# SPEC CPU®2017 Integer Rate Result

**NEC Corporation**

Express5800/R120h-2M (Intel Xeon Gold 6240L)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>NEC Corporation</td>
</tr>
<tr>
<td>Tested by:</td>
<td>NEC Corporation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 229</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak = 240</td>
</tr>
</tbody>
</table>

## Hardware

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base (229)</th>
<th>SPECrate®2017_int_peak (240)</th>
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<tbody>
<tr>
<td>500.perlbench_r 72</td>
<td>202</td>
<td>176</td>
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<tr>
<td>502.gcc_r 72</td>
<td>183</td>
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<tr>
<td>505.mcf_r 72</td>
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<td>520.omnetpp_r 72</td>
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<td>525.x264_r 72</td>
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<tr>
<td>557.xz_r 72</td>
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## Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux Server release 7.6 (Maipo)</th>
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<tbody>
<tr>
<td></td>
<td>Kernel 3.10.0-957.5.1.el7.x86_64</td>
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<td>Parallel:</td>
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<td>System State:</td>
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<tr>
<td>Base Pointers:</td>
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<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
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<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1</td>
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<tr>
<td>Power Management:</td>
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</table>

## CPU Name:

Intel Xeon Gold 6240L

Max MHz: 3900

Nominal: 2600

Enabled: 36 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: 24.75 MB I+D on chip per chip

Other: None

Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)

Storage: 1 x 480 GB SATA SSD, RAID 0

Other: None
NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 6240L)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrate®2017_int_base = 229

SPECrate®2017_int_peak = 240

Results Table

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<tr>
<th>Benchmark</th>
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</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"

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 i9-799K 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.:
umactl --interleave=all runcpu <etc>

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.
SPEC CPU®2017 Integer Rate Result

NEC Corporation
Express5800/R120h-2M (Intel Xeon Gold 6240L)

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

SPECrater®2017_int_peak = 240
SPECrater®2017_int_base = 229

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

General Notes (Continued)

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.

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
Enhanced Processor Performance: Enabled
Workload Profile: Custom
Advanced Memory Protection: Advanced ECC Support
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r120h2m Wed Oct 9 08:22:05 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 6240L CPU @ 2.60GHz
  2 "physical id"s (chips)
  72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 2

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

**NEC Corporation**

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

**SPECrate®2017_int_base = 229**  
**SPECrate®2017_int_peak = 240**

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**Platform Notes (Continued)**

NUMA node(s): 4  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 6240L CPU @ 2.60GHz  
Stepping: 7  
CPU MHz: 2600.000  
BogoMIPS: 5200.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 25344K  
NUMA node0 CPU(s): 0-8,36-44  
NUMA node1 CPU(s): 9-17,45-53  
NUMA node2 CPU(s): 18-26,54-62  
NUMA node3 CPU(s): 27-35,63-71  
Flags: fpu vme de pse tsc msr pae 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 nopl xtopology nonstop_tsc aperfmpref 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 3nowprefetch ebp cat13 cdp_l3 intel_ppln intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpidd fs.gsbase tsc_adjust bmis hle avx2 smep bmi2 invpcid rtm cqm mpx rdtd_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsave xgetb v1 cgq kcal cqm_llc cqm_spared cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni spec_ctrl intel_stibp flush_lld arch_capabilities

/proc/cpuinfo cache data  
cache size : 25344 KB

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

available: 4 nodes (0-3)  
note 0 cpus: 0 1 2 3 4 5 6 7 8 36 37 38 39 40 41 42 43 44  
note 0 size: 196256 MB  
note 0 free: 191664 MB  
note 1 cpus: 9 10 11 12 13 14 15 16 17 45 46 47 48 49 50 51 52 53  
note 1 size: 196608 MB  
note 1 free: 192144 MB  
note 2 cpus: 18 19 20 21 22 23 24 25 26 54 55 56 57 58 59 60 61 62  
note 2 size: 196608 MB  
note 2 free: 192240 MB  
note 3 cpus: 27 28 29 30 31 32 33 34 35 63 64 65 66 67 68 69 70 71  
note 3 size: 196607 MB  
note 3 free: 192233 MB

(Continued on next page)
Platform Notes (Continued)

node distances:
node 0 1 2 3
  0: 10 21 31 31
  1: 21 10 31 31
  2: 31 31 10 21
  3: 31 31 21 10

From /proc/meminfo
- MemTotal: 792271256 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"
  - 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 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 9 08:16

SPEC is set to: /home/cpu2017
- Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda3 ext4 432G 57G 354G 14% /

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
SPEC CPU®2017 Integer Rate Result

NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 6240L)

SPECrater®2017_int_base = 229
SPECrater®2017_int_peak = 240

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

Platform Notes (Continued)

Memory:
24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(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)
        | 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================

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++     | 523.xalancbmk_r(peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.4.227 Build 20190416
(Continued on next page)
### NEC Corporation

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

#### SPECrate®2017_int_base = 229

**SPECrate®2017_int_peak = 240**

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### Compiler Version Notes (Continued)

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<table>
<thead>
<tr>
<th>C++</th>
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</table>
| `520.omnetpp_r(base, peak)`  
| `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,  
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<table>
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<tr>
<td><code>523.xalancbmk_r(peak)</code></td>
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<table>
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<tr>
<td><code>548.exchange2_r(base, peak)</code></td>
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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### Base Compiler Invocation

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

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

(Continued on next page)
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**CPU2017 License:** 9006  
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**Test Date:** Oct-2019  
**Hardware Availability:** May-2019  
**Software Availability:** May-2019

### Base Compiler Invocation (Continued)

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

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Portability Flags</th>
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<tbody>
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<td>500.perlbench_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<td>557.xz_r</td>
<td>-DSPEC_LP64</td>
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</tbody>
</table>

### 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`

### Peak Compiler Invocation

**C benchmarks (except as noted below):**
```
icc -m64 -std=c11
```
SPEC CPU®2017 Integer Rate Result  
Copyright 2017-2019 Standard Performance Evaluation Corporation

NEC Corporation  
Express5800/R120h-2M (Intel Xeon Gold 6240L)  

SPECrate®2017_int_base = 229  
SPECrate®2017_int_peak = 240

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

Peak Compiler Invocation (Continued)


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

523.xalancbmk_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.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
-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: -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

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
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NEC Corporation
Express5800/R120h-2M (Intel Xeon Gold 6240L)

| SPECrate®2017_int_base | 229 |
| SPECrate®2017_int_peak | 240 |

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)

505.mcf_r (continued):
-1qkmalloc

525.x264_r -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-alias
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-1qkmalloc

557.xz_r: Same as 505.mcf_r

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
-1/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
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-1qkmalloc

541.leela_r: Same as 531.deepsjeng_r

Fortran benchmarks:

-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-1qkmalloc

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.

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