



# SPEC® CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Dell Inc.

SPECrate2017\_int\_base = 147

PowerEdge R6415 (AMD EPYC 7551P, 2.00GHz)

SPECrate2017\_int\_peak = 155

CPU2017 License: 55

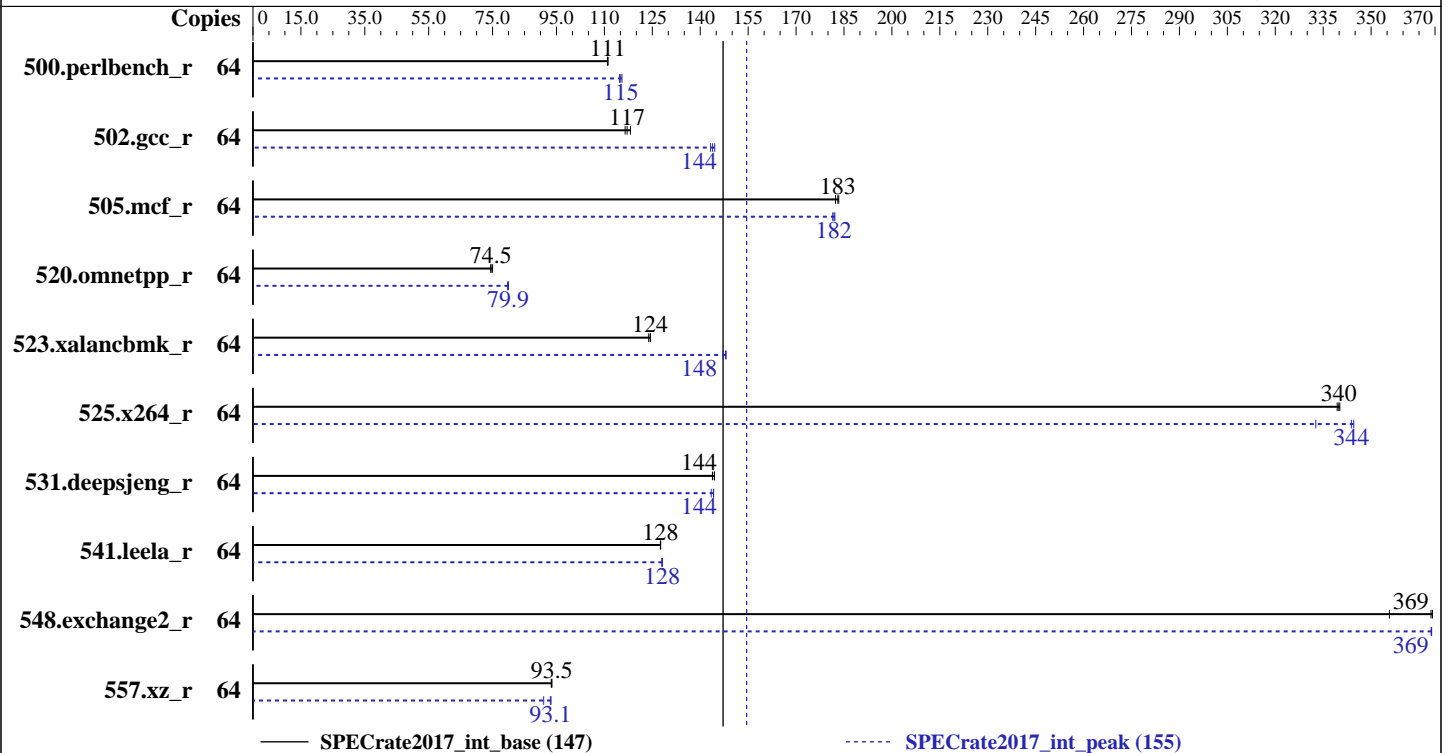
Test Date: Mar-2019

Test Sponsor: Dell Inc.

Hardware Availability: Apr-2019

Tested by: Dell Inc.

