### Lenovo Global Technology

ThinkSystem SR950  
(2.30 GHz, Intel Xeon Gold 5118)

<table>
<thead>
<tr>
<th>SPECfp®2006 = 127</th>
<th>SPECfp_base2006 = 121</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
</table>
| CPU Name: Intel Xeon Gold 5118 | Operating System: SUSE Linux Enterprise Server 12 SP2 (x86_64)  
Kernel 4.4.21-69-default |
| CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz | 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 |
| CPU MHz: 2300 | Auto Parallel: Yes |
| FPU: Integrated | File System: btrfs |
| CPU(s) enabled: 48 cores, 4 chips, 12 cores/chip | System State: Run level 3 (multi-user) |
| 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 | |

### Lenovo Global Technology

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

**Test date:** Nov-2017  
**Hardware Availability:** Sep-2017  
**Software Availability:** Apr-2017
Lenovo Global Technology
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L3 Cache: 16.5 MB I+D on chip per chip
Other Cache: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
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>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>11.7</td>
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<td>11.3</td>
<td>1200</td>
<td>11.0</td>
<td>1230</td>
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<tr>
<td>416.gamess</td>
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<td>475</td>
<td>41.2</td>
<td>474</td>
<td>41.3</td>
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<td>433.milc</td>
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<td>64.1</td>
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<td>64.2</td>
<td>141</td>
<td>65.1</td>
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<td>434.xeusp</td>
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<td>1100</td>
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<td>437.leslie3d</td>
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<td>293</td>
<td>31.0</td>
<td>303</td>
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<tr>
<td>444.namd</td>
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<tr>
<td>447.dealII</td>
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<td>62.9</td>
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<td>454.calculix</td>
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<td>62.1</td>
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<tr>
<td>459.GemsFDTD</td>
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<td>173</td>
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<td>172</td>
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<tr>
<td>465.tonto</td>
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<td>482.sphinx3</td>
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<td>61.1</td>
<td>319</td>
<td>61.0</td>
<td>320</td>
<td>61.0</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)
runtime on Proton4S-SUSE12SP2 Wed Nov 29 00:15:52 2017

This section contains SUT (System Under Test) info as seen by
Lenovo Global Technology
ThinkSystem SR950
(2.30 GHz, Intel Xeon Gold 5118)

SPECFp2006 = 127
SPECFp_base2006 = 121

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) Gold 5118 CPU @ 2.30GHz
4 "physical id"s (chips)
48 "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 : 12
siblings : 12
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 16896 KB

From /proc/meminfo
MemTotal:  1584766852 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 Proton4S-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 Nov 29 00:10
SPEC is set to: /home/cpu2006-1.2-ic17.0u3
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 btrfs 743G 182G 561G 25% /home

Additional information from dmidecode:
Warning: Use caution when you interpret this section. The 'dmidecode' program
Continued on next page
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 -[PSE105X-1.00]- 08/17/2017
Memory:
48x NO DIMM NO DIMM
48x Samsung M393A4K40BB2-CTD 32 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-icl7.0u3/lib/ia32:/home/cpu2006-1.2-icl7.0u3/lib/intel64:/home/cpu2006-1.2-icl7.0u3/sh10.2"
OMP_NUM_THREADS = "48"

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

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# SPEC CFP2006 Result

## Lenovo Global Technology

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### 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`
- 463.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
  ```
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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-ipo32

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

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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-E.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-E.xml

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Tested with SPEC CPU2006 v1.2.
Originally published on 26 December 2017.