# SPEC CPU®2017 Integer Speed Result

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## New H3C Technologies Co., Ltd.

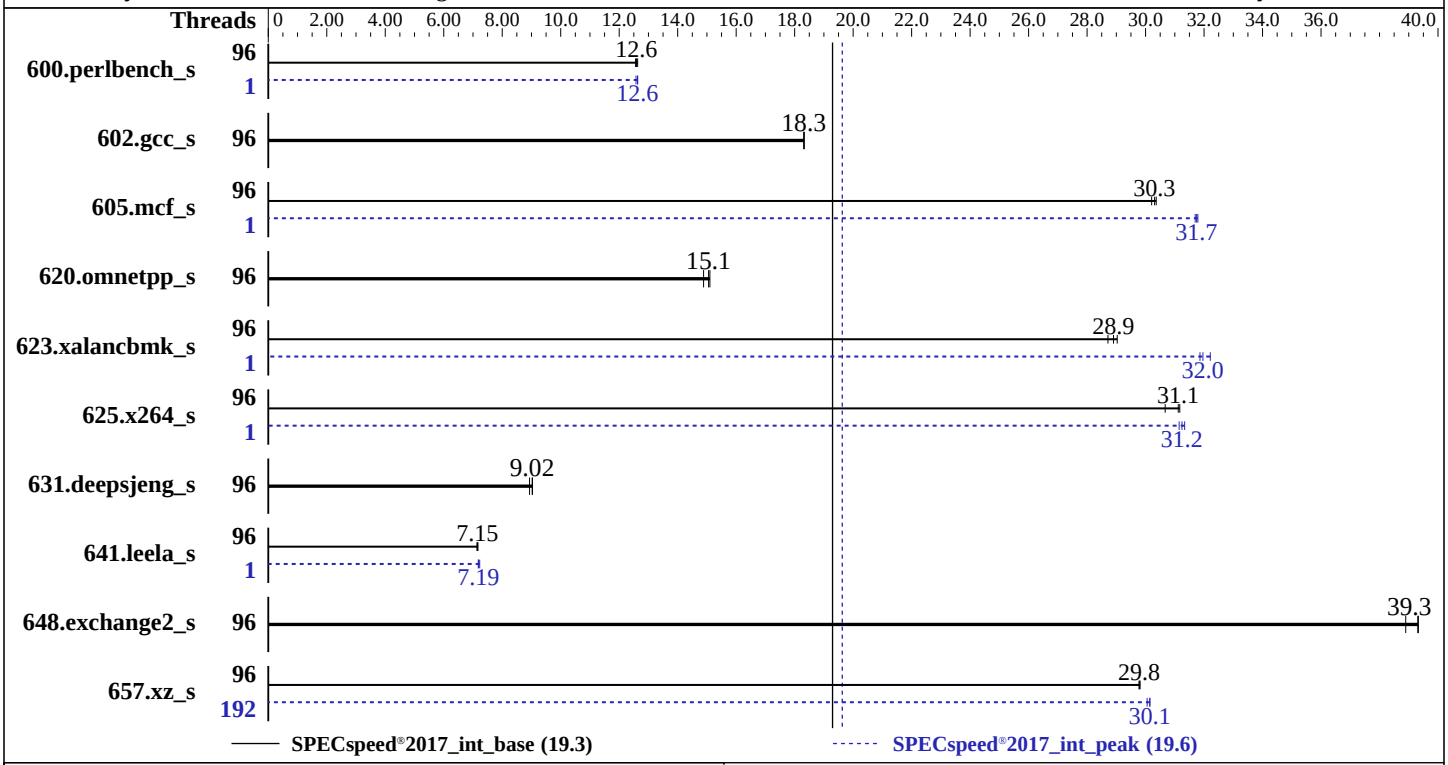
H3C UniServer R3950 G7 (AMD EPYC 9655)
AMD EPYC 9655

SPECspeed®2017_int_base = 19.3

SPECspeed®2017_int_peak = 19.6

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

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




## Hardware

| | |
|---|---|
| CPU Name: | AMD EPYC 9655 |
| Max MHz: | 4500 |
| Nominal: | 2600 |
| Enabled: | 96 cores, 1 chip, 2 threads/core |
| 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: | 384 GB (12 x 32 GB 2Rx8 PC5-6400B-R, running at 6000) |
| Storage: | 1 x 3.84TB SSD |
| 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: | Yes |
| Firmware: | Version 7.30.00P04 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 set to prefer performance at the cost of additional power usage. |

