# SPEC CPU®2017 Floating Point Speed Result

## Lenovo Global Technology

**ThinkSystem SR655 V3**  
**CPU** 3.10 GHz, **AMD EPYC 9554**

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License</td>
<td>9017</td>
</tr>
<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Test Date</td>
<td>Feb-2023</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Apr-2023</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Nov-2022</td>
</tr>
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</table>

### SPECspeed®2017_fp_base = 301
### SPECspeed®2017_fp_peak = 304

<table>
<thead>
<tr>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
</tr>
<tr>
<td>619.lbm_s</td>
</tr>
<tr>
<td>621.wrf_s</td>
</tr>
<tr>
<td>627.cam4_s</td>
</tr>
<tr>
<td>628.pop2_s</td>
</tr>
<tr>
<td>638.imagick_s</td>
</tr>
<tr>
<td>644.nab_s</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
</tr>
<tr>
<td>654.roms_s</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 9554  
- **Max MHz:** 3750  
- **Nominal:** 3100  
- **Enabled:** 64 cores, 1 chip  
- **Orderable:** 1 chip  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 256 MB I+D on chip per chip, 32 MB shared / 8 cores  
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

### 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  
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
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**SPECspeed®2017 fp_base = 301**  
**SPECspeed®2017 fp_peak = 304**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td>66.0</td>
<td>894</td>
<td><strong>65.9</strong></td>
<td><strong>895</strong></td>
<td>65.8</td>
<td>896</td>
<td>66.0</td>
<td>894</td>
<td><strong>65.9</strong></td>
<td><strong>895</strong></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td><strong>34.2</strong></td>
<td><strong>488</strong></td>
<td>34.6</td>
<td>482</td>
<td>34.1</td>
<td>489</td>
<td>64</td>
<td><strong>34.2</strong></td>
<td><strong>488</strong></td>
<td>34.6</td>
</tr>
<tr>
<td>619.lbm_s</td>
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<td><strong>29.9</strong></td>
<td><strong>175</strong></td>
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<td><strong>29.9</strong></td>
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<tr>
<td>621.wrf_s</td>
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<td>284</td>
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<tr>
<td>627.cam4_s</td>
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<td><strong>43.9</strong></td>
<td><strong>202</strong></td>
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<td>202</td>
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<tr>
<td>628.pop2_s</td>
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<td>103</td>
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<td><strong>103</strong></td>
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<td>638.imagick_s</td>
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<td>64</td>
<td><strong>61.2</strong></td>
<td><strong>149</strong></td>
<td>61.1</td>
<td>149</td>
<td>62.0</td>
<td>147</td>
<td>64</td>
<td><strong>61.2</strong></td>
<td><strong>149</strong></td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
<td>43.5</td>
<td>362</td>
<td><strong>43.6</strong></td>
<td><strong>361</strong></td>
<td>43.8</td>
<td>360</td>
<td>64</td>
<td>41.7</td>
<td>377</td>
<td>42.2</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, 'syscall -w vm.dirty_ratio=8' run as root.  
To limit swap usage to minimum necessary, 'syscall -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 filesystem layout randomization (ASLR) to reduce run-to-run variability, 'syscall -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, 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 = "0-63"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.9-amd-aocc400-genoa-B1e/amd_speed_aocc400_genoa_B_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 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-63"

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 = "0-63"

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 25 26 27 28 29 28 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64"
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 and then set it to Custom Mode
SMT Mode set to Disabled

Sysinfo program /home/cpu2017-1.1.9-amd-aocc400-genoa-Ble/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Mon Feb 27 14:04:12 2023

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

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7. lscpu
8. numactl --hardware
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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/kl晖page
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode

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Platform Notes (Continued)

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
14:04:12 up 1 min, 1 user, load average: 0.26, 0.11, 0.04
USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
root     tty1     -                14:03   12.00s  1.14s  0.05s /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) 1545968
 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) 1545968
 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 ./speccpu_genoa.sh
/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

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Platform Notes (Continued)

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/CPU2017.038/tempos/preenv.fpspeed.038.0.log --lognum 038.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017-1.1.9-amd-aocc400-genoa-Ble

6. /proc/cpuinfo
   model name : AMD EPYC 9554 64-Core Processor
   vendor_id : AuthenticAMD
   cpu family : 25
   model : 17
   stepping : 1
   microcode : 0xa101111
   bugs : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
   TLB size : 3584 4K pages
   cpu cores : 64
   siblings : 64
   1 physical ids (chips)
   64 processors (hardware threads)
   physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
   physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
   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): 64
   On-line CPU(s) list: 0-63
   Vendor ID: AuthenticAMD
   Model name: AMD EPYC 9554 64-Core Processor
   CPU family: 25
   Model: 17
   Thread(s) per core: 1
   Core(s) per socket: 64
   Socket(s): 1
   Stepping: 1
   Frequency boost: enabled
   CPU max MHz: 3762.9880
   CPU min MHz: 1500.0000
   BogoMIPS: 6190.71

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Platform Notes (Continued)

Flags:

Virtualization: AMD-V
L1d cache: 2 MiB (64 instances)
L1i cache: 2 MiB (64 instances)
L2 cache: 64 MiB (64 instances)
L3 cache: 256 MiB (8 instances)
NUMA node(s): 1
NUMA node0 CPU(s): 0-63
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spectre v1: Mitigation; speculative store bypass disabled via prctl and seccomp
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB filling
Vulnerability Srbd: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
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<tbody>
<tr>
<td>L1d</td>
<td>32K</td>
<td>2M</td>
<td>8</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>2M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>1M</td>
<td>64M</td>
<td>8</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
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<tr>
<td>L3</td>
<td>32M</td>
<td>256M</td>
<td>16</td>
<td>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.

