# Lenovo Group Limited

## Lenovo System x3650 M5
(Intel Xeon E5-2690 v3, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>117</td>
<td>112</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
</table>
| **CPU Name:** Intel Xeon E5-2690 v3  
**CPU Characteristics:** Intel Turbo Boost Technology up to 3.50 GHz  
**CPU MHz:** 2600  
**FPU:** Integrated  
**CPU(s) enabled:** 24 cores, 2 chips, 12 cores/chip, 2 threads/core  
**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  
| **Operating System:** Red Hat Enterprise Linux Server release 7.0 (Maipo)  
**Compiler:** C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux  
**Auto Parallel:** Yes  
**File System:** xfs |

**Test date:** Mar-2015  
**Hardware Availability:** Oct-2014  
**Software Availability:** Sep-2014  

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECfp®2006</th>
<th>SPECfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>bwaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gamess</td>
<td></td>
<td></td>
</tr>
<tr>
<td>milc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>zeusmp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gromacs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cactusADM</td>
<td>395</td>
<td></td>
</tr>
<tr>
<td>leslie3d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>namd</td>
<td>30.4</td>
<td>29.6</td>
</tr>
<tr>
<td>dealII</td>
<td>55.5</td>
<td></td>
</tr>
<tr>
<td>soplex</td>
<td>45.1</td>
<td></td>
</tr>
<tr>
<td>povray</td>
<td>61.2</td>
<td>54.5</td>
</tr>
<tr>
<td>calculix</td>
<td></td>
<td>56.1</td>
</tr>
<tr>
<td>GemsFDTD</td>
<td>52.1</td>
<td></td>
</tr>
<tr>
<td>tonto</td>
<td></td>
<td>50.5</td>
</tr>
<tr>
<td>lbm</td>
<td>41.4</td>
<td></td>
</tr>
<tr>
<td>wrf</td>
<td></td>
<td>119</td>
</tr>
<tr>
<td>sphinx3</td>
<td></td>
<td>75.8</td>
</tr>
</tbody>
</table>

**SPECfp®2006 = 117**  
**SPECfp_base2006 = 112**
LENovo Group Limited
Lenovo System x3650 M5
(Intel Xeon E5-2690 v3, 2.60 GHz)

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 PC4-2133P-R)
Disk Subsystem: 1 x 1000 GB SATA, 7200 RPM
Other Hardware: None

System State: Run level 3 (multi-user)
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>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>24.8</td>
<td>549</td>
<td>24.1</td>
<td>564</td>
<td>24.4</td>
<td>556</td>
<td>24.8</td>
<td>549</td>
<td>24.1</td>
<td>564</td>
</tr>
<tr>
<td>416.gamess</td>
<td>527</td>
<td>37.1</td>
<td>527</td>
<td>37.1</td>
<td>528</td>
<td>37.1</td>
<td>469</td>
<td>41.7</td>
<td>471</td>
<td>41.6</td>
</tr>
<tr>
<td>433.milc</td>
<td>138</td>
<td>66.7</td>
<td>138</td>
<td>66.7</td>
<td>137</td>
<td>66.8</td>
<td>136</td>
<td>67.5</td>
<td>136</td>
<td>67.5</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>42.0</td>
<td>217</td>
<td>42.1</td>
<td>216</td>
<td>41.9</td>
<td>217</td>
<td>42.0</td>
<td>217</td>
<td>42.1</td>
<td>216</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>157</td>
<td>45.6</td>
<td>157</td>
<td>45.6</td>
<td>159</td>
<td>45.0</td>
<td>157</td>
<td>45.6</td>
<td>157</td>
<td>45.6</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>13.2</td>
<td>904</td>
<td>12.7</td>
<td>940</td>
<td>13.0</td>
<td>922</td>
<td>13.2</td>
<td>904</td>
<td>12.7</td>
<td>940</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>23.4</td>
<td>402</td>
<td>23.8</td>
<td>395</td>
<td>24.7</td>
<td>381</td>
<td>23.4</td>
<td>402</td>
<td>23.8</td>
<td>395</td>
</tr>
<tr>
<td>444.namd</td>
<td>271</td>
<td>29.6</td>
<td>271</td>
<td>29.6</td>
<td>271</td>
<td>29.6</td>
<td>263</td>
<td>30.4</td>
<td>263</td>
<td>30.5</td>
</tr>
<tr>
<td>447.dealII</td>
<td>206</td>
<td>55.5</td>
<td>207</td>
<td>55.3</td>
<td>206</td>
<td>55.5</td>
<td>206</td>
<td>55.5</td>
<td>207</td>
<td>55.3</td>
</tr>
<tr>
<td>450.soplex</td>
<td>186</td>
<td>44.9</td>
<td>185</td>
<td>45.1</td>
<td>184</td>
<td>45.3</td>
<td>186</td>
<td>44.9</td>
<td>185</td>
<td>45.1</td>
</tr>
<tr>
<td>453.povray</td>
<td>97.6</td>
<td>54.5</td>
<td>97.5</td>
<td>54.6</td>
<td>97.9</td>
<td>54.3</td>
<td>86.8</td>
<td>61.3</td>
<td>87.0</td>
<td>61.2</td>
</tr>
<tr>
<td>454.calculix</td>
<td>158</td>
<td>52.1</td>
<td>158</td>
<td>52.3</td>
<td>159</td>
<td>52.0</td>
<td>147</td>
<td>56.1</td>
<td>147</td>
<td>56.2</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>45.3</td>
<td>234</td>
<td>44.2</td>
<td>240</td>
<td>43.8</td>
<td>242</td>
<td>37.5</td>
<td>283</td>
<td>37.3</td>
<td>285</td>
</tr>
<tr>
<td>465.tonto</td>
<td>236</td>
<td>41.6</td>
<td>238</td>
<td>41.4</td>
<td>238</td>
<td>41.3</td>
<td>195</td>
<td>50.6</td>
<td>195</td>
<td>50.5</td>
</tr>
<tr>
<td>470.lbm</td>
<td>17.8</td>
<td>772</td>
<td>17.6</td>
<td>782</td>
<td>17.2</td>
<td>797</td>
<td>17.8</td>
<td>772</td>
<td>17.6</td>
<td>782</td>
</tr>
<tr>
<td>481.wrf</td>
<td>94.0</td>
<td>119</td>
<td>93.7</td>
<td>119</td>
<td>94.3</td>
<td>119</td>
<td>94.0</td>
<td>119</td>
<td>93.7</td>
<td>119</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>253</td>
<td>77.0</td>
<td>257</td>
<td>76.0</td>
<td>257</td>
<td>75.9</td>
<td>259</td>
<td>75.3</td>
<td>257</td>
<td>75.8</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 setting:
Operating Mode set to "Efficiency-Favor Performance"
Sysinfo program /SPECcpu/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on x3650M5 Thu Mar 12 23:12:16 2015

