



# SPEC® CFP2006 Result

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## Lenovo Group Limited

Lenovo NeXtScale nx360 M5  
(2.20 GHz, Intel Xeon E5-2699R v4)

SPECfp®2006 = 127

SPECfp\_base2006 = 121

CPU2006 license: 9017

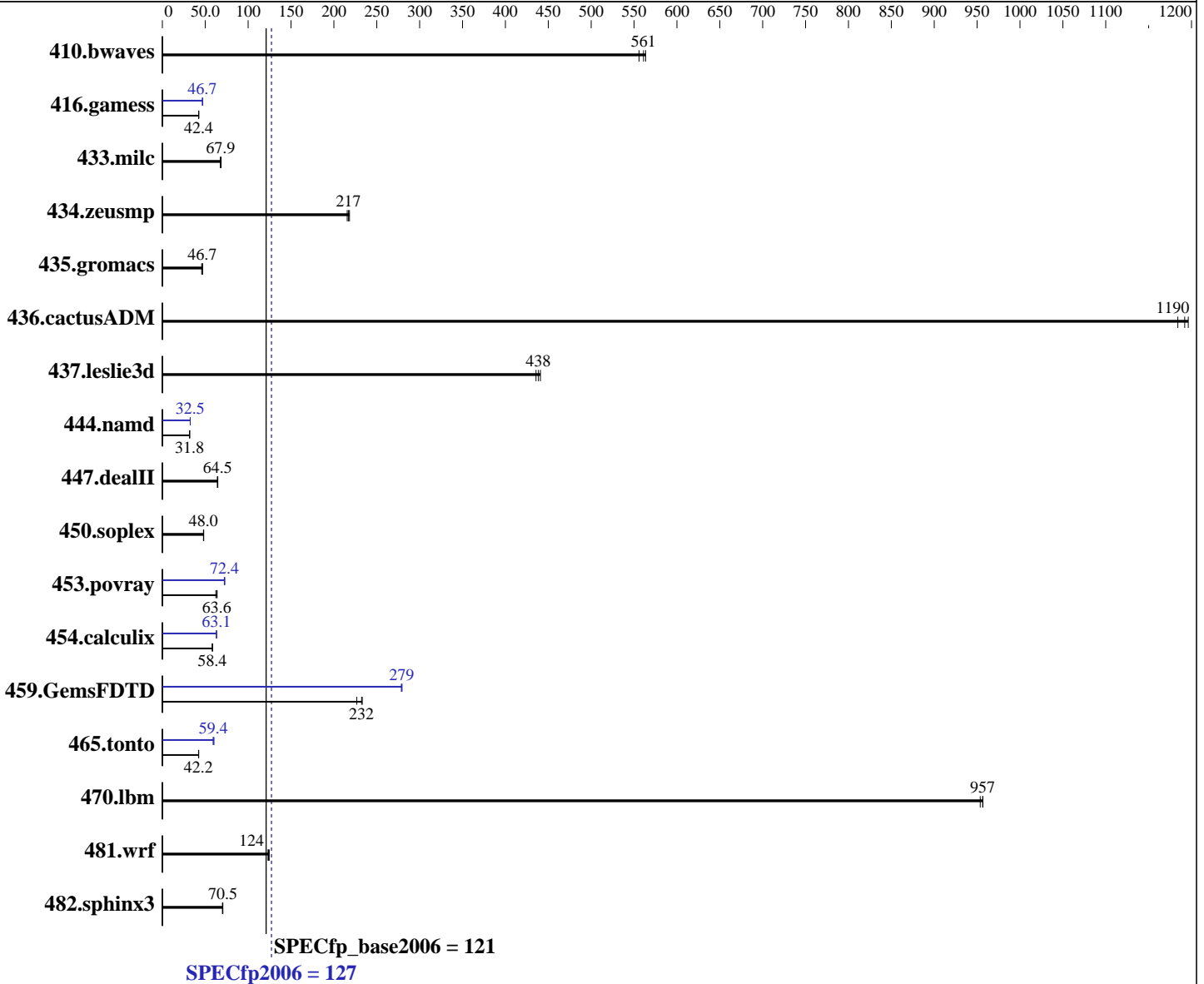
Test sponsor: Lenovo Group Limited

Tested by: Lenovo Group Limited

Test date: Dec-2016

Hardware Availability: Jan-2017

Software Availability: Sep-2016



### Hardware

CPU Name: Intel Xeon E5-2699R v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 44 cores, 2 chips, 22 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

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### Software

Operating System: SUSE Linux Enterprise Server 12 SP1 (x86\_64)  
 Kernel 3.12.49-11-default  
 Compiler: C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux  
 Auto Parallel: Yes  
 File System: btrfs  
 System State: Run level 3 (multi-user)

