# SPEC CPU®2017 Floating Point Rate Result

## Altos Computing Inc.

### SPEC CPU®2017 Floating Point Rate Result

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**Altos Computing Inc.**

**BrainSphere W2050h-W275h F5 (AMD EPYC 7252)**

**SPECrate®2017_fp_base = 148**

**SPECrate®2017_fp_peak = 149**

**CPU2017 License:** 97

**Test Sponsor:** Altos Computing Inc.

**Tested by:** Altos Computing Inc.

**Test Date:** Dec-2020

**Hardware Availability:** Jul-2020

**Software Availability:** Dec-2019

### Performance Results

| Copy | 0  | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0 | 105.0 | 120.0 | 135.0 | 150.0 | 165.0 | 180.0 | 195.0 | 210.0 | 225.0 | 240.0 | 255.0 | 270.0 | 285.0 | 300.0 | 315.0 | 330.0 | 345.0 | 360.0 |
|------|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 503.bwaves_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 328 |
| 507.cactuBSSN_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 239 |
| 508.namd_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 91.1 |
| 510.parest_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 123 |
| 511.povray_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 133 |
| 519.lbm_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 137 |
| 521.wrf_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 157 |
| 526.blender_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 136 |
| 527.cam4_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 125 |
| 538.imagick_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 360 |
| 544.nab_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 363 |
| 549.fotonik3d_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 160 |
| 554.roms_r | 32 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 160 |

**SPECrate®2017_fp_base (148)**

**SPECrate®2017_fp_peak (149)**

### Hardware

**CPU Name:** AMD EPYC 7252

**Max MHz:** 3200

**Nominal:** 3100

**Enabled:** 16 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:** 64 MB I+D on chip per chip, 16 MB shared / 2 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:** Ubuntu 19.04

**Kernel:** 5.0.0-38-generic

**Compiler:** C/C++/Fortran: Version 2.0.0 of AOCC

**Parallel:** No

**Firmware:** Version R15 released Jun-2020

**File System:** ext4

**System State:** Run level 5 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** 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
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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**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

(Continued on next page)
Altos Computing Inc.
BrainSphere W2050h-W275h F5 (AMD EPYC 7252)

SPECrate®2017_fp_base = 148
SPECrate®2017_fp_peak = 149

<table>
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<th>Specification</th>
<th>Value</th>
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Test Date: Dec-2020
Hardware Availability: Jul-2020
Software Availability: Dec-2019

Operating System Notes (Continued)

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 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_aocc200_rome_C_lib/32;"
MALLOC_CONF = "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 settings:
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 295195f888a3d7ed86e646a485a0011
running on ubuntu Mon Dec 28 16:31:46 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

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BrainSphere W2050h-W275h F5 (AMD EPYC 7252)

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SPECrate®2017_fp_base = 148  
SPECrate®2017_fp_peak = 149

Platform Notes (Continued)

model name : AMD EPYC 7252 8-Core Processor
2 "physical id"s (chips)
32 "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 : 8
siblings : 16
physical 0: cores 0 1 4 5 8 9 12 13
physical 1: cores 0 1 4 5 8 9 12 13

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): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: AuthenticAMD
CPU family: 23
Model: 49
Model name: AMD EPYC 7252 8-Core Processor
Stepping: 0
CPU MHz: 1499.429
CPU max MHz: 3100.0000
CPU min MHz: 1500.0000
BogoMIPS: 6200.18
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
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 bmpext perfctr_llc mwAITx cpb
cat_l3 cdp_l3 hw_pstate sme ssbd mba sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2
smep bmi2 sqm rdt_a rdseed adx smap clflushopt clwb sha ni xsaveopt xsaves xgetbv1
xsaves sqm_llc sqm_occup_llc sqm_mbm_total sqm_mbm_local clzero iperf xsaveerptr
wbnoinvd arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyastid

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## SPEC CPU®2017 Floating Point Rate Result

**Altos Computing Inc.**

**BrainSphere W2050h-W275h F5 (AMD EPYC 7252)**

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**CPU2017 License:** 97  
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### Platform Notes (Continued)

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: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
node 0 size: 257886 MB
node 0 free: 257312 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 258043 MB
node 1 free: 257467 MB
node distances:
  node 0 1
  0:  10  32
  1:  32  10
```

From /proc/meminfo

```
MemTotal:       528312244 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

```
/usr/bin/lsb_release -d
Ubuntu 19.04
```

From /etc/*release* /etc/*version*

```
debian_version: buster/sid
os-release:
  NAME="Ubuntu"
  VERSION="19.04 (Disco Dingo)"
  ID=ubuntu
  ID_LIKE=debian
  PRETTY_NAME="Ubuntu 19.04"
  VERSION_ID="19.04"
  HOME_URL="https://www.ubuntu.com/"
  SUPPORT_URL="https://help.ubuntu.com/
```

```
uname -a:
  Linux ubuntu 5.0.0-38-generic #41-Ubuntu SMP Tue Dec 3 00:27:35 UTC 2019 x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
  itlb_multihit: Not affected
```

(Continued on next page)
Altos Computing Inc.  

