## Lenovo Group Limited

Lenovo System x3650 M5  
(2.60 GHz, Intel Xeon E5-2690 v4)

### SPECfp®2006 = 126

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tr>
<td>410.bwaves</td>
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<td>434.zeusmp</td>
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<td>435.gromacs</td>
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<td>436.cactusADM</td>
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**SPECfp_base2006 = 119**

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
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</table>
| CPU Name: Intel Xeon E5-2690 v4 | Operating System: SUSE Linux Enterprise Server 12 SP1 (x86_64)  
Kernel 3.12.49-11-default |
| CPU Characteristics: Intel Turbo Boost Technology up to 3.50 GHz | 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 |
| CPU MHz: 2600 | Auto Parallel: Yes |
| FPU: Integrated | File System: xfs |
| CPU(s) enabled: 28 cores, 2 chips, 14 cores/chip | System State: Run level 3 (multi-user) |
| CPU(s) orderable: 1.2 chips | |
## Lenovo Group Limited

Lenovo System x3650 M5  
(2.60 GHz, Intel Xeon E5-2690 v4)

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<thead>
<tr>
<th>CPU2006 license: 9017</th>
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<td>Hardware Availability: Mar-2016</td>
</tr>
<tr>
<td>Tested by: Lenovo Group Limited</td>
<td>Software Availability: Dec-2015</td>
</tr>
</tbody>
</table>

### L3 Cache:
35 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

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<thead>
<tr>
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<th>Seconds</th>
<th>Ratio</th>
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<td>255</td>
<td>76.4</td>
</tr>
</tbody>
</table>

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## Operating System Notes

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

## Platform Notes

**BIOS Configuration:**
- Operating Mode set to "Maximum Performance"
- Hyper-Threading set to Disabled
- COD Preference set to Disable

Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914

$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb867b5a285932ceab81e28219e1
running on ip10-245-48-80 Tue Apr 12 15:29:04 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

---

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
Lenovo Group Limited

Lenovo System x3650 M5
(2.60 GHz, Intel Xeon E5-2690 v4)

| SPECfp2006 | 126 |
| SPECfp_base2006 | 119 |

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

Test date: Apr-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 E5-2690 v4@ 2.60GHz
2 "physical id"s (chips)
28 "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 : 14
siblings : 14
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
cache size : 35840 KB
```

From /proc/meminfo

```
MemTotal:       263960272 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 Apr 11 06:35
SPEC is set to: /home/cpu2006-1.2-ic16.0
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   690G  18G  673G  3% /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.

Continued on next page
## SPEC CFP2006 Result

**Lenovo Group Limited**

Lenovo System x3650 M5  
(2.60 GHz, Intel Xeon E5-2690 v4)

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</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2015</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

- BIOS LENOVO -[TCE123H-2.10]- 03/25/2016
- 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 = "28"

- 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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
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<td>-DSPEC_CPU_LP64 -nofor_main</td>
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Continued on next page
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SPECfp_base2006 = 119

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
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Hardware Availability: Mar-2016
Software Availability: Dec-2015

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
Lenovo Group Limited

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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) -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
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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-Flags-V1.2-BDW-B.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-Flags-V1.2-BDW-B.xml

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

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