# SPEC CPU®2017 Floating Point Speed Result

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## Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

(Tyrone Camarero SDA200A2N-18)
(2.5 GHz, AMD EPYC 9224)

$SPECspeed®2017\_fp\_base = 225$

$SPECspeed®2017\_fp\_peak = 245$

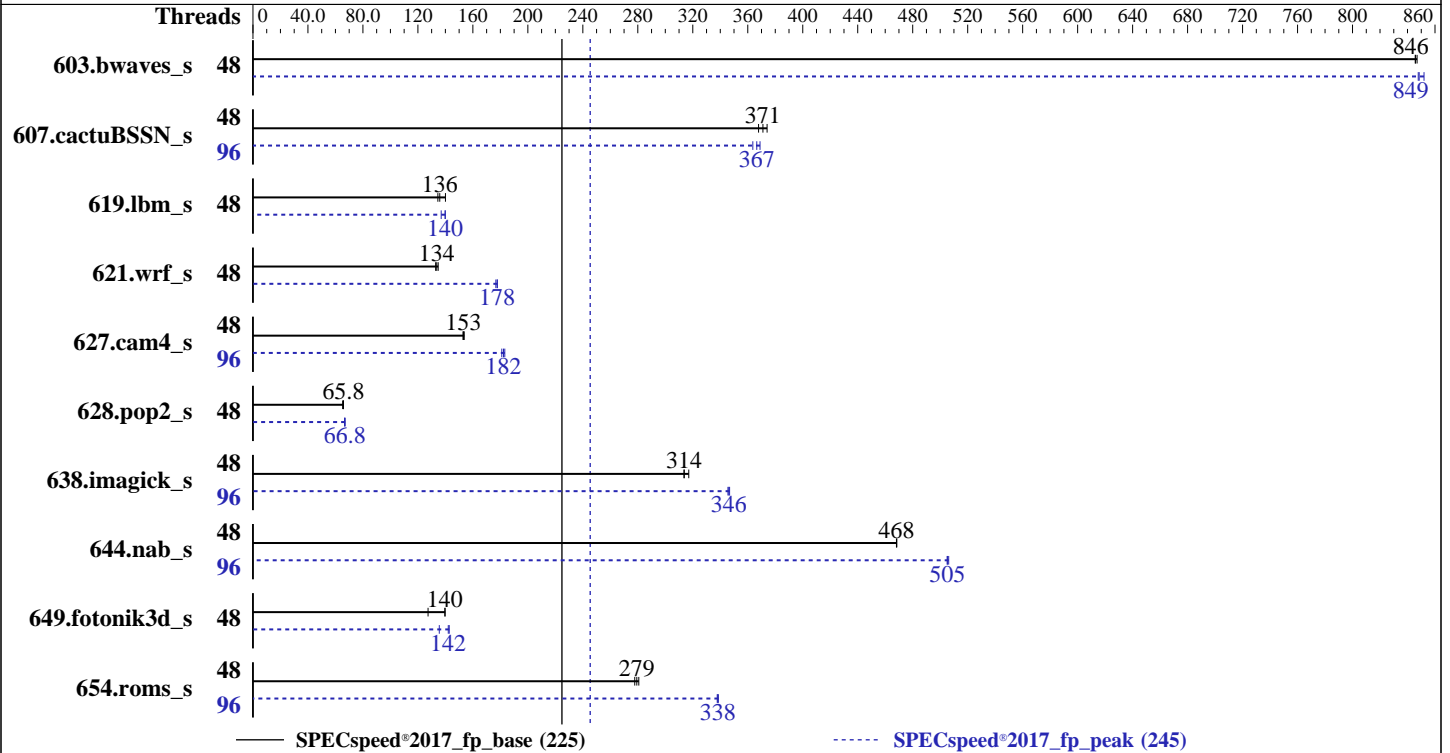| | |
|---|---|
| **CPU2017 License:** 6042 | **Test Date:** Dec-2023 |
| **Test Sponsor:** Netweb Pte Ltd | **Hardware Availability:** Jun-2023 |
| **Tested by:** Tyrone Systems | **Software Availability:** Nov-2023 |