BrainSphere W2050h-W275h F5 (AMD EPYC 7252)

SPECrates:  
- SPECrate\textsuperscript{\textregistered}2017\textsubscript{fp}\textsuperscript{peak} = 149  
- SPECrate\textsuperscript{\textregistered}2017\textsubscript{fp}\textsuperscript{base} = 148

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Test Sponsor: Altos Computing Inc.
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### Platform Notes (Continued)

- 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: conditional, RSB filling
- txs_async_abort: Not affected

run-level 5 Dec 25 17:57

SPEC is set to: /home/cpu2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda2 ext4 1.5T 47G 1.4T 4% /

From /sys/devices/virtual/dmi/id  
BIOS: GIGABYTE R15 06/19/2020  
Vendor: Altos  
Product: BrainSphere W2050h-W275h F5  
Product Family: Server  
Serial: DG9P89A21A0012

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

(End of data from sysinfo program)

### Compiler Version Notes

==============================================================================  
C | 519.lbm\_r(base, peak) 538.imagick\_r(base, peak)  
| 544.nab\_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  

(Continued on next page)
Altos Computing Inc.

BrainSphere W2050h-W275h F5 (AMD EPYC 7252)

SPEC CPU® 2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 148
SPECrate®2017_fp_peak = 149

Altos Computing Inc.

Test Sponsor:  Altos Computing Inc.
Tested by:  Altos Computing Inc.

Compiler Version Notes (Continued)

==============================================================================
C++          | 508.namd_r(base, peak) 510.parest_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++, C        | 511.povray_r(base, peak) 526.blender_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
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++, C, Fortran | 507.cactuBSSN_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
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
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Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

==============================================================================

(Continued on next page)
Altos Computing Inc.  

BrainSphere W2050h-W275h F5 (AMD EPYC 7252)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 148</th>
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<tbody>
<tr>
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**CPU2017 License:** 97
**Test Sponsor:** Altos Computing Inc.
**Test Date:** Dec-2020
**Tested by:** Altos Computing Inc.
**Hardware Availability:** Jul-2020
**Software Availability:** Dec-2019

---

### Compiler Version Notes (Continued)

**Fortran**

- 503.bwaves_r(base, peak)
- 549.fotonik3d_r(base, peak)
- 554.roms_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

**C++ benchmarks:**
clang++

**Fortran benchmarks:**
flang

**Benchmarks using both Fortran and C:**
flang clang

**Benchmarks using both C and C++:**
clang++ clang

**Benchmarks using Fortran, C, and C++:**
clang++ clang flang
## SPEC CPU®2017 Floating Point Rate Result

### Altos Computing Inc.

**BrainSphere W2050h-W275h F5 (AMD EPYC 7252)**

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
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<td>148</td>
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### CPU2017 License:
97

**Test Date:** Dec-2020

**Test Sponsor:** Altos Computing Inc.

**Tested by:** Altos Computing Inc.

**Hardware Availability:** Jul-2020

**Software Availability:** Dec-2019

### Base Portability Flags

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>503.bwaves_r: -DSPEC_LP64</td>
</tr>
<tr>
<td>507.cactuBSSN_r: -DSPEC_LP64</td>
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<tr>
<td>508.namd_r: -DSPEC_LP64</td>
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<td>510.parest_r: -DSPEC_LP64</td>
</tr>
<tr>
<td>511.povray_r: -DSPEC_LP64</td>
</tr>
<tr>
<td>519.lbm_r: -DSPEC_LP64</td>
</tr>
<tr>
<td>521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64</td>
</tr>
<tr>
<td>526.blender_r: -funsigned-char -D__BOOL_DEFINED -DSPEC_LP64</td>
</tr>
<tr>
<td>527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64</td>
</tr>
<tr>
<td>538.imagick_r: -DSPEC_LP64</td>
</tr>
<tr>
<td>544.nab_r: -DSPEC_LP64</td>
</tr>
<tr>
<td>549.fotonik3d_r: -DSPEC_LP64</td>
</tr>
<tr>
<td>554.roms_r: -DSPEC_LP64</td>
</tr>
</tbody>
</table>

### 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`

#### C++ benchmarks:
- `-std=c++98 -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=1000 -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 -O3 -march=znver2`
- `-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs`
- `-kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang`

(Continued on next page)
 Altos Computing Inc.  

