SPEC® CFP2006 Result
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Dell Inc.

PowerEdge R815 (AMD Opteron 6124 HE, 1.80 GHz)

$SPECfp^{®}\_rate2006 =$ 215

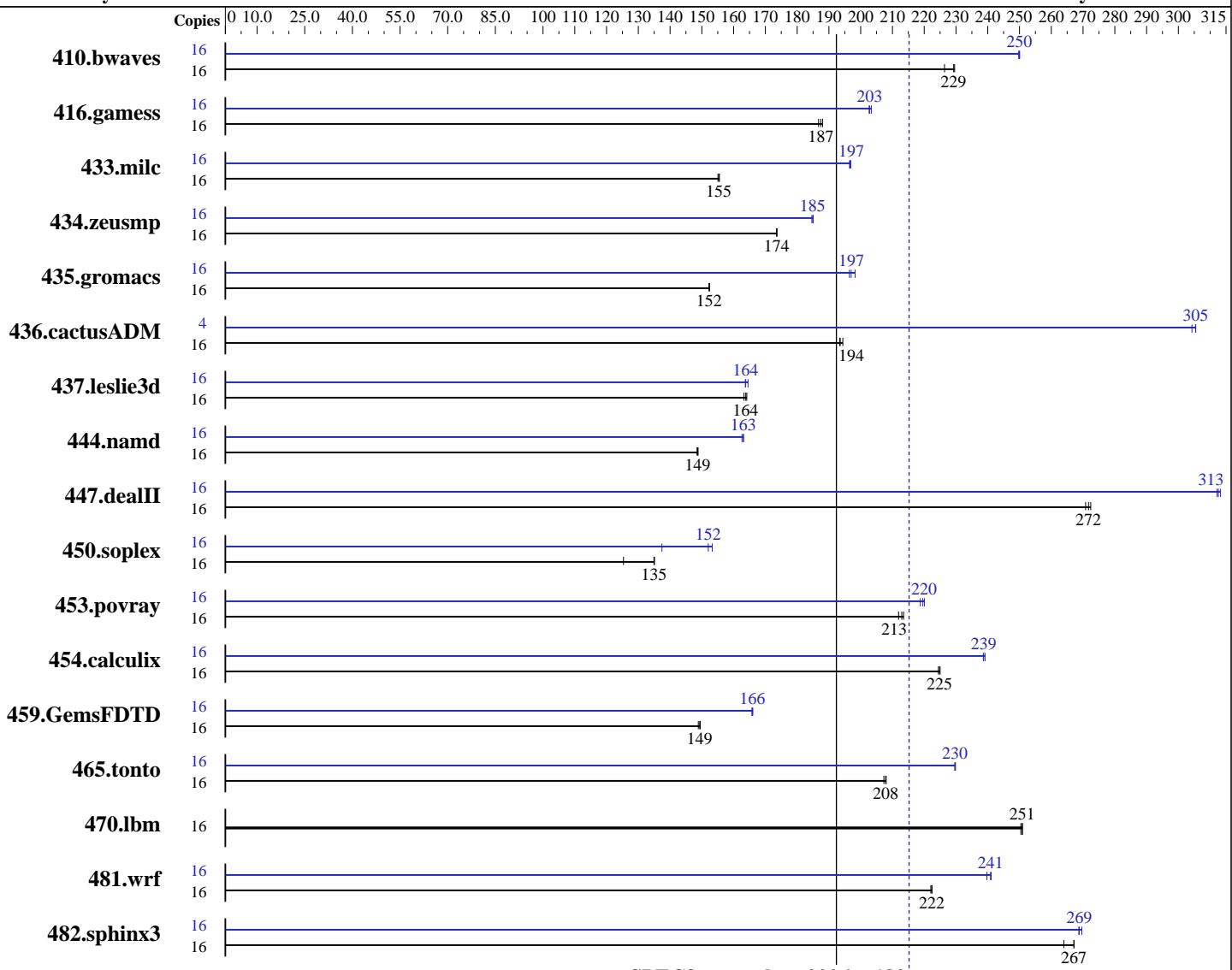$SPECfp\_rate\_base2006 =$ 192

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

Test date: May-2010
Hardware Availability: May-2010
Software Availability: Feb-2010