Threads scale: 0 40.0 80.0 120 160 200 240 280 320 360 400 440 480 520 560 600 640 680 720 760 800 860

- **603.bwaves_s** 48: 846 / 96: 849
- **607.cactuBSSN_s** 48: 371 / 96: 367
- **619.lbm_s** 48: 136 / 140
- **621.wrf_s** 48: 134 / 178
- **627.cam4_s** 48: 153 / 96: 182
- **628.pop2_s** 48: 65.8 / 66.8
- **638.imagick_s** 48: 314 / 96: 346
- **644.nab_s** 48: 468 / 96: 505
- **649.fotonik3d_s** 48: 140 / 142
- **654.roms_s** 48: 279 / 96: 338

SPECspeed®2017_fp_base (225) — SPECspeed®2017_fp_peak (245)

## Hardware

CPU Name: AMD EPYC 9224
Max MHz: 3700
Nominal: 2500
Enabled: 48 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 64 MB I+D on chip per chip, 16 MB shared / 6 cores
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB NVMe
Other: None

## Software

OS: Ubuntu 20.04.4 LTS
kernel version
5.15.0-89-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Version 1.4 released Apr-2023
File System: ext4
System State: Run level 3 (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 |
| 603.bwaves_s | 48 | 69.7 | 847 | 69.8 | 846 | **69.7** | **846** | 48 | 69.2 | 852 | **69.5** | **849** | 69.6 | 848 |
| 607.cactuBSSN_s | 48 | 44.6 | 374 | **44.9** | **371** | 45.3 | 368 | 96 | 45.2 | 369 | **45.5** | **367** | 45.8 | 364 |
| 619.lbm_s | 48 | **38.5** | **136** | 37.4 | 140 | 38.9 | 135 | 48 | 38.2 | 137 | **37.5** | **140** | 37.4 | 140 |
| 621.wrf_s | 48 | **98.9** | **134** | 99.5 | 133 | 98.1 | 135 | 48 | 74.8 | 177 | **74.4** | **178** | 74.4 | 178 |
| 627.cam4_s | 48 | 57.7 | 154 | **57.9** | **153** | 58.0 | 153 | 96 | 49.0 | 181 | **48.6** | **182** | 48.4 | 183 |
| 628.pop2_s | 48 | **180** | **65.8** | 182 | 65.2 | 180 | 65.8 | 48 | **178** | **66.8** | 177 | 67.1 | 178 | 66.6 |
| 638.imagick_s | 48 | 46.0 | 314 | 45.5 | 317 | **46.0** | **314** | 96 | **41.7** | **346** | 41.7 | 346 | 41.6 | 347 |
| 644.nab_s | 48 | 37.3 | 468 | 37.3 | 468 | **37.3** | **468** | 96 | 34.5 | 506 | **34.6** | **505** | 34.6 | 505 |
| 649.fotonik3d_s | 48 | **65.3** | **140** | 65.2 | 140 | 71.6 | 127 | 48 | 63.8 | 143 | **64.2** | **142** | 67.2 | 136 |
| 654.roms_s | 48 | 56.7 | 278 | 56.1 | 281 | **56.4** | **279** | 96 | 46.5 | 339 | 46.6 | 338 | **46.6** | **338** |
| **SPECspeed®2017_fp_base =** | **225** | | | | | | | | | | | | | |
| **SPECspeed®2017_fp_peak =** | **245** | | | | | | | | | | | | | |

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) only on request for base runs,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To enable THP for all allocations for peak runs,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

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| **Tested by:** | Tyrone Systems | **Software Availability:** | Nov-2023 |

## Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-95"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocc400_znver4_A_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "96"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-95"

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

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-95"