**BrainSphere W2050h-W275h F5 (AMD EPYC 7252)**

<table>
<thead>
<tr>
<th>SpecCpu2017 License</th>
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<tr>
<td>Hardware Availability</td>
<td>Jul-2020</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Dec-2019</td>
</tr>
</tbody>
</table>

**Base Optimization Flags (Continued)**

**Benchmarks using both Fortran and C:**
- `-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 -mlvm -inline-threshold=1000`
- `-flv-function-specialization -funroll-loops -Mrecursive -z muldefs`
- `-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lfang`

**Benchmarks using both C and C++:**
- `-std=c++98 -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`
- `-fstruct-layout=3 -mlvm -unroll-threshold=50 -fremap-arrays`
- `-mllvm -function-specialize -mlvm -enable-gvn-hoist`
- `-mlvm -reduce-array-computations=3 -mlvm -inline-threshold=1000`
- `-flv-function-specialization -mlvm -loop-unswitch-threshold=200000`
- `-mlvm -unroll-threshold=100 -mlvm -enable-partial-unswitch -z muldefs`
- `-lmvec -lamdlibm -ljemalloc -lfang`

**Benchmarks using Fortran, C, and C++:**
- `-std=c++98 -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`
- `-fstruct-layout=3 -mlvm -unroll-threshold=50 -fremap-arrays`
- `-mllvm -function-specialize -mlvm -enable-gvn-hoist`
- `-mlvm -reduce-array-computations=3 -mlvm -global-vectorize-slp`
- `-mlvm -vector-library=LIBMVEC -mlvm -inline-threshold=1000`
- `-flv-function-specialization -mlvm -loop-unswitch-threshold=200000`
- `-mlvm -unroll-threshold=100 -mlvm -enable-partial-unswitch`
- `-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only`
- `-lmvec -lamdlibm -ljemalloc -lfang`

**Peak Compiler Invocation**

C benchmarks:
- `clang`

(Continued on next page)
# SPEC CPU®2017 Floating Point Rate Result

## Altos Computing Inc.

### SPECrate®2017_fp_base = 148

### SPECrate®2017_fp_peak = 149

| CPU2017 License: 97 | Test Date: Dec-2020 |
| Test Sponsor: Altos Computing Inc. | Hardware Availability: Jul-2020 |
| Tested by: Altos Computing Inc. | Software Availability: Dec-2019 |

### Peak Compiler Invocation (Continued)

- **C++ benchmarks:**
  - `clang++`

- **Fortran benchmarks:**
  - `flang`

- **Benchmarks using both Fortran and C:**
  - `flang clang`

- **Benchmarks using both C and C++:**
  - `clang++ clang`

- **Benchmarks using Fortran, C, and C++:**
  - `clang++ clang flang`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**

- `519.lbm_r: basepeak = yes`


- `544.nab_r: Same as 538.imagick_r`

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Altos Computing Inc.

BrainSphere W2050h-W275h F5 (AMD EPYC 7252)

SPECrate®2017_fp_base = 148

SPECrate®2017_fp_peak = 149

CPU2017 License: 97
Test Sponsor: Altos Computing Inc.
Tested by: Altos Computing Inc.

Test Date: Dec-2020
Hardware Availability: Jul-2020
Software Availability: Dec-2019

Peak Optimization Flags (Continued)

C++ benchmarks:

508.namd_r: basepeak = yes
510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes
554.roms_r: -flto -Wl,-mltvm -Wl,-function-specialize
-Wl,-mltvm -Wl,-region-vectorize
-Wl,-mltvm -Wl,-vector-library=LIBMVEC
-Wl,-mltvm -Wl, -reduce-array-computations=3
-Wl,-mltvm -Wl, -enable-X86-prefetching -O3 -march=znver2
-funroll-loops -Mrecursive -mltvm -vector-library=LIBMVEC
-KIEEE -fno-finite-math-only -lmvec -lamdlibm -ljemalloc
-1flang

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes
527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -std=c++98 -flto -Wl,-mltvm -Wl,-function-specialize
-Wl,-mltvm -Wl,-region-vectorize
-Wl,-mltvm -Wl,-vector-library=LIBMVEC
-Wl,-mltvm -Wl, -reduce-array-computations=3
-Wl,-mltvm -Wl, -x86-use-vzeroupper=false -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mltvm -vectorize-memory-aggressively
-mltvm -function-specialize -mltvm -enable-gvn-hoist
-mltvm -unroll-threshold=50 -fremap-arrays
-mltvm -vector-library=LIBMVEC
-mltvm -reduce-array-computations=3
-mltvm -global-vectorize-slp -mltvm -inline-threshold=1000
-flv-function-specialization -mltvm -unroll-threshold=100
-mltvm -enable-partial-unswitch
-mltvm -loop-unswitch-threshold=200000 -lmvec -lamdlibm
-ljemalloc -1flang

(Continued on next page)
# SPEC CPU®2017 Floating Point Rate Result

## Altos Computing Inc.

### Benchmark Information

- **Name**: BrainSphere W2050h-W275h F5 (AMD EPYC 7252)
- **CPU2017 License**: 97
- **Test Sponsor**: Altos Computing Inc.
- **Tested by**: Altos Computing Inc.
- **Test Date**: Dec-2020
- **Hardware Availability**: Jul-2020
- **Software Availability**: Dec-2019

### Performance Results

**SPECrate®2017_fp_base** = 148
**SPECrate®2017_fp_peak** = 149

## Benchmark Details

### Peak Optimization Flags (Continued)

- 526.blender_r: basepeak = yes
- **Benchmarks using Fortran, C, and C++:**
  - 507.cactuBSSN_r: basepeak = yes

### Flags Files

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


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


---

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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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