**Lenovo Global Technology**

ThinkSystem ST550  
(2.00 GHz, Intel Xeon Gold 6138T)  

<table>
<thead>
<tr>
<th>SPECint_rate2006</th>
<th>1810</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_rate_base2006</td>
<td>1700</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 9017  
**Test sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test date:** Jul-2017  
**Hardware Availability:** Aug-2017  
**Software Availability:** Nov-2016

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 6138T</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.70 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2000</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>40 cores, 2 chips, 20 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1,2 chips</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB L1 + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache:</td>
<td>1 MB L1+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache:</td>
<td>27.5 MB L1+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 800 GB SATA SSD</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>SUSE Linux Enterprise Server 12 SP2 (x86_64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kernel:</td>
<td>4.4.21-69-default</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 17.0.1.132 of Intel C/C++ Compiler for Linux</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>No</td>
</tr>
<tr>
<td>File System:</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>32-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software:</td>
<td>Microquill SmartHeap V10.2</td>
</tr>
</tbody>
</table>

---

**SPEC CINT2006 Result**

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info@spec.org

http://www.spec.org/
Lenovo Global Technology
ThinkSystem ST550
(2.00 GHz, Intel Xeon Gold 6138T)

**SPECint_rate2006 = 1810**
**SPECint_rate_base2006 = 1700**

**CPU2006 license:** 9017  
**Test date:** Jul-2017  
**Hardware Availability:** Aug-2017  
**Test sponsor:** Lenovo Global Technology  
**Software Availability:** Nov-2016  
**Tested by:** Lenovo Global Technology

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th><strong>Base</strong></th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th><strong>Peak</strong></th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>80</td>
<td>661</td>
<td>1180</td>
<td>659</td>
<td>1190</td>
<td>661</td>
<td>1180</td>
<td>80</td>
<td>510</td>
<td>1530</td>
<td>510</td>
<td>1530</td>
<td>945</td>
<td>817</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>401.bzip2</td>
<td>80</td>
<td>1023</td>
<td>755</td>
<td>1021</td>
<td>756</td>
<td>1023</td>
<td>754</td>
<td>80</td>
<td>944</td>
<td>818</td>
<td>948</td>
<td>815</td>
<td>945</td>
<td>817</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>403.mcf</td>
<td>80</td>
<td>311</td>
<td>2340</td>
<td>312</td>
<td>2340</td>
<td>310</td>
<td>2350</td>
<td>80</td>
<td>311</td>
<td>2340</td>
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<td>310</td>
<td>2350</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>445.gobmk</td>
<td>80</td>
<td>850</td>
<td>987</td>
<td>850</td>
<td>987</td>
<td>851</td>
<td>987</td>
<td>80</td>
<td>854</td>
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<td>856</td>
<td>981</td>
<td>856</td>
<td>981</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>456.hmmer</td>
<td>80</td>
<td>311</td>
<td>2400</td>
<td>309</td>
<td>2420</td>
<td>311</td>
<td>2400</td>
<td>80</td>
<td>236</td>
<td>3170</td>
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<td>3140</td>
<td>240</td>
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<tr>
<td>458.sjeng</td>
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<td>903</td>
<td>1070</td>
<td>903</td>
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<td>903</td>
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<td>80</td>
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<td>853</td>
<td>1140</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>462.libquantum</td>
<td>80</td>
<td>60.3</td>
<td>27500</td>
<td>60.3</td>
<td>27500</td>
<td>60.3</td>
<td>27500</td>
<td>80</td>
<td>60.3</td>
<td>27500</td>
<td>60.3</td>
<td>27500</td>
<td>60.3</td>
<td>27500</td>
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<td></td>
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</tr>
<tr>
<td>464.h264ref</td>
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<td>977</td>
<td>1810</td>
<td>969</td>
<td>1830</td>
<td>978</td>
<td>1810</td>
<td>80</td>
<td>948</td>
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<td>1870</td>
<td>950</td>
<td>1860</td>
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<td></td>
<td></td>
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<tr>
<td>471.omnetpp</td>
<td>80</td>
<td>549</td>
<td>911</td>
<td>548</td>
<td>912</td>
<td>549</td>
<td>912</td>
<td>80</td>
<td>513</td>
<td>975</td>
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<td>975</td>
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<td>973</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>473.astar</td>
<td>80</td>
<td>585</td>
<td>960</td>
<td>585</td>
<td>960</td>
<td>582</td>
<td>964</td>
<td>80</td>
<td>585</td>
<td>960</td>
<td>585</td>
<td>960</td>
<td>582</td>
<td>964</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

### Platform Notes

- BIOS configuration:
  - Choose Operating Mode set to Maximum Performance
  - DCU Streamer Prefetcher set to Disable
  - SNC set to Enable
  - Per Core P-state set to Disable
  - UPI Prefetcher set to Disable
  - Stale AtoS set to Enable
  - LLC dead line alloc set to Disable
- Sysinfo program 
  - http://www.spec.org/cpu2006/Docs/config.html#sysinfo
  - Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
  - running on ST550 Mon Jul 17 21:53:46 2017

