# SPEC CPU®2017 Floating Point Speed Result

## Lenovo Global Technology

ThinkSystem SR850  
(2.90 GHz, Intel Xeon Platinum 8268)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base =</th>
<th>224</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (224)</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>96</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>96</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>96</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>96</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>96</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>96</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>96</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>96</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>96</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
</tr>
<tr>
<td>Max MHz:</td>
</tr>
<tr>
<td>Nominal:</td>
</tr>
<tr>
<td>Enabled:</td>
</tr>
<tr>
<td>Orderable:</td>
</tr>
<tr>
<td>Cache L1:</td>
</tr>
<tr>
<td>L2:</td>
</tr>
<tr>
<td>L3:</td>
</tr>
<tr>
<td>Other:</td>
</tr>
<tr>
<td>Memory:</td>
</tr>
<tr>
<td>Storage:</td>
</tr>
<tr>
<td>Other:</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS:</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Compiler:</td>
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<td>Parallel:</td>
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<tr>
<td>Firmware:</td>
</tr>
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<tr>
<td>File System:</td>
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<tr>
<td>System State:</td>
</tr>
<tr>
<td>Base Pointers:</td>
</tr>
<tr>
<td>Peak Pointers:</td>
</tr>
<tr>
<td>Other:</td>
</tr>
</tbody>
</table>

| Power Management: | BIOS set to prefer performance at the cost of additional power usage |
Lenovo Global Technology
ThinkSystem SR850
(2.90 GHz, Intel Xeon Platinum 8268)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>96</td>
<td>66.3</td>
<td>891</td>
<td>66.2</td>
<td>891</td>
<td>67.6</td>
<td>872</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>96</td>
<td>80.1</td>
<td>208</td>
<td>80.6</td>
<td>207</td>
<td>80.1</td>
<td>208</td>
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<tr>
<td>619.lbm_s</td>
<td>96</td>
<td>31.5</td>
<td>166</td>
<td>31.4</td>
<td>167</td>
<td>31.6</td>
<td>166</td>
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<tr>
<td>621.wrf_s</td>
<td>96</td>
<td>91.0</td>
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<td>92.9</td>
<td>142</td>
<td>91.2</td>
<td>145</td>
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<tr>
<td>627.cam4_s</td>
<td>96</td>
<td>52.5</td>
<td>169</td>
<td>52.6</td>
<td>169</td>
<td>52.5</td>
<td>169</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>96</td>
<td>179</td>
<td>66.4</td>
<td>178</td>
<td>66.5</td>
<td>179</td>
<td>66.2</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>96</td>
<td>57.1</td>
<td>252</td>
<td>56.3</td>
<td>256</td>
<td>56.2</td>
<td>257</td>
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<tr>
<td>644.nab_s</td>
<td>96</td>
<td>36.1</td>
<td>483</td>
<td>36.2</td>
<td>483</td>
<td>36.1</td>
<td>484</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>96</td>
<td>73.3</td>
<td>124</td>
<td>73.5</td>
<td>124</td>
<td>73.6</td>
<td>124</td>
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<tr>
<td>654.roms_s</td>
<td>96</td>
<td>38.0</td>
<td>414</td>
<td>38.0</td>
<td>415</td>
<td>37.8</td>
<td>416</td>
</tr>
</tbody>
</table>

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-ic19.0u4/lib/intel64"
OMP_STACKSIZE = "192M"

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 disabled by default
echo never > /sys/kernel/mm/transparent_hugepage/enabled
echo never > /sys/kernel/mm/transparent_hugepage/defrag
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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a)
Lenovo Global Technology
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(2.90 GHz, Intel Xeon Platinum 8268)

General Notes (Continued)

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 and then set it to Custom Mode
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable
MONITOR/MWAIT set to Enable

Sysinfo program /home/cpu2017-1.1.0-ic19.0u4/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe1e6e46a485a0011
running on linux-9o83 Wed Nov 13 23:35:32 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 8268 CPU @ 2.90GHz
        4  "physical id"s (chips)
         96 "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 : 24
siblings : 24
    physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
    physical 1: cores 0 1 2 3 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 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 21 22 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 25 26 27 28 29

