Lenovo Global Technology
ThinkSystem SR635 V3
(2.75 GHz, AMD EPYC 9454P)

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

CPU Name: AMD EPYC 9454P
Max MHz: 3800
Nominal: 2750
Enabled: 48 cores, 1 chip, 2 threads/core
Orderable: 1 chip
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 core,
32 MB shared / 6 cores
Other: None
Memory: 384 GB (12 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480 GB SATA 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 KAE109A 1.40 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

SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

SPECspeed®2017_fp_base = 264
SPECspeed®2017_fp_peak = 277

Threads

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base (264)</th>
<th>SPECspeed®2017_fp_peak (277)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads</td>
<td></td>
</tr>
<tr>
<td>603.bwaves_s</td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td></td>
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<tr>
<td>619.lbm_s</td>
<td></td>
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<tr>
<td>621.wrf_s</td>
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<tr>
<td>627.cam4_s</td>
<td></td>
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<tr>
<td>628.pop2_s</td>
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<tr>
<td>638.imagick_s</td>
<td></td>
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<tr>
<td>644.nab_s</td>
<td></td>
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<tr>
<td>649.fotonik3d_s</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
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</table>

Test Date: Feb-2023
Hardware Availability: Apr-2023
Software Availability: Nov-2022
## Lenovo Global Technology

**ThinkSystem SR635 V3** *(2.75 GHz, AMD EPYC 9454P)*

- **SPECspeed®2017_fp_base = 264**
- **SPECspeed®2017_fp_peak = 277**

**Results Table**

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td></td>
</tr>
</tbody>
</table>

**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.
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:
'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 = "0-95"
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"
MALLOCC_CONF = "oversize_threshold:0,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 = "0-47"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 638.imagick_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"

(Continued on next page)
### Environment Variables Notes (Continued)

Environment variables set by runcpu during the 654.roms_s peak run:
```
GOMP_CPU_AFFINITY = "0 48 1 49 2 50 3 51 4 52 5 53 6 54 7 55 8 56 9 57 10 58
  11 59 12 60 13 61 14 62 15 63 16 64 17 65 18 66 19 67 20 68 21 69 22 70
  23 71 24 72 25 73 26 74 27 75 28 76 29 77 30 78 31 79 32 80 33 81 34 82
  35 83 36 84 37 85 38 86 39 87 40 88 41 89 42 90 43 91 44 92 45 93 46 94
  47 95"
```

### General Notes

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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

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

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

### Platform Notes

BIOS configuration:
Operating Mode set to Maximum Performance

Sysinfo program /home/cpu2017-1.1.9-amd-aocc400-genoa-Ble/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Thu Feb 16 21:08:51 2023

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

---

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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: systemctl 249 (249.11+suse.124.g2bc0b2c447)
12. Services, from systemctl list-unit-files

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SPECspeed®2017_fp_base = 264
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Platform Notes (Continued)

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
21:08:51 up 1 min, 1 user, load average: 0.10, 0.09, 0.03
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty1 - 21:07 34.00s 1.19s 0.06s /bin/bash ./amd_speed_aocc400_genoa_B1.sh

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) 1545937
  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) 1545937
  virtual memory (kbytes, -v) unlimited
  file locks (-x) unlimited

(Continued on next page)
Platform Notes (Continued)

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
-bash
/bin/bash ./Run036-compliant-amd-speedfp.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 fpspeed
runcpu --configfile amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.009/templogs/preenv.fpspeed.009.0.log --lognum 009.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-amd-aocc400-genoa-B1e

6. /proc/cpuinfo

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): 96
CPU family: 25
Model name: AMD EPYC 9454P 48-Core Processor
Vendor ID: AuthenticAMD
Model name: AMD EPYC 9454P 48-Core Processor
CPU family: 25

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**SPEC CPU®2017 Floating Point Speed Result**

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</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Nov-2022</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

- **Model:** 17
- **Thread(s) per core:** 2
- **Core(s) per socket:** 48
- **Socket(s):** 1
- **Stepping:** 1
- **Frequency boost:** enabled
- **CPU max MHz:** 3810.7910
- **CPU min MHz:** 1500.0000
- **BogoMIPS:** 5491.41

**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 rdtsscp lm
constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf r apl
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 3nowprefetch osvw ibs skinit wdt tce topoext
perfcctf_core perfctf_nb bprext perfctf_llc mwaitx cpb cat_l3 cdp_l3
invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmcall fagsbase bmis
avx2 smep bmis invpcid cmp rdta avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb avx512cd sha ni avx512bw avx512vl xsaveopt
xsaveav xgetbv1 xsave avx512cd avx512vm avx512bw vni avx512v1
vulnerability_itlb_multihit: Not affected
vulnerability_l1tf: Not affected
vulnerability_mds: Not affected
vulnerability_meltdown: Not affected

Virtualization: AMD-V

| L1d cache: | 1.5 MiB (48 instances) |
| L1i cache: | 1.5 MiB (48 instances) |
| L2 cache:  | 48 MiB (48 instances)  |
| L3 cache:  | 256 MiB (8 instances)  |

NUMA node(s): 1

NUMA node0 CPU(s): 0-95

Vulnerability Spectre v1: Mitigation; usercopy/swaps 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:

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<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
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<th>COHERENCY-SIZE</th>
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<tr>
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<td>32K</td>
<td>1.5M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
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**Hardware Availability:** Apr-2023  
**Software Availability:** Nov-2022

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#### Platform Notes (Continued)

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<th>48M</th>
<th>8 Unified</th>
<th>2</th>
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<tbody>
<tr>
<td>L3</td>
<td>32M</td>
<td>256M</td>
<td>16 Unified</td>
<td>3</td>
<td>32768</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