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

Continued on next page
Lenovo Global Technology
ThinkSystem ST550
(2.00 GHz, Intel Xeon Gold 6138T)

SPECint\_rate2006 = 1810
SPECint\_rate\_base2006 = 1700

CPU2006 license: 9017
Test date: Jul-2017
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Hardware Availability: Aug-2017
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Platform Notes (Continued)

model name : Intel(R) Xeon(R) Gold 6138T CPU @ 2.00GHz
  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
cautions.)
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
  cache size : 28160 KB

From /proc/meminfo
  MemTotal: 395881920 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 ST550 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 17 21:52

  SPEC is set to: /home/cpu2006-1.2-ic17.0u1
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sdb2 btrfs 744G 91G 652G 13% /home

  Additional information from dmidecode:

    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 SMI BIOS" standard.

    BIOS Lenovo -[00E105R-1.00]- 04/27/2017
    Memory:

  Continued on next page
Lenovo Global Technology

ThinkSystem ST550
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<td>Software Availability:</td>
<td>Nov-2016</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

12x Hynix HMA84GR7AFR4N-VK 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:
LD_LIBRARY_PATH = "/home/cpu2006-1.2-ic17.0u1/lib/ia32:/home/cpu2006-1.2-ic17.0u1/lib/intel64:/home/cpu2006-1.2-ic17.0u1/sh10.2"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled by default
Filesystem page cache cleared with:
echo 1> /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>

### Base Compiler Invocation

C benchmarks:
```bash
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
```

C++ benchmarks:
```bash
icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
```

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td><code>-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32</code></td>
</tr>
<tr>
<td>401.bzip2</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>403.gcc</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>429.mcf</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>445.gobmk</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>456.hmmer</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>458.sjeng</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>462.libquantum</td>
<td><code>-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX</code></td>
</tr>
<tr>
<td>464.h264ref</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>471.omnetpp</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>473.astar</td>
<td><code>-D_FILE_OFFSET_BITS=64</code></td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td><code>-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX</code></td>
</tr>
</tbody>
</table>

### Base Optimization Flags

C benchmarks:
```bash
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -qopt-mem-layout-trans=3
```
**Lenovo Global Technology**

ThinkSystem ST550
(2.00 GHz, Intel Xeon Gold 6138T)

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**SPECint_rate_base2006 = 1700**

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</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

**Base Optimization Flags (Continued)**

C++ benchmarks:
- -xCORE-AVX512
- -ipo
- -O3
- -no-prec-div
- -gopt-prefetch
- -gopt-mem-layout-trans=3
- -Wl,-z,muldefs
- -L/sh10.2
- -lsmartheap

**Base Other Flags**

C benchmarks:
403.gcc: -Dalloca=_alloca

**Peak Compiler Invocation**

C benchmarks (except as noted below):
- icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32
- 400.perlbench: icc -m64
- 401.bzip2: icc -m64
- 456.hmmer: icc -m64
- 458.sjeng: icc -m64

C++ benchmarks:
- icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

**Peak Portability Flags**

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
LENNOVO GLOBAL TECHNOLOGY

THINKSYSTEM ST550
(2.00 GHz, Intel Xeon Gold 6138T)

SPECint_rate2006 = 1810
SPECint_rate_base2006 = 1700

CPU2006 license: 9017
Test sponsor: Lenovo Global Technology
Test date: Jul-2017
Tested by: Lenovo Global Technology
Hardware Availability: Aug-2017
Software Availability: Nov-2016

Peak Optimization Flags

C benchmarks:

400.perlbench: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -auto-ilp32 -qopt-mem-layout-trans=3

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -qopt-prefetch -auto-ilp32
  -qopt-mem-layout-trans=3

403.gcc: -xCORE-AVX512 -ipo -O3 -no-prec-div
  -qopt-mem-layout-trans=3

429.mcf: basepeak = yes

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -qopt-mem-layout-trans=3

456.hmmer: -xCORE-AVX512 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
  -qopt-mem-layout-trans=3

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -unroll4 -auto-ilp32
  -qopt-mem-layout-trans=3

462.libquantum: basepeak = yes

464.h264ref: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -no-prec-div(pass 2) -unroll2 -qopt-mem-layout-trans=3

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
  -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
  -qopt-ra-region-strategy=block
  -qopt-mem-layout-trans=3 -Wl,-z,muldefs
  -L/sh10.2 -lsmartheap

473.astar: basepeak = yes

483.xalancbmk: basepeak = yes
Lenovo Global Technology
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CPU2006 license: 9017
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Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

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-revD.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.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-revD.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.xml

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For other inquiries, please contact webmaster@spec.org.

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