SPEC CPU®2017 Integer Speed Result

Dell Inc.

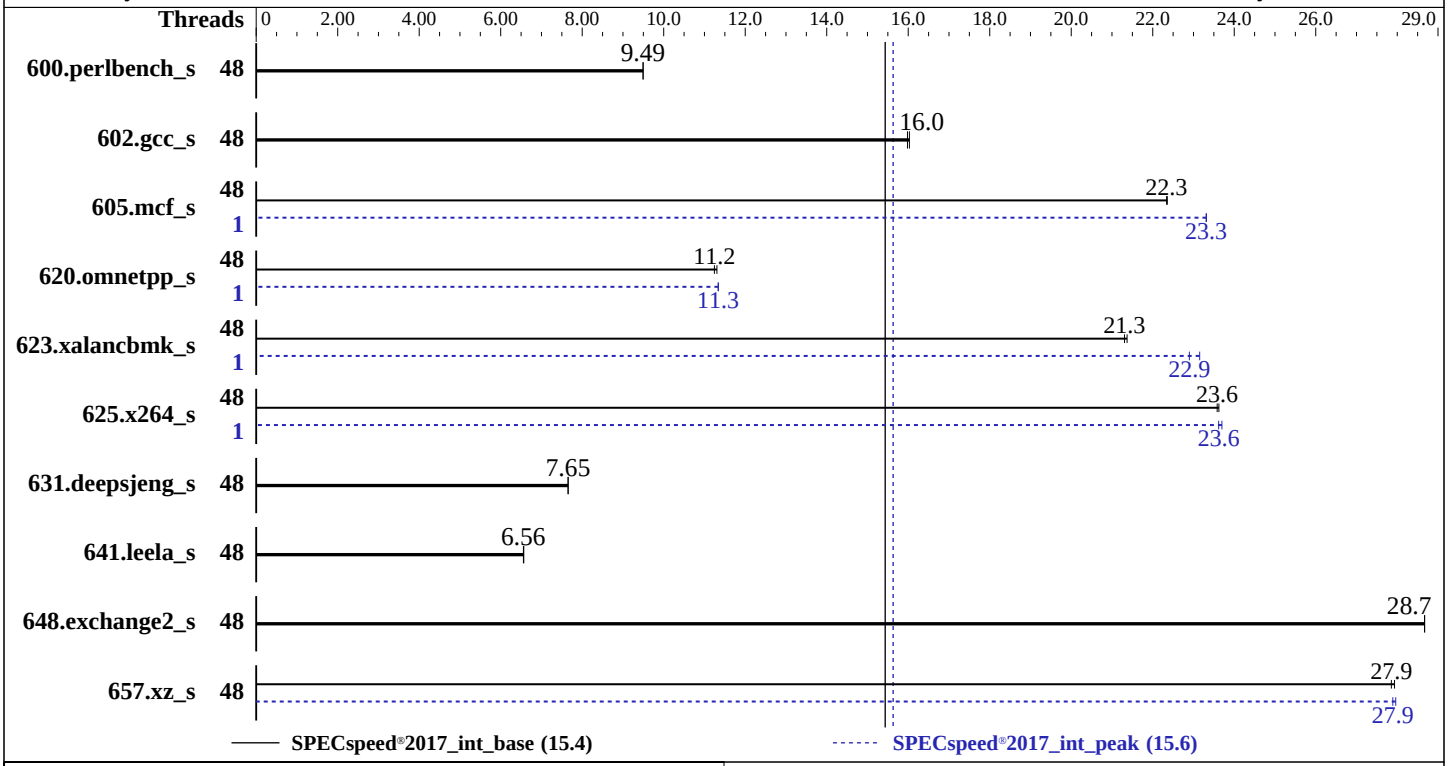
PowerEdge R7625 (AMD EPYC 9254 24-Core Processor)

SPECspeed®2017_int_base = 15.4

SPECspeed®2017_int_peak = 15.6

CPU2017 License: 6573
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Oct-2023
Hardware Availability: Feb-2023
Software Availability: Oct-2023



