



SPEC® CPU2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen10

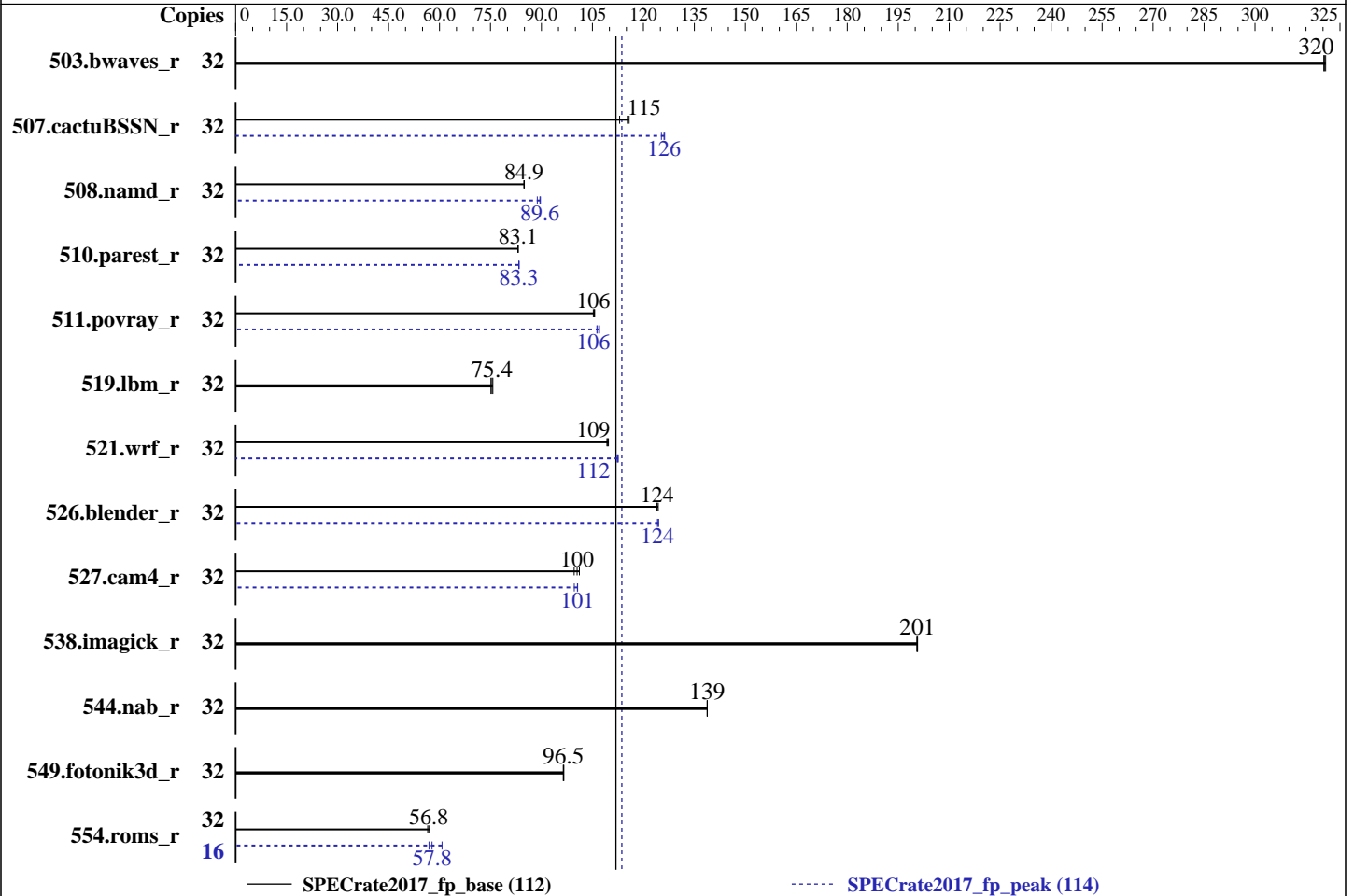
(3.10 GHz, AMD EPYC 7371)

