SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECspeed®2017_fp_base = 385

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Threads		Result
603.bwaves_s	224	1100
		1100
607.cactuBSSN_s	224	644
619.lbm_s	224	267
621.wrf_s	224	172
		202
627.cam4_s	224	262
628.pop2_s	224	88.6
		89.2
638.imagick_s	224	775
	448	786
644.nab_s	224	956
649.fotonik3d_s	224	169
		172
654.roms_s	224	758
	448	995

SPECspeed®2017_fp_base (385)   SPECspeed®2017_fp_peak (404)

Hardware

CPU Name: AMD EPYC 9734
 Max MHz: 3000
 Nominal: 2200
Enabled: 224 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 256 MB I+D on chip per chip,
 16 MB shared / 7 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 3.84 TB NVME 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 QGE115H 3.10 released Sep-2023
File System: btrfs
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

Lenovo Global Technology

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_base = 385
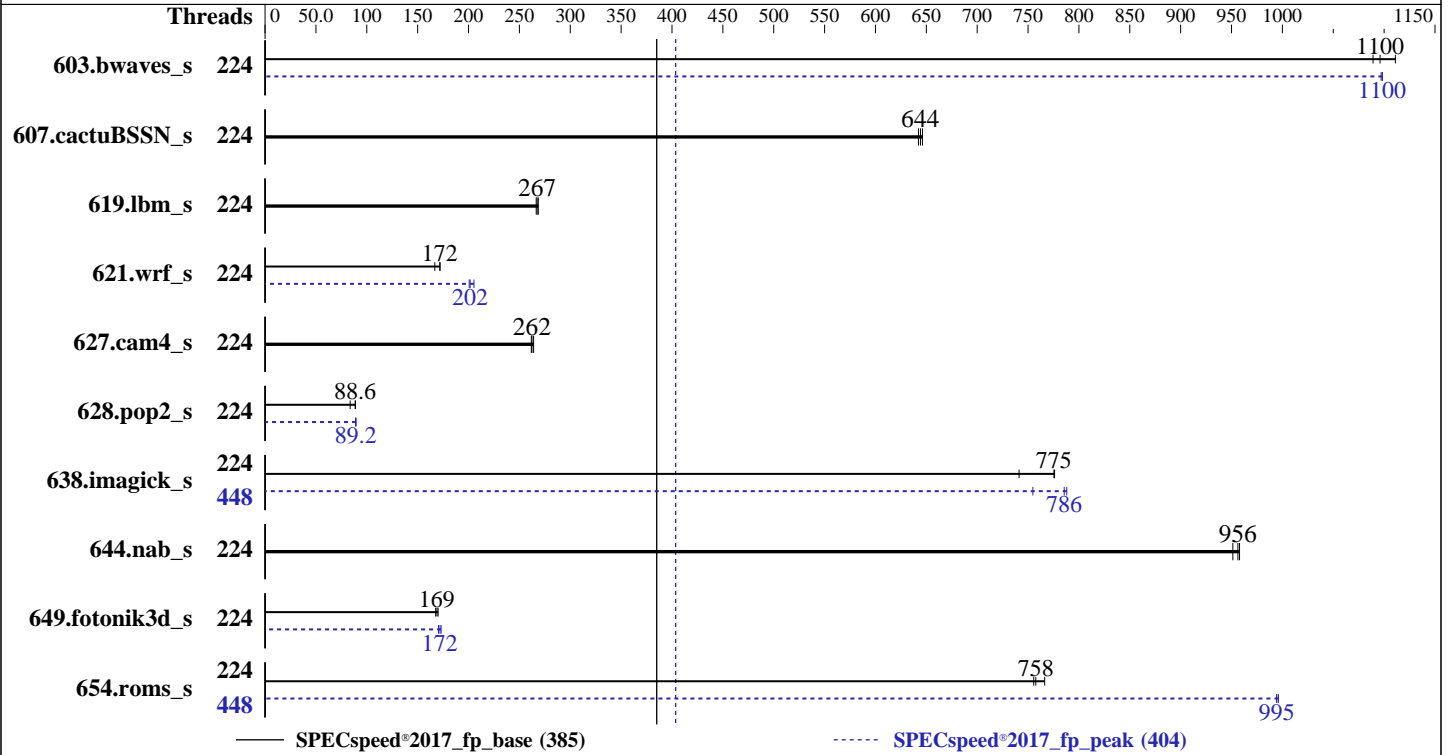
SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	224	54.2	1090	**53.8**	**1100**	53.1	1110	224	53.7	1100	53.8	1100	**53.7**	**1100**
607.cactuBSSN_s	224	26.0	642	**25.9**	**644**	25.8	646	224	26.0	642	**25.9**	**644**	25.8	646
619.lbm_s	224	19.7	267	**19.6**	**267**	19.5	269	224	19.7	267	**19.6**	**267**	19.5	269
621.wrf_s	224	76.9	172	79.3	167	**77.0**	**172**	224	65.9	201	**65.6**	**202**	64.4	205
627.cam4_s	224	**33.8**	**262**	33.9	262	33.6	264	224	**33.8**	**262**	33.9	262	33.6	264
628.pop2_s	224	**134**	**88.6**	134	88.9	142	83.7	224	133	89.4	134	88.9	**133**	**89.2**
638.imagick_s	224	**18.6**	**775**	18.6	776	19.5	741	448	**18.4**	**786**	19.1	755	18.3	788
644.nab_s	224	18.2	958	18.4	951	**18.3**	**956**	224	18.2	958	18.4	951	**18.3**	**956**
649.fotonik3d_s	224	53.6	170	54.4	168	**54.0**	**169**	224	53.5	170	**53.0**	**172**	52.7	173
654.roms_s	224	20.8	756	**20.8**	**758**	20.5	766	448	**15.8**	**995**	15.8	994	15.8	996
SPECspeed®2017_fp_base =		**385**												
SPECspeed®2017_fp_peak =		**404**												

