



# SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

GIGA-BYTE TECHNOLOGY CO., LTD.

R181-Z90  
(AMD EPYC 7601, 2.20 GHz)

SPECrate2017\_fp\_base = 265

SPECrate2017\_fp\_peak = 276

CPU2017 License: 4872

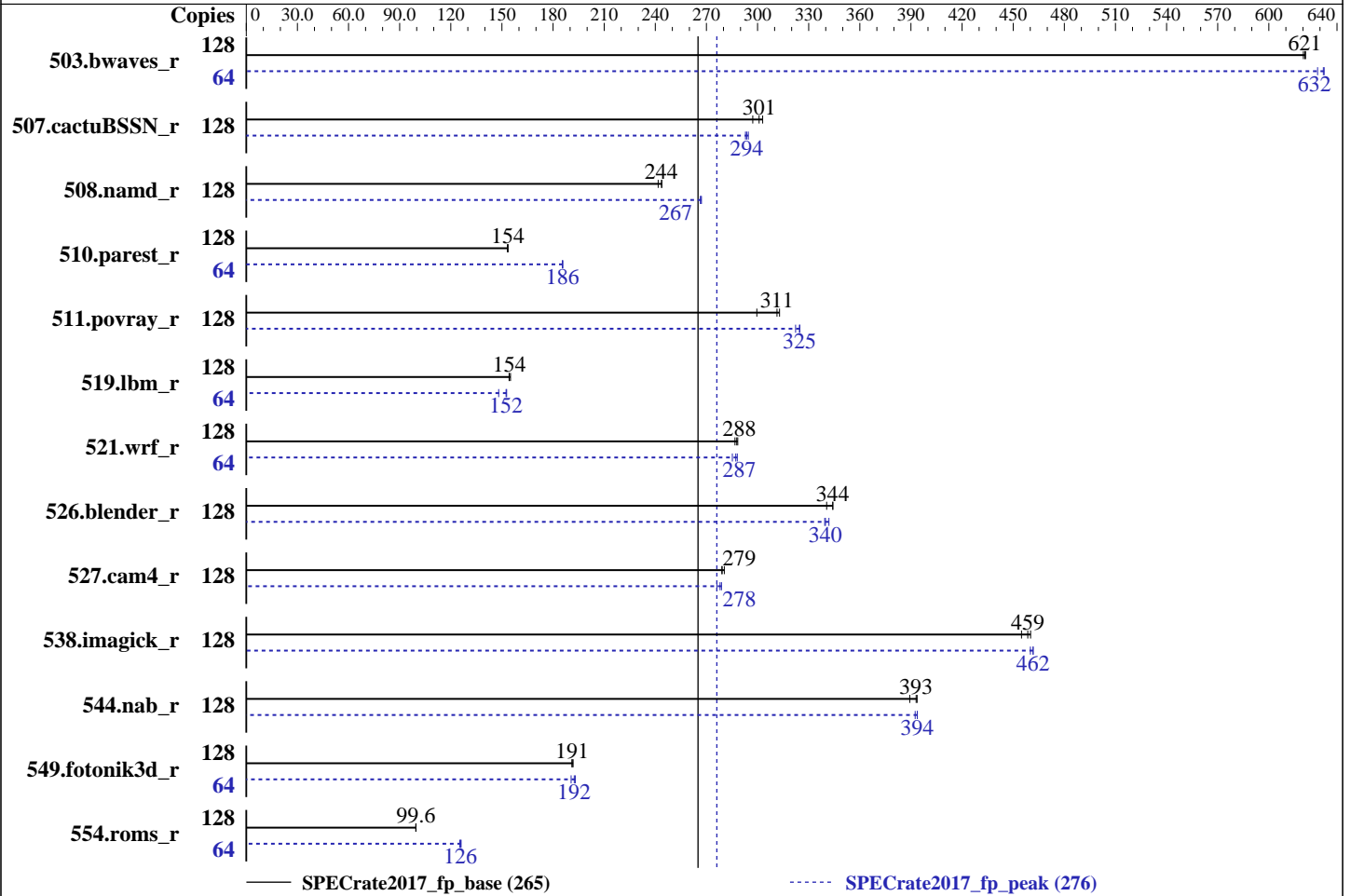
Test Sponsor: GIGA-BYTE TECHNOLOGY CO., LTD.

Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.