SPECrate2017_fp_base = 112

SPECrate2017_fp_peak = 114

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

Test Date: Feb-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018



Hardware

CPU Name: AMD EPYC 7371
 Max MHz.: 3800
 Nominal: 3100
 Enabled: 16 cores, 1 chip, 2 threads/core
 Orderable: 1 chip
 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 (8 x 64 GB 4Rx4 PC4-2666V-L)
 Storage: 1 x 400 GB SAS SSD RAID 0
 Other: None

Software

OS: SUSE linux Enterprise Server 12 (x86_64) SP3
 Kernel version 4.4.132-94.33-default
 Compiler: C/C++: Version 1.3.0 of AOCC
 Fortran: Version 4.8.2 of GCC
 Parallel: No
 Firmware: HPE BIOS Version A41 10/02/2018 released Oct-2018
 File System: btrfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: jemalloc memory allocator library V5.1.0



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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	32	<u>1001</u>	<u>320</u>	1000	321	1002	320	32	<u>1001</u>	<u>320</u>	1000	321	1002	320
507.cactuBSSN_r	32	<u>351</u>	<u>115</u>	358	113	350	116	32	<u>321</u>	<u>126</u>	321	126	323	125
508.namd_r	32	358	84.9	358	85.0	<u>358</u>	<u>84.9</u>	32	342	88.8	339	89.7	<u>339</u>	<u>89.6</u>
510.parest_r	32	1007	83.1	<u>1007</u>	<u>83.1</u>	1007	83.1	32	1005	83.3	<u>1005</u>	<u>83.3</u>	1003	83.4
511.povray_r	32	710	105	707	106	<u>708</u>	<u>106</u>	32	<u>702</u>	<u>106</u>	698	107	703	106
519.lbm_r	32	449	75.1	<u>447</u>	<u>75.4</u>	446	75.7	32	449	75.1	<u>447</u>	<u>75.4</u>	446	75.7
521.wrf_r	32	656	109	<u>655</u>	<u>109</u>	653	110	32	638	112	<u>638</u>	<u>112</u>	637	113
526.blender_r	32	<u>393</u>	<u>124</u>	392	124	393	124	32	<u>392</u>	<u>124</u>	394	124	391	124
527.cam4_r	32	562	99.6	553	101	<u>557</u>	<u>100</u>	32	<u>556</u>	<u>101</u>	556	101	562	99.7
538.imagick_r	32	397	201	<u>397</u>	<u>201</u>	397	200	32	397	201	<u>397</u>	<u>201</u>	397	200
544.nab_r	32	<u>388</u>	<u>139</u>	388	139	388	139	32	<u>388</u>	<u>139</u>	388	139	388	139
549.fotonik3d_r	32	1291	96.6	1293	96.4	<u>1293</u>	<u>96.5</u>	32	1291	96.6	1293	96.4	<u>1293</u>	<u>96.5</u>
554.roms_r	32	<u>894</u>	<u>56.8</u>	890	57.1	899	56.5	16	<u>440</u>	<u>57.8</u>	419	60.7	447	56.9

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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 1.3.0 was used to leverage AOCC optimizers with gfortran. It is available here: <http://developer.amd.com/amd-aocc/>

jemalloc: configured and 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 2^21 = 2MiB.

Submit Notes

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



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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)

General Notes

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

LD_LIBRARY_PATH = "/home/cpu2017/amd1812na_rate_revA_lib/64:/home/cpu2017/amd1812na_rate_revA_lib/32:"

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>

Platform Notes

BIOS Configuration

Thermal Configuration set to Maximum Cooling

Performance Determinism set to Power Deterministic

Workload Power and Utilization Monitoring set to Disabled

Minimum Processor Idle Power core C-State set to C6 State

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on linux-qlr8 Tue Feb 5 19:54:50 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>

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Platform Notes (Continued)

From /proc/cpuinfo

```
model name : AMD EPYC 7371 16-Core Processor
 1 "physical id"s (chips)
 32 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 16
siblings : 32
physical 0: 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):                32
On-line CPU(s) list:   0-31
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):              1
NUMA node(s):          4
Vendor ID:              AuthenticAMD
CPU family:             23
Model:                 1
Model name:             AMD EPYC 7371 16-Core Processor
Stepping:               2
CPU MHz:               3100.000
CPU max MHz:           3100.0000
CPU min MHz:           2500.0000
BogoMIPS:              6188.22
Virtualization:        AMD-V
L1d cache:             32K
L1i cache:             64K
L2 cache:              512K
L3 cache:              8192K
NUMA node0 CPU(s):     0-3,16-19
NUMA node1 CPU(s):     4-7,20-23
NUMA node2 CPU(s):     8-11,24-27
NUMA node3 CPU(s):     12-15,28-31
Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
constant_tsc rep_good nopl 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
hw_pstate ssbd retpoline retpoline_amd npt lbrv svm_lock nrip_save tsc_scale
vmcb_clean flushbyasid decodeassists pausefilter pfthreshold vmmcall avic fsgsbase
```

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Platform Notes (Continued)

bmi1 avx2 smep bmi2 rdseed adx smap clflushopt sha_ni xsaveopt xsavec xgetbv1 clzero
irperf 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: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 16 17 18 19
node 0 size: 128841 MB
node 0 free: 128654 MB
node 1 cpus: 4 5 6 7 20 21 22 23
node 1 size: 129022 MB
node 1 free: 128845 MB
node 2 cpus: 8 9 10 11 24 25 26 27
node 2 size: 129022 MB
node 2 free: 128864 MB
node 3 cpus: 12 13 14 15 28 29 30 31
node 3 size: 129021 MB
node 3 free: 128855 MB
node distances:
node  0  1  2  3
  0:  10  16  16  16
  1:  16  10  16  16
  2:  16  16  10  16
  3:  16  16  16  10
```

```
From /proc/meminfo
MemTotal:      528289016 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"
```

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Platform Notes (Continued)

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-qlr8 4.4.132-94.33-default #1 SMP Tue May 29 20:09:56 UTC 2018 (76aae3b)
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

run-level 3 Feb 5 11:53 last=5

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda4	xfs	331G	4.4G	326G	2%	/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 A41 10/02/2018

Memory:

8x UNKNOWN NOT AVAILABLE

8x UNKNOWN NOT AVAILABLE 64 GB 4 rank 2666

(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.1.3.0.B34.2018_10_22 clang version 7.0.0 (CLANG: Jenkins

AOCC_1_3_0_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018_10_22)

Target: x86_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin

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

(Continued on next page)



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AOCC_1_3_0_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018_10_22)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin

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

AOCC.LLVM.1.3.0.B34.2018_10_22 clang version 7.0.0 (CLANG: Jenkins
AOCC_1_3_0_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018_10_22)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin
AOCC.LLVM.1.3.0.B34.2018_10_22 clang version 7.0.0 (CLANG: Jenkins
AOCC_1_3_0_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018_10_22)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin

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

AOCC.LLVM.1.3.0.B34.2018_10_22 clang version 7.0.0 (CLANG: Jenkins
AOCC_1_3_0_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018_10_22)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin
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AOCC_1_3_0_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018_10_22)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-Compiler/bin
GNU Fortran (GCC) 4.8.2
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under the terms of the GNU General Public License.
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=====
FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base,
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(Continued on next page)



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

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AOCC_1_3_0_Release-Build#34) (based on LLVM AOCC.LLVM.1.3.0.B34.2018_10_22)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /root/work/compilers/aoccl.3.0/AOCC-1.3.0-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
-Wl,-plugin-opt=-enable-vectorize-compares=false -O3 -ffast-math
-march=znver1 -mno-avx2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-freemap-arrays -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -enable-gvn-hoist
-mllvm -function-specialize -z muldefs -lamdlibm -lpthread -ldl
-ljemalloc
```

C++ benchmarks:

```
-std=c++98 -flto -Wl,-plugin-opt=-merge-constant
-Wl,-plugin-opt=-lsr-in-nested-loop
-Wl,-plugin-opt=-enable-vectorize-compares=false -O3 -march=znver1
-mllvm -unroll-threshold=100 -finline-aggressive -freemap-arrays
-mllvm -inline-threshold=1000 -mllvm -enable-vectorize-compares=false
-z muldefs -lpthread -ldl -ljemalloc
```