Software Availability: Feb-2019



### Hardware

CPU Name: AMD EPYC 7551P  
 Max MHz.: 3000  
 Nominal: 2000  
 Enabled: 32 cores, 1 chip, 2 threads/core  
 Orderable: 1 chip  
 Cache L1: 64 KB I + 32 KB D on chip per core  
 L2: 512 KB I+D on chip per core  
 L3: 64 MB I+D on chip per chip, 8 MB shared / 4 cores  
 Other: None  
 Memory: 512 GB (8 x 64 GB 4Rx4 PC4-2667V-L)  
 Storage: 1 x 480 GB SATA SSD  
 Other: None

### Software

OS: Ubuntu 18.04.2 LTS  
 kernel 4.15-45-generic  
 Compiler: C/C++: Version 1.3.0 of AOCC  
 Fortran: Version 4.8.2 of GCC  
 Parallel: No  
 Firmware: Version 1.8.4 Released Feb-2019  
 File System: ext4  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other: jemalloc: jemalloc memory allocator library  
 V5.1.0;



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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	64	918	111	917	111	<b>918</b>	<b>111</b>	64	882	116	<b>885</b>	<b>115</b>	888	115
502.gcc_r	64	778	116	767	118	<b>774</b>	<b>117</b>	64	<b>630</b>	<b>144</b>	633	143	627	145
505.mcf_r	64	567	182	564	183	<b>565</b>	<b>183</b>	64	570	181	<b>569</b>	<b>182</b>	568	182
520.omnetpp_r	64	<b>1127</b>	<b>74.5</b>	1119	75.0	1128	74.5	64	1053	79.7	1050	80.0	<b>1051</b>	<b>79.9</b>
523.xalancbmk_r	64	546	124	<b>543</b>	<b>124</b>	543	124	64	459	147	<b>457</b>	<b>148</b>	456	148
525.x264_r	64	<b>330</b>	<b>340</b>	329	340	330	339	64	337	333	325	345	<b>326</b>	<b>344</b>
531.deepsjeng_r	64	510	144	<b>508</b>	<b>144</b>	508	144	64	509	144	<b>509</b>	<b>144</b>	511	143
541.leela_r	64	831	128	831	128	<b>831</b>	<b>128</b>	64	<b>827</b>	<b>128</b>	828	128	827	128
548.exchange2_r	64	471	356	454	369	<b>455</b>	<b>369</b>	64	<b>455</b>	<b>369</b>	454	369	455	369
557.xz_r	64	740	93.4	739	93.6	<b>739</b>	<b>93.5</b>	64	759	91.0	741	93.3	<b>743</b>	<b>93.1</b>

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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/>

The AOCC Gold Linker plugin was installed and used for the link stage.

The AOCC Fortran Plugin version 1.3.0 was used to leverage AOCC optimizers with gfortran. It is available here:  
<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

runspec command invoked through numactl i.e.:  
numactl --interleave=all runspec <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

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## Operating System Notes (Continued)

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).

Transparent huge pages were enabled for this run (OS default)

## General Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5/amd1812na_rate_revA_lib/64:/home/cpu2017-1.0.5/amd1812na_rate_revA_lib/32:"
```

Binaries were compiled on a system with 2 x AMD EPYC 7601 CPU + 512GB Memory using RHEL 7.6

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.

jemalloc: configured and built with GCC v4.8.5 in RHEL v7.2 under default conditions.

jemalloc: sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

jemalloc uses environment variable MALLOC\_CONF with values narenas and lg\_chunk:

narenas: sets the maximum number of arenas to use for automatic multiplexing of threads and arenas.

lg\_chunk: set the virtual memory chunk size (log base 2). For example,

lg\_chunk:21 sets the default chunk size to  $2^{21}$  = 2MiB.

## Platform Notes

BIOS settings:

Virtualization Technology disabled

System Profile set to Custom

CPU Power Management set to Maximum Performance

Memory Frequency set to Maximum Performance

Turbo Boost enabled

C States set to Autonomous

Memory Patrol Scrub disabled

Memory Refresh Rate set to 1x

PCI ASPM L1 Link Power Management disabled

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## Platform Notes (Continued)

Determinism Slider set to Power Determinism  
Sysinfo program /home/cpu2017-1.0.5/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on bionic-beaver-sut Thu Mar 28 11:01:04 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>

From /proc/cpuinfo

```
model name : AMD EPYC 7551P 32-Core Processor
 1 "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 : 32
siblings : 64
physical 0: cores 0 1 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
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 1
NUMA node(s): 4
Vendor ID: AuthenticAMD
CPU family: 23
Model: 1
Model name: AMD EPYC 7551P 32-Core Processor
Stepping: 2
CPU MHz: 2526.031
BogoMIPS: 3992.46
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 64K
L2 cache: 512K
L3 cache: 8192K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60
NUMA node1 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61
NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62
NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
```

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## Platform Notes (Continued)

