SPEC CPU®2017 Integer Speed Result

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Dell Inc.

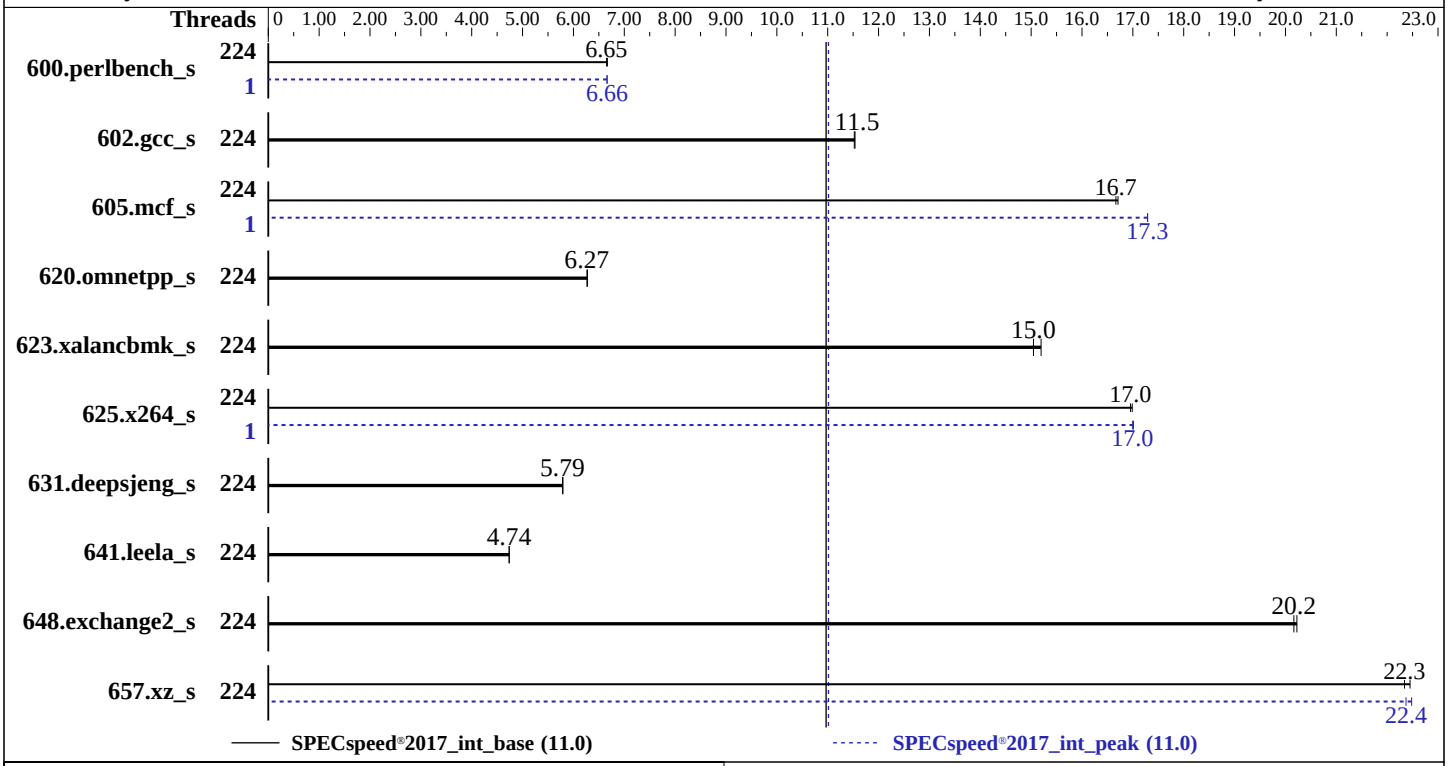
PowerEdge R6625 (AMD EPYC 9734 112-Core Processor)

SPECspeed®2017_int_base = 11.0

SPECspeed®2017_int_peak = 11.0

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

Test Date: May-2023
Hardware Availability: Jun-2023
Software Availability: Nov-2022



Hardware

CPU Name:	AMD EPYC 9734
Max MHz:	3000
Nominal:	2200
Enabled:	224 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, 16 MB shared / 7 cores
Other:	None
Memory:	1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage:	120 GB on tmpfs
Other:	None

Software

OS:	Ubuntu 22.04.1 LTS 5.15.0-46-generic
Compiler:	C/C++/Fortran: Version 4.0.0 of AOCC
Parallel:	Yes
Firmware:	Version 1.3.11 released Mar-2023
File System:	tmpfs
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.

