



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

NEC Corporation

SPECrate®2017_fp_base = 37.3

Express5800/T110j-S (Intel Xeon E-2246G)

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 9006

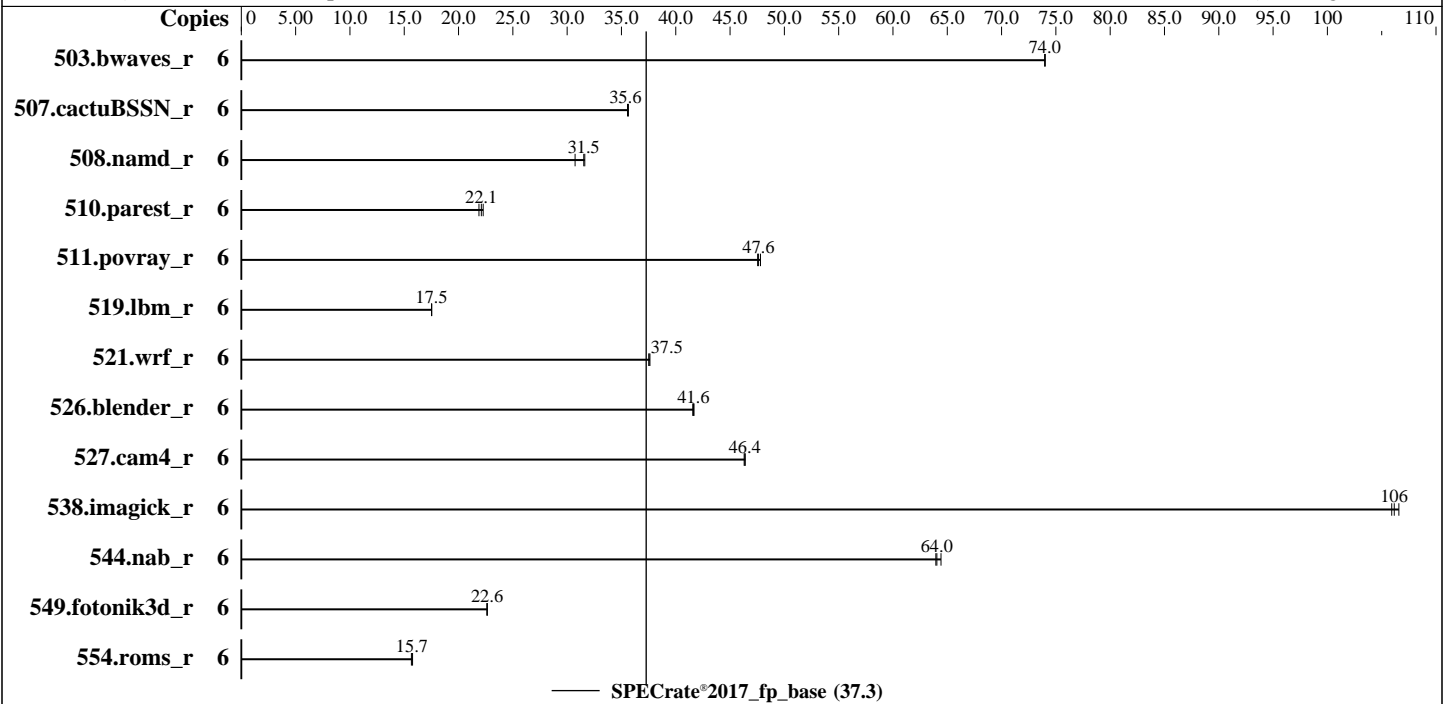
Test Date: Nov-2019

Test Sponsor: NEC Corporation

Hardware Availability: Nov-2019

Tested by: NEC Corporation

Software Availability: Aug-2019



Hardware

CPU Name: Intel Xeon E-2246G
 Max MHz: 4800
 Nominal: 3600
 Enabled: 6 cores, 1 chip
 Orderable: 1 chip
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 256 KB I+D on chip per core
 L3: 12 MB I+D on chip per chip
 Other: None
 Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
 Storage: 1 x 1 TB SATA, 7200 RPM
 Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.7 (Maipo)
 Kernel 3.10.0-1062.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: No
 Firmware: NEC BIOS Version F01 08/21/2019 released Nov-2019
 File System: ext4
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 Other: None
 Power Management: --



