



# SPEC® CPU2017 Floating Point Rate Result

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## Sugon

SPECrate2017\_fp\_base = 176

### Sugon A620-G30 (AMD EPYC 7351)

SPECrate2017\_fp\_peak = 177

CPU2017 License: 9046

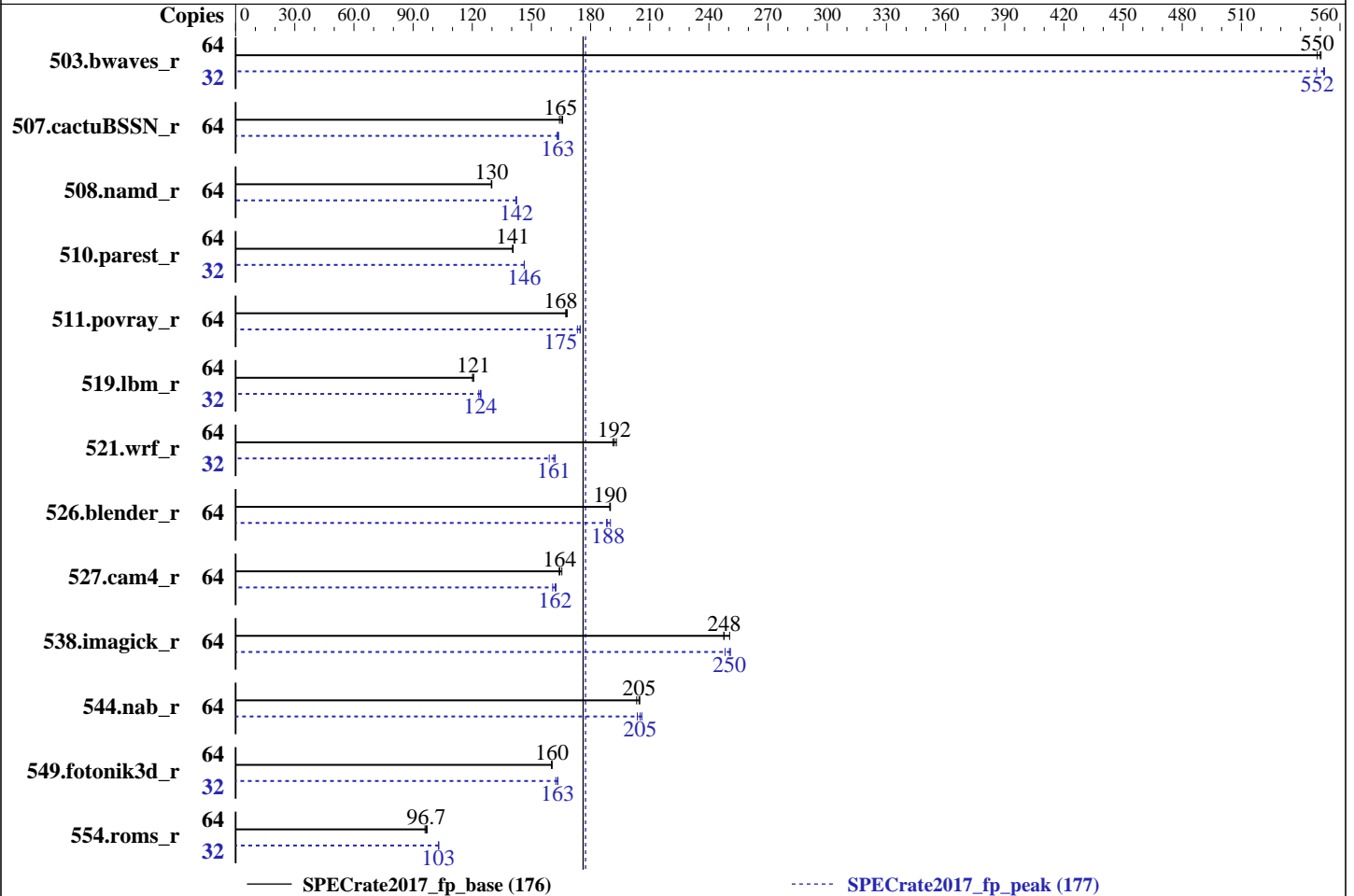
Test Sponsor: Sugon

Tested by: Sugon

Test Date: Dec-2017

Hardware Availability: Dec-2017

Software Availability: Aug-2017



#### Hardware

CPU Name: AMD EPYC 7351  
 Max MHz.: 2900  
 Nominal: 2400  
 Enabled: 32 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 / 2 cores  
 Other: None  
 Memory: 512 GB (16 x 32 GB 2Rx4 PC4-2667V-R, running at 2400)  
 Storage: 1 x 3000 GB SATA, 7200 RPM  
 Other: None

