SPEC CPU®2017 Integer Rate Result

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Fujitsu

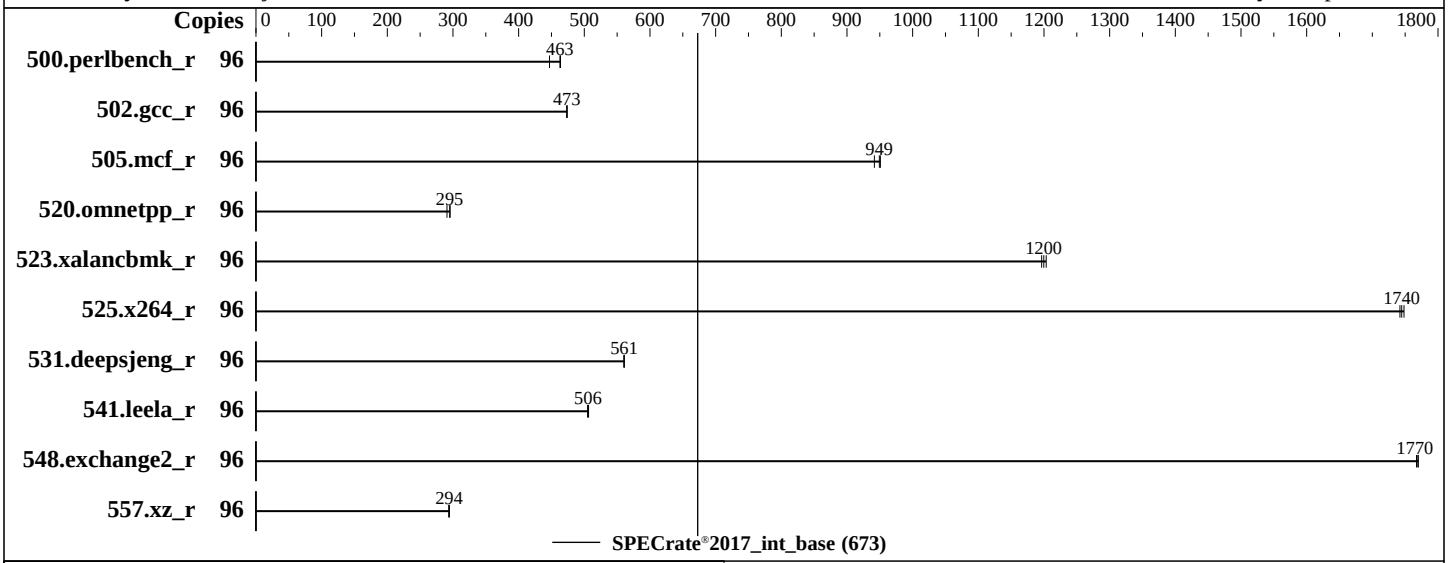
PRIMERGY RX1440 M2,
AMD EPYC 9475F, 3.65 GHz

SPECrate®2017_int_base = 673

SPECrate®2017_int_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Jan-2025
Hardware Availability: Jan-2025
Software Availability: Sep-2024



Hardware

CPU Name:	AMD EPYC 9475F
Max MHz:	4800
Nominal:	3650
Enabled:	48 cores, 1 chip, 2 threads/core
Orderable:	1 chip
Cache L1:	32 KB I + 48 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	256 MB I+D on chip per chip, 32 MB shared / 6 cores
Other:	None
Memory:	384 GB (12 x 32 GB 2Rx8 PC5-5600B-R, running at 4800)
Storage:	1 x SATA SSD, 960 GB
Other:	CPU Cooling: Air

Software

OS:	SUSE Linux Enterprise Server 15 SP6 kernel version 6.4.0-150600.21-default
Compiler:	C/C++/Fortran: Version 5.0.0 of AOCC
Parallel:	No
Firmware:	Fujitsu BIOS Version V5.0.0.35 R2.4.0 for D4130-A1x. Released Feb-2025 tested as V5.0.0.35 R2.3.0_PI-1003 for D4130-A1x Dec-2024
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None
Power Management:	BIOS set to prefer performance at the cost of aditional 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	96	342	447	330	464	**330**	**463**							
502.gcc_r	96	287	473	**287**	**473**	287	474							
505.mcf_r	96	**163**	**949**	163	951	165	942							
520.omnetpp_r	96	426	296	**427**	**295**	433	291							
523.xalancbmk_r	96	84.2	1200	**84.5**	**1200**	84.7	1200							
525.x264_r	96	**96.3**	**1740**	96.5	1740	96.2	1750							
531.deepsjeng_r	96	196	561	196	560	**196**	**561**							
541.leela_r	96	315	505	314	506	**314**	**506**							
548.exchange2_r	96	**142**	**1770**	142	1770	142	1770							
557.xz_r	96	**352**	**294**	353	294	352	295							

SPECrate®2017_int_base = 673

SPECrate®2017_int_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

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

Submit Notes

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

Operating System Notes

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

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

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

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

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/Benchmark/speccpu2017r-Turin/amd_rate_aocc500_znver5_A_lib/lib:/home/Benchmark/speccpu2017r-Tur
     in/amd_rate_aocc500_znver5_A_lib/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

