



# SPEC<sup>®</sup> CFP2006 Result

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## Lenovo Group Limited

SPECfp<sup>®</sup>\_rate2006 = 746

Lenovo Flex System x240 M5  
(Intel Xeon E5-2685 v3, 2.60 GHz)

SPECfp\_rate\_base2006 = 732

CPU2006 license: 9017

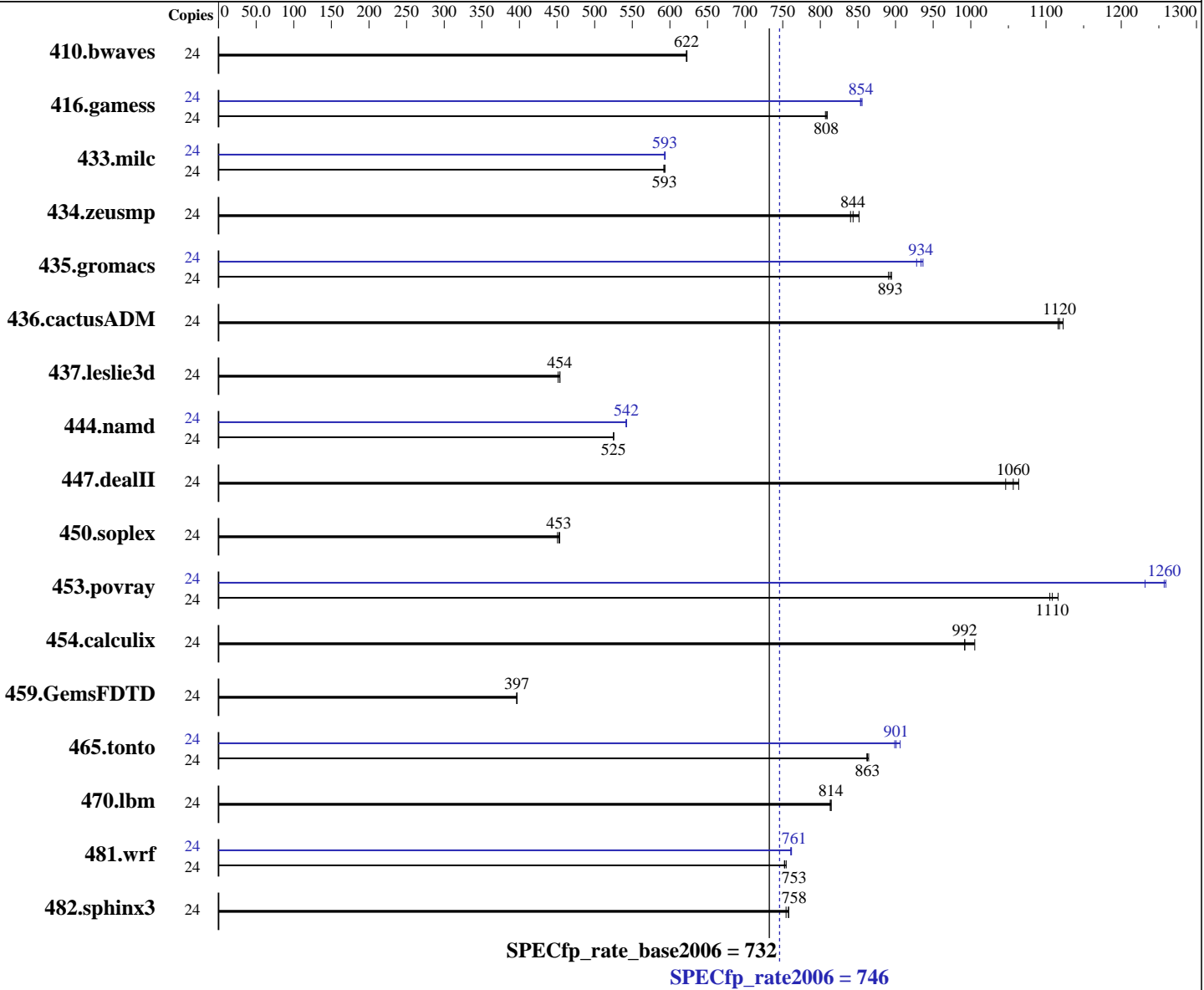
Test date: Sep-2015

Test sponsor: Lenovo Group Limited

Hardware Availability: Dec-2014

Tested by: Lenovo Group Limited

Software Availability: Nov-2013



### Hardware

CPU Name: Intel Xeon E5-2685 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2600  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 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: Red Hat Enterprise Linux Server release 6.5 (Santiago)  
 2.6.32-431.el6.x86\_64  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
 Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext4

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L3 Cache: 30 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, 10000 RPM  
Other Hardware: None

System State: Run level 3 (multi-user)  
Base Pointers: 32/64-bit  
Peak Pointers: 32/64-bit  
Other Software: None

## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	24	524	623	<u>524</u>	<u>622</u>	524	622	24	524	623	<u>524</u>	<u>622</u>	524	622		
416.gamess	24	581	809	<u>582</u>	<u>808</u>	582	807	24	549	855	<u>550</u>	<u>854</u>	551	853		
433.milc	24	371	593	372	592	<u>372</u>	<u>593</u>	24	<u>371</u>	<u>593</u>	371	594	372	593		
434.zeusmp	24	<u>259</u>	<u>844</u>	260	840	257	851	24	<u>259</u>	<u>844</u>	260	840	257	851		
435.gromacs	24	192	895	<u>192</u>	<u>893</u>	192	891	24	<u>183</u>	<u>934</u>	183	936	185	928		
436.cactusADM	24	257	1120	<u>257</u>	<u>1120</u>	255	1120	24	257	1120	<u>257</u>	<u>1120</u>	255	1120		
437.leslie3d	24	500	451	<u>497</u>	<u>454</u>	497	454	24	500	451	<u>497</u>	<u>454</u>	497	454		
444.namd	24	366	525	367	525	<u>366</u>	<u>525</u>	24	355	542	<u>355</u>	<u>542</u>	355	542		
447.dealII	24	262	1050	258	1060	<u>260</u>	<u>1060</u>	24	262	1050	258	1060	<u>260</u>	<u>1060</u>		
450.soplex	24	444	451	<u>442</u>	<u>453</u>	441	453	24	444	451	<u>442</u>	<u>453</u>	441	453		
453.povray	24	116	1110	<u>115</u>	<u>1110</u>	114	1120	24	101	1260	104	1230	<u>102</u>	<u>1260</u>		
454.calculix	24	200	992	197	1010	<u>200</u>	<u>992</u>	24	200	992	197	1010	<u>200</u>	<u>992</u>		
459.GemsFDTD	24	642	396	<u>642</u>	<u>397</u>	642	397	24	642	396	<u>642</u>	<u>397</u>	642	397		
465.tonto	24	<u>274</u>	<u>863</u>	273	864	274	862	24	263	899	261	906	<u>262</u>	<u>901</u>		
470.lbm	24	406	813	405	814	<u>405</u>	<u>814</u>	24	406	813	405	814	<u>405</u>	<u>814</u>		
481.wrf	24	355	755	356	752	<u>356</u>	<u>753</u>	24	<u>352</u>	<u>761</u>	352	761	352	762		
482.sphinx3	24	620	754	<u>617</u>	<u>758</u>	617	758	24	620	754	<u>617</u>	<u>758</u>	617	758		

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Platform Notes

Operating Mode set to Maximum Performance in BIOS  
Enabled COD Preference in BIOS  
Disable Early Snoop Preference in BIOS

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### Platform Notes (Continued)

Sysinfo program /cpu2006.1.2\_14.0\_jan2014/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 # \$ e86d102572650a6e4d596a3cee98f191  
running on newport-rhel6.5 Mon Sep 21 18:35:35 2015

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 E5-2685 v3 @ 2.60GHz
 2 "physical id"s (chips)
 24 "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 : 12
siblings   : 12
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 15360 KB
```

From /proc/meminfo

```
MemTotal:      264122260 kB
HugePages_Total: 0
Hugepagesize:   2048 kB
```

/usr/bin/lsb\_release -d

```
Red Hat Enterprise Linux Server release 6.5 (Santiago)
```

From /etc/\*release\* /etc/\*version\*

```
redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

uname -a:

```
Linux newport-rhel6.5 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54 EST
2013 x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Sep 21 11:55 last=5

SPEC is set to: /cpu2006.1.2\_14.0\_jan2014

```
Filesystem                Type      Size   Used Avail Use% Mounted on
/dev/mapper/vg_newportrhel6-lv_root ext4      265G   87G  166G  35% /
```

Additional information from dmidecode:

```
BIOS IBM  -[C4E105JUS-1.10]- 04/11/2015
Memory:
 8x NO DIMM Unknown
16x Samsung M393A2G40DB0-CPB 16 GB 2133 MHz 2 rank
```

(End of data from sysinfo program)



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## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/cpu2006.1.2\_14.0\_jan2014/libs/32:/cpu2006.1.2\_14.0\_jan2014/libs/64:/cpu2006.1.2\_14.0\_jan2014/sh"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4

Transparent Huge Pages enabled with:

echo always > /sys/kernel/mm/redhat\_transparent\_hugepage/enabled

Filesystem page cache cleared with:

echo 1> /proc/sys/vm/drop\_caches

runspec command invoked through numactl i.e.:

numactl --interleave=all runspec <etc>

## 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.deallI: -DSPEC\_CPU\_LP64  
 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



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## Base Optimization Flags

C benchmarks:

`-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3`

C++ benchmarks:

`-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3`

Fortran benchmarks:

`-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch`

Benchmarks using both Fortran and C:

`-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3`

## 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

## 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)  
-opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
-auto-ilp32`

`470.lbm: basepeak = yes`

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## Peak Optimization Flags (Continued)

482.sphinx3: basepeak = yes

### C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2)  
-opt-mem-layout-trans=3(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)  
-opt-mem-layout-trans=3(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: basepeak = yes

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) -unroll4  
-auto -inline-calloc -opt-malloc-options=3

### Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
-O3(pass 2) -no-prec-div(pass 2)  
-opt-mem-layout-trans=3(pass 2) -prof-use(pass 2)  
-opt-prefetch -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32



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The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html>

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

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

<http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml>

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

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