# SPEC® CPU2017 Floating Point Rate Result



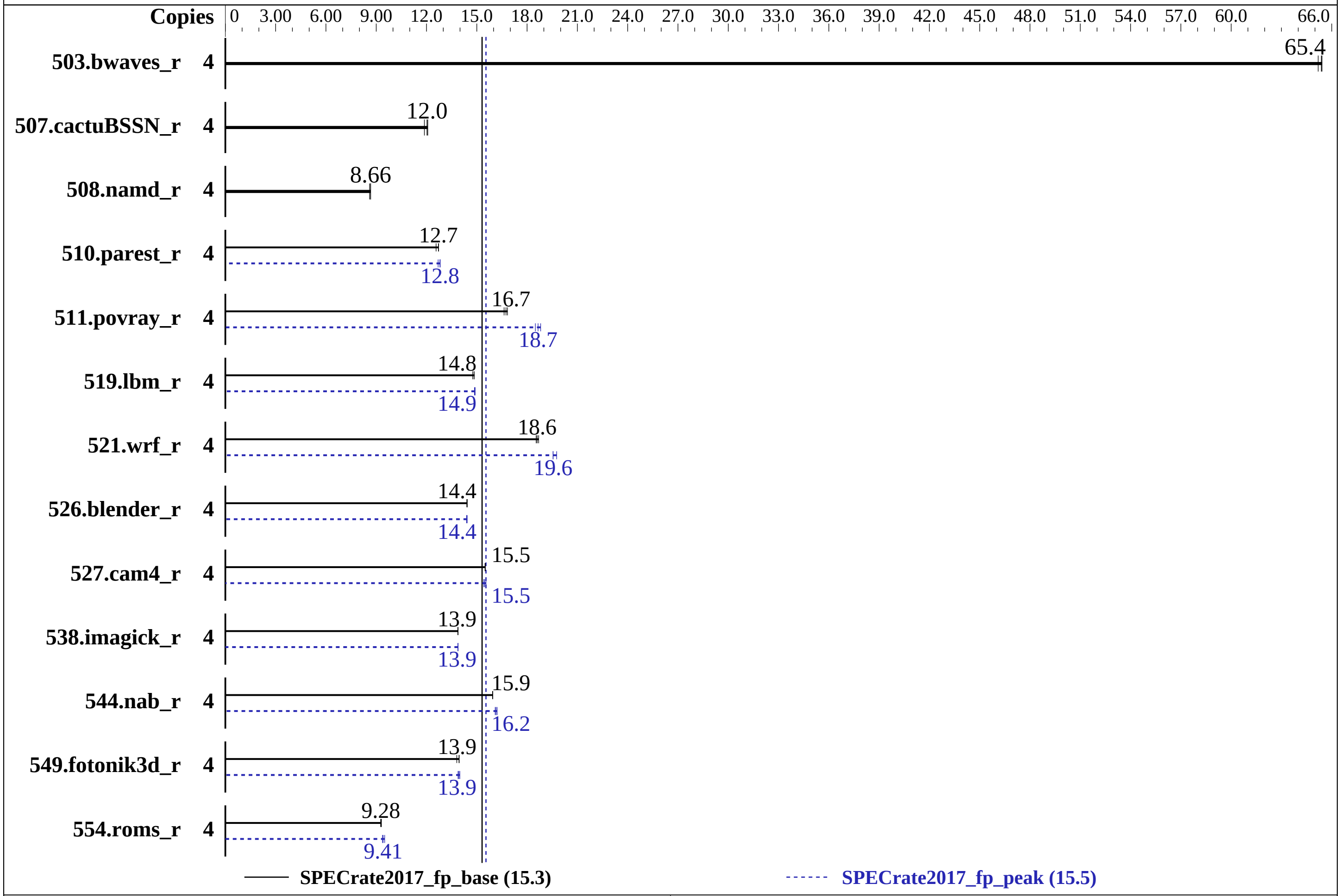
## NEC Corporation

Express5800/T110j (Intel Pentium Gold G5400)

