## SPEC CPU®2017 Integer Rate Result

**NEC Corporation**

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

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 12.9</th>
<th>SPECrate®2017_int_peak = 13.9</th>
</tr>
</thead>
</table>

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

### 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
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400)
- **Storage:** 1 x 1 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:** No
- **File System:** ext4
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** --

### Performance Results

<table>
<thead>
<tr>
<th>Benchmarks</th>
<th>2017_int_base</th>
<th>2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>13.9</td>
<td>14.3</td>
</tr>
<tr>
<td>gcc_r</td>
<td>14.9</td>
<td>16.6</td>
</tr>
<tr>
<td>mcf_r</td>
<td>8.72</td>
<td>9.33</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>14.9</td>
<td>15.0</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>14.9</td>
<td>15.0</td>
</tr>
<tr>
<td>x264_r</td>
<td>8.44</td>
<td>8.45</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>12.1</td>
<td>12.4</td>
</tr>
<tr>
<td>leela_r</td>
<td>11.5</td>
<td>11.7</td>
</tr>
<tr>
<td>exchange2_r</td>
<td>8.44</td>
<td>8.45</td>
</tr>
</tbody>
</table>

---

**NEC Corporation**"
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

NEC Corporation
Express5800/T110j-S (Intel Pentium Gold G5420)

SPECrate®2017_int_base = 12.9
SPECrate®2017_int_peak = 13.9

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>4</td>
<td>553</td>
<td>11.5</td>
<td>555</td>
<td>11.5</td>
<td>555</td>
<td>11.5</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>4</td>
<td>396</td>
<td>14.3</td>
<td>396</td>
<td>14.3</td>
<td>398</td>
<td>14.2</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>4</td>
<td>430</td>
<td>15.0</td>
<td>434</td>
<td>14.9</td>
<td>434</td>
<td>14.9</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>4</td>
<td>602</td>
<td>8.72</td>
<td>603</td>
<td>8.71</td>
<td>598</td>
<td>8.78</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>4</td>
<td>284</td>
<td>14.9</td>
<td>284</td>
<td>14.9</td>
<td>283</td>
<td>14.9</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>4</td>
<td>332</td>
<td>21.1</td>
<td>329</td>
<td>21.3</td>
<td>335</td>
<td>20.9</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>4</td>
<td>381</td>
<td>12.0</td>
<td>379</td>
<td>12.1</td>
<td>379</td>
<td>12.1</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>4</td>
<td>576</td>
<td>11.5</td>
<td>578</td>
<td>11.5</td>
<td>580</td>
<td>11.4</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>4</td>
<td>635</td>
<td>16.5</td>
<td>635</td>
<td>16.5</td>
<td>634</td>
<td>16.5</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>4</td>
<td>511</td>
<td>8.45</td>
<td>513</td>
<td>8.42</td>
<td>512</td>
<td>8.44</td>
</tr>
</tbody>
</table>

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
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.

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

NEC Corporation

Express5800/T110j-S (Intel Pentium Gold G5420)

SPECrate®2017_int_base = 12.9

SPECrate®2017_int_peak = 13.9

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

General Notes (Continued)

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Settings:
VT-x: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on t110js Fri Oct 25 15:25:55 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: 3520.983
CPU max MHz: 3800.0000
CPU min MHz: 800.0000
BogoMIPS: 7584.00

(Continued on next page)
## NEC Corporation

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

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>12.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>13.9</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9006

<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>NEC Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by:</td>
<td>NEC Corporation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Oct-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Nov-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Aug-2019</td>
</tr>
</tbody>
</table>

## Platform Notes (Continued)

- **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 mcr mce cmov cmov pse36 cdflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf 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 3nowprefetch intel_pt ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust smep smp ems invpcid mxp rdseed smap clflushopt xsaveopt xsavec xgetbv1 dtherm arat pin pts hwp hwp_notify hwp_act_window hwp_epp md_clear spec_ctrl intel_stibp flush_l1d

/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)
n	ode 0 cpus: 0 1 2 3
node 0 size: 65284 MB
node 0 free: 63401 MB
node distances:
  node 0
      0:  10
```

From /proc/meminfo

```
MemTotal:       65719160 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
```

(Continued on next page)
## Platform Notes (Continued)

```
uname -a:
    Linux t110js 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 retpoline, IBPB

run-level 3 Oct 25 15:20

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda3     ext4 908G  27G 835G 4% /

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

```
------------------------------------------
 | 502.gcc_r(peak)
------------------------------------------

Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

------------------------------------------
 | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
 | 525.x264_r(base, peak) 557.xz_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.
```

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

NEC Corporation

Express5800/T110j-S (Intel Pentium Gold G5420)

SPECrate®2017_int_base = 12.9

SPECrate®2017_intpeak = 13.9

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

Compiler Version Notes (Continued)

==============================================================================
C       | 502.gcc_r(peak)
==============================================================================
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
| 525.x264_r(base, peak) 557.xz_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++     | 523.xalancbmk_r(peak)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
| 531.deepsjeng_r(base, peak) 541.leela_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++     | 523.xalancbmk_r(peak)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
| 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,

(Continued on next page)
## Compiler Version Notes (Continued)

Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```
Fortran | 548.exchange2_r(base, peak)
```

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.

## Base Compiler Invocation

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

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

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

## Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

## Base Optimization Flags

C benchmarks:
```
-Wl, -z, muldefs -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/jemalloc-5.0.1-64/lib -ljemalloc
```

(Continued on next page)
NEC Corporation
Express5800/T110j-S (Intel Pentium Gold G5420)

SPECrates
- SPECrater2017_int_base = 12.9
- SPECrater2017_int_peak = 13.9

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

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

Base Optimization Flags (Continued)

C++ benchmarks:
- W1,-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:
- W1,-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 (except as noted below):
icc -m64 -std=c11

502.gcc_r: icc -m32 -std=c11 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.0.117/linux/compiler/lib/ia32_lin

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

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

Fortran benchmarks:
ifort -m64

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcfr: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
Peak Optimization Flags

C benchmarks:

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

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

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

525.x264_r: -Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
-L/usr/local/je5.0.1-64/lib -ljemalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

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

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

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

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
<table>
<thead>
<tr>
<th>NEC Corporation</th>
<th>SPECrate®2017_int_base = 12.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Express5800/T110j-S (Intel Pentium Gold G5420)</td>
<td>SPECrate®2017_int_peak = 13.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License: 9006</th>
<th>Test Date: Oct-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: NEC Corporation</td>
<td>Hardware Availability: Nov-2019</td>
</tr>
<tr>
<td>Tested by: NEC Corporation</td>
<td>Software Availability: Aug-2019</td>
</tr>
</tbody>
</table>

You can also download the XML flags sources by saving the following links:

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2019-10-25 02:25:54-0400.
Originally published on 2019-11-12.