SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge C6525 (AMD EPYC 7452, 2.35 GHz)

$SPECrate®2017\_int\_base = 402$

$SPECrate®2017\_int\_peak = 434$
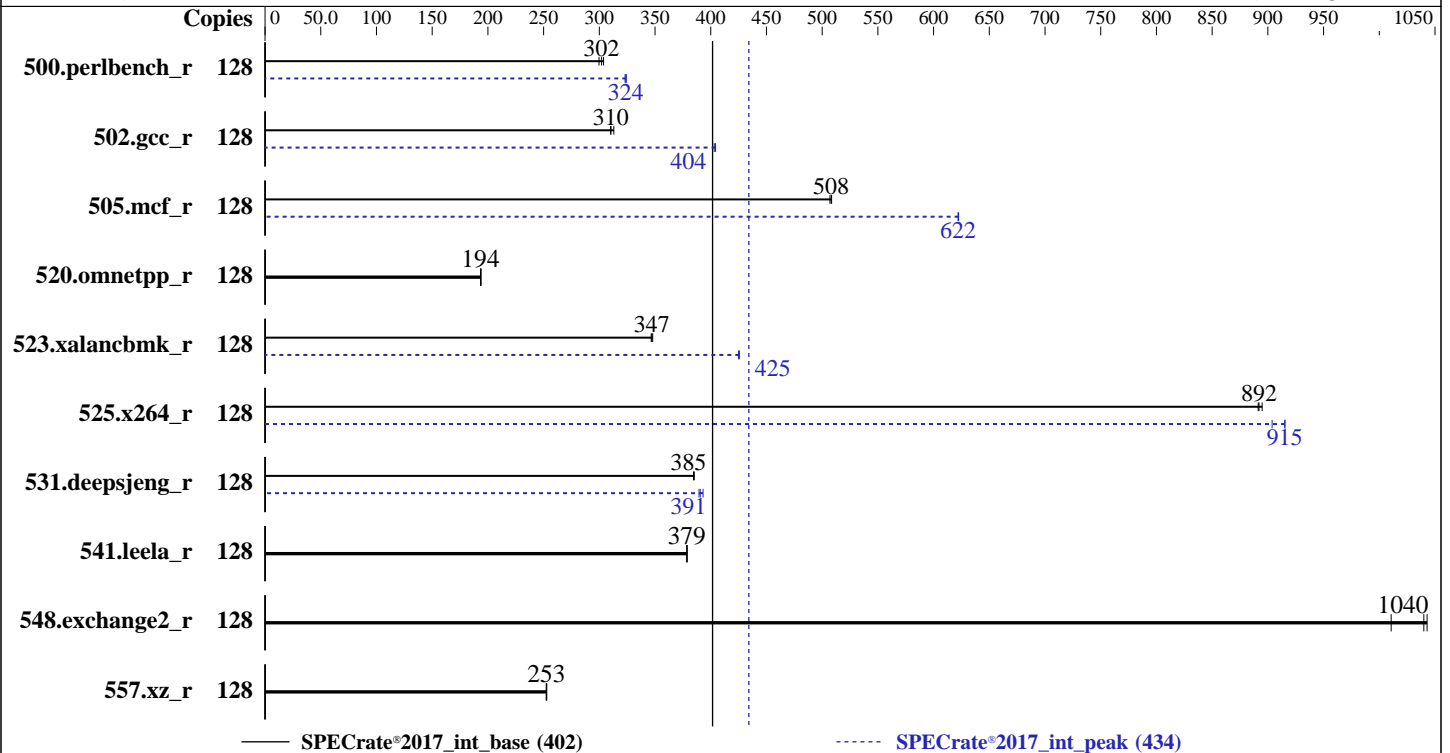
CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Sep-2019
Hardware Availability: Oct-2019
Software Availability: Aug-2019

Benchmark	Copies	base	peak
500.perlbench_r	128	302	324
502.gcc_r	128	310	404
505.mcf_r	128	508	622
520.omnetpp_r	128	194	
523.xalancbmk_r	128	347	425
525.x264_r	128	892	915
531.deepsjeng_r	128	385	391
541.leela_r	128	379	
548.exchange2_r	128	1040	
557.xz_r	128	253	

SPECrate®2017_int_base (402)   SPECrate®2017_int_peak (434)

