SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

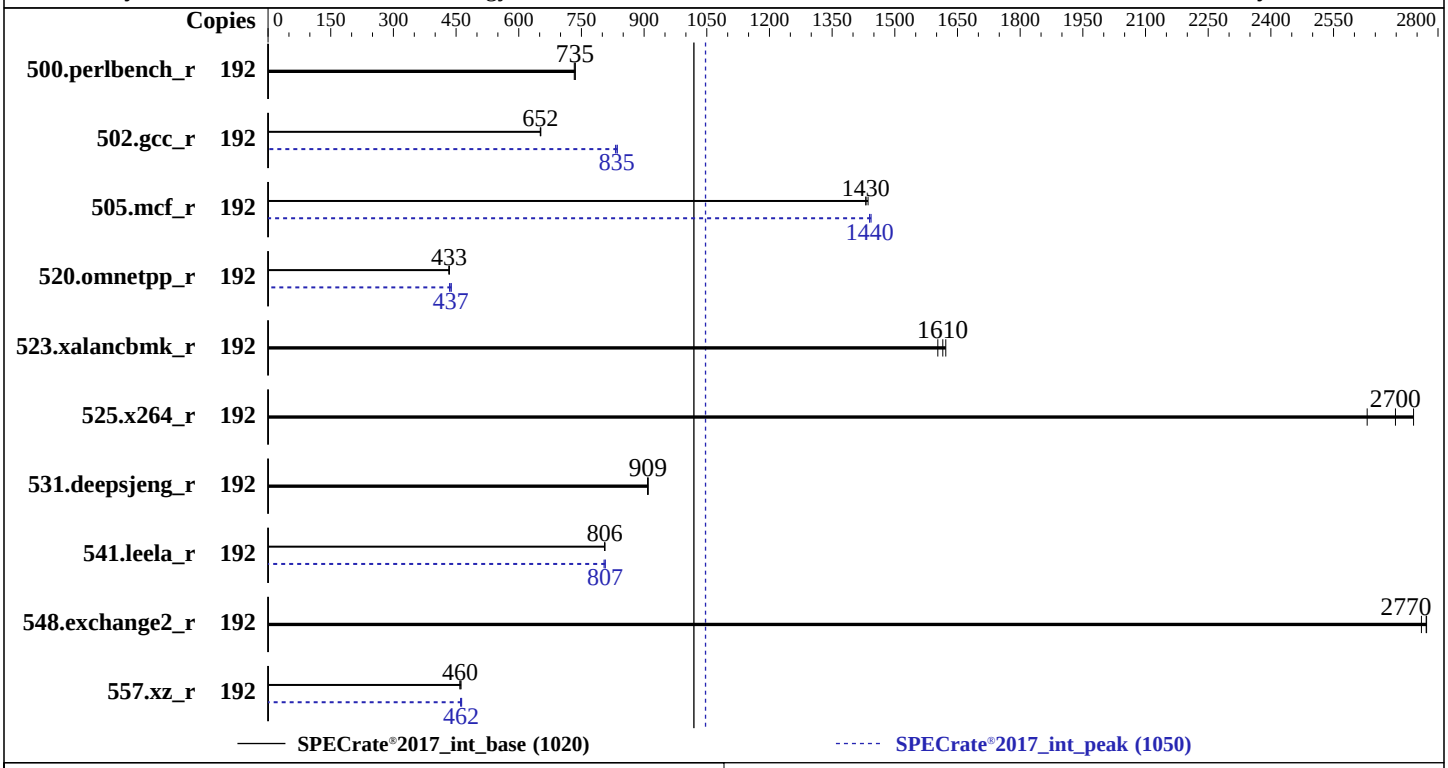
ThinkSystem SD535 V3
(2.30 GHz, AMD EPYC 9645)

SPECrate®2017_int_base = 1020

SPECrate®2017_int_peak = 1050

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Feb-2025
Hardware Availability: Feb-2025
Software Availability: Oct-2024



Hardware

CPU Name:	AMD EPYC 9645
Max MHz:	3700
Nominal:	2300
Enabled:	96 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 / 12 cores
Other:	None
Memory:	384 GB (12 x 32 GB 2Rx8 PC5-6400B-R, running at 6000)
Storage:	1 x 960 GB M.2 SATA SSD
Other:	CPU Cooling: Air

