Lenovo Group Limited

Lenovo ThinkServer TS150
(3.50 GHz, Intel Xeon E3-1245 v5)

| Test sponsor:       | Lenovo Group Limited |
| CPU2006 license:    | 9017                 |
| Tested by:          | Lenovo Group Limited |
| Test date:          | Jan-2016             |
| Hardware Availability: | Oct-2015             |
| Software Availability: | Aug-2015             |

**SPECfp®2006 = 98.9**

**SPECfp_base2006 = 96.5**

<table>
<thead>
<tr>
<th>Program</th>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
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<tr>
<td>410.bwaves</td>
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<td>416.gamess</td>
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**SPECfp_base2006 = 96.5**

**SPECfp2006 = 98.9**

**Hardware**

- **CPU Name:** Intel Xeon E3-1245 v5
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.90 GHz
- **CPU MHz:** 3500
- **FPU:** Integrated
- **CPU(s) enabled:** 4 cores, 1 chip, 4 cores/chip
- **Primary Cache:** 32 KB I + 32 KB D on chip per core
- **Secondary Cache:** 256 KB I+D on chip per core

**Software**

- **Operating System:** SUSE Linux Enterprise Server 12 (x86_64)
- **Compiler:** C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux; Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux
- **Auto Parallel:** Yes
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
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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>
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<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
</tbody>
</table>

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS Configuration:
- EIST Support set to Enabled
- Intel (R) Hyper-Threading set to Disabled
- C1E 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 Thu Jan 14 13:12:13 2016

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# Lenovo Group Limited

**Lenovo ThinkServer TS150**  
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<table>
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**CPU2006 license:** 9017  
**Test date:** Jan-2016  
**Test sponsor:** Lenovo Group Limited  
**Hardware Availability:** Oct-2015  
**Tested by:** Lenovo Group Limited  
**Software Availability:** Aug-2015

---

**Platform Notes (Continued)**

This section contains SUT (System Under Test) info as seen by 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 E3-1245 v5 @ 3.50GHz  
- 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: 32933324 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.

From `/etc/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 Jan 14 09:02

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...
Lenovo Group Limited

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CPU2006 license: 9017
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Platform Notes (Continued)

hardware, firmware, and the "DMTF SMBIOS" standard.

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/libs/32:/home/cpu2006-1.2-ic16.0/libs/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

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| SPECfp2006 | 98.9 |
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### Base Portability Flags (Continued)

<table>
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<tr>
<th>Benchmark</th>
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<tr>
<td>453.povray</td>
<td>-DSPEC_CPU_LP64</td>
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<td>454.calculix</td>
<td>-DSPEC_CPU_LP64 -nofor_main</td>
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<td>459.GemsFDTD</td>
<td>-DSPEC_CPU_LP64</td>
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<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>
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</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
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SPECfp_base2006 = 96.5

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) -unroll4
             -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 -unroll4

Benchmarks using both Fortran and C:

Continued on next page
SPEC CFP2006 Result

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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 other inquiries, please contact webmaster@spec.org.

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