



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECrate2017_fp_base = 37.3

ThinkSystem ST250
(3.30 GHz, Intel Xeon E-2136)

SPECrate2017_fp_peak = Not Run

CPU2017 License: 9017

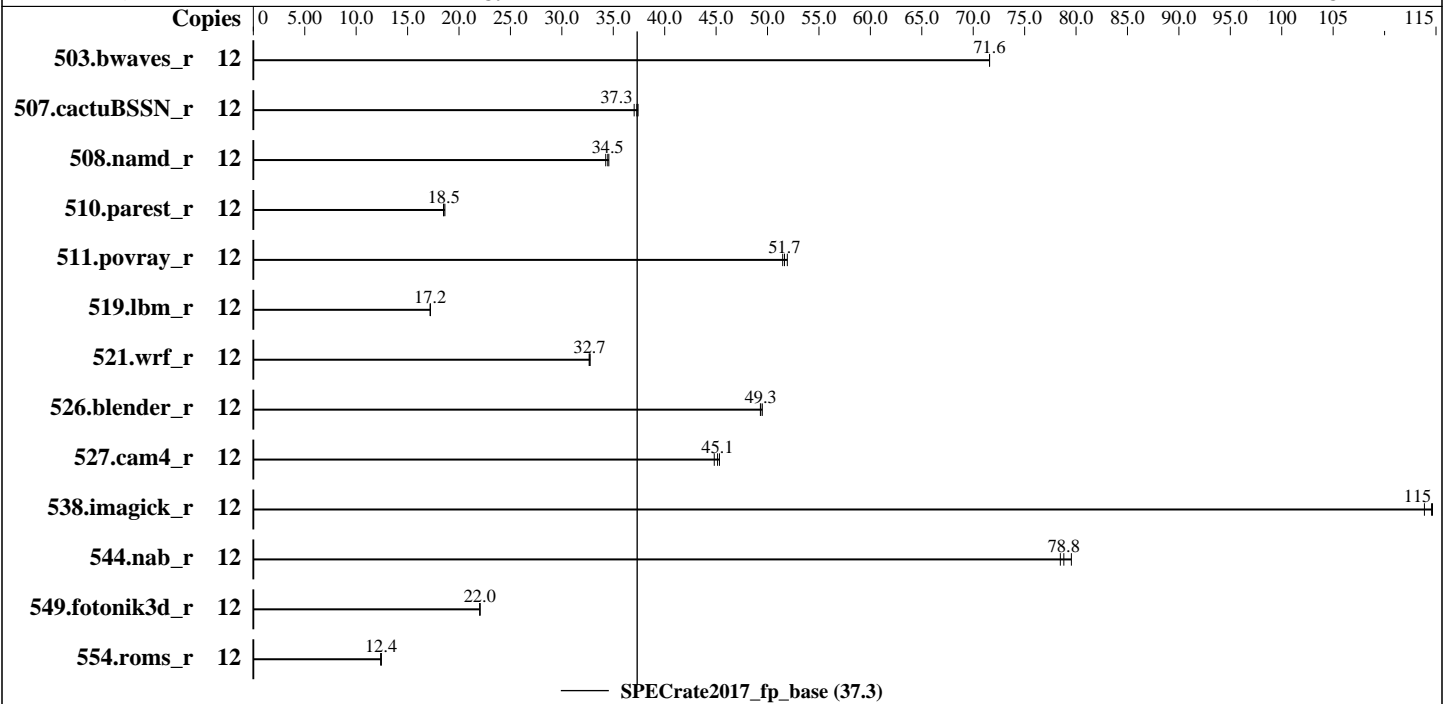
Test Date: Nov-2018

Test Sponsor: Lenovo Global Technology

Hardware Availability: Nov-2018

Tested by: Lenovo Global Technology

Software Availability: Aug-2018



Hardware

CPU Name: Intel Xeon E-2136
 Max MHz.: 4500
 Nominal: 3300
 Enabled: 6 cores, 1 chip, 2 threads/core
 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 960 GB SATA SSD
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64)
 Kernel 4.12.14-25.13-default
 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: No
 Firmware: Lenovo BIOS Version ISE105E 1.01 released Oct-2018
 File System: btrfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 Other: None