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

Compiler Notes

```
The AMD64 AOCC Compiler Suite is available at
http://developer.amd.com/amd-aocc/
```

Submit Notes

```
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.
```

Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
To always enable THP for peak runs of:
603.bwaves_s, 607.cactuBSSN_s, 619.lbm_s, 627.cam4_s, 628.pop2_s, 638.imagick_s, 644.nab_s, 649.fotonik3d_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
To disable THP for peak runs of 621.wrf_s:
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_base = 385

SPECspeed®2017_fp_peak = 404

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Oct-2023

Hardware Availability: Oct-2023

Software Availability: Nov-2022

Operating System Notes (Continued)

```
'echo never > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
To enable THP only on request for peak runs of 654.roms_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo madvise > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-447"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/amd_speed_aocc400_znver4_A_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "448"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-223"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-223"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-223"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-447"

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-223"
PGHPF_ZMEM = "yes"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 224 1 225 2 226 3 227 4 228 5 229 6 230 7 231 8 232 9 233 10 234 11 235 12 236 13
      237 14 238 15 239 16 240 17 241 18 242 19 243 20 244 21 245 22 246 23 247 24 248 25 249 26 250 27 251
      28 252 29 253 30 254 31 255 32 256 33 257 34 258 35 259 36 260 37 261 38 262 39 263 40 264 41 265 42
      266 43 267 44 268 45 269 46 270 47 271 48 272 49 273 50 274 51 275 52 276 53 277 54 278 55 279 56 280
      57 281 58 282 59 283 60 284 61 285 62 286 63 287 64 288 65 289 66 290 67 291 68 292 69 293 70 294 71
      295 72 296 73 297 74 298 75 299 76 300 77 301 78 302 79 303 80 304 81 305 82 306 83 307 84 308 85 309
      86 310 87 311 88 312 89 313 90 314 91 315 92 316 93 317 94 318 95 319 96 320 97 321 98 322 99 323 100
      324 101 325 102 326 103 327 104 328 105 329 106 330 107 331 108 332 109 333 110 334 111 335 112 336
      113 337 114 338 115 339 116 340 117 341 118 342 119 343 120 344 121 345 122 346 123 347 124 348 125
      349 126 350 127 351 128 352 129 353 130 354 131 355 132 356 133 357 134 358 135 359 136 360 137 361
      138 362 139 363 140 364 141 365 142 366 143 367 144 368 145 369 146 370 147 371 148 372 149 373 150
      374 151 375 152 376 153 377 154 378 155 379 156 380 157 381 158 382 159 383 160 384 161 385 162 386
      163 387 164 388 165 389 166 390 167 391 168 392 169 393 170 394 171 395 172 396 173 397 174 398 175
      399 176 400 177 401 178 402 179 403 180 404 181 405 182 406 183 407 184 408 185 409 186 410 187 411
      188 412 189 413 190 414 191 415 192 416 193 417 194 418 195 419 196 420 197 421 198 422 199 423 200
      424 201 425 202 426 203 427 204 428 205 429 206 430 207 431 208 432 209 433 210 434 211 435 212 436
      213 437 214 438 215 439 216 440 217 441 218 442 219 443 220 444 221 445 222 446 223 447"
```

