



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECspeed®2017\_fp\_peak = 133

CPU2017 License: 55

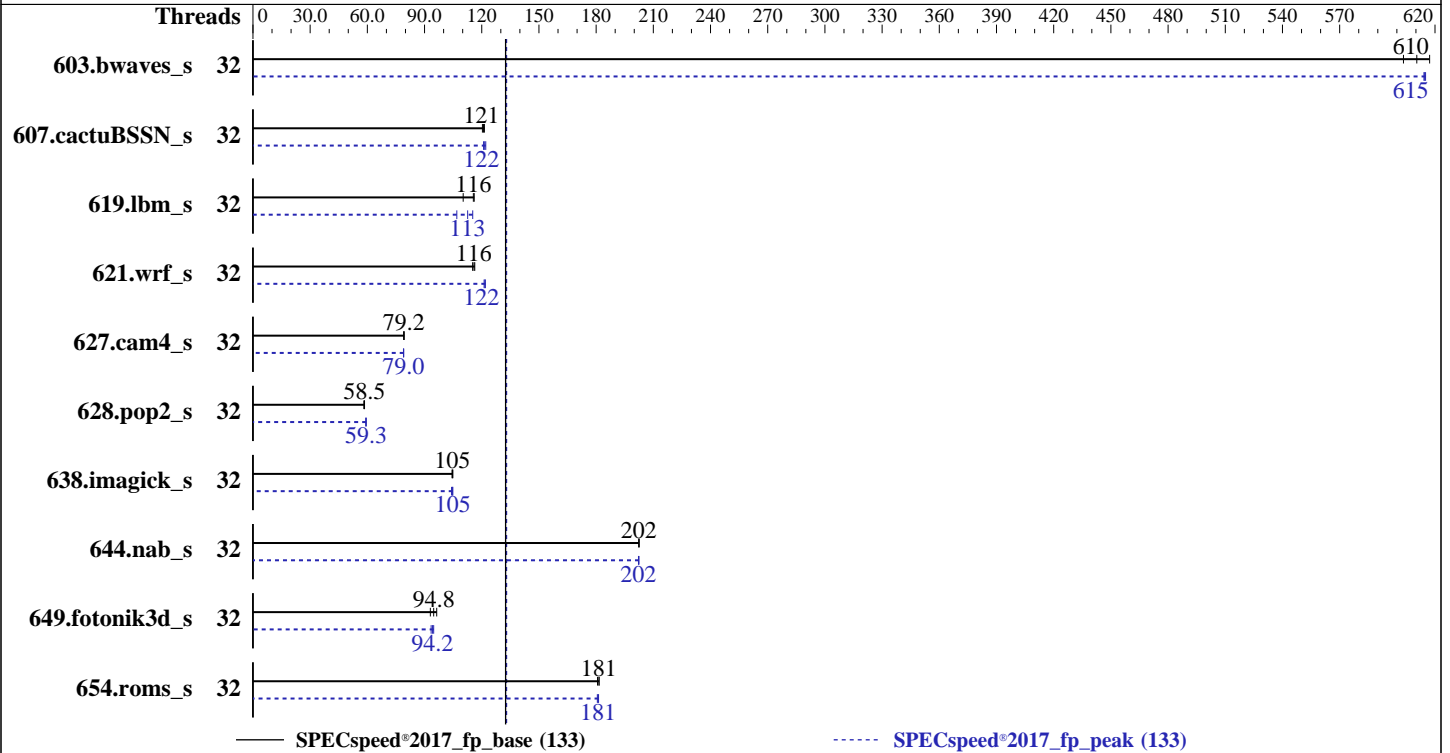
Test Date: Mar-2019

Test Sponsor: Dell Inc.

Hardware Availability: Apr-2019

Tested by: Dell Inc.