Fortran benchmarks:

```
-flto -Wl,-plugin-opt=-merge-constant
-Wl,-plugin-opt=-lsr-in-nested-loop
-Wl,-plugin-opt=-enable-vectorize-compares=false -O3 -mavx -madx
-funroll-loops -ffast-math -z muldefs -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-merge-constant
-fplugin-arg-dragonegg-llvm-option=-enable-vectorize-compares:false
-lpthread -ldl -ljemalloc -lgfortran -lamdlibm
```

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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

```
-flto -Wl,-plugin-opt=-merge-constant
-Wl,-plugin-opt=-lsr-in-nested-loop
-Wl,-plugin-opt=-enable-vectorize-compares=false -O3 -ffast-math
-march=znver1 -mno-avx2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-freemap-arrays -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -enable-gvn-hoist
-mllvm -function-specialize -mavx -madox -funroll-loops -z muldefs
-fplugin=dragonegg.so -fplugin-arg-dragonegg-llvm-option=-merge-constant
-fplugin-arg-dragonegg-llvm-option=-enable-vectorize-compares:false
-lpthread -ldl -ljemalloc -lgfortran -lamdlibm
```

Benchmarks using both C and C++:

```
-std=c++98 -flto -Wl,-plugin-opt=-merge-constant
-Wl,-plugin-opt=-lsr-in-nested-loop
-Wl,-plugin-opt=-enable-vectorize-compares=false -O3 -ffast-math
-march=znver1 -mno-avx2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-freemap-arrays -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -enable-gvn-hoist
-mllvm -function-specialize -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -enable-vectorize-compares=false -z muldefs
-lpthread -ldl -ljemalloc
```

Benchmarks using Fortran, C, and C++:

```
-std=c++98 -flto -Wl,-plugin-opt=-merge-constant
-Wl,-plugin-opt=-lsr-in-nested-loop
-Wl,-plugin-opt=-enable-vectorize-compares=false -O3 -ffast-math
-march=znver1 -mno-avx2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-freemap-arrays -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -enable-gvn-hoist
-mllvm -function-specialize -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -enable-vectorize-compares=false -mavx
-madox -funroll-loops -z muldefs -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-merge-constant
-fplugin-arg-dragonegg-llvm-option=-enable-vectorize-compares:false
-lpthread -ldl -ljemalloc
```

Peak Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

(Continued on next page)



SPEC CPU2017 Floating Point Rate Result

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(Test Sponsor: HPE)

ProLiant DL325 Gen10

(3.10 GHz, AMD EPYC 7371)

SPECrate2017_fp_base = 112

SPECrate2017_fp_peak = 114

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Feb-2019

Hardware Availability: Apr-2019

Software Availability: Dec-2018

Peak Compiler Invocation (Continued)

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

-std=c++98 -flto -Wl,-plugin-opt=-merge-constant
-Wl,-plugin-opt=-lsr-in-nested-loop -Ofast -march=znver1
-finline-aggressive -mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -lpthread -ldl -ljemalloc

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: -flto -Wl,-plugin-opt=-merge-constant
-Wl,-plugin-opt=-lsr-in-nested-loop -O3 -mavx2 -madx

(Continued on next page)



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Peak Optimization Flags (Continued)

554.roms_r (continued):

```
-funroll-loops -ffast-math -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-merge-constant
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000
-lpthread -ldl -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 -mavx -ffast-math
-funroll-loops -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-merge-constant
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000
-lpthread -ldl -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 -mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -O3 -mavx2 -madx
-funroll-loops -ffast-math -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-merge-constant
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000
-lpthread -ldl -ljemalloc -lgfortran -lamdlibm
```

Benchmarks using both C and C++:

```
-std=c++98 -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
-mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -finline-aggressive -lpthread -ldl
-ljemalloc
```

Benchmarks using Fortran, C, and C++:

```
-std=c++98 -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
-mllvm -unroll-threshold=100 -fremap-arrays
-mllvm -inline-threshold=1000 -finline-aggressive -O3 -mavx2 -madx
-funroll-loops -ffast-math -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=-merge-constant
-fplugin-arg-dragonegg-llvm-option=-inline-threshold:1000 -lpthread
-ldl -ljemalloc
```



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

<http://www.spec.org/cpu2017/flags/aocc130-flags-revA2.html>

<http://www.spec.org/cpu2017/flags/gcc.2017-11-20.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/aocc130-flags-revA2.xml>

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

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

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