



# SPEC® CFP2006 Result

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## Dell Inc.

### SPECfp®\_rate2006 = 134

### PowerEdge R515 (AMD Opteron 4162 EE, 1.70 GHz)

### SPECfp\_rate\_base2006 = 123

CPU2006 license: 55

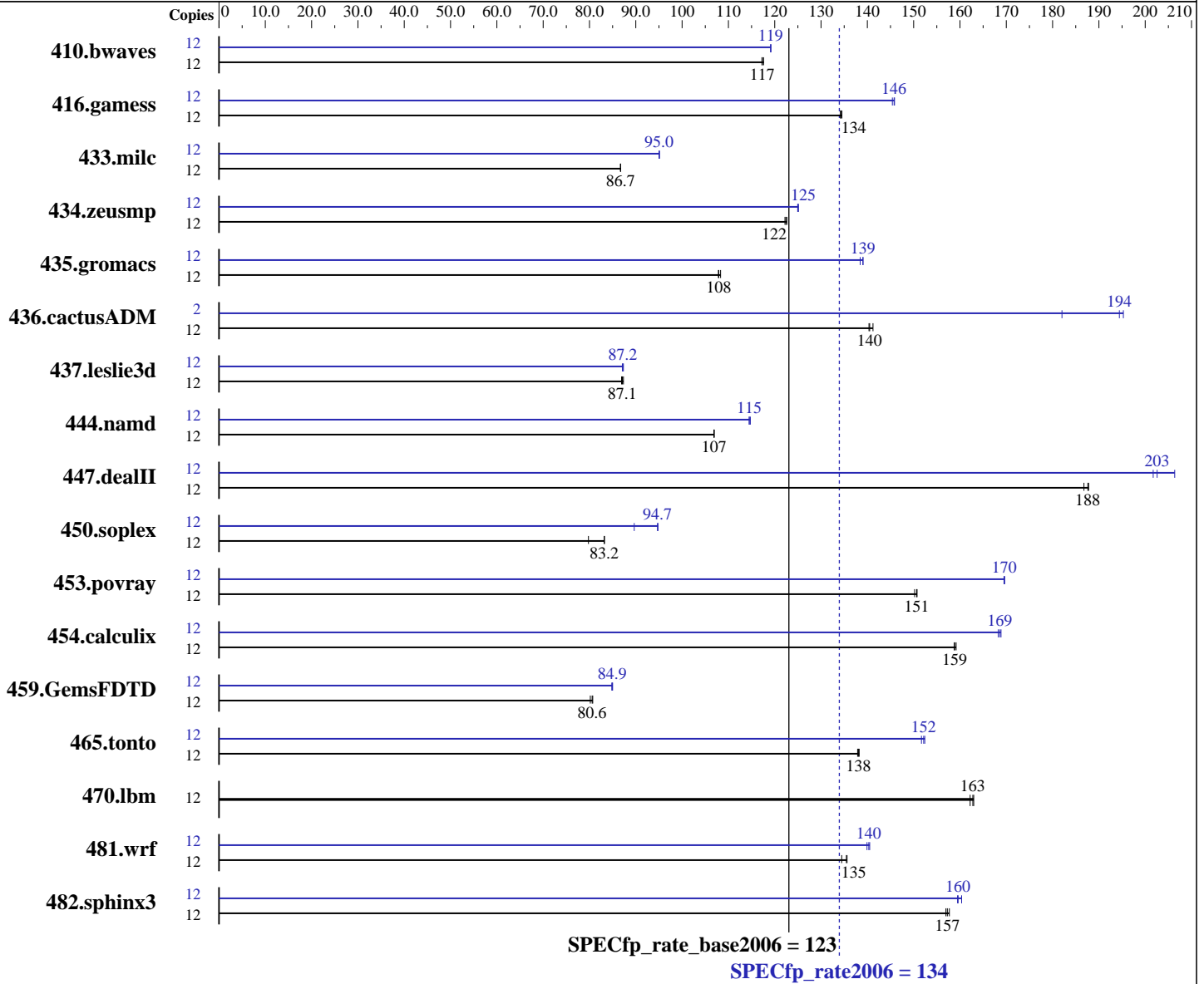
Test date: Jul-2010

Test sponsor: Dell Inc.

Hardware Availability: Jul-2010

Tested by: Dell Inc.

