# SPEC® CFP2006 Result

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## IBM Corporation

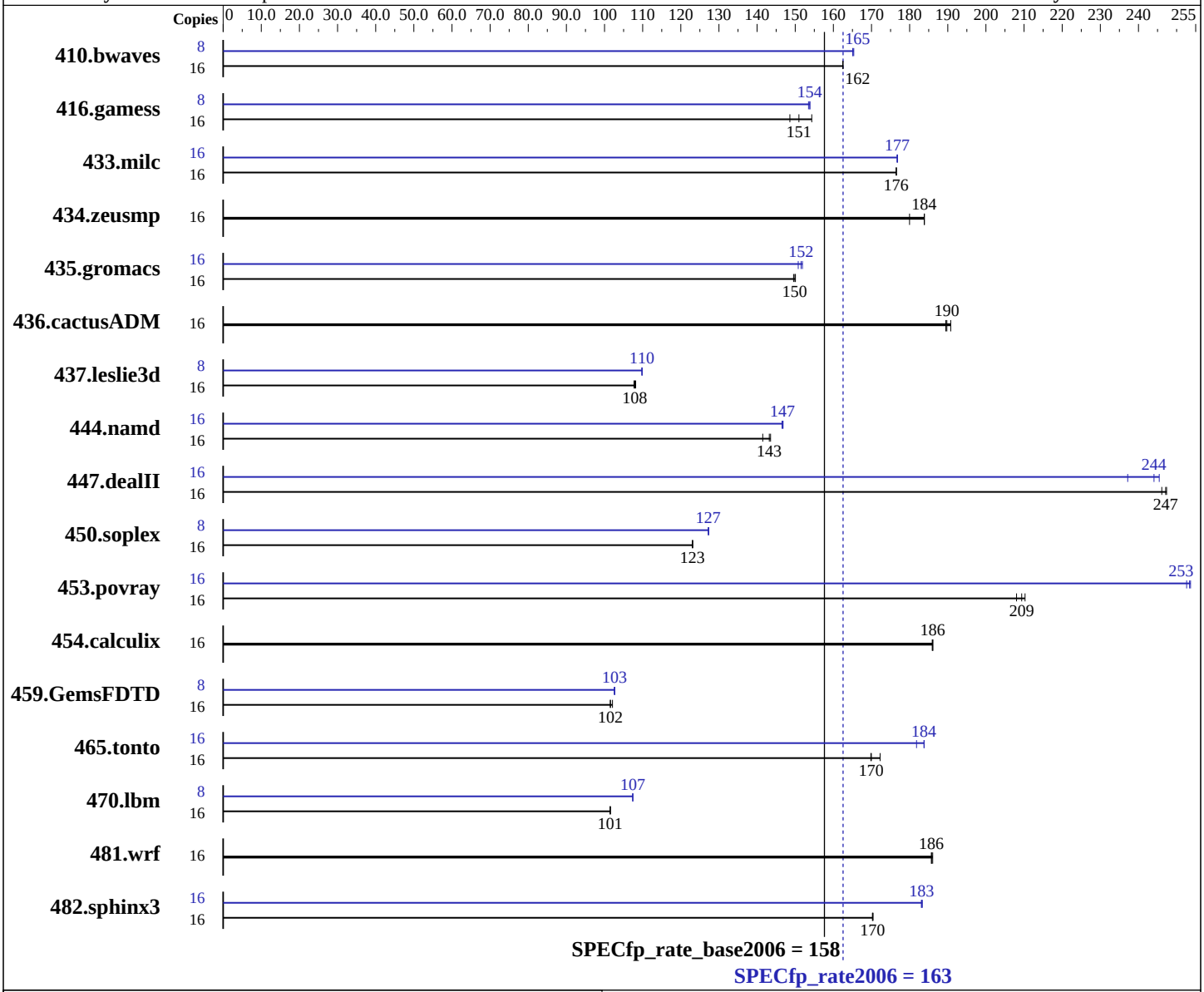
## IBM System x3400 M3 (Intel Xeon E5520)

SPECfp®_rate2006 = 163

SPECfp_rate_base2006 = 158

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

**Test date:** Jun-2010
**Hardware Availability:** Jun-2010
**Software Availability:** Jan-2010




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5520 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.53 GHz |
| CPU MHz: | 2267 |
| FPU: | Integrated |
| CPU(s) enabled: | 8 cores, 2 chips, 4 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 |

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## Software

| | |
|---|---|
| Operating System: | SuSe Linux Enterprise Server 11 (x86_64), Kernel 2.6.27.19-5-default |
| Compiler: | Intel C++ and Fortran Professional Compiler for IA32 and Intel 64, Version 11.1 Build 20091130 Package ID: l_cproc_p_11.1.064, l_cprof_p_11.1.064 |
| Auto Parallel: | No |
| File System: | ext3 |
| System State: | Run level 3 (multi-user) |

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L3 Cache: 8 MB I+D on chip per chip
Other Cache: None
Memory: 48 GB (12 x 4 GB PC3-10600R CL9, 2 Rank)
Disk Subsystem: 1 x 73 GB SAS, 15000 RPM
Other Hardware: None

