



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SD665 V3
(2.75 GHz,AMD EPYC 9454)

SPECspeed®2017_int_base = 14.3

SPECspeed®2017_int_peak = 14.5

CPU2017 License: 9017

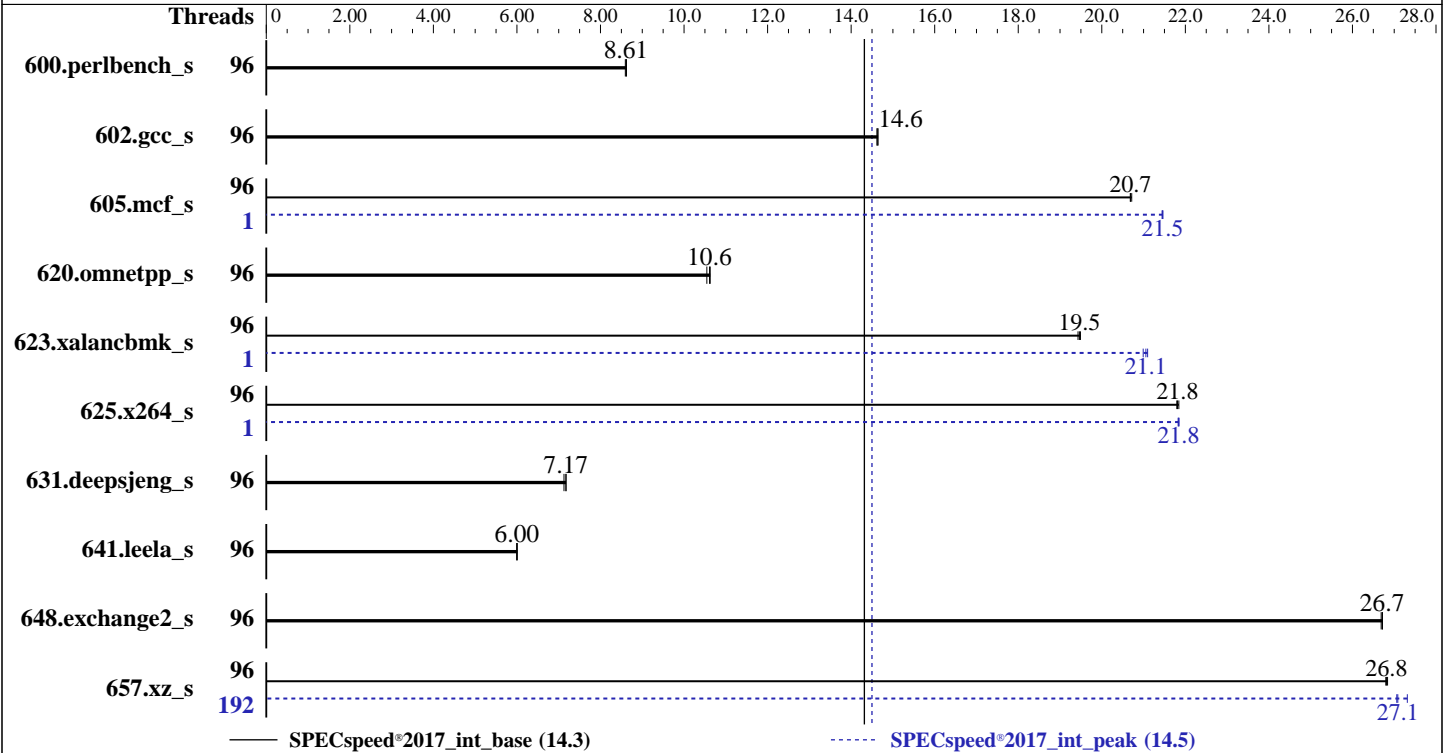
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Feb-2023

