SPEC CPU®2017 Floating Point Rate Result

Lenovo Global Technology

ThinkSystem SR675 V3
(2.40 GHz,AMD EPYC 9654)

$SPECrate®2017\_fp\_base = 1410$
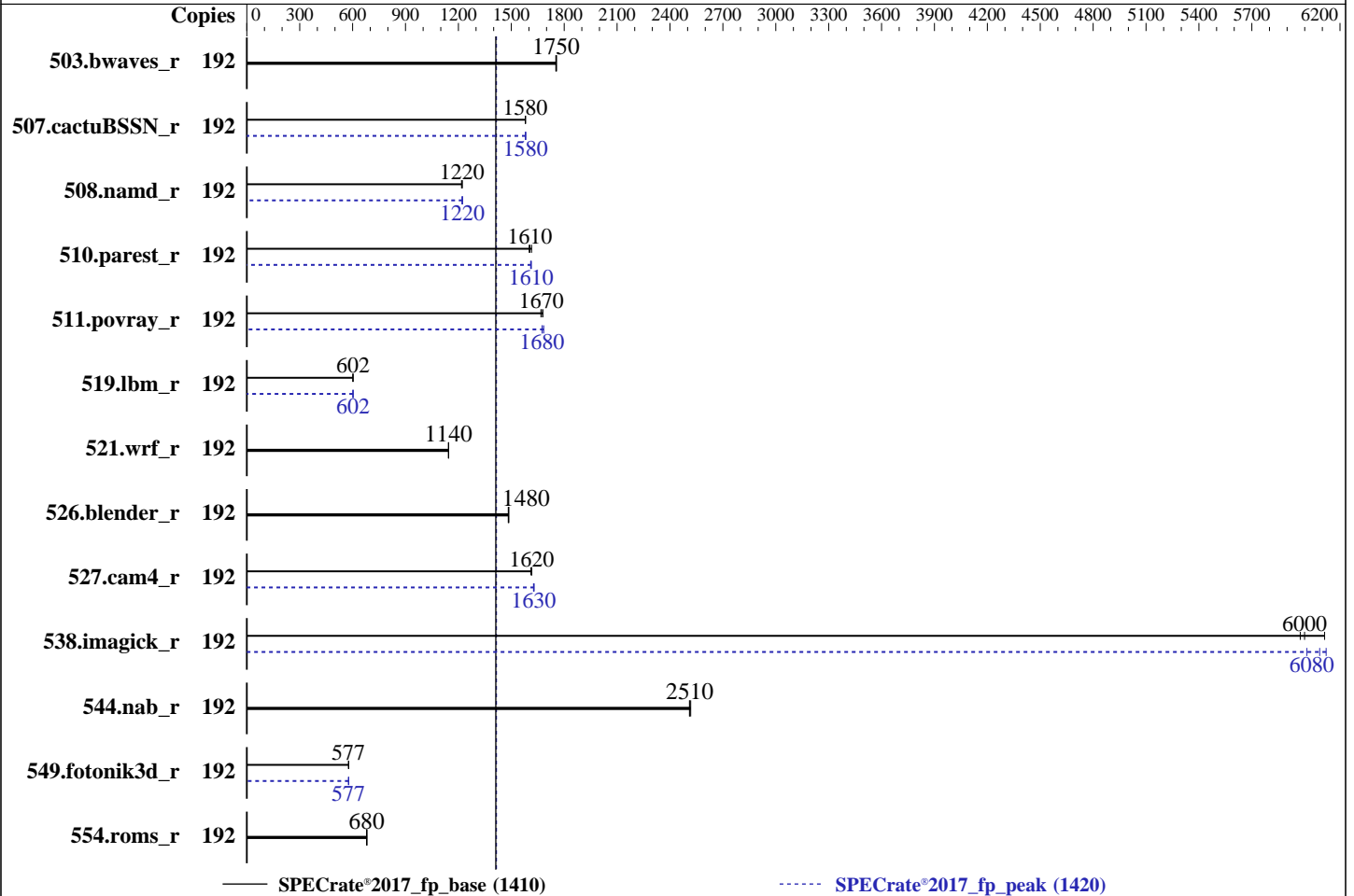
$SPECrate®2017\_fp\_peak = 1420$

