## SPEC® CPU2017 Floating Point Rate Result

**NEC Corporation**

**Express5800/T110j (Intel Xeon E-2134)**

<table>
<thead>
<tr>
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<th>SPECrate2017_fp_base = 31.3</th>
<th>SPECrate2017_fp_peak = 31.8</th>
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### Hardware

- **CPU Name:** Intel Xeon E-2134
- **Max MHz.:** 4500
- **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 core
- **Other:** None
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
- **Storage:** 1 x 4 TB SATA, 7200 RPM
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.5 (Maipo)
- **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:** 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

---

<table>
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<tr>
<th>Benchmark</th>
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<th>SPECrate2017_fp_peak (31.8)</th>
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Results Table

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<td>1039</td>
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</tr>
</tbody>
</table>

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 i7-6700K 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)
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CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Apr-2019
Hardware Availability: Dec-2018
Software Availability: Aug-2018

General Notes (Continued)

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.

Platform Notes

BIOS Settings:
VT-x: Disabled
Energy Efficient P-state: Disabled
Energy Efficient Turbo: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on t110j Fri Apr  5 18:54:19 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) Xeon(R) E-2134 CPU @ 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 lspcup:
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-2134 CPU @ 3.50GHz
Stepping: 10

(Continued on next page)
### NEC Corporation

**Express5800/T110j (Intel Xeon E-2134)**

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**Test Sponsor:** NEC Corporation  
**Hardware Availability:** Dec-2018  
**Test Sponsor:** NEC Corporation  
**Software Availability:** Aug-2018  
**Test Date:** Apr-2019

### Platform Notes (Continued)

- **CPU MHz:** 4280.578
- **CPU max MHz:** 4500.0000
- **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 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 intel_pt ssbd ibp ibpib stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 iesms invpcid rtm rmta adx smap clflushopt xsaveopt xsavec xgetbv1 dtherm ida arat pls hwp hwp_notify hwp_act_window hwp-epp spec_ctrl intel_stibp flush_lid

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.
- **node 0 cpus:** 0 1 2 3 4 5 6 7
- **node 0 size:** 65455 MB
- **node 0 free:** 63568 MB
- **node distances:**
  - node 0
  - 0: 10

From `/proc/meminfo`
- **MemTotal:** 65894652 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

From `/etc/*release* /etc/*version*`

```
NAME="Red Hat Enterprise Linux Server"
VERSION="7.5 (Maipo)"
ID=rhel
ID_LIKE=fedora
VARIANT=Server
VARIANT_ID=server
VERSION_ID="7.5"
```
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Platform Notes (Continued)

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)
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
ox86_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, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Apr 5 18:48

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 3.6T 89G 3.4T 3% /

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

(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)
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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
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 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)
```

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### Compiler Version Notes (Continued)

```
ifort (IFORT) 18.0.2 20180210
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)
```

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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:**  
```
icp -m64
```

**Fortran benchmarks:**  
```
ifort -m64
```

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

**Benchmarks using both C and C++:**  
```
icp -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

(Continued on next page)
# SPEC CPU2017 Floating Point Rate Result

**NEC Corporation**  
**Express5800/T110j (Intel Xeon E-2134)**  

<table>
<thead>
<tr>
<th>SPECrate2017_fp_peak</th>
<th>31.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_base</td>
<td>31.3</td>
</tr>
</tbody>
</table>

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

## Peak Optimization Flags (Continued)

544.nab_r: basepeak = yes

### 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:

521.wrf_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

527.cam4_r: basepeak = yes

### 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: -xCORE-AVX2 -ipo -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
SPEC CPU2017 Floating Point Rate Result

NEC Corporation

Express5800/T110j (Intel Xeon E-2134)

SPECrate2017_fp_base = 31.3
SPECrate2017_fp_peak = 31.8

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

Test Date: Apr-2019
Hardware Availability: Dec-2018
Software Availability: Aug-2018

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

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

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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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