Hardware

CPU Name:	AMD EPYC 9254
Max MHz:	4150
Nominal:	2900
Enabled:	48 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:	128 MB I+D on chip per chip, 32 MB shared / 6 cores
Other:	None
Memory:	768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
Storage:	50 GB on tmpfs
Other:	None

Software

OS:	Ubuntu 22.04.3 LTS 5.15.0-86-generic
Compiler:	C/C++/Fortran: Version 4.0.0 of AOCC
Parallel:	Yes
Firmware:	Version 1.4.6 released Jul-2023
File System:	tmpfs
System State:	Run level 5 (graphical 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.

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	48	187	9.50	**187**	**9.49**			48	187	9.50	**187**	**9.49**		
602.gcc_s	48	248	16.0	**249**	**16.0**			48	248	16.0	**249**	**16.0**		
605.mcf_s	48	211	22.4	**211**	**22.3**			1	**203**	**23.3**	202	23.3		
620.omnetpp_s	48	**145**	**11.2**	144	11.3			1	144	11.3	**144**	**11.3**		
623.xalancbmk_s	48	66.3	21.4	**66.5**	**21.3**			1	**61.9**	**22.9**	61.2	23.2		
625.x264_s	48	**74.8**	**23.6**	74.7	23.6			1	74.4	23.7	**74.7**	**23.6**		
631.deepsjeng_s	48	**187**	**7.65**	187	7.65			48	**187**	**7.65**	187	7.65		
641.leela_s	48	**260**	**6.56**	260	6.57			48	**260**	**6.56**	260	6.57		
648.exchange2_s	48	103	28.7	**103**	**28.7**			48	103	28.7	**103**	**28.7**		
657.xz_s	48	**222**	**27.9**	221	27.9			48	221	28.0	**222**	**27.9**		

SPECspeed®2017_int_base = 15.4

SPECspeed®2017_int_peak = 15.6

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.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-47"
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1.1/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 = "48"

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

Environment variables set by runcpu during the 620.omnetpp_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 = "0-47"
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.


 Benchmark run from a 50 GB ramdisk created with the cmd: "mount -t tmpfs -o size=50G tmpfs /mnt/ramdisk"
```

Platform Notes

```
 BIOS settings:
            DRAM Refresh Delay : Performance
         DIMM Self Healing on
    Uncorrectable Memory Error : Disabled

             Logical Processor : Disabled
     Virtualization Technology : Disabled
         NUMA Nodes per Socket : 4
       L3 cache as NUMA Domain : Enabled

               System Profile : Custom
                     C-States : Disabled
           Memory Patrol Scrub : Disabled
           PCI ASPM L1 Link
```

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Platform Notes (Continued)

```
             Power Management : Disabled
           Determinism Slider : Power Determinism
      Algorithm Performance
        Boost Disable (ApbDis) : Enabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1.1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on amd-spa Tue Oct 10 20:57:36 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 (249.11-0ubuntu3.10)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux amd-spa 5.15.0-86-generic #96-Ubuntu SMP Wed Sep 20 08:23:49 UTC 2023 x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   20:57:36 up 1 min,  1 user,  load average: 0.26, 0.09, 0.03
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                27Nov61 32.00s  1.39s  0.29s /bin/bash ./amd_speed_aocc400_znver4_A1.sh

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

------------------------------------------------------------
4. ulimit -a
  time(seconds)        unlimited
  file(blocks)         unlimited
  data(kbytes)         unlimited
  stack(kbytes)        unlimited
  coredump(blocks)     0
```

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Platform Notes (Continued)

```
   memory(kbytes)       unlimited
   locked memory(kbytes) 2097152
   process              3093892
   nofiles              1024
   vmemory(kbytes)      unlimited
   locks                unlimited
   rtprio               0

