## Lenovo Global Technology

**ThinkSystem SN550**  
(2.50 GHz, Intel Xeon Silver 4215)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base = 76.8</th>
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<tbody>
<tr>
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<td>SPECspeed2017_fp_peak = Not Run</td>
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</tbody>
</table>

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo)  
  - Kernel 3.10.0-957.el7.x86_64  
  - 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

- **Compiler:** Intel  
  - 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

- **Firmware:** Lenovo BIOS Version IVE135M 2.10 released Jan-2019

### Hardware

- **CPU Name:** Intel Xeon Silver 4215  
  - **Max MHz.:** 3500  
  - **Nominal:** 2500  
  - **Enabled:** 16 cores, 2 chips, 2 threads/core  
  - **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:** 11 MB I+D on chip per chip  
  - **Other:** None  

- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  

- **Storage:** 1 x 960 GB SATA SSD  

- **Other:** None

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**CPU2017 License:** 9017  
**Test Date:** May-2019  
**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Apr-2019  
**Tested by:** Lenovo Global Technology  
**Software Availability:** Nov-2018
Lenovo Global Technology
ThinkSystem SN550
(2.50 GHz, Intel Xeon Silver 4215)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>324</td>
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<td>205</td>
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<td>81.6</td>
<td>205</td>
<td>81.5</td>
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<td>42.1</td>
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<td></td>
<td></td>
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</tbody>
</table>

SPECspeed2017_fp_base = 76.8
SPECspeed2017_fp_peak = Not Run

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,1,0"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"
OMP_STACKSIZE = "192M"

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

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.
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Tested by: Lenovo Global Technology
Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

Platform Notes

BIOS configuration:
Choose Operating Mode set to Custom Mode
Page Policy set to Adaptive
Trusted Execution Technology set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Sun May 5 18:22:03 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) Silver 4215 CPU @ 2.50GHz
    2 "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 : 16
    physical 0: cores 0 1 2 3 4 5 6 7
    physical 1: 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
    CPU(s): 32
    On-line CPU(s) list: 0-31
    Thread(s) per core: 2
    Core(s) per socket: 8
    Socket(s): 2
    NUMA node(s): 2
    Vendor ID: GenuineIntel
    CPU family: 6
    Model: 85
    Model name: Intel(R) Xeon(R) Silver 4215 CPU @ 2.50GHz
    Stepping: 6
    CPU MHz: 2500.000
    BogoMIPS: 5000.00
    Virtualization: VT-x
    L1d cache: 32K
    L1i cache: 32K
    L2 cache: 1024K
    L3 cache: 11264K
    NUMA node0 CPU(s): 0-7,16-23
    NUMA node1 CPU(s): 8-15,24-31

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

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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_before_cdpellige ssm mtrr ms
```

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.  
```
available: 2 nodes (0-1)  
nod 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23  
node 0 size: 196282 MB  
node 0 free: 191364 MB  
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31  
node 1 size: 196608 MB  
node 1 free: 191899 MB  
node distances:  
node 0 1: 10 21  
0: 10 21  
1: 21 10  
```

From `/proc/meminfo`  
```
MemTotal: 395880484 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  
```

From `/etc/*release*/etc/*version*`  
```
NAME="Red Hat Enterprise Linux Server"  
VERSION="7.6 (Maipo)"  
ID="rhel"  
ID_LIKE="fedora"  
VARIANT="Server"  
VARIANT_ID="server"  
VERSION_ID="7.6"  
PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"  
redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)  
system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)  
```

(Continued on next page)
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Platform Notes (Continued)

uname -a:
    Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018
    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: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 May 5 18:16

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
    Filesystem  Type  Size  Used Avail Use% Mounted on
    /dev/sda2    xfs   839G   14G  826G   2% /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 -{IVE135M-2.10}- 01/16/2019
    Memory:
        24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, 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 19.0.1.144 Build 20181018
    Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
    FC  607.cactuBSSN_s(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,
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FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.1.144 Build 20181018
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(Continued on next page)
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Base Portability Flags (Continued)

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 bytelecl
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=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-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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