



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate2017_fp_base = 288

PowerEdge R840 (Intel Xeon Gold 6126, 2.60 GHz)

SPECrate2017_fp_peak = 295

CPU2017 License: 55

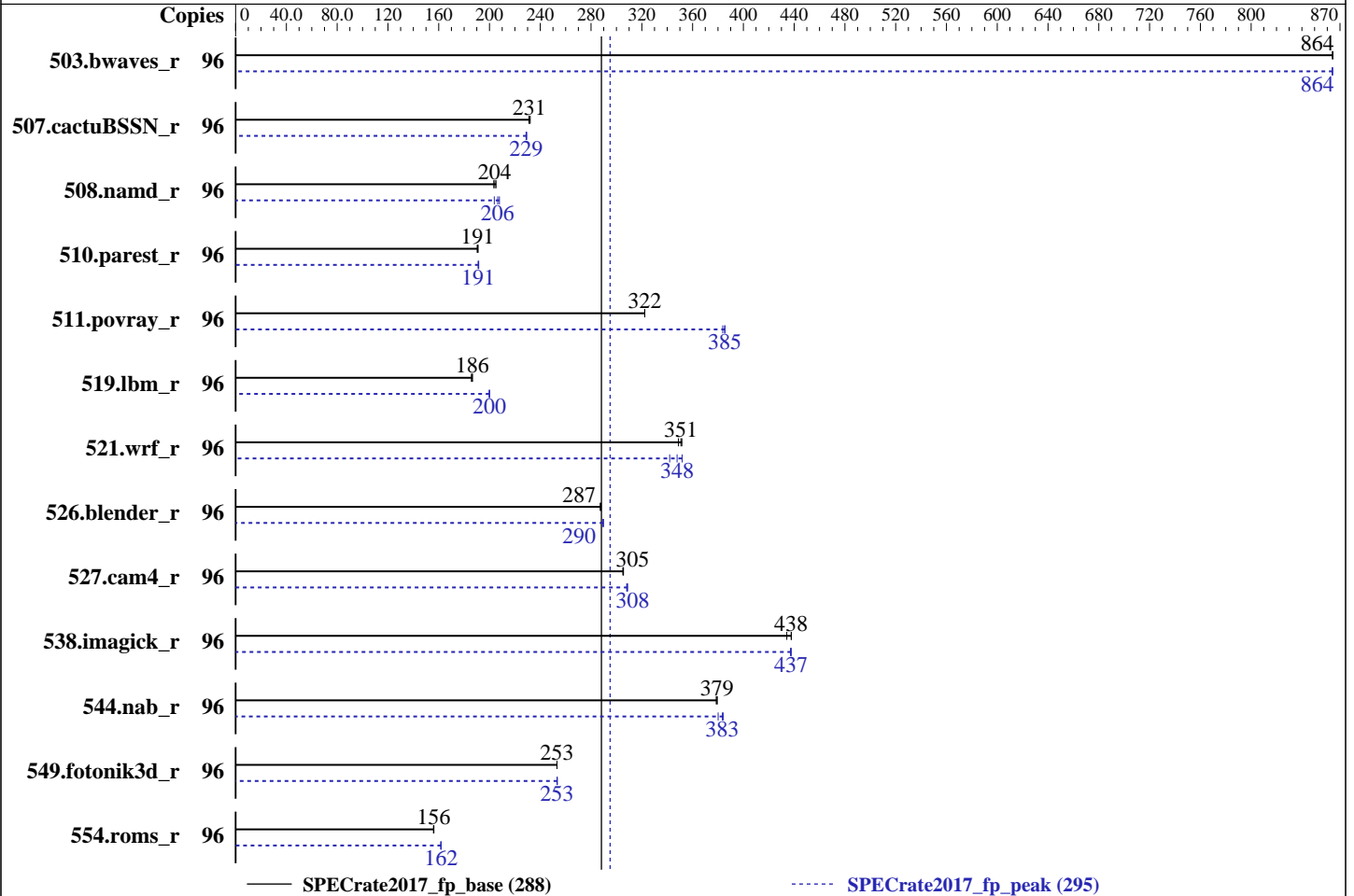
Test Date: May-2018

Test Sponsor: Dell Inc.

Hardware Availability: May-2018

Tested by: Dell Inc.

