## Lenovo Global Technology

**ThinkSystem SN550**  
(2.10 GHz, Intel Xeon Gold 6238L)

### Hardware

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6238L</td>
</tr>
<tr>
<td>Max MHz</td>
<td>3700</td>
</tr>
<tr>
<td>Nominal</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled</td>
<td>44 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>30.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.4.227 of Intel C/C++</td>
</tr>
<tr>
<td>Compiler for Linux</td>
<td></td>
</tr>
<tr>
<td>Fortran</td>
<td>Version 19.0.4.227 of Intel Fortran</td>
</tr>
<tr>
<td>Compiler for Linux</td>
<td></td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version IVE142E 2.30 released Aug-2019 tested as IVE141E 2.30 Jul-2019</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Power Management</td>
<td>--</td>
</tr>
</tbody>
</table>

---

**SPEC CPU®2017 Integer Rate Result**

**Lenovo Global Technology**

**ThinkSystem SN550**  
(2.10 GHz, Intel Xeon Gold 6238L)

### SPECRate®2017_int_base = 248

**SPECrate®2017_int_peak = Not Run**

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test by:** Lenovo Global Technology  
**Hardware Availability:** Jul-2019  
**Test Date:** Sep-2019  
**Software Availability:** May-2019

### Copies

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<th>Specification</th>
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<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<tr>
<td>500.perlbench_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
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<tr>
<td>548.exchange2_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>88</td>
<td>20.0</td>
<td>50.0</td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6238L)

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

SPECrate®2017_int_base = 248
SPECrate®2017_int_peak = Not Run

Test Date: Sep-2019
Hardware Availability: Jul-2019
Software Availability: May-2019

Results Table

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<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>189</td>
<td>746</td>
<td>188</td>
<td>739</td>
<td>190</td>
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<tr>
<td>502.gcc_r</td>
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<td>620</td>
<td>201</td>
<td>619</td>
<td>201</td>
<td>623</td>
<td>200</td>
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<tr>
<td>505.mcf_r</td>
<td>88</td>
<td>445</td>
<td>320</td>
<td>443</td>
<td>321</td>
<td>445</td>
<td>320</td>
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<tr>
<td>520.omnetpp_r</td>
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<td>699</td>
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<td>165</td>
<td>703</td>
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<tr>
<td>523.xalancbmk_r</td>
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<td>494</td>
<td>314</td>
<td>491</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>487</td>
<td>207</td>
<td>489</td>
<td>206</td>
<td>487</td>
<td>207</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>88</td>
<td>750</td>
<td>194</td>
<td>772</td>
<td>189</td>
<td>749</td>
<td>194</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>88</td>
<td>462</td>
<td>500</td>
<td>462</td>
<td>499</td>
<td>462</td>
<td>499</td>
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<tr>
<td>557.zr_r</td>
<td>88</td>
<td>572</td>
<td>166</td>
<td>572</td>
<td>166</td>
<td>572</td>
<td>166</td>
</tr>
</tbody>
</table>

SPECrate®2017_int_base = 248
SPECrate®2017_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-ic19.0u4/lib/intel64"

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
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)
Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6238L)

SPECrater®2017_int_base = 248
SPECrater®2017_int_peak = Not Run

Test Sponsor: Lenovo Global Technology
Test Date: Sep-2019
Hardware Availability: Jul-2019
Tested by: Lenovo Global Technology
Software Availability: May-2019

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-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on linux-4brr Wed Sep 11 23:20:02 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) Gold 6238L CPU @ 2.10GHz
  2 "physical id"s (chips)
  88 "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 : 22
siblings : 44
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 88
On-line CPU(s) list: 0-87
Thread(s) per core: 2
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238L CPU @ 2.10GHz

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

**Lenovo Global Technology**

**ThinkSystem SN550**

*(2.10 GHz, Intel Xeon Gold 6238L)*

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
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### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stepping</td>
<td>7</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2100.000</td>
</tr>
<tr>
<td>CPU max MHz:</td>
<td>3700.0000</td>
</tr>
<tr>
<td>CPU min MHz:</td>
<td>1000.0000</td>
</tr>
<tr>
<td>BogoMIPS:</td>
<td>4200.00</td>
</tr>
<tr>
<td>Virtualization:</td>
<td>VT-x</td>
</tr>
<tr>
<td>L1d cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L1i cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L2 cache:</td>
<td>1024K</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>30976K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-2, 6-8, 11-13, 17, 18, 44-46, 50-52, 55-57, 61, 62</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>3-5, 9, 10, 14-16, 19-21, 47-49, 53, 54, 58-60, 63-65</td>
</tr>
<tr>
<td>NUMA node2 CPU(s):</td>
<td>22-24, 28-30, 33-35, 39, 40, 66-68, 72-74, 77-79, 83, 84</td>
</tr>
<tr>
<td>NUMA node3 CPU(s):</td>
<td>25-27, 31, 32-38, 41-43, 69-71, 75, 76, 80-82, 85-87</td>
</tr>
</tbody>
</table>
| 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 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 abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pni 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 xsaveopt xsvset vvmx f16c Felix first-class f16c
| /proc/cpuinfo cache data | cache size : 30976 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 6 7 8 11 12 13 17 18 44 45 46 50 51 52 55 56 57 61 62  
node 0 size: 96364 MB  
node 0 free: 90255 MB  
node 1 cpus: 3 4 5 9 10 14 15 16 19 20 21 47 48 49 53 54 58 59 60 63 64 65  
node 1 size: 96753 MB  
node 1 free: 96454 MB  
node 2 cpus: 22 23 24 28 29 30 33 34 35 39 40 66 67 68 72 73 74 77 78 79 83 84  
node 2 size: 96753 MB  
node 2 free: 96491 MB  
node 3 cpus: 25 26 27 31 32 36 37 38 41 42 43 69 70 71 75 76 80 81 82 85 86 87  
node 3 size: 96721 MB  
node 3 free: 96271 MB  
node distances:  
node 0 1 2 3  
0: 10 11 21 21

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(Continued on next page)
Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6238L)
Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6238L)  
SPECrater®2017_int_base = 248  
SPECrater®2017_int_peak = Not Run

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: Sep-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Jul-2019</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: May-2019</td>
</tr>
</tbody>
</table>

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 Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```
Fortran | 548.exchange2_r(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
```

Page 6 Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/
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---

Base Portability Flags (Continued)

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

---

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_2019.4.227/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_2019.4.227/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_2019.4.227/linux/compiler/lib/intel64
-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-D.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-D.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 v1.0.5 on 2019-09-11 11:20:01-0400.
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