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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 600.perlbench_s | 96 | **141** | **12.6** | 141 | 12.6 | 141 | 12.6 | 1 | **141** | **12.6** | 140 | 12.6 | 141 | 12.6 |
| 602.gcc_s | 96 | 217 | 18.3 | 217 | 18.3 | **217** | **18.3** | 96 | 217 | 18.3 | 217 | 18.3 | **217** | **18.3** |
| 605.mcf_s | 96 | **156** | **30.3** | 155 | 30.4 | 156 | 30.2 | 1 | 149 | 31.8 | **149** | **31.7** | 149 | 31.7 |
| 620.omnetpp_s | 96 | 110 | 14.9 | 108 | 15.1 | **108** | **15.1** | 96 | 110 | 14.9 | 108 | 15.1 | **108** | **15.1** |
| 623.xalancbmk_s | 96 | **49.0** | **28.9** | 48.8 | 29.0 | 49.3 | 28.7 | 1 | 44.0 | 32.2 | 44.5 | 31.9 | **44.3** | **32.0** |
| 625.x264_s | 96 | **56.7** | **31.1** | 56.6 | 31.2 | 57.5 | 30.7 | 1 | 56.6 | 31.1 | **56.5** | **31.2** | 56.3 | 31.3 |
| 631.deepsjeng_s | 96 | **159** | **9.02** | 159 | 9.04 | 160 | 8.93 | 96 | **159** | **9.02** | 159 | 9.04 | 160 | 8.93 |
| 641.leela_s | 96 | 238 | 7.17 | **239** | **7.15** | 239 | 7.14 | 1 | 236 | 7.23 | **237** | **7.19** | 238 | 7.18 |
| 648.exchange2_s | 96 | 74.8 | 39.3 | 75.6 | 38.9 | **74.8** | **39.3** | 96 | 74.8 | 39.3 | 75.6 | 38.9 | **74.8** | **39.3** |
| 657.xz_s | 96 | 207 | 29.8 | **208** | **29.8** | 208 | 29.8 | 192 | 205 | 30.1 | **205** | **30.1** | 206 | 30.1 |

**SPECspeed®2017_int_base =** **19.3**

**SPECspeed®2017_int_peak =** **19.6**

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.
```

## Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-191"
LD_LIBRARY_PATH =
     "/home/cpu2017/amd_speed_aocc500_znver5_A_lib/lib:/home/cpu2017/amd_speed_aocc500_znver5_A_lib/lib32:/
     usr/lib:/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"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "192"

Environment variables set by runcpu during the 600.perlbench_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 605.mcf_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 625.x264_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 641.leela_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-191"
```

## General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9D64 CPU + 500GiB Memory using Ubuntu 22.04

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 Control set to Enabled
SVM Mode set to Disabled
Power Profile Selection set to High Performance Mode
Determinism Slider set to Power
cTDP set to 400
PPT set to 400
NUMA nodes per socket set to NPS 4
ACPI SRAT L3 cache as NUMA domain set to Enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on h3c Sun Dec 22 07:51:42 2024
```

**(Continued on next page)**

## Platform Notes (Continued)

```
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 (255.4-1ubuntu8.4)
12. Failed units, from systemctl list-units --state=failed
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 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
   07:51:42 up 3 min,  1 user,  load average: 0.24, 0.05, 0.02
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                07:51    5.00s  0.78s  0.05s /bin/bash ./amd_speed_aocc500_znver5_A1.sh

------------------------------------------------------------
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              1545482
  nofiles              1024
  vmemory(kbytes)      unlimited
  locks                unlimited
  rtprio               0
```

**(Continued on next page)**

## Platform Notes (Continued)

```
------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
 /bin/login -p --
 -bash
 python3 ./run_amd_speed_aocc500_znver5_A1.py
 /bin/bash ./amd_speed_aocc500_znver5_A1.sh
 runcpu --config amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 intspeed
 runcpu --configfile amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode speed --tune base:peak --size test:train:refspeed intspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.005/templogs/preenv.intspeed.005.0.log --lognum 005.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9655 96-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 26
    model           : 2
    stepping        : 1
    microcode       : 0xb002113
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size        : 192 4K pages
    cpu cores       : 96
    siblings        : 192
    1 physical ids (chips)
    192 processors (hardware threads)
    physical id 0: core ids 0-95
    physical id 0: apicids 0-191
  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):                               192
  On-line CPU(s) list:                  0-191
  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):                            1
  Stepping:                             1
  Frequency boost:                      enabled
  CPU(s) scaling MHz:                   38%
  CPU max MHz:                          4509.3750
  CPU min MHz:                          1500.0000
  BogoMIPS:                             5192.56
```

**(Continued on next page)**

## Platform Notes (Continued)

```
  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
                                   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):               0-7,96-103
  NUMA node1 CPU(s):               8-15,104-111
  NUMA node2 CPU(s):               16-23,112-119
  NUMA node3 CPU(s):               24-31,120-127
  NUMA node4 CPU(s):               32-39,128-135
  NUMA node5 CPU(s):               40-47,136-143
  NUMA node6 CPU(s):               48-55,144-151
  NUMA node7 CPU(s):               56-63,152-159
  NUMA node8 CPU(s):               64-71,160-167
  NUMA node9 CPU(s):               72-79,168-175
  NUMA node10 CPU(s):              80-87,176-183
  NUMA node11 CPU(s):              88-95,184-191
  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     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
```

(Continued on next page)

## Platform Notes (Continued)

