



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

### SPECfp<sup>®</sup>\_rate2006 = 47.0

### IBM BladeCenter LS21 (AMD Opteron 2220)

### SPECfp\_rate\_base2006 = 44.5

CPU2006 license: 11

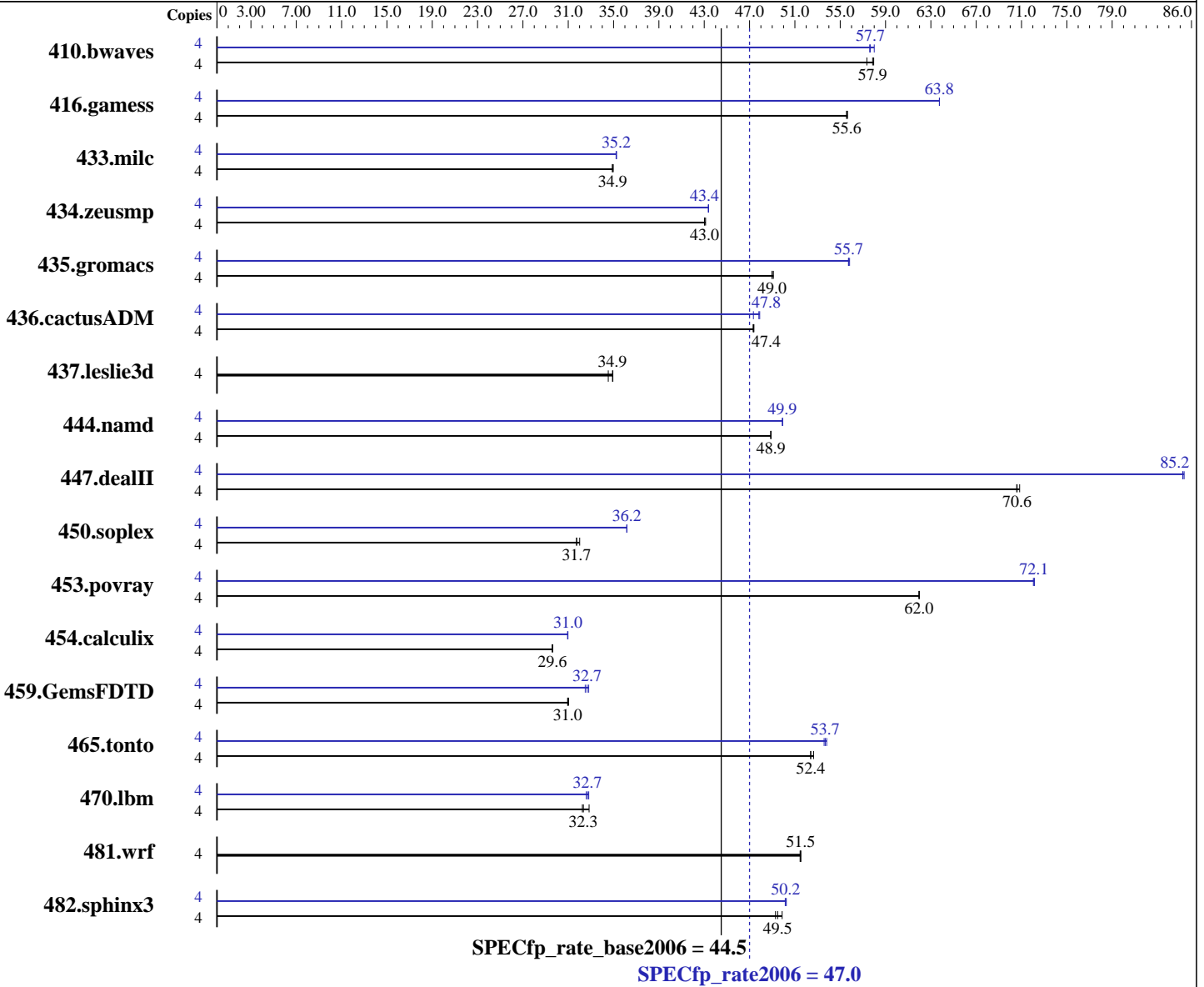
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Feb-2007

Hardware Availability: Feb-2007

Software Availability: Aug-2006



#### Hardware

CPU Name: AMD Opteron 2220  
 CPU Characteristics:  
 CPU MHz: 2800  
 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: SLES9 SP3 for AMD64/EM64T  
 Compiler: QLogic PathScale Compiler Suite 2.5  
 Auto Parallel: No  
 File System: ext3  
 System State: Multi-user, run level 3  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: None



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L3 Cache: None  
Other Cache: None  
Memory: 16 GB (8 x 2GB DDR2-5300 ECC)  
Disk Subsystem: 1 x 74 GB SAS, 10000 RPM  
Other Hardware: None

