**Lenovo Group Limited**

Lenovo NeXtScale nx360 M5
(2.20 GHz, Intel Xeon E5-2630 v4)

**CPU2006 license:** 9017
**Test sponsor:** Lenovo Group Limited
**Test date:** Apr-2016

**Tested by:** Lenovo Group Limited
**Hardware Availability:** Mar-2016
**Software Availability:** Dec-2015

**SPECfp®2006 = 113**

**SPECfp_base2006 = 106**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Score</th>
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<tbody>
<tr>
<td>410.bwaves</td>
<td>545</td>
</tr>
<tr>
<td>416.gamess</td>
<td>530</td>
</tr>
<tr>
<td>433.milc</td>
<td>510</td>
</tr>
<tr>
<td>434.zeusmp</td>
<td>505</td>
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<tr>
<td>435.gromacs</td>
<td>500</td>
</tr>
<tr>
<td>436.cactusADM</td>
<td>495</td>
</tr>
<tr>
<td>437.leslie3d</td>
<td>490</td>
</tr>
<tr>
<td>444.namd</td>
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<td>447.dealII</td>
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<td>465.tonto</td>
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<td>470.lbm</td>
<td>450</td>
</tr>
<tr>
<td>481.wrf</td>
<td>445</td>
</tr>
<tr>
<td>482.sphinx3</td>
<td>440</td>
</tr>
</tbody>
</table>

**Hardware**
- **CPU Name:** Intel Xeon E5-2630 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.10 GHz
- **CPU MHz:** 2200
- **FPU:** Integrated
- **CPU(s) enabled:** 20 cores, 2 chips, 10 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

**Software**
- **Operating System:** SUSE Linux Enterprise Server 12 SP1 (x86_64)
  Kernel 3.12.49-11-default
- **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)

Continued on next page
## Lenovo Group Limited

**Lenovo NeXtScale nx360 M5**

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<table>
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</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Group Limited</td>
</tr>
</tbody>
</table>

| L3 Cache:        | 25 MB I+D on chip per chip |
| Other Cache:     | None |
| Memory:          | 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 2133 MHz) |
| Disk Subsystem:  | 1 x 800 GB SATA SSD |
| Other Hardware:  | None |

| Base Pointers:   | 64-bit |
| Peak Pointers:   | 32/64-bit |

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>67.4</td>
<td>290</td>
<td>67.3</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"
- Transparent Huge Pages disabled with:
  - echo never > /sys/kernel/mm/transparent_hugepage/enable

### 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 Fri Apr 8 14:12:47 2016
- Continued on next page
Platform Notes (Continued)

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

From /proc/cpuinfo
model name: Intel(R) Xeon(R) CPU E5-2630 v4 @ 2.20GHz
  2 "physical id"s (chips)
  20 "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: 10
siblings: 10
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size: 25600 KB

From /proc/meminfo
MemTotal: 263967248 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 8 08:45

SPEC is set to: /home/cpu2006-1.2-ic16.0
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 690G 4.0G 686G 1% /home
Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program
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Platform Notes (Continued)

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 -[THE123G-2.10]- 03/24/2016
Memory:
16x Hynix HMA42GR7AFR4N- UH 16 GB 2 rank 2400 MHz, configured at 2133 MHz

(Gen 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-icl6.0/libs/32:/home/cpu2006-1.2-icl6.0/libs/64:/home/cpu2006-1.2-icl6.0/sh"
OMP_NUM_THREADS = "20"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
memory using RedHat EL 7.1

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

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Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
Lenovo Group Limited
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Base Portability Flags (Continued)

453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64
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 NeXtScale nx360 M5
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SPECfp2006 = 113
SPECfp_base2006 = 106

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:
Lenovo Group Limited

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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-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-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

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For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.