SPEC® CPU2017 Floating Point Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

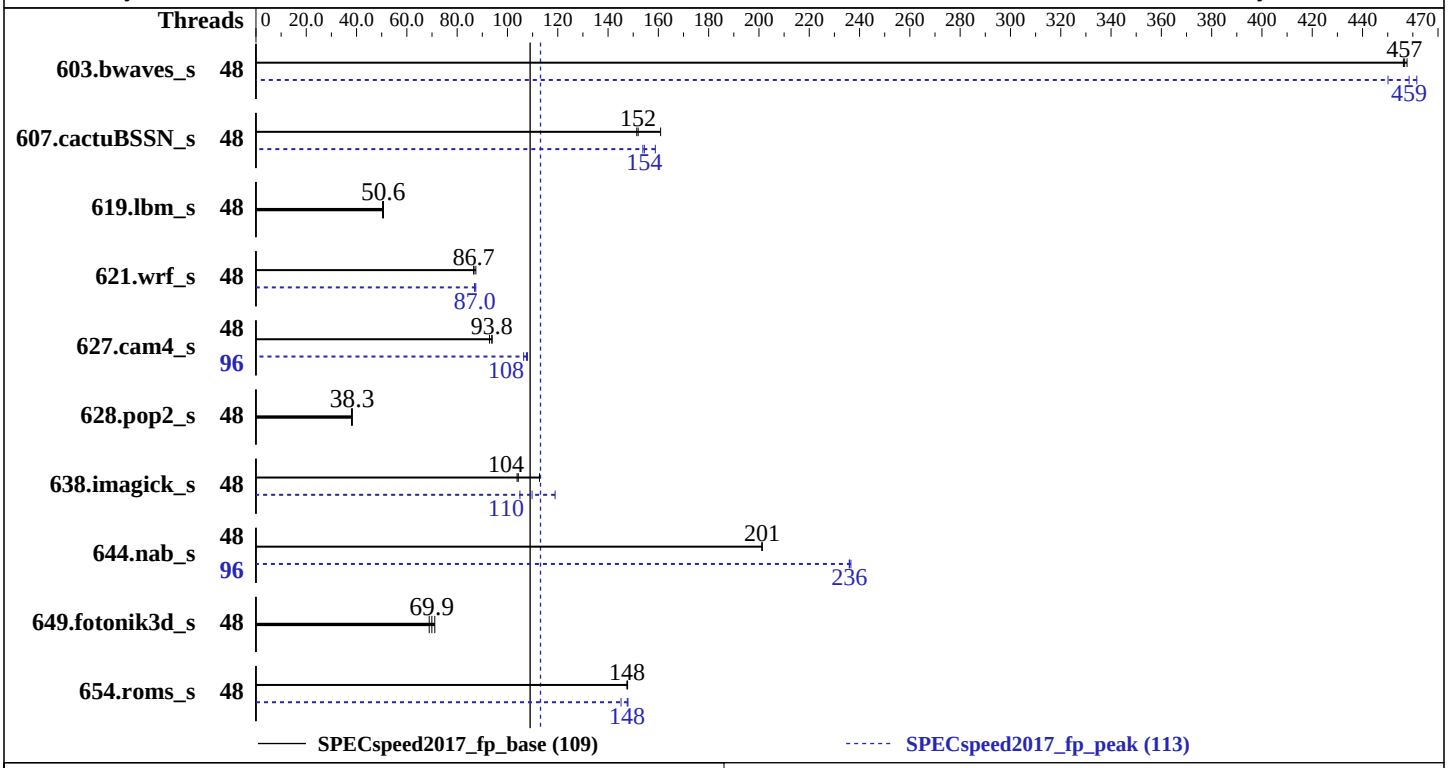
ProLiant DL385 Gen10
(2.00 GHz, AMD EPYC 7401)

SPECspeed2017_fp_base = 109

SPECspeed2017_fp_peak = 113

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 7401
Max MHz.:	3000
Nominal:	2000
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