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	224	266	6.67	**267**	**6.65**			1	266	6.66	**266**	**6.66**		
602.gcc_s	224	**346**	**11.5**	345	11.5			224	**346**	**11.5**	345	11.5		
605.mcf_s	224	283	16.7	**283**	**16.7**			1	273	17.3	**273**	**17.3**		
620.omnetpp_s	224	**260**	**6.27**	260	6.28			224	**260**	**6.27**	260	6.28		
623.xalancbmk_s	224	**94.2**	**15.0**	93.3	15.2			224	**94.2**	**15.0**	93.3	15.2		
625.x264_s	224	**104**	**17.0**	104	17.0			1	104	17.0	**104**	**17.0**		
631.deepsjeng_s	224	**248**	**5.79**	247	5.79			224	**248**	**5.79**	247	5.79		
641.leela_s	224	**360**	**4.74**	360	4.74			224	**360**	**4.74**	360	4.74		
648.exchange2_s	224	**146**	**20.2**	145	20.2			224	**146**	**20.2**	145	20.2		
657.xz_s	224	275	22.5	**277**	**22.3**			224	275	22.5	**276**	**22.4**		

SPECspeed®2017_int_base = 11.0

SPECspeed®2017_int_peak = 11.0

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 = "0-223"
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1/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 = "224"

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 625.x264_s peak run:
GOMP_CPU_AFFINITY = "15"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-223"
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 120 GB ramdisk created with the cmd: "mount -t tmpfs -o size=120G 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
              Power Management : Disabled
            Determinism Slider : Power Determinism
      Algorithm Performance
        Boost Disable (ApbDis) : Enabled
```

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Platform Notes (Continued)

```
Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on genoa-sut Mon May 15 21:02:30 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 (249.11-0ubuntu3.4)
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 genoa-sut 5.15.0-46-generic #49-Ubuntu SMP Thu Aug 4 18:03:25 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   21:02:30 up 1 min,  1 user,  load average: 2.27, 1.44, 0.56
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1     -                21:01   30.00s  1.94s  0.38s /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              6190259
  nofiles              1024
```

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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-BIOS-LogProcD=1
   --define DL-BIOS-adddcD=1 --define DL-BIOS-VirtD=1 --define DL-VERS=v4.5 --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-BIOSinc=Dell-BIOS_EPYC-4.inc --define DL-BIOS-LogProcD=1 --define DL-BIOS-adddcD=1 --define
   DL-BIOS-VirtD=1 --define DL-VERS=v4.5 --output_format html,pdf,txt intspeed
 runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 2 --define
   DL-BIOSinc=Dell-BIOS_EPYC-4.inc --define DL-BIOS-LogProcD=1 --define DL-BIOS-adddcD=1 --define
   DL-BIOS-VirtD=1 --define DL-VERS=v4.5 --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

------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9734 112-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 160
    stepping        : 2
    microcode       : 0xaa00205
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size        : 3584 4K pages
    cpu cores       : 112
    siblings        : 112
    2 physical ids (chips)
    224 processors (hardware threads)
    physical id 0: core ids
    0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,
    240-246
    physical id 1: core ids
    0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,
    240-246
    physical id 0: apicids
    0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,
    240-246
    physical id 1: apicids
    256-262,272-278,288-294,304-310,320-326,336-342,352-358,368-374,384-390,400-406,416-422,432-438,448-454,4
    64-470,480-486,496-502
  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:
```

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Platform Notes (Continued)

```
  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):                          224
  On-line CPU(s) list:             0-223
  Vendor ID:                       AuthenticAMD
  Model name:                      AMD EPYC 9734 112-Core Processor
  CPU family:                      25
  Model:                           160
  Thread(s) per core:              1
  Core(s) per socket:              112
  Socket(s):                       2
  Stepping:                        2
  Frequency boost:                 enabled
  CPU max MHz:                     3000.0000
  CPU min MHz:                     400.0000
  BogoMIPS:                        4401.15
  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 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:                       7 MiB (224 instances)
  L1i cache:                       7 MiB (224 instances)
  L2 cache:                        224 MiB (224 instances)
  L3 cache:                        512 MiB (32 instances)
  NUMA node(s):                    32
  NUMA node0 CPU(s):               0-6
  NUMA node1 CPU(s):               7-13
  NUMA node2 CPU(s):               56-62
  NUMA node3 CPU(s):               63-69
  NUMA node4 CPU(s):               28-34
  NUMA node5 CPU(s):               35-41
  NUMA node6 CPU(s):               84-90
  NUMA node7 CPU(s):               91-97
  NUMA node8 CPU(s):               42-48
  NUMA node9 CPU(s):               49-55
  NUMA node10 CPU(s):              98-104
  NUMA node11 CPU(s):              105-111
  NUMA node12 CPU(s):              14-20
  NUMA node13 CPU(s):              21-27
  NUMA node14 CPU(s):              70-76
  NUMA node15 CPU(s):              77-83
  NUMA node16 CPU(s):              112-118
  NUMA node17 CPU(s):              119-125
  NUMA node18 CPU(s):              168-174
  NUMA node19 CPU(s):              175-181
```

