



# SPEC® CFP2006 Result

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Dell Inc.

SPECfp®\_rate2006 = 131

PowerEdge M805 (AMD Opteron 2427, 2.20 GHz)

SPECfp\_rate\_base2006 = 118

CPU2006 license: 55

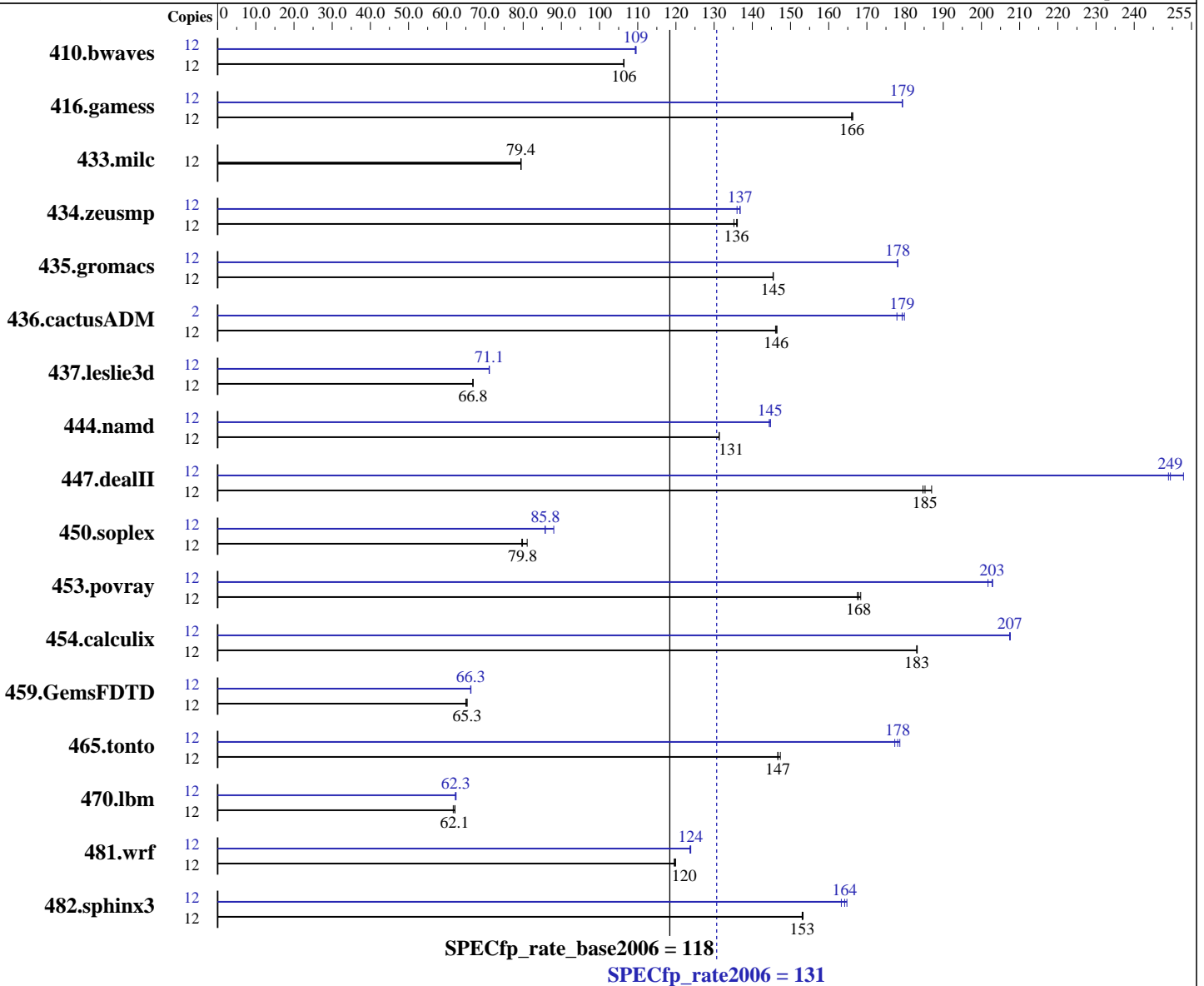
Test date: Aug-2009

Test sponsor: Dell Inc.

Hardware Availability: Jul-2009

Tested by: Dell Inc.

Software Availability: Apr-2009



### Hardware

CPU Name: AMD Opteron 2427  
 CPU Characteristics:  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 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: Red Hat Enterprise Linux Server release 5.3, Kernel 2.6.18-128.el5  
 Compiler: PGI Server Complete Version 8.0 x86 Open64 4.2.2 Compiler Suite (from AMD)  
 Auto Parallel: Yes  
 File System: ext3  
 System State: Run level 3 (Full multiuser with network)  
 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 73 GB 15000 RPM SAS  
Other Hardware: None

