SPEC CPU®2017 Integer Speed Result

Lenovo Global Technology

ThinkSystem SD665 V3
(2.10 GHz, AMD EPYC 9845)

$SPECspeed^®2017\_int\_base = 16.1$
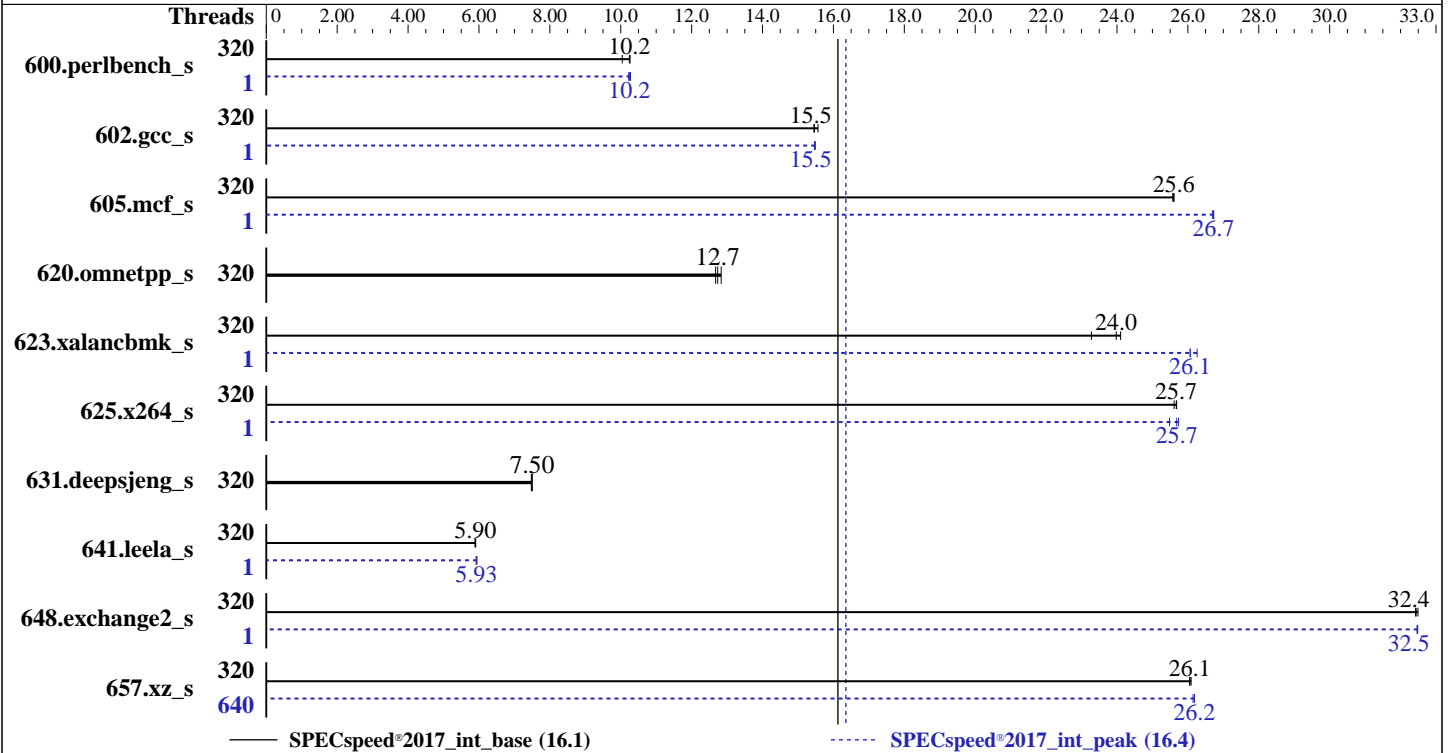
$SPECspeed^®2017\_int\_peak = 16.4$

CPU2017 License: 9017   **Test Date:** Jun-2025
Test Sponsor: Lenovo Global Technology   **Hardware Availability:** Jul-2025
Tested by: Lenovo Global Technology   **Software Availability:** Oct-2024

