SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

ThinkSystem SD535 V3
(2.25 GHz, AMD EPYC 9965)

$SPECrate^{®}2017\_int\_base = 1530$

$SPECrate^{®}2017\_int\_peak = 1600$
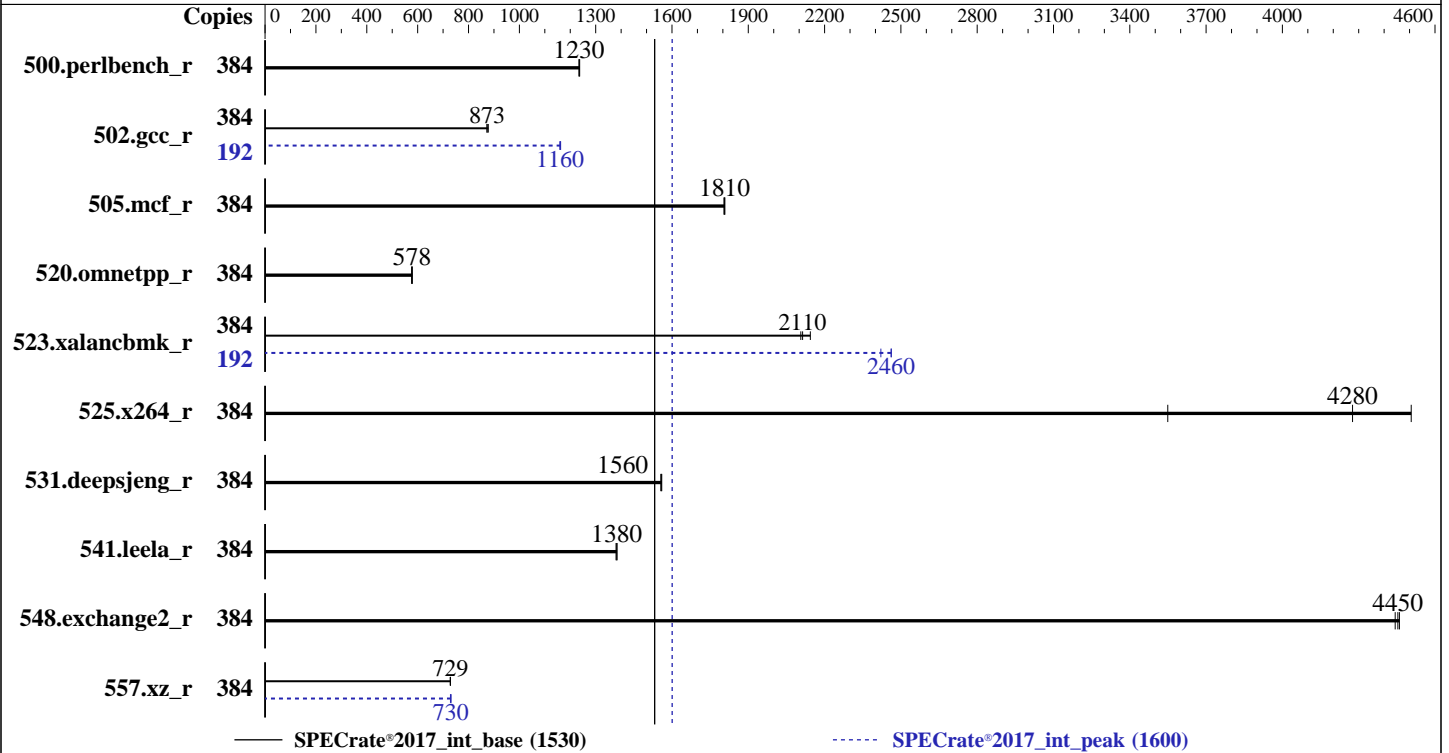
CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: May-2025
Hardware Availability: Jun-2025
Software Availability: Oct-2024

Benchmark	Copies	Result
500.perlbench_r	384	1230
502.gcc_r	384	873
502.gcc_r	192	1160
505.mcf_r	384	1810
520.omnetpp_r	384	578
523.xalancbmk_r	384	2110
523.xalancbmk_r	192	2460
525.x264_r	384	4280
531.deepsjeng_r	384	1560
541.leela_r	384	1380
548.exchange2_r	384	4450
557.xz_r	384	729
557.xz_r	384	730

SPECrate®2017_int_base (1530)   SPECrate®2017_int_peak (1600)

Hardware

CPU Name: AMD EPYC 9965
 Max MHz: 3700
 Nominal: 2250
Enabled: 192 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: 384 MB I+D on chip per chip,
 32 MB shared / 16 cores
 Other: None
Memory: 768 GB (12 x 64 GB 2Rx4 PC5-6400B-R)
Storage: 1 x 960 GB M.2 SATA SSD
Other: CPU Cooling: DLC

