



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

## Lenovo Global Technology ThinkSystem SR655 V3 (2.60 GHz, AMD EPYC 9655)

SPECspeed®2017\_fp\_base = 324

SPECspeed®2017\_fp\_energy\_base = 1190

SPECspeed®2017\_fp\_peak = 327

SPECspeed®2017\_fp\_energy\_peak = 1210

CPU2017 License: 9017

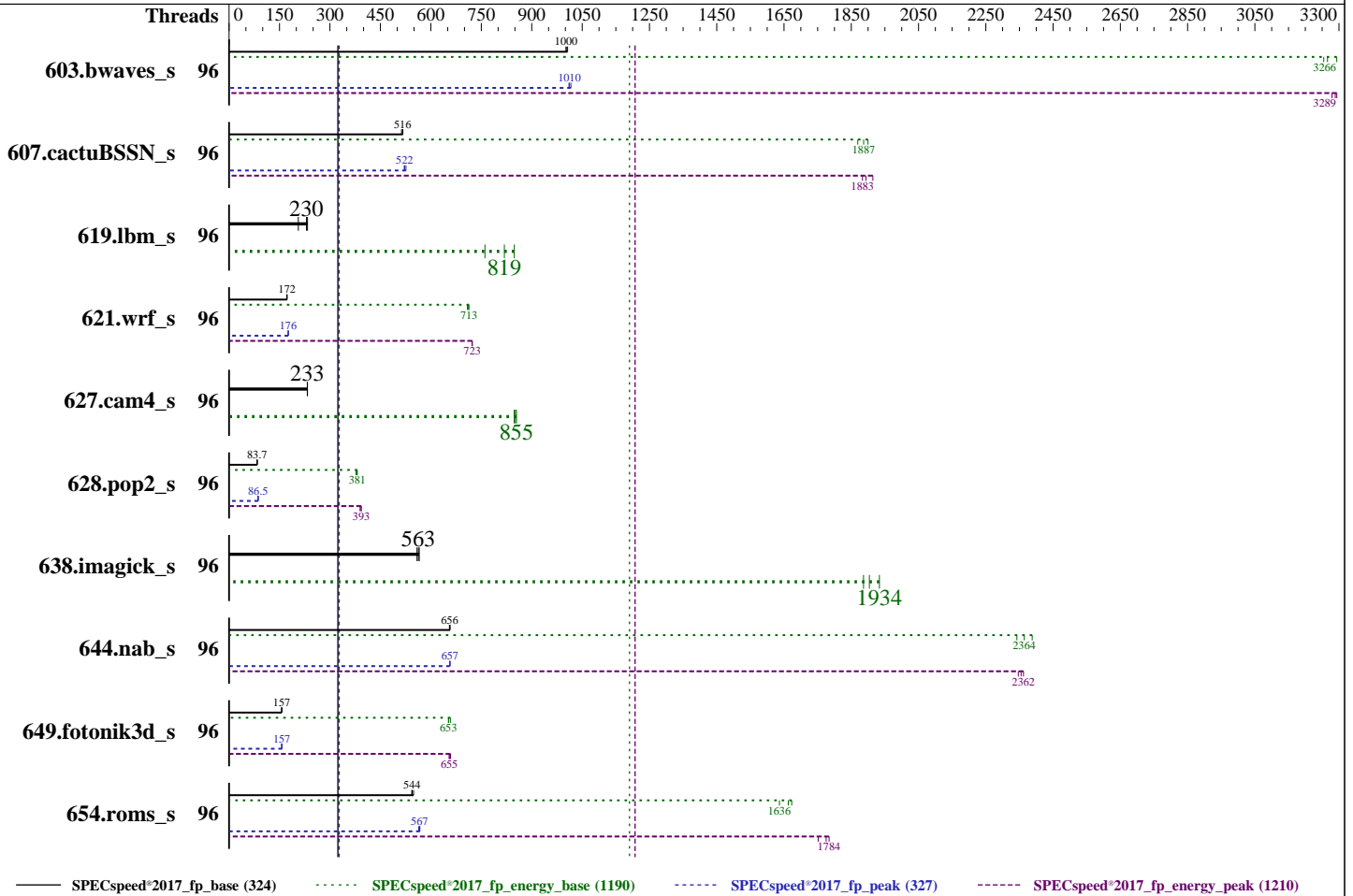
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Sep-2024