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

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-47"
PGHPF_ZMEM = "yes"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 48 1 49 2 50 3 51 4 52 5 53 6 54 7 55 8 56 9 57 10 58 11 59 12 60 13 61 14 62 15 63
        16 64 17 65 18 66 19 67 20 68 21 69 22 70 23 71 24 72 25 73 26 74 27 75 28 76 29 77 30 78 31 79 32 80
        33 81 34 82 35 83 36 84 37 85 38 86 39 87 40 88 41 89 42 90 43 91 44 92 45 93 46 94 47 95"
```

## 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.
```

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**Test Date:** Dec-2023  
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## Platform Notes

```
BIOS Settings:
cTDP: 240
Package Power: 240
ACPI SRAT L3 Cache as NUMA Domain: enabled
Memory interleaving: Disabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on amd2-Super-Server Fri Dec  1 10:57:48 2023

 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 245 (245.4-4ubuntu3.20)
 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. 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 amd2-Super-Server 5.15.0-89-generic #99~20.04.1-Ubuntu SMP Thu Nov 2 15:16:47 UTC 2023 x86_64 x86_64
   x86_64 GNU/Linux


 -----------------------------------------------------------
 2. w
    10:57:48 up 1 day, 29 min,  1 user,  load average: 5.91, 6.40, 3.78
   USER      TTY       FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   amd2      tty2      -                Thu10    3:34m  1.98s  0.02s -bash


 -----------------------------------------------------------
 3. Username
   From environment variable $USER:  amd2


 -----------------------------------------------------------
 4. ulimit -a
   time(seconds)         unlimited
   file(blocks)          unlimited
   data(kbytes)          unlimited
   stack(kbytes)         unlimited
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
   coredump(blocks)      0
   memory(kbytes)        unlimited
   locked memory(kbytes) 2097152
   process               4126432
   nofiles               1024
   vmemory(kbytes)       unlimited
   locks                 unlimited
   rtprio                0


  -----------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init splash
 /bin/login -p --
 -bash
  su
  bash
  python3 ./run_amd_speed_aocc400_znver4_A1.py
 /bin/bash ./amd_speed_aocc400_znver4_A1.sh
 runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fpspeed
 runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.002/templogs/preenv.fpspeed.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017


  -----------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9224 24-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 17
    stepping        : 1
    microcode       : 0xa10113e
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
    TLB size        : 3584 4K pages
    cpu cores       : 24
    siblings        : 48
    2 physical ids (chips)
    96 processors (hardware threads)
    physical id 0: core ids 0-5,8-13,16-21,24-29
    physical id 1: core ids 0-5,8-13,16-21,24-29
    physical id 0: apicids 0-11,16-27,32-43,48-59
    physical id 1: apicids 64-75,80-91,96-107,112-123
  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 2.34:
  Architecture:            x86_64
  CPU op-mode(s):          32-bit, 64-bit
  Byte Order:              Little Endian
  Address sizes:           52 bits physical, 57 bits virtual
  CPU(s):                  96
  On-line CPU(s) list:     0-95
  Thread(s) per core:      2
  Core(s) per socket:      24
  Socket(s):               2
  NUMA node(s):            8
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
  Vendor ID:                        AuthenticAMD
  CPU family:                       25
  Model:                            17
  Model name:                       AMD EPYC 9224 24-Core Processor
  Stepping:                         1
  Frequency boost:                  enabled
  CPU MHz:                          1500.000
  CPU max MHz:                      3706.0540
  CPU min MHz:                      1500.0000
  BogoMIPS:                         4999.85
  Virtualization:                   AMD-V
  L1d cache:                        1.5 MiB
  L1i cache:                        1.5 MiB
  L2 cache:                         48 MiB
  L3 cache:                         128 MiB
  NUMA node0 CPU(s):                0-5,48-53
  NUMA node1 CPU(s):                6-11,54-59
  NUMA node2 CPU(s):                12-17,60-65
  NUMA node3 CPU(s):                18-23,66-71
  NUMA node4 CPU(s):                24-29,72-77
  NUMA node5 CPU(s):                30-35,78-83
  NUMA node6 CPU(s):                36-41,84-89
  NUMA node7 CPU(s):                42-47,90-95
  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 Retbleed:           Not affected
  Vulnerability Spec rstack overflow: Mitigation; safe RET
  Vulnerability Spec store bypass:  Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:         Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:         Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB
                                    filling, PBRSB-eIBRS Not affected
  Vulnerability Srbds:              Not affected
  Vulnerability Tsx async abort:    Not affected
  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 nopl nonstop_tsc cpuid extd_apicid aperfmperf
                                    rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
                                    movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic
                                    cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce
                                    topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3
                                    cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall
                                    fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
                                    rdseed adx smap avx512ifma clflushopt clwb avx512cd sha_ni avx512bw
                                    avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
                                    cqm_mbm_total cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru
                                    wbnoinvd amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale
                                    vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic
                                    v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku ospke avx512_vbmi2
                                    gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq la57
                                    rdpid overflow_recov succor smca fsrm flush_l1d


  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL
      L1d       32K     1.5M    8 Data             1
      L1i       32K     1.5M    8 Instruction      1
      L2         1M      48M    8 Unified          2
```

