SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

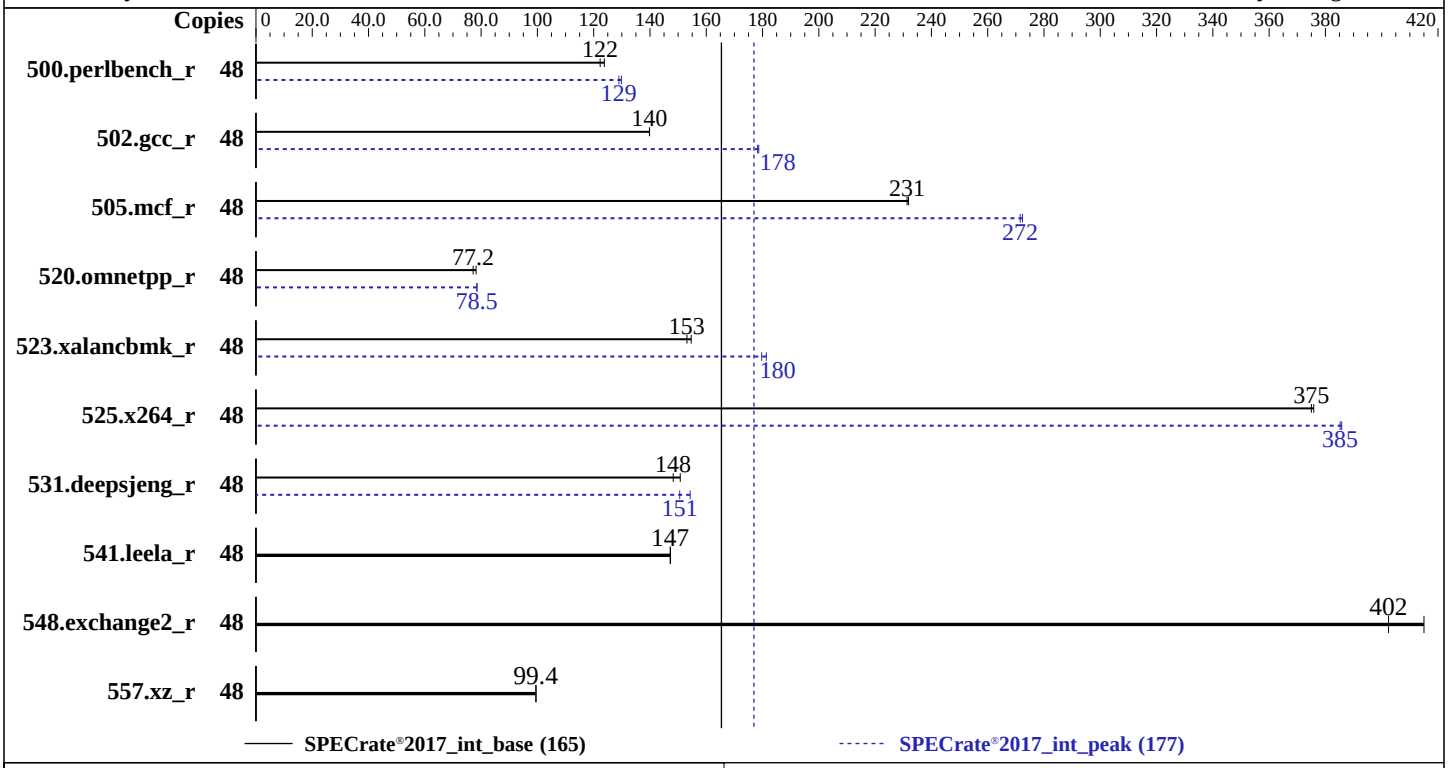
PowerEdge R7515 (AMD EPYC 7402P, 2.80GHz)

SPECrate®2017_int_base = 165

SPECrate®2017_int_peak = 177

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

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



Hardware

CPU Name:	AMD EPYC 7402P
Max MHz:	3350
Nominal:	2800
Enabled:	24 cores, 1 chip, 2 threads/core
Orderable:	1 chip
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 / 3 cores
Other:	None
Memory:	256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R, running at 3200)
Storage:	1 x 960 GB SAS SSD
Other:	None

Software

OS:	SUSE Linux Enterprise Server 15 SP1 kernel 4.12.14-195-default
Compiler:	C/C++/Fortran: Version 2.0.0 of AOCC
Parallel:	No
Firmware:	Version 1.0.1 released Aug-2019
File System:	xfs
System State:	Run level 5 (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	48	**625**	**122**	617	124			48	**593**	**129**	588	130		
502.gcc_r	48	**486**	**140**	486	140			48	**381**	**178**	380	179		
505.mcf_r	48	335	232	**335**	**231**			48	285	272	**286**	**272**		
520.omnetpp_r	48	**816**	**77.2**	805	78.2			48	**802**	**78.5**	802	78.5		
523.xalancbmk_r	48	328	155	**331**	**153**			48	280	181	**282**	**180**		
525.x264_r	48	224	376	**224**	**375**			48	218	386	**218**	**385**		
531.deepsjeng_r	48	**371**	**148**	365	151			48	**365**	**151**	357	154		
541.leela_r	48	**540**	**147**	540	147			48	**540**	**147**	540	147		
548.exchange2_r	48	303	415	**313**	**402**			48	303	415	**313**	**402**		
557.xz_r	48	521	99.5	**521**	**99.4**			48	521	99.5	**521**	**99.4**		