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 configuration:
Determinism Slider = Power
TDP Control = Manual
TDP Limit = 400
Package Power Limit Control = Manual
Package Power Limit = 400
Power Profile Selection = High Performance
NUMA nodes per socket = NPS4
Probe Filter Organization = Shared
Interleaving Region Size = 2K Region Size
FAN Control = Full

 Sysinfo program /home/Benchmark/speccpu2017r-Turin/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Jan 21 03:34:05 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 254 (254.10+suse.84.ge8d77af424)
 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
```

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Platform Notes (Continued)

```
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 localhost 6.4.0-150600.21-default #1 SMP PREEMPT_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)
  x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   03:34:05 up  9:22,  2 users,  load average: 71.37, 89.88, 93.05
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                19:18   11.00s  0.93s  0.07s /bin/bash ./amd_rate_aocc500_znver5_A1.sh
  root     tty2     -                22:51    4:42m  0.03s  0.03s -bash

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

------------------------------------------------------------
4. ulimit -a
  core file size          (blocks, -c) unlimited
  data seg size           (kbytes, -d) unlimited
  scheduling priority             (-e) 0
  file size               (blocks, -f) unlimited
  pending signals                 (-i) 1542853
  max locked memory       (kbytes, -l) 2097152
  max memory size         (kbytes, -m) unlimited
  open files                      (-n) 1024
  pipe size            (512 bytes, -p) 8
  POSIX message queues     (bytes, -q) 819200
  real-time priority              (-r) 0
  stack size              (kbytes, -s) unlimited
  cpu time               (seconds, -t) unlimited
  max user processes              (-u) 1542853
  virtual memory          (kbytes, -v) unlimited
  file locks                      (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize=42
 login -- root
 -bash
 python3 ./run_amd_intrate_aocc500_znver5_A1_3l.py
 /bin/bash ./amd_rate_aocc500_znver5_A1.sh
 runcpu --config amd_rate_aocc500_znver5_A1.cfg --tune base --reportable --iterations 3 intrate
 runcpu --configfile amd_rate_aocc500_znver5_A1.cfg --tune base --reportable --iterations 3 --nopower
   --runmode rate --tune base --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/Benchmark/speccpu2017r-Turin

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9475F 48-Core Processor
```

(Continued on next page)

Platform Notes (Continued)

```
     vendor_id       : AuthenticAMD
     cpu family      : 26
     model           : 2
     stepping        : 1
     microcode       : 0xb00211e
     bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size        : 192 4K pages
     cpu cores       : 48
     siblings        : 96
     1 physical ids (chips)
     96 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 0: apicids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems.  Use the above data carefully.

------------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.39.3:
   Architecture:                         x86_64
   CPU op-mode(s):                       32-bit, 64-bit
   Address sizes:                        52 bits physical, 57 bits virtual
   Byte Order:                           Little Endian
   CPU(s):                               96
   On-line CPU(s) list:                  0-95
   Vendor ID:                            AuthenticAMD
   BIOS Vendor ID:                       Advanced Micro Devices, Inc.
   Model name:                           AMD EPYC 9475F 48-Core Processor
   BIOS Model name:                      AMD EPYC 9475F 48-Core Processor                Unknown CPU @ 3.6GHz
   BIOS CPU family:                      107
   CPU family:                           26
   Model:                                2
   Thread(s) per core:                   2
   Core(s) per socket:                   48
   Socket(s):                            1
   Stepping:                             1
   Frequency boost:                      enabled
   CPU(s) scaling MHz:                   34%
   CPU max MHz:                          4819.1401
   CPU min MHz:                          1500.0000
   BogoMIPS:                             7289.31
   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 tsc_adjust bmi1 avx2
                                         smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
                                         avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
                                         xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                                         cqm_mbm_local user_shstk avx_vnni avx512_bf16 clzero irperf
                                         xsaveerptr rdpru wbnoinvd amd_ppin cppc arat npt lbrv svm_lock
                                         nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                                         pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi
                                         avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
                                         avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdpid bus_lock_detect
```

(Continued on next page)

Platform Notes (Continued)

```
                                    movdiri movdir64b overflow_recov succor smca fsrm avx512_vp2intersect
                                    flush_l1d debug_swap
  Virtualization:                   AMD-V
  L1d cache:                        2.3 MiB (48 instances)
  L1i cache:                        1.5 MiB (48 instances)
  L2 cache:                         48 MiB (48 instances)
  L3 cache:                         256 MiB (8 instances)
  NUMA node(s):                     4
  NUMA node0 CPU(s):                0-11,48-59
  NUMA node1 CPU(s):                12-23,60-71
  NUMA node2 CPU(s):                24-35,72-83
  NUMA node3 CPU(s):                36-47,84-95
  Vulnerability Gather data sampling:   Not affected
  Vulnerability Itlb multihit:          Not affected
  Vulnerability L1tf:                   Not affected
  Vulnerability Mds:                    Not affected
  Vulnerability Meltdown:               Not affected
  Vulnerability Mmio stale data:        Not affected
  Vulnerability Reg file data sampling: Not affected
  Vulnerability Retbleed:               Not affected
  Vulnerability Spec rstack overflow:   Not affected
  Vulnerability Spec store bypass:      Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:             Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:             Mitigation; Enhanced / Automatic IBRS; IBPB conditional; STIBP
                                    always-on; RSB filling; PBRSB-eIBRS Not affected; BHI Not affected
  Vulnerability Srbds:                  Not affected
  Vulnerability Tsx async abort:        Not affected

