NEC Corporation
Express5800/R120h-2E (Intel Xeon Bronze 3106)

SPECspeed2017_fp_base = 46.3
SPECspeed2017_fp_peak = 47.1

<table>
<thead>
<tr>
<th>Software</th>
<th>Software</th>
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<tr>
<td>OS: Red Hat Enterprise Linux Server release 7.4</td>
<td>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</td>
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<tr>
<td>Kernel 3.10.0-693.21.1.el7.x86_64</td>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>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</td>
<td>Firmware: NEC BIOS Version U31 02/14/2018 released Mar-2018</td>
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<tr>
<td>File System: ext4</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>Peak Pointers: 64-bit</td>
</tr>
<tr>
<td>Other: jemalloc memory allocator V5.0.1</td>
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<table>
<thead>
<tr>
<th>Hardware</th>
<th>Hardware</th>
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<tbody>
<tr>
<td>CPU Name: Intel Xeon Bronze 3106</td>
<td>OS: Red Hat Enterprise Linux Server release 7.4</td>
</tr>
<tr>
<td>Max MHz.: 1700</td>
<td>(Maipo)</td>
</tr>
<tr>
<td>Nominal: 1700</td>
<td>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</td>
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<tr>
<td>Enabled: 16 cores, 2 chips</td>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>Orderable: 1,2 chips</td>
<td>Firmware: NEC BIOS Version U31 02/14/2018 released Mar-2018</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>File System: ext4</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>System State: Run level 3 (multi-user)</td>
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<tr>
<td>L3: 11 MB I+D on chip per chip</td>
<td>Base Pointers: 64-bit</td>
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<tr>
<td>Other: None</td>
<td>Peak Pointers: 64-bit</td>
</tr>
<tr>
<td>Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Storage: 1 x 600 GB SAS, 15000 RPM, RAID 0</td>
<td></td>
</tr>
</tbody>
</table>
### SPEC CPU2017 Floating Point Speed Result

**NEC Corporation**

Express5800/R120h-2E (Intel Xeon Bronze 3106)

**SPECspeed2017_fp_base = 46.3**

**SPECspeed2017_fp_peak = 47.1**

**CPU2017 License:** 9006  
**Test Date:** Jul-2018  
**Test Sponsor:** NEC Corporation  
**Hardware Availability:** Nov-2017  
**Tested by:** NEC Corporation  
**Software Availability:** Mar-2018

#### Results Table

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<th>Benchmark</th>
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<th>Seconds</th>
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<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>607.cactuBSSN_s</td>
<td>16</td>
<td>279</td>
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<td>56.6</td>
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<td><strong>34.2</strong></td>
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<td>34.4</td>
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<td>627.cam4_s</td>
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<td>649.fotonik3d_s</td>
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<td>304</td>
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<td><strong>51.9</strong></td>
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</tbody>
</table>

**SPECspeed2017_fp_base = 46.3**  
**SPECspeed2017_fp_peak = 47.1**

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.

NEC Corporation

Express5800/R120h-2E (Intel Xeon Bronze 3106)

SPEC CPU2017 Floating Point Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECspeed2017_fp_base = 46.3
SPECspeed2017_fp_peak = 47.1

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

Test Date: Jul-2018
Hardware Availability: Nov-2017
Software Availability: Mar-2018

Platform Notes

BIOS Settings:
Thermal Configuration: Maximum Cooling
Workload Profile: General Peak Frequency Compute
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 r120h2e Fri Jul 20 09:14:46 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) Bronze 3106 CPU @ 1.70GHz
  2 "physical id"s (chips)
  16 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3106 CPU @ 1.70GHz
Stepping: 4
CPU MHz: 1700.000
BogoMIPS: 3400.00
Virtualization: VT-x

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

NEC Corporation

Express5800/R120h-2E (Intel Xeon Bronze 3106)

SPECspeed2017_fp_base = 46.3
SPECspeed2017_fp_peak = 47.1

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

Test Date: Jul-2018
Hardware Availability: Nov-2017
Software Availability: Mar-2018

Platform Notes (Continued)

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-3,8-11
NUMA node1 CPU(s): 4-7,12-15
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 mce cx8 apic
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp

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 8 9 10 11
node 0 size: 97964 MB
node 0 free: 95467 MB
node 1 cpus: 4 5 6 7 12 13 14 15
node 1 size: 98303 MB
node 1 free: 95961 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 197751812 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"

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

NEC Corporation

Express5800/R120h-2E (Intel Xeon Bronze 3106)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>46.3</td>
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</table>

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

Test Date: Jul-2018
Hardware Availability: Nov-2017
Software Availability: Mar-2018

Platform Notes (Continued)

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 r120h2e 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 Jul 20 09:09
SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 542G 341G 174G 67% /

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 U31 02/14/2018
Memory:
4x UNKNOWN NOT AVAILABLE
12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
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)
### NEC Corporation

#### Express5800/R120h-2E (Intel Xeon Bronze 3106)

**SPECspeed2017_fp_base** = 46.3

**SPECspeed2017_fp_peak** = 47.1

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<td>NEC Corporation</td>
<td>Nov-2017</td>
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<td>Mar-2018</td>
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</tbody>
</table>

**Compiler Version Notes (Continued)**

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

---

FC  607.cactuBSSN_s(base, peak)

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

---

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

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

---

FC  603.bwaves_s(peak) 649.fotonik3d_s(peak)

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

---

CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(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  621.wrf_s(peak) 628.pop2_s(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.
SPECFP2017 Floating Point Speed Result

NEC Corporation
Express5800/R120h-2E (Intel Xeon Bronze 3106)

SPECspeed2017_fp_base = 46.3
SPECspeed2017_fp_peak = 47.1

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation
Test Date: Jul-2018
Hardware Availability: Nov-2017
Software Availability: Mar-2018

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)
NEC Corporation

Express5800/R120h-2E (Intel Xeon Bronze 3106)

| SPECspeed2017_fp_base = 46.3 |
| SPECspeed2017_fp_peak = 47.1 |

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

Test Date: Jul-2018
Hardware Availability: Nov-2017
Software Availability: Mar-2018

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)
NEC Corporation
Express5800/R120h-2E (Intel Xeon Bronze 3106)

<table>
<thead>
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<th>SPECspeed2017 fp_base</th>
<th>SPECspeed2017 fp_peak</th>
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</tr>
</tbody>
</table>

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

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

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.

Tested with SPEC CPU2017 v1.0.5 on 2018-07-19 20:14:44-0400.
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