



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

## Dell Inc.

SPECrate®2017\_int\_base = 210

PowerEdge R7515 (AMD EPYC 7413 24-Core Processor)

SPECrate®2017\_int\_peak = 217

CPU2017 License: 55

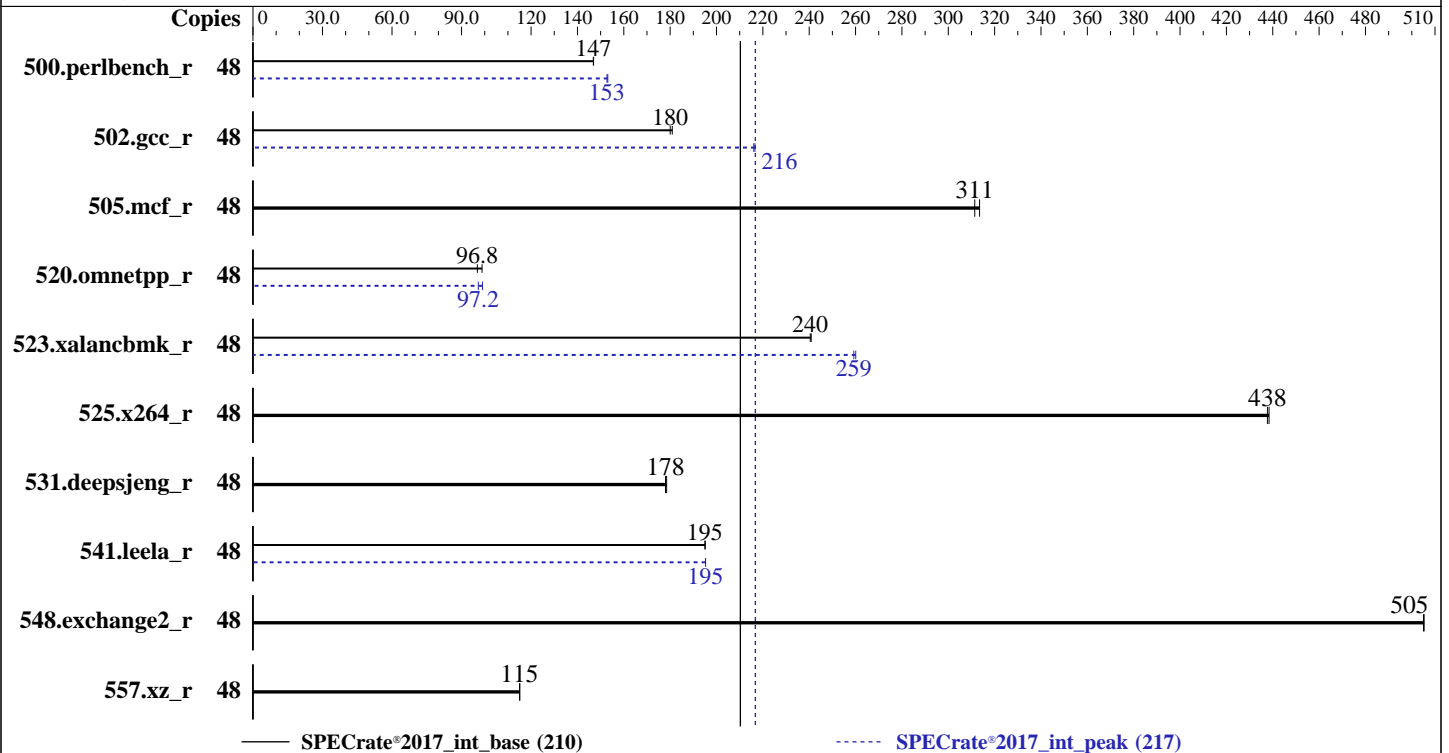
Test Date: Mar-2021

Test Sponsor: Dell Inc.

Hardware Availability: Apr-2021

Tested by: Dell Inc.

Software Availability: Mar-2021



### Hardware

CPU Name: AMD EPYC 7413  
 Max MHz: 3600  
 Nominal: 2650  
 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, 32 MB shared / 6 cores  
 Other: None  
 Memory: 1 TB (8 x 128 GB 4Rx4 PC4-3200AA-R)  
 Storage: 125 GB on tmpfs  
 Other: None

### Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)  
 4.18.0-240.el8.x86\_64  
 Compiler: C/C++/Fortran: Version 3.0.0 of AOCC  
 Parallel: No  
 Firmware: Version 2.0.3 released Jan-2021  
 File System: tmpfs  
 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  
 Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.



