# SPEC® CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

## Dell Inc.

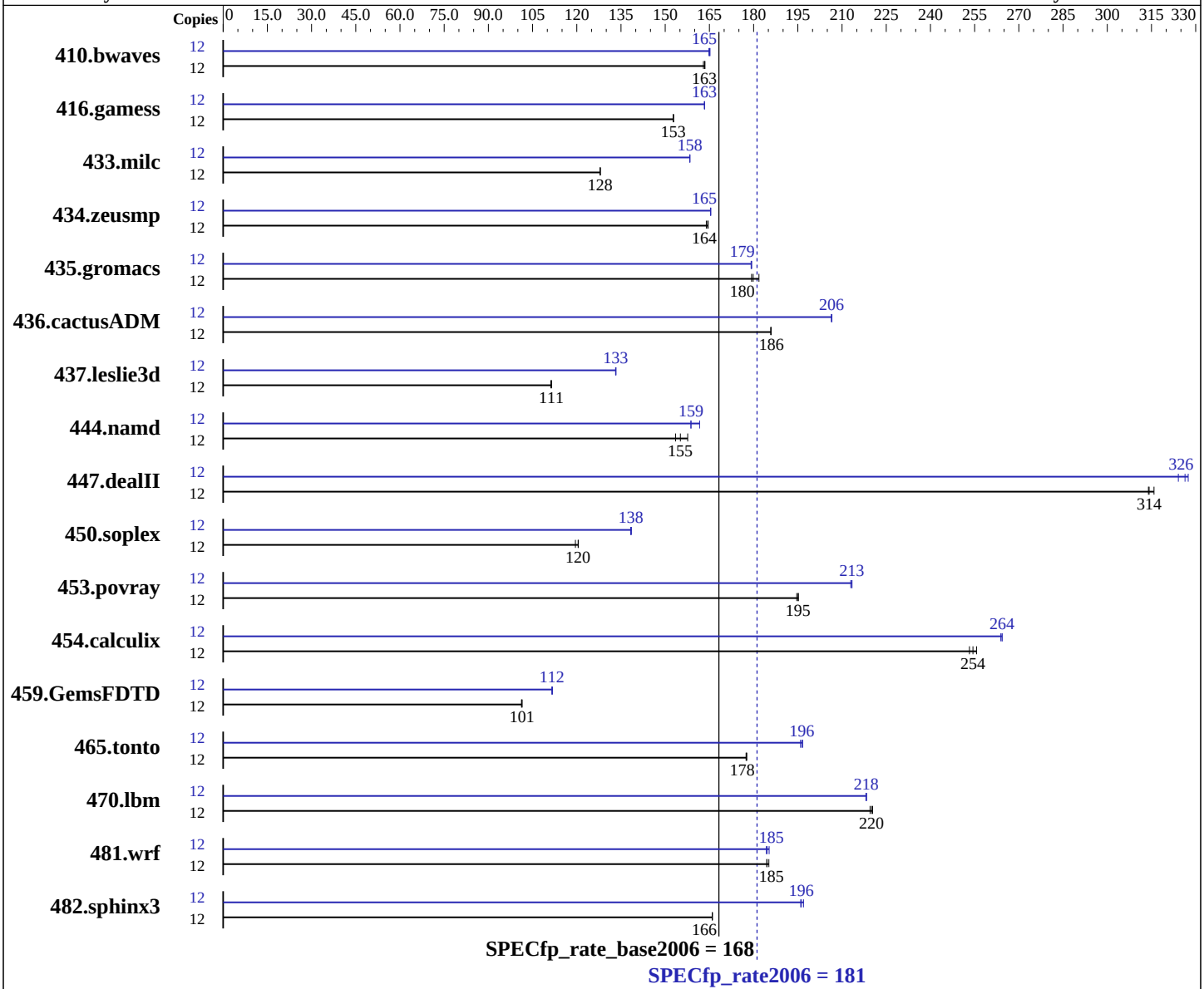
PowerEdge R515
(AMD Opteron 4234, 3.10 GHz)

