Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6230)

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

Hardware
CPU Name: Intel Xeon Gold 6230
Max MHz.: 3900
Nominal: 2100
Enabled: 40 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: 27.5 MB I+D on chip per chip
Other: None
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

SPECspeed2017_fp_base = 129
SPECspeed2017_fp_peak = Not Run
Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6230)

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

SPECspeed2017_fp_base = 129
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>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>40</td>
<td>115</td>
<td>513</td>
<td>115</td>
<td>511</td>
<td>116</td>
<td>509</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>114</td>
<td>146</td>
<td>114</td>
<td>147</td>
<td>113</td>
<td>147</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>52.7</td>
<td>99.3</td>
<td>52.8</td>
<td>99.3</td>
<td>52.8</td>
<td>99.3</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>123</td>
<td>108</td>
<td>122</td>
<td>109</td>
<td>120</td>
<td>110</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>99.6</td>
<td>89.0</td>
<td>99.7</td>
<td>88.9</td>
<td>99.5</td>
<td>89.0</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>182</td>
<td>65.3</td>
<td>180</td>
<td>65.8</td>
<td>181</td>
<td>65.5</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>125</td>
<td>115</td>
<td>126</td>
<td>115</td>
<td>125</td>
<td>115</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>86.1</td>
<td>203</td>
<td>86.0</td>
<td>203</td>
<td>86.0</td>
<td>203</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>103</td>
<td>88.8</td>
<td>103</td>
<td>88.9</td>
<td>102</td>
<td>89.2</td>
</tr>
<tr>
<td>Base</td>
<td>40</td>
<td>122</td>
<td>129</td>
<td>122</td>
<td>129</td>
<td>120</td>
<td>131</td>
</tr>
</tbody>
</table>

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.
### Lenovo Global Technology

**ThinkSystem SN550**  
(2.10 GHz, Intel Xeon Gold 6230)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>129</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Date:** May-2019  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Apr-2019  
**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 Sun May 5 06:08:24 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

```plaintext
model name: Intel(R) Xeon(R) Gold 6230 CPU @ 2.10GHz
  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:

```plaintext
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 6230 CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-19,40-59
NUMA node1 CPU(s): 20-39,60-79
```

(Continued on next page)
Platform Notes (Continued)

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
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 intel_pt ssbd mba
ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rd_a avx512f avx512dq
rdseed adx smap clflushopt clwb avx512cd avx512bw avx512v1 xsaveopt xsavec 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

From /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: 392888 MB
    node 0 free: 383242 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: 393216 MB
    node 1 free: 384284 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"
      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)

(Continued on next page)
Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6230)

**SPEC CPU2017 Floating Point Speed Result**

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

---

**Platform Notes (Continued)**

```
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 5 06:06
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.libm_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, 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, -------
```

(Continued on next page)
# Lenovo Global Technology

**ThinkSystem SN550**  
(2.10 GHz, Intel Xeon Gold 6230)

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

## SPEC CPU2017 Floating Point Speed Result

| SPECspeed2017_fp_base = 129 | SPECspeed2017_fp_peak = Not Run |

### Compiler Version Notes (Continued)

Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

### Base Compiler Invocation

C benchmarks:  
```bash  
icc -m64 -std=c11  
```

Fortran benchmarks:  
```bash  
ifort -m64  
```

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

Benchmarks using Fortran, C, and C++:  
```bash  
icpc -m64 icc -m64 -std=c11 ifort -m64  
```

### Base Portability Flags

603.bwaves_s: -DSPEC_LP64

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

Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6230)

SPECspeed2017_fp_base = 129
SPECspeed2017_fp_peak = Not Run

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

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

Base Portability Flags (Continued)

607.cactuBSSN_s: -DSPEC_LP64
619.lbm_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 byteuck
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
Lenovo Global Technology
ThinkSystem SN550
(2.10 GHz, Intel Xeon Gold 6230)

SPECspeed2017_fp_base = 129
SPECspeed2017_fp_peak = Not Run

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

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.5 on 2019-05-05 06:08:24-0400.
Originally published on 2019-05-29.