



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate2017_fp_base = 239

PowerEdge R940xa (Intel Xeon Gold 6134, 3.20GHz)

SPECrate2017_fp_peak = 246

CPU2017 License: 55

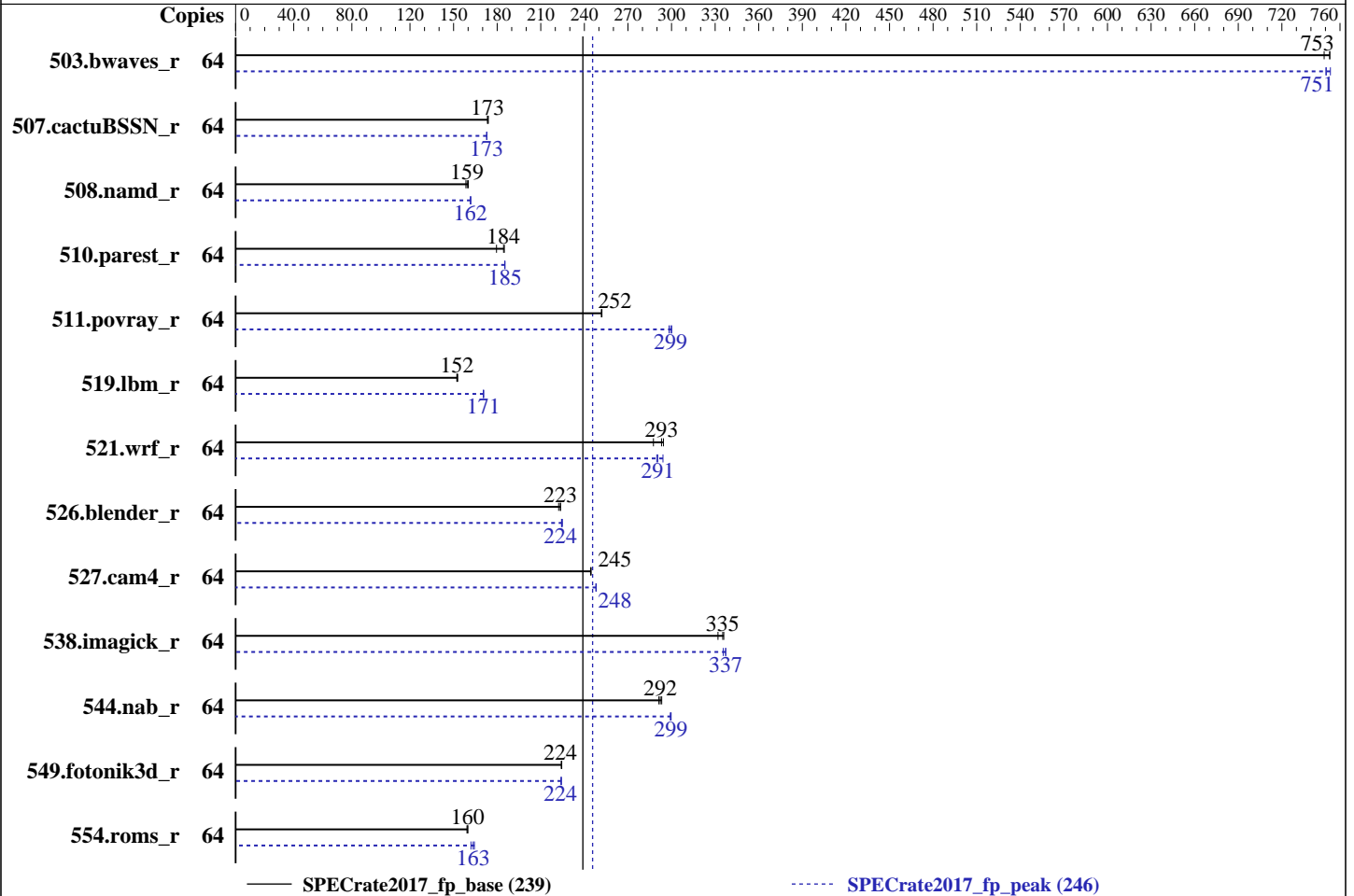
Test Date: Mar-2018

Test Sponsor: Dell Inc.

Hardware Availability: May-2018

Tested by: Dell Inc.

