SPEC CPU®2017 Floating Point Speed Result

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Lenovo Global Technology
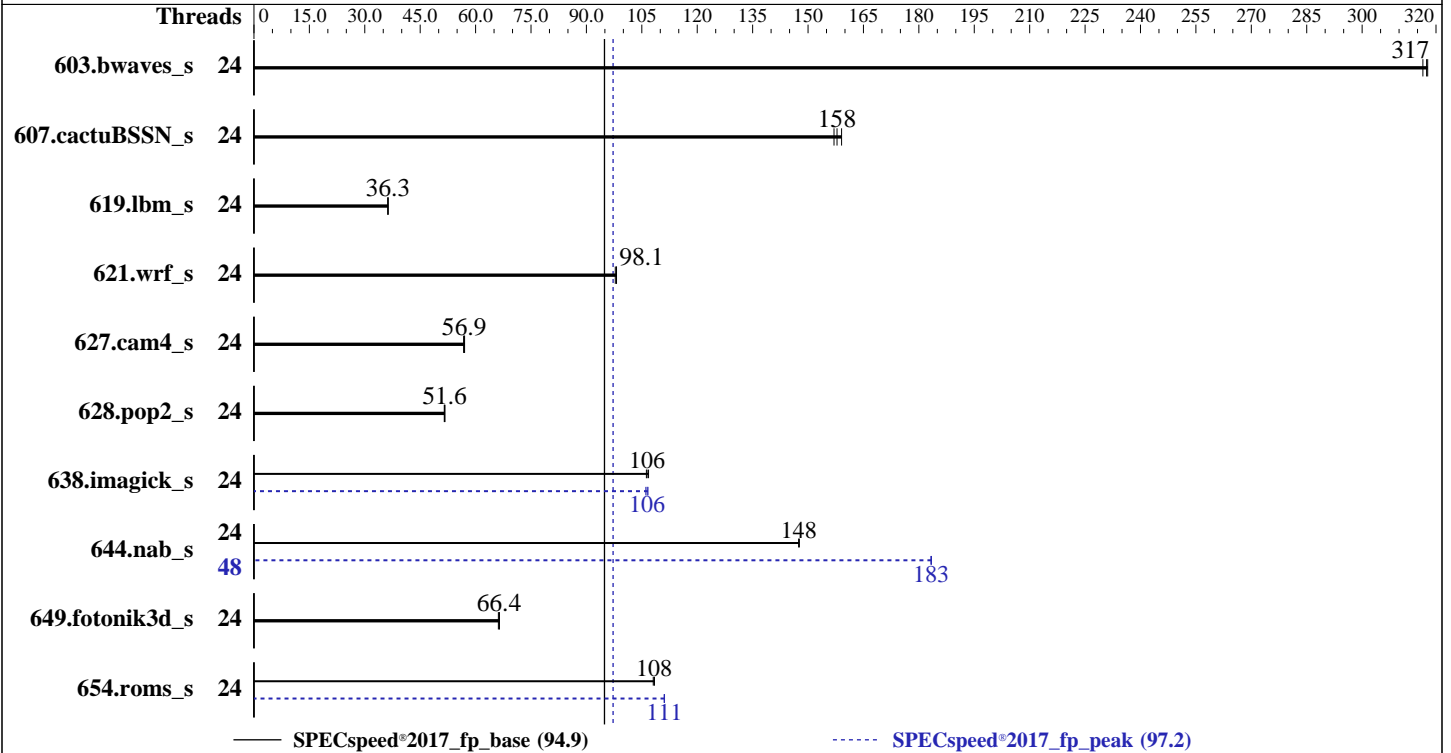
SPECspeed®2017_fp_base = 94.9

ThinkSystem SR645
2.90 GHz, AMD EPYC 7272

SPECspeed®2017_fp_peak = 97.2

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jun-2020
Hardware Availability: Jun-2020
Software Availability: Dec-2019

Threads — 0 15.0 30.0 45.0 60.0 75.0 90.0 105 120 135 150 165 180 195 210 225 240 255 270 285 300 320

- 603.bwaves_s 24 317
- 607.cactuBSSN_s 24 158
- 619.lbm_s 24 36.3
- 621.wrf_s 24 98.1
- 627.cam4_s 24 56.9
- 628.pop2_s 24 51.6
- 638.imagick_s 24 / 106 106
- 644.nab_s 24 148 / **48** 183
- 649.fotonik3d_s 24 66.4
- 654.roms_s 24 108 / 111

SPECspeed®2017_fp_base (94.9)   SPECspeed®2017_fp_peak (97.2)