SPECrate2017_fp_base = 15.3

SPECrate2017_fp_peak = 15.5

| | | | |
|---|---|---|---|
| **CPU2017 License:** 9006 | | **Test Date:** | Apr-2019 |
| **Test Sponsor:** | NEC Corporation | **Hardware Availability:** | Dec-2018 |
| **Tested by:** | NEC Corporation | **Software Availability:** | Aug-2018 |




### Hardware

| | |
|---|---|
| CPU Name: | Intel Pentium Gold G5400 |
| Max MHz.: | 3700 |
| Nominal: | 3700 |
| Enabled: | 2 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: | 4 MB I+D on chip per chip |
| Other: | None |
| Memory: | 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400) |
| Storage: | 1 x 4 TB SATA, 7200 RPM |
| Other: | None |

### Software

| | |
|---|---|
| OS: | Red Hat Enterprise Linux Server release 7.5 (Maipo) Kernel 3.10.0-862.11.6.el7.x86_64 |
| 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: | NEC BIOS Version F09 12/04/2018 released Feb-2019 |
| File System: | ext4 |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| Other: | None |

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Express5800/T110j (Intel Pentium Gold G5400)

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**CPU2017 License:** 9006
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**Hardware Availability:** Dec-2018
**Software Availability:** Aug-2018

# Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 503.bwaves_r | 4 | 615 | 65.2 | 613 | 65.4 | **614** | **65.4** | 4 | 615 | 65.2 | 613 | 65.4 | **614** | **65.4** |
| 507.cactuBSSN_r | 4 | **421** | **12.0** | 427 | 11.9 | 419 | 12.1 | 4 | **421** | **12.0** | 427 | 11.9 | 419 | 12.1 |
| 508.namd_r | 4 | 438 | 8.67 | **439** | **8.66** | 442 | 8.60 | 4 | 438 | 8.67 | **439** | **8.66** | 442 | 8.60 |
| 510.parest_r | 4 | 832 | 12.6 | **823** | **12.7** | 823 | 12.7 | 4 | 816 | 12.8 | 824 | 12.7 | **817** | **12.8** |
| 511.povray_r | 4 | **558** | **16.7** | 562 | 16.6 | 555 | 16.8 | 4 | **501** | **18.7** | 505 | 18.5 | 497 | 18.8 |
| 519.lbm_r | 4 | 285 | 14.8 | **285** | **14.8** | 284 | 14.9 | 4 | **283** | **14.9** | 284 | 14.9 | 283 | 14.9 |
| 521.wrf_r | 4 | 483 | 18.5 | 479 | 18.7 | **482** | **18.6** | 4 | **458** | **19.6** | 458 | 19.5 | 453 | 19.8 |
| 526.blender_r | 4 | **422** | **14.4** | 422 | 14.4 | 423 | 14.4 | 4 | **423** | **14.4** | 422 | 14.4 | 423 | 14.4 |
| 527.cam4_r | 4 | **451** | **15.5** | 452 | 15.5 | 451 | 15.5 | 4 | 454 | 15.4 | **452** | **15.5** | 450 | 15.5 |
| 538.imagick_r | 4 | 717 | 13.9 | 717 | 13.9 | **717** | **13.9** | 4 | **717** | **13.9** | 716 | 13.9 | 717 | 13.9 |
| 544.nab_r | 4 | 422 | 15.9 | 422 | 15.9 | **422** | **15.9** | 4 | 415 | 16.2 | 418 | 16.1 | **417** | **16.2** |
| 549.fotonik3d_r | 4 | 1129 | 13.8 | **1118** | **13.9** | 1117 | 14.0 | 4 | **1119** | **13.9** | 1123 | 13.9 | 1114 | 14.0 |
| 554.roms_r | 4 | **685** | **9.28** | 683 | 9.31 | 686 | 9.27 | 4 | 669 | 9.50 | 678 | 9.37 | **675** | **9.41** |

