



# SPEC® CFP2006 Result

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## Sun Microsystems Sun Blade X8440

SPECfp®\_rate2006 = 156

SPECfp\_rate\_base2006 = 144

CPU2006 license: 6

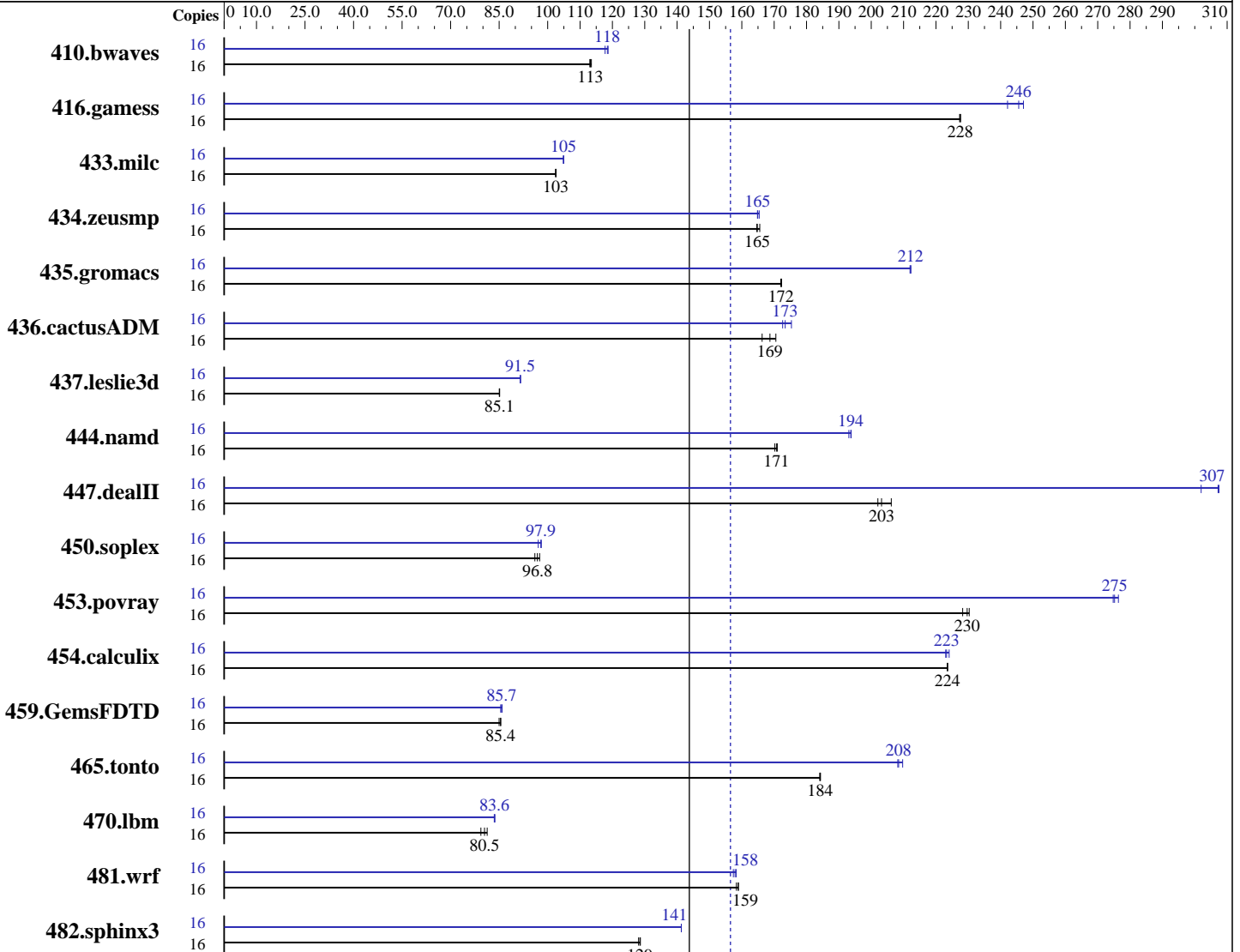
Test sponsor: Sun Microsystems

Tested by: Sun Microsystems

Test date: May-2008

Hardware Availability: May-2008

Software Availability: May-2008



SPECfp\_rate\_base2006 = 144

SPECfp\_rate2006 = 156

### Hardware

CPU Name: AMD Opteron 8356  
 CPU Characteristics:  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip  
 CPU(s) orderable: 2,4 chips  
 Primary Cache: 64 KB I + 64 KB D on chip per core  
 Secondary Cache: 512 KB I+D on chip per core

Continued on next page

### Software

Operating System: SuSE Linux Enterprise Server 10 (x86\_64) SP1, Kernel 2.6.16.46-0.12-smp  
 Compiler: PGI Server Complete Version 7.2 PathScale Compiler Suite Version 3.1  
 Auto Parallel: No  
 File System: ext3  
 System State: Runlevel 3 (Full multiuser with network)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit

