



# SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge T340 (Intel Xeon E-2146G,  
3.50GHz)

**SPECrate2017\_fp\_base = 36.4**

**SPECrate2017\_fp\_peak = 35.4**

CPU2017 License: 55

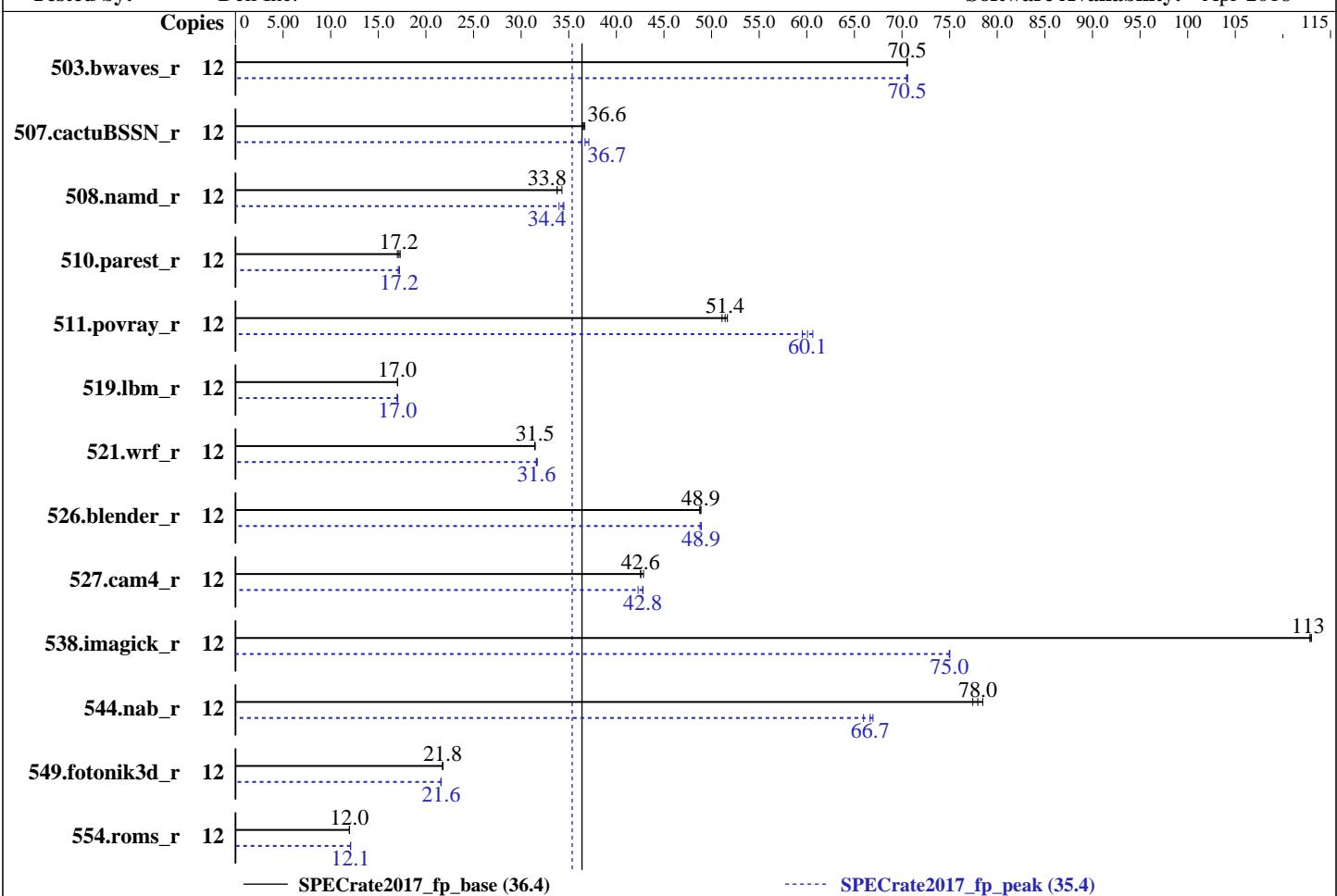
Test Date: Dec-2018

Test Sponsor: Dell Inc.

Hardware Availability: Dec-2018

Tested by: Dell Inc.

