



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

## Altos Computing Inc.

SPECrate®2017\_int\_base = 406

## BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017\_int\_peak = 434

CPU2017 License: 97

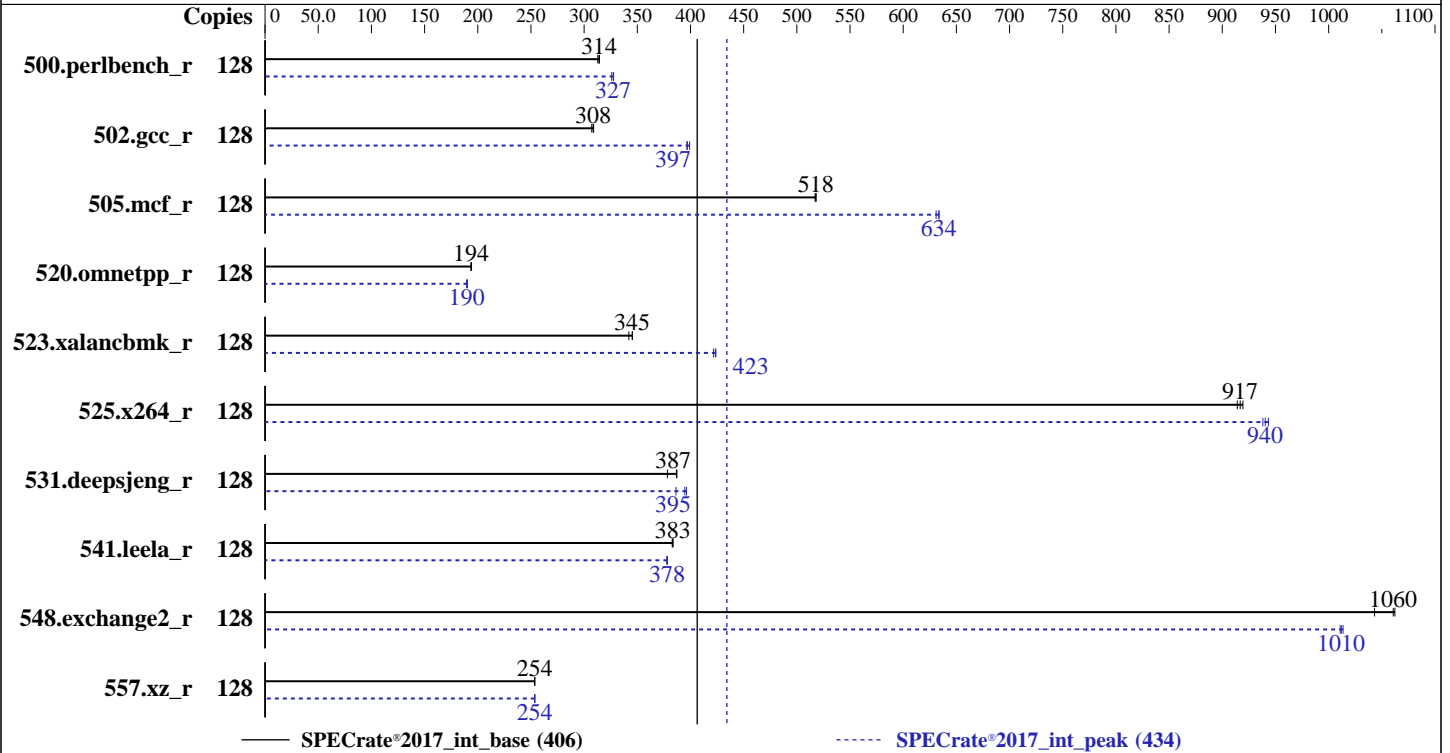
Test Sponsor: Altos Computing Inc.

Tested by: Altos Computing Inc.

