## NEC Corporation

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tr>
<td>603.bwaves_s</td>
<td>17.5</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>621.wrf_s</td>
<td>14.3</td>
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<td>628.pop2_s</td>
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<td>638.imagick_s</td>
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<td>644.nab_s</td>
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<td>649.fotonik3d_s</td>
<td>11.0</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>16.0</td>
<td>11.0</td>
</tr>
</tbody>
</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
- **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 2 TB SATA, 7200 RPM
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.7 (Maipo)  
  Kernel 3.10.0-1062.el7.x86_64
- **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:** Yes
- **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 Speed Result

NEC Corporation
Express5800/T110j (Intel Pentium Gold G5420)

SPECspeed®2017_fp_base = 13.8
SPECspeed®2017_fp_peak = 14.9

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

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

Results Table

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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
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</tbody>
</table>

SPECspeed®2017_fp_base = 13.8
SPECspeed®2017_fp_peak = 14.9

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,1,0"
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 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.
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/T110j (Intel Pentium Gold G5420)

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

SPECspeed®2017_fp_peak = 14.9
SPECspeed®2017_fp_base = 13.8

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

Platform Notes

BIOS Settings:
VT-x: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on t110j Fri Nov 1 12:21:07 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: 3694.934
CPU max MHz: 3800.0000
CPU min MHz: 800.0000
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

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NEC Corporation

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Platform Notes (Continued)

lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagercpu pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg cx16
xtr pdc pcd sse4_1 ssse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave rdrand
lahf_lm abm 3dnowprefetch epb intel_pt ssbd ibrs ibpb stibp tpr_shadow vnum
flexpriority ept vpid fsgsbase tsc_adjust smep erms invpcid mpx rdseed smp
ciflushopt 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

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a

physical chip.

From /proc/meminfo

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

uname -a:

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI

(Continued on next page)
NEC Corporation

Express5800/T110j (Intel Pentium Gold G5420)

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

**Platform Notes (Continued)**

CVE-2017-573 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization  
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Nov 1 12:15

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)

**Compiler Version Notes**

```
==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(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++, C, Fortran | 607.cactuBSSN_s(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.
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.
Intel(R) Fortran 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.
==============================================================================
```

Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)

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NEC Corporation

Express5800/T110j (Intel Pentium Gold G5420)

SPEC CPU® 2017 Floating Point Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

<table>
<thead>
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</table>
| Intel(R) Fortran 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. |
| Fortran, C |
| 621.wrf_s(base, peak) 627.cam4_s(base, peak) |
| 628.pop2_s(base, peak) |

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 |

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SPEC CPU®2017 Floating Point Speed Result
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Base Portability Flags (Continued)

644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

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

Fortran benchmarks:
-DSPEC_OPENMP -xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-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 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

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

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
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Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

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

644.nab_s: Same as 638.imagick_s

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

654.roms_s: -DSPEC_OPENMP -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xSSE4.2
-qopt-prefetch -ipo -O3 -no-prec-div -ffinite-math-only
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

627.cam4_s: -xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte
NEC Corporation

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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:

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.0.5 on 2019-10-31 23:21:07-0400.