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

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

Copies

Benchmark	Copies	base	peak
503.bwaves_r	192	1750	
507.cactuBSSN_r	192	1580	1580
508.namd_r	192	1220	1220
510.parest_r	192	1610	1610
511.povray_r	192	1670	1680
519.lbm_r	192	602	602
521.wrf_r	192	1140	
526.blender_r	192	1480	
527.cam4_r	192	1620	1630
538.imagick_r	192	6000	6080
544.nab_r	192	2510	
549.fotonik3d_r	192	577	577
554.roms_r	192	680	

——— **SPECrate®2017_fp_base (1410)**   ------- **SPECrate®2017_fp_peak (1420)**

Hardware

CPU Name: AMD EPYC 9654
 Max MHz: 3700
 Nominal: 2400
Enabled: 192 cores, 2 chips
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: 384 MB I+D on chip per chip,
  32 MB shared / 8 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: No
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

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

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Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	192	**1098**	**1750**	1099	1750	1096	1760	192	**1098**	**1750**	1099	1750	1096	1760
507.cactuBSSN_r	192	**154**	**1580**	154	1580	154	1580	192	154	1580	**154**	**1580**	154	1580
508.namd_r	192	**149**	**1220**	150	1220	149	1220	192	149	1220	**149**	**1220**	149	1220
510.parest_r	192	311	1620	314	1600	**313**	**1610**	192	**312**	**1610**	311	1610	312	1610
511.povray_r	192	267	1680	269	1670	**268**	**1670**	192	266	1680	268	1680	**268**	**1680**
519.lbm_r	192	336	602	**336**	**602**	336	602	192	336	602	**336**	**602**	336	603
521.wrf_r	192	376	1140	**376**	**1140**	376	1140	192	376	1140	**376**	**1140**	376	1140
526.blender_r	192	197	1480	**197**	**1480**	197	1490	192	197	1480	**197**	**1480**	197	1490
527.cam4_r	192	**208**	**1620**	208	1620	209	1610	192	**206**	**1630**	207	1630	206	1630
538.imagick_r	192	**79.6**	**6000**	79.9	5970	78.1	6110	192	**78.5**	**6080**	78.0	6120	79.4	6010
544.nab_r	192	129	2510	128	2520	**129**	**2510**	192	129	2510	128	2520	**129**	**2510**
549.fotonik3d_r	192	**1296**	**577**	1296	577	1295	578	192	1296	577	1296	578	**1296**	**577**
554.roms_r	192	447	682	449	679	**449**	**680**	192	447	682	449	679	**449**	**680**

SPECrate®2017_fp_base =	**1410**
SPECrate®2017_fp_peak =	**1420**

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,
```

(Continued on next page)

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Operating System Notes (Continued)

```
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
    "/home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu2017-1.1.9-amd
    -aocc400-znver4-A1.2/amd_rate_aocc400_znver4_A_lib/lib32:"
MALLOC_CONF = "retain:true"
```

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:
Choose Operating Mode set to Maximum Performance and then set to Custom Mode
NUMA Nodes per Socket set to NPS4
L2 Stream HW Prefetcher set to Disabled
SMT Mode set to Disabled

 Sysinfo program /home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Oct 12 18:33:31 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
```

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Platform Notes (Continued)

```
 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
    18:33:31 up  1:28,  1 user,  load average: 17.64, 117.07, 161.09
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                17:05   19.00s  1.28s  0.13s /bin/bash ./amd_rate_aocc400_znver4_A1.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) 6190553
   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) 6190553
   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 ./Run026-compliant-amd-ratefp.sh
 python3 ./run_amd_rate_aocc400_znver4_A1.py
 /bin/bash ./amd_rate_aocc400_znver4_A1.sh
 runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fprate
 runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
    --runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.070/templogs/preenv.fprate.070.0.log --lognum 070.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017-1.1.9-amd-aocc400-znver4-A1.2
```

(Continued on next page)

