**Lenovo Global Technology**  
ThinkSystem SN850  
(2.20 GHz, Intel Xeon Gold 5120T)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copy</th>
<th>CPU2006</th>
<th>SPECfp_rate2006</th>
<th>SPECfp_rate_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>56</td>
<td>112</td>
<td>1800</td>
<td>1830</td>
</tr>
<tr>
<td>416.gamess</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>433.milc</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>435.gromacs</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>56</td>
<td>112</td>
<td>1370</td>
<td>1290</td>
</tr>
<tr>
<td>444.namd</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>447.dealII</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>450.soplex</td>
<td>56</td>
<td>112</td>
<td>1410</td>
<td>1330</td>
</tr>
<tr>
<td>453.povray</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>454.calculix</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>56</td>
<td>112</td>
<td>1150</td>
<td>1210</td>
</tr>
<tr>
<td>465.tonto</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>470.lbm</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>481.wrf</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>112</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**  
CPU Name: Intel Xeon Gold 5120T  
CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz  
CPU MHz: 2200  
FPU: Integrated  
CPU(s) enabled: 56 cores, 4 chips, 14 cores/chip, 2 threads/core  
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: No  
File System: tmpfs  
System State: Run level 3 (multi-user)
Lenovo Global Technology

ThinkSystem SN850
(2.20 GHz, Intel Xeon Gold 5120T)

CPUs: 6
Total Memory: 1536 GB

SPEC CFP2006 Result

SPECfp_rate2006 = 2140
SPECfp_rate_base2006 = 2100

Lenovo Global Technology

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

L3 Cache: 19.25 MB I+D on chip per chip
Other Cache: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R, running at 2400 MHz)
Disk Subsystem: 800 GB tmpfs
Other Hardware: None

Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: None

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>112</td>
<td>932</td>
<td>830</td>
<td>831</td>
<td>180</td>
<td>833</td>
<td>1830</td>
</tr>
<tr>
<td>416.gamess</td>
<td>112</td>
<td>1064</td>
<td>2060</td>
<td>1063</td>
<td>2060</td>
<td>1064</td>
<td>2060</td>
</tr>
<tr>
<td>433.mile</td>
<td>112</td>
<td>570</td>
<td>1800</td>
<td>571</td>
<td>1800</td>
<td>570</td>
<td>1800</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>112</td>
<td>394</td>
<td>2580</td>
<td>396</td>
<td>2570</td>
<td>396</td>
<td>2580</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>112</td>
<td>325</td>
<td>2460</td>
<td>325</td>
<td>2460</td>
<td>325</td>
<td>2460</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>112</td>
<td>465</td>
<td>2880</td>
<td>465</td>
<td>2870</td>
<td>465</td>
<td>2880</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>112</td>
<td>814</td>
<td>1290</td>
<td>818</td>
<td>1290</td>
<td>823</td>
<td>1280</td>
</tr>
<tr>
<td>444.namd</td>
<td>112</td>
<td>523</td>
<td>1720</td>
<td>521</td>
<td>1720</td>
<td>524</td>
<td>1710</td>
</tr>
<tr>
<td>447.dealII</td>
<td>112</td>
<td>392</td>
<td>3260</td>
<td>392</td>
<td>3270</td>
<td>391</td>
<td>3280</td>
</tr>
<tr>
<td>450.soplex</td>
<td>112</td>
<td>702</td>
<td>1330</td>
<td>701</td>
<td>1330</td>
<td>701</td>
<td>1330</td>
</tr>
<tr>
<td>453.povray</td>
<td>112</td>
<td>212</td>
<td>2820</td>
<td>211</td>
<td>2820</td>
<td>211</td>
<td>2820</td>
</tr>
<tr>
<td>454.calculix</td>
<td>112</td>
<td>291</td>
<td>3170</td>
<td>292</td>
<td>3170</td>
<td>290</td>
<td>3180</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>112</td>
<td>982</td>
<td>1210</td>
<td>982</td>
<td>1210</td>
<td>983</td>
<td>1210</td>
</tr>
<tr>
<td>465.tonto</td>
<td>112</td>
<td>508</td>
<td>2170</td>
<td>510</td>
<td>2160</td>
<td>508</td>
<td>2170</td>
</tr>
<tr>
<td>470.lbm</td>
<td>112</td>
<td>639</td>
<td>2410</td>
<td>640</td>
<td>2410</td>
<td>639</td>
<td>2410</td>
</tr>
<tr>
<td>481.wrf</td>
<td>112</td>
<td>585</td>
<td>2140</td>
<td>580</td>
<td>2160</td>
<td>581</td>
<td>2150</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>112</td>
<td>1095</td>
<td>1990</td>
<td>1097</td>
<td>1990</td>
<td>1090</td>
<td>2000</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

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.