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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	520	147	<b>520</b>	<b>147</b>			48	499	153	<b>500</b>	<b>153</b>		
502.gcc_r	48	<b>378</b>	<b>180</b>	376	181			48	<b>315</b>	<b>216</b>	314	217		
505.mcf_r	48	247	313	<b>249</b>	<b>311</b>			48	247	313	<b>249</b>	<b>311</b>		
520.omnetpp_r	48	<b>651</b>	<b>96.8</b>	637	98.9			48	636	99.1	<b>648</b>	<b>97.2</b>		
523.xalancbmk_r	48	<b>211</b>	<b>240</b>	210	241			48	<b>196</b>	<b>259</b>	195	260		
525.x264_r	48	192	438	<b>192</b>	<b>438</b>			48	192	438	<b>192</b>	<b>438</b>		
531.deepsjeng_r	48	308	178	<b>309</b>	<b>178</b>			48	308	178	<b>309</b>	<b>178</b>		
541.leela_r	48	<b>408</b>	<b>195</b>	407	195			48	<b>407</b>	<b>195</b>	407	195		
548.exchange2_r	48	<b>249</b>	<b>505</b>	249	505			48	<b>249</b>	<b>505</b>	249	505		
557.xz_r	48	<b>451</b>	<b>115</b>	450	115			48	<b>451</b>	<b>115</b>	450	115		

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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>

'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of memory.
'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum necessary.
'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory and avoid remote memory usage.
'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.
'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout
```

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## Operating System Notes (Continued)

randomization (ASLR) to reduce run-to-run variability.

'echo always > /sys/kernel/mm/transparent\_hugepage/enabled' and  
'echo always > /sys/kernel/mm/transparent\_hugepage/defrag' run as root for peak integer runs and all FP runs to enable Transparent Hugepages (THP).  
'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled' run as root for base

## Environment Variables Notes

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

```
LD_LIBRARY_PATH =  
    "/mnt/ramdisk/cpu2017-1.1.5/amd_rate_aocc300_milan_A_lib/64:/mnt/ramdisk  
    /cpu2017-1.1.5/amd_rate_aocc300_milan_A_lib/32:"  
MALLOC_CONF = "retain:true"
```

Environment variables set by runcpu during the 523.xalanbmk\_r peak run:

```
MALLOC_CONF = "thp:never"
```

## General Notes

Binaries were compiled on a system with 2x AMD EPYC 7713 CPU + 512GiB Memory using RHEL 8.2

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"

jemalloc: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)  
jemalloc 5.1.0 is available here:  
<https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2>

## Platform Notes

BIOS settings:

```
Memory Interleaving      : Disabled  
NUMA Nodes per Socket    : 4  
L3 Cache as NUMA Domain  : Enabled
```

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## Platform Notes (Continued)

```

Virtualization Technology : Disabled
DRAM Refresh Delay       : Performance
System Profile            : Custom
  CPU Power Management    : Maximum Performance
  Memory Patrol Scrub     : Disabled
  PCI ASPM L1 Link       :
  Power Management       : Disabled

```

```

Sysinfo program /mnt/ramdisk/cpu2017-1.1.5/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on rhel-8-3-amd Tue Mar 23 13:12:33 2021

```

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 7413 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 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

```

```

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
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):          4
Vendor ID:             AuthenticAMD
CPU family:            25
Model:                 1
Model name:            AMD EPYC 7413 24-Core Processor
Stepping:              1
CPU MHz:               2860.318
BogoMIPS:              5289.71
Virtualization:        AMD-V
L1d cache:             32K
L1i cache:            32K
L2 cache:              512K

```

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## Platform Notes (Continued)

```

L3 cache: 32768K
NUMA node0 CPU(s): 0-5,24-29
NUMA node1 CPU(s): 6-11,30-35
NUMA node2 CPU(s): 12-17,36-41
NUMA node3 CPU(s): 18-23,42-47
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 nonstop_tsc cpuid extd_apicid aperfmperf 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 sme ssbd mba sev ibrs ibpb stibp vmmcall
fsgsbase bmi1 avx2 smep bmi2 invpcid 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 wbnoinvd amd_ppin arat npt lbrv svm_lock
nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold
v_omsave_vmload vgif umip pku ospke vaes vpclmulqdq 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: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 24 25 26 27 28 29
node 0 size: 257233 MB
node 0 free: 253195 MB
node 1 cpus: 6 7 8 9 10 11 30 31 32 33 34 35
node 1 size: 257808 MB
node 1 free: 257720 MB
node 2 cpus: 12 13 14 15 16 17 36 37 38 39 40 41
node 2 size: 257815 MB
node 2 free: 257662 MB
node 3 cpus: 18 19 20 21 22 23 42 43 44 45 46 47
node 3 size: 257826 MB
node 3 free: 257658 MB
node distances:
node  0  1  2  3
 0:  10  12  12  12
 1:  12  10  12  12
 2:  12  12  10  12
 3:  12  12  12  10

