



# SPEC CPU®2017 Floating Point Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL385 Gen10

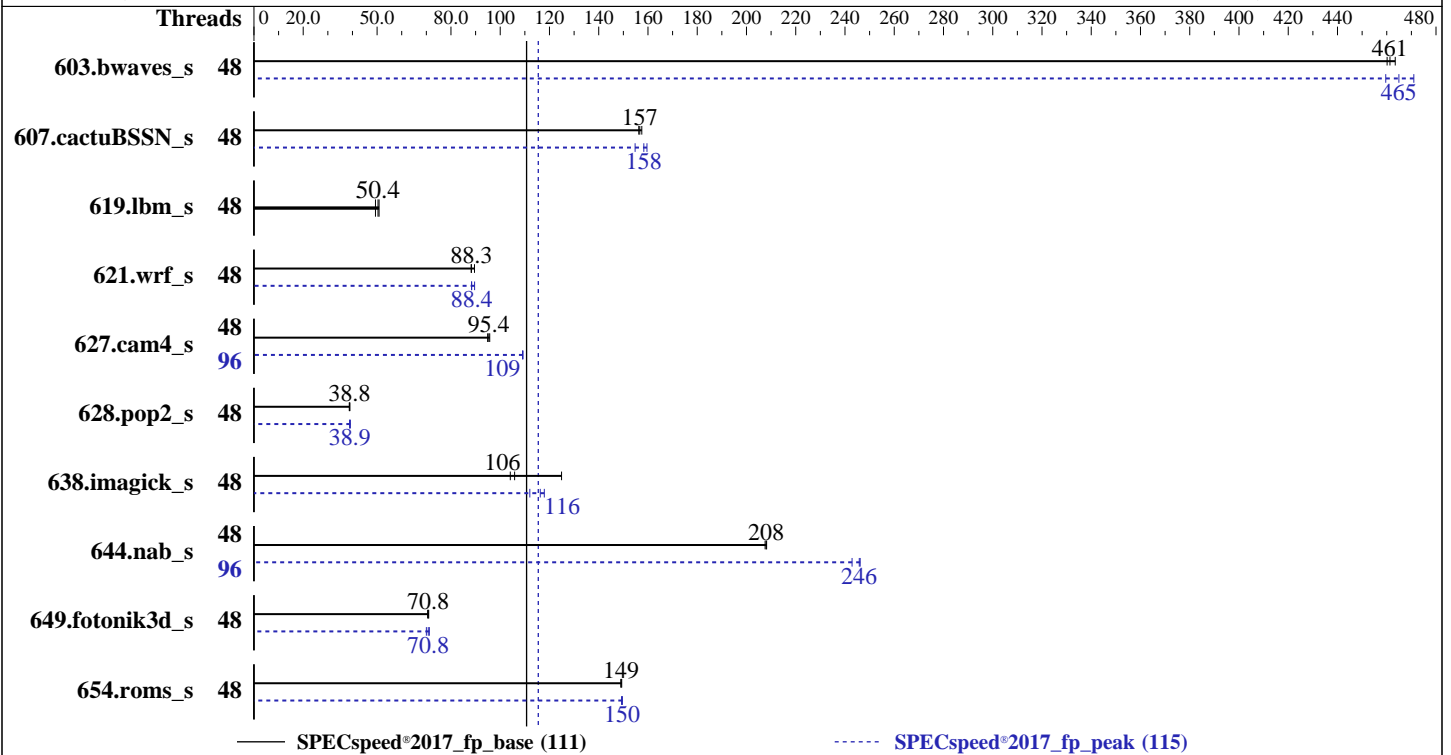
(2.30 GHz, AMD EPYC 7451)

SPECspeed®2017\_fp\_base = 111

SPECspeed®2017\_fp\_peak = 115

CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE

Test Date: Jan-2019  
Hardware Availability: Oct-2018  
Software Availability: Nov-2018



