Lenovo Global Technology
ThinkSystem SR950
(2.30 GHz, Intel Xeon Gold 6140)

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

SPECfp®2006 = 150
SPECfp_base2006 = 142

Test date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Apr-2017

CPU Name: Intel Xeon Gold 6140
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz: 2300
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

Operating System: SUSE Linux Enterprise Server 12 SP2 (x86_64)
Kernel 4.4.21-69-default
Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux;
Fortran: Version 17.0.3.191 of Intel Fortran Compiler for Linux
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Lenovo Global Technology

ThinkSystem SR950
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 150
SPECfp_base2006 = 142

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 800 GB SAS SSD
Other Hardware: None

### 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>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>405</td>
<td>48.4</td>
<td>405</td>
<td>48.4</td>
<td>405</td>
<td>48.3</td>
<td>379</td>
<td>51.7</td>
<td>379</td>
<td>51.7</td>
</tr>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>128</td>
<td>71.8</td>
<td>129</td>
<td>71.4</td>
<td>129</td>
<td>71.9</td>
<td>128</td>
<td>71.8</td>
<td>128</td>
<td>71.9</td>
</tr>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>47.5</td>
<td>192</td>
<td>49.5</td>
<td>184</td>
<td>47.8</td>
<td>190</td>
<td>47.5</td>
<td>192</td>
<td>49.5</td>
<td>184</td>
</tr>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>47.7</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</td>
</tr>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.77</td>
<td>1360</td>
<td>8.57</td>
<td>1390</td>
<td>8.65</td>
<td>1380</td>
<td>8.77</td>
<td>1360</td>
<td>8.57</td>
<td>1390</td>
</tr>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25.5</td>
<td>368</td>
<td>27.9</td>
<td>337</td>
<td>25.4</td>
<td>370</td>
<td>25.5</td>
<td>368</td>
<td>27.9</td>
<td>337</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>405</td>
<td>48.4</td>
<td>405</td>
<td>48.4</td>
<td>405</td>
<td>48.3</td>
<td>379</td>
<td>51.7</td>
<td>379</td>
<td>51.7</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>128</td>
<td>71.8</td>
<td>129</td>
<td>71.4</td>
<td>129</td>
<td>71.9</td>
<td>128</td>
<td>71.8</td>
<td>128</td>
<td>71.9</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>47.5</td>
<td>192</td>
<td>49.5</td>
<td>184</td>
<td>47.8</td>
<td>190</td>
<td>47.5</td>
<td>192</td>
<td>49.5</td>
<td>184</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>47.7</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25.5</td>
<td>368</td>
<td>27.9</td>
<td>337</td>
<td>25.4</td>
<td>370</td>
<td>25.5</td>
<td>368</td>
<td>27.9</td>
<td>337</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>405</td>
<td>48.4</td>
<td>405</td>
<td>48.4</td>
<td>405</td>
<td>48.3</td>
<td>379</td>
<td>51.7</td>
<td>379</td>
<td>51.7</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>128</td>
<td>71.8</td>
<td>129</td>
<td>71.4</td>
<td>129</td>
<td>71.9</td>
<td>128</td>
<td>71.8</td>
<td>128</td>
<td>71.9</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>47.5</td>
<td>192</td>
<td>49.5</td>
<td>184</td>
<td>47.8</td>
<td>190</td>
<td>47.5</td>
<td>192</td>
<td>49.5</td>
<td>184</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>47.7</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</td>
<td>150</td>
<td>47.8</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
  - LLC dead line alloc set to Disable

```
Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-ciok Fri Oct 20 09:55:51 2017
```

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

Continued on next page
Lenovo Global Technology
ThinkSystem SR950
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 150
SPECfp_base2006 = 142

CPU2006 license: 9017
Test date: Oct-2017
Test sponsor: Lenovo Global Technology
Hardware Availability: Sep-2017
Tested by: Lenovo Global Technology
Software Availability: Apr-2017

Platform Notes (Continued)

From /proc/cpuinfo

- model name: Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz
- 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: 1584767344 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

- SuSE-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:
  - x86_64 x86_64 x86_64 GNU/Linux

- run-level 3 Oct 20 09:35

- SPEC is set to: /home/cpu2006-1.2-ic17.0u3
- Filesystem Type Size Used Avail Use% Mounted on
  - /dev/sda3 xfs 445G 31G 415G 7% /

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 continued on next page
Platform Notes (Continued)

determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Lenovo -[PSE105X-1.00]- 08/17/2017
Memory:
48x NO DIMM NO DIMM
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-ic17.0u3/lib/ia32:/home/cpu2006-1.2-ic17.0u3/lib/intel64:/home/cpu2006-1.2-ic17.0u3/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
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run

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.mlinc: —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 SR950
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 150
SPECfp_base2006 = 142

CPU2006 license: 9017
Test sponsor: Lenovo Global Technology
Test date: Oct-2017
Tested by: Lenovo Global Technology
Hardware Availability: Sep-2017
Software Availability: Apr-2017

Base Portability Flags (Continued)

<table>
<thead>
<tr>
<th>Base Portability Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>437.leslie3d: ~DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>444.namd: ~DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>447.dealII: ~DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>450.soplex: ~DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>453.povray: ~DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>454.calculix: ~DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>459.GemsFDTD: ~DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto: ~DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm: ~DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf: ~DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3: ~DSPEC_CPU_LP64</td>
</tr>
</tbody>
</table>

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 SR950**  
(2.30 GHz, Intel Xeon Gold 6140)

### SPEC CFP2006 Result

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>150</td>
<td>142</td>
</tr>
</tbody>
</table>

### CPU2006 license: 9017

<table>
<thead>
<tr>
<th>Test sponsor:</th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Oct-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Sep-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2017</td>
</tr>
</tbody>
</table>

---

### 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-4

- 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 SR950  
(2.30 GHz, Intel Xeon Gold 6140)

<table>
<thead>
<tr>
<th>SPECfp2006</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006</td>
<td>142</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Test date:</th>
<th>Oct-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Sep-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2017</td>
</tr>
</tbody>
</table>

**Peak Optimization Flags (Continued)**

454.calculix:  
-xCORE-AVX2  
-ipo  
-03  
-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/Lenovo-Platform-Flags-V1.2-SKL-E.html](http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-E.html)

You can also download the XML flags sources by saving the following links:

- [http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-E.xml](http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-E.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.  