



# SPEC® CFP2006 Result

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## IBM Corporation

SPECfp®\_rate2006 = 407

IBM System x3630 M4 (Intel Xeon E5-2470)

SPECfp\_rate\_base2006 = 395

CPU2006 license: 11

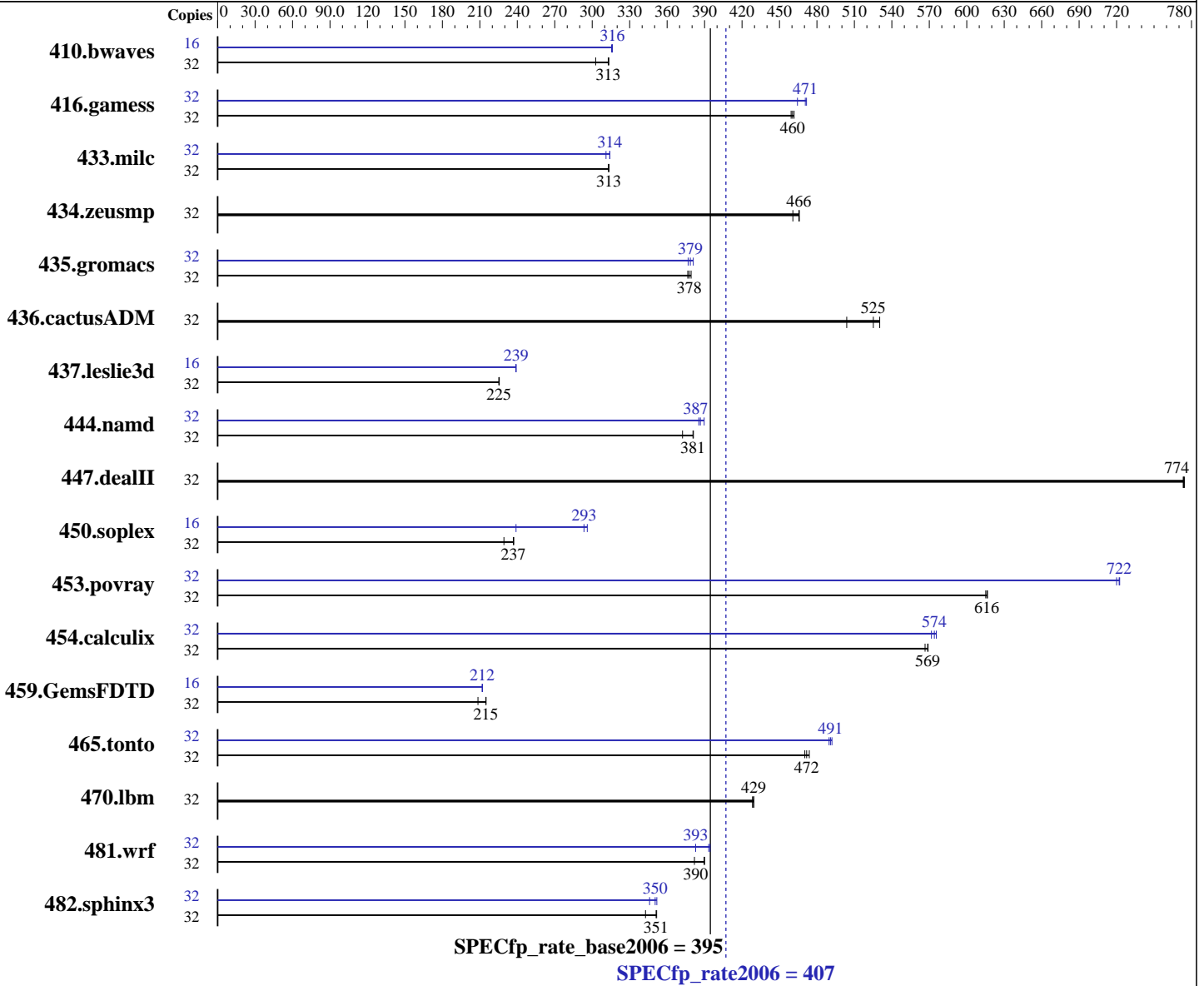
Test date: May-2012

Test sponsor: IBM Corporation

Hardware Availability: Jun-2012

Tested by: IBM Corporation

Software Availability: Dec-2011



### Hardware

CPU Name: Intel Xeon E5-2470  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.10 GHz  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip, 2 threads/core  
 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 6.2 (Santiago)  
 2.6.32-220.el6.x86\_64  
 Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;  
 Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: ext4