------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
 /bin/login -p --
 -bash
 /bin/bash ./DELL_speed.sh
 /bin/bash ./dell-run-main.sh speed
 /bin/bash ./dell-run-main.sh speed
 /bin/bash ./dell-run-speccpu.sh speed --define DL-BIOSinc=Dell-BIOS_EPYC-4.inc --define DL-VERS=v4.8
   --output_format html,pdf,txt
 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 2 --define
   DL-BIOS-L3NUMA=1 --define DL-BIOS-NPS=2 --define DL-BIOSinc=Dell-BIOS_EPYC-4.inc --define DL-VERS=v4.8
   --output_format html,pdf,txt intspeed
 runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 2 --define
   DL-BIOS-L3NUMA=1 --define DL-BIOS-NPS=2 --define DL-BIOSinc=Dell-BIOS_EPYC-4.inc --define DL-VERS=v4.8
   --output_format html,pdf,txt --nopower --runmode speed --tune base:peak --size test:train:refspeed
   intspeed --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.001/templogs/preenv.intspeed.001.0.log
   --lognum 001.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1.1

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9254 24-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 17
    stepping        : 1
    microcode       : 0xa10113e
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
    TLB size        : 3584 4K pages
    cpu cores       : 24
    siblings        : 24
    2 physical ids (chips)
    48 processors (hardware threads)
    physical id 0: core ids 0-5,16-21,32-37,48-53
    physical id 1: core ids 0-5,16-21,32-37,48-53
    physical id 0: apicids 0-5,16-21,32-37,48-53
    physical id 1: apicids 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
```

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Platform Notes (Continued)

```
  CPU(s):                          48
  On-line CPU(s) list:             0-47
  Vendor ID:                       AuthenticAMD
  Model name:                      AMD EPYC 9254 24-Core Processor
  CPU family:                      25
  Model:                           17
  Thread(s) per core:              1
  Core(s) per socket:              24
  Socket(s):                       2
  Stepping:                        1
  Frequency boost:                 enabled
  CPU max MHz:                     4151.7568
  CPU min MHz:                     1500.0000
  BogoMIPS:                        5801.69
  Flags:                           fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                                   clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp
                                   lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf
                                   rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic
                                   movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic
                                   cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce
                                   topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3
                                   cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall
                                   fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
                                   rdseed adx smap avx512ifma clflushopt clwb avx512cd sha_ni avx512bw
                                   avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
                                   cqm_mbm_total cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru
                                   wbnoinvd amd_ppin cppc arat npt lbrv svm_lock nrip_save tsc_scale
                                   vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic
                                   v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku ospke avx512_vbmi2
                                   gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq la57
                                   rdpid overflow_recov succor smca fsrm flush_l1d
  Virtualization:                  AMD-V
  L1d cache:                       1.5 MiB (48 instances)
  L1i cache:                       1.5 MiB (48 instances)
  L2 cache:                        48 MiB (48 instances)
  L3 cache:                        256 MiB (8 instances)
  NUMA node(s):                    8
  NUMA node0 CPU(s):               0-5
  NUMA node1 CPU(s):               6-11
  NUMA node2 CPU(s):               12-17
  NUMA node3 CPU(s):               18-23
  NUMA node4 CPU(s):               24-29
  NUMA node5 CPU(s):               30-35
  NUMA node6 CPU(s):               36-41
  NUMA node7 CPU(s):               42-47
  Vulnerability Gather data sampling: Not affected
  Vulnerability Itlb multihit:     Not affected
  Vulnerability L1tf:              Not affected
  Vulnerability Mds:               Not affected
  Vulnerability Meltdown:          Not affected
  Vulnerability Mmio stale data:   Not affected
  Vulnerability Retbleed:          Not affected
  Vulnerability Spec rstack overflow: Mitigation; safe RET
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:        Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB
                                   filling, PBRSB-eIBRS Not affected
  Vulnerability Srbds:             Not affected
  Vulnerability Tsx async abort:   Not affected
```

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Platform Notes (Continued)