Test Date: Jun-2018

Hardware Availability: Mar-2018

Software Availability: Jun-2018



### Hardware

CPU Name: AMD EPYC 7601  
 Max MHz.: 3200  
 Nominal: 2200  
 Enabled: 64 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chips  
 Cache L1: 64 KB I + 32 KB D on chip per core  
 L2: 512 KB I+D on chip per core  
 L3: 64 MB I+D on chip per chip, 8 MB shared / 4 cores  
 Other: None  
 Memory: 1 TB (16 x 64 GB 4Rx4 PC4-2667V-L)

Storage: 1 x 2 TB SATA SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP3 (x86\_64)  
 kernel 4.4.73-5-default

Compiler: C/C++: Version 1.0.0 of AOCC  
 Fortran: Version 4.8.2 of GCC

Parallel: No  
 Firmware: Version F07 released Jun-2018  
 File System: xfs  
 System State: Run Level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: jemalloc general malloc implementation  
 V4.5.0



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## Results Table

Benchmark	Base						Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	128	2069	620	2065	622	<u>2067</u>	<u>621</u>	64	1015	632	1021	629	<u>1016</u>	<u>632</u>
507.cactuBSSN_r	128	545	297	<u>539</u>	<u>301</u>	535	303	128	553	293	<u>552</u>	<u>294</u>	550	295
508.namd_r	128	<u>499</u>	<u>244</u>	499	244	503	242	128	455	267	<u>456</u>	<u>267</u>	456	266
510.parest_r	128	<u>2181</u>	<u>154</u>	2185	153	2181	154	64	<u>902</u>	<u>186</u>	902	186	902	186
511.povray_r	128	998	300	955	313	<u>960</u>	<u>311</u>	128	927	322	<u>921</u>	<u>325</u>	920	325
519.lbm_r	128	870	155	<u>874</u>	<u>154</u>	875	154	64	455	148	442	153	<u>443</u>	<u>152</u>
521.wrf_r	128	994	288	1000	287	<u>996</u>	<u>288</u>	64	503	285	<u>499</u>	<u>287</u>	498	288
526.blender_r	128	566	344	<u>567</u>	<u>344</u>	572	341	128	574	339	570	342	<u>574</u>	<u>340</u>
527.cam4_r	128	798	280	<u>802</u>	<u>279</u>	802	279	128	<u>805</u>	<u>278</u>	811	276	803	279
538.imagick_r	128	692	460	700	455	<u>694</u>	<u>459</u>	128	<u>690</u>	<u>462</u>	692	460	689	462
544.nab_r	128	553	389	547	394	<u>548</u>	<u>393</u>	128	549	392	547	394	<u>547</u>	<u>394</u>
549.fotonik3d_r	128	2611	191	<u>2608</u>	<u>191</u>	2601	192	64	<u>1296</u>	<u>192</u>	1309	191	1292	193
554.roms_r	128	<u>2043</u>	<u>99.6</u>	2044	99.5	2043	99.6	64	812	125	807	126	<u>809</u>	<u>126</u>

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores.  
See the configuration file for details.

## Operating System Notes

'ulimit -s unlimited' was used to set environment stack size  
'ulimit -l 2097152' was used to set environment locked pages in memory limit

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

Set dirty\_ratio=8 to limit dirty cache to 8% of memory  
Set swappiness=1 to swap only if necessary  
Set zone\_reclaim\_mode=1 to free local node memory and avoid remote memory  
sync then drop\_caches=3 to reset caches before invoking runcpu

dirty\_ratio, swappiness, zone\_reclaim\_mode and drop\_caches were  
all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).  
Transparent huge pages were enabled for this run (OS default)

Huge pages were not configured for this run.



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## General Notes

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

```
LD_LIBRARY_PATH = "/home/amd/CPU2017/amd1704-rate-libs-revC/64;/home/amd/CPU2017/amd1704-rate-libs-revC/32:"  
MALLOC_CONF = "lg_chunk:28"
```

The AMD64 AOCC Compiler Suite is available at  
<http://developer.amd.com/amd-aocc/>

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using RHEL 7.4

jemalloc, a general purpose malloc implementation, was obtained at  
<https://github.com/jemalloc/jemalloc/releases/download/4.5.0/jemalloc-4.5.0.tar.bz2>  
jemalloc was built with GCC v4.8.5 in RHEL v7.2 under default conditions.  
jemalloc uses environment variable MALLOC\_CONF with values narenas and lg\_chunk:  
narenas: sets the maximum number of arenas to use for automatic multiplexing  
of threads and arenas.  
lg\_chunk: set the virtual memory chunk size (log base 2). For example,  
lg\_chunk:21 sets the default chunk size to 2<sup>21</sup> = 2MiB.