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Platform Notes (Continued)

```
  NUMA node20 CPU(s):              140-146
  NUMA node21 CPU(s):              147-153
  NUMA node22 CPU(s):              196-202
  NUMA node23 CPU(s):              203-209
  NUMA node24 CPU(s):              154-160
  NUMA node25 CPU(s):              161-167
  NUMA node26 CPU(s):              210-216
  NUMA node27 CPU(s):              217-223
  NUMA node28 CPU(s):              126-132
  NUMA node29 CPU(s):              133-139
  NUMA node30 CPU(s):              182-188
  NUMA node31 CPU(s):              189-195
  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
  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       7M    8 Data            1    64        1             64
     L1i       32K       7M    8 Instruction     1    64        1             64
     L2         1M     224M    8 Unified         2  2048        1             64
     L3        16M     512M   16 Unified         3 16384        1             64

------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 32 nodes (0-31)
  node 0 cpus: 0-6
  node 0 size: 47928 MB
  node 0 free: 47528 MB
  node 1 cpus: 7-13
  node 1 size: 48382 MB
  node 1 free: 48118 MB
  node 2 cpus: 56-62
  node 2 size: 48382 MB
  node 2 free: 48120 MB
  node 3 cpus: 63-69
  node 3 size: 48380 MB
  node 3 free: 48150 MB
  node 4 cpus: 28-34
  node 4 size: 48382 MB
  node 4 free: 48185 MB
  node 5 cpus: 35-41
  node 5 size: 48382 MB
  node 5 free: 48222 MB
  node 6 cpus: 84-90
  node 6 size: 48382 MB
  node 6 free: 48200 MB
  node 7 cpus: 91-97
  node 7 size: 48380 MB
  node 7 free: 44689 MB
```

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Platform Notes (Continued)

```
  node 8 cpus: 42-48
  node 8 size: 48346 MB
  node 8 free: 48184 MB
  node 9 cpus: 49-55
  node 9 size: 48382 MB
  node 9 free: 48247 MB
  node 10 cpus: 98-104
  node 10 size: 48382 MB
  node 10 free: 48237 MB
  node 11 cpus: 105-111
  node 11 size: 48380 MB
  node 11 free: 48257 MB
  node 12 cpus: 14-20
  node 12 size: 48382 MB
  node 12 free: 48222 MB
  node 13 cpus: 21-27
  node 13 size: 48382 MB
  node 13 free: 48271 MB
  node 14 cpus: 70-76
  node 14 size: 48382 MB
  node 14 free: 48244 MB
  node 15 cpus: 77-83
  node 15 size: 48364 MB
  node 15 free: 48224 MB
  node 16 cpus: 112-118
  node 16 size: 48382 MB
  node 16 free: 48274 MB
  node 17 cpus: 119-125
  node 17 size: 48382 MB
  node 17 free: 48275 MB
  node 18 cpus: 168-174
  node 18 size: 48382 MB
  node 18 free: 48257 MB
  node 19 cpus: 175-181
  node 19 size: 48380 MB
  node 19 free: 48250 MB
  node 20 cpus: 140-146
  node 20 size: 48382 MB
  node 20 free: 48274 MB
  node 21 cpus: 147-153
  node 21 size: 48382 MB
  node 21 free: 48278 MB
  node 22 cpus: 196-202
  node 22 size: 48382 MB
  node 22 free: 48275 MB
  node 23 cpus: 203-209
  node 23 size: 48380 MB
  node 23 free: 48265 MB
  node 24 cpus: 154-160
  node 24 size: 48382 MB
  node 24 free: 48270 MB
  node 25 cpus: 161-167
  node 25 size: 48382 MB
  node 25 free: 48282 MB
  node 26 cpus: 210-216
  node 26 size: 48382 MB
  node 26 free: 48263 MB
  node 27 cpus: 217-223
  node 27 size: 48380 MB
  node 27 free: 48268 MB
```

