### Lenovo Global Technology

ThinkSystem SN550 V2
(2.00 GHz, Intel Xeon Gold 6330)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>179</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** May-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Feb-2021

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (179)</th>
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</table>
| 603.bwaves_s | 56  
| 607.cactuBSSN_s | 56  
| 619.lbm_s | 56  
| 621.wrf_s | 56  
| 627.cam4_s | 56  
| 628.pop2_s | 56  
| 638.imagick_s | 56  
| 644.nab_s | 56  
| 649.fotonik3d_s | 56  
| 654.roms_s | 56  

**CPU Name:** Intel Xeon Gold 6330  
**Max MHz:** 3100  
**Nominal:** 2000  
**Enabled:** 56 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:** 42 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**

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux 8.3 (Ootpa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Lenovo BIOS Version U8E109PT1 1.01 released Apr-2021</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>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management:</td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>
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**CPU2017 License:** 9017  
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### SPEC CPU 2017 Floating Point Speed Result

**Test Date:** May-2021  
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#### 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>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>56</td>
<td>96.0</td>
<td></td>
<td>615</td>
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<td>95.6</td>
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<td>607.cactuBSSN_s</td>
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<tr>
<td>621.wrf_s</td>
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<td>132</td>
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<td>100</td>
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<tr>
<td>627.cam4_s</td>
<td>56</td>
<td>67.5</td>
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<td>67.7</td>
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<tr>
<td>628.pop2_s</td>
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<tr>
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<tr>
<td>654.roms_s</td>
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</tr>
</tbody>
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**SPECspeed\textsuperscript{2017\_fp\_base} = 179**  
**SPECspeed\textsuperscript{2017\_fp\_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,compact,1,0"
- `LD_LIBRARY_PATH = "/home/cpu2017-1.1.5-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.5-ic2021-revB/jen5.0.1-64"
- `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)
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
C-States set to Legacy
DCA set to Disabled
LLC Prefetch set to Enable

Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Fri May 14 13:59:53 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 6330 CPU @ 2.00GHz
  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 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
           25 26 27
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 24
           25 26 27

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):       2
Vendor ID:          GenuineIntel
CPU family:         6
(Continued on next page)
Lenovo Global Technology

ThinkSystem SN550 V2
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SPEC CPU®2017 Floating Point Speed Result

SPECspeed®2017_fp_base = 179
SPECspeed®2017_fp_peak = Not Run

CPU2017 License: 9017
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Tested by: Lenovo Global Technology
Hardware Availability: Jul-2021
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Platform Notes (Continued)

Model: 106
Model name: Intel(R) Xeon(R) Gold 6330 CPU @ 2.00GHz
Stepping: 6
CPU MHz: 1563.574
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 43008K
NUMA node0 CPU(s): 0-27,56-83
NUMA node1 CPU(s): 28-55,84-111
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref 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_ppn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnumi flexpriority ept
vpid ept_ad fsgsbase tsc_adjust bm1i hle avx2 smep bmi2 erms invpcid cmq rdt_a
avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni
avx512bw avx512vl xsaveopt xsavec xgetbv1 xsavec cqm_llc cqm_occsp_llc cqm_mbm_total
cqm_mbm_local split_lock_detect wbnoinvd dtherm ida arat pln pts avx512vbmi umip pk
ospke avx512_vbmi2 gfnl vaes vpclmulqdq avx512_vnni avx512_bitalg tme
avx512_vpopcntdq la57 rdpid md_clear pconfi flush_l1d arch_capabilities

From /proc/cpuinfo cache data

(cache size : 43008 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 24 25 26 27
56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
node 0 size: 242641 MB
node 0 free: 255683 MB
node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106
107 108 109 110 111
node 1 size: 243895 MB
node 1 free: 257261 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo

(Continued on next page)
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Platform Notes (Continued)

MemTotal: 527864872 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-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): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 May 14 10:49

SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB
Filesystem Type  Size Used Avail Use% Mounted on
/dev/sda4 xfs  818G  15G  803G  2% /home

(Continued on next page)
## Lenovo Global Technology

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### Platform Notes (Continued)

From /sys/devices/virtual/dmi/id

| Vendor: | Lenovo |
| Product: | ThinkSystem SN550 V2 |
| 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:

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

BIOS:

| BIOS Vendor: | Lenovo |
| BIOS Version: | U8E109PT1-1.01 |
| BIOS Date: | 04/28/2021 |
| BIOS Revision: | 1.1 |
| Firmware Revision: | 1.40 |

(End of data from sysinfo program)

### Compiler Version Notes

```ini
C | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)

Intel(R) C 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.

C++, C, Fortran | 607.cactuBSSN_s(base)

Intel(R) C++ 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.

Intel(R) C 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.

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.
```

(Continued on next page)
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Compiler Version Notes (Continued)

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Fortran, C | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base) 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
==============================================================================

Base Compiler Invocation

C benchmarks:
  icc

Fortran benchmarks:
  ifort

Benchmarks using both Fortran and C:
  ifort icc

Benchmarks using Fortran, C, and C++:
  icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cacltBSSN_s: -DSPEC_LP64
619.lbmf_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl

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Base Portability Flags (Continued)

-638.imagick_s: -DSPEC\_LP64
-644.nab_s: -DSPEC\_LP64
-649.fotonik3d_s: -DSPEC\_LP64
-654.roms_s: -DSPEC\_LP64

Base Optimization Flags

C benchmarks:
-\texttt{-m64 -std=c11 -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP -mbranches\_within\_32B\_boundaries}

Fortran benchmarks:
-\texttt{-m64 -Wl,-z,muldefs -DSPEC\_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs -mbranches\_within\_32B\_boundaries -L/usr\_local/jemalloc64\_5\_0\_1/lib -ljemalloc}

Benchmarks using both Fortran and C:
-\texttt{-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP -mbranches\_within\_32B\_boundaries -nostandard-realloc-lhs -L/usr\_local/jemalloc64\_5\_0\_1/lib -ljemalloc}

Benchmarks using Fortran, C, and C++:
-\texttt{-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP -mbranches\_within\_32B\_boundaries -nostandard-realloc-lhs -L/usr\_local/jemalloc64\_5\_0\_1/lib -ljemalloc}

The flags files that were used to format this result can be browsed at
-\texttt{http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.html}
-\texttt{http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html}

You can also download the XML flags sources by saving the following links:
-\texttt{http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.xml}
-\texttt{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.

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