SