Lenovo Global Technology
ThinkSystem SR950
(3.60 GHz, Intel Xeon Platinum 8156)

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

SPECfp®2006 = 142
SPECfp_base2006 = 137

Hardware
CPU Name: Intel Xeon Platinum 8156
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHz: 3600
FPU: Integrated
CPU(s) enabled: 32 cores, 8 chips, 4 cores/chip
CPU(s) orderable: 2,4,8 chips
Primary Cache: 32 KB L1 + 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: btrfs
System State: Run level 3 (multi-user)
## Lenovo Global Technology

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- **L3 Cache:** 16.5 MB I+D on chip per chip  
- **Other Cache:** None  
- **Memory:** 3 TB (96 x 32 GB 2Rx4 PC4-2666V-R)  
- **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>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seconds</td>
<td>Ratio</td>
</tr>
<tr>
<td>410.bwaves</td>
<td>6.60</td>
<td>2060</td>
</tr>
<tr>
<td>416.gamess</td>
<td>400</td>
<td>49.0</td>
</tr>
<tr>
<td>433.milc</td>
<td>137</td>
<td>67.2</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>62.6</td>
<td>145</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>110</td>
<td>64.8</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>10.3</td>
<td>1160</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>25.8</td>
<td>365</td>
</tr>
<tr>
<td>444.namd</td>
<td>225</td>
<td>35.6</td>
</tr>
<tr>
<td>447.dealII</td>
<td>161</td>
<td>70.9</td>
</tr>
<tr>
<td>450.soplex</td>
<td>178</td>
<td>46.8</td>
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<tr>
<td>453.povray</td>
<td>76.2</td>
<td>69.9</td>
</tr>
<tr>
<td>454.calculix</td>
<td>112</td>
<td>73.9</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>76.6</td>
<td>138</td>
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<tr>
<td>465.tonto</td>
<td>196</td>
<td>50.2</td>
</tr>
<tr>
<td>470.lbm</td>
<td>5.79</td>
<td>2370</td>
</tr>
<tr>
<td>481.wrf</td>
<td>130</td>
<td>86.1</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>237</td>
<td>82.3</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 Proton8S-SUSE12SP2 Wed Aug 30 11:01:17 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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Standard Performance Evaluation Corporation  
info@spec.org  
http://www.spec.org/
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<td>Hardware Availability:</td>
<td>Sep-2017</td>
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<td>Software Availability:</td>
<td>Apr-2017</td>
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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) Platinum 8156 CPU @ 3.60GHz
8 "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 : 4
siblings : 4
physical 0: cores 1 5 9 13
physical 1: cores 0 3 10 13
physical 2: cores 1 2 5 11
physical 3: cores 1 5 9 13
physical 4: cores 1 2 5 11
physical 5: cores 1 5 9 13
physical 6: cores 1 5 9 13
physical 7: cores 1 5 9 13
cache size : 16896 KB

From `/proc/meminfo`
MemTotal:       3170209980 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 Proton8S-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 30 06:53

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sdb3      btrfs  743G  62G  681G  9% /home
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Platform Notes (Continued)

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.

BIOS Lenovo -[PSE105L-1.00]- 06/22/2017
Memory: 96x 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 = "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 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

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Base Portability Flags (Continued)

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
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -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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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-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
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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-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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