#### Software

OS: Red Hat Enterprise Linux Server 7.4  
 kernel 3.10.0-693.2.2  
 Compiler: C/C++: Version 1.0.0 of AOCC  
 Fortran: Version 4.8.2 of GCC  
 Parallel: No  
 Firmware: American Megatrends Inc. BIOS Version 0WYSZ018 released Aug-2017  
 File System: ext4  
 System State: Run level 3 (Multi User)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other: None



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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	64	1166	550	<b><u>1167</u></b>	<b><u>550</u></b>	1170	549	32	<b><u>582</u></b>	<b><u>552</u></b>	585	548	581	552
507.cactuBSSN_r	64	489	166	<b><u>491</u></b>	<b><u>165</u></b>	493	164	64	<b><u>496</u></b>	<b><u>163</u></b>	497	163	495	164
508.namd_r	64	468	130	469	130	<b><u>468</u></b>	<b><u>130</u></b>	64	427	142	<b><u>427</u></b>	<b><u>142</u></b>	428	142
510.parest_r	64	1192	140	1190	141	<b><u>1191</u></b>	<b><u>141</u></b>	32	572	146	<b><u>572</u></b>	<b><u>146</u></b>	572	146
511.povray_r	64	<b><u>891</u></b>	<b><u>168</u></b>	893	167	889	168	64	862	173	855	175	<b><u>856</u></b>	<b><u>175</u></b>
519.lbm_r	64	<b><u>559</u></b>	<b><u>121</u></b>	562	120	559	121	32	274	123	271	124	<b><u>272</u></b>	<b><u>124</u></b>
521.wrf_r	64	742	193	749	191	<b><u>746</u></b>	<b><u>192</u></b>	32	451	159	442	162	<b><u>444</u></b>	<b><u>161</u></b>
526.blender_r	64	514	190	513	190	<b><u>513</u></b>	<b><u>190</u></b>	64	513	190	518	188	<b><u>517</u></b>	<b><u>188</u></b>
527.cam4_r	64	682	164	<b><u>681</u></b>	<b><u>164</u></b>	677	165	64	696	161	689	162	<b><u>691</u></b>	<b><u>162</u></b>
538.imagick_r	64	635	250	<b><u>643</u></b>	<b><u>248</u></b>	643	248	64	634	251	641	248	<b><u>636</u></b>	<b><u>250</u></b>
544.nab_r	64	530	203	526	205	<b><u>527</u></b>	<b><u>205</u></b>	64	523	206	529	204	<b><u>525</u></b>	<b><u>205</u></b>
549.fotonik3d_r	64	<b><u>1555</u></b>	<b><u>160</u></b>	1557	160	1554	160	32	763	163	<b><u>764</u></b>	<b><u>163</u></b>	768	162
554.roms_r	64	1059	96.1	<b><u>1052</u></b>	<b><u>96.7</u></b>	1047	97.1	32	<b><u>494</u></b>	<b><u>103</u></b>	493	103	495	103

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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

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).

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/cpu2017/amd1704-rate-libs-revC/64;/home/cpu2017/amd1704-rate-libs-revC/32:"  
MALLOC\_CONF = "lg\_chunk:28"

The AMD64 AOCC Compiler Suite is available at  
<http://developer.amd.com/tools-and-sdks/cpu-development/amd-optimizing-cc-compiler/>

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/>

### Platform Notes

BIOS settings:

Determinism Slider = Power  
cTDP Control = Manual  
cTDP = 200

This system Sugon A620-G30 is electrically equal with Sugon A420-G30 populated with the same processors and memories.  
Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on localhost Sun Dec 3 09:42:25 2017

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 7351 16-Core Processor
 2 "physical id"s (chips)
 64 "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 : 16
```

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### Platform Notes (Continued)

