# SPEC CPU®2017 Integer Rate Result

## NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 5217)**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>106</td>
<td>110</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9006

- **Test Date:** Jul-2020
- **Hardware Availability:** Dec-2019
- **Software Availability:** Sep-2019

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base (106)</th>
<th>SPECrate®2017_int_peak (110)</th>
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</thead>
<tbody>
<tr>
<td>500.perlbench_r 32</td>
<td>90.0 85.9</td>
<td>97.3 142</td>
</tr>
<tr>
<td>502.gcc_r 32</td>
<td>78.3</td>
<td>89.9 125</td>
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<tr>
<td>505.mcf_r 32</td>
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<td>81.8 132</td>
</tr>
<tr>
<td>520.omnetpp_r 32</td>
<td>125</td>
<td>89.9 211</td>
</tr>
<tr>
<td>523.xalanchmk_r 32</td>
<td>142</td>
<td>81.8 219</td>
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<tr>
<td>525.x264_r 32</td>
<td>208</td>
<td>82.1 208</td>
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<tr>
<td>531.deepsjeng_r 32</td>
<td>211</td>
<td>89.9 208</td>
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</tr>
<tr>
<td>557.xz_r 32</td>
<td>208</td>
<td>89.9 208</td>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5217
- **Max MHz:** 3700
- **Nominal:** 3000
- **Enabled:** 16 cores, 2 chips, 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
- **Other:** None
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)
- **Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.7 (Maipo)
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
  Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
- **Parallel:** No
- **Firmware:** NEC BIOS Version U32 v2.32 03/09/2020 released Jun-2020
- **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:** BIOS set to prefer performance at the cost of additional power usage.
**SPEC CPU®2017 Integer Rate Result**

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**SPECrate®2017_int_base = 106**

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### Results Table

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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Results appear in the order in which they were run. Bold underlined text indicates a median measurement.**

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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"

### Environment Variables 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"
```

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X 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
```

runcpu command invoked through numactl i.e.:

```
numactl --interleave=all runcpu <etc>
```

(Continued on next page)
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**Tested by:** NEC Corporation

**Test Date:** Jul-2020  
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---

**General Notes (Continued)**

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.


---

**Platform Notes**

**BIOS Settings:**
- Thermal Configuration: MaximumCooling
- WorkloadProfile: General Throughput Compute
- MemoryPatrolScrubbing: Disabled
- LLC DeadLineAllocation: Disabled
- LLC Prefetch: Enabled
- Enhanced Processor Performance: Enabled
- WorkloadProfile: Custom
- Advanced Memory Protection: Advanced ECC Support
- Sub-NUMA Clustering: Disabled

**Sysinfo program /home/cpu2017/bin/sysinfo**

Rev: r6365 of 2019-08-21 295195f888a3d7ed1b6e46e485a0011 running on r120h1m Thu Jul 30 10:27:54 2020

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
  2  "physical id"s (chips)
  32 "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
physical 1: cores 0 1 2 3 4 5 6 7
```

From lscpu:

```
Architecture: x86_64
```

(Continued on next page)
Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
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): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
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 bts rep_good ncpu idtinit mce pbe memtest728 nonstop_tsc aperfmpref eagerfpu nni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpre pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ebpx cat13 cpd13 invpcid_single intel_pni intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erdms invpcid rtm cmmp mx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pin pts pku ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_l1d arch_capabilities

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
node 0 size: 196265 MB
node 0 free: 191655 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 196607 MB
node 1 free: 192077 MB

(Continued on next page)
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</tbody>
</table>

### Platform Notes (Continued)

node distances:
- node 0 1
  - 0: 10 21
  - 1: 21 10

From /proc/meminfo
- MemTotal:       395925192 kB
- HugePages_Total:       0
- Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
- os-release:
  - 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)

uname -a:
- Linux r120h1m 3.10.0-1062.1.1.el7.x86_64 #1 SMP Tue Aug 13 18:39:59 UTC 2019 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
- CVE-2018-3620 (L1 Terminal Fault): Not affected
- Microarchitectural Data Sampling: Not affected
- CVE-2017-5754 (Meltdown): Not affected
- CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, usercopy/swapps barriers and __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Jul 30 10:22

SPEC is set to: /home/cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use% Mounted on</th>
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</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>ext4</td>
<td>908G</td>
<td>183G</td>
<td>680G</td>
<td>22% /</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id
- BIOS: NEC U32 03/09/2020

(Continued on next page)
Platform Notes (Continued)

Vendor: NEC  
Product: Express5800/R120h-1M  
Serial: JPN0084094

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.

Memory:
24x HPE P03050-091 16 GB 2 rank 2933

(End of data from sysinfo program)

Regarding the sysinfo display about the memory speed, the correct configured memory speed is 2400 MT/s. The dmidecode description should be as follows:
24x HPE P03050-091 16 GB 2 rank 2933, configured at 2666

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)  
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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
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==============================================================================
C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
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C++ | 523.xalancbmk_r(peak)
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==============================================================================
C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
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==============================================================================
Fortran | 548.exchange2_r(base, peak)
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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:
-W1,-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:
-W1,-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:
-W1,-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
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## Peak Compiler Invocation

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

```plaintext
502.gcc_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):
```plaintext
icpc -m64
```

```plaintext
523.xalancbmk_r.icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin
```

Fortran benchmarks:
```plaintext
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.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:
```plaintext
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
```

```plaintext
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

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

## NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 5217)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<td>106</td>
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<tr>
<td>SPECrate®2017_int_peak</td>
<td>110</td>
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</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Jul-2020  
**Hardware Availability:** Dec-2019  
**Software Availability:** Sep-2019

---

## Peak Optimization Flags (Continued)


557.xz_r: `basepeak = yes`

### C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

523.xalancbmk_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`

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`

541.leela_r: `Same as 531.deepsjeng_r`

### Fortran benchmarks:


---

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.

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