



SPEC[®] CFP2006 Result

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Dell Inc.

SPECfp[®]_rate2006 = 73.8

PowerEdge 2970 (AMD Opteron 2344 HE, 1.7 GHz)

SPECfp_rate_base2006 = 67.4

CPU2006 license: 55

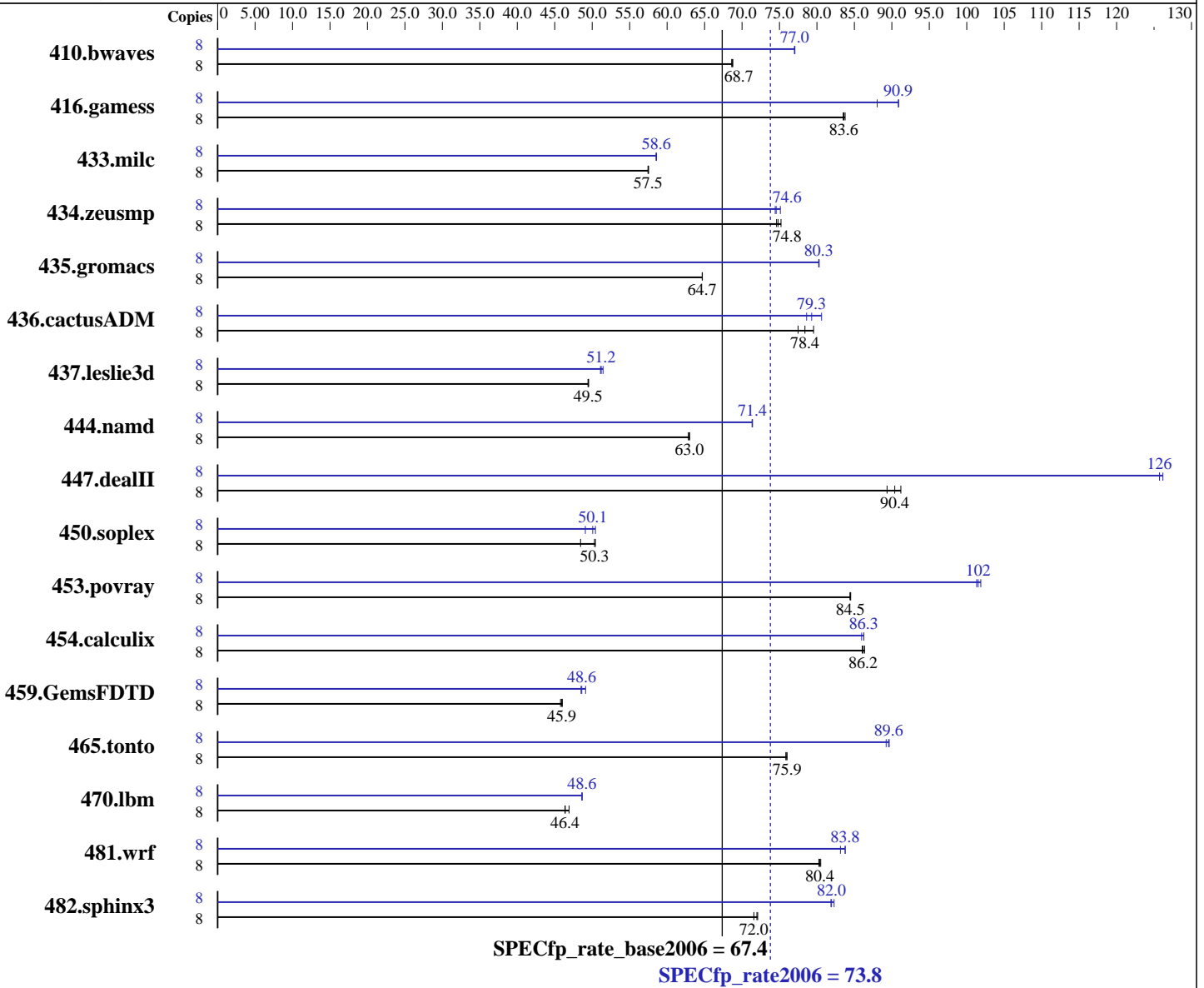
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: May-2008

Hardware Availability: Apr-2008

Software Availability: Jun-2008



Hardware

CPU Name: AMD Opteron 2344 HE
 CPU Characteristics:
 CPU MHz: 1700
 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	1585	68.6	<u>1582</u>	<u>68.7</u>	1581	68.8	8	<u>1411</u>	<u>77.0</u>	1411	77.1	1412	77.0
416.gamess	8	1876	83.5	1870	83.8	<u>1874</u>	<u>83.6</u>	8	1723	90.9	1779	88.0	<u>1724</u>	<u>90.9</u>
433.milc	8	<u>1278</u>	<u>57.5</u>	1278	57.5	1277	57.5	8	1255	58.5	<u>1254</u>	<u>58.6</u>	1254	58.6
434.zeusmp	8	976	74.6	<u>973</u>	<u>74.8</u>	968	75.2	8	969	75.1	978	74.4	<u>976</u>	<u>74.6</u>
435.gromacs	8	883	64.7	<u>883</u>	<u>64.7</u>	883	64.7	8	711	80.3	<u>712</u>	<u>80.3</u>	712	80.2
436.cactusADM	8	1234	77.5	<u>1219</u>	<u>78.4</u>	1202	79.6	8	1216	78.6	1186	80.6	<u>1206</u>	<u>79.3</u>
437.leslie3d	8	1521	49.4	<u>1520</u>	<u>49.5</u>	1518	49.5	8	1471	51.1	1462	51.4	<u>1469</u>	<u>51.2</u>
444.namd	8	1021	62.8	<u>1019</u>	<u>63.0</u>	1018	63.0	8	899	71.3	<u>899</u>	<u>71.4</u>	899	71.4
447.dealII	8	1003	91.2	<u>1013</u>	<u>90.4</u>	1024	89.4	8	<u>728</u>	<u>126</u>	725	126	728	126
450.soplex	8	1377	48.4	1323	50.4	<u>1326</u>	<u>50.3</u>	8	1359	49.1	<u>1333</u>	<u>50.1</u>	1323	50.4
453.povray	8	504	84.5	<u>504</u>	<u>84.5</u>	504	84.4	8	<u>419</u>	<u>102</u>	420	101	418	102
454.calculix	8	764	86.4	767	86.0	<u>766</u>	<u>86.2</u>	8	<u>765</u>	<u>86.3</u>	765	86.3	768	86.0
459.GemsFDTD	8	1845	46.0	<u>1848</u>	<u>45.9</u>	1854	45.8	8	1728	49.1	<u>1746</u>	<u>48.6</u>	1750	48.5
465.tonto	8	1036	76.0	<u>1037</u>	<u>75.9</u>	1038	75.9	8	<u>879</u>	<u>89.6</u>	878	89.6	882	89.2
470.lbm	8	<u>2369</u>	<u>46.4</u>	2370	46.4	2343	46.9	8	<u>2260</u>	<u>48.6</u>	2260	48.6	2260	48.6
481.wrf	8	1113	80.3	<u>1112</u>	<u>80.4</u>	1110	80.5	8	1075	83.1	<u>1067</u>	<u>83.8</u>	1067	83.8
482.sphinx3	8	2178	71.6	<u>2166</u>	<u>72.0</u>	2163	72.1	8	<u>1903</u>	<u>82.0</u>	1895	82.3	1904	81.9

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 2097152' was used to set environment locked pages in memory limit
mount -t hugetlbfs nodev /mnt/hugepages
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 -Mnodepchck -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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