### NEC Corporation

**Express5800/R120h-2M (Intel Xeon Gold 5120)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base = 134</th>
<th>SPECrate2017_int_peak = 143</th>
</tr>
</thead>
</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Jul-2018  
**Hardware Availability:** Jun-2018  
**Software Availability:** Mar-2018

#### Hardware

- **CPU Name:** Intel Xeon Gold 5120  
  - Max MHz.: 3200  
  - Nominal: 2200  
  - Enabled: 28 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: 19.25 MB I+D on chip per chip  
  - Other: None  
- **Memory:** 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2400)  
- **Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0  
- **Other:** None

#### Software

- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
  - Kernel: 3.10.0-693.21.1.el7.x86_64  
- **Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++  
  - Compiler for Linux: Fortran: Version 18.0.2.199 of Intel Fortran  
- **Firmware:** NEC BIOS Version U30 02/15/2018 released Mar-2018  
- **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

#### SPEC CPU2017 Integer Rate Result

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Copies</th>
<th>SPECrate2017_int_peak</th>
<th>SPECrate2017_int_base</th>
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<tbody>
<tr>
<td>perlbench</td>
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<td>143</td>
<td>134</td>
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<tr>
<td>gcc</td>
<td>56</td>
<td>117</td>
<td>140</td>
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<td>mcf</td>
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<td>omnetpp</td>
<td>56</td>
<td>168</td>
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<tr>
<td>xalancbmk</td>
<td>56</td>
<td>134</td>
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<td>x264</td>
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<td>deepsjeng</td>
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<td>exchange2</td>
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<td>xz</td>
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SPEC CPU2017 Integer Rate Result

NEC Corporation
Express5800/R120h-2M (Intel Xeon Gold 5120)

SPECrate2017_int_base = 134
SPECrate2017_int_peak = 143

Results Table

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<td>650</td>
<td>93.1</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 134
SPECrate2017_int_peak = 143

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/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 i7-6700K 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.:
    numaclt --interleave=all runcpu <etc>

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.
General Notes (Continued)

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
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r120h2m Thu Jul 5 13:59:04 2018

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 5120 CPU @ 2.20GHz
  2  "physical id"s (chips)
  56 "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 : 14
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 2
Core(s) per socket: 14
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
SPEC CPU2017 Integer Rate Result

NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 5120)

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CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation
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Hardware Availability: Jun-2018
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Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2200.000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-6,28-34
NUMA node1 CPU(s): 7-13,35-41
NUMA node2 CPU(s): 14-20,42-48
NUMA node3 CPU(s): 21-27,49-55
Flags: fpu vme de pse ts cestmsr 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 nopl xtopology nonstop_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma cx16 xtrm xcd pdc pcid pca sse4_1 sse4_2 x2apic movbe-popcnt-tsc-deadline-timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat _13 cdpl _3 invpcid_single intel_pt spec_ctrl ibpb_support_tpr_shadow vmxest tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmq mpx rdt_a avx512f avx512dq rdsread adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveopt xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 28 29 30 31 32 33 34
node 0 size: 48812 MB
node 0 free: 47406 MB
node 1 cpus: 7 8 9 10 11 12 13 35 36 37 38 39 40 41
node 1 size: 49152 MB
node 1 free: 47919 MB
node 2 cpus: 14 1 5 16 17 18 19 20 42 43 44 45 46 47 48
node 2 size: 49152 MB
node 2 free: 48000 MB
node 3 cpus: 21 22 23 24 25 26 27 49 50 51 52 53 54 55
node 3 size: 49152 MB
node 3 free: 48006 MB
node distances:
node 0 cpus: 0 1 2 3
0: 10 21 31 31
1: 21 10 31 31
2: 31 31 10 21

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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Express5800/R120h-2M (Intel Xeon Gold 5120)

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Platform Notes (Continued)

3: 31 31 21 10

From /proc/meminfo
MemTotal: 197744756 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
   NAME="Red Hat Enterprise Linux Server"
   VERSION="7.4 (Maipo)"
   ID=rhel
   ID_LIKE="fedora"
   VARIANT="Server"
   VARIANT_ID="server"
   VERSION_ID="7.4"
   PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
Linux r120h2m 3.10.0-693.21.1.el7.x86_64 #1 SMP Fri Feb 23 18:54:16 UTC 2018 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
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Jul 5 13:53

SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      ext4  909G  332G  531G  39% /

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 02/15/2018
Memory:
24x HPE 876319-081 8 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
# SPEC CPU2017 Integer Rate Result

## NEC Corporation

**Express5800/R120h-2M (Intel Xeon Gold 5120)**

<table>
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<tr>
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## Compiler Version Notes

---

**CC**

- 500.perlbench_r(base)
- 502.gcc_r(base)
- 505.mcf_r(base)
- 525.x264_r(base)
- 557.xz_r(base)

---

**icc (ICC) 18.0.2 20180210**  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

---

**CC**

- 500.perlbench_r(peak)
- 502.gcc_r(peak)
- 505.mcf_r(peak)
- 525.x264_r(peak)
- 557.xz_r(peak)

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Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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**CXXC**

- 520.omnetpp_r(base)
- 523.xalancbmk_r(base)
- 531.deepsjeng_r(base)
- 541.leela_r(base)

---

**icpc (ICC) 18.0.2 20180210**  
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**CXXC**

- 520.omnetpp_r(peak)
- 523.xalancbmk_r(peak)
- 531.deepsjeng_r(peak)
- 541.leela_r(peak)

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**FC**

- 548.exchange2_r(base)

---

**ifort (IFORT) 18.0.2 20180210**  
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---

**FC**

- 548.exchange2_r(peak)

---

**ifort (IFORT) 18.0.2 20180210**  
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SPEC CPU2017 Integer Rate Result

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</table>

**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=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc
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Peak Compiler Invocation
C benchmarks (except as noted below):
icc -m64 -std=c11
502.gcc_r: icc -m32 -std=c11 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin
C++ benchmarks (except as noted below):
icpc -m64
523.xalancbmk_r: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/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=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
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc
505.mcf_r: basepeak = yes

(Continued on next page)
### NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 5120)

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### Peak Optimization Flags (Continued)

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<td>525.x264_r: basepeak = yes</td>
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<td>557.xz_r: basepeak = yes</td>
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<table>
<thead>
<tr>
<th>Fortran benchmarks:</th>
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<tbody>
<tr>
<td>548.exchange2_r: basepeak = yes</td>
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</table>

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:

- http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevB.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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