



# SPEC® CFP2006 Result

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## Lenovo Group Limited

SPECfp®2006 = 117

Lenovo Flex System x240 M5  
(2.10 GHz, Intel Xeon E5-2695 v4)

SPECfp\_base2006 = 110

CPU2006 license: 9017

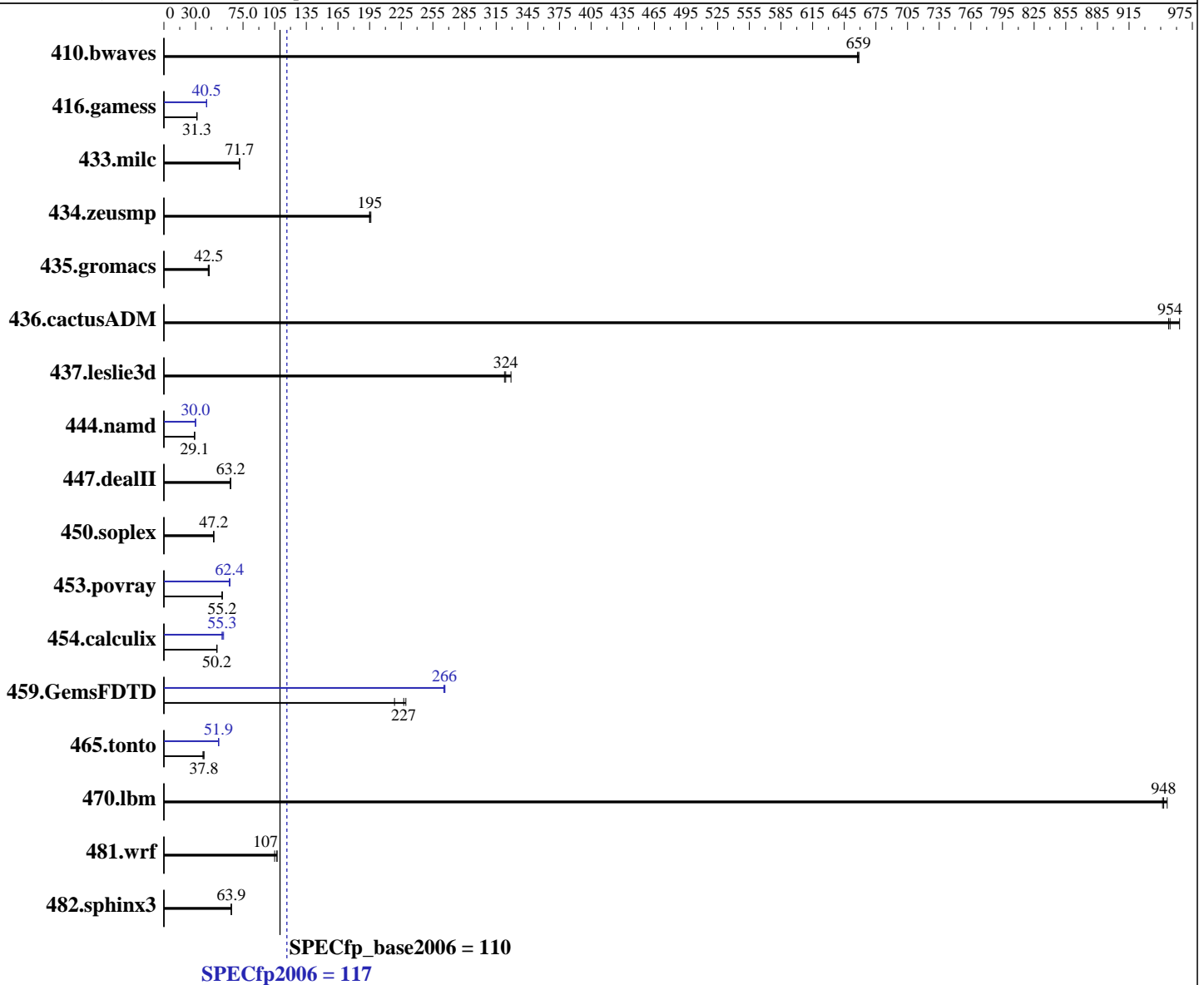
Test date: May-2016

Test sponsor: Lenovo Group Limited

Hardware Availability: Mar-2016

Tested by: Lenovo Group Limited

Software Availability: Dec-2015



### Hardware

CPU Name: Intel Xeon E5-2695 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2100  
 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)

