SPEC CPU®2017 Integer Rate Result

Tyrone Systems
(Test Sponsor: Netweb Technologies India Ltd)

(Tyrone Camarero SDA200A2N-212)
(3.25 GHz, AMD EPYC 9354)

$SPECrate^{®}2017\_int\_base = 699$

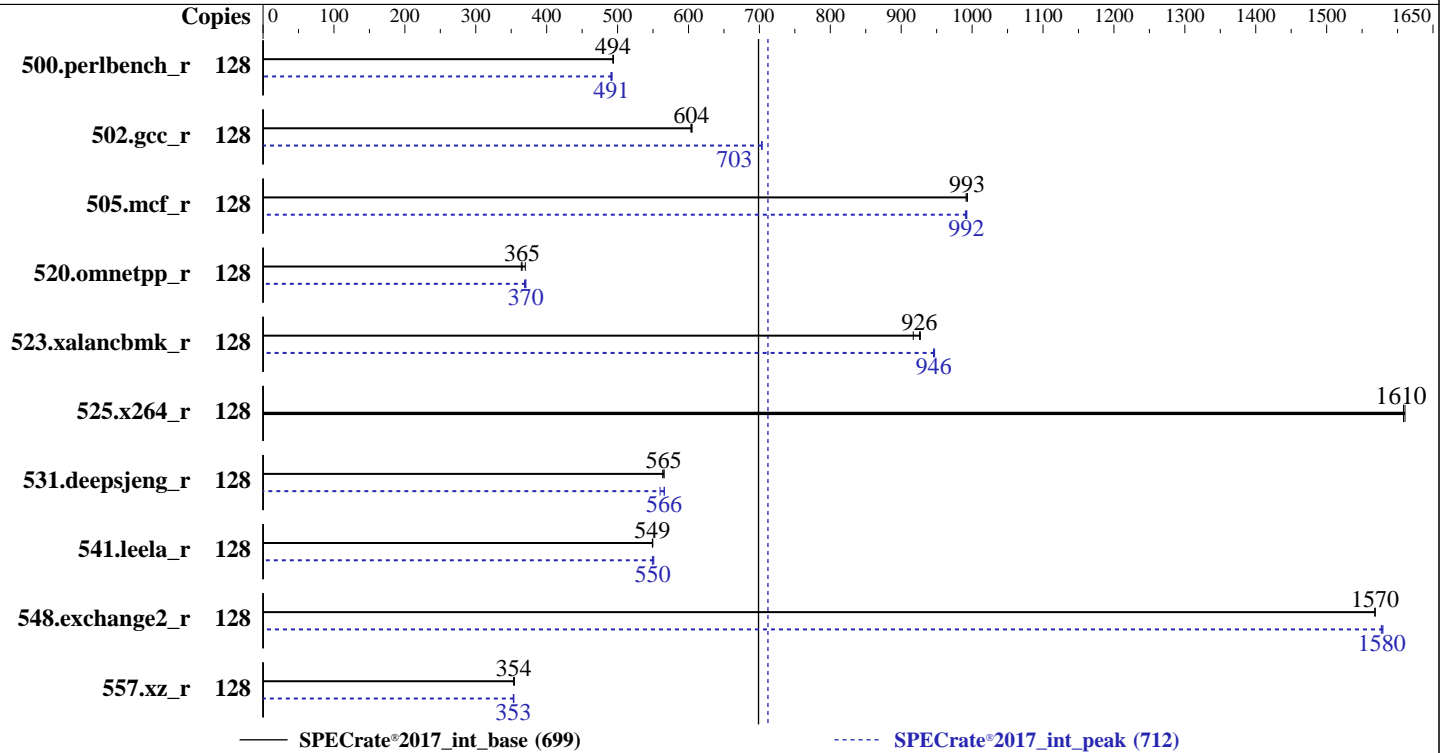$SPECrate^{®}2017\_int\_peak = 712$

CPU2017 License: 6802

Test Sponsor: Netweb Technologies India Ltd

Tested by: Tyrone Systems

Test Date: Jun-2024

Hardware Availability: Jun-2023

Software Availability: Apr-2024

Benchmark	Copies	base	peak
500.perlbench_r	128	494	491
502.gcc_r	128	604	703
505.mcf_r	128	993	992
520.omnetpp_r	128	365	370
523.xalancbmk_r	128	926	946
525.x264_r	128	1610	
531.deepsjeng_r	128	565	566
541.leela_r	128	549	550
548.exchange2_r	128	1570	1580
557.xz_r	128	354	353

