



SPEC CPU®2017 Integer Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017_int_base = 10.9

PowerEdge R7625 (AMD EPYC 9734 112-Core Processor)

SPECspeed®2017_int_peak = Not Run

CPU2017 License: 6573

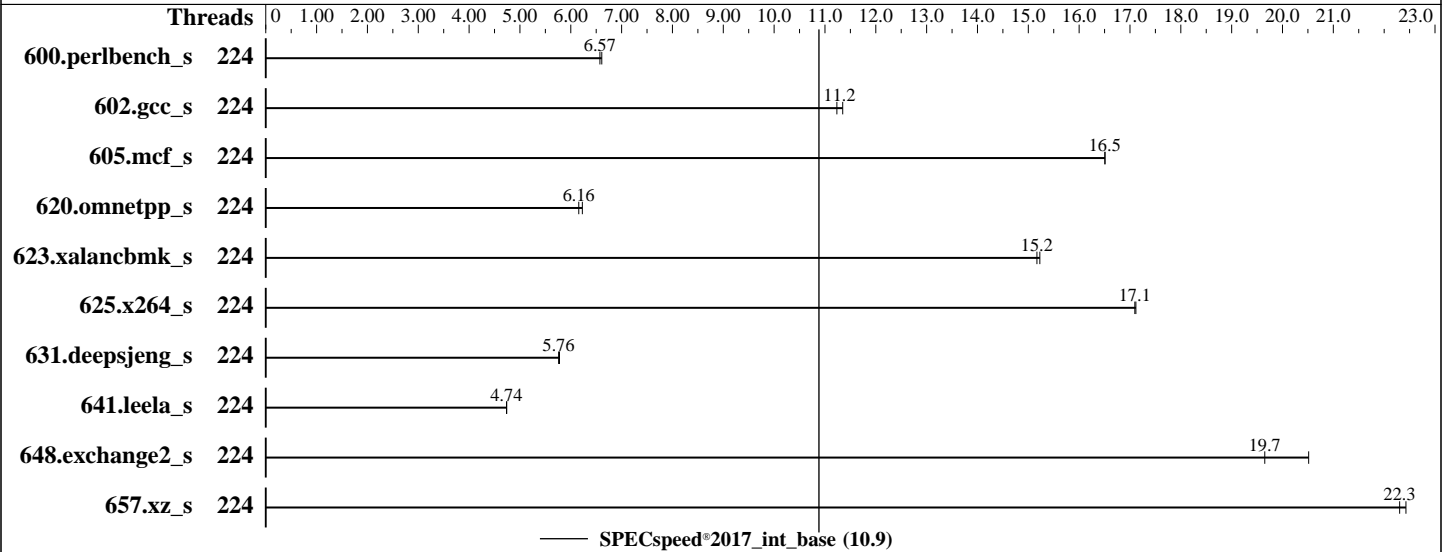
Test Date: Apr-2023

Test Sponsor: Dell Inc.

Hardware Availability: Jun-2023

Tested by: Dell Inc.

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 1.4.0 released Apr-2023
 File System: tmpfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 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 | 224 | <u>270</u> | <u>6.57</u> | 269 | 6.61 | | | | | | | | | |
| 602.gcc_s | 224 | 351 | 11.3 | <u>354</u> | <u>11.2</u> | | | | | | | | | |
| 605.mcf_s | 224 | <u>286</u> | <u>16.5</u> | 286 | 16.5 | | | | | | | | | |
| 620.omnetpp_s | 224 | 262 | 6.23 | <u>265</u> | <u>6.16</u> | | | | | | | | | |
| 623.xalancbmk_s | 224 | 93.1 | 15.2 | <u>93.4</u> | <u>15.2</u> | | | | | | | | | |
| 625.x264_s | 224 | 103 | 17.1 | <u>103</u> | <u>17.1</u> | | | | | | | | | |
| 631.deepsjeng_s | 224 | <u>249</u> | <u>5.76</u> | 248 | 5.78 | | | | | | | | | |
| 641.leela_s | 224 | 360 | 4.74 | <u>360</u> | <u>4.74</u> | | | | | | | | | |
| 648.exchange2_s | 224 | <u>150</u> | <u>19.7</u> | 143 | 20.5 | | | | | | | | | |
| 657.xz_s | 224 | 276 | 22.4 | <u>277</u> | <u>22.3</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 = "0-223"
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.9-aocc400-B1f/amd_speed_aocc400_genoa_B_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"
```

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
```