Threads	0 2.00 4.00 6.00 8.00 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0 33.0
600.perlbench_s	320: 10.2 / 1: 10.2
602.gcc_s	320: 15.5 / 1: 15.5
605.mcf_s	320: 25.6 / 1: 26.7
620.omnetpp_s	320: 12.7
623.xalancbmk_s	320: 24.0 / 1: 26.1
625.x264_s	320: 25.7 / 1: 25.7
631.deepsjeng_s	320: 7.50
641.leela_s	320: 5.90 / 1: 5.93
648.exchange2_s	320: 32.4 / 1: 32.5
657.xz_s	320: 26.1 / 640: 26.2

SPECspeed®2017_int_base (16.1)   SPECspeed®2017_int_peak (16.4)

Hardware

CPU Name: AMD EPYC 9845
 Max MHz: 3700
 Nominal: 2100
Enabled: 320 cores, 2 chips, 2 threads/core
Orderable: 2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 320 MB I+D on chip per chip,
         32 MB shared / 16 cores
 Other: None
Memory: 768 GB (24 x 32 GB 2Rx8 PC5-6400B-R)
Storage: 1 x 3.84 TB NVME SSD
Other: CPU Cooling: DLC

Software

OS: SUSE Linux Enterprise Server 15 SP6
      Kernel 6.4.0-150600.21-default
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Parallel: Yes
Firmware: Lenovo BIOS Version QGE139H 8.21 released May-2025
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: BIOS and OS set to prefer performance at the cost
      of additional power usage

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SPECspeed®2017_int_peak = 16.4

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	320	173	10.3	177	10.0	**173**	**10.2**	1	174	10.2	173	10.3	**173**	**10.2**
602.gcc_s	320	**257**	**15.5**	258	15.5	256	15.6	1	257	15.5	257	15.5	**257**	**15.5**
605.mcf_s	320	184	25.6	185	25.6	**184**	**25.6**	1	177	26.7	**177**	**26.7**	177	26.7
620.omnetpp_s	320	129	12.7	127	12.8	**128**	**12.7**	320	129	12.7	127	12.8	**128**	**12.7**
623.xalancbmk_s	320	58.8	24.1	60.9	23.3	**59.1**	**24.0**	1	54.0	26.3	54.4	26.1	**54.4**	**26.1**
625.x264_s	320	**68.7**	**25.7**	68.7	25.7	68.9	25.6	1	69.2	25.5	68.5	25.7	**68.7**	**25.7**
631.deepsjeng_s	320	**191**	**7.50**	191	7.50	192	7.48	320	**191**	**7.50**	191	7.50	192	7.48
641.leela_s	320	**289**	**5.90**	290	5.89	289	5.91	1	287	5.94	**288**	**5.93**	288	5.92
648.exchange2_s	320	90.5	32.5	90.7	32.4	**90.6**	**32.4**	1	90.6	32.5	**90.5**	**32.5**	90.5	32.5
657.xz_s	320	**237**	**26.1**	237	26.1	237	26.0	640	**236**	**26.2**	236	26.1	236	26.2
SPECspeed®2017_int_base =		**16.1**												
SPECspeed®2017_int_peak =		**16.4**												

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.
```

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

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CPU2017 License: 9017

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Test Date: Jun-2025

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-639"
LD_LIBRARY_PATH =
     "/home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2/amd_speed_aocc500_znver5_A_lib/lib:/home/cpu2017-1.1.9-am
     d-aocc500_znver5_A1.2/amd_speed_aocc500_znver5_A_lib/lib32:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "640"

Environment variables set by runcpu during the 600.perlbench_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 602.gcc_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 605.mcf_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 625.x264_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 641.leela_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 648.exchange2_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-639"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9D64 CPU + 500GiB Memory using Ubuntu 22.04

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
P-State set to Enabled
NUMA Nodes per Socket set to NPS2

 Sysinfo program /home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
```

