



# SPEC CPU®2017 Floating Point Speed Result

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## Lenovo Global Technology

ThinkSystem SR665 V3  
(3.55 GHz, AMD EPYC 9184X)

SPECspeed®2017\_fp\_base = 270

SPECspeed®2017\_fp\_peak = 292

CPU2017 License: 9017

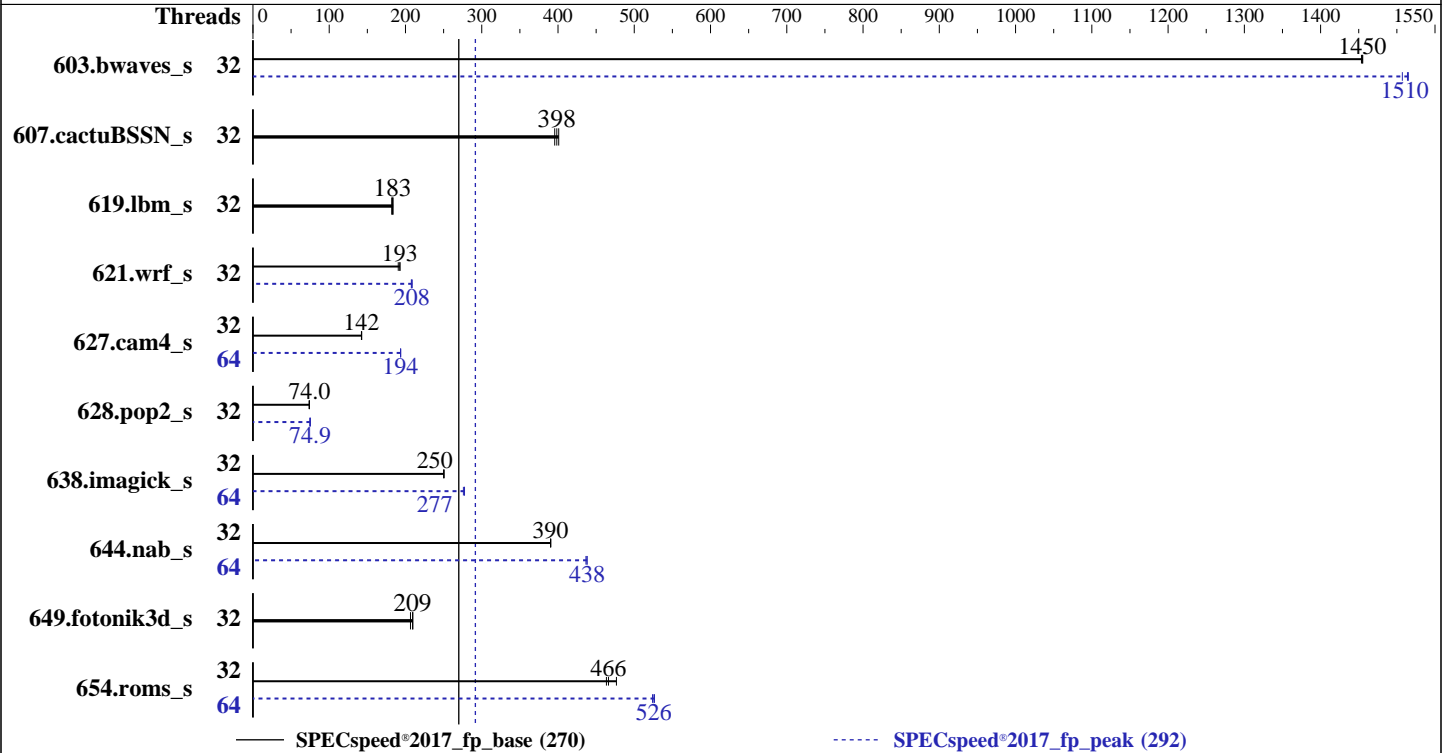
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Nov-2023

