SPEC CPU®2017 Integer Rate Result

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Fusionstor
(Test Sponsor: meganet)
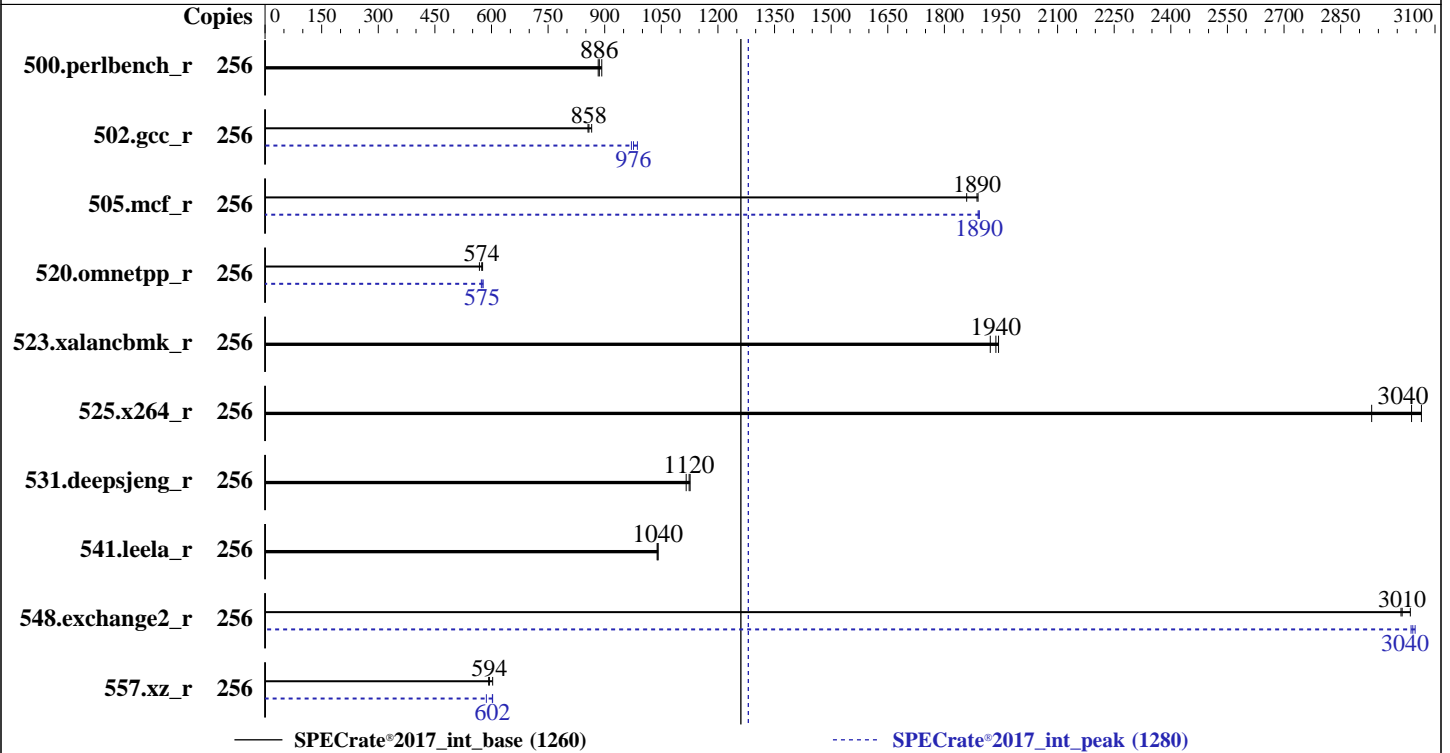
Invento i6000 EPYC (AMD EPYC 9554)

$SPECrate^{®}2017\_int\_base = 1260$

$SPECrate^{®}2017\_int\_peak = 1280$

CPU2017 License: 6221

Test Sponsor: meganet

Tested by: Fusionstor system

Test Date: Jan-2025

Hardware Availability: Oct-2024

Software Availability: Nov-2024

Benchmark	Copies	base	peak
500.perlbench_r	256	886	
502.gcc_r	256	858	976
505.mcf_r	256	1890	1890
520.omnetpp_r	256	574	575
523.xalancbmk_r	256	1940	
525.x264_r	256	3040	
531.deepsjeng_r	256	1120	
541.leela_r	256	1040	
548.exchange2_r	256	3010	3040
557.xz_r	256	594	602

SPECrate®2017_int_base (1260) ----- SPECrate®2017_int_peak (1280)

