



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

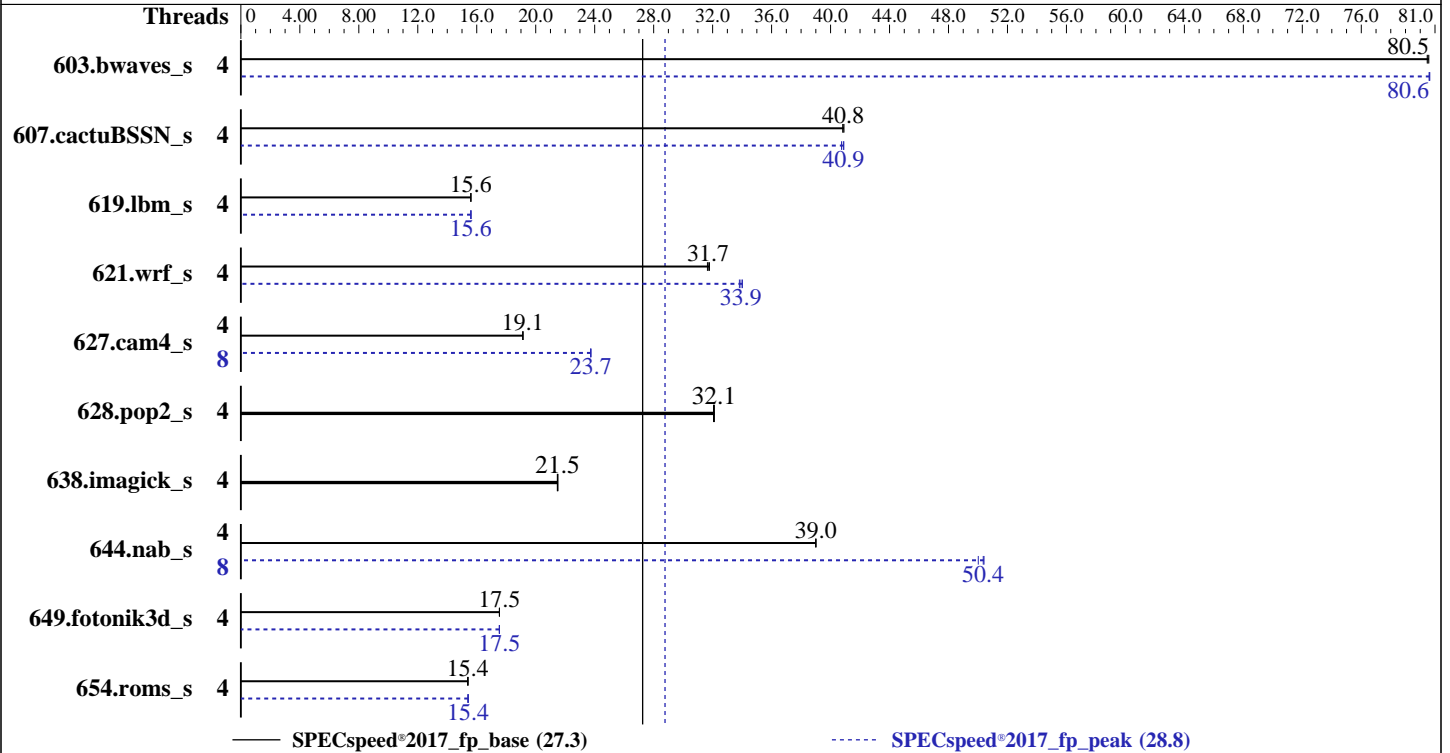
SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

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

Test Date: Feb-2020
Hardware Availability: Jan-2020
Software Availability: Sep-2019



Hardware

CPU Name: Intel Xeon E-2234
Max MHz: 4800
Nominal: 3600
Enabled: 4 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: 8 MB I+D on chip per chip
Other: None
Memory: 32 GB (2 x 16 GB 2Rx8 PC4-2666V-E)
Storage: 1 x 1 TB SATA, 7200 RPM
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.7 (Maipo)
Kernel 3.10.0-1062.1.1.el7.x86_64
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
Parallel: Yes
Firmware: NEC BIOS Version U43 v2.12 12/06/2019 released Jan-2020
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: BIOS set to prefer performance at the cost of additional power usage.



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

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

Test Date: Feb-2020
Hardware Availability: Jan-2020
Software Availability: Sep-2019

Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	4	733	80.5	732	80.6	<u>733</u>	<u>80.5</u>	4	<u>732</u>	<u>80.6</u>	732	80.6	732	80.6
607.cactuBSSN_s	4	408	40.8	407	40.9	408	40.8	4	408	40.9	409	40.7	408	40.9
619.lbm_s	4	<u>336</u>	<u>15.6</u>	336	15.6	336	15.6	4	335	15.6	<u>336</u>	<u>15.6</u>	336	15.6
621.wrf_s	4	416	31.8	<u>417</u>	<u>31.7</u>	418	31.6	4	<u>390</u>	<u>33.9</u>	389	34.0	391	33.8
627.cam4_s	4	463	19.1	<u>463</u>	<u>19.1</u>	463	19.1	8	373	23.7	374	23.7	<u>373</u>	<u>23.7</u>
628.pop2_s	4	370	32.1	370	32.1	<u>370</u>	<u>32.1</u>	4	370	32.1	370	32.1	<u>370</u>	<u>32.1</u>
638.imagick_s	4	671	21.5	672	21.5	<u>671</u>	<u>21.5</u>	4	671	21.5	672	21.5	<u>671</u>	<u>21.5</u>
644.nab_s	4	448	39.0	448	39.0	448	39.0	8	349	50.0	347	50.4	<u>347</u>	<u>50.4</u>
649.fotonik3d_s	4	<u>520</u>	<u>17.5</u>	520	17.5	520	17.5	4	520	17.5	520	17.5	<u>520</u>	<u>17.5</u>
654.roms_s	4	1024	15.4	1021	15.4	<u>1023</u>	<u>15.4</u>	4	<u>1021</u>	<u>15.4</u>	1021	15.4	1023	15.4

