



# SPEC<sup>®</sup> CFP2006 Result

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Dell Inc.

SPECfp<sup>®</sup>\_rate2006 = 115

PowerEdge M605 (AMD Opteron 2382, 2.60 GHz)

SPECfp\_rate\_base2006 = 103

CPU2006 license: 55

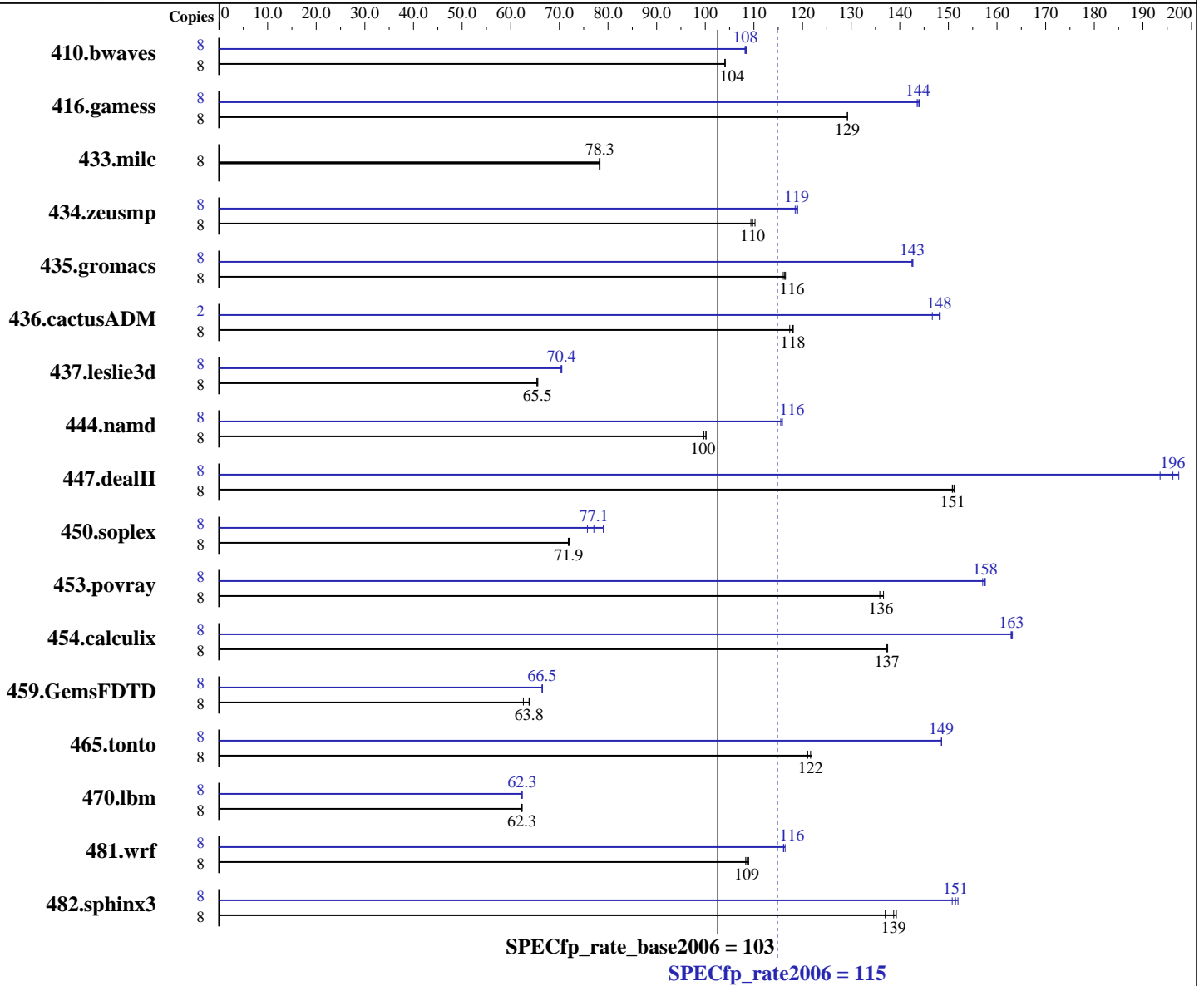
Test date: Nov-2008

Test sponsor: Dell Inc.

Hardware Availability: Nov-2008

Tested by: Dell Inc.