Benchmark	Copies	Result
410.bwaves	16	250
410.bwaves	16	229
416.gamess	16	203
416.gamess	16	187
433.milc	16	197
433.milc	16	155
434.zeusmp	16	185
434.zeusmp	16	174
435.gromacs	16	197
435.gromacs	16	152
436.cactusADM	4	305
436.cactusADM	16	194
437.leslie3d	16	164
437.leslie3d	16	164
444.namd	16	163
444.namd	16	149
447.dealII	16	313
447.dealII	16	272
450.soplex	16	152
450.soplex	16	135
453.povray	16	220
453.povray	16	213
454.calculix	16	239
454.calculix	16	225
459.GemsFDTD	16	166
459.GemsFDTD	16	149
465.tonto	16	230
465.tonto	16	208
470.lbm	16	251
481.wrf	16	241
481.wrf	16	222
482.sphinx3	16	269
482.sphinx3	16	267

SPECfp_rate_base2006 = 192

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Hardware

CPU Name:	AMD Opteron 6124 HE
CPU Characteristics:	
CPU MHz:	1800
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 cores/chip
CPU(s) orderable:	2,4 chips
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	512 KB I+D on chip per core

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 11 (x86_64), Kernel 2.6.27.19-5-smp
Compiler:	x86 Open64 4.2.3 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: 12 MB I+D on chip per chip, 6 MB shared / 4 cores
Other Cache: None
Memory: 64 GB (16 x 4 GB DDR3-1333 DR RDIMM, CL9, ECC)
Disk Subsystem: 1 x 148 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	16	**948**	**229**	947	230	960	226	16	871	250	**870**	**250**	870	250
416.gamess	16	1678	187	**1671**	**187**	1666	188	16	1546	203	1541	203	**1545**	**203**
433.milc	16	**945**	**155**	944	156	947	155	16	748	196	746	197	**747**	**197**
434.zeusmp	16	839	174	**839**	**174**	839	174	16	**787**	**185**	789	185	787	185
435.gromacs	16	750	152	750	152	**750**	**152**	16	582	196	**580**	**197**	576	198
436.cactusADM	16	**988**	**194**	984	194	989	193	4	157	304	156	305	**157**	**305**
437.leslie3d	16	**918**	**164**	921	163	916	164	16	**918**	**164**	914	165	919	164
444.namd	16	864	148	862	149	**863**	**149**	16	789	163	**787**	**163**	787	163
447.dealII	16	**674**	**272**	676	271	672	272	16	584	313	586	312	**586**	**313**
450.soplex	16	1065	125	**989**	**135**	988	135	16	971	137	**878**	**152**	871	153
453.povray	16	402	212	399	214	**400**	**213**	16	**388**	**220**	387	220	389	219
454.calculix	16	**587**	**225**	587	225	588	224	16	**553**	**239**	553	239	552	239
459.GemsFDTD	16	1140	149	1135	150	**1137**	**149**	16	1024	166	**1023**	**166**	1022	166
465.tonto	16	760	207	**757**	**208**	757	208	16	685	230	686	230	**685**	**230**
470.lbm	16	878	250	**876**	**251**	876	251	16	878	250	**876**	**251**	876	251
481.wrf	16	**804**	**222**	803	222	805	222	16	745	240	741	241	**742**	**241**
482.sphinx3	16	1181	264	1167	267	**1167**	**267**	16	**1160**	**269**	1161	269	1157	270

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=14336 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 = "896"
LD_LIBRARY_PATH = "/root/cpu2006-1.1/amd1002mc-rate-revA-libs/64:/root/cpu2006-1.1/amd1002mc-rate-revA-libs/32"
OMP_NUM_THREADS = "4"

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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CPU2006 license: 55		**Test date:**	May-2010
Test sponsor:	Dell Inc.	**Hardware Availability:**	May-2010
Tested by:	Dell Inc.	**Software Availability:**	Feb-2010

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
             -fno-second-underscore
  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.dealII: -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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Test sponsor: Dell Inc.		**Hardware Availability:**	May-2010
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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-open64-4.2.3-flags-revA.html
http://www.spec.org/cpu2006/flags/amd-platform-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/x86-open64-4.2.3-flags-revA.xml
http://www.spec.org/cpu2006/flags/amd-platform-revA.xml

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

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