SPECrate®2017_int_base = 165

SPECrate®2017_int_peak = 177

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)

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_A_lib/64;
/root/cpu2017-1.0.5/amd_rate_aocc200_rome_A_lib/32:"
MALLOC_CONF = "retain:true"

Binaries were compiled on a system with 2p 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 /root/cpu2017-1.0.5/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-g3ob Tue Aug 20 23:07:25 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

 From /proc/cpuinfo
```

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Platform Notes (Continued)

```
    model name : AMD EPYC 7402P 24-Core Processor
       1  "physical id"s (chips)
       48 "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 : 24
       siblings  : 48
       physical 0: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30

 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):              48
      On-line CPU(s) list: 0-47
      Thread(s) per core:  2
      Core(s) per socket:  24
      Socket(s):           1
      NUMA node(s):        8
      Vendor ID:           AuthenticAMD
      CPU family:          23
      Model:               49
      Model name:          AMD EPYC 7402P 24-Core Processor
      Stepping:            0
      CPU MHz:             2794.922
      BogoMIPS:            5589.84
      Virtualization:      AMD-V
      L1d cache:           32K
      L1i cache:           32K
      L2 cache:            512K
      L3 cache:            16384K
      NUMA node0 CPU(s):   0-2,24-26
      NUMA node1 CPU(s):   3-5,27-29
      NUMA node2 CPU(s):   6-8,30-32
      NUMA node3 CPU(s):   9-11,33-35
      NUMA node4 CPU(s):   12-14,36-38
      NUMA node5 CPU(s):   15-17,39-41
      NUMA node6 CPU(s):   18-20,42-44
      NUMA node7 CPU(s):   21-23,45-47
      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 xtopology 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
```

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Platform Notes (Continued)

```
      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: 8 nodes (0-7)
    node 0 cpus: 0 1 2 24 25 26
    node 0 size: 31820 MB
    node 0 free: 31375 MB
    node 1 cpus: 3 4 5 27 28 29
    node 1 size: 32224 MB
    node 1 free: 32060 MB
    node 2 cpus: 6 7 8 30 31 32
    node 2 size: 32254 MB
    node 2 free: 32005 MB
    node 3 cpus: 9 10 11 33 34 35
    node 3 size: 32254 MB
    node 3 free: 32154 MB
    node 4 cpus: 12 13 14 36 37 38
    node 4 size: 32254 MB
    node 4 free: 32033 MB
    node 5 cpus: 15 16 17 39 40 41
    node 5 size: 32254 MB
    node 5 free: 31937 MB
    node 6 cpus: 18 19 20 42 43 44
    node 6 size: 32254 MB
    node 6 free: 32073 MB
    node 7 cpus: 21 22 23 45 46 47
    node 7 size: 32241 MB
    node 7 free: 32045 MB
    node distances:
    node   0   1   2   3   4   5   6   7
      0:  10  11  12  12  12  12  12  12
      1:  11  10  12  12  12  12  12  12
      2:  12  12  10  11  12  12  12  12
      3:  12  12  11  10  12  12  12  12
      4:  12  12  12  12  10  11  12  12
      5:  12  12  12  12  11  10  12  12
      6:  12  12  12  12  12  12  10  11
      7:  12  12  12  12  12  12  11  10

  From /proc/meminfo
```

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Platform Notes (Continued)

```
    MemTotal:       263740424 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

  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 linux-g3ob 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
    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 5 Aug 20 22:56

  SPEC is set to: /root/cpu2017-1.0.5
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   440G   97G  344G  22% /

  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. 1.0.1 08/19/2019
    Memory:
     5x 80AD80B380AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
     1x 80AD863280AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
     2x 80AD869D80AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
     8x Not Specified Not Specified

  (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C       | 502.gcc_r(peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/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.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C       | 502.gcc_r(peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/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.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C++     | 523.xalancbmk_r(peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
```

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Compiler Version Notes (Continued)

```
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/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.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
C++     | 523.xalancbmk_r(peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/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.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------

==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/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:
-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

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-mllvm -enable-partial-unswitch -z muldefs -lmvec -lamdlibm
-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

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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Peak Optimization Flags (Continued)

525.x264_r: `Same as 500.perlbench_r`

557.xz_r: `basepeak = yes`

C++ benchmarks:

520.omnetpp_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`

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: `Same as 520.omnetpp_r`

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_A_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_A_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`

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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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