Lenovo Group Limited

Lenovo System x3650 M5
(Intel Xeon E5-2620 v3, 2.40 GHz)

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

SPECfp®2006 = 99.6
SPECfp_base2006 = 94.4

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECfp2006</th>
<th>SPECfp_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>bwaves</td>
<td>40.9</td>
<td></td>
</tr>
<tr>
<td>gamess</td>
<td>33.2</td>
<td></td>
</tr>
<tr>
<td>milc</td>
<td>67.7</td>
<td></td>
</tr>
<tr>
<td>zeusmp</td>
<td></td>
<td>175</td>
</tr>
<tr>
<td>gromacs</td>
<td>40.2</td>
<td></td>
</tr>
<tr>
<td>cactusADM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>leslie3d</td>
<td></td>
<td>236</td>
</tr>
<tr>
<td>namd</td>
<td>27.8</td>
<td>27.1</td>
</tr>
<tr>
<td>dealII</td>
<td>53.2</td>
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<tr>
<td>soplex</td>
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<tr>
<td>povray</td>
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</tr>
<tr>
<td>calculix</td>
<td>55.6</td>
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<td>GemsFDTD</td>
<td></td>
<td>233</td>
</tr>
<tr>
<td>onto</td>
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<tr>
<td>lbm</td>
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<td></td>
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<tr>
<td>wrf</td>
<td>69.0</td>
<td>68.3</td>
</tr>
<tr>
<td>sphinx3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**
- CPU Name: Intel Xeon E5-2620 v3
- CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz
- CPU MHz: 2400
- FPU: Integrated
- CPU(s) enabled: 12 cores, 2 chips, 6 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

**Software**
- Operating System: Red Hat Enterprise Linux Server release 7.0 (Maipo) 3.10.0-123.el7.x86_64
- 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

Continued on next page
**Lenovo Group Limited**  
*Lenovo System x3650 M5  (Intel Xeon E5-2620 v3, 2.40 GHz)*

**CPU2006 license:** 9017  
**Test sponsor:** Lenovo Group Limited  
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<table>
<thead>
<tr>
<th>L3 Cache:</th>
<th>15 MB I+D on chip per chip</th>
<th>System State:</th>
<th>Run level 3 (multi-user)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Cache:</td>
<td>None</td>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Memory:</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)</td>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
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<tr>
<td>Disk Subsystem:</td>
<td>1 x 300 GB SAS, 10000 RPM</td>
<td>Other Software:</td>
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<td>Other Hardware:</td>
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### Results Table

<table>
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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>410.bwaves</td>
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<td>24.0</td>
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<td>68.4</td>
<td>283</td>
<td>68.8</td>
<td>282</td>
<td>69.1</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 x3650m5 Wed Feb 25 05:08:26 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

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**Lenovo Group Limited**

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**CPU2006 license:** 9017

**Test sponsor:** Lenovo Group Limited

**Tested by:** Lenovo Group Limited

**Test date:** Feb-2015

**Hardware Availability:** Oct-2014

**Software Availability:** Sep-2014

---

**Platform Notes (Continued)**

From `/proc/cpuinfo`

- 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`

- MemTotal: 263453772 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:** /home/SPEC

**Filesystem**

<table>
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<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/rhel-home</td>
<td>xfs</td>
<td>877G</td>
<td>6.8G</td>
<td>870G</td>
<td>1%</td>
<td>/home</td>
</tr>
</tbody>
</table>

**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 484D4134324752374D4652344E2D54465431 16 GB 2 rank 2133 MHz, configured at 1866 MHz

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Test date: Feb-2015
Hardware Availability: Oct-2014
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

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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

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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 -03 -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

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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/IBM-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/IBM-Platform-Flags-V1.2-HSW-B.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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