SPEC CPU®2017 Floating Point Rate Result

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New H3C Technologies Co., Ltd.

$SPECrate^{®}2017\_fp\_base = 987$

H3C UniServer R3950 G7 (AMD EPYC 9655)
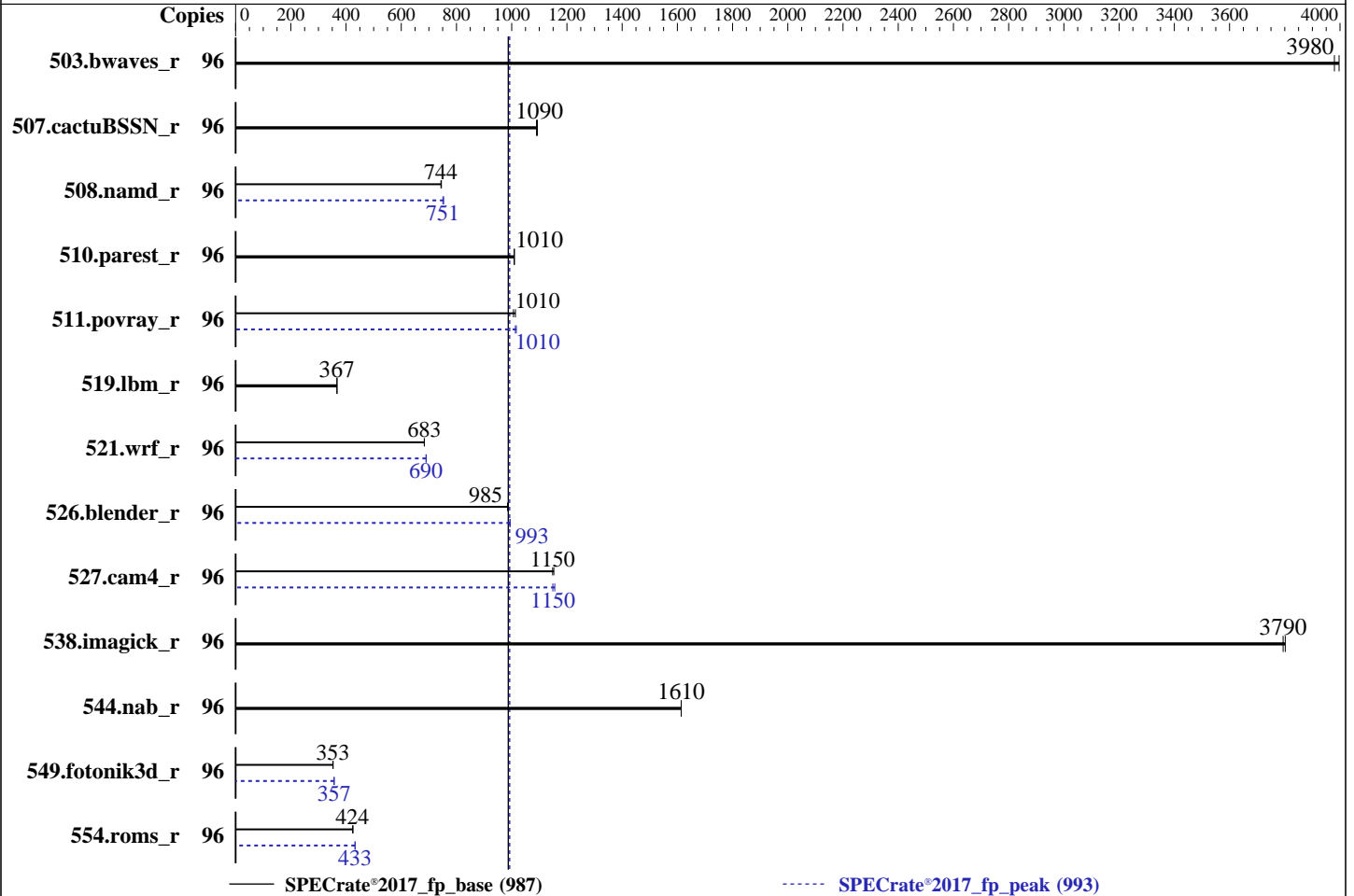
$SPECrate^{®}2017\_fp\_peak = 993$

