SPEC CPU®2017 Integer Rate Result

Dell Inc.

$SPECrate^{®}2017\_int\_base = 442$

PowerEdge R7625 (AMD EPYC 9174F 16-Core Processor)

$SPECrate^{®}2017\_int\_peak = 450$

CPU2017 License: 6573	**Test Date:** Oct-2022
Test Sponsor: Dell Inc.	**Hardware Availability:** Feb-2023
Tested by: Dell Inc.	**Software Availability:** Nov-2022

Copies — scale 0 to 1050

- 500.perlbench_r 64 — base 313, peak 316
- 502.gcc_r 64 — base 393, peak 457
- 505.mcf_r 64 — base 628
- 520.omnetpp_r 64 — base 233
- 523.xalancbmk_r 64 — base 645
- 525.x264_r 64 — base 1020
- 531.deepsjeng_r 64 — base 342
- 541.leela_r 64 — base 331, peak 331
- 548.exchange2_r 64 — base 961
- 557.xz_r 64 — base 222

——— SPECrate®2017_int_base (442)   - - - - SPECrate®2017_int_peak (450)

Hardware

CPU Name: AMD EPYC 9174F
  Max MHz: 4400
  Nominal: 4100
Enabled: 32 cores, 2 chips, 2 threads/core
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 / 2 cores
  Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 125 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: No
Firmware: Version 1.0.2 released Oct-2022
File System: tmpfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: None
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

SPEC CPU®2017 Integer Rate Result

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Dell Inc.
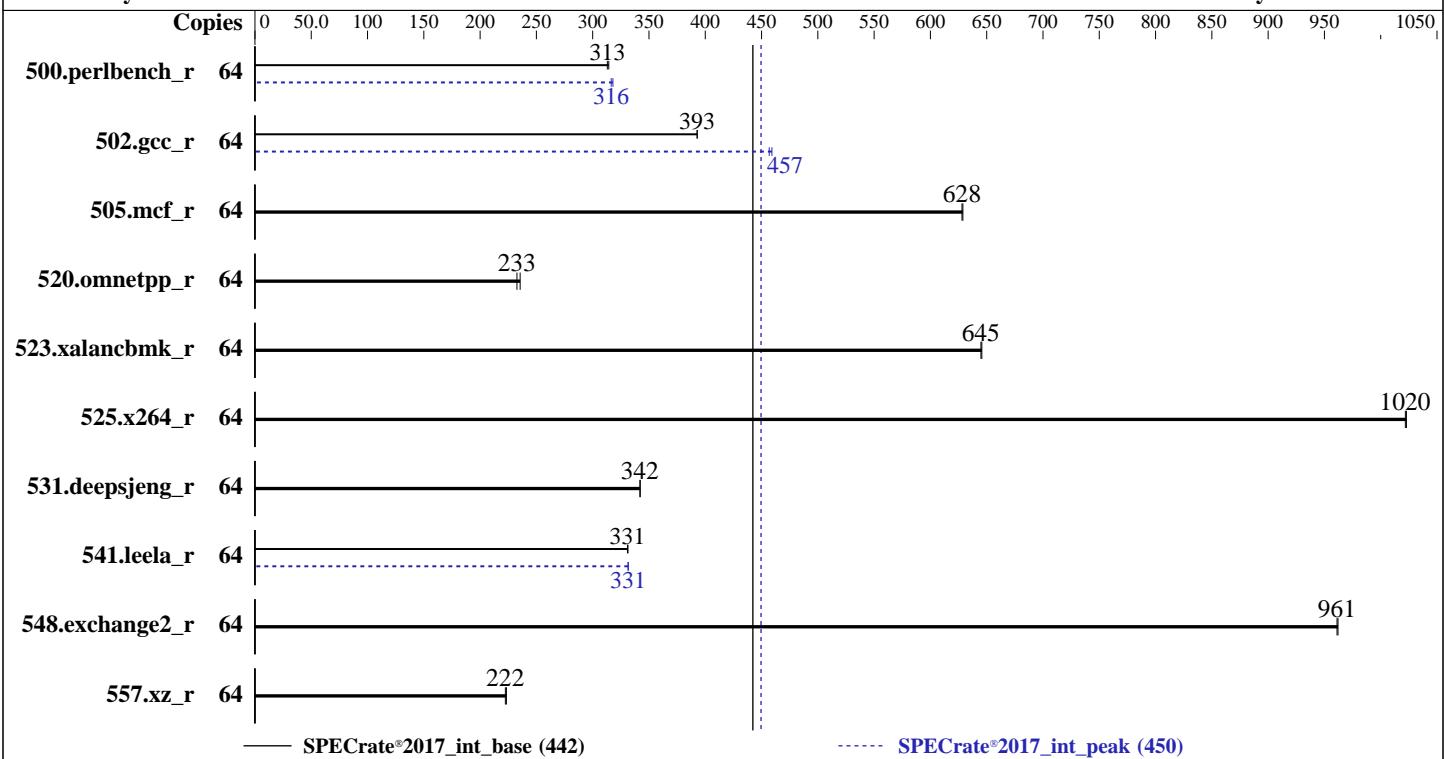
PowerEdge R7625 (AMD EPYC 9174F 16-Core Processor)

