



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Group Limited

SPECfp<sup>®</sup>2006 = **115**

Lenovo System x3650 M5  
(Intel Xeon E5-2699 v3, 2.30 GHz)

SPECfp\_base2006 = **109**

CPU2006 license: 9017

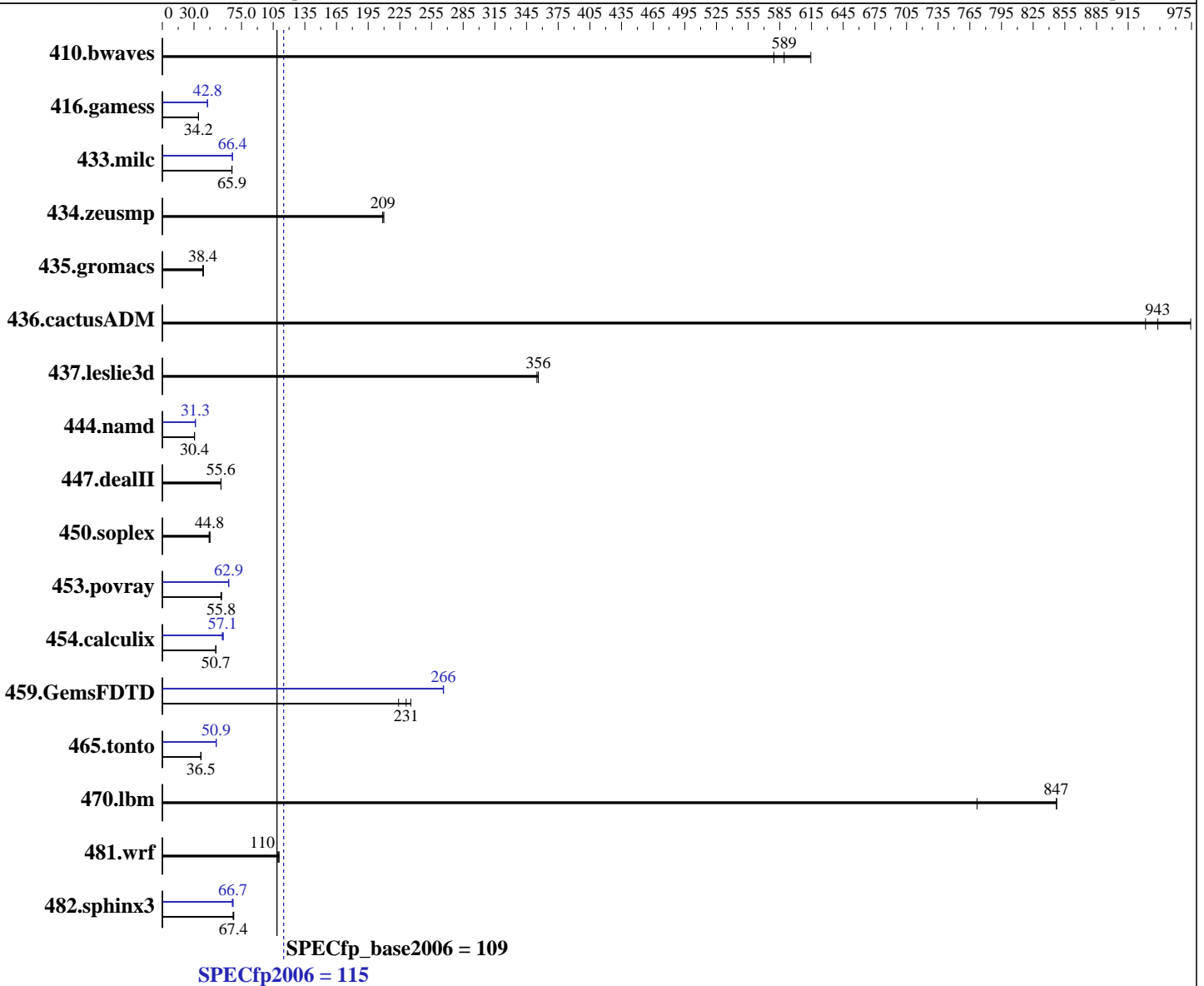
Test date: Jan-2015

Test sponsor: Lenovo Group Limited

Hardware Availability: Oct-2014

Tested by: Lenovo Group Limited

Software Availability: Sep-2014



### Hardware

CPU Name: Intel Xeon E5-2699 v3  
 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: Red Hat Enterprise Linux Server release 7.0 (Maipo)  
 3.10.0-123.el7.x86\_64  
 Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;  
 Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux  
 Auto Parallel: Yes  
 File System: xfs

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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 PC4-2133P-R)  
Disk Subsystem: 1 x 300 GB SAS  
Other Hardware: None

