Lenovo Global Technology
ThinkSystem SR950
(2.10 GHz, Intel Xeon Platinum 8170M)

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

<table>
<thead>
<tr>
<th>Software Availability</th>
<th>Hardware Availability</th>
<th>Test date</th>
<th>Copyright 2006-2017 Standard Performance Evaluation Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test date: Oct-2017</td>
<td>Hardware Availability: Sep-2017</td>
<td>Lenovo Global Technology</td>
<td></td>
</tr>
</tbody>
</table>

**SPECfp®2006 = 148**
**SPECfp_base2006 = 140**

**Software**
- 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)

**Hardware**
- CPU Name: Intel Xeon Platinum 8170M
- CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
- CPU MHz: 2100
- FPU: Integrated
- CPU(s) enabled: 104 cores, 4 chips, 26 cores/chip
- 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
- **Continued on next page**
Lenovo Global Technology

ThinkSystem SR950
(2.10 GHz, Intel Xeon Platinum 8170M)

SPECFp2006 = 148
SPECFp_base2006 = 140

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

L3 Cache: 35.75 MB I+D on chip per chip
Other Cache: None
Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)
Disk Subsystem: 1 x 800 GB SAS SSD
Other Hardware: None

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 linux-uyxw Fri Oct 20 17:19:17 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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>8.75</td>
<td>8.75</td>
</tr>
<tr>
<td>416.gamess</td>
<td>408.0</td>
<td>379.0</td>
</tr>
<tr>
<td>433.milc</td>
<td>124</td>
<td>124</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>47.5</td>
<td>47.5</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>166</td>
<td>166</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>8.38</td>
<td>8.38</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>23.5</td>
<td>23.5</td>
</tr>
<tr>
<td>444.namd</td>
<td>225</td>
<td>220</td>
</tr>
<tr>
<td>447.dealII</td>
<td>159</td>
<td>159</td>
</tr>
<tr>
<td>450.soplex</td>
<td>161</td>
<td>161</td>
</tr>
<tr>
<td>453.povray</td>
<td>117</td>
<td>117</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>80.5</td>
<td>80.5</td>
</tr>
<tr>
<td>465.tonto</td>
<td>244</td>
<td>148</td>
</tr>
<tr>
<td>470.lbm</td>
<td>3.42</td>
<td>3.42</td>
</tr>
<tr>
<td>481.wrf</td>
<td>85.6</td>
<td>85.6</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>308</td>
<td>308</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
Lenovo Global Technology

ThinkSystem SR950
(2.10 GHz, Intel Xeon Platinum 8170M)

SPECfp2006 = 148
SPECfp_base2006 = 140

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

Test date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Apr-2017

Platform Notes (Continued)

From /proc/cpuinfo

model name : Intel(R) Xeon(R) Platinum 8170M CPU @ 2.10GHz
  4 "physical id"s (chips)
  104 "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 : 26
siblings : 26
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
26 27 28 29
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
26 27 28 29
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25
26 27 28 29
cache size : 36608 KB

From /proc/meminfo
MemTotal: 1584767360 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:
(9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Oct 20 16:10

SPEC is set to: /home/cpu2006-1.2-ic17.0u3
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 744G 32G 712G 5% /home

Continued on next page
Lenovo Global Technology
ThinkSystem SR950
(2.10 GHz, Intel Xeon Platinum 8170M)

SPECfp2006 = 148
SPECfp_base2006 = 140

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

Test date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Apr-2017

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 -[PSE103K-1.00]- 06/19/2017
Memory:
48x NO DIMM NO DIMM
48x 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 = "104"

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

Continued on next page
Lenovo Global Technology
ThinkSystem SR950
(2.10 GHz, Intel Xeon Platinum 8170M)

| SPECfp2006 = | 148 |
| SPECfp_base2006 = | 140 |

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

Test date: Oct-2017
Hardware Availability: Sep-2017
Software Availability: Apr-2017

### Base Portability Flags (Continued)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Additional Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>433.milc</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>434.zesmp</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>437.lesie3d</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>444.namd</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>447.dealII</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>450.soplex</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>453.povray</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>454.calculix</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto</td>
<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
Lenovo Global Technology

ThinkSystem SR950
(2.10 GHz, Intel Xeon Platinum 8170M)

SPECfp2006 = 148
SPECfp_base2006 = 140

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

Test date: Oct-2017
Hardware Availability: Sep-2017
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-illp32

- 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

Continued on next page
Lenovo Global Technology
ThinkSystem SR950
(2.10 GHz, Intel Xeon Platinum 8170M)

SPECfp2006 = 148
SPECfp_base2006 = 140

CPU2006 license: 9017
Test sponsor: Lenovo Global Technology
Test date: Oct-2017
Tested by: Lenovo Global Technology
Hardware Availability: Sep-2017
Software Availability: Apr-2017

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-llp32
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