Test Date: Jun-2020

Hardware Availability: Dec-2019

Software Availability: Dec-2019



### Hardware

CPU Name: AMD EPYC 7502  
 Max MHz: 3350  
 Nominal: 2500  
 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)  
 Storage: 1 x 1.6 TB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux release 8.1  
 Kernel 4.18.0-147.el8.x86\_64  
 Compiler: C/C++/Fortran: Version 2.0.0 of AOCC  
 Parallel: No  
 Firmware: Version R11 released Oct-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: BIOS 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	128	<b>649</b>	<b>314</b>	648	314	651	313	128	625	326	622	328	<b>623</b>	<b>327</b>
502.gcc_r	128	590	307	<b>588</b>	<b>308</b>	587	309	128	<b>456</b>	<b>397</b>	454	399	457	397
505.mcf_r	128	399	518	<b>399</b>	<b>518</b>	400	517	128	328	631	326	634	<b>326</b>	<b>634</b>
520.omnetpp_r	128	<b>867</b>	<b>194</b>	867	194	865	194	128	882	190	885	190	<b>885</b>	<b>190</b>
523.xalancbmk_r	128	391	345	<b>391</b>	<b>345</b>	395	342	128	321	422	319	424	<b>319</b>	<b>423</b>
525.x264_r	128	<b>244</b>	<b>917</b>	245	914	244	919	128	<b>238</b>	<b>940</b>	238	943	239	938
531.deepsjeng_r	128	379	387	<b>379</b>	<b>387</b>	388	378	128	380	386	370	396	<b>372</b>	<b>395</b>
541.leela_r	128	554	383	553	384	<b>553</b>	<b>383</b>	128	<b>561</b>	<b>378</b>	560	378	561	378
548.exchange2_r	128	321	1040	<b>316</b>	<b>1060</b>	316	1060	128	332	1010	331	1010	<b>331</b>	<b>1010</b>
557.xz_r	128	545	254	545	253	<b>545</b>	<b>254</b>	128	<b>545</b>	<b>254</b>	545	254	545	253

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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  
'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).

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## Operating System Notes (Continued)

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

## Environment Variables Notes

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

```
LD_LIBRARY_PATH =
    "/home/cpu2017/amd_rate_aocc200_rome_C_lib/64:/home/cpu2017/amd_rate_aoc
    c200_rome_C_lib/32:"
MALLOCONF = "retain:true"
```

## General Notes

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 Configuration:  
Power Policy Quick Settings set to Best Performance  
NUMA Nodes Per Socket set to NPS4

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on localhost.localdomain Fri Jun 19 08:33:23 2020
```

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 7502 32-Core Processor
    2 "physical id"s (chips)
    128 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
```

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## Platform Notes (Continued)

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
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 7502 32-Core Processor
Stepping:               0
CPU MHz:                2065.141
BogoMIPS:               5000.14
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
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

```

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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 xtopology nonstop_tsc cpuid extd_apicid 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 ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb
cat_l3 cdp_l3 hw_pstate sme ssbd mba 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
wbnoinvd 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: 31813 MB
node 0 free: 31612 MB
node 1 cpus: 4 5 6 7 68 69 70 71
node 1 size: 32251 MB
node 1 free: 32055 MB
node 2 cpus: 8 9 10 11 72 73 74 75
node 2 size: 32252 MB
node 2 free: 32182 MB
node 3 cpus: 12 13 14 15 76 77 78 79
node 3 size: 32251 MB
node 3 free: 32175 MB
node 4 cpus: 16 17 18 19 80 81 82 83
node 4 size: 32252 MB
node 4 free: 32164 MB
node 5 cpus: 20 21 22 23 84 85 86 87
node 5 size: 32251 MB
node 5 free: 32184 MB
node 6 cpus: 24 25 26 27 88 89 90 91
node 6 size: 32252 MB
node 6 free: 32169 MB
node 7 cpus: 28 29 30 31 92 93 94 95
node 7 size: 32239 MB
node 7 free: 32174 MB
node 8 cpus: 32 33 34 35 96 97 98 99
node 8 size: 32252 MB
node 8 free: 32198 MB
node 9 cpus: 36 37 38 39 100 101 102 103
node 9 size: 32251 MB

```

(Continued on next page)