### Hardware

CPU Name: AMD EPYC 7451  
 Max MHz: 3200  
 Nominal: 2300  
 Enabled: 48 cores, 2 chips, 2 threads/core  
 Orderable: 1, 2 chip(s)  
 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 / 3 cores  
 Other: None  
 Memory: 256 GB (16 x 16 GB 1Rx4 PC4-2667V-R)  
 Storage: 2 x 600 GB 10 K SAS HDD, RAID 1  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 (x86\_64) SP3  
 Kernel 4.4.162-94.72-default  
 Compiler: C/C++: Version 1.2.1 of AOCC  
 Fortran: Version 4.8.2 of GCC  
 Parallel: Yes  
 Firmware: HPE BIOS Version A40 10/02/2018 released Oct-2018  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: jemalloc memory allocator library V4.5.0  
 Power Management: --



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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	48	128	460	<b><u>128</u></b>	<b><u>461</u></b>	127	463	48	128	460	<b><u>127</u></b>	<b><u>465</u></b>	125	471
607.cactuBSSN_s	48	107	156	<b><u>106</u></b>	<b><u>157</u></b>	106	157	48	<b><u>105</u></b>	<b><u>158</u></b>	108	155	104	160
619.lbm_s	48	103	50.8	<b><u>104</u></b>	<b><u>50.4</u></b>	106	49.3	48	103	50.8	<b><u>104</u></b>	<b><u>50.4</u></b>	106	49.3
621.wrf_s	48	148	89.6	150	88.2	<b><u>150</u></b>	<b><u>88.3</u></b>	48	<b><u>150</u></b>	<b><u>88.4</u></b>	150	88.3	148	89.6
627.cam4_s	48	<b><u>92.9</u></b>	<b><u>95.4</u></b>	92.6	95.7	93.4	94.9	96	81.2	109	81.1	109	<b><u>81.2</u></b>	<b><u>109</u></b>
628.pop2_s	48	<b><u>306</u></b>	<b><u>38.8</u></b>	307	38.7	305	39.0	48	303	39.1	305	38.9	<b><u>305</u></b>	<b><u>38.9</u></b>
638.imagick_s	48	115	125	<b><u>136</u></b>	<b><u>106</u></b>	139	104	48	129	112	122	118	<b><u>124</u></b>	<b><u>116</u></b>
644.nab_s	48	83.9	208	<b><u>84.0</u></b>	<b><u>208</u></b>	84.2	208	96	<b><u>71.1</u></b>	<b><u>246</u></b>	71.0	246	71.9	243
649.fotonik3d_s	48	<b><u>129</u></b>	<b><u>70.8</u></b>	129	70.5	128	71.0	48	130	70.0	128	71.2	<b><u>129</u></b>	<b><u>70.8</u></b>
654.roms_s	48	105	149	<b><u>106</u></b>	<b><u>149</u></b>	106	149	48	<b><u>105</u></b>	<b><u>150</u></b>	105	150	105	149

SPECspeed®2017\_fp\_base = **111**

SPECspeed®2017\_fp\_peak = **115**

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/>

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

The AOCC Fortran Plugin version 1.2 was used to leverage AOCC optimizers with gfortran. It is available here:  
<http://developer.amd.com/amd-aocc/>

## 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)



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## General Notes

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

GOMP\_CPU\_AFFINITY = "0-95"

LD\_LIBRARY\_PATH = "/home/cpu2017/amd1806-speed-libs-revA/64:/home/cpu2017/amd1806-speed-libs-revA/32:"

OMP\_PROC\_BIND = "true"

OMP\_STACKSIZE = "192M"

OMP\_WAIT\_POLICY = "active"

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using RHEL 7.4 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 v4.8.2 in RHEL v7.2 under default conditions.

jemalloc: sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

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 2^21 = 2MiB.

