



# SPEC® CFP2006 Result

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## Lenovo Group Limited

SPECfp®2006 = **126**

Lenovo NeXtScale nx360 M5  
(2.30 GHz, Intel Xeon E5-2697 v4)

SPECfp\_base2006 = **119**

CPU2006 license: 9017

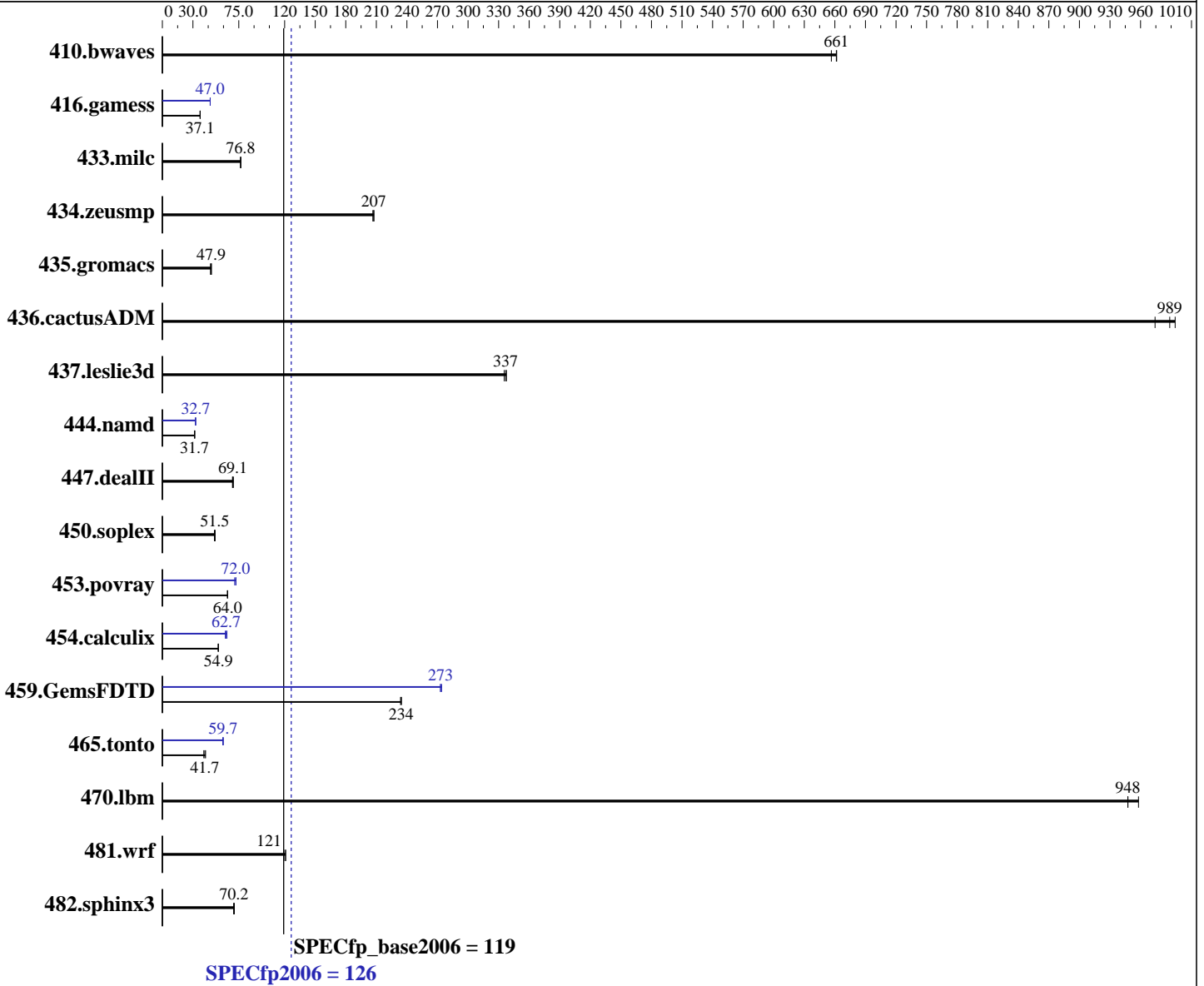
Test date: Jun-2016

Test sponsor: Lenovo Group Limited

Hardware Availability: Mar-2016

Tested by: Lenovo Group Limited

Software Availability: Dec-2015



**Hardware**

CPU Name: Intel Xeon E5-2697 v4  
CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz  
CPU MHz: 2300  
FPU: Integrated  
CPU(s) enabled: 36 cores, 2 chips, 18 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

