SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECrate®2017_int_base =   990
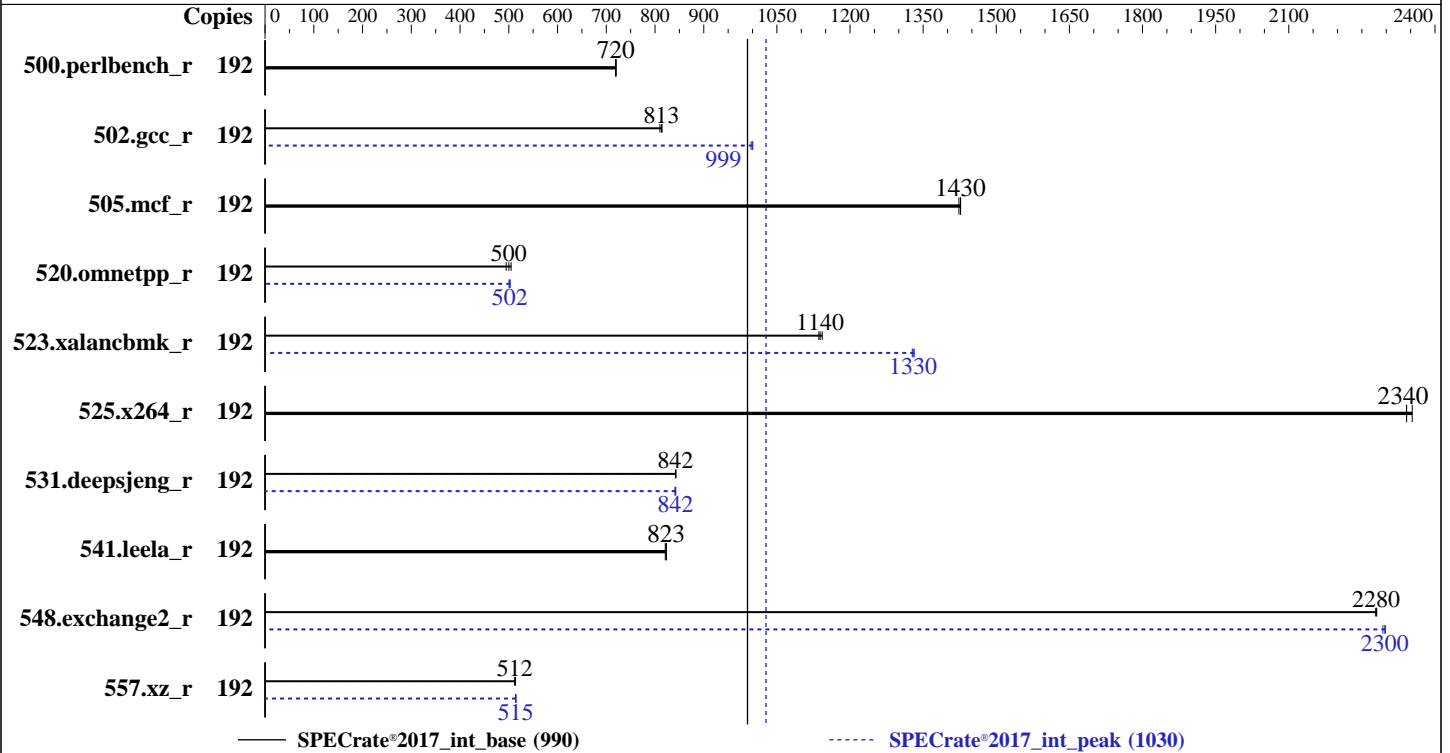
SPECrate®2017_int_peak = 1030

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

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

Copies

Benchmark	Copies	base	peak
500.perlbench_r	192	720	
502.gcc_r	192	813	999
505.mcf_r	192	1430	
520.omnetpp_r	192	500	502
523.xalancbmk_r	192	1140	1330
525.x264_r	192	2340	
531.deepsjeng_r	192	842	842
541.leela_r	192	823	
548.exchange2_r	192	2280	2300
557.xz_r	192	512	515

SPECrate®2017_int_base (990)   SPECrate®2017_int_peak (1030)

Hardware

CPU Name: AMD EPYC 9454
 Max MHz: 3800
 Nominal: 2750
Enabled: 96 cores, 2 chips, 2 threads/core
Orderable: 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 / 6 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 3.2 TB NVME SSD
Other: CPU Cooling: Air

Software

OS: Ubuntu 22.04.4 LTS
 Kernel 5.15.0-112-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Lenovo BIOS Version R5E101H 1.10 released May-2024
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

