Lenovo Group Limited

Lenovo System x3550 M5
(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp®2006 = 71.2
SPECfp_base2006 = 69.3

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

CPU Name: Intel Xeon E5-2603 v4
CPU Characteristics:
CPU MHz: 1700
FPU: Integrated
CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip
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: SUSE Linux Enterprise Server 12 SP1 (x86_64)
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
Auto Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Lenovo Group Limited

Lenovo System x3550 M5
(1.70 GHz, Intel Xeon E5-2603 v4)

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 PC4-2400T-R, running at 1866 MHz)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None
L3 Cache: 15 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 1866 MHz)
Disk Subsystem: 1 x 800 GB SATA SSD
Other Hardware: None

SPEC CFP2006 Result

SPECFp2006 = 71.2
SPECFp_base2006 = 69.3

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>33.6</td>
<td>404</td>
<td>32.8</td>
<td>415</td>
<td>32.5</td>
<td>419</td>
<td>33.6</td>
<td>404</td>
<td>32.8</td>
<td>415</td>
<td>32.5</td>
<td>419</td>
</tr>
<tr>
<td>416.gamess</td>
<td>928</td>
<td>21.1</td>
<td>927</td>
<td>21.1</td>
<td>930</td>
<td>21.0</td>
<td>880</td>
<td>22.2</td>
<td>879</td>
<td>22.3</td>
<td>876</td>
<td>22.4</td>
</tr>
<tr>
<td>433.milc</td>
<td>192</td>
<td>47.8</td>
<td>193</td>
<td>47.5</td>
<td>192</td>
<td>47.9</td>
<td>192</td>
<td>47.8</td>
<td>193</td>
<td>47.5</td>
<td>192</td>
<td>47.9</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>65.0</td>
<td>140</td>
<td>65.3</td>
<td>139</td>
<td>65.2</td>
<td>140</td>
<td>65.0</td>
<td>140</td>
<td>65.3</td>
<td>139</td>
<td>65.2</td>
<td>140</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>227</td>
<td>31.4</td>
<td>232</td>
<td>30.7</td>
<td>228</td>
<td>31.4</td>
<td>227</td>
<td>31.4</td>
<td>232</td>
<td>30.7</td>
<td>228</td>
<td>31.4</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>25.2</td>
<td>474</td>
<td>25.2</td>
<td>474</td>
<td>25.3</td>
<td>473</td>
<td>25.2</td>
<td>474</td>
<td>25.2</td>
<td>474</td>
<td>25.3</td>
<td>473</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>51.0</td>
<td>184</td>
<td>51.2</td>
<td>183</td>
<td>51.0</td>
<td>184</td>
<td>51.0</td>
<td>184</td>
<td>51.2</td>
<td>183</td>
<td>51.0</td>
<td>184</td>
</tr>
<tr>
<td>444.namd</td>
<td>535</td>
<td>15.0</td>
<td>535</td>
<td>15.0</td>
<td>535</td>
<td>15.0</td>
<td>519</td>
<td>15.5</td>
<td>519</td>
<td>15.5</td>
<td>520</td>
<td>15.4</td>
</tr>
<tr>
<td>447.dealII</td>
<td>325</td>
<td>35.2</td>
<td>326</td>
<td>35.1</td>
<td>325</td>
<td>35.2</td>
<td>325</td>
<td>35.2</td>
<td>326</td>
<td>35.1</td>
<td>325</td>
<td>35.2</td>
</tr>
<tr>
<td>450.soplex</td>
<td>307</td>
<td>27.2</td>
<td>307</td>
<td>27.2</td>
<td>306</td>
<td>27.2</td>
<td>307</td>
<td>27.2</td>
<td>307</td>
<td>27.2</td>
<td>306</td>
<td>27.2</td>
</tr>
<tr>
<td>453.povray</td>
<td>175</td>
<td>30.4</td>
<td>175</td>
<td>30.4</td>
<td>175</td>
<td>30.4</td>
<td>155</td>
<td>34.4</td>
<td>155</td>
<td>34.3</td>
<td>155</td>
<td>34.3</td>
</tr>
<tr>
<td>454.calculix</td>
<td>258</td>
<td>32.0</td>
<td>258</td>
<td>32.0</td>
<td>258</td>
<td>32.0</td>
<td>253</td>
<td>32.6</td>
<td>253</td>
<td>32.6</td>
<td>253</td>
<td>32.6</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>62.2</td>
<td>171</td>
<td>62.3</td>
<td>170</td>
<td>62.8</td>
<td>169</td>
<td>54.0</td>
<td>196</td>
<td>53.8</td>
<td>197</td>
<td>54.0</td>
<td>196</td>
</tr>
<tr>
<td>465.tonto</td>
<td>363</td>
<td>27.1</td>
<td>364</td>
<td>27.1</td>
<td>363</td>
<td>27.1</td>
<td>332</td>
<td>29.7</td>
<td>332</td>
<td>29.6</td>
<td>332</td>
<td>29.6</td>
</tr>
<tr>
<td>470.lbm</td>
<td>23.2</td>
<td>593</td>
<td>23.0</td>
<td>596</td>
<td>23.1</td>
<td>594</td>
<td>23.2</td>
<td>593</td>
<td>23.0</td>
<td>596</td>
<td>23.1</td>
<td>594</td>
</tr>
<tr>
<td>481.wrf</td>
<td>168</td>
<td>66.4</td>
<td>167</td>
<td>66.7</td>
<td>170</td>
<td>65.6</td>
<td>168</td>
<td>66.4</td>
<td>167</td>
<td>66.7</td>
<td>170</td>
<td>65.6</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>402</td>
<td>48.5</td>
<td>402</td>
<td>48.5</td>
<td>402</td>
<td>48.5</td>
<td>402</td>
<td>48.5</td>
<td>402</td>
<td>48.5</td>
<td>402</td>
<td>48.5</td>
</tr>
</tbody>
</table>

