SPEC CPU®2017 Integer Speed Result

Lenovo Global Technology

$SPECspeed^{®}2017\_int\_base = 11.3$

ThinkSystem SD535 V3
(2.25 GHz, AMD EPYC 9754)

$SPECspeed^{®}2017\_int\_peak = 11.5$

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

Test Date: Apr-2024
Hardware Availability: May-2024
Software Availability: Jun-2023

Threads graph (scale 0 to 23.0):

- **600.perlbench_s** — 128: 6.91; 1: 6.93
- **602.gcc_s** — 128: 11.7
- **605.mcf_s** — 128: 17.1; 1: 17.7
- **620.omnetpp_s** — 128: 6.35
- **623.xalancbmk_s** — 128: 15.8; 1: 17.1
- **625.x264_s** — 128: 17.5; 1: 17.5
- **631.deepsjeng_s** — 128: 5.93
- **641.leela_s** — 128: 4.89
- **648.exchange2_s** — 128: 21.4
- **657.xz_s** — 128: 22.7; 256: 22.8

SPECspeed®2017_int_base (11.3) ———
SPECspeed®2017_int_peak (11.5) ┄┄┄┄

Hardware

CPU Name: AMD EPYC 9754
 Max MHz: 3100
 Nominal: 2250
Enabled: 128 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,
 16 MB shared / 8 cores
 Other: None
Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB M.2 SATA SSD
Other: CPU Cooling: Air

Software

OS: SUSE Linux Enterprise Server 15 SP5
 Kernel 5.14.21-150500.53-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Lenovo BIOS Version GPE103H 1.10 released Mar-2024
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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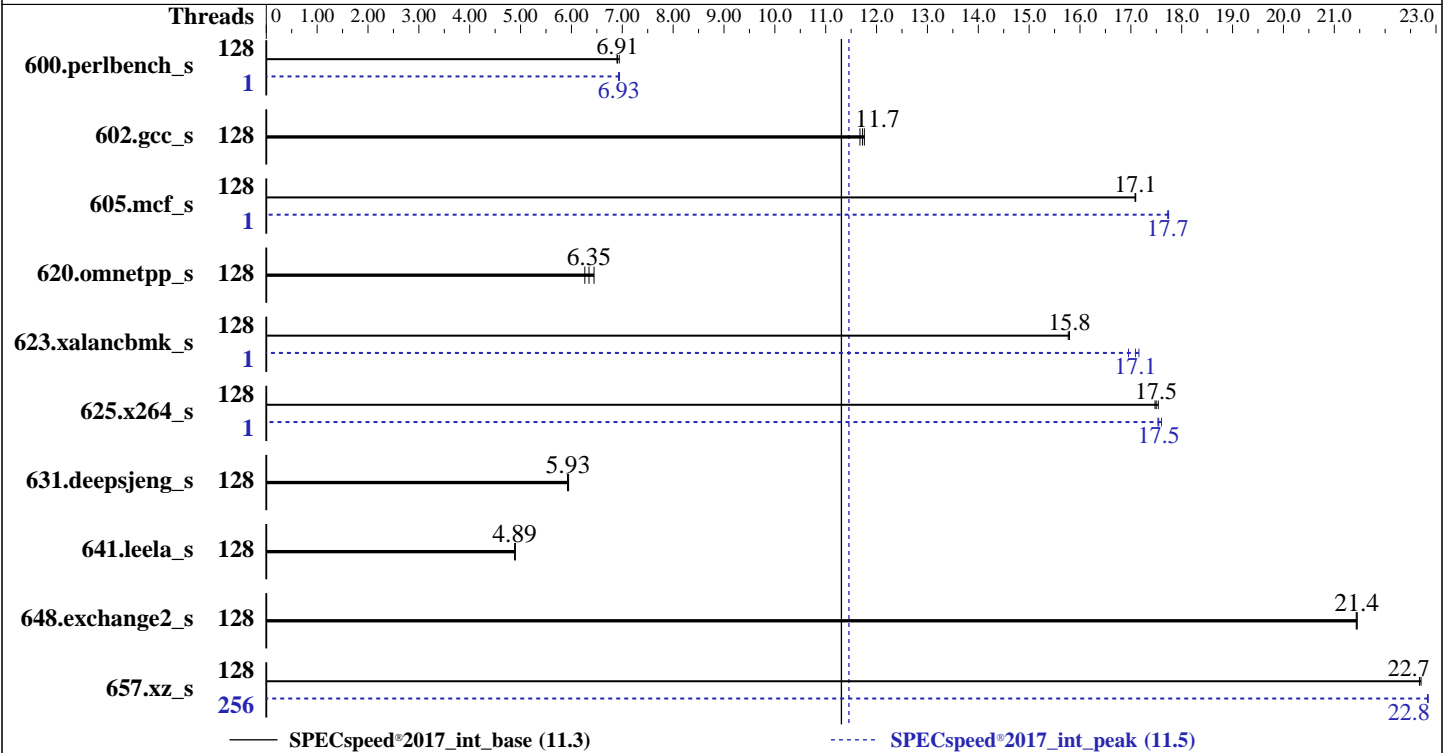
SPECspeed®2017_int_peak = 11.5