Hardware

CPU Name: AMD EPYC 9554
Max MHz: 3750
Nominal: 3100
Enabled: 256 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 / 8 cores
Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC5-5600B-R, running at 4800)
Storage: 960 GB SATA SSD
Other: CPU Cooling: Air

Software

OS: Ubuntu 22.04.5 LTS
kernel version
6.8.0-49-generic
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: No
Firmware: Version 5.27 released Nov-2024
File System: ext4
System State: Run level 5 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: None
Power Management: OS set to prefer performance at the expense of additional power usage

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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	256	**460**	**886**	457	892	462	883	256	**460**	**886**	457	892	462	883
502.gcc_r	256	424	856	**422**	**858**	419	865	256	373	971	**371**	**976**	367	987
505.mcf_r	256	223	1860	**219**	**1890**	219	1890	256	219	1890	219	1890	**219**	**1890**
520.omnetpp_r	256	591	568	583	576	**585**	**574**	256	581	578	**584**	**575**	586	573
523.xalancbmk_r	256	141	1920	139	1940	**140**	**1940**	256	141	1920	139	1940	**140**	**1940**
525.x264_r	256	153	2930	146	3060	**148**	**3040**	256	153	2930	146	3060	**148**	**3040**
531.deepsjeng_r	256	263	1120	**261**	**1120**	260	1130	256	263	1120	**261**	**1120**	260	1130
541.leela_r	256	408	1040	407	1040	**407**	**1040**	256	408	1040	407	1040	**407**	**1040**
548.exchange2_r	256	223	3010	**223**	**3010**	221	3030	256	**221**	**3040**	220	3050	221	3040
557.xz_r	256	467	592	**465**	**594**	458	603	256	**459**	**602**	459	603	471	586
SPECrate®2017_int_base =	**1260**													
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

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

Submit Notes

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

Operating System Notes

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

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

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

To enable Transparent Hugepages (THP) for all allocations,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

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

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
    "/home/speccpu/cpu2017/amd_rate_aocc500_znver5_A_lib/lib:/home/speccpu/cpu2017/amd_rate_aocc500_znver5
    _A_lib/lib32:/home/speccpu/cpu2017/aocc-compiler-5.0.0/ompd:/home/speccpu/cpu2017/aocc-compiler-5.0.0/
    lib:/home/speccpu/cpu2017/aocc-compiler-5.0.0/lib32:/usr/lib64:/usr/lib/x86_64-linux-gnu:/usr/lib:/usr
    /lib32:"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6
```

Platform Notes

```
 Sysinfo program /home/speccpu/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on AMD Thu Jan  9 16:23:30 2025

 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 249 (249.11-0ubuntu3.12)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
 ------------------------------------------------------------

 ------------------------------------------------------------
 1. uname -a
   Linux AMD 6.8.0-49-generic #49~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Wed Nov  6 17:42:15 UTC 2 x86_64 x86_64
   x86_64 GNU/Linux

 ------------------------------------------------------------
 2. w
    16:23:30 up 1 day, 23:03,  2 users,  load average: 0.23, 14.29, 91.78
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
```

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Platform Notes (Continued)

```
   test     :1       :1              Tue17   ?xdm?  30:58m  0.00s /usr/libexec/gdm-x-session --run-script env
  GNOME_SHELL_SESSION_MODE=ubuntu /usr/bin/gnome-session --session=ubuntu
   test     pts/1    -               16:14   8.00s  2.03s  0.05s sudo -s


  ----------------------------------------------------------
3. Username
  From environment variable $USER:  root
  From the command 'logname':       test


  ----------------------------------------------------------
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               3094316
  nofiles               1024
  vmemory(kbytes)       unlimited
  locks                 unlimited
  rtprio                0


  ----------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init splash
 /lib/systemd/systemd --user
 /usr/libexec/gnome-terminal-server
 bash
 sudo -s
 sudo -s
 /bin/bash
 python3 ./run_amd_rate_aocc500_znver5_A1.py
 /bin/bash ./amd_rate_aocc500_znver5_A1.sh
 runcpu --config amd_rate_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 intrate
 runcpu --configfile amd_rate_aocc500_znver5_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/speccpu/cpu2017


  ----------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9554 64-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 17
    stepping        : 1
    microcode       : 0xa101148
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
    TLB size        : 3584 4K pages
    cpu cores       : 64
    siblings        : 128
    2 physical ids (chips)
    256 processors (hardware threads)
    physical id 0: core ids 0-63
    physical id 1: core ids 0-63
    physical id 0: apicids 0-127
    physical id 1: apicids 128-255
```

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Platform Notes (Continued)