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Platform Notes (Continued)

```
   -----------------------------------------------------------
   6. /proc/cpuinfo
      model name       : AMD EPYC 9654 96-Core Processor
      vendor_id        : AuthenticAMD
      cpu family       : 25
      model            : 17
      stepping         : 1
      microcode        : 0xa10113b
      bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
      TLB size         : 3584 4K pages
      cpu cores        : 96
      siblings         : 96
      2 physical ids (chips)
      192 processors (hardware threads)
      physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
      physical id 1: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
      physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
      physical id 1: apicids
      256-263,272-279,288-295,304-311,320-327,336-343,352-359,368-375,384-391,400-407,416-423,432-439
   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 9654 96-Core Processor
     CPU family:            25
     Model:                 17
     Thread(s) per core:    1
     Core(s) per socket:    96
     Socket(s):             2
     Stepping:              1
     Frequency boost:       enabled
     CPU max MHz:           3707.8120
     CPU min MHz:           1500.0000
     BogoMIPS:              4792.49
     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
```

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Platform Notes (Continued)

```
  Virtualization:              AMD-V
  L1d cache:                   6 MiB (192 instances)
  L1i cache:                   6 MiB (192 instances)
  L2 cache:                    192 MiB (192 instances)
  L3 cache:                    768 MiB (24 instances)
  NUMA node(s):                8
  NUMA node0 CPU(s):           0-23
  NUMA node1 CPU(s):           24-47
  NUMA node2 CPU(s):           48-71
  NUMA node3 CPU(s):           72-95
  NUMA node4 CPU(s):           96-119
  NUMA node5 CPU(s):           120-143
  NUMA node6 CPU(s):           144-167
  NUMA node7 CPU(s):           168-191
  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 disabled, RSB
                                filling
  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       6M    8 Data            1    64        1             64
      L1i       32K       6M    8 Instruction     1    64        1             64
      L2         1M     192M    8 Unified         2  2048        1             64
      L3        32M     768M   16 Unified         3 32768        1             64


  ------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0-23
  node 0 size: 193225 MB
  node 0 free: 191228 MB
  node 1 cpus: 24-47
  node 1 size: 193519 MB
  node 1 free: 192675 MB
  node 2 cpus: 48-71
  node 2 size: 193519 MB
  node 2 free: 192708 MB
  node 3 cpus: 72-95
  node 3 size: 193519 MB
  node 3 free: 192736 MB
  node 4 cpus: 96-119
  node 4 size: 193519 MB
  node 4 free: 192666 MB
  node 5 cpus: 120-143
  node 5 size: 193519 MB
  node 5 free: 192759 MB
  node 6 cpus: 144-167
  node 6 size: 193519 MB
  node 6 free: 192774 MB
  node 7 cpus: 168-191
  node 7 size: 193317 MB
  node 7 free: 192520 MB
```

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Platform Notes (Continued)

```
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  12  12  12  32  32  32  32
    1:  12  10  12  12  32  32  32  32
    2:  12  12  10  12  32  32  32  32
    3:  12  12  12  10  32  32  32  32
    4:  32  32  32  32  10  12  12  12
    5:  32  32  32  32  12  10  12  12
    6:  32  32  32  32  12  12  10  12
    7:  32  32  32  32  12  12  12  10

  ------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1584807208 kB


  ------------------------------------------------------------
10. who -r
  run-level 3 Oct 12 17:05


  ------------------------------------------------------------
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
   mitigations=auto


  ------------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 1.50 GHz and 2.40 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
     boost state support:
       Supported: yes
       Active: yes
```

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Platform Notes (Continued)

```
         --------------------------------------------------------
         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
           /dev/nvme0n1p2 btrfs  3.5T  186G  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.
```

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Platform Notes (Continued)

```
   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             | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(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++           | 508.namd_r(base, peak) 510.parest_r(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        | 511.povray_r(base, peak) 526.blender_r(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
--------------------------------------------------------------------------------------------------


==================================================================================================
C++, C, Fortran | 507.cactuBSSN_r(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
```

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Lenovo Global Technology

ThinkSystem SR675 V3
(2.40 GHz,AMD EPYC 9654)