SPECrate®2017_int_base (699)   SPECrate®2017_int_peak (712)

Hardware

CPU Name: AMD EPYC 9354
  Max MHz: 3800
  Nominal: 3250
Enabled: 64 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 / 4
       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
    5.15.0-107-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Version 1.6a released Mar-2024
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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CPU2017 License: 6802		**Test Date:** Jun-2024
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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	128	412	494	413	493	**413**	**494**	128	414	492	415	491	**415**	**491**
502.gcc_r	128	300	603	300	605	**300**	**604**	128	258	704	**258**	**703**	258	703
505.mcf_r	128	**208**	**993**	209	992	208	993	128	209	991	**209**	**992**	208	993
520.omnetpp_r	128	**460**	**365**	461	364	454	370	128	453	371	455	369	**453**	**370**
523.xalancbmk_r	128	146	927	**146**	**926**	147	917	128	143	947	**143**	**946**	143	946
525.x264_r	128	139	1610	**139**	**1610**	139	1610	128	139	1610	**139**	**1610**	139	1610
531.deepsjeng_r	128	259	565	**259**	**565**	260	564	128	259	566	**259**	**566**	262	560
541.leela_r	128	386	549	386	550	**386**	**549**	128	**386**	**550**	386	549	385	551
548.exchange2_r	128	**214**	**1570**	214	1570	214	1570	128	213	1580	212	1580	**213**	**1580**
557.xz_r	128	390	354	391	354	**391**	**354**	128	**391**	**353**	391	354	392	353
SPECrate®2017_int_base =		**699**												
SPECrate®2017_int_peak =		**712**												

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

```
BIOS Settings:
cTDP: 400
Determinism Slider set to Power
Package Power: 400
EDC: 400
ACPI SRAT L3 Cache as NUMA Domain: enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on amd2-Super-Server Sun Jun 16 10:17:42 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
```

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

Platform Notes (Continued)

```
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
 -----------------------------------------------------------

 -----------------------------------------------------------
 1. uname -a
   Linux amd2-Super-Server 5.15.0-107-generic #117~20.04.1-Ubuntu SMP Tue Apr 30 10:35:57 UTC 2024 x86_64
   x86_64 x86_64 GNU/Linux

 -----------------------------------------------------------
 2. w
    10:17:42 up 2 min,  1 user,  load average: 0.61, 0.31, 0.12
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                29May24  5.00s  1.66s  0.32s /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               6191094
   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 9354 32-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       : 32
```

(Continued on next page)

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Platform Notes (Continued)

```
      siblings        : 64
    2 physical ids (chips)
    128 processors (hardware threads)
    physical id 0: core ids 0-3,8-11,16-19,24-27,32-35,40-43,48-51,56-59
    physical id 1: core ids 0-3,8-11,16-19,24-27,32-35,40-43,48-51,56-59
    physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
    physical id 1: apicids 128-135,144-151,160-167,176-183,192-199,208-215,224-231,240-247
  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):                      128
  On-line CPU(s) list:         0-127
  Thread(s) per core:          2
  Core(s) per socket:          32
  Socket(s):                   2
  NUMA node(s):                2
  Vendor ID:                   AuthenticAMD
  CPU family:                  25
  Model:                       17
  Model name:                  AMD EPYC 9354 32-Core Processor
  Stepping:                    1
  Frequency boost:             enabled
  CPU MHz:                     1500.000
  CPU max MHz:                 3799.0720
  CPU min MHz:                 1500.0000
  BogoMIPS:                    6499.94
  Virtualization:              AMD-V
  L1d cache:                   2 MiB
  L1i cache:                   2 MiB
  L2 cache:                    64 MiB
  L3 cache:                    512 MiB
  NUMA node0 CPU(s):           0-31,64-95
  NUMA node1 CPU(s):           32-63,96-127
  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; BHI 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
```

