**Lenovo Global Technology**  
ThinkSystem SR590  
(2.20 GHz, Intel Xeon Silver 4214Y)

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** May-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Dec-2018

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base = 93.6</th>
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<tbody>
<tr>
<td>603.bwaves_s 24</td>
<td>SPECspeed2017_fp_peak = Not Run</td>
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<tr>
<td>607.cactuBSSN_s 24</td>
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<tr>
<td>619.lbm_s 24</td>
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<tr>
<td>621.wrf_s 24</td>
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<tr>
<td>627.cam4_s 24</td>
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<tr>
<td>628.pop2_s 24</td>
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<tr>
<td>638.imagick_s 24</td>
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<tr>
<td>644.nab_s 24</td>
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<tr>
<td>649.fotonik3d_s 24</td>
<td></td>
</tr>
<tr>
<td>654.roms_s 24</td>
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</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4214Y  
- **Max MHz.:** 3200  
- **Nominal:** 2200  
- **Enabled:** 24 cores, 2 chips  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 16.5 MB I+D on chip per chip  
- **Other:** None

- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 12 SP4 (x86_64)
- **Kernel:** 4.12.14-94.41-default  
- **Compiler:** C/C++: Version 19.0.0.117 of Intel C/C++  
- **Fortran:** Version 19.0.0.117 of Intel Fortran  
- **Compiler for Linux:**  
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version TEE135L 2.10 released Jan-2019  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None
SPEC CPU2017 Floating Point Speed Result

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Results Table

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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
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<td>183</td>
<td>86.2</td>
<td>181</td>
<td>86.9</td>
</tr>
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RESULTS

SPECspeed2017_fp_base = 93.6
SPECspeed2017_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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19/lib/intel64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-799X 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

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) 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.
**Lenovo Global Technology**

ThinkSystem SR590  
(2.20 GHz, Intel Xeon Silver 4214Y)

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**Platform Notes**

- BIOS configuration:
  - Choose Operating Mode set to Maximum Performance
  - Choose Operating Mode set to Custom Mode
  - CPU P-state Control set to Automatic
  - MONITOR/MWAIT set to Enable
  - Hyper-Threading set to Disable
  - Adjacent Cache Prefetch set to disable
  - Sysinfo program `/home/cpu2017-1.0.5-ic19/bin/sysinfo`

- **Rev:** r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
  running on SR590-sles12sp4 Thu May 23 15:56:59 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- From `/proc/cpuinfo`
  - `model name`: Intel(R) Xeon(R) Silver 4214C CPU @ 2.20GHz
  - `2 "physical id"s (chips)`
  - `24 "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`: 12
    - `siblings`: 12
    - `physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13`
    - `physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13`

- From `lscpu`:
  - `Architecture`: x86_64
  - `CPU op-mode(s)`: 32-bit, 64-bit
  - `Byte Order`: Little Endian
  - `CPU(s)`: 24
  - `On-line CPU(s) list`: 0-23
  - `Thread(s) per core`: 1
  - `Core(s) per socket`: 12
  - `Socket(s)`: 2
  - `NUMA node(s)`: 2
  - `Vendor ID`: GenuineIntel
  - `CPU family`: 6
  - `Model`: 85
  - `Model name`: Intel(R) Xeon(R) Silver 4214C CPU @ 2.20GHz
  - `Stepping`: 6
  - `CPU MHz`: 2200.000
  - `BogoMIPS`: 4400.00
  - `Virtualization`: VT-x
  - `L1d cache`: 32K
  - `L1i cache`: 32K
  - `L2 cache`: 1024K

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(Continued on next page)
# SPEC CPU2017 Floating Point Speed Result

## Lenovo Global Technology

### ThinkSystem SR590

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### Platform Notes (Continued)

- L3 cache: 16896K
- NUMA node0 CPU(s): 0-11
- NUMA node1 CPU(s): 12-23
- 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 aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xptr pdcm pccd 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 vmmi fexppriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnow invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqmmq cmq_occup_llc cmq_mbmbb_total cmq_mbmbb_local dtherm ida arat pin pts hwp_epp pku ospke avx512_vnni flush_l1d arch_capabilities

### /proc/cpuinfo cache data

- cache size: 16896 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
- available: 2 nodes (0-1)
- node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
- node 0 size: 96357 MB
- node 0 free: 95898 MB
- node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
- node 1 size: 96713 MB
- node 1 free: 96253 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

From /proc/meminfo
- MemTotal: 197705276 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"

(Continued on next page)
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Platform Notes (Continued)

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:
      (3090901) 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 May 23 15:55

SPEC is set to: /home/cpu2017-1.0.5-ic19
   Filesystem   Type  Size  Used Avail Use% Mounted on
   /dev/sda3 btrfs  740G  41G  699G  6% /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 -[TEE135L-2.10]- 01/10/2019
   Memory:
      4x NO DIMM NO DIMM
      12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
FC  607.cactuBSSN_s(base)
(Continued on next page)
Lenovo Global Technology
ThinkSystem SR590
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SPECspeed2017_fp_base = 93.6
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Compiler Version Notes (Continued)

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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

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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
   -assume byterecl
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:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
   -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
   -nostandard-realloc-lhs -align array32byte

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
   -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/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/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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