Hardware

CPU Name: AMD EPYC 7452
 Max MHz: 3350
 Nominal: 2350
Enabled: 64 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 128 MB I+D on chip per chip, 16 MB shared / 4 cores
 Other: None
Memory: 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 3200)
Storage: 1 x 480 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP1 kernel 4.12.14-197.7-default
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: No
Firmware: Version 0.4.4 released Aug-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc: jemalloc memory allocator library v5.2.0
Power Management: --

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	128	671	304	**675**	**302**	680	300	128	**629**	**324**	631	323	629	324
502.gcc_r	128	579	313	**584**	**310**	584	310	128	448	404	450	403	**449**	**404**
505.mcf_r	128	407	508	**407**	**508**	408	507	128	332	622	**332**	**622**	333	622
520.omnetpp_r	128	868	193	866	194	**868**	**194**	128	868	193	866	194	**868**	**194**
523.xalancbmk_r	128	**389**	**347**	389	348	390	347	128	318	426	318	425	**318**	**425**
525.x264_r	128	251	891	**251**	**892**	250	895	128	**245**	**915**	245	915	248	904
531.deepsjeng_r	128	381	385	**381**	**385**	381	385	128	**376**	**391**	377	389	373	393
541.leela_r	128	560	379	**560**	**379**	560	379	128	560	379	**560**	**379**	560	379
548.exchange2_r	128	332	1010	**322**	**1040**	322	1040	128	332	1010	**322**	**1040**	322	1040
557.xz_r	128	547	253	**547**	**253**	548	252	128	547	253	**547**	**253**	548	252
SPECrate®2017_int_base =		**402**												
SPECrate®2017_int_peak =		**434**												

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
'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>

Set dirty_ratio=8 to limit dirty cache to 8% of memory
Set swappiness=1 to swap only if necessary
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory
sync then drop_caches=3 to reset caches before invoking runcpu

dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were
all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

(Continued on next page)

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Operating System Notes (Continued)

Transparent huge pages set to 'always' for this run (OS default)

General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2017-1.0.5/amd_rate_aocc200_rome_B_lib/64;
/root/cpu2017-1.0.5/amd_rate_aocc200_rome_B_lib/32:"
MALLOC_CONF = "retain:true"

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

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.

jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.2.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.tar.bz2
```

Platform Notes

```
BIOS settings:
 NUMA Nodes Per Socket set to 4
 CCX as NUMA Domain set to Enabled
 System Profile set to Custom
 CPU Power Management set to Maximum Performance
 Memory Frequency set to Maximum Performance
 Turbo Boost Enabled
 Cstates set to Enabled
 Memory Patrol Scrub Disabled
 Memory Refresh Rate set to 1x
 PCI ASPM L1 Link Power Management Disabled
 Determinism Slider set to Power Determinism
 Efficiency Optimized Mode Disabled
 Sysinfo program /home/cpu2017-1.0.5/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on suse15-sp1 Thu Aug 22 20:49:04 2019

 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
```

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Test Date: Sep-2019
Hardware Availability: Oct-2019
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Platform Notes (Continued)

```
From /proc/cpuinfo
   model name : AMD EPYC 7452 32-Core Processor
      2  "physical id"s (chips)
      128 "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 : 32
      siblings  : 64
      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
      physical 1: 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

From lscpu:
     Architecture:        x86_64
     CPU op-mode(s):      32-bit, 64-bit
     Byte Order:          Little Endian
     Address sizes:       43 bits physical, 48 bits virtual
     CPU(s):              128
     On-line CPU(s) list: 0-127
     Thread(s) per core:  2
     Core(s) per socket:  32
     Socket(s):           2
     NUMA node(s):        16
     Vendor ID:           AuthenticAMD
     CPU family:          23
     Model:               49
     Model name:          AMD EPYC 7452 32-Core Processor
     Stepping:            0
     CPU MHz:             2345.792
     BogoMIPS:            4691.58
     Virtualization:      AMD-V
     L1d cache:           32K
     L1i cache:           32K
     L2 cache:            512K
     L3 cache:            16384K
     NUMA node0 CPU(s):   0-3,64-67
     NUMA node1 CPU(s):   4-7,68-71
     NUMA node2 CPU(s):   8-11,72-75
     NUMA node3 CPU(s):   12-15,76-79
     NUMA node4 CPU(s):   16-19,80-83
     NUMA node5 CPU(s):   20-23,84-87
     NUMA node6 CPU(s):   24-27,88-91
     NUMA node7 CPU(s):   28-31,92-95
     NUMA node8 CPU(s):   32-35,96-99
     NUMA node9 CPU(s):   36-39,100-103
     NUMA node10 CPU(s):  40-43,104-107
```

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Platform Notes (Continued)