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

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

Copies		
503.bwaves_r	96	3980
507.cactuBSSN_r	96	1090
508.namd_r	96	744 / 751
510.parest_r	96	1010
511.povray_r	96	1010 / 1010
519.lbm_r	96	367
521.wrf_r	96	683 / 690
526.blender_r	96	985 / 993
527.cam4_r	96	1150 / 1150
538.imagick_r	96	3790
544.nab_r	96	1610
549.fotonik3d_r	96	353 / 357
554.roms_r	96	424 / 433

SPECrate®2017_fp_base (987)
SPECrate®2017_fp_peak (993)

Hardware

CPU Name: AMD EPYC 9655
Max MHz: 4500
Nominal: 2600
Enabled: 96 cores, 1 chip
Orderable: 1 chip
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: 768 GB (12 x 64 GB 2Rx4 PC5-6400B-R, running at 6000)
Storage: 1 x 7.68 TB NVME
Other: CPU Cooling: Air

Software

OS: Ubuntu 24.04.1 LTS kernel version 6.8.0-41-generic
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: No
Firmware: Version 7.30.00P04 released Aug-2024
File System: ext4
System State: Run level 5 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: BIOS 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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Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	96	**242**	**3980**	241	4000			96	**242**	**3980**	241	4000		
507.cactuBSSN_r	96	111	1090	**112**	**1090**			96	111	1090	**112**	**1090**		
508.namd_r	96	**123**	**744**	122	745			96	121	754	**121**	**751**		
510.parest_r	96	**249**	**1010**	249	1010			96	**249**	**1010**	249	1010		
511.povray_r	96	**223**	**1010**	221	1010			96	**221**	**1010**	220	1020		
519.lbm_r	96	275	367	**276**	**367**			96	275	367	**276**	**367**		
521.wrf_r	96	**315**	**683**	315	684			96	**312**	**690**	312	690		
526.blender_r	96	**148**	**985**	148	985			96	**147**	**993**	147	994		
527.cam4_r	96	**146**	**1150**	146	1150			96	145	1160	**146**	**1150**		
538.imagick_r	96	62.8	3800	**62.9**	**3790**			96	62.8	3800	**62.9**	**3790**		
544.nab_r	96	**100**	**1610**	100	1610			96	**100**	**1610**	100	1610		
549.fotonik3d_r	96	**1061**	**353**	1060	353			96	1048	357	**1048**	**357**		
554.roms_r	96	359	425	**360**	**424**			96	353	433	**353**	**433**		

SPECrate®2017_fp_base =	**987**
SPECrate®2017_fp_peak =	**993**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

```
The AMD64 AOCC Compiler Suite is available at
http://developer.amd.com/amd-aocc/
```

Submit Notes

```
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.
```

Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,
```

(Continued on next page)

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Operating System Notes (Continued)

```
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
    "/home/spec2017/amd_rate_aocc500_znver5_A_lib/lib:/home/spec2017/amd_rate_aocc500_znver5_A_lib/lib32:/
    usr/local/mpc-131/lib:/usr/local/gmp-630/lib:/usr/local/mpfr-421/lib:/usr/local/isl-027/lib:/usr/local
    /gcc-1420/lib64:/usr/local/lib:/usr/lib"
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:
cTDP Control: Manual
cTDP: 400
PPT Control: Manual
PPT: 400
Determinism Slider set to Power
NUMA nodes per socket: NPS4
IOMMU: Auto
SVM Mode: Disabled
ACPI SRAT L3 Cache As NUMA Domain: Enabled
SMT Control: Disabled

 Sysinfo program /home/spec2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on h3c Sun Sep 29 07:49:23 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
```

(Continued on next page)

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Platform Notes (Continued)