SPECspeed®2017_fp_base = 27.3

SPECspeed®2017_fp_peak = 28.8

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X 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.



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

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

Test Date: Feb-2020
Hardware Availability: Jan-2020
Software Availability: Sep-2019

Platform Notes

BIOS Settings:

Thermal Configuration: Maximum Cooling
Intel Virtualization Technology (Intel VT): Disabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on r110j1 Thu Feb 20 13:00:17 2020

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) E-2234 CPU @ 3.60GHz
1 "physical id"s (chips)
8 "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 : 4
siblings : 8
physical 0: cores 0 1 2 3

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2234 CPU @ 3.60GHz
Stepping: 10
CPU MHz: 4592.944
CPU max MHz: 4800.0000
CPU min MHz: 800.0000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-7

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

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

Test Date: Feb-2020
Hardware Availability: Jan-2020
Software Availability: Sep-2019

Platform Notes (Continued)

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 sse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb invpcid_single intel_pt ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp md_clear spec_ctrl intel_stibp flush_lld

```
/proc/cpuinfo cache data
cache size : 8192 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 4 5 6 7
node 0 size: 32618 MB
node 0 free: 31396 MB
node distances:
node 0
0: 10
```

```
From /proc/meminfo
MemTotal: 32791356 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.7 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.7"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.7 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.7:ga:server
```

```
uname -a:
Linux r110j1 3.10.0-1062.1.1.el7.x86_64 #1 SMP Tue Aug 13 18:39:59 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

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

Test Date: Feb-2020
Hardware Availability: Jan-2020
Software Availability: Sep-2019

Platform Notes (Continued)

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault):	Mitigation: PTE Inversion
Microarchitectural Data Sampling:	Mitigation: Clear CPU buffers; SMT vulnerable
CVE-2017-5754 (Meltdown):	Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass):	Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):	Mitigation: Load fences, usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Full retpoline, IBPB

run-level 3 Feb 20 12:54

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda3	ext4	908G	38G	825G	5%	/

From /sys/devices/virtual/dmi/id

BIOS: NEC U43 12/06/2019
 Vendor: NEC
 Product: Express5800/R110j-1
 Serial: CN69380JHR

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.

Memory:
 2x UNKNOWN NOT AVAILABLE
 2x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

```

=====
C          | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
          | 644.nab_s(base, peak)
-----
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-----
=====
C++, C, Fortran | 607.cactuBSSN_s(base, peak)

```

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

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

Test Date: Feb-2020
Hardware Availability: Jan-2020
Software Availability: Sep-2019

Compiler Version Notes (Continued)

```
-----
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-----
```

```
=====
Fortran          | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                  | 654.roms_s(base, peak)
-----
```

```
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-----
```

```
=====
Fortran, C       | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                  | 628.pop2_s(base, peak)
-----
```

```
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-----
```

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
```



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

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

Test Date: Feb-2020
Hardware Availability: Jan-2020
Software Availability: Sep-2019

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:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

Fortran benchmarks:

```
-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

Peak Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

Fortran benchmarks:

```
ifort -m64
```

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

CPU2017 License: 9006

Test Sponsor: NEC Corporation

Tested by: NEC Corporation

Test Date: Feb-2020

Hardware Availability: Jan-2020

Software Availability: Sep-2019

Peak Compiler Invocation (Continued)

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: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-DSPEC_OPENMP
```

```
638.imagick_s: basepeak = yes
```

```
644.nab_s: Same as 619.lbm_s
```

Fortran benchmarks:

```
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=4  
-qopenmp -nostandard-realloc-lhs
```

```
649.fotonik3d_s: Same as 603.bwaves_s
```

```
654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4  
-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=4 -DSPEC_SUPPRESS_OPENMP -qopenmp  
-DSPEC_OPENMP -nostandard-realloc-lhs
```

(Continued on next page)



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation

SPECspeed®2017_fp_base = 27.3

Express5800/R110j-1 (Intel Xeon E-2234)

SPECspeed®2017_fp_peak = 28.8

CPU2017 License: 9006

Test Sponsor: NEC Corporation

Tested by: NEC Corporation

Test Date: Feb-2020

Hardware Availability: Jan-2020

Software Availability: Sep-2019

Peak Optimization Flags (Continued)

```
627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs
```

```
628.pop2_s: basepeak = yes
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html>

<http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-R110j-RevD.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml>

<http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-R110j-RevD.xml>

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.1.0 on 2020-02-19 23:00:17-0500.

Report generated on 2020-03-17 16:15:48 by CPU2017 PDF formatter v6255.

Originally published on 2020-03-17.