## NEC Corporation

**Express5800/R110j-1 (Intel Pentium Gold G5400)**

**SPECrate2017_fp_base = 15.3**

**SPECrate2017_fp_peak = 15.5**

### Hardware

- **CPU Name:** Intel Pentium Gold G5400  
  - **Max MHz.:** 3700  
  - **Nominal:** 3700  
  - **Enabled:** 2 cores, 1 chip, 2 threads/core  
  - **Orderable:** 1 chip  
  - **Cache L1:** 32 KB I + 32 KB D on chip per core  
  - **Cache L2:** 256 KB I+D on chip per core  
  - **Cache L3:** 4 MB I+D on chip per chip  
  - **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400)  
  - **Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0  
  - **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.5 (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:** NEC BIOS Version U43 10/02/2018 released Dec-2018  
  - **File System:** ext4  
  - **System State:** Run level 3 (multi-user)  
  - **Base Pointers:** 64-bit  
  - **Peak Pointers:** 64-bit  
  - **Other:** None

---

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| | | | | | | | | | | | | | | | | | | | | | | | | | 65.4 | |
### SPEC CPU2017 Floating Point Rate Result

#### NEC Corporation

**Express5800/R110j-1 (Intel Pentium Gold G5400)**

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#### SPECrate2017_fp_base = 15.3

#### SPECrate2017_fp_peak = 15.5

### Results Table

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**SPECrate2017_fp_base = 15.3**

**SPECrate2017_fp_peak = 15.5**

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 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
```

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
SPEC CPU2017 Floating Point Rate Result

NEC Corporation

Express5800/R110j-1 (Intel Pentium Gold G5400)  

| SPECrate2017_fp_base = 15.3 |
| SPECrate2017_fp_peak = 15.5 |

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

Test Date: Dec-2018  
Hardware Availability: Jan-2019  
Software Availability: Aug-2018

**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:
- Thermal Configuration: Maximum Cooling
- Intel Virtualization Technology (Intel VT): Disabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0c9109f
running on r110j Sat Dec 1 03:27:57 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) Pentium(R) Gold G5400 CPU @ 3.70GHz
  - 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 G5400 CPU @ 3.70GHz
- Stepping: 11
- CPU MHz: 3686.450
- CPU max MHz: 3700.0000

(Continued on next page)
NEC Corporation

Express5800/R110j-1 (Intel Pentium Gold G5400) | SPECrate2017_fp_base = 15.3
SPECrate2017_fp_peak = 15.5

| Test Sponsor: | NEC Corporation |
| Hardware Availability: | Jan-2019 |
| Software Availability: | Aug-2018 |

CPU2017 License: 9006

Platform Notes (Continued)

CPU min MHz: 800.0000
BogoMIPS: 7392.00
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 bs rep_good nopl xtopology nonstop_tsc
aperfmrperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg cx16
xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave rdrand
lahf_lm abm 3dnowprefetch epb intel_pt ssbd ibrs ibpb stibp tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust smep erms invpcid mxr rdxseed smap
clflushopt xsaveopt xsavec xgetbv1 dtherm arat pln pts hwp hwp_notify hwp_act_window
hwp_epp spec_ctrl intel_stibp flush_lld

(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: 65386 MB
  node 0 free: 63493 MB
  node distances:
  node 0
    0: 10

From /proc/meminfo
  MemTotal: 65822136 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.5 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VARIANT="Server"
    VARIANT_ID="server"
    VERSION_ID="7.5"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.5 (Maipo)"
  redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)

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

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NEC Corporation

Express5800/R110j-1 (Intel Pentium Gold G5400)

SPECrate2017_fp_base = 15.3
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CPU2017 License: 9006
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Tested by: NEC Corporation

Test Date: Dec-2018
Hardware Availability: Jan-2019
Software Availability: Aug-2018

Platform Notes (Continued)

system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server

uname -a:
Linux r110j 3.10.0-862.11.6.el7.x86_64 #1 SMP Fri Aug 10 16:55:11 UTC 2018 x86_64
x86_64 x86_64 GNU/Linux

run-level 3 Dec 1 03:22

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 909G 122G 741G 15% /

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 U43 10/02/2018
Memory:
4x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2400

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.
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==============================================================================
CC  519.lbm_r(peak) 544.nab_r(peak)
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CXXC 508.namd_r(base) 510.parest_r(base)
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------------------------------------------------------------------------------

(Continued on next page)
NEC Corporation

Express5800/R110j-1 (Intel Pentium Gold G5400)

SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_fp_peak = 15.5
SPECrate2017_fp_base = 15.3

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SPEC CPU2017 Floating Point Rate Result

NEC Corporation
Express5800/R110j-1 (Intel Pentium Gold G5400)

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CPU2017 License: 9006
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Compiler Version Notes (Continued)

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

Base 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

(Continued on next page)
NEC Corporation  
Express5800/R110j-1 (Intel Pentium Gold G5400)

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Base Compiler Invocation (Continued)

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

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

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

Fortran benchmarks:
-xSSE4.2 -ipo -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:
-xSSE4.2 -ipo -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++:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only

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

NEC Corporation
Express5800/R110j-1 (Intel Pentium Gold G5400)  

| SPECrate2017_fp_base = 15.3 | SPECrate2017_fp_peak = 15.5 |

CPU2017 License: 9006  
Test Sponsor: NEC Corporation  
Tested by: NEC Corporation  
Test Date: Dec-2018  
Hardware Availability: Jan-2019  
Software Availability: Aug-2018

Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
- qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
- xSSE4.2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3 -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

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 -03
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

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

**NEC Corporation**

Express5800/R110j-1 (Intel Pentium Gold G5400)

<table>
<thead>
<tr>
<th>SPECrate2017_fp_peak</th>
<th>SPECrate2017_fp_base</th>
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<tbody>
<tr>
<td>15.5</td>
<td>15.3</td>
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</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Dec-2018  
**Hardware Availability:** Jan-2019  
**Software Availability:** Aug-2018

### Peak Optimization Flags (Continued)

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 519.lbmr

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_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

Fortran benchmarks:

503.bwaves_r: -xSSE4.2 -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) -ipo -xSSE4.2 -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) -ipo -xSSE4.2 -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++:

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: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes
NEC Corporation
Express5800/R110j-1 (Intel Pentium Gold G5400)

<table>
<thead>
<tr>
<th>SPEC Rate2017_fp_base = 15.3</th>
<th>SPEC Rate2017_fp_peak = 15.5</th>
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CPU2017 License: 9006
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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:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml

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