SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

$SPECspeed^{®}2017\_fp\_base = 379$

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

$SPECspeed^{®}2017\_fp\_peak = 396$

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

Test Date: Jun-2024
Hardware Availability: May-2024
Software Availability: May-2024

Benchmark	Threads	base	peak
603.bwaves_s	96	1520	1520
607.cactuBSSN_s	96	574	
619.lbm_s	96	236	237
621.wrf_s	96	226	253
627.cam4_s	96 / 192	262	290
628.pop2_s	96	83.9	84.0
638.imagick_s	96 / 192	551	565
644.nab_s	96	784	
649.fotonik3d_s	96	225	
654.roms_s	96 / 192	615	748

SPECspeed®2017_fp_base (379)   SPECspeed®2017_fp_peak (396)

Hardware

CPU Name: AMD EPYC 9454
 Max MHz: 3800
 Nominal: 2750
Enabled: 96 cores, 2 chips, 2 threads/core
Orderable: 2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 256 MB I+D on chip per chip,
 32 MB shared / 6 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 3.2 TB NVME SSD
Other: CPU Cooling: Air

Software

OS: Ubuntu 22.04.4 LTS
 Kernel 5.15.0-112-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Lenovo BIOS Version R5E101H 1.10 released May-2024
File System: ext4
System State: Run level 5 (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

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

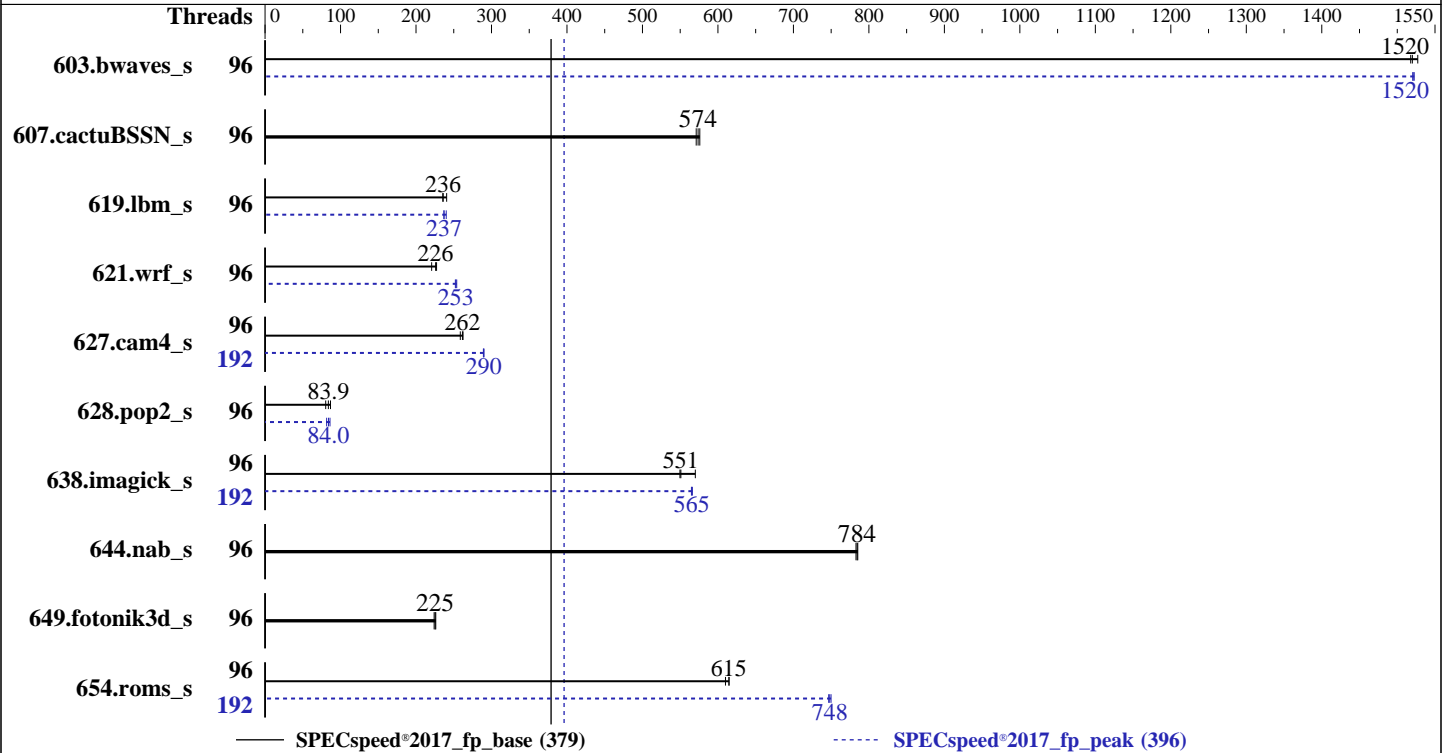|		
CPU2017 License: 9017	**Test Date:**	Jun-2024
Test Sponsor: Lenovo Global Technology	**Hardware Availability:**	May-2024
Tested by: Lenovo Global Technology	**Software Availability:**	May-2024

