SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Altos Computing Inc.

BrainSphere R365 F4 (AMD EPYC 7502)

$SPECrate®2017\_fp\_base = 353$

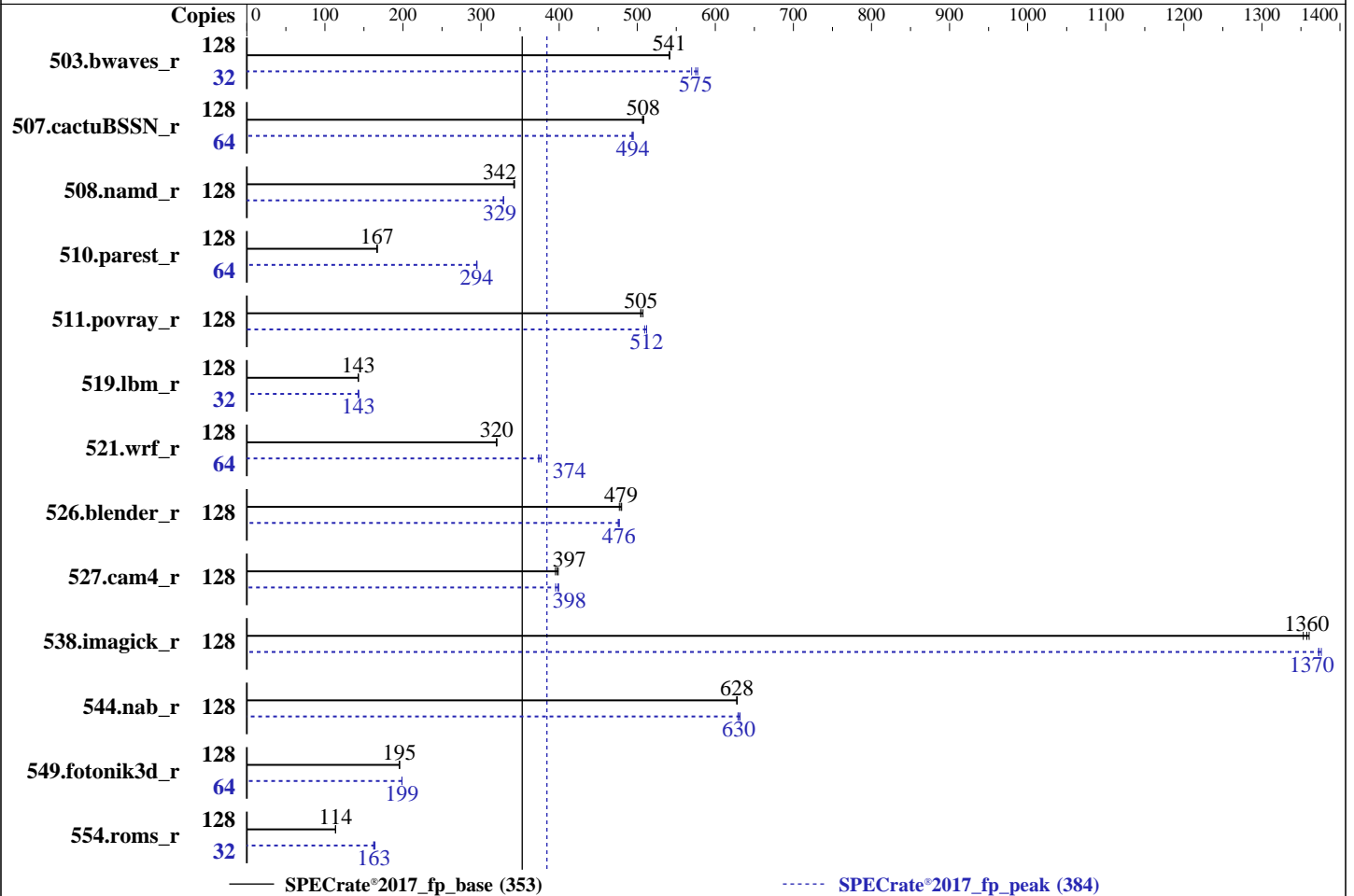$SPECrate®2017\_fp\_peak = 384$

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

Copies		
503.bwaves_r	128	541
	32	575
507.cactuBSSN_r	128	508
	64	494
508.namd_r	128	342
	128	329
510.parest_r	128	167
	64	294
511.povray_r	128	505
	128	512
519.lbm_r	128	143
	32	143
521.wrf_r	128	320
	64	374
526.blender_r	128	479
	128	476
527.cam4_r	128	397
	128	398
538.imagick_r	128	1360
	128	1370
544.nab_r	128	628
	128	630
549.fotonik3d_r	128	195
	64	199
554.roms_r	128	114
	32	163

——— SPECrate®2017_fp_base (353)
- - - - SPECrate®2017_fp_peak (384)

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: 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

Page 1   Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Altos Computing Inc.

