## Lenovo Global Technology

ThinkSystem SN550 V2
(2.10 GHz, Intel Xeon Gold 5318Y)

<table>
<thead>
<tr>
<th>Thread</th>
<th>600.perlbench_s</th>
<th>602.gcc_s</th>
<th>605.mcf_s</th>
<th>620.omnetpp_s</th>
<th>623.xalancbmk_s</th>
<th>625.x264_s</th>
<th>631.deepsjeng_s</th>
<th>641.leela_s</th>
<th>648.exchange2_s</th>
<th>657.xz_s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td>96</td>
<td>96</td>
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</tr>
<tr>
<td></td>
<td>1.00</td>
<td>3.00</td>
<td>5.00</td>
<td>7.00</td>
<td>9.00</td>
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<td>5.00</td>
<td>7.00</td>
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<td>11.0</td>
<td>13.0</td>
<td>15.0</td>
<td>17.0</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>6.96</td>
<td>10.4</td>
<td>11.4</td>
<td>11.2</td>
<td>16.7</td>
<td>5.66</td>
<td>4.63</td>
<td>19.6</td>
<td>22.9</td>
<td></td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_base = 11.5

### SPECspeed®2017_int_peak = Not Run

### Hardware

- **CPU Name:** Intel Xeon Gold 5318Y
- **Max MHz:** 3400
- **Nominal:** 2100
- **Enabled:** 48 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 36 MB I+D on chip per chip
- **Other:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux 8.3 (Ootpa)
  - Kernel 4.18.0-240.el8.x86_64
- **Compiler:** C/C++, Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
  - Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version U8Ei111A 1.02 released May-2021
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
Lenovo Global Technology

ThinkSystem SN550 V2
(2.10 GHz, Intel Xeon Gold 5318Y)

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

Test Date: Jun-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600:perlbench_s</td>
<td>96</td>
<td>255</td>
<td>6.96</td>
<td>256</td>
<td>6.93</td>
<td>255</td>
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<tr>
<td>602:gcc_s</td>
<td>96</td>
<td>381</td>
<td>10.4</td>
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<tr>
<td>605:mcf_s</td>
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<tr>
<td>620:omnetpp_s</td>
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<tr>
<td>625:x264_s</td>
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<td>16.7</td>
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<td>5.66</td>
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<tr>
<td>641:leela_s</td>
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<td>4.63</td>
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<td>4.63</td>
<td>366</td>
<td>4.63</td>
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<tr>
<td>648:exchange2_s</td>
<td>96</td>
<td>150</td>
<td>19.7</td>
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<td>19.6</td>
<td>150</td>
<td>19.6</td>
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<td></td>
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<td>657:xz_s</td>
<td>96</td>
<td>270</td>
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<td>22.9</td>
<td>268</td>
<td>23.1</td>
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</tbody>
</table>

SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = Not Run

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

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:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.8-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.8-ic2021.1-revB/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

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
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.

(Continued on next page)
Lenovo Global Technology
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SPECspeed®2017_int_base = 11.5
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CPU2017 License: 9017
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General Notes (Continued)

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enabled
CPU P-state Control set to Cooperative with Legacy
C-States set to Legacy
UPI Link Disable set to Disabled 1 Link
UPI Prefetcher set to Disabled

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revB/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d
running on localhost.localdomain Wed Jun 23 16:45:27 2021

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 5318Y CPU @ 2.10GHz
  2 "physical id"s (chips)
  96 "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 : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106

(Continued on next page)
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SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = Not Run

Test Date: Jun-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
Stepping: 6
CPU MHz: 1730.272
CPU max MHz: 3400.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K
NUMA node0 CPU(s): 0-23, 48-71
NUMA node1 CPU(s): 24-47, 72-95
Flags: fpu vme de pse tsc msr pae mce 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 abm 3nowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pinn ssbd ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcl cmqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsavec qm_llc qm_occu llc qm_mb local split_lock_detect wboinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospke avx512_vbm12 gfn vaes vpcmulqdq avx512_vnni avx512_vbitalg tme avx512_vpopcntdq 1a57 rdpid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size : 36864 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 10 11 12 13 14 15 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
node 0 size: 243129 MB
node 0 free: 256210 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 1 size: 243968 MB
node 1 free: 257258 MB
node distances:
node 0 1
 0: 10 20
 1: 20 10

(Continued on next page)
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Test Date: Jun-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Platform Notes (Continued)

From /proc/meminfo
   MemTotal: 527868016 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

/sbin/tuned-adm active
   Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux"
      VERSION="8.3 (Ootpa)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="8.3"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
      ANSI_COLOR="0;31"
      redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
      system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
      system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
   Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store
CVE-2018-3639 (Speculative Store Bypass): Bypass disabled via prctl and
CVE-2017-5753 (Spectre variant 1): seccomp
CVE-2017-5715 (Spectre variant 2): Mitigation: usercopy/swaps
CVE-2020-0543 (Special Register Buffer Data Sampling): barriers and __user pointer
CVE-2019-11135 (TSX Asynchronous Abort): sanitization

run-level 3 Jun 23 14:38

(Continued on next page)
**Lenovo Global Technology**

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<table>
<thead>
<tr>
<th>SPECs2017_int_base</th>
<th>11.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECs2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

SPEC is set to: /home/cpu2017-1.1.8-ic2021.1-revB

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>818G</td>
<td>29G</td>
<td>789G</td>
<td>4%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

Vendor: Lenovo  
Product: ThinkSystem SN550 V2  
Product Family: ThinkSystem  
Serial: 1234567890

Additional information from dmidecode 3.2 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:

16x Samsung M393A4G43AB3-CWE 32 GB 2 rank 3200, configured at 2933

**BIOS:**

<table>
<thead>
<tr>
<th>BIOS Vendor:</th>
<th>Lenovo</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOS Version:</td>
<td>U8E111A-1.02</td>
</tr>
<tr>
<td>BIOS Date:</td>
<td>05/07/2021</td>
</tr>
<tr>
<td>BIOS Revision:</td>
<td>1.2</td>
</tr>
<tr>
<td>Firmware Revision:</td>
<td>1.40</td>
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</tbody>
</table>

(End of data from sysinfo program)

**Compiler Version Notes**

```
C       | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)  
         | 625.x264_s(base) 657.xz_s(base)  

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  

C++      | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)  
         | 641.leela_s(base)  

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

(Continued on next page)
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COMPILER VERSION NOTES (CONTINUED)

Fortran | 648.exchange2_s(base)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

BASE COMPILER INVOCATION

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

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

BASE OPTIMIZATION FLAGS

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -ftopenmp -Wl,-z,muldefs -xCORE-AVX2
-O3 -ffast-math -flto -mpmath=sse -funroll-loops
-fopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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Base Optimization Flags (Continued)

C++ benchmarks:
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
-1qkmalloc

Fortran benchmarks:
-m64 -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

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-ICElake-E.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-ICElake-E.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.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 v1.1.8 on 2021-06-23 04:45:26-0400.
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