



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Supermicro

SuperServer 6029U-TR4 (X11DPU , Intel Xeon Gold 5118)

SPECrate2017_fp_base = 133

SPECrate2017_fp_peak = 136

CPU2017 License: 001176

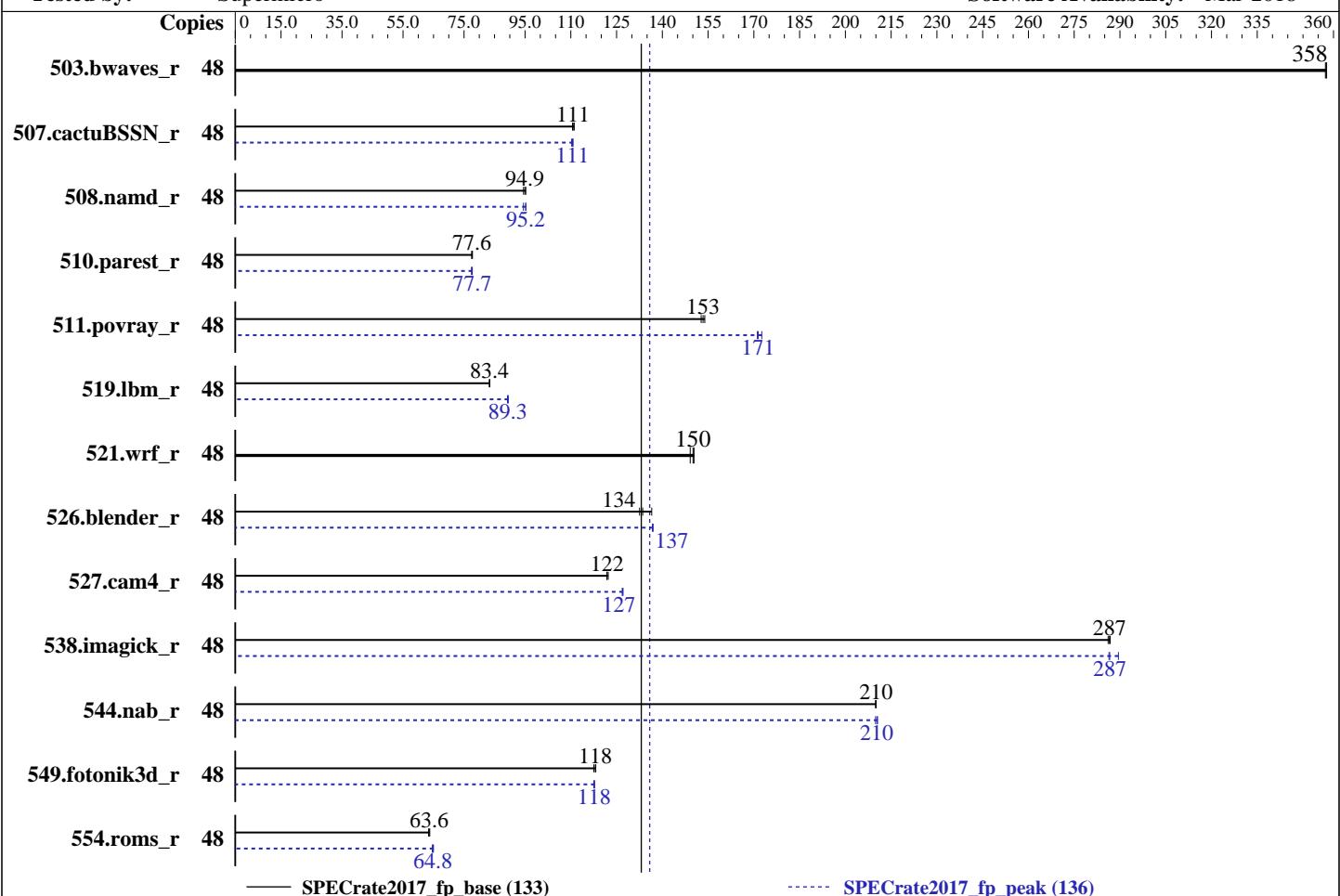
Test Date: Oct-2018

Test Sponsor: Supermicro

Hardware Availability: Jul-2017

Tested by: Supermicro

Software Availability: Mar-2018



— SPECrate2017_fp_base (133)