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Test Date: Jun-2025
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Platform Notes (Continued)

```
running on localhost Wed Jun 11 01:42:32 2025

SUT (System Under Test) info as seen by some common utilities.

------------------------------------------------------------
Table of contents
------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
------------------------------------------------------------


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


------------------------------------------------------------
2. w
   01:42:32 up  3:06,  1 user,  load average: 1.45, 6.07, 4.56
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT


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


------------------------------------------------------------
4. ulimit -a
  core file size          (blocks, -c) unlimited
  data seg size           (kbytes, -d) unlimited
  scheduling priority             (-e) 0
  file size               (blocks, -f) unlimited
  pending signals                 (-i) 3092234
  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
```

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Platform Notes (Continued)

```
   max user processes              (-u) 3092234
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited


   -------------------------------------------------------------
5. sysinfo process ancestry
 /usr/lib/systemd/systemd --switched-root --system --deserialize=42
 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 ./Run035-compliant-amd-speedint.sh
 python3 ./run_amd_speed_aocc500_znver5_A1.py
 /bin/bash ./amd_speed_aocc500_znver5_A1.sh
 runcpu --config amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 intspeed
 runcpu --configfile amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode speed --tune base:peak --size test:train:refspeed intspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.538/templogs/preenv.intspeed.538.0.log --lognum 538.0 --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 9845 160-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       : 160
   siblings        : 320
   2 physical ids (chips)
   640 processors (hardware threads)
   physical id 0: core ids 0-159
   physical id 1: core ids 0-159
   physical id 0: apicids 0-319
   physical id 1: apicids 512-831
  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):                         640
  On-line CPU(s) list:            0-639
  Vendor ID:                      AuthenticAMD
  BIOS Vendor ID:                 Advanced Micro Devices, Inc.
  Model name:                     AMD EPYC 9845 160-Core Processor
  BIOS Model name:                AMD EPYC 9845 160-Core Processor        Unknown CPU @ 2.1GHz
  BIOS CPU family:                107
  CPU family:                     26
  Model:                          17
  Thread(s) per core:             2
```

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Platform Notes (Continued)

```
Core(s) per socket:              160
Socket(s):                       2
Stepping:                        0
Frequency boost:                 enabled
CPU(s) scaling MHz:              101%
CPU max MHz:                     2100.0000
CPU min MHz:                     1500.0000
BogoMIPS:                        4199.98
Flags:                           fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat
                                 pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb
                                 rdtscp lm constant_tsc rep_good amd_lbr_v2 nopl nonstop_tsc cpuid
                                 extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid
                                 sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand lahf_lm
                                 cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
                                 osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext
                                 perfctr_llc mwaitx cpb cat_l3 cdp_l3 hw_pstate ssbd mba perfmon_v2
                                 ibrs ibpb stibp ibrs_enhanced vmmcall fsgsbase tsc_adjust bmi1 avx2
                                 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
                                 avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
                                 xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                                 cqm_mbm_local user_shstk avx_vnni avx512_bf16 clzero irperf
                                 xsaveerptr rdpru wbnoinvd amd_ppin cppc arat npt lbrv svm_lock
                                 nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                                 pfthreshold avic v_vmsave_vmload vgif x2avic v_spec_ctrl vnmi
                                 avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
                                 avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdpid bus_lock_detect
                                 movdiri movdir64b overflow_recov succor smca fsrm avx512_vp2intersect
                                 flush_l1d debug_swap
Virtualization:                  AMD-V
L1d cache:                       15 MiB (320 instances)
L1i cache:                       10 MiB (320 instances)
L2 cache:                        320 MiB (320 instances)
L3 cache:                        640 MiB (20 instances)
NUMA node(s):                    4
NUMA node0 CPU(s):               0-79,320-399
NUMA node1 CPU(s):               80-159,400-479
NUMA node2 CPU(s):               160-239,480-559
NUMA node3 CPU(s):               240-319,560-639
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      15M   12 Data             1    64        1             64
    L1i       32K      10M    8 Instruction      1    64        1             64
    L2         1M     320M   16 Unified          2  1024        1             64
    L3        32M     640M   16 Unified          3 32768        1             64
```

