Lenovo Global Technology
ThinkSystem SR630
(2.00 GHz, Intel Xeon Silver 4109T)

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

SPECfp®2006 = 112
SPECfp_base2006 = 106

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

CPU Name: Intel Xeon Silver 4109T
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2000
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 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

Hardware
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;
File System: btrfs
System State: Run level 3 (multi-user)

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L3 Cache: 11 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400 MHz)
Disk Subsystem: 1 x 800 GB SAS 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>
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<td>370</td>
<td>52.7</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 Cable-SPECcpu2006-SUSE12SP2 Fri Aug 25 02:00:35 2017

This section contains SUT (System Under Test) info as seen by
Continued on next page
Lenovo Global Technology

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SPECfp_base2006 = 106

CPU2006 license: 9017
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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) Silver 4109T CPU @ 2.00GHz
  2 "physical id"s (chips)
  16 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
cpu cores : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7
cache size : 11264 KB

From /proc/meminfo
  MemTotal:       395893920 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 Cable-SPECcpu2006-SUSE12SP2 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 25 01:59

  SPEC is set to: /home/cpu2006-1.2-ic17.0u3
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 btrfs 744G 216G 526G 30% /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
## Lenovo Global Technology

**ThinkSystem SR630 (2.00 GHz, Intel Xeon Silver 4109T)**

<table>
<thead>
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**CPU2006 license:** 9017

**Test date:** Aug-2017

**Test sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Hardware Availability:** Aug-2017

**Software Availability:** Apr-2017

### Platform Notes (Continued)

- Hardware, firmware, and the "DMTF SMBIOS" standard.
- BIOS Lenovo -[IVE109Q-1.00]- 06/28/2017
- Memory: 24x Samsung M393A2K43BB1-CTD 16 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:

- 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 = "16"

- 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

<table>
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<th>Portability Flags</th>
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## Lenovo Global Technology

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### SPEC CFP2006 Result

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<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>454.calculix</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
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<td>-DSPEC_CPU_LP64</td>
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<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>-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
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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-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

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