Sysinfo program /mnt/ramdisk/cpu2017-1.1.9-aocc400-B1f/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on amd-sut Thu Apr 27 14:40:11 2023

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

Table of contents

1. uname -a
2. w
3. Username

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Platform Notes (Continued)

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. 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 amd-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
14:40:11 up 5 min, 1 user, load average: 0.16, 0.09, 0.04
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU WHAT
root     tty1    -             14:37   39.00s  1.94s  0.41s /bin/bash ./amd_speed_aocc400_genoa_B1.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            6190279
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
```

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Platform Notes (Continued)

```

/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 csv,html,pdf,txt
python3 ./run_amd_speed_aocc400_genoa_B1.py
/bin/bash ./amd_speed_aocc400_genoa_B1.sh
runcpu --config amd_speed_aocc400_genoa_B1.cfg --tune base --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 csv,html,pdf,txt intspeed
runcpu --configfile amd_speed_aocc400_genoa_B1.cfg --tune base --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 csv,html,pdf,txt --nopower --runmode speed --tune
base --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-B1f

```

```

-----
6. /proc/cpuinfo
model name      : AMD EPYC 9734 112-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
model         : 160
stepping      : 2
microcode     : 0xaa00208
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:
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

```

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Platform Notes (Continued)

```

Socket(s):                2
Stepping:                 2
Frequency boost:          enabled
CPU max MHz:              3000.0000
CPU min MHz:              400.0000
BogoMIPS:                 4401.27
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 pdpelgb 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 cpc 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_lld

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):            2
NUMA node0 CPU(s):      0-111
NUMA node1 CPU(s):      112-223
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: 2 nodes (0-1)
node 0 cpus: 0-111
node 0 size: 773604 MB
node 0 free: 771818 MB
node 1 cpus: 112-223
node 1 size: 774077 MB
node 1 free: 768604 MB

```

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Platform Notes (Continued)

```
node distances:
node    0    1
0:    10   32
1:    32   10
```

```
-----
9. /proc/meminfo
MemTotal:    1584825520 kB
```

```
-----
10. who -r
run-level 3 Apr 27 14:37
```

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

```
-----
12. Failed units, from systemctl list-units --state=failed
UNIT                                LOAD ACTIVE SUB DESCRIPTION
* systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured
```

```
-----
13. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled blk-availability console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager grub-common grub-initrd-fallback irqbalance keyboard-setup lm-sensors networkd-dispatcher open-iscsi 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 vgauth wpa_supplicant
enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-networkd-wait-online systemd-remount-fs
disabled ModemManager apparmor console-getty debug-shell iscsid lvm2-monitor lxd-agent multipathd nftables rsync serial-getty@ systemd-boot-check-no-failures systemd-network-generator systemd-sysext systemd-time-wait-sync ufw upower wpa_supplicant-nl80211@ wpa_supplicant-wired@ wpa_supplicant@
generated apport
indirect uuuid
masked NetworkManager NetworkManager-dispatcher NetworkManager-wait-online cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo x11-common
```

```
-----
14. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.15.0-46-generic
root=UUID=593ab29a-c8fe-4d75-821a-b60d5c945311
ro
```

```
-----
15. cpupower frequency-info
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
```

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Platform Notes (Continued)

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

17. 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

18. /sys/kernel/mm/transparent_hugepage
defrag [always] 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 Ubuntu 22.04.1 LTS

21. Disk information
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.9-aocc400-B1f
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 120G 3.5G 117G 3% /mnt/ramdisk

22. /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R7625
Product Family: PowerEdge
Serial: BRZ5015

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Platform Notes (Continued)

23. 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

24. BIOS

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

BIOS Vendor: Dell Inc.
BIOS Version: 1.4.0
BIOS Date: 04/11/2023
BIOS Revision: 1.4

Compiler Version Notes

C | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(base)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

C++ | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

Fortran | 648.exchange2_s(base)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

(Continued on next page)



SPEC CPU®2017 Integer Speed Result

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Dell Inc.

SPECspeed®2017_int_base = 10.9

PowerEdge R7625 (AMD EPYC 9734 112-Core Processor)

SPECspeed®2017_int_peak = Not Run

CPU2017 License: 6573

Test Date: Apr-2023

Test Sponsor: Dell Inc.

Hardware Availability: Jun-2023

Tested by: Dell Inc.

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

(Continued on next page)



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Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-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
```

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

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