Software Availability: Jul-2010



#### Hardware

CPU Name: AMD Opteron 4162 EE  
 CPU Characteristics:  
 CPU MHz: 1700  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 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

#### Software

Operating System: SUSE Linux Enterprise Server 11 (x86\_64)  
 Kernel 2.6.27.19-5-default  
 Compiler: x86 Open64 4.2.4 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  
 Other Software: None

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L3 Cache: 6 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 32 GB (8 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 146 GB 10000 RPM SAS  
 Other Hardware: None

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	12	<b><u>1390</u></b>	<b><u>117</u></b>	1387	118	1391	117	12	<b><u>1369</u></b>	<b><u>119</u></b>	1369	119	1369	119
416.gamess	12	<b><u>1750</u></b>	<b><u>134</u></b>	1751	134	1747	135	12	1611	146	1616	145	<b><u>1612</u></b>	<b><u>146</u></b>
433.milc	12	1270	86.7	<b><u>1270</u></b>	<b><u>86.7</u></b>	1271	86.7	12	<b><u>1159</u></b>	<b><u>95.0</u></b>	1158	95.1	1159	95.0
434.zeusmp	12	<b><u>892</u></b>	<b><u>122</u></b>	894	122	891	123	12	<b><u>873</u></b>	<b><u>125</u></b>	874	125	873	125
435.gromacs	12	795	108	<b><u>794</u></b>	<b><u>108</u></b>	791	108	12	<b><u>616</u></b>	<b><u>139</u></b>	616	139	619	138
436.cactusADM	12	<b><u>1021</u></b>	<b><u>140</u></b>	1022	140	1015	141	2	131	182	122	195	<b><u>123</u></b>	<b><u>194</u></b>
437.leslie3d	12	<b><u>1295</u></b>	<b><u>87.1</u></b>	1292	87.3	1298	86.9	12	1295	87.1	1292	87.3	<b><u>1293</u></b>	<b><u>87.2</u></b>
444.namd	12	<b><u>900</u></b>	<b><u>107</u></b>	900	107	900	107	12	<b><u>840</u></b>	<b><u>115</u></b>	839	115	841	114
447.dealII	12	<b><u>732</u></b>	<b><u>188</u></b>	735	187	731	188	12	<b><u>678</u></b>	<b><u>203</u></b>	681	202	665	206
450.soplex	12	1254	79.8	1202	83.2	<b><u>1203</u></b>	<b><u>83.2</u></b>	12	1116	89.7	1056	94.8	<b><u>1057</u></b>	<b><u>94.7</u></b>
453.povray	12	425	150	424	151	<b><u>424</u></b>	<b><u>151</u></b>	12	376	170	377	170	<b><u>376</u></b>	<b><u>170</u></b>
454.calculix	12	622	159	624	159	<b><u>623</u></b>	<b><u>159</u></b>	12	588	168	<b><u>587</u></b>	<b><u>169</u></b>	586	169
459.GemsFDTD	12	1588	80.2	1578	80.7	<b><u>1580</u></b>	<b><u>80.6</u></b>	12	1501	84.8	<b><u>1499</u></b>	<b><u>84.9</u></b>	1498	85.0
465.tonto	12	856	138	<b><u>855</u></b>	<b><u>138</u></b>	854	138	12	<b><u>776</u></b>	<b><u>152</u></b>	775	152	778	152
470.lbm	12	1012	163	1017	162	<b><u>1013</u></b>	<b><u>163</u></b>	12	1012	163	1017	162	<b><u>1013</u></b>	<b><u>163</u></b>
481.wrf	12	<b><u>989</u></b>	<b><u>135</u></b>	988	136	997	134	12	958	140	954	141	<b><u>955</u></b>	<b><u>140</u></b>
482.sphinx3	12	1490	157	<b><u>1487</u></b>	<b><u>157</u></b>	1483	158	12	<b><u>1465</u></b>	<b><u>160</u></b>	1467	159	1458	160

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/amd1002-rate-libs-revC/64:/root/cpu2006-1.1/amd1002-rate-libs-revC/32"

OMP\_NUM\_THREADS = "6"

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

Binaries were compiled on SLES10 SP2 with binutils 2.18

## Base Compiler Invocation

C benchmarks:

opencc

C++ benchmarks:

openCC

Fortran benchmarks:

openf95

Benchmarks using both Fortran and C:

opencc openf95

## 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  
 436.cactusADM: -DSPEC\_CPU\_LP64 -fno-second-underscore  
 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  
 459.GemsFDTD: -DSPEC\_CPU\_LP64  
 465.tonto: -DSPEC\_CPU\_LP64  
 470.lbm: -DSPEC\_CPU\_LP64  
 481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX -DSPEC\_CPU\_CASE\_FLAG  
 -fno-second-underscore  
 482.sphinx3: -DSPEC\_CPU\_LP64