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

The AOCC Fortran Plugin version 1.0 was used to leverage AOCC optimizers  
with gfortran. It is available here:  
<http://developer.amd.com/amd-aocc/>

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.

## Platform Notes

BIOS Settings:

Determinism Slider = Power

cTDP Control = Manual

cTDP = 200

Sysinfo program /home/amd/CPU2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on linux-qb43 Thu Jun 21 10:40:49 2018

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 7601 32-Core Processor

(Continued on next page)



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## Platform Notes (Continued)

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
physical 1: cores 0 1 2 3 4 5 6 7
```

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):          8
Vendor ID:              AuthenticAMD
CPU family:             23
Model:                  1
Model name:             AMD EPYC 7601 32-Core Processor
Stepping:               2
CPU MHz:                2200.000
CPU max MHz:           2200.0000
CPU min MHz:           1200.0000
BogoMIPS:               4400.22
Virtualization:        AMD-V
L1d cache:             32K
L1i cache:             64K
L2 cache:               512K
L3 cache:               8192K
NUMA node0 CPU(s):     0-7,64-71
NUMA node1 CPU(s):     8-15,72-79
NUMA node2 CPU(s):     16-23,80-87
NUMA node3 CPU(s):     24-31,88-95
NUMA node4 CPU(s):     32-39,96-103
NUMA node5 CPU(s):     40-47,104-111
NUMA node6 CPU(s):     48-55,112-119
NUMA node7 CPU(s):     56-63,120-127
```

```
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 nonstop_tsc extd_apicid amd_dcm aperfmperf eagerfpu 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 skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_l2 mwaitx arat
```

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## Platform Notes (Continued)

hw\_pstate npt lbrv svm\_lock nrip\_save tsc\_scale vmcb\_clean flushbyasid decodeassists  
pausefilter pfthreshold vmmcall avic fsgsbase bml1 avx2 smep bmi2 rdseed adx smap  
clflushopt sha\_ni xsaveopt xsavec xgetbv1 clzero irperf 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: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 4 5 6 7 64 65 66 67 68 69 70 71
node 0 size: 128896 MB
node 0 free: 128595 MB
node 1 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79
node 1 size: 129021 MB
node 1 free: 128795 MB
node 2 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87
node 2 size: 129021 MB
node 2 free: 128788 MB
node 3 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95
node 3 size: 129021 MB
node 3 free: 128793 MB
node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103
node 4 size: 129021 MB
node 4 free: 128799 MB
node 5 cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111
node 5 size: 129021 MB
node 5 free: 128799 MB
node 6 cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119
node 6 size: 129021 MB
node 6 free: 128803 MB
node 7 cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127
node 7 size: 116924 MB
node 7 free: 116700 MB
```

```
node distances:
node  0  1  2  3  4  5  6  7
 0:  10 16 16 16 32 32 32 32
 1:  16 10 16 16 32 32 32 32
 2:  16 16 10 16 32 32 32 32
 3:  16 16 16 10 32 32 32 32
 4:  32 32 32 32 10 16 16 16
 5:  32 32 32 32 16 10 16 16
 6:  32 32 32 32 16 16 10 16
 7:  32 32 32 32 16 16 16 10
```

```
From /proc/meminfo
MemTotal: 1044426228 kB
```

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## Platform Notes (Continued)

HugePages\_Total: 0  
Hugepagesize: 2048 kB

From /etc/\*release\* /etc/\*version\*  
SuSE-release:

SUSE Linux Enterprise Server 12 (x86\_64)  
VERSION = 12  
PATCHLEVEL = 3  
# This file is deprecated and will be removed in a future service pack or release.  
# Please check /etc/os-release for details about this release.

os-release:

NAME="SLES"  
VERSION="12-SP3"  
VERSION\_ID="12.3"  
PRETTY\_NAME="SUSE Linux Enterprise Server 12 SP3"  
ID="sles"  
ANSI\_COLOR="0;32"  
CPE\_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:

Linux linux-qb43 4.4.73-5-default #1 SMP Tue Jul 4 15:33:39 UTC 2017 (b7ce4e4) x86\_64  
x86\_64 x86\_64 GNU/Linux

run-level 3 Jun 19 13:54

SPEC is set to: /home/amd/CPU2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sdb4	xfs	1.8T	4.7G	1.8T	1%	/home

Additional information from dmidecode follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS GIGABYTE F07 06/13/2018

Memory:

16x Samsung M386A8K40BM2-CTD 64 GB 4 rank 2667  
16x Unknown Unknown

(End of data from sysinfo program)

## Compiler Version Notes

=====  
CC 519.lbm\_r(base, peak) 538.imagick\_r(base, peak) 544.nab\_r(base, peak)  
=====

AOCC.LLVM.4.0.0.B35.2017\_04\_26 clang version 4.0.0 (CLANG:) (based on LLVM

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## Compiler Version Notes (Continued)

```

AOCCLLVM.4.0.0.B35.2017_04_26)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/AOCC-1.0-Compiler/bin
-----

```

```

=====
CXXC 508.namd_r(base, peak) 510.parest_r(base, peak)
-----

```

```

AOCCLLVM.4.0.0.B35.2017_04_26 clang version 4.0.0 (CLANG:) (based on LLVM
AOCCLLVM.4.0.0.B35.2017_04_26)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/AOCC-1.0-Compiler/bin
-----

```

```

=====
CC 511.povray_r(base, peak) 526.blender_r(base, peak)
-----

```

```

AOCCLLVM.4.0.0.B35.2017_04_26 clang version 4.0.0 (CLANG:) (based on LLVM
AOCCLLVM.4.0.0.B35.2017_04_26)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/AOCC-1.0-Compiler/bin
AOCCLLVM.4.0.0.B35.2017_04_26 clang version 4.0.0 (CLANG:) (based on LLVM
AOCCLLVM.4.0.0.B35.2017_04_26)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/AOCC-1.0-Compiler/bin
-----

```

```

=====
FC 507.cactuBSSN_r(base, peak)
-----

```

```

AOCCLLVM.4.0.0.B35.2017_04_26 clang version 4.0.0 (CLANG:) (based on LLVM
AOCCLLVM.4.0.0.B35.2017_04_26)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/AOCC-1.0-Compiler/bin
AOCCLLVM.4.0.0.B35.2017_04_26 clang version 4.0.0 (CLANG:) (based on LLVM
AOCCLLVM.4.0.0.B35.2017_04_26)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/AOCC-1.0-Compiler/bin
GNU Fortran (GCC) 4.8.2
Copyright (C) 2013 Free Software Foundation, Inc.
GNU Fortran comes with NO WARRANTY, to the extent permitted by law.

```

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## Compiler Version Notes (Continued)

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FC 503.bwaves\_r(base, peak) 549.fotonik3d\_r(base, peak) 554.roms\_r(base, peak)

GNU Fortran (GCC) 4.8.2  
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CC 521.wrf\_r(base, peak) 527.cam4\_r(base, peak)

GNU Fortran (GCC) 4.8.2  
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You may redistribute copies of GNU Fortran under the terms of the GNU General Public License. For more information about these matters, see the file named COPYING  
AOCC.LLVM.4.0.0.B35.2017\_04\_26 clang version 4.0.0 (CLANG:) (based on LLVM AOCC.LLVM.4.0.0.B35.2017\_04\_26)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /root/work/compilers/AOCC-1.0-Compiler/bin

## Base Compiler Invocation

C benchmarks:  
clang

C++ benchmarks:  
clang++

Fortran benchmarks:  
clang gfortran

Benchmarks using both Fortran and C:  
clang gfortran

(Continued on next page)





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## Base Compiler Invocation (Continued)

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang gfortran

## 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 -fconvert=big-endian -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, -plugin-opt= -merge-constant -lsr-in-nested-loop  
-disable-vect-cmp -O3 -ffast-math -march=znver1 -fstruct-layout=2  
-mllvm -unroll-threshold=100 -fremap-arrays -mno-avx2  
-inline-threshold=1000 -z muldefs -ljemalloc

C++ benchmarks:

-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop  
-disable-vect-cmp -O3 -march=znver1 -mllvm -unroll-threshold=100  
-finline-aggressive -fremap-arrays -inline-threshold=1000 -z muldefs  
-ljemalloc

Fortran benchmarks:

-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop  
-disable-vect-cmp -O3(gfortran) -O3(clang) -mavx -madox  
-funroll-loops -ffast-math -z muldefs -fplugin=dragonegg.so

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## Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-fplugin-arg-dragonegg-llvm-option=" -disable-vect-cmp" -ljemalloc
-lgfortran -lamdlibm
```

Benchmarks using both Fortran and C:

```
-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop
-disable-vect-cmp -O3(clang) -ffast-math -march=znver1
-fstruct-layout=2 -mllvm -unroll-threshold=100 -fremap-arrays
-mno-avx2 -inline-threshold=1000 -O3(gfortran) -mavx -madox
-funroll-loops -z muldefs -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=" -disable-vect-cmp" -ljemalloc
-lgfortran -lamdlibm
```