```
siblings : 32
physical 0: cores 0 1 4 5 8 9 12 13 16 17 20 21 24 25 28 29
physical 1: cores 0 1 4 5 8 9 12 13 16 17 20 21 24 25 28 29
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                64
On-line CPU(s) list:   0-63
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):             2
NUMA node(s):         8
Vendor ID:             AuthenticAMD
CPU family:            23
Model:                1
Model name:            AMD EPYC 7351 16-Core Processor
Stepping:              2
CPU MHz:               2400.000
CPU max MHz:           2400.0000
CPU min MHz:           1200.0000
BogoMIPS:              4790.42
Virtualization:        AMD-V
L1d cache:             32K
L1i cache:             64K
L2 cache:              512K
L3 cache:              8192K
NUMA node0 CPU(s):    0-3,32-35
NUMA node1 CPU(s):    4-7,36-39
NUMA node2 CPU(s):    8-11,40-43
NUMA node3 CPU(s):    12-15,44-47
NUMA node4 CPU(s):    16-19,48-51
NUMA node5 CPU(s):    20-23,52-55
NUMA node6 CPU(s):    24-27,56-59
NUMA node7 CPU(s):    28-31,60-63
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 art rep_good nopl nonstop_tsc extd_apicid 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 cpb
hw_pstate avic fsgsbase bmi1 avx2 smep bmi2 rdseed adx smap clflushopt sha_ni
xsaveopt xsavec xgetbv1 arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean
flushbyasid decodeassists pausefilter pfthreshold overflow_recov succor smca
```

/proc/cpuinfo cache data

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### Platform Notes (Continued)

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 32 33 34 35
node 0 size: 65442 MB
node 0 free: 63751 MB
node 1 cpus: 4 5 6 7 36 37 38 39
node 1 size: 65535 MB
node 1 free: 64063 MB
node 2 cpus: 8 9 10 11 40 41 42 43
node 2 size: 65535 MB
node 2 free: 64074 MB
node 3 cpus: 12 13 14 15 44 45 46 47
node 3 size: 65535 MB
node 3 free: 64062 MB
node 4 cpus: 16 17 18 19 48 49 50 51
node 4 size: 65535 MB
node 4 free: 63916 MB
node 5 cpus: 20 21 22 23 52 53 54 55
node 5 size: 65535 MB
node 5 free: 64054 MB
node 6 cpus: 24 25 26 27 56 57 58 59
node 6 size: 65535 MB
node 6 free: 64059 MB
node 7 cpus: 28 29 30 31 60 61 62 63
node 7 size: 65535 MB
node 7 free: 64047 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:      528151684 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:

```

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### Platform Notes (Continued)

```
NAME="Red Hat Enterprise Linux Server"
VERSION="7.4 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.4"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
```

```
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server
```

```
uname -a:
Linux localhost 3.10.0-693.2.2.el7.x86_64 #1 SMP Mon Sep 25 08:21:56 EDT 2017 x86_64
x86_64 x86_64 GNU/Linux
```

```
run-level 3 Nov 30 09:33
```

```
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3        ext4  394G   64G  311G  18% /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 American Megatrends Inc. 0WYSZ018 08/22/2017
Memory:
16x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400
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
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
-----
=====
```

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### Compiler Version Notes (Continued)

CXXC 508.namd\_r(base, peak) 510.parest\_r(base, peak)

-----  
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  
-----

=====  
CC 511.povray\_r(base, peak) 526.blender\_r(base, peak)

-----  
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  
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  
-----

=====  
FC 507.cactuBSSN\_r(base, peak)

-----  
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  
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  
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.  
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  
-----

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

(Continued on next page)



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### Compiler Version Notes (Continued)

peak)

```
-----
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.
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
-----
```

```
=====
CC 521.wrf_r(base, peak) 527.cam4_r(base, peak)
-----
```

```
-----
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.
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

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

Benchmarks using Fortran, C, and C++:  
clang++ clang gfortran





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

### C++ benchmarks:

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

### Fortran benchmarks:

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

### Benchmarks using both Fortran and C:

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

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## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-ljemalloc -lgfortran -lamdlibm
```

Benchmarks using both C and C++:

```
-flto -Wl,-plugin-opt=-merge-constant  
-Wl,-plugin-opt=-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  
-Wl,-plugin-opt=-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 -madx -funroll-loops  
-z muldefs -fplugin=dragonegg.so  
-fplugin-arg-dragonegg-llvm-option="-merge-constant -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
```

Benchmarks using Fortran, C, and C++:

```
clang++ clang gfortran
```



# SPEC CPU2017 Floating Point Rate Result

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## Sugon

SPECrate2017\_fp\_base = 176

### Sugon A620-G30 (AMD EPYC 7351)

SPECrate2017\_fp\_peak = 177

**CPU2017 License:** 9046  
**Test Sponsor:** Sugon  
**Tested by:** Sugon

**Test Date:** Dec-2017  
**Hardware Availability:** Dec-2017  
**Software Availability:** Aug-2017

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

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

```
527.cam4_r: -flto -Wl,-plugin-opt= -merge-constant
-Wl,-plugin-opt=-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
-madx -funroll-loops -ffast-math -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option="-merge-constant
-inline-threshold:1000" -ljemalloc -lgfortran -lamdlibm
```

Benchmarks using both C and C++:

```
-flto -Wl,-plugin-opt= -merge-constant
-Wl,-plugin-opt=-lsr-in-nested-loop -Ofast -march=znver1
```

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## Peak Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):

```
-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  
-Wl,-plugin-opt=-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="-merge-constant  
-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.2017-11-20.html>

<http://www.spec.org/cpu2017/flags/aoccl100-flags-revC-I.html>

<http://www.spec.org/cpu2017/flags/Sugon-Naples-Platform-Settings-revC-I.html>

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

<http://www.spec.org/cpu2017/flags/gcc.2017-11-20.xml>

<http://www.spec.org/cpu2017/flags/aoccl100-flags-revC-I.xml>

<http://www.spec.org/cpu2017/flags/Sugon-Naples-Platform-Settings-revC-I.xml>

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