Hardware Availability: Dec-2023

Software Availability: Jun-2023



### Hardware

CPU Name: AMD EPYC 9184X  
 Max MHz: 4200  
 Nominal: 3550  
 Enabled: 32 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 768 MB I+D on chip per chip,  
 96 MB shared / 2 cores  
 Other: None  
 Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)  
 Storage: 1 x 480 GB SATA SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP5  
 Kernel 5.14.21-150500.53-default  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: Yes  
 Firmware: Lenovo BIOS Version KAE115K 3.10 released Oct-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
603.bwaves_s	32	40.6	1450	<b><u>40.6</u></b>	<b><u>1450</u></b>	40.5	1460	32	39.1	1510	<b><u>39.0</u></b>	<b><u>1510</u></b>	38.9	1520
607.cactuBSSN_s	32	<b><u>41.8</u></b>	<b><u>398</u></b>	41.6	401	42.1	396	32	<b><u>41.8</u></b>	<b><u>398</u></b>	41.6	401	42.1	396
619.lbm_s	32	<b><u>28.6</u></b>	<b><u>183</u></b>	28.8	182	28.5	184	32	<b><u>28.6</u></b>	<b><u>183</u></b>	28.8	182	28.5	184
621.wrf_s	32	68.6	193	69.4	191	<b><u>68.6</u></b>	<b><u>193</u></b>	32	63.3	209	<b><u>63.5</u></b>	<b><u>208</u></b>	63.7	208
627.cam4_s	32	62.1	143	62.3	142	<b><u>62.3</u></b>	<b><u>142</u></b>	64	45.8	194	45.8	194	<b><u>45.8</u></b>	<b><u>194</u></b>
628.pop2_s	32	161	73.7	160	74.1	<b><u>161</u></b>	<b><u>74.0</u></b>	32	158	75.3	<b><u>158</u></b>	<b><u>74.9</u></b>	159	74.6
638.imagick_s	32	57.6	250	<b><u>57.6</u></b>	<b><u>250</u></b>	57.6	250	64	<b><u>52.0</u></b>	<b><u>277</u></b>	52.0	277	52.3	276
644.nab_s	32	<b><u>44.8</u></b>	<b><u>390</u></b>	44.8	390	44.7	391	64	39.9	438	<b><u>39.9</u></b>	<b><u>438</u></b>	40.0	437
649.fotonik3d_s	32	<b><u>43.6</u></b>	<b><u>209</u></b>	43.5	210	44.1	207	32	<b><u>43.6</u></b>	<b><u>209</u></b>	43.5	210	44.1	207
654.roms_s	32	33.0	477	34.0	464	<b><u>33.8</u></b>	<b><u>466</u></b>	64	30.1	524	29.9	527	<b><u>29.9</u></b>	<b><u>526</u></b>

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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.

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.

To always enable THP for peak runs of:  
603.bwaves\_s, 607.cactuBSSN\_s, 619.lbm\_s, 627.cam4\_s, 628.pop2\_s, 638.imagick\_s, 644.nab\_s, 649.fotonik3d\_s:  
'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled; echo always > /sys/kernel/mm/transparent\_hugepage/defrag'  
run as root.  
To disable THP for peak runs of 621.wrf\_s:

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### Operating System Notes (Continued)

```
'echo never > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
To enable THP only on request for peak runs of 654.roms_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo madvise > /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 = "0-63"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/amd_speed_aocc400_znver4_A_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 = "64"
```

Environment variables set by runcpu during the 603.bwaves\_s peak run:

```
GOMP_CPU_AFFINITY = "0-31"
```

Environment variables set by runcpu during the 621.wrf\_s peak run:

```
GOMP_CPU_AFFINITY = "0-31"
```

Environment variables set by runcpu during the 627.cam4\_s peak run:

```
GOMP_CPU_AFFINITY = "0-63"
```

Environment variables set by runcpu during the 628.pop2\_s peak run:

```
GOMP_CPU_AFFINITY = "0-31"
```

Environment variables set by runcpu during the 638.imagick\_s peak run:

```
GOMP_CPU_AFFINITY = "0-63"
```

Environment variables set by runcpu during the 644.nab\_s peak run:

```
GOMP_CPU_AFFINITY = "0-63"
```

Environment variables set by runcpu during the 654.roms\_s peak run:

```
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42 11 43 12 44 13 45 14 46 15 47
16 48 17 49 18 50 19 51 20 52 21 53 22 54 23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"
```

### 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

Sysinfo program /home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost Sun Nov 26 20:56:54 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 (249.16+suse.171.gdad0071f15)
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 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
x86_64 x86_64 x86_64 GNU/Linux
```

```
2. w
20:56:54 up 4:10, 2 users, load average: 20.36, 37.50, 39.32
USER   TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
root   tty1      -                 16:47    3:04m  0.97s  0.07s /bin/bash ./amd_speed_aocc400_znver4_A1.sh
root   tty2      -                 19:00    46:41  0.02s  0.02s -bash
```

```
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) 3094787
max locked memory       (kbytes, -l) 2097152
```

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### Platform Notes (Continued)

