



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R940
(Intel Xeon Gold 6142, 2.60 GHz)

SPECrate2017_fp_base = 347

SPECrate2017_fp_peak = 355

CPU2017 License: 55

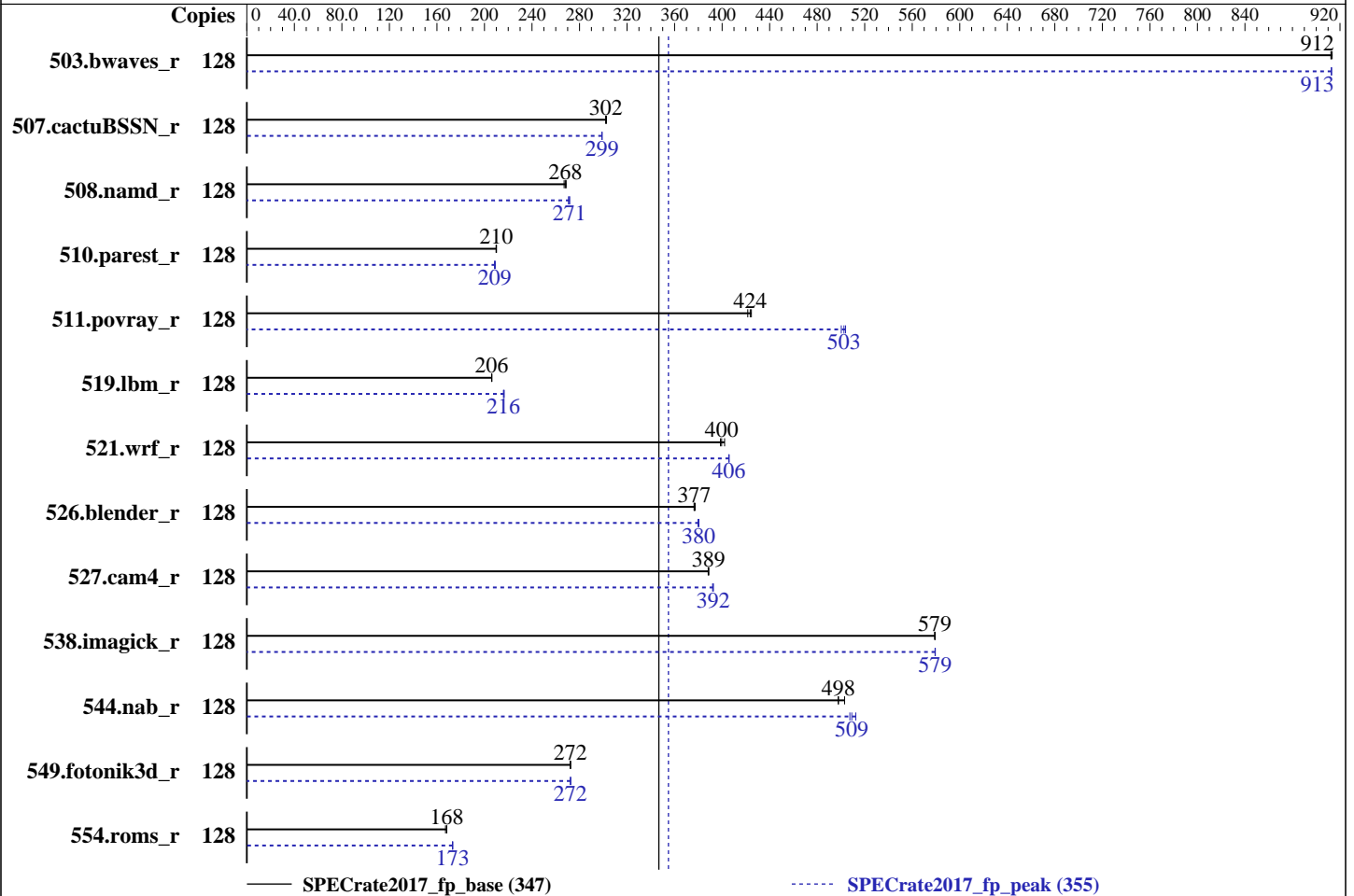
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Oct-2017

Hardware Availability: Sep-2017

Software Availability: Sep-2017



Hardware

CPU Name: Intel Xeon Gold 6142
 Max MHz.: 3700
 Nominal: 2600
 Enabled: 64 cores, 4 chips, 2 threads/core
 Orderable: 2,4 chip
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 22 MB I+D on chip per chip
 Other: None
 Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)
 Storage: 1 x 900 GB 15K RPM SAS12
 Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP2
 4.4.21-69-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 1.1.7 released Sep-2017
 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	128	1407	912	1405	913	1407	912	128	1406	913	1406	913	1406	913
507.cactuBSSN_r	128	535	303	536	302	537	302	128	542	299	542	299	542	299
508.namd_r	128	455	267	454	268	452	269	128	448	272	448	271	449	271
510.parest_r	128	1594	210	1597	210	1595	210	128	1601	209	1606	208	1605	209
511.povray_r	128	704	425	706	424	709	422	128	597	500	595	503	593	504
519.lbm_r	128	655	206	654	206	655	206	128	624	216	623	217	624	216
521.wrf_r	128	719	399	713	402	718	400	128	707	406	707	406	706	406
526.blender_r	128	517	377	518	377	518	376	128	512	380	513	380	513	380
527.cam4_r	128	576	389	577	388	576	389	128	570	393	570	392	571	392
538.imagick_r	128	550	579	550	579	550	579	128	549	579	550	579	549	579
544.nab_r	128	433	498	433	498	428	503	128	423	509	424	508	420	513
549.fotonik3d_r	128	1833	272	1832	272	1830	273	128	1831	272	1831	272	1831	272
554.roms_r	128	1216	167	1209	168	1209	168	128	1175	173	1174	173	1174	173

