



# SPEC® CFP2006 Result

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## IBM Corporation

### SPECfp®\_rate2006 = 46.9

## IBM System x3655 (AMD Opteron 2218)

### SPECfp\_rate\_base2006 = 44.6

CPU2006 license: 11

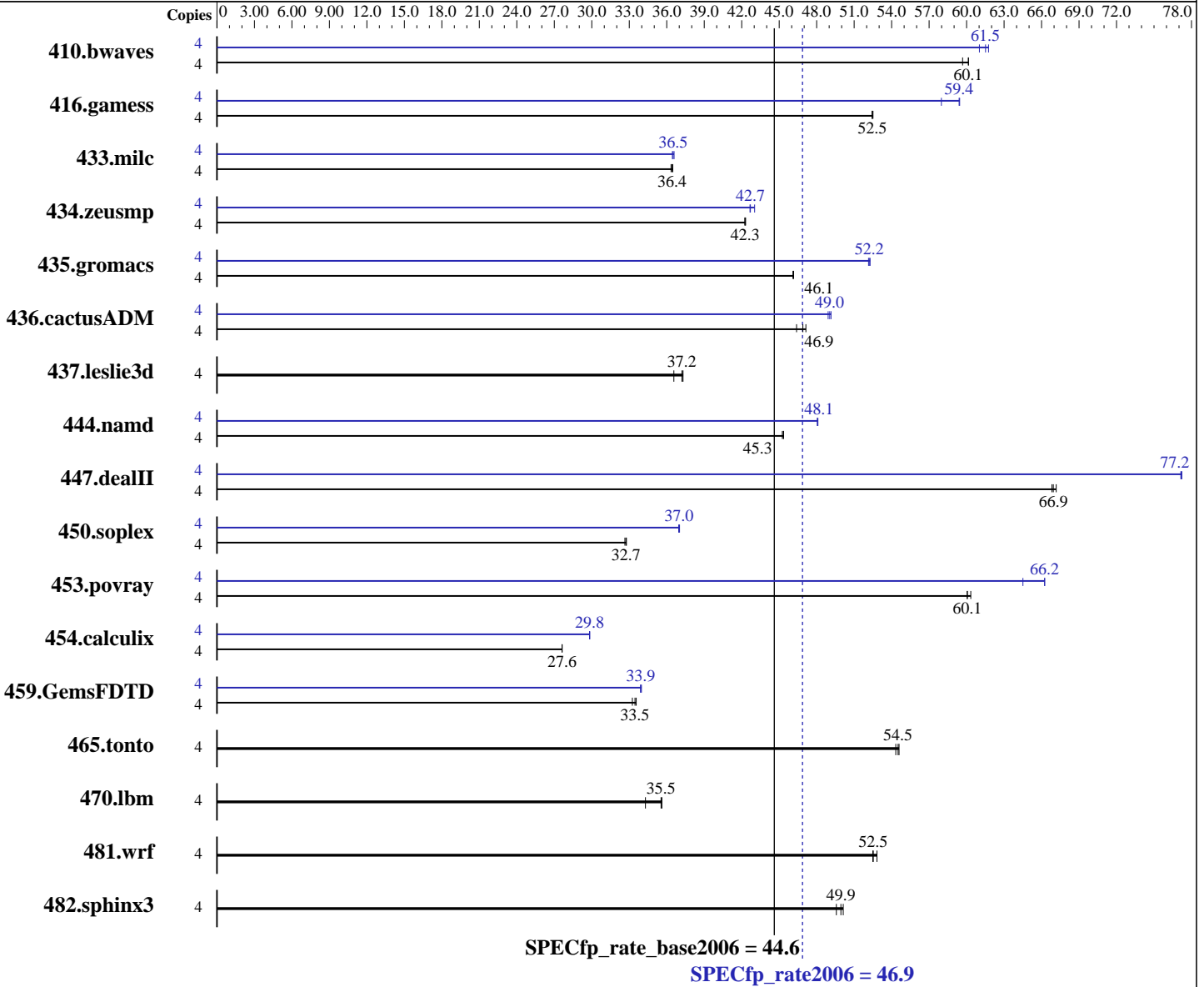
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Jul-2007

Hardware Availability: Oct-2006

Software Availability: Mar-2007



**Hardware**

CPU Name: AMD Opteron 2218  
 CPU Characteristics: 2600  
 CPU MHz: Integrated  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 2 chips, 2 cores/chip  
 CPU(s) orderable: 1, 2 chips  
 Primary Cache: 64 KB I + 64 KB D on chip per core  
 Secondary Cache: 1 MB I+D on chip per core