General Notes

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

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_base = 385

SPECspeed®2017_fp_peak = 404

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

General Notes (Continued)

```
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 Maximum Performance

 Sysinfo program /home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Wed Oct 18 20:12:42 2023

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 249 (249.11+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/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
    20:12:42 up 1 min,  1 user,  load average: 0.66, 0.30, 0.11
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                20:12   25.00s  1.47s  0.20s /bin/bash ./amd_speed_aocc400_znver4_A1.sh


 ------------------------------------------------------------
 3. Username
```

(Continued on next page)

Lenovo Global Technology

SPECspeed®2017_fp_base = 385

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Platform Notes (Continued)

```
   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) 6190531
    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) 6190531
    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
  -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/CPU2017.084/templogs/preenv.fpspeed.084.0.log --lognum 084.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2


    -----------------------------------------------------------
 6. /proc/cpuinfo
    model name       : AMD EPYC 9734 112-Core Processor
    vendor_id        : AuthenticAMD
    cpu family       : 25
    model            : 160
    stepping         : 1
    microcode        : 0xaa00115
    bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size         : 3584 4K pages
    cpu cores        : 112
    siblings         : 224
    2 physical ids (chips)
    448 processors (hardware threads)
    physical id 0: core ids
    0-6,8-14,16-22,24-30,32-38,40-46,48-54,56-62,64-70,72-78,80-86,88-94,96-102,104-110,112-118,120-126
    physical id 1: core ids
    0-6,8-14,16-22,24-30,32-38,40-46,48-54,56-62,64-70,72-78,80-86,88-94,96-102,104-110,112-118,120-126
    physical id 0: apicids
    0-13,16-29,32-45,48-61,64-77,80-93,96-109,112-125,128-141,144-157,160-173,176-189,192-205,208-221,224-237
    ,240-253
    physical id 1: apicids
    256-269,272-285,288-301,304-317,320-333,336-349,352-365,368-381,384-397,400-413,416-429,432-445,448-461,4
```

(Continued on next page)

Lenovo Global Technology

SPECspeed®2017_fp_base = 385

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Platform Notes (Continued)

```
     64-477,480-493,496-509
  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):                   448
  On-line CPU(s) list:      0-447
  Vendor ID:                AuthenticAMD
  Model name:               AMD EPYC 9734 112-Core Processor
  CPU family:               25
  Model:                    160
  Thread(s) per core:       2
  Core(s) per socket:       112
  Socket(s):                2
  Stepping:                 1
  Frequency boost:          enabled
  CPU max MHz:              2999.2180
  CPU min MHz:              1500.0000
  BogoMIPS:                 4393.18
  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 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:                7 MiB (224 instances)
  L1i cache:                7 MiB (224 instances)
  L2 cache:                 224 MiB (224 instances)
  L3 cache:                 512 MiB (32 instances)
  NUMA node(s):             2
  NUMA node0 CPU(s):        0-111,224-335
  NUMA node1 CPU(s):        112-223,336-447
  Vulnerability Itlb multihit:     Not affected
  Vulnerability L1tf:              Not affected
  Vulnerability Mds:               Not affected
  Vulnerability Meltdown:          Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:        Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB
                                   filling
  Vulnerability Srbds:             Not affected
  Vulnerability Tsx async abort:   Not affected
```