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CPU2017 License: 6573	**Test Date:** Oct-2022
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Results Table

Benchmark	Base Copies	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Copies	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
500.perlbench_r	64	324	314	**325**	**313**			64	**322**	**316**	320	318		
502.gcc_r	64	231	393	**231**	**393**			64	197	459	**198**	**457**		
505.mcf_r	64	**165**	**628**	164	629			64	**165**	**628**	164	629		
520.omnetpp_r	64	**361**	**233**	356	236			64	**361**	**233**	356	236		
523.xalancbmk_r	64	105	646	**105**	**645**			64	105	646	**105**	**645**		
525.x264_r	64	110	1020	**110**	**1020**			64	110	1020	**110**	**1020**		
531.deepsjeng_r	64	**215**	**342**	214	342			64	**215**	**342**	214	342		
541.leela_r	64	320	331	**320**	**331**			64	320	332	**320**	**331**		
548.exchange2_r	64	**174**	**961**	174	962			64	**174**	**961**	174	962		
557.xz_r	64	309	223	**311**	**222**			64	309	223	**311**	**222**		
SPECrate®2017_int_base =		**442**												
SPECrate®2017_int_peak =		**450**												

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.
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Test Date: Oct-2022
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Operating System Notes (Continued)

```
To enable Transparent Hugepages (THP) only on request for base runs,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To enable THP for all allocations for peak runs,
'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:
LD_LIBRARY_PATH =
     "/mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b/amd_rate_aocc400_genoa_B_lib/lib
     :/mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b/amd_rate_aocc400_genoa_B_lib/lib
     32:"
MALLOC_CONF = "retain:true"
```

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 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"
```

Platform Notes

```
 BIOS settings:
             DRAM Refresh Delay : Performance
          DIMM Self Healing on
     Uncorrectable Memory Error : Disabled
       Virtualization Technology : Disabled
             NUMA Nodes per Socket : 4
        L3 Cache as NUMA Domain : Enabled

                 System Profile : Custom
            Memory Patrol Scrub : Disabled
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

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Hardware Availability: Feb-2023
Software Availability: Nov-2022

Platform Notes (Continued)

```
              PCI ASPM L1 Link
                  Power Management : Disabled
                  Determinism Slider : Power Determinism


 Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on amd-sut Mon Oct 31 19:32:54 2022


 SUT (System Under Test) info as seen by some common utilities.
 For more information on this section, see
    https://www.spec.org/cpu2017/Docs/config.html#sysinfo


 From /proc/cpuinfo
    model name : AMD EPYC 9174F 16-Core Processor
       2  "physical id"s (chips)
       64 "processors"
    cores, siblings (Caution: counting these is hw and system dependent. The following
    excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
       cpu cores : 16
       siblings  : 32
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15


 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 9174F 16-Core Processor
       CPU family:                   25
       Model:                        17
       Thread(s) per core:           2
       Core(s) per socket:           16
       Socket(s):                    2
       Stepping:                     1
       Frequency boost:              enabled
       CPU max MHz:                  4409.0000
       CPU min MHz:                  400.0000
       BogoMIPS:                     8202.39
       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
```

(Continued on next page)

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Platform Notes (Continued)

```
     misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb
     bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs
     ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f
     avx512dq rdseed adx smap avx512ifma clflushopt clwb avx512cd sha_ni avx512bw
     avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
     cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin cppc arat
     npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
     pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku
     ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq
     la57 rdpid overflow_recov succor smca fsrm flush_l1d
  Virtualization:                 AMD-V
  L1d cache:                      1 MiB (32 instances)
  L1i cache:                      1 MiB (32 instances)
  L2 cache:                       32 MiB (32 instances)
  L3 cache:                       512 MiB (16 instances)
  NUMA node(s):                   16
  NUMA node0 CPU(s):              0,1,32,33
  NUMA node1 CPU(s):              8,9,40,41
  NUMA node2 CPU(s):              4,5,36,37
  NUMA node3 CPU(s):              12,13,44,45
  NUMA node4 CPU(s):              6,7,38,39
  NUMA node5 CPU(s):              14,15,46,47
  NUMA node6 CPU(s):              2,3,34,35
  NUMA node7 CPU(s):              10,11,42,43
  NUMA node8 CPU(s):              16,17,48,49
  NUMA node9 CPU(s):              24,25,56,57
  NUMA node10 CPU(s):             20,21,52,53
  NUMA node11 CPU(s):             28,29,60,61
  NUMA node12 CPU(s):             22,23,54,55
  NUMA node13 CPU(s):             30,31,62,63
  NUMA node14 CPU(s):             18,19,50,51
  NUMA node15 CPU(s):             26,27,58,59
  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 always-on, RSB filling
  Vulnerability Srbds:            Not affected
  Vulnerability Tsx async abort:  Not affected
```

