SPEC CPU®2017 Integer Rate Result

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Dell Inc.

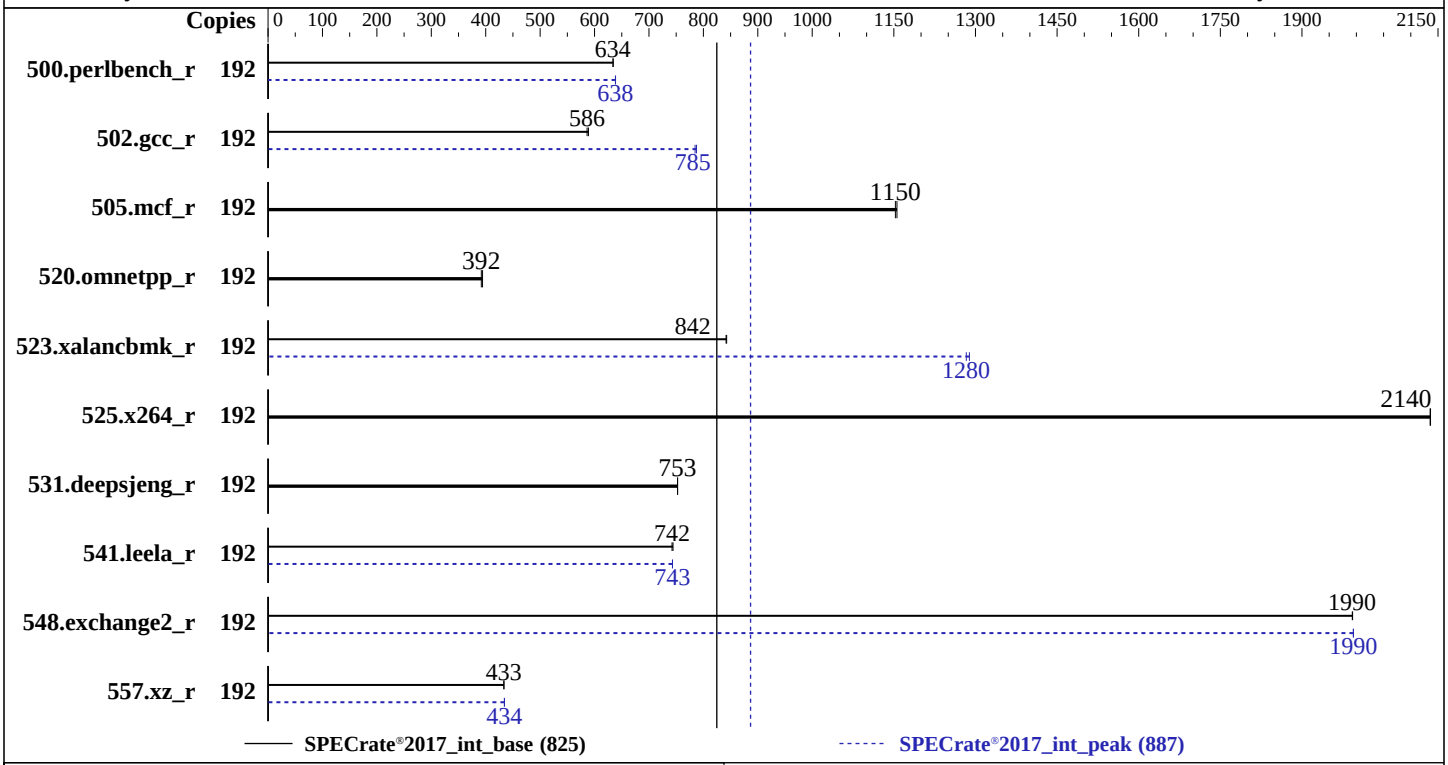
PowerEdge R7615 (AMD EPYC 9654P 96-Core Processor)

SPECrate®2017_int_base = 825

SPECrate®2017_int_peak = 887

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

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



Hardware

CPU Name:	AMD EPYC 9654P
Max MHz:	3700
Nominal:	2400
Enabled:	96 cores, 1 chip, 2 threads/core
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:	384 MB I+D on chip per chip, 32 MB shared / 8 cores
Other:	None
Memory:	768 GB (12 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 0.5.1 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.

