## SPEC® CPU2017 Floating Point Speed Result

**NEC Corporation**

**Express5800/R120h-2M (Intel Xeon Platinum 8153)**

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
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### Hardware

- **CPU Name:** Intel Xeon Platinum 8153
- **Max MHz.:** 2800
- **Nominal:** 2000
- **Enabled:** 32 cores, 2 chips
- **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:** 22 MB I+D on chip per chip
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
- **Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo)
- **Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
  Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** NEC BIOS Version U30 02/15/2018 released Mar-2018
- **File System:** ext4
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1

### Results

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NEC Corporation

Express5800/R120h-2M (Intel Xeon Platinum 8153)

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SPECspeed2017_fp_base = 97.3

SPECspeed2017_fp_peak = 98.2

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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-6700K 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

Yes: 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.

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
NEC Corporation

Express5800/R120h-2M (Intel Xeon Platinum 8153)

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Test Sponsor: NEC Corporation
Test Date: Oct-2018
Hardware Availability: Aug-2017
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Platform Notes

BIOS Settings:
Thermal Configuration: Maximum Cooling
Workload Profile: General Peak Frequency Compute
Intel Hyper-Threading: Disabled
Memory Patrol Scrubbing: Disabled
Energy/Performance Bias: Maximum Performance
LLC Dead Line Allocation: Disabled
Workload Profile: Custom
NUMA Group Size Optimization: Flat
Adjacent Sector Prefetch: Disabled
DCU Stream Prefetcher: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f29999c33d61f564985e45859ea9
running on r120h2m Fri Oct 5 07:46:22 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) Platinum 8153 CPU @ 2.00GHz
  2 "physical id"s (chips)
  32 "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 : 16
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8153 CPU @ 2.00GHz
Stepping: 4
CPU MHz: 2000.000
BogoMIPS: 4000.00

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## NEC Corporation

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### Platform Notes (Continued)

| Virtualization:        | VT-x                  |
| L1d cache:             | 32K                   |
| L1i cache:             | 32K                   |
| L2 cache:              | 1024K                 |
| L3 cache:              | 22528K                |
| NUMA node0 CPU(s):     | 0-15                  |
| NUMA node1 CPU(s):     | 16-31                 |
| Flags:                 | fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clf flush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant-tsc arch_perfmon pebs bts rep_good nop1 xtopology nonstop_tsc aperfmperf eagerfpup ni pclmulqdq dtes64 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 cdp_l3 invpcid_single intel_pt spec_ctrl ibpb_support tpr_shadow vmi 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 xsave xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts |

/proc/cpuinfo cache data

- cache size : 22528 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
- node 0 size: 196268 MB
- node 0 free: 191654 MB
- node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
- node 1 size: 196607 MB
- node 1 free: 192150 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

From /proc/meminfo

- MemTotal: 395929384 kB
- HugePages_Total: 0
- Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*

- os-release:
  - NAME="Red Hat Enterprise Linux Server"
  - VERSION="7.4 (Maipo)"
  - ID="rhel"
  - ID_LIKE="fedora"
  - VARIANT="Server"

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**Platform Notes (Continued)**

VARIANT_ID="server"
VERSION_ID="7.4"

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 r120h2m 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

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Oct 5 07:40

SPEC is set to: /home/cpu2017  
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 909G 469G 394G 55% /

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 U30 02/15/2018  
Memory:  
24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)

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**Compiler Version Notes**

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================

icc (ICC) 18.0.2 20180210
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Compiler Version Notes (Continued)

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FC 607.cactuBSSN_s(base, peak)
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 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:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Benchmarks using both Fortran and C:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
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Benchmarks using Fortran, C, and C++:
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- `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`  
- `-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

#### 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: basepeak = yes`

Fortran benchmarks:
- `638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`

- `644.nab_s: basepeak = yes`

(Continued on next page)
PEC CPU2017 Floating Point Speed Result

NEC Corporation

Express5800/R120h-2M (Intel Xeon Platinum 8153)

SPECspeed2017_fp_base =  97.3
SPECspeed2017_fp_peak =  98.2

CPU2017 License:  9006
Test Sponsor:   NEC Corporation
Test Date: Oct-2018
Hardware Availability:  Aug-2017
Tested by: NEC Corporation
Software Availability:  Mar-2018

Peak Optimization Flags (Continued)

603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -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-RevB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.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.

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