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L3 Cache: 55 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	24.4	556	<u>24.2</u>	<u>561</u>	24.1	564	24.4	556	<u>24.2</u>	<u>561</u>	24.1	564
416.gamess	<u>462</u>	<u>42.4</u>	462	42.4	462	42.4	<u>419</u>	<u>46.7</u>	417	47.0	419	46.7
433.milc	136	67.7	<u>135</u>	<u>67.9</u>	134	68.6	136	67.7	<u>135</u>	<u>67.9</u>	134	68.6
434.zeusmp	42.2	216	41.7	218	<u>42.0</u>	<u>217</u>	42.2	216	41.7	218	<u>42.0</u>	<u>217</u>
435.gromacs	152	46.8	156	45.8	<u>153</u>	<u>46.7</u>	152	46.8	156	45.8	<u>153</u>	<u>46.7</u>
436.cactusADM	<u>10.0</u>	<u>1190</u>	10.1	1180	9.99	1200	<u>10.0</u>	<u>1190</u>	10.1	1180	9.99	1200
437.leslie3d	21.6	436	21.3	441	<u>21.4</u>	<u>438</u>	21.6	436	21.3	441	<u>21.4</u>	<u>438</u>
444.namd	<u>252</u>	<u>31.8</u>	252	31.8	252	31.8	<u>247</u>	<u>32.5</u>	247	32.5	247	32.5
447.dealII	<u>177</u>	<u>64.5</u>	178	64.1	177	64.7	<u>177</u>	<u>64.5</u>	178	64.1	177	64.7
450.soplex	<u>174</u>	<u>48.0</u>	173	48.2	174	47.9	<u>174</u>	<u>48.0</u>	173	48.2	174	47.9
453.povray	83.4	63.8	85.4	62.3	<u>83.7</u>	<u>63.6</u>	73.7	72.2	73.0	72.9	<u>73.5</u>	<u>72.4</u>
454.calculix	141	58.3	<u>141</u>	<u>58.4</u>	141	58.4	131	63.1	131	63.1	<u>131</u>	<u>63.1</u>
459.GemsFDTD	<u>45.7</u>	<u>232</u>	45.5	233	46.8	227	<u>38.0</u>	<u>279</u>	38.1	279	38.0	279
465.tonto	<u>233</u>	<u>42.2</u>	232	42.4	233	42.2	163	60.2	166	59.3	<u>166</u>	<u>59.4</u>
470.lbm	<u>14.4</u>	<u>957</u>	14.4	954	14.4	957	<u>14.4</u>	<u>957</u>	14.4	954	14.4	957
481.wrf	89.7	125	90.7	123	<u>90.2</u>	<u>124</u>	89.7	125	90.7	123	<u>90.2</u>	<u>124</u>
482.sphinx3	276	70.5	<u>277</u>	<u>70.5</u>	278	70.0	276	70.5	<u>277</u>	<u>70.5</u>	278	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"  
Transparent Huge Pages disabled with:  
echo never > /sys/kernel/mm/transparent\_hugepage/enabled

## Platform Notes

BIOS configuration:  
Operating Mode set to Maximum Performance  
Hyper-Threading set to Disabled  
Snoop Preference set to Home Snoop  
Sysinfo program /home/cpu2006-1.2-ic17.0/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
running on nx360 Wed Dec 14 17:38:14 2016

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### 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 E5-2699R v4 @ 2.20GHz
 2 "physical id"s (chips)
 44 "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    : 22
  siblings     : 22
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
                28
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27
                28
cache size     : 56320 KB

```

```

From /proc/meminfo
MemTotal:      263963528 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 Dec 14 17:34

```

SPEC is set to: /home/cpu2006-1.2-ic17.0
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/sda2       btrfs    746G   32G  714G   5% /home
Additional information from dmidecode:

```

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## Platform Notes (Continued)

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 LENOVO -[THE126N-2.20]- 09/07/2016

Memory:

16x Samsung M393A2G40DB1-CRC 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-ic17.0/libs/32:/home/cpu2006-1.2-ic17.0/libs/64:/home/cpu2006-1.2-ic17.0/sh10.2"

OMP\_NUM\_THREADS = "44"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2

## 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

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## Base Portability Flags (Continued)

```

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
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 -qopt-prefetch

C++ benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

Fortran benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

Benchmarks using both Fortran and C:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch

## 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: Sep-2016

## Peak Optimization Flags

### C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

### C++ benchmarks:

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll4 -ansi-alias

### Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll2 -inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -unroll2 -inline-level=0  
-qopt-prefetch -parallel

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)  
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -inline-calloc -qopt-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

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-ic17.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-C.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-BDW-C.xml>

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Tested with SPEC CPU2006 v1.2.

Report generated on Tue Feb 7 17:00:49 2017 by SPEC CPU2006 PS/PDF formatter v6932.

Originally published on 7 February 2017.