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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	424	720	425	719	**425**	**720**	192	424	720	425	719	**425**	**720**
502.gcc_r	192	**334**	**813**	336	810	334	814	192	272	1000	**272**	**999**	273	997
505.mcf_r	192	**217**	**1430**	218	1420	217	1430	192	**217**	**1430**	218	1420	217	1430
520.omnetpp_r	192	**504**	**500**	499	505	509	495	192	**502**	**502**	503	500	501	503
523.xalancbmk_r	192	177	1140	**178**	**1140**	178	1140	192	152	1330	**152**	**1330**	153	1330
525.x264_r	192	143	2350	144	2340	**144**	**2340**	192	143	2350	144	2340	**144**	**2340**
531.deepsjeng_r	192	261	842	261	843	**261**	**842**	192	**261**	**842**	261	842	262	841
541.leela_r	192	387	821	386	823	**386**	**823**	192	387	821	386	823	**386**	**823**
548.exchange2_r	192	221	2280	**221**	**2280**	221	2280	192	**219**	**2300**	219	2290	219	2300
557.xz_r	192	404	514	405	512	**405**	**512**	192	403	515	**403**	**515**	404	514
SPECrate®2017_int_base =		**990**												
SPECrate®2017_int_peak =		**1030**												

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) only on request for base runs,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To enable THP for all allocations for peak runs,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
```

(Continued on next page)

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Operating System Notes (Continued)

'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 =
    "/speccpu/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/amd_rate_aocc400_znver4_A_lib/lib:/speccpu/cpu2017-1.1
    .9-amd-aocc400-znver4-A1.2/amd_rate_aocc400_znver4_A_lib/lib32:"
MALLOC_CONF = "retain:true"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:never"
```

General Notes

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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
```

Platform Notes

```
BIOS configuration:
Operating Mode set to Maximum Performance
NUMA Nodes per Socket set to NPS4

 Sysinfo program /speccpu/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on ubuntu2204 Fri Jun 14 19:18:03 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 249 (249.11-0ubuntu3.12)
 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
```

(Continued on next page)

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Platform Notes (Continued)

```
   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 ubuntu2204 5.15.0-112-generic #122-Ubuntu SMP Thu May 23 07:48:21 UTC 2024 x86_64 x86_64 x86_64
     GNU/Linux

   ----------------------------------------------------------
   2. w
      19:18:03 up 59 min,  2 users,  load average: 0.14, 0.03, 0.01
     USER     TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
     spv      tty1     -               18:26   51:54   0.56s  0.01s -bash
     spv      pts/0    -               18:26   19.00s  1.31s  0.54s sudo -i

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

   ----------------------------------------------------------
   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              6190873
     nofiles              1024
     vmemory(kbytes)      unlimited
     locks                unlimited
     rtprio               0

   ----------------------------------------------------------
   5. sysinfo process ancestry
    /sbin/init
    /bin/login -p --
    -bash
    sudo -i
    sudo -i
    -bash
    /bin/bash ./Run025-compliant-amd-rateint.sh
    python3 ./run_amd_rate_aocc400_znver4_A1.py
    /bin/bash ./amd_rate_aocc400_znver4_A1.sh
    runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 intrate
    runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
      --runmode rate --tune base:peak --size test:train:refrate intrate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.009/templogs/preenv.intrate.009.0.log --lognum 009.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
    $SPEC = /speccpu/cpu2017-1.1.9-amd-aocc400-znver4-A1.2
```

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Platform Notes (Continued)

```
        ----------------------------------------------------------
        6. /proc/cpuinfo
           model name      : AMD EPYC 9454 48-Core Processor
           vendor_id       : AuthenticAMD
           cpu family      : 25
           model           : 17
           stepping        : 1
           microcode       : 0xa101144
           bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
           TLB size        : 3584 4K pages
           cpu cores       : 48
           siblings        : 96
           2 physical ids (chips)
           192 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 1: 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
           physical id 1: apicids 128-139,144-155,160-171,176-187,192-203,208-219,224-235,240-251
         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):                192
          On-line CPU(s) list:   0-191
          Vendor ID:             AuthenticAMD
          Model name:            AMD EPYC 9454 48-Core Processor
          CPU family:            25
          Model:                 17
          Thread(s) per core:    2
          Core(s) per socket:    48
          Socket(s):             2
          Stepping:              1
          Frequency boost:       enabled
          CPU max MHz:           3810.7910
          CPU min MHz:           1500.0000
          BogoMIPS:              5491.42
          Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                                 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp
                                 lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf
                                 rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
                                 movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic
                                 cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce
                                 topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3
                                 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall
                                 fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
                                 rdseed adx smap avx512ifma clflushopt clwb avx512cd sha_ni avx512bw
                                 avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
                                 cqm_mbm_total cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru
                                 wbnoinvd amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale
                                 vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic
                                 v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku ospke avx512_vbmi2
                                 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq la57
```

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

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Platform Notes (Continued)