Hardware Availability: Nov-2024

Software Availability: Oct-2024



Hardware	Software
CPU Name: AMD EPYC 9655	OS: Red Hat Enterprise Linux 9.4 (Plow)
Max MHz: 4500	Kernel 5.14.0-427.13.1.el9_4.x86_64
Nominal: 2600	Compiler: C/C++/Fortran: Version 5.0.0 of AOCC
Enabled: 96 cores, 1 chip	Parallel: Yes
Orderable: 1 chip	Firmware: Lenovo BIOS Version KAE125W 5.10 released Aug-2024
Cache L1: 32 KB I + 48 KB D on chip per core	File System: xfs
L2: 1 MB I+D on chip per core	System State: Run level 3 (multi-user)
L3: 384 MB I+D on chip per chip, 32 MB shared / 8 cores	Base Pointers: 64-bit
Other: None	Peak Pointers: 64-bit
Memory: 384 GB (12 x 32 GB 2Rx8 PC5-6400B-R, running at 6000)	Other: None
Storage: 1 x 480 GB SATA SSD	Power Management: BIOS and OS set to balance power and performance
Other: CPU Cooling: Air	



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### Power

Max. Power (W): 417.8  
Idle Power (W): 100.29  
Min. Temperature (C): 21.94  
Elevation (m): 43  
Line Standard: 220 V / 50 Hz / 1 phase / 3 wires  
Provisioning: Line-powered

### Power Settings

Management FW: Version 53.9 of KAX341H  
Memory Mode: Normal

### Power-Relevant Hardware

Power Supply: 1 x 1100 W (non-redundant)  
Details: ThinkSystem 1100W 230V Titanium Power Supply 4P57A72666  
Backplane: 8 x 2.5-inch HDD back plane  
Other Storage: None  
Storage Model #: 4XB7A17107  
NICs Installed: 1 x ThinkSystem Ethernet 4-port Adaptor @ 1 Gb  
NICs Enabled (FW/OS): 4 / 1  
NICs Connected/Speed: 1 @ 1 Gb  
Other HW Model #: 6 x Performance fans

### Power Analyzer

Power Analyzer: WIN:9888  
Hardware Vendor: YOKOGAWA, Inc.  
Model: YokogawaWT310E  
Serial Number: C3UD17025E  
Input Connection: Default  
Metrology Institute: CNAS  
Calibration By: GRG METROLOGY & TEST (BEIJING) CO., LTD.  
Calibration Label: J202308266858A-0002  
Calibration Date: 16-Oct-2023  
PTDaemon® Version: 1.10.0 (82175bac; 2022-08-17)  
Setup Description: Connected to PSU1  
Current Ranges Used: 5A  
Voltage Range Used: 300V

### Temperature Meter

Temperature Meter: WIN:9889  
Hardware Vendor: Digi International, Inc.  
Model: DigiWATCHPORT\_H  
Serial Number: W63390099  
Input Connection: USB  
PTDaemon Version: 1.10.0 (82175bac; 2022-08-17)  
Setup Description: 50 mm in front of SUT main intake