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"

Platform Notes

BIOS Configuration:
Operating Mode set to Maximum Performance
Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1 running on DaAn-02 Fri Jun 10 10:45:20 2016

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
Lenovo Group Limited

Lenovo System x3550 M5
(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 =  71.2
SPECfp_base2006 =  69.3

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

Test date: Jun-2016
Hardware Availability: Mar-2016
Software Availability: Dec-2015

Platform Notes (Continued)

From /proc/cpuinfo
  model name : Intel(R) Xeon(R) CPU E5-2603 v4@ 1.70GHz
  2 "physical id"s (chips)
  12 "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 : 6
    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:       263830720 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-02 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 Jun 10 01:36

  SPEC is set to: /home/cpu2006-1.2-ic16.0
    Filesystem  Type  Size  Used Avail Use% Mounted on
    /dev/sda4  xfs  688G  28G  661G   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.

Continued on next page
Lenovo Group Limited

Lenovo System x3550 M5
(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 = 71.2
SPECfp_base2006 = 69.3

CPU2006 license: 9017
Test sponsor: Lenovo Group Limited
Tested by: Lenovo Group Limited
Test date: Jun-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, configured at 1867 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 = "12"

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.gamest: -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

Continued on next page
**Lenovo Group Limited**

**Lenovo System x3550 M5**

(1.70 GHz, Intel Xeon E5-2603 v4)

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
<th>9017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sponsor:</td>
<td>Lenovo Group Limited</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Group Limited</td>
</tr>
</tbody>
</table>

**SPEC CFP2006 Result**

<table>
<thead>
<tr>
<th>SPECfp2006 =</th>
<th>71.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECfp_base2006 =</td>
<td>69.3</td>
</tr>
</tbody>
</table>

**Base Portability Flags (Continued)**

- 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
Lenovo System x3550 M5
(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 = 71.2
SPECfp_base2006 = 69.3

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

Test date: Jun-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-llp32

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
Lenovo Group Limited

Lenovo System x3550 M5
(1.70 GHz, Intel Xeon E5-2603 v4)

SPECfp2006 = 71.2
SPECfp_base2006 = 69.3

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

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 28 June 2016.