## NEC Corporation

**Express5800/R120h-2M (Intel Xeon Gold 5115)**

**SPECrate2017_fp_base** = 118

**SPECrate2017_fp_peak** = 121

### Hardware

- **CPU Name:** Intel Xeon Gold 5115
- **Max MHz.:** 3200
- **Nominal:** 2400
- **Enabled:** 20 cores, 2 chips, 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:** 13.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)
- **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:** No
- **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:** None
SPEC CPU2017 Floating Point Rate Result

NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 5115)

SPECrate2017_fp_base = 118
SPECrate2017_fp_peak = 121

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NEC Corporation

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

Hardware Availability: Jun-2018
Software Availability: Mar-2018

Results Table

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</tbody>
</table>

SPECrate2017_fp_base = 118
SPECrate2017_fp_peak = 121

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

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 i7-6700K 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
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)

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

**NEC Corporation**

Express5800/R120h-2M (Intel Xeon Gold 5115)

<table>
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**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Aug-2018  
**Hardware Availability:** Jun-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:**
- Thermal Configuration: Maximum Cooling  
- Workload Profile: General Throughput Compute  
- Memory Patrol Scrubbing: Disabled  
- LLC Dead Line Allocation: Disabled  
- LLC Prefetch: Enabled  
- Workload Profile: Custom  
- Sub-NUMA Clustering: Disabled  
- Sysinfo program /home/cpu2017/bin/sysinfo  
- Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
- running on r120h2m Tue Aug 21 19:37:30 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 5115 CPU @ 2.40GHz  
- 2 "physical id"s (chips)  
- 40 "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: 10  
- siblings : 20  
- physical 0: cores 0 1 2 3 4 8 9 10 11 12  
- physical 1: cores 0 1 2 3 4 8 9 10 11 12

From `lscpu`:

- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 40  
- On-line CPU(s) list: 0-39  
- Thread(s) per core: 2  
- Core(s) per socket: 10  
- Socket(s): 2  
- NUMA node(s): 2

(Continued on next page)
## NEC Corporation

**Express5800/R120h-2M (Intel Xeon Gold 5115)**

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**SPECrate2017_fp_base = 118**

**SPECrate2017_fp_peak = 121**

---

**Platform Notes (Continued)**

- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 5115 CPU @ 2.40GHz
- **Stepping:** 4
- **CPU MHz:** 2400.000
- **BogoMIPS:** 4800.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 14080K
- **NUMA node0 CPU(s):** 0-9,20-29
- **NUMA node1 CPU(s):** 10-19,30-39
- **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 xtpre pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch 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_mbb_total cqm_mbb_local dtherm ida arat pln pts

From `/proc/cpuinfo`

```
cache size : 14080 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 3 4 5 6 7 8 9 20 21 22 23 24 25 26 27 28 29
node 0 size: 97964 MB
node 0 free: 95460 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 98303 MB
node 1 free: 95945 MB
node distances:
  node  0  1
  0: 10  21
  1: 21  10
```

From `/proc/meminfo`

```
MemTotal: 197747508 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

(Continued on next page)
NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 5115)

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

**Platform Notes (Continued)**

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

```plaintext
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 r120h2m 3.10.0-693.21.1.el7.x86_64 #1 SMP Fri Feb 23 18:54:16 UTC 2018 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 Aug 21 19:31

SPEC is set to: /home/cpu2017

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 HPE 876319-081 8 GB 2 rank 2666, configured at 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)
```
## SPEC CPU2017 Floating Point Rate Result

### NEC Corporation

**Express5800/R120h-2M (Intel Xeon Gold 5115)**

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### Compiler Version Notes (Continued)

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

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**CC 519.lbm_r(peak)**

- icc (ICC) 18.0.2 20180210
  - Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

**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
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---

**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.
NEC Corporation
Express5800/R120h-2M (Intel Xeon Gold 5115)

SPEC CPU2017 Floating Point Rate Result

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Compiler Version Notes (Continued)

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.

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FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
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icc (ICC) 18.0.2 20180210
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---------------------------------------------------------------
Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

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### NEC Corporation

**Express5800/R120h-2M (Intel Xeon Gold 5115)**

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#### Base Compiler Invocation (Continued)

**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`

#### Base Portability Flags

<table>
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<td>519.libm_r: -DSPEC_LP64</td>
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<td>521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
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<td>526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char</td>
</tr>
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<td>527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG</td>
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#### 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`

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SPEC CPU2017 Floating Point Rate Result
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Express5800/R120h-2M (Intel Xeon Gold 5115)

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Base Optimization Flags (Continued)

- 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

- 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:

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

NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 5115)  

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</tr>
</thead>
<tbody>
<tr>
<td>118</td>
<td>121</td>
</tr>
</tbody>
</table>

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

Test Date: Aug-2018
Hardware Availability: Jun-2018
Software Availability: Mar-2018

Peak Optimization Flags (Continued)

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: basepeak = yes

544.nab_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

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: -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 -auto -nostandard-realloc-lhs
SPEC CPU2017 Floating Point Rate Result

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Express5800/R120h-2M (Intel Xeon Gold 5115)

| SPECrate2017_fp_base = 118 |
| SPECrate2017_fp_peak = 121 |

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Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Aug-2018
Hardware Availability: Jun-2018
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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-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

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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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