SPEC® CPU2017 Floating Point Rate Result

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NEC Corporation

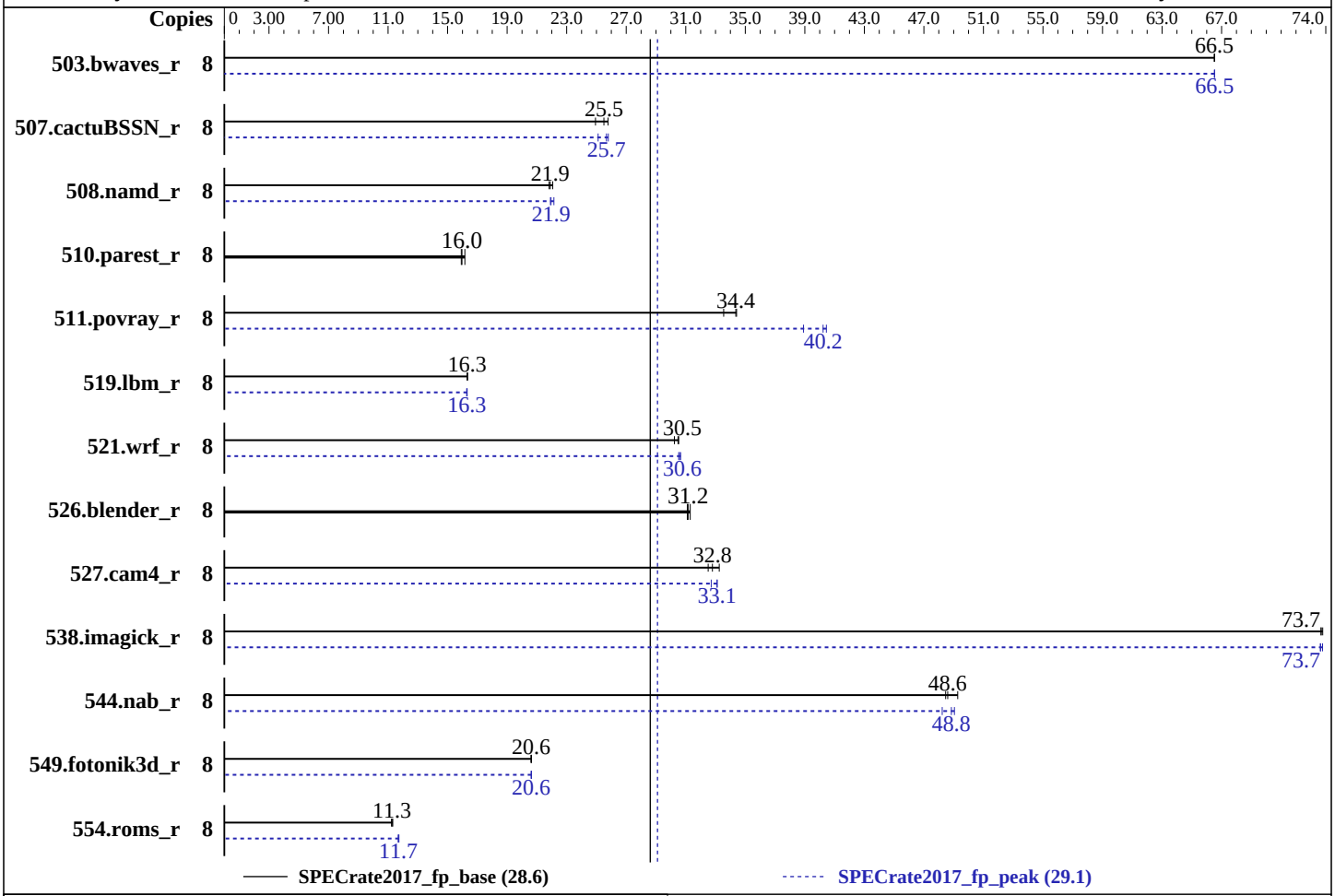
Express5800/R110i-1 (Intel Xeon E3-1230 v6)

SPECrate2017_fp_base = 28.6

SPECrate2017_fp_peak = 29.1

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

Test Date: Oct-2018
Hardware Availability: Apr-2017
Software Availability: Mar-2018



