SPEC CPU®2017 Integer Rate Result

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero SDA200A2N-212
(3.60 GHz, AMD EPYC 9474F)

SPECrate®2017_int_base = 1040

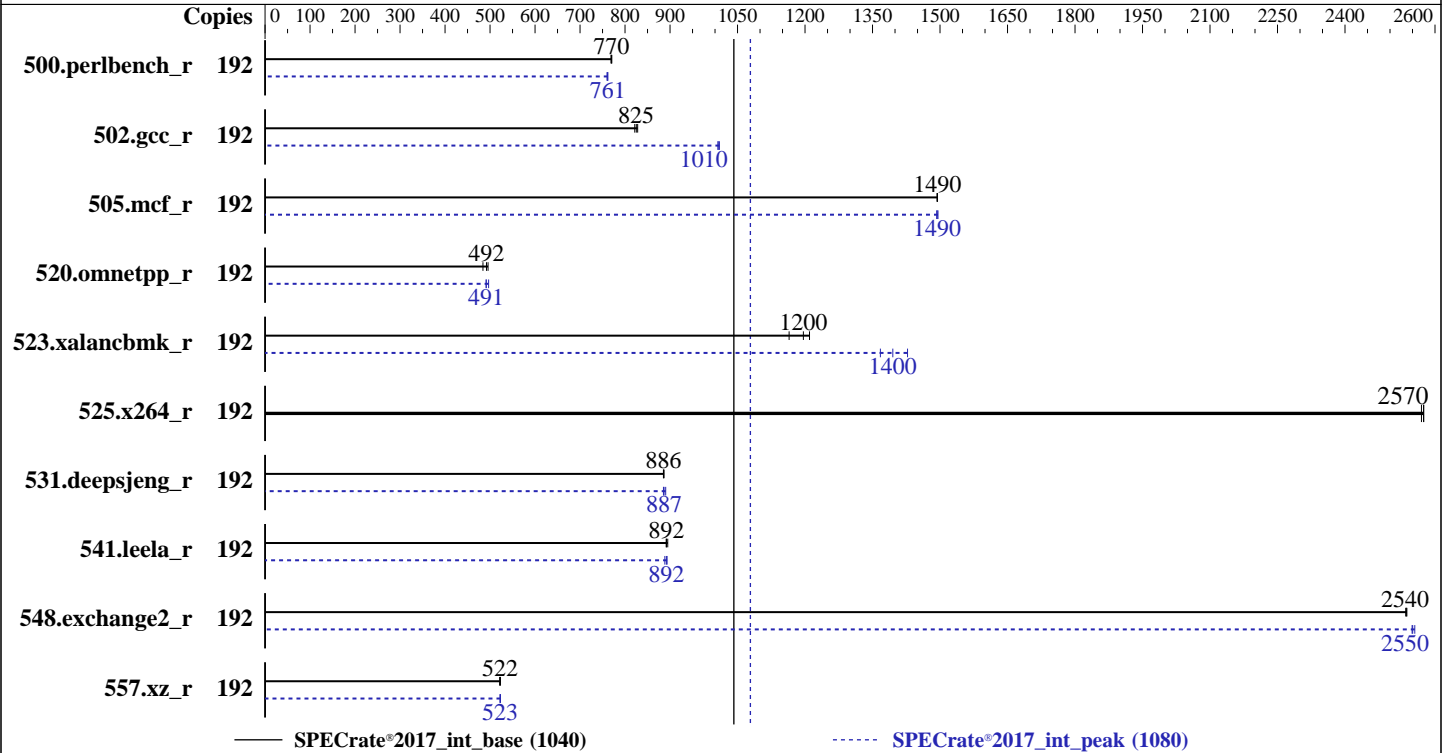### SPECrate®2017_int_peak = 1080

CPU2017 License: 6042   **Test Date:** Mar-2024

Test Sponsor: Netweb Pte Ltd   **Hardware Availability:** Jun-2023

Tested by: Tyrone Systems   **Software Availability:** Feb-2024

Benchmark	Copies	base	peak
500.perlbench_r	192	770	761
502.gcc_r	192	825	1010
505.mcf_r	192	1490	1490
520.omnetpp_r	192	492	491
523.xalancbmk_r	192	1200	1400
525.x264_r	192	2570	
531.deepsjeng_r	192	886	887
541.leela_r	192	892	892
548.exchange2_r	192	2540	2550
557.xz_r	192	522	523

