



# SPEC<sup>®</sup> CFP2006 Result

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## Dell Inc.

### SPECfp<sup>®</sup>\_rate2006 = 46.3

### PowerEdge T105 (AMD Opteron 1352, 2.1 GHz)

### SPECfp\_rate\_base2006 = 41.6

CPU2006 license: 55

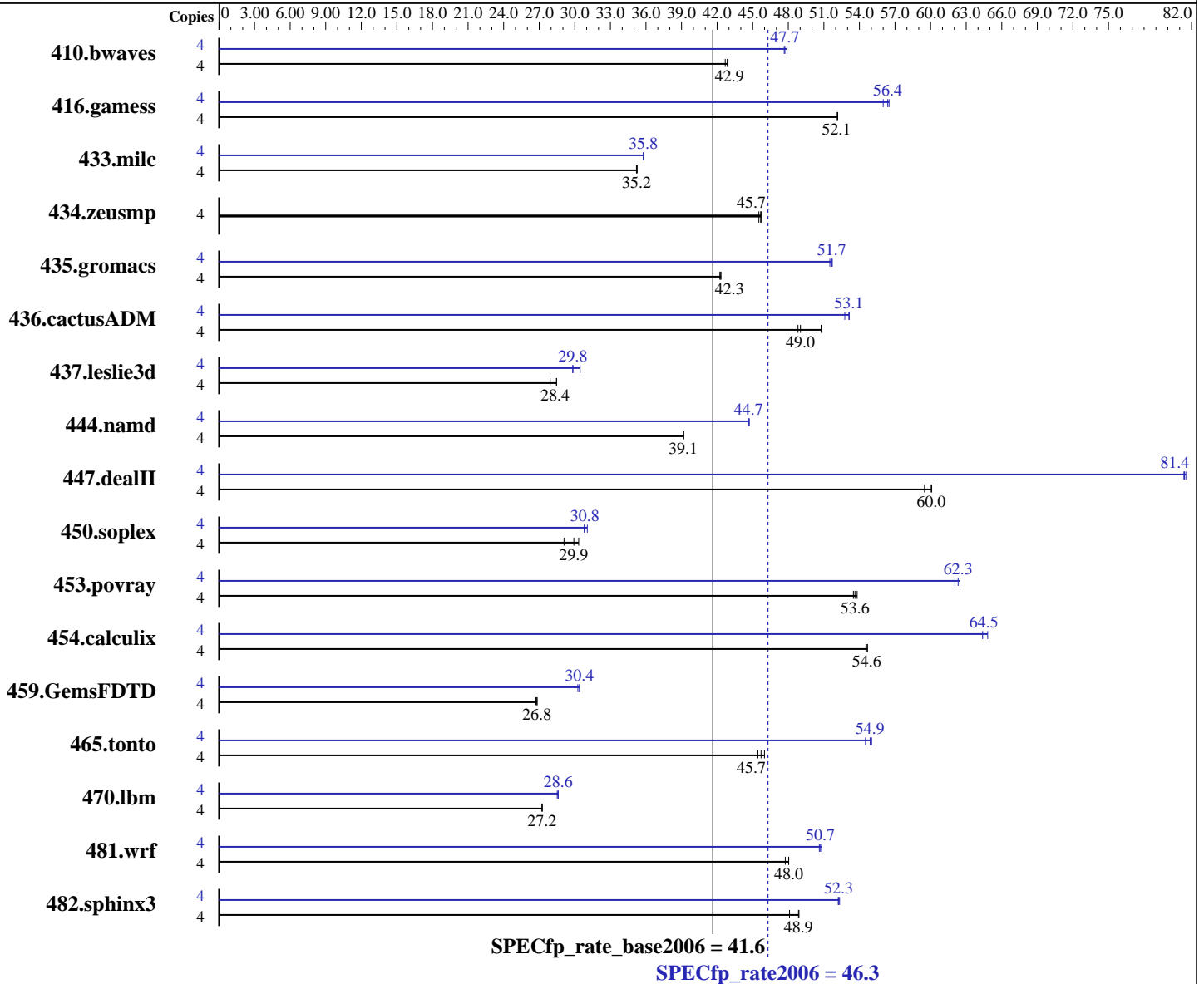
Test date: Jun-2008

Test sponsor: Dell Inc.

