## Lenovo Global Technology

**ThinkSystem SN550**  
(2.50 GHz, Intel Xeon Gold 6248)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base = 137</th>
<th>CPU2017 License: 9017</th>
<th>Test Date: Sep-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak = Not Run</td>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: May-2019</td>
<td></td>
</tr>
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</table>

### Threads

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base (137)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threads</td>
</tr>
<tr>
<td>603.bwaves_s</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
</tr>
<tr>
<td>619.lbm_s</td>
</tr>
<tr>
<td>621.wrf_s</td>
</tr>
<tr>
<td>627.cam4_s</td>
</tr>
<tr>
<td>628.pop2_s</td>
</tr>
<tr>
<td>638.imagick_s</td>
</tr>
<tr>
<td>644.nab_s</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
</tr>
<tr>
<td>654.roms_s</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base (137)</th>
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<tbody>
<tr>
<td>Hardware</td>
</tr>
<tr>
<td>CPU Name: Intel Xeon Gold 6248</td>
</tr>
<tr>
<td>Max MHz: 3900</td>
</tr>
<tr>
<td>Nominal: 2500</td>
</tr>
<tr>
<td>Enabled: 40 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable: 1.2 chips</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3: 27.5 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage: 1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base (137)</th>
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<tbody>
<tr>
<td>Software</td>
</tr>
<tr>
<td>OS: Red Hat Enterprise Linux Server release 7.6 (Maipo)</td>
</tr>
<tr>
<td>Kernel 3.10.0-957.el7.x86_64</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 19.0.4.227 of Intel C/C++</td>
</tr>
<tr>
<td>Compiler for Linux; Fortran: Version 19.0.4.227 of Intel Fortran</td>
</tr>
<tr>
<td>Parallel: Yes</td>
</tr>
<tr>
<td>Firmware: Lenovo BIOS Version IVE142E 2.30 released Aug-2019 tested as IVE141E 2.30 Jul-2019</td>
</tr>
<tr>
<td>File System: xfs</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Peak Pointers: Not Applicable</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Power Management: --</td>
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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>
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<tr>
<td>603.bwaves_s</td>
<td>40</td>
<td>113</td>
<td>520</td>
<td>113</td>
<td>521</td>
<td>113</td>
<td>520</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>40</td>
<td>107</td>
<td>156</td>
<td>108</td>
<td>155</td>
<td>107</td>
<td>156</td>
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<tr>
<td>619.lbm_s</td>
<td>40</td>
<td>51.7</td>
<td>101</td>
<td>51.6</td>
<td>102</td>
<td>51.6</td>
<td>102</td>
</tr>
<tr>
<td>621.wrf_s</td>
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<td>109</td>
<td>122</td>
<td>108</td>
<td>122</td>
<td>110</td>
<td>121</td>
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<tr>
<td>627.cam4_s</td>
<td>40</td>
<td>90.2</td>
<td>98.2</td>
<td>89.9</td>
<td>98.5</td>
<td>90.4</td>
<td>98.0</td>
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<tr>
<td>628.pop2_s</td>
<td>40</td>
<td>172</td>
<td>69.0</td>
<td>176</td>
<td>67.5</td>
<td>171</td>
<td>69.5</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>40</td>
<td>112</td>
<td>129</td>
<td>112</td>
<td>129</td>
<td>111</td>
<td>129</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>40</td>
<td>76.0</td>
<td>230</td>
<td>76.1</td>
<td>230</td>
<td>75.9</td>
<td>230</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>40</td>
<td>102</td>
<td>89.0</td>
<td>103</td>
<td>88.7</td>
<td>102</td>
<td>89.1</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>40</td>
<td>118</td>
<td>133</td>
<td>119</td>
<td>133</td>
<td>118</td>
<td>134</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 137**

**SPECspeed®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"

## 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-ic19.0u4/lib/intel64"
- OMP_STACKSIZE = "192M"

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

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
Choose Operating Mode set to Custom Mode
MONITOR/MWAIT set to Enable
Trusted Execution Technology set to Enable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Fri Sep 20 07:19:56 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 6248 CPU @ 2.50GHz
  2 "physical id"s (chips)
  80 "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 : 20
siblings : 40
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                80
On-line CPU(s) list:   0-79
Thread(s) per core:    2
Core(s) per socket:    20
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 6248 CPU @ 2.50GHz
Stepping:              6
CPU MHz:               2500.000
BogoMIPS:              5000.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              28160K
NUMA node0 CPU(s):     0-19,40-59

(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

Platform Notes (Continued)

NUMA node1 CPU(s): 20-39,60-79
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 rdrtscp
 lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
 aperfmrperf eagerfpu nni pclmulqdq dtst64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
 fma cx16 xtrm pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
 xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_13 cdp_13 intel_patin
 intel_pt ssbd mba ibrs ibpib stibp ibrs enhanced tpr_shadow vnumi flexpriority ept
 vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmqm mpq rdt_a
 avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
 xsaves xgetbv1 cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln
 pts hwp_epp pku ospke avx512_vnni spec_ctrl intel_stibp flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 28160 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 40 41 42 43 44 45 46 47
 48 49 50 51 52 53 54 55 56 57 58 59
node 0 size: 196280 MB
node 0 free: 190869 MB

node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 60 61 62 63 64
 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 1 size: 196608 MB
node 1 free: 191922 MB

node distances:

node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
  MemTotal: 395878432 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"
  VERSION_ID="7.6"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"

(Continued on next page)
Lenovo Global Technology

ThinkSystem SN550 (2.50 GHz, Intel Xeon Gold 6248)

**SPEC CPU®2017 Floating Point Speed Result**

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base =</th>
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<td>SPECspeed®2017_fp_peak = Not Run</td>
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</tbody>
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**Platform Notes (Continued)**

```
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 Sep 20 07:18
```

```
SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4

   Filesystem   Type   Size  Used Avail  Use% Mounted on
   /dev/sda2    xfs    839G  33G   807G   4%   /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 -[IVE141E-2.30]- 07/02/2019
Memory:
  24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933
```

(End of data from sysinfo program)

**Compiler Version Notes**

```
==============================================================================
| C               | 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```
==============================================================================
| C++, C, Fortran | 607.cactuBSSN_s(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.
```

(Continued on next page)
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SPECSpeed®2017_fp_base = 137
SPECSpeed®2017_fp_peak = Not Run

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

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

Compiler Version Notes (Continued)

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.

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.

--------------------
Fortran         | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(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.

--------------------
Fortran, C      | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(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.

--------------------
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.

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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
Lenovo Global Technology
ThinkSystem SN550
(2.50 GHz, Intel Xeon Gold 6248)

Lenovo Global Technology

SPECspeed\textsuperscript{\textregistered}2017\textunderscore fp\_base = 137
SPECspeed\textsuperscript{\textregistered}2017\textunderscore fp\_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Software Availability: May-2019

Base Portability Flags

603.bwaves\_s: -DSPEC\_LP64
607.cactuBSSN\_s: -DSPEC\_LP64
619.hm\_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 byte\_recl
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-F.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-F.xml
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| Software Availability: | May-2019 |

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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 2019-09-20 07:19:55-0400.  