



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 11.2

PowerEdge C6615 (AMD EPYC 8534P 64-Core Processor)

SPECspeed®2017_int_peak = 11.4

CPU2017 License: 6573

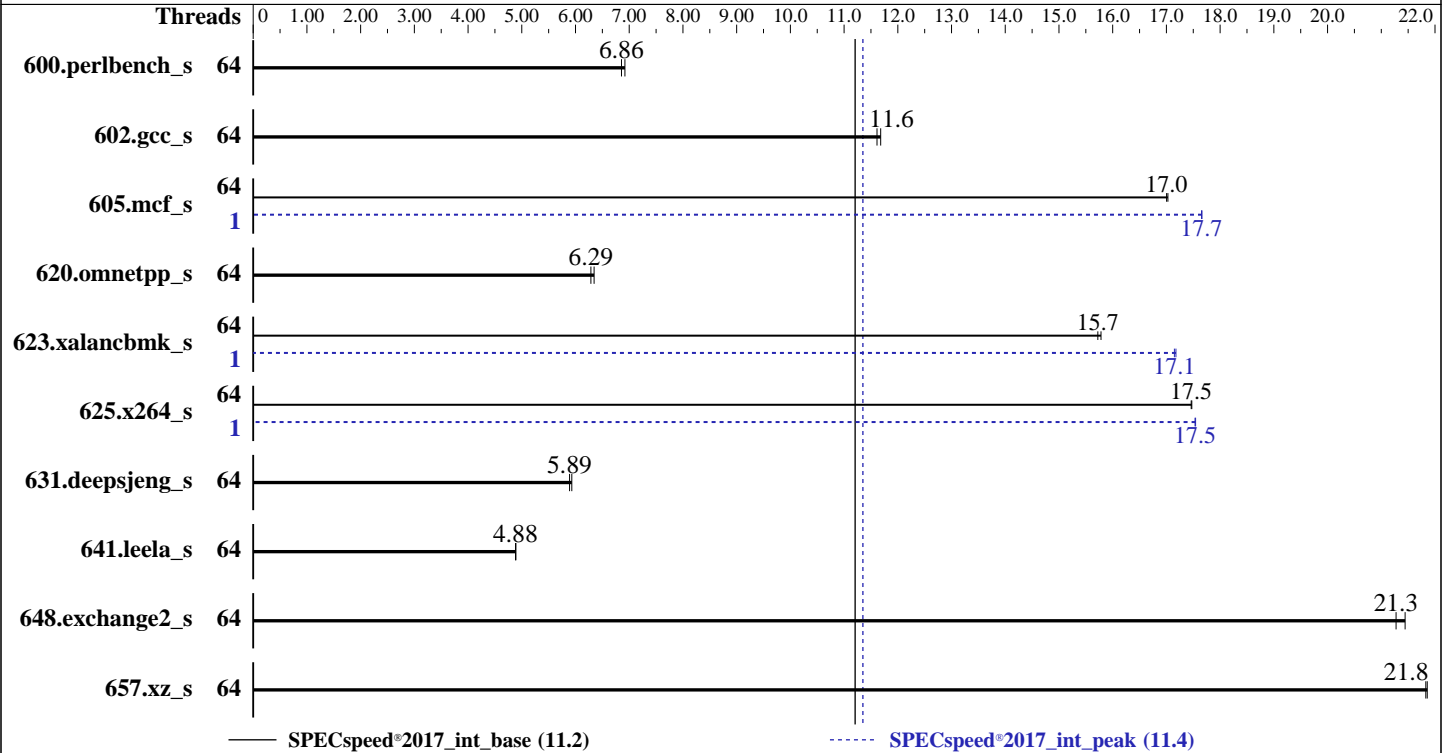
Test Date: Aug-2023

Test Sponsor: Dell Inc.

Hardware Availability: Sep-2023

Tested by: Dell Inc.

Software Availability: Nov-2022



Hardware

CPU Name: AMD EPYC 8534P
 Max MHz: 3100
 Nominal: 2300
 Enabled: 64 cores, 1 chip
 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: 128 MB I+D on chip per chip, 16 MB shared / 8 cores
 Other: None
 Memory: 384 GB (6 x 64 GB 2Rx4 PC5-4800B-R)
 Storage: 60 GB on tmpfs
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.22-default
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
 Parallel: Yes
 Firmware: Version 1.0.2 released Jul-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.



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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	<u>259</u>	<u>6.86</u>	257	6.92			64	<u>259</u>	<u>6.86</u>	257	6.92		
602.gcc_s	64	341	11.7	<u>343</u>	<u>11.6</u>			64	341	11.7	<u>343</u>	<u>11.6</u>		
605.mcf_s	64	277	17.0	<u>278</u>	<u>17.0</u>			1	<u>267</u>	<u>17.7</u>	267	17.7		
620.omnetpp_s	64	<u>259</u>	<u>6.29</u>	257	6.35			64	<u>259</u>	<u>6.29</u>	257	6.35		
623.xalancbmk_s	64	89.8	15.8	<u>90.1</u>	<u>15.7</u>			1	82.5	17.2	<u>82.6</u>	<u>17.1</u>		
625.x264_s	64	<u>101</u>	<u>17.5</u>	101	17.5			1	101	17.5	<u>101</u>	<u>17.5</u>		
631.deepsjeng_s	64	242	5.93	<u>243</u>	<u>5.89</u>			64	242	5.93	<u>243</u>	<u>5.89</u>		
641.leela_s	64	<u>349</u>	<u>4.88</u>	349	4.89			64	<u>349</u>	<u>4.88</u>	349	4.89		
648.exchange2_s	64	<u>138</u>	<u>21.3</u>	137	21.4			64	<u>138</u>	<u>21.3</u>	137	21.4		
657.xz_s	64	283	21.9	<u>283</u>	<u>21.8</u>			64	283	21.9	<u>283</u>	<u>21.8</u>		

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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.



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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/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"
```

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 : 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
```

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-aocc400-znver4-A1/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Tue Aug 15 22:39:07 2023

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Platform Notes (Continued)

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

Table of contents

- 1. `uname -a`
 - 2. `w`
 - 3. Username
 - 4. `ulimit -a`
 - 5. `sysinfo process ancestry`
 - 6. `/proc/cpuinfo`
 - 7. `lscpu`
 - 8. `numactl --hardware`
 - 9. `/proc/meminfo`
 - 10. `who -r`
 - 11. Systemd service manager version: `systemd 249 (249.11+suse.124.g2bc0b2c447)`
 - 12. Failed units, from `systemctl list-units --state=failed`
 - 13. Services, from `systemctl list-unit-files`
 - 14. Linux kernel boot-time arguments, from `/proc/cmdline`
 - 15. `cpupower frequency-info`
 - 16. `tuned-adm active`
 - 17. `sysctl`
 - 18. `/sys/kernel/mm/transparent_hugepage`
 - 19. `/sys/kernel/mm/transparent_hugepage/khugepaged`
 - 20. OS release
 - 21. Disk information
 - 22. `/sys/devices/virtual/dmi/id`
 - 23. `dmidecode`
 - 24. BIOS
- ```

1. uname -a
Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
x86_64 x86_64 x86_64 GNU/Linux

2. w
22:39:07 up 5 min, 1 user, load average: 0.39, 0.55, 0.29
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
root tty1 - 22:38 35.00s 1.97s 0.30s /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) 1545134
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

```

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### Platform Notes (Continued)

|                    |               |           |
|--------------------|---------------|-----------|
| stack size         | (kbytes, -s)  | unlimited |
| cpu time           | (seconds, -t) | unlimited |
| max user processes | (-u)          | 1545134   |
| virtual memory     | (kbytes, -v)  | unlimited |
| file locks         | (-x)          | unlimited |

```

5. sysinfo process ancestry
/usr/lib/systemd/systemd linux --switched-root --system --deserialize 30
login -- root
-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=v4.6 --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=v4.6 --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=v4.6 --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 8534P 64-Core Processor
vendor_id : AuthenticAMD
cpu family : 25
model : 160
stepping : 2
microcode : 0xaa00212
bugs : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size : 3584 4K pages
cpu cores : 64
siblings : 64
1 physical ids (chips)
64 processors (hardware threads)
physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119
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 8534P 64-Core Processor