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	128	257	6.90	256	6.94	**257**	**6.91**	1	**256**	**6.93**	256	6.93	256	6.95
602.gcc_s	128	**340**	**11.7**	341	11.7	339	11.8	128	**340**	**11.7**	341	11.7	339	11.8
605.mcf_s	128	276	17.1	276	17.1	**276**	**17.1**	1	266	17.7	266	17.7	**266**	**17.7**
620.omnetpp_s	128	260	6.26	253	6.44	**257**	**6.35**	128	260	6.26	253	6.44	**257**	**6.35**
623.xalancbmk_s	128	**89.7**	**15.8**	89.7	15.8	89.9	15.8	1	83.6	17.0	82.6	17.2	**82.9**	**17.1**
625.x264_s	128	101	17.5	**101**	**17.5**	101	17.5	1	101	17.5	**101**	**17.5**	100	17.6
631.deepsjeng_s	128	**241**	**5.93**	242	5.92	241	5.94	128	**241**	**5.93**	242	5.92	241	5.94
641.leela_s	128	**349**	**4.89**	348	4.90	349	4.89	128	**349**	**4.89**	348	4.90	349	4.89
648.exchange2_s	128	137	21.4	137	21.4	**137**	**21.4**	128	137	21.4	137	21.4	**137**	**21.4**
657.xz_s	128	272	22.7	273	22.7	**273**	**22.7**	256	271	22.8	**271**	**22.8**	271	22.8
SPECspeed®2017_int_base =						**11.3**								
SPECspeed®2017_int_peak =						**11.5**								

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.

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

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-255"
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 = "256"

Environment variables set by runcpu during the 600.perlbench_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 605.mcf_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 625.x264_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-255"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "8"
```

General Notes

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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
```

Platform Notes

```
BIOS configuration:
Operating Mode set to Maximum Performance and then set it to Custom Mode
NUMA Nodes per Socket set to NPS4

 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 Apr 10 14:24:18 2024

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
```

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SPECspeed®2017_int_base = 11.3

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CPU2017 License: 9017　　　　　　　　　　　　　　　**Test Date:** Apr-2024
Test Sponsor: Lenovo Global Technology　　　　　　**Hardware Availability:** May-2024
Tested by: Lenovo Global Technology　　　　　　　　**Software Availability:** Jun-2023

Platform Notes (Continued)

```
     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 (249.16+suse.171.gdad0071f15)
    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 5.14.21-150500.53-default #1 SMP PREEMPT_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)
       x86_64 x86_64 x86_64 GNU/Linux


    -------------------------------------------------------------
     2. w
        14:24:18 up 1 min,  1 user,  load average: 0.35, 0.19, 0.07
       USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
       root     tty1     -                14:23   18.00s  1.45s  0.19s /bin/bash ./amd_speed_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) 3094377
       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) 3094377
       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 ./Run035-compliant-amd-speedint.sh
```

(Continued on next page)