```
      NUMA node11 CPU(s):     44-47,108-111
      NUMA node12 CPU(s):     48-51,112-115
      NUMA node13 CPU(s):     52-55,116-119
      NUMA node14 CPU(s):     56-59,120-123
      NUMA node15 CPU(s):     60-63,124-127
      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 pni pclmulqdq
   monitor ssse3 fma cx16 sse4_1 sse4_2 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_l2 mwaitx cpb cat_l3
   cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2
   cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsavec xgetbv1 xsaves
   cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local clzero irperf xsaveerptr arat npt
   lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
   pfthreshold avic v_vmsave_vmload vgif umip rdpid overflow_recov succor smca


 /proc/cpuinfo cache data
    cache size : 512 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 2 3 64 65 66 67
   node 0 size: 31819 MB
   node 0 free: 31740 MB
   node 1 cpus: 4 5 6 7 68 69 70 71
   node 1 size: 32253 MB
   node 1 free: 32169 MB
   node 2 cpus: 8 9 10 11 72 73 74 75
   node 2 size: 32254 MB
   node 2 free: 32179 MB
   node 3 cpus: 12 13 14 15 76 77 78 79
   node 3 size: 32253 MB
   node 3 free: 32126 MB
   node 4 cpus: 16 17 18 19 80 81 82 83
   node 4 size: 32254 MB
   node 4 free: 32181 MB
   node 5 cpus: 20 21 22 23 84 85 86 87
   node 5 size: 32253 MB
   node 5 free: 32188 MB
   node 6 cpus: 24 25 26 27 88 89 90 91
   node 6 size: 32254 MB
   node 6 free: 32186 MB
   node 7 cpus: 28 29 30 31 92 93 94 95
   node 7 size: 32241 MB
   node 7 free: 32149 MB
```

(Continued on next page)

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Platform Notes (Continued)

```
    node 8 cpus: 32 33 34 35 96 97 98 99
    node 8 size: 32224 MB
    node 8 free: 32160 MB
    node 9 cpus: 36 37 38 39 100 101 102 103
    node 9 size: 32253 MB
    node 9 free: 32193 MB
    node 10 cpus: 40 41 42 43 104 105 106 107
    node 10 size: 32254 MB
    node 10 free: 32192 MB
    node 11 cpus: 44 45 46 47 108 109 110 111
    node 11 size: 32253 MB
    node 11 free: 32187 MB
    node 12 cpus: 48 49 50 51 112 113 114 115
    node 12 size: 32254 MB
    node 12 free: 32191 MB
    node 13 cpus: 52 53 54 55 116 117 118 119
    node 13 size: 32253 MB
    node 13 free: 32191 MB
    node 14 cpus: 56 57 58 59 120 121 122 123
    node 14 size: 32254 MB
    node 14 free: 32191 MB
    node 15 cpus: 60 61 62 63 124 125 126 127
    node 15 size: 32252 MB
    node 15 free: 32194 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:       527962184 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB
```

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

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Platform Notes (Continued)

```
From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP1"
      VERSION_ID="15.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
   Linux suse15-sp1 4.12.14-197.7-default #1 SMP Mon Jun 24 08:33:54 UTC 2019 (650fd32)
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown):           Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB: conditional,
IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Aug 22 20:07

SPEC is set to: /home/cpu2017-1.0.5
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda2       xfs   444G   20G  425G   5% /

Additional information from dmidecode 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.
  BIOS Dell Inc. 0.4.4 08/05/2019
  Memory:
   16x 802C869D802C 36ASF4G72PZ-3G2E2 32 GB 2 rank 3200

(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C      | 502.gcc_r(peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
```

(Continued on next page)

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Compiler Version Notes (Continued)

```
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/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)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------


==============================================================================
C         | 502.gcc_r(peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/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)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------


