



# SPEC® CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Dell Inc.

SPECfp®\_rate2006 = 77.8

PowerEdge 2970 (AMD Opteron 2347 HE, 1.9 GHz)

SPECfp\_rate\_base2006 = 71.0

CPU2006 license: 55

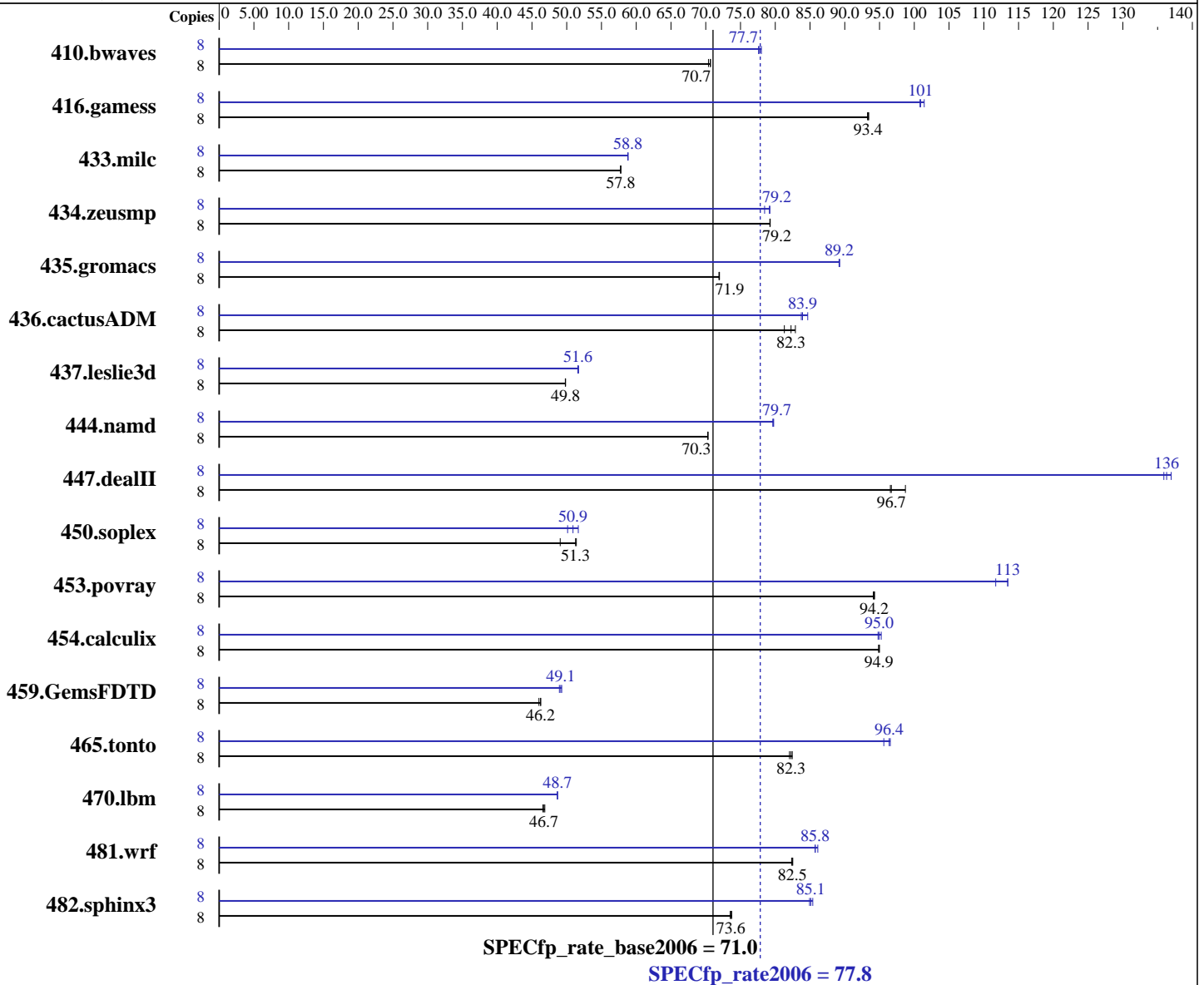
Test date: Jun-2008

Test sponsor: Dell Inc.

Hardware Availability: Apr-2008

Tested by: Dell Inc.