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Platform Notes (Continued)

```
 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 intspeed
 runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode speed --tune base:peak --size test:train:refspeed intspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.011/templogs/preenv.intspeed.011.0.log --lognum 011.0 --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 9754 128-Core Processor
    vendor_id        : AuthenticAMD
    cpu family       : 25
    model            : 160
    stepping         : 2
    microcode        : 0xaa00213
    bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size         : 3584 4K pages
    cpu cores        : 128
    siblings         : 256
    1 physical ids (chips)
    256 processors (hardware threads)
    physical id 0: core ids 0-127
    physical id 0: apicids 0-255
 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 2.37.4:
   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):                 256
   On-line CPU(s) list:    0-255
   Vendor ID:              AuthenticAMD
   Model name:             AMD EPYC 9754 128-Core Processor
   CPU family:             25
   Model:                  160
   Thread(s) per core:     2
   Core(s) per socket:     128
   Socket(s):              1
   Stepping:               2
   Frequency boost:        enabled
   CPU max MHz:            3100.3411
   CPU min MHz:            1500.0000
   BogoMIPS:               4493.08
   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 amd_lbr_v2 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 perfmon_v2 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
```

(Continued on next page)

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Platform Notes (Continued)

```
                              avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
                              cqm_mbm_total cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru
                              wbnoinvd amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale
                              vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic
                              v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku ospke avx512_vbmi2
                              gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdpid
                              overflow_recov succor smca fsrm flush_l1d
   Virtualization:            AMD-V
   L1d cache:                 4 MiB (128 instances)
   L1i cache:                 4 MiB (128 instances)
   L2 cache:                  128 MiB (128 instances)
   L3 cache:                  256 MiB (16 instances)
   NUMA node(s):              4
   NUMA node0 CPU(s):         0-31,128-159
   NUMA node1 CPU(s):         32-63,160-191
   NUMA node2 CPU(s):         64-95,192-223
   NUMA node3 CPU(s):         96-127,224-255
   Vulnerability Itlb multihit:   Not affected
   Vulnerability L1tf:            Not affected
   Vulnerability Mds:             Not affected
   Vulnerability Meltdown:        Not affected
   Vulnerability Mmio stale data: Not affected
   Vulnerability Retbleed:        Not affected
   Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
   Vulnerability Spectre v1:      Mitigation; usercopy/swapgs barriers and __user pointer sanitization
   Vulnerability Spectre v2:      Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB
                                  filling, PBRSB-eIBRS Not affected
   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       4M    8 Data             1    64        1             64
      L1i       32K       4M    8 Instruction      1    64        1             64
      L2         1M     128M    8 Unified          2  2048        1             64
      L3        16M     256M   16 Unified          3 16384        1             64


  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0-31,128-159
    node 0 size: 193216 MB
    node 0 free: 192349 MB
    node 1 cpus: 32-63,160-191
    node 1 size: 193519 MB
    node 1 free: 192421 MB
    node 2 cpus: 64-95,192-223
    node 2 size: 193485 MB
    node 2 free: 192416 MB
    node 3 cpus: 96-127,224-255
    node 3 size: 193401 MB
    node 3 free: 192550 MB
    node distances:
    node   0   1   2   3
      0:  10  20  20  20
      1:  20  10  20  20
      2:  20  20  10  20
      3:  20  20  20  10
```

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Platform Notes (Continued)

```
  ----------------------------------------------------------------
  9. /proc/meminfo
     MemTotal:       792191348 kB


  ----------------------------------------------------------------
  10. who -r
    run-level 3 Apr 10 14:23


  ----------------------------------------------------------------
  11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
    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@ irqbalance issue-generator
                      kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd
                      systemd-pstore 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 haveged-switch-root hwloc-dump-hwdata ipmi ipmievd
                      issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind
                      rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts 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-5.14.21-150500.53-default
     root=UUID=3505b9fe-eece-4ce1-bf46-116abd9cf337
     splash=silent
     mitigations=auto
     quiet
     security=apparmor


  ----------------------------------------------------------------
  14. cpupower frequency-info
     analyzing CPU 0:
       current policy: frequency should be within 1.50 GHz and 2.25 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
```

