SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Supermicro
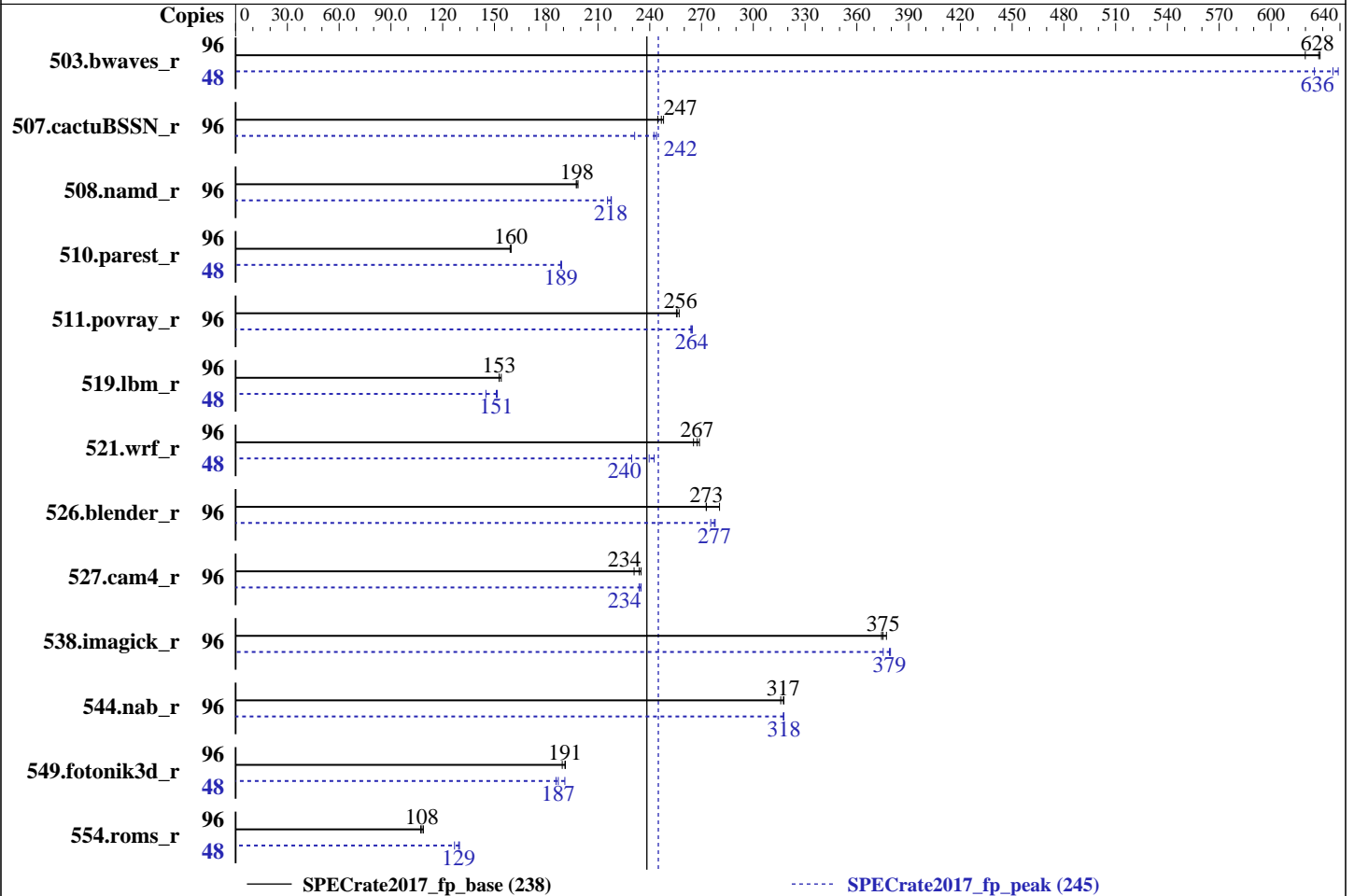
A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base =   238

SPECrate2017_fp_peak =   245

CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Mar-2018

Hardware Availability: Jun-2017

Software Availability: Nov-2017

Copies		
503.bwaves_r	96	628
	48	636
507.cactuBSSN_r	96	247
		242
508.namd_r	96	198
		218
510.parest_r	96	160
	48	189
511.povray_r	96	256
		264
519.lbm_r	96	153
	48	151
521.wrf_r	96	267
	48	240
526.blender_r	96	273
		277
527.cam4_r	96	234
		234
538.imagick_r	96	375
		379
544.nab_r	96	317
		318
549.fotonik3d_r	96	191
	48	187
554.roms_r	96	108
	48	129