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**Software**

Operating System: SLES 10 (x86\_64), 2.6.16.21-0.8-smp  
 Compiler: QLogic PathScale Compiler Suite, Release 3.0  
 Auto Parallel: No  
 File System: ext3  
 System State: Multi-user, run level 3  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit

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L3 Cache: None  
Other Cache: None  
Memory: 16 GB (8 x 2GB DDR2-5300 ECC)  
Disk Subsystem: 1 x 36 GB SAS, 10000 RPM  
Other Hardware: None

Other Software: MicroQuill SmartHeap 8.1

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	4	904	60.2	<u>904</u>	<u>60.1</u>	911	59.7	4	891	61.0	880	61.8	<u>884</u>	<u>61.5</u>
416.gamess	4	1492	52.5	<u>1493</u>	<u>52.5</u>	1494	52.4	4	1351	58.0	<u>1319</u>	<u>59.4</u>	1318	59.4
433.milc	4	1010	36.3	<u>1008</u>	<u>36.4</u>	1006	36.5	4	<u>1006</u>	<u>36.5</u>	1007	36.5	1004	36.6
434.zeusmp	4	862	42.2	<u>861</u>	<u>42.3</u>	860	42.3	4	<u>853</u>	<u>42.7</u>	853	42.7	846	43.0
435.gromacs	4	619	46.1	619	46.2	<u>619</u>	<u>46.1</u>	4	<u>547</u>	<u>52.2</u>	548	52.2	546	52.3
436.cactusADM	4	1030	46.4	<u>1019</u>	<u>46.9</u>	1014	47.1	4	<u>975</u>	<u>49.0</u>	977	48.9	973	49.1
437.leslie3d	4	1008	37.3	<u>1010</u>	<u>37.2</u>	1028	36.6	4	1008	37.3	<u>1010</u>	<u>37.2</u>	1028	36.6
444.namd	4	707	45.4	<u>708</u>	<u>45.3</u>	709	45.3	4	667	48.1	<u>667</u>	<u>48.1</u>	668	48.1
447.dealII	4	685	66.8	681	67.2	<u>684</u>	<u>66.9</u>	4	593	77.1	<u>593</u>	<u>77.2</u>	593	77.2
450.soplex	4	1018	32.8	<u>1019</u>	<u>32.7</u>	1022	32.7	4	901	37.0	903	37.0	<u>902</u>	<u>37.0</u>
453.povray	4	353	60.3	<u>354</u>	<u>60.1</u>	354	60.0	4	330	64.5	<u>321</u>	<u>66.2</u>	321	66.2
454.calculix	4	<u>1195</u>	<u>27.6</u>	1195	27.6	1195	27.6	4	<u>1106</u>	<u>29.8</u>	1107	29.8	1106	29.8
459.GemsFDTD	4	1265	33.6	<u>1268</u>	<u>33.5</u>	1276	33.2	4	1252	33.9	1249	34.0	<u>1251</u>	<u>33.9</u>
465.tonto	4	721	54.6	<u>722</u>	<u>54.5</u>	724	54.3	4	721	54.6	<u>722</u>	<u>54.5</u>	724	54.3
470.lbm	4	1603	34.3	1543	35.6	<u>1546</u>	<u>35.5</u>	4	1603	34.3	1543	35.6	<u>1546</u>	<u>35.5</u>
481.wrf	4	<u>851</u>	<u>52.5</u>	846	52.8	851	52.5	4	<u>851</u>	<u>52.5</u>	846	52.8	851	52.5
482.sphinx3	4	1555	50.1	<u>1561</u>	<u>49.9</u>	1573	49.6	4	1555	50.1	<u>1561</u>	<u>49.9</u>	1573	49.6

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

## General Notes

taskset utility used to bind CPU(s) to processes  
DSPEC\_CPU\_TABLE\_WORKAROUND was used for portability when compiling 447.dealII  
due to compilation being performed on SLES 9 SP3

## Base Compiler Invocation

C benchmarks:  
pathcc

C++ benchmarks:  
pathCC

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## Base Compiler Invocation (Continued)