From lscpu:
       Architecture:        x86_64
       CPU op-mode(s):       32-bit, 64-bit
       Byte Order:           Little Endian
       CPU(s):               96
       On-line CPU(s) list:  0-95
       Thread(s) per core:   1
       Core(s) per socket:   24
       Socket(s):            4
       NUMA node(s):         4
       Vendor ID:            GenuineIntel
       CPU family:           6
       Model:                85

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

**Lenovo Global Technology**  
ThinkSystem SR850  
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---

**SPECspeed®2017_fp_base = 224**  
**SPECspeed®2017_fp_peak = Not Run**

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** Nov-2019

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**Platform Notes (Continued)**

- **Model name:** Intel(R) Xeon(R) Platinum 8268 CPU @ 2.90GHz  
- **Stepping:** 6  
- **CPU MHz:** 2900.000  
- **CPU max MHz:** 3900.0000  
- **CPU min MHz:** 1200.0000  
- **BogoMIPS:** 5800.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 36608K  
- **NUMA node0 CPU(s):** 0-23  
- **NUMA node1 CPU(s):** 24-47  
- **NUMA node2 CPU(s):** 48-71  
- **NUMA node3 CPU(s):** 72-95  
- **Flags:** fpu vme de pse tsc msr pae mca 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf 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 ablp_lm abcf_lm abbf_lm abblf_lm abf_lm abfmlf_lm abfr_lm abfrf_lm abfrmlf_lm abfrb_lm abfrbmlf_lm abfrbflf_lm abfrbflmlf_lm

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 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23  
- **node 0 size:** 386661 MB  
- **node 0 free:** 386264 MB  
- **node 1 cpus:** 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47  
- **node 1 size:** 387028 MB  
- **node 1 free:** 386797 MB  
- **node 2 cpus:** 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71  
- **node 2 size:** 387056 MB  
- **node 2 free:** 386470 MB  
- **node 3 cpus:** 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95  
- **node 3 size:** 387054 MB  
- **node 3 free:** 386832 MB  
- **node distances:**
  - **node 0 1 2 3**

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<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
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<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</td>
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</table>

**CPU2017 License:** 9017
**Test Sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology
**Test Date:** Nov-2019
**Hardware Availability:** Apr-2019
**Software Availability:** May-2019

**Platform Notes (Continued)**

```
0:  10  21  21  31
1:  21  10  31  21
2:  21  31  10  21
3:  31  21  21  10
```

From `/proc/meminfo`
- MemTotal: 1584947876 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release` /`/etc/*version`
- SuSE-release:
  - SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 4
  - # 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"
    - VERSION="12-SP4"
    - VERSION_ID="12.4"
    - PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    - ID="sles"
    - ANSI_COLOR="0;32"
    - CPE_NAME="cpe:/o:suse:sles:12:sp4"

`uname -a`:
- x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** No status reported
- **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: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

**run-level 3** Nov 13 23:29

**SPEC is set to:** `/home/cpu2017-1.1.0-ic19.0u4`

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda2</td>
<td>btrfs</td>
<td>744G</td>
<td>147G</td>
<td>598G</td>
<td>20%</td>
<td>/home</td>
</tr>
</tbody>
</table>

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SPEC Speed®2017_fp_base = 224
SPEC Speed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Nov-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[TEE141E-2.30]- 07/02/2019
Vendor: Lenovo
Product: ThinkSystem SR850 -[7X1925Z000]-
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 SMIOS" standard.
Memory:
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

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 19.0.4.227 Build 20190416
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 19.0.4.227 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 | 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 19.0.4.227 Build 20190416
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Compiler Version Notes (Continued)

Fortran, C | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(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

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactusBSSN_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
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64
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**SPECspeed®2017_fp_base = 224**

**SPECspeed®2017_fp_peak = Not Run**

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Nov-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

#### Base Optimization Flags

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

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

**Benchmarks using both Fortran and C:**
- `-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++:**
- `-xCORE-AVX512`  
- `-ipo -O3 -no-prec-div -qopt-prefetch`  
- `-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-F.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.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-F.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.xml)