Software

OS:	Red Hat Enterprise Linux 9.4 (Plow) Kernel 5.14.0-427.13.1.el9_4.x86_64
Compiler:	C/C++/Fortran: Version 5.0.0 of AOCC
Parallel:	No
Firmware:	Lenovo BIOS Version GPE113I 4.10 released Dec-2024
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other:	None
Power Management:	BIOS and OS set to prefer performance at the cost 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	192	416	735	**416**	**735**	417	733	192	416	735	**416**	**735**	417	733
502.gcc_r	192	417	652	**417**	**652**	417	653	192	**326**	**835**	327	831	325	836
505.mcf_r	192	216	1440	**217**	**1430**	217	1430	192	215	1440	**215**	**1440**	216	1440
520.omnetpp_r	192	582	433	580	434	**581**	**433**	192	574	439	**576**	**437**	580	434
523.xalancbmk_r	192	126	1600	**126**	**1610**	125	1620	192	126	1600	**126**	**1610**	125	1620
525.x264_r	192	128	2630	**125**	**2700**	123	2740	192	128	2630	**125**	**2700**	123	2740
531.deepsjeng_r	192	242	910	242	908	**242**	**909**	192	242	910	242	908	**242**	**909**
541.leela_r	192	394	806	395	805	**395**	**806**	192	**394**	**807**	394	807	395	804
548.exchange2_r	192	182	2760	181	2770	**181**	**2770**	192	182	2760	181	2770	**181**	**2770**
557.xz_r	192	449	462	**451**	**460**	451	459	192	448	463	450	461	**449**	**462**

SPECrate®2017_int_base = 1020

SPECrate®2017_int_peak = 1050

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.

cpupower set to performance mode
cpupower frequency-set -r -g performance
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/cpu2017-1.1.9-amd-aocc500_znver5_A1.2/amd_rate_aocc500_znver5_A_lib/lib:/home/cpu2017-1.1.9-amd
     -aocc500_znver5_A1.2/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:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
NUMA Nodes per Socket set to NPS4
P-State set to Enabled

 Sysinfo program /home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Mon Mar 18 13:23:21 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 252 (252-32.el9_4)
 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
 ------------------------------------------------------------
```

(Continued on next page)

Platform Notes (Continued)

```
------------------------------------------------------------
1. uname -a
  Linux localhost.localdomain 5.14.0-427.13.1.el9_4.x86_64 #1 SMP PREEMPT_DYNAMIC Wed Apr 10 10:29:16 EDT
  2024 x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   13:23:21 up  5:23,  0 users,  load average: 51.31, 146.48, 174.37
  USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT

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

------------------------------------------------------------
4. ulimit -a
  real-time non-blocking time  (microseconds, -R) unlimited
  core file size              (blocks, -c) 0
  data seg size               (kbytes, -d) unlimited
  scheduling priority                 (-e) 0
  file size                   (blocks, -f) unlimited
  pending signals                     (-i) 1545801
  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) 1545801
  virtual memory              (kbytes, -v) unlimited
  file locks                          (-x) unlimited

------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize 31
 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
 sshd: root [priv]
 sshd: root@notty
 /bin/bash ./02.remote_local_SPECcpu_1.01.sh
 /bin/bash ./Run025-compliant-amd-rateint.sh
 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/CPU2017.038/templogs/preenv.intrate.038.0.log --lognum 038.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9645 96-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 26
    model           : 17
    stepping        : 0
    microcode       : 0xb101025
```

(Continued on next page)

Platform Notes (Continued)

```
     bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size        : 192 4K pages
     cpu cores       : 96
     siblings        : 192
     1 physical ids (chips)
     192 processors (hardware threads)
     physical id 0: core ids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
     physical id 0: apicids 0-23,32-55,64-87,96-119,128-151,160-183,192-215,224-247
   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 2.37.4:
   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):                               192
   On-line CPU(s) list:                  0-191
   Vendor ID:                            AuthenticAMD
   BIOS Vendor ID:                       Advanced Micro Devices, Inc.
   Model name:                           AMD EPYC 9645 96-Core Processor
   BIOS Model name:                      AMD EPYC 9645 96-Core Processor
   CPU family:                           26
   Model:                                17
   Thread(s) per core:                   2
   Core(s) per socket:                   96
   Socket(s):                            1
   Stepping:                             0
   Frequency boost:                      enabled
   CPU(s) scaling MHz:                   100%
   CPU max MHz:                          2300.0000
   CPU min MHz:                          1500.0000
   BogoMIPS:                             4593.33
   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
                                         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 movdiri movdir64b overflow_recov succor smca fsrm
                                         avx512_vp2intersect flush_l1d debug_swap
   Virtualization:                       AMD-V
   L1d cache:                            4.5 MiB (96 instances)
   L1i cache:                            3 MiB (96 instances)
   L2 cache:                             96 MiB (96 instances)
   L3 cache:                             256 MiB (8 instances)
```

(Continued on next page)

Platform Notes (Continued)

