SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology

ThinkSystem SR655 V3
(4.05 GHz,AMD EPYC 9274F)

$SPECspeed^{®}2017\_fp\_base = 212$

$SPECspeed^{®}2017\_fp\_peak = 228$

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

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

Benchmark	Threads	Base	Peak
603.bwaves_s	24	852	
607.cactuBSSN_s	24	311	
	48		329
619.lbm_s	24	114	
621.wrf_s	24	211	
	24		214
627.cam4_s	24	115	
	48		152
628.pop2_s	24	103	
	24		104
638.imagick_s	24	199	
	48		221
644.nab_s	24	312	
	48		358
649.fotonik3d_s	24	148	
654.roms_s	24	267	
	48		300

SPECspeed®2017_fp_base (212)   SPECspeed®2017_fp_peak (228)

Hardware

CPU Name: AMD EPYC 9274F
 Max MHz: 4300
 Nominal: 4050
Enabled: 24 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 256 MB I+D on chip per chip,
   32 MB shared / 3 cores
 Other: None
Memory: 384 GB (12 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 480 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
   Kernel 5.14.21-150400.22-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Lenovo BIOS Version KAE109F 1.40 released Feb-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage

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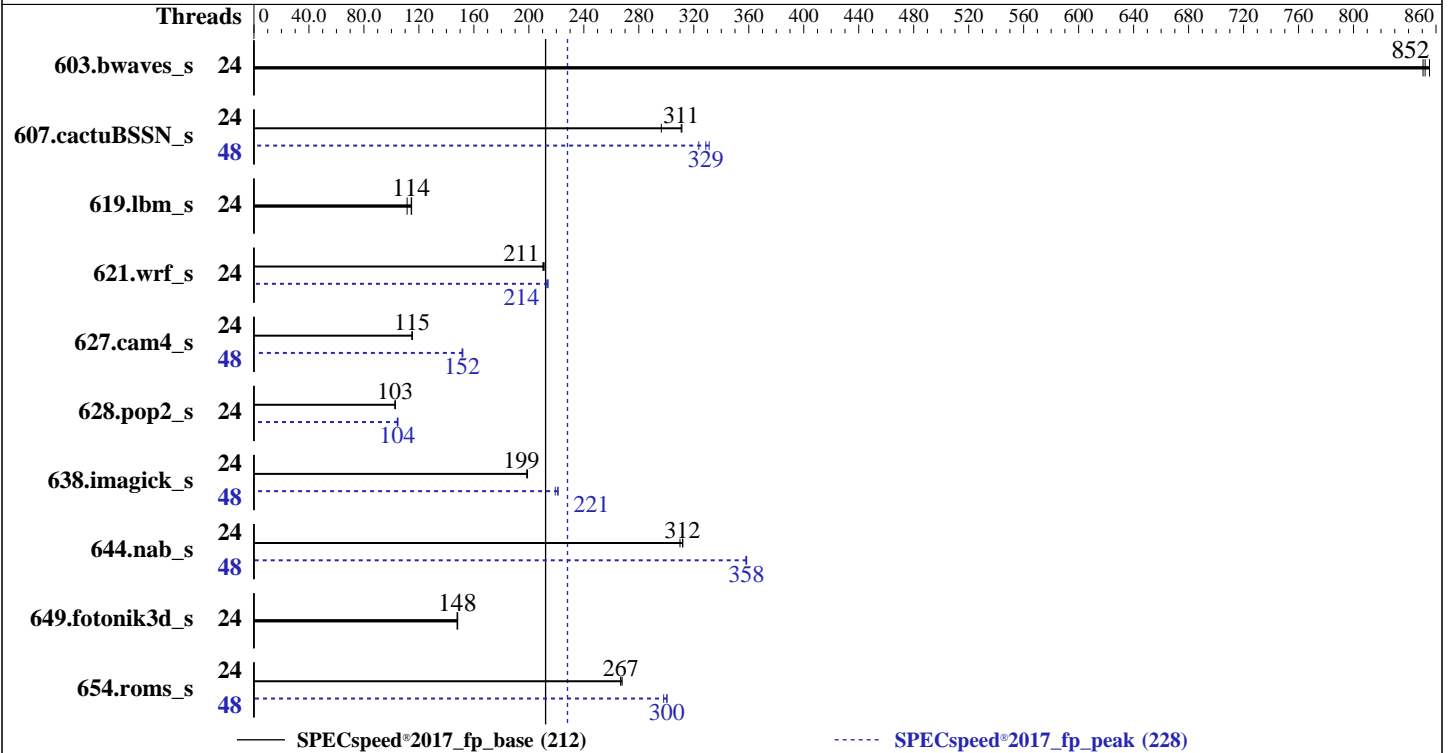
SPECspeed®2017_fp_peak = 228