Software Availability: Apr-2018



## Hardware

CPU Name: Intel Xeon E-2146G  
 Max MHz.: 4500  
 Nominal: 3500  
 Enabled: 6 cores, 1 chip, 2 threads/core  
 Orderable: 1 chip  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 256 KB I+D on chip per core  
 L3: 12 MB I+D on chip per chip  
 Other: None  
 Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-R)  
 Storage: 1 x 960 GB SATA SSD  
 Other: None

## Software

OS: SUSE Linux Enterprise Server 12 SP3  
 Compiler: kernel 4.4.126-94.22-default  
 C/C++: Version 18.0.2.20180210 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 18.0.2.20180210 of Intel Fortran Compiler for Linux  
 Parallel: No  
 Firmware: Version 1.0.1 released Oct-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    | 12     | 1705               | 70.6               | <b><u>1706</u></b> | <b><u>70.5</u></b> | 1706               | 70.5               | 12     | 1707               | 70.5               | 1705               | 70.6               | <b><u>1706</u></b> | <b><u>70.5</u></b> |
| 507.cactubSSN_r | 12     | 417                | 36.5               | 414                | 36.7               | <b><u>416</u></b>  | <b><u>36.6</u></b> | 12     | 409                | 37.1               | <b><u>414</u></b>  | <b><u>36.7</u></b> | 418                | 36.4               |
| 508.namd_r      | 12     | 332                | 34.3               | <b><u>337</u></b>  | <b><u>33.8</u></b> | 338                | 33.8               | 12     | <b><u>331</u></b>  | <b><u>34.4</u></b> | 331                | 34.5               | 336                | 34.0               |
| 510.parest_r    | 12     | <b><u>1829</u></b> | <b><u>17.2</u></b> | 1815               | 17.3               | 1847               | 17.0               | 12     | 1823               | 17.2               | <b><u>1826</u></b> | <b><u>17.2</u></b> | 1836               | 17.1               |
| 511.povray_r    | 12     | 542                | 51.7               | <b><u>545</u></b>  | <b><u>51.4</u></b> | 548                | 51.1               | 12     | <b><u>466</u></b>  | <b><u>60.1</u></b> | 462                | 60.6               | 471                | 59.5               |
| 519.lbm_r       | 12     | 742                | 17.0               | <b><u>743</u></b>  | <b><u>17.0</u></b> | 744                | 17.0               | 12     | <b><u>746</u></b>  | 17.0               | 742                | 17.0               | <b><u>743</u></b>  | <b><u>17.0</u></b> |
| 521.wrf_r       | 12     | <b><u>855</u></b>  | <b><u>31.5</u></b> | 854                | 31.5               | 855                | 31.4               | 12     | 848                | 31.7               | 851                | 31.6               | <b><u>850</u></b>  | <b><u>31.6</u></b> |
| 526.blender_r   | 12     | 374                | 48.9               | <b><u>374</u></b>  | <b><u>48.9</u></b> | 375                | 48.7               | 12     | <b><u>374</u></b>  | 48.9               | <b><u>374</u></b>  | <b><u>48.9</u></b> | 375                | 48.8               |
| 527.cam4_r      | 12     | <b><u>493</u></b>  | <b><u>42.6</u></b> | 490                | 42.9               | 493                | 42.5               | 12     | <b><u>491</u></b>  | <b><u>42.8</u></b> | 496                | 42.3               | 490                | 42.8               |
| 538.imagick_r   | 12     | 264                | 113                | <b><u>264</u></b>  | <b><u>113</u></b>  | 265                | 113                | 12     | <b><u>398</u></b>  | <b><u>75.0</u></b> | 398                | 75.0               | 398                | 75.0               |
| 544.nab_r       | 12     | 261                | 77.4               | 257                | 78.5               | <b><u>259</u></b>  | <b><u>78.0</u></b> | 12     | <b><u>303</u></b>  | <b><u>66.7</u></b> | 302                | 67.0               | 306                | 66.0               |
| 549.fotonik3d_r | 12     | 2149               | 21.8               | 2149               | 21.8               | <b><u>2149</u></b> | <b><u>21.8</u></b> | 12     | 2168               | 21.6               | 2164               | 21.6               | <b><u>2166</u></b> | <b><u>21.6</u></b> |
| 554.roms_r      | 12     | <b><u>1592</u></b> | <b><u>12.0</u></b> | 1596               | 11.9               | 1592               | 12.0               | 12     | <b><u>1579</u></b> | 12.1               | 1576               | 12.1               | <b><u>1578</u></b> | <b><u>12.1</u></b> |

**SPECrate2017\_fp\_base = 36.4**

**SPECrate2017\_fp\_peak = 35.4**

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"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM

memory using Redhat Enterprise Linux 7.4

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.

