**NEC Corporation**

**Express5800/R120h-1M (Intel Xeon Platinum 8268)**

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<tr>
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<tr>
<td>619.lbm_s 48</td>
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<tr>
<td>628.pop2_s 48</td>
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<td>68.3</td>
</tr>
<tr>
<td>638.imagick_s 48</td>
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</tr>
<tr>
<td>644.nab_s 48</td>
<td>292</td>
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</tr>
<tr>
<td>649.fotonik3d_s 48</td>
<td>91.2</td>
<td>292</td>
</tr>
<tr>
<td>654.roms_s 48</td>
<td>91.2</td>
<td>292</td>
</tr>
</tbody>
</table>

**Hardware**

CPU Name: Intel Xeon Platinum 8268  
Max MHz: 3900  
Nominal: 2900  
Enabled: 48 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: 35.75 MB I+D on chip per chip  
Other: None  
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)  
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  
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.
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>171</td>
<td>92.9</td>
<td>169</td>
<td>92.2</td>
<td>171</td>
</tr>
</tbody>
</table>

### 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
Filesyste 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 Platinum 8268)**

<table>
<thead>
<tr>
<th>SPEC®2017_fp_base</th>
<th>SPEC®2017_fp_peak</th>
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<tbody>
<tr>
<td>150</td>
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</tr>
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**CPU2017 License:** 9006  
**Test Date:** Jun-2020  
**Hardware Availability:** Dec-2019  
**Test Sponsor:** NEC Corporation  
**Software Availability:** Sep-2019  
**Tested by:** NEC Corporation

### 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 295195f888a3d7edbe6e46a485a0011  
  - running on r120h1m Thu Jun 25 13:45:29 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- **From /proc/cpuinfo**
  - model name : Intel(R) Xeon(R) Platinum 8268 CPU @ 2.90GHz
  - 2 "physical id"s (chips)
  - 48 "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 : 24
    - siblings : 24
    - physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
    - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

- **From lscpu:**
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - CPU(s): 48
  - On-line CPU(s) list: 0-47
  - Thread(s) per core: 1
  - Core(s) per socket: 24
  - Socket(s): 2
  - NUMA node(s): 2
  - Vendor ID: GenuineIntel
  - CPU family: 6
  - Model: 85
  - Model name: Intel(R) Xeon(R) Platinum 8268 CPU @ 2.90GHz
  - Stepping: 6
  - CPU MHz: 2900.000

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

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NEC Corporation

Express5800/R120h-1M (Intel Xeon Platinum 8268)

SPECspeed®2017_fp_base = 150
SPECspeed®2017_fp_peak = 151

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

Platform Notes (Continued)

BogoMIPS: 5800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
Flags: fpu vme de pse msr mcr mxe pmx 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
aperffmap perf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
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 cdp_l3 invpcid_single
intel_ppin intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced 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 xsaveopt xsaves avx512f10 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

/proc/cpuinfo cache data
  cache size : 36608 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 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  node 0 size: 196264 MB
  node 0 free: 191528 MB
  node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
  node 1 size: 196607 MB
  node 1 free: 192134 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395921672 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)
NEC Corporation

Express5800/R120h-1M (Intel Xeon Platinum 8268)

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

SPECspeed®2017_fp_base = 150
SPECspeed®2017_fp_peak = 151

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

```
run-level 3 Jun 25 13:39
SPEC is set to: /home/cpu2017
```

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 908G 159G 704G 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)
NEC Corporation

Express5800/R120h-1M (Intel Xeon Platinum 8268)

Table: Compiler Version Notes

<table>
<thead>
<tr>
<th>Platform</th>
<th>Test Date</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
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<td>9006</td>
<td>Dec-2019</td>
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**SPEC CPU®2017 Floating Point Speed Result**

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**NEC Corporation**

**SPECspeed®2017_fp_base = 150**

**SPECspeed®2017_fp_peak = 151**

**CPU2017 License:** 9006

**Test Date:** Jun-2020

**Hardware Availability:** Dec-2019

**Test Sponsor:** NEC Corporation

**Hardware Availability:** Dec-2019

**Tested by:** NEC Corporation

**Software Availability:** Sep-2019

**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,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```
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
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

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: 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

(Continued on next page)


## SPEC CPU®2017 Floating Point Speed Result

### NEC Corporation

**Express5800/R120h-1M (Intel Xeon Platinum 8268)**

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

### 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: `-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:


You can also download the XML flags sources by saving the following links:


---

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2020-06-25 00:45:28-0400.  
Originally published on 2020-07-21.