## Lenovo Global Technology

**ThinkSystem SN850**  
(3.00 GHz, Intel Xeon Platinum 8158)  

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Aug-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Aug-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Nov-2016</td>
</tr>
</tbody>
</table>

### SPECfp2006 Result

<table>
<thead>
<tr>
<th>SPECfp²006 = 156</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>SPECfp_base²006 = 150</th>
</tr>
</thead>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8158
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.70 GHz
- **CPU MHz:** 3000
- **FPU:** Integrated
- **CPU(s) enabled:** 48 cores, 4 chips, 12 cores/chip
- **CPU(s) orderable:** 2.4 chips
- **Primary Cache:** 32 KB I + 32 KB D on chip per core
- **Secondary Cache:** 1 MB I+D on chip per core

### Software

- **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)
Lenovo Global Technology
ThinkSystem SN850
(3.00 GHz, Intel Xeon Platinum 8158)

CPU2006 license: 9017
Test sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

L3 Cache: 24.75 MB I+D on chip per chip
Other Cache: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)
Disk Subsystem: 1 x 960 GB SATA SSD
Other Hardware: None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds Base</th>
<th>Ratio</th>
<th>Seconds Base</th>
<th>Ratio</th>
<th>Seconds Base</th>
<th>Ratio</th>
<th>Seconds Peak</th>
<th>Ratio</th>
<th>Seconds Peak</th>
<th>Ratio</th>
<th>Seconds Peak</th>
<th>Ratio</th>
<th>Seconds Peak</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>8.50</td>
<td>1600</td>
<td>8.50</td>
<td>1600</td>
<td>8.45</td>
<td>1610</td>
<td>8.50</td>
<td>1600</td>
<td>8.45</td>
<td>1610</td>
<td>8.50</td>
<td>1600</td>
<td>8.45</td>
<td>1610</td>
</tr>
<tr>
<td>416.gamess</td>
<td>399</td>
<td>49.0</td>
<td>400</td>
<td>48.9</td>
<td>399</td>
<td>49.1</td>
<td>378</td>
<td>51.8</td>
<td>378</td>
<td>51.8</td>
<td>378</td>
<td>51.8</td>
<td>378</td>
<td>51.8</td>
</tr>
<tr>
<td>433.milc</td>
<td>128</td>
<td>71.8</td>
<td>130</td>
<td>70.7</td>
<td>127</td>
<td>72.1</td>
<td>128</td>
<td>71.8</td>
<td>130</td>
<td>70.7</td>
<td>127</td>
<td>72.1</td>
<td>128</td>
<td>71.8</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>43.3</td>
<td>210</td>
<td>39.9</td>
<td>228</td>
<td>40.8</td>
<td>223</td>
<td>43.3</td>
<td>210</td>
<td>39.9</td>
<td>228</td>
<td>40.8</td>
<td>223</td>
<td>43.3</td>
<td>210</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>118</td>
<td>60.6</td>
<td>117</td>
<td>60.8</td>
<td>118</td>
<td>60.5</td>
<td>118</td>
<td>60.6</td>
<td>117</td>
<td>60.8</td>
<td>118</td>
<td>60.5</td>
<td>118</td>
<td>60.5</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>8.28</td>
<td>1440</td>
<td>8.46</td>
<td>1410</td>
<td>8.32</td>
<td>1440</td>
<td>8.28</td>
<td>1440</td>
<td>8.46</td>
<td>1410</td>
<td>8.32</td>
<td>1440</td>
<td>8.28</td>
<td>1440</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>23.3</td>
<td>403</td>
<td>22.6</td>
<td>417</td>
<td>22.8</td>
<td>412</td>
<td>23.3</td>
<td>403</td>
<td>22.6</td>
<td>417</td>
<td>22.8</td>
<td>412</td>
<td>23.3</td>
<td>403</td>
</tr>
<tr>
<td>444.namd</td>
<td>225</td>
<td>35.6</td>
<td>225</td>
<td>35.6</td>
<td>225</td>
<td>35.6</td>
<td>220</td>
<td>36.5</td>
<td>220</td>
<td>36.5</td>
<td>220</td>
<td>36.5</td>
<td>220</td>
<td>36.5</td>
</tr>
<tr>
<td>447.dealII</td>
<td>161</td>
<td>70.9</td>
<td>161</td>
<td>70.8</td>
<td>161</td>
<td>70.9</td>
<td>161</td>
<td>70.9</td>
<td>161</td>
<td>70.9</td>
<td>161</td>
<td>70.9</td>
<td>161</td>
<td>70.9</td>
</tr>
<tr>
<td>450.soplex</td>
<td>168</td>
<td>49.8</td>
<td>168</td>
<td>49.6</td>
<td>169</td>
<td>49.3</td>
<td>168</td>
<td>49.8</td>
<td>168</td>
<td>49.6</td>
<td>169</td>
<td>49.3</td>
<td>169</td>
<td>49.3</td>
</tr>
<tr>
<td>453.povray</td>
<td>76.0</td>
<td>70.0</td>
<td>76.0</td>
<td>70.0</td>
<td>76.2</td>
<td>69.8</td>
<td>67.1</td>
<td>79.2</td>
<td>67.0</td>
<td>79.4</td>
<td>67.3</td>
<td>79.1</td>
<td>67.3</td>
<td>79.1</td>
</tr>
<tr>
<td>454.calculix</td>
<td>111</td>
<td>74.4</td>
<td>111</td>
<td>74.4</td>
<td>111</td>
<td>74.4</td>
<td>108</td>
<td>76.3</td>
<td>109</td>
<td>76.0</td>
<td>108</td>
<td>76.1</td>
<td>108</td>
<td>76.1</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>54.0</td>
<td>197</td>
<td>55.9</td>
<td>190</td>
<td>54.9</td>
<td>193</td>
<td>45.2</td>
<td>235</td>
<td>45.0</td>
<td>236</td>
<td>45.5</td>
<td>233</td>
<td>45.5</td>
<td>233</td>
</tr>
<tr>
<td>465.tonto</td>
<td>196</td>
<td>50.1</td>
<td>188</td>
<td>52.4</td>
<td>189</td>
<td>52.1</td>
<td>146</td>
<td>67.2</td>
<td>146</td>
<td>67.3</td>
<td>146</td>
<td>67.3</td>
<td>146</td>
<td>67.3</td>
</tr>
<tr>
<td>470.lbm</td>
<td>4.75</td>
<td>2890</td>
<td>4.78</td>
<td>2870</td>
<td>4.75</td>
<td>2890</td>
<td>4.75</td>
<td>2890</td>
<td>4.78</td>
<td>2870</td>
<td>4.75</td>
<td>2890</td>
<td>4.75</td>
<td>2890</td>
</tr>
<tr>
<td>481.wrf</td>
<td>85.4</td>
<td>131</td>
<td>86.1</td>
<td>130</td>
<td>86.0</td>
<td>130</td>
<td>85.4</td>
<td>131</td>
<td>86.1</td>
<td>130</td>
<td>86.0</td>
<td>130</td>
<td>85.4</td>
<td>131</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>233</td>
<td>83.5</td>
<td>231</td>
<td>84.3</td>
<td>232</td>
<td>83.9</td>
<td>233</td>
<td>83.5</td>
<td>231</td>
<td>84.3</td>
<td>232</td>
<td>83.9</td>
<td>233</td>
<td>83.9</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
- Per Core P-state 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)
runtime on SN850-01 Mon Aug 7 10:04:21 2017