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## Base Optimization Flags

C benchmarks:

-march=barcelona -mso -Ofast -OPT:malloc\_alg=1 -HP:bdt=2m

C++ benchmarks:

-march=barcelona -mso -Ofast -static -INLINE:aggressive=on  
-OPT:malloc\_alg=1 -HP:bdt=2m

Fortran benchmarks:

-march=barcelona -mso -Ofast -HP

Benchmarks using both Fortran and C:

-march=barcelona -mso -Ofast -OPT:malloc\_alg=1 -HP:bdt=2m -HP

## Peak Compiler Invocation

C benchmarks:

opencc

C++ benchmarks:

openCC

Fortran benchmarks:

openf95

Benchmarks using both Fortran and C:

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 -fno-second-underscore  
437.leslie3d: -DSPEC\_CPU\_LP64  
444.namd: -DSPEC\_CPU\_LP64  
453.povray: -DSPEC\_CPU\_LP64  
454.calculix: -DSPEC\_CPU\_LP64  
459.GemsFDTD: -DSPEC\_CPU\_LP64  
465.tonto: -DSPEC\_CPU\_LP64  
470.lbm: -DSPEC\_CPU\_LP64  
481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_LINUX -DSPEC\_CPU\_CASE\_FLAG  
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482.sphinx3: -DSPEC\_CPU\_LP64



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## Peak Optimization Flags

### C benchmarks:

433.milc: -march=barcelona -mso -Ofast -CG:movnti=1  
-CG:local\_sched\_alg=1 -CG:locs\_shallow\_depth=1  
-HP:bdt=2m:heap=2m -LNO:prefetch=3

470.lbm: basepeak = yes

482.sphinx3: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:malloc\_alg=2  
-CG:sse\_cse\_regs=0 -CG:locs\_shallow\_depth=1 -CG:cmp\_peep=on  
-CG:local\_sched\_alg=1 -INLINE:aggressive=on

### C++ benchmarks:

444.namd: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:ignore\_feedback=off  
-CG:local\_sched\_alg=2 -CG:load\_exe=0 -CG:compute\_to=on  
-OPT:unroll\_size=256 -fno-exceptions -HP:bdt=2m:heap=2m

447.deall: -march=barcelona -mso -Ofast -static -INLINE:aggressive=on  
-LNO:opt=0 -fno-emit-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 -mso -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 -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on

### Fortran benchmarks:

410.bwaves: -march=barcelona -mso -O3 -OPT:Ofast -OPT:treeheight=on  
-LNO:blocking=off -LNO:prefetch\_ahead=5  
-LNO:ignore\_feedback=off -WOPT:aggstr=0 -HP:bdt=2m:heap=2m  
-CG:cmp\_peep=on

416.gamess: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0  
-LNO:prefetch=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll\_size=256  
-HP:bdt=2m:heap=2m

434.zeusmp: -march=barcelona -mso -Ofast -LNO:blocking=off  
-LNO:interchange=off -OPT:treeheight=on -OPT:unroll\_size=256  
-CG:cmp\_peep=on -GRA:prioritize\_by\_density=on -HP

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## Peak Optimization Flags (Continued)

437.leslie3d: -march=barcelona -mso -Ofast -HP:bdt=2m:heap=2m

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

465.tonto: -march=barcelona -mso -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 -mso -Ofast -OPT:rsqrt=2  
-HP:bdt=2m:heap=2m

436.cactusADM: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -apo -LNO:prefetch\_ahead=1  
-HP:bdt=2m:heap=2m -LANG:heap\_allocation\_threshold=100

454.calculix: -march=barcelona -mso -Ofast -CG:load\_exe=0  
-CG:ptr\_load\_use=0 -CG:local\_sched\_alg=2 -CG:compute\_to=on  
-LNO:prefetch\_ahead=30 -WOPT:unroll=2  
-GRA:optimize\_boundary=on -HP:bdt=2m:heap=2m

481.wrf: -march=barcelona -mso -Ofast -LNO:blocking=off  
-LNO:prefetch\_ahead=10 -LANG:copyinout=off  
-IPA:callee\_limit=5000 -GRA:prioritize\_by\_density=on -m3dnow  
-HP

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

<http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20100901.html>  
<http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20100901.xml>  
<http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.xml>

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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