----- SPECrate2017_fp_peak (136)

Hardware

CPU Name: Intel Xeon Gold 5118
 Max MHz.: 3200
 Nominal: 2300
 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: 1 MB I+D on chip per core
 L3: 16.5 MB I+D on chip per chip
 Other: None
 Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R,
 running at 2400)
 Storage: 1 x 200 GB SATA III SSD
 Other: None

OS: SUSE Linux Enterprise Server 12 SP3 (x86_64)
 Compiler: Kernel 4.4.114-94.11-default
 C/C++: Version 18.0.2.199 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 18.0.2.199 of Intel Fortran
 Compiler for Linux
 Parallel: No
 Firmware: Supermicro BIOS version 2.1a released Aug-2018
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: None



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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	48	1346	358	1347	357	1346	358	48	1346	358	1347	357	1346	358
507.cactuBSSN_r	48	550	111	547	111	549	111	48	549	111	551	110	550	111
508.namd_r	48	479	95.2	483	94.5	480	94.9	48	479	95.2	479	95.2	483	94.5
510.parest_r	48	1619	77.6	1615	77.8	1619	77.5	48	1616	77.7	1622	77.4	1617	77.7
511.povray_r	48	731	153	734	153	728	154	48	649	173	655	171	654	171
519.lbm_r	48	608	83.3	607	83.4	606	83.5	48	567	89.2	566	89.3	565	89.5
521.wrf_r	48	715	150	721	149	717	150	48	715	150	721	149	717	150
526.blender_r	48	552	133	547	134	535	137	48	535	137	534	137	534	137
527.cam4_r	48	689	122	689	122	687	122	48	661	127	662	127	661	127
538.imagick_r	48	416	287	417	287	417	286	48	416	287	412	289	417	286
544.nab_r	48	385	210	385	210	385	210	48	384	211	384	210	385	210
549.fotonik3d_r	48	1591	118	1585	118	1583	118	48	1592	118	1588	118	1591	118
554.roms_r	48	1200	63.6	1203	63.4	1196	63.8	48	1181	64.6	1174	65.0	1176	64.8

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

General Notes

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

LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Filesystem page cache synced and cleared with:

sync; echo 3> /proc/sys/vm/drop_caches

runcpu command invoked through numactl i.e.:

numactl --interleave=all runcpu <etc>

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

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General Notes (Continued)

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:

LLC prefetch = Enable

Power Technology = Custom

Power Performance Tuning = BIOS Controls EPB

ENERGY_PERF_BIAS_CFG mode = Extreme Performance

Hardware P-state = Out of Band Mode

SNC = Enable

XPT Prefetch = Enable

Stale AtoS = Enable

LLC dead line alloc = Disable

IMC Interleaving = 1-way Interleave

SDDC Plus One = Disable

ADDDC Sparing = Disable

Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on linux-ima8 Sat Oct 27 03:27:29 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

model name : Intel(R) Xeon(R) Gold 5118 CPU @ 2.30GHz

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 3 4 5 8 9 10 11 12 13

physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From lscpu:

Architecture: x86_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 48

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Platform Notes (Continued)

```

On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5118 CPU @ 2.30GHz
Stepping: 4
CPU MHz: 2299.995
BogoMIPS: 4599.99
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-2,6-8,24-26,30-32
NUMA node1 CPU(s): 3-5,9-11,27-29,33-35
NUMA node2 CPU(s): 12-14,18-20,36-38,42-44
NUMA node3 CPU(s): 15-17,21-23,39-41,45-47
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl retrpline kaiser tpr_shadow vnmi flexpriority
ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

