



# SPEC® CFP2006 Result

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## Lenovo Group Limited

SPECfp®2006 = 119

Lenovo System x3550 M5  
(2.40 GHz, Intel Xeon E5-2640 v4)

SPECfp\_base2006 = 112

CPU2006 license: 9017

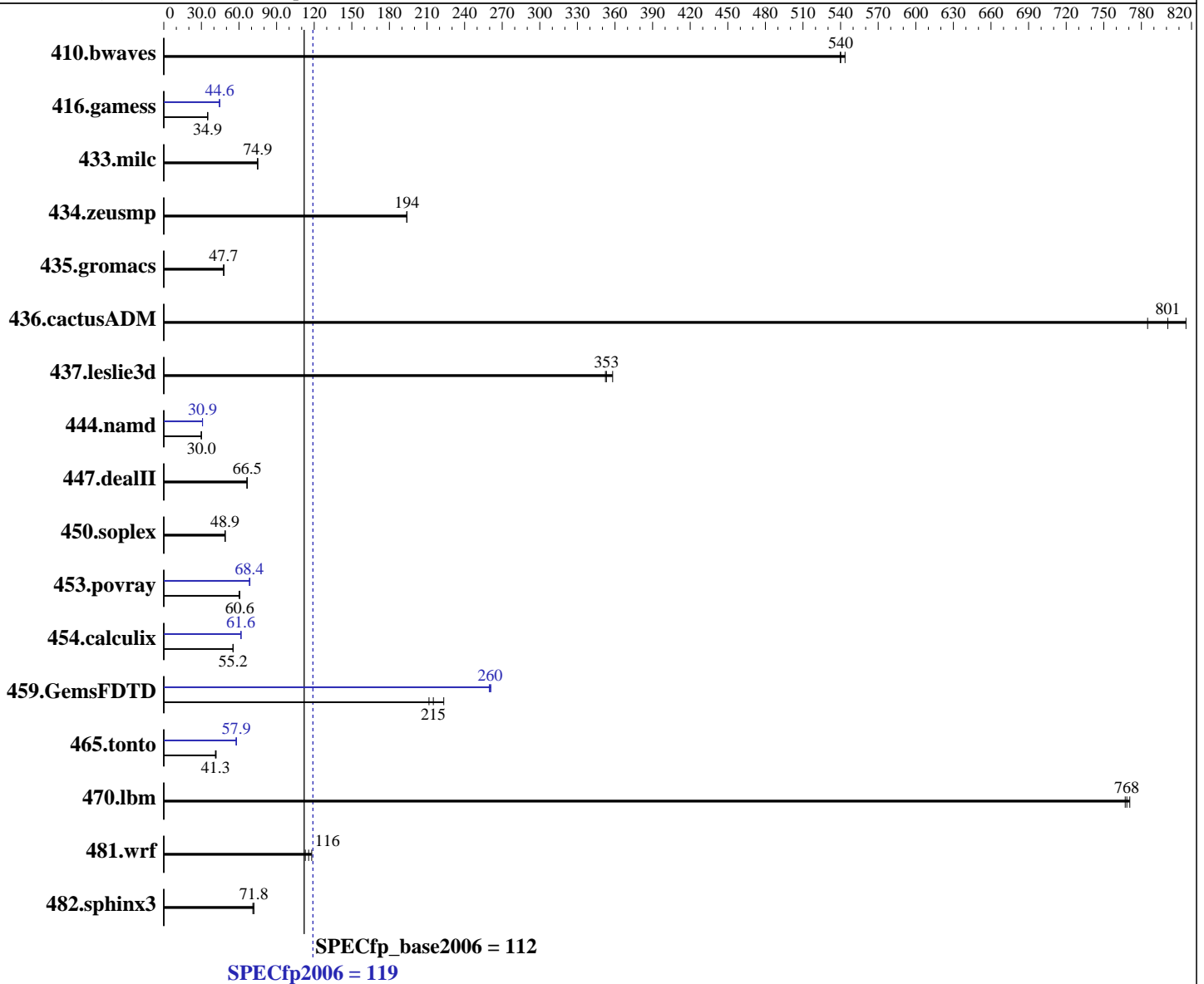
Test date: Jun-2016

Test sponsor: Lenovo Group Limited

Hardware Availability: Mar-2016

Tested by: Lenovo Group Limited

Software Availability: Dec-2015



### Hardware

CPU Name: Intel Xeon E5-2640 v4  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.40 GHz  
 CPU MHz: 2400  
 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

