# SPEC CPU®2017 Floating Point Rate Result

## NEC Corporation

**Express5800/T110j (Intel Pentium Gold G5420)**

<table>
<thead>
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<th>Copies</th>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<td>503.bwaves_r</td>
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<tr>
<td>507.cactuBSSN_r</td>
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<td>508.namd_r</td>
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<td>510.parest_r</td>
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<td>527.cam4_r</td>
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<td>538.imagick_r</td>
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<td>544.nab_r</td>
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<td>554.roms_r</td>
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</table>

**Hardware**

- **CPU Name:** Intel Pentium Gold G5420
- **Max MHz:** 3800
- **Nominal:** 3800
- **Enabled:** 2 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:** 4 MB I+D on chip per chip
- **Other:** None
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400)
- **Storage:** 1 x 2 TB SATA, 7200 RPM
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux Server release 7.7 (Maipo)
- **Compiler:** C/C++: Version 19.0.0.117 of Intel C/C++ Compiler Build 20180804 for Linux;
  Fortran: Version 19.0.0.117 of Intel Fortran Compiler Build 20180804 for Linux
- **Parallel:** No
- **Firmware:** NEC BIOS Version F01 08/21/2019 released Nov-2019
- **File System:** ext4
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** --
SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

NEC Corporation
Exprss5800/T110j (Intel Pentium Gold G5420)

SPECrate®2017_fp_base = 15.6
SPECrate®2017_fp_peak = 15.9

Results Table

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</tr>
</tbody>
</table>

SPECrate®2017_fp_base = 15.6
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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/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 i9–799X 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.

(Continued on next page)
NEC Corporation

Express5800/T110j (Intel Pentium Gold G5420)

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<td>CPU2017 License: 9006</td>
<td>Test Date: Oct-2019</td>
</tr>
<tr>
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<td>Hardware Availability: Nov-2019</td>
</tr>
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<td>Software Availability: Aug-2019</td>
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</tbody>
</table>

General Notes (Continued)

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
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on t110j Thu Oct 31 17:17:33 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) Pentium(R) Gold G5420 CPU @ 3.80GHz
  1 "physical id"s (chips)
  4 "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 : 2
siblings : 4
physical 0: cores 0 1

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 4
On-line CPU(s) list: 0-3
Thread(s) per core: 2
Core(s) per socket: 2
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Pentium(R) Gold G5420 CPU @ 3.80GHz
Stepping: 11
CPU MHz: 3800.000
CPU max MHz: 3800.0000
CPU min MHz: 800.0000

(Continued on next page)
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CPU2017 License: 9006
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Platform Notes (Continued)

BogoMIPS: 7584.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 4096K
NUMA node0 CPU(s): 0-3
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 est tm2 ssse3 sdbg cx16
xtrm pdcmd pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave rdrand
lahf_lm abm 3nowprefetch epb intel_pt ssbd ibrs ibpb stibp tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust smep erms invpcid mxpeg fpgas bpe smpactiv
hwpעים lmp cef xsaveopt xsavec xgetbv1 dtherm arat pln pts hwp hwp_notify hwp_act_window
hwp_epp md_clear spec_ctrl intel_stibp flush_l1d

From /proc/cpuinfo cache data
  cache size: 4096 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0 1 2 3
  node 0 size: 65441 MB
  node 0 free: 63564 MB
  node distances:
    node 0
    0: 10

From /proc/meminfo
  MemTotal: 65880068 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.7 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VARIANT="Server"
    VARIANT_ID="server"
    VERSION_ID="7.7"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.7 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)

(Continued on next page)
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**Test Date:** Oct-2019  
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**Software Availability:** Aug-2019

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**Platform Notes (Continued)**

```plaintext
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.7:ga:server
uname -a:
    Linux t110j 3.10.0-1062.el7.x86_64 #1 SMP Thu Jul 18 20:25:13 UTC 2019 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, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retropine, IBPB

run-level 3 Oct 31 17:11

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda3 ext4 1.8T 41G 1.7T 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. F01 08/21/2019

**Memory:**

4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667

(End of data from sysinfo program)

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**Compiler Version Notes**

```
==================================================================================================
  C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
  | 544.nab_r(base, peak)
==================================================================================================
  Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------

  C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
----------------------------------------------------------------------------------------------
  Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
  Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
----------------------------------------------------------------------------------------------
```

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**Compiler Version Notes (Continued)**

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**C++, C**  |  511.povray_r(base, peak)  526.blender_r(base, peak)  
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**C++, C, Fortran**  |  507.cactuBSSN_r(base, peak)  
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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**Fortran**  |  503.bwaves_r(base, peak)  549.fotonik3d_r(base, peak)  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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**Fortran, C**  |  521.wrf_r(base, peak)  527.cam4_r(base, peak)  
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**Base Compiler Invocation**

C benchmarks:
```plaintext
icc -m64 -std=c11
```

C++ benchmarks:
```plaintext
icpc -m64
```

Fortran benchmarks:
```plaintext
ifort -m64
```

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

Benchmarks using both C and C++:
```plaintext
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```plaintext
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:
```plaintext
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
```

C++ benchmarks:
```plaintext
-xSSE4.2 -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:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both C and C++:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
-align array32byte

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
NEC Corporation

Express5800/T110j (Intel Pentium Gold G5420)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 15.6
SPECrate®2017_fp_peak = 15.9

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

Test Date: Oct-2019
Hardware Availability: Nov-2019
Software Availability: Aug-2019

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  -xSSE4.2  -O3
-no-prec-div  -qopt-prefetch  -ffinite-math-only
-qopt-mem-layout-trans=3

538.imagick_r: -xSSE4.2  -ipo  -O3  -no-prec-div  -qopt-prefetch
-ffinite-math-only  -qopt-mem-layout-trans=3

544.nab_r: Same as 538.imagick_r

C++ benchmarks:

508.namd_r: -prof-gen(pass 1)  -prof-use(pass 2)  -ipo  -xSSE4.2  -O3
-no-prec-div  -qopt-prefetch  -ffinite-math-only
-qopt-mem-layout-trans=3

510.parest_r: -xSSE4.2  -ipo  -O3  -no-prec-div  -qopt-prefetch
-ffinite-math-only  -qopt-mem-layout-trans=3

Fortran benchmarks:

503.bwaves_r: -xSSE4.2  -ipo  -O3  -no-prec-div  -qopt-prefetch
-ffinite-math-only  -qopt-mem-layout-trans=3  -auto
-nostandard-realloc-lhs  -align array32byte

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1)  -prof-use(pass 2)  -ipo  -xSSE4.2  -O3
-no-prec-div  -qopt-prefetch  -ffinite-math-only
-qopt-mem-layout-trans=3  -auto  -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:

-prof-gen(pass 1)  -prof-use(pass 2)  -ipo  -xSSE4.2  -O3  -no-prec-div
-qopt-prefetch  -ffinite-math-only  -qopt-mem-layout-trans=3  -auto
-nostandard-realloc-lhs  -align array32byte

Benchmarks using both C and C++:

(Continued on next page)
PEC CPU®2017 Floating Point Rate Result

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NEC Corporation

Express5800/T110j (Intel Pentium Gold G5420)

SPECrater®2017_fp_base = 15.6
SPECrater®2017_fp_peak = 15.9

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

Test Date: Oct-2019
Hardware Availability: Nov-2019
Software Availability: Aug-2019

Peak Optimization Flags (Continued)

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xSSE4.2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

526.blender_r: -xSSE4.2 -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

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:

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Tested with SPEC CPU®2017 v1.0.5 on 2019-10-31 04:17:33-0400.