# Lenovo Group Limited

### Lenovo System x3500 M5
(Intel Xeon E5-2620 v3, 2.30 GHz)

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

**SPECfp®2006 =** 100  
**SPECfp_base2006 =** 94.8

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>41.0</td>
</tr>
<tr>
<td>416.gamess</td>
<td>33.1</td>
</tr>
<tr>
<td>433.milc</td>
<td>68.5</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>176</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>40.2</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>243</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>27.1</td>
</tr>
<tr>
<td>444.namd</td>
<td>53.3</td>
</tr>
<tr>
<td>447.dealII</td>
<td>38.3</td>
</tr>
<tr>
<td>450.soplex</td>
<td>61.2</td>
</tr>
<tr>
<td>453.povray</td>
<td>54.7</td>
</tr>
<tr>
<td>454.calculix</td>
<td>50.6</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>233</td>
</tr>
<tr>
<td>465.tonto</td>
<td>51.0</td>
</tr>
<tr>
<td>470.lbm</td>
<td>37.2</td>
</tr>
<tr>
<td>481.wrf</td>
<td>92.3</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>69.4</td>
</tr>
</tbody>
</table>

**SPECfp_base2006 = 94.8**

**SPECfp2006 = 100**

## Hardware

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2620 v3</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 3.20 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>12 cores, 2 chips, 6 cores/chip, 2 threads/core</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>
</tr>
</tbody>
</table>

## Software

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System:</td>
<td>Red Hat Enterprise Linux Server release 7.0 (Maipo)</td>
</tr>
<tr>
<td>Compiler:</td>
<td>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</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
</tbody>
</table>

Test date: May-2015  
Hardware Availability: Jan-2015  
Software Availability: Sep-2014

### Continued on next page
Lenovo Group Limited

Lenovo System x3500 M5
(Intel Xeon E5-2620 v3, 2.30 GHz)

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

L3 Cache: 15 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)
Disk Subsystem: 1 x 960 GB SATA SSD
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>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>33.1</td>
<td>411</td>
<td>32.3</td>
<td>421</td>
<td>32.1</td>
<td>423</td>
<td>33.1</td>
<td>411</td>
<td>32.3</td>
<td>421</td>
<td>32.1</td>
<td>423</td>
</tr>
<tr>
<td>416.gamess</td>
<td>591</td>
<td>33.1</td>
<td>590</td>
<td>33.2</td>
<td>591</td>
<td>33.1</td>
<td>479</td>
<td>40.8</td>
<td>477</td>
<td>41.0</td>
<td>477</td>
<td>41.0</td>
</tr>
<tr>
<td>433.milc</td>
<td>135</td>
<td>68.2</td>
<td>135</td>
<td>68.2</td>
<td>135</td>
<td>67.9</td>
<td>134</td>
<td>68.5</td>
<td>134</td>
<td>68.5</td>
<td>134</td>
<td>68.5</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>51.6</td>
<td>176</td>
<td>51.9</td>
<td>175</td>
<td>51.8</td>
<td>176</td>
<td>51.6</td>
<td>176</td>
<td>51.9</td>
<td>175</td>
<td>51.8</td>
<td>176</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>178</td>
<td>40.2</td>
<td>178</td>
<td>40.2</td>
<td>178</td>
<td>40.1</td>
<td>178</td>
<td>40.2</td>
<td>178</td>
<td>40.1</td>
<td>178</td>
<td>40.1</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>20.2</td>
<td>593</td>
<td>20.0</td>
<td>597</td>
<td>19.8</td>
<td>603</td>
<td>20.2</td>
<td>593</td>
<td>20.0</td>
<td>597</td>
<td>19.8</td>
<td>603</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>38.6</td>
<td>244</td>
<td>42.4</td>
<td>222</td>
<td>38.7</td>
<td>243</td>
<td>38.6</td>
<td>244</td>
<td>42.4</td>
<td>222</td>
<td>38.7</td>
<td>243</td>
</tr>
<tr>
<td>444.namd</td>
<td>296</td>
<td>27.1</td>
<td>296</td>
<td>27.1</td>
<td>296</td>
<td>27.1</td>
<td>288</td>
<td>27.8</td>
<td>288</td>
<td>27.9</td>
<td>288</td>
<td>27.8</td>
</tr>
<tr>
<td>447.dealII</td>
<td>215</td>
<td>53.3</td>
<td>215</td>
<td>53.3</td>
<td>215</td>
<td>53.2</td>
<td>215</td>
<td>53.3</td>
<td>215</td>
<td>53.3</td>
<td>215</td>
<td>53.3</td>
</tr>
<tr>
<td>450.soplex</td>
<td>219</td>
<td>38.0</td>
<td>218</td>
<td>38.3</td>
<td>217</td>
<td>38.4</td>
<td>219</td>
<td>38.0</td>
<td>218</td>
<td>38.3</td>
<td>217</td>
<td>38.4</td>
</tr>
<tr>
<td>453.povray</td>
<td>95.3</td>
<td>55.8</td>
<td>97.3</td>
<td>54.7</td>
<td>97.4</td>
<td>54.6</td>
<td>87.4</td>
<td>60.8</td>
<td>86.7</td>
<td>61.3</td>
<td>86.9</td>
<td>61.2</td>
</tr>
<tr>
<td>454.calculix</td>
<td>163</td>
<td>50.6</td>
<td>163</td>
<td>50.6</td>
<td>163</td>
<td>50.7</td>
<td>148</td>
<td>55.7</td>
<td>148</td>
<td>55.7</td>
<td>148</td>
<td>55.7</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>53.2</td>
<td>199</td>
<td>50.7</td>
<td>209</td>
<td>52.5</td>
<td>202</td>
<td>45.5</td>
<td>233</td>
<td>45.4</td>
<td>234</td>
<td>45.8</td>
<td>232</td>
</tr>
<tr>
<td>465.tonto</td>
<td>265</td>
<td>37.2</td>
<td>265</td>
<td>37.1</td>
<td>264</td>
<td>37.3</td>
<td>193</td>
<td>51.0</td>
<td>193</td>
<td>51.0</td>
<td>193</td>
<td>50.9</td>
</tr>
<tr>
<td>470.lbm</td>
<td>24.3</td>
<td>566</td>
<td>24.1</td>
<td>571</td>
<td>24.6</td>
<td>560</td>
<td>24.3</td>
<td>566</td>
<td>24.1</td>
<td>571</td>
<td>24.6</td>
<td>560</td>
</tr>
<tr>
<td>481.wrf</td>
<td>121</td>
<td>92.3</td>
<td>120</td>
<td>93.2</td>
<td>121</td>
<td>92.2</td>
<td>121</td>
<td>92.3</td>
<td>120</td>
<td>93.2</td>
<td>121</td>
<td>92.2</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>284</td>
<td>68.7</td>
<td>283</td>
<td>68.8</td>
<td>282</td>
<td>69.0</td>
<td>281</td>
<td>69.4</td>
<td>283</td>
<td>69.0</td>
<td>281</td>
<td>69.4</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 /home/SPEC/config/sysinfo_rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on x3500M5 Fri May 29 20:04:34 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
Platform Notes (Continued)

