## Lenovo Global Technology

**ThinkSystem SN550**
(2.20 GHz, Intel Xeon Gold 6238R)

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### SPEC CPU®2017 Integer Rate Result

**Lenovo Global Technology**

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** May-2020  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Mar-2020  
**Software Availability:** Apr-2020

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### Specification

**CPU Name:** Intel Xeon Gold 6238R  
**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  
**L2:** 1 MB I+D on chip per core  
**L3:** 38.5 MB I+D on chip per chip  
**Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 960 GB SATA SSD  
**Other:** None

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### Software

**OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
**Kernel:** 4.12.14-195-default  
**Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++  
**Compiler for Linux:** Fortran: Version 19.1.1.217 of Intel Fortran  
**Parallel:** No  
**Firmware:** Lenovo BIOS Version IVE155L 2.61 released May-2020  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** None  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage

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### Results

**SPECrate®2017_int_base = 319**  
**SPECrate®2017_int_peak = Not Run**

---

### Copies

<table>
<thead>
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<th>Benchmark</th>
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<tr>
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</tr>
<tr>
<td>557.xz_r</td>
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---

### Hardware

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### Software

---

### Power Management

---

---
Lenovo Global Technology
ThinkSystem SN550
(2.20 GHz, Intel Xeon Gold 6238R)

SPECrater®2017_int_base = 319
SPECrater®2017_int_peak = Not Run

Results Table

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

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

Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux. The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux.

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "*/home/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/lib/ia32:/home/cpu2017-1.1.0-ic19.1.1/je5.0.1-32"
MALLOC_CONF = "retain:true"
Lenovo Global Technology
ThinkSystem SN550
(2.20 GHz, Intel Xeon Gold 6238R)

SPECrate®2017_int_base = 319
SPECrate®2017_int_peak = Not Run

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
</tr>
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<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Test Date:</td>
<td>May-2020</td>
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<tr>
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<td>Mar-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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)
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 and then set it to Custom Mode
MONITOR/MWAIT set to Enable
Trusted Execution Technology set to Enable
SNC set to Enable
Stale AtoS set to Enable
Patrol Scrub set to Disable

Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbble6e46a485a0011
running on linux-anu7 Fri May 29 22:22:15 2020

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) Gold 6238R 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
```
Lenovo Global Technology

ThinkSystem SN550
(2.20 GHz, Intel Xeon Gold 6238R)

**SPEC CPU®2017 Integer Rate Result**

<table>
<thead>
<tr>
<th>Rate</th>
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<tbody>
<tr>
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<td>= 319</td>
</tr>
<tr>
<td><strong>SPECrate®2017_int_peak</strong></td>
<td>= Not Run</td>
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**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** May-2020

**Hardware Availability:** Mar-2020

**Software Availability:** Apr-2020

---

**Platform Notes (Continued)**

```
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
Address sizes: 46 bits physical, 48 bits virtual
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
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238R CPU @ 2.20GHz
Stepping: 7
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): 0-3,7-9,14-17,21-23,26-27
NUMA node1 CPU(s): 4-6,10-13,18-20,24-27
NUMA node2 CPU(s): 28-31,35-37,42-45,49-51,54-57,60-63,66-69,74-76,80-83
NUMA node3 CPU(s): 32-34,38-41,46-48,52-55,58-61,64-67,70-73,77-79
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 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abtm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pppin ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vni 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 avx512vli xsaves xsaveopt xsavevc xsavePrefetchListenerEnabled cpuid Capability capability

/proc/cpuinfo cache data
```

(Continued on next page)
**SPEC CPU®2017 Integer Rate Result**

**Lenovo Global Technology**

ThinkSystem SN550  
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
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</tr>
</tbody>
</table>

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### Platform Notes (Continued)

- **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: 193149 MB  
node 0 free: 192150 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: 193530 MB  
node 1 free: 192991 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: 193530 MB  
node 2 free: 192993 MB
node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 88 89 90 94 95 96 97 102 103 104 108 109 110 111
node 3 size: 193499 MB  
node 3 free: 192977 MB
node distances:

<table>
<thead>
<tr>
<th>node</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<td>21 21 21</td>
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From `/proc/meminfo`

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<tr>
<th>MemTotal:</th>
<th>792279440 kB</th>
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<tr>
<td>HugePages_Total:</td>
<td>0</td>
</tr>
<tr>
<td>Hugepagesize:</td>
<td>2048 kB</td>
</tr>
</tbody>
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From `/etc/*release* /etc/*version*`

```
o-s-release:
    NAME="SLES"
    VERSION="15-SP1"
    VERSION_ID="15.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
    Linux linux-anu7 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
    x86_64 x86_64 x86_64 GNU/Linux
```

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

Kernel self-reported vulnerability status:

- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **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: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 May 29 17:35

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 893G 55G 838G 7% /

From /sys/devices/virtual/dmi/id
  BIOS: Lenovo -[IVE155L-2.61]- 05/20/2020
  Vendor: Lenovo
  Product: ThinkSystem SN550 : ThinkSystem SN550 -[7X16CTOOWW]-
  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 SMBIOS" standard.

Memory:
  24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

**Compiler Version Notes**

==============================================================================
| C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) |
|         | 525.x264_r(base) 557.xz_r(base)                  |
==============================================================================

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
Lenovo Global Technology  
ThinkSystem SN550  
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CPU2017 License: 9017  
Test Sponsor: Lenovo Global Technology  
Tested by: Lenovo Global Technology  

**Compiler Version Notes (Continued)**

```plaintext
C++   | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
   NextGen Build 20200304
   Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

```plaintext
Fortran | 548.exchange2_r(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
   Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

**Base Compiler Invocation**

- **C benchmarks:**
  - icc

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

- **Fortran benchmarks:**
  - ifort

**Base Portability Flags**

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
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(2.20 GHz, Intel Xeon Gold 6238R)

SPECr2017 Integ Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

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Base Optimization Flags

C benchmarks:
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops ,-fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- nostandard-realloc-lhs -align array32byte -auto
-branches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

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-H.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-H.xml

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

Tested with SPEC CPU*2017 v1.1.0 on 2020-05-29 10:22:15-0400.
Report generated on 2020-06-23 18:09:03 by CPU2017 PDF formatter v6255.
Originally published on 2020-06-23.