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Platform Notes (Continued)

```
                     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       2M    8 Data            1
      L1i       32K       2M    8 Instruction     1
      L2         1M      64M    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: 0-31,64-95
    node 0 size: 773818 MB
    node 0 free: 771995 MB
    node 1 cpus: 32-63,96-127
    node 1 size: 774030 MB
    node 1 free: 772037 MB
    node distances:
    node   0   1
      0:  10  32
      1:  32  10


  -----------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       1584997324 kB


  -----------------------------------------------------------
  10. who -r
    run-level 3 May 29 17:41


  -----------------------------------------------------------
  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
    * apparmor.service     loaded failed failed Load AppArmor profiles
    * 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
```

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Platform Notes (Continued)

```
                    irqbalance kerneloops keyboard-setup network-manager networkd-dispatcher ondemand openvpn
                    pppd-dns rsync rsyslog secureboot-db setvtrgb 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
                    snapd sudo x11-common

  ----------------------------------------------------------------
  14. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.15.0-107-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
```

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Platform Notes (Continued)

```
    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  870G   3% /


  -------------------------------------------------------------
  20. /sys/devices/virtual/dmi/id
      Vendor:         Tyrone Systems
      Product:        Tyrone Camarero SDA200A2N-212
      Product Family: SMC H13
      Serial:         A509935X4406816


  -------------------------------------------------------------
  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:     1.6a
    BIOS Date:        03/28/2024
    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
----------------------------------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================================
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++     | 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)
```

SPEC CPU®2017 Integer Rate Result
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Tyrone Systems
(Test Sponsor: Netweb Technologies India Ltd)

(Tyrone Camarero SDA200A2N-212)
(3.25 GHz, AMD EPYC 9354)

SPECrate®2017_int_base = 699

SPECrate®2017_int_peak = 712

CPU2017 License: 6802
Test Sponsor: Netweb Technologies India Ltd
Tested by: Tyrone Systems

Test Date: Jun-2024
Hardware Availability: Jun-2023
Software Availability: Apr-2024

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

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
```

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

Tyrone Systems
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(Tyrone Camarero SDA200A2N-212)
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Tested by: Tyrone Systems

Test Date: Jun-2024

Hardware Availability: Jun-2023

Software Availability: Apr-2024

Base Optimization Flags (Continued)

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
-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
```

Tyrone Systems
(Test Sponsor: Netweb Technologies India Ltd)

(Tyrone Camarero SDA200A2N-212)
(3.25 GHz, AMD EPYC 9354)

SPECrate®2017_int_base = 699

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CPU2017 License: 6802
Test Sponsor: Netweb Technologies India Ltd
Tested by: Tyrone Systems

Test Date: Jun-2024
Hardware Availability: Jun-2023
Software Availability: Apr-2024

Peak Portability Flags

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

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SPECrate®2017_int_peak = 712

CPU2017 License: 6802		**Test Date:** Jun-2024
Test Sponsor:	Netweb Technologies India Ltd	**Hardware Availability:** Jun-2023
Tested by:	Tyrone Systems	**Software Availability:** Apr-2024

Peak Optimization Flags (Continued)

557.xz_r: Same as 505.mcf_r

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
```

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SPEC CPU®2017 Integer Rate Result

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SPECrate®2017_int_base = 699

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CPU2017 License: 6802		**Test Date:**	Jun-2024
Test Sponsor: Netweb Technologies India Ltd		**Hardware Availability:** Jun-2023
Tested by: Tyrone Systems		**Software Availability:** Apr-2024

Peak Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-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
```

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