Hardware

CPU Name: AMD EPYC 7272
 Max MHz: 3200
 Nominal: 2900
Enabled: 24 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 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,
  16 MB shared / 3 cores
 Other: None
Memory: 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP5 (x86_64)
  Kernel 4.12.14-120-default
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: Yes
Firmware: Lenovo BIOS Version D8E105P 1.00 released May-2020
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc: jemalloc memory allocator library v5.1.0
Power Management: BIOS set to prefer performance at the cost of additional power usage

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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	24	186	318	**186**	**317**	186	316	24	186	318	**186**	**317**	186	316
607.cactuBSSN_s	24	105	159	106	157	**106**	**158**	24	105	159	106	157	**106**	**158**
619.lbm_s	24	144	36.3	145	36.2	**144**	**36.3**	24	144	36.3	145	36.2	**144**	**36.3**
621.wrf_s	24	135	98.1	135	97.8	**135**	**98.1**	24	135	98.1	135	97.8	**135**	**98.1**
627.cam4_s	24	**156**	**56.9**	155	57.0	156	56.8	24	**156**	**56.9**	155	57.0	156	56.8
628.pop2_s	24	230	51.5	230	51.7	**230**	**51.6**	24	230	51.5	230	51.7	**230**	**51.6**
638.imagick_s	24	135	107	136	106	**136**	**106**	24	135	107	**136**	**106**	136	106
644.nab_s	24	118	148	**118**	**148**	118	147	48	**95.3**	**183**	95.3	183	95.3	183
649.fotonik3d_s	24	137	66.5	138	66.2	**137**	**66.4**	24	137	66.5	138	66.2	**137**	**66.4**
654.roms_s	24	**145**	**108**	145	108	146	108	24	**142**	**111**	142	111	142	111
SPECspeed®2017_fp_base =	**94.9**											
SPECspeed®2017_fp_peak =	**97.2**											

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/
```

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 set to 'always' for this run (OS default)
```

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-47"
LD_LIBRARY_PATH =
      "/home/cpu2017-1.1.0-amd-rome-aocc200-C3/amd_speed_aocc200_rome_C_lib/64
      ;/home/cpu2017-1.1.0-amd-rome-aocc200-C3/amd_speed_aocc200_rome_C_lib/32
      :"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "48"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 24 1 25 2 26 3 27 4 28 5 29 6 30 7 31 8 32 9 33 10 34
      11 35 12 36 13 37 14 38 15 39 16 40 17 41 18 42 19 43 20 44 21 45 22 46
      23 47"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-23"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4)
is mitigated in the system as tested and documented.
jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
```

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Platform Notes

```
BIOS settings:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
SOC P-States set to P0
Global C-state Control set to Disable

Sysinfo program /home/cpu2017-1.1.0-amd-rome-aocc200-C3/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on linux-d9uk Mon Jun  1 10:50:23 2020

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 7272 12-Core Processor
      2  "physical id"s (chips)
      48 "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 : 12
      siblings  : 24
      physical 0: cores 0 1 2 4 5 6 8 9 10 12 13 14
      physical 1: cores 0 1 2 4 5 6 8 9 10 12 13 14

From lscpu:
      Architecture:         x86_64
      CPU op-mode(s):       32-bit, 64-bit
      Byte Order:           Little Endian
      Address sizes:        43 bits physical, 48 bits virtual
      CPU(s):               48
      On-line CPU(s) list:  0-47
      Thread(s) per core:   2
      Core(s) per socket:   12
      Socket(s):            2
      NUMA node(s):         2
      Vendor ID:            AuthenticAMD
      CPU family:           23
      Model:                49
      Model name:           AMD EPYC 7272 12-Core Processor
      Stepping:             0
      CPU MHz:              2900.000
      CPU max MHz:          2900.0000
      CPU min MHz:          1500.0000
      BogoMIPS:             5788.86
      Virtualization:       AMD-V
      L1d cache:            32K
      L1i cache:            32K
```

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Platform Notes (Continued)

```
     L2 cache:             512K
     L3 cache:             16384K
     NUMA node0 CPU(s):    0-11,24-35
     NUMA node1 CPU(s):    12-23,36-47
     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 cpuid extd_apicid aperfmperf 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 ibs
  skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_l2 mwaitx cpb cat_l3
  cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2
  cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsavec xgetbv1 xsaves
  cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local clzero irperf xsaveerptr wbnoinvd
  arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
  pausefilter pfthreshold avic v_vmsave_vmload vgif umip rdpid 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: 2 nodes (0-1)
   node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 24 25 26 27 28 29 30 31 32 33 34 35
   node 0 size: 515855 MB
   node 0 free: 515284 MB
   node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 36 37 38 39 40 41 42 43 44 45 46 47
   node 1 size: 516089 MB
   node 1 free: 515755 MB
   node distances:
   node   0    1
     0:  10   32
     1:  32   10

