# NEC Corporation

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

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>77.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>78.0</td>
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**Cpu2017 License:** 9006  
**Test Date:** Aug-2018  
**Test Sponsor:** NEC Corporation  
**Hardware Availability:** Jun-2018  
**Tested by:** NEC Corporation  
**Software Availability:** Mar-2018

## Threads

<table>
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<tr>
<th>Benchmark</th>
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<th>SPECspeed2017_fp_peak</th>
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<td>20</td>
<td>96.7</td>
<td>78.0</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>20</td>
<td>35.9</td>
<td>77.2</td>
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<tr>
<td>619.lbm_s</td>
<td>20</td>
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<td>77.2</td>
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<tr>
<td>621.wrf_s</td>
<td>20</td>
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<td>78.0</td>
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<tr>
<td>627.cam4_s</td>
<td>20</td>
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<td>78.0</td>
</tr>
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<td>20</td>
<td>57.0</td>
<td>78.0</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>20</td>
<td>58.9</td>
<td>78.0</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>20</td>
<td>118</td>
<td>78.0</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>20</td>
<td>68.5</td>
<td>78.0</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>20</td>
<td>73.6</td>
<td>78.0</td>
</tr>
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## Hardware

- **CPU Name:** Intel Xeon Gold 5115  
- **Max MHz:** 3200  
- **Nominal:** 2400  
- **Enabled:** 20 cores, 2 chips  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 13.75 MB I+D on chip per core  
- **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:** Yes  
- **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:** jemalloc memory allocator V5.0.1
SPEC CPU2017 Floating Point Speed Result

NEC Corporation

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

SPECspeed2017_fp_base = 77.2
SPECspeed2017_fp_peak = 78.0

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<th>Seconds</th>
<th>Ratio</th>
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<td>68.6</td>
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<tr>
<td>654.roms_s</td>
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<td>73.6</td>
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<td>73.6</td>
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<td>73.4</td>
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<td>73.6</td>
<td>214</td>
<td>73.6</td>
<td>215</td>
<td>73.4</td>
</tr>
</tbody>
</table>

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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

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.
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.

jemalloc, a general purpose malloc implementation
built with the Redhat Enterprise 7.5, and the system compiler gcc 4.8.5
**Platform Notes**

BIOS Settings:
- Thermal Configuration: Maximum Cooling
- Workload Profile: General Peak Frequency Compute
- Intel Hyper-Threading: Disabled
- Memory Patrol Scrubbing: Disabled
- Energy/Performance Bias: Maximum Performance
- LLC Dead Line Allocation: Disabled
- Workload Profile: Custom
- NUMA Group Size Optimization: Flat
- Adjacent Sector Prefetch: Disabled
- DCU Stream Prefetcher: Disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r120h2m Fri Aug 24 06:00:14 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

```plaintext
model name : Intel(R) Xeon(R) Gold 5115 CPU @ 2.40GHz
  2 "physical id"s (chips)
  20 "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 : 10
  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:

```plaintext
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 20
On-line CPU(s) list: 0-19
Thread(s) per core: 1
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
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
```

(Continued on next page)
**SPEC CPU2017 Floating Point Speed Result**

**NEC Corporation**

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

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**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Software Availability:** Mar-2018  
**Hardware Availability:** Jun-2018

**Platform Notes (Continued)**

Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 14080K  
NUMA node0 CPU(s): 0-9  
NUMA node1 CPU(s): 10-19  
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 apic pmr nonstop_tsc aperf perf_event eagerfpu pni pclmulqdq dtes64monitor ds_cpl vmx smx est tm2 ssse3 fma cx16 xtpre pdcm pdcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abmh 3dnowprefetch epb cat_l3 cdp_l3 invpcid_single intel_pt spec_ctrl ibpb support tpr_shadow vmmx 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 xsavesvc xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtmemp ida arat pln pts

/proc/cpuinfo cache data  
  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  
  node 0 size: 97964 MB  
  node 0 free: 95535 MB  
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19  
  node 1 size: 98303 MB  
  node 1 free: 95933 MB  
  node distances:  
    node 0 1  
    0: 10 21  
    1: 21 10

From /proc/meminfo  
  MemTotal: 197750308 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"

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

NEC Corporation

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

| SPECspeed2017 fp_base = 77.2 |
| SPECspeed2017 fp_peak = 78.0 |

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**Platform Notes (Continued)**

```plaintext
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 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 24 05:54

SPEC is set to: /home/cpu2017

<table>
<thead>
<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>396G</td>
<td>467G</td>
<td>46%</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 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**

```plaintext
==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  619.lbm_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
```

(Continued on next page)
**SPEC CPU2017 Floating Point Speed Result**

**NEC Corporation**

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

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**SPECspeed2017_fp_base = 77.2**

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<td>Copyright (C) 1985–2018 Intel Corporation. All rights reserved.</td>
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</table>

```plaintext
FC 607.cactuBSSN_s(base, peak)
```

```plaintext
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.
```

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

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.
```

```plaintext
FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
```

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.
```

```plaintext
CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
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```

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

```plaintext
CC 621.wrf_s(peak) 628.pop2_s(peak)
```

```plaintext
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985–2018 Intel Corporation. All rights reserved.
```

```plaintext
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```
NEC Corporation
Express5800/R120h-2M (Intel Xeon Gold 5115)

SPECspeed2017_fp_base = 77.2
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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

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:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
 -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp
 -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Benchmarks using both Fortran and C:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
 -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

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**Base Optimization Flags (Continued)**

Benchmarks using Fortran, C, and C++:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

**Peak 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

**Peak Portability Flags**

Same as Base Portability Flags

**Peak Optimization Flags**

C benchmarks:
619.lbm_s: basepeak = yes

638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

644.nab_s: basepeak = yes

Fortran benchmarks:

(Continued on next page)
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Software Availability: Mar-2018

Peak Optimization Flags (Continued)

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=3 -qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

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=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

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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