



# SPEC® CFP2006 Result

Copyright 2006-2016 Standard Performance Evaluation Corporation

Dell Inc.

SPECfp®2006 = 14.2

PowerEdge M905 (AMD Opteron 8356, 2.3 GHz)

SPECfp\_base2006 = 12.4

CPU2006 license: 55

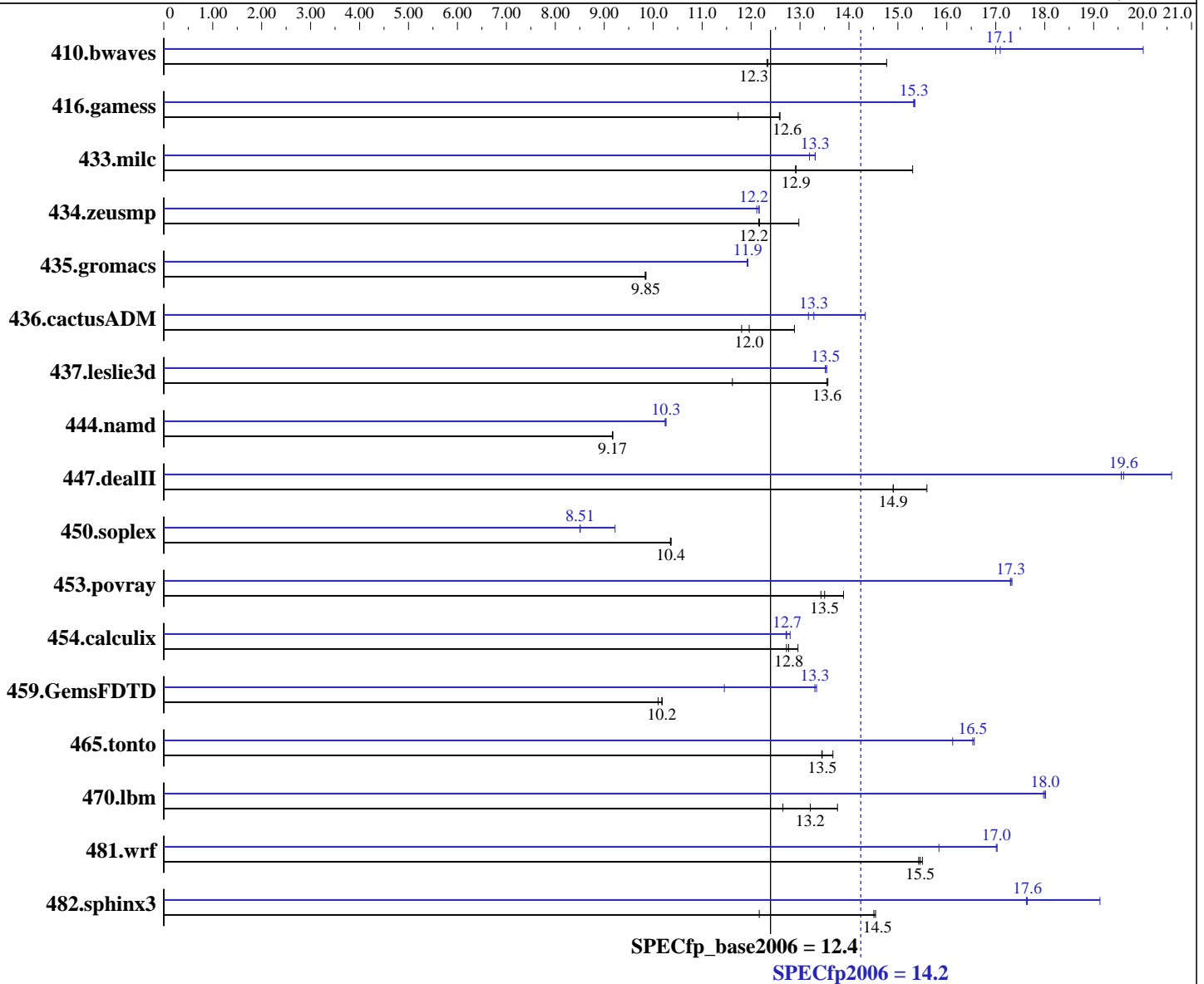
Test date: Aug-2008

Test sponsor: Dell Inc.

Hardware Availability: Aug-2008

Tested by: Dell Inc.