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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 i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4

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>
```



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Platform Notes

BIOS settings:

Logical Processor Enabled
 Virtualization Technology Disabled
 Sub NUMA Cluster Enabled
 System Profile set to Custom
 CPU Performance set to Maximum Performance
 C1E Disabled
 C States set to Autonomous
 Uncore Frequency set to Dynamic
 Memory Patrol Scrub Disabled
 Energy Efficiency Policy set to Performance
 CPU Interconnect Bus Link Power Management Disabled
 PCI ASPM L1 Link Power Management Disabled
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-2h8y Sun Oct 8 12:14:42 2017

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 6142 CPU @ 2.60GHz
 4 "physical id"s (chips)
 128 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

```

From lscpu:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                128
On-line CPU(s) list:   0-127
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):             4
NUMA node(s):         8
Vendor ID:             GenuineIntel
CPU family:            6
Model:                85

```

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Platform Notes (Continued)

```

Model name: Intel(R) Xeon(R) Gold 6142 CPU @ 2.60GHz
Stepping: 4
CPU MHz: 2593.925
BogoMIPS: 5187.85
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0, 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96, 104, 112, 120
NUMA node1 CPU(s): 1, 9, 17, 25, 33, 41, 49, 57, 65, 73, 81, 89, 97, 105, 113, 121
NUMA node2 CPU(s): 2, 10, 18, 26, 34, 42, 50, 58, 66, 74, 82, 90, 98, 106, 114, 122
NUMA node3 CPU(s): 3, 11, 19, 27, 35, 43, 51, 59, 67, 75, 83, 91, 99, 107, 115, 123
NUMA node4 CPU(s): 4, 12, 20, 28, 36, 44, 52, 60, 68, 76, 84, 92, 100, 108, 116, 124
NUMA node5 CPU(s): 5, 13, 21, 29, 37, 45, 53, 61, 69, 77, 85, 93, 101, 109, 117, 125
NUMA node6 CPU(s): 6, 14, 22, 30, 38, 46, 54, 62, 70, 78, 86, 94, 102, 110, 118, 126
NUMA node7 CPU(s): 7, 15, 23, 31, 39, 47, 55, 63, 71, 79, 87, 95, 103, 111, 119, 127
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 pln pts dtherm intel_pt
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

```

```
/proc/cpuinfo cache data
cache size : 22528 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 96 104 112 120
node 0 size: 95359 MB
node 0 free: 94965 MB
node 1 cpus: 1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121
node 1 size: 96760 MB
node 1 free: 96425 MB
node 2 cpus: 2 10 18 26 34 42 50 58 66 74 82 90 98 106 114 122
node 2 size: 96760 MB
node 2 free: 96432 MB
node 3 cpus: 3 11 19 27 35 43 51 59 67 75 83 91 99 107 115 123
node 3 size: 96760 MB
node 3 free: 96434 MB
node 4 cpus: 4 12 20 28 36 44 52 60 68 76 84 92 100 108 116 124
node 4 size: 96760 MB

```

(Continued on next page)



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Platform Notes (Continued)

```

node 4 free: 96438 MB
node 5 cpus: 5 13 21 29 37 45 53 61 69 77 85 93 101 109 117 125
node 5 size: 96760 MB
node 5 free: 96422 MB
node 6 cpus: 6 14 22 30 38 46 54 62 70 78 86 94 102 110 118 126
node 6 size: 96760 MB
node 6 free: 96423 MB
node 7 cpus: 7 15 23 31 39 47 55 63 71 79 87 95 103 111 119 127
node 7 size: 96757 MB
node 7 free: 96419 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: 791224272 kB

HugePages_Total: 0

Hugepagesize: 2048 kB

/usr/bin/lsb_release -d

SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*

SuSE-release:

SUSE Linux Enterprise Server 12 (x86_64)

VERSION = 12

PATCHLEVEL = 2

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-SP2"

VERSION_ID="12.2"

PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"

ID="sles"

ANSI_COLOR="0;32"

CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:

Linux linux-2h8y 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)

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Platform Notes (Continued)

x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 8 02:54

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda4	xf	796G	17G	780G	3%	/home

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. 1.1.7 08/10/2017

Memory:

48x 00CE063200CE M393A2K43BB1-CTD 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.

=====
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)

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Compiler Version Notes (Continued)

=====
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)
=====

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.
=====

(Continued on next page)



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Compiler Version Notes (Continued)

=====
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

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



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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

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



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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

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



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

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
```



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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

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.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.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.

Tested with SPEC CPU2017 v1.0.2 on 2017-10-08 15:14:42-0400.

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