Software

OS: Ubuntu 24.04 LTS
 Kernel 6.8.0-39-generic
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: No
Firmware: Lenovo BIOS Version GPE119F 5.20 released Apr-2025
File System: ext4
System State: Run level 5 (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

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	384	494	1240	**495**	**1230**	495	1230	384	494	1240	**495**	**1230**	495	1230
502.gcc_r	384	620	878	623	873	**623**	**873**	192	235	1160	234	1160	**234**	**1160**
505.mcf_r	384	**343**	**1810**	343	1810	344	1800	384	**343**	**1810**	343	1810	344	1800
520.omnetpp_r	384	**872**	**578**	871	579	874	576	384	**872**	**578**	871	579	874	576
523.xalancbmk_r	384	**192**	**2110**	193	2110	189	2140	192	82.3	2460	83.7	2420	**82.4**	**2460**
525.x264_r	384	189	3550	149	4510	**157**	**4280**	384	189	3550	149	4510	**157**	**4280**
531.deepsjeng_r	384	282	1560	**283**	**1560**	283	1560	384	282	1560	**283**	**1560**	283	1560
541.leela_r	384	461	1380	460	1380	**460**	**1380**	384	461	1380	460	1380	**460**	**1380**
548.exchange2_r	384	**226**	**4450**	226	4440	226	4460	384	**226**	**4450**	226	4440	226	4460
557.xz_r	384	569	729	570	728	**569**	**729**	384	567	731	569	729	**568**	**730**

SPECrate®2017_int_base =	**1530**
SPECrate®2017_int_peak =	**1600**

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.
```

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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:/opt/intel/oneapi/tbb/2021.13/env/../lib/inte
    l64/gcc4.8:/opt/intel/oneapi/mpi/2021.13/opt/mpi/libfabric/lib:/opt/intel/oneapi/mpi/2021.13/lib:/opt/
    intel/oneapi/mkl/2024.2/lib:/opt/intel/oneapi/dpl/2022.6/lib:/opt/intel/oneapi/debugger/2024.2/opt/deb
    ugger/lib:/opt/intel/oneapi/compiler/2024.2/opt/compiler/lib:/opt/intel/oneapi/compiler/2024.2/lib:/op
    t/intel/oneapi/ccl/2021.13/lib/"
MALLOC_CONF = "retain:true"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:always"
```

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
ACPI SRAT L3 Cache as NUMA Domain set to Enabled
L1 Stride Prefetcher set to Disabled
L1 Region Prefetcher set to Disabled
P-State set to Enabled
BMC Configuration:
Fan Speed Boost set to High

 Sysinfo program /home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on HiloServer Wed May  7 21:47:44 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 255 (255.4-1ubuntu8.2)
```

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Platform Notes (Continued)

```
   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. cpupower frequency-info
   16. sysctl
   17. /sys/kernel/mm/transparent_hugepage
   18. /sys/kernel/mm/transparent_hugepage/khugepaged
   19. OS release
   20. Disk information
   21. /sys/devices/virtual/dmi/id
   22. dmidecode
   23. BIOS
  -----------------------------------------------------------


  -----------------------------------------------------------
  1. uname -a
    Linux HiloServer 6.8.0-39-generic #39-Ubuntu SMP PREEMPT_DYNAMIC Fri Jul  5 21:49:14 UTC 2024 x86_64 x86_64
    x86_64 GNU/Linux


  -----------------------------------------------------------
  2. w
     21:47:44 up 6 min,  3 users,  load average: 0.19, 0.05, 0.01
    USER     TTY        FROM             LOGIN@   IDLE   JCPU    PCPU WHAT
    root                10.131.186.238   21:43    6:38   0.00s  0.06s sshd: root@pts/0
    root                10.131.186.238   21:43    6:38   0.00s  0.06s sshd: root@notty
    root     tty1       -                21:47    23.00s 1.39s  0.13s /bin/bash ./amd_rate_aocc500_znver5_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                unlimited
    nofiles                131072
    vmemory(kbytes)        unlimited
    locks                  unlimited
    rtprio                 0


  -----------------------------------------------------------
  5. sysinfo process ancestry
   /sbin/init
   /bin/login -p --
   -bash
   /bin/bash ./autoSpecCPU.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/CPU2017.009/templogs/preenv.intrate.009.0.log --lognum 009.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
```

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Platform Notes (Continued)