### Results Table

| Benchmark     | Base   |             |             |             |             |             |             | Peak   |             |             |             |             |             |             |
|---------------|--------|-------------|-------------|-------------|-------------|-------------|-------------|--------|-------------|-------------|-------------|-------------|-------------|-------------|
|               | Copies | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Copies | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       |
| 410.bwaves    | 4      | 938         | 58.0        | <u>939</u>  | <u>57.9</u> | 948         | 57.4        | 4      | <u>943</u>  | <u>57.7</u> | 937         | 58.0        | 944         | 57.6        |
| 416.gamess    | 4      | <u>1409</u> | <u>55.6</u> | 1410        | 55.6        | 1407        | 55.6        | 4      | 1229        | 63.7        | <u>1228</u> | <u>63.8</u> | 1228        | 63.8        |
| 433.milc      | 4      | 1050        | 35.0        | 1052        | 34.9        | <u>1052</u> | <u>34.9</u> | 4      | <u>1042</u> | <u>35.2</u> | 1041        | 35.3        | 1043        | 35.2        |
| 434.zeusmp    | 4      | <u>846</u>  | <u>43.0</u> | 844         | 43.1        | 846         | 43.0        | 4      | 839         | 43.4        | <u>839</u>  | <u>43.4</u> | 839         | 43.4        |
| 435.gromacs   | 4      | <u>583</u>  | <u>49.0</u> | 583         | 49.0        | 582         | 49.1        | 4      | <u>512</u>  | <u>55.7</u> | 513         | 55.7        | 512         | 55.8        |
| 436.cactusADM | 4      | <u>1009</u> | <u>47.4</u> | 1009        | 47.4        | 1010        | 47.3        | 4      | <u>1000</u> | <u>47.8</u> | 1010        | 47.3        | 998         | 47.9        |
| 437.leslie3d  | 4      | <u>1077</u> | <u>34.9</u> | 1076        | 34.9        | 1089        | 34.5        | 4      | <u>1077</u> | <u>34.9</u> | 1076        | 34.9        | 1089        | 34.5        |
| 444.namd      | 4      | 656         | 48.9        | <u>656</u>  | <u>48.9</u> | 656         | 48.9        | 4      | 643         | 49.9        | <u>643</u>  | <u>49.9</u> | 643         | 49.9        |
| 447.dealII    | 4      | <u>648</u>  | <u>70.6</u> | 646         | 70.8        | 648         | 70.6        | 4      | <u>537</u>  | <u>85.2</u> | 536         | 85.3        | 537         | 85.2        |
| 450.soplex    | 4      | 1042        | 32.0        | <u>1051</u> | <u>31.7</u> | 1051        | 31.7        | 4      | 923         | 36.2        | 922         | 36.2        | <u>922</u>  | <u>36.2</u> |
| 453.povray    | 4      | <u>343</u>  | <u>62.0</u> | 344         | 62.0        | 343         | 62.0        | 4      | 295         | 72.1        | <u>295</u>  | <u>72.1</u> | 295         | 72.0        |
| 454.calculix  | 4      | 1114        | 29.6        | <u>1114</u> | <u>29.6</u> | 1116        | 29.6        | 4      | 1065        | 31.0        | <u>1066</u> | <u>31.0</u> | 1067        | 30.9        |
| 459.GemsFDTD  | 4      | 1371        | 30.9        | <u>1371</u> | <u>31.0</u> | 1367        | 31.0        | 4      | 1306        | 32.5        | 1294        | 32.8        | <u>1299</u> | <u>32.7</u> |
| 465.tonto     | 4      | 748         | 52.7        | <u>751</u>  | <u>52.4</u> | 751         | 52.4        | 4      | <u>733</u>  | <u>53.7</u> | 732         | 53.8        | 735         | 53.6        |
| 470.lbm       | 4      | 1704        | 32.2        | <u>1700</u> | <u>32.3</u> | 1673        | 32.8        | 4      | <u>1680</u> | <u>32.7</u> | 1675        | 32.8        | 1686        | 32.6        |
| 481.wrf       | 4      | 868         | 51.5        | <u>867</u>  | <u>51.5</u> | 867         | 51.5        | 4      | 868         | 51.5        | <u>867</u>  | <u>51.5</u> | 867         | 51.5        |
| 482.sphinx3   | 4      | 1563        | 49.9        | <u>1575</u> | <u>49.5</u> | 1582        | 49.3        | 4      | <u>1553</u> | <u>50.2</u> | 1555        | 50.1        | 1552        | 50.2        |

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

### Operating System Notes

taskset utility used to bind CPU(s) to processes

### Base Compiler Invocation

C benchmarks:  
pathcc

C++ benchmarks:  
pathCC

Fortran benchmarks:  
pathf95

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Test date: Feb-2007

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Hardware Availability: Feb-2007

Tested by: IBM Corporation

Software Availability: Aug-2006

## Base Compiler Invocation (Continued)

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:
-march=auto -Ofast

C++ benchmarks:
-march=auto -Ofast

Fortran benchmarks:
-march=auto -Ofast

Benchmarks using both Fortran and C:
-march=auto -Ofast

```

## Base Other Flags

```

C benchmarks:
-IPA:max_jobs=2

C++ benchmarks:
-IPA:max_jobs=2

```

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## Base Other Flags (Continued)

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

## Peak Optimization Flags

C benchmarks:

-march=auto -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast

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## Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -march=auto -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2)  
-Ofast

447.dealII: -march=auto -Ofast -m32 -fno-exceptions

450.soplex: -march=auto -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 -fno-exceptions

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

Fortran benchmarks:

410.bwaves: -march=auto -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: -march=auto -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2)  
-O2 -OPT:Ofast -OPT:ro=3 -OPT:unroll\_size=256

434.zeusmp: -march=auto -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: -march=auto -Ofast -LNO:fission=2 -LNO:prefetch=0

465.tonto: -march=auto -Ofast -CG:local\_fwd\_sched=on -IPA:plimit=525

Benchmarks using both Fortran and C:

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

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

454.calculix: -march=auto -Ofast -CG:prefetch=off -LNO:simd=0  
-OPT:unroll\_times\_max=8 -WOPT:mem\_opnds=on

481.wrf: basepeak = yes



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## 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.20090714.17.html](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090714.17.html)

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

[http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090714.17.xml](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090714.17.xml)

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