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	96	38.6	1530	**38.8**	**1520**	38.9	1520	96	38.8	1520	38.8	1520	**38.8**	**1520**
607.cactuBSSN_s	96	29.2	571	28.9	576	**29.1**	**574**	96	29.2	571	28.9	576	**29.1**	**574**
619.lbm_s	96	**22.2**	**236**	22.2	235	21.8	241	96	**22.1**	**237**	22.1	237	21.8	240
621.wrf_s	96	**58.5**	**226**	58.2	227	59.9	221	96	52.5	252	52.1	254	**52.3**	**253**
627.cam4_s	96	33.8	262	34.3	259	**33.9**	**262**	192	**30.6**	**290**	30.6	289	30.6	290
628.pop2_s	96	137	86.7	**142**	**83.9**	148	80.4	96	138	86.0	**141**	**84.0**	146	81.6
638.imagick_s	96	25.3	570	**26.2**	**551**	26.2	550	192	25.5	565	**25.5**	**565**	25.5	566
644.nab_s	96	22.2	785	**22.3**	**784**	22.3	783	96	22.2	785	**22.3**	**784**	22.3	783
649.fotonik3d_s	96	**40.5**	**225**	40.3	226	40.7	224	96	**40.5**	**225**	40.3	226	40.7	224
654.roms_s	96	25.8	610	**25.6**	**615**	25.6	615	192	21.0	750	21.1	747	**21.0**	**748**
SPECspeed®2017_fp_base =		**379**												
SPECspeed®2017_fp_peak =		**396**												

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.


cpupower set to performance mode
cpupower frequency-set -r -g performance
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'
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jun-2024

Hardware Availability: May-2024

Software Availability: May-2024

Operating System Notes (Continued)

```
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 = "0-191"
LD_LIBRARY_PATH = "/speccpu/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 = "192"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 619.lbm_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 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-191"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-191"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 96 1 97 2 98 3 99 4 100 5 101 6 102 7 103 8 104 9 105 10 106 11 107 12 108 13 109 14
      110 15 111 16 112 17 113 18 114 19 115 20 116 21 117 22 118 23 119 24 120 25 121 26 122 27 123 28 124
      29 125 30 126 31 127 32 128 33 129 34 130 35 131 36 132 37 133 38 134 39 135 40 136 41 137 42 138 43
      139 44 140 45 141 46 142 47 143 48 144 49 145 50 146 51 147 52 148 53 149 54 150 55 151 56 152 57 153
      58 154 59 155 60 156 61 157 62 158 63 159 64 160 65 161 66 162 67 163 68 164 69 165 70 166 71 167 72
      168 73 169 74 170 75 171 76 172 77 173 78 174 79 175 80 176 81 177 82 178 83 179 84 180 85 181 86 182
      87 183 88 184 89 185 90 186 91 187 92 188 93 189 94 190 95 191"
```

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.
```

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

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

Test Date: Jun-2024
Hardware Availability: May-2024
Software Availability: May-2024

Platform Notes

```
 BIOS configuration:
 Operating Mode set to Maximum Performance

  Sysinfo program /speccpu/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/bin/sysinfo
  Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
  running on ubuntu2204 Thu Jun 13 20:58:02 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 249 (249.11-0ubuntu3.12)
  12. Failed units, from systemctl list-units --state=failed
  13. Services, from systemctl list-unit-files
  14. Linux kernel boot-time arguments, from /proc/cmdline
  15. cpupower frequency-info
  16. sysctl
  17. /sys/kernel/mm/transparent_hugepage
  18. /sys/kernel/mm/transparent_hugepage/khugepaged
  19. OS release
  20. Disk information
  21. /sys/devices/virtual/dmi/id
  22. dmidecode
  23. BIOS
  ------------------------------------------------------------

  ------------------------------------------------------------
  1. uname -a
    Linux ubuntu2204 5.15.0-112-generic #122-Ubuntu SMP Thu May 23 07:48:21 UTC 2024 x86_64 x86_64 x86_64
    GNU/Linux