```

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 amd_dcm aperfmperf pni
pclmulqdq monitor ssse3 fma cxl6 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c
rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
osvw skinit wdt tce topoext perfctr_core perfctr_nb bpxext perfctr_llc mwaitx cpb
hw_pstate sme ssbd ibpb vmcall fsgsbase bmi1 avx2 smep bmi2 rdseed adx smap
clflushopt sha_ni xsaveopt xsavec xgetbv1 xsaves clzero irperf xsaveerptr arat npt
lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
pfthreshold avic v_vmsave_vmload vgif 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: 4 nodes (0-3)
node 0 cpus: 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60
node 0 size: 128635 MB
node 0 free: 128450 MB
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61
node 1 size: 129017 MB
node 1 free: 128828 MB
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62
node 2 size: 128996 MB
node 2 free: 128804 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63
node 3 size: 129016 MB
node 3 free: 128828 MB
node distances:
node  0  1  2  3
 0:  10  16  16  16
 1:  16  10  16  16
 2:  16  16  10  16
 3:  16  16  16  10

```

```

From /proc/meminfo
MemTotal:      528041812 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

/usr/bin/lsb_release -d
Ubuntu 18.04.2 LTS

```

```

From /etc/*release* /etc/*version*
debian_version: buster/sid
os-release:
NAME="Ubuntu"

```

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## Platform Notes (Continued)

VERSION="18.04.2 LTS (Bionic Beaver)"

ID=ubuntu

ID\_LIKE=debian

PRETTY\_NAME="Ubuntu 18.04.2 LTS"

VERSION\_ID="18.04"

HOME\_URL="https://www.ubuntu.com/"

SUPPORT\_URL="https://help.ubuntu.com/"

uname -a:

```
Linux bionic-beaver-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019
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

run-level 3 Mar 28 10:58

SPEC is set to: /home/cpu2017-1.0.5

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2        ext4  439G   25G  392G   6% /
```

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. 1.8.4 02/22/2019

Memory:

8x 80CE863280CE M386A8K40BM2-CTD 64 GB 4 rank 2666

8x Not Specified Not Specified

(End of data from sysinfo program)

## Compiler Version Notes

=====  
CC 502.gcc\_r(peak)  
=====

```
AOCC.LLVM.1.3.0.B34.2018_10_22 clang version 7.0.0 (CLANG: Jenkins
AOCC_1_3_0_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018_10_22)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin
=====
```

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## Compiler Version Notes (Continued)

=====  
CXXC 523.xalancbmk\_r(peak)  
=====

-----  
AOCC.LLVM.1.3.0.B34.2018\_10\_22 clang version 7.0.0 (CLANG: Jenkins  
AOCC\_1\_3\_0\_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018\_10\_22)  
Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin  
-----

=====  
CC 500.perlbench\_r(base) 502.gcc\_r(base) 505.mcf\_r(base, peak)  
525.x264\_r(base) 557.xz\_r(base, peak)  
=====

-----  
AOCC.LLVM.1.3.0.B34.2018\_10\_22 clang version 7.0.0 (CLANG: Jenkins  
AOCC\_1\_3\_0\_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018\_10\_22)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin  
-----

=====  
CXXC 520.omnetpp\_r(base, peak) 523.xalancbmk\_r(base) 531.deepsjeng\_r(base,  
peak) 541.leela\_r(base)  
=====

-----  
AOCC.LLVM.1.3.0.B34.2018\_10\_22 clang version 7.0.0 (CLANG: Jenkins  
AOCC\_1\_3\_0\_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018\_10\_22)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin  
-----

=====  
CC 500.perlbench\_r(peak) 525.x264\_r(peak)  
=====

-----  
AOCC.LLVM.1.3.0.B34.2018\_10\_22 clang version 7.0.0 (CLANG: Jenkins  
AOCC\_1\_3\_0\_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018\_10\_22)  
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-----

=====  
CXXC 541.leela\_r(peak)  
=====

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AOCC\_1\_3\_0\_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018\_10\_22)  
 Target: x86\_64-unknown-linux-gnu  
 Thread model: posix  
 InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin

-----  
 FC 548.exchange2\_r(base, peak)  
 -----

GNU Fortran (GCC) 4.8.2  
 Copyright (C) 2013 Free Software Foundation, Inc.  
 GNU Fortran comes with NO WARRANTY, to the extent permitted by law.  
 You may redistribute copies of GNU Fortran  
 under the terms of the GNU General Public License.  
 For more information about these matters, see the file named COPYING

## Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

clang gfortran

## 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





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## Base Optimization Flags

C benchmarks:

```
500.perlbench_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -O3 -ffast-math
-march=znver1 -mno-avx2 -fstruct-layout=3
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000 -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -function-specialize
-z muldefs -lamdlibm -lpthread -ldl -ljemalloc
```

502.gcc\_r: Same as 500.perlbench\_r

505.mcf\_r: Same as 500.perlbench\_r

525.x264\_r: Same as 500.perlbench\_r

