl,-mllvm -Wl,-enable-masked-gather-sequence=false -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang -ldl
```

Benchmarks using both C and C++:
```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie
-flto -fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -mllvm -unroll-threshold=100
```

**(Continued on next page)**

## Supermicro

Hyper A+ Server AS -2126HS-TN
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# Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
```
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
-ldl
```

Benchmarks using Fortran, C, and C++:
```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie
-flto -fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -mllvm -unroll-threshold=100
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang -ldl
```

# Base Other Flags

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

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

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

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

Benchmarks using both C and C++:
```
-Wno-unused-command-line-argument
```

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

# Peak Compiler Invocation

C benchmarks:
```
clang
```

**(Continued on next page)**

## Supermicro

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**Hardware Availability:** Oct-2024
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# Peak Compiler Invocation (Continued)

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

538.imagick_r: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6 -Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver5 -fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=7 -mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining -mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc -ldl`

544.nab_r: `-m64 -flto -Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -Ofast -march=znver5 -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 -lamdlibm -lamdalloc -ldl`

**(Continued on next page)**

## Supermicro

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(H14DSH , AMD EPYC 9655)

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# Peak Optimization Flags (Continued)

C++ benchmarks:

```
508.namd_r: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc -ldl
```

510.parest_r: `basepeak = yes`

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_r: `basepeak = yes`

554.roms_r: `basepeak = yes`

Benchmarks using both Fortran and C:

```
521.wrf_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-ldl -lflang
```

```
527.cam4_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-ldl -lflang
```

**(Continued on next page)**

## Supermicro

Hyper A+ Server AS -2126HS-TN
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**Software Availability:** Oct-2024

# Peak Optimization Flags (Continued)

Benchmarks using both C and C++:

```
511.povray_r: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100
-mllvm -loop-unswitch-threshold=200000 -lamdlibm
-lamdalloc -ldl
```

```
526.blender_r: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100 -lamdlibm -lamdalloc -ldl
```

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
```

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

## Supermicro

Hyper A+ Server AS -2126HS-TN
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SPECrate®2017_fp_base = 1900

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| | | | | |
|---|---|---|---|---|
| **CPU2017 License:** | 001176 | | **Test Date:** | Sep-2024 |
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| **Tested by:** | Supermicro | | **Software Availability:** | Oct-2024 |

# Peak Other Flags (Continued)

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/aocc500-flags.html`
`http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Turin-revB.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc500-flags.xml`
`http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Turin-revB.xml`

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

Tested with SPEC CPU®2017 v1.1.9 on 2024-09-14 23:40:21-0400.
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