Software Availability: Feb-2018



Hardware

CPU Name: Intel Xeon Gold 6126
 Max MHz.: 3700
 Nominal: 2600
 Enabled: 48 cores, 4 chips, 2 threads/core
 Orderable: 2,4 chips
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 19.25 MB I+D on chip per chip
 Other: None
 Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)
 Storage: 1 x 480 GB SATA SSD
 Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP3
 4.4.114-94.11-default
 Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 18.0.0.128 of Intel Fortran
 Compiler for Linux
 Parallel: No
 Firmware: Version 1.0.0 released Mar-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	96	1114	864	1114	864	1114	864	96	1114	864	1114	864	1114	864
507.cactuBSSN_r	96	526	231	525	231	524	232	96	531	229	531	229	530	229
508.namd_r	96	447	204	445	205	448	203	96	448	204	442	206	439	208
510.parest_r	96	1320	190	1317	191	1315	191	96	1313	191	1311	192	1314	191
511.povray_r	96	696	322	695	322	695	322	96	582	385	581	386	584	384
519.lbm_r	96	543	186	542	187	545	186	96	506	200	506	200	506	200
521.wrf_r	96	612	352	616	349	613	351	96	611	352	618	348	629	342
526.blender_r	96	509	287	508	288	509	287	96	505	290	505	290	505	289
527.cam4_r	96	550	305	550	306	550	305	96	544	308	545	308	544	309
538.imagick_r	96	550	434	546	438	545	438	96	546	437	546	437	546	438
544.nab_r	96	426	379	426	379	427	379	96	425	380	421	384	421	383
549.fotonik3d_r	96	1478	253	1478	253	1478	253	96	1476	253	1477	253	1478	253
554.roms_r	96	978	156	978	156	977	156	96	942	162	944	162	942	162

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

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

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General Notes (Continued)

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>
 Dell PowerEdge R840 and PowerEdge R940xa are electronically equivalent.
 This result was measured on Dell PowerEdge R840.

Platform Notes

BIOS settings:
 Sub NUMA Cluster enabled
 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 /root/cpu2017/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-v604 Thu May 3 20:43:11 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 6126 CPU @ 2.60GHz
 4 "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 : 12
 siblings : 24
 physical 0: cores 0 1 2 3 4 5 6 8 9 11 12 13
 physical 1: cores 0 1 3 4 5 6 8 9 10 11 12 13
 physical 2: cores 0 1 2 4 5 6 8 9 10 11 13 14
 physical 3: cores 0 1 3 4 5 6 8 9 10 11 12 13

From lscpu:
 Architecture: x86_64

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Platform Notes (Continued)

```

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: 12
Socket(s):           4
NUMA node(s):        8
Vendor ID:           GenuineIntel
CPU family:           6
Model:               85
Model name:          Intel(R) Xeon(R) Gold 6126 CPU @ 2.60GHz
Stepping:             4
CPU MHz:             2593.893
BogoMIPS:            5187.78
Virtualization:      VT-x
L1d cache:           32K
L1i cache:           32K
L2 cache:            1024K
L3 cache:            19712K
NUMA node0 CPU(s):  0,8,16,24,32,40,48,56,64,72,80,88
NUMA node1 CPU(s):  1,9,17,25,33,41,49,57,65,73,81,89
NUMA node2 CPU(s):  2,10,18,26,34,42,50,58,66,74,82,90
NUMA node3 CPU(s):  3,11,19,27,35,43,51,59,67,75,83,91
NUMA node4 CPU(s):  4,12,20,28,36,44,52,60,68,76,84,92
NUMA node5 CPU(s):  5,13,21,29,37,45,53,61,69,77,85,93
NUMA node6 CPU(s):  6,14,22,30,38,46,54,62,70,78,86,94
NUMA node7 CPU(s):  7,15,23,31,39,47,55,63,71,79,87,95

```

```

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
aperfmpperf 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 retpoline 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 : 19712 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 8 16 24 32 40 48 56 64 72 80 88
node 0 size: 95361 MB

