# SPEC® CFP2006 Result

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## IBM Corporation

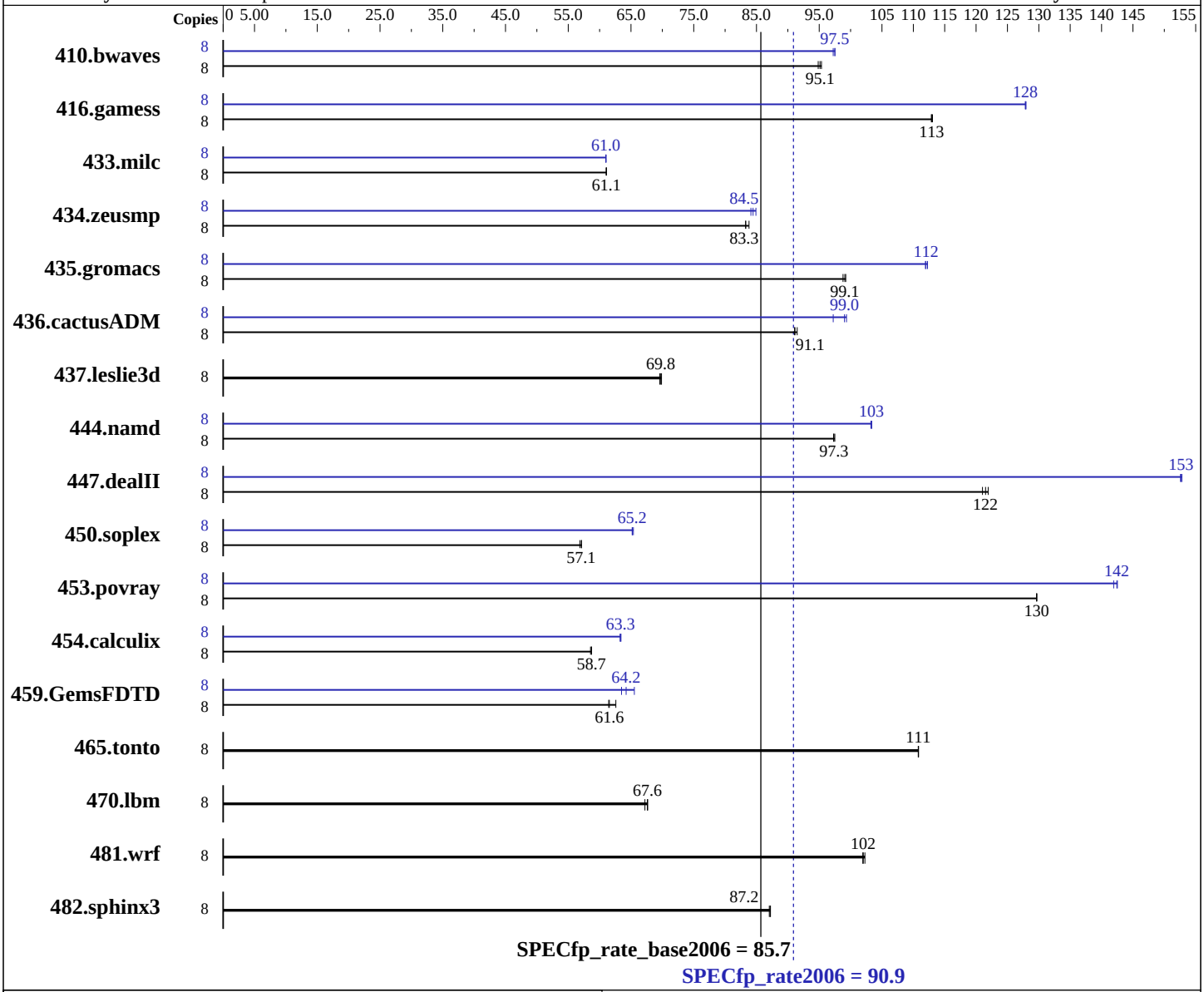
## IBM System x3755 (AMD Opteron 8220)

