



# SPEC® CFP2006 Result

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## Dell Inc.

PowerEdge R515  
(AMD Opteron 4238, 3.30 GHz)

SPECfp®\_rate2006 = 189

SPECfp\_rate\_base2006 = 175

CPU2006 license: 55

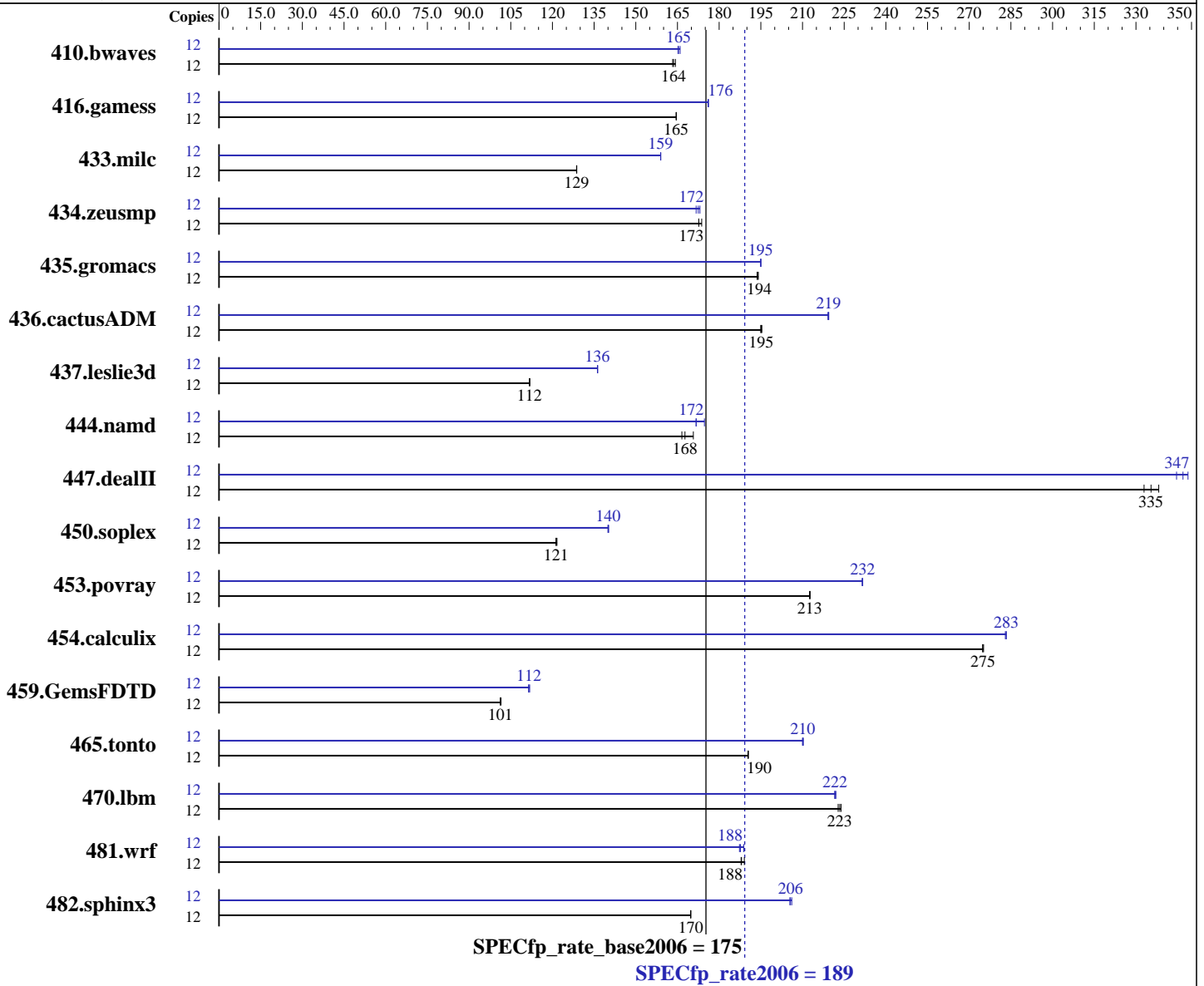
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Dec-2011

Hardware Availability: Jan-2012

Software Availability: Jul-2011



### Hardware

CPU Name: AMD Opteron 4238  
 CPU Characteristics: AMD Turbo CORE technology up to 3.70 GHz  
 CPU MHz: 3300  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip  
 CPU(s) orderable: 1,2 chips