Hardware Availability: Feb-2023

Software Availability: Nov-2022



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: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
 Storage: 1 x 3.84 TB NVME SSD
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 Kernel 5.14.21-150400.22-default
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
 Parallel: Yes
 Firmware: Lenovo BIOS Version QGE109D 1.20 released Jan-2023
 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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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	96	206	8.61	206	8.62	207	8.59	96	206	8.61	206	8.62	207	8.59
602.gcc_s	96	272	14.6	272	14.6	272	14.6	96	272	14.6	272	14.6	272	14.6
605.mcf_s	96	228	20.7	228	20.7	228	20.7	1	220	21.4	220	21.5	220	21.5
620.omnetpp_s	96	154	10.6	155	10.5	153	10.6	96	154	10.6	155	10.5	153	10.6
623.xalancbmk_s	96	72.7	19.5	72.8	19.5	72.9	19.4	1	67.2	21.1	67.5	21.0	67.3	21.1
625.x264_s	96	80.9	21.8	80.9	21.8	80.8	21.8	1	80.7	21.8	80.8	21.8	80.8	21.8
631.deepsjeng_s	96	200	7.17	200	7.18	201	7.13	96	200	7.17	200	7.18	201	7.13
641.leela_s	96	285	6.00	284	6.00	284	6.01	96	285	6.00	284	6.00	284	6.01
648.exchange2_s	96	110	26.7	110	26.7	110	26.7	96	110	26.7	110	26.7	110	26.7
657.xz_s	96	231	26.8	231	26.8	230	26.8	192	228	27.1	228	27.1	226	27.3

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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.

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Operating System Notes (Continued)

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

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-191"
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.9-amd-aocc400-genoa-B1e/amd_speed_aocc400_genoa_B_lib
/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "192"

Environment variables set by runcpu during the 605.mcf_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 625.x264_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-191"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "8"

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.



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Platform Notes

BIOS configuration:

Operating Mode set to Maximum Performance and then set it to Custom Mode

NUMA Nodes per Socket set to NPS4

Sysinfo program /home/cpu2017-1.1.9-amd-aocc400-genoa-Ble/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on localhost Fri Feb 10 19:51:43 2023

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+suse.124.g2bc0b2c447)
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 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
19:51:43 up 2 min,  1 user,  load average: 1.37, 2.10, 0.97
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU   WHAT
root     ttyl      -             19:50    21.00s  1.09s  0.12s  /bin/bash ./amd_speed_aocc400_genoa_B1.sh
```

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Platform Notes (Continued)

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) 3094046
max locked memory       (kbytes, -l) 2097152
max memory size         (kbytes, -m) unlimited
open files               (-n) 1024
pipe size                (512 bytes, -p) 8
POSIX message queues    (bytes, -q) 819200
real-time priority      (-r) 0
stack size               (kbytes, -s) unlimited
cpu time                 (seconds, -t) unlimited
max user processes      (-u) 3094046
virtual memory          (kbytes, -v) unlimited
file locks               (-x) unlimited
```

5. sysinfo process ancestry

```
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
/bin/bash ./run_SD665V3_genoa.sh
/bin/bash ./Run035-compliant-amd-speedint.sh
python3 ./run_amd_speed_aocc400_genoa_B1.py
/bin/bash ./amd_speed_aocc400_genoa_B1.sh
runcpu --config amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 intspeer
runcpu --configfile amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train:refspeed intspeer --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.003/templogs/preenv.intspeer.003.0.log --lognum 003.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-amd-aocc400-genoa-B1e
```

6. /proc/cpuinfo

```
model name      : AMD EPYC 9454 48-Core Processor
vendor_id       : AuthenticAMD
cpu family      : 25
model           : 17
stepping        : 1
```

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Platform Notes (Continued)

```

microcode      : 0xa101111
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
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:               5499.62

```

```

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

```

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Platform Notes (Continued)

avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
pausefilter pftthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi
umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_11d

```

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 Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
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
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: 96504 MB
node 0 free: 94511 MB
node 1 cpus: 12-23,108-119
node 1 size: 96752 MB
node 1 free: 96316 MB