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Platform Notes (Continued)

```
        --------------------------------------------------------------
        8. numactl --hardware
        NOTE: a numactl 'node' might or might not correspond to a physical chip.
          available: 4 nodes (0-3)
          node 0 cpus: 0-79,320-399
          node 0 size: 192878 MB
          node 0 free: 192001 MB
          node 1 cpus: 80-159,400-479
          node 1 size: 193494 MB
          node 1 free: 191969 MB
          node 2 cpus: 160-239,480-559
          node 2 size: 193455 MB
          node 2 free: 192937 MB
          node 3 cpus: 240-319,560-639
          node 3 size: 193256 MB
          node 3 free: 192786 MB
          node distances:
          node   0   1   2   3
            0:  10  12  32  32
            1:  12  10  32  32
            2:  32  32  10  12
            3:  32  32  12  10


        --------------------------------------------------------------
        9. /proc/meminfo
           MemTotal:       791639044 kB


        --------------------------------------------------------------
        10. who -r
          run-level 3 Jun 10 22:36


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


        --------------------------------------------------------------
        12. Services, from systemctl list-unit-files
          STATE           UNIT FILES
          enabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ irqbalance issue-generator
                          kbdsettings klog lvm2-monitor nscd nvmefc-boot-connections nvmf-autoconnect postfix
                          purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4
                          wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
          enabled-runtime systemd-remount-fs
          disabled        autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                          chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                          firewalld fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievd issue-add-ssh-keys
                          kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd
                          serial-getty@ smartd_generate_opts snmpd snmptrapd systemd-boot-check-no-failures
                          systemd-confext systemd-network-generator systemd-sysext systemd-time-wait-sync
                          systemd-timesyncd
          indirect        systemd-userdbd wickedd


        --------------------------------------------------------------
        13. Linux kernel boot-time arguments, from /proc/cmdline
          BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
          root=UUID=9444ad63-6600-41de-9db7-026811eaf134
          splash=silent
          mitigations=auto
```

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Platform Notes (Continued)

```
    quiet
    security=apparmor


    -----------------------------------------------------------
    14. cpupower frequency-info
      analyzing CPU 383:
        current policy: frequency should be within 1.50 GHz and 2.10 GHz.
                        The governor "performance" may decide which speed to use
                        within this range.
        boost state support:
          Supported: yes
          Active: yes


    -----------------------------------------------------------
    15. sysctl
      kernel.numa_balancing             1
      kernel.randomize_va_space         0
      vm.compaction_proactiveness       20
      vm.dirty_background_bytes         0
      vm.dirty_background_ratio         10
      vm.dirty_bytes                    0
      vm.dirty_expire_centisecs         3000
      vm.dirty_ratio                    8
      vm.dirty_writeback_centisecs      500
      vm.dirtytime_expire_seconds       43200
      vm.extfrag_threshold              500
      vm.min_unmapped_ratio             1
      vm.nr_hugepages                   0
      vm.nr_hugepages_mempolicy         0
      vm.nr_overcommit_hugepages        0
      vm.swappiness                     1
      vm.watermark_boost_factor         15000
      vm.watermark_scale_factor         10
      vm.zone_reclaim_mode              1


    -----------------------------------------------------------
    16. /sys/kernel/mm/transparent_hugepage
      defrag          [always] defer defer+madvise madvise never
      enabled         [always] madvise never
      hpage_pmd_size  2097152
      shmem_enabled   always within_size advise [never] deny force


    -----------------------------------------------------------
    17. /sys/kernel/mm/transparent_hugepage/khugepaged
      alloc_sleep_millisecs   60000
      defrag                      1
      max_ptes_none             511
      max_ptes_shared           256
      max_ptes_swap              64
      pages_to_scan            4096
      scan_sleep_millisecs    10000


    -----------------------------------------------------------
    18. OS release
      From /etc/*-release /etc/*-version
      os-release SUSE Linux Enterprise Server 15 SP6


    -----------------------------------------------------------
    19. Disk information
    SPEC is set to: /home/cpu2017-1.1.9-amd-aocc500_znver5_A1.2
```