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## Platform Notes (Continued)

```
     L3         16M     128M   16 Unified        3

   ---------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0-5,48-53
  node 0 size: 128733 MB
  node 0 free: 127626 MB
  node 1 cpus: 6-11,54-59
  node 1 size: 129008 MB
  node 1 free: 127889 MB
  node 2 cpus: 12-17,60-65
  node 2 size: 129008 MB
  node 2 free: 128171 MB
  node 3 cpus: 18-23,66-71
  node 3 size: 128961 MB
  node 3 free: 127817 MB
  node 4 cpus: 24-29,72-77
  node 4 size: 129008 MB
  node 4 free: 128484 MB
  node 5 cpus: 30-35,78-83
  node 5 size: 129008 MB
  node 5 free: 128294 MB
  node 6 cpus: 36-41,84-89
  node 6 size: 129008 MB
  node 6 free: 128405 MB
  node 7 cpus: 42-47,90-95
  node 7 size: 128946 MB
  node 7 free: 128420 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:       1056443840 kB

   ---------------------------------------------------------
10. who -r
   run-level 3 Nov 30 10:41 last=5

   ---------------------------------------------------------
11. Systemd service manager version: systemd 245 (245.4-4ubuntu3.20)
   Default Target  Status
   multi-user      degraded

   ---------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
     UNIT                 LOAD   ACTIVE SUB    DESCRIPTION
   * fwupd-refresh.service loaded failed failed Refresh fwupd metadata and update motd

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

**(Continued on next page)**

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## Platform Notes (Continued)

```
 13. Services, from systemctl list-unit-files
   STATE              UNIT FILES
   enabled            ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                      accounts-daemon anacron apparmor autovt@ avahi-daemon bluetooth console-setup cron cups
                      cups-browsed dmesg e2scrub_reap getty@ gpu-manager grub-common grub-initrd-fallback
                      irqbalance kerneloops keyboard-setup network-manager networkd-dispatcher ondemand openvpn
                      pppd-dns rsync rsyslog secureboot-db setvtrgb snapd ssh sshd switcheroo-control syslog
                      systemd-pstore systemd-resolved systemd-timesyncd thermald ua-reboot-cmds udisks2 ufw
                      unattended-upgrades whoopsie wpa_supplicant
   enabled-runtime    netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
   disabled           acpid brltty console-getty debug-shell ipmievd openvpn-client@ openvpn-server@ openvpn@
                      rtkit-daemon serial-getty@ speech-dispatcher speech-dispatcherd
                      systemd-boot-check-no-failures systemd-network-generator systemd-networkd
                      systemd-networkd-wait-online systemd-time-wait-sync upower wpa_supplicant-nl80211@
                      wpa_supplicant-wired@ wpa_supplicant@
   generated          apport ipmidrv openipmi
   indirect           display-manager lightdm saned@ spice-vdagent spice-vdagentd uuidd
   masked             alsa-utils cryptdisks cryptdisks-early hwclock pulseaudio-enable-autospawn rc rcS saned
                      sudo x11-common


