SPEC® CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation
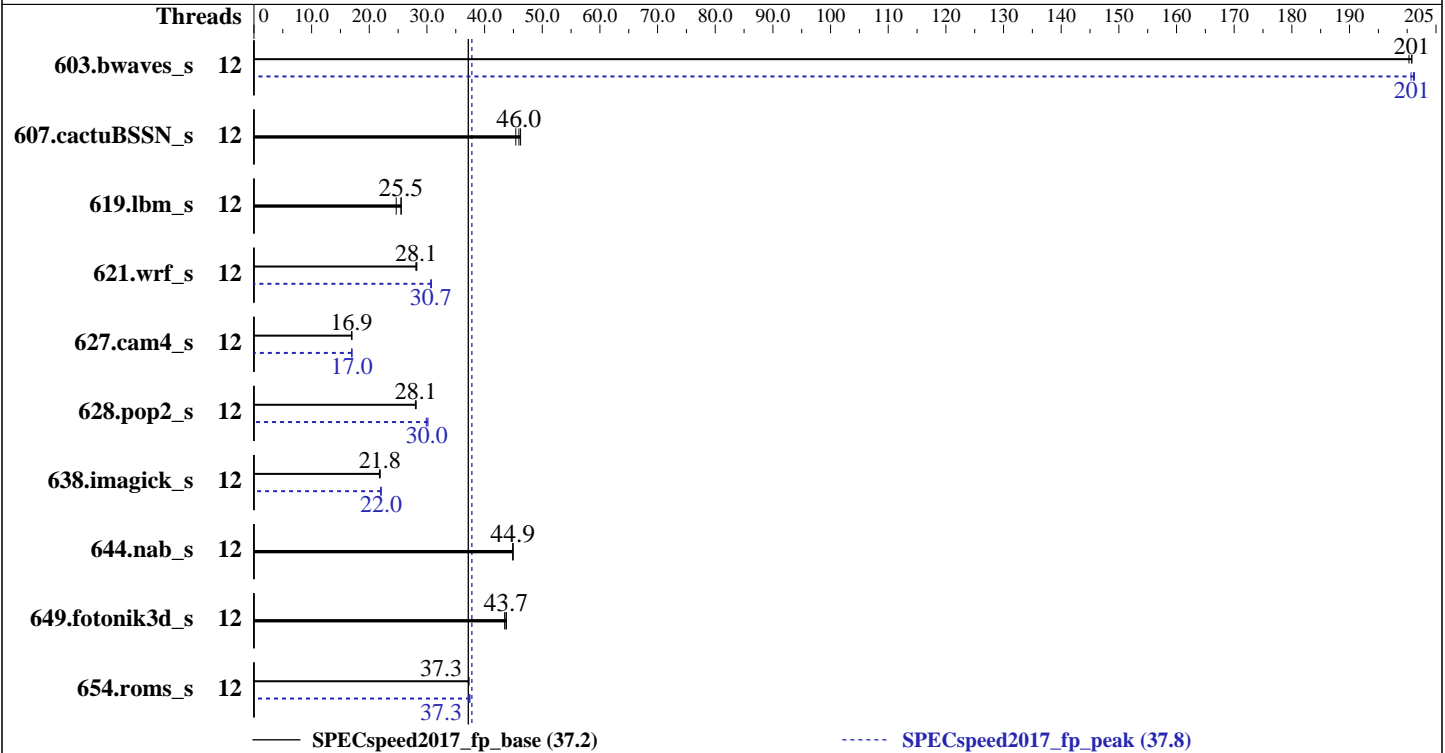
Express5800/R120h-2M (Intel Xeon Bronze 3104)

$SPECspeed2017\_fp\_base = 37.2$

$SPECspeed2017\_fp\_peak = 37.8$

CPU2017 License: 9006   **Test Date:** Nov-2018
Test Sponsor: NEC Corporation   **Hardware Availability:** Aug-2017
Tested by: NEC Corporation   **Software Availability:** Mar-2018