## Base Results Table

Benchmark	Threads	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
603.bwaves_s	96	58.9	1000	19.5	3290	332	341	58.6	1010	19.8	3250	337	345	<b>58.9</b>	<b>1000</b>	<b>19.7</b>	<b>3270</b>	<b>335</b>	<b>346</b>
607.cactuBSSN_s	96	32.5	513	9.60	1900	295	315	<b>32.3</b>	<b>516</b>	<b>9.67</b>	<b>1890</b>	<b>299</b>	<b>317</b>	32.3	517	9.76	1870	302	319
619.lbm_s	96	22.5	233	7.02	848	312	344	25.4	206	7.82	761	308	341	<b>22.7</b>	<b>230</b>	<b>7.27</b>	<b>819</b>	<b>320</b>	<b>344</b>
621.wrf_s	96	77.0	172	20.3	711	264	268	76.7	172	20.4	709	266	269	<b>76.8</b>	<b>172</b>	<b>20.2</b>	<b>713</b>	<b>264</b>	<b>268</b>
627.cam4_s	96	38.1	233	11.4	848	299	327	<b>38.1</b>	<b>233</b>	<b>11.3</b>	<b>855</b>	<b>296</b>	<b>329</b>	38.0	233	11.3	851	298	327
628.pop2_s	96	<b>142</b>	<b>83.7</b>	<b>34.2</b>	<b>381</b>	<b>241</b>	<b>245</b>	143	83.2	34.6	377	242	245	142	83.7	34.3	380	242	245
638.imagick_s	96	25.5	565	8.26	1900	324	417	<b>25.6</b>	<b>563</b>	<b>8.13</b>	<b>1930</b>	<b>317</b>	<b>418</b>	25.8	559	8.34	1890	323	417
644.nab_s	96	26.6	657	7.96	2390	299	334	<b>26.6</b>	<b>656</b>	<b>8.04</b>	<b>2360</b>	<b>302</b>	<b>333</b>	26.7	655	8.12	2340	304	333
649.fotonik3d_s	96	58.2	157	15.7	653	269	312	58.2	157	15.6	658	267	311	<b>58.2</b>	<b>157</b>	<b>15.7</b>	<b>653</b>	<b>270</b>	<b>311</b>
654.roms_s	96	28.7	549	10.5	1670	367	388	<b>28.9</b>	<b>544</b>	<b>10.8</b>	<b>1640</b>	<b>372</b>	<b>389</b>	29.0	543	10.6	1660	365	387

SPECSpeed®2017\_fp\_base = 324

SPECSpeed®2017\_fp\_energy\_base = 1190

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



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SPECSpeed®2017\_fp\_peak = 327  
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CPU2017 License: 9017

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Tested by: Lenovo Global Technology

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### Peak Results Table

Benchmark	Threads	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
603.bwaves_s	96	58.0	1020	19.5	3290	337	346	58.4	1010	19.6	3280	336	345	<b>58.3</b>	<b>1010</b>	<b>19.6</b>	<b>3290</b>	<b>336</b>	<b>346</b>
607.cactuBSSN_s	96	<b>31.9</b>	<b>522</b>	<b>9.68</b>	<b>1880</b>	<b>303</b>	<b>319</b>	32.0	521	9.63	1890	301	318	31.7	526	9.53	1910	301	318
619.lbm_s	96	22.5	233	7.02	848	312	344	25.4	206	7.82	761	308	341	<b>22.7</b>	<b>230</b>	<b>7.27</b>	<b>819</b>	<b>320</b>	<b>344</b>
621.wrf_s	96	<b>75.2</b>	<b>176</b>	<b>20.0</b>	<b>723</b>	<b>266</b>	<b>270</b>	75.1	176	20.0	723	266	270	75.2	176	20.0	722	266	270
627.cam4_s	96	38.1	233	11.4	848	299	327	<b>38.1</b>	<b>233</b>	<b>11.3</b>	<b>855</b>	<b>296</b>	<b>329</b>	38.0	233	11.3	851	298	327
628.pop2_s	96	137	86.6	33.2	393	242	246	138	86.1	33.5	390	243	246	<b>137</b>	<b>86.5</b>	<b>33.2</b>	<b>393</b>	<b>242</b>	<b>245</b>
638.imagick_s	96	25.5	565	8.26	1900	324	417	<b>25.6</b>	<b>563</b>	<b>8.13</b>	<b>1930</b>	<b>317</b>	<b>418</b>	25.8	559	8.34	1890	323	417
644.nab_s	96	26.6	657	8.10	2350	305	335	26.6	657	8.07	2350	303	334	<b>26.6</b>	<b>657</b>	<b>8.05</b>	<b>2360</b>	<b>302</b>	<b>335</b>
649.fotonik3d_s	96	<b>58.1</b>	<b>157</b>	<b>15.6</b>	<b>655</b>	<b>269</b>	<b>313</b>	57.8	158	15.5	659	269	313	<b>58.3</b>	156	15.6	655	268	312
654.roms_s	96	<b>27.8</b>	<b>567</b>	<b>9.87</b>	<b>1780</b>	<b>355</b>	<b>383</b>	27.9	564	9.92	1780	355	384	27.8	567	10.0	1750	362	382

