



# SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR150  
(3.80 GHz, Intel Xeon E-2174G)

SPECrate2017\_fp\_base = 31.2

SPECrate2017\_fp\_peak = Not Run

CPU2017 License: 9017

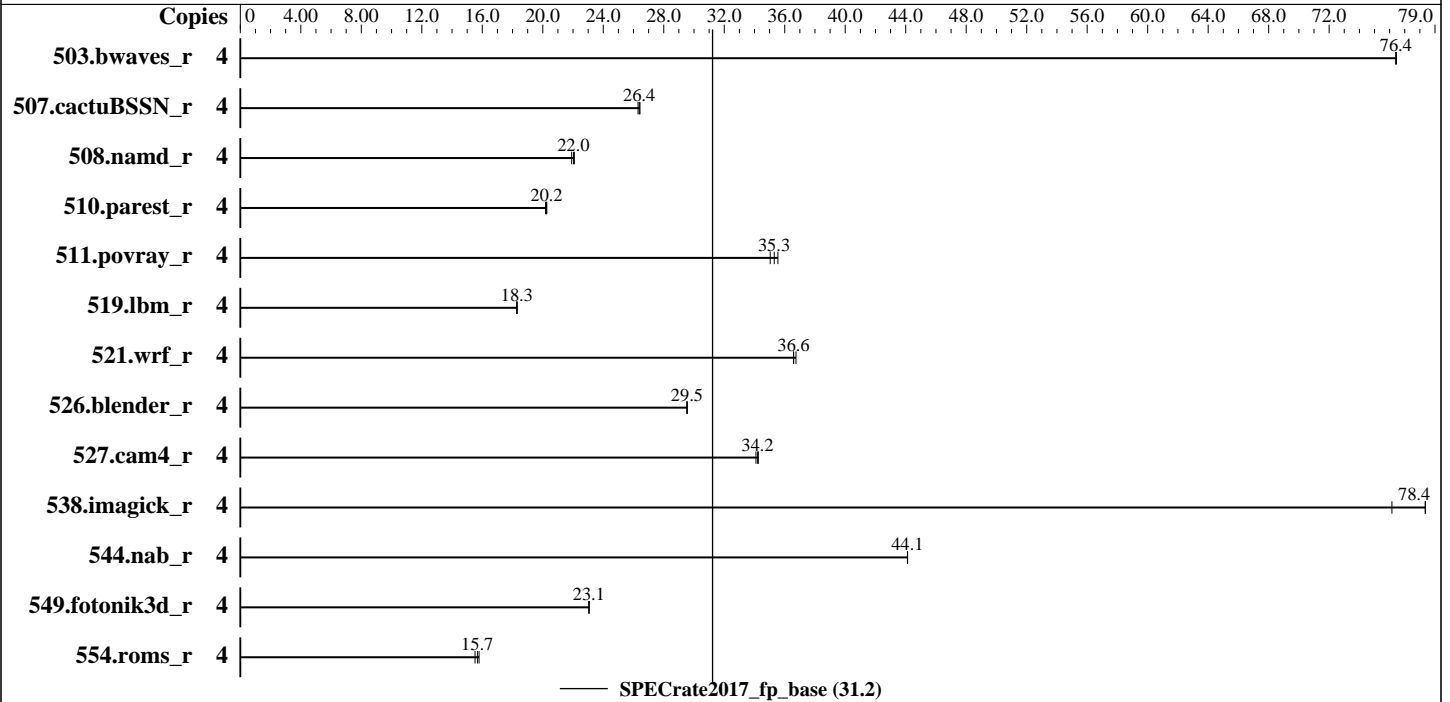
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Nov-2018