——— SPECrate®2017_int_base (1040)   - - - - SPECrate®2017_int_peak (1080)

Hardware

CPU Name: AMD EPYC 9474F
Max MHz: 4100
Nominal: 3600
Enabled: 96 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: 256 MB I+D on chip per chip, 32 MB shared / 6 cores
Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1 TB NVMe
Other: CPU Cooling: Air

Software

OS: Ubuntu 20.04.4 LTS
kernel version 5.15.0-92-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Version 1.6 released Nov-2023
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-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
500.perlbench_r	192	397	770	**397**	**770**	398	769	192	**401**	**761**	401	762	402	760
502.gcc_r	192	331	822	328	828	**330**	**825**	192	**270**	**1010**	269	1010	270	1010
505.mcf_r	192	208	1490	**208**	**1490**	208	1490	192	208	1490	**208**	**1490**	207	1500
520.omnetpp_r	192	520	484	508	496	**512**	**492**	192	507	497	513	491	**513**	**491**
523.xalancbmk_r	192	**169**	**1200**	168	1210	174	1160	192	**145**	**1400**	148	1370	142	1430
525.x264_r	192	131	2570	**131**	**2570**	131	2570	192	131	2570	**131**	**2570**	131	2570
531.deepsjeng_r	192	248	887	**248**	**886**	249	885	192	**248**	**887**	249	885	247	890
541.leela_r	192	**356**	**892**	357	891	355	895	192	358	888	356	893	**356**	**892**
548.exchange2_r	192	198	2540	198	2530	**198**	**2540**	192	197	2550	197	2560	**197**	**2550**
557.xz_r	192	396	523	**397**	**522**	398	521	192	396	523	397	522	**397**	**523**
SPECrate®2017_int_base =	**1040**													
SPECrate®2017_int_peak =	**1080**													

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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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/cpu2017/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu2017/amd_rate_aocc400_znver4_A_lib/lib32:"
MALLOC_CONF = "retain:true"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:never"
```

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

```
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on amd2-Super-Server Tue Feb 27 19:04:52 2024

 SUT (System Under Test) info as seen by some common utilities.

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 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
 ------------------------------------------------------------

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```

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Platform Notes (Continued)

```
1. uname -a
  Linux amd2-Super-Server 5.15.0-92-generic #102~20.04.1-Ubuntu SMP Mon Jan 15 13:09:14 UTC 2024 x86_64
  x86_64 x86_64 GNU/Linux


----------------------------------------------------------
2. w
   19:04:52 up 2 min,  1 user,  load average: 6.94, 5.43, 2.20
  USER     TTY     FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1    -                07Feb24 12.00s  1.49s  0.31s /bin/bash ./amd_rate_aocc400_znver4_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              6191050
  nofiles              1024
  vmemory(kbytes)      unlimited
  locks                unlimited
  rtprio               0


----------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init splash
 /bin/login -p --
 -bash
 python3 ./run_amd_rate_aocc400_znver4_A1.py
 /bin/bash ./amd_rate_aocc400_znver4_A1.sh
 runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 intrate
 runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.001/templogs/preenv.intrate.001.0.log --lognum 001.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017


----------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9474F 48-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       : 48
    siblings        : 96
    2 physical ids (chips)
    192 processors (hardware threads)
    physical id 0: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
    physical id 1: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
    physical id 0: apicids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
```