**SPECfp®_rate2006 = 90.9**

**SPECfp_rate_base2006 = 85.7**

**CPU2006 license:** 11
**Test sponsor:** IBM Corporation
**Tested by:** IBM Corporation

**Test date:** Jul-2007
**Hardware Availability:** Apr-2007
**Software Availability:** Mar-2007




### Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 8220 |
| CPU Characteristics: | |
| CPU MHz: | 2800 |
| FPU: | Integrated |
| CPU(s) enabled: | 8 cores, 4 chips, 2 cores/chip |
| CPU(s) orderable: | 1, 2, 3, 4 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: 32 GB (16 x 2GB DDR2-5300 ECC)
Disk Subsystem: 1 x 36 GB SAS, 15000 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 | 8 | **1143** | **95.1** | 1140 | 95.4 | 1146 | 94.8 | 8 | 1115 | 97.5 | 1118 | 97.2 | **1115** | **97.5** |
| 416.gamess | 8 | 1388 | 113 | **1387** | **113** | 1386 | 113 | 8 | 1224 | 128 | 1225 | 128 | **1225** | **128** |
| 433.milc | 8 | 1202 | 61.1 | 1203 | 61.1 | **1203** | **61.1** | 8 | 1204 | 61.0 | 1204 | 61.0 | **1204** | **61.0** |
| 434.zeusmp | 8 | 869 | 83.8 | 874 | 83.3 | **874** | **83.3** | 8 | **862** | **84.5** | 865 | 84.1 | 857 | 84.9 |
| 435.gromacs | 8 | 578 | 98.8 | **576** | **99.1** | 576 | 99.2 | 8 | 510 | 112 | 509 | 112 | **510** | **112** |
| 436.cactusADM | 8 | 1045 | 91.5 | **1049** | **91.1** | 1050 | 91.1 | 8 | **965** | **99.0** | 983 | 97.2 | 962 | 99.3 |
| 437.leslie3d | 8 | 1081 | 69.6 | **1078** | **69.8** | 1076 | 69.9 | 8 | 1081 | 69.6 | **1078** | **69.8** | 1076 | 69.9 |
| 444.namd | 8 | **659** | **97.3** | 658 | 97.5 | 659 | 97.3 | 8 | 621 | 103 | 622 | 103 | **621** | **103** |
| 447.dealII | 8 | **753** | **122** | 751 | 122 | 756 | 121 | 8 | 599 | 153 | 600 | 153 | **599** | **153** |
| 450.soplex | 8 | **1169** | **57.1** | 1174 | 56.8 | 1168 | 57.1 | 8 | 1020 | 65.4 | **1023** | **65.2** | 1023 | 65.2 |
| 453.povray | 8 | 328 | 130 | **328** | **130** | 328 | 130 | 8 | 299 | 143 | **299** | **142** | 300 | 142 |
| 454.calculix | 8 | 1124 | 58.7 | **1125** | **58.7** | 1127 | 58.6 | 8 | 1041 | 63.4 | 1043 | 63.3 | **1042** | **63.3** |
| 459.GemsFDTD | 8 | 1381 | 61.4 | 1356 | 62.6 | **1379** | **61.6** | 8 | 1337 | 63.5 | **1322** | **64.2** | 1295 | 65.5 |
| 465.tonto | 8 | **710** | **111** | 710 | 111 | 711 | 111 | 8 | **710** | **111** | 710 | 111 | 711 | 111 |
| 470.lbm | 8 | 1635 | 67.2 | 1625 | 67.7 | **1626** | **67.6** | 8 | 1635 | 67.2 | 1625 | 67.7 | **1626** | **67.6** |
| 481.wrf | 8 | 874 | 102 | **876** | **102** | 877 | 102 | 8 | 874 | 102 | **876** | **102** | 877 | 102 |
| 482.sphinx3 | 8 | 1787 | 87.2 | **1789** | **87.2** | 1791 | 87.0 | 8 | 1787 | 87.2 | **1789** | **87.2** | 1791 | 87.0 |

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

Continued on next page

## 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`

# 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.dealII: `-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`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/CPU2006_flags.20090714.13.xml`


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