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	48	**129**	**457**	129	456	129	458	48	**129**	**459**	128	462	131	450
607.cactuBSSN_s	48	110	151	104	161	**110**	**152**	48	105	159	**108**	**154**	108	154
619.lbm_s	48	103	50.7	104	50.3	**103**	**50.6**	48	103	50.7	104	50.3	**103**	**50.6**
621.wrf_s	48	**153**	**86.7**	153	86.6	151	87.4	48	**152**	**87.0**	151	87.4	152	86.9
627.cam4_s	48	**94.5**	**93.8**	95.4	92.9	94.4	93.9	96	**82.4**	**108**	83.3	106	82.1	108
628.pop2_s	48	**310**	**38.3**	313	38.0	310	38.3	48	**310**	**38.3**	313	38.0	310	38.3
638.imagick_s	48	128	113	**138**	**104**	139	104	48	121	119	137	105	**131**	**110**
644.nab_s	48	86.8	201	86.8	201	**86.8**	**201**	96	**74.0**	**236**	73.9	237	74.1	236
649.fotonik3d_s	48	132	68.9	**130**	**69.9**	128	71.1	48	132	68.9	**130**	**69.9**	128	71.1
654.roms_s	48	**107**	**148**	107	148	107	148	48	**107**	**148**	106	148	108	145

SPECspeed2017_fp_base = **109**

SPECspeed2017_fp_peak = **113**

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)
```

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 Wed Jan 30 10:34:47 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 7401 24-Core Processor
```

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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 7401 24-Core Processor
      Stepping:              2
      CPU MHz:               2000.000
      CPU max MHz:           2000.0000
      CPU min MHz:           1200.0000
      BogoMIPS:              3992.22
      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
```

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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 bmi1 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: 31783 MB
   node 1 cpus: 6 7 8 9 10 11 54 55 56 57 58 59
   node 1 size: 32253 MB
   node 1 free: 31993 MB
   node 2 cpus: 12 13 14 15 16 17 60 61 62 63 64 65
   node 2 size: 32253 MB
   node 2 free: 32103 MB
   node 3 cpus: 18 19 20 21 22 23 66 67 68 69 70 71
   node 3 size: 32253 MB
   node 3 free: 32115 MB
   node 4 cpus: 24 25 26 27 28 29 72 73 74 75 76 77
   node 4 size: 32253 MB
   node 4 free: 32136 MB
   node 5 cpus: 30 31 32 33 34 35 78 79 80 81 82 83
   node 5 size: 32253 MB
   node 5 free: 32147 MB
   node 6 cpus: 36 37 38 39 40 41 84 85 86 87 88 89
   node 6 size: 32253 MB
   node 6 free: 32144 MB
   node 7 cpus: 42 43 44 45 46 47 90 91 92 93 94 95
   node 7 size: 32120 MB
   node 7 free: 32014 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
```

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Platform Notes (Continued)

```
    MemTotal:       263823852 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 30 10:29

  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

```
==============================================================================
 CC  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/aocc1.2.1/AOCC-1.2.1-Compiler/bin
------------------------------------------------------------------------------

==============================================================================
 FC  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/aocc1.2.1/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/aocc1.2.1/AOCC-1.2.1-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  603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base,
      peak)
------------------------------------------------------------------------------
```


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Compiler Version Notes (Continued)

```
GNU Fortran (GCC) 4.8.2
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------------------------------------------------------------------------------

==============================================================================
 CC  621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------
GNU Fortran (GCC) 4.8.2
Copyright (C) 2013 Free Software Foundation, Inc.
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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.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/aocc1.2.1/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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64

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Base Portability Flags (Continued)

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
-funroll-loops -z muldefs -lamdlibm -fplugin=dragonegg.so

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Base Optimization Flags (Continued)

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

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:

603.bwaves_s: `-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`

649.fotonik3d_s: `basepeak = yes`

654.roms_s: `Same as 603.bwaves_s`

Benchmarks using both Fortran and C:

621.wrf_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 -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`

627.cam4_s: `Same as 621.wrf_s`

628.pop2_s: `basepeak = yes`

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Peak Optimization Flags (Continued)

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

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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