```
   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 2.37.2:
     Architecture:                     x86_64
     CPU op-mode(s):                   32-bit, 64-bit
     Address sizes:                    52 bits physical, 57 bits virtual
     Byte Order:                       Little Endian
     CPU(s):                           256
     On-line CPU(s) list:              0-255
     Vendor ID:                        AuthenticAMD
     Model name:                       AMD EPYC 9554 64-Core Processor
     CPU family:                       25
     Model:                            17
     Thread(s) per core:               2
     Core(s) per socket:               64
     Socket(s):                        2
     Stepping:                         1
     Frequency boost:                  enabled
     CPU max MHz:                      3762.9880
     CPU min MHz:                      1500.0000
     BogoMIPS:                         6199.57
     Flags:                            fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
                                       pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
                                       rdtscp lm constant_tsc rep_good amd_lbr_v2 nopl nonstop_tsc cpuid
                                       extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid
                                       sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm
                                       cmp_legacy 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 hw_pstate ssbd mba perfmon_v2
                                       ibrs ibpb stibp ibrs_enhanced 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
                                       user_shstk avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd
                                       amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean
                                       flushbyasid decodeassists pausefilter pfthreshold avic
                                       v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi avx512vbmi umip pku
                                       ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                                       avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
                                       debug_swap
     Virtualization:                   AMD-V
     L1d cache:                        4 MiB (128 instances)
     L1i cache:                        4 MiB (128 instances)
     L2 cache:                         128 MiB (128 instances)
     L3 cache:                         512 MiB (16 instances)
     NUMA node(s):                     2
     NUMA node0 CPU(s):                0-63,128-191
     NUMA node1 CPU(s):                64-127,192-255
     Vulnerability Gather data sampling:  Not affected
     Vulnerability Itlb multihit:      Not affected
     Vulnerability L1tf:               Not affected
     Vulnerability Mds:                Not affected
     Vulnerability Meltdown:           Not affected
     Vulnerability Mmio stale data:    Not affected
     Vulnerability Reg file data sampling: Not affected
     Vulnerability Retbleed:           Not affected
```

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Platform Notes (Continued)

```
   Vulnerability Spec rstack overflow:   Mitigation; Safe RET
   Vulnerability Spec store bypass:      Mitigation; Speculative Store Bypass disabled via prctl
   Vulnerability Spectre v1:             Mitigation; usercopy/swapgs barriers and __user pointer sanitization
   Vulnerability Spectre v2:             Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                         always-on; RSB filling; PBRSB-eIBRS Not affected; BHI Not affected
   Vulnerability Srbds:                  Not affected
   Vulnerability Tsx async abort:        Not affected

From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d       32K       4M   8 Data            1    64     1             64
     L1i       32K       4M   8 Instruction     1    64     1             64
     L2         1M     128M   8 Unified         2  2048     1             64
     L3        32M     512M  16 Unified         3 32768     1             64

-------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0-63,128-191
  node 0 size: 386682 MB
  node 0 free: 382930 MB
  node 1 cpus: 64-127,192-255
  node 1 size: 386972 MB
  node 1 free: 382384 MB
  node distances:
  node   0   1
    0:  10  32
    1:  32  10

-------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       792222800 kB

-------------------------------------------------------------
10. who -r
   run-level 5 Jan 7 17:20

-------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)
   Default Target  Status
   graphical       running

-------------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                   accounts-daemon anacron anydesk apparmor avahi-daemon bluetooth console-setup cron cups
                   cups-browsed dmesg e2scrub_reap getty@ gpu-manager grub-common grub-initrd-fallback
                   irqbalance kerneloops keyboard-setup networkd-dispatcher openvpn power-profiles-daemon
                   rsyslog secureboot-db setvtrgb snapd ssh switcheroo-control systemd-oomd systemd-pstore
                   systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                   unattended-upgrades wpa_supplicant
   enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
   disabled        acpid brltty console-getty debug-shell ipmievd nftables openvpn-client@ openvpn-server@
                   openvpn@ rsync rtkit-daemon serial-getty@ speech-dispatcherd
                   systemd-boot-check-no-failures systemd-network-generator systemd-networkd
                   systemd-networkd-wait-online systemd-sysext systemd-time-wait-sync upower
                   wpa_supplicant-nl80211@ wpa_supplicant-wired@ wpa_supplicant@
   generated       apport openipmi speech-dispatcher
```

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Platform Notes (Continued)

```
    indirect        saned@ spice-vdagentd uuidd
    masked          alsa-utils cryptdisks cryptdisks-early hwclock pulseaudio-enable-autospawn rc rcS saned
                    screen-cleanup sudo x11-common


  ------------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-6.8.0-49-generic
    root=UUID=e953dd87-e49e-4230-a412-5a6320fe39a0
    ro
    quiet
    splash
    vt.handoff=7