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Platform Notes (Continued)

```
     physical id 1: apicids 128-139,144-155,160-171,176-187,192-203,208-219,224-235,240-251
  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):                      192
    On-line CPU(s) list:         0-191
    Thread(s) per core:          2
    Core(s) per socket:          48
    Socket(s):                   2
    NUMA node(s):                2
    Vendor ID:                   AuthenticAMD
    CPU family:                  25
    Model:                       17
    Model name:                  AMD EPYC 9474F 48-Core Processor
    Stepping:                    1
    Frequency boost:             enabled
    CPU MHz:                     1492.916
    CPU max MHz:                 4113.2808
    CPU min MHz:                 1500.0000
    BogoMIPS:                    7199.71
    Virtualization:              AMD-V
    L1d cache:                   3 MiB
    L1i cache:                   3 MiB
    L2 cache:                    96 MiB
    L3 cache:                    512 MiB
    NUMA node0 CPU(s):           0-47,96-143
    NUMA node1 CPU(s):           48-95,144-191
    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 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
```

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Platform Notes (Continued)

```
                      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       3M    8 Data             1
      L1i       32K       3M    8 Instruction      1
      L2         1M      96M    8 Unified          2
      L3        32M     512M   16 Unified          3


  --------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 2 nodes (0-1)
    node 0 cpus: 0-47,96-143
    node 0 size: 773815 MB
    node 0 free: 771386 MB
    node 1 cpus: 48-95,144-191
    node 1 size: 774022 MB
    node 1 free: 771702 MB
    node distances:
    node   0   1
      0:  10  32
      1:  32  10


  --------------------------------------------------------------
  9. /proc/meminfo
    MemTotal:       1584986040 kB


  --------------------------------------------------------------
  10. who -r
    run-level 3 Feb 7 11:39


  --------------------------------------------------------------
  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


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

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Platform Notes (Continued)

```
                    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-5.15.0-92-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
     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
```

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Platform Notes (Continued)

```
   ----------------------------------------------------------------
   19. Disk information
   SPEC is set to: /home/cpu2017
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/nvme0n1p2 ext4  938G   20G  870G   3% /


   ----------------------------------------------------------------
   20. /sys/devices/virtual/dmi/id
       Vendor:         Tyrone Systems
       Product:        Tyrone Camarero SDA200A2N-212
       Product Family: SMC H13
       Serial:         A509935X3C01325


   ----------------------------------------------------------------
   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:
       24x 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:     1.6
     BIOS Date:        11/16/2023
     BIOS Revision:    5.27
```

Compiler Version Notes

```
==============================================================================
C       | 502.gcc_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------


==============================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
        | 557.xz_r(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       | 502.gcc_r(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)
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Compiler Version Notes (Continued)

```
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------

================================================================================
C         | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
          | 557.xz_r(base, peak)
--------------------------------------------------------------------------------
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Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------

================================================================================
C++       | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------

================================================================================
C++       | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(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++       | 523.xalancbmk_r(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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------

================================================================================
C++       | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(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 | 548.exchange2_r(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
--------------------------------------------------------------------------------
```

SPEC CPU®2017 Integer Rate Result

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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

SPECrate®2017_int_base = 1040

Tyrone Camarero SDA200A2N-212
(3.60 GHz, AMD EPYC 9474F)

SPECrate®2017_int_peak = 1080

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

Test Date: Mar-2024
Hardware Availability: Jun-2023
Software Availability: Feb-2024

Base Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Base Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-DSPEC_LP64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
`-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather`
`-z muldefs -O3 -march=znver4 -fveclib=AMDLIBM -ffast-math`
`-fstruct-layout=7 -mllvm -unroll-threshold=50`
`-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining`
`-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang`
`-lamdalloc`

C++ benchmarks:
`-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3`
`-march=znver4 -fveclib=AMDLIBM -ffast-math`
`-mllvm -unroll-threshold=100 -finline-aggressive`
`-mllvm -loop-unswitch-threshold=200000`
`-mllvm -reduce-array-computations=3 -zopt`
`-fvirtual-function-elimination -fvisibility=hidden -lamdlibm -lflang`