(Continued on next page)

Lenovo Global Technology

SPECspeed®2017_fp_base = 385

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Platform Notes (Continued)

```
From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d       32K       7M    8 Data             1    64        1             64
     L1i       32K       7M    8 Instruction      1    64        1             64
     L2         1M     224M    8 Unified          2  2048        1             64
     L3        16M     512M   16 Unified          3 16384        1             64


-------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0-111,224-335
  node 0 size: 773819 MB
  node 0 free: 769554 MB
  node 1 cpus: 112-223,336-447
  node 1 size: 773837 MB
  node 1 free: 772649 MB
  node distances:
  node   0   1
    0:  10  32
    1:  32  10


-------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1584801376 kB


-------------------------------------------------------------
10. who -r
   run-level 3 Oct 18 20:12


-------------------------------------------------------------
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 kbdsettings klog lvm2-monitor nscd nvmefc-boot-connections postfix
                    purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4
                    wickedd-dhcp6 wickedd-nanny
  enabled-runtime   systemd-remount-fs
  disabled          autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                    chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                    firewalld gpm grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                    issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap ntp-wait
                    ntpd nvmf-autoconnect rdisc rpcbind rpmconfigcheck rsyncd serial-getty@
                    smartd_generate_opts snmpd snmptrapd svnserve systemd-boot-check-no-failures
                    systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd
  indirect          wickedd


-------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
   root=UUID=57007a51-1b8d-4733-95f6-d7d0c84f41c9
   splash=silent
   quiet
   security=apparmor
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECspeed®2017_fp_base = 385

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Platform Notes (Continued)

```
    mitigations=auto


    ----------------------------------------------------------
    14. cpupower frequency-info
      analyzing CPU 0:
        current policy: frequency should be within 1.50 GHz and 2.20 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            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
      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-znver4-A1.2
      Filesystem      Type   Size  Used Avail Use% Mounted on
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_base = 385

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Platform Notes (Continued)

```
   /dev/nvme0n1p2 btrfs  3.5T  187G  3.4T   6% /home


  ----------------------------------------------------------------
 20. /sys/devices/virtual/dmi/id
     Vendor:         Lenovo
     Product:        ThinkSystem SR675 V3 System Board
     Product Family: ThinkSystem
     Serial:         None


  ----------------------------------------------------------------
 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:
     24x SK Hynix HMCG94MEBRA123N 64 GB 2 rank 4800


  ----------------------------------------------------------------
 22. BIOS
 (This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Lenovo
   BIOS Version:      QGE115H-3.10
   BIOS Date:         09/07/2023
   BIOS Revision:     3.10
   Firmware Revision: 3.10
```

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)
------------------------------------------------------------------------------
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECspeed®2017_fp_base = 385

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Compiler Version Notes (Continued)

```
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------------------------

==================================================================================================
Fortran, C    | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
--------------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
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 2017-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_base = 385

SPECspeed®2017_fp_peak = 404

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 2017-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_base = 385

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-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)

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

Lenovo Global Technology

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_base = 385

SPECspeed®2017_fp_peak = 404

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

Test Date: Oct-2023
Hardware Availability: Oct-2023
Software Availability: Nov-2022

Peak Optimization Flags (Continued)

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

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: `-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 -flto -Mrecursive
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

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: 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
```

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR675 V3
(2.20 GHz,AMD EPYC 9734)

SPECspeed®2017_fp_base = 385

SPECspeed®2017_fp_peak = 404

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

Peak Optimization Flags (Continued)

628.pop2_s (continued):
```
-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-T.html
http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-T.xml
http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.xml

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 2023-10-18 08:12:41-0400.
Report generated on 2023-11-07 18:42:28 by CPU2017 PDF formatter v6716.
Originally published on 2023-11-07.