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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	12	1681	71.6	<u>1681</u>	<u>71.6</u>	1681	71.6							
507.cactuBSSN_r	12	406	37.4	410	37.0	<u>407</u>	<u>37.3</u>							
508.namd_r	12	<u>331</u>	<u>34.5</u>	333	34.3	330	34.6							
510.parest_r	12	1698	18.5	1685	18.6	<u>1694</u>	<u>18.5</u>							
511.povray_r	12	544	51.5	540	51.9	<u>542</u>	<u>51.7</u>							
519.lbm_r	12	735	17.2	734	17.2	<u>735</u>	<u>17.2</u>							
521.wrf_r	12	823	32.7	<u>822</u>	<u>32.7</u>	821	32.7							
526.blender_r	12	369	49.5	371	49.3	<u>370</u>	<u>49.3</u>							
527.cam4_r	12	<u>465</u>	<u>45.1</u>	463	45.3	468	44.8							
538.imagick_r	12	<u>260</u>	<u>115</u>	262	114	260	115							
544.nab_r	12	<u>256</u>	<u>78.8</u>	257	78.5	254	79.5							
549.fotonik3d_r	12	2121	22.0	<u>2123</u>	<u>22.0</u>	2123	22.0							
554.roms_r	12	1532	12.4	1540	12.4	<u>1534</u>	<u>12.4</u>							

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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"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic18.0u2/lib/ia32:/home/cpu2017-1.0.5-ic18.0u2/lib/intel64"
LD_LIBRARY_PATH = "\$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-32:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-64"

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)

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General Notes (Continued)

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 configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
CPU P-state Control set to Legacy
Sysinfo program /home/cpu2017-1.0.5-ic18.0u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-nnmv Tue Nov 27 13:55:05 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) E-2136 CPU @ 3.30GHz
1 "physical id"s (chips)
12 "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 : 12
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): 12
On-line CPU(s) list: 0-11
Thread(s) per core: 2
Core(s) per socket: 6
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2136 CPU @ 3.30GHz
Stepping: 10
CPU MHz: 3300.000
CPU max MHz: 4500.0000
CPU min MHz: 800.0000

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Platform Notes (Continued)

```

BogoMIPS:          6624.00
Virtualization:    VT-x
L1d cache:         32K
L1i cache:         32K
L2 cache:          256K
L3 cache:          12288K
NUMA node0 CPU(s): 0-11
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 cpuid
aperfmpperf tsc_known_freq 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 cpuid_fault epb invpcid_single
pti 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 intel_pt
xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window
hwp_epp flush_l1d

```

```

/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 6 7 8 9 10 11
node 0 size: 64365 MB
node 0 free: 62855 MB
node distances:
node    0
0:     10

```

From /proc/meminfo

```

MemTotal:        65910156 kB
HugePages_Total: 0
Hugepagesize:    2048 kB

```

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

```

os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"

```

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Platform Notes (Continued)

```
uname -a:
Linux linux-nnmv 4.12.14-25.13-default #1 SMP Tue Aug 14 15:07:35 UTC 2018 (947aa51)
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation,
IBPB, IBRS_FW
```

```
run-level 3 Nov 27 10:00
```

```
SPEC is set to: /home/cpu2017-1.0.5-ic18.0u2
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       btrfs 895G   18G  876G   2% /home
```

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 Lenovo -[ISE105E-1.01]- 10/11/2018
Memory:
4x Micron 18ASF2G72AZ-2G6D1 16 GB 2 rank 2666
```

(End of data from sysinfo program)

Compiler Version Notes

```
====
CC 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
-----
```

```
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

```
====
CXXC 508.namd_r(base) 510.parest_r(base)
-----
```

```
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

```
====
CC 511.povray_r(base) 526.blender_r(base)
-----
```

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```
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.
```

```
=====
FC 507.cactuBSSN_r(base)
```

```
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.
```

```
=====
FC 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
```

```
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
=====
CC 521.wrf_r(base) 527.cam4_r(base)
```

```
ifort (IFORT) 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.
```

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
```

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Base Compiler Invocation (Continued)

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
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=3
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

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Base Optimization Flags (Continued)

Benchmarks using both C and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-H.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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-H.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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