——— SPECrate2017_fp_base (238)   ------ SPECrate2017_fp_peak (245)

Hardware

CPU Name: AMD EPYC 7451

 Max MHz.: 3200

 Nominal: 2300

Enabled: 48 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 / 3 cores

 Other: None

Memory: 1 TB (16 x 64 GB 4Rx4 PC4-2666V-L)

Storage: 1 x 500 GB SATAIII, 7200 RPM

Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP3 (x86_64)
             kernel 4.4.114-94.11-default

Compiler: C/C++: Version 1.0.0 of AOCC
             Fortran: Version 4.8.2 of GCC

Parallel: No

Firmware: Supermicro BIOS version 1.0c released Feb-2018

File System: xfs

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: 64-bit

Other: jemalloc general purpose malloc implementation
             V4.5.0

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base =   238

SPECrate2017_fp_peak =   245

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Mar-2018
Hardware Availability: Jun-2017
Software Availability: Nov-2017

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	96	**1534**	**628**	1553	620	1532	628	48	753	639	**757**	**636**	770	625
507.cactuBSSN_r	96	**493**	**247**	490	248	497	245	96	526	231	**501**	**242**	498	244
508.namd_r	96	460	198	462	197	**461**	**198**	96	423	216	419	218	**419**	**218**
510.parest_r	96	1579	159	1574	160	**1574**	**160**	48	**666**	**189**	665	189	666	189
511.povray_r	96	872	257	877	255	**876**	**256**	96	847	265	**848**	**264**	850	264
519.lbm_r	96	657	154	663	153	**662**	**153**	48	334	152	349	145	**335**	**151**
521.wrf_r	96	800	269	810	265	**804**	**267**	48	468	230	443	243	**449**	**240**
526.blender_r	96	**536**	**273**	521	280	536	273	96	**527**	**277**	526	278	531	275
527.cam4_r	96	715	235	727	231	**718**	**234**	96	**717**	**234**	718	234	715	235
538.imagick_r	96	**636**	**375**	638	374	633	377	96	**630**	**379**	636	375	629	380
544.nab_r	96	511	316	509	318	**509**	**317**	96	509	317	**509**	**318**	509	318
549.fotonik3d_r	96	**1960**	**191**	1976	189	1957	191	48	1007	186	980	191	**1000**	**187**
554.roms_r	96	1402	109	**1412**	**108**	1422	107	48	588	130	**590**	**129**	601	127

SPECrate2017_fp_base =	**238**
SPECrate2017_fp_peak =	**245**

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

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)

Huge pages were not configured for this run.
```

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base = 238

SPECrate2017_fp_peak = 245

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Mar-2018
Hardware Availability: Jun-2017
Software Availability: Nov-2017

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/amd-aocc/

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/

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 2^21 = 2MiB.

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.
```

Platform Notes

```
BIOS Settings:
Determinism Slider = Power
cTDP Control = Manual
cTDP = 200
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-769d Wed Mar 28 20:41:44 2018

 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
```

(Continued on next page)

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base =   238

SPECrate2017_fp_peak =   245

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Mar-2018
Hardware Availability: Jun-2017
Software Availability: Nov-2017

Platform Notes (Continued)

```
model name : AMD EPYC 7451 24-Core Processor
   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:              4599.61
   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
```

(Continued on next page)

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base = 238

SPECrate2017_fp_peak = 245

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Mar-2018
Hardware Availability: Jun-2017
Software Availability: Nov-2017

Platform Notes (Continued)

```
      osvw skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_l2 mwaitx arat cpb
      hw_pstate retpoline retpoline_amd 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
      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: 128851 MB
   node 0 free: 128662 MB
   node 1 cpus: 6 7 8 9 10 11 54 55 56 57 58 59
   node 1 size: 129021 MB
   node 1 free: 128861 MB
   node 2 cpus: 12 13 14 15 16 17 60 61 62 63 64 65
   node 2 size: 129021 MB
   node 2 free: 128869 MB
   node 3 cpus: 18 19 20 21 22 23 66 67 68 69 70 71
   node 3 size: 129021 MB
   node 3 free: 128861 MB
   node 4 cpus: 24 25 26 27 28 29 72 73 74 75 76 77
   node 4 size: 129021 MB
   node 4 free: 128880 MB
   node 5 cpus: 30 31 32 33 34 35 78 79 80 81 82 83
   node 5 size: 129021 MB
   node 5 free: 128882 MB
   node 6 cpus: 36 37 38 39 40 41 84 85 86 87 88 89
   node 6 size: 129021 MB
   node 6 free: 128881 MB
   node 7 cpus: 42 43 44 45 46 47 90 91 92 93 94 95
   node 7 size: 129019 MB
   node 7 free: 128879 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
```