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Results Table

Benchmark	Base						Peak					
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	24	**69.2**	**852**	69.4	851	69.0	855	24	**69.2**	**852**	69.4	851	69.0	855
607.cactuBSSN_s	24	53.5	311	56.2	296	**53.6**	**311**	48	**50.7**	**329**	50.3	331	51.5	324
619.lbm_s	24	**45.8**	**114**	47.0	111	45.7	115	24	**45.8**	**114**	47.0	111	45.7	115
621.wrf_s	24	62.9	210	62.6	211	**62.8**	**211**	24	**61.9**	**214**	61.8	214	62.1	213
627.cam4_s	24	76.9	115	**77.0**	**115**	77.1	115	48	58.3	152	**58.5**	**152**	58.5	151
628.pop2_s	24	115	103	116	102	**115**	**103**	24	113	105	**114**	**104**	114	104
638.imagick_s	24	72.5	199	72.7	198	**72.5**	**199**	48	**65.3**	**221**	65.2	221	65.8	219
644.nab_s	24	56.0	312	**56.0**	**312**	56.4	310	48	48.8	358	48.7	359	**48.8**	**358**
649.fotonik3d_s	24	61.7	148	61.5	148	**61.6**	**148**	24	61.7	148	61.5	148	**61.6**	**148**
654.roms_s	24	58.8	268	59.0	267	**59.0**	**267**	48	**52.4**	**300**	52.8	298	52.4	301
SPECspeed®2017_fp_base =		**212**										
SPECspeed®2017_fp_peak =		**228**										

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'
```

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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 = "0-47"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.9-amd-aocc400-genoa-B1e/amd_speed_aocc400_genoa_B_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "48"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 24 1 25 2 26 3 27 4 28 5 29 6 30 7 31 8 32 9 33 10 34 11 35 12 36 13 37 14 38 15 39
    16 40 17 41 18 42 19 43 20 44 21 45 22 46 23 47"
```

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.
```

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Platform Notes

```
BIOS configuration:
Operating Mode set to Maximum Performance and then set it to Custom Mode

 Sysinfo program /home/cpu2017-1.1.9-amd-aocc400-genoa-B1e/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Apr  4 01:55:26 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
   01:55:26 up 11:14,  1 user,  load average: 0.52, 14.84, 24.50
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                14:41   10:57m  0.99s  0.08s /bin/bash ./amd_speed_aocc400_genoa_B1.sh

 ------------------------------------------------------------
 3. Username
   From environment variable $USER:  root

 ------------------------------------------------------------
 4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 1546020
   max locked memory       (kbytes, -l) 2097152
   max memory size         (kbytes, -m) unlimited
```

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Platform Notes (Continued)

```
   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) 1546020
   virtual memory         (kbytes, -v) unlimited
   file locks                      (-x) unlimited


    -----------------------------------------------------------
 5. sysinfo process ancestry
  /usr/lib/systemd/systemd --switched-root --system --deserialize 30
  login -- root
  -bash
  /bin/bash ./speccpu_genoa.sh
  /bin/bash ./Run036-compliant-amd-speedfp.sh
  python3 ./run_amd_speed_aocc400_genoa_B1.py
  /bin/bash ./amd_speed_aocc400_genoa_B1.sh
  runcpu --config amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 fpspeed
  runcpu --configfile amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower
    --runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
    $SPEC/tmp/CPU2017.274/templogs/preenv.fpspeed.274.0.log --lognum 274.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017-1.1.9-amd-aocc400-genoa-B1e


    -----------------------------------------------------------
 6. /proc/cpuinfo
     model name       : AMD EPYC 9274F 24-Core Processor
     vendor_id        : AuthenticAMD
     cpu family       : 25
     model            : 17
     stepping         : 1
     microcode        : 0xa101111
     bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size         : 3584 4K pages
     cpu cores        : 24
     siblings         : 48
     1 physical ids (chips)
     48 processors (hardware threads)
     physical id 0: core ids 0-2,8-10,16-18,24-26,32-34,40-42,48-50,56-58
     physical id 0: apicids 0-5,16-21,32-37,48-53,64-69,80-85,96-101,112-117
   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):                    48
   On-line CPU(s) list:       0-47
   Vendor ID:                 AuthenticAMD
   Model name:                AMD EPYC 9274F 24-Core Processor
   CPU family:                25
   Model:                     17
   Thread(s) per core:        2
```

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Platform Notes (Continued)

```
    Core(s) per socket:            24
    Socket(s):                     1
    Stepping:                      1
    Frequency boost:               enabled
    CPU max MHz:                   4303.1250
    CPU min MHz:                   1500.0000
    BogoMIPS:                      8087.15
    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:                     768 KiB (24 instances)
    L1i cache:                     768 KiB (24 instances)
    L2 cache:                      24 MiB (24 instances)
    L3 cache:                      256 MiB (8 instances)
    NUMA node(s):                  1
    NUMA node0 CPU(s):             0-47
    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