(Continued on next page)

Lenovo Global Technology

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Hardware Availability: Jul-2025
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Platform Notes (Continued)

```
  Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/nvme0n1p3 xfs   3.5T   99G  3.4T   3% /


  -------------------------------------------------------------
  20. /sys/devices/virtual/dmi/id
     Vendor:         Lenovo
     Product:        ThinkSystem SD665 V3
     Product Family: ThinkSystem
     Serial:         1234567890


  -------------------------------------------------------------
  21. dmidecode
    Additional information from dmidecode 3.4 follows.  WARNING: Use caution when you interpret this section.
    The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
    determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
    "DMTF SMBIOS" standard.
    Memory:
      12x SK Hynix HMCG88AHBRA471N 32 GB 2 rank 6400
      2x SK Hynix HMCG88AHBRA472N 32 GB 2 rank 6400
      10x SK Hynix HMCG88AHBRA478N 32 GB 2 rank 6400



  -------------------------------------------------------------
  22. BIOS
  (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:      Lenovo
     BIOS Version:     QGE139H-8.21
     BIOS Date:        05/14/2025
     BIOS Revision:    8.21
     Firmware Revision: 13.10
```

Compiler Version Notes

```
==============================================================================================
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)
        | 657.xz_s(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++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
        | 641.leela_s(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 | 648.exchange2_s(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
```

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Lenovo Global Technology

ThinkSystem SD665 V3
(2.10 GHz, AMD EPYC 9845)

SPECspeed®2017_int_base = 16.1

SPECspeed®2017_int_peak = 16.4

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

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

Compiler Version Notes (Continued)

```
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

600.perlbench_s: `-DSPEC_LINUX_X64 -DSPEC_LP64`
602.gcc_s: `-DSPEC_LP64`
605.mcf_s: `-DSPEC_LP64`
620.omnetpp_s: `-DSPEC_LP64`
623.xalancbmk_s: `-DSPEC_LINUX -DSPEC_LP64`
625.x264_s: `-DSPEC_LP64`
631.deepsjeng_s: `-DSPEC_LP64`
641.leela_s: `-DSPEC_LP64`
648.exchange2_s: `-DSPEC_LP64`
657.xz_s: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -Wl,-mllvm -Wl,-extra-inliner -O3
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP
-flto -fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp -lamdlibm
-lflang -lamdalloc
```

C++ benchmarks:
```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver5
```

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Lenovo Global Technology

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -mllvm -unroll-threshold=100 -zopt
-fvirtual-function-elimination -fvisibility=hidden -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc-ext
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-iv-split -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -O3 -march=znver5 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc
```

Base Other Flags

C benchmarks:
```
-Wno-return-type -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
```

SPEC CPU®2017 Integer Speed Result

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Lenovo Global Technology

ThinkSystem SD665 V3
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Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

602.gcc_s: `Same as 600.perlbench_s`

```
605.mcf_s: -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 -fopenmp -flto
-DSPEC_OPENMP -fremap-arrays -fstrip-mining
-fstruct-layout=9 -mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

625.x264_s: `Same as 600.perlbench_s`

657.xz_s: `Same as 600.perlbench_s`

C++ benchmarks:

620.omnetpp_s: `basepeak = yes`

```
623.xalancbmk_s: -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 -fopenmp
-flto -DSPEC_OPENMP -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=100 -zopt
```

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Peak Optimization Flags (Continued)

623.xalancbmk_s (continued):
```
-fvirtual-function-elimination -fvisibility=hidden
-mllvm -do-block-reorder=advanced -fopenmp=libomp -lomp
-lamdlibm -lamdalloc-ext -lflang
```

631.deepsjeng_s: basepeak = yes

641.leela_s: -m64 -std=c++14
```
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -DSPEC_OPENMP -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=100 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-iv-split -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -O3 -march=znver5 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

Peak Other Flags

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

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

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

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/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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Software Availability: Oct-2024

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

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