  ------------------------------------------------------------
  2. w
    20:58:02 up 26 min,  2 users,  load average: 0.07, 0.03, 0.00
   USER     TTY       FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   spv      tty1      -                20:52    5:14   0.56s  0.01s -bash
   spv      pts/0     -                20:52   18.00s  1.32s  0.53s sudo -i

  ------------------------------------------------------------
  3. Username
    From environment variable $USER:  root
    From the command 'logname':       spv

  ------------------------------------------------------------
  4. ulimit -a
   time(seconds)         unlimited
   file(blocks)          unlimited
   data(kbytes)          unlimited
   stack(kbytes)         unlimited
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

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

Test Date: Jun-2024
Hardware Availability: May-2024
Software Availability: May-2024

Platform Notes (Continued)

```
   coredump(blocks)      0
   memory(kbytes)        unlimited
   locked memory(kbytes) 2097152
   process               6190877
   nofiles               1024
   vmemory(kbytes)       unlimited
   locks                 unlimited
   rtprio                0


   ------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
 /bin/login -p --
 -bash
 sudo -i
 sudo -i
 -bash
 /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/CPU2017.005/templogs/preenv.fpspeed.005.0.log --lognum 005.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /speccpu/cpu2017-1.1.9-amd-aocc400-znver4-A1.2


   ------------------------------------------------------------
6. /proc/cpuinfo
   model name        : AMD EPYC 9454 48-Core Processor
   vendor_id         : AuthenticAMD
   cpu family        : 25
   model             : 17
   stepping          : 1
   microcode         : 0xa101144
   bugs              : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
   TLB size          : 3584 4K pages
   cpu cores         : 48
   siblings          : 96
   2 physical ids (chips)
   192 processors (hardware threads)
   physical id 0: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
   physical id 1: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
   physical id 0: apicids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
   physical id 1: apicids 128-139,144-155,160-171,176-187,192-203,208-219,224-235,240-251
 Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
 virtualized systems.  Use the above data carefully.


   ------------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.37.2:
  Architecture:                x86_64
  CPU op-mode(s):              32-bit, 64-bit
  Address sizes:               52 bits physical, 57 bits virtual
  Byte Order:                  Little Endian
  CPU(s):                      192
  On-line CPU(s) list:         0-191
  Vendor ID:                   AuthenticAMD
  Model name:                  AMD EPYC 9454 48-Core Processor
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jun-2024

Hardware Availability: May-2024

Software Availability: May-2024

Platform Notes (Continued)

```
       CPU family:                     25
       Model:                          17
       Thread(s) per core:             2
       Core(s) per socket:             48
       Socket(s):                      2
       Stepping:                       1
       Frequency boost:                enabled
       CPU max MHz:                    3810.7910
       CPU min MHz:                    1500.0000
       BogoMIPS:                       5491.53
       Flags:                          fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                                       clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp
                                       lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf
                                       rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
                                       movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic
                                       cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce
                                       topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3
                                       cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall
                                       fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
                                       rdseed adx smap avx512ifma clflushopt clwb avx512cd sha_ni avx512bw
                                       avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
                                       cqm_mbm_total cqm_mbm_local 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 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
       Virtualization:                 AMD-V
       L1d cache:                      3 MiB (96 instances)
       L1i cache:                      3 MiB (96 instances)
       L2 cache:                       96 MiB (96 instances)
       L3 cache:                       512 MiB (16 instances)
       NUMA node(s):                   2
       NUMA node0 CPU(s):              0-47,96-143
       NUMA node1 CPU(s):              48-95,144-191
       Vulnerability Gather data sampling: Not affected
       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 rstack overflow: Mitigation; safe RET
       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; PBRSB-eIBRS Not affected; BHI 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       3M    8 Data            1    64        1             64
       L1i       32K       3M    8 Instruction     1    64        1             64
       L2         1M      96M    8 Unified         2  2048        1             64
       L3        32M     512M   16 Unified         3 32768        1             64


   ----------------------------------------------------------
   8. numactl --hardware
   NOTE: a numactl 'node' might or might not correspond to a physical chip.
```

(Continued on next page)

Lenovo Global Technology

SPECspeed®2017_fp_base = 379

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_peak = 396

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jun-2024

Hardware Availability: May-2024

Software Availability: May-2024

Platform Notes (Continued)

```
   available: 2 nodes (0-1)
   node 0 cpus: 0-47,96-143
   node 0 size: 773811 MB
   node 0 free: 771398 MB
   node 1 cpus: 48-95,144-191
   node 1 size: 774021 MB
   node 1 free: 771989 MB
   node distances:
   node    0   1
     0:   10  20
     1:   20  10