```
  $SPEC = /home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2


  --------------------------------------------------------------
6. /proc/cpuinfo
     model name       : AMD EPYC 9965 192-Core Processor
     vendor_id        : AuthenticAMD
     cpu family       : 26
     model            : 17
     stepping         : 0
     microcode        : 0xb101047
     bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size         : 192 4K pages
     cpu cores        : 192
     siblings         : 384
     1 physical ids (chips)
     384 processors (hardware threads)
     physical id 0: core ids 0-191
     physical id 0: apicids 0-383
  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):                          384
    On-line CPU(s) list:             0-383
    Vendor ID:                       AuthenticAMD
    BIOS Vendor ID:                  Advanced Micro Devices, Inc.
    Model name:                      AMD EPYC 9965 192-Core Processor
    BIOS Model name:                 AMD EPYC 9965 192-Core Processor          Unknown CPU @ 2.2GHz
    BIOS CPU family:                 107
    CPU family:                      26
    Model:                           17
    Thread(s) per core:              2
    Core(s) per socket:              192
    Socket(s):                       1
    Stepping:                        0
    Frequency boost:                 enabled
    CPU(s) scaling MHz:              100%
    CPU max MHz:                     2250.0000
    CPU min MHz:                     1500.0000
    BogoMIPS:                        4493.51
    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
```

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Platform Notes (Continued)

```
                            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:               9 MiB (192 instances)
   L1i cache:               6 MiB (192 instances)
   L2 cache:                192 MiB (192 instances)
   L3 cache:                384 MiB (12 instances)
   NUMA node(s):            12
   NUMA node0 CPU(s):       0-15,192-207
   NUMA node1 CPU(s):       16-31,208-223
   NUMA node2 CPU(s):       32-47,224-239
   NUMA node3 CPU(s):       48-63,240-255
   NUMA node4 CPU(s):       64-79,256-271
   NUMA node5 CPU(s):       80-95,272-287
   NUMA node6 CPU(s):       96-111,288-303
   NUMA node7 CPU(s):       112-127,304-319
   NUMA node8 CPU(s):       128-143,320-335
   NUMA node9 CPU(s):       144-159,336-351
   NUMA node10 CPU(s):      160-175,352-367
   NUMA node11 CPU(s):      176-191,368-383
   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       9M   12 Data            1    64       1          64
       L1i      32K       6M    8 Instruction     1    64       1          64
       L2        1M     192M   16 Unified         2  1024       1          64
       L3       32M     384M   16 Unified         3 32768       1          64

   ------------------------------------------------------------
   8. numactl --hardware
   NOTE: a numactl 'node' might or might not correspond to a physical chip.
     available: 12 nodes (0-11)
     node 0 cpus: 0-15,192-207
     node 0 size: 64014 MB
     node 0 free: 63534 MB
     node 1 cpus: 16-31,208-223
     node 1 size: 64501 MB
     node 1 free: 64169 MB
     node 2 cpus: 32-47,224-239
     node 2 size: 64501 MB
```

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Platform Notes (Continued)

```
   node 2 free: 64207 MB
   node 3 cpus: 48-63,240-255
   node 3 size: 64501 MB
   node 3 free: 64117 MB
   node 4 cpus: 64-79,256-271
   node 4 size: 64501 MB
   node 4 free: 64144 MB
   node 5 cpus: 80-95,272-287
   node 5 size: 64501 MB
   node 5 free: 64170 MB
   node 6 cpus: 96-111,288-303
   node 6 size: 64457 MB
   node 6 free: 63711 MB
   node 7 cpus: 112-127,304-319
   node 7 size: 64501 MB
   node 7 free: 64214 MB
   node 8 cpus: 128-143,320-335
   node 8 size: 64501 MB
   node 8 free: 64136 MB
   node 9 cpus: 144-159,336-351
   node 9 size: 64501 MB
   node 9 free: 63843 MB
   node 10 cpus: 160-175,352-367
   node 10 size: 64501 MB
   node 10 free: 64071 MB
   node 11 cpus: 176-191,368-383
   node 11 size: 64419 MB
   node 11 free: 63979 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11
     0:  10  11  11  12  12  12  12  12  12  12  12  12
     1:  11  10  11  12  12  12  12  12  12  12  12  12
     2:  11  11  10  12  12  12  12  12  12  12  12  12
     3:  12  12  12  10  11  11  12  12  12  12  12  12
     4:  12  12  12  11  10  11  12  12  12  12  12  12
     5:  12  12  12  11  11  10  12  12  12  12  12  12
     6:  12  12  12  12  12  12  10  11  11  12  12  12
     7:  12  12  12  12  12  12  11  10  11  12  12  12
     8:  12  12  12  12  12  12  11  11  10  12  12  12
     9:  12  12  12  12  12  12  12  12  12  10  11  11
    10:  12  12  12  12  12  12  12  12  12  11  10  11
    11:  12  12  12  12  12  12  12  12  12  11  11  10


   ------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       791963412 kB


   ------------------------------------------------------------
10. who -r
   run-level 5 May 7 21:43


   ------------------------------------------------------------
11. Systemd service manager version: systemd 255 (255.4-1ubuntu8.2)
   Default Target  Status
   graphical       degraded


   ------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
     UNIT                              LOAD   ACTIVE SUB    DESCRIPTION
   * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured
```

(Continued on next page)

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Platform Notes (Continued)

```
   Legend: LOAD   -> Reflects whether the unit definition was properly loaded.
           ACTIVE -> The high-level unit activation state, i.e. generalization of SUB.
           SUB    -> The low-level unit activation state, values depend on unit type.
   1 loaded units listed.