SPECSpeed®2017\_fp\_peak = 327

SPECSpeed®2017\_fp\_energy\_peak = 1210

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### 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.



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## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
GOMP_CPU_AFFINITY = "0-95"
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.9-amd-aocc500_znver5_A1/amd_speed_aocc500_znver5_A_lib/lib:/home/cpu2017-1.1.9-amd-
aocc500_znver5_A1/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 = "96"
```

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

```
GOMP_CPU_AFFINITY = "0-95"
```

Environment variables set by runcpu during the 607.cactuBSSN\_s peak run:

```
GOMP_CPU_AFFINITY = "0-95"
```

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

```
GOMP_CPU_AFFINITY = "0-95"
```

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

```
GOMP_CPU_AFFINITY = "0-95"
```

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

```
GOMP_CPU_AFFINITY = "0-95"
```

Environment variables set by runcpu during the 649.fotonik3d\_s peak run:

```
GOMP_CPU_AFFINITY = "0-95"
```

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

```
GOMP_CPU_AFFINITY = "0-95"
```

## 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 Custom Mode
Core Performance Boost set to Disabled
DF P-states set to P1
NUMA Nodes per Socket set to NPS4
L2 Stream HW Prefetcher set to Disabled
SMT Mode set to Disabled
```

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### Platform Notes (Continued)

sysinfo program /home/cpu2017-1.1.9-amd-aocc500\_znver5\_A1/bin/sysinfo  
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
 running on localhost.localdomain Sun Sep 22 10:06:21 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 252 (252-32.el9\_4)
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.localdomain 5.14.0-427.13.1.el9\_4.x86\_64 #1 SMP PREEMPT\_DYNAMIC Wed Apr 10 10:29:16 EDT 2024 x86\_64 x86\_64 x86\_64 GNU/Linux  
 -----

2. w  
 10:06:21 up 2 min, 1 user, load average: 0.09, 0.15, 0.07  

USER	TTY	LOGIN@	IDLE	JCPU	PCPU	WHAT
root	ttyl	10:03	21.00s	1.47s	0.11s	/bin/bash ./amd_speed_aocc500_znver5_A1.sh

 -----

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

4. ulimit -a  
 real-time non-blocking time (microseconds, -R) unlimited  
 core file size (blocks, -c) 0  
 data seg size (kbytes, -d) unlimited  
 scheduling priority (-e) 0  
 file size (blocks, -f) unlimited  
 pending signals (-i) 1545955  
 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) 1545955
virtual memory            (kbytes, -v) unlimited
file locks                (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 31
login -- root
-bash
/bin/bash ./Run036-compliant-amd-speedfp.sh
python3 ./run_amd_speed_aocc500_znver5_A1.py
/bin/bash ./amd_speed_aocc500_znver5_A1.sh
runcpu --power --config amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 fpspeed
runcpu --power --configfile amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --runmode
speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.002/templogs/preenv.fpspeed.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-amd-aocc500_znver5_A1

```

```

-----
6. /proc/cpuinfo
model name      : AMD EPYC 9655 96-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 26
model          : 2
stepping       : 1
microcode      : 0xb00210e
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 192 4K pages
cpu cores      : 96
siblings       : 96
1 physical ids (chips)
96 processors (hardware threads)
physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
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):                 96
On-line CPU(s) list:   0-95
Vendor ID:              AuthenticAMD
BIOS Vendor ID:        Advanced Micro Devices, Inc.

```

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### Platform Notes (Continued)