Hardware

CPU Name:	Intel Xeon E3-1230 v6
Max MHz.:	3900
Nominal:	3500
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:	64 GB (4 x 16 GB 2Rx8 PC4-2400T-E)
Storage:	1 x 1 TB SATA, 7200 RPM
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:	No
Firmware:	Version 5.0.3006 02/28/2018 released Apr-2018
File System:	ext4
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	8	**1206**	**66.5**	1206	66.5	1206	66.5	8	1206	66.5	**1206**	**66.5**	1206	66.5
507.cactuBSSN_r	8	406	24.9	**397**	**25.5**	393	25.8	8	393	25.8	403	25.1	**395**	**25.7**
508.namd_r	8	344	22.1	**347**	**21.9**	348	21.8	8	**346**	**21.9**	343	22.1	347	21.9
510.parest_r	8	**1311**	**16.0**	1295	16.2	1315	15.9	8	**1311**	**16.0**	1295	16.2	1315	15.9
511.povray_r	8	**544**	**34.4**	543	34.4	557	33.5	8	**464**	**40.2**	462	40.4	480	38.9
519.lbm_r	8	516	16.3	517	16.3	**516**	**16.3**	8	518	16.3	517	16.3	**517**	**16.3**
521.wrf_r	8	587	30.5	**588**	**30.5**	593	30.2	8	585	30.7	587	30.5	**586**	**30.6**
526.blender_r	8	389	31.3	392	31.1	**391**	**31.2**	8	389	31.3	392	31.1	**391**	**31.2**
527.cam4_r	8	421	33.3	**427**	**32.8**	430	32.5	8	423	33.1	**423**	**33.1**	428	32.7
538.imagick_r	8	270	73.7	**270**	**73.7**	270	73.8	8	270	73.8	**270**	**73.7**	270	73.6
544.nab_r	8	273	49.3	278	48.5	**277**	**48.6**	8	274	49.1	279	48.2	**276**	**48.8**
549.fotonik3d_r	8	**1512**	**20.6**	1511	20.6	1513	20.6	8	**1512**	**20.6**	1511	20.6	1512	20.6
554.roms_r	8	1123	11.3	**1128**	**11.3**	1132	11.2	8	1084	11.7	**1087**	**11.7**	1087	11.7

SPECrate2017_fp_base = 28.6

SPECrate2017_fp_peak = 29.1

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"
```

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 i7-6700K 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.
```

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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:
 Power Management Policy: Custom
 Energy Performance: Performance
 DCU Streamer Prefetcher: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r110i1 Wed Oct 17 19:16:28 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) CPU E3-1230 v6 @ 3.50GHz
      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) CPU E3-1230 v6 @ 3.50GHz
     Stepping:              9
     CPU MHz:               3142.207
```

(Continued on next page)

Platform Notes (Continued)

```
      CPU max MHz:           3900.0000
      CPU min MHz:           800.0000
      BogoMIPS:              7008.00
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              256K
      L3 cache:              8192K
      NUMA node0 CPU(s):     0-7
      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 sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
      avx f16c rdrand lahf_lm abm 3dnowprefetch epb 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 mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1
      dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp

  /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: 65474 MB
    node 0 free: 63615 MB
    node distances:
    node   0
      0:  10

  From /proc/meminfo
     MemTotal:       65915156 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"
        VERSION_ID="7.4"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
```

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Platform Notes (Continued)

```
    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 r110i1 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 Oct 17 19:10

  SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      ext4  909G   87G  776G  11% /

  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. 5.0.3006 02/28/2018
    Memory:
     4x Micron 18ASF2G72AZ-2G3B1 16 GB 2 rank 2400

  (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC   519.lbm_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
 CXXC 508.namd_r(base) 510.parest_r(base, peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 508.namd_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CC  511.povray_r(base) 526.blender_r(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.
------------------------------------------------------------------------------

==============================================================================
CC   511.povray_r(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.
------------------------------------------------------------------------------

==============================================================================
 FC  507.cactuBSSN_r(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  503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
```

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Compiler Version Notes (Continued)

```
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC   554.roms_r(peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CC  521.wrf_r(base) 527.cam4_r(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   521.wrf_r(peak) 527.cam4_r(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.
------------------------------------------------------------------------------
```

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
```

Benchmarks using both C and C++:
```
icpc -m64 icc -m64 -std=c11
```

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Base Compiler Invocation (Continued)

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:
-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 -auto -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=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

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 -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`

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Peak Optimization Flags (Continued)

544.nab_r: Same as 538.imagick_r

C++ benchmarks:

508.namd_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

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -auto
-nostandard-realloc-lhs

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 -auto -nostandard-realloc-lhs

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 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:

511.povray_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

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

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-110i-RevA.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-110i-RevA.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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