# SPEC CPU®2017 Floating Point Speed Result

## NEC Corporation

**Express5800/R120h-1M (Intel Xeon Silver 4208)**

**SPECspeed®2017_fp_base = 67.4**

**SPECspeed®2017_fp_peak = 68.2**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (67.4)</th>
<th>SPECspeed®2017_fp_peak (68.2)</th>
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<tr>
<td>0</td>
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<tr>
<td>16</td>
<td>57.3</td>
<td>57.5</td>
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<tr>
<td>66.8</td>
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<tr>
<td>33.9</td>
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<tr>
<td>46.2</td>
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<tr>
<td>47.7</td>
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<td>44.1</td>
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<td>80.8</td>
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<tr>
<td>62.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66.9</td>
<td></td>
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</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4208
- **Max MHz:** 3200
- **Nominal:** 2100
- **Enabled:** 16 cores, 2 chips
- **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 2400)
- **Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.7 (Maipo)
  - Kernel 3.10.0-1062.1.1.el7.x86_64
- **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:** Yes
- **Firmware:** NEC BIOS Version U32 v2.22 11/13/2019 released Mar-2020
- **File System:** ext4
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.
NEC Corporation

Express5800/R120h-1M (Intel Xeon Silver 4208)

SPECspeed®2017_fp_base = 67.4
SPECspeed®2017_fp_peak = 68.2

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<td>80.9</td>
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<td>649.fotonik3d_s</td>
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<td>16</td>
<td>236</td>
<td>66.7</td>
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<td>67.0</td>
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</tbody>
</table>

SPECspeed®2017_fp_base = 67.4
SPECspeed®2017_fp_peak = 68.2

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

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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

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

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.
### NEC Corporation

**Express5800/R120h-1M (Intel Xeon Silver 4208)**

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<td>Test Date: Jun-2020</td>
</tr>
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<td>Test Sponsor: NEC Corporation</td>
<td>Hardware Availability: Dec-2019</td>
</tr>
<tr>
<td>Tested by: NEC Corporation</td>
<td>Software Availability: Sep-2019</td>
</tr>
</tbody>
</table>

**Platform Notes**

- **BIOS Settings:**
  - Thermal Configuration: Maximum Cooling
  - Workload Profile: General Peak Frequency Compute
  - Intel Hyper-Threading: Disabled
  - 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
    - NUMA Group Size Optimization: Flat

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

Rev: r6365 of 2019-08-21 295195f888a3d7edbble6e46a485a0011
running on r120h1m Thu Jun 18 15:37:31 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) Silver 4208 CPU @ 2.10GHz
  - 2 "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: 8
  - 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
- 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: 1
- 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) Silver 4208 CPU @ 2.10GHz
- Stepping: 6
- CPU MHz: 2100.000

(Continued on next page)
**NEC Corporation**

**Express5800/R120h-1M (Intel Xeon Silver 4208)**

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### Platform Notes (Continued)

<table>
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<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BogoMIPS</td>
<td>4200.00</td>
</tr>
<tr>
<td>Virtualization</td>
<td>VT-x</td>
</tr>
<tr>
<td>L1d cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L1i cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L2 cache:</td>
<td>1024K</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>11264K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-7</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>8-15</td>
</tr>
<tr>
<td>Flags:</td>
<td>fpu vme de pse tsc msr pae mce 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 sdbg fma cx16 xtpc pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_l3 cdp_l3 invpcid_single intel_ppn intel_pt ssbd mba ibrs ibpb stibp ibrs_enabled tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves xsaveopt xsave xsetmvb1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pin pts pku ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_l1d arch_capabilities</td>
</tr>
</tbody>
</table>

From `/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: 2 nodes (0-1)  
node 0 cpus: 0 1 2 3 4 5 6 7  
node 0 size: 196265 MB  
node 0 free: 191682 MB  
node 1 cpus: 8 9 10 11 12 13 14 15  
node 1 size: 196607 MB  
node 1 free: 192119 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10

From `/proc/meminfo`  
MemTotal: 395927624 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

From `/etc/*release*/`  
**os-release:**  
`NAME="Red Hat Enterprise Linux Server" VERSION="7.7 (Maipo)"`

(Continued on next page)
Platform Notes (Continued)

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)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.7:ga:server

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 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/swapgs barriers and __user pointer sanitation
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Jun 18 15:31

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 908G 156G 706G 19% /

From /sys/devices/virtual/dmi/id
BIOS: NEC U32 11/13/2019
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:

(Continued on next page)
NEC Corporation

24x HPE P03050-091 16 GB 2 rank 2933, configured at 2400

Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)</th>
</tr>
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<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
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<tr>
<td>Version 19.0.4.227 Build 20190416</td>
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<th>C++, C, Fortran</th>
<th>607.cactuBSSN_s(base, peak)</th>
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CPU2017 License: 9006  Test Date:     Jun-2020
Test Sponsor:    NEC Corporation  Hardware Availability: Dec-2019
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Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

(Continued on next page)
NEC Corporation
Express5800/R120h-1M (Intel Xeon Silver 4208)

SPEC®2017 Floating Point Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

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

**Base Optimization Flags (Continued)**

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

**Peak Compiler Invocation**

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

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

**Peak Portability Flags**

Same as Base Portability Flags

**Peak Optimization Flags**

C benchmarks:

619.lbm_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

638.imagick_s: basepeak = yes

644.nab_s: Same as 619.lbm_s

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

Fortran benchmarks:

603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs
628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: 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.

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