System State: Run level 3 (multi-user)  
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	23.5	579	<u>23.1</u>	<u>589</u>	22.1	614	23.5	579	<u>23.1</u>	<u>589</u>	22.1	614
416.gamess	<u>573</u>	<u>34.2</u>	571	34.3	573	34.2	459	42.6	457	42.8	<u>457</u>	<u>42.8</u>
433.milc	139	66.0	<u>139</u>	<u>65.9</u>	140	65.8	138	66.5	139	66.2	<u>138</u>	<u>66.4</u>
434.zeusmp	43.4	210	43.6	209	<u>43.6</u>	<u>209</u>	43.4	210	43.6	209	<u>43.6</u>	<u>209</u>
435.gromacs	183	39.0	186	38.3	<u>186</u>	<u>38.4</u>	183	39.0	186	38.3	<u>186</u>	<u>38.4</u>
436.cactusADM	12.8	931	12.3	974	<u>12.7</u>	<u>943</u>	12.8	931	12.3	974	<u>12.7</u>	<u>943</u>
437.leslie3d	26.4	356	<u>26.4</u>	<u>356</u>	26.5	355	26.4	356	<u>26.4</u>	<u>356</u>	26.5	355
444.namd	<u>263</u>	<u>30.4</u>	264	30.4	263	30.5	256	31.3	256	31.3	<u>256</u>	<u>31.3</u>
447.dealII	206	55.6	<u>206</u>	<u>55.6</u>	206	55.5	206	55.6	<u>206</u>	<u>55.6</u>	206	55.5
450.soplex	185	45.2	188	44.3	<u>186</u>	<u>44.8</u>	185	45.2	188	44.3	<u>186</u>	<u>44.8</u>
453.povray	95.9	55.5	<u>95.3</u>	<u>55.8</u>	94.8	56.1	<u>84.6</u>	<u>62.9</u>	84.9	62.7	84.5	62.9
454.calculix	<u>163</u>	<u>50.7</u>	163	50.5	162	50.8	<u>145</u>	<u>57.1</u>	145	56.8	143	57.8
459.GemsFDTD	<u>45.9</u>	<u>231</u>	47.4	224	45.1	235	39.9	266	<u>39.8</u>	<u>266</u>	39.8	266
465.tonto	<u>270</u>	<u>36.5</u>	270	36.4	268	36.7	192	51.2	<u>193</u>	<u>50.9</u>	193	50.9
470.lbm	16.2	847	17.8	772	<u>16.2</u>	<u>847</u>	16.2	847	17.8	772	<u>16.2</u>	<u>847</u>
481.wrf	<u>102</u>	<u>110</u>	101	111	103	109	<u>102</u>	<u>110</u>	101	111	103	109
482.sphinx3	288	67.7	291	67.0	<u>289</u>	<u>67.4</u>	294	66.2	290	67.1	<u>292</u>	<u>66.7</u>

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 setting:  
Operating Mode set to "Efficiency-Favor Performance"  
Intel Hyperthreading set to Disabled  
COD Preference set to Disable  
Early Snoop Preference set to Disable  
Sysinfo program /root/SPECcpu\_15/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on x3650M5 Tue Jan 27 20:47:37 2015

This section contains SUT (System Under Test) info as seen by  
Continued on next page



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### Platform Notes (Continued)

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 E5-2699 v3 @ 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:      263632456 kB
HugePages_Total:    0
Hugepagesize:    2048 kB

```

```

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux Server"
VERSION="7.0 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.0"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

```

```

uname -a:
Linux x3650M5 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57 EDT 2014 x86_64
x86_64 x86_64 GNU/Linux

```

run-level 3 Jan 27 15:20

```

SPEC is set to: /root/SPECcpu_15
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs   275G  13G  262G   5% /

```

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.

BIOS IBM -[TCE103G-1.01]- 12/04/2014

Continued on next page



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## Platform Notes (Continued)

### Memory:

3x Hynix 484D4134324752374D4652344E2D54462020 16 GB 2 rank 2133 MHz  
13x Hynix 484D4134324752374D4652344E2D54465431 16 GB 2 rank 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 = "/root/SPECcpu_15/libs/32:/root/SPECcpu_15/libs/64:/root/SPECcpu_15/sh"
OMP_NUM_THREADS = "36"
```

Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0

Transparent Huge Pages enabled with:

```
echo always > /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
```

Continued on next page



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## Base Portability Flags (Continued)

```

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:** Sep-2014

## Peak Optimization Flags

### C benchmarks:

433.milc: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-auto-ilp32 -ansi-alias

470.lbm: basepeak = yes

482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias  
-parallel

### C++ benchmarks:

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

447.dealII: basepeak = yes

450.soplex: basepeak = yes

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

### Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -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(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -opt-prefetch -parallel

465.tonto: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
-inline-calloc -opt-malloc-options=3 -auto -unroll4

### Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

Continued on next page



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## Peak Optimization Flags (Continued)

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-ic15.0-official-linux64.html>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20141230.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml>

<http://www.spec.org/cpu2006/flags/Lenovo-Platform-Flags-V1.2-HSW-B.20141230.xml>

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Tested with SPEC CPU2006 v1.2.  
Report generated on Wed Feb 25 11:28:55 2015 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 24 February 2015.