## SPEC® CFP2006 Result

### Dell Inc.

**PowerEdge R715 (AMD Opteron 6176 SE, 2.30 GHz)**

<table>
<thead>
<tr>
<th>SPECfp®_rate2006</th>
<th>SPECfp_rate_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>322</td>
<td>295</td>
</tr>
</tbody>
</table>

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

**Hardware**

- **CPU Name:** AMD Opteron 6176 SE
- **CPU Characteristics:**
  - **CPU MHz:** 2300
  - **FPU:** Integrated
  - **CPU(s) enabled:** 24 cores, 2 chips, 12 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

**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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**Test date:** Jun-2010  
**Hardware Availability:** May-2010  
**Software Availability:** Feb-2010
Spec CFP2006 Result

Dell Inc.

PowerEdge R715 (AMD Opteron 6176 SE, 2.30 GHz)

SPECfp_rate2006 = 322
SPECfp_rate_base2006 = 295

CPU2006 license: 55
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L3 Cache: 12 MB I+D on chip per chip, 6 MB shared / 6 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

<table>
<thead>
<tr>
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<th>Seconds</th>
<th>Ratio</th>
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</tbody>
</table>

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=10800 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
Dell Inc.

PowerEdge R715 (AMD Opteron 6176 SE, 2.30 GHz)

SPECfp_rate2006 = 322
SPECfp_rate_base2006 = 295

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

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

General Notes

Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "450"
LD_LIBRARY_PATH = "/cpu2006/amd1002mc-rate-revA-libs/64:/cpu2006/amd1002mc-rate-revA-libs/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` - `msl` - `O2` - `OPT:malloc_alg=1` - `HP:bdt=2m`

C++ benchmarks:
- `march=barcelona` - `msl` - `O2` - `static` - `INLINE:aggressive=on`
- `OPT:malloc_alg=1` - `HP:bdt=2m`

Fortran benchmarks:
- `march=barcelona` - `msl` - `O2` - `HP`

Benchmarks using both Fortran and C:
- `march=barcelona` - `msl` - `O2` - `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.cactusADM: `-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`
Peak Optimization Flags

C benchmarks:

433.milc: -march=barcelona -ms0 -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 -ms0 -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 -ms0 -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 -ms0 -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 -ms0 -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 -ms0 -fb_create fbdata(pass 1)
   -fb_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on

Fortran benchmarks:

410.bwaves: -march=barcelona -ms0 -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 -ms0 -fb_create fbdata(pass 1)
   -fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
   -LNO:prefetch=0 -OPT:O3 -OPT:ro=3 -OPT:unroll_size=256
   -HP:bdt=2m:heap=2m

434.zeusmp: -march=barcelona -ms0 -Ofast -LNO:blocking=off
   -LNO:interchange=off -OPT:treeheight=on -OPT:unroll_size=256
   -CG:cmp_peep=on -GRA:prioritize_by_density=on -HP

Continued on next page
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Peak Optimization Flags (Continued)

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

459.GemsFDTD: -march=barcelona -ms -Ofast -LNO:fission=2
-HP
-LNO:prefetch_ahead=1 -CG:load_exe=0 -CG:local_sched_alg=1

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

436.cactusADM: -march=barcelona -ms -fb_create fbdata(pass 1)
-HP
-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 -ms -Ofast -CG:load_exe=0
-HP:bdt=2m:heap=2m -LANG:heap_allocation_threshold=100
-CG:ptr_load_use=0 -CG:local_sched_alg=2 -CG:compute_to=on
-LNO:prefetch_ahead=30 -WOPT:unroll=2
-HP
-IPA:callscan_limit=5000 -GRA:prioritize_by_density=on -m3dnow

481.wrf: -march=barcelona -ms -Ofast -LNO:blocking=off
-HP
-IPA:callcan_limit=5000 -GRA:prioritize_by_density=on -m3dnow

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.20100721.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.20100721.xml
http://www.spec.org/cpu2006/flags/amd-platform-revA.xml

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