Lenovo Group Limited

Lenovo NeXtScale nx360 M5
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp®2006 = 118
SPECfp_base2006 = 111

| Test sponsor: | Lenovo Group Limited |
| Test date: | Apr-2016 |
| Hardware Availability: | Mar-2016 |
| Software Availability: | Dec-2015 |

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>410.bwaves</td>
<td>41.9</td>
</tr>
<tr>
<td>416.gamess</td>
<td>32.5</td>
</tr>
<tr>
<td>433.milc</td>
<td>71.5</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>197</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>43.7</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>893</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>328</td>
</tr>
<tr>
<td>444.namd</td>
<td>29.1</td>
</tr>
<tr>
<td>447.dealII</td>
<td>62.7</td>
</tr>
<tr>
<td>450.soplex</td>
<td>47.3</td>
</tr>
<tr>
<td>453.povray</td>
<td>64.4</td>
</tr>
<tr>
<td>454.calculix</td>
<td>56.8</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>51.1</td>
</tr>
<tr>
<td>465.tonto</td>
<td>54.0</td>
</tr>
<tr>
<td>470.lbm</td>
<td>38.5</td>
</tr>
<tr>
<td>481.wrf</td>
<td>113</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>65.8</td>
</tr>
</tbody>
</table>

| SPECfp®2006 = 118 | SPECfp_base2006 = 111 |

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-2660 v4</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>2000</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>28 cores, 2 chips, 14 cores/chip</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>
<tr>
<td>Operating System:</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64)</td>
</tr>
<tr>
<td>Compiler:</td>
<td>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</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
</tbody>
</table>

Continued on next page
## Lenovo Group Limited

**Lenovo NeXtScale nx360 M5**

(2.00 GHz, Intel Xeon E5-2660 v4)

**SPEC CFP2006 Result**

<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>21.6</td>
<td>630</td>
<td>21.4</td>
<td>634</td>
<td>21.6</td>
<td>629</td>
<td>21.6</td>
<td>630</td>
<td>21.4</td>
<td>634</td>
<td>21.6</td>
<td>629</td>
</tr>
<tr>
<td>416.gamess</td>
<td>602</td>
<td>32.5</td>
<td>602</td>
<td>32.5</td>
<td>602</td>
<td>32.5</td>
<td>468</td>
<td>41.8</td>
<td>467</td>
<td>41.9</td>
<td>468</td>
<td>41.9</td>
</tr>
<tr>
<td>433.milc</td>
<td>128</td>
<td>71.8</td>
<td>128</td>
<td>71.5</td>
<td>129</td>
<td>71.4</td>
<td>128</td>
<td>71.8</td>
<td>128</td>
<td>71.5</td>
<td>129</td>
<td>71.4</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>46.4</td>
<td>196</td>
<td>46.2</td>
<td>197</td>
<td>46.0</td>
<td>198</td>
<td>46.4</td>
<td>196</td>
<td>46.2</td>
<td>197</td>
<td>46.0</td>
<td>198</td>
</tr>
<tr>
<td>435.gromacs</td>
<td>164</td>
<td>43.7</td>
<td>164</td>
<td>43.7</td>
<td>166</td>
<td>42.9</td>
<td>164</td>
<td>43.7</td>
<td>164</td>
<td>43.7</td>
<td>166</td>
<td>42.9</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>13.4</td>
<td>893</td>
<td>13.5</td>
<td>884</td>
<td>13.3</td>
<td>900</td>
<td>13.4</td>
<td>893</td>
<td>13.5</td>
<td>884</td>
<td>13.3</td>
<td>900</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>28.7</td>
<td>328</td>
<td>28.2</td>
<td>333</td>
<td>29.3</td>
<td>321</td>
<td>28.7</td>
<td>328</td>
<td>28.2</td>
<td>333</td>
<td>29.3</td>
<td>321</td>
</tr>
<tr>
<td>444.namd</td>
<td>284</td>
<td>28.2</td>
<td>284</td>
<td>28.2</td>
<td>284</td>
<td>28.2</td>
<td>276</td>
<td>29.1</td>
<td>276</td>
<td>29.1</td>
<td>276</td>
<td>29.1</td>
</tr>
<tr>
<td>447.dealII</td>
<td>184</td>
<td>62.3</td>
<td>182</td>
<td>62.7</td>
<td>182</td>
<td>62.9</td>
<td>184</td>
<td>62.3</td>
<td>182</td>
<td>62.7</td>
<td>182</td>
<td>62.9</td>
</tr>
<tr>
<td>450.soplex</td>
<td>176</td>
<td>47.4</td>
<td>177</td>
<td>47.1</td>
<td>176</td>
<td>47.3</td>
<td>176</td>
<td>47.4</td>
<td>177</td>
<td>47.1</td>
<td>176</td>
<td>47.3</td>
</tr>
<tr>
<td>453.povray</td>
<td>93.6</td>
<td>56.8</td>
<td>93.9</td>
<td>56.7</td>
<td>93.7</td>
<td>56.8</td>
<td>83.2</td>
<td>63.9</td>
<td>82.6</td>
<td>64.4</td>
<td>82.5</td>
<td>64.5</td>
</tr>
<tr>
<td>454.calculix</td>
<td>161</td>
<td>51.1</td>
<td>161</td>
<td>51.1</td>
<td>161</td>
<td>51.1</td>
<td>142</td>
<td>57.9</td>
<td>143</td>
<td>57.8</td>
<td>144</td>
<td>57.4</td>
</tr>
<tr>
<td>459.GemsFDTD</td>
<td>44.3</td>
<td>240</td>
<td>45.7</td>
<td>232</td>
<td>44.3</td>
<td>240</td>
<td>37.8</td>
<td>280</td>
<td>37.7</td>
<td>281</td>
<td>37.7</td>
<td>282</td>
</tr>
<tr>
<td>465.tonto</td>
<td>255</td>
<td>38.5</td>
<td>255</td>
<td>38.6</td>
<td>260</td>
<td>37.8</td>
<td>182</td>
<td>54.0</td>
<td>183</td>
<td>53.8</td>
<td>182</td>
<td>54.2</td>
</tr>
<tr>
<td>470.lbm</td>
<td>14.9</td>
<td>920</td>
<td>15.0</td>
<td>919</td>
<td>15.0</td>
<td>919</td>
<td>14.9</td>
<td>920</td>
<td>15.0</td>
<td>919</td>
<td>15.0</td>
<td>919</td>
</tr>
<tr>
<td>481.wrf</td>
<td>99.1</td>
<td>113</td>
<td>98.7</td>
<td>113</td>
<td>99.2</td>
<td>113</td>
<td>99.1</td>
<td>113</td>
<td>98.7</td>
<td>113</td>
<td>99.2</td>
<td>113</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>296</td>
<td>65.8</td>
<td>297</td>
<td>65.6</td>
<td>296</td>
<td>65.9</td>
<td>296</td>
<td>65.8</td>
<td>297</td>
<td>65.5</td>
<td>296</td>
<td>65.9</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 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 $$ e3fbb8667b5a285932ceab81e28219e1
running on NX360 Mon Apr 18 16:40:22 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
Platform Notes (Continued)