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L3 Cache: 2 MB I+D on chip per chip  
Other Cache: None  
Memory: 64 GB (16x4GB, DDR2-667, CL5, Reg, Dual Rank)  
Disk Subsystem: SAS, 72 GB, 10 K RPM  
Other Hardware: None

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     | 1924        | 113        | 1916        | 114         | <u>1921</u> | <u>113</u>  | 16     | 1847        | 118         | 1832        | 119         | <u>1836</u> | <u>118</u> |
| 416.gamess    | 16     | 1378        | 227        | <u>1377</u> | <u>228</u>  | 1376        | 228         | 16     | <u>1276</u> | <u>246</u>  | 1294        | 242         | 1268        | 247        |
| 433.milc      | 16     | <u>1433</u> | <u>103</u> | 1434        | 102         | 1432        | 103         | 16     | <u>1400</u> | <u>105</u>  | 1401        | 105         | 1399        | 105        |
| 434.zeusmp    | 16     | 884         | 165        | 879         | 166         | <u>884</u>  | <u>165</u>  | 16     | 880         | 165         | <u>883</u>  | <u>165</u>  | 883         | 165        |
| 435.gromacs   | 16     | 664         | 172        | <u>664</u>  | <u>172</u>  | 663         | 172         | 16     | <u>538</u>  | <u>212</u>  | 538         | 212         | 539         | 212        |
| 436.cactusADM | 16     | <u>1133</u> | <u>169</u> | 1150        | 166         | 1121        | 171         | 16     | 1090        | 175         | 1108        | 173         | <u>1103</u> | <u>173</u> |
| 437.leslie3d  | 16     | 1766        | 85.2       | <u>1767</u> | <u>85.1</u> | 1769        | 85.0        | 16     | <u>1643</u> | <u>91.5</u> | 1643        | 91.5        | 1642        | 91.6       |
| 444.namd      | 16     | 754         | 170        | <u>751</u>  | <u>171</u>  | 751         | 171         | 16     | 665         | 193         | 662         | 194         | <u>663</u>  | <u>194</u> |
| 447.dealII    | 16     | 888         | 206        | <u>901</u>  | <u>203</u>  | 906         | 202         | 16     | 595         | 307         | 606         | 302         | <u>596</u>  | <u>307</u> |
| 450.soplex    | 16     | 1389        | 96.0       | <u>1378</u> | <u>96.8</u> | 1368        | 97.5        | 16     | 1375        | 97.1        | <u>1363</u> | <u>97.9</u> | 1361        | 98.0       |
| 453.povray    | 16     | 373         | 228        | <u>371</u>  | <u>230</u>  | 370         | 230         | 16     | 310         | 275         | 308         | 276         | <u>309</u>  | <u>275</u> |
| 454.calculix  | 16     | 591         | 224        | 590         | 224         | <u>590</u>  | <u>224</u>  | 16     | <u>591</u>  | <u>223</u>  | 592         | 223         | 589         | 224        |
| 459.GemsFDTD  | 16     | 1985        | 85.5       | <u>1987</u> | <u>85.4</u> | 1998        | 85.0        | 16     | 1986        | 85.5        | <u>1980</u> | <u>85.7</u> | 1976        | 85.9       |
| 465.tonto     | 16     | 855         | 184        | 854         | 184         | <u>855</u>  | <u>184</u>  | 16     | <u>755</u>  | <u>208</u>  | 751         | 210         | 756         | 208        |
| 470.lbm       | 16     | 2704        | 81.3       | 2770        | 79.4        | <u>2732</u> | <u>80.5</u> | 16     | 2627        | 83.7        | <u>2630</u> | <u>83.6</u> | 2633        | 83.5       |
| 481.wrf       | 16     | 1124        | 159        | 1129        | 158         | <u>1125</u> | <u>159</u>  | 16     | <u>1132</u> | <u>158</u>  | 1136        | 157         | 1129        | 158        |
| 482.sphinx3   | 16     | 2435        | 128        | <u>2427</u> | <u>129</u>  | 2424        | 129         | 16     | 2207        | 141         | 2207        | 141         | <u>2207</u> | <u>141</u> |

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

## Operating System Notes

'numactl' was used to bind copies to the cores  
Environment variable PGI\_HUGE\_PAGES set to 150  
'ulimit -s unlimited' was used to set environment stack size  
'ulimit -l 4915200' was used to set environment locked pages in memory quantity  
Set vm/nr\_hugepages=14336 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

## Platform Notes

Default BIOS settings were used.



