



# SPEC<sup>®</sup> CFP2006 Result

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Dell Inc.

SPECfp<sup>®</sup>\_rate2006 = 82.5

PowerEdge R805 (AMD Opteron 2352, 2.10 GHz)

SPECfp\_rate\_base2006 = 75.2

CPU2006 license: 55

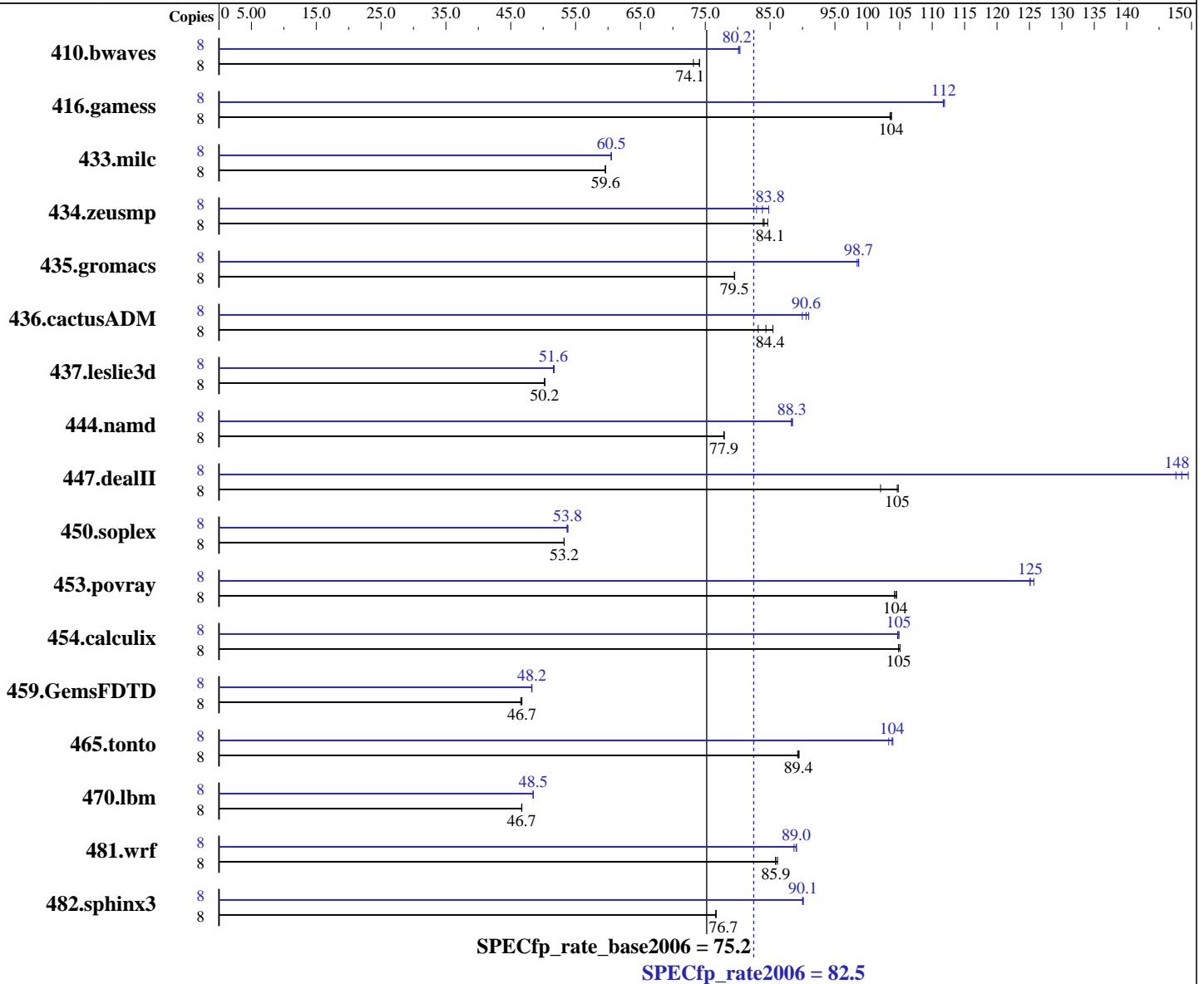
Test date: Apr-2008

Test sponsor: Dell Inc.

