# Lenovo Global Technology

**ThinkSystem SN550**  
(3.60 GHz, Intel Xeon Gold 5122)  

## CPU2006 license:
9017  

## Test sponsor:
Lenovo Global Technology  

## Tested by:
Lenovo Global Technology  

### Hardware

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>51.8</td>
</tr>
<tr>
<td>416.gamess</td>
<td>49.2</td>
</tr>
<tr>
<td>433.milc</td>
<td>71.3</td>
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<tr>
<td>434.zeusmp</td>
<td>213</td>
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<tr>
<td>435.gromacs</td>
<td>68.5</td>
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<tr>
<td>436.cactusADM</td>
<td>761</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>315</td>
</tr>
<tr>
<td>444.namd</td>
<td>36.4</td>
</tr>
<tr>
<td>447.dealII</td>
<td>70.4</td>
</tr>
<tr>
<td>450.soplex</td>
<td>46.7</td>
</tr>
<tr>
<td>453.povray</td>
<td>29.6</td>
</tr>
<tr>
<td>454.calculix</td>
<td>69.9</td>
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<tr>
<td>459.GemsFDTD</td>
<td>200</td>
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<tr>
<td>465.tonto</td>
<td>66.8</td>
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<tr>
<td>470.lbm</td>
<td>58.9</td>
</tr>
<tr>
<td>481.wrf</td>
<td>98.9</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>88.5</td>
</tr>
</tbody>
</table>

## Software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
</table>
| Operating System: | SUSE Linux Enterprise Server 12 SP2 (x86_64)  
Kernel 4.4.21-69-default |
| Compiler: | C/C++: Version 17.0.0.098 of Intel C/C++  
Compiler for Linux;  
Fortran: Version 17.0.0.098 of Intel Fortran  
Compiler for Linux |
| Auto Parallel: | Yes |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |

## SPECfp®2006 = 124

## SPECfp_base2006 = 121

## Test date:
Jul-2017  

## Hardware Availability:
Aug-2017  

## Software Availability:
Nov-2016
Lenovo Global Technology
ThinkSystem SN550
(3.60 GHz, Intel Xeon Gold 5122)

CPU2006 license: 9017
Test sponsor: Lenovo Global Technology
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L3 Cache: 16.5 MB I+D on chip per chip
Other Cache: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None

SPEC CFP2006 Result

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Pointers:</th>
<th>Peak Pointers:</th>
<th>Software Availability:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>64-bit</td>
<td>32/64-bit</td>
<td>Nov-2016</td>
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</tbody>
</table>

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seconds</td>
<td>Ratio</td>
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<tr>
<td>410.bwaves</td>
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<td>15.8</td>
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<td>180</td>
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<td>76.1</td>
<td>69.9</td>
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<tr>
<td>454.calculix</td>
<td>108</td>
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<tr>
<td>459.GemsFDTD</td>
<td>56.9</td>
<td>187</td>
</tr>
<tr>
<td>465.tonto</td>
<td>167</td>
<td>58.9</td>
</tr>
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<td>470.lbm</td>
<td>22.9</td>
<td>600</td>
</tr>
<tr>
<td>481.wrf</td>
<td>112</td>
<td>99.9</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>220</td>
<td>88.5</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"

**Platform Notes**

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Hyper-Threading set to Disable
DCU Streamer Prefetcher set to Disable
DCA set to Disable
Patrol Scrub set to Disable
LLC dead line alloc set to Disable
Sysinfo program /home/cpu2006-1.2-ic17.0/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on SN550 Fri Jul 21 16:54:12 2017

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Lenovo Global Technology

ThinkSystem SN550
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SPECFp2006 = 124
SPECFp_base2006 = 121

CPU2006 license: 9017
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Test date: Jul-2017
Hardware Availability: Aug-2017
Software Availability: Nov-2016

Platform Notes (Continued)

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz
2 "physical id"s (chips)
8 "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 : 4
siblings : 4
physical 0: cores 1 5 9 13
physical 1: cores 2 3 4 10
cache size : 16896 KB

From /proc/meminfo
MemTotal:       792245900 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.
oS-release:
  NAME="SLES"
  VERSION="12-SP2"
  VERSION_ID="12.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
  Linux SN550 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 21 16:51

SPEC is set to: /home/cpu2006-1.2-ic17.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 687G 74G 614G 11% /home

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program
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Platform Notes (Continued)

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 -[IVE109A-1.00]- 04/27/2017
Memory:
  24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = */home/cpu2006-1.2-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/shl0.2"
OMP_NUM_THREADS = "8"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages disabled with:
echo never > /sys/kernel/mm/transparent_hugepage/enabled

Base Compiler Invocation

C benchmarks:
  icc -m64

C++ benchmarks:
  icpc -m64

Fortran benchmarks:
  ifort -m64

Benchmarks using both Fortran and C:
  icc -m64 ifort -m64

Base Portability Flags

410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
  433.milc: -DSPEC_CPU_LP64
  434.zeusmp: -DSPEC_CPU_LP64 -nofor_main
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64

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### Base Portability Flags (Continued)

- 447.dealII: -DSPEC_CPU_LP64
- 450.soplex: -DSPEC_CPU_LP64
- 453.povray: -DSPEC_CPU_LP64
- 454.calculix: -DSPEC_CPU_LP64 -nofor_main
- 459.GemsFDTD: -DSPEC_CPU_LP64
- 465.tonto: -DSPEC_CPU_LP64
- 470.lbm: -DSPEC_CPU_LP64
- 481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
- 482.sphinx3: -DSPEC_CPU_LP64

### Base Optimization Flags

**C benchmarks:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

**C++ benchmarks:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

**Fortran benchmarks:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

**Benchmarks using both Fortran and C:**
- -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

### Peak Compiler Invocation

**C benchmarks:**
- icc -m64

**C++ benchmarks:**
- icpc -m64

**Fortran benchmarks:**
- ifort -m64

**Benchmarks using both Fortran and C:**
- icc -m64 ifort -m64

### Peak Portability Flags

Same as Base Portability Flags
SPEC CFP2006 Result

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Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes
470.lbm: basepeak = yes
482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
- par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
- no-prec-div(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes
450.soplex: basepeak = yes

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
- par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
- no-prec-div(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes
416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
- par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
- no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes
437.leslie3d: basepeak = yes

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
- par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
- no-prec-div(pass 2) -unroll2 -inline-level=0 -qopt-prefetch -parallel

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
- par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
- no-prec-div(pass 2) -inline-callloc -qopt-malloc-options=3
- auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes

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Peak Optimization Flags (Continued)

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32
481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.20171004.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.20171004.xml

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