Software Availability: May-2019



### Hardware

CPU Name: Intel Xeon Gold 5217  
 Max MHz: 3700  
 Nominal: 3000  
 Enabled: 32 cores, 4 chips  
 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: 11 MB I+D on chip per chip  
 Other: None  
 Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)  
 Storage: 1 x 480 GB SATA SSD  
 Other: None

### Software

OS: Ubuntu 18.04.2 LTS  
 kernel 4.15.0-45-generic  
 Compiler: C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;  
 Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux  
 Parallel: Yes  
 Firmware: Version 2.2.9 released May-2019  
 File System: ext4  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: None  
 Power Management: --



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECSpeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECSpeed®2017\_fp\_peak = 133

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: May-2019

## Results Table

| Benchmark       | Base    |             |             |             |            |             |            | Peak    |             |             |             |             |             |             |
|-----------------|---------|-------------|-------------|-------------|------------|-------------|------------|---------|-------------|-------------|-------------|-------------|-------------|-------------|
|                 | Threads | Seconds     | Ratio       | Seconds     | Ratio      | Seconds     | Ratio      | Threads | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       |
| 603.bwaves_s    | 32      | <b>96.6</b> | <b>610</b>  | 95.6        | 617        | 97.8        | 603        | 32      | <b>96.0</b> | <b>615</b>  | 95.9        | 615         | 96.1        | 614         |
| 607.cactuBSSN_s | 32      | 137         | 121         | <b>138</b>  | <b>121</b> | 139         | 120        | 32      | <b>137</b>  | <b>122</b>  | 137         | 122         | 138         | 121         |
| 619.lbm_s       | 32      | 45.1        | 116         | 47.5        | 110        | <b>45.3</b> | <b>116</b> | 32      | 49.0        | 107         | <b>46.5</b> | <b>113</b>  | 45.4        | 115         |
| 621.wrf_s       | 32      | <b>114</b>  | <b>116</b>  | 114         | 116        | 115         | 115        | 32      | 109         | 122         | <b>109</b>  | <b>122</b>  | 109         | 121         |
| 627.cam4_s      | 32      | <b>112</b>  | <b>79.2</b> | 112         | 79.1       | 112         | 79.3       | 32      | 112         | 79.1        | <b>112</b>  | <b>79.0</b> | 112         | 78.9        |
| 628.pop2_s      | 32      | <b>203</b>  | <b>58.5</b> | 203         | 58.5       | 204         | 58.1       | 32      | <b>200</b>  | <b>59.3</b> | 201         | 59.2        | 200         | 59.4        |
| 638.imagick_s   | 32      | 138         | 104         | <b>138</b>  | <b>105</b> | 138         | 105        | 32      | 139         | 104         | 138         | 105         | <b>138</b>  | <b>105</b>  |
| 644.nab_s       | 32      | 86.3        | 202         | <b>86.3</b> | <b>202</b> | 86.3        | 203        | 32      | 86.3        | 202         | <b>86.4</b> | <b>202</b>  | 86.4        | 202         |
| 649.fotonik3d_s | 32      | <b>96.2</b> | <b>94.8</b> | 98.0        | 93.0       | 94.6        | 96.4       | 32      | 96.2        | 94.8        | 97.5        | 93.5        | <b>96.8</b> | <b>94.2</b> |
| 654.roms_s      | 32      | 86.7        | 182         | 87.1        | 181        | <b>86.8</b> | <b>181</b> | 32      | <b>87.0</b> | <b>181</b>  | 86.9        | 181         | 87.2        | 181         |

SPECSpeed®2017\_fp\_base = **133**

SPECSpeed®2017\_fp\_peak = **133**

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 i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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.

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>
```



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECspeed®2017\_fp\_peak = 133

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Mar-2019

Hardware Availability: Apr-2019

Software Availability: May-2019

## Platform Notes

BIOS settings:

```

ADDDC setting disabled
Sub NUMA Cluster enabled
Virtualization Technology disabled
DCU Streamer Prefetcher enabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
ClE disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Logical Processor disabled
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 intel-sut Thu Nov 21 23:21:03 2019

```

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 5217 CPU @ 3.00GHz
 4 "physical id"s (chips)
 32 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
physical 2: cores 0 1 2 3 4 5 6 7
physical 3: cores 0 1 2 3 4 5 6 7

```

From lscpu:

```

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel

```

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECspeed®2017\_fp\_peak = 133

