# SPEC® CPU2017 Floating Point Rate Result

## NEC Corporation

Express5800/D120h (Intel Xeon Gold 6130)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9006</th>
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<tbody>
<tr>
<td>Test Sponsor:</td>
<td>NEC Corporation</td>
</tr>
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<td>Tested by:</td>
<td>NEC Corporation</td>
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**Test Date:** Jul-2018  
**Hardware Availability:** Jan-2018  
**Software Availability:** Mar-2018

### Copies

<table>
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<tr>
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<tr>
<td>554.roms_r</td>
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</tbody>
</table>

### SPECrate2017_fp_base = 83.3

### SPECrate2017_fp_peak = 85.5

---

### Hardware

- **CPU Name:** Intel Xeon Gold 6130  
- **Max MHz.:** 3700  
- **Nominal:** 2100  
- **Enabled:** 16 cores, 1 chip, 2 threads/core  
- **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:** 22 MB I+D on chip per chip  
- **Memory:** 192 GB (6 x 32 GB 2Rx4 PC4-2666V-R)  
- **Storage:** 1 x 1 TB SATA, 7200 RPM  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
- **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:** Version F21 02/22/2018 released Apr-2018  
- **File System:** ext4  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None
SPEC CPU2017 Floating Point Rate Result

NEC Corporation

Express5800/D120h (Intel Xeon Gold 6130) SPECrate2017_fp_base = 83.3
SPECrate2017_fp_peak = 85.5

Results Table

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</tbody>
</table>

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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 i7-4790 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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
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SPECrate2017_fp_base = 83.3
SPECrate2017_fp_peak = 85.5

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

Test Date: Jul-2018
Hardware Availability: Jan-2018
Software Availability: Mar-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:
ENERGY_PERF_BIAS_CFG mode: Performance
SNC: Enable
IMC Interleaving: 1-way Interleave
LLC dead line alloc: Disable
Patrol Scrub: Disable
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc091c0f
running on d120h Sat Jul 21 23:00:42 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) Gold 6130 CPU @ 2.10GHz
  1 "physical id"s (chips)
  32 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
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Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 6130 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2381.531
CPU max MHz: 3700.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-3,8-11,16-19,24-27
NUMA node1 CPU(s): 4-7,12-15,20-23,28-31
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 no管理体制	
a arch_perfmon eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma
cx16 xtpr pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_13 cd_p_l3 invpcid_single
intel_pt spec_ctrl ibpb_support tpr_shadow vnumi flexpriority ept vpid fsqgsbase
tsc_adjust bmi1 bmi2 bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq
rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl vscodeav xgetbv1
cqm_llc cqm_occup_llc cqm_mbbb_total cqm_mbbb_local dtherm ida arat pln pts hwp
hwp_act_window hwp_pgp_req

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

From /proc/meminfo
MemTotal: 196476032kB
HugePages_Total: 0
Hugepagesize: 2048kB

(Continued on next page)
### Platform Notes (Continued)

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

```bash
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)"
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 d120h 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
```

`run-level 3 Jul 21 22:55`

`SPEC is set to: /home/cpu2017`

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<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>ext4</td>
<td>909G</td>
<td>403G</td>
<td>460G</td>
<td>47%</td>
<td>/</td>
</tr>
</tbody>
</table>

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 GIGABYTE F21 02/22/2018`

`Memory:`
- 10x NO DIMM NO DIMM
- 6x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(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.
`;Continued on next page`
## NEC Corporation

### Express5800/D120h (Intel Xeon Gold 6130)

<table>
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<tbody>
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### Compiler Version Notes (Continued)

```plaintext
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.

=================================
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.
icpc (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.
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

=================================
FC 507.cactuBSSN_r(base)
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icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icpc (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.
```

(Continued on next page)
NEC Corporation
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Compiler Version Notes (Continued)

==============================================================================
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
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FC  503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
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ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC   554.roms_r(peak)
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icc (ICC) 18.0.0 20170811
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### Base Compiler Invocation

- **C benchmarks**: `icc`
- **C++ benchmarks**: `icpc`
- **Fortran benchmarks**: `ifort`
- **Benchmarks using both Fortran and C**: `ifort icc`
- **Benchmarks using both C and C++**: `icpc icc`
- **Benchmarks using Fortran, C, and C++**: `icpc icc ifort`

### Base Portability Flags

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<th>Benchmark</th>
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<td><code>-DSPEC_LP64</code></td>
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<tr>
<td>519.lbm_r</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>521.wrf_r</td>
<td><code>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</code></td>
</tr>
<tr>
<td>526.blender_r</td>
<td><code>-DSPEC_LP64 -DSPEC_LINUX -funsigned-char</code></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td><code>-DSPEC_LP64 -DSPEC_CASE_FLAG</code></td>
</tr>
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</tr>
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</table>

### 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`

(Continued on next page)
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### Base Optimization Flags (Continued)

**C++ benchmarks (continued):**
- -qopt-mem-layout-trans=3

**Fortran benchmarks:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- -qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

**Benchmarks using both Fortran and C:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- -qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

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

**Benchmarks using Fortran, C, and C++:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- -qopt-mem-layout-trans=3 -nstandard-realloc-lhs -align array32byte

### Base Other Flags

**C benchmarks:**
- -m64 -std=c11

**C++ benchmarks:**
- -m64

**Fortran benchmarks:**
- -m64

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

**Benchmarks using both C and C++:**
- -m64 -std=c11

**Benchmarks using Fortran, C, and C++:**
- -m64 -std=c11
## SPEC CPU2017 Floating Point Rate Result

**NEC Corporation**

**Express5800/D120h (Intel Xeon Gold 6130)**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base = 83.3</th>
<th>SPECrate2017_fp_peak = 85.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 9006</td>
<td>Test Date: Jul-2018</td>
</tr>
<tr>
<td>Test Sponsor: NEC Corporation</td>
<td>Hardware Availability: Jan-2018</td>
</tr>
<tr>
<td>Tested by: NEC Corporation</td>
<td>Software Availability: Mar-2018</td>
</tr>
</tbody>
</table>

### Peak Compiler Invocation

- **C benchmarks:**
  - icc

- **C++ benchmarks:**
  - icpc

- **Fortran benchmarks:**
  - ifort

- **Benchmarks using both Fortran and C:**
  - ifort icc

- **Benchmarks using both C and C++:**
  - icpc icc

- **Benchmarks using Fortran, C, and C++:**
  - icpc icc ifort

### 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
  - 544.nab_r: Same as 519.lbm_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
**Peak Optimization Flags (Continued)**

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: -$CORE-AVX2 $ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
-nostandard-realloc-lhs -align array32byte

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -$CORE-AVX2 -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) -$CORE-AVX2 -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) -$CORE-AVX2 -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

**Peak Other Flags**

C benchmarks:

-m64 -std=c11

C++ benchmarks:

-m64

Fortran benchmarks:

-m64

Benchmarks using both Fortran and C:

-m64 -std=c11

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

NEC Corporation
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The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-D120h-RevA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-D120h-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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