```

```
/proc/cpuinfo cache data
cache size : 16896 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 6 7 8 24 25 26 30 31 32
node 0 size: 95332 MB
node 0 free: 87826 MB
node 1 cpus: 3 4 5 9 10 11 27 28 29 33 34 35
node 1 size: 96759 MB
node 1 free: 90880 MB
node 2 cpus: 12 13 14 18 19 20 36 37 38 42 43 44
node 2 size: 96759 MB
node 2 free: 91003 MB

```

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Platform Notes (Continued)

```
node 3 cpus: 15 16 17 21 22 23 39 40 41 45 46 47
node 3 size: 96756 MB
node 3 free: 90998 MB
node distances:
node   0   1   2   3
 0: 10 11 21 21
 1: 11 10 21 21
 2: 21 21 10 11
 3: 21 21 11 10

From /proc/meminfo
MemTotal:      394861332 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-ima8 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

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown):           Mitigation: PTI
CVE-2017-5753 (Spectre variant 1):  Mitigation: Barriers
CVE-2017-5715 (Spectre variant 2):  Mitigation: IBRS+IBPB

run-level 3 Oct 26 16:29

SPEC is set to: /home/cpu2017
Filesystem  Type  Size  Used  Avail Use% Mounted on
/dev/sda4    xfs   145G   50G   95G  35%  /home
```

(Continued on next page)



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Platform Notes (Continued)

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. 2.1a 08/23/2018

Memory:

12x NO DIMM NO DIMM

12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

=====

CC 519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base, peak)

=====

icc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

CC 519.lbm_r(peak)

=====

icc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

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

=====

icpc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

CXXC 508.namd_r(peak)

=====

icpc (ICC) 18.0.2 20180210

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=====

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

=====

icpc (ICC) 18.0.2 20180210

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icc (ICC) 18.0.2 20180210

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=====

CC 511.povray_r(peak)

icpc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

icc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

FC 507.cactubSSN_r(base, peak)

icpc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

icc (ICC) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

ifort (IFORT) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)

ifort (IFORT) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

FC 554.roms_r(peak)

ifort (IFORT) 18.0.2 20180210

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====

CC 521.wrf_r(base) 527.cam4_r(base)

ifort (IFORT) 18.0.2 20180210

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icc (ICC) 18.0.2 20180210

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Compiler Version Notes (Continued)

```
=====
```

```
CC      521.wrf_r(peak) 527.cam4_r(peak)
```

```
=====
```

```
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
=====
```

Base Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

C++ benchmarks:

```
icpc -m64
```

Fortran benchmarks:

```
ifort -m64
```

Benchmarks using both Fortran and C:

```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:

```
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

Base Portability Flags

```
503.bwaves_r: -DSPEC_LP64
507.cactusBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.llbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
```

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Base Portability Flags (Continued)

554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

Benchmarks using both C and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

Peak Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

C++ benchmarks:

```
icpc -m64
```

Fortran benchmarks:

```
ifort -m64
```

Benchmarks using both Fortran and C:

```
ifort -m64 icc -m64 -std=c11
```

(Continued on next page)



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Peak Compiler Invocation (Continued)

Benchmarks using both C and C++:

```
icpc -m64icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```
icpc -m64icc -m64 -std=c11 ifort -m64
```

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

```
519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

```
538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3
```

544.nab_r: Same as 538.imagick_r

C++ benchmarks:

```
508.namd_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

```
510.parest_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3
```

Fortran benchmarks:

503.bwaves_r: basepeak = yes

```
549.fotonik3d_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3 -auto  
-nostandard-realloc-lhs
```

```
554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only
```

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Peak Optimization Flags (Continued)

554.roms_r (continued):

```
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
521.wrf_r: basepeak = yes
```

```
527.cam4_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

Benchmarks using both C and C++:

```
511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

```
526.blender_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html>
<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SKL-revD.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml>
<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SKL-revD.xml>

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