Threads — scale 0 to 205

Benchmark	Threads	base	peak
603.bwaves_s	12	201	201
607.cactuBSSN_s	12	46.0	
619.lbm_s	12	25.5	
621.wrf_s	12	28.1	30.7
627.cam4_s	12	16.9	17.0
628.pop2_s	12	28.1	30.0
638.imagick_s	12	21.8	22.0
644.nab_s	12	44.9	
649.fotonik3d_s	12	43.7	
654.roms_s	12	37.3	37.3

SPECspeed2017_fp_base (37.2)   **SPECspeed2017_fp_peak (37.8)**

Hardware

CPU Name: Intel Xeon Bronze 3104
 Max MHz.: 1700
 Nominal: 1700
Enabled: 12 cores, 2 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: 8.25 MB I+D on chip per chip
 Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)
Storage: 1 x 1 TB SATA, 7200 RPM, RAID 0
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)
 Kernel 3.10.0-693.21.1.el7.x86_64
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
 Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
Parallel: Yes
Firmware: NEC BIOS Version U30 02/15/2018 released Mar-2018
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc memory allocator V5.0.1

SPEC CPU2017 Floating Point Speed Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation

Express5800/R120h-2M (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base =   37.2

SPECspeed2017_fp_peak =   37.8

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Results Table

Benchmark	Base						Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	12	294	201	295	200	**294**	**201**	12	**293**	**201**	293	201	294	201
607.cactuBSSN_s	12	361	46.2	367	45.4	**363**	**46.0**	12	361	46.2	367	45.4	**363**	**46.0**
619.lbm_s	12	205	25.6	212	24.7	**206**	**25.5**	12	205	25.6	212	24.7	**206**	**25.5**
621.wrf_s	12	468	28.3	**470**	**28.1**	470	28.1	12	430	30.8	**431**	**30.7**	431	30.7
627.cam4_s	12	521	17.0	524	16.9	**523**	**16.9**	12	522	17.0	522	17.0	**522**	**17.0**
628.pop2_s	12	423	28.1	**423**	**28.1**	424	28.0	12	**396**	**30.0**	397	29.9	393	30.2
638.imagick_s	12	660	21.9	663	21.8	**660**	**21.8**	12	656	22.0	**655**	**22.0**	654	22.1
644.nab_s	12	389	44.9	**389**	**44.9**	389	44.9	12	389	44.9	**389**	**44.9**	389	44.9
649.fotonik3d_s	12	210	43.5	**209**	**43.7**	208	43.8	12	210	43.5	**209**	**43.7**	208	43.8
654.roms_s	12	422	37.3	423	37.2	**423**	**37.3**	12	420	37.5	422	37.3	**422**	**37.3**
SPECspeed2017_fp_base =		**37.2**											
SPECspeed2017_fp_peak =		**37.8**											

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

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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

 Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.5
 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.
 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.

 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

SPEC CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation

Express5800/R120h-2M (Intel Xeon Bronze 3104)

$SPECspeed2017\_fp\_base = 37.2$

$SPECspeed2017\_fp\_peak = 37.8$

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Platform Notes

```
BIOS Settings:
 Thermal Configuration: Maximum Cooling
 Workload Profile: General Peak Frequency Compute
 Memory Patrol Scrubbing: Disabled
 Energy/Performance Bias: Maximum Performance
 LLC Dead Line Allocation: Disabled
 Workload Profile: Custom
 NUMA Group Size Optimization: Flat
 Adjacent Sector Prefetch: Disabled
 DCU Stream Prefetcher: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r120h2m Thu Nov 15 13:26:42 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) Bronze 3104 CPU @ 1.70GHz
      2  "physical id"s (chips)
      12 "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 : 6
      siblings  : 6
      physical 0: cores 0 1 2 3 4 5
      physical 1: cores 0 1 2 3 4 5

From lscpu:
   Architecture:        x86_64
   CPU op-mode(s):      32-bit, 64-bit
   Byte Order:          Little Endian
   CPU(s):              12
   On-line CPU(s) list: 0-11
   Thread(s) per core:  1
   Core(s) per socket:  6
   Socket(s):           2
   NUMA node(s):        2
   Vendor ID:           GenuineIntel
   CPU family:          6
   Model:               85
   Model name:          Intel(R) Xeon(R) Bronze 3104 CPU @ 1.70GHz
   Stepping:            4
   CPU MHz:             1700.000
   BogoMIPS:            3400.00
   Virtualization:      VT-x
```

