



# SPEC CPU®2017 Floating Point Rate Result

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**Fujitsu**

PRIMERGY TX1330 M4, Intel Xeon E-2226G,  
3.40 GHz

**SPECrate®2017\_fp\_base = 37.7**

**SPECrate®2017\_fp\_peak = 38.5**

CPU2017 License: 19

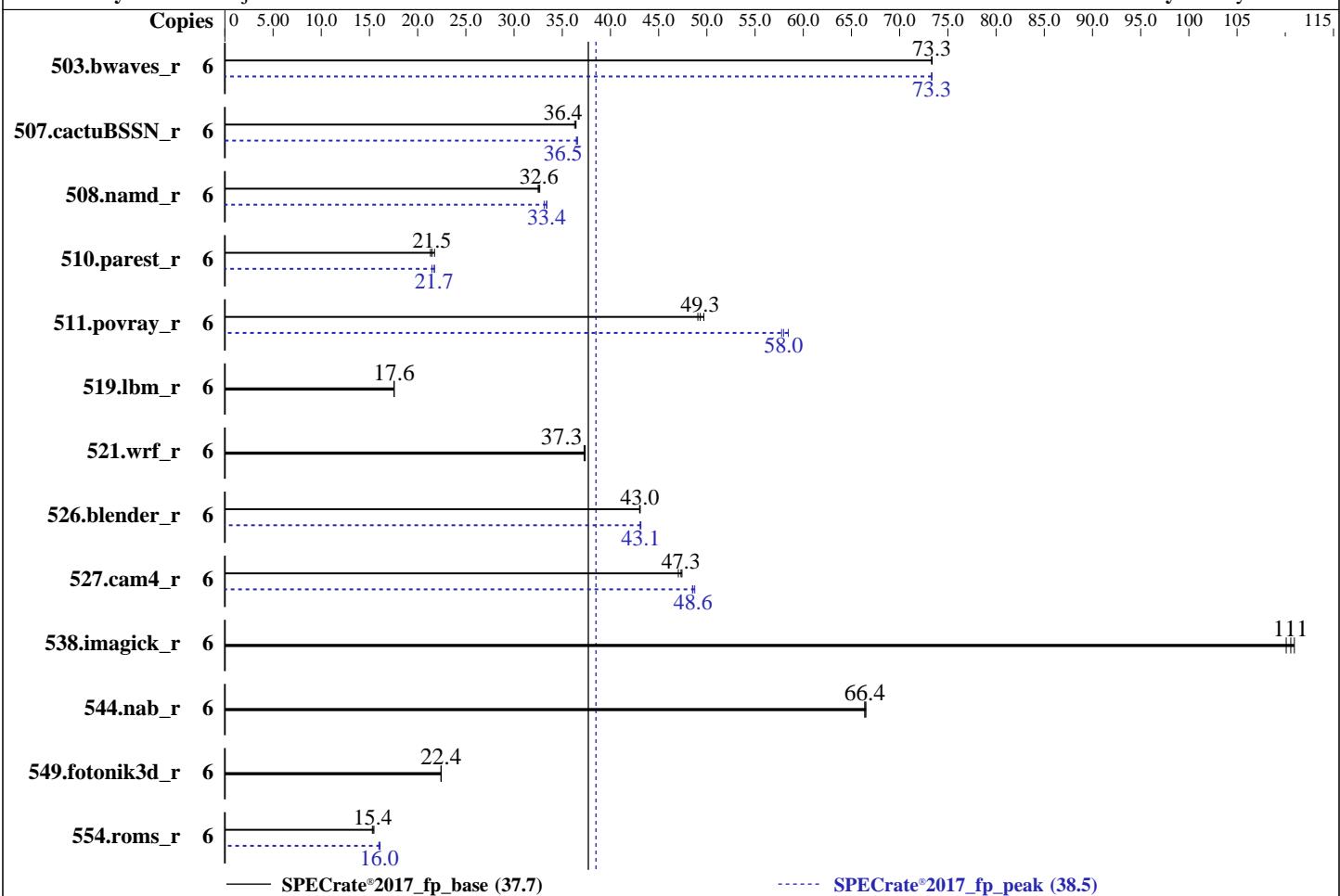
Test Sponsor: Fujitsu

Tested by: Fujitsu

**Test Date:** Jan-2020

**Hardware Availability:** Oct-2019

**Software Availability:** May-2019



Hardware		Software	
CPU Name:	Intel Xeon E-2226G	OS:	SUSE Linux Enterprise Server 15
Max MHz:	4700		4.12.14-25.28-default
Nominal:	3400	Compiler:	C/C++: Version 19.0.4.227 of
Enabled:	6 cores, 1 chip		Intel C/C++ Compiler for Linux;
Orderable:	1 chip		Fortran: Version 19.0.4.227 of
Cache L1:	32 KB I + 32 KB D on chip per core		Intel Fortran Compiler for Linux
L2:	256 KB I+D on chip per core	Parallel:	No
L3:	12 MB I+D on chip per chip	Firmware:	Fujitsu BIOS Version V5.0.0.13 R1.12.0 for D3673-A1x.
Other:	None		Released Sep-2019
Memory:	64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)	File System:	xfs
Storage:	1 x SATA M.2 SSD, 480 GB	System State:	Run level 3 (multi-user)
Other:	None	Base Pointers:	64-bit
		Peak Pointers:	64-bit
		Other:	None
		Power Management:	BIOS set to prefer performance at the cost of additional power usage



