## Lenovo Global Technology

**ThinkSystem SN550**  
(2.20 GHz, Intel Xeon Platinum 8276)

### SPECrate2017_int_base = 277

**SPECrate2017_int_peak = Not Run**

<table>
<thead>
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**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** May-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Nov-2018

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### Hardware

**CPU Name:** Intel Xeon Platinum 8276

**Max MHz.:** 4000

**Nominal:** 2200

**Enabled:** 56 cores, 2 chips, 2 threads/core

**Orderable:** 1,2 chips

**Cache L1:** 32 KB I + 32 KB D on chip per core

**Cache L2:** 1 MB I+D on chip per core

**Cache L3:** 38.5 MB I+D on chip per chip

**Other:** None

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

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

**Other:** None

### Software

**OS:** SUSE Linux Enterprise Server 15 (x86_64)

**Kernel:** 4.12.14-25.13-default

**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:** No

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

**File System:** xfs

**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** Not Applicable

**Other:** None
Lenovo Global Technology
ThinkSystem SN550
(2.20 GHz, Intel Xeon Platinum 8276)

**SPEC CPU2017 Integer Rate Result**

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

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<th>Benchmark</th>
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**SPECrate2017_int_base = 277**
**SPECrate2017_int_peak = Not Run**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes
The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### 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:
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
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)

(Continued on next page)
General Notes (Continued)

is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (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.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Trusted Execution Technology set to Enable
SNC set to Enable
Stale AtoS set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-cq9p Thu May 23 17:24:39 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 8276 CPU @ 2.20GHz
        2 *physical id*s (chips)
        112 *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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:

    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Byte Order: Little Endian
    CPU(s): 112
    On-line CPU(s) list: 0-111
    Thread(s) per core: 2
    Core(s) per socket: 28
    Socket(s): 2
    NUMA node(s): 4
    Vendor ID: GenuineIntel
    CPU family: 6
**SPEC CPU2017 Integer Rate Result**

**Lenovo Global Technology**

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(2.20 GHz, Intel Xeon Platinum 8276)

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

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**Platform Notes (Continued)**

Model: 85  
Model name: Intel(R) Xeon(R) Platinum 8276 CPU @ 2.20GHz  
Stepping: 6  
CPU MHz: 2200.000  
CPU max MHz: 4000.0000  
CPU min MHz: 1000.0000  
BogoMIPS: 4400.00  
Virtualization: VT-x

L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 39424K

NUMA node0 CPU(s): 0-3,7-9,14-17,21-23,56-59,63-65,70-73,77-79  
NUMA node1 CPU(s): 4-6,10-13,18-20,24-27,60-62,66-69,74-76,80-83  
NUMA node2 CPU(s): 28-31,35-37,42-45,49-51,84-87,91-93,98-101,105-107  
NUMA node3 CPU(s): 32-34,38-41,46-48,52-55,88-90,94-97,102-104,108-111

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 nop1 xtopology nonstop_tsc cpuid  
- aperfmpref pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm  
- pcd ic dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx fl64  
- 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 avx512v1 xsavesopt xsaveopt xsave xsvcr xsavec  
- cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida pln pts pku ospke  
- avx512_vnni flush_lld arch_capabilities

```
/cache size : 39424 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 7 8 9 14 15 16 17 21 22 23 56 57 58 59 63 64 65 70 71 72 73 77 78 79  
  node 0 size: 96363 MB  
  node 0 free: 90271 MB  
  node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 60 61 62 66 67 68 69 74 75 76 80 81 82 83  
  node 1 size: 96723 MB  
  node 1 free: 96353 MB  
  node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 84 85 86 87 91 92 93 98 99 100 101 105 106 107  
  node 2 size: 96752 MB  
  node 2 free: 96514 MB  
  node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 58 88 89 90 94 95 96 97 102 103 104

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**Platform Notes (Continued)**

```
108 109 110 111
node 3 size: 96749 MB
node 3 free: 96250 MB
node distances:
node 0 1 2 3
  0: 10 11 21 21
  1: 11 10 21 21
  2: 21 21 10 11
  3: 21 21 11 10
```

From `/proc/meminfo`

```
MemTotal:       395867608 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From `/etc/*release* /etc/*version*`

```
os-release:
  NAME="SLES"
  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 23 17:23

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
```
Filesystem  Type  Size  Used Avail Use%  Mounted on
/dev/sda3    xfs   893G  39G  855G    5%  /
```

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)
Lenovo Global Technology
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SPECrate2017_int_base = 277
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Platform Notes (Continued)

BIOS Lenovo -[IVE135M-2.10]- 01/16/2019
Memory:
24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
## Lenovo Global Technology

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### Base Portability Flags

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### Base Optimization Flags

**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`

**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**:

- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64 -lqkmalloc`

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:

## Lenovo Global Technology

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

Tested with SPEC CPU2017 v1.0.5 on 2019-05-23 05:24:39-0400.  
Originally published on 2019-06-11.