## Platform Notes

BIOS Configuration:

Thermal Configuration set to Maximum Cooling

Performance Determinism set to Power Deterministic

Memory Patrol Scrubbing set to Disabled

Workload Profile set to General Throughput Compute

Processor Power and Utilization Monitoring set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on linux-ubi7 Fri Jan 18 14:00:05 2019

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 7451 24-Core Processor

(Continued on next page)



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## Platform Notes (Continued)

2 "physical id"s (chips)  
96 "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 : 24
siblings  : 48
physical 0: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
physical 1: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                96
On-line CPU(s) list:   0-95
Thread(s) per core:    2
Core(s) per socket:    24
Socket(s):             2
NUMA node(s):         8
Vendor ID:             AuthenticAMD
CPU family:            23
Model:                1
Model name:            AMD EPYC 7451 24-Core Processor
Stepping:              2
CPU MHz:               2300.000
CPU max MHz:           2300.0000
CPU min MHz:           1200.0000
BogoMIPS:              4591.28
Virtualization:        AMD-V
L1d cache:             32K
L1i cache:             64K
L2 cache:              512K
L3 cache:              8192K
NUMA node0 CPU(s):    0-5,48-53
NUMA node1 CPU(s):    6-11,54-59
NUMA node2 CPU(s):    12-17,60-65
NUMA node3 CPU(s):    18-23,66-71
NUMA node4 CPU(s):    24-29,72-77
NUMA node5 CPU(s):    30-35,78-83
NUMA node6 CPU(s):    36-41,84-89
NUMA node7 CPU(s):    42-47,90-95
```

```
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 cpb
```

(Continued on next page)



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## Platform Notes (Continued)

hw\_pstate ssbd ibpb npt lbrv svm\_lock nrip\_save tsc\_scale vmcb\_clean flushbyasid  
decodeassists pausefilter pfthreshold vmmcall avic fsgsbase bml avx2 smep bmi2  
rdseed adx smap clflushopt sha\_ni xsaveopt xsavec xgetbv1 clzero irperf amd\_ibpb  
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 48 49 50 51 52 53
node 0 size: 31998 MB
node 0 free: 31760 MB
node 1 cpus: 6 7 8 9 10 11 54 55 56 57 58 59
node 1 size: 32253 MB
node 1 free: 32051 MB
node 2 cpus: 12 13 14 15 16 17 60 61 62 63 64 65
node 2 size: 32253 MB
node 2 free: 32071 MB
node 3 cpus: 18 19 20 21 22 23 66 67 68 69 70 71
node 3 size: 32253 MB
node 3 free: 32097 MB
node 4 cpus: 24 25 26 27 28 29 72 73 74 75 76 77
node 4 size: 32253 MB
node 4 free: 32140 MB
node 5 cpus: 30 31 32 33 34 35 78 79 80 81 82 83
node 5 size: 32253 MB
node 5 free: 32154 MB
node 6 cpus: 36 37 38 39 40 41 84 85 86 87 88 89
node 6 size: 32253 MB
node 6 free: 32150 MB
node 7 cpus: 42 43 44 45 46 47 90 91 92 93 94 95
node 7 size: 32120 MB
node 7 free: 32022 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

(Continued on next page)



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## Platform Notes (Continued)

MemTotal: 263823864 kB  
HugePages\_Total: 0  
Hugepagesize: 2048 kB

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP3
```

```
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-ubi7 4.4.162-94.72-default #1 SMP Mon Nov 12 18:57:45 UTC 2018 (9de753f)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Not affected

CVE-2017-5753 (Spectre variant 1): Mitigation: \_\_user pointer sanitization

CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB, RSB filling