```
------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 12 nodes (0-11)
  node 0 cpus: 0-7,96-103
  node 0 size: 31791 MB
  node 0 free: 31539 MB
  node 1 cpus: 8-15,104-111
  node 1 size: 32250 MB
  node 1 free: 31922 MB
  node 2 cpus: 16-23,112-119
  node 2 size: 32207 MB
  node 2 free: 31917 MB
  node 3 cpus: 24-31,120-127
  node 3 size: 32250 MB
  node 3 free: 32096 MB
  node 4 cpus: 32-39,128-135
  node 4 size: 32250 MB
  node 4 free: 32138 MB
  node 5 cpus: 40-47,136-143
  node 5 size: 32250 MB
  node 5 free: 32125 MB
  node 6 cpus: 48-55,144-151
  node 6 size: 32250 MB
  node 6 free: 32125 MB
  node 7 cpus: 56-63,152-159
  node 7 size: 32250 MB
  node 7 free: 32114 MB
  node 8 cpus: 64-71,160-167
  node 8 size: 32250 MB
  node 8 free: 32109 MB
  node 9 cpus: 72-79,168-175
  node 9 size: 32250 MB
  node 9 free: 32125 MB
  node 10 cpus: 80-87,176-183
  node 10 size: 32250 MB
  node 10 free: 32136 MB
  node 11 cpus: 88-95,184-191
  node 11 size: 32188 MB
  node 11 free: 31999 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:       395715428 kB

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

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## Platform Notes (Continued)

```
10. who -r
  run-level 5 Dec 22 07:50

------------------------------------------------------------
11. Systemd service manager version: systemd 255 (255.4-1ubuntu8.4)
  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 NetworkManager NetworkManager-dispatcher NetworkManager-wait-online apparmor
                   apport blk-availability cloud-config cloud-final cloud-init cloud-init-local 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 wpa_supplicant
  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 wpa_supplicant-nl80211@ wpa_supplicant-wired@
                   wpa_supplicant@
  indirect         systemd-sysupdate systemd-sysupdate-reboot
  masked           cryptdisks cryptdisks-early hwclock multipath-tools-boot sudo x11-common

------------------------------------------------------------
14. 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

------------------------------------------------------------
15. cpupower frequency-info
  analyzing CPU 105:
    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

------------------------------------------------------------
16. sysctl
  kernel.numa_balancing               1
```

(Continued on next page)

## Platform Notes (Continued)

```
  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
  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 24.04.1 LTS

------------------------------------------------------------
20. Disk information
SPEC is set to: /home/cpu2017
  Filesystem                     Type  Size  Used Avail Use% Mounted on
  /dev/mapper/ubuntu--vg-ubuntu--lv ext4   98G   22G   72G  23% /

------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         AMD Corporation
    Product:        Quartz
    Product Family: Rack

------------------------------------------------------------
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:
```

(Continued on next page)

## Platform Notes (Continued)

```
     4x Samsung M321R4GA3EB2-CCPEC 32 GB 2 rank 6400, configured at 6000
     3x Samsung M321R4GA3EB2-CCPKC 32 GB 2 rank 6400, configured at 6000
     1x Samsung M321R4GA3EB2-CCPPC 32 GB 2 rank 6400, configured at 6000
     4x Samsung M321R4GA3EB2-CCPWC 32 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:      7.30.00P04
    BIOS Date:         09/10/2024
    BIOS Revision:     5.35
```

## Compiler Version Notes

```
==============================================================================================================
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)
        | 657.xz_s(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++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
        | 641.leela_s(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 | 648.exchange2_s(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
--------------------------------------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

**(Continued on next page)**

## Base Compiler Invocation (Continued)

Fortran benchmarks:
flang

## Base Portability Flags

600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

## Base Optimization Flags

C benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -Wl,-mllvm -Wl,-extra-inliner -O3
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP
-flto -fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp -lamdlibm
-lflang -lamdalloc

C++ benchmarks:
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -mllvm -unroll-threshold=100 -zopt
-fvirtual-function-elimination -fvisibility=hidden -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc-ext

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-iv-split -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -O3 -march=znver5 -fveclib=AMDLIBM

**(Continued on next page)**

## Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc

## Base Other Flags

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

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

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

## Peak Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

600.perlbench_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3

**(Continued on next page)**

## Peak Optimization Flags (Continued)

600.perlbench_s (continued):
-Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang

602.gcc_s: basepeak = yes

605.mcf_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang

625.x264_s: Same as 600.perlbench_s

657.xz_s: Same as 600.perlbench_s

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=100 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -fopenmp=libomp -lomp
-lamdlibm -lamdalloc-ext -lflang

631.deepsjeng_s: basepeak = yes

641.leela_s: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast

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## Peak Optimization Flags (Continued)

641.leela_s (continued):
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=100 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

Fortran benchmarks:

648.exchange2_s: basepeak = yes

## Peak Other Flags

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

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

Fortran benchmarks:
-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.2024-10-10.html
http://www.spec.org/cpu2017/flags/New_H3C-Platform-AMD-Settings-V1.5-Turin.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml
http://www.spec.org/cpu2017/flags/New_H3C-Platform-AMD-Settings-V1.5-Turin.xml


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