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CPU2006 license: 6  
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Tested by: Sun Microsystems

Test date: May-2008  
Hardware Availability: May-2008  
Software Availability: May-2008

## Base Compiler Invocation

C benchmarks:  
pgcc  
C++ benchmarks:  
pgcpp  
Fortran benchmarks:  
pgf95  
Benchmarks using both Fortran and C:  
pgcc pgf95

## 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 -Mnomain  
436.cactusADM: -DSPEC\_CPU\_LP64 -Mnomain  
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 -Mnomain  
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:  
-fast -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed  
-Msmartalloc=huge:150 -tp barcelona-64 -Bstatic\_pgi  
C++ benchmarks:  
-fast -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed  
-Msmartalloc=huge:150 --zc\_eh -tp barcelona-64 -Bstatic\_pgi  
Fortran benchmarks:  
-fast -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed  
-Msmartalloc=huge:150 -tp barcelona-64 -Bstatic\_pgi

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Software Availability: May-2008

## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

-fast -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed  
-Msmartalloc=huge:150 -tp barcelona-64 -Bstatic\_pgi

## Base Other Flags

C benchmarks:

-w

C++ benchmarks:

-w

Fortran benchmarks:

-w

Benchmarks using both Fortran and C:

-w

## Peak Compiler Invocation

C benchmarks (except as noted below):

pathcc

433.milc: pgcc

C++ benchmarks (except as noted below):

pathCC

444.namd: pgcpp

Fortran benchmarks (except as noted below):

pathf95

410.bwaves: pgf95

434.zeusmp: pgf95

Benchmarks using both Fortran and C (except as noted below):

pgcc pgf95

436.cactusADM: pathcc pathf95

481.wrf: pathcc pathf95



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## 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 -Mnomain
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -Mnomain
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: -fastsse -Msmartalloc=huge:150 -Msafeptr -Mfprelaxed
-Mipa=jobs:4 -Mipa=inline -Mipa=arg -Mipa=const -Mipa=ptr
-Mipa=shape -tp barcelona-64 -Bstatic_pgi

470.lbm: -march=barcelona -Ofast -m3dnow

482.sphinx3: -march=barcelona -Ofast
```

### C++ benchmarks:

```
444.namd: -Mpfi(pass 1) -Mipa=jobs:4(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -Mpfo(pass 2) -fast -Mfprelaxed
-Msmartalloc=huge:150 --zc_eh -Mnodepchk -Munroll=n:4
-Munroll=m:8 -tp barcelona-64 -Bstatic_pgi

447.dealIII: -march=barcelona -Ofast -static -INLINE:aggressive=on
-OPT:malloc_alg=1 -m32 -fno-exceptions

450.soplex: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -m32 -O3 -TENV:frame_pointer=off
-LNO:prefetch=1

453.povray: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -CG:load_exe=0
```

### Fortran benchmarks:

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## Peak Optimization Flags (Continued)

410.bwaves: -Mphi(pass 1) -Mipa=jobs:4(pass 2) -Mipa=fast(pass 2)  
-Mipa=inline(pass 2) -Mpfo(pass 2) -fastsse -Mfprelaxed  
-Msmartalloc -Mprefetch=distance:12 -Mprefetch=nta  
-tp barcelona-64 -Bstatic\_pgi

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

434.zeusmp: -fastsse -Mfprelaxed -Msmartalloc=huge:150 -Mipa=jobs:4  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

437.leslie3d: -march=barcelona -Ofast -m3dnow -OPT:unroll\_size=256  
-CG:load\_exe=0 -OPT:malloc\_alg=1

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2  
-OPT:malloc\_alg=1

465.tonto: -march=barcelona -Ofast -OPT:malloc\_alg=1  
-OPT:alias=no\_f90\_pointer\_alias -LNO:blocking=off  
-CG:load\_exe=1 -IPA:plimit=525

Benchmarks using both Fortran and C:

435.gromacs: -fast -Mfpapprox=rsqrt -Mipa=jobs:4 -Mipa=fast  
-Mipa=inline -Mfprelaxed -Msmartalloc=huge:150  
-tp barcelona-64 -Bstatic\_pgi

436.cactusADM: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -WOPT:aggstr=0

454.calculix: -fastsse -Mfprelaxed -Msmartalloc=huge:150 -Mipa=jobs:4  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

481.wrf: -march=barcelona -Ofast -LNO:blocking=off  
-LNO:prefetch\_ahead=10 -OPT:malloc\_alg=1 -m3dnow  
-LANG:copyinout=off -IPA:callee\_limit=5000

## Peak Other Flags

C benchmarks:

433.milc: -w

C++ benchmarks:

444.namd: -w

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## Peak Other Flags (Continued)

Fortran benchmarks:

410.bwaves: -w

434.zeusmp: -w

Benchmarks using both Fortran and C:

435.gromacs: -w

454.calculix: -w

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

<http://www.spec.org/cpu2006/flags/amd123GH-flags.20090713.html>

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

<http://www.spec.org/cpu2006/flags/amd123GH-flags.20090713.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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