Hardware Availability: May-2008

Tested by: Dell Inc.

Software Availability: Jun-2008



#### Hardware

CPU Name: AMD Opteron 1352  
 CPU Characteristics: 2100  
 CPU MHz: Integrated  
 FPU: 4 cores, 1 chip, 4 cores/chip  
 CPU(s) enabled: 1 chip  
 CPU(s) orderable: 64 KB I + 64 KB D on chip per core  
 Primary Cache: 512 KB I+D on chip per core  
 Secondary Cache:

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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 3.2  
 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: 8 GB (4 x 2GB 800 MHz DDR2)  
Disk Subsystem: 2 x 250GB SATA, 7200 RPM (RAID-0)  
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	4	1274	42.7	<u>1269</u>	<u>42.9</u>	1267	42.9	4	1135	47.9	<u>1139</u>	<u>47.7</u>	1141	47.7
416.gamess	4	<u>1504</u>	<u>52.1</u>	1501	52.2	1505	52.1	4	1399	56.0	<u>1389</u>	<u>56.4</u>	1386	56.5
433.milc	4	1041	35.3	1043	35.2	<u>1042</u>	<u>35.2</u>	4	1025	35.8	1026	35.8	<u>1026</u>	<u>35.8</u>
434.zeusmp	4	800	45.5	<u>797</u>	<u>45.7</u>	796	45.7	4	800	45.5	<u>797</u>	<u>45.7</u>	796	45.7
435.gromacs	4	<u>676</u>	<u>42.3</u>	675	42.3	676	42.2	4	<u>553</u>	<u>51.7</u>	552	51.7	555	51.5
436.cactusADM	4	979	48.8	941	50.8	<u>975</u>	<u>49.0</u>	4	<u>900</u>	<u>53.1</u>	899	53.1	906	52.8
437.leslie3d	4	1321	28.5	1347	27.9	<u>1326</u>	<u>28.4</u>	4	1235	30.4	<u>1260</u>	<u>29.8</u>	1260	29.8
444.namd	4	820	39.1	<u>820</u>	<u>39.1</u>	819	39.2	4	719	44.6	<u>718</u>	<u>44.7</u>	717	44.7
447.dealII	4	769	59.5	<u>762</u>	<u>60.0</u>	761	60.1	4	561	81.5	<u>562</u>	<u>81.4</u>	562	81.4
450.soplex	4	1147	29.1	<u>1115</u>	<u>29.9</u>	1100	30.3	4	1083	30.8	<u>1082</u>	<u>30.8</u>	1074	31.1
453.povray	4	398	53.5	<u>397</u>	<u>53.6</u>	395	53.8	4	343	62.0	<u>341</u>	<u>62.3</u>	341	62.5
454.calculix	4	605	54.5	<u>604</u>	<u>54.6</u>	603	54.7	4	<u>512</u>	<u>64.5</u>	509	64.8	513	64.4
459.GemsFDTD	4	1588	26.7	<u>1583</u>	<u>26.8</u>	1582	26.8	4	1403	30.3	<u>1396</u>	<u>30.4</u>	1396	30.4
465.tonto	4	<u>861</u>	<u>45.7</u>	856	46.0	866	45.4	4	<u>717</u>	<u>54.9</u>	715	55.0	722	54.5
470.lbm	4	2017	27.3	<u>2017</u>	<u>27.2</u>	2018	27.2	4	1927	28.5	1922	28.6	<u>1922</u>	<u>28.6</u>
481.wrf	4	936	47.7	<u>930</u>	<u>48.0</u>	930	48.0	4	883	50.6	<u>881</u>	<u>50.7</u>	879	50.8
482.sphinx3	4	<u>1596</u>	<u>48.9</u>	1594	48.9	1621	48.1	4	<u>1492</u>	<u>52.3</u>	1493	52.2	1490	52.3