**SPECrate2017_fp_base = 15.3**
**SPECrate2017_fp_peak = 15.5**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

# Submit Notes

```
The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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"
IRQ balance service was stopped using "systemctl stop irqbalance.service"
```

# General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/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
 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

 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
 is mitigated in the system as tested and documented.
```

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## General Notes (Continued)

```
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.
```

## Platform Notes

```
BIOS Settings:
 VT-x: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on t110j Thu Apr 18 17:53:20 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) Pentium(R) Gold G5400 CPU @ 3.70GHz
      1  "physical id"s (chips)
      4 "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 : 2
      siblings  : 4
      physical 0: cores 0 1

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                4
     On-line CPU(s) list:   0-3
     Thread(s) per core:    2
     Core(s) per socket:    2
     Socket(s):             1
     NUMA node(s):          1
     Vendor ID:             GenuineIntel
     CPU family:            6
     Model:                 158
     Model name:            Intel(R) Pentium(R) Gold G5400 CPU @ 3.70GHz
     Stepping:              11
     CPU MHz:               3700.000
     CPU max MHz:           3700.0000
     CPU min MHz:           800.0000
```

**(Continued on next page)**

## Platform Notes (Continued)

```
     BogoMIPS:              7392.00
     Virtualization:        VT-x
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              256K
     L3 cache:              4096K
     NUMA node0 CPU(s):     0-3
     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
     aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg cx16
     xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave rdrand
     lahf_lm abm 3dnowprefetch epb intel_pt ssbd ibrs ibpb stibp tpr_shadow vnmi
     flexpriority ept vpid fsgsbase tsc_adjust smep erms invpcid mpx rdseed smap
     clflushopt xsaveopt xsavec xgetbv1 dtherm arat pln pts hwp hwp_notify hwp_act_window
     hwp_epp spec_ctrl intel_stibp flush_l1d

 /proc/cpuinfo cache data
    cache size : 4096 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
   node 0 size: 65455 MB
   node 0 free: 63586 MB
   node distances:
   node   0
     0:  10

 From /proc/meminfo
    MemTotal:       65895300 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux Server"
       VERSION="7.5 (Maipo)"
       ID="rhel"
       ID_LIKE="fedora"
       VARIANT="Server"
       VARIANT_ID="server"
       VERSION_ID="7.5"
       PRETTY_NAME="Red Hat Enterprise Linux Server 7.5 (Maipo)"
    redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
    system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
```

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## Platform Notes (Continued)

```
    system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server

 uname -a:
    Linux t110j 3.10.0-862.11.6.el7.x86_64 #1 SMP Fri Aug 10 16:55:11 UTC 2018 x86_64
    x86_64 x86_64 GNU/Linux

 run-level 3 Apr 18 17:47

 SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      ext4  3.6T  120G  3.3T   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 American Megatrends Inc. F09 12/04/2018
   Memory:
    4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667, configured at 2400

 (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.
------------------------------------------------------------------------------

==============================================================================
```

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## Compiler Version Notes (Continued)

```
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)
------------------------------------------------------------------------------
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.
------------------------------------------------------------------------------

==============================================================================
```

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## Compiler Version Notes (Continued)

```
 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 -m64 -std=c11`

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

Benchmarks using both Fortran and C:
`ifort -m64 icc -m64 -std=c11`

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# Base Compiler Invocation (Continued)

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

# Base Optimization Flags

C benchmarks:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xSSE4.2 -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:
-xSSE4.2 -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++:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only

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## Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

## 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

## 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 -xSSE4.2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

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# Peak Optimization Flags (Continued)

538.imagick_r: -xSSE4.2 -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:

508.namd_r: basepeak = yes

510.parest_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xSSE4.2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: -xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xSSE4.2 -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 -xSSE4.2 -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 -xSSE4.2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

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/NEC-Platform-Settings-T110j-RevB.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/NEC-Platform-Settings-T110j-RevB.xml

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 2019-04-18 04:53:19-0400.
Report generated on 2019-05-29 15:48:12 by CPU2017 PS formatter v6067.
Originally published on 2019-05-29.