Software Availability: Feb-2018



Hardware

CPU Name: Intel Xeon Gold 6134
 Max MHz.: 3700
 Nominal: 3200
 Enabled: 32 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: 24.75 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	64	852	753	857	749	852	753	64	855	750	855	751	852	753
507.cactuBSSN_r	64	466	174	467	173	467	173	64	469	173	469	173	469	173
508.namd_r	64	384	158	382	159	380	160	64	376	162	376	162	376	162
510.parest_r	64	933	180	905	185	908	184	64	903	185	904	185	904	185
511.povray_r	64	593	252	594	252	593	252	64	501	298	499	299	498	300
519.lbm_r	64	443	152	442	152	441	153	64	395	171	396	170	395	171
521.wrf_r	64	487	294	489	293	499	288	64	493	291	487	294	495	290
526.blender_r	64	438	222	436	224	436	223	64	433	225	435	224	434	224
527.cam4_r	64	458	244	458	245	458	245	64	451	248	452	248	451	248
538.imagick_r	64	479	332	475	335	474	336	64	474	336	472	337	472	337
544.nab_r	64	370	291	367	293	369	292	64	359	300	360	299	360	299
549.fotonik3d_r	64	1113	224	1111	224	1112	224	64	1113	224	1113	224	1113	224
554.roms_r	64	637	160	639	159	637	160	64	622	163	628	162	619	164

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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-ld79 Thu Mar 29 18:15:55 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 6134 CPU @ 3.20GHz
4 "physical id"s (chips)
64 "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 : 16
physical 0: cores 0 2 3 9 16 19 26 27
physical 1: cores 0 1 2 3 10 11 24 27
physical 2: cores 2 3 4 8 10 18 24 25
physical 3: cores 1 3 4 6 7 18 20 22

From lscpu:

(Continued on next page)



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Platform Notes (Continued)

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                64
On-line CPU(s) list:   0-63
Thread(s) per core:    2
Core(s) per socket:    8
Socket(s):             4
NUMA node(s):          8
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 6134 CPU @ 3.20GHz
Stepping:              4
CPU MHz:               3192.503
BogoMIPS:              6385.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              25344K
NUMA node0 CPU(s):    0,8,16,24,32,40,48,56
NUMA node1 CPU(s):    1,9,17,25,33,41,49,57
NUMA node2 CPU(s):    2,10,18,26,34,42,50,58
NUMA node3 CPU(s):    3,11,19,27,35,43,51,59
NUMA node4 CPU(s):    4,12,20,28,36,44,52,60
NUMA node5 CPU(s):    5,13,21,29,37,45,53,61
NUMA node6 CPU(s):    6,14,22,30,38,46,54,62
NUMA node7 CPU(s):    7,15,23,31,39,47,55,63

```

```

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
aperfperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pcdm 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 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 : 25344 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

```

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Platform Notes (Continued)

```

node 0 size: 95361 MB
node 0 free: 95155 MB
node 1 cpus: 1 9 17 25 33 41 49 57
node 1 size: 96763 MB
node 1 free: 96613 MB
node 2 cpus: 2 10 18 26 34 42 50 58
node 2 size: 96763 MB
node 2 free: 96606 MB
node 3 cpus: 3 11 19 27 35 43 51 59
node 3 size: 96763 MB
node 3 free: 96623 MB
node 4 cpus: 4 12 20 28 36 44 52 60
node 4 size: 96763 MB
node 4 free: 96600 MB
node 5 cpus: 5 13 21 29 37 45 53 61
node 5 size: 96763 MB
node 5 free: 96627 MB
node 6 cpus: 6 14 22 30 38 46 54 62
node 6 size: 96763 MB
node 6 free: 96620 MB
node 7 cpus: 7 15 23 31 39 47 55 63
node 7 size: 96760 MB
node 7 free: 96626 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:      791245484 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

```

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Platform Notes (Continued)

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-ld79 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 Mar 29 10:25

SPEC is set to: /root/cpu2017

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3        xfs   405G   16G   390G   4% /
```

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:

```
3x 002C00B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666
14x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
11x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
20x 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)  
=====
```

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Compiler Version Notes (Continued)

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)

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
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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

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icc (ICC) 18.0.0 20170811

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

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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

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

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Base Optimization Flags (Continued)

C++ benchmarks (continued):

`-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`

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`



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Peak Compiler Invocation

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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

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:

(Continued on next page)



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Peak Optimization Flags (Continued)

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

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

(Continued on next page)



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Peak Other Flags (Continued)

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-linux64.2017-10-19.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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