  From lscpu --cache:
      NAME ONE-SIZE ALL-SIZE WAYS TYPE          LEVEL  SETS PHY-LINE COHERENCY-SIZE
      L1d       32K     768K   8 Data               1    64        1             64
      L1i       32K     768K   8 Instruction        1    64        1             64
      L2         1M      24M   8 Unified            2  2048        1             64
      L3        32M     256M  16 Unified            3 32768        1             64

  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 1 nodes (0)
    node 0 cpus: 0-47
    node 0 size: 386529 MB
    node 0 free: 385575 MB
    node distances:
    node   0
      0:  10

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

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Platform Notes (Continued)

```
 9. /proc/meminfo
    MemTotal:       395805856 kB


   -----------------------------------------------------------
10. who -r
   run-level 3 Apr 3 14:41


   -----------------------------------------------------------
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 iscsi
                       issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
                       smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
    enabled-runtime    systemd-remount-fs
    disabled           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 iscsi-init
                       iscsid iscsiuio issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs
                       nfs-blkmap nmb rdisc rpcbind rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts smb
                       snmpd snmptrapd systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                       systemd-time-wait-sync systemd-timesyncd
    generated          ntp_sync
    indirect           wickedd


   -----------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=4fcd643d-e392-48aa-b6f6-80f024d1c633
    splash=silent
    mitigations=auto
    quiet
    security=apparmor


   -----------------------------------------------------------
14. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 1.50 GHz and 4.05 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes


   -----------------------------------------------------------
15. sysctl
    kernel.numa_balancing              0
    kernel.randomize_va_space          0
    vm.compaction_proactiveness        20
    vm.dirty_background_bytes          0
    vm.dirty_background_ratio          10
    vm.dirty_bytes                     0
    vm.dirty_expire_centisecs          3000
    vm.dirty_ratio                     8
    vm.dirty_writeback_centisecs       500
    vm.dirtytime_expire_seconds        43200
```

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Platform Notes (Continued)

```
    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-genoa-B1e
      Filesystem      Type  Size  Used Avail Use% Mounted on
      /dev/sda3       xfs   446G   24G  422G   6% /


    -----------------------------------------------------------
    20. /sys/devices/virtual/dmi/id
        Vendor:         Lenovo
        Product:        ThinkSystem SR655V3
        Product Family: ThinkSystem
        Serial:         1234567890


    -----------------------------------------------------------
    21. dmidecode
      Additional information from dmidecode 3.2 follows.  WARNING: Use caution when you interpret this section.
      The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
      determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
      "DMTF SMBIOS" standard.
      Memory:
        12x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800


    -----------------------------------------------------------
    22. BIOS
    (This section combines info from /sys/devices and dmidecode.)
        BIOS Vendor:    Lenovo
        BIOS Version:   KAE109F-1.40
```

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Platform Notes (Continued)

```
    BIOS Date:       02/27/2023
    BIOS Revision:   1.40
    Firmware Revision: 1.40
```

Compiler Version Notes

```
==============================================================================
C              | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
Fortran        | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
Fortran, C     | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------
```

SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology

ThinkSystem SR655 V3
(4.05 GHz,AMD EPYC 9274F)

SPECspeed®2017_fp_base = 212

SPECspeed®2017_fp_peak = 228

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

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

Base Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

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

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

Base Portability Flags

603.bwaves_s: `-DSPEC_LP64`
607.cactuBSSN_s: `-DSPEC_LP64`
619.lbm_s: `-DSPEC_LP64`
621.wrf_s: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
627.cam4_s: `-DSPEC_CASE_FLAG -DSPEC_LP64`
628.pop2_s: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
638.imagick_s: `-DSPEC_LP64`
644.nab_s: `-DSPEC_LP64`
649.fotonik3d_s: `-DSPEC_LP64`
654.roms_s: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-m64 -Wl,-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
```

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

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-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
```

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
```

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Test Date: Apr-2023
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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
-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: -m64 -Wl,-mllvm -Wl,-region-vectorize -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
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

Fortran benchmarks:

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

Peak Optimization Flags (Continued)

603.bwaves_s: `basepeak = yes`

649.fotonik3d_s: `basepeak = yes`

654.roms_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -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`

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`

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`

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Test Sponsor: Lenovo Global Technology		**Hardware Availability:**	Apr-2023
Tested by: Lenovo Global Technology		**Software Availability:**	Nov-2022

Peak Optimization Flags (Continued)

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 -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 -finline-aggressive -mllvm -unroll-threshold=100
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Peak Other Flags

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

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

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

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-R.html
http://www.spec.org/cpu2017/flags/aocc400-flags.html

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

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

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