```
   8. numactl --hardware
   9. /proc/meminfo
  10. who -r
  11. Systemd service manager version: systemd 255 (255.4-1ubuntu8.4)
  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 h3c 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
     07:49:23 up 0 min,  2 users,  load average: 0.08, 0.02, 0.01
    USER     TTY        FROM             LOGIN@   IDLE   JCPU    PCPU WHAT
    root                172.17.16.110    07:48    51days 0.00s  0.05s sshd: root@pts/0
    root                172.17.16.110    07:48    51days 0.00s  0.03s sshd: root@notty

    ----------------------------------------------------------
  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              3093895
    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/0
    -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 2 fprate
    runcpu --configfile amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 2 --nopower
      --runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
```

(Continued on next page)

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Platform Notes (Continued)

```
 specperl $SPEC/bin/sysinfo
$SPEC = /home/spec2017


     ------------------------------------------------------------
6. /proc/cpuinfo
    model name        : AMD EPYC 9655 96-Core Processor
    vendor_id         : AuthenticAMD
    cpu family        : 26
    model             : 2
    stepping          : 1
    microcode         : 0xb00210e
    bugs              : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size          : 192 4K pages
    cpu cores         : 96
    siblings          : 96
    1 physical ids (chips)
    96 processors (hardware threads)
    physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
    physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
  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):                  96
  On-line CPU(s) list:     0-95
  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:      1
  Core(s) per socket:      96
  Socket(s):               1
  Stepping:                1
  Frequency boost:         enabled
  CPU(s) scaling MHz:      41%
  CPU max MHz:             4509.3750
  CPU min MHz:             1500.0000
  BogoMIPS:                5192.46
  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 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
                           xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
```

(Continued on next page)

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Platform Notes (Continued)

```
                          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
  L1d cache:              4.5 MiB (96 instances)
  L1i cache:              3 MiB (96 instances)
  L2 cache:               96 MiB (96 instances)
  L3 cache:               384 MiB (12 instances)
  NUMA node(s):           12
  NUMA node0 CPU(s):      0-7
  NUMA node1 CPU(s):      8-15
  NUMA node2 CPU(s):      16-23
  NUMA node3 CPU(s):      24-31
  NUMA node4 CPU(s):      32-39
  NUMA node5 CPU(s):      40-47
  NUMA node6 CPU(s):      48-55
  NUMA node7 CPU(s):      56-63
  NUMA node8 CPU(s):      64-71
  NUMA node9 CPU(s):      72-79
  NUMA node10 CPU(s):     80-87
  NUMA node11 CPU(s):     88-95
  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
                                       disabled; 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     4.5M   12 Data            1    64       1              64
       L1i      32K       3M    8 Instruction     1    64       1              64
       L2        1M      96M   16 Unified         2  1024       1              64
       L3       32M     384M   16 Unified         3 32768       1              64

  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 12 nodes (0-11)
    node 0 cpus: 0-7
    node 0 size: 64048 MB
    node 0 free: 63470 MB
    node 1 cpus: 8-15
    node 1 size: 64509 MB
    node 1 free: 64360 MB
    node 2 cpus: 16-23
    node 2 size: 64509 MB
```

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Platform Notes (Continued)

```
   node 2 free: 64327 MB
   node 3 cpus: 24-31
   node 3 size: 64465 MB
   node 3 free: 64272 MB
   node 4 cpus: 32-39
   node 4 size: 64509 MB
   node 4 free: 64348 MB
   node 5 cpus: 40-47
   node 5 size: 64509 MB
   node 5 free: 64344 MB
   node 6 cpus: 48-55
   node 6 size: 64509 MB
   node 6 free: 64330 MB
   node 7 cpus: 56-63
   node 7 size: 64509 MB
   node 7 free: 64334 MB
   node 8 cpus: 64-71
   node 8 size: 64509 MB
   node 8 free: 64367 MB
   node 9 cpus: 72-79
   node 9 size: 64509 MB
   node 9 free: 64370 MB
   node 10 cpus: 80-87
   node 10 size: 64509 MB
   node 10 free: 64346 MB
   node 11 cpus: 88-95
   node 11 size: 64447 MB
   node 11 free: 64276 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11
     0:  10  11  11  12  12  12  12  12  12  12  12  12
     1:  11  10  11  12  12  12  12  12  12  12  12  12
     2:  11  11  10  12  12  12  12  12  12  12  12  12
     3:  12  12  12  10  11  11  12  12  12  12  12  12
     4:  12  12  12  11  10  11  12  12  12  12  12  12
     5:  12  12  12  11  11  10  12  12  12  12  12  12
     6:  12  12  12  12  12  12  10  11  11  12  12  12
     7:  12  12  12  12  12  12  11  10  11  12  12  12
     8:  12  12  12  12  12  12  11  11  10  12  12  12
     9:  12  12  12  12  12  12  12  12  12  10  11  11
    10:  12  12  12  12  12  12  12  12  12  11  10  11
    11:  12  12  12  12  12  12  12  12  12  11  11  10