   ------------------------------------------------------------
   9. /proc/meminfo
     MemTotal:       1584981488 kB


   ------------------------------------------------------------
   10. who -r
     run-level 5 Jun 13 20:34


   ------------------------------------------------------------
   11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)
     Default Target  Status
     graphical       degraded


   ------------------------------------------------------------
   12. Failed units, from systemctl list-units --state=failed
       UNIT                               LOAD   ACTIVE SUB    DESCRIPTION
     * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured


   ------------------------------------------------------------
   13. Services, from systemctl list-unit-files
     STATE           UNIT FILES
     enabled         ModemManager apparmor blk-availability cloud-config cloud-final cloud-init
                     cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                     grub-common grub-initrd-fallback irqbalance keyboard-setup lvm2-monitor lxd-agent
                     multipathd networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog secureboot-db
                     setvtrgb snapd ssh systemd-networkd systemd-networkd-wait-online systemd-pstore
                     systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                     unattended-upgrades vgauth
     enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
     disabled        console-getty debug-shell ipmievd iscsid nftables rsync serial-getty@
                     systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                     systemd-time-wait-sync upower
     generated       apport openipmi
     indirect        uuidd
     masked          cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo
                     x11-common


   ------------------------------------------------------------
   14. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-5.15.0-112-generic
     root=UUID=e2a91883-1e50-4c69-bb19-9d905b1b613e
     ro


   ------------------------------------------------------------
   15. cpupower frequency-info
     analyzing CPU 0:
       current policy: frequency should be within 1.50 GHz and 2.75 GHz.
                       The governor "performance" may decide which speed to use
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

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

Test Date: Jun-2024
Hardware Availability: May-2024
Software Availability: May-2024

Platform Notes (Continued)

```
                       within this range.
     boost state support:
        Supported: yes
        Active: yes
        Boost States: 0
        Total States: 3
        Pstate-P0:  2750MHz


     ----------------------------------------------------------------
16. 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


     ----------------------------------------------------------------
17. /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


     ----------------------------------------------------------------
18. /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


     ----------------------------------------------------------------
19. OS release
   From /etc/*-release /etc/*-version
   os-release Ubuntu 22.04.4 LTS


     ----------------------------------------------------------------
20. Disk information
SPEC is set to: /speccpu/cpu2017-1.1.9-amd-aocc400-znver4-A1.2
   Filesystem    Type  Size  Used Avail Use% Mounted on
   /dev/nvme1n1p2 ext4  2.9T   25G  2.7T   1% /


     ----------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jun-2024

Hardware Availability: May-2024

Software Availability: May-2024

Platform Notes (Continued)

```
      Vendor:        Lenovo
      Product:       ThinkSystem SR685a V3 System Board
      Product Family: ThinkSystem
      Serial:        None


    --------------------------------------------------------------
 22. dmidecode
   Additional information from dmidecode 3.3 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:
       24x SK Hynix HMCG94MEBRA121N 64 GB 2 rank 4800


    --------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:       Lenovo
     BIOS Version:      R5E101H-1.10
     BIOS Date:         05/09/2024
     BIOS Revision:     1.10
     Firmware Revision: 1.10
```

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
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

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

Test Date: Jun-2024
Hardware Availability: May-2024
Software Availability: May-2024

Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------------------------

========================================================================================
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
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`

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

CPU2017 License: 9017 **Test Date:** Jun-2024
Test Sponsor: Lenovo Global Technology **Hardware Availability:** May-2024
Tested by: Lenovo Global Technology **Software Availability:** May-2024

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
-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 -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=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
-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 -lamdalloc
-lflang
```

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

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

Test Date: Jun-2024
Hardware Availability: May-2024
Software Availability: May-2024

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: -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
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jun-2024

Hardware Availability: May-2024

Software Availability: May-2024

Peak Optimization Flags (Continued)

619.lbm_s (continued):
```
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

638.imagick_s: `Same as 619.lbm_s`

644.nab_s: `basepeak = yes`

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
-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 -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
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

Lenovo Global Technology

ThinkSystem SR685a V3
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 379

SPECspeed®2017_fp_peak = 396

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

Test Date: Jun-2024
Hardware Availability: May-2024
Software Availability: May-2024

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
-fremap-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-U.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-U.xml
http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.xml

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

Tested with SPEC CPU®2017 v1.1.9 on 2024-06-13 16:58:01-0400.
Report generated on 2024-07-17 11:47:22 by CPU2017 PDF formatter v6716.
Originally published on 2024-07-16.