Software Availability: Oct-2008



## Hardware

CPU Name: AMD Opteron 2382  
 CPU Characteristics:  
 CPU MHz: 2600  
 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) SP2,  
 Kernel 2.6.16.60-0.21-smp  
 Compiler: PGI Server Complete Version 7.2  
 PathScale Compiler Suite Version 3.2  
 Auto Parallel: Yes  
 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: 6 MB I+D on chip per chip  
Other Cache: None  
Memory: 32 GB (8 x 4 GB DDR2-800)  
Disk Subsystem: 1 x 80 GB 5400 RPM SATA  
Other Hardware: None

Other Software: binutils 2.18  
32-bit and 64-bit libhugetlbfs libraries

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	8	1044	104	<b>1045</b>	<b>104</b>	1045	104	8	<b>1004</b>	<b>108</b>	1003	108	1005	108
416.gamess	8	1215	129	1212	129	<b>1212</b>	<b>129</b>	8	1091	144	1088	144	<b>1090</b>	<b>144</b>
433.milc	8	939	78.2	937	78.4	<b>938</b>	<b>78.3</b>	8	939	78.2	937	78.4	<b>938</b>	<b>78.3</b>
434.zeusmp	8	660	110	<b>663</b>	<b>110</b>	666	109	8	612	119	<b>613</b>	<b>119</b>	614	118
435.gromacs	8	492	116	<b>491</b>	<b>116</b>	490	117	8	401	143	400	143	<b>401</b>	<b>143</b>
436.cactusADM	8	<b>810</b>	<b>118</b>	815	117	809	118	2	163	147	<b>161</b>	<b>148</b>	161	148
437.leslie3d	8	<b>1149</b>	<b>65.5</b>	1150	65.4	1147	65.6	8	1069	70.3	1066	70.5	<b>1068</b>	<b>70.4</b>
444.namd	8	<b>641</b>	<b>100</b>	643	99.7	641	100	8	555	116	<b>554</b>	<b>116</b>	554	116
447.dealII	8	<b>607</b>	<b>151</b>	607	151	605	151	8	473	194	464	197	<b>467</b>	<b>196</b>
450.soplex	8	929	71.8	927	72.0	<b>928</b>	<b>71.9</b>	8	<b>865</b>	<b>77.1</b>	881	75.8	844	79.0
453.povray	8	311	137	313	136	<b>313</b>	<b>136</b>	8	<b>270</b>	<b>158</b>	271	157	270	158
454.calculix	8	480	138	<b>480</b>	<b>137</b>	481	137	8	404	163	405	163	<b>405</b>	<b>163</b>
459.GemsFDTD	8	1330	63.8	<b>1331</b>	<b>63.8</b>	1356	62.6	8	<b>1277</b>	<b>66.5</b>	1276	66.5	1277	66.4
465.tonto	8	<b>647</b>	<b>122</b>	650	121	646	122	8	531	148	<b>530</b>	<b>149</b>	530	149
470.lbm	8	1765	62.3	1764	62.3	<b>1764</b>	<b>62.3</b>	8	1763	62.3	<b>1764</b>	<b>62.3</b>	1764	62.3
481.wrf	8	825	108	<b>823</b>	<b>109</b>	820	109	8	<b>770</b>	<b>116</b>	768	116	770	116
482.sphinx3	8	1138	137	1119	139	<b>1124</b>	<b>139</b>	8	1026	152	1034	151	<b>1029</b>	<b>151</b>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores

## Operating System Notes

The libhugetlbfs libraries were installed using the installation rpms that came with the distribution.

'ulimit -s unlimited' was used to set environment stack size  
'ulimit -l 2097152' was used to set environment locked pages in memory limit

Set vm/nr\_hugepages=7168 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages



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## General Notes

Environment variables set by runspec before the start of the run:

HUGETLB\_MORECORE = "yes"

LD\_LIBRARY\_PATH = "/root/cpu2006\_1.1/amd909gh-libs/64:/root/cpu2006\_1.1/amd909gh-libs/32"

NCPUS = "4"

## Base Compiler Invocation

C benchmarks:

pgcc

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.deallI: -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:

-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

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## Base Optimization Flags (Continued)

C++ benchmarks:

-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed  
--zc\_eh -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

Fortran benchmarks:

-Mvect=cachesize:6291456 -fastsse -Mfprelaxed -Msmartalloc=huge  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

Benchmarks using both Fortran and C:

-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

## 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:

pgcc

C++ benchmarks (except as noted below):

pathCC

444.namd: pgcpp

Fortran benchmarks (except as noted below):

pathf95

410.bwaves: pgf95

434.zeusmp: pgf95

437.leslie3d: pgf95

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## Peak Compiler Invocation (Continued)

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

pgcc pgf95

435.gromacs: 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  
 436.cactusADM: -DSPEC\_CPU\_LP64 -Mnomain  
 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: basepeak = yes

470.lbm: -Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge  
-Mprefetch=t0 -Mloop32 -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

482.sphinx3: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2)  
-Mvect=cachesize:6291456 -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) -Mvect=cachesize:6291456 -fastsse  
-Munroll=n:4 -Munroll=m:8 -Msmartalloc=huge -Mnodepchk  
-Mfprelaxed --zc\_eh -tp barcelona-64 -Bstatic\_pgi

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## Peak Optimization Flags (Continued)

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

450.soplex: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -L/usr/lib -lhugetlbfs(pass 2) -O3  
-INLINE:aggressive=on -OPT:IEEE\_arith=3  
-OPT:IEEE\_NaN\_Inf=off -OPT:fold\_unsigned\_relops=on  
-OPT:malloc\_alg=1 -CG:load\_exe=0 -fno-exceptions -m32

453.povray: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on

### Fortran benchmarks:

410.bwaves: -Mvect=cachesize:6291456 -fastsse -Msmartalloc  
-Mprefetch=nta -Mfpelaxed -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

416.gamess: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2)  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT(pass 2)  
-L/usr/lib64 -lhugetlbfs(pass 2) -O2 -OPT:Ofast -OPT:ro=3  
-OPT:unroll\_size=256

434.zeusmp: -Mvect=cachesize:6291456 -fastsse -Mfpelaxed  
-Mprefetch=distance:8 -Mprefetch=t0 -Msmartalloc=huge  
-Msmartalloc=hugebss -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

437.leslie3d: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2)  
-Mvect=cachesize:6291456 -fastsse -Mvect=fuse  
-Msmartalloc=huge -Mprefetch=distance:8 -Mprefetch=t0  
-Mfpelaxed -tp barcelona-64 -Bstatic\_pgi

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2  
-LNO:prefetch\_ahead=1 -CG:load\_exe=0 -CG:prefer\_lru\_reg=off  
-OPT:malloc\_alg=1  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

465.tonto: -march=barcelona -Ofast -OPT:alias=no\_f90\_pointer\_alias  
-LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525  
-OPT:malloc\_alg=1  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

### Benchmarks using both Fortran and C:

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## Peak Optimization Flags (Continued)

435.gromacs: -march=barcelona -Ofast -OPT:rsqrt=2 -OPT:malloc\_alg=1  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

436.cactusADM: -Mvect=cachesize:6291456 -fastsse -Mconcur  
-Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

454.calculix: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2)  
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge  
-Mprefetch=t0 -Mpre -Mfprelaxed -tp barcelona-64  
-Bstatic\_pgi

481.wrf: -march=barcelona -Ofast -LNO:blocking=off  
-LNO:prefetch\_ahead=10 -LANG:copyinout=off  
-IPA:callee\_limit=5000 -GRA:prioritize\_by\_density=on  
-OPT:malloc\_alg=1 -m3dnow  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

## Peak Other Flags

C benchmarks:  
-Mipa=jobs:4(pass 2)

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

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)

435.gromacs: No flags used

481.wrf: No flags used



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The flags files that were used to format this result can be browsed at

- [http://www.spec.org/cpu2006/flags/pgi72\\_linux\\_flags.20090713.html](http://www.spec.org/cpu2006/flags/pgi72_linux_flags.20090713.html)
- [http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090710.html](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.html)
- <http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.html>

You can also download the XML flags sources by saving the following links:

- [http://www.spec.org/cpu2006/flags/pgi72\\_linux\\_flags.20090713.xml](http://www.spec.org/cpu2006/flags/pgi72_linux_flags.20090713.xml)
- [http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090710.xml](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.xml)
- <http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.xml>

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Tested with SPEC CPU2006 v1.1.  
Report generated on Tue Jul 22 21:37:12 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 24 December 2008.