# Lenovo Group Limited

**Lenovo System x3550 M5**  
(1.90 GHz, Intel Xeon E5-2628L v4)

**SPECfp®2006 = 97.5**  
**SPECfp_base2006 = 93.7**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>30.2</td>
</tr>
<tr>
<td>416.gamess</td>
<td>26.7</td>
</tr>
<tr>
<td>433.milc</td>
<td>59.4</td>
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<tr>
<td>434.zeusmp</td>
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<tr>
<td>435.gromacs</td>
<td>38.6</td>
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<tr>
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</tr>
<tr>
<td>437.leslie3d</td>
<td>308</td>
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<tr>
<td>444.namd</td>
<td>21.8</td>
</tr>
<tr>
<td>447.dealII</td>
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</tr>
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<td>482.sphinx3</td>
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</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon E5-2628L v4  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 2.40 GHz  
- **CPU MHz:** 1900  
- **FPU:** Integrated  
- **CPU(s) enabled:** 24 cores, 2 chips, 12 cores/chip  
- **CPU(s) orderable:** 1.2 chips  
- **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 SP1 (x86_64)  
  Kernel 3.12.49-11-default  
- **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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Test date: May-2016  
Hardware Availability: Mar-2016  
Software Availability: Dec-2015

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Continued on next page
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<th>Peak Pointers</th>
<th>Other Software</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>64-bit</td>
<td>32/64-bit</td>
<td>None</td>
</tr>
</tbody>
</table>

| CPU2006 license: | 9017 |
| Test sponsor:   | Lenovo Group Limited |
| Tested by:      | Lenovo Group Limited |
| L3 Cache:       | 30 MB I+D on chip per chip |
| Other Cache:    | None |
| Memory:         | 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz) |
| Disk Subsystem: | 1 x 800 GB SATA SSD |
| Other Hardware: | None |

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>41.0</td>
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</tr>
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</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:**  
- Operating Mode set to Maximum Performance  
- Intel Hyperthreading set to Disabled  
- Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914  
- $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  
- running on DaAn-01 Thu May 26 04:46:11 2016

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

**Test date:** May-2016  
**Hardware Availability:** Mar-2016  
**Software Availability:** Dec-2015

### Platform Notes (Continued)

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo

- model name: Intel(R) Xeon(R) CPU E5-2628L v4@ 1.90GHz
- 2 "physical id"s (chips)
- 24 "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: 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
- cache size: 30720 KB

From /proc/meminfo

- MemTotal: 263829472 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*

- SuSE-release:
  - SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 1
  - # 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-SP1"
    - VERSION_ID="12.1"
    - PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
    - ID="sles"
    - ANSI_COLOR="0;32"
    - CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:

```
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 May 25 21:37

**SPEC is set to:** /home/cpu2006-1.2-ic16.0  
**Filesystem** | Type | Size | Used | Avail | Use% | Mounted on
---|---|---|---|---|---|---
/dev/sda4 | xfs | 688G | 28G | 661G | 5% | /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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Platform Notes (Continued)

BIOS LENOVO -[TBE124K-2.10]- 05/10/2016
Memory:
16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz, configured at 2133 MHz
8x NO DIMM Unknown

(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-ic16.0/libs/32:/home/cpu2006-1.2-ic16.0/libs/64:/home/cpu2006-1.2-ic16.0/sh"
OMP_NUM_THREADS = "24"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1
Transparent Huge Pages disabled with:
echo never > /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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**Base Portability Flags (Continued)**

- 453.povray: -DSPEC_CPU_LP64
- 454.calculix: -DSPEC_CPU_LP64 -nofor_main
- 459.GemsFDTD: -DSPEC_CPU_LP64
- 465.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 -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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CPU2006 license: 9017
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Test sponsor: Lenovo Group Limited
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Tested by: Lenovo Group Limited
Software Availability: Dec-2015

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:

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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
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revC.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
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Settings-V1.2-BDW-revC.xml

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For other inquiries, please contact webmaster@spec.org.

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