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## Platform Notes (Continued)

```

node 9 free: 32196 MB
node 10 cpus: 40 41 42 43 104 105 106 107
node 10 size: 32252 MB
node 10 free: 32178 MB
node 11 cpus: 44 45 46 47 108 109 110 111
node 11 size: 32226 MB
node 11 free: 32171 MB
node 12 cpus: 48 49 50 51 112 113 114 115
node 12 size: 32252 MB
node 12 free: 32200 MB
node 13 cpus: 52 53 54 55 116 117 118 119
node 13 size: 32251 MB
node 13 free: 32196 MB
node 14 cpus: 56 57 58 59 120 121 122 123
node 14 size: 32252 MB
node 14 free: 32195 MB
node 15 cpus: 60 61 62 63 124 125 126 127
node 15 size: 32249 MB
node 15 free: 32192 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:      527930268 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.1 (Ootpa)"

```

(Continued on next page)



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## Platform Notes (Continued)

```

ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.1"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
ANSI_COLOR="0;31"

```

```

redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga

```

uname -a:

```

Linux localhost.localdomain 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux

```

Kernel self-reported vulnerability status:

```

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/swaps barriers and __user
pointer sanitization
CVE-2017-5715 (Spectre variant 2):        Mitigation: Full AMD retpoline, IBPB:
conditional, IBRS_FW, STIBP: conditional, RSB
filling

```

run-level 3 Jun 19 08:27

SPEC is set to: /home/cpu2017

```

Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs      1.5T   16G  1.4T   2% /home

```

From /sys/devices/virtual/dmi/id

```

BIOS: GIGABYTE R11 10/25/2019
Vendor: Acer
Product: Altos R365 F4
Product Family: Server
Serial: DJ7002921A0002

```

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:

```

16x Samsung M393A4K40DB3-CWE 32 kB 2 rank 3200
16x Unknown Unknown

```

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## Platform Notes (Continued)

(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)  
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  
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-----

=====  
C | 500.perlbench\_r(base, peak) 502.gcc\_r(base) 505.mcf\_r(base, peak)  
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## Compiler Version Notes (Continued)

=====  
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  
-----

=====  
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  
-----

(Continued on next page)



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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

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

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# SPEC CPU®2017 Integer Rate Result

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Altos Computing Inc.

SPECrate®2017\_int\_base = 406

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017\_int\_peak = 434

CPU2017 License: 97

Test Sponsor: Altos Computing Inc.

Tested by: Altos Computing Inc.

Test Date: Jun-2020

Hardware Availability: Dec-2019

Software Availability: Dec-2019

## Base Optimization Flags (Continued)

C benchmarks (continued):

-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  
-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

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## Peak Portability Flags (Continued)

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

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## Peak Optimization Flags (Continued)

505.mcf\_r (continued):

```
-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
```

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

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

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: Same as 520.omnetpp\_r

Fortran benchmarks:

```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
```

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## Peak Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-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  
-mllvm -disable-indvar-simplify -mllvm -unroll-aggressive  
-mllvm -unroll-threshold=150 -lmvec -lamdlibm -ljemalloc -lflang
```

## Peak Other Flags

C benchmarks:

```
502.gcc_r: -L/sppo/dev/cpu2017/v110/amd_rate_aocc200_rome_C_lib/32
```

C++ benchmarks:

```
523.xalancbmk_r: -L/sppo/dev/cpu2017/v110/amd_rate_aocc200_rome_C_lib/32
```

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

<http://www.spec.org/cpu2017/flags/aocc200-flags-C3.html>

<http://www.spec.org/cpu2017/flags/Altos-Platform-Settings-V1.0-revC.html>

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

<http://www.spec.org/cpu2017/flags/aocc200-flags-C3.xml>

<http://www.spec.org/cpu2017/flags/Altos-Platform-Settings-V1.0-revC.xml>

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Tested with SPEC CPU®2017 v1.1.0 on 2020-06-19 08:33:22-0400.

Report generated on 2020-07-07 14:39:21 by CPU2017 PDF formatter v6255.

Originally published on 2020-07-07.