Lenovo Global Technology

ThinkSystem SR550
(2.10 GHz, Intel Xeon Gold 6130)

<table>
<thead>
<tr>
<th>SPECfp®2006 =</th>
<th>144</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006 =</td>
<td>137</td>
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</table>

**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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result</th>
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</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>53.0</td>
</tr>
<tr>
<td>416.gamess</td>
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<tr>
<td>433.milc</td>
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<tr>
<td>435.gromacs</td>
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<tr>
<td>436.cactusADM</td>
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<td>465.tonto</td>
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<tr>
<td>482.sphinx3</td>
<td>69.4</td>
</tr>
</tbody>
</table>

**SPECfp_base2006 = 137**

**SPECfp2006 = 144**

### Hardware

- **CPU Name**: Intel Xeon Gold 6130
- **CPU Characteristics**: Intel Turbo Boost Technology up to 3.70 GHz
- **CPU MHz**: 2100
- **FPU**: Integrated
- **CPU(s) enabled**: 32 cores, 2 chips, 16 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)
  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**: btrfs
- **System State**: Run level 3 (multi-user)
Lenovo Global Technology

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L3 Cache: 22 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>
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<td>69.4</td>
<td>282</td>
<td>69.1</td>
<td>281</td>
<td>69.4</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:
Operating Mode set to Maximum Performance
Hyper-Threading set to Disabled
Uncore Frequency Scaling 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 linux-g50d Thu Aug 3 08:05:54 2017

This section contains SUT (System Under Test) info as seen by
Continued on next page
Lenovo Global Technology
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CPU2006 license: 9017
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SPECfp2006 = 144
SPECfp_base2006 = 137

Test date: Aug-2017
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Platform Notes (Continued)

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 6130 CPU @ 2.10GHz
  2 "physical id"s (chips)
  32 "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 : 16
  siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  cache size : 22528 KB

From /proc/meminfo
  MemTotal: 395882580 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 linux-g50d 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 3 07:57

SPEC is set to: /home/cpu2006-1.2-ic17.0
  Filesystem  Type  Size  Used Avail Use% Mounted on
  /dev/sda2  btrfs  744G  172G  571G  24%  /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
Continued on next page
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**Platform Notes (Continued)**

- hardware, firmware, and the "DMTF SMBIOS" standard.
- BIOS Lenovo -[TEE105Z-1.00]- 04/27/2017
- Memory:
  - 12x Hynix HMA84GR7AFR4N-VK 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/ibs;2:/home/cpu2006-1.2-ic17.0/ibs/64;/home/cpu2006-1.2-ic17.0/sh10.2"
- OMP_NUM_THREADS = "32"

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.

**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
- 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
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Base Portability Flags (Continued)

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:
cc -m64

C++ benchmarks:
icc -m64

Fortran benchmarks:
ifort -m64

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

Peak Portability Flags

Same as Base Portability Flags
Lenovo Global Technology
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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

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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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