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Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|-----------------|--------|--------------------|--------------------|-------------------|--------------------|-------------------|--------------------|--------|---------|-------|---------|-------|---------|-------|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 503.bwaves_r | 6 | 813 | 74.0 | <u>813</u> | <u>74.0</u> | 813 | 74.0 | | | | | | | |
| 507.cactuBSSN_r | 6 | <u>213</u> | <u>35.6</u> | 214 | 35.6 | 213 | 35.6 | | | | | | | |
| 508.namd_r | 6 | <u>181</u> | <u>31.5</u> | 185 | 30.7 | 180 | 31.6 | | | | | | | |
| 510.parest_r | 6 | 705 | 22.3 | 717 | 21.9 | <u>710</u> | <u>22.1</u> | | | | | | | |
| 511.povray_r | 6 | <u>294</u> | <u>47.6</u> | 295 | 47.5 | 293 | 47.8 | | | | | | | |
| 519.lbm_r | 6 | 361 | 17.5 | 361 | 17.5 | <u>361</u> | <u>17.5</u> | | | | | | | |
| 521.wrf_r | 6 | 358 | 37.5 | 357 | 37.6 | <u>358</u> | <u>37.5</u> | | | | | | | |
| 526.blender_r | 6 | 220 | 41.6 | 219 | 41.7 | <u>219</u> | <u>41.6</u> | | | | | | | |
| 527.cam4_r | 6 | 227 | 46.3 | 226 | 46.4 | <u>226</u> | <u>46.4</u> | | | | | | | |
| 538.imagick_r | 6 | 141 | 106 | 140 | 107 | <u>141</u> | <u>106</u> | | | | | | | |
| 544.nab_r | 6 | 157 | 64.4 | <u>158</u> | <u>64.0</u> | 158 | 63.9 | | | | | | | |
| 549.fotonik3d_r | 6 | <u>1033</u> | <u>22.6</u> | 1033 | 22.6 | 1033 | 22.6 | | | | | | | |
| 554.roms_r | 6 | 609 | 15.7 | <u>607</u> | <u>15.7</u> | 605 | 15.8 | | | | | | | |

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset commands to bind each copy to a specific processor. For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
IRQ balance service was stopped using "systemctl stop irqbalance.service"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"

General Notes

Binaries compiled on a system with 1x Intel Core i9-799X 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:

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General Notes (Continued)

```
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.

Platform Notes

BIOS Settings:

VT-x: Disabled
Energy Efficient P-state: Disabled
Energy Efficient Turbo: Disabled
Hyper-Threading: Disabled

sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on t110js Mon Nov 11 07:13:56 2019

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) E-2246G CPU @ 3.60GHz
 1 "physical id"s (chips)
 6 "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 : 6
siblings : 6
physical 0: cores 0 1 2 3 4 5
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 6
On-line CPU(s) list: 0-5
Thread(s) per core: 1
Core(s) per socket: 6
Socket(s): 1
NUMA node(s): 1
```

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Platform Notes (Continued)

```

Vendor ID:           GenuineIntel
CPU family:         6
Model:              158
Model name:         Intel(R) Xeon(R) E-2246G CPU @ 3.60GHz
Stepping:           10
CPU MHz:            4752.685
CPU max MHz:        4800.0000
CPU min MHz:        800.0000
BogoMIPS:           7200.00
Virtualization:     VT-x
L1d cache:          32K
L1i cache:          32K
L2 cache:           256K
L3 cache:           12288K
NUMA node0 CPU(s): 0-5
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
aperfperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch intel_pt ssbd ibrs ibpb stibp
tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 dtherm ida
arat pln pts hwp hwp_notify hwp_act_window hwp_epp md_clear spec_ctrl intel_stibp
flush_lld

```

```

/proc/cpuinfo cache data
cache size : 12288 KB

```

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5
node 0 size: 65283 MB
node 0 free: 63396 MB
node distances:
node    0
0:     10

```

```

From /proc/meminfo
MemTotal:      65718712 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"

```

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Platform Notes (Continued)

```
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)"
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 t110js 3.10.0-1062.el7.x86_64 #1 SMP Thu Jul 18 20:25:13 UTC 2019 x86_64 x86_64
x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
CVE-2018-3620 (L1 Terminal Fault):      Mitigation: PTE Inversion
Microarchitectural Data Sampling:      Mitigation: Clear CPU buffers; SMT disabled
CVE-2017-5754 (Meltdown):              Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):      Mitigation: Load fences, __user pointer
sanitization
CVE-2017-5715 (Spectre variant 2):      Mitigation: Full retpoline, IBPB
```

run-level 3 Nov 11 07:08

```
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3       ext4  908G   76G  787G   9% /
```

```
From /sys/devices/virtual/dmi/id
BIOS:      American Megatrends Inc. F01 08/21/2019
Vendor:    NEC
Product:   Express5800/T110j-S [N8100-2802Y]
Serial:    0000002
```

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:
4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667
```

(End of data from sysinfo program)



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Compiler Version Notes

=====
C | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)

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++ | 508.namd_r(base) 510.parest_r(base)

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 | 511.povray_r(base) 526.blender_r(base)

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.

=====
C++, C, Fortran | 507.cactuBSSN_r(base)

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 | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416
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Compiler Version Notes (Continued)

=====
Fortran, C | 521.wrf_r(base) 527.cam4_r(base)

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

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:

icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:

icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char

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Base Portability Flags (Continued)

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Fortran benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both C and C++:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:

-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html>
<http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-T110j-RevF.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml>
<http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-T110j-RevF.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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