```

```

From /proc/meminfo
MemTotal: 1056318800 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

```

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## Platform Notes (Continued)

```

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

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.3 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.3"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux rhel-8-3-amd 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):           Not affected
CVE-2018-3620 (L1 Terminal Fault):       Not affected
Microarchitectural Data Sampling:       Not affected
CVE-2017-5754 (Meltdown):               Not affected
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: Full AMD retpoline,
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 Mar 23 13:05

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.5
Filesystem      Type      Size  Used Avail Use% Mounted on
tmpfs           tmpfs    125G   3.9G 122G   4% /mnt/ramdisk

From /sys/devices/virtual/dmi/id

```

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## Platform Notes (Continued)

Vendor: Dell Inc.  
Product: PowerEdge R7515  
Product Family: PowerEdge  
Serial: 5MGPH13

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.

Memory:

8x 80CE80B380CE M386AAG40AM3-CWE 128 GB 4 rank 3200  
8x Not Specified Not Specified

BIOS:

BIOS Vendor: Dell Inc.  
BIOS Version: 2.0.3  
BIOS Date: 01/15/2021  
BIOS Revision: 2.0

(End of data from sysinfo program)

## Compiler Version Notes

C | 502.gcc\_r(peak)

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)  
Target: i386-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/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)

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

C | 502.gcc\_r(peak)

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## Compiler Version Notes (Continued)

-----

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)  
 Target: i386-unknown-linux-gnu  
 Thread model: posix  
 InstalledDir: /opt/AMD/aocc-compiler-3.0.0/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)

-----

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)  
 Target: x86\_64-unknown-linux-gnu  
 Thread model: posix  
 InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

-----

=====  
 C++ | 523.xalanbmk\_r(peak)

-----

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)  
 Target: i386-unknown-linux-gnu  
 Thread model: posix  
 InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

-----

=====  
 C++ | 520.omnetpp\_r(base, peak) 523.xalanbmk\_r(base)  
 | 531.deepsjeng\_r(base, peak) 541.leela\_r(base, peak)

-----

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)  
 Target: x86\_64-unknown-linux-gnu  
 Thread model: posix  
 InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

-----

=====  
 C++ | 523.xalanbmk\_r(peak)

-----

AMD clang version 12.0.0 (CLANG: AOCC\_3.0.0-Build#78 2020\_12\_10) (based on LLVM Mirror.Version.12.0.0)  
 Target: i386-unknown-linux-gnu  
 Thread model: posix

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## Compiler Version Notes (Continued)

InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

```

=====
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
=====

```

```

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
=====

```

```

=====
Fortran | 548.exchange2_r(base, peak)
=====

```

```

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/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

```

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## Base Portability Flags (Continued)

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 -Wl,-allow-multiple-definition -Wl,-mllvm -Wl,-enable-licm-vrp  
-flto -Wl,-mllvm -Wl,-region-vectorize  
-Wl,-mllvm -Wl,-function-specialize  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math  
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=5  
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000  
-fremap-arrays -mllvm -function-specialize -flv-function-specialization  
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true  
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs  
-lamdlibm -ljemalloc -lflang -lflangrti
```

C++ benchmarks:

```
-m64 -std=c++98 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto  
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math  
-march=znver3 -fveclib=AMDLIBM -mllvm -enable-partial-unswitch  
-mllvm -unroll-threshold=100 -finline-aggressive  
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000  
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch  
-mllvm -extra-vectorizer-passes -mllvm -reduce-array-computations=3  
-mllvm -global-vectorize-slp=true -mllvm -convert-pow-exp-to-int=false  
-z muldefs -mllvm -do-block-reorder=aggressive  
-fvirtual-function-elimination -fvisibility=hidden -lamdlibm  
-ljemalloc -lflang -lflangrti
```

Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-inline-recursion=4  
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split  
-flto -Wl,-mllvm -Wl,-region-vectorize  
-Wl,-mllvm -Wl,-function-specialize  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math  
-march=znver3 -fveclib=AMDLIBM -z muldefs -mllvm -unroll-aggressive  
-mllvm -unroll-threshold=500 -lamdlibm -ljemalloc -lflang -lflangrti
```



