Lenovo Global Technology
ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 6140)

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

SPECfp®2006 = 145
SPECfp_base2006 = 139

Hardware
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: 36 cores, 2 chips, 18 cores/chip
CPU(s) orderable: 1.2 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)
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 SD530
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 145
SPECfp_base2006 = 139

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: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: 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>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>13.4</td>
<td>1010</td>
<td>13.6</td>
<td>1000</td>
<td>13.6</td>
<td>997</td>
<td>13.4</td>
<td>1010</td>
<td>13.6</td>
<td>1000</td>
<td>13.6</td>
<td>997</td>
</tr>
<tr>
<td>416.gamess</td>
<td>405</td>
<td>48.3</td>
<td>406</td>
<td>48.3</td>
<td>405</td>
<td>48.3</td>
<td>380</td>
<td>51.5</td>
<td>379</td>
<td>51.7</td>
<td>378</td>
<td>51.7</td>
</tr>
<tr>
<td>433.milc</td>
<td>125</td>
<td>73.4</td>
<td>125</td>
<td>73.7</td>
<td>124</td>
<td>74.2</td>
<td>125</td>
<td>73.4</td>
<td>125</td>
<td>73.7</td>
<td>124</td>
<td>74.2</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>34.8</td>
<td>262</td>
<td>35.0</td>
<td>260</td>
<td>35.1</td>
<td>259</td>
<td>34.8</td>
<td>262</td>
<td>35.0</td>
<td>260</td>
<td>35.1</td>
<td>259</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>141</td>
<td>50.7</td>
<td>142</td>
<td>50.4</td>
<td>142</td>
<td>50.3</td>
<td>141</td>
<td>50.7</td>
<td>142</td>
<td>50.4</td>
<td>142</td>
<td>50.3</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>8.92</td>
<td>1340</td>
<td>9.06</td>
<td>1320</td>
<td>9.05</td>
<td>1320</td>
<td>8.92</td>
<td>1340</td>
<td>9.06</td>
<td>1320</td>
<td>9.05</td>
<td>1320</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>
</tr>
<tr>
<td>447.dealII</td>
<td>160</td>
<td>71.6</td>
<td>160</td>
<td>71.6</td>
<td>159</td>
<td>71.9</td>
<td>160</td>
<td>71.6</td>
<td>160</td>
<td>71.6</td>
<td>159</td>
<td>71.9</td>
</tr>
<tr>
<td>450.soplex</td>
<td>163</td>
<td>51.1</td>
<td>162</td>
<td>51.5</td>
<td>165</td>
<td>50.6</td>
<td>163</td>
<td>51.1</td>
<td>162</td>
<td>51.5</td>
<td>165</td>
<td>50.6</td>
</tr>
<tr>
<td>453.povray</td>
<td>76.4</td>
<td>69.6</td>
<td>76.3</td>
<td>69.7</td>
<td>76.4</td>
<td>69.6</td>
<td>67.0</td>
<td>79.3</td>
<td>67.2</td>
<td>79.1</td>
<td>67.2</td>
<td>79.2</td>
</tr>
<tr>
<td>454.calculix</td>
<td>114</td>
<td>72.1</td>
<td>115</td>
<td>72.0</td>
<td>115</td>
<td>71.7</td>
<td>107</td>
<td>77.0</td>
<td>107</td>
<td>77.0</td>
<td>108</td>
<td>76.6</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>39.5</td>
<td>269</td>
<td>40.0</td>
<td>265</td>
<td>40.5</td>
<td>262</td>
<td>34.3</td>
<td>310</td>
<td>34.6</td>
<td>307</td>
<td>34.5</td>
<td>308</td>
</tr>
<tr>
<td>465.tonto</td>
<td>198</td>
<td>49.6</td>
<td>200</td>
<td>49.2</td>
<td>199</td>
<td>49.3</td>
<td>144</td>
<td>68.5</td>
<td>144</td>
<td>68.5</td>
<td>144</td>
<td>68.5</td>
</tr>
<tr>
<td>470.libm</td>
<td>10.7</td>
<td>1280</td>
<td>10.8</td>
<td>1270</td>
<td>10.9</td>
<td>1260</td>
<td>10.7</td>
<td>1280</td>
<td>10.8</td>
<td>1270</td>
<td>10.9</td>
<td>1260</td>
</tr>
<tr>
<td>481.wrf</td>
<td>84.4</td>
<td>132</td>
<td>89.4</td>
<td>125</td>
<td>85.3</td>
<td>131</td>
<td>84.4</td>
<td>132</td>
<td>89.4</td>
<td>125</td>
<td>85.3</td>
<td>131</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>286</td>
<td>68.2</td>
<td>285</td>
<td>68.3</td>
<td>285</td>
<td>68.3</td>
<td>286</td>
<td>68.2</td>
<td>285</td>
<td>68.3</td>
<td>285</td>
<td>68.4</td>
</tr>
</tbody>
</table>

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS Configuration:
Choose Operating Mode set to Maximum Performance
LLC dead line alloc set to Disable
Patrol Scrub set to Disable
DCU Streamer Prefetcher set to Disable
DCA set to Enable
Hyper-Threading set to Disable
Sysinfo program /home/cpu2006-1.2-ic17.0u3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on Stark-node-02 Thu Jul 20 02:21:39 2017
Continued on next page
Lenovo Global Technology
ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 145
SPECfp_base2006 = 139

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

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 6140 CPU @ 2.30GHz
  2 "physical id"s (chips)
  36 "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
  cache size : 25344 KB

From /proc/meminfo
  MemTotal: 395738148 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 Stark-node-02 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 20 02:14

  SPEC is set to: /home/cpu2006-1.2-ic17.0u3
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda4 xfs 688G 150G 539G 22% /home

  Additional information from dmidecode:

  Warning: Use caution when you interpret this section. The 'dmidecode' program
Continued on next page
Lenovo Global Technology
ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 145
SPECfp_base2006 = 139

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

Test date: Jul-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

Platform Notes (Continued)

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 -[TEE105Z-1.00]- 04/27/2017
Memory:
4x NO DIMM NO DIMM
12x 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 = "36"

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
Filesysteem 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.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64 -nofor_main
435.gromacs: -DSPEC_CPU_LP64

Continued on next page
Lenovo Global Technology
ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 145
SPECfp_base2006 = 139

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

Base Portability Flags (Continued)

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 -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
Lenovo Global Technology
ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 145
SPECfp_base2006 = 139

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

Test date: Jul-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

Peak Portability Flags
Same as Base Portability Flags

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-ipl32

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

Continued on next page
Lenovo Global Technology
ThinkSystem SD530
(2.30 GHz, Intel Xeon Gold 6140)

SPECfp2006 = 145
SPECfp_base2006 = 139

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

Test date: Jul-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

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