Continued on next page



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L3 Cache: 20 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 96 GB (12 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: 1 x 500 GB SATA, 7200 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	32	<b><u>1390</u></b>	<b><u>313</u></b>	1436	303	1388	313	16	689	316	<b><u>688</u></b>	<b><u>316</u></b>	688	316
416.gamess	32	<b><u>1361</u></b>	<b><u>460</u></b>	1364	459	1357	462	32	1349	464	<b><u>1331</u></b>	<b><u>471</u></b>	1328	472
433.milc	32	938	313	<b><u>938</u></b>	<b><u>313</u></b>	937	313	32	935	314	<b><u>935</u></b>	<b><u>314</u></b>	944	311
434.zeusmp	32	632	461	625	466	<b><u>626</u></b>	<b><u>466</u></b>	32	632	461	625	466	<b><u>626</u></b>	<b><u>466</u></b>
435.gromacs	32	<b><u>605</u></b>	<b><u>378</u></b>	607	377	603	379	32	<b><u>603</u></b>	<b><u>379</u></b>	606	377	600	381
436.cactusADM	32	759	504	<b><u>728</u></b>	<b><u>525</u></b>	721	530	32	759	504	<b><u>728</u></b>	<b><u>525</u></b>	721	530
437.leslie3d	32	<b><u>1335</u></b>	<b><u>225</u></b>	1335	225	1333	226	16	630	239	<b><u>629</u></b>	<b><u>239</u></b>	629	239
444.namd	32	<b><u>674</u></b>	<b><u>381</u></b>	689	372	673	381	32	666	385	<b><u>664</u></b>	<b><u>387</u></b>	659	390
447.dealII	32	<b><u>473</u></b>	<b><u>774</u></b>	473	773	473	774	32	<b><u>473</u></b>	<b><u>774</u></b>	473	773	473	774
450.soplex	32	<b><u>1127</u></b>	<b><u>237</u></b>	1164	229	1125	237	16	558	239	451	296	<b><u>455</u></b>	<b><u>293</u></b>
453.povray	32	277	615	<b><u>276</u></b>	<b><u>616</u></b>	276	617	32	236	722	236	720	<b><u>236</u></b>	<b><u>722</u></b>
454.calculix	32	466	567	464	569	<b><u>464</u></b>	<b><u>569</u></b>	32	<b><u>460</u></b>	<b><u>574</u></b>	459	576	462	572
459.GemsFDTD	32	1628	209	1579	215	<b><u>1581</u></b>	<b><u>215</u></b>	16	800	212	801	212	<b><u>801</u></b>	<b><u>212</u></b>
465.tonto	32	664	474	<b><u>667</u></b>	<b><u>472</u></b>	670	470	32	640	492	643	490	<b><u>641</u></b>	<b><u>491</u></b>
470.lbm	32	1026	428	<b><u>1024</u></b>	<b><u>429</u></b>	1024	429	32	1026	428	<b><u>1024</u></b>	<b><u>429</u></b>	1024	429
481.wrf	32	936	382	916	390	<b><u>917</u></b>	<b><u>390</u></b>	32	934	383	<b><u>909</u></b>	<b><u>393</u></b>	906	394
482.sphinx3	32	1820	343	<b><u>1776</u></b>	<b><u>351</u></b>	1774	352	32	1803	346	<b><u>1780</u></b>	<b><u>350</u></b>	1773	352

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"  
 Zone reclaim mode enabled with:  
 echo 1 > /proc/sys/vm/zone\_reclaim\_mode



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## Platform Notes

### BIOS Settings:

Operating Mode set to Maximum Performance

Sysinfo program /home/SPECcpu-v1.2/config/sysinfo.rev6800

\$Rev: 6800 \$ \$Date:: 2011-10-11 #\$ 6f2ebdff5032aaa42e583f96b07f99d3

running on x3630m4-rhel62 Tue May 8 01:52:04 2012

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 E5-2470 0 @ 2.30GHz

2 "physical id"s (chips)

32 "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 : 8

siblings : 16

physical 0: cores 0 1 2 3 4 5 6 7

physical 1: cores 0 1 2 3 4 5 6 7

cache size : 20480 KB

### From /proc/meminfo

MemTotal: 99042548 kB

HugePages\_Total: 0

Hugepagesize: 2048 kB

### /usr/bin/lsc\_release -d

Red Hat Enterprise Linux Server release 6.2 (Santiago)

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

redhat-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)

system-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)

system-release-cpe: cpe:/o:redhat:enterprise\_linux:6server:ga:server

### uname -a:

Linux x3630m4-rhel62 2.6.32-220.el6.x86\_64 #1 SMP Wed Nov 9 08:03:13 EST 2011  
x86\_64 x86\_64 x86\_64 GNU/Linux

### run-level 3 May 7 12:24

### SPEC is set to: /home/SPECcpu-v1.2

Filesystem Type Size Used Avail Use% Mounted on

/dev/mapper/vg\_x3630m4rhel62-lv\_home

ext4 383G 65G 299G 18% /home

### Additional information from dmidecode:

#### Memory:

12x Samsung M393B1K70DH0-CK0 8 GB 1600 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 = "/home/SPECcpu-v1.2/libs/32:/home/SPECcpu-v1.2/libs/64"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5  
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:

-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:

-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:

-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch

Benchmarks using both Fortran and C:

-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

## Peak Compiler Invocation

C benchmarks (except as noted below):

icc -m64

482.sphinx3: icc -m32

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## Peak 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

453.povray: -DSPEC\_CPU\_LP64

Continued on next page

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Page 5



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## Peak Portability Flags (Continued)

454.calculix: -DSPEC\_CPU\_LP64 -nofor\_main  
 465.tonto: -DSPEC\_CPU\_LP64  
 470.lbm: -DSPEC\_CPU\_LP64  
 481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX

## Peak Optimization Flags

### C benchmarks:

433.milc: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32  
 -opt-mem-layout-trans=3

470.lbm: basepeak = yes

482.sphinx3: -xAVX -ipo -O3 -no-prec-div -unroll2

### C++ benchmarks:

444.namd: -xAVX(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.dealIII: basepeak = yes

450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

453.povray: -xAVX(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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -prof-use(pass 2) -static

416.gamess: -xAVX(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- -static

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -static -opt-prefetch

459.GemsFDTD: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

Continued on next page



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## Peak Optimization Flags (Continued)

465.tonto: -xAVX(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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-prefetch  
-static -auto-ilp32 -opt-mem-layout-trans=3

436.cactusADM: basepeak = yes

454.calculix: -xAVX -ipo -O3 -no-prec-div -static -auto-ilp32  
-opt-mem-layout-trans=3

481.wrf: Same as 454.calculix

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

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.html>

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

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

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml>

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

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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