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_base = 353

SPECrate®2017_fp_peak = 384

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

Results Table

Benchmark	Copies	Base Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Peak Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	2370	542	2372	541	**2371**	**541**	32	556	577	563	570	**558**	**575**
507.cactuBSSN_r	128	319	508	320	507	**319**	**508**	64	164	495	164	493	**164**	**494**
508.namd_r	128	**355**	**342**	356	342	355	343	128	370	329	**370**	**329**	370	329
510.parest_r	128	2012	166	2004	167	**2005**	**167**	64	568	295	569	294	**569**	**294**
511.povray_r	128	592	504	589	507	**592**	**505**	128	**584**	**512**	587	509	584	512
519.lbm_r	128	945	143	944	143	**945**	**143**	32	**236**	**143**	236	143	235	143
521.wrf_r	128	897	320	896	320	**896**	**320**	64	380	377	384	374	**383**	**374**
526.blender_r	128	406	480	409	477	**407**	**479**	128	410	476	**409**	**476**	409	477
527.cam4_r	128	561	399	**563**	**397**	566	395	128	561	399	**562**	**398**	566	396
538.imagick_r	128	**235**	**1360**	235	1350	234	1360	128	232	1370	**232**	**1370**	231	1380
544.nab_r	128	343	628	343	627	**343**	**628**	128	**342**	**630**	342	629	341	632
549.fotonik3d_r	128	**2552**	**195**	2552	195	2550	196	64	1256	199	**1255**	**199**	1255	199
554.roms_r	128	**1789**	**114**	1788	114	1791	114	32	310	164	**313**	**163**	313	163
SPECrate®2017_fp_base =		**353**												
SPECrate®2017_fp_peak =		**384**												

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
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Altos Computing Inc.

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_base = 353

SPECrate®2017_fp_peak = 384

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

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_aoc
      c200_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 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 295195f888a3d7edb1e6e46a485a0011
 running on localhost.localdomain Fri Jun 19 16:44:15 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
```

(Continued on next page)

Altos Computing Inc.

SPECrate®2017_fp_base = 353

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_peak = 384

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

Platform Notes (Continued)

```
     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
     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:             3312.038
     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
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Altos Computing Inc.

SPECrate®2017_fp_base = 353

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_peak = 384

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

Platform Notes (Continued)

```
     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
   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_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: 31584 MB
   node 1 cpus: 4 5 6 7 68 69 70 71
   node 1 size: 32251 MB
   node 1 free: 32023 MB
   node 2 cpus: 8 9 10 11 72 73 74 75
   node 2 size: 32252 MB
   node 2 free: 32150 MB
   node 3 cpus: 12 13 14 15 76 77 78 79
   node 3 size: 32251 MB
   node 3 free: 32148 MB
   node 4 cpus: 16 17 18 19 80 81 82 83
   node 4 size: 32252 MB
   node 4 free: 32139 MB
   node 5 cpus: 20 21 22 23 84 85 86 87
   node 5 size: 32251 MB
   node 5 free: 32156 MB
   node 6 cpus: 24 25 26 27 88 89 90 91
   node 6 size: 32252 MB
   node 6 free: 32144 MB
   node 7 cpus: 28 29 30 31 92 93 94 95
   node 7 size: 32239 MB
   node 7 free: 32143 MB
   node 8 cpus: 32 33 34 35 96 97 98 99
```

(Continued on next page)

Altos Computing Inc.

SPECrate®2017_fp_base = 353

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_peak = 384

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

Platform Notes (Continued)

```
   node 8 size: 32252 MB
   node 8 free: 32160 MB
   node 9 cpus: 36 37 38 39 100 101 102 103
   node 9 size: 32251 MB
   node 9 free: 32161 MB
   node 10 cpus: 40 41 42 43 104 105 106 107
   node 10 size: 32252 MB
   node 10 free: 32140 MB
   node 11 cpus: 44 45 46 47 108 109 110 111
   node 11 size: 32226 MB
   node 11 free: 32136 MB
   node 12 cpus: 48 49 50 51 112 113 114 115
   node 12 size: 32252 MB
   node 12 free: 32161 MB
   node 13 cpus: 52 53 54 55 116 117 118 119
   node 13 size: 32251 MB
   node 13 free: 32162 MB
   node 14 cpus: 56 57 58 59 120 121 122 123
   node 14 size: 32252 MB
   node 14 free: 32158 MB
   node 15 cpus: 60 61 62 63 124 125 126 127
   node 15 size: 32249 MB
   node 15 free: 32158 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
```

(Continued on next page)

Altos Computing Inc.