   --------------------------------------------------------
9. /proc/meminfo
   MemTotal:       792109212 kB


   --------------------------------------------------------
10. who -r
   run-level 5 Sep 29 07:48


   --------------------------------------------------------
11. Systemd service manager version: systemd 255 (255.4-1ubuntu8.4)
   Default Target  Status
   graphical       running


   --------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          apparmor apport blk-availability cloud-config cloud-final cloud-init cloud-init-local
```

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Platform Notes (Continued)

```
                    console-setup e2scrub_reap finalrd getty@ gpu-manager grub-common grub-initrd-fallback
                    keyboard-setup lvm2-monitor multipathd networkd-dispatcher open-iscsi pollinate
                    secureboot-db setvtrgb snapd systemd-networkd systemd-networkd-wait-online systemd-pstore
                    systemd-resolved systemd-timesyncd thermald unattended-upgrades
  enabled-runtime   netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
  disabled          console-getty debug-shell iscsid serial-getty@ ssh systemd-boot-check-no-failures
                    systemd-confext systemd-network-generator 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
  indirect          systemd-sysupdate systemd-sysupdate-reboot
  masked            cryptdisks cryptdisks-early hwclock multipath-tools-boot sudo x11-common


  ----------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/vmlinuz-6.8.0-41-generic
    root=/dev/mapper/ubuntu--vg-ubuntu--lv
    ro
    iommu=pt


  ----------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 60:
      current policy: frequency should be within 1.50 GHz and 2.60 GHz.
                      The governor "schedutil" 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


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

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Tested by: New H3C Technologies Co., Ltd.	**Software Availability:** Sep-2024

Platform Notes (Continued)

```
    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 Ubuntu 24.04.1 LTS

  ----------------------------------------------------------------
  19. Disk information
  SPEC is set to: /home/spec2017
    Filesystem                     Type  Size  Used Avail Use% Mounted on
    /dev/mapper/ubuntu--vg-ubuntu--lv ext4   98G   17G   77G  18% /

  ----------------------------------------------------------------
  20. /sys/devices/virtual/dmi/id
     Vendor:       H3C
     Product:      R3950 G6
     Serial:       202311A3SFH20C000109


  ----------------------------------------------------------------
  21. 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:
      4x Samsung M321R8GA0EB2-CCPKC 64 GB 2 rank 6400, configured at 6000
      8x Samsung M321R8GA0EB2-CCPWC 64 GB 2 rank 6400, configured at 6000



  ----------------------------------------------------------------
  22. BIOS
  (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:     American Megatrends International, LLC.
     BIOS Version:    7.30.00P04
     BIOS Date:       08/21/2024
     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
--------------------------------------------------------------------------------------------------
```

(Continued on next page)

New H3C Technologies Co., Ltd.