Continued on next page

### Software

Operating System: Red Hat Enterprise Linux Server release 6.1, Kernel 2.6.32-131.0.15.el6.x86\_64  
 Compiler: C/C++/Fortran: Version 4.2.5.2 of x86 Open64 Compiler Suite (from AMD)  
 Auto Parallel: No  
 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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Primary Cache: 192 KB I on chip per chip,  
64 KB I shared / 2 cores;  
16 KB D on chip per core

Secondary Cache: 6 MB I+D on chip per chip, 2 MB shared / 2 cores

L3 Cache: 8 MB I+D on chip per chip

Other Cache: None

Memory: 32 GB (4 x 8 GB 2Rx4 PC3-12800R-11, ECC)

Disk Subsystem: 2 x 73 GB SAS, 15000 RPM

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	12	993	164	<u>997</u>	<u>164</u>	999	163	12	987	165	983	166	<u>986</u>	<u>165</u>		
416.gamess	12	1427	165	<u>1428</u>	<u>165</u>	1428	165	12	<u>1334</u>	<u>176</u>	1334	176	1335	176		
433.milc	12	856	129	<u>856</u>	<u>129</u>	856	129	12	693	159	<u>693</u>	<u>159</u>	693	159		
434.zeusmp	12	629	174	632	173	<u>632</u>	<u>173</u>	12	631	173	<u>633</u>	<u>172</u>	636	172		
435.gromacs	12	441	194	<u>442</u>	<u>194</u>	442	194	12	<u>439</u>	<u>195</u>	439	195	439	195		
436.cactusADM	12	734	195	<u>735</u>	<u>195</u>	736	195	12	<u>654</u>	<u>219</u>	653	219	654	219		
437.leslie3d	12	1009	112	<u>1009</u>	<u>112</u>	1010	112	12	828	136	<u>828</u>	<u>136</u>	828	136		
444.namd	12	578	167	<u>574</u>	<u>168</u>	564	171	12	551	175	560	172	<u>560</u>	<u>172</u>		
447.dealII	12	412	333	<u>409</u>	<u>335</u>	406	338	12	<u>396</u>	<u>347</u>	394	349	398	345		
450.soplex	12	823	122	825	121	<u>825</u>	<u>121</u>	12	714	140	<u>715</u>	<u>140</u>	715	140		
453.povray	12	<u>300</u>	<u>213</u>	300	213	300	213	12	276	231	276	232	<u>276</u>	<u>232</u>		
454.calculix	12	360	275	<u>360</u>	<u>275</u>	360	275	12	350	283	349	283	<u>349</u>	<u>283</u>		
459.GemsFDTD	12	1257	101	<u>1257</u>	<u>101</u>	1254	102	12	1143	111	<u>1142</u>	<u>112</u>	1139	112		
465.tonto	12	620	190	<u>620</u>	<u>190</u>	620	190	12	<u>562</u>	<u>210</u>	561	210	562	210		
470.lbm	12	736	224	<u>738</u>	<u>223</u>	740	223	12	743	222	<u>744</u>	<u>222</u>	744	222		
481.wrf	12	<u>713</u>	<u>188</u>	713	188	709	189	12	710	189	716	187	<u>714</u>	<u>188</u>		
482.sphinx3	12	1378	170	1377	170	<u>1378</u>	<u>170</u>	12	1138	205	1135	206	<u>1137</u>	<u>206</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  
Large pages were not enabled for this run  
Binaries were compiled on a system with 2x AMD Opteron 6276 chips + 128GB Memory using RHEL 6.1  
Continued on next page



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## Operating System Notes (Continued)

Set kernel/randomize\_va\_space=0 in /etc/sysctl.conf

## General Notes

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

LD\_LIBRARY\_PATH = "/root/cpu2006-1.1/amd1104-rate-libs-revA/32:/root/cpu2006-1.1/amd1104-rate-libs-revA/64"

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:

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_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
      -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

```



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## Base Optimization Flags

### C benchmarks:

-march=bdver1 -Ofast -OPT:malloc\_alg=1 -HP:bd=2m:heap=2m  
-IPA:plimit=8000 -IPA:small\_pu=100 -mso

### C++ benchmarks:

-march=bdver1 -Ofast -static -CG:load\_exe=0 -OPT:malloc\_alg=1  
-INLINE:aggressive=on -HP:bd=2m:heap=2m -D\_\_OPEN64\_FAST\_SET

### Fortran benchmarks:

-march=bdver1 -Ofast -LNO:blocking=off -OPT:rsqrt=2  
-OPT:unroll\_size=256 -HP:bd=2m:heap=2m -mso

### Benchmarks using both Fortran and C:

-march=bdver1 -Ofast -OPT:malloc\_alg=1 -HP:bd=2m:heap=2m  
-IPA:plimit=8000 -IPA:small\_pu=100 -mso -LNO:blocking=off  
-OPT:rsqrt=2 -OPT:unroll\_size=256

## 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

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## Peak Portability Flags (Continued)

470.lbm: -DSPEC\_CPU\_LP64  
481.wrf: -DSPEC\_CPU\_LINUX -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LP64  
-fno-second-underscore  
482.sphinx3: -DSPEC\_CPU\_LP64

## Peak Optimization Flags

C benchmarks:

433.milc: -march=bdver1 -Ofast -CG:movnti=1 -CG:locs\_best=on  
-HP:bdt=2m:heap=2m -IPA:plimit=7000 -IPA:callee\_limit=1200  
-OPT:struct\_array\_copy=2 -OPT:alias=field\_sensitive -mso  
470.lbm: -march=bdver1 -Ofast -CG:cmp\_peep=on  
-OPT:unroll\_times\_max=8 -OPT:unroll\_size=256  
-OPT:unroll\_level=2 -OPT:keep\_ext=on -HP:bdt=2m:heap=2m  
-IPA:plimit=8000 -IPA:small\_pu=100 -mso  
482.sphinx3: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:malloc\_alg=2  
-CG:cmp\_peep=on -CG:local\_sched\_alg=2 -INLINE:aggressive=on  
-LNO:prefetch=2 -LNO:prefetch\_ahead=4 -mso

C++ benchmarks:

444.namd: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:ignore\_feedback=off  
-CG:local\_sched\_alg=2 -CG:load\_exe=0 -OPT:unroll\_size=256  
-fno-exceptions -HP:bdt=2m:heap=2m  
447.deallI: -march=bdver1 -Ofast -D\_\_OPEN64\_FAST\_SET -static  
-INLINE:aggressive=on -LNO:opt=0 -LNO:simd=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 -CG:movext\_icmp=off  
-TENV:frame\_pointer=off  
450.soplex: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -INLINE:aggressive=on -OPT:RO=1  
-OPT:IEEE\_arith=3 -OPT:IEEE\_NaN\_inf=off  
-OPT:fold\_unsigned\_relops=on -fno-exceptions -m32  
-HP:bdt=2m:heap=2m -WOPT:sib=on  
453.povray: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -CG:pre\_local\_sched=off  
-INLINE:aggressive=on -HP:bdt=2m:heap=2m -OPT:transform=2  
-OPT:alias=disjoint -WOPT:aggcm=0

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## Peak Optimization Flags (Continued)

Fortran benchmarks:

- 410.bwaves: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:Ofast -OPT:treeheight=on  
-LNO:blocking=off -LNO:ignore\_feedback=off -LNO:fu=4  
-LNO:loop\_model\_simd=on -LNO:simd\_rm\_unity\_remainder=on  
-WOPT:aggstr=0 -HP:bdt=2m:heap=2m -CG:cmp\_peep=on
- 416.gamess: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0  
-LNO:simd=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll\_size=256  
-OPT:unroll\_times\_max=2 -CG:local\_sched\_alg=1  
-HP:bdt=2m:heap=2m -WOPT:sib=on
- 434.zeusmp: -march=bdver1 -Ofast -LNO:blocking=off -LNO:interchange=off  
-HP:bdt=2m:heap=2m
- 437.leslie3d: -march=bdver1 -Ofast -CG:pre\_minreg\_level=2 -LNO:simd=0  
-LNO:fusion=2 -HP:bdt=2m:heap=2m -mso
- 459.GemsFDTD: -march=bdver1 -Ofast -OPT:unroll\_size=0 -LNO:fission=2  
-CG:load\_exe=0 -CG:local\_sched\_alg=2 -HP
- 465.tonto: -march=bdver1 -Ofast -OPT:alias=no\_f90\_pointer\_alias  
-LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525  
-HP:bdt=2m:heap=2m

Benchmarks using both Fortran and C:

- 435.gromacs: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:rsqrt=2  
-HP:bdt=2m:heap=2m
- 436.cactusADM: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:blocking=off  
-LNO:prefetch=2 -HP -CG:locs\_shallow\_depth=1 -CG:load\_exe=0  
-WOPT:sib=on
- 454.calculix: -march=bdver1 -Ofast -OPT:unroll\_size=256  
-GRA:optimize\_boundary=on -HP:bdt=2m:heap=2m
- 481.wrf: -march=bdver1 -Ofast -LNO:blocking=off -LANG:copyinout=off  
-IPA:callee\_limit=5000 -GRA:prioritize\_by\_density=on  
-CG:load\_exe=1 -HP -WOPT:sib=on

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

<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.html>  
<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.html>



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

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<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.xml>

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

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