## Lenovo Group Limited

### Lenovo ThinkServer TS150 (3.00 GHz, Intel Xeon E3-1220 v5)

<table>
<thead>
<tr>
<th>Test sponsor: Lenovo Group Limited</th>
<th>Hardware Availability: Oct-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by: Lenovo Group Limited</td>
<td>Software Availability: Aug-2015</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
<th>Operating System: SUSE Linux Enterprise Server 12 (x86_64)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kernel 3.12.28-4-default</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;</td>
</tr>
<tr>
<td></td>
<td>Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for</td>
</tr>
<tr>
<td></td>
<td>Linux</td>
</tr>
</tbody>
</table>

## SPECfp®2006 Result

### Lenovo Group Limited

<table>
<thead>
<tr>
<th>Lenovo ThinkServer TS150</th>
<th>SPECfp®2006 = 93.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPECfp_base2006 = 91.1</td>
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</tbody>
</table>

### Lenovo ThinkServer TS150 (3.00 GHz, Intel Xeon E3-1220 v5) Details:

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CPU: Intel Xeon E3-1220 v5</td>
</tr>
<tr>
<td></td>
<td>Characteristics: Intel Turbo Boost Technology up to 3.50 GHz</td>
</tr>
<tr>
<td></td>
<td>CPU MHz: 3000</td>
</tr>
<tr>
<td></td>
<td>CPU enabled: 4 cores, 1 chip, 4 cores/chip</td>
</tr>
<tr>
<td></td>
<td>FPU: Integrated</td>
</tr>
<tr>
<td></td>
<td>CPU orderable: 1 chip</td>
</tr>
<tr>
<td></td>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td></td>
<td>Secondary Cache: 256 KB I+D on chip per core</td>
</tr>
</tbody>
</table>

### Lenovo ThinkServer TS150 (3.00 GHz, Intel Xeon E3-1220 v5) Performance:

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
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<tbody>
<tr>
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<td>SPECfp_base2006 = 91.1</td>
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<td>SPECfp®2006 = 93.1</td>
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### SPECfp®2006 Test Results:

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
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<tbody>
<tr>
<td></td>
<td>CPU2006 license: 9017</td>
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<tr>
<td></td>
<td>Test date: Dec-2015</td>
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<td></td>
<td>Test sponsor: Lenovo Group Limited</td>
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<td>Hardware Availability: Oct-2015</td>
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<td>Software Availability: Aug-2015</td>
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<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>410.bwaves: 141</td>
</tr>
<tr>
<td></td>
<td>416.gamess: 4</td>
</tr>
<tr>
<td></td>
<td>433.milc: 108</td>
</tr>
<tr>
<td></td>
<td>434.zeusmp: 200</td>
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<tr>
<td></td>
<td>435.gromacs: 61.2</td>
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<tr>
<td></td>
<td>436.cactusADM: 352</td>
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<td></td>
<td>437.leslie3d: 107</td>
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<tr>
<td></td>
<td>444.namd: 343</td>
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<td></td>
<td>447.dealII: 74.0</td>
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<tr>
<td></td>
<td>450.soplex: 53.4</td>
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<tr>
<td></td>
<td>453.povray: 73.8</td>
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<td></td>
<td>454.calculix: 65.1</td>
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<td></td>
<td>459.GemsFDTD: 83.3</td>
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<tr>
<td></td>
<td>465.tonto: 66.4</td>
</tr>
<tr>
<td></td>
<td>470.lbm: 60.0</td>
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<tr>
<td></td>
<td>481.wrf: 187</td>
</tr>
<tr>
<td></td>
<td>482.sphinx3: 93.2</td>
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</table>

## Continued on next page
Lenovo Group Limited

Lenovo ThinkServer TS150
(3.00 GHz, Intel Xeon E3-1220 v5)

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

L3 Cache: 8 MB I+D on chip per chip
Other Cache: None
Memory: 32 GB (4 x 8 GB 2Rx8 PC4-2133P-U)
Disk Subsystem: 1 x 800 GB SATA 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>
<th>Seconds</th>
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<td>92.7</td>
<td>209</td>
<td>93.2</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:
  - EIST Support set to Enabled
  - CIE Support set to Enabled
  - C State Support set to Enabled
  - Turbo Mode set to Enable
- Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
  - $Rev: 6914 $ $Date:: 2014-06-25 $ e3fbb8667b5a285932ceab81e28219e1
  - running on TS150 Wed Dec 30 16:42:07 2015

This section contains SUT (System Under Test) info as seen by the SUT during the test.
Lenovo Group Limited

Lenovo ThinkServer TS150
(3.00 GHz, Intel Xeon E3-1220 v5)

SPECfp2006 = 93.1
SPECfp_base2006 = 91.1

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited

Test date: Dec-2015
Hardware Availability: Oct-2015
Software Availability: Aug-2015

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) CPU E3-1220 v5 @ 3.00GHz
     1 "physical id"s (chips)
     4 "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 0 1 2 3
   cache size : 8192 KB

From /proc/meminfo
   MemTotal:       32933544 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 0
   # 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"
      VERSION_ID="12"
      PRETTY_NAME="SUSE Linux Enterprise Server 12"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12"

uname -a:
   Linux TS150 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014 (9879bd4)
   x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 28 11:32

SPEC is set to: /home/cpu2006-1.2-ic16.0
Filesystem    Type Size Used Avail Use% Mounted on
/dev/sda3      xfs  693G  27G  667G   4%  /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.

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Lenovo Group Limited
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SPECfp2006 = 93.1
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Tested by: Lenovo Group Limited

Platform Notes (Continued)

BIOS LENOVO FWKT32A 12/25/2015
Memory:
4x Samsung M378A1G43DB0-CPB 8 GB 2 rank 2133 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,1,0"
LD_LIBRARY_PATH = "/home/cpu2006-1.2-ic16.0/32:/home/cpu2006-1.2-ic16.0/64:/home/cpu2006-1.2-ic16.0/sh"
OMP_NUM_THREADS = "4"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

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
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64

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Base Portability Flags (Continued)

<table>
<thead>
<tr>
<th>Base Portability Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>454.calculix: -DSPEC_CPU_LP64 -nofor_main</td>
</tr>
<tr>
<td>459.GemsFDTD: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>465.tonto: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>470.lbm: -DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>482.sphinx3: -DSPEC_CPU_LP64</td>
</tr>
</tbody>
</table>

Base Optimization Flags

- **C benchmarks:**
  -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
  -ansi-alias

- **C++ benchmarks:**
  -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias

- **Fortran benchmarks:**
  -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch

- **Benchmarks using both Fortran and C:**
  -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch
  -ansi-alias

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
Lenovo Group Limited
Lenovo ThinkServer TS150
(3.00 GHz, Intel Xeon E3-1220 v5)

SPECfp2006 = 93.1
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CPU2006 license: 9017
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Tested by: Lenovo Group Limited

Test date: Dec-2015
Hardware Availability: Oct-2015
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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: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
           -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
           -par-num-threads=1(pass 1) -prof-use(pass 2) -fno-alias
           -auto-ilp32

447.dealII: basepeak = yes
450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
            -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
            -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll14
            -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes
416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
            -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
            -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
            -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes
437.leslie3d: basepeak = yes

459.GemsFDTD: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
              -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
              -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
              -inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
          -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
          -par-num-threads=1(pass 1) -prof-use(pass 2) -inline-calloc
          -opt-malloc-options=3 -auto -unroll14

Benchmarks using both Fortran and C:

Continued on next page
Lenovo Group Limited

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Peak Optimization Flags (Continued)

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias
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-ic16.0-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
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