From /proc/cpuinfo

- model name : Intel(R) Xeon(R) CPU E5-2660 v4@ 2.00GHz
- 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: 263966416 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 NX360 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 Apr 18 11:20

SPEC is set to: /home/cpu2006-1.2-ic16.0

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 690G 4.1G 686G 1% /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 NeXtScale nx360 M5
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp2006 = 118
SPECfp_base2006 = 111

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)

BIOS IBM -[THE123G-2.10]- 03/24/2016
Memory: 16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz

(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

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

Continued on next page
Lenovo Group Limited
Lenovo NeXtScale nx360 M5
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp2006 = 118
SPECfp_base2006 = 111

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

**Base Portability Flags (Continued)**

- 454.calculix: \(-\text{DSPEC\_CPU\_LP64}\) \(-\text{nofor\_main}\)
- 459.GemsFDTD: \(-\text{DSPEC\_CPU\_LP64}\)
- 465.tonto: \(-\text{DSPEC\_CPU\_LP64}\)
- 470.lbm: \(-\text{DSPEC\_CPU\_LP64}\)
- 481.wrf: \(-\text{DSPEC\_CPU\_LP64}\) \(-\text{DSPEC\_CPU\_CASE\_FLAG}\) \(-\text{DSPEC\_CPU\_LINUX}\)
- 482.sphinx3: \(-\text{DSPEC\_CPU\_LP64}\)

**Base Optimization Flags**

C benchmarks:
- \(-\text{xCORE-AVX2}\) \(-\text{ipo}\) \(-\text{-O3}\) \(-\text{-no-prec-div}\) \(-\text{-parallel}\) \(-\text{-opt-prefetch}\)
- \(-\text{-ansi-alias}\)

C++ benchmarks:
- \(-\text{xCORE-AVX2}\) \(-\text{ipo}\) \(-\text{-O3}\) \(-\text{-no-prec-div}\) \(-\text{-opt-prefetch}\) \(-\text{-ansi-alias}\)

Fortran benchmarks:
- \(-\text{xCORE-AVX2}\) \(-\text{ipo}\) \(-\text{-O3}\) \(-\text{-no-prec-div}\) \(-\text{-parallel}\) \(-\text{-opt-prefetch}\)

Benchmarks using both Fortran and C:
- \(-\text{xCORE-AVX2}\) \(-\text{ipo}\) \(-\text{-O3}\) \(-\text{-no-prec-div}\) \(-\text{-parallel}\) \(-\text{-opt-prefetch}\)
- \(-\text{-ansi-alias}\)

**Peak Compiler Invocation**

C benchmarks:
- \text{icc} \ -m64

C++ benchmarks:
- \text{icpc} \ -m64

Fortran benchmarks:
- \text{ifort} \ -m64

Benchmarks using both Fortran and C:
- \text{icc} \ -m64 \text{ifort} \ -m64

**Peak Portability Flags**

Same as Base Portability Flags
Lenovo Group Limited
Lenovo NeXtScale nx360 M5
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp2006 = 118
SPECfp_base2006 = 111

CPU2006 license: 9017
Test date: Apr-2016
Test sponsor: Lenovo Group Limited
Hardware Availability: Mar-2016
Tested by: Lenovo Group Limited
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-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
Lenovo Group Limited

Lenovo NeXtScale nx360 M5
(2.00 GHz, Intel Xeon E5-2660 v4)

SPECfp2006 = 118
SPECfp_base2006 = 111

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

Peak Optimization Flags (Continued)

435.gromacs: basepeak = yes
436.cactusADM: basepeak = yes
454.calculix: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-lp32 -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

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 Tue May 17 16:52:03 2016 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 17 May 2016.