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	192	**482**	**634**	482	634			192	479	639	**479**	**638**		
502.gcc_r	192	**464**	**586**	462	589			192	**346**	**785**	345	787		
505.mcf_r	192	**269**	**1150**	268	1160			192	**269**	**1150**	268	1160		
520.omnetpp_r	192	639	394	**643**	**392**			192	639	394	**643**	**392**		
523.xalancbmk_r	192	**241**	**842**	241	843			192	**158**	**1280**	157	1290		
525.x264_r	192	157	2140	**157**	**2140**			192	157	2140	**157**	**2140**		
531.deepsjeng_r	192	292	753	**292**	**753**			192	292	753	**292**	**753**		
541.leela_r	192	427	744	**428**	**742**			192	**428**	**743**	428	743		
548.exchange2_r	192	252	1990	**252**	**1990**			192	252	1990	**252**	**1990**		
557.xz_r	192	**479**	**433**	478	434			192	477	434	**477**	**434**		

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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.
```

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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"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:
MALLOC_CONF = "thp:never"
```

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
```

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Platform Notes (Continued)

```
              System Profile : Custom
           Memory Patrol Scrub : Disabled
           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 Tue Nov  1 19:45:03 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 9654P 96-Core Processor
       1  "physical id"s (chips)
       192 "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 : 96
       siblings  : 192
       physical 0: cores 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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
       53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
       81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

 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):                          192
      On-line CPU(s) list:             0-191
      Vendor ID:                       AuthenticAMD
      Model name:                      AMD EPYC 9654P 96-Core Processor
      CPU family:                      25
      Model:                           17
      Thread(s) per core:              2
      Core(s) per socket:              96
      Socket(s):                       1
      Stepping:                        1
      Frequency boost:                 enabled
      CPU max MHz:                     3709.0000
      CPU min MHz:                     400.0000
      BogoMIPS:                        4800.68
```

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Platform Notes (Continued)

```
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:                       3 MiB (96 instances)
L1i cache:                       3 MiB (96 instances)
L2 cache:                        96 MiB (96 instances)
L3 cache:                        384 MiB (12 instances)
NUMA node(s):                    12
NUMA node0 CPU(s):               0-7,96-103
NUMA node1 CPU(s):               32-39,128-135
NUMA node2 CPU(s):               64-71,160-167
NUMA node3 CPU(s):               16-23,112-119
NUMA node4 CPU(s):               48-55,144-151
NUMA node5 CPU(s):               80-87,176-183
NUMA node6 CPU(s):               24-31,120-127
NUMA node7 CPU(s):               56-63,152-159
NUMA node8 CPU(s):               88-95,184-191
NUMA node9 CPU(s):               8-15,104-111
NUMA node10 CPU(s):              40-47,136-143
NUMA node11 CPU(s):              72-79,168-175
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
```

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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       3M    8 Data            1    64        1             64
     L1i       32K       3M    8 Instruction     1    64        1             64
     L2         1M      96M    8 Unified         2  2048        1             64
     L3        32M     384M   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: 12 nodes (0-11)
  node 0 cpus: 0 1 2 3 4 5 6 7 96 97 98 99 100 101 102 103
  node 0 size: 64054 MB
  node 0 free: 63666 MB
  node 1 cpus: 32 33 34 35 36 37 38 39 128 129 130 131 132 133 134 135
  node 1 size: 64508 MB
  node 1 free: 60650 MB
  node 2 cpus: 64 65 66 67 68 69 70 71 160 161 162 163 164 165 166 167
  node 2 size: 64506 MB
  node 2 free: 64190 MB
  node 3 cpus: 16 17 18 19 20 21 22 23 112 113 114 115 116 117 118 119
  node 3 size: 64508 MB
  node 3 free: 64250 MB
  node 4 cpus: 48 49 50 51 52 53 54 55 144 145 146 147 148 149 150 151
  node 4 size: 64508 MB
  node 4 free: 64280 MB
  node 5 cpus: 80 81 82 83 84 85 86 87 176 177 178 179 180 181 182 183
  node 5 size: 64471 MB
  node 5 free: 64247 MB
  node 6 cpus: 24 25 26 27 28 29 30 31 120 121 122 123 124 125 126 127
  node 6 size: 64508 MB
  node 6 free: 64301 MB
  node 7 cpus: 56 57 58 59 60 61 62 63 152 153 154 155 156 157 158 159
  node 7 size: 64508 MB
  node 7 free: 64280 MB
  node 8 cpus: 88 89 90 91 92 93 94 95 184 185 186 187 188 189 190 191
  node 8 size: 64506 MB
  node 8 free: 64267 MB
  node 9 cpus: 8 9 10 11 12 13 14 15 104 105 106 107 108 109 110 111
  node 9 size: 64508 MB
  node 9 free: 64258 MB
  node 10 cpus: 40 41 42 43 44 45 46 47 136 137 138 139 140 141 142 143
  node 10 size: 64508 MB
  node 10 free: 64290 MB
```