   ----------------------------------------------------------
 14. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.15.0-89-generic
   root=UUID=1ae71a13-cac0-48f6-b6e6-e15e5e687f57
   ro
   quiet
   splash
   vt.handoff=7


   ----------------------------------------------------------
 15. sysctl
   kernel.numa_balancing            1
   kernel.randomize_va_space        0
   vm.compaction_proactiveness      20
   vm.dirty_background_bytes         0
   vm.dirty_background_ratio        10
   vm.dirty_bytes                    0
   vm.dirty_expire_centisecs      3000
   vm.dirty_ratio                    8
   vm.dirty_writeback_centisecs    500
   vm.dirtytime_expire_seconds   43200
   vm.extfrag_threshold            500
   vm.min_unmapped_ratio             1
   vm.nr_hugepages                   0
   vm.nr_hugepages_mempolicy         0
   vm.nr_overcommit_hugepages        0
   vm.swappiness                     1
   vm.watermark_boost_factor     15000
   vm.watermark_scale_factor        10
   vm.zone_reclaim_mode              1


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


   ----------------------------------------------------------
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
```

**(Continued on next page)**

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

(Tyrone Camarero SDA200A2N-18)
(2.5 GHz, AMD EPYC 9224)

SPECspeed®2017_fp_base = 225

SPECspeed®2017_fp_peak = 245

**CPU2017 License:** 6042
**Test Sponsor:**      Netweb Pte Ltd
**Tested by:**         Tyrone Systems

**Test Date:**             Dec-2023
**Hardware Availability:** Jun-2023
**Software Availability:** Nov-2023

## Platform Notes (Continued)

```
   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 20.04.4 LTS


   ----------------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p2 ext4  938G   20G  871G   3% /


   ----------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
   Vendor:         Tyrone Systems
   Product:        Tyrone Camarero SDA200A2R-424
   Product Family: SMC H13
   Serial:         A509935X3311011


   ----------------------------------------------------------------
21. dmidecode
   Additional information from dmidecode 3.2 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:
     8x NO DIMM NO DIMM
     16x Samsung M321R8GA0BB0-CQKZJ 64 GB 2 rank 4800



   ----------------------------------------------------------------
22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:     American Megatrends International, LLC.
   BIOS Version:    1.4
   BIOS Date:       04/19/2023
   BIOS Revision:   5.27
```

## Compiler Version Notes

```
==================================================================================================
C                | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
--------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------------------------


==================================================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
--------------------------------------------------------------------------------------------------
```

**(Continued on next page)**

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

(Tyrone Camarero SDA200A2N-18)
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| **CPU2017 License:** 6042 | **Test Date:** Dec-2023 |
|---|---|
| **Test Sponsor:** Netweb Pte Ltd | **Hardware Availability:** Jun-2023 |
| **Tested by:** Tyrone Systems | **Software Availability:** Nov-2023 |

## Compiler Version Notes (Continued)

```
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------------------

============================================================================================
Fortran       | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
--------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------------------

============================================================================================
Fortran, C    | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
--------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

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

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

# SPEC CPU®2017 Floating Point Speed Result

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## Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

(Tyrone Camarero SDA200A2N-18)
(2.5 GHz, AMD EPYC 9224)

SPECspeed®2017_fp_base = 225

SPECspeed®2017_fp_peak = 245

**CPU2017 License:** 6042

**Test Sponsor:** Netweb Pte Ltd

**Tested by:** Tyrone Systems

**Test Date:** Dec-2023

**Hardware Availability:** Jun-2023

**Software Availability:** Nov-2023

## Base Portability Flags

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

## Base Optimization Flags

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

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

Benchmarks using both Fortran and C:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang

