SPEC CPU®2017 Integer Speed Result

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Dell Inc.

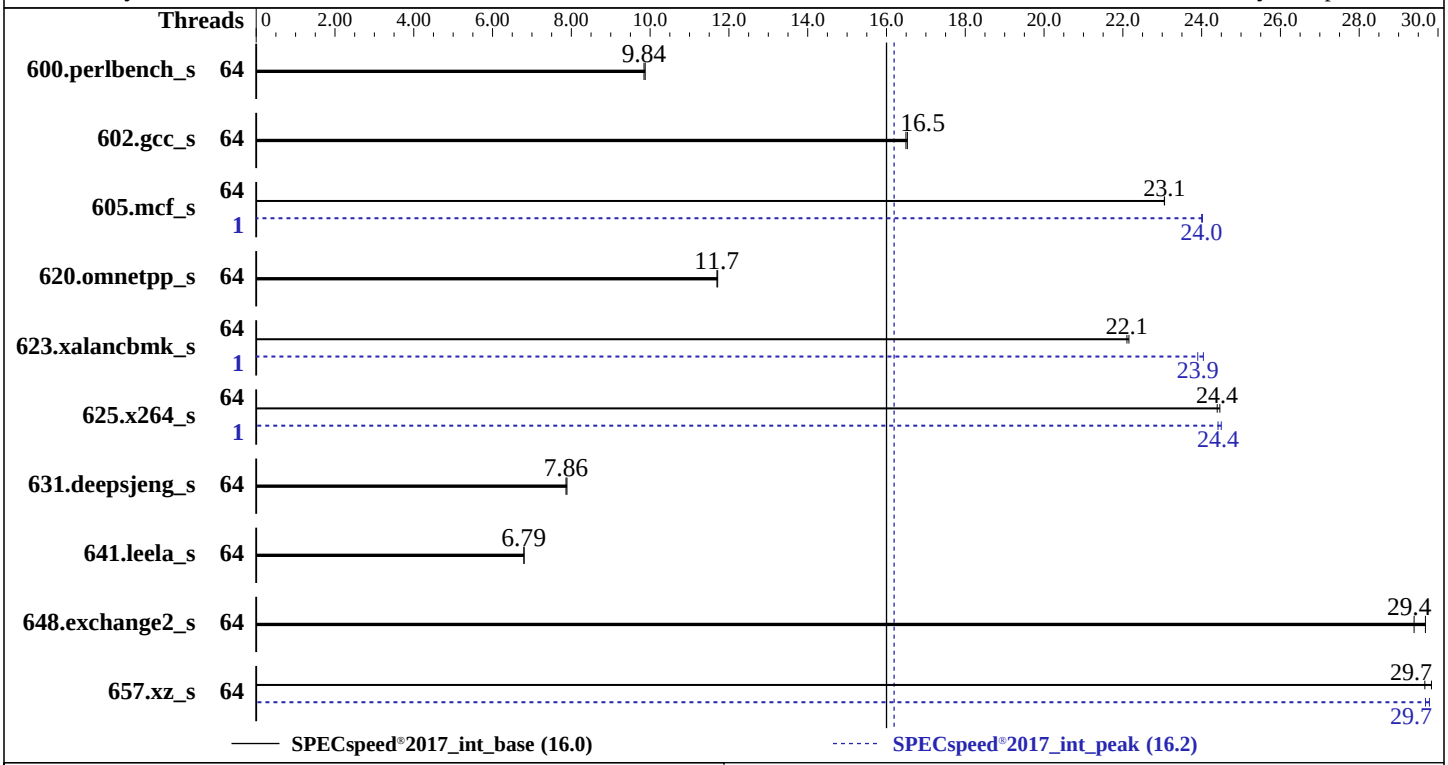
PowerEdge R6625 (AMD EPYC 9374F 32-Core Processor)

SPECspeed®2017_int_base = 16.0

SPECspeed®2017_int_peak = 16.2

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

Test Date: Jan-2024
Hardware Availability: May-2023
Software Availability: Sep-2023



Hardware

CPU Name:	AMD EPYC 9374F
Max MHz:	4300
Nominal:	3850
Enabled:	64 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:	256 MB I+D on chip per chip, 32 MB shared / 4 cores
Other:	None
Memory:	768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
Storage:	60 GB on tmpfs
Other:	None

Software

OS:	Ubuntu 22.04.3 LTS 5.15.0-84-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.