SPECrate®2017_fp_base = 987

H3C UniServer R3950 G7 (AMD EPYC 9655) | **SPECrate®2017_fp_peak = 993**

CPU2017 License: 9066		**Test Date:**	Sep-2024
Test Sponsor: New H3C Technologies Co., Ltd.		**Hardware Availability:**	Oct-2024
Tested by: New H3C Technologies Co., Ltd.		**Software Availability:**	Sep-2024

Compiler Version Notes (Continued)

```
================================================================================
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
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
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

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New H3C Technologies Co., Ltd.

H3C UniServer R3950 G7 (AMD EPYC 9655)

SPECrate®2017_fp_base = 987

SPECrate®2017_fp_peak = 993

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

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

Compiler Version Notes (Continued)

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
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

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New H3C Technologies Co., Ltd.

H3C UniServer R3950 G7 (AMD EPYC 9655)

SPECrate®2017_fp_base = 987

SPECrate®2017_fp_peak = 993

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

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

Base Optimization Flags (Continued)

C benchmarks (continued):
```
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -O3
-march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang -ldl
```

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

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

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

Benchmarks using both C and C++:
```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
```

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

New H3C Technologies Co., Ltd.

SPECrate®2017_fp_base = 987

H3C UniServer R3950 G7 (AMD EPYC 9655)

SPECrate®2017_fp_peak = 993

CPU2017 License: 9066		**Test Date:**	Sep-2024
Test Sponsor:	New H3C Technologies Co., Ltd.	**Hardware Availability:**	Oct-2024
Tested by:	New H3C Technologies Co., Ltd.	**Software Availability:**	Sep-2024

Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
```
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie
-flto -fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -mllvm -unroll-threshold=100
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
-ldl
```

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

Base Other Flags

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

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

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

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

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

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

New H3C Technologies Co., Ltd.

H3C UniServer R3950 G7 (AMD EPYC 9655)

SPECrate®2017_fp_base = 987

SPECrate®2017_fp_peak = 993

CPU2017 License: 9066
Test Sponsor: New H3C Technologies Co., Ltd.
Tested by: New H3C Technologies Co., Ltd.

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

Peak Compiler Invocation

C benchmarks:
```
clang
```

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

Fortran benchmarks:
```
flang
```

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

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

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

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `basepeak = yes`

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
```

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SPEC CPU®2017 Floating Point Rate Result
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New H3C Technologies Co., Ltd.

H3C UniServer R3950 G7 (AMD EPYC 9655)

SPECrate®2017_fp_base = 987

SPECrate®2017_fp_peak = 993

CPU2017 License: 9066	**Test Date:** Sep-2024
Test Sponsor: New H3C Technologies Co., Ltd.	**Hardware Availability:** Oct-2024
Tested by: New H3C Technologies Co., Ltd.	**Software Availability:** Sep-2024

Peak Optimization Flags (Continued)

510.parest_r: `basepeak = yes`

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_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`
`-Mrecursive -mllvm -reduce-array-computations=3`
`-fepilog-vectorization-of-inductions -fvector-transform`
`-fscalar-transform -lamdlibm -lamdalloc -ldl -lflang`

554.roms_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`
`-Mrecursive -mllvm -reduce-array-computations=3`
`-fepilog-vectorization-of-inductions -zopt -lamdlibm`
`-lamdalloc -ldl -lflang`

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)

New H3C Technologies Co., Ltd.

H3C UniServer R3950 G7 (AMD EPYC 9655)

SPECrate®2017_fp_base = 987

SPECrate®2017_fp_peak = 993

CPU2017 License: 9066	**Test Date:** Sep-2024
Test Sponsor: New H3C Technologies Co., Ltd.	**Hardware Availability:** Oct-2024
Tested by: New H3C Technologies Co., Ltd.	**Software Availability:** Sep-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
```

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New H3C Technologies Co., Ltd.

SPECrate®2017_fp_base = 987

H3C UniServer R3950 G7 (AMD EPYC 9655)

SPECrate®2017_fp_peak = 993

CPU2017 License: 9066　　　　　　　　　　　　　**Test Date:** Sep-2024
Test Sponsor: New H3C Technologies Co., Ltd.　　　　**Hardware Availability:** Oct-2024
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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/New_H3C-Platform-AMD-Settings-V1.1-Turin.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/New_H3C-Platform-AMD-Settings-V1.1-Turin.xml
```

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

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