## SPEC CPU®2017 Floating Point Speed Result

**Lenovo Global Technology**  
ThinkSystem SR850P  
(3.00 GHz, Intel Xeon Gold 5217)  

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>115</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
<td>110</td>
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<tr>
<td>619.lbm_s</td>
<td>32</td>
<td>111</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>73.2</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>54.9</td>
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<tr>
<td>628.pop2_s</td>
<td>32</td>
<td>103</td>
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<tr>
<td>638.imagick_s</td>
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<td>200</td>
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<tr>
<td>644.nab_s</td>
<td>32</td>
<td>162</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>119</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td>71.8</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5217  
- **Max MHz:** 3700  
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
- **Storage:** 1 x 960 GB SATA SSD

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
  Kernel 4.12.14-195-default
- **Compiler:** C/C++: Version 19.0.5.281 of Intel C/C++  
  Compiler for Linux; Fortran: Version 19.0.5.281 of Intel Fortran
- **Firmware:** Lenovo BIOS Version TEE156L 2.61 released May-2020
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECspeed®2017_fp_base = 122
SPECspeed®2017_fp_peak = Not Run

Results Table

<table>
<thead>
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<th>Benchmark</th>
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<td>97.0</td>
<td>162</td>
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</tbody>
</table>

SPECspeed®2017_fp_base = 122
SPECspeed®2017_fp_peak = Not Run

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.1.0-ic19.0u5-2/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-9900K CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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

NA: 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 configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enable
Hyper-Threading set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u5-2/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edeb1e6e46a485a0011
running on linux-z1c1 Thu Dec 24 19:49:06 2020

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) Gold 5217 CPU @ 3.00GHz
 4 "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: 8
siblings: 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
physical 2: cores 0 1 2 3 4 5 6 7
physical 3: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5217 CPU @ 3.00GHz
Stepping: 6
CPU MHz: 3000.000
CPU max MHz: 3700.0000
CPU min MHz: 1200.0000
BogoMIPS: 6000.00
Virtualization: VT-x

(Continued on next page)
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**Platform Notes (Continued)**

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
NUMA node2 CPU(s): 16-23
NUMA node3 CPU(s): 24-31
Flags: fpu vme de pse tsc mts msr pae mce cmov
pat pse36 clflush dtc 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
aperfmon perf pni pclmulqdq dtes64 monitor ds_cpl vmx 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 3nowprefetch cpuid_fault epb cat_13 cdq_13
invpcid_single intel_pchin ssbd ma ibps ibps2 ibps_2enhanced tpr_shadow vmx
flexpriority ept vpid fsgsbset tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a lapch_lm abm 3nowprefetch cpuid_fault epb cat_13 cdq_13
invpcid_single intel_pchin ssbd ma ibps ibps2 ibps_2enhanced tpr_shadow vmx
flexpriority ept vpid fsgsbset tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a lapch_lm abm 3nowprefetch cpuid_fault epb cat_13 cdq_13
invpcid_single intel_pchin ssbd ma ibps ibps2 ibps_2enhanced tpr_shadow vmx
flexpriority ept vpid fsgsbset tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdt_a lapch_lm abm 3nowprefetch cpuid_fault epb cat_13 cdq_13
invpcid_single intel_pchin ssbd ma ibps ibps2 ibps_2enhanced tpr_shadow vmx
flexpriority ept vpid fsgsbset tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm

/proc/cpuinfo cache data
| cache size | : | 11264 KB |

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7
node 0 size: 386688 MB
node 0 free: 386309 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 387070 MB
node 1 free: 386746 MB
node 2 cpus: 16 17 18 19 20 21 22 23
node 2 size: 387070 MB
node 2 free: 386888 MB
node 3 cpus: 24 25 26 27 28 29 30 31
node 3 size: 387040 MB
node 3 free: 385728 MB
node distances:
<table>
<thead>
<tr>
<th>node</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:</td>
<td>10 21 21 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:</td>
<td>21 10 31 21</td>
<td></td>
<td></td>
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<tr>
<td>2:</td>
<td>21 31 10 21</td>
<td></td>
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<tr>
<td>3:</td>
<td>31 21 21 10</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

From /proc/meminfo (Continued on next page)
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SPECspeed®2017_fp_base = 122
SPECspeed®2017_fp_peak = Not Run

<table>
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<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>Dec-2020</th>
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</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Jan-2020</td>
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<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Sep-2019</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

MemTotal: 1585017692 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
Linux linux-z1c1 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Dec 24 18:18

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u5-2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb3 xfs 892G 30G 863G 4% /

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE156L-2.61]- 05/20/2020
Vendor: Lenovo
Product: ThinkSystem SR850P -[7D2HCTO1WW]-
Product Family: ThinkSystem
Serial: 1234567890

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.

(Continued on next page)
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**Platform Notes (Continued)**

Memory:
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)
Memory on this system run at 2666 MHz due to CPU limitation.

**Compiler Version Notes**

```
C   | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
---------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++, C, Fortran | 607.cactuBSSN_s(base)
---------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
---------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran, C | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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**Test Date:** Dec-2020  
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**Software Availability:** Sep-2019

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**Compiler Version Notes (Continued)**

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**Base Compiler Invocation**

C benchmarks:
- `icc`

Fortran benchmarks:
- `ifort`

Benchmarks using both Fortran and C:
- `ifort icc`

Benchmarks using Fortran, C, and C++:
- `icpc icc ifort`

---

**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`
- `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:
- `-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`

Fortran benchmarks:
- `-m64 -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs`

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**Test Date:** Dec-2020
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### Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

```bash
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

Benchmarks using Fortran, C, and C++:

```bash
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-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs
```

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

- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.html)

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

- [http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.xml)

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.0 on 2020-12-24 06:49:06-0500.
Report generated on 2021-01-19 16:56:06 by CPU2017 PDF formatter v6255.
Originally published on 2021-01-19.