```

Model name: AMD EPYC 9655 96-Core Processor
BIOS Model name: AMD EPYC 9655 96-Core Processor
CPU family: 26
Model: 2
Thread(s) per core: 1
Core(s) per socket: 96
Socket(s): 1
Stepping: 1
CPU(s) scaling MHz: 58%
CPU max MHz: 4509.3750
CPU min MHz: 1500.0000
BogoMIPS: 5191.87
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
aperfperf 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 cat_l3
cdp_l3 hw_pstate ssbd mba perfmon_v2 ibrs ibpb stibp ibrs_enhanced
vmmcall fsgsbase tsc_adjust bmil 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 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: 4.5 MiB (96 instances)
L1i cache: 3 MiB (96 instances)
L2 cache: 96 MiB (96 instances)
L3 cache: 384 MiB (12 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
NUMA node2 CPU(s): 48-71
NUMA node3 CPU(s): 72-95
Vulnerability Gather data sampling: Not affected
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: 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
disabled, RSB filling, PBRBS-eIBRS Not affected
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

```

From lscpu --cache:

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

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## Lenovo Global Technology ThinkSystem SR655 V3 (2.60 GHz, AMD EPYC 9655)

SPECspeed®2017\_fp\_base = 324  
SPECspeed®2017\_fp\_energy\_base = 1190  
SPECspeed®2017\_fp\_peak = 327  
SPECspeed®2017\_fp\_energy\_peak = 1210

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

**Test Date:** Sep-2024  
**Hardware Availability:** Nov-2024  
**Software Availability:** Oct-2024

### Platform Notes (Continued)

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	4.5M	12	Data	1	64	1	64
L1i	32K	3M	8	Instruction	1	64	1	64
L2	1M	96M	16	Unified	2	1024	1	64
L3	32M	384M	16	Unified	3	32768	1	64

```
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0-23
node 0 size: 96344 MB
node 0 free: 95875 MB
node 1 cpus: 24-47
node 1 size: 96761 MB
node 1 free: 96104 MB
node 2 cpus: 48-71
node 2 size: 96720 MB
node 2 free: 96227 MB
node 3 cpus: 72-95
node 3 size: 96702 MB
node 3 free: 96219 MB
node distances:
node  0  1  2  3
 0:  10  12  12  12
 1:  12  10  12  12
 2:  12  12  10  12
 3:  12  12  12  10
```

```
9. /proc/meminfo
MemTotal: 395804748 kB
```

```
10. who -r
run-level 3 Sep 22 10:03
```

```
11. Systemd service manager version: systemd 252 (252-32.el9_4)
Default Target Status
multi-user running
```

```
12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
dbus-broker firewalld getty@ insights-client-boot irqbalance kdump low-memory-monitor
mdmonitor microcode nis-domainname rhsmcertd rsyslog rtkit-daemon selinux-autorelabel-mark
sshd sssd systemd-boot-update systemd-network-generator udisks2 upower
enabled-runtime systemd-remount-fs
disabled canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot
chrony-wait chronyd-restricted console-getty cpupower debug-shell dnf-system-upgrade
kvm_stat man-db-restart-cache-update nftables pesign rdisc rhcd rhsm rhsm-facts
rpmdb-rebuild selinux-check-proper-disable serial-getty@ sshd-keygen@
systemd-boot-check-no-failures systemd-pstore systemd-sysext
indirect sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo systemd-sysupdate
systemd-sysupdate-reboot
```

(Continued on next page)





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CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

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Test Date: Sep-2024

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### Platform Notes (Continued)

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=(hd3,gpt2)/boot/vmlinuz-5.14.0-427.13.1.el9_4.x86_64
root=UUID=fbl38839-ae87-46f8-b982-dbl388d5161d
ro
resume=UUID=e504a4b5-5b29-425c-bfb8-cd6371631035