(Continued on next page)

NEC Corporation

Express5800/R120h-2M (Intel Xeon Bronze 3104)

$SPECspeed2017\_fp\_base = 37.2$

$SPECspeed2017\_fp\_peak = 37.8$

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Platform Notes (Continued)

```
      L1d cache:              32K
      L1i cache:              32K
      L2 cache:               1024K
      L3 cache:               8448K
      NUMA node0 CPU(s):      0-2,6-8
      NUMA node1 CPU(s):      3-5,9-11
      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 smx est tm2 ssse3 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 epb cat_l3 cdp_l3 invpcid_single
   intel_pt spec_ctrl ibpb_support 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 avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1
   cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm arat pln pts

 /proc/cpuinfo cache data
    cache size : 8448 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
   available: 2 nodes (0-1)
   node 0 cpus: 0 1 2 6 7 8
   node 0 size: 196268 MB
   node 0 free: 191694 MB
   node 1 cpus: 3 4 5 9 10 11
   node 1 size: 196607 MB
   node 1 free: 192174 MB
   node distances:
   node   0   1
     0:  10  21
     1:  21  10

 From /proc/meminfo
    MemTotal:       395932708 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux Server"
       VERSION="7.4 (Maipo)"
       ID="rhel"
       ID_LIKE="fedora"
       VARIANT="Server"
       VARIANT_ID="server"
```

(Continued on next page)

NEC Corporation

Express5800/R120h-2M (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base = 37.2

SPECspeed2017_fp_peak = 37.8

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Platform Notes (Continued)

```
      VERSION_ID="7.4"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
   redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
   Linux r120h2m 3.10.0-693.21.1.el7.x86_64 #1 SMP Fri Feb 23 18:54:16 UTC 2018 x86_64
   x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown):           Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Nov 15 13:21

SPEC is set to: /home/cpu2017
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda3       ext4  909G  382G  481G  45% /

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 NEC U30 02/15/2018
  Memory:
   24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC   619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CC   619.lbm_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
```

(Continued on next page)

SPEC CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation

Express5800/R120h-2M (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base = 37.2

SPECspeed2017_fp_peak = 37.8

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------

==========================================================================
 FC  607.cactuBSSN_s(base, peak)
--------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------

==========================================================================
 FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
--------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------

==========================================================================
FC   603.bwaves_s(peak) 649.fotonik3d_s(peak)
--------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------

==========================================================================
 CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
--------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------

==========================================================================
CC   621.wrf_s(peak) 628.pop2_s(peak)
--------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------
```

SPEC CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation

Express5800/R120h-2M (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base =   37.2

SPECspeed2017_fp_peak =   37.8

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

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:
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:
```
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Benchmarks using both Fortran and C:
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

(Continued on next page)

SPEC CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation

Express5800/R120h-2M (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base = 37.2

SPECspeed2017_fp_peak = 37.8

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc
```

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:

619.lbm_s: basepeak = yes

638.imagick_s: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`

644.nab_s: basepeak = yes

Fortran benchmarks:

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

SPEC CPU2017 Floating Point Speed Result

NEC Corporation

Express5800/R120h-2M (Intel Xeon Bronze 3104)

SPECspeed2017_fp_base = 37.2

SPECspeed2017_fp_peak = 37.8

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Nov-2018
Hardware Availability: Aug-2017
Software Availability: Mar-2018

Peak Optimization Flags (Continued)

603.bwaves_s: –prof-gen(pass 1) –prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: basepeak = yes

654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

621.wrf_s: –prof-gen(pass 1) –prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: –xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: 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-V1.2-R120h-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-V1.2-R120h-RevB.xml

---

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

Tested with SPEC CPU2017 v1.0.5 on 2018-11-14 23:26:40-0500.
Report generated on 2018-12-11 14:53:24 by CPU2017 PDF formatter v6067.
Originally published on 2018-12-11.