Hardware Availability: Apr-2008

Tested by: Dell Inc.

Software Availability: May-2008



### Hardware

CPU Name: AMD Opteron 2352  
 CPU Characteristics:  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip  
 CPU(s) orderable: 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 (8 x 2 GB, DDR2-667, CL5, Reg, Dual Rank)  
Disk Subsystem: 1 x 73 GB SAS, 15000 RPM  
Other Hardware: None

Other Software: --

## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	8	1486	73.2	<b>1467</b>	<b>74.1</b>	1467	74.1	8	1353	80.4	1357	80.1	<b>1355</b>	<b>80.2</b>		
416.gamess	8	1510	104	<b>1511</b>	<b>104</b>	1513	104	8	1402	112	1400	112	<b>1401</b>	<b>112</b>		
433.milc	8	1233	59.6	<b>1232</b>	<b>59.6</b>	1231	59.6	8	1213	60.5	<b>1214</b>	<b>60.5</b>	1214	60.5		
434.zeusmp	8	867	83.9	<b>866</b>	<b>84.1</b>	860	84.6	8	859	84.8	<b>869</b>	<b>83.8</b>	878	82.9		
435.gromacs	8	719	79.5	<b>718</b>	<b>79.5</b>	718	79.5	8	580	98.4	<b>579</b>	<b>98.7</b>	579	98.7		
436.cactusADM	8	1119	85.4	<b>1133</b>	<b>84.4</b>	1150	83.2	8	1051	91.0	1063	90.0	<b>1056</b>	<b>90.6</b>		
437.leslie3d	8	1497	50.2	1497	50.2	<b>1497</b>	<b>50.2</b>	8	1457	51.6	1455	51.7	<b>1457</b>	<b>51.6</b>		
444.namd	8	823	77.9	<b>824</b>	<b>77.9</b>	824	77.9	8	725	88.5	727	88.3	<b>726</b>	<b>88.3</b>		
447.dealII	8	897	102	874	105	<b>875</b>	<b>105</b>	8	620	148	612	149	<b>616</b>	<b>148</b>		
450.soplex	8	1254	53.2	<b>1253</b>	<b>53.2</b>	1253	53.2	8	1243	53.7	<b>1241</b>	<b>53.8</b>	1240	53.8		
453.povray	8	408	104	407	105	<b>408</b>	<b>104</b>	8	<b>340</b>	<b>125</b>	340	125	339	126		
454.calculix	8	628	105	630	105	<b>630</b>	<b>105</b>	8	<b>630</b>	<b>105</b>	629	105	631	105		
459.GemsFDTD	8	1824	46.5	<b>1817</b>	<b>46.7</b>	1817	46.7	8	1758	48.3	<b>1759</b>	<b>48.2</b>	1761	48.2		
465.tonto	8	882	89.2	<b>881</b>	<b>89.4</b>	880	89.5	8	757	104	762	103	<b>758</b>	<b>104</b>		
470.lbm	8	<b>2354</b>	<b>46.7</b>	2353	46.7	2355	46.7	8	<b>2268</b>	<b>48.5</b>	2268	48.5	2269	48.5		
481.wrf	8	1041	85.9	1037	86.2	<b>1041</b>	<b>85.9</b>	8	<b>1004</b>	<b>89.0</b>	1003	89.1	1008	88.7		
482.sphinx3	8	2035	76.6	<b>2034</b>	<b>76.7</b>	2034	76.7	8	1732	90.0	<b>1731</b>	<b>90.1</b>	1730	90.1		

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 2457600' was used to set environment locked pages in memory quantity
Set /proc/sys/vm/nr_hugepages=1200
mount -t hugetlbfs nodev /mnt/hugepages
```

## 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=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

Benchmarks using both Fortran and C:

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



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## 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

## 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=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: -Mphi(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.dealII: -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=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

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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=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

Fortran benchmarks:

410.bwaves: -w

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## Peak Other Flags (Continued)

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.20090714.02.html>

You can also download the XML flags source by saving the following link:  
<http://www.spec.org/cpu2006/flags/amd123GH-flags.20090714.02.xml>

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