### SPEC CPU®2017 Floating Point Speed Result

**NEC Corporation**  
**Express5800/R120h-1M (Intel Xeon Silver 4215)**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tr>
<td>603.bwaves_s 16</td>
<td>81.3</td>
<td>81.5</td>
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<tr>
<td>607.cactuBSSN_s 16</td>
<td>65.1</td>
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<tr>
<td>619.lbm_s 16</td>
<td>82.6</td>
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<tr>
<td>621.wrf_s 16</td>
<td>41.7</td>
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<tr>
<td>627.cam4_s 16</td>
<td>54.5</td>
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<td>638.imagick_s 16</td>
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<td>644.nab_s 16</td>
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<tr>
<td>649.fotonik3d_s 16</td>
<td>64.4</td>
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</tr>
<tr>
<td>654.roms_s 16</td>
<td>75.1</td>
<td>75.3</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4215  
  **Max MHz:** 3500  
  **Nominal:** 2500  
  **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 v2.32 03/09/2020 released Jun-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.
SPEC CPU®2017 Floating Point Speed Result

NEC Corporation

Express5800/R120h-1M (Intel Xeon Silver 4215)

SPECspeed®2017_fp_base = 77.5
SPECspeed®2017_fp_peak = 78.3

NEC Corporation

CPU2017 License: 9006
Test Date: Sep-2020
Test Sponsor: NEC Corporation
Hardware Availability: Dec-2019
Tested by: NEC Corporation
Software Availability: Sep-2019

Results Table

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<tr>
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<td></td>
</tr>
</tbody>
</table>

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.
**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 295195f888a3d7ed6e6e646a485a0011
running on r120h1m Sun Sep 6 21:22:22 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 4215 CPU @ 2.50GHz
  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 4215 CPU @ 2.50GHz
  Stepping:              6
  CPU MHz:               2500.000
Platform Notes (Continued)

BogoMIPS: 5000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
Flags: fpu vme de pse tsc msr 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
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcz pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx flisc rdrand lahf_lm abm 3nowprefetch epb cat_l3 cdcp_l3 invpcid_single
intel_ppin intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
flexpririty ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpzx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw
avx512vl xsavesopt xsaves xgetbv1 cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pin pts pku ospke avx512_vnni md_clear spec_ctrl intel_stibp
flush_l1d arch_capabilities

/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: 191758 MB
  node 1 cpus: 8 9 10 11 12 13 14 15
  node 1 size: 196607 MB
  node 1 free: 192038 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395927628 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

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

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

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NEC Corporation

Express5800/R120h-1M (Intel Xeon Silver 4215)

| CPU2017 License:         | 9006          |
| Test Sponsor:            | NEC Corporation |
| Tested by:               | NEC Corporation |
| SPECspeed®2017_fp_base   | 77.5          |
| SPECspeed®2017_fp_peak   | 78.3          |

| Test Date:          | Sep-2020          |
| Hardware Availability: | Dec-2019         |
| Software Availability: | Sep-2019         |

**Platform Notes (Continued)**

```plaintext
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 Sep 6 21:16

SPEC is set to: /home/cpu2017

Filesystem  Type  Size  Used  Avail  Use% Mounted on
/dev/sda3   ext4  908G  186G  677G   22% /

From /sys/devices/virtual/dmi/id
BIOS: NEC U32 03/09/2020
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

Express5800/R120h-1M (Intel Xeon Silver 4215)

SPECspeed®2017_fp_base = 77.5
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CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Sep-2020
Hardware Availability: Dec-2019
Software Availability: Sep-2019

Platform Notes (Continued)

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

Compiler Version Notes

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.

C++, C, Fortran

| 607.cactuBSSN_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) 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.

Fortran

| 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) |
| 654.roms_s(base, peak) |

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.

Fortran, C

| 621.wrf_s(base, peak) 627.cam4_s(base, peak) |
| 628.pop2_s(base, peak) |

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.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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<td>Tested by: NEC Corporation</td>
<td>Software Availability: Sep-2019</td>
</tr>
</tbody>
</table>

Compiler Version Notes (Continued)

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### Base Compiler Invocation

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

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

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

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

Fortran benchmarks:
```bash
-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)
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:
```
-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
```

(Continued on next page)
NEC Corporation

Express5800/R120h-1M (Intel Xeon Silver 4215)

| SPECspeed®2017_fp_base = 77.5 |
| SPECspeed®2017_fp_peak = 78.3 |

Peak Optimization Flags (Continued)

649.fotonik3d_s (continued):
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

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: basepeak = yes

628.pop2_s: Same as 621.wrf_s

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

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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