(Continued on next page)

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Platform Notes (Continued)

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

/proc/cpuinfo cache data
   cache size : 1024 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 16 nodes (0-15)
  node 0 cpus: 0 1 32 33
  node 0 size: 96312 MB
  node 0 free: 96113 MB
  node 1 cpus: 8 9 40 41
  node 1 size: 96765 MB
  node 1 free: 96596 MB
  node 2 cpus: 4 5 36 37
  node 2 size: 96766 MB
  node 2 free: 93021 MB
  node 3 cpus: 12 13 44 45
  node 3 size: 96765 MB
  node 3 free: 96597 MB
  node 4 cpus: 6 7 38 39
  node 4 size: 96766 MB
  node 4 free: 96585 MB
  node 5 cpus: 14 15 46 47
  node 5 size: 96765 MB
  node 5 free: 96604 MB
  node 6 cpus: 2 3 34 35
  node 6 size: 96766 MB
  node 6 free: 96580 MB
  node 7 cpus: 10 11 42 43
  node 7 size: 96749 MB
  node 7 free: 96609 MB
  node 8 cpus: 16 17 48 49
  node 8 size: 96766 MB
  node 8 free: 96612 MB
  node 9 cpus: 24 25 56 57
  node 9 size: 96765 MB
  node 9 free: 96619 MB
  node 10 cpus: 20 21 52 53
  node 10 size: 96766 MB
  node 10 free: 96639 MB
  node 11 cpus: 28 29 60 61
```

(Continued on next page)

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Test Date: Oct-2022
Hardware Availability: Feb-2023
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Platform Notes (Continued)

```
    node 11 size: 96765 MB
    node 11 free: 96602 MB
    node 12 cpus: 22 23 54 55
    node 12 size: 96766 MB
    node 12 free: 96632 MB
    node 13 cpus: 30 31 62 63
    node 13 size: 96765 MB
    node 13 free: 96616 MB
    node 14 cpus: 18 19 50 51
    node 14 size: 96766 MB
    node 14 free: 96627 MB
    node 15 cpus: 26 27 58 59
    node 15 size: 96707 MB
    node 15 free: 96561 MB
    node distances:
    node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
      0:  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
      1:  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32
      2:  12  12  10  11  12  12  12  12  32  32  32  32  32  32  32  32
      3:  12  12  11  10  12  12  12  12  32  32  32  32  32  32  32  32
      4:  12  12  12  12  10  11  12  12  32  32  32  32  32  32  32  32
      5:  12  12  12  12  11  10  12  12  32  32  32  32  32  32  32  32
      6:  12  12  12  12  12  12  10  11  32  32  32  32  32  32  32  32
      7:  12  12  12  12  12  12  11  10  32  32  32  32  32  32  32  32
      8:  32  32  32  32  32  32  32  32  10  11  12  12  12  12  12  12
      9:  32  32  32  32  32  32  32  32  11  10  12  12  12  12  12  12
     10:  32  32  32  32  32  32  32  32  12  12  10  11  12  12  12  12
     11:  32  32  32  32  32  32  32  32  12  12  11  10  12  12  12  12
     12:  32  32  32  32  32  32  32  32  12  12  12  12  10  11  12  12
     13:  32  32  32  32  32  32  32  32  12  12  12  12  11  10  12  12
     14:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
     15:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10

  From /proc/meminfo
    MemTotal:       1584878412 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

  /sbin/tuned-adm active
     Current active profile: latency-performance

  /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
    performance

  /usr/bin/lsb_release -d
    Ubuntu 22.04.1 LTS
```

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Platform Notes (Continued)

```
From /etc/*release* /etc/*version*
   debian_version: bookworm/sid
   os-release:
      PRETTY_NAME="Ubuntu 22.04.1 LTS"
      NAME="Ubuntu"
      VERSION_ID="22.04"
      VERSION="22.04.1 LTS (Jammy Jellyfish)"
      VERSION_CODENAME=jammy
      ID=ubuntu
      ID_LIKE=debian
      HOME_URL="https://www.ubuntu.com/"