Benchmarks using both C and C++:

```
-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop
-disable-vect-cmp -O3 -ffast-math -march=znver1 -fstruct-layout=2
-mllvm -unroll-threshold=100 -fremap-arrays -mno-avx2
-inline-threshold=1000 -finline-aggressive -z muldefs -ljemalloc
```

Benchmarks using Fortran, C, and C++:

```
-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop
-disable-vect-cmp -O3(clang) -ffast-math -march=znver1
-fstruct-layout=2 -mllvm -unroll-threshold=100 -fremap-arrays
-mno-avx2 -inline-threshold=1000 -finline-aggressive -O3(gfortran)
-mavx -madox -funroll-loops -z muldefs -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=" -disable-vect-cmp" -ljemalloc
```

## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

clang gfortran

Benchmarks using both Fortran and C:

clang gfortran

Benchmarks using both C and C++:

clang++ clang

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# SPEC CPU2017 Floating Point Rate Result

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GIGA-BYTE TECHNOLOGY CO., LTD.  
R181-Z90  
(AMD EPYC 7601, 2.20 GHz)

SPECrate2017\_fp\_base = 265

SPECrate2017\_fp\_peak = 276

CPU2017 License: 4872

Test Sponsor: GIGA-BYTE TECHNOLOGY CO., LTD.

Tested by: GIGA-BYTE TECHNOLOGY CO., LTD.

Test Date: Jun-2018

Hardware Availability: Mar-2018

Software Availability: Jun-2018

## Peak Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:

```
clang++ clang gfortran
```

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

```
-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop -Ofast  
-march=znver1 -fstruct-layout=3 -mllvm -vectorize-memory-aggressively  
-mno-avx2 -unroll-threshold=100 -fremap-arrays -inline-threshold=1000  
-ljemalloc
```

C++ benchmarks:

```
-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop -Ofast  
-march=znver1 -finline-aggressive -mllvm -unroll-threshold=100  
-fremap-arrays -inline-threshold=1000 -ljemalloc
```

Fortran benchmarks:

```
-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop  
-O3(gfortran) -O3(clang) -mavx2 -madox -funroll-loops -ffast-math  
-fplugin=dragonegg.so -fplugin-arg-dragonegg-llvm-option="  
-inline-threshold:1000" -ljemalloc -lgfortran -lamdlibm
```

Benchmarks using both Fortran and C:

```
521.wrf_r: -flto -Wl, -plugin-opt= -merge-constant  
-lsr-in-nested-loop -O3(clang) -mavx -ffast-math  
-O3(gfortran) -funroll-loops -fplugin=dragonegg.so  
-fplugin-arg-dragonegg-llvm-option="  
-inline-threshold:1000" -ljemalloc -lgfortran -lamdlibm
```

```
527.cam4_r: -flto -Wl, -plugin-opt= -merge-constant  
-lsr-in-nested-loop -Ofast -march=znver1  
-fstruct-layout=3 -mllvm -vectorize-memory-aggressively  
-mno-avx2 -unroll-threshold=100 -fremap-arrays  
-inline-threshold=1000 -O3(gfortran) -O3(clang) -mavx2  
-madox -funroll-loops -ffast-math -fplugin=dragonegg.so  
-fplugin-arg-dragonegg-llvm-option="  
-inline-threshold:1000" -ljemalloc -lgfortran -lamdlibm
```

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# SPEC CPU2017 Floating Point Rate Result

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Test Date: Jun-2018

Hardware Availability: Mar-2018

Software Availability: Jun-2018

## Peak Optimization Flags (Continued)

Benchmarks using both C and C++:

```
-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop -Ofast  
-march=znver1 -fstruct-layout=3 -mllvm -vectorize-memory-aggressively  
-mno-avx2 -unroll-threshold=100 -fremap-arrays -inline-threshold=1000  
-finline-aggressive -ljemalloc
```

Benchmarks using Fortran, C, and C++:

```
-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop -Ofast  
-march=znver1 -fstruct-layout=3 -mllvm -vectorize-memory-aggressively  
-mno-avx2 -unroll-threshold=100 -fremap-arrays -inline-threshold=1000  
-finline-aggressive -O3 -mavx2 -madox -funroll-loops -ffast-math  
-fplugin=dragonegg.so -fplugin-arg-dragonegg-llvm-option="  
-inline-threshold:1000" -ljemalloc
```

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

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

<http://www.spec.org/cpu2017/flags/aocc100-flags-revC-I.2018-02-16.html>

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

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

<http://www.spec.org/cpu2017/flags/aocc100-flags-revC-I.2018-02-16.xml>

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