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Platform Notes (Continued)

```
   node 11 cpus: 72 73 74 75 76 77 78 79 168 169 170 171 172 173 174 175
   node 11 size: 64465 MB
   node 11 free: 64222 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11
     0:  10  11  11  12  12  12  12  12  12  12  12  12
     1:  11  10  11  12  12  12  12  12  12  12  12  12
     2:  11  11  10  12  12  12  12  12  12  12  12  12
     3:  12  12  12  10  11  11  12  12  12  12  12  12
     4:  12  12  12  11  10  11  12  12  12  12  12  12
     5:  12  12  12  11  11  10  12  12  12  12  12  12
     6:  12  12  12  12  12  12  10  11  11  12  12  12
     7:  12  12  12  12  12  12  11  10  11  12  12  12
     8:  12  12  12  12  12  12  11  11  10  12  12  12
     9:  12  12  12  12  12  12  12  12  12  10  11  11
    10:  12  12  12  12  12  12  12  12  12  11  10  11
    11:  12  12  12  12  12  12  12  12  12  11  11  10

  From /proc/meminfo
     MemTotal:       792126376 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

  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
```

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Platform Notes (Continued)

```
 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 Nov 1 19:40

 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 R7615
     Product Family: PowerEdge

 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:
     12x 802C0000802C MTC40F2046S1RC48BA1 64 GB 2 rank 4800
     12x Not Specified Not Specified

 BIOS:
    BIOS Vendor:       Dell Inc.
    BIOS Version:      0.5.1
    BIOS Date:         10/28/2022
    BIOS Revision:     0.5

 (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)
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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++     | 523.xalancbmk_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)
```

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Compiler Version Notes (Continued)

```
Target: i386-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)
        | 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
------------------------------------------------------------------------------

==============================================================================
C++     | 523.xalancbmk_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++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
        | 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

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

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-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

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

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Peak Portability Flags (Continued)

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)
-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: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -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 -lamdlibm
-lflang -lamdalloc

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Peak Optimization Flags (Continued)

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

523.xalancbmk_r: `-m32 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6 -Wl,-mllvm -Wl,-reduce-array-computations=3 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -fno-loop-reroll -Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math -finline-aggressive -mllvm -unroll-threshold=100 -mllvm -reduce-array-computations=3 -zopt -mllvm -do-block-reorder=aggressive -fvirtual-function-elimination -fvisibility=hidden -lamdalloc-ext`

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:
`-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 -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`

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`

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Peak Other Flags (Continued)

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

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

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`

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