Other Software: binutils 2.18

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	12	1534	106	1532	106	<u>1533</u>	<u>106</u>	12	1488	110	<u>1490</u>	<u>109</u>	1491	109
416.gamess	12	1413	166	<u>1415</u>	<u>166</u>	1415	166	12	1311	179	1310	179	<u>1310</u>	<u>179</u>
433.milc	12	<u>1387</u>	<u>79.4</u>	1386	79.5	1387	79.4	12	<u>1387</u>	<u>79.4</u>	1386	79.5	1387	79.4
434.zeusmp	12	802	136	<u>804</u>	<u>136</u>	808	135	12	803	136	<u>798</u>	<u>137</u>	798	137
435.gromacs	12	589	145	589	145	<u>589</u>	<u>145</u>	12	481	178	<u>481</u>	<u>178</u>	481	178
436.cactusADM	12	979	146	982	146	<u>980</u>	<u>146</u>	2	134	178	<u>133</u>	<u>179</u>	133	180
437.leslie3d	12	1688	66.8	<u>1688</u>	<u>66.8</u>	1686	66.9	12	1587	71.1	1586	71.1	<u>1586</u>	<u>71.1</u>
444.namd	12	733	131	733	131	<u>733</u>	<u>131</u>	12	666	144	665	145	<u>665</u>	<u>145</u>
447.dealII	12	734	187	<u>741</u>	<u>185</u>	743	185	12	<u>550</u>	<u>249</u>	543	253	551	249
450.soplex	12	1257	79.6	<u>1254</u>	<u>79.8</u>	1235	81.0	12	<u>1166</u>	<u>85.8</u>	1167	85.7	1137	88.0
453.povray	12	379	168	381	168	<u>380</u>	<u>168</u>	12	<u>315</u>	<u>203</u>	316	202	315	203
454.calculix	12	<u>541</u>	<u>183</u>	540	183	541	183	12	477	207	477	208	<u>477</u>	<u>207</u>
459.GemsFDTD	12	1959	65.0	<u>1950</u>	<u>65.3</u>	1950	65.3	12	1922	66.3	1919	66.3	<u>1921</u>	<u>66.3</u>
465.tonto	12	<u>805</u>	<u>147</u>	801	147	805	147	12	<u>663</u>	<u>178</u>	666	177	661	179
470.lbm	12	2653	62.2	2673	61.7	<u>2656</u>	<u>62.1</u>	12	<u>2645</u>	<u>62.3</u>	2649	62.2	2640	62.4
481.wrf	12	1118	120	<u>1119</u>	<u>120</u>	1121	120	12	1084	124	<u>1082</u>	<u>124</u>	1082	124
482.sphinx3	12	1526	153	1528	153	<u>1528</u>	<u>153</u>	12	1419	165	1432	163	<u>1425</u>	<u>164</u>

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.  
See the configuration file for details.

## Operating System Notes

'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=5400 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\_LIMIT = "450"

LD\_LIBRARY\_PATH = "/root/cpu2006-1.1/amd0905is-libs/64:/root/cpu2006-1.1/amd0905is-libs/32"

NCPUS = "6"

PGI\_HUGE\_PAGES = "450"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at <http://developer.amd.com/cpu/open64>

## 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



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## Base Optimization Flags

C benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp shanghai-64 -Bstatic\_pgi

C++ benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed --zc\_eh -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

Fortran benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mvect=short -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

Benchmarks using both Fortran and C:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp shanghai-64 -Mvect=short -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):

openCC

444.namd: pgcpp

Fortran benchmarks (except as noted below):

openf95

410.bwaves: pgf95

Continued on next page



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## Peak Compiler Invocation (Continued)

434.zeusmp: pgf95

437.leslie3d: pgf95

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

pgcc pgf95

435.gromacs: opencc openf95

## 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\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
 482.sphinx3: -DSPEC\_CPU\_LP64

## Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

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

482.sphinx3: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse  
-Mfprelaxed -Msmartalloc -tp shanghai-64 -Bstatic\_pgi

C++ benchmarks:

444.namd: -Mphi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)  
-Mipa=inline(pass 2) -fastsse -Munroll=n:4 -Munroll=m:8  
-Msmartalloc=huge -Mnodepchk -Mfprelaxed --zc\_eh  
-tp shanghai-64 -Bstatic\_pgi

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## Peak Optimization Flags (Continued)

447.deallI: -march=barcelona -Ofast -static -INLINE:aggressive=on  
-LNO:opt=0 -Wf,-fno-exceptions -m32 -OPT:unroll\_times\_max=8  
-OPT:unroll\_size=256 -OPT:unroll\_level=2 -HP:bdt=2m:heap=2m  
-GRA:unspill=on -CG:cmp\_peep=on -TENV:frame\_pointer=off

450.soplex: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(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 -HP:bdt=2m

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

### Fortran benchmarks:

410.bwaves: -fastsse -Msmartalloc -Mprefetch=nta -Mfprelaxed  
-Mipa=fast -Mipa=inline -tp shanghai-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 -HP:bdt=2m:heap=2m

434.zeusmp: -fastsse -Mfprelaxed -Mprefetch=distance:8 -Mprefetch=t0  
-Msmartalloc=huge -Msmartalloc=hugebss -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

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

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2  
-LNO:prefetch\_ahead=1 -CG:load\_exe=0 -HP

465.tonto: -march=barcelona -Ofast -OPT:alias=no\_f90\_pointer\_alias  
-LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525 -HP

### Benchmarks using both Fortran and C:

435.gromacs: -march=barcelona -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m

436.cactusADM: -fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

454.calculix: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse  
-Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre

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## Peak Optimization Flags (Continued)

454.calculix (continued):

-Mfprelaxed -tp shanghai-64 -Bstatic\_pgi

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

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

-Bstatic\_pgi

## Peak Other Flags

C benchmarks:

-Mipa=jobs:4(pass 2)

C++ benchmarks:

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

Fortran benchmarks:

410.bwaves: -Mipa=jobs:4

434.zeusmp: -Mipa=jobs:4

437.leslie3d: -Mipa=jobs:4(pass 2)

Benchmarks using both Fortran and C:

436.cactusADM: -Mipa=jobs:4

454.calculix: -Mipa=jobs:4(pass 2)

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

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090914.html](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090914.html)

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.html>

<http://www.spec.org/cpu2006/flags/amd-platform.20090914.html>

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

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090914.xml](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090914.xml)

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

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