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: May-2019

## Platform Notes (Continued)

```

CPU family:           6
Model:                85
Model name:          Intel(R) Xeon(R) Gold 5217 CPU @ 3.00GHz
Stepping:            6
CPU MHz:              3382.461
BogoMIPS:             6000.00
Virtualization:      VT-x
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            11264K
NUMA node0 CPU(s):   0,4,8,12,16,20,24,28
NUMA node1 CPU(s):   1,5,9,13,17,21,25,29
NUMA node2 CPU(s):   2,6,10,14,18,22,26,30
NUMA node3 CPU(s):   3,7,11,15,19,23,27,31
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
aperfmpperf 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 aes xsave avx f16c rdrand
lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_ppin
ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_lld arch_capabilities

```

```
/proc/cpuinfo cache data
cache size : 11264 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 4 8 12 16 20 24 28
node 0 size: 191895 MB
node 0 free: 188595 MB
node 1 cpus: 1 5 9 13 17 21 25 29
node 1 size: 193534 MB
node 1 free: 192211 MB
node 2 cpus: 2 6 10 14 18 22 26 30
node 2 size: 193534 MB
node 2 free: 191859 MB
node 3 cpus: 3 7 11 15 19 23 27 31
node 3 size: 193533 MB
node 3 free: 191611 MB
node distances:
node  0  1  2  3

```

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECspeed®2017\_fp\_peak = 133

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: May-2019

## Platform Notes (Continued)

```
0: 10 21 31 21
1: 21 10 21 31
2: 31 21 10 21
3: 21 31 21 10
```

```
From /proc/meminfo
MemTotal: 791038392 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsb_release -d
Ubuntu 18.04.2 LTS
```

```
From /etc/*release* /etc/*version*
debian_version: buster/sid
os-release:
  NAME="Ubuntu"
  VERSION="18.04.2 LTS (Bionic Beaver)"
  ID=ubuntu
  ID_LIKE=debian
  PRETTY_NAME="Ubuntu 18.04.2 LTS"
  VERSION_ID="18.04"
  HOME_URL="https://www.ubuntu.com/"
  SUPPORT_URL="https://help.ubuntu.com/"
```

```
uname -a:
Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB
```

```
run-level 3 Nov 21 18:00
```

```
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 439G 37G 380G 9% /
```

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. 2.2.9 05/08/2019
Memory:
```

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECspeed®2017\_fp\_peak = 133

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.

Test Date: Mar-2019  
Hardware Availability: Apr-2019  
Software Availability: May-2019

## Platform Notes (Continued)

16x 00AD00B300AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2666  
8x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933, configured at 2666  
24x Not Specified Not Specified

(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)  
-----

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 | 607.cactuBSSN\_s(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.  
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 | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak)  
| 654.roms\_s(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.  
-----

=====  
Fortran, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak)  
| 628.pop2\_s(base, peak)  
-----

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

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECspeed®2017\_fp\_peak = 133

CPU2017 License: 55

Test Date: Mar-2019

Test Sponsor: Dell Inc.

Hardware Availability: Apr-2019

Tested by: Dell Inc.

Software Availability: May-2019

## Compiler Version Notes (Continued)

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
```

Fortran benchmarks:

```
ifort -m64
```

Benchmarks using both Fortran and C:

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

Benchmarks using Fortran, C, and C++:

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

## Base Portability Flags

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

## Base Optimization Flags

C benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECspeed®2017\_fp\_peak = 133

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Mar-2019

Hardware Availability: Apr-2019

Software Availability: May-2019

## Base Optimization Flags (Continued)

Fortran benchmarks:

-DSPEC\_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP  
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP  
-nostandard-realloc-lhs

## Peak Compiler Invocation

C benchmarks:

icc -m64 -std=c11

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

ifort -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:

-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP

(Continued on next page)





# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECspeed®2017\_fp\_base = 133

PowerEdge M640 (Intel Xeon Gold 5217, 3.00GHz)

SPECspeed®2017\_fp\_peak = 133

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Mar-2019

Hardware Availability: Apr-2019

Software Availability: May-2019

## Peak Optimization Flags (Continued)

Fortran benchmarks:

```
603.bwaves_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs
```

649.fotonik3d\_s: Same as 603.bwaves\_s

```
654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs
```

```
627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs
```

628.pop2\_s: Same as 621.wrf\_s

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html>  
<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE7.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml>  
<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-revE7.xml>

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.0.5 on 2019-11-21 18:21:02-0500.  
Report generated on 2019-12-11 10:47:45 by CPU2017 PDF formatter v6255.  
Originally published on 2019-12-10.