```
557.xz_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -O3 -ffast-math
-march=znver1 -mno-avx2 -fstruct-layout=3
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000 -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -function-specialize
-z muldefs -lpthread -ldl -ljemalloc
```

C++ benchmarks:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -O3 -march=znver1
-mllvm -unroll-threshold=100 -finline-aggressive -fremap-arrays
-mllvm -inline-threshold=1000 -mllvm -enable-vectorize-compares=false
-z muldefs -lpthread -ldl -ljemalloc
```

Fortran benchmarks:

```
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -Wl,-mllvm -Wl,-merge-constant
-Wl,-mllvm -Wl,-unroll-aggressive -Wl,-mllvm -Wl,-unroll-threshold=150
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -O3(gfortran) -O3(clang)
-mavx -madox -funroll-loops -ffast-math -fpack-arrays -z muldefs
-fplugin=dragonegg.so -specs=integrated-as.specs
-fplugin-arg-dragonegg-llvm-option=-disable-indvar-simplify
-fplugin-arg-dragonegg-llvm-option=-unroll-aggressive
-fplugin-arg-dragonegg-llvm-option=-unroll-threshold:150 -lpthread -ldl
-ljemalloc -lgfortran -lamdlibm
```



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## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

clang gfortran

## 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,-enable-vectorize-compares
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -Ofast -march=znver1
-fstruct-layout=3 -mllvm -vectorize-memory-aggressively
-mno-avx2 -mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -lpthread -ldl -ljemalloc
```

```
502.gcc_r: -m32 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -Ofast
-march=znver1 -fstruct-layout=3
-mllvm -vectorize-memory-aggressively -mno-avx2
-mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -fgnu89-inline -lpthread
-ldl -L/root/work/lib/jemalloc510/lib32 -ljemalloc
```

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## Peak Optimization Flags (Continued)

```
505.mcf_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -Ofast
-march=znver1 -fstruct-layout=3
-mllvm -vectorize-memory-aggressively -mno-avx2
-mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -lpthread -ldl -ljemalloc
```

```
525.x264_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -Ofast -march=znver1
-mno-avx2 -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-flv-function-specialization -lamdlibm -ljemalloc
-lpthread -ldl
```

557.xz\_r: Same as 505.mcf\_r

C++ benchmarks:

```
520.omnetpp_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -Ofast
-march=znver1 -finline-aggressive
-mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -lpthread -ldl -ljemalloc
```

```
523.xalancbmk_r: -m32 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -Ofast
-march=znver1 -finline-aggressive
-mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -lpthread -ldl
-L/root/work/lib/jemalloc510/lib32 -ljemalloc
```

531.deepsjeng\_r: Same as 520.omnetpp\_r

```
541.leela_r: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -Ofast -march=znver1
-mllvm -unroll-count=8 -mllvm -unroll-threshold=100
-lpthread -ldl -ljemalloc
```

Fortran benchmarks:

```
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
```

(Continued on next page)



# SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate2017\_int\_base = 147

PowerEdge R6415 (AMD EPYC 7551P, 2.00GHz)

SPECrate2017\_int\_peak = 155

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Mar-2019

Hardware Availability: Apr-2019

Software Availability: Feb-2019

## Peak Optimization Flags (Continued)

Fortran benchmarks (continued):

```

-Wl,-mllvm -Wl,-enable-iv-split -Wl,-mllvm -Wl,-merge-constant
-Wl,-mllvm -Wl,-unroll-aggressive -Wl,-mllvm -Wl,-unroll-threshold=150
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-enable-vectorize-compares -O3(gfortran) -O3(clang)
-mavx -madx -funroll-loops -ffast-math -fpack-arrays
-fplugin=dragonegg.so -specs=integrated-as.specs
-fplugin-arg-dragonegg-llvm-option=-disable-indvar-simplify
-fplugin-arg-dragonegg-llvm-option=-unroll-aggressive
-fplugin-arg-dragonegg-llvm-option=-unroll-threshold:150 -lpthread -ldl
-ljemalloc -lgfortran -lamdlibm

```

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

<http://www.spec.org/cpu2017/flags/gcc.2018-02-16.html>

<http://www.spec.org/cpu2017/flags/aocc130-flags-revA2.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revE2.html>

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

<http://www.spec.org/cpu2017/flags/gcc.2018-02-16.xml>

<http://www.spec.org/cpu2017/flags/aocc130-flags-revA2.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revE2.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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