# SPEC CPU®2017 Integer Speed Result

## NEC Corporation

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

**SPECspeed®2017_int_base = 7.19**  
**SPECspeed®2017_int_peak = 7.58**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong> Intel Pentium Gold G5420</td>
<td><strong>OS:</strong> Red Hat Enterprise Linux Server release 7.7 (Maipo)</td>
</tr>
<tr>
<td><strong>Max MHz:</strong> 3800</td>
<td><strong>Kernel:</strong> 3.10.0-1062.el7.x86_64</td>
</tr>
<tr>
<td><strong>Nominal:</strong> 3800</td>
<td><strong>Compiler:</strong> 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</td>
</tr>
<tr>
<td><strong>Enabled:</strong> 2 cores, 1 chip, 2 threads/core</td>
<td><strong>Parallel:</strong> Yes</td>
</tr>
<tr>
<td><strong>Orderable:</strong> 1 chip</td>
<td><strong>Firmware:</strong> NEC BIOS Version F01 08/21/2019 released Nov-2019</td>
</tr>
<tr>
<td><strong>Cache L1:</strong> 32 KB I + 32 KB D on chip per core</td>
<td><strong>File System:</strong> ext4</td>
</tr>
<tr>
<td><strong>L2:</strong> 256 KB I+D on chip per core</td>
<td><strong>System State:</strong> Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>L3:</strong> 4 MB I+D on chip per chip</td>
<td><strong>Base Pointers:</strong> 64-bit</td>
</tr>
<tr>
<td><strong>Other:</strong> None</td>
<td><strong>Peak Pointers:</strong> 32/64-bit</td>
</tr>
<tr>
<td><strong>Memory:</strong> 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400)</td>
<td><strong>Other:</strong> jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td><strong>Storage:</strong> 1 x 2 TB SATA, 7200 RPM</td>
<td><strong>Power Management:</strong> --</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9006  
**Test Date:** Nov-2019  
**Test Sponsor:** NEC Corporation  
**Hardware Availability:** Nov-2019  
**Tested by:** NEC Corporation  
**Software Availability:** Aug-2019

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base (7.19)</th>
<th>SPECspeed®2017_int_peak (7.58)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>4</td>
<td>5.79</td>
<td>6.88</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>4</td>
<td>9.81</td>
<td>9.99</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>4</td>
<td>4.78</td>
<td>5.28</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>4</td>
<td>8.91</td>
<td>9.18</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>4</td>
<td>9.66</td>
<td>10.7</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>4</td>
<td>9.66</td>
<td>9.66</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>4</td>
<td>5.26</td>
<td>5.39</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>4</td>
<td>4.45</td>
<td>4.51</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>4</td>
<td>6.77</td>
<td>6.79</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>4</td>
<td>6.79</td>
<td>6.79</td>
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</table>
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seeds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>4</td>
<td>310</td>
<td>5.73</td>
<td>306</td>
<td>5.79</td>
<td>307</td>
<td>5.79</td>
<td>4</td>
<td>255</td>
<td>6.95</td>
<td>259</td>
<td>6.85</td>
<td>258</td>
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<tr>
<td>605.mcf_s</td>
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<td>433</td>
<td>10.9</td>
<td>435</td>
<td>10.9</td>
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<tr>
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<td>342</td>
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<td>4.59</td>
<td>341</td>
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<tr>
<td>623.xalanchmk_s</td>
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<td>159</td>
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<td>8.91</td>
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<td>132</td>
<td>10.7</td>
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<td>10.7</td>
<td>131</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>4</td>
<td>273</td>
<td>5.26</td>
<td>273</td>
<td>5.25</td>
<td>273</td>
<td>5.26</td>
<td>4</td>
<td>266</td>
<td>5.39</td>
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<td>5.39</td>
<td>265</td>
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<tr>
<td>641.leela_s</td>
<td>4</td>
<td>384</td>
<td>4.44</td>
<td>384</td>
<td>4.45</td>
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<td>379</td>
<td>4.51</td>
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<td>4.51</td>
<td>379</td>
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<tr>
<td>657.xz_s</td>
<td>4</td>
<td>915</td>
<td>6.76</td>
<td>914</td>
<td>6.77</td>
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<td>6.77</td>
<td>4</td>
<td>911</td>
<td>6.79</td>
<td>911</td>
<td>6.79</td>
<td>911</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 7.19**  
**SPECspeed®2017_int_peak = 7.58**

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,scatter"
- **LD_LIBRARY_PATH** = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/jemalloc5.0.1-32:/home/cpu2017/jemalloc5.0.1-64"
- **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.

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CPU2017 License: 9006
Test Sponsor: NEC Corporation
Test Date: Nov-2019
Tested by: NEC Corporation
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 05:46:38 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: 3545.568
CPU max MHz: 3800.000
CPU min MHz: 800.000
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

(Continued on next page)
Platform Notes (Continued)

lm constant_tsc art arch_perfmon pebs bts rep_good nop1 xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg cx16
xpr 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 vt
flexpriority ept vpid fsgsbase tsc_adjust smep erms invpcid mpx rdseed smap
ciflushopt xsaveopt xsaveopt xgetbv1 dtherm arat pln pts hwp hwp_notify hwp_act_window
hwp_epp md_clear spec_ctrl intel_stibp flush_l1d

/cache data

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: 63565 MB
node distances:
node 0
0: 10

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

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

(Continued on next page)
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Platform Notes (Continued)

CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Nov 1 05:40

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

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.0.117 Build 20180804</td>
<td></td>
</tr>
<tr>
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<td></td>
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</table>

==============================================================================
<table>
<thead>
<tr>
<th>C++</th>
<th>623.xalancbmk_s(peak)</th>
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<tbody>
<tr>
<td>Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.0.117 Build 20180804</td>
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<th>620.omnetpp_s(base, peak) 623.xalancbmk_s(base) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)</th>
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(Continued on next page)
## NEC Corporation

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

<table>
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<tr>
<th>CPU2017 License:</th>
<th>9006</th>
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<tr>
<td>Test Sponsor:</td>
<td>NEC Corporation</td>
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<tr>
<td>Tested by:</td>
<td>NEC Corporation</td>
</tr>
<tr>
<td>SPECspeed\textsuperscript{2017_int_base}</td>
<td>7.19</td>
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### Compiler Version Notes (Continued)

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<tr>
<th>Fortran</th>
<th>648.exchange2_s(base, peak)</th>
</tr>
</thead>
<tbody>
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<td>Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.0.117 Build 20180804</td>
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</tbody>
</table>

### Base Compiler Invocation

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

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

- **Fortran benchmarks:**
  - `ifort -m64`

### Base Portability Flags

- `600.perlbench\_s: -DSPEC_LP64 -DSPEC_LINUX_X64`
- `602.gcc\_s: -DSPEC_LP64`
- `605.mcf\_s: -DSPEC_LP64`
- `620.omnetpp\_s: -DSPEC_LP64`

(Continued on next page)
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---

Base Portability Flags (Continued)

623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

---

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

---

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64

623.xalancbmk_s: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.0.117/linux/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

---

Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64

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Peak Portability Flags (Continued)

602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leea_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xSSE4.2 -qopt-mem-layout-trans=3 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -fno-strict-overflow -L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xSSE4.2 -qopt-mem-layout-trans=3 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -fno-strict-overflow -L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: Same as 602.gcc_s

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

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Peak Optimization Flags (Continued)

623.xalancbmk_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-32/lib -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: Same as 620.omnetpp_s

Fortran benchmarks:
-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

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 16:46:37-0400.