  ------------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 174:
      current policy: frequency should be within 1.50 GHz and 3.10 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes
        Boost States: 0
        Total States: 3
        Pstate-P0:  3100MHz


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

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Platform Notes (Continued)

```
     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 22.04.5 LTS

     ----------------------------------------------------------
     19. Disk information
     SPEC is set to: /home/speccpu/cpu2017
       Filesystem      Type  Size  Used Avail Use% Mounted on
       /dev/sda2       ext4  879G   35G  800G   5% /

     ----------------------------------------------------------
     20. /sys/devices/virtual/dmi/id
         Vendor:          FusionStor
         Product:         Fusionstor_Invento_i6000_EPYC_Series
         Product Family:  Server
         Serial:          GNG6PB312A0006

     ----------------------------------------------------------
     21. dmidecode
       Additional information from dmidecode 3.3 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 M321R4GA3PB0-CWMKJ 32 GB 2 rank 5600, configured at 4800


     ----------------------------------------------------------
     22. BIOS
     (This section combines info from /sys/devices and dmidecode.)
       BIOS Vendor:       FUSIONSTOR
       BIOS Version:      F18
       BIOS Date:         10/11/2024
       BIOS Revision:     5.27
```

Compiler Version Notes

```
==============================================================================================
C        | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
```

(Continued on next page)

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


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C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
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Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
-------------------------------------------------------------------------------------------


==============================================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
         | 541.leela_r(base, peak)
-------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
-------------------------------------------------------------------------------------------


==============================================================================================
Fortran | 548.exchange2_r(base, peak)
-------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
-------------------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

SPEC CPU®2017 Integer Rate Result

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Fusionstor
(Test Sponsor: meganet)

Invento i6000 EPYC (AMD EPYC 9554)

SPECrate®2017_int_base = 1260

SPECrate®2017_int_peak = 1280

CPU2017 License: 6221
Test Sponsor: meganet
Tested by: Fusionstor system

Test Date: Jan-2025
Hardware Availability: Oct-2024
Software Availability: Nov-2024

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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-Wl,-mllvm -Wl,-extra-inliner -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang
-lamdalloc-ext -ldl
```

C++ benchmarks:
```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -z muldefs -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -mllvm -unroll-threshold=100
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -fno-PIE -no-pie
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lflang -lamdalloc-ext
-ldl
```

Fortran benchmarks:
```
-m64 -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=znver5
-fveclib=AMDLIBM -ffast-math -flto
-fepilog-vectorization-of-inductions -mllvm -optimize-strided-mem-cost
-floop-transform -mllvm -unroll-aggressive -mllvm -unroll-threshold=500
-lamdlibm -lflang -lamdalloc -ldl
```

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SPEC CPU®2017 Integer Rate Result

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CPU2017 License: 6221
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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`
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: `basepeak = yes`

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SPECrate®2017_int_peak = 1280

CPU2017 License: 6221
Test Sponsor: meganet
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Test Date: Jan-2025
Hardware Availability: Oct-2024
Software Availability: Nov-2024

Peak Optimization Flags (Continued)

502.gcc_r: -m32 -flto -Wl,-mllvm -Wl,-ldist-scalar-expand
-fenable-aggressive-gather -Wl,-mllvm -Wl,-extra-inliner
-z muldefs -Ofast -march=znver5 -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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc-ext -ldl

525.x264_r: basepeak = yes

557.xz_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand
-fenable-aggressive-gather -Wl,-mllvm -Wl,-extra-inliner
-Ofast -march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc-ext -ldl

C++ benchmarks:

520.omnetpp_r: -m64 -std=c++14
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=advanced -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -fno-PIE
-no-pie -fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -lamdlibm -lamdalloc-ext
-ldl

523.xalancbmk_r: basepeak = yes

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Invento i6000 EPYC (AMD EPYC 9554)

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CPU2017 License: 6221
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Test Date: Jan-2025
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Peak Optimization Flags (Continued)

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `basepeak = yes`

Fortran benchmarks:
```
-m64 -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=znver5 -fveclib=AMDLIBM
-ffast-math -flto -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc -ldl
```

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/aocc5/1316/amd_rate_aocc500_znver5_A_lib/lib32`

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

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

The flags files that were used to format this result can be browsed at
```
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.html
http://www.spec.org/cpu2017/flags/Fusionstor-Platform-Flags-AMD-rev1.html
```

You can also download the XML flags sources by saving the following links:
```
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml
http://www.spec.org/cpu2017/flags/Fusionstor-Platform-Flags-AMD-rev1.xml
```

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

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