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

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero SDA200A2N-212
(3.60 GHz, AMD EPYC 9474F)

SPECrate®2017_int_base = 1040

SPECrate®2017_int_peak = 1080

CPU2017 License: 6042		**Test Date:**	Mar-2024
Test Sponsor:	Netweb Pte Ltd	**Hardware Availability:**	Jun-2023
Tested by:	Tyrone Systems	**Software Availability:**	Feb-2024

Base Optimization Flags (Continued)

C++ benchmarks (continued):
`-lamdalloc-ext`

Fortran benchmarks:
`-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop`
`-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fepilog-vectorization-of-inductions`
`-mllvm -optimize-strided-mem-cost -floop-transform`
`-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm`
`-lflang -lamdalloc`

Base Other Flags

C benchmarks:
`-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

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`

(Continued on next page)

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

SPECrate®2017_int_base = 1040

Tyrone Camarero SDA200A2N-212
(3.60 GHz, AMD EPYC 9474F)

SPECrate®2017_int_peak = 1080

CPU2017 License: 6042	**Test Date:** Mar-2024
Test Sponsor: Netweb Pte Ltd	**Hardware Availability:** Jun-2023
Tested by: Tyrone Systems	**Software Availability:** Feb-2024

Peak Portability Flags (Continued)

505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Peak Optimization Flags

C benchmarks:

500.perlbench_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-fprofile-instr-generate`(pass 1)
`-fprofile-instr-use`(pass 2) `-Ofast -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -fremap-arrays`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3`
`-faggressive-loop-transform -fvector-transform`
`-fscalar-transform -lamdlibm -lflang -lamdalloc`

502.gcc_r: `-m32 -flto -z muldefs -Ofast -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline`
`-lamdalloc`

505.mcf_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math`
`-fstruct-layout=7 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -zopt -lamdlibm`
`-lflang -lamdalloc`

525.x264_r: `basepeak = yes`

557.xz_r: `Same as 505.mcf_r`

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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

SPECrate®2017_int_base = 1040

Tyrone Camarero SDA200A2N-212
(3.60 GHz, AMD EPYC 9474F)

SPECrate®2017_int_peak = 1080

CPU2017 License: 6042		**Test Date:**	Mar-2024
Test Sponsor:	Netweb Pte Ltd	**Hardware Availability:**	Jun-2023
Tested by:	Tyrone Systems	**Software Availability:**	Feb-2024

Peak Optimization Flags (Continued)

C++ benchmarks:

```
520.omnetpp_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext

523.xalancbmk_r: -m32 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-fno-loop-reroll -Ofast -march=znver4 -fveclib=AMDLIBM
-ffast-math -finline-aggressive
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdalloc-ext

531.deepsjeng_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext

541.leela_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lflang -lamdalloc-ext
```

Fortran benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
```

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SPEC CPU®2017 Integer Rate Result

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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero SDA200A2N-212
(3.60 GHz, AMD EPYC 9474F)

$SPECrate®2017\_int\_base = 1040$

$SPECrate®2017\_int\_peak = 1080$

CPU2017 License: 6042	**Test Date:** Mar-2024
Test Sponsor: Netweb Pte Ltd	**Hardware Availability:** Jun-2023
Tested by: Tyrone Systems	**Software Availability:** Feb-2024

Peak Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-lflang -lamdalloc
```

Peak Other Flags

C benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

```
502.gcc_r: -L/usr/lib32 -Wno-unused-command-line-argument
-L/home/work/cpu2017/v119/aocc4/znver4/rate/amd_rate_aocc400_znver4_A_lib/lib32
```

C++ benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

```
523.xalancbmk_r: -L/usr/lib32 -Wno-unused-command-line-argument
-L/home/work/cpu2017/v119/aocc4/znver4/rate/amd_rate_aocc400_znver4_A_lib/lib32
```

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

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

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