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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 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: 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  
Other Software: None

## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	<b>25.2</b>	<b>540</b>	25.2	540	25.0	544	<b>25.2</b>	<b>540</b>	25.2	540	25.0	544
416.gamess	558	35.1	<b>560</b>	<b>34.9</b>	560	34.9	<b>439</b>	<b>44.6</b>	439	44.6	441	44.3
433.milc	123	74.8	<b>123</b>	<b>74.9</b>	122	75.0	<b>123</b>	<b>74.8</b>	<b>123</b>	<b>74.9</b>	122	75.0
434.zeusmp	<b>46.9</b>	<b>194</b>	46.9	194	46.9	194	<b>46.9</b>	<b>194</b>	46.9	194	46.9	194
435.gromacs	149	48.0	<b>150</b>	<b>47.7</b>	150	47.7	<b>149</b>	<b>48.0</b>	<b>150</b>	<b>47.7</b>	150	47.7
436.cactusADM	15.2	785	<b>14.9</b>	<b>801</b>	14.7	816	15.2	785	<b>14.9</b>	<b>801</b>	14.7	816
437.leslie3d	26.2	358	<b>26.6</b>	<b>353</b>	26.7	352	26.2	358	<b>26.6</b>	<b>353</b>	26.7	352
444.namd	<b>268</b>	<b>30.0</b>	268	29.9	268	30.0	<b>260</b>	<b>30.9</b>	260	30.9	260	30.9
447.dealII	172	66.6	173	66.3	<b>172</b>	<b>66.5</b>	172	66.6	173	66.3	<b>172</b>	<b>66.5</b>
450.soplex	170	49.0	<b>171</b>	<b>48.9</b>	171	48.9	170	49.0	<b>171</b>	<b>48.9</b>	171	48.9
453.povray	<b>87.8</b>	<b>60.6</b>	88.6	60.0	87.7	60.7	<b>77.7</b>	<b>68.4</b>	77.9	68.3	77.4	68.7
454.calculix	149	55.4	<b>149</b>	<b>55.2</b>	149	55.2	134	61.6	134	61.5	<b>134</b>	<b>61.6</b>
459.GemsFDTD	47.5	223	50.1	212	<b>49.3</b>	<b>215</b>	<b>40.8</b>	<b>260</b>	40.7	261	40.9	260
465.tonto	<b>238</b>	<b>41.3</b>	238	41.3	236	41.8	<b>170</b>	<b>57.9</b>	170	58.0	171	57.6
470.lbm	17.9	767	17.8	771	<b>17.9</b>	<b>768</b>	17.9	767	17.8	771	<b>17.9</b>	<b>768</b>
481.wrf	94.6	118	<b>96.6</b>	<b>116</b>	98.9	113	94.6	118	<b>96.6</b>	<b>116</b>	98.9	113
482.sphinx3	<b>271</b>	<b>71.8</b>	271	71.9	274	71.0	<b>271</b>	<b>71.8</b>	271	71.9	274	71.0

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 DaAn-03 Wed Jun 8 12:09:05 2016

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

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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 E5-2640 v4 @ 2.40GHz

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: 263829888 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 DaAn-03 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 8 07:09

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

Filesystem Type Size Used Avail Use% Mounted on

/dev/sda4 xfs 689G 28G 662G 5% /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 -[TBE124K-2.10]- 05/10/2016

Memory:

16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz, configured at 2133 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 = "20"

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

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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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**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:

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**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-Settings-V1.2-BDW-revC.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-Settings-V1.2-BDW-revC.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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