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base = 238

SPECrate2017_fp_peak = 245

CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Mar-2018

Hardware Availability: Jun-2017

Software Availability: Nov-2017

Platform Notes (Continued)

```
From /proc/meminfo
   MemTotal:       1056765968 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

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-769d 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 28 10:22

SPEC is set to: /home/cpu2017
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda4       xfs   422G   25G  397G   6% /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. 1.0c 02/07/2018
  Memory:
   16x Samsung M386A8K40BM2-CTD 64 GB 4 rank 2667

(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)
------------------------------------------------------------------------------
```

(Continued on next page)

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base = 238

SPECrate2017_fp_peak = 245

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Mar-2018
Hardware Availability: Jun-2017
Software Availability: Nov-2017

Compiler Version Notes (Continued)

```
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
------------------------------------------------------------------------------


==============================================================================
 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.
```

(Continued on next page)

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base = 238

SPECrate2017_fp_peak = 245

CPU2017 License: 001176   **Test Date:**   Mar-2018
Test Sponsor: Supermicro   **Hardware Availability:** Jun-2017
Tested by: Supermicro   **Software Availability:** Nov-2017

Compiler Version Notes (Continued)

```
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,
     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

(Continued on next page)

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base = 238

SPECrate2017_fp_peak = 245

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Mar-2018
Hardware Availability: Jun-2017
Software Availability: Nov-2017

Base Compiler Invocation (Continued)

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`

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 -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 -z muldefs -ljemalloc`

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

Fortran benchmarks:
`-flto -Wl, -plugin-opt= -merge-constant -lsr-in-nested-loop`
`-disable-vect-cmp -O3(gfortran) -O3(clang) -mavx -madx`

(Continued on next page)

SPEC CPU2017 Floating Point Rate Result

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base =   238

SPECrate2017_fp_peak =   245

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Mar-2018
Hardware Availability: Jun-2017
Software Availability: Nov-2017

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-funroll-loops -ffast-math -z muldefs -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=" -disable-vect-cmp" -ljemalloc
-lgfortran  -lamdlibm
```

Benchmarks using both Fortran and C:
```
-flto -Wl, -plugin-opt= -merge-constant -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 -O3(gfortran) -mavx -madx
-funroll-loops -z muldefs -fplugin=dragonegg.so
-fplugin-arg-dragonegg-llvm-option=" -disable-vect-cmp" -ljemalloc
-lgfortran  -lamdlibm
```

Benchmarks using both C and C++:
```
-flto -Wl, -plugin-opt= -merge-constant -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 -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=" -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
```

(Continued on next page)

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base = 238

SPECrate2017_fp_peak = 245

CPU2017 License:	001176	**Test Date:**	Mar-2018
Test Sponsor:	Supermicro	**Hardware Availability:**	Jun-2017
Tested by:	Supermicro	**Software Availability:**	Nov-2017

Peak Compiler Invocation (Continued)

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

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

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

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

Benchmarks using both Fortran and C:

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

```
 527.cam4_r: -flto -Wl, -plugin-opt= -merge-constant
-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
```

(Continued on next page)

Supermicro

A+ Server 4023S-TRT
(H11DSi-NT , AMD EPYC 7451)

SPECrate2017_fp_base = 238

SPECrate2017_fp_peak = 245

CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Mar-2018

Hardware Availability: Jun-2017

Software Availability: Nov-2017

Peak Optimization Flags (Continued)

527.cam4_r (continued):
```
-fplugin-arg-dragonegg-llvm-option="
-inline-threshold:1000" -ljemalloc -lgfortran  -lamdlibm
```

Benchmarks using both C and C++:
```
-flto -Wl, -plugin-opt= -merge-constant -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 -ljemalloc
```

Benchmarks using Fortran, C, and C++:
```
-flto -Wl, -plugin-opt= -merge-constant -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 -madx -funroll-loops -ffast-math
-fplugin=dragonegg.so -fplugin-arg-dragonegg-llvm-option="
-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.2018-02-16.html
http://www.spec.org/cpu2017/flags/aocc100-flags-revC-I.2018-02-16.html
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Naples-revD.html

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

http://www.spec.org/cpu2017/flags/gcc.2018-02-16.xml
http://www.spec.org/cpu2017/flags/aocc100-flags-revC-I.2018-02-16.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-Naples-revD.xml

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2018-03-28 08:41:44-0400.
Report generated on 2019-02-21 14:42:42 by CPU2017 PDF formatter v6067.
Originally published on 2018-04-17.