Continued on next page
Lenovo Global Technology
ThinkSystem SN850
(3.00 GHz, Intel Xeon Platinum 8158)

**SPECfp2006 =** 156
**SPECfp_base2006 =** 150

### CPU2006 license:
9017

### Test date:
Aug-2017

### Test sponsor:
Lenovo Global Technology

### Hardware Availability:
Aug-2017

### Tested by:
Lenovo Global Technology

### 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) Platinum 8158 CPU @ 3.00GHz`
- `4 "physical id"s (chips)`
- `48 "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 : 12`
  - `siblings : 12`
  - `physical 0: cores 0 1 2 3 4 9 10 16 18 19 25 26`
  - `physical 1: cores 0 1 2 3 4 8 9 11 17 18 19 20`
  - `physical 2: cores 0 1 2 3 4 9 10 16 18 19 25 26`
  - `physical 3: cores 0 1 2 3 4 8 9 11 17 18 19 20`
- `cache size : 25344 KB`

---

From `/proc/meminfo`

- `MemTotal: 1584966120 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.
  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 SN850-01 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 Aug 7 10:00`

**SPEC is set to:** `/home/cpu2006-1.2-ic17.0`

**Files system Type Size Used Avail Use% Mounted on**

| /dev/sda4 | xfs | 836G | 292G | 545G | 35% | /home |

---

Additional information from `dmidecode`:

Continued on next page
### Platform Notes (Continued)

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 -[IVE109A-1.00]- 04/27/2017  
Memory:  
48x 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-ic17.0/1ibs/32:/home/cpu2006-1.2-ic17.0/1ibs/64:/home/cpu2006-1.2-ic17.0/sh10.2"`
- `OMP_NUM_THREADS = "48"`

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.mlmc: -DSPEC_CPU_LP64`
- `434.zeusmp: -DSPEC_CPU_LP64`
- `435.gromacs: -DSPEC_CPU_LP64 -nofor_main`
- `436.cactusADM: -DSPEC_CPU_LP64 -nofor_main`
Lenovo Global Technology
ThinkSystem SN850
(3.00 GHz, Intel Xeon Platinum 81588)

SPECfp2006 = 156
SPECfp_base2006 = 150

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

Base Portability Flags (Continued)

437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
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
Lenovo Global Technology
ThinkSystem SN850
(3.00 GHz, Intel Xeon Platinum 8158)

SPECfp2006 = 156
SPECfp_base2006 = 150

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

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-calloc -qopt-malloc-options=3
-auto -unroll4

Benchmarks using both Fortran and C:

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

Continued on next page
## SPEC CFP2006 Result

**Lenovo Global Technology**

**ThinkSystem SN850**

(3.00 GHz, Intel Xeon Platinum 8158)

<table>
<thead>
<tr>
<th>CPU2006 license: 9017</th>
<th>Test date: Aug-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Aug-2017</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Nov-2016</td>
</tr>
</tbody>
</table>

**SPECfp2006 = 156**

**SPECfp_base2006 = 150**

### 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

SPEC and SPECfp are registered trademarks 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 webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.


Originally published on 3 October 2017.