```

```

-----
14. cpupower frequency-info
analyzing CPU 73:
  current policy: frequency should be within 1.50 GHz and 2.60 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

  boost state support:
    Supported: no
    Active: no
    Boost States: 0
    Total States: 3
    Pstate-P0: 800MHz

```

```

-----
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

```

(Continued on next page)



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## Platform Notes (Continued)

pages\_to\_scan 4096  
scan\_sleep\_millisecs 10000

-----  
18. OS release  
From /etc/\*-release /etc/\*-version  
os-release Red Hat Enterprise Linux 9.4 (Plow)  
redhat-release Red Hat Enterprise Linux release 9.4 (Plow)  
system-release Red Hat Enterprise Linux release 9.4 (Plow)

-----  
19. Disk information  
SPEC is set to: /home/cpu2017-1.1.9-amd-aocc500\_znver5\_A1  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda4 xfs 373G 81G 293G 22% /home

-----  
20. /sys/devices/virtual/dmi/id  
Vendor: Lenovo  
Product: ThinkSystem SR655V3  
Product Family: ThinkSystem  
Serial: 1234567890

-----  
21. dmidecode  
Additional information from dmidecode 3.5 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.  
Memory:  
6x SK Hynix HMC88AHBRA477N 32 GB 2 rank 6400, configured at 6000  
6x SK Hynix HMC88AHBRA478N 32 GB 2 rank 6400, configured at 6000

-----  
22. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: Lenovo  
BIOS Version: KAE125W-5.10  
BIOS Date: 08/02/2024  
BIOS Revision: 5.10  
Firmware Revision: 53.9

## Compiler Version Notes

=====  
C | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak) 644.nab\_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++, C, Fortran | 607.cactuBSSN\_s(base, peak)

(Continued on next page)



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## Compiler Version Notes (Continued)

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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  
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  
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 | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak) 654.roms\_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, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak) 628.pop2\_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  
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  
-----

## 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



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**Tested by:** Lenovo Global Technology

**Test Date:** Sep-2024  
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## 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=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 -mrecip=none -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-X86-prefetching -DSPEC\_OPENMP -O3 -march=znver5  
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -funroll-loops  
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3  
-Mrecursive -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc  
-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=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 -funroll-loops  
-mllvm -lsr-in-nested-loop -Mrecursive -mrecip=none -fopenmp=libomp  
-lomp -lamdlibm -lamdalloc -lflang

(Continued on next page)



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**Test Date:** Sep-2024  
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## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flt0
-freemap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt
-mllvm -loop-unswitch-threshold=200000 -mllvm -unroll-threshold=100
-funroll-loops -mllvm -lsr-in-nested-loop -Mrecursive -mrecip=none
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

## Base 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
```

## 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
```



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## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm\_s: basepeak = yes

638.imagick\_s: basepeak = yes

644.nab\_s: -m64 -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 -fremap-arrays -fstrip-mining  
-fstruct-layout=9 -mllvm -inline-threshold=1000  
-mllvm -reduce-array-computations=3  
-mllvm -unroll-threshold=50 -zopt -mrecip=none  
-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=znver5 -fveclib=AMDLIBM -ffast-math  
-fopenmp -fscalar-transform -fvector-transform  
-mllvm -reduce-array-computations=3 -Mrecursive  
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

649.fotonik3d\_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=znver5 -fveclib=AMDLIBM -ffast-math  
-fopenmp -flto -mllvm -reduce-array-computations=3  
-Mrecursive -zopt -fopenmp=libomp -lomp -lamdlibm  
-lamdalloc -lflang

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

Benchmarks using both Fortran and C:

(Continued on next page)



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## Peak Optimization Flags (Continued)

```
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=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 -funroll-loops
-mllvm -lsr-in-nested-loop -Mrecursive -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

627.cam4\_s: basepeak = yes

```
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=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 -fscalar-transform
-fvector-transform -Mrecursive -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -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 -mllvm -unroll-threshold=100
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

## Peak 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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## Peak 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

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-A.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-A.xml>  
<http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml>

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