## Lenovo Global Technology

**ThinkSystem SN550**  
(2.20 GHz, Intel Xeon Silver 4210)

<table>
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<th>SPECspeed2017_int_base =</th>
<th>7.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak =</td>
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</tr>
</tbody>
</table>

### CPU2017 License: 9017

- **Test Sponsor:** Lenovo Global Technology  
- **Tested by:** Lenovo Global Technology  
- **Test Date:** May-2019

### Hardware

- **CPU Name:** Intel Xeon Silver 4210  
- **Max MHz.:** 3200  
- **Nominal:** 2200  
- **Enabled:** 20 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:** 13.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 (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
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version IVE135M 2.10 released Jan-2019  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** Jemalloc memory allocator V5.0.1

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**Software Availability:** Nov-2018  
**Hardware Availability:** Apr-2019
Lenovo Global Technology
ThinkSystem SN550
(2.20 GHz, Intel Xeon Silver 4210)

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

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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</tr>
</tbody>
</table>

**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,scatter"
- `LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"
- `LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u1/je5.0.1-64"
- `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.
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

(Continued on next page)
**SPEC CPU2017 Integer Speed Result**

**Lenovo Global Technology**

ThinkSystem SN550
(2.20 GHz, Intel Xeon Silver 4210)

**SPECspeed2017_int_base = 7.97**
**SPECspeed2017_int_peak = Not Run**

<table>
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**Test Date:** May-2019
**Hardware Availability:** Apr-2019
**Software Availability:** Nov-2018

**General Notes (Continued)**


**Platform Notes**

- BIOS configuration:
  - Choose Operating Mode set to Custom Mode
  - Energy Efficient Turbo set to Disable
  - C-States set to Disable
  - Platform Controlled Type set to Efficiency-Favor Power
  - Page Policy set to Adaptive
  - Trusted Execution Technology set to Enable
  - Workload Configuration set to I/O Sensitive
  - Stale AtoS set to Enable

- Sysinfo program `/home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo`
  - Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
  - running on linux-4brr Tue May 14 13:52:31 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 4210 CPU @ 2.20GHz
  - 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: 10
    - siblings: 20
    - physical 0: cores 0 1 2 3 4 8 9 10 11 12
    - physical 1: cores 0 1 2 3 4 8 9 10 11 12

- From `lscpu`:
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - CPU(s): 40
  - On-line CPU(s) list: 0-39
  - Thread(s) per core: 2
  - Core(s) per socket: 10
  - Socket(s): 2
  - NUMA node(s): 2
  - Vendor ID: GenuineIntel
  - CPU family: 6
  - Model: 85
  - Model name: Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz

(Continued on next page)
## Lenovo Global Technology
### ThinkSystem SN550
**(2.20 GHz, Intel Xeon Silver 4210)**

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</table>

### Platform Notes (Continued)

- Stepping: 6
- CPU MHz: 2200.000
- BogoMIPS: 4400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 14080K
- NUMA node0 CPU(s): 0-9,20-29
- NUMA node1 CPU(s): 10-19,30-39
- 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 xtpr pdcm pcid dca sse4_1 l1e_apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_13 cdp_13 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 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtcwoo ida arat pin pts hwp_epp pkp ospke avx512_vnni flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 14080 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 20 21 22 23 24 25 26 27 28 29
  node 0 size: 386660 MB
  node 0 free: 380113 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
  node 1 size: 387015 MB
  node 1 free: 385830 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 792244276 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
Lenovo Global Technology
ThinkSystem SN550
(2.20 GHz, Intel Xeon Silver 4210)

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

SPECspeed2017_int_base = 7.97
SPECspeed2017_int_peak = Not Run

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

Platform Notes (Continued)

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:
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 14 10:54

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 891G 47G 845G 6% /

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 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
   657.xz_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.

(Continued on next page)
**Lenovo Global Technology**  
ThinkSystem SN550  
(2.20 GHz, Intel Xeon Silver 4210)

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### SPECspeed2017_int_base = 7.97

**SPECspeed2017_int_peak = Not Run**

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## Compiler Version Notes (Continued)

CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_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 648.exchange2_s(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.

---

## Base Compiler Invocation

- **C benchmarks:**
  - icc -m64 -std=c11

- **C++ benchmarks:**
  - icpc -m64

- **Fortran benchmarks:**
  - ifort -m64

---

## Base Portability Flags

- 600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
- 602.gcc_s: -DSPEC_LP64
- 605.mcf_s: -DSPEC_LP64
- 620.omnetpp_s: -DSPEC_LP64
- 623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
- 625.x264_s: -DSPEC_LP64
- 631.deepsjeng_s: -DSPEC_LP64
- 641.leela_s: -DSPEC_LP64
- 648.exchange2_s: -DSPEC_LP64
- 657.xz_s: -DSPEC_LP64
## Lenovo Global Technology

**ThinkSystem SN550**  
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### CPU2017 License: 9017  
**Test Sponsor:** Lenovo Global Technology  
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---

### Base Optimization Flags

**C benchmarks:**

- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-L/usr/local/je5.0.1-64/lib`  
- `-ljemalloc`

**C++ benchmarks:**

- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`  
- `-lqkmalloc`

**Fortran benchmarks:**

- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs`

---

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


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


---

**SPEC CPU2017 v1.0.5 on 2019-05-14 01:52:30-0400.**  
**Originally published on 2019-06-11.**