Continued on next page



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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: 2 x 300 GB 10000 RPM SAS, RAID 0  
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	<b><u>20.6</u></b>	<b><u>659</u></b>	20.7	657	20.6	659	<b><u>20.6</u></b>	<b><u>659</u></b>	20.7	657	20.6	659
416.gamess	627	31.2	625	31.3	<b><u>625</u></b>	<b><u>31.3</u></b>	484	40.5	483	40.5	<b><u>484</u></b>	<b><u>40.5</u></b>
433.milc	128	71.5	128	71.8	<b><u>128</u></b>	<b><u>71.7</u></b>	128	71.5	128	71.8	<b><u>128</u></b>	<b><u>71.7</u></b>
434.zeusmp	46.7	195	46.4	196	<b><u>46.6</u></b>	<b><u>195</u></b>	46.7	195	46.4	196	<b><u>46.6</u></b>	<b><u>195</u></b>
435.gromacs	166	43.0	<b><u>168</u></b>	<b><u>42.5</u></b>	170	42.0	166	43.0	<b><u>168</u></b>	<b><u>42.5</u></b>	170	42.0
436.cactusADM	12.5	952	12.4	963	<b><u>12.5</u></b>	<b><u>954</u></b>	12.5	952	12.4	963	<b><u>12.5</u></b>	<b><u>954</u></b>
437.leslie3d	28.6	329	<b><u>29.0</u></b>	<b><u>324</u></b>	29.1	323	28.6	329	<b><u>29.0</u></b>	<b><u>324</u></b>	29.1	323
444.namd	276	29.1	<b><u>276</u></b>	<b><u>29.1</u></b>	276	29.1	<b><u>268</u></b>	<b><u>30.0</u></b>	268	30.0	268	29.9
447.dealII	181	63.3	182	63.0	<b><u>181</u></b>	<b><u>63.2</u></b>	181	63.3	182	63.0	<b><u>181</u></b>	<b><u>63.2</u></b>
450.soplex	176	47.3	177	47.2	<b><u>177</u></b>	<b><u>47.2</u></b>	176	47.3	177	47.2	<b><u>177</u></b>	<b><u>47.2</u></b>
453.povray	96.5	55.1	96.0	55.4	<b><u>96.4</u></b>	<b><u>55.2</u></b>	<b><u>85.3</u></b>	<b><u>62.4</u></b>	85.1	62.5	85.8	62.0
454.calculix	164	50.3	<b><u>164</u></b>	<b><u>50.2</u></b>	164	50.2	146	56.6	149	55.2	<b><u>149</u></b>	<b><u>55.3</u></b>
459.GemsFDTD	48.5	219	<b><u>46.7</u></b>	<b><u>227</u></b>	46.3	229	39.8	266	<b><u>39.9</u></b>	<b><u>266</u></b>	40.0	265
465.tonto	266	37.0	259	38.0	<b><u>261</u></b>	<b><u>37.8</u></b>	190	51.8	<b><u>190</u></b>	<b><u>51.9</u></b>	190	51.9
470.lbm	<b><u>14.5</u></b>	<b><u>948</u></b>	14.5	947	14.4	951	<b><u>14.5</u></b>	<b><u>948</u></b>	14.5	947	14.4	951
481.wrf	106	105	<b><u>104</u></b>	<b><u>107</u></b>	104	107	106	105	<b><u>104</u></b>	<b><u>107</u></b>	104	107
482.sphinx3	<b><u>305</u></b>	<b><u>63.9</u></b>	305	63.8	305	64.0	<b><u>305</u></b>	<b><u>63.9</u></b>	305	63.8	305	64.0

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

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 x240m5-cpu2006 Sun May 22 15:41:21 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

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Page 2



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### Platform Notes (Continued)

<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

From /proc/cpuinfo

```

model name      : Intel(R) Xeon(R) CPU E5-2695 v4 @ 2.10GHz
 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:      263827464 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 x240m5-cpu2006 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 May 22 10:29

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

```

Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/sda4        xfs       515G      7.1G  508G   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.

Continued on next page



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## Platform Notes (Continued)

BIOS LENOVO -[C4E123H-2.10]- 03/25/2016

Memory:

16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 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 = "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

Continued on next page

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Page 4



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## Base Portability Flags (Continued)

```

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 -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:

Continued on next page



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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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