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Platform Notes (Continued)

```
node 28 cpus: 126-132
node 28 size: 48382 MB
node 28 free: 48272 MB
node 29 cpus: 133-139
node 29 size: 48382 MB
node 29 free: 48263 MB
node 30 cpus: 182-188
node 30 size: 48382 MB
node 30 free: 48277 MB
node 31 cpus: 189-195
node 31 size: 48348 MB
node 31 free: 48237 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24
25  26  27  28  29  30  31
  0:  10  11  11  11  12  12  12  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  1:  11  10  11  11  12  12  12  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  2:  11  11  10  11  12  12  12  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  3:  11  11  11  10  12  12  12  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  4:  12  12  12  12  10  11  11  11  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  5:  12  12  12  12  11  10  11  11  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  6:  12  12  12  12  11  11  10  11  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  7:  12  12  12  12  11  11  11  10  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  8:  12  12  12  12  12  12  12  12  10  11  11  11  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
  9:  12  12  12  12  12  12  12  12  11  10  11  11  12  12  12  12  32  32  32  32  32  32  32  32  32
  32  32  32  32  32  32  32
 10:  12  12  12  12  12  12  12  12  11  11  10  11  12  12  12  12  32  32  32  32  32  32  32  32  32
 32  32  32  32  32  32  32
 11:  12  12  12  12  12  12  12  12  11  11  11  10  12  12  12  12  32  32  32  32  32  32  32  32  32
 32  32  32  32  32  32  32
 12:  12  12  12  12  12  12  12  12  12  12  12  12  10  11  11  11  32  32  32  32  32  32  32  32  32
 32  32  32  32  32  32  32
 13:  12  12  12  12  12  12  12  12  12  12  12  12  11  10  11  11  32  32  32  32  32  32  32  32  32
 32  32  32  32  32  32  32
 14:  12  12  12  12  12  12  12  12  12  12  12  12  11  11  10  11  32  32  32  32  32  32  32  32  32
 32  32  32  32  32  32  32
 15:  12  12  12  12  12  12  12  12  12  12  12  12  11  11  11  10  32  32  32  32  32  32  32  32  32
 32  32  32  32  32  32  32
 16:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  10  11  11  11  12  12  12  12  12
 12  12  12  12  12  12  12
 17:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  11  10  11  11  12  12  12  12  12
 12  12  12  12  12  12  12
 18:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  11  12  12  12  12  12
 12  12  12  12  12  12  12
 19:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  10  12  12  12  12  12
 12  12  12  12  12  12  12
 20:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  10  11  11  11  12
 12  12  12  12  12  12  12
 21:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  11  10  11  11  12
 12  12  12  12  12  12  12
 22:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  11  11  10  11  12
```

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Platform Notes (Continued)

```
    12  12  12  12  12  12  12
    23:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  11  11  11  10  12
    12  12  12  12  12  12  12
    24:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  10
    11  11  11  12  12  12  12
    25:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  11
    10  11  11  12  12  12  12
    26:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  11
    11  10  11  12  12  12  12
    27:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  11
    11  11  10  12  12  12  12
    28:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12
    12  12  12  10  11  11  11
    29:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12
    12  12  12  11  10  11  11
    30:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12
    12  12  12  11  11  10  11
    31:  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12  12
    12  12  12  11  11  11  10

------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1584820224 kB

------------------------------------------------------------
10. who -r
  run-level 3 May 15 21:01

------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.4)
  Default Target  Status
  multi-user      running

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

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=/vmlinuz-5.15.0-46-generic
  root=/dev/mapper/ubuntu--vg-ubuntu--lv
  ro

------------------------------------------------------------
14. cpupower frequency-info
```

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Platform Notes (Continued)

```
  analyzing CPU 0:
    current policy: frequency should be within 400 MHz and 3.00 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:  2200MHz

------------------------------------------------------------
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
  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 22.04.1 LTS

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

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Platform Notes (Continued)

```
 20. Disk information
 SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1
   Filesystem     Type   Size  Used Avail Use% Mounted on
   tmpfs          tmpfs  120G  3.5G  117G   3% /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:
     24x 802C0000802C MTC40F2046S1RC48BA1 64 GB 2 rank 4800


 ------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       Dell Inc.
    BIOS Version:      1.3.11
    BIOS Date:         03/31/2023
    BIOS Revision:     1.3
```

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
```

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Compiler Version Notes (Continued)

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

(Continued on next page)

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-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: -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

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: basepeak = yes

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

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Peak Other Flags (Continued)

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

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Tested with SPEC CPU®2017 v1.1.9 on 2023-05-15 17:02:29-0400.
Report generated on 2023-06-13 15:18:00 by CPU2017 PDF formatter v6716.
Originally published on 2023-06-13.