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

Continued on next page
Lenovo Group Limited
Lenovo System x3650 M5
(Intel Xeon E5-2690 v3, 2.60 GHz)

SPECfp2006 = 117
SPECfp_base2006 = 112

CPU2006 license: 9017
Test date: Mar-2015
Test sponsor: Lenovo Group Limited
Hardware Availability: Oct-2014
Tested by: Lenovo Group Limited
Software Availability: Sep-2014

Platform Notes (Continued)

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz
  2 "physical id"s (chips)
  48 "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 : 24
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: 263582204 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.0 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="7.0"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
  ANSI_COLOR="0;31"
  CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
  redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
  Linux x3650M5 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014 x86_64
  x86_64 x86_64 GNU/Linux

SPEC is set to: /SPECcpu
  Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 239G 18G 222G 8% /

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.

BIOS IBM -[TCE103EUS-1.01]- 10/21/2014
Memory:
  16x Hynix 484D4134324752374D4652344E2D54462020 16 GB 2 rank 2133 MHz
  8x NO DIMM Unknown

Continued on next page
Lenovo Group Limited

SPEC CFP2006 Result

Lenovo System x3650 M5
(Intel Xeon E5-2690 v3, 2.60 GHz)

SPECfp2006 = 117
SPECfp_base2006 = 112

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

Test date: Mar-2015
Hardware Availability: Oct-2014
Software Availability: Sep-2014

Platform Notes (Continued)

(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 = "/SPECcpu/libs/32:/SPECcpu/libs/64:/SPECcpu/sh"
OMP_NUM_THREADS = "24"

Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0
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
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

Continued on next page
Lenovo Group Limited
Lenovo System x3650 M5
(Intel Xeon E5-2690 v3, 2.60 GHz)

SPECfp2006 = 117
SPECfp_base2006 = 112

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Test date: Mar-2015
Tested by: Lenovo Group Limited
Hardware Availability: Oct-2014
Software Availability: Sep-2014

Base Portability Flags (Continued)
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

Peak Optimization Flags
C benchmarks:
433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-auto-ilp32 -ansi-alias

Continued on next page
Lenovo Group Limited

Lenovo System x3650 M5
(Intel Xeon E5-2690 v3, 2.60 GHz)

SPECfp2006 = 117
SPECfp_base2006 = 112

CPU2006 license: 9017
Test date: Mar-2015
Test sponsor: Lenovo Group Limited
Hardware Availability: Oct-2014
Tested by: Lenovo Group Limited
Software Availability: Sep-2014

Peak Optimization Flags (Continued)

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias -parallel

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4
-ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -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(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2
-inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-03(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-inline-calloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

Continued on next page
Lenovo Group Limited
Lenovo System x3650 M5
(Intel Xeon E5-2690 v3, 2.60 GHz)

SPECfp2006 = 117
SPECfp_base2006 = 112

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

Lenovo Group Limited

Peak Optimization Flags (Continued)

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-ic15.0-official-linux64.html
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.xml

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.
Report generated on Wed Apr 8 11:01:50 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 7 April 2015.