Base Pointers: 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 | 16 | **1338** | **162** | 1338 | 163 | 1339 | 162 | 8 | **658** | **165** | 657 | 165 | 659 | 165 |
| 416.gamess | 16 | 2030 | 154 | **2075** | **151** | 2108 | 149 | 8 | 1018 | 154 | **1018** | **154** | 1021 | 153 |
| 433.milc | 16 | **832** | **176** | 832 | 177 | 832 | 176 | 16 | 831 | 177 | 831 | 177 | **831** | **177** |
| 434.zeusmp | 16 | 809 | 180 | 792 | 184 | **792** | **184** | 16 | 809 | 180 | 792 | 184 | **792** | **184** |
| 435.gromacs | 16 | **762** | **150** | 761 | 150 | 764 | 150 | 16 | 758 | 151 | 752 | 152 | **754** | **152** |
| 436.cactusADM | 16 | **1008** | **190** | 1009 | 189 | 1002 | 191 | 16 | **1008** | **190** | 1009 | 189 | 1002 | 191 |
| 437.leslie3d | 16 | 1396 | 108 | **1393** | **108** | 1390 | 108 | 8 | 685 | 110 | **685** | **110** | 684 | 110 |
| 444.namd | 16 | **896** | **143** | 894 | 144 | 907 | 141 | 16 | **875** | **147** | 876 | 147 | 874 | 147 |
| 447.dealII | 16 | 740 | 247 | **741** | **247** | 744 | 246 | 16 | 772 | 237 | **750** | **244** | 746 | 245 |
| 450.soplex | 16 | 1084 | 123 | **1084** | **123** | 1084 | 123 | 8 | 525 | 127 | 524 | 127 | **524** | **127** |
| 453.povray | 16 | 409 | 208 | **407** | **209** | 405 | 210 | 16 | 337 | 253 | **336** | **253** | 336 | 254 |
| 454.calculix | 16 | 710 | 186 | **709** | **186** | 709 | 186 | 16 | 710 | 186 | **709** | **186** | 709 | 186 |
| 459.GemsFDTD | 16 | 1673 | 101 | **1671** | **102** | 1663 | 102 | 8 | 828 | 103 | 826 | 103 | **827** | **103** |
| 465.tonto | 16 | 914 | 172 | **926** | **170** | 927 | 170 | 16 | 866 | 182 | 857 | 184 | **857** | **184** |
| 470.lbm | 16 | 2165 | 102 | **2166** | **101** | 2167 | 101 | 8 | 1023 | 107 | **1023** | **107** | 1023 | 107 |
| 481.wrf | 16 | 962 | 186 | 961 | 186 | **962** | **186** | 16 | 962 | 186 | 961 | 186 | **962** | **186** |
| 482.sphinx3 | 16 | 1830 | 170 | **1831** | **170** | 1832 | 170 | 16 | **1702** | **183** | 1701 | 183 | 1703 | 183 |

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

## Submit Notes

```
The config file option 'submit' was used.
 numactl was used to bind copies to the cores
```

## Platform Notes

```
 Turbo Mode Enable
 Turbo Boost set to Traditional
 CPU C State Enable
```

## General Notes

```
Binaries were compiled on SLES 10 with Binutils 2.18.50.0.7.20080502
'ulimit -s unlimited' was used to set the stack size to unlimited prior to run
```

## 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.dealII: -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

## Base Optimization Flags

C benchmarks:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static
```

C++ benchmarks:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static
```

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## Base Optimization Flags (Continued)

Fortran benchmarks:
`-xSSE4.2 -ipo -O3 -no-prec-div -static`

Benchmarks using both Fortran and C:
`-xSSE4.2 -ipo -O3 -no-prec-div -static`

## 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.dealII: `-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`

# Peak Optimization Flags

C benchmarks:

433.milc: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -fno-alias -opt-prefetch

470.lbm: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -opt-malloc-options=3 -ansi-alias -auto-ilp32

482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -static -unroll2

C++ benchmarks:

444.namd: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -unroll2 -ansi-alias -scalar-rep-

450.soplex: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -opt-malloc-options=3

453.povray: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: -xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch

416.gamess: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -unroll2 -Ob0 -ansi-alias -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: -xSSE4.2 -ipo -O3 -no-prec-div -static

459.GemsFDTD: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -unroll2 -Ob0

465.tonto: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2) -unroll4 -auto -inline-calloc -opt-malloc-options=3

Continued on next page

# Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: `-xSSE4.2`(pass 2) `-prof-gen`(pass 1) `-ipo`(pass 2) `-O3`(pass 2) `-no-prec-div`(pass 2) `-static`(pass 2) `-prof-use`(pass 2) `-opt-prefetch -auto-ilp32`

436.cactusADM: `basepeak = yes`

454.calculix: `basepeak = yes`

481.wrf: `basepeak = yes`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/Intel-ic11.1-linux64-revE.20100804.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/Intel-ic11.1-linux64-revE.20100804.xml`


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