```
From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d       32K     1.5M    8 Data            1    64        1             64
     L1i       32K     1.5M    8 Instruction     1    64        1             64
     L2         1M      48M    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: 8 nodes (0-7)
  node 0 cpus: 0-5
  node 0 size: 96312 MB
  node 0 free: 96068 MB
  node 1 cpus: 6-11
  node 1 size: 96718 MB
  node 1 free: 96491 MB
  node 2 cpus: 12-17
  node 2 size: 96765 MB
  node 2 free: 96546 MB
  node 3 cpus: 18-23
  node 3 size: 96749 MB
  node 3 free: 96561 MB
  node 4 cpus: 24-29
  node 4 size: 96765 MB
  node 4 free: 96520 MB
  node 5 cpus: 30-35
  node 5 size: 96765 MB
  node 5 free: 96412 MB
  node 6 cpus: 36-41
  node 6 size: 96765 MB
  node 6 free: 92962 MB
  node 7 cpus: 42-47
  node 7 size: 96742 MB
  node 7 free: 96501 MB
  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:       792151984 kB

------------------------------------------------------------
10. who -r
  run-level 5 Nov 27 00:23

------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.10)
  Default Target  Status
  graphical       running

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

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Platform Notes (Continued)

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

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/vmlinuz-5.15.0-86-generic
  root=/dev/mapper/ubuntu--vg-ubuntu--lv
  ro

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 1.50 GHz and 2.90 GHz.
                    The governor "performance" may decide which speed to use
                    within this range.
    boost state support:
      Supported: yes
      Active: yes
      Boost States: 0
      Total States: 3
      Pstate-P0:  2900MHz

------------------------------------------------------------
15. tuned-adm active
  Current active profile: latency-performance

------------------------------------------------------------
16. sysctl
  kernel.numa_balancing               1
  kernel.randomize_va_space           0
  vm.compaction_proactiveness        20
  vm.dirty_background_bytes           0
  vm.dirty_background_ratio           3
  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
```

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Platform Notes (Continued)

```
------------------------------------------------------------
17. /sys/kernel/mm/transparent_hugepage
  defrag          [always] defer defer+madvise madvise never
  enabled         [always] madvise never
  hpage_pmd_size  2097152
  shmem_enabled   always within_size advise [never] deny force

------------------------------------------------------------
18. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                      1
  max_ptes_none             511
  max_ptes_shared           256
  max_ptes_swap              64
  pages_to_scan            4096
  scan_sleep_millisecs    10000

------------------------------------------------------------
19. OS release
  From /etc/*-release /etc/*-version
  os-release Ubuntu 22.04.3 LTS

------------------------------------------------------------
20. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1.1
  Filesystem     Type   Size  Used Avail Use% Mounted on
  tmpfs          tmpfs   50G  3.4G   47G   7% /mnt/ramdisk

------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
    Vendor:         Dell Inc.
    Product:        PowerEdge R7625
    Product Family: PowerEdge
    Serial:         1234567

------------------------------------------------------------
22. dmidecode
  Additional information from dmidecode 3.3 follows.  WARNING: Use caution when you interpret this section.
  The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
  determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
  "DMTF SMBIOS" standard.
  Memory:
    24x 802C0000802C MTC20F2085S1RC48BA1 32 GB 2 rank 4800


------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       Dell Inc.
   BIOS Version:      1.4.6
   BIOS Date:         07/06/2023
   BIOS Revision:     1.4
```

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)
```


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Compiler Version Notes (Continued)

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

============================================================================================================
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

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

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Base Portability Flags (Continued)

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
```

Base Other Flags

C benchmarks:

```
-Wno-return-type -Wno-unused-command-line-argument
```

C++ benchmarks:

```
-Wno-unused-command-line-argument
```

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Base Other Flags (Continued)

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: `basepeak = yes`

602.gcc_s: `basepeak = yes`

605.mcf_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`

625.x264_s: `Same as 605.mcf_s`

657.xz_s: `Same as 605.mcf_s`

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Peak Optimization Flags (Continued)

C++ benchmarks:

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

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/aocc400-flags_A1.1.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.1.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/aocc400-flags_A1.1.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-EPYC-v1.1.xml

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

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