```
                                  rdpid overflow_recov succor smca fsrm flush_l1d
    Virtualization:               AMD-V
    L1d cache:                    3 MiB (96 instances)
    L1i cache:                    3 MiB (96 instances)
    L2 cache:                     96 MiB (96 instances)
    L3 cache:                     512 MiB (16 instances)
    NUMA node(s):                 8
    NUMA node0 CPU(s):            0-11,96-107
    NUMA node1 CPU(s):            12-23,108-119
    NUMA node2 CPU(s):            24-35,120-131
    NUMA node3 CPU(s):            36-47,132-143
    NUMA node4 CPU(s):            48-59,144-155
    NUMA node5 CPU(s):            60-71,156-167
    NUMA node6 CPU(s):            72-83,168-179
    NUMA node7 CPU(s):            84-95,180-191
    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: Mitigation; safe RET
    Vulnerability Spec store bypass:  Mitigation; Speculative Store Bypass disabled via prctl and seccomp
    Vulnerability Spectre v1:         Mitigation; usercopy/swapgs barriers and __user pointer sanitization
    Vulnerability Spectre v2:         Mitigation; Retpolines; IBPB conditional; IBRS_FW; STIBP always-on; RSB
                                      filling; PBRSB-eIBRS Not affected; BHI Not affected
    Vulnerability Srbds:              Not affected
    Vulnerability Tsx async abort:    Not affected

  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL  SETS PHY-LINE COHERENCY-SIZE
      L1d       32K       3M    8 Data             1    64        1             64
      L1i       32K       3M    8 Instruction      1    64        1             64
      L2         1M      96M    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: 8 nodes (0-7)
    node 0 cpus: 0-11,96-107
    node 0 size: 193174 MB
    node 0 free: 192450 MB
    node 1 cpus: 12-23,108-119
    node 1 size: 193529 MB
    node 1 free: 192944 MB
    node 2 cpus: 24-35,120-131
    node 2 size: 193529 MB
    node 2 free: 193005 MB
    node 3 cpus: 36-47,132-143
    node 3 size: 193529 MB
    node 3 free: 192929 MB
    node 4 cpus: 48-59,144-155
    node 4 size: 193529 MB
    node 4 free: 193007 MB
    node 5 cpus: 60-71,156-167
    node 5 size: 193529 MB
    node 5 free: 192968 MB
    node 6 cpus: 72-83,168-179
```

(Continued on next page)

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Platform Notes (Continued)

```
   node 6 size: 193529 MB
   node 6 free: 193007 MB
   node 7 cpus: 84-95,180-191
   node 7 size: 193478 MB
   node 7 free: 192870 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  20  20  20  20  20  20  20
     1:  20  10  20  20  20  20  20  20
     2:  20  20  10  20  20  20  20  20
     3:  20  20  20  10  20  20  20  20
     4:  20  20  20  20  10  20  20  20
     5:  20  20  20  20  20  10  20  20
     6:  20  20  20  20  20  20  10  20
     7:  20  20  20  20  20  20  20  10


  ------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1584980460 kB


  ------------------------------------------------------------
10. who -r
  run-level 5 Jun 14 18:21


  ------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)
  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


  ------------------------------------------------------------
13. Services, from systemctl list-unit-files
  STATE           UNIT FILES
  enabled         ModemManager apparmor blk-availability cloud-config cloud-final cloud-init
                  cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                  grub-common grub-initrd-fallback irqbalance keyboard-setup lvm2-monitor lxd-agent
                  multipathd networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db
                  setvtrgb snapd ssh systemd-networkd systemd-networkd-wait-online systemd-pstore
                  systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                  unattended-upgrades vgauth
  enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
  disabled        console-getty debug-shell ipmievd iscsid nftables rsync serial-getty@
                  systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                  systemd-time-wait-sync upower
  generated       apport openipmi
  indirect        uuidd
  masked          cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo
                  x11-common

  ------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/boot/vmlinuz-5.15.0-112-generic
  root=UUID=e2a91883-1e50-4c69-bb19-9d905b1b613e
  ro

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

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Platform Notes (Continued)

```
 15. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 1.50 GHz and 2.75 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:  2750MHz


   ----------------------------------------------------------------
 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
   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 22.04.4 LTS


   ----------------------------------------------------------------
 20. Disk information
 SPEC is set to: /speccpu/cpu2017-1.1.9-amd-aocc400-znver4-A1.2
   Filesystem      Type  Size  Used Avail Use% Mounted on
```

