### Lenovo Group Limited

**Lenovo System x3550 M5**  
(2.30 GHz, Intel Xeon E5-2697 v4)

**CPU2006 license:** 9017  
**Test date:** May-2016  
**Test sponsor:** Lenovo Group Limited  
**Hardware Availability:** Mar-2016

**Tested by:** Lenovo Group Limited  
**Software Availability:** Dec-2015

**Performance Results:**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>47.0</td>
<td>36.8</td>
</tr>
<tr>
<td>416.gamess</td>
<td>76.9</td>
<td></td>
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<tr>
<td>433.milc</td>
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<tr>
<td>434.zeusmp</td>
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<td>435.gromacs</td>
<td>978</td>
<td>144</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>336</td>
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</tr>
<tr>
<td>437.leslie3d</td>
<td>32.7</td>
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</tr>
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<td>444.namd</td>
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</tr>
<tr>
<td>447.dealII</td>
<td>51.4</td>
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<tr>
<td>450.soplex</td>
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<tr>
<td>453.povray</td>
<td>64.1</td>
<td>61.3</td>
</tr>
<tr>
<td>454.calculix</td>
<td>55.0</td>
<td></td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>274</td>
<td>230</td>
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<tr>
<td>465.tonto</td>
<td>59.4</td>
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<tr>
<td>470.lbm</td>
<td>42.0</td>
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</tr>
<tr>
<td>481.wrf</td>
<td>119</td>
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</tr>
<tr>
<td>482.sphinx3</td>
<td>70.2</td>
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</tr>
</tbody>
</table>

**SPECfp2006 = 126**  
**SPECfp_base2006 = 119**

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2697 v4</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.60 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>2300</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>36 cores, 2 chips, 18 cores/ chip</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Primary Cache:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache:</td>
<td>256 KB I+D on chip per core</td>
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### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System:</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64)</td>
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<tr>
<td></td>
<td>Kernel 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler:</td>
<td>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</td>
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<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
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<tr>
<td>File System:</td>
<td>xfs</td>
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<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

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**Lenovo Group Limited**  
**Lenovo System x3550 M5**  
(2.30 GHz, Intel Xeon E5-2697 v4)  

**SPECfp2006 =** 126  
**SPECfp_base2006 =** 119

**CPU2006 license:** 9017  
**Test sponsor:** Lenovo Group Limited  
**Tested by:** Lenovo Group Limited  
**L3 Cache:** 45 MB I+D on chip per chip  
**Other Cache:** None  
**Memory:** 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)  
**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>
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<tr>
<td>482.sphinx3</td>
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<td>70.2</td>
<td>277</td>
<td>70.4</td>
<td>280</td>
<td>69.7</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:  
Operating Mode set to Maximum Performance  
Hyper-Threadig set to Disabled  
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  

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

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Lenovo Group Limited

Lenovo System x3550 M5
(2.30 GHz, Intel Xeon E5-2697 v4)

SPECfp2006 = 126
SPECfp_base2006 = 119

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

Platform Notes (Continued)

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-2697 v4 @ 2.30GHz
  2 "physical id"s (chips)
  36 "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 : 18
siblings : 18
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 46080 KB

From /proc/meminfo
MemTotal:       263827712 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:
Linux DaAn-03 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
(8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 25 05:55

SPEC is set to: /home/cpu2006-1.2-ic16.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 689G 28G 662G 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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Lenovo Group Limited
Lenovo System x3550 M5
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CPU2006 license: 9017
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Test date: May-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Platform Notes (Continued)

BIOS LENOVO -[TBE124K-2.10]- 05/10/2016
Memory:
16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 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 = "36"

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
453.povray: -DSPEC_CPU_LP64

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Lenovo Group Limited
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**SPECfp2006 = 126**

**SPECfp_base2006 = 119**

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</table>

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### Base Portability Flags (Continued)

- 454.calcixix: \(-\text{SPEC\_CPU\_LP64} \ -\text{nofor\_main}\)
- 459.GemsFDTD: \(-\text{SPEC\_CPU\_LP64}\)
- 465.tonto: \(-\text{SPEC\_CPU\_LP64}\)
- 470.lbm: \(-\text{SPEC\_CPU\_LP64}\)
- 481.wrf: \(-\text{SPEC\_CPU\_LP64} \ -\text{SPEC\_CPU\_CASE\_FLAG} \ -\text{SPEC\_CPU\_LINUX}\)
- 482.sphinx3: \(-\text{SPEC\_CPU\_LP64}\)

---

### Base Optimization Flags

**C benchmarks:**
- \(-x\text{CORE-AVX2} \ -i\text{po} \ -03 \ -no-prec-div \ -parallel \ -opt-prefetch \ -ansi-alias\)

**C++ benchmarks:**
- \(-x\text{CORE-AVX2} \ -i\text{po} \ -03 \ -no-prec-div \ -opt-prefetch \ -ansi-alias\)

**Fortran benchmarks:**
- \(-x\text{CORE-AVX2} \ -i\text{po} \ -03 \ -no-prec-div \ -parallel \ -opt-prefetch\)

**Benchmarks using both Fortran and C:**
- \(-x\text{CORE-AVX2} \ -i\text{po} \ -03 \ -no-prec-div \ -parallel \ -opt-prefetch \ -ansi-alias\)

---

### 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 System x3550 M5
(2.30 GHz, Intel Xeon E5-2697 v4)

**SPEC CFP2006 Result**

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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

**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

Benchmarks using both Fortran and C:

Continued on next page
Lenovo Group Limited

Lenovo System x3550 M5  
(2.30 GHz, Intel Xeon E5-2697 v4)

SPEC CFP2006 Result

SPECfp2006 = 126
SPECfp_base2006 = 119

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

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

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