```

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) 3094787
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_SR665V3_genoa-X_1.02.sh
/bin/bash ./Run036-compliant-amd-speedfp.sh
python3 ./run_amd_speed_aocc400_znver4_A1.py
/bin/bash ./amd_speed_aocc400_znver4_A1.sh
runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fpspeed
runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.232/templogs/preenv.fpspeed.232.0.log --lognum 232.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2

```

#### 6. /proc/cpuinfo

```

model name      : AMD EPYC 9184X 16-Core Processor
vendor_id       : AuthenticAMD
cpu family      : 25
model           : 17
stepping        : 2
microcode       : 0xa10123e
bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size        : 3584 4K pages
cpu cores       : 16
siblings        : 32
2 physical ids (chips)
64 processors (hardware threads)
physical id 0:  core ids 0-1,8-9,16-17,24-25,32-33,40-41,48-49,56-57
physical id 1:  core ids 0-1,8-9,16-17,24-25,32-33,40-41,48-49,56-57
physical id 0:  apicids 0-3,16-19,32-35,48-51,64-67,80-83,96-99,112-115
physical id 1:  apicids 128-131,144-147,160-163,176-179,192-195,208-211,224-227,240-243

```

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

#### 7. lscpu

From lscpu from util-linux 2.37.4:

```

Architecture:      x86_64
CPU op-mode(s):    32-bit, 64-bit
Address sizes:      52 bits physical, 57 bits virtual
Byte Order:         Little Endian
CPU(s):             64
On-line CPU(s) list: 0-63
Vendor ID:          AuthenticAMD
Model name:         AMD EPYC 9184X 16-Core Processor

```

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### Platform Notes (Continued)

```

CPU family:                25
Model:                     17
Thread(s) per core:       2
Core(s) per socket:      16
Socket(s):                 2
Stepping:                 2
Frequency boost:          enabled
CPU max MHz:              4208.6909
CPU min MHz:              1500.0000
BogoMIPS:                 7089.01
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 sse3 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 perfmon_v2 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_omsave_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_l1d
AMD-V
Virtualization:           AMD-V
L1d cache:               1 MiB (32 instances)
L1i cache:               1 MiB (32 instances)
L2 cache:                32 MiB (32 instances)
L3 cache:                1.5 GiB (16 instances)
NUMA node(s):            2
NUMA node0 CPU(s):      0-15,32-47
NUMA node1 CPU(s):      16-31,48-63
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 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, PBRSE-eIBRS Not affected
Vulnerability Srbds:    Not affected
Vulnerability Tsx async abort: Not affected

```

```

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE          LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d   32K      1M      8 Data          1      64      1             64
L1i   32K      1M      8 Instruction   1      64      1             64
L2    1M       32M     8 Unified       2    2048     1             64
L3    96M     1.5G    16 Unified       3   98304     1             64

```

```

-----
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0-15,32-47

```

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### Platform Notes (Continued)

```
node 0 size: 386727 MB
node 0 free: 385900 MB
node 1 cpus: 16-31,48-63
node 1 size: 386999 MB
node 1 free: 386115 MB
node distances:
node  0  1
  0:  10  32
  1:  32  10
```

```
-----
9. /proc/meminfo
   MemTotal:      792297116 kB
```

```
-----
10. who -r
    run-level 3 Nov 26 16:47
```

```
-----
11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
    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 postfix purge-kernels rollback rsyslog smartd sshd
systemd-pstore 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
firewalld gpm grub2-once haveged haveged-switch-root 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-network-generator systemd-sysext
systemd-time-wait-sync systemd-timesyncd
generated ntp_sync
indirect wickedd
```

```
-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
root=UUID=5c910b1f-682a-4d6d-8760-ecffd555ecb9
splash=silent
mitigations=auto
quiet
security=apparmor
```

```
-----
14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 1.50 GHz and 3.55 GHz.
                       The governor "performance" may decide which speed to use
                       within this range.

    boost state support:
      Supported: yes
      Active: yes
```

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### Platform Notes (Continued)

#### 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+advise advise 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 SP5

```

#### 19. Disk information

SPEC is set to: /home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2

```

Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/md126p3  xfs  442G  26G  417G   6% /