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## Base Other Flags

C benchmarks:

-Wno-unused-command-line-argument

C++ benchmarks:

-Wno-unused-command-line-argument

## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

## Peak Portability Flags

500.perlbench\_r: -DSPEC\_LINUX\_X64 -DSPEC\_LP64

502.gcc\_r: -D\_FILE\_OFFSET\_BITS=64

505.mcf\_r: -DSPEC\_LP64

520.omnetpp\_r: -DSPEC\_LP64

523.xalancbmk\_r: -DSPEC\_LINUX -DSPEC\_LP64

525.x264\_r: -DSPEC\_LP64

531.deepsjeng\_r: -DSPEC\_LP64

541.leela\_r: -DSPEC\_LP64

548.exchange2\_r: -DSPEC\_LP64

557.xz\_r: -DSPEC\_LP64

## Peak Optimization Flags

C benchmarks:

500.perlbench\_r: -m64 -Wl,-allow-multiple-definition

-Wl,-mllvm -Wl,-enable-licm-vrp -flto

-Wl,-mllvm -Wl,-function-specialize

-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

-Wl,-mllvm -Wl,-reduce-array-computations=3

-fprofile-instr-generate(pass 1)

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# SPEC CPU®2017 Integer Rate Result

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Dell Inc.

SPECrate®2017\_int\_base = 210

PowerEdge R7515 (AMD EPYC 7413 24-Core Processor)

SPECrate®2017\_int\_peak = 217

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Mar-2021

Hardware Availability: Apr-2021

Software Availability: Mar-2021

## Peak Optimization Flags (Continued)

500.perlbench\_r (continued):

```
-fprofile-instr-use(pass 2) -Ofast -march=znver3
-fveclib=AMDLIBM -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllvm -inline-threshold=1000
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=false
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -lamdlibm -ljemalloc
```

502.gcc\_r: -m32 -Wl,-allow-multiple-definition

```
-Wl,-mllvm -Wl,-enable-licm-vrp -flto
-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllvm -inline-threshold=1000
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -fgnu89-inline
-ljemalloc
```

505.mcf\_r: basepeak = yes

525.x264\_r: basepeak = yes

557.xz\_r: basepeak = yes

C++ benchmarks:

520.omnetpp\_r: -m64 -std=c++98

```
-Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -finline-aggressive
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-licm-vrp -mllvm -reroll-loops
-mllvm -aggressive-loop-unswitch
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -ljemalloc
```

523.xalancbmk\_r: -m32 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto

```
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
```

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## Peak Optimization Flags (Continued)

523.xalancbmk\_r (continued):

```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -finline-aggressive
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-licm-vrp -mllvm -reroll-loops
-mllvm -aggressive-loop-unswitch
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-ljemalloc
```

531.deepsjeng\_r: basepeak = yes

541.leela\_r: Same as 520.omnetpp\_r

Fortran benchmarks:

548.exchange2\_r: basepeak = yes

## Peak Other Flags

C benchmarks (except as noted below):

```
-Wno-unused-command-line-argument
```

502.gcc\_r: -L/usr/lib -Wno-unused-command-line-argument

```
-L/sppo/bin/cpu2017v115aocc3/amd_rate_aocc300_milan_A_lib/32
```

C++ benchmarks (except as noted below):

```
-Wno-unused-command-line-argument
```

523.xalancbmk\_r: -L/usr/lib -Wno-unused-command-line-argument

```
-L/sppo/bin/cpu2017v115aocc3/amd_rate_aocc300_milan_A_lib/32
```

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

<http://www.spec.org/cpu2017/flags/aocc300-flags-A1.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-Milan-rev1.0.html>

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

<http://www.spec.org/cpu2017/flags/aocc300-flags-A1.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-AMD-Milan-rev1.0.xml>



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**Test Date:** Mar-2021

**Hardware Availability:** Apr-2021

**Software Availability:** Mar-2021

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Tested with SPEC CPU®2017 v1.1.5 on 2021-03-23 14:12:32-0400.

Report generated on 2021-04-14 14:16:04 by CPU2017 PDF formatter v6442.

Originally published on 2021-04-13.