Software Availability: May-2008



### 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: 4 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) SP2, Kernel 2.6.16-60.0.21-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: 32 GB (16 x 2 GB, DDR2-667, CL5, Reg, Dual Rank)  
 Disk Subsystem: 1 x 36 GB SAS 15000 RPM (OS), 1 x 73 GB SAS 10000 RPM (CPU2006)  
 Other Hardware: None

Other Software: None

## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	920	14.8	<b><u>1101</u></b>	<b><u>12.3</u></b>	1103	12.3	<b><u>679</u></b>	20.0	<b><u>795</u></b>	<b><u>17.1</u></b>	800	17.0
416.gamess	1668	11.7	1555	12.6	<b><u>1557</u></b>	<b><u>12.6</u></b>	<b><u>1277</u></b>	<b><u>15.3</u></b>	1278	15.3	1276	15.3
433.milc	600	15.3	<b><u>711</u></b>	<b><u>12.9</u></b>	711	12.9	<b><u>690</u></b>	13.3	<b><u>690</u></b>	<b><u>13.3</u></b>	696	13.2
434.zeusmp	701	13.0	<b><u>748</u></b>	<b><u>12.2</u></b>	749	12.2	<b><u>748</u></b>	<b><u>12.2</u></b>	751	12.1	748	12.2
435.gromacs	<b><u>725</u></b>	<b><u>9.85</u></b>	726	9.84	725	9.85	<b><u>598</u></b>	11.9	<b><u>598</u></b>	<b><u>11.9</u></b>	599	11.9
436.cactusADM	927	12.9	<b><u>999</u></b>	<b><u>12.0</u></b>	1012	11.8	834	14.3	<b><u>900</u></b>	<b><u>13.3</u></b>	907	13.2
437.leslie3d	809	11.6	<b><u>694</u></b>	<b><u>13.6</u></b>	693	13.6	<b><u>695</u></b>	13.5	<b><u>695</u></b>	<b><u>13.5</u></b>	694	13.5
444.namd	875	9.17	<b><u>874</u></b>	<b><u>9.17</u></b>	874	9.17	<b><u>782</u></b>	<b><u>10.3</u></b>	782	10.3	783	10.2
447.dealII	<b><u>767</u></b>	<b><u>14.9</u></b>	768	14.9	734	15.6	<b><u>585</u></b>	19.6	556	20.6	<b><u>583</u></b>	<b><u>19.6</u></b>
450.soplex	<b><u>805</u></b>	<b><u>10.4</u></b>	804	10.4	806	10.4	904	9.22	980	8.51	<b><u>980</u></b>	<b><u>8.51</u></b>
453.povray	396	13.4	<b><u>394</u></b>	<b><u>13.5</u></b>	383	13.9	308	17.3	307	17.3	<b><u>307</u></b>	<b><u>17.3</u></b>
454.calculix	<b><u>646</u></b>	<b><u>12.8</u></b>	637	13.0	648	12.7	645	12.8	649	12.7	<b><u>648</u></b>	<b><u>12.7</u></b>
459.GemsFDTD	1042	10.2	1050	10.1	<b><u>1043</u></b>	<b><u>10.2</u></b>	795	13.3	926	11.5	<b><u>798</u></b>	<b><u>13.3</u></b>
465.tonto	720	13.7	732	13.4	<b><u>731</u></b>	<b><u>13.5</u></b>	<b><u>595</u></b>	<b><u>16.5</u></b>	594	16.6	610	16.1
470.lbm	<b><u>1040</u></b>	<b><u>13.2</u></b>	998	13.8	1086	12.7	<b><u>763</u></b>	18.0	764	18.0	<b><u>763</u></b>	<b><u>18.0</u></b>
481.wrf	<b><u>723</u></b>	<b><u>15.5</u></b>	721	15.5	724	15.4	<b><u>656</u></b>	17.0	705	15.8	<b><u>657</u></b>	<b><u>17.0</u></b>
482.sphinx3	1340	14.5	<b><u>1343</u></b>	<b><u>14.5</u></b>	1602	12.2	<b><u>1105</u></b>	<b><u>17.6</u></b>	1019	19.1	1106	17.6

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 = 2400 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

## Base Compiler Invocation

C benchmarks:  
pgcc

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CPU2006 license: 55

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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/amd123GH-flags.20090713.01.html>

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

<http://www.spec.org/cpu2006/flags/amd123GH-flags.20090713.01.xml>

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

Tested with SPEC CPU2006 v1.0.  
Report generated on Tue Sep 13 11:39:46 2016 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 2 September 2008.