```
  NUMA node(s):                         4
  NUMA node0 CPU(s):                    0-23,96-119
  NUMA node1 CPU(s):                    24-47,120-143
  NUMA node2 CPU(s):                    48-71,144-167
  NUMA node3 CPU(s):                    72-95,168-191
  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: 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
  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     4.5M   12 Data            1    64        1             64
     L1i       32K       3M    8 Instruction     1    64        1             64
     L2         1M      96M   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: 0-23,96-119
  node 0 size: 96296 MB
  node 0 free: 95425 MB
  node 1 cpus: 24-47,120-143
  node 1 size: 96755 MB
  node 1 free: 95921 MB
  node 2 cpus: 48-71,144-167
  node 2 size: 96755 MB
  node 2 free: 95946 MB
  node 3 cpus: 72-95,168-191
  node 3 size: 96681 MB
  node 3 free: 95807 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
   MemTotal:       395765164 kB

------------------------------------------------------------
10. who -r
  run-level 3 Mar 18 08:00

------------------------------------------------------------
11. Systemd service manager version: systemd 252 (252-32.el9_4)
```

(Continued on next page)

Platform Notes (Continued)

```
  Default Target  Status
  multi-user      running

------------------------------------------------------------
12. Services, from systemctl list-unit-files
  STATE            UNIT FILES
  enabled          NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
                   dbus-broker getty@ insights-client-boot irqbalance kdump low-memory-monitor mdmonitor
                   microcode nis-domainname nvmefc-boot-connections rhsmcertd rsyslog rtkit-daemon
                   selinux-autorelabel-mark sshd sssd systemd-boot-update systemd-network-generator udisks2
                   upower
  enabled-runtime  systemd-remount-fs
  disabled         canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot
                   chrony-wait chronyd-restricted console-getty cpupower debug-shell dnf-system-upgrade
                   firewalld kvm_stat man-db-restart-cache-update nftables nvmf-autoconnect pesign rdisc rhcd
                   rhsm rhsm-facts rpmdb-rebuild selinux-check-proper-disable serial-getty@ sshd-keygen@
                   systemd-boot-check-no-failures systemd-pstore systemd-sysext
  indirect         sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate
                   systemd-sysupdate-reboot

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(hd3,gpt2)/boot/vmlinuz-5.14.0-427.13.1.el9_4.x86_64
  root=UUID=609e1264-f568-475c-b502-9e0795850886
  ro
  resume=UUID=7f8ee8bf-b24d-4aea-9bd8-e670d4778be8

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 176:
    current policy: frequency should be within 1.50 GHz and 2.30 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:  40800MHz

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

(Continued on next page)

Platform Notes (Continued)

```
  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     Red Hat Enterprise Linux 9.4 (Plow)
  redhat-release Red Hat Enterprise Linux release 9.4 (Plow)
  system-release Red Hat Enterprise Linux release 9.4 (Plow)

------------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p4 xfs   820G   38G  782G   5% /home

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Lenovo
    Product:        ThinkSystem SD535 V3
    Product Family: ThinkSystem
    Serial:         1234567890

------------------------------------------------------------
21. dmidecode
  Additional information from dmidecode 3.5 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 M321R4GA3PB2-CCPEC 32 GB 2 rank 6400, configured at 6000


------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Lenovo
   BIOS Version:      GPE113I-4.10
   BIOS Date:         12/12/2024
   BIOS Revision:     4.10
   Firmware Revision: 5.10
```

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
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
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
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

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

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-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

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`

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`

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Peak Optimization Flags (Continued)

557.xz_r (continued):
-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

531.deepsjeng_r: basepeak = yes

541.leela_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 -lflang
-lamdalloc-ext -ldl

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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

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Peak Other Flags (Continued)

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Turin-E.html
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Turin-E.xml
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml

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