# SPEC CPU®2017 Integer Rate Result

## NEC Corporation

### Express5800/R120h-2M (Intel Xeon Gold 5217)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 55.6</th>
<th>SPECrate®2017_int_peak = 57.5</th>
</tr>
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<tbody>
<tr>
<td>Tested by: NEC Corporation</td>
<td>Tested Date: Oct-2019</td>
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<tr>
<td>Hardware Availability: May-2019</td>
<td>Software Availability: May-2019</td>
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<th>CPU2017 License: 9006</th>
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### Hardware

- **CPU Name:** Intel Xeon Gold 5217
- **Max MHz:** 3700
- **Nominal:** 3000
- **Enabled:** 8 cores, 1 chip, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 11 MB I+D on chip per chip
- **Orderable:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
- **Storage:** 1 x 480 GB SATA SSD, RAID 0
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo)
  - Kernel 3.10.0-957.5.1.el7.x86_64
- **Compiler:**
  - C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux;
  - Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux
- **Parallel:** No
- **Firmware:** NEC BIOS Version U30 v2.10 05/21/2019 released Jul-2019
- **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>Benchmark</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>35.0</td>
<td>41.8</td>
</tr>
<tr>
<td>gcc_r</td>
<td>46.0</td>
<td>51.4</td>
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<tr>
<td>mcf_r</td>
<td>75.4</td>
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<tr>
<td>omnetpp_r</td>
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<td></td>
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<tr>
<td>xalancbmk_r</td>
<td>66.1</td>
<td></td>
</tr>
<tr>
<td>x264_r</td>
<td>108</td>
<td>113</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td></td>
<td></td>
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<tr>
<td>leela_r</td>
<td>116</td>
<td></td>
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<tr>
<td>exchange2_r</td>
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<td></td>
</tr>
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Results Table

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<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>16</td>
<td>609</td>
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<td>502.gcc_r</td>
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<td>493</td>
<td>45.9</td>
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<td>35.1</td>
<td>492</td>
<td>35.1</td>
<td>492</td>
<td>35.1</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"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"

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

NA: 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)
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NEC Corporation
Express5800/R120h-2M (Intel Xeon Gold 5217)

SPECrater®2017_int_base = 55.6
SPECrater®2017_int_peak = 57.5

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Test Date: Oct-2019
Tested by: NEC Corporation
Hardware Availability: May-2019
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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:
Thermal Configuration: Maximum Cooling
Workload Profile: General Throughput Compute
Memory Patrol Scrubbing: Disabled
LLC Dead Line Allocation: Disabled
LLC Prefetch: Enabled
Workload Profile: Custom
Advanced Memory Protection: Advanced ECC Support
Sub-NUMA Clustering: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r120h2m Thu Oct 3 19:39:38 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) Xeon(R) Gold 5217 CPU @ 3.00GHz
  1 "physical id"s (chips)
  16 "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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
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Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 5217 CPU @ 3.00GHz
Stepping: 6
CPU MHz: 3000.000
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-15
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dtsc acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscd lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmrperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch lb1t cat_i3 cdp cmlcbd intel_pt ssbd mba ibpb stibp ibrs ibrs_enhanced ibrs_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust mmse hle avx2 smep bmi2  slm invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clfshopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves ucxetbvl cqm_llc cqm_occup_llc cqm_mmb_total cqm_mmb_local dtherm ida arat pln
ptx pku ospke avx512_vnni spec_ctrl intel_stibp flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size: 11264 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 4 5 6 7 8 9 10 11 12 13 14 15
  node 0 size: 392865 MB
  node 0 free: 383839 MB
  node distances:
    node 0
      0: 10

From /proc/meminfo
  MemTotal: 395919796 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.6 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VARIANT="Server"

(Continued on next page)
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Platform Notes (Continued)

VARIANT_ID="server"
VERSION_ID="7.6"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)

uname -a:
Linux r120h2m 3.10.0-957.5.1.el7.x86_64 #1 SMP Wed Dec 19 10:46:58 EST 2018 x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 Oct 3 19:34

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 432G 32G 378G 8% /

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 U30 05/21/2019
Memory:
12x UNKNOWN NOT AVAILABLE
12x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933, configured at 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C | 502.gcc_r (peak) |
==============================================================================

Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
| C | 500.perlbench_r (base, peak) 502.gcc_r (base) 505.mcf_r (base, peak) |
==============================================================================

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

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| Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------------------------------------------------

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| 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) |
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| Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
| Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------------------------------------------------

C++ | 523.xalancbmk_r(peak) |
------------------------------------------------------------------------------------------------------------------------
| Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416
| Copyright (C) 1985-2019 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) |
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| Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
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C++ | 523.xalancbmk_r(peak) |
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Compiler Version Notes (Continued)

==============================================================================
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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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
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Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Peak Compiler Invocation

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

502gcc_r:icc -m32 -std=c11 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin

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

523xalancbnk_r:icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/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.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbnk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64

(Continued on next page)
### Peak Portability Flags (Continued)

- 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
- -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
- -fno-strict-overflow
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- -lqkmalloc

- 502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
- -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
- -L/usr/local/je5.0.1-32/lib -ljemalloc

- 505.mcf_r: basepeak = yes

- 520.omnetpp_r: basepeak = yes

- 523.xalancbmk_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4 -fno-alias
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- -lqkmalloc

- 531.deepsjeng_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- -lqkmalloc

#### C++ benchmarks:

- 520.omnetpp_r: basepeak = yes

- 523.xalancbmk_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4
- -L/usr/local/je5.0.1-32/lib -ljemalloc

- 531.deepsjeng_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- -lqkmalloc

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

NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 5217)

SPECrate®2017_int_base = 55.6
SPECrate®2017_int_peak = 57.5

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

Test Date: Oct-2019
Hardware Availability: May-2019
Software Availability: May-2019

Peak Optimization Flags (Continued)

541.leela_r: Same as 531.deepsjeng_r

Fortran benchmarks:

548.exchange2_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevE.xml

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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 2019-10-03 06:39:37-0400.
Report generated on 2019-10-29 16:07:42 by CPU2017 PDF formatter v6255.
Originally published on 2019-10-29.