Lenovo Global Technology

ThinkSystem SN850
(2.70 GHz, Intel Xeon Gold 6150)

SPECfp®2006 = 152
SPECfp_base2006 = 146

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

Hardware
- CPU Name: Intel Xeon Gold 6150
- CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
- CPU MHz: 2700
- FPU: Integrated
- CPU(s) enabled: 72 cores, 4 chips, 18 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 (2.70 GHz, Intel Xeon Gold 6150)

**SPEC CFP2006 Result**

- **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
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Software Availability:** Nov-2016
- **Hardware Availability:** Aug-2017

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>78.0</td>
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<td></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)
- running on SN850 Mon Aug 21 10:29:03 2017
## Lenovo Global Technology

**ThinkSystem SN850**  
(2.70 GHz, Intel Xeon Gold 6150)

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>152</td>
<td>146</td>
</tr>
</tbody>
</table>

### 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 6150 CPU @ 2.70GHz  
- 4 "physical id"s (chips)  
- 72 "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`: 18  
  - `siblings`: 18  
  - `physical 0`: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
  - `physical 1`: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
  - `physical 2`: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
  - `physical 3`: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27  
- `cache size`: 25344 KB

From `/proc/meminfo`  
- `MemTotal`: 1584965728 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 SN850 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 21 10:23`

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

Additional information from `dmidecode`:  
Continued on next page
Lenovo Global Technology

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CPU2006 license: 9017
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Software Availability: Nov-2016

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 = "72"

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
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main

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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:
ilfort -m64

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

Peak Portability Flags

Same as Base Portability Flags
Lenovo Global Technology
ThinkSystem SN850
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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

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
Lenovo Global Technology  
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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.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.xml

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

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