Benchmarks using Fortran, C, and C++:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

**(Continued on next page)**

# SPEC CPU®2017 Floating Point Speed Result

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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

(Tyrone Camarero SDA200A2N-18)
(2.5 GHz, AMD EPYC 9224)

SPECspeed®2017_fp_base = 225

SPECspeed®2017_fp_peak = 245

**CPU2017 License:** 6042
**Test Sponsor:** Netweb Pte Ltd
**Tested by:** Tyrone Systems

**Test Date:** Dec-2023
**Hardware Availability:** Jun-2023
**Software Availability:** Nov-2023

## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

## Base Other Flags

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

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

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

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

## Peak Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

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

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

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# SPEC CPU®2017 Floating Point Speed Result

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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

(Tyrone Camarero SDA200A2N-18)
(2.5 GHz, AMD EPYC 9224)

SPECspeed®2017_fp_base = 225

SPECspeed®2017_fp_peak = 245

| | | | |
|---|---|---|---|
| **CPU2017 License:** 6042 | | **Test Date:** | Dec-2023 |
| **Test Sponsor:** | Netweb Pte Ltd | **Hardware Availability:** | Jun-2023 |
| **Tested by:** | Tyrone Systems | **Software Availability:** | Nov-2023 |

# Peak Portability Flags

```
Same as Base Portability Flags
```

# Peak Optimization Flags

C benchmarks:

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

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

```
644.nab_s: -m64 -Wl,-mllvm -Wl,-region-vectorize -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Fortran benchmarks:

```
603.bwaves_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

```
649.fotonik3d_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -flto -Mrecursive
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

(Tyrone Camarero SDA200A2N-18)
(2.5 GHz, AMD EPYC 9224)

SPECspeed®2017_fp_base = 225

SPECspeed®2017_fp_peak = 245

| | | | |
|---|---|---|---|
| **CPU2017 License:** 6042 | | **Test Date:** | Dec-2023 |
| **Test Sponsor:** | Netweb Pte Ltd | **Hardware Availability:** | Jun-2023 |
| **Tested by:** | Tyrone Systems | **Software Availability:** | Nov-2023 |

# Peak Optimization Flags (Continued)

654.roms_s: `Same as 603.bwaves_s`

Benchmarks using both Fortran and C:

621.wrf_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp`
`-flto -fstruct-layout=9 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt`
`-O3 -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop`
`-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

627.cam4_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp`
`-flto -fstruct-layout=9 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt`
`-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc`
`-lflang`

628.pop2_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp`
`-flto -fstruct-layout=9 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt`
`-Mrecursive -fvector-transform -fscalar-transform`
`-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

Benchmarks using Fortran, C, and C++:
`-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=9`
`-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3`
`-DSPEC_OPENMP -zopt -finline-aggressive -mllvm -unroll-threshold=100`
`-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

# SPEC CPU®2017 Floating Point Speed Result
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(Tyrone Camarero SDA200A2N-18)
(2.5 GHz, AMD EPYC 9224)

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| **Test Sponsor:** | Netweb Pte Ltd | **Hardware Availability:** | Jun-2023 |
| **Tested by:** | Tyrone Systems | **Software Availability:** | Nov-2023 |

## Peak Other Flags

C benchmarks:

`-Wno-return-type -Wno-unused-command-line-argument`

Fortran benchmarks:

`-Wno-unused-command-line-argument`

Benchmarks using both Fortran and C:

`-Wno-return-type -Wno-unused-command-line-argument`

Benchmarks using Fortran, C, and C++:

`-Wno-return-type -Wno-unused-command-line-argument`

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/aocc400-flags.html
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-Genoa-revC.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/aocc400-flags.xml
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-Genoa-revC.xml

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

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