SPECrate®2017_fp_base = 1410

SPECrate®2017_fp_peak = 1420

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

Compiler Version Notes (Continued)

```
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       | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(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
--------------------------------------------------------------------------------------------

============================================================================================
Fortran, C    | 521.wrf_r(base, peak) 527.cam4_r(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
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

Benchmarks using both Fortran and C:
```
flang clang
```

Benchmarks using both C and C++:
```
clang++ clang
```

Benchmarks using Fortran, C, and C++:
```
clang++ clang flang
```

Lenovo Global Technology

ThinkSystem SR675 V3
(2.40 GHz,AMD EPYC 9654)

SPECrate®2017_fp_base = 1410

SPECrate®2017_fp_peak = 1420

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

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -lflang

C++ benchmarks:
-m64 -flto -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 -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang

Fortran benchmarks:
-m64 -flto -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 -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang

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Lenovo Global Technology

ThinkSystem SR675 V3
(2.40 GHz,AMD EPYC 9654)

SPECrate®2017_fp_base = 1410

SPECrate®2017_fp_peak = 1420

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

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

Benchmarks using both C and C++:
```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:
```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

Base Other Flags

C benchmarks:
```
-Wno-unused-command-line-argument
```

C++ benchmarks:
```
-Wno-unused-command-line-argument
```

Fortran benchmarks:
```
-Wno-unused-command-line-argument
```

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Lenovo Global Technology

ThinkSystem SR675 V3
(2.40 GHz,AMD EPYC 9654)

SPECrate®2017_fp_base = 1410

SPECrate®2017_fp_peak = 1420

Base Other Flags (Continued)

Benchmarks using both Fortran and C:
```
-Wno-unused-command-line-argument
```

Benchmarks using both C and C++:
```
-Wno-unused-command-line-argument
```

Benchmarks using Fortran, C, and C++:
```
-Wno-unused-command-line-argument
```

Peak Compiler Invocation

C benchmarks:
```
clang
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

Benchmarks using both Fortran and C:
```
flang clang
```

Benchmarks using both C and C++:
```
clang++ clang
```

Benchmarks using Fortran, C, and C++:
```
clang++ clang flang
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
519.lbm_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
```

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Lenovo Global Technology

ThinkSystem SR675 V3
(2.40 GHz,AMD EPYC 9654)

SPECrate®2017_fp_base = 1410

SPECrate®2017_fp_peak = 1420

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

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

Peak Optimization Flags (Continued)

519.lbm_r (continued):
```
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

538.imagick_r: `Same as 519.lbm_r`

544.nab_r: `basepeak = yes`

C++ benchmarks:

508.namd_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
```
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

510.parest_r: `-m64 -flto -Wl,-mllvm -Wl,-suppress-fmas`
```
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_r: `-m64 -flto -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 -Kieee
-Mrecursive -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -fvector-transform
-fscalar-transform -lamdlibm -lamdalloc -lflang
```

554.roms_r: `basepeak = yes`

Benchmarks using both Fortran and C:

521.wrf_r: `basepeak = yes`

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Lenovo Global Technology

ThinkSystem SR675 V3
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Tested by: Lenovo Global Technology

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

Peak Optimization Flags (Continued)

```
527.cam4_r: -m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -reduce-array-computations=3 -zopt
-Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-lflang
```

Benchmarks using both C and C++:

```
511.povray_r: -m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm
-lamdalloc
```

```
526.blender_r: basepeak = yes
```

Benchmarks using Fortran, C, and C++:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100 -mllvm -loop-unswitch-threshold=200000
-finline-aggressive -faggressive-loop-transform -fvector-transform
-fscalar-transform -Mrecursive -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang
```

Peak Other Flags

C benchmarks:
```
-Wno-unused-command-line-argument
```

C++ benchmarks:
```
-Wno-unused-command-line-argument
```

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Lenovo Global Technology

ThinkSystem SR675 V3
(2.40 GHz,AMD EPYC 9654)

SPECrate®2017_fp_base = 1410

SPECrate®2017_fp_peak = 1420

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

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

Peak Other Flags (Continued)

Fortran benchmarks:
-Wno-unused-command-line-argument

Benchmarks using both Fortran and C:
-Wno-unused-command-line-argument

Benchmarks using both C and C++:
-Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:
-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.

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