Stack size set to unlimited using "ulimit -s unlimited"
Tmpfs filesystem can be set with:
mount -t tmpfs -o size=800g tmpfs /home
Lenovo Global Technology
ThinkSystem SN850
(2.20 GHz, Intel Xeon Gold 5120T)

SPECfp_rate2006 = 2140
SPECfp_rate_base2006 = 2100

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

Platform Notes

BIOS configuration:
- Choose Operating Mode set to Maximum Performance
- Adjacent Cache Prefetch set to Disable
- DCU Streamer Prefetcher set to Disable
- SNC set to Enable
- Stale Atos 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 SN850-01 Fri Sep 8 17:29:33 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
- model name : Intel(R) Xeon(R) Gold 5120T CPU @ 2.20GHz
- 4 "physical id"s (chips)
- 112 "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 : 14
  - siblings : 28
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
  - physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
- cache size : 19712 KB

From /proc/meminfo
- MemTotal: 1584967240 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"

Continued on next page
Lenovo Global Technology

ThinkSystem SN850
(2.20 GHz, Intel Xeon Gold 5120T)

SPECfp_rate2006 = 2140
SPECfp_rate_base2006 = 2100

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

Platform Notes (Continued)

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 Sep 8 17:27
SPEC is set to: /home/cpu2006-1.2-ic17.0
    Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 800G 4.5G 796G 1% /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 SMBIOS" standard.

BIOS Lenovo -[IVE109A-1.00]- 04/27/2017
Memory:
    48x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666 MHz, configured at 2400 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-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/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:
    icc -m64

C++ benchmarks:
    icpc -m64

Fortran benchmarks:
    ifort -m64

Benchmarks using both Fortran and C:
    icc -m64 ifort -m64
Lenovo Global Technology
ThinkSystem SN850
(2.20 GHz, Intel Xeon Gold 5120T)

SPEC CFP2006 Result

SPECfp_rate2006 = 2140
SPECfp_rate_base2006 = 2100

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

Test date: Sep-2017
Hardware Availability: Aug-2017
Software Availability: Nov-2016

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
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 -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

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

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

Peak Compiler Invocation

C benchmarks:
icc -m64

C++ benchmarks (except as noted below):
icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

Continued on next page
Lenovo Global Technology
ThinkSystem SN850
(2.20 GHz, Intel Xeon Gold 5120T)

SPEC CFP2006 Result

SPECfp_rate2006 = 2140
SPECfp_rate_base2006 = 2100

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

Peak Compiler Invocation (Continued)

Fortran benchmarks:
ifort -m64

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

Peak 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
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64 -nofor_main
450.soplex: -D_FILE_OFFSET_BITS=64
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

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
-qopt-mem-layout-trans=3
447.dealII: basepeak = yes

Continued on next page
Lenovo Global Technology

ThinkSystem SN850
(2.20 GHz, Intel Xeon Gold 5120T)

| SPECfp_rate2006 | 2140 |
| SPECfp_rate_base2006 | 2100 |

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

Test date: Sep-2017
Hardware Availability: Aug-2017
Software Availability: Nov-2016

Peak Optimization Flags (Continued)

450.soplex: -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) -qopt-malloc-options=3
-qopt-mem-layout-trans=3

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 -qopt-mem-layout-trans=3

Fortran benchmarks:

410.bwaves: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

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: Same as 410.bwaves

459.GemsFDTD: Same as 410.bwaves

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

Benchmarks using both Fortran and C:

435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32
-qopt-mem-layout-trans=3

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

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
## Lenovo Global Technology

**ThinkSystem SN850**  
(2.20 GHz, Intel Xeon Gold 5120T)

<table>
<thead>
<tr>
<th>SPECfp_rate2006 = 2140</th>
<th>SPECfp_rate_base2006 = 2100</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CPU2006 license: 9017</th>
<th>Test date: Sep-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>

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 12 October 2017.