(Continued on next page)

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Platform Notes (Continued)

```
  /dev/nvme1n1p2 ext4  2.9T   25G  2.7T   1% /


  -------------------------------------------------------------
  21. /sys/devices/virtual/dmi/id
      Vendor:          Lenovo
      Product:         ThinkSystem SR685a V3 System Board
      Product Family:  ThinkSystem
      Serial:          None


  -------------------------------------------------------------
  22. 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 SK Hynix HMCG94MEBRA121N 64 GB 2 rank 4800


  -------------------------------------------------------------
  23. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Lenovo
    BIOS Version:      R5E101H-1.10
    BIOS Date:         05/09/2024
    BIOS Revision:     1.10
    Firmware Revision: 1.10
```

Compiler Version Notes

```
==============================================================================================
C         | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C         | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
          | 557.xz_r(base, peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


==============================================================================================
C         | 502.gcc_r(peak)
----------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


==============================================================================================
```

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Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECrate®2017_int_base =   990

SPECrate®2017_int_peak = 1030

CPU2017 License: 9017   **Test Date:**   Jun-2024
Test Sponsor: Lenovo Global Technology   **Hardware Availability:** May-2024
Tested by: Lenovo Global Technology   **Software Availability:** May-2024

Compiler Version Notes (Continued)

```
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
         | 557.xz_r(base, peak)
-------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------


=================================================================================================
C++      | 523.xalancbmk_r(peak)
-------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------


=================================================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base,
         | peak)
-------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------


=================================================================================================
C++      | 523.xalancbmk_r(peak)
-------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------


=================================================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base,
         | peak)
-------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------


=================================================================================================
Fortran | 548.exchange2_r(base, peak)
-------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------------
```

SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECrate®2017_int_base =   990

SPECrate®2017_int_peak = 1030

Base Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Base Portability Flags

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-DSPEC_LP64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-z muldefs -O3 -march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang
-lamdalloc
```

C++ benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm -lflang
```

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Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECrate®2017_int_base = 990

SPECrate®2017_int_peak = 1030

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

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

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-lamdalloc-ext
```

Fortran benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc
```

Base Other Flags

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

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

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

Peak Compiler Invocation

C benchmarks:
```
clang
```

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

Fortran benchmarks:
```
flang
```

Peak Portability Flags

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

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Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECrate®2017_int_base =   990

SPECrate®2017_int_peak = 1030

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

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

Peak Portability Flags (Continued)

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 -z muldefs -Ofast -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline`
`-lamdalloc`

505.mcf_r: basepeak = yes

525.x264_r: basepeak = yes

557.xz_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math`
`-fstruct-layout=7 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -zopt -lamdlibm`
`-lflang -lamdalloc`

C++ benchmarks:

520.omnetpp_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math`
`-finline-aggressive -mllvm -unroll-threshold=100`
`-mllvm -reduce-array-computations=3 -zopt`
`-fvirtual-function-elimination -fvisibility=hidden`
`-lamdlibm -lamdalloc-ext`

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Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECrate®2017_int_base =   990

SPECrate®2017_int_peak = 1030

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jun-2024

Hardware Availability: May-2024

Software Availability: May-2024

Peak Optimization Flags (Continued)

```
 523.xalancbmk_r: -m32 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-fno-loop-reroll -Ofast -march=znver4 -fveclib=AMDLIBM
-ffast-math -finline-aggressive
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdalloc-ext
```

```
 531.deepsjeng_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext
```

```
 541.leela_r: basepeak = yes
```

Fortran benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc
```

Peak Other Flags

C benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

```
 502.gcc_r: -L/usr/lib32 -Wno-unused-command-line-argument
-L/home/work/cpu2017/v119/aocc4/znver4/rate/amd_rate_aocc400_znver4_A_lib/lib32
```

C++ benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

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Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECrate®2017_int_base =   990

SPECrate®2017_int_peak = 1030

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

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

Peak Other Flags (Continued)

523.xalancbmk_r: `-L/usr/lib32 -Wno-unused-command-line-argument`
`-L/home/work/cpu2017/v119/aocc4/znver4/rate/amd_rate_aocc400_znver4_A_lib/lib32`

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

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-U.html`
`http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.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-Genoa-U.xml`
`http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.xml`

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 2024-06-14 15:18:03-0400.
Report generated on 2024-07-17 11:47:25 by CPU2017 PDF formatter v6716.
Originally published on 2024-07-16.