**NEC Corporation**

**Express5800/R120h-1M (Intel Xeon Gold 5122)**

**SPECrate2017_fp_base = 36.0**

**SPECrate2017_fp_peak = 37.0**

---

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

### Hardware

- **CPU Name:** Intel Xeon Gold 5122  
- **Max MHz.:** 3700  
- **Nominal:** 3600  
- **Enabled:** 4 cores, 1 chip, 2 threads/core  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 16.5 MB I+D on chip per chip  
- **Memory:** 96 GB (12 x 8 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server 7.4 (Maipo)  
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
- **Parallel:** No  
- **Firmware:** NEC BIOS Version U32 02/14/2018 released Mar-2018  
- **File System:** ext4  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None

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**Copies**

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SPEC CPU2017 Floating Point Rate Result

NEC Corporation
Express5800/R120h-1M (Intel Xeon Gold 5122)

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Results Table

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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 i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesyste 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>

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

NEC Corporation

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

Test Date: May-2018
Hardware Availability: Jun-2018
Software Availability: Mar-2018

General Notes (Continued)

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:
Workload Profile: General Throughput Compute
Thermal Configuration: Maximum Cooling
LLC Prefetch: Enabled
LLC Dead Line Allocation: Disabled
Memory Patrol Scrubbing: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on r120h1m Sun May 13 01:52:43 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 5122 CPU @ 3.60GHz
  1 "physical id"s (chips)
  8 "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 : 4
siblings : 8
physical 0: cores 2 3 4 10

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
SPEC CPU2017 Floating Point Rate Result

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Test Date: May-2018
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Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz
Stepping: 4
CPU MHz: 3600.000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0,1,4,5
NUMA node0 CPU(s): 0,1,4,5
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dtst acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpte1gb rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good xtopology nonstop_tsc
aperfmperf eargerfpu pni pclmulqdq dtst64 monitor ds_cpl vmx smx est tm2 ssse3 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 epb cat_l3 cdpl_c3 invpcid_single
intel_pt spec_ctrl ibpb_support tpr_shadow vnuma flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdts_a avx512f avx512dq
rdsseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1
cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

/proc/cpuinfo cache data
   cache size : 16896 KB

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 4 5
   node 0 size: 48812 MB
   node 0 free: 47441 MB
   node 1 cpus: 2 3 6 7
   node 1 size: 49151 MB
   node 1 free: 47878 MB
   node distances:
     node 0 1
     0: 10 21
     1: 21 10

From /proc/meminfo
   MemTotal: 98661604 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"

(Continued on next page)
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Platform Notes (Continued)

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 r120h1m 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

run-level 3 May 13 01:47

SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      ext4  909G   46G  817G   6% /

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 U32 02/14/2018
Memory:
  12x HPE 876319-081 8 GB 2 rank 2666
  12x UNKNOWN NOT AVAILABLE

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base) |
|==============================================================================
| icc (ICC) 18.0.0 20170811 |
| Copyright (C) 1985-2017 Intel Corporation. All rights reserved. |
|==============================================================================
| CC  519.lbm_r(peak) 544.nab_r(peak) |
|==============================================================================
| icc (ICC) 18.0.0 20170811 |
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(Continued on next page)
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SPEC CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

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Compiler Version Notes (Continued)

==============================================================================
CXXC 508.namd_r(base) 510.parest_r(base)
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icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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FC  507.cactuBSSN_r(base)
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icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
FC  507.cactuBSSN_r(peak)

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**Compiler Version Notes (Continued)**

icpc (ICC) 18.0.0 20170811
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icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)

ifort (IFORT) 18.0.0 20170811
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**Base Compiler Invocation**

C benchmarks:
icc

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Base Compiler Invocation (Continued)

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

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</table>

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Base Optimization Flags (Continued)

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Benchmarks using both Fortran and C:
-m64 -std=c11

Benchmarks using both C and C++:
-m64 -std=c11

Benchmarks using Fortran, C, and C++:
-m64 -std=c11

Peak Compiler Invocation

C benchmarks:
icc

(Continued on next page)
Peak Compiler Invocation (Continued)

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using both C and C++:
icpc icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

544.nab_r: Same as 519.lbm_r

C++ benchmarks:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
-nostandard-realloc-lhs -align array32byte

(Continued on next page)
Peak Optimization Flags (Continued)

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
        -no-prec-div -qopt-prefetch -ffinite-math-only
        -qopt-mem-layout-trans=3 -nostandard-realloc-lhs
        -align array32byte

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
        -no-prec-div -qopt-prefetch -ffinite-math-only
        -qopt-mem-layout-trans=3 -nostandard-realloc-lhs
        -align array32byte

Benchmarks using both C and C++:
        -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
        -no-prec-div -qopt-prefetch -ffinite-math-only
        -qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

Peak Other Flags

C benchmarks:
        -m64 -std=c11

C++ benchmarks:
        -m64

Fortran benchmarks:
        -m64

Benchmarks using both Fortran and C:
        -m64 -std=c11

Benchmarks using both C and C++:
        -m64 -std=c11

(Continued on next page)
## SPEC CPU2017 Floating Point Rate Result

<table>
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<th>NEC Corporation</th>
<th>SPECrate2017_fp_base = 36.0</th>
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<tr>
<td>Express5800/R120h-1M (Intel Xeon Gold 5122)</td>
<td>SPECrate2017_fp_peak = 37.0</td>
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</tbody>
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**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** May-2018  
**Hardware Availability:** Jun-2018  
**Software Availability:** Mar-2018

### Peak Other Flags (Continued)

Benchmarks using Fortran, C, and C++:
```
-m64 -std=c11
```

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](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.

Tested with SPEC CPU2017 v1.0.2 on 2018-05-12 12:52:42-0400.  
Report generated on 2018-10-31 17:34:01 by CPU2017 PDF formatter v6067.  