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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	6	820	73.4	<b>821</b>	<b>73.3</b>	821	73.3	<b>6</b>	<b>821</b>	<b>73.3</b>	821	73.3	821	73.3
507.cactuBSSN_r	6	209	36.3	<b>209</b>	<b>36.4</b>	209	36.4	<b>6</b>	<b>208</b>	<b>36.5</b>	208	36.6	208	36.5
508.namd_r	6	175	32.5	175	32.7	<b>175</b>	<b>32.6</b>	<b>6</b>	<b>172</b>	33.1	<b>171</b>	<b>33.4</b>	171	33.4
510.parest_r	6	<b>731</b>	<b>21.5</b>	722	21.7	736	21.3	<b>6</b>	<b>722</b>	21.7	<b>723</b>	<b>21.7</b>	731	21.5
511.povray_r	6	282	49.7	286	49.1	<b>284</b>	<b>49.3</b>	<b>6</b>	<b>243</b>	57.8	<b>242</b>	<b>58.0</b>	240	58.5
519.lbm_r	6	360	17.6	360	17.6	<b>360</b>	<b>17.6</b>	<b>6</b>	<b>360</b>	17.6	360	17.6	<b>360</b>	<b>17.6</b>
521.wrf_r	6	361	37.3	<b>360</b>	<b>37.3</b>	360	37.4	<b>6</b>	<b>361</b>	37.3	<b>360</b>	<b>37.3</b>	360	37.4
526.blender_r	6	212	43.0	212	43.1	<b>212</b>	<b>43.0</b>	<b>6</b>	<b>212</b>	43.1	<b>212</b>	<b>43.1</b>	212	43.2
527.cam4_r	6	221	47.4	<b>222</b>	<b>47.3</b>	223	47.0	<b>6</b>	<b>216</b>	<b>48.6</b>	216	48.5	215	48.7
538.imagick_r	6	135	111	136	110	<b>135</b>	<b>111</b>	<b>6</b>	<b>135</b>	111	136	110	<b>135</b>	<b>111</b>
544.nab_r	6	152	66.4	152	66.5	<b>152</b>	<b>66.4</b>	<b>6</b>	<b>152</b>	66.4	152	66.5	<b>152</b>	<b>66.4</b>
549.fotonik3d_r	6	1043	22.4	<b>1042</b>	<b>22.4</b>	1042	22.4	<b>6</b>	<b>1043</b>	22.4	<b>1042</b>	<b>22.4</b>	1042	22.4
554.roms_r	6	<b>620</b>	<b>15.4</b>	623	15.3	617	15.5	<b>6</b>	<b>594</b>	<b>16.0</b>	592	16.1	597	16.0

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

## Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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"

## Environment Variables Notes

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

LD\_LIBRARY\_PATH = "/home/Benchmark/speccpu2017-1.1.0/lib/intel64"  
Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32 GB 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:

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## General Notes (Continued)

sync; echo 3> /proc/sys/vm/drop\_caches

Yes: 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 configuration:

AES = Disabled

DCU Streamer Prefetcher = Disabled

Fan Control = Full

Package C-State limit = C0

Sysinfo program /home/Benchmark/speccpu2017-1.1.0/bin/sysinfo

Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011

running on SLES15-BMT Sat Jan 11 21:56:34 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 : Intel(R) Xeon(R) E-2226G CPU @ 3.40GHz

1 "physical id"s (chips)

6 "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 : 6

siblings : 6

physical 0: cores 0 1 2 3 4 5

From lscpu:

Architecture: x86\_64

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

Byte Order: Little Endian

CPU(s): 6

On-line CPU(s) list: 0-5

Thread(s) per core: 1

Core(s) per socket: 6

Socket(s): 1

NUMA node(s): 1

Vendor ID: GenuineIntel

CPU family: 6

(Continued on next page)



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## Platform Notes (Continued)

