



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECrate2017_fp_base = 530

ThinkSystem SR950
(2.70 GHz, Intel Xeon Platinum 8270)

SPECrate2017_fp_peak = Not Run

CPU2017 License: 9017

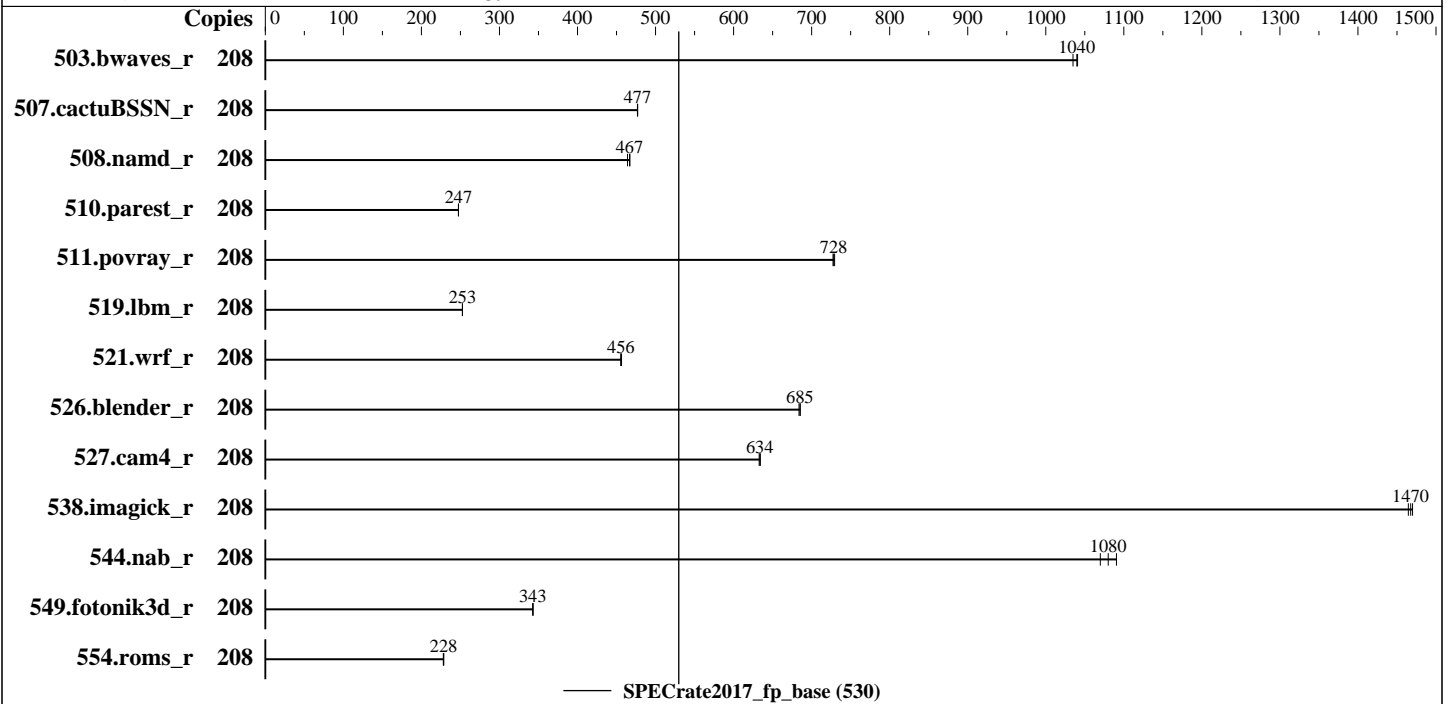
Test Date: Apr-2019

Test Sponsor: Lenovo Global Technology

Hardware Availability: Apr-2019

Tested by: Lenovo Global Technology

Software Availability: Nov-2018



Hardware

CPU Name: Intel Xeon Platinum 8270
 Max MHz.: 4000
 Nominal: 2700
 Enabled: 104 cores, 4 chips, 2 threads/core
 Orderable: 2,3,4 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: 768 GB (48 x 16 GB 2Rx8 PC4-2933Y-R)
 Storage: 1 x 800 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 19.0.1.144 of Intel C/C++
 Compiler Build 20181018 for Linux;
 Fortran: Version 19.0.1.144 of Intel Fortran
 Compiler Build 20181018 for Linux
 Parallel: No
 Firmware: Lenovo BIOS Version PSE12II 1.50 released Mar-2019
 File System: xfs
 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	208	2006	1040	2004	1040	2015	1030							
507.cactuBSSN_r	208	552	477	552	477	552	477							
508.namd_r	208	426	464	423	467	423	467							
510.parest_r	208	2199	247	2199	247	2199	247							
511.povray_r	208	666	729	668	727	667	728							
519.lbm_r	208	868	253	868	252	868	253							
521.wrf_r	208	1023	455	1021	456	1022	456							
526.blender_r	208	462	685	463	684	462	685							
527.cam4_r	208	574	634	574	634	575	633							
538.imagick_r	208	352	1470	352	1470	353	1460							
544.nab_r	208	321	1090	324	1080	327	1070							
549.fotonik3d_r	208	2364	343	2364	343	2365	343							
554.roms_r	208	1446	229	1447	228	1449	228							

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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-ic19.0u1/lib/intel64"

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
Filesystem page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

(Continued on next page)



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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.

Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4) 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

Intel Virtualization Technology set to Disable

Hardware Perfetcher set to Disable

MONITOR/MWAIT set to Enable

SNC set to Enable

 Sysinfo program /home/cpu2017-1.0.5-ic19.0ul/bin/sysinfo

 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

 running on linux-jdx4 Thu Apr 25 14:32:52 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) Platinum 8270 CPU @ 2.70GHz

 4 "physical id"s (chips)

 208 "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 : 26

 siblings : 52

 physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 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 22 24 25 26 27 28 29

 physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

 physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

From lscpu:

 Architecture: x86_64

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

(Continued on next page)



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Platform Notes (Continued)

```

Byte Order:           Little Endian
CPU(s):               208
On-line CPU(s) list: 0-207
Thread(s) per core:  2
Core(s) per socket:  26
Socket(s):            4
NUMA node(s):         8
Vendor ID:            GenuineIntel
CPU family:           6
Model:                85
Model name:           Intel(R) Xeon(R) Platinum 8270 CPU @ 2.70GHz
Stepping:             6
CPU MHz:              2700.000
CPU max MHz:          4000.0000
CPU min MHz:          1000.0000
BogoMIPS:             5400.00
Virtualization:       VT-x
L1d cache:            32K
L1i cache:            32K
L2 cache:             1024K
L3 cache:             36608K
NUMA node0 CPU(s):   0-3,7-9,13-15,20-22,104-107,111-113,117-119,124-126
NUMA node1 CPU(s):   4-6,10-12,16-19,23-25,108-110,114-116,120-123,127-129
NUMA node2 CPU(s):   26-29,33-35,39-41,46-48,130-133,137-139,143-145,150-152
NUMA node3 CPU(s):   30-32,36-38,42-45,49-51,134-136,140-142,146-149,153-155
NUMA node4 CPU(s):   52-55,59-61,65-67,72-74,156-159,163-165,169-171,176-178
NUMA node5 CPU(s):   56-58,62-64,68-71,75-77,160-162,166-168,172-175,179-181
NUMA node6 CPU(s):   78-81,85-87,91-93,98-100,182-185,189-191,195-197,202-204
NUMA node7 CPU(s):   82-84,88-90,94-97,101-103,186-188,192-194,198-201,205-207
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
aperfperf 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 cpuid_fault epb cat_l3 cdp_l3
invpcid_single ssbd mba ibrs ibpb stibp 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 intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_lld 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: 8 nodes (0-7)
```

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Platform Notes (Continued)

```

node 0 cpus: 0 1 2 3 7 8 9 13 14 15 20 21 22 104 105 106 107 111 112 113 117 118 119
124 125 126
node 0 size: 96346 MB
node 0 free: 95947 MB
node 1 cpus: 4 5 6 10 11 12 16 17 18 19 23 24 25 108 109 110 114 115 116 120 121 122
123 127 128 129
node 1 size: 96728 MB
node 1 free: 93508 MB
node 2 cpus: 26 27 28 29 33 34 35 39 40 41 46 47 48 130 131 132 133 137 138 139 143 144
145 150 151 152
node 2 size: 96757 MB
node 2 free: 96506 MB
node 3 cpus: 30 31 32 36 37 38 42 43 44 45 49 50 51 134 135 136 140 141 142 146 147 148
149 153 154 155
node 3 size: 96757 MB
node 3 free: 96555 MB
node 4 cpus: 52 53 54 55 59 60 61 65 66 67 72 73 74 156 157 158 159 163 164 165 169 170
171 176 177 178
node 4 size: 96757 MB
node 4 free: 96566 MB
node 5 cpus: 56 57 58 62 63 64 68 69 70 71 75 76 77 160 161 162 166 167 168 172 173 174
175 179 180 181
node 5 size: 96757 MB
node 5 free: 96564 MB
node 6 cpus: 78 79 80 81 85 86 87 91 92 93 98 99 100 182 183 184 185 189 190 191 195
196 197 202 203 204
node 6 size: 96757 MB
node 6 free: 96279 MB
node 7 cpus: 82 83 84 88 89 90 94 95 96 97 101 102 103 186 187 188 192 193 194 198 199
200 201 205 206 207
node 7 size: 96754 MB
node 7 free: 96574 MB
node distances:
node  0  1  2  3  4  5  6  7
0:  10 11 21 21 21 21 21 21
1:  11 10 21 21 21 21 21 21
2:  21 21 10 11 21 21 21 21
3:  21 21 11 10 21 21 21 21
4:  21 21 21 21 10 11 21 21
5:  21 21 21 21 11 10 21 21
6:  21 21 21 21 21 21 10 11
7:  21 21 21 21 21 21 11 10

```

From /proc/meminfo

```

MemTotal:      792184028 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

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Platform Notes (Continued)

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"
```

uname -a:

```
Linux linux-jdx4 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): Not affected
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 Apr 25 14:30

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       xfs   744G   22G  723G   3% /
```

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 -[PSE121I-1.50]- 03/01/2019

Memory:

```
48x NO DIMM NO DIMM
48x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933
```

(End of data from sysinfo program)

Compiler Version Notes

```
=====  
CC 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,

(Continued on next page)



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Compiler Version Notes (Continued)

Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====
FC 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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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

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Compiler Version Notes (Continued)

```

-----
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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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
```

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

```

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Base Portability Flags (Continued)

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-ic18.0-official-linux64.2019-04-02.html>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.xml>

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