 From /proc/meminfo
    MemTotal:       1056711704 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

 From /etc/*release* /etc/*version*
    SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 5
      # 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:
```

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Platform Notes (Continued)

```
      NAME="SLES"
      VERSION="12-SP5"
      VERSION_ID="12.5"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP5"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp5"

  uname -a:
      Linux linux-d9uk 4.12.14-120-default #1 SMP Thu Nov 7 16:39:09 UTC 2019 (fd9dc36)
      x86_64 x86_64 x86_64 GNU/Linux

  Kernel self-reported vulnerability status:

  itlb_multihit:                         Not affected
  CVE-2018-3620 (L1 Terminal Fault):     Not affected
  Microarchitectural Data Sampling:      Not affected
  CVE-2017-5754 (Meltdown):              Not affected
  CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
                                         via prctl and seccomp
  CVE-2017-5753 (Spectre variant 1):     Mitigation: usercopy/swapgs barriers and __user
                                         pointer sanitization
  CVE-2017-5715 (Spectre variant 2):     Mitigation: Full AMD retpoline, IBPB:
                                         conditional, IBRS_FW, STIBP: conditional, RSB
                                         filling
  tsx_async_abort:                       Not affected

  run-level 3 Jun 1 05:33

  SPEC is set to: /home/cpu2017-1.1.0-amd-rome-aocc200-C3
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sdb3       xfs   889G   81G  808G  10% /

  From /sys/devices/virtual/dmi/id
     BIOS:    Lenovo D8E105P-1.00 05/08/2020
     Vendor:  Lenovo
     Product: ThinkSystem SR645 MB
     Product Family: ThinkSystem
     Serial:  1234567890

  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.
     Memory:
     32x Samsung M393A4G43AB3-CWE 32 kB 2 rank 3200
```

(Continued on next page)

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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.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------


==============================================================================
Fortran           | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                  | 654.roms_s(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
Fortran, C     | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
               | 628.pop2_s(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`clang`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

Benchmarks using Fortran, C, and C++:
`clang++ clang flang`

Base Portability Flags

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

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Base Optimization Flags

C benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
-lflang
```

Fortran benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -fopenmp=libomp
-lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using both Fortran and C:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -funroll-loops -Mrecursive -z muldefs
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -fopenmp=libomp
-lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using Fortran, C, and C++:
```
-std=c++98 -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-fstruct-layout=3 -mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lpthread -ldl -lmvec
-lamdlibm -ljemalloc -lflang
```

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Base Other Flags

C benchmarks:
`-Wno-return-type`

Fortran benchmarks:
`-Wno-return-type`

Benchmarks using both Fortran and C:
`-Wno-return-type`

Benchmarks using Fortran, C, and C++:
`-Wno-return-type`

Peak Compiler Invocation

C benchmarks:
`clang`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

Benchmarks using Fortran, C, and C++:
`clang++ clang flang`

Peak Portability Flags

`Same as Base Portability Flags`

Peak Optimization Flags

C benchmarks:

619.lbm_s: `basepeak = yes`

638.imagick_s: `-flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize`
`-Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`

(Continued on next page)

Lenovo Global Technology

ThinkSystem SR645
2.90 GHz, AMD EPYC 7272

SPECspeed®2017_fp_base = 94.9

SPECspeed®2017_fp_peak = 97.2

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Jun-2020
Hardware Availability: Jun-2020
Software Availability: Dec-2019

Peak Optimization Flags (Continued)

638.imagick_s (continued):
```
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -DSPEC_OPENMP -fopenmp
-lmvec -lamdlibm -fopenmp=libomp -lomp -lpthread -ldl
-ljemalloc -lflang
```

644.nab_s: `Same as 638.imagick_s`

Fortran benchmarks:

603.bwaves_s: `basepeak = yes`

649.fotonik3d_s: `basepeak = yes`

654.roms_s:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang
```

Benchmarks using both Fortran and C:

621.wrf_s: `basepeak = yes`

627.cam4_s: `basepeak = yes`

628.pop2_s: `basepeak = yes`

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: `basepeak = yes`

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Peak Other Flags

C benchmarks:
`-Wno-return-type`

Fortran benchmarks:
`-Wno-return-type`

Benchmarks using both Fortran and C:
`-Wno-return-type`

Benchmarks using Fortran, C, and C++:
`-Wno-return-type`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/aocc200-flags-C3.html`
`http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome2P-K.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc200-flags-C3.xml`
`http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome2P-K.xml`

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Tested with SPEC CPU®2017 v1.1.0 on 2020-05-31 22:50:22-0400.
Report generated on 2020-06-23 18:12:17 by CPU2017 PDF formatter v6255.
Originally published on 2020-06-23.