   ------------------------------------------------------------
13. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         ModemManager apparmor apport blk-availability cloud-config cloud-final cloud-init
                   cloud-init-local console-setup cron dmesg e2scrub_reap finalrd fsidd getty@ gpu-manager
                   grub-common grub-initrd-fallback ibacm keyboard-setup lm-sensors lvm2-monitor multipathd
                   networkd-dispatcher nfs-blkmap nfs-server open-iscsi open-vm-tools openibd pollinate
                   rpcbind rsyslog secureboot-db setvtrgb sysstat systemd-networkd
                   systemd-networkd-wait-online systemd-pstore systemd-resolved thermald ua-reboot-cmds
                   ubuntu-advantage udisks2 ufw vgauth
   enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
   disabled        autoperf console-getty debug-shell ipmievd iscsid nftables opensmd opensmd@ rshim rsync
                   serial-getty@ srp_daemon srp_daemon_port@ ssh systemd-boot-check-no-failures
                   systemd-confext systemd-network-generator systemd-networkd-wait-online@
                   systemd-pcrlock-file-system systemd-pcrlock-firmware-code systemd-pcrlock-firmware-config
                   systemd-pcrlock-machine-id systemd-pcrlock-make-policy
                   systemd-pcrlock-secureboot-authority systemd-pcrlock-secureboot-policy systemd-sysext
                   systemd-time-wait-sync systemd-timesyncd upower
   generated       mst openipmi
   indirect        systemd-sysupdate systemd-sysupdate-reboot uuidd
   masked          cryptdisks cryptdisks-early hwclock multipath-tools-boot nfs-common screen-cleanup sudo
                   x11-common

   ------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-6.8.0-39-generic
   root=UUID=22e15533-357f-4af2-970c-ac65df6b9b86
   ro

   ------------------------------------------------------------
15. cpupower frequency-info
   analyzing CPU 270:
     current policy: frequency should be within 1.50 GHz and 2.25 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:  38800MHz

   ------------------------------------------------------------
16. 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
```

(Continued on next page)

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Platform Notes (Continued)

```
  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


  -----------------------------------------------------------
  17. /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


  -----------------------------------------------------------
  18. /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


  -----------------------------------------------------------
  19. OS release
    From /etc/*-release /etc/*-version
    os-release Ubuntu 24.04 LTS


  -----------------------------------------------------------
  20. 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/sda2        ext4  442G  190G  230G  46% /


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


  -----------------------------------------------------------
  22. 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:
      4x Samsung M321R8GA0PB2-CCPEC 64 GB 2 rank 6400
      2x Samsung M321R8GA0PB2-CCPPC 64 GB 2 rank 6400
      6x Samsung M321R8GA0PB2-CCPWC 64 GB 2 rank 6400


  -----------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Lenovo
```

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Platform Notes (Continued)

```
       BIOS Version:      GPE119F-5.20
       BIOS Date:         04/25/2025
       BIOS Revision:     5.20
       Firmware Revision: 8.10
```

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)
```

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Test Date: May-2025
Hardware Availability: Jun-2025
Software Availability: Oct-2024

Compiler Version Notes (Continued)

```
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
```

(Continued on next page)

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Base Optimization Flags (Continued)

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
```

Peak Compiler Invocation

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

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CPU2017 License: 9017		**Test Date:**	May-2025
Test Sponsor:	Lenovo Global Technology	**Hardware Availability:**	Jun-2025
Tested by:	Lenovo Global Technology	**Software Availability:**	Oct-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: 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: basepeak = yes

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:

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Peak Optimization Flags (Continued)

520.omnetpp_r: `basepeak = yes`

523.xalancbmk_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`
`-fvirtual-function-elimination -fvisibility=hidden`
`-mllvm -do-block-reorder=advanced -lamdlibm -lflang`
`-lamdalloc-ext -ldl`

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `basepeak = yes`

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`

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-F.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-F.xml
http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.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 2025-05-07 09:47:44-0400.
Report generated on 2025-06-03 15:44:02 by CPU2017 PDF formatter v6716.
Originally published on 2025-06-03.