*Continued on next page*

**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)

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L3 Cache: 45 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)  
Disk Subsystem: 1 x 800 GB SATA SSD  
Other Hardware: None

Base Pointers: 64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	20.7	657	<b>20.5</b>	<b>661</b>	20.5	662	20.7	657	<b>20.5</b>	<b>661</b>	20.5	662
416.gamess	527	37.1	<b>528</b>	<b>37.1</b>	529	37.0	<b>417</b>	<b>47.0</b>	417	47.0	417	46.9
433.milc	120	76.8	119	77.0	<b>120</b>	<b>76.8</b>	120	76.8	119	77.0	<b>120</b>	<b>76.8</b>
434.zeusmp	44.1	207	43.8	208	<b>43.9</b>	<b>207</b>	44.1	207	43.8	208	<b>43.9</b>	<b>207</b>
435.gromacs	151	47.2	<b>149</b>	<b>47.9</b>	148	48.1	151	47.2	<b>149</b>	<b>47.9</b>	148	48.1
436.cactusADM	<b>12.1</b>	<b>989</b>	12.0	994	12.3	974	<b>12.1</b>	<b>989</b>	12.0	994	12.3	974
437.leslie3d	<b>27.9</b>	<b>337</b>	28.0	336	27.8	338	<b>27.9</b>	<b>337</b>	28.0	336	27.8	338
444.namd	253	31.7	<b>253</b>	<b>31.7</b>	253	31.7	247	32.5	245	32.7	<b>246</b>	<b>32.7</b>
447.dealII	166	68.8	164	69.7	<b>166</b>	<b>69.1</b>	166	68.8	164	69.7	<b>166</b>	<b>69.1</b>
450.soplex	163	51.1	<b>162</b>	<b>51.5</b>	161	51.7	163	51.1	<b>162</b>	<b>51.5</b>	161	51.7
453.povray	<b>83.2</b>	<b>64.0</b>	83.1	64.0	83.2	63.9	73.6	72.3	75.0	71.0	<b>73.9</b>	<b>72.0</b>
454.calculix	150	54.9	150	54.9	<b>150</b>	<b>54.9</b>	<b>132</b>	<b>62.7</b>	134	61.7	130	63.4
459.GemsFDTD	45.2	235	<b>45.3</b>	<b>234</b>	45.4	234	38.7	274	<b>38.9</b>	<b>273</b>	38.9	273
465.tonto	<b>236</b>	<b>41.7</b>	232	42.4	242	40.7	166	59.3	<b>165</b>	<b>59.7</b>	165	59.8
470.lbm	14.5	948	14.3	958	<b>14.5</b>	<b>948</b>	14.5	948	14.3	958	<b>14.5</b>	<b>948</b>
481.wrf	<b>92.4</b>	<b>121</b>	93.7	119	92.3	121	<b>92.4</b>	<b>121</b>	93.7	119	92.3	121
482.sphinx3	<b>278</b>	<b>70.2</b>	276	70.7	279	70.0	<b>278</b>	<b>70.2</b>	276	70.7	279	70.0

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

Sysinfo program /home/cpu2006-1.2-ic16.0/config/sysinfo.rev6914

\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1

running on NX360 Mon Jun 20 15:35:57 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>

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Software Availability: Dec-2015

### Platform Notes (Continued)

```

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-2697 v4 @ 2.30GHz
 2 "physical id"s (chips)
36 "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 : 18
  siblings  : 18
  physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 46080 KB

```

```

From /proc/meminfo
MemTotal:      263965104 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 Jun 20 10:50

```

SPEC is set to: /home/cpu2006-1.2-ic16.0
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4       xfs   690G  7.5G  683G  2% /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.

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## Platform Notes (Continued)

BIOS LENOVO -[THE124GUS-2.10]- 04/28/2016

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 = "36"

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

454.calculix: -DSPEC\_CPU\_LP64 -nofor\_main

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## Base Portability Flags (Continued)

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



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**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:

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## 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](mailto:webmaster@spec.org).

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