Lenovo Global Technology

ThinkSystem SR630
(2.00 GHz, Intel Xeon Gold 6138)

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 = 144
SPECfp_base2006 = 137

Hardware

<table>
<thead>
<tr>
<th>SPECfp2006 = 144</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006 = 137</td>
</tr>
</tbody>
</table>

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

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Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
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### SPEC CFP2006 Result

<table>
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<th>Benchmark</th>
<th>Results</th>
<th>Base Pointers</th>
<th>Peak Pointers</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>13.9s</td>
<td>14.0s</td>
<td>13.9s</td>
</tr>
<tr>
<td>416.gamess</td>
<td>408s</td>
<td>409s</td>
<td>379s</td>
</tr>
<tr>
<td>433.milc</td>
<td>126s</td>
<td>125s</td>
<td>126s</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>36.2s</td>
<td>36.6s</td>
<td>36.2s</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>158s</td>
<td>158s</td>
<td>158s</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>9.05s</td>
<td>9.05s</td>
<td>9.05s</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>21.2s</td>
<td>21.1s</td>
<td>21.2s</td>
</tr>
<tr>
<td>444.namd</td>
<td>225s</td>
<td>225s</td>
<td>220s</td>
</tr>
<tr>
<td>447.dealII</td>
<td>160s</td>
<td>160s</td>
<td>160s</td>
</tr>
<tr>
<td>450.soplex</td>
<td>166s</td>
<td>165s</td>
<td>166s</td>
</tr>
<tr>
<td>453.povray</td>
<td>75.9s</td>
<td>76.3s</td>
<td>67.4s</td>
</tr>
<tr>
<td>454.calculix</td>
<td>117s</td>
<td>117s</td>
<td>108s</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>39.1s</td>
<td>39.6s</td>
<td>32.7s</td>
</tr>
<tr>
<td>465.tonto</td>
<td>223s</td>
<td>225s</td>
<td>148s</td>
</tr>
<tr>
<td>470.libm</td>
<td>8.90s</td>
<td>8.89s</td>
<td>8.90s</td>
</tr>
<tr>
<td>481.wrf</td>
<td>87.3s</td>
<td>86.9s</td>
<td>87.3s</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>314s</td>
<td>315s</td>
<td>314s</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
  - 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-SPECcpu2017-SUSE12SP2 Mon Jul 24 23:49:17 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
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Platform Notes (Continued)

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz
 2 "physical id"s (chips)
 40 "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 : 20
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
cache size : 28160 KB

From /proc/meminfo
MemTotal: 395892352 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-SPECcpu2017-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 Jul 24 23:48

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 35G 706G 5% /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.

Continued on next page
## Lenovo Global Technology

### SPEC CFP2006 Result

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<table>
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<tr>
<th>Benchmark</th>
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<tr>
<td></td>
<td>= 144</td>
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**CPU2006 license:** 9017  
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### Platform Notes (Continued)

- **BIOS** Lenovo -[IVE109Q-1.00]- 06/28/2017
- **Memory:** 24x Samsung M393A2K43BB1-CTD 16 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/ia32:/home/cpu2006-1.2-ic17.0u3/lib/ia32:/home/cpu2006-1.2-ic17.0u3/intel64:/home/cpu2006-1.2-ic17.0u3/sh10.2"  
  - OMP_NUM_THREADS = "40"

  - 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.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 -nofor_main
- 447.dealII: -DSPEC_CPU_LP64
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Base Portability Flags (Continued)

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

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-llp32

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

Continued on next page
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**Peak Optimization Flags (Continued)**

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

481.wrf: basepeak = yes

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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-C.20171004.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/Lenovo-Platform-Flags-V1.2-SKL-C.20171004.xml](http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-SKL-C.20171004.xml)

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