```

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### Platform Notes (Continued)

```

CPU family: 25
Model: 160
Thread(s) per core: 1
Core(s) per socket: 64
Socket(s): 1
Stepping: 2
Frequency boost: enabled
CPU max MHz: 3101.8550
CPU min MHz: 1500.0000
BogoMIPS: 4593.06
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
 constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf rapl
 pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
 popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy
 abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext
 perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3
 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1
 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
 avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
 xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
 avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
 svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
 pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi
 umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
 avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
Virtualization: AMD-V
L1d cache: 2 MiB (64 instances)
L1i cache: 2 MiB (64 instances)
L2 cache: 64 MiB (64 instances)
L3 cache: 128 MiB (8 instances)
NUMA node(s): 1
NUMA node0 CPU(s): 0-63
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swaps 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      | 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   | 16M      | 128M     | 16   | Unified     | 3     | 16384 | 1        | 64             |

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```

available: 1 nodes (0)
node 0 cpus: 0-63
node 0 size: 386307 MB
node 0 free: 381919 MB
node distances:
node 0

```

(Continued on next page)



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## Platform Notes (Continued)

0: 10

9. /proc/meminfo

MemTotal: 395579032 kB

10. who -r

run-level 3 Aug 15 22:35

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)

Default Target Status  
multi-user degraded

12. Failed units, from systemctl list-units --state=failed

| UNIT           | LOAD   | ACTIVE | SUB    | DESCRIPTION               |
|----------------|--------|--------|--------|---------------------------|
| * nscd.service | loaded | failed | failed | Name Service Cache Daemon |

13. Services, from systemctl list-unit-files

| STATE           | UNIT FILES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| enabled         | YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager firewalld getty@<br>haveged irqbalance issue-generator kbdsettings klog lvm2-monitor nscd<br>nvme-fc-boot-connections postfix purge-kernels rollback rsyslog smartd sshd tuned wicked<br>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<br>chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info gpm<br>grub2-once haveged-switch-root hwloc-dump-hwdata ipmi ipmievd issue-add-ssh-keys<br>kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nvmmf-autoconnect rdisc rpcbind<br>rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd<br>systemd-boot-check-no-failures systemd-network-generator systemd-sysext<br>systemd-time-wait-sync systemd-timesyncd<br>wickedd |
| indirect        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

14. Linux kernel boot-time arguments, from /proc/cmdline

BOOT\_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default  
root=UUID=14ffde7d-4984-4509-bc13-0ad572987371  
linux  
splash=silent  
mitigations=auto  
quiet  
security=apparmor

15. cpupower frequency-info

analyzing CPU 0:  
current policy: frequency should be within 1.50 GHz and 2.30 GHz.  
The governor "performance" may decide which speed to use  
within this range.  
boost state support:  
Supported: yes  
Active: yes

16. tuned-adm active

Current active profile: throughput-performance

(Continued on next page)



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## Platform Notes (Continued)

```

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

18. /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

19. /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

20. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP4

21. 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 60G 3.5G 57G 6% /mnt/ramdisk

22. /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge C6615
Product Family: PowerEdge
Serial: SC665C4

23. dmidecode

```

(Continued on next page)





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## Platform Notes (Continued)

Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:

6x 802C0000802C MTC40F2046S1RC48BA1 64 GB 2 rank 4800

### 24. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: Dell Inc.

BIOS Version: 1.0.2

BIOS Date: 07/26/2023

BIOS Revision: 1.0

## 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++

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# SPEC CPU®2017 Integer Speed Result

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Dell Inc.

SPECspeed®2017\_int\_base = 11.2

PowerEdge C6615 (AMD EPYC 8534P 64-Core Processor)

SPECspeed®2017\_int\_peak = 11.4

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Aug-2023

Hardware Availability: Sep-2023

Software Availability: Nov-2022

## Base Compiler Invocation (Continued)

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

```

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## Base Optimization Flags (Continued)

Fortran benchmarks (continued):

-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:

(Continued on next page)



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SPECspeed®2017\_int\_peak = 11.4

CPU2017 License: 6573

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Aug-2023

Hardware Availability: Sep-2023

Software Availability: Nov-2022

## Peak Optimization Flags (Continued)

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: basepeak = yes

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

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Test Date: Aug-2023

Hardware Availability: Sep-2023

Software Availability: Nov-2022

## 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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