==============================================================================
C++       | 523.xalancbmk_r(peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------
```

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Dell Inc.

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CPU2017 License: 55   **Test Date:**   Sep-2019
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Compiler Version Notes (Continued)

```
==============================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------


==============================================================================
C++      | 523.xalancbmk_r(peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------


==============================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
clang
```

(Continued on next page)

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Test Date: Sep-2019
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Base Compiler Invocation (Continued)

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:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -lmvec -lamdlibm -ljemalloc
-lflang
```

C++ benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-partial-unswitch -z muldefs -lmvec -lamdlibm
```

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Dell Inc.

PowerEdge C6525 (AMD EPYC 7452, 2.35 GHz)

$SPECrate^{®}2017\_int\_base = 402$

$SPECrate^{®}2017\_int\_peak = 434$

CPU2017 License: 55		**Test Date:** Sep-2019
Test Sponsor: Dell Inc.		**Hardware Availability:** Oct-2019
Tested by: Dell Inc.		**Software Availability:** Aug-2019

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-ljemalloc -lflang
```

Fortran benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -ffast-math
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops
-Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-mllvm -disable-indvar-simplify -mllvm -unroll-aggressive
-mllvm -unroll-threshold=150 -lmvec -lamdlibm -ljemalloc -lflang
```

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 -D_FILE_OFFSET_BITS=64`
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`

SPEC CPU®2017 Integer Rate Result

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Tested by: Dell Inc.

Test Date: Sep-2019
Hardware Availability: Oct-2019
Software Availability: Aug-2019

Peak Optimization Flags

C benchmarks:

 500.perlbench_r: `-flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize`
`-Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-fprofile-instr-generate`(pass 1)
`-fprofile-instr-use`(pass 2) `-Ofast -march=znver2`
`-mno-sse4a -fstruct-layout=5`
`-mllvm -vectorize-memory-aggressively`
`-mllvm -function-specialize -mllvm -enable-gvn-hoist`
`-mllvm -unroll-threshold=50 -fremap-arrays`
`-mllvm -vector-library=LIBMVEC`
`-mllvm -reduce-array-computations=3`
`-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000`
`-flv-function-specialization -lmvec -lamdlibm -ljemalloc`
`-lflang`

 502.gcc_r: `-m32 -flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize`
`-Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver2 -mno-sse4a -fstruct-layout=5`
`-mllvm -vectorize-memory-aggressively`
`-mllvm -function-specialize -mllvm -enable-gvn-hoist`
`-mllvm -unroll-threshold=50 -fremap-arrays`
`-mllvm -vector-library=LIBMVEC`
`-mllvm -reduce-array-computations=3`
`-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000`
`-flv-function-specialization -fgnu89-inline -ljemalloc`

 505.mcf_r: `-flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize`
`-Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver2 -mno-sse4a -fstruct-layout=5`
`-mllvm -vectorize-memory-aggressively`
`-mllvm -function-specialize -mllvm -enable-gvn-hoist`
`-mllvm -unroll-threshold=50 -fremap-arrays`
`-mllvm -vector-library=LIBMVEC`
`-mllvm -reduce-array-computations=3`
`-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000`
`-flv-function-specialization -lmvec -lamdlibm -ljemalloc`
`-lflang`

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Dell Inc.

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Peak Optimization Flags (Continued)

525.x264_r: Same as 500.perlbench_r

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: -m32 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -ljemalloc

531.deepsjeng_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -lmvec -lamdlibm -ljemalloc
-lflang

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

Peak Other Flags

C benchmarks:

502.gcc_r: -L/sppo/dev/cpu2017/amd_rate_aocc200_rome/amd_rate_aocc200_rome_B_lib/32

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Peak Other Flags (Continued)

C++ benchmarks:

523.xalancbmk_r: `-L/sppo/dev/cpu2017/amd_rate_aocc200_rome/amd_rate_aocc200_rome_B_lib/32`

The flags files that were used to format this result can be browsed at

`http://www.spec.org/cpu2017/flags/aocc200-flags-B1-speed-Dell.html`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE5.html`

You can also download the XML flags sources by saving the following links:

`http://www.spec.org/cpu2017/flags/aocc200-flags-B1-speed-Dell.xml`
`http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE5.xml`

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

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