```
run-level 3 Jan 18 13:56
```

SPEC is set to: /home/cpu2017

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4        xfs   518G  5.2G  512G   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 HPE A40 10/02/2018

Memory:

16x HPE 840757-191 16 GB 1 rank 2666

16x UNKNOWN NOT AVAILABLE

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## Platform Notes (Continued)

(End of data from sysinfo program)

## Compiler Version Notes

=====  
C | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak)  
| 644.nab\_s(base, peak)  
=====

-----  
AOCC.LLVM.1.2.1.B29.2018\_05\_14 clang version 6.0.0 (CLANG:  
b6b3d31d6df08fb7da935a28842b39b7b3c2c55b) (llvm/cpu/llvm  
18855c80ed252fc4ba4ac41e2086627ef2bddd04) (based on LLVM  
AOCC.LLVM.1.2.1.B29.2018\_05\_14)

Target: x86\_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /root/work/compilers/aoccl.2.1/AOCC-1.2.1-Compiler/bin  
-----

=====  
C++, C, Fortran | 607.cactuBSSN\_s(base, peak)  
=====

-----  
AOCC.LLVM.1.2.1.B29.2018\_05\_14 clang version 6.0.0 (CLANG:  
b6b3d31d6df08fb7da935a28842b39b7b3c2c55b) (llvm/cpu/llvm  
18855c80ed252fc4ba4ac41e2086627ef2bddd04) (based on LLVM  
AOCC.LLVM.1.2.1.B29.2018\_05\_14)

Target: x86\_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /root/work/compilers/aoccl.2.1/AOCC-1.2.1-Compiler/bin

-----  
AOCC.LLVM.1.2.1.B29.2018\_05\_14 clang version 6.0.0 (CLANG:  
b6b3d31d6df08fb7da935a28842b39b7b3c2c55b) (llvm/cpu/llvm  
18855c80ed252fc4ba4ac41e2086627ef2bddd04) (based on LLVM  
AOCC.LLVM.1.2.1.B29.2018\_05\_14)

Target: x86\_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /root/work/compilers/aoccl.2.1/AOCC-1.2.1-Compiler/bin

GNU Fortran (GCC) 4.8.2

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-----

=====  
Fortran | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak)  
| 654.roms\_s(base, peak)  
=====

(Continued on next page)



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-----

=====  
 Fortran, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak)  
 | 628.pop2\_s(base, peak)

-----

GNU Fortran (GCC) 4.8.2  
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AOCC.LLVM.1.2.1.B29.2018\_05\_14 clang version 6.0.0 (CLANG:  
 b6b3d31d6df08fb7da935a28842b39b7b3c2c55b) (llvm/cpu/llvm  
 18855c80ed252fc4ba4ac41e2086627ef2bddd04) (based on LLVM  
 AOCC.LLVM.1.2.1.B29.2018\_05\_14)  
 Target: x86\_64-unknown-linux-gnu  
 Thread model: posix  
 InstalledDir: /root/work/compilers/aoccl.2.1/AOCC-1.2.1-Compiler/bin

-----

## Base Compiler Invocation

C benchmarks:

clang

Fortran benchmarks:

clang gfortran

Benchmarks using both Fortran and C:

clang gfortran

Benchmarks using Fortran, C, and C++:

clang++ clang gfortran





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## Base Portability Flags

```
603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_CASE_FLAG -fconvert=big-endian -DSPEC_LP64
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64
628.pop2_s: -DSPEC_CASE_FLAG -fconvert=big-endian -DSPEC_LP64
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64
```

## Base Optimization Flags

C benchmarks:

```
-flto -fuse-ld=lld -Wl,-mllvm -Wl,-function-specialize -O3
-ffast-math -march=znver1 -fstruct-layout=3
-mllvm -unroll-threshold=50 -fremap-arrays -mno-avx2
-mllvm -inline-threshold=1000 -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -function-specialize -z muldefs
-lamdlibm -DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -ljemalloc
```

Fortran benchmarks:

```
-flto -fuse-ld=lld -Wl,-mllvm -Wl,-function-specialize -O3
-funroll-loops -ffast-math -z muldefs -lamdlibm -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -ljemalloc -lgfortran
```

Benchmarks using both Fortran and C:

```
-flto -fuse-ld=lld -Wl,-mllvm -Wl,-function-specialize -O3
-ffast-math -march=znver1 -fstruct-layout=3
-mllvm -unroll-threshold=50 -fremap-arrays -mno-avx2
-mllvm -inline-threshold=1000 -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -function-specialize -funroll-loops
-z muldefs -lamdlibm -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -ljemalloc -lgfortran
```

Benchmarks using Fortran, C, and C++:

```
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto -fuse-ld=lld
-Wl,-mllvm -Wl,-function-specialize -O3 -ffast-math -march=znver1
-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-arrays -mno-avx2
-mllvm -inline-threshold=1000 -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -function-specialize
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
```

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**Software Availability:** Nov-2018

## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-funroll-loops -z muldefs -lamdlibm -fplugin=dragonegg.so  
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000 -DSPEC_OPENMP  
-fopenmp -fopenmp=libomp -lomp -ljemalloc
```

## Base Other Flags

C benchmarks:

```
-Wno-return-type -DUSE_OPENMP
```

Fortran benchmarks:

```
-DUSE_OPENMP -Wno-return-type
```

Benchmarks using both Fortran and C:

```
-DUSE_OPENMP -Wno-return-type
```

Benchmarks using Fortran, C, and C++:

```
-Wno-return-type -DUSE_OPENMP
```

## Peak Compiler Invocation

C benchmarks:

```
clang
```

Fortran benchmarks:

```
clang gfortran
```

Benchmarks using both Fortran and C:

```
clang gfortran
```

Benchmarks using Fortran, C, and C++:

```
clang++ clang gfortran
```

## Peak Portability Flags

Same as Base Portability Flags



# SPEC CPU®2017 Floating Point Speed Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL385 Gen10

(2.30 GHz, AMD EPYC 7451)

SPECspeed®2017\_fp\_base = 111

SPECspeed®2017\_fp\_peak = 115

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Jan-2019

**Hardware Availability:** Oct-2018

**Software Availability:** Nov-2018

## Peak Optimization Flags

C benchmarks:

619.lbm\_s: basepeak = yes

```
638.imagick_s: -flto -fuse-ld=lld -Wl,-mllvm -Wl,-function-specialize
-Ofast -march=znver1 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively -mno-avx2
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-flv-function-specialization
-mllvm -enable-vectorize-compares -z muldefs -lamdlibm
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -ljemalloc
```

644.nab\_s: Same as 638.imagick\_s

Fortran benchmarks:

```
-flto -fuse-ld=lld -Wl,-mllvm -Wl,-function-specialize -O3
-funroll-loops -ffast-math -z muldefs -lamdlibm -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -ljemalloc -lgfortran
```

Benchmarks using both Fortran and C:

```
-flto -fuse-ld=lld -Wl,-mllvm -Wl,-function-specialize -Ofast
-march=znver1 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively -mno-avx2
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-flv-function-specialization -mllvm -enable-vectorize-compares -O3
-funroll-loops -ffast-math -z muldefs -lamdlibm -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -ljemalloc -lgfortran
```

Benchmarks using Fortran, C, and C++:

```
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto -fuse-ld=lld
-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver1 -mno-sse4a
-fstruct-layout=5 -mllvm -vectorize-memory-aggressively -mno-avx2
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-flv-function-specialization -mllvm -enable-vectorize-compares
-mllvm -unroll-threshold=100 -O3 -funroll-loops -ffast-math
-z muldefs -lamdlibm -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -ljemalloc
```



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**CPU2017 License:** 3

**Test Sponsor:** HPE

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**Test Date:** Jan-2019

**Hardware Availability:** Oct-2018

**Software Availability:** Nov-2018

## Peak Other Flags

C benchmarks:

-Wno-return-type -DUSE\_OPENMP

Fortran benchmarks:

-DUSE\_OPENMP -Wno-return-type

Benchmarks using both Fortran and C:

-DUSE\_OPENMP -Wno-return-type

Benchmarks using Fortran, C, and C++:

-Wno-return-type -DUSE\_OPENMP

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

<http://www.spec.org/cpu2017/flags/aocc100-flags-revC-I.2018-11-13.html>

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revD.html>

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

<http://www.spec.org/cpu2017/flags/aocc100-flags-revC-I.2018-11-13.xml>

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revD.xml>

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