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Platform Notes (Continued)

```
      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 SP5


   ----------------------------------------------------------------
   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/sda3      xfs   893G   25G  868G   3% /


   ----------------------------------------------------------------
   20. /sys/devices/virtual/dmi/id
         Vendor:        Lenovo
         Product:       ThinkSystem SD535V3 MB
         Product Family: ThinkSystem
         Serial:        1234567890


   ----------------------------------------------------------------
   21. dmidecode
      Additional information from dmidecode 3.4 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:
        1x Samsung M321R8GA0BB0-CQKEG 64 GB 2 rank 4800
        2x Samsung M321R8GA0BB0-CQKMG 64 GB 2 rank 4800
        9x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800



   ----------------------------------------------------------------
   22. BIOS
```

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SPECspeed®2017_int_base = 11.3

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Platform Notes (Continued)

```
   (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:       Lenovo
     BIOS Version:      GPE103H-1.10
     BIOS Date:         03/12/2024
     BIOS Revision:     1.10
     Firmware Revision: 0.50
```

Compiler Version Notes

```
==============================================================================
C        | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak)
         | 657.xz_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++      | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak)
         | 641.leela_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
------------------------------------------------------------------------------


==============================================================================
Fortran | 648.exchange2_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
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
clang
```

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

Fortran benchmarks:
```
flang
```

SPEC CPU®2017 Integer Speed Result
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Lenovo Global Technology

ThinkSystem SD535 V3
(2.25 GHz, AMD EPYC 9754)

SPECspeed®2017_int_base = 11.3

SPECspeed®2017_int_peak = 11.5

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

Test Date: Apr-2024
Hardware Availability: May-2024
Software Availability: Jun-2023

Base Portability Flags

600.perlbench_s: `-DSPEC_LINUX_X64 -DSPEC_LP64`
602.gcc_s: `-DSPEC_LP64`
605.mcf_s: `-DSPEC_LP64`
620.omnetpp_s: `-DSPEC_LP64`
623.xalancbmk_s: `-DSPEC_LINUX -DSPEC_LP64`
625.x264_s: `-DSPEC_LP64`
631.deepsjeng_s: `-DSPEC_LP64`
641.leela_s: `-DSPEC_LP64`
648.exchange2_s: `-DSPEC_LP64`
657.xz_s: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -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 -lflang
-lamdalloc
```

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
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fvirtual-function-elimination -fvisibility=hidden -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc-ext
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fopenmp -flto -mllvm -optimize-strided-mem-cost
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -fopenmp=libomp
-lomp -lamdlibm -lflang -lamdalloc
```

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

Lenovo Global Technology

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Base Other Flags

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

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

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

Peak Compiler Invocation

C benchmarks:
```
clang
```

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

Fortran benchmarks:
```
flang
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-allow-multiple-definition -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
```

```
602.gcc_s: basepeak = yes
```

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Lenovo Global Technology

ThinkSystem SD535 V3
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SPECspeed®2017_int_base = 11.3

SPECspeed®2017_int_peak = 11.5

CPU2017 License: 9017　　　　　　　　　　　　　　　　　**Test Date:**　　　　　　　Apr-2024
Test Sponsor:　Lenovo Global Technology　　　　　　　**Hardware Availability:** May-2024
Tested by:　　　Lenovo Global Technology　　　　　　　**Software Availability:**　Jun-2023

Peak Optimization Flags (Continued)

605.mcf_s: `Same as 600.perlbench_s`

625.x264_s: `Same as 600.perlbench_s`

657.xz_s: `Same as 600.perlbench_s`

C++ benchmarks:

620.omnetpp_s: `basepeak = yes`

623.xalancbmk_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-do-block-reorder=aggressive -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp`
`-flto -finline-aggressive -mllvm -unroll-threshold=100`
`-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt`
`-mllvm -do-block-reorder=aggressive`
`-fvirtual-function-elimination -fvisibility=hidden`
`-fopenmp=libomp -lomp -lamdlibm -lamdalloc-ext -lflang`

631.deepsjeng_s: `basepeak = yes`

641.leela_s: `basepeak = yes`

Fortran benchmarks:

648.exchange2_s: `basepeak = yes`

Peak Other Flags

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

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

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Genoa-U.html
http://www.spec.org/cpu2017/flags/aocc400-flags.2023-09-13.html

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

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