## SPEC CPU®2017 Floating Point Speed Result

**NEC Corporation**

Express5800/R120h-1M (Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>SPECspeak®2017_fp_base</th>
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**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Mar-2020  
**Hardware Availability:** Dec-2019  
**Software Availability:** Sep-2019

### Threads

<table>
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<tr>
<th>Program</th>
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<td>37.2</td>
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</tr>
<tr>
<td>619.ibm_s</td>
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<td>55.8</td>
<td>58.5</td>
</tr>
<tr>
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<td>10</td>
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<td>31.6</td>
<td>31.7</td>
</tr>
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<td>59.0</td>
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</tr>
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<td>10</td>
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</tr>
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</table>

### 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

**Power Management:** BIOS set to prefer performance at the cost of additional power usage.

### Hardware

**CPU Name:** Intel Xeon Silver 4210  
**Max MHz:** 3200  
**Nominal:** 2200  
**Enabled:** 10 cores, 1 chip  
**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:** 13.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)  
**Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0  
**Other:** None
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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**SPECspeed®2017_fp_base = 48.9**

**SPECspeed®2017_fp_peak = 49.4**

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.
**SPEC CPU®2017 Floating Point Speed Result**

**NEC Corporation**

Express5800/R120h-1M (Intel Xeon Silver 4210)

**SPECspeed®2017_fp_base = 48.9**

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**NEC Corporation**

**Test Sponsor:** NEC Corporation

**Test Date:** Mar-2020

**Hardware Availability:** Dec-2019

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---

**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 295195f888a3d7edble6e46a485a0011
running on r120h1m Tue Mar 24 14:08:34 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 4210 CPU @ 2.20GHz
  1  "physical id"'s (chips)
  10 "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 : 10
siblings : 10
physical 0: cores 0 1 2 3 4 8 9 10 11 12
```

**From lscpu:**

```
Architecture:         x86_64
CPU op-mode(s):       32-bit, 64-bit
Byte Order:           Little Endian
CPU(s):               10
On-line CPU(s) list:  0-9
Thread(s) per core:   1
Core(s) per socket:   10
Socket(s):            1
NUMA node(s):         1
Vendor ID:            GenuineIntel
CPU family:           6
Model:                85
Model name:           Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz
Stepping:             6
CPU MHz:              2200.000
BogoMIPS:             4400.00
```

(Continued on next page)
### NEC Corporation

**Express5800/R120h-1M (Intel Xeon Silver 4210)**

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#### Platform Notes (Continued)

- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 14080K
- **NUMA node0 CPU(s):** 0-9
- **Flags:** fpu vme de pse tsc msr cmov cmov apic sep mtrr pge mca cmov
- **/proc/cpuinfo cache data**
  - `cache size : 14080 KB`
- **/proc/meminfo**
  - `MemTotal: 197747468 kB`
  - `HugePages_Total: 0`
  - `Hugepagesize: 2048 kB`
- **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)"

(Continued on next page)
NEC Corporation

Express5800/R120h-1M (Intel Xeon Silver 4210)

SPECSPEED®2017_fp_base = 48.9
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Platform Notes (Continued)

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 sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Mar 24 14:02

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 908G 51G 811G 6% /

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:
12x HPE P03050-091 16 GB 2 rank 2933
12x UNKNOWN NOT AVAILABLE

(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:
12x HPE P03050-091 16 GB 2 rank 2933, configured at 2400
NEC Corporation
Express5800/R120h-1M (Intel Xeon Silver 4210)

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Compiler Version Notes

```
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               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(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.
------------------------------------------------------------------------------
Intel(R) Fortran 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.
------------------------------------------------------------------------------
```
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### 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
  ```

- **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
  ```

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Base Optimization Flags (Continued)

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

Peak Portability Flags

Same as Base Portability Flags

Peak 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:
603.bwaves_s: basepeak = yes
649.fotonik3d_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs
654.roms_s: basepeak = yes

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

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: basepeak = yes

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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