Fortran benchmarks:  
pathf95

Benchmarks using both Fortran and C:  
pathcc pathf95

## 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  
 436.cactusADM: -DSPEC\_CPU\_LP64 -fno-second-underscore  
 437.leslie3d: -DSPEC\_CPU\_LP64  
 444.namd: -DSPEC\_CPU\_LP64  
 447.dealII: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_TABLE\_WORKAROUND  
 450.soplex: -DSPEC\_CPU\_LP64  
 453.povray: -DSPEC\_CPU\_LP64  
 454.calculix: -DSPEC\_CPU\_LP64  
 459.GemsFDTD: -DSPEC\_CPU\_LP64  
 465.tonto: -DSPEC\_CPU\_LP64  
 470.lbm: -DSPEC\_CPU\_LP64  
 481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX -fno-second-underscore  
 482.sphinx3: -DSPEC\_CPU\_LP64

## Base Optimization Flags

C benchmarks:  
-Ofast

C++ benchmarks:  
-Ofast

Fortran benchmarks:  
-Ofast -OPT:malloc\_alg=1

Benchmarks using both Fortran and C:  
-Ofast -OPT:malloc\_alg=1

## Base Other Flags

C benchmarks:  
-IPA:max\_jobs=2

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## Base Other Flags (Continued)

C++ benchmarks:

-IPA:max\_jobs=2

Fortran benchmarks:

-IPA:max\_jobs=2

Benchmarks using both Fortran and C:

-IPA:max\_jobs=2

## Peak Compiler Invocation

C benchmarks:

pathcc

C++ benchmarks:

pathCC

Fortran benchmarks:

pathf95

Benchmarks using both Fortran and C:

pathcc pathf95

## 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  
 436.cactusADM: -DSPEC\_CPU\_LP64 -fno-second-underscore  
 437.leslie3d: -DSPEC\_CPU\_LP64  
 444.namd: -DSPEC\_CPU\_LP64  
 447.dealII: -DSPEC\_CPU\_TABLE\_WORKAROUND  
 453.povray: -DSPEC\_CPU\_LP64  
 454.calculix: -DSPEC\_CPU\_LP64  
 459.GemsFDTD: -DSPEC\_CPU\_LP64  
 465.tonto: -DSPEC\_CPU\_LP64  
 470.lbm: -DSPEC\_CPU\_LP64  
 481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX -fno-second-underscore  
 482.sphinx3: -DSPEC\_CPU\_LP64



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## Peak Optimization Flags

### C benchmarks:

433.milc: -Ofast -CG:cflow=off -LNO:prefetch=1 -OPT:malloc\_alg=1

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

### C++ benchmarks:

444.namd: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-fno-exceptions

447.dealIII: -Ofast -INLINE:aggressive=on -LNO:opt=0 -OPT:alias=disjoint  
-m32 -fno-exceptions

450.soplex: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -m32 -O3  
-OPT:IEEE\_arith=3 -CG:load\_exe=0 -CG:movnti=1  
-LNO:minvariant=off -LNO:prefetch=1 -fno-exceptions

453.povray: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-fno-fast-math

### Fortran benchmarks:

410.bwaves: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -O3  
-OPT:Ofast -OPT:IEEE\_arith=3 -LNO:blocking=off  
-LNO:ignore\_feedback=off

416.gamess: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -O2  
-OPT:Ofast -OPT:ro=3 -OPT:unroll\_size=256

434.zeusmp: -Ofast -CG:local\_fwd\_sched=on -LNO:blocking=off  
-LNO:interchange=off -LNO:fu=10 -LNO:full\_unroll\_outer=on

437.leslie3d: basepeak = yes

459.GemsFDTD: -Ofast -LNO:fission=2 -LNO:prefetch=0

465.tonto: basepeak = yes

### Benchmarks using both Fortran and C:

435.gromacs: -O3 -OPT:rsqrt=2 -OPT:ro=3

436.cactusADM: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -O3  
-LNO:prefetch=3 -LNO:prefetch\_ahead=5 -LNO:ou\_prod\_max=10  
-LNO:full\_unroll=5 -ipa

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## Peak Optimization Flags (Continued)

454.calculix: -Ofast -LNO:simd=0 -WOPT:mem\_opnds=on

481.wrf: basepeak = yes

## Peak Other Flags

C benchmarks:

-IPA:max\_jobs=2

C++ benchmarks:

-IPA:max\_jobs=2

Fortran benchmarks:

-IPA:max\_jobs=2

Benchmarks using both Fortran and C:

-IPA:max\_jobs=2

The flags file that was used to format this result can be browsed at

[http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090714.13.html](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090714.13.html)

You can also download the XML flags source by saving the following link:

[http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090714.13.xml](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090714.13.xml)

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