# SPEC® CFP2006 Result

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## IBM Corporation

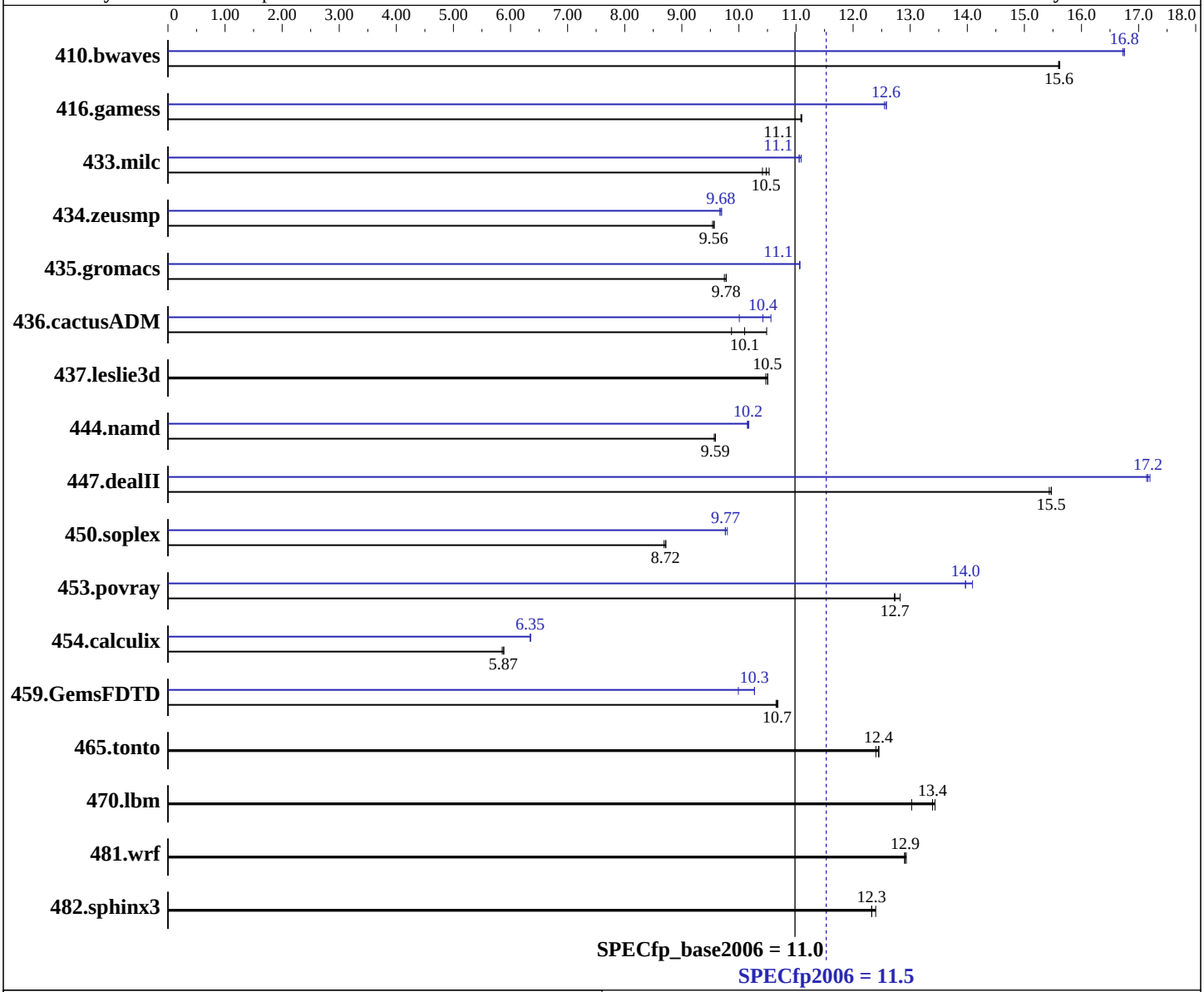
## IBM System x3455 (AMD Opteron 2214)

SPECfp®2006 = 11.5

SPECfp_base2006 = 11.0

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

**Test date:** Aug-2007
**Hardware Availability:** Oct-2006
**Software Availability:** Mar-2007




### Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 2214 |
| CPU Characteristics: | |
| CPU MHz: | 2200 |
| 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 160 GB Serial ATA, 7200 RPM
Other Hardware: None

Other Software: None

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 870 | 15.6 | 871 | 15.6 | **871** | **15.6** | 811 | 16.8 | 813 | 16.7 | **811** | **16.8** |
| 416.gamess | **1765** | **11.1** | 1766 | 11.1 | 1764 | 11.1 | 1560 | 12.5 | 1556 | 12.6 | **1556** | **12.6** |
| 433.milc | **876** | **10.5** | 882 | 10.4 | 872 | 10.5 | **830** | **11.1** | 830 | 11.1 | 828 | 11.1 |
| 434.zeusmp | **952** | **9.56** | 954 | 9.54 | 951 | 9.57 | 938 | 9.70 | **940** | **9.68** | 941 | 9.67 |
| 435.gromacs | 733 | 9.74 | **730** | **9.78** | 730 | 9.78 | 645 | 11.1 | **645** | **11.1** | 645 | 11.1 |
| 436.cactusADM | 1211 | 9.87 | **1183** | **10.1** | 1140 | 10.5 | 1131 | 10.6 | **1147** | **10.4** | 1194 | 10.0 |
| 437.leslie3d | 895 | 10.5 | **895** | **10.5** | 898 | 10.5 | 895 | 10.5 | **895** | **10.5** | 898 | 10.5 |
| 444.namd | 836 | 9.59 | 838 | 9.57 | **837** | **9.59** | 788 | 10.2 | 790 | 10.1 | **790** | **10.2** |
| 447.dealII | 741 | 15.4 | **740** | **15.5** | 739 | 15.5 | 665 | 17.2 | **667** | **17.2** | 667 | 17.1 |
| 450.soplex | **957** | **8.72** | 960 | 8.69 | 956 | 8.72 | **854** | **9.77** | 854 | 9.76 | 851 | 9.80 |
| 453.povray | 418 | 12.7 | 415 | 12.8 | **418** | **12.7** | 381 | 14.0 | 378 | 14.1 | **381** | **14.0** |
| 454.calculix | 1402 | 5.88 | **1405** | **5.87** | 1409 | 5.85 | 1300 | 6.34 | **1300** | **6.35** | 1299 | 6.35 |
| 459.GemsFDTD | **995** | **10.7** | 993 | 10.7 | 996 | 10.7 | **1033** | **10.3** | 1033 | 10.3 | 1062 | 9.99 |
| 465.tonto | 790 | 12.5 | **791** | **12.4** | 794 | 12.4 | 790 | 12.5 | **791** | **12.4** | 794 | 12.4 |
| 470.lbm | 1023 | 13.4 | **1026** | **13.4** | 1055 | 13.0 | 1023 | 13.4 | **1026** | **13.4** | 1055 | 13.0 |
| 481.wrf | 864 | 12.9 | 866 | 12.9 | **865** | **12.9** | 864 | 12.9 | 866 | 12.9 | **865** | **12.9** |
| 482.sphinx3 | **1581** | **12.3** | 1581 | 12.3 | 1572 | 12.4 | **1581** | **12.3** | 1581 | 12.3 | 1572 | 12.4 |

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`

Continued on next page

## 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`

# 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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