```

#### 20. /sys/devices/virtual/dmi/id

```

Vendor:      Lenovo
Product:     ThinkSystem SR665 V3 MB,Genoa,Kauai,DDR5,Kauai,2U
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

(Continued on next page)





# SPEC CPU®2017 Floating Point Speed Result

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## Lenovo Global Technology

ThinkSystem SR665 V3  
(3.55 GHz, AMD EPYC 9184X)

SPECspeed®2017\_fp\_base = 270

SPECspeed®2017\_fp\_peak = 292

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

**Test Date:** Nov-2023  
**Hardware Availability:** Dec-2023  
**Software Availability:** Jun-2023

### Platform Notes (Continued)

determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:

1x SK Hynix HMC88AEBRA107N 32 GB 2 rank 4800  
23x SK Hynix HMC88AEBRA168N 32 GB 2 rank 4800

#### 22. BIOS

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

BIOS Vendor: Lenovo  
BIOS Version: KAE115K-3.10  
BIOS Date: 10/27/2023  
BIOS Revision: 3.10  
Firmware Revision: 2.30

### Compiler Version Notes

C | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak) 644.nab\_s(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++, C, Fortran | 607.cactuBSSN\_s(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  
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  
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 | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak) 654.roms\_s(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, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak) 628.pop2\_s(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

(Continued on next page)



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CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Nov-2023

Hardware Availability: Dec-2023

Software Availability: Jun-2023

## Compiler Version Notes (Continued)

InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
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

## Base Compiler Invocation

C benchmarks:

clang

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Base Portability Flags

603.bwaves\_s: -DSPEC\_LP64  
607.cactuBSSN\_s: -DSPEC\_LP64  
619.lbm\_s: -DSPEC\_LP64  
621.wrf\_s: -DSPEC\_CASE\_FLAG -Mbyteswapio -DSPEC\_LP64  
627.cam4\_s: -DSPEC\_CASE\_FLAG -DSPEC\_LP64  
628.pop2\_s: -DSPEC\_CASE\_FLAG -Mbyteswapio -DSPEC\_LP64  
638.imagick\_s: -DSPEC\_LP64  
644.nab\_s: -DSPEC\_LP64  
649.fotonik3d\_s: -DSPEC\_LP64  
654.roms\_s: -DSPEC\_LP64

## Base Optimization Flags

C benchmarks:

-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -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 -lamdalloc

(Continued on next page)



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## Lenovo Global Technology

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CPU2017 License: 9017

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Test Sponsor: Lenovo Global Technology

Hardware Availability: Dec-2023

Tested by: Lenovo Global Technology

Software Availability: Jun-2023

## Base Optimization Flags (Continued)

C benchmarks (continued):

-lflang

Fortran benchmarks:

-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC\_OPENMP -O3 -march=znver4  
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -Mrecursive  
-funroll-loops -mllvm -lsr-in-nested-loop  
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp  
-lamdlibm -lamdallic -lflang

Benchmarks using both Fortran and C:

-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching -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 -Mrecursive -funroll-loops  
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdallic  
-lflang

Benchmarks using Fortran, C, and C++:

-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -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 -mllvm -unroll-threshold=100 -finline-aggressive  
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops  
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdallic  
-lflang

## Base Other Flags

C benchmarks:

-Wno-return-type -Wno-unused-command-line-argument

Fortran benchmarks:

-Wno-unused-command-line-argument

(Continued on next page)



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**Software Availability:** Jun-2023

## Base Other Flags (Continued)

Benchmarks using both Fortran and C:

-Wno-return-type -Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:

-Wno-return-type -Wno-unused-command-line-argument

## Peak Compiler Invocation

C benchmarks:

clang

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm\_s: basepeak = yes

638.imagick\_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -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

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Hardware Availability: Dec-2023

Tested by: Lenovo Global Technology

Software Availability: Jun-2023

## Peak Optimization Flags (Continued)

```
644.nab_s: -m64 -Wl,-mllvm -Wl,-region-vectorize -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Fortran benchmarks:

```
603.bwaves_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

649.fotonik3d\_s: basepeak = yes

654.roms\_s: Same as 603.bwaves\_s

Benchmarks using both Fortran and C:

```
621.wrf_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-O3 -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

```
627.cam4_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

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SPECspeed®2017\_fp\_peak = 292

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

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Test Date: Nov-2023

Hardware Availability: Dec-2023

Software Availability: Jun-2023

## Peak Optimization Flags (Continued)

```
628.pop2_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:

```
607.cactuBSSN_s: basepeak = yes
```

## Peak Other Flags

C benchmarks:

```
-Wno-return-type -Wno-unused-command-line-argument
```

Fortran benchmarks:

```
-Wno-unused-command-line-argument
```

Benchmarks using both Fortran and C:

```
-Wno-return-type -Wno-unused-command-line-argument
```

Benchmarks using Fortran, C, and C++:

```
-Wno-return-type -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-T.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-T.xml>

<http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.xml>

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Tested with SPEC CPU®2017 v1.1.9 on 2023-11-26 07:56:54-0500.

Report generated on 2023-12-20 13:12:46 by CPU2017 PDF formatter v6716.

Originally published on 2023-12-20.