From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d       48K     2.3M   12 Data            1    64        1             64
     L1i       32K     1.5M    8 Instruction     1    64        1             64
     L2         1M      48M   16 Unified         2  1024        1             64
     L3        32M     256M   16 Unified         3 32768        1             64

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0-11,48-59
  node 0 size: 95934 MB
  node 0 free: 95446 MB
  node 1 cpus: 12-23,60-71
  node 1 size: 96761 MB
  node 1 free: 96275 MB
  node 2 cpus: 24-35,72-83
  node 2 size: 96761 MB
  node 2 free: 96168 MB
  node 3 cpus: 36-47,84-95
  node 3 size: 96282 MB
  node 3 free: 95487 MB
  node distances:
  node   0   1   2   3
    0:  10  12  12  12
    1:  12  10  12  12
    2:  12  12  10  12
    3:  12  12  12  10

------------------------------------------------------------
9. /proc/meminfo
```

(Continued on next page)

Platform Notes (Continued)

```
    MemTotal:       394997224 kB

------------------------------------------------------------
10. who -r
  run-level 3 Jan 20 18:12

------------------------------------------------------------
11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
  Default Target  Status
  multi-user      running

------------------------------------------------------------
12. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ irqbalance
                   iscsi issue-generator kbdsettings kdump kdump-early kdump-notify klog lvm2-monitor nscd
                   postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore virtqemud wicked
                   wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
  enabled-runtime  systemd-remount-fs
  disabled         autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                   chronyd console-getty cups cups-browsed debug-shell dnsmasq ebtables exchange-bmc-os-info
                   firewalld fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsid
                   issue-add-ssh-keys kexec-load ksm kvm_stat libvirt-guests lunmask man-db-create multipathd
                   nfs nfs-blkmap nfs-server nfsserver rpcbind rpmconfigcheck rsyncd serial-getty@
                   smartd_generate_opts snmpd snmptrapd strongswan strongswan-starter svnserve
                   systemd-boot-check-no-failures systemd-confext systemd-network-generator systemd-nspawn@
                   systemd-sysext systemd-time-wait-sync systemd-timesyncd tcsd udisks2 virtinterfaced
                   virtlockd virtlogd virtnetworkd virtnodedevd virtnwfilterd virtsecretd virtstoraged
                   vncserver@
  indirect         pcscd systemd-userdbd tftp wickedd

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
  root=UUID=803d1916-887f-4e1e-bc36-a1ab2542d352
  splash=silent
  resume=/dev/disk/by-uuid/ff08e126-00b4-4583-943a-09584dbe7c67
  mitigations=auto
  quiet
  security=apparmor
  crashkernel=369M,high
  crashkernel=72M,low

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 41:
    current policy: frequency should be within 1.50 GHz and 3.65 GHz.
                    The governor "ondemand" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes

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

(Continued on next page)

Platform Notes (Continued)

```
  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 SUSE Linux Enterprise Server 15 SP6

------------------------------------------------------------
19. Disk information
SPEC is set to: /home/Benchmark/speccpu2017r-Turin
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sdb3      xfs   476G   33G  444G   7% /home

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         FUJITSU
    Product:        PRIMERGY RX1440 M2
    Product Family: SERVER
    Serial:         XXXXXXXXXX

------------------------------------------------------------
21. dmidecode
  Additional information from dmidecode 3.4 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:
    12x Samsung M321R4GA3PB0-CWMKH 32 GB 2 rank 5600, configured at 4800
```

(Continued on next page)

Platform Notes (Continued)

```
 ------------------------------------------------------------
 22. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       FUJITSU // American Megatrends Inc.
    BIOS Version:      V5.0.0.35 R2.3.0_PI-1003 for D4130-A1x
    BIOS Date:         12/24/2024
    BIOS Revision:     2.3
    Firmware Revision: 2.47
```

Compiler Version Notes

```
==============================================================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
--------------------------------------------------------------------------------------------------------------
AMD clang version 17.0.6 (CLANG: AOCC_5.0.0-Build#1316 2024_09_09)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------

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

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
```

Base Other Flags

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

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

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

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.00.html`
`http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-Turin-RevB.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.00.xml`
`http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-Turin-RevB.xml`

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

Tested with SPEC CPU®2017 v1.1.9 on 2025-01-20 13:34:04-0500.
Report generated on 2025-02-11 17:15:46 by CPU2017 PS formatter v6716.
Originally published on 2025-02-11.