Transparent Huge Pages enabled by default

Prior to runcpu invocation

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## General Notes (Continued)

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>

## Platform Notes

BIOS settings:

Virtualization Technology disabled

System Profile set to Custom

CPU Performance set to Maximum Performance

C States set to Autonomous

C1E disabled

Uncore Frequency set to Dynamic

Energy Efficiency Policy set to Performance

Memory Patrol Scrub disabled

Logical Processor enabled

CPU Interconnect Bus Link Power Management disabled

PCI ASPM L1 Link Power Management disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-icjc Fri Dec 7 17:13:46 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) E-2146G CPU @ 3.50GHz

1 "physical id"s (chips)

12 "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 : 12

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): 12

On-line CPU(s) list: 0-11

Thread(s) per core: 2

Core(s) per socket: 6

Socket(s): 1

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## Platform Notes (Continued)

NUMA node(s): 1  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 158  
Model name: Intel(R) Xeon(R) E-2146G CPU @ 3.50GHz  
Stepping: 10  
CPU MHz: 3641.732  
CPU max MHz: 4500.0000  
CPU min MHz: 800.0000  
BogoMIPS: 7007.99  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 256K  
L3 cache: 12288K  
NUMA node0 CPU(s): 0-11  
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 aperfmpfperf eagerfpu 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 aes xsave avx f16c rdrand lahf\_lm abm 3dnowprefetch ida arat epb invpcid\_single pln pts dtherm hwp hwp\_act\_window hwp\_epp intel\_pt rsb\_ctxsw spec\_ctrl stibp retpoline kaiser tpr\_shadow vnmi flexpriority ept vpid fsgsbase tsc\_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1

/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 6 7 8 9 10 11  
node 0 size: 64276 MB  
node 0 free: 63783 MB  
node distances:  
node 0  
0: 10

From /proc/meminfo  
MemTotal: 65818632 kB  
HugePages\_Total: 0  
Hugepagesize: 2048 kB

/usr/bin/lsb\_release -d  
SUSE Linux Enterprise Server 12 SP3

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## Platform Notes (Continued)

```
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-icjc 4.4.126-94.22-default #1 SMP Wed Apr 11 07:45:03 UTC 2018 (9649989)
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):  Mitigation: IBRS+IBPB
```

run-level 3 Dec 7 09:24 last=5

SPEC is set to: /home/cpu2017

| Filesystem | Type | Size | Used | Avail | Use% | Mounted on |
|------------|------|------|------|-------|------|------------|
| /dev/sda2  | xfs  | 301G | 16G  | 285G  | 6%   | /          |

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 Dell Inc. 1.0.1 10/19/2018

Memory:

|                                  |       |        |      |
|----------------------------------|-------|--------|------|
| 3x 00AD00000A02 HMA82GU7CJR8N-VK | 16 GB | 2 rank | 2666 |
| 1x 00AD00000A07 HMA82GU7CJR8N-VK | 16 GB | 2 rank | 2666 |

(End of data from sysinfo program)



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## Compiler Version Notes

=====

CC 519.lbm\_r(base) 538.imagick\_r(base) 544.nab\_r(base)

=====

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

=====

CC 519.lbm\_r(peak) 538.imagick\_r(peak) 544.nab\_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)

=====

-----  
icpc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====

CXXC 508.namd\_r(peak) 510.parest\_r(peak)

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

=====

CC 511.povray\_r(base) 526.blender\_r(base)

=====

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

CC 511.povray\_r(peak) 526.blender\_r(peak)

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## Compiler Version Notes (Continued)

FC 507.cactubSSN\_r(base)

```
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 507.cactubSSN\_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.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

FC 503.bwaves\_r(base) 549.fotonik3d\_r(base) 554.roms\_r(base)

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

FC 503.bwaves\_r(peak) 549.fotonik3d\_r(peak) 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
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

CC 521.wrf\_r(peak) 527.cam4\_r(peak)

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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.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_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
```



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## 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
```

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
```



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## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

```
-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
```

C++ benchmarks:

```
-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
```

Fortran benchmarks:

```
-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 Fortran and C:

```
-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++:

```
-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
```

Benchmarks using Fortran, C, and C++:

```
-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
```

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/Dell-Platform-Flags-PowerEdge14G-revC.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/Dell-Platform-Flags-PowerEdge14G-revC.xml>



# SPEC CPU2017 Floating Point Rate Result

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Dell Inc.

PowerEdge T340 (Intel Xeon E-2146G,  
3.50GHz)

SPECCrate2017\_fp\_base = 36.4

SPECCrate2017\_fp\_peak = 35.4

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Dec-2018

Hardware Availability: Dec-2018

Software Availability: Apr-2018

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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