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

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):                        Not affected
CVE-2018-3620 (L1 Terminal Fault):                     Not affected
Microarchitectural Data Sampling:                      Not affected
CVE-2017-5754 (Meltdown):                              Not affected
mmio_stale_data:                                       Not affected
retbleed:                                              Not affected
CVE-2018-3639 (Speculative Store Bypass):              Mitigation: Speculative Store
                                                       Bypass disabled via prctl and
                                                       seccomp
CVE-2017-5753 (Spectre variant 1):                     Mitigation: usercopy/swapgs
                                                       barriers and __user pointer
                                                       sanitization
CVE-2017-5715 (Spectre variant 2):                     Mitigation: Retpolines, IBPB:
                                                       conditional, IBRS_FW, STIBP:
                                                       always-on, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):               Not affected

run-level 3 Oct 31 19:29

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-aocc400-B1b
   Filesystem      Type   Size  Used Avail Use% Mounted on
   tmpfs           tmpfs  125G  3.4G  122G   3% /mnt/ramdisk

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

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Platform Notes (Continued)

```
 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 80AD000080AD HMCG94MEBRA109N 64 GB 2 rank 4800

 BIOS:
    BIOS Vendor:       Dell Inc.
    BIOS Version:      1.0.2
    BIOS Date:         10/17/2022
    BIOS Revision:     1.0

 (End of data from sysinfo program)
```

Compiler Version Notes

```
================================================================================
C        | 502.gcc_r(peak)
--------------------------------------------------------------------------------
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: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
--------------------------------------------------------------------------------


================================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
         | 525.x264_r(base, peak) 557.xz_r(base, peak)
--------------------------------------------------------------------------------
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        | 502.gcc_r(peak)
--------------------------------------------------------------------------------
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: i386-unknown-linux-gnu
Thread model: posix
```

(Continued on next page)

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Software Availability: Nov-2022

Compiler Version Notes (Continued)

```
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------


==============================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
         | 525.x264_r(base, peak) 557.xz_r(base, peak)
------------------------------------------------------------------------
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++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------
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 | 548.exchange2_r(base, peak)
------------------------------------------------------------------------
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++`

Fortran benchmarks:
`flang`

SPEC CPU®2017 Integer Rate Result

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Dell Inc.

PowerEdge R7625 (AMD EPYC 9174F 16-Core Processor)

$SPECrate^{®}2017\_int\_base = 442$

$SPECrate^{®}2017\_int\_peak = 450$

CPU2017 License: 6573		**Test Date:**	Oct-2022
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Feb-2023
Tested by:	Dell Inc.	**Software Availability:**	Nov-2022

Base Portability Flags

500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-z muldefs -O3 -march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang
-lamdalloc

C++ benchmarks:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm -lflang
-lamdalloc-ext

Fortran benchmarks:
-m64 -flto -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 -z muldefs -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

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SPECrate®2017_int_base = 442

SPECrate®2017_int_peak = 450

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

Test Date: Oct-2022
Hardware Availability: Feb-2023
Software Availability: Nov-2022

Base Other Flags

C benchmarks:
`-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

500.perlbench_r: `-DSPEC_LINUX_X64 -DSPEC_LP64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LINUX -DSPEC_LP64`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Peak Optimization Flags

C benchmarks:

500.perlbench_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-fprofile-instr-generate`(pass 1)

(Continued on next page)

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PowerEdge R7625 (AMD EPYC 9174F 16-Core Processor)

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SPECrate®2017_int_peak = 450

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Tested by: Dell Inc.

Test Date: Oct-2022
Hardware Availability: Feb-2023
Software Availability: Nov-2022

Peak Optimization Flags (Continued)

500.perlbench_r (continued):
```
-fprofile-instr-use(pass 2) -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-faggressive-loop-transform -fvector-transform
-fscalar-transform -lamdlibm -lflang -lamdalloc
```

502.gcc_r: `-m32 -flto -z muldefs -Ofast -march=znver4`
```
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline
-lamdalloc
```

505.mcf_r: `basepeak = yes`

525.x264_r: `basepeak = yes`

557.xz_r: `basepeak = yes`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

523.xalancbmk_r: `basepeak = yes`

531.deepsjeng_r: `basepeak = yes`

541.leela_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lflang -lamdalloc-ext
```

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

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PowerEdge R7625 (AMD EPYC 9174F 16-Core Processor)

$SPECrate®2017\_int\_base = 442$

$SPECrate®2017\_int\_peak = 450$

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Software Availability: Nov-2022

Peak Other Flags

C benchmarks (except as noted below):
```
-Wno-unused-command-line-argument
```

```
502.gcc_r: -L/usr/lib32 -Wno-unused-command-line-argument
-L/home/work/cpu2017/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_lib/lib32
```

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-v1.0.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-v1.0.xml
```

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

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