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 1228800' was used to set environment locked pages in memory limit
Set vm/nr_hugepages=600 in /etc/sysctl.conf
```

## Base Compiler Invocation

C benchmarks:  
gcc

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

C++ benchmarks:  
 -fastsse -Msmartalloc=huge:150 -Mfprelaxed --zc\_eh -Mipa=fast  
 -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

Fortran benchmarks:  
 -fastsse -Mfprelaxed -Msmartalloc=huge:150 -Mipa=fast -Mipa=inline  
 -tp barcelona-64 -Bstatic\_pgi

Benchmarks using both Fortran and C:  
 -fastsse -Msmartalloc=huge:150 -Mfprelaxed -Mipa=fast -Mipa=inline  
 -tp barcelona-64 -Bstatic\_pgi



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## Base Other Flags

C benchmarks:

-Mipa=jobs:4

C++ benchmarks:

-Mipa=jobs:4

Fortran benchmarks:

-Mipa=jobs:4

Benchmarks using both Fortran and C:

-Mipa=jobs:4

## Peak Compiler Invocation

C benchmarks (except as noted below):

pgcc

470.lbm: pathcc

C++ benchmarks (except as noted below):

pathCC

444.namd: pgcpp

Fortran benchmarks (except as noted below):

pgf95

416.gamess: pathf95

459.GemsFDTD: pathf95

465.tonto: pathf95

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

pgcc pgf95

436.cactusADM: 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
447.dealII: -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

```

## 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 -CG:sse_cse_regs=0
-CG:locs_shallow_depth=1 -m3dnow

482.sphinx3: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Mfprelaxed -Msmartalloc -tp barcelona-64 -Bstatic_pgi

```

C++ benchmarks:

```

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

447.dealII: -march=barcelona -Ofast -static -INLINE:aggressive=on
-fno-exceptions -m32

450.soplex: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -TENV:frame_pointer=off
-LNO:prefetch=1 -OPT:malloc_alg=1 -CG:load_exe=0 -m32

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

```

Fortran benchmarks:

```

410.bwaves: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -fastsse -Msmartalloc
-Mprefetch=distance:12 -Mprefetch=nta -Mpre -Mfprelaxed

```

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## Peak Optimization Flags (Continued)

410.bwaves (continued):

-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: basepeak = yes

437.leslie3d: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)

-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse

-Mvect=fuse -Msmartalloc=huge:150 -Mprefetch=distance:8

-Mprefetch=t0 -Mfprelaxed -tp barcelona-64 -Bstatic\_pgi

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2

-LNO:prefetch\_ahead=1 -CG:load\_exe=0

465.tonto: -march=barcelona -Ofast -OPT:alias=no\_f90\_pointer\_alias

-LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525

Benchmarks using both Fortran and C:

435.gromacs: -fastsse -Msmartalloc=huge:150 -Mfprelaxed -Mfpapprox=rsqrt

-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

436.cactusADM: -march=barcelona -fb\_create fbdata(pass 1)

-fb\_opt fbdata(pass 2) -Ofast -LNO:blocking=off

454.calculix: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)

-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse

-Msmartalloc=huge:150 -Mprefetch=t0 -Mpre -Mfprelaxed

-tp barcelona-64 -Bstatic\_pgi

481.wrf: -fastsse -Mvect=noaltcode -Msmartalloc

-Mprefetch=distance:8 -Mfprelaxed -tp barcelona-64

-Bstatic\_pgi

## Peak Other Flags

C benchmarks (except as noted below):

-Mipa=jobs:4(pass 2)

470.lbm: No flags used

C++ benchmarks:

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

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## Peak Other Flags (Continued)

Fortran benchmarks (except as noted below):

-Mipa=jobs:4(pass 2)

416.gamess: No flags used

459.GemsFDTD: No flags used

465.tonto: No flags used

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

-Mipa=jobs:4(pass 2)

436.cactusADM: No flags used

481.wrf: No flags used

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

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