SPECrate®2017_fp_base = 353

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_peak = 384

CPU2017 License: 97   **Test Date:**   Jun-2020

Test Sponsor: Altos Computing Inc.   **Hardware Availability:** Dec-2019

Tested by: Altos Computing Inc.   **Software Availability:** Dec-2019

Platform Notes (Continued)

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

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Altos Computing Inc.

SPECrate®2017_fp_base = 353

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_peak = 384

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

Platform Notes (Continued)

```
 frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
   Memory:
     16x Samsung M393A4K40DB3-CWE 32 kB 2 rank 3200
     16x Unknown Unknown

 (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
------------------------------------------------------------------------------


==============================================================================
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
------------------------------------------------------------------------------


==============================================================================
```

(Continued on next page)

Altos Computing Inc.

SPECrate®2017_fp_base = 353

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_peak = 384

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

Compiler Version Notes (Continued)

```
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
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
-------------------------------------------------------------------------


==========================================================================
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
-------------------------------------------------------------------------


==========================================================================
Fortran, C      | 521.wrf_r(base, peak) 527.cam4_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
-------------------------------------------------------------------------
```

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Altos Computing Inc.

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_base = 353

SPECrate®2017_fp_peak = 384

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 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`

Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`
510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
526.blender_r: `-funsigned-char -D__BOOL_DEFINED -DSPEC_LP64`
527.cam4_r: `-DSPEC_CASE_FLAG -DSPEC_LP64`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-DSPEC_LP64`
549.fotonik3d_r: `-DSPEC_LP64`
554.roms_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
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

Altos Computing Inc.

SPECrate®2017_fp_base = 353

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_peak = 384

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):
```
-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:
```
-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=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 -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang
```

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 -mllvm -inline-threshold=1000
-flv-function-specialization -funroll-loops -Mrecursive -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang
```

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 -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 -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch -z muldefs
-lmvec -lamdlibm -ljemalloc -lflang
```

(Continued on next page)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Altos Computing Inc.

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_base = 353

SPECrate®2017_fp_peak = 384

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)

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 -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 -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only
-lmvec -lamdlibm -ljemalloc -lflang
```

Peak 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
```

Peak Portability Flags

```
Same as Base Portability Flags
```

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Altos Computing Inc.

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_base = 353

SPECrate®2017_fp_peak = 384

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

Peak 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 -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
```

C++ benchmarks:

```
 508.namd_r: -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 -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
```

```
 510.parest_r: -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 -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
```

Fortran benchmarks:

```
 503.bwaves_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 -O3
-march=znver2 -funroll-loops -Mrecursive
-mllvm -vector-library=LIBMVEC -Kieee
-fno-finite-math-only -lmvec -lamdlibm -ljemalloc
```

(Continued on next page)

Altos Computing Inc.

SPECrate®2017_fp_base = 353

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_peak = 384

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

Peak Optimization Flags (Continued)

503.bwaves_r (continued):
```
-lflang
```

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_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
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc
-lflang
```

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 -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 -O3 -funroll-loops -Mrecursive -Kieee
-fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using both C and C++:

511.povray_r: -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,-x86-use-vzeroupper=false -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 -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000 -lmvec -lamdlibm
-ljemalloc -lflang
```

(Continued on next page)

Altos Computing Inc.

BrainSphere R365 F4 (AMD EPYC 7502)

SPECrate®2017_fp_base = 353

SPECrate®2017_fp_peak = 384

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

Peak Optimization Flags (Continued)

```
526.blender_r: -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 -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 -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000 -lmvec -lamdlibm
-ljemalloc -lflang
```

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 -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 -mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch -mllvm -loop-unswitch-threshold=200000
-O3 -funroll-loops -Mrecursive -Kieee -fno-finite-math-only -lmvec
-lamdlibm -ljemalloc -lflang
```

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

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2020-06-19 16:44:14-0400.
Report generated on 2020-07-07 14:40:13 by CPU2017 PDF formatter v6255.
Originally published on 2020-07-07.