## Lenovo Global Technology

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

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>May-2019</th>
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<td>Hardware Availability:</td>
<td>Apr-2019</td>
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<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Nov-2018</td>
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### SPECspeed2017_fp_base

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_fp_base (147)</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>56</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>56</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>56</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>56</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>56</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>56</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>56</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>56</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>56</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>56</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8276M  
- **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

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo)  
- **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:** Yes  
- **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 8276M)

SPECspeed2017_fp_base = 147
SPECspeed2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>117</td>
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<tr>
<td>638.imagick_s</td>
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<td>649.fotonik3d_s</td>
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<td>654.roms_s</td>
<td>56</td>
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<td>99.1</td>
<td>159</td>
<td>99.4</td>
<td>158</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 147
SPECspeed2017_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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"
OMP_STACKSIZE = "192M"

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

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.
SPEC CPU2017 Floating Point Speed Result

Lenovo Global Technology
ThinkSystem SN550
(2.20 GHz, Intel Xeon Platinum 8276M)

| SPECspeed2017_fp_base = 147 |
| SPECspeed2017_fp_peak = Not Run |

| CPU2017 License: 9017 | Test Date: May-2019 |
| Test Sponsor: Lenovo Global Technology | Hardware Availability: Apr-2019 |
| Tested by: Lenovo Global Technology | Software Availability: Nov-2018 |

Platform Notes

BIOS configuration:
Choose Operating Mode set to Custom Mode
Page Policy set to Adaptive
Trusted Execution Technology set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Mon May  6 21:28:10 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 8276M 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):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8276M CPU @ 2.20GHz
Stepping:              6
CPU MHz:               2200.000
BogoMIPS:              4400.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              39424K
```

(Continued on next page)
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Platform Notes (Continued)

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 
aperfmrperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg 
fma cx16 xtrr pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes 
xsavexfvfls6c rdrand lahf_lm abm 3nowprefetch epb cat_l3 cdp_l3 intel_pt ssbd mba 
ibr ibbp stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase 
tsc_adjtim bm1 hle avx2 sse4 sse4_2 avx512f avx512dq 
rseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 
cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts hwp_epp 
puo ospec avx512_vnni spec_ctrl intel_stibp flush_l1d arch_capabilities 

/cache data  
cache size : 39424 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: 392888 MB  
node 0 free: 389291 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 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 1 size: 393216 MB  
node 1 free: 384306 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10  

From /proc/meminfo  
MemTotal: 792240396 KB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  

From /etc/*release* /etc/*version*  
OS-release:  
NAME="Red Hat Enterprise Linux Server"  
VERSION="7.6 (Maipo)"  
ID="rhel"  
ID_LIKE="fedora"  
VARIANT="Server"  
VARIANT_ID="server"  

(Continued on next page)
Lenovo Global Technology
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SPEC CPU2017 Floating Point Speed Result

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Platform Notes (Continued)

VERSION_ID="7.6"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)

uname -a:
    Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018
    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: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 May 6 21:25

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
    Filesystem   Type  Size  Used Avail Use% Mounted on
    /dev/sda2      xfs   839G   21G  819G   3% /home

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.

BIOS Lenovo -[IVE135M-2.10]- 01/16/2019
Memory:
    24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
    Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================

FC  607.cactuBSSN_s(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Lenovo Global Technology
ThinkSystem SN550
(2.20 GHz, Intel Xeon Platinum 8276M)

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Compiler Version Notes (Continued)

Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64
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Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.ibm_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
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:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

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-A.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-A.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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