```

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Platform Notes (Continued)

```

node 2 cpus: 24-35,120-131
node 2 size: 96752 MB
node 2 free: 96433 MB
node 3 cpus: 36-47,132-143
node 3 size: 96717 MB
node 3 free: 96372 MB
node 4 cpus: 48-59,144-155
node 4 size: 96752 MB
node 4 free: 96491 MB
node 5 cpus: 60-71,156-167
node 5 size: 96752 MB
node 5 free: 96407 MB
node 6 cpus: 72-83,168-179
node 6 size: 96752 MB
node 6 free: 96307 MB
node 7 cpus: 84-95,180-191
node 7 size: 96553 MB
node 7 free: 96210 MB
node distances:
node  0  1  2  3  4  5  6  7
0:  10 12 12 12 32 32 32 32
1:  12 10 12 12 32 32 32 32
2:  12 12 10 12 32 32 32 32
3:  12 12 12 10 32 32 32 32
4:  32 32 32 32 10 12 12 12
5:  32 32 32 32 12 10 12 12
6:  32 32 32 32 12 12 10 12
7:  32 32 32 32 12 12 12 10

```

```

-----
9. /proc/meminfo
   MemTotal:          792100484 kB

```

```

-----
10. who -r
    run-level 3 Feb 10 19:49

```

```

-----
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
    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@ haveged irqbalance
                   issue-generator kbdsettings klog lvm2-monitor nscd nvme-fc-boot-connections postfix

```

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Platform Notes (Continued)

```

purge-kernels rollback rsyslog smartd sshd 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 ebttables exchange-bmc-os-info
                  firewallld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                  issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap
                  nvmmf-autoconnect rdisc rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts
                  snmpd snmptrapd systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                  systemd-time-wait-sync systemd-timesyncd
indirect          wickedd

```

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=9967e7c1-1dd8-42c0-9234-ca3fa2c502ae
splash=silent
mitigations=auto
quiet
security=apparmor

```

```

-----
14. 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

```

```

-----
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

```

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Platform Notes (Continued)

```

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 SP4

```

```

-----
19. Disk information
SPEC is set to: /home/cpu2017-1.1.9-amd-aocc400-genoa-Ble
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/nvme0n1p3 xfs   3.5T  95G  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 3.2 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.

```

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Platform Notes (Continued)

Memory:

- 3x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800
- 4x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800
- 17x Samsung M321R4GA3BB6-CQKVG 32 GB 2 rank 4800

22. BIOS

(This section combines info from /sys/devices and dmidecode.)

```

BIOS Vendor:      Lenovo
BIOS Version:    QGE109D-1.20
BIOS Date:       01/19/2023
BIOS Revision:   1.20
Firmware Revision: 0.90

```

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 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)

Target: x86_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)

Target: x86_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

```

=====
Fortran | 648.exchange2_s(base, peak)
-----

```

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)

Target: x86_64-unknown-linux-gnu

Thread model: posix

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SPEC CPU®2017 Integer Speed Result

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Lenovo Global Technology

SPECspeed®2017_int_base = 14.3

ThinkSystem SD665 V3
(2.75 GHz,AMD EPYC 9454)

SPECspeed®2017_int_peak = 14.5

CPU2017 License: 9017

Test Date: Feb-2023

Test Sponsor: Lenovo Global Technology

Hardware Availability: Feb-2023

Tested by: Lenovo Global Technology

Software Availability: Nov-2022

Compiler Version Notes (Continued)

InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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 -O3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lflang
-lamdalloc

C++ benchmarks:

-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

(Continued on next page)



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Tested by: Lenovo Global Technology

Software Availability: Nov-2022

Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -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,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver4 -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
```



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Lenovo Global Technology

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SPECspeed®2017_int_peak = 14.5

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Feb-2023

Hardware Availability: Feb-2023

Software Availability: Nov-2022

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench_s: basepeak = yes

602.gcc_s: basepeak = yes

605.mcf_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto
-fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

625.x264_s: Same as 605.mcf_s

657.xz_s: Same as 605.mcf_s

C++ benchmarks:

620.omnetpp_s: basepeak = yes

623.xalancbmk_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=aggressive -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-fopenmp=libomp -lomp -lamdlibm -lamdalloc-ext -lflang

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:

(Continued on next page)



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Test Date: Feb-2023

Hardware Availability: Feb-2023

Software Availability: Nov-2022

Peak Optimization Flags (Continued)

648.exchange2_s:basepeak = yes

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-Genoa-Q.html>

<http://www.spec.org/cpu2017/flags/aocc400-flags.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-Q.xml>

<http://www.spec.org/cpu2017/flags/aocc400-flags.xml>

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