Model: 158  
Model name: Intel(R) Xeon(R) E-2226G CPU @ 3.40GHz  
Stepping: 10  
CPU MHz: 3400.000  
CPU max MHz: 4700.0000  
CPU min MHz: 800.0000  
BogoMIPS: 6816.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 256K  
L3 cache: 12288K  
NUMA node0 CPU(s): 0-5  
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 cpuid aperfmpf perf tsc\_known\_freq pni pclmulqdq dtes64 monitor ds\_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4\_1 sse4\_2 x2apic movbe popcnt tsc\_deadline\_timer xsave avx f16c rdrand lahf\_lm abm 3dnowprefetch cpuid\_fault epb invpcid\_single pti ssbd ibrs ibpb stibp tpr\_shadow vnmi flexpriority ept vpid fsgsbase tsc\_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel\_pt xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp\_notify hwp\_act\_window hwp\_epp flush\_l1d

/proc/cpuinfo cache data  
cache size : 12288 KB

From numactl --hardware    WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 1 nodes (0)  
node 0 cpus: 0 1 2 3 4 5  
node 0 size: 63768 MB  
node 0 free: 63285 MB  
node distances:  
node 0  
0: 10

From /proc/meminfo  
MemTotal: 65299120 kB  
HugePages\_Total: 0  
Hugepagesize: 2048 kB

From /etc/\*release\* /etc/\*version\*  
os-release:  
NAME="SLES"  
VERSION="15"  
VERSION\_ID="15"

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## Platform Notes (Continued)

```
PRETTY_NAME="SUSE Linux Enterprise Server 15"
```

```
ID="sles"
```

```
ID_LIKE="suse"
```

```
ANSI_COLOR="0;32"
```

```
CPE_NAME="cpe:/o:suse:sles:15"
```

```
uname -a:
```

```
Linux SLES15-BMT 4.12.14-25.28-default #1 SMP Wed Jan 16 20:00:47 UTC 2019 (dd6077c)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault):	Mitigation: PTE Inversion; VMX: vulnerable, SMT disabled
------------------------------------	--

Microarchitectural Data Sampling:	No status reported
-----------------------------------	--------------------

CVE-2017-5754 (Meltdown):	Mitigation: PTI
---------------------------	-----------------

CVE-2018-3639 (Speculative Store Bypass):	Vulnerable
---	------------

CVE-2017-5753 (Spectre variant 1):	Mitigation: __user pointer sanitization
------------------------------------	---

CVE-2017-5715 (Spectre variant 2):	Mitigation: Indirect Branch Restricted Speculation, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
------------------------------------	--

```
run-level 3 Jan 11 21:55
```

```
SPEC is set to: /home/Benchmark/speccpu2017-1.1.0
```

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda5	xfs	343G	66G	277G	20%	/home

```
From /sys/devices/virtual/dmi/id
```

BIOS:	FUJITSU // American Megatrends Inc.	v5.0.0.13 R1.12.0 for D3673-A1x
	09/06/2019	

Vendor:	FUJITSU
---------	---------

Product:	PRIMERGY TX1330 M4
----------	--------------------

Product Family:	SERVER
-----------------	--------

Serial:	YMJLXXXXXX
---------	------------

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:

4x SK Hynix HMA82GU7CJR8N-VK	16 GB	2 rank	2667
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(End of data from sysinfo program)



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## Compiler Version Notes

=====

C | 519.lbm\_r(base, peak) 538.imagick\_r(base, peak)  
| 544.nab\_r(base, peak)

=====

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====

=====

C++ | 508.namd\_r(base, peak) 510.parest\_r(base, peak)

=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====

=====

C++, C | 511.povray\_r(base, peak) 526.blender\_r(base, peak)

=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====

=====

C++, C, Fortran | 507.cactusBSSN\_r(base, peak)

=====

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416

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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416

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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

=====

Fortran | 503.bwaves\_r(base, peak) 549.fotonik3d\_r(base, peak)  
| 554.roms\_r(base, peak)

=====

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)

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## Compiler Version Notes (Continued)

64, Version 19.0.4.227 Build 20190416

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=====  
Fortran, C | 521.wrf\_r(base, peak) 527.cam4\_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)

64, Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,

Version 19.0.4.227 Build 20190416

Copyright (C) 1985-2019 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.lbm\_r: -DSPEC\_LP64

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## Base Portability Flags (Continued)

```
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  
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=4
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte
```

Benchmarks using both C and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte
```

## Peak Compiler Invocation

C benchmarks:

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

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Software Availability: May-2019

## Peak Compiler Invocation (Continued)

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

## 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:

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=4

510.parest\_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4

Fortran benchmarks:

503.bwaves\_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto

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## Peak Optimization Flags (Continued)

503.bwaves\_r (continued):

```
-nostandard-realloc-lhs -align array32byte
```

549.fotonik3d\_r: basepeak = yes

```
554.roms_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=4 -auto -nostandard-realloc-lhs  
-align array32byte
```

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=4 -auto -nostandard-realloc-lhs  
-align array32byte
```

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=4
```

```
526.blender_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs  
-align array32byte
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0ul-official-linux64.2019-07-09.html>  
<http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevD.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0ul-official-linux64.2019-07-09.xml>  
<http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevD.xml>



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Hardware Availability: Oct-2019

Software Availability: May-2019

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