---

8. numactl --hardware  
**NOTE:** a numactl 'node' might or might not correspond to a physical chip.  
available: 1 nodes (0)  
node 0 cpus: 0-95  
node 0 size: 386508 MB  
node 0 free: 385163 MB  
node distances:  
node 0  
0: 10

---

9. /proc/meminfo  
MemTotal: 395784584 kB

---

10. who -r  
run-level 3 Feb 16 21:07

---

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)  
**Default Target** running

---

12. Services, from systemctl list-unit-files  
**STATE** **UNIT FILES**

<table>
<thead>
<tr>
<th>Enabled</th>
<th>YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron getty@ haveged irqbalance issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny</th>
</tr>
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<tbody>
<tr>
<td>Enabled-runtime</td>
<td>systemd-remount-fs</td>
</tr>
<tr>
<td>Indirect</td>
<td></td>
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</tbody>
</table>

---

13. Linux kernel boot-time arguments, from /proc/cmdline  
**BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default**  
**root=UUID=3bbe645f-e8ac-484d-b283-98c451feb714**

---

(Continued on next page)
Platform Notes (Continued)

splash=silent
mitigations=auto
quiet
security=apparmor

14. cpupower frequency-info
anlyzing 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               0
  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        432000
  vm.extfrag_threshold               500
  vm.min_unmapped_ratio               1
  vm.nr_hugemaps                      0
  vm.nr_hugemaps_mempolicy           0
  vm.nr_overcommit_hugemaps          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
shmemp_enabled  always within_size advise [never] deny force

17. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs  60000

(Continued on next page)
Platform Notes (Continued)

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-B1e
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda3      xfs   446G   53G  393G  12% /

20. /sys/devices/virtual/dmi/id
   Vendor:         Lenovo
   Product:        ThinkSystem SR635V3
   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.
   Memory:
   3x Samsung M321R4GA3BB0-CQKDG 32 GB 2 rank 4800
   8x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
   1x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800

22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:         Lenovo
   BIOS Version:       KAE109A-1.40
   BIOS Date:          01/17/2023
   BIOS Revision:      1.40
   Firmware Revision:  1.40
Lenovo Global Technology
ThinkSystem SR635 V3
(2.75 GHz, AMD EPYC 9454P)

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

---

**SPEC CPU®2017 Floating Point Speed Result**

| SPECspeed®2017_fp_base = 264 | SPECspeed®2017_fp_peak = 277 |

---

**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#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++, C, Fortran | 607.cactuBSSN_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         | 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#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, 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#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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Lenovo Global Technology
ThinkSystem SR635 V3
(2.75 GHz, AMD EPYC 9454P)

**SPECspeed®2017_fp_base = 264**
**SPECspeed®2017_fp_peak = 277**

- **CPU2017 License:** 9017
- **Test Sponsor:** Lenovo Global Technology
- **Tested by:** Lenovo Global Technology
- **Test Date:** Feb-2023
- **Hardware Availability:** Apr-2023
- **Software Availability:** Nov-2022

### Compiler Version Notes (Continued)

```markdown
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
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
```

### 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
Lenovo Global Technology
ThinkSystem SR635 V3
(2.75 GHz, AMD EPYC 9454P)

SPECsm®2017_fp_base = 264
SPECsm®2017_fp_peak = 277

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Feb-2023
Tested by: Lenovo Global Technology
Hardware Availability: Apr-2023
Software Availability: Nov-2022

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
-llang

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 -lamdalloc -llang

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 -lamdalloc
-llang

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-unsswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-llang
Lenovo Global Technology
ThinkSystem SR635 V3
(2.75 GHz, AMD EPYC 9454P)

SPECspeed®2017_fp_base = 264
SPECspeed®2017_fp_peak = 277

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

Test Date: Feb-2023
Hardware Availability: Apr-2023
Software Availability: Nov-2022

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

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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR635 V3
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Peak Optimization Flags (Continued)

638.imagick_s (continued):
-fremap-arrays -fstrip-mining
-mlivm -inline-threshold=1000
-mlivm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamilocal -lflang

644.nab_s: -m64 -Wl,-mlivm -Wl,-region-vectorize -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flt0 -fstruct-layout=9 -mlivm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mlivm -inline-threshold=1000
-mlivm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamilocal -lflang

Fortran benchmarks:

603.bwaves_s: -m64 -Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlivm -Wl,-reduce-array-computations=3
-Wl,-mlivm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mlivm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamilocal -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,-mlivm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlivm -Wl,-reduce-array-computations=3
-Wl,-mlivm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flt0 -fstruct-layout=9 -mlivm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mlivm -inline-threshold=1000
-mlivm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-O3 -Mrecursive -funroll-loops -mlivm -lsr-in-nested-loop
-fopenmp=libomp -lomp -lamdlibm -lamilocal -lflang

627.cam4_s: -m64 -Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlivm -Wl,-reduce-array-computations=3
-Wl,-mlivm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flt0 -fstruct-layout=9 -mlivm -unroll-threshold=50

(Continued on next page)
Lenovo Global Technology
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SPECspeed®2017_fp_base = 264
SPECspeed®2017_fp_peak = 277

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

Peak Optimization Flags (Continued)

627.cam4_s (continued):
-fremap-arrays -fstrip-mining
-mlvm -inline-threshold=1000
-mlvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-1flang

628.pop2_s: -m64 -Wl,-mlvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlvm -Wl,-reduce-array-computations=3
-Wl,-mlvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -ffast-math -fopenmp
-flto -fstruct-layout=9 -mlvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mlvm -inline-threshold=1000
-mlvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -1flang

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-R.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-R.xml
http://www.spec.org/cpu2017/flags/aocc400-flags.xml
Lenovo Global Technology  
ThinkSystem SR635 V3  
(2.75 GHz, AMD EPYC 9454P)  

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

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