From /proc/cpuinfo

```plaintext
model name : Intel(R) Xeon(R) CPU E5-2620 v3 @ 2.40GHz
  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 : 6
  siblings : 12
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5
  cache size : 15360 KB
```

From /proc/meminfo

```plaintext
MemTotal:       263456756 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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

```plaintext
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
```

```plaintext
uname -a:
  Linux x3500M5 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: /home/SPEC

```plaintext
Filesystem            Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs   927G  140G  787G  16% /
```

Additional information from dmidecode:

```plaintext
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 -[TAE103F-1.02]- 12/05/2014
Memory:
  8x Hynix HMA42GR7MFR4N-TFT1 16 GB 2 rank 2133 MHz, configured at 1866 MHz
  8x NO DIMM HMA42GR7MFR4N-TFT1 16 GB 2 rank 2133 MHz, configured at 1866 MHz
```

Continued on next page
Lenovo Group Limited
Lenovo System x3500 M5
(Intel Xeon E5-2620 v3, 2.30 GHz)

SPECfp2006 = 100
SPECfp_base2006 = 94.8

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

Test date: May-2015
Hardware Availability: Jan-2015
Software Availability: Sep-2014

Platform Notes (Continued)

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,1,0"
LD_LIBRARY_PATH = "/home/SPEC/libs/32:/home/SPEC/libs/64:/home/SPEC/sh"
OMP_NUM_THREADS = "12"

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
  465.tonto: -DSPEC_CPU_LP64

Continued on next page
Lenovo Group Limited

<table>
<thead>
<tr>
<th>Lenovo System x3500 M5</th>
<th>SPECfp2006 = 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intel Xeon E5-2620 v3, 2.30 GHz)</td>
<td>SPECfp_base2006 = 94.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2006 license: 9017</th>
<th>Test date: May-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor: Lenovo Group Limited</td>
<td>Hardware Availability: Jan-2015</td>
</tr>
<tr>
<td>Tested by: Lenovo Group Limited</td>
<td>Software Availability: Sep-2014</td>
</tr>
</tbody>
</table>

Base Portability Flags (Continued)

- 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

Peak Optimization Flags

C benchmarks:

Continued on next page
Lenovo Group Limited

Lenovo System x3500 M5
(Intel Xeon E5-2620 v3, 2.30 GHz)

SPECfp2006 = 100
SPECfp_base2006 = 94.8

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

Test date: May-2015
Hardware Availability: Jan-2015
Software Availability: Sep-2014

Peak Optimization Flags (Continued)

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

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

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

Continued on next page
Lenovo Group Limited

Lenovo System x3500 M5
(Intel Xeon E5-2620 v3, 2.30 GHz)

**SPECfp2006 = 100**

**SPECfp_base2006 = 94.8**

<table>
<thead>
<tr>
<th>CPU2006 license: 9017</th>
<th>Test date: May-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor: Lenovo Group Limited</td>
<td>Hardware Availability: Jan-2015</td>
</tr>
<tr>
<td>Tested by: Lenovo Group Limited</td>
<td>Software Availability: Sep-2014</td>
</tr>
</tbody>
</table>

---

### Peak Optimization Flags (Continued)

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-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.
Originally published on 14 July 2015.