```

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Platform Notes (Continued)

```

node 0 free: 95123 MB
node 1 cpus: 1 9 17 25 33 41 49 57 65 73 81 89
node 1 size: 96762 MB
node 1 free: 96567 MB
node 2 cpus: 2 10 18 26 34 42 50 58 66 74 82 90
node 2 size: 96762 MB
node 2 free: 96600 MB
node 3 cpus: 3 11 19 27 35 43 51 59 67 75 83 91
node 3 size: 96762 MB
node 3 free: 96584 MB
node 4 cpus: 4 12 20 28 36 44 52 60 68 76 84 92
node 4 size: 96762 MB
node 4 free: 96592 MB
node 5 cpus: 5 13 21 29 37 45 53 61 69 77 85 93
node 5 size: 96762 MB
node 5 free: 96599 MB
node 6 cpus: 6 14 22 30 38 46 54 62 70 78 86 94
node 6 size: 96762 MB
node 6 free: 96598 MB
node 7 cpus: 7 15 23 31 39 47 55 63 71 79 87 95
node 7 size: 96760 MB
node 7 free: 96595 MB
node distances:
node  0  1  2  3  4  5  6  7
  0: 10 21 21 21 11 21 21 21
  1: 21 10 21 21 21 11 21 21
  2: 21 21 10 21 21 21 11 21
  3: 21 21 21 10 21 21 21 11
  4: 11 21 21 21 10 21 21 21
  5: 21 11 21 21 21 10 21 21
  6: 21 21 11 21 21 21 10 21
  7: 21 21 21 11 21 21 21 10

```

From /proc/meminfo

```

MemTotal:      791242012 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

/usr/bin/lsb_release -d

SUSE Linux Enterprise Server 12 SP3

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.

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Platform Notes (Continued)

```
# 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-v604 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 May 3 11:35
```

```
SPEC is set to: /root/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3       xfs   415G   34G  381G   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. 1.0.0 03/20/2018
Memory:
24x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
24x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
```

(End of data from sysinfo program)

Compiler Version Notes

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

```
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
-----
```

```
=====  
CC 519.lbm_r(peak) 544.nab_r(peak)  
-----
```

```
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
-----
```

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Compiler Version Notes (Continued)

```

=====
CXXC 508.namd_r(base) 510.parest_r(base)
-----
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----

=====
CXXC 508.namd_r(peak) 510.parest_r(peak)
-----
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----

=====
CC 511.povray_r(base) 526.blender_r(base)
-----
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----

=====
CC 511.povray_r(peak) 526.blender_r(peak)
-----
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----

=====
FC 507.cactuBSSN_r(base)
-----
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----

=====
FC 507.cactuBSSN_r(peak)
-----

```

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Compiler Version Notes (Continued)

```
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

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

```
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```
=====
FC 554.roms_r(peak)
=====
```

```
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

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

```
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

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

```
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

Base Compiler Invocation

C benchmarks:
icc

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Base Compiler Invocation (Continued)

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

ifort icc

Benchmarks using both C and C++:

icpc icc

Benchmarks using Fortran, C, and C++:

icpc icc ifort

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

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

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Base Optimization Flags (Continued)

Fortran benchmarks:

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

Benchmarks using Fortran, C, and C++:

`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte`

Base Other Flags

C benchmarks:

`-m64 -std=c11`

C++ benchmarks:

`-m64`

Fortran benchmarks:

`-m64`

Benchmarks using both Fortran and C:

`-m64 -std=c11`

Benchmarks using both C and C++:

`-m64 -std=c11`

Benchmarks using Fortran, C, and C++:

`-m64 -std=c11`

Peak Compiler Invocation

C benchmarks:

`icc`

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Peak Compiler Invocation (Continued)

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

ifort icc

Benchmarks using both C and C++:

icpc icc

Benchmarks using Fortran, C, and C++:

icpc icc ifort

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 519.lbm_r

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:

503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
-nonstandard-realloc-lhs -align array32byte

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Peak Optimization Flags (Continued)

549.fotonik3d_r: Same as 503.bwaves_r

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=3 -nostandard-realloc-lhs
-align array32byte

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 -nostandard-realloc-lhs -align array32byte

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 -nostandard-realloc-lhs -align array32byte

Peak Other Flags

C benchmarks:

-m64 -std=c11

C++ benchmarks:

-m64

Fortran benchmarks:

-m64

Benchmarks using both Fortran and C:

-m64 -std=c11

Benchmarks using both C and C++:

-m64 -std=c11

Benchmarks using Fortran, C, and C++:

-m64 -std=c11



SPEC CPU2017 Floating Point Rate Result

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Dell Inc.

SPECrate2017_fp_base = 288

PowerEdge R840 (Intel Xeon Gold 6126, 2.60 GHz)

SPECrate2017_fp_peak = 295

CPU2017 License: 55

Test Date: May-2018

Test Sponsor: Dell Inc.

Hardware Availability: May-2018

Tested by: Dell Inc.

Software Availability: Feb-2018

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.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-linux64.2017-10-19.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revC.xml>

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

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