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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	64	180	9.87	**180**	**9.84**			64	180	9.87	**180**	**9.84**		
602.gcc_s	64	**241**	**16.5**	241	16.5			64	**241**	**16.5**	241	16.5		
605.mcf_s	64	**205**	**23.1**	205	23.1			1	**197**	**24.0**	197	24.0		
620.omnetpp_s	64	139	11.7	**139**	**11.7**			64	139	11.7	**139**	**11.7**		
623.xalancbmk_s	64	64.0	22.2	**64.1**	**22.1**			1	**59.3**	**23.9**	58.9	24.0		
625.x264_s	64	**72.3**	**24.4**	72.1	24.5			1	**72.2**	**24.4**	72.0	24.5		
631.deepsjeng_s	64	**182**	**7.86**	182	7.89			64	**182**	**7.86**	182	7.89		
641.leela_s	64	251	6.80	**251**	**6.79**			64	251	6.80	**251**	**6.79**		
648.exchange2_s	64	99.1	29.7	**100**	**29.4**			64	99.1	29.7	**100**	**29.4**		
657.xz_s	64	**208**	**29.7**	207	29.8			64	**208**	**29.7**	208	29.8		

SPECspeed®2017_int_base = 16.0

SPECspeed®2017_int_peak = 16.2

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 = "0-63"
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 = "64"

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 = "0-63"
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 60 GB ramdisk created with the cmd: "mount -t tmpfs -o size=60G 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 : 2

                System Profile : Custom
                      C-States : Disabled
           Memory Patrol Scrub : Disabled
           PCI ASPM L1 Link
              Power Management : Disabled
           Determinism Slider : Power Determinism
      Algorithm Performance
        Boost Disable (ApbDis) : Enabled
```

(Continued on next page)

Platform Notes (Continued)

```
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 Jan 16 18:40:24 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
 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 5.15.0-84-generic #93-Ubuntu SMP Tue Sep 5 17:16:10 UTC 2023 x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   18:40:24 up 5 min,  1 user,  load average: 0.39, 0.13, 0.04
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                18:39   40.00s  1.38s  0.28s /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
  memory(kbytes)       unlimited
  locked memory(kbytes) 2097152
  process              3093858
  nofiles              1024
```

(Continued on next page)

Platform Notes (Continued)

```
   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=v4.8.1
   --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=v4.8.1
   --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=v4.8.1
   --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 9374F 32-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
    TLB size        : 3584 4K pages
    cpu cores       : 32
    siblings        : 32
    2 physical ids (chips)
    64 processors (hardware threads)
    physical id 0: core ids 0-3,16-19,32-35,48-51,64-67,80-83,96-99,112-115
    physical id 1: core ids 0-3,16-19,32-35,48-51,64-67,80-83,96-99,112-115
    physical id 0: apicids 0-3,16-19,32-35,48-51,64-67,80-83,96-99,112-115
    physical id 1: apicids 128-131,144-147,160-163,176-179,192-195,208-211,224-227,240-243
  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):                          64
  On-line CPU(s) list:             0-63
  Vendor ID:                       AuthenticAMD
  Model name:                      AMD EPYC 9374F 32-Core Processor
```

(Continued on next page)

Platform Notes (Continued)