SPECfp®_rate2006 = 181

SPECfp_rate_base2006 = 168

**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 4234 |
| CPU Characteristics: | AMD Turbo CORE technology up to 3.50 GHz |
| CPU MHz: | 3100 |
| 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 |

Continued on next page

# SPEC CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge R515
(AMD Opteron 4234, 3.10 GHz)

SPECfp_rate2006 = 181

SPECfp_rate_base2006 = 168

**CPU2006 license:** 55
**Test sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test date:** Dec-2011
**Hardware Availability:** Jan-2012
**Software Availability:** Jul-2011

| | |
|---|---|
| Primary Cache: | 192 KB I on chip per chip,<br>64 KB I shared / 2 cores;<br>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 | 997 | 163 | **998** | **163** | 1001 | 163 | 12 | 989 | 165 | 987 | 165 | **988** | **165** |
| 416.gamess | 12 | 1539 | 153 | **1538** | **153** | 1538 | 153 | 12 | 1439 | 163 | 1438 | 163 | **1438** | **163** |
| 433.milc | 12 | 861 | 128 | **861** | **128** | 861 | 128 | 12 | 696 | 158 | 696 | 158 | **696** | **158** |
| 434.zeusmp | 12 | 666 | 164 | **664** | **164** | 664 | 165 | 12 | **660** | **165** | 660 | 165 | 660 | 165 |
| 435.gromacs | 12 | 478 | 179 | 471 | 182 | **476** | **180** | 12 | 478 | 179 | **478** | **179** | 478 | 179 |
| 436.cactusADM | 12 | **771** | **186** | 771 | 186 | 772 | 186 | 12 | 695 | 206 | **695** | **206** | 694 | 207 |
| 437.leslie3d | 12 | 1015 | 111 | 1013 | 111 | **1013** | **111** | 12 | **847** | **133** | 847 | 133 | 846 | 133 |
| 444.namd | 12 | 627 | 154 | 611 | 158 | **620** | **155** | 12 | 606 | 159 | 595 | 162 | **606** | **159** |
| 447.dealII | 12 | **437** | **314** | 437 | 314 | 435 | 316 | 12 | **421** | **326** | 424 | 324 | 419 | 327 |
| 450.soplex | 12 | 837 | 120 | 830 | 121 | **831** | **120** | 12 | 722 | 139 | 724 | 138 | **723** | **138** |
| 453.povray | 12 | 328 | 195 | **327** | **195** | 327 | 195 | 12 | 300 | 213 | **299** | **213** | 299 | 213 |
| 454.calculix | 12 | 391 | 253 | **389** | **254** | 387 | 256 | 12 | 375 | 264 | 375 | 264 | **375** | **264** |
| 459.GemsFDTD | 12 | 1255 | 101 | **1256** | **101** | 1258 | 101 | 12 | 1139 | 112 | 1141 | 112 | **1141** | **112** |
| 465.tonto | 12 | 665 | 178 | 665 | 177 | **665** | **178** | 12 | 603 | 196 | **601** | **196** | 600 | 197 |
| 470.lbm | 12 | 748 | 220 | **749** | **220** | 751 | 220 | 12 | 755 | 218 | **756** | **218** | 756 | 218 |
| 481.wrf | 12 | 727 | 184 | **726** | **185** | 724 | 185 | 12 | 727 | 184 | **726** | **185** | 723 | 185 |
| 482.sphinx3 | 12 | 1409 | 166 | **1409** | **166** | 1409 | 166 | 12 | 1188 | 197 | **1192** | **196** | 1193 | 196 |

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

## 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

## 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

Continued on next page

## 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.dealII: -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:bd=2m:heap=2m -OPT:transform=2 -OPT:alias=disjoint -WOPT:aggcm=0

Continued on next page

# 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

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

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


SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.


For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.1.
Report generated on Thu Jul 24 02:08:00 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 17 January 2012.