Software Availability: Jun-2008



### Hardware

CPU Name: AMD Opteron 2347 HE  
 CPU Characteristics:  
 CPU MHz: 1900  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 64 KB I + 64 KB D on chip per core  
 Secondary Cache: 512 KB I+D on chip per core

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### 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: ReiserFS  
 System State: Run level 3 (multi-user)  
 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: 16 GB (4 x 4GB, DDR2-667, CL5)  
Disk Subsystem: 1 x 73GB 2.5" SAS 10000 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	8	1545	70.4	1538	70.7	<u>1539</u>	<u>70.7</u>	8	1394	78.0	<u>1398</u>	<u>77.7</u>	1401	77.6
416.gamess	8	1676	93.4	1679	93.3	<u>1678</u>	<u>93.4</u>	8	<u>1552</u>	<u>101</u>	1544	101	1554	101
433.milc	8	<u>1271</u>	<u>57.8</u>	1272	57.8	1271	57.8	8	1249	58.8	1249	58.8	<u>1249</u>	<u>58.8</u>
434.zeusmp	8	918	79.3	919	79.2	<u>919</u>	<u>79.2</u>	8	919	79.2	<u>920</u>	<u>79.2</u>	928	78.5
435.gromacs	8	<u>794</u>	<u>71.9</u>	794	71.9	794	72.0	8	<u>640</u>	<u>89.2</u>	640	89.3	641	89.2
436.cactusADM	8	1176	81.3	<u>1162</u>	<u>82.3</u>	1153	82.9	8	1142	83.7	1129	84.7	<u>1139</u>	<u>83.9</u>
437.leslie3d	8	1509	49.8	<u>1510</u>	<u>49.8</u>	1510	49.8	8	<u>1457</u>	<u>51.6</u>	1457	51.6	1454	51.7
444.namd	8	913	70.3	912	70.3	<u>913</u>	<u>70.3</u>	8	<u>805</u>	<u>79.7</u>	805	79.7	804	79.8
447.dealII	8	927	98.7	<u>946</u>	<u>96.7</u>	948	96.6	8	668	137	<u>671</u>	<u>136</u>	673	136
450.soplex	8	1360	49.1	1298	51.4	<u>1301</u>	<u>51.3</u>	8	1331	50.1	<u>1311</u>	<u>50.9</u>	1291	51.7
453.povray	8	<u>452</u>	<u>94.2</u>	451	94.3	452	94.1	8	381	112	<u>375</u>	<u>113</u>	375	113
454.calculix	8	695	95.0	<u>695</u>	<u>94.9</u>	696	94.9	8	696	94.8	<u>695</u>	<u>95.0</u>	693	95.2
459.GemsFDTD	8	1835	46.3	<u>1836</u>	<u>46.2</u>	1845	46.0	8	1734	48.9	1722	49.3	<u>1727</u>	<u>49.1</u>
465.tonto	8	<u>957</u>	<u>82.3</u>	955	82.4	959	82.0	8	823	95.6	815	96.6	<u>817</u>	<u>96.4</u>
470.lbm	8	2346	46.9	2360	46.6	<u>2352</u>	<u>46.7</u>	8	2259	48.7	2259	48.7	<u>2259</u>	<u>48.7</u>
481.wrf	8	<u>1084</u>	<u>82.5</u>	1085	82.4	1083	82.5	8	1042	85.7	<u>1042</u>	<u>85.8</u>	1038	86.1
482.sphinx3	8	2121	73.5	2114	73.7	<u>2118</u>	<u>73.6</u>	8	1836	84.9	<u>1832</u>	<u>85.1</u>	1826	85.4

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
mount -t hugetlbfs nodev /mnt/hugepages
'ulimit -l 2097152' was used to set environment locked pages in memory limit
Set vm/nr_hugepages=1200 in /etc/sysctl.conf
```

## Base Compiler Invocation

C benchmarks:  
pgcc

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## Base Compiler Invocation (Continued)

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=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150
-tp barcelona-64 -Bstatic_pgi

```

C++ benchmarks:

```

-fast -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150
--zc_eh -tp barcelona-64 -Bstatic_pgi

```

Fortran benchmarks:

```

-fast -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150
-tp barcelona-64 -Bstatic_pgi

```

Benchmarks using both Fortran and C:

```

-fast -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150
-tp barcelona-64 -Bstatic_pgi

```



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## Base Other Flags

C benchmarks:  
-w -Mipa=jobs:4

C++ benchmarks:  
-w -Mipa=jobs:4

Fortran benchmarks:  
-w -Mipa=jobs:4

Benchmarks using both Fortran and C:  
-w -Mipa=jobs:4

## 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

## 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

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## Peak Portability Flags (Continued)

```

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=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: -Mphi(pass 1) -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.deallI: -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:

```

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

```

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## Peak Optimization Flags (Continued)

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=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=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=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 -Mipa=jobs:4

C++ benchmarks:

444.namd: -w -Mipa=jobs:4(pass 2)

Fortran benchmarks:

410.bwaves: -w -Mipa=jobs:4(pass 2)

434.zeusmp: -w -Mipa=jobs:4

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## Peak Other Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: -w -Mipa=jobs:4

454.calculix: -w -Mipa=jobs:4

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

<http://www.spec.org/cpu2006/flags/amd421GH-flags.20090713.01.html>

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

<http://www.spec.org/cpu2006/flags/amd421GH-flags.20090713.01.xml>

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