```
  CPU family:                          25
  Model:                               17
  Thread(s) per core:                  1
  Core(s) per socket:                  32
  Socket(s):                           2
  Stepping:                            1
  BogoMIPS:                            7702.73
  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:                           2 MiB (64 instances)
  L1i cache:                           2 MiB (64 instances)
  L2 cache:                            64 MiB (64 instances)
  L3 cache:                            512 MiB (16 instances)
  NUMA node(s):                        8
  NUMA node0 CPU(s):                   0-7
  NUMA node1 CPU(s):                   8-15
  NUMA node2 CPU(s):                   16-23
  NUMA node3 CPU(s):                   24-31
  NUMA node4 CPU(s):                   32-39
  NUMA node5 CPU(s):                   40-47
  NUMA node6 CPU(s):                   48-55
  NUMA node7 CPU(s):                   56-63
  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 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

From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d       32K       2M    8 Data            1    64        1             64
     L1i       32K       2M    8 Instruction     1    64        1             64
     L2         1M      64M    8 Unified         2  2048        1             64
     L3        32M     512M   16 Unified         3 32768        1             64

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

(Continued on next page)

Platform Notes (Continued)

```
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 8 nodes (0-7)
   node 0 cpus: 0-7
   node 0 size: 96311 MB
   node 0 free: 96047 MB
   node 1 cpus: 8-15
   node 1 size: 96717 MB
   node 1 free: 96505 MB
   node 2 cpus: 16-23
   node 2 size: 96764 MB
   node 2 free: 96560 MB
   node 3 cpus: 24-31
   node 3 size: 96748 MB
   node 3 free: 96544 MB
   node 4 cpus: 32-39
   node 4 size: 96764 MB
   node 4 free: 92893 MB
   node 5 cpus: 40-47
   node 5 size: 96764 MB
   node 5 free: 96367 MB
   node 6 cpus: 48-55
   node 6 size: 96764 MB
   node 6 free: 96441 MB
   node 7 cpus: 56-63
   node 7 size: 96741 MB
   node 7 free: 96457 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:       792143864 kB

 ------------------------------------------------------------
 10. who -r
   run-level 5 Jan 16 18:35

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

 ------------------------------------------------------------
 12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          ModemManager apparmor blk-availability console-setup cron dmesg e2scrub_reap finalrd
                    getty@ gpu-manager grub-common grub-initrd-fallback irqbalance keyboard-setup lm-sensors
                    lvm2-monitor lxd-agent multipathd networkd-dispatcher open-vm-tools pollinate rsyslog
                    secureboot-db setvtrgb ssh systemd-networkd systemd-pstore systemd-resolved
                    systemd-timesyncd thermald tuned ua-reboot-cmds ubuntu-advantage udisks2 ufw vgauth
   enabled-runtime  netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
```

(Continued on next page)

Platform Notes (Continued)

```
  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 hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo
                   systemd-networkd-wait-online x11-common

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/vmlinuz-5.15.0-84-generic
  root=/dev/mapper/ubuntu--vg-ubuntu--lv
  ro

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 0:
    Unable to determine current policy
    boost state support:
      Supported: yes
      Active: yes
      Boost States: 0
      Total States: 3
      Pstate-P0:  3850MHz

------------------------------------------------------------
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

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

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Platform Notes (Continued)

```
   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   60G  3.4G   57G   6% /mnt/ramdisk

 ------------------------------------------------------------
 21. /sys/devices/virtual/dmi/id
     Vendor:         Dell Inc.
     Product:        PowerEdge R6625
     Product Family: PowerEdge
     Serial:         BGP4016

 ------------------------------------------------------------
 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:
     10x 802C0000802C MTC20F2085S1RC48BA1 32 GB 2 rank 4800
     8x 80CE000080CE M321R4GA3BB0-CQKVG 32 GB 2 rank 4800
     6x 80CE000080CE M321R4GA3BB6-CQKVG 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)
--------------------------------------------------------------------------------------------------------------
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
--------------------------------------------------------------------------------------------------------------

==============================================================================================================
```

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Compiler Version Notes (Continued)

```
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
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
```

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

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

(Continued on next page)

Peak Optimization Flags (Continued)

623.xalancbmk_s (continued):
-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-v1.2.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-v1.2.xml

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