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Platform Notes (Continued)

node 0 free: 385471 MB
node distances:
node 0
0: 10

9. /proc/meminfo
MemTotal: 395792280 kB

10. who -r
run-level 3 Feb 27 14:02

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 kbsdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
enabled-runtime systemd-remount-fs
disabled autosfs autoyast-intscripts blk-availability boot-sysctl ca-certificates chrony-wait
chronyd console-getty cups cups-browsed debug-shelletabsls exchange-bmc-os-info
firewalld gpm grub2-once haveged-switchover hwloc-dump-hwdata ipmi ipmievd
issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rdisc
rpcbind rpmconfigcheck rsysncd serial-getty@ smartd_generate_opts snmpd snmptrapd
systemd-boot-check-no-failures systemd-network-generator systemd-sysext
systemd-time-wait-sync systemd-timesync

13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=b688f3c1-4135-48b5-a7b5-149c36a17cd9
splash=silent
mitigations=auto
quiet
security=apparmor

14. cpupower frequency-info
analyzing CPU 0:
Platform Notes (Continued)

current policy: frequency should be within 1.50 GHz and 3.10 GHz. The governor "performance" may decide which speed to use within this range.

boost state support:
Supported: yes
Active: yes

15. sysctl
   - kernel.numa_balancing 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 43200
   - vm.extrfrag_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 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/klhugepaged
   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

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Platform Notes (Continued)

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 54G 393G 12% /

20. /sys/devices/virtual/dmi/id
   Vendor: Lenovo  Product: ThinkSystem SR655V3  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:
   11x Samsung M321R4GA3BB0-CQKEG 32 GB 2 rank 4800
   1x Samsung M321R4GA3BB0-CQKMG 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

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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR655 V3
(3.10 GHz, AMD EPYC 9554)

SPECspeed®2017_fp_base = 301
SPECspeed®2017_fp_peak = 304

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

Compiler Version Notes (Continued)

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

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

Compiler Version Notes (Continued)

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

Base Optimization Flags

C benchmarks:
-m64 -Wl,-mllv -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllv -Wl,-reduce-array-computations=3 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllv -unroll-threshold=50 -mllv -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllv -reduce-array-computations=3
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamlalloc
-llflang

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Lenovo Global Technology
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SPECspeed®2017_fp_base = 301
SPECspeed®2017_fp_peak = 304

Base Optimization Flags (Continued)

Fortran benchmarks:
- m64 -Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
- m64 -Wl,-mlivm -Wl,-reduce-array-computations=3
- m64 -Wl,-mlivm -Wl,-enable-X86-prefetching -DSPEC_OPENMP -O3 -march=znver4
- fveclib=AMDLIBM -ffast-math -fopenmp -flto -Mrecursive
- funroll-loops -mlivm -lsr-in-nested-loop
- mlivm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp
- lamdlibm -lamdalloc -lflang

Benchmarks using both Fortran and C:
- m64 -Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
- m64 -Wl,-mlivm -Wl,-reduce-array-computations=3
- m64 -Wl,-mlivm -Wl,-enable-X86-prefetching -O3 -march=znver4
- fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
- mlivm -unroll-threshold=50 -mlivm -inline-threshold=1000
- fremap-arrays -fstrip-mining -mlivm -reduce-array-computations=3
- DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
- mlivm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

Benchmarks using Fortran, C, and C++:
- m64 -Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
- m64 -Wl,-mlivm -Wl,-reduce-array-computations=3
- m64 -Wl,-mlivm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
- fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
- mlivm -unroll-threshold=50 -mlivm -inline-threshold=1000
- fremap-arrays -fstrip-mining -mlivm -reduce-array-computations=3
- DSPEC_OPENMP -zopt -mlivm -unroll-threshold=100 -finline-aggressive
- mlivm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
- mlivm -lsr-in-nested-loop -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

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Lenovo Global Technology
ThinkSystem SR655 V3
(3.10 GHz, AMD EPYC 9554)

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<td>SPECspeed®2017_fp_peak = 304</td>
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</tbody>
</table>

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 (Continued)

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: basepeak = yes
644.nab_s: basepeak = yes

Fortran benchmarks:
603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes

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Lenovo Global Technology

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

Peak Optimization Flags (Continued)

654.roms_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Oofast
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-Ofopenmp -mrecursive -mllvm -Wl,-reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -1flang

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
-fmarch=znver4 -fveclib=AMDLIBM -ffast-math -Ofopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-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 -1flang

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
-fmarch=znver4 -fveclib=AMDLIBM -ffast-math -Ofopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-o3 -mrecursive -foffopenmp=libomp -lomp -lamdlibm -lamdalloc -1flang

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
-fmarch=znver4 -fveclib=AMDLIBM -ffast-math -Ofopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-o3 -mrecursive -foffopenmp=libomp -lomp -lamdlibm -lamdalloc -1flang

Benchmarks using Fortran, C, and C++:

(Continued on next page)
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Peak Optimization Flags (Continued)

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

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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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