Hardware Availability: Jan-2019

Software Availability: May-2018



### Hardware

CPU Name: Intel Xeon E-2174G  
 Max MHz.: 4700  
 Nominal: 3800  
 Enabled: 4 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: 8 MB I+D on chip per chip  
 Other: None  
 Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)  
 Storage: 1 x 480 GB SATA SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP3 (x86\_64)  
 Kernel 4.4.131-94.29-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 ISE105G 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	4	<u>525</u>	<u>76.4</u>	525	76.5	525	76.4							
507.cactuBSSN_r	4	<u>192</u>	<u>26.4</u>	193	26.3	192	26.4							
508.namd_r	4	172	22.1	<u>172</u>	<u>22.0</u>	173	21.9							
510.parest_r	4	516	20.3	<u>517</u>	<u>20.2</u>	518	20.2							
511.povray_r	4	<u>265</u>	<u>35.3</u>	263	35.5	267	35.0							
519.lbm_r	4	231	18.3	<u>230</u>	<u>18.3</u>	230	18.3							
521.wrf_r	4	244	36.7	<u>245</u>	<u>36.6</u>	245	36.6							
526.blender_r	4	<u>206</u>	<u>29.5</u>	206	29.5	206	29.6							
527.cam4_r	4	204	34.3	<u>205</u>	<u>34.2</u>	205	34.1							
538.imagick_r	4	<u>127</u>	<u>78.4</u>	131	76.2	127	78.4							
544.nab_r	4	<u>153</u>	<u>44.1</u>	153	44.1	153	44.1							
549.fotonik3d_r	4	676	23.1	<u>676</u>	<u>23.1</u>	676	23.1							
554.roms_r	4	403	15.8	<u>405</u>	<u>15.7</u>	410	15.5							

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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.

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### General Notes (Continued)

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 configuration:

Choose Operating Mode set to Maximum Performance

Hyper-Threading set to Disable

Execute Disable Bit set to Disable

DCA set to Enable

    Sysinfo program /home/cpu2017-1.0.5-ic18.0u2/bin/sysinfo

    Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

    running on linux-tsni Tue Nov 20 14:26:15 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-2174G CPU @ 3.80GHz

    1 "physical id"s (chips)

    4 "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 : 4

    siblings : 4

    physical 0: cores 0 1 2 3

From lscpu:

Architecture: x86\_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 4

On-line CPU(s) list: 0-3

Thread(s) per core: 1

Core(s) per socket: 4

Socket(s): 1

NUMA node(s): 1

Vendor ID: GenuineIntel

CPU family: 6

Model: 158

Model name: Intel(R) Xeon(R) E-2174G CPU @ 3.80GHz

Stepping: 10

CPU MHz: 4637.703

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### Platform Notes (Continued)

```

CPU max MHz:      4700.0000
CPU min MHz:      800.0000
BogoMIPS:         7583.98
Virtualization:   VT-x
L1d cache:        32K
L1i cache:        32K
L2 cache:         256K
L3 cache:         8192K
NUMA node0 CPU(s): 0-3

```

```

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
aperfmpperf 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 ida arat epb invpcid_single pln pts
dtherm hwp hwp_notify hwp_act_window hwp_epp intel_pt rsb_ctxsw spec_ctrl stibp ssbd
retpoline kaiser tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bml hle
avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec
xgetbv1

```

```

/proc/cpuinfo cache data
cache size : 8192 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
node 0 size: 64382 MB
node 0 free: 63837 MB
node distances:
node 0
0: 10

```

```

From /proc/meminfo
MemTotal:      65927492 kB
HugePages_Total: 0
Hugepagesize:  2048 kB

```

```

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"

```

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### Platform Notes (Continued)

```
VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"
```

```
uname -a:
Linux linux-tsni 4.4.131-94.29-default #1 SMP Mon May 21 14:41:34 UTC 2018 (f49bc78)
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: IBRS+IBPB
```

```
run-level 3 Nov 20 14:19
```

```
SPEC is set to: /home/cpu2017-1.0.5-ic18.0u2
Filesystem Type Size Used Avail Use% Mounted on
/dev/md126p2 btrfs 446G 18G 428G 4% /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 -[ISE105G-1.01]- 10/25/2018
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
```

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## Compiler Version Notes (Continued)

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====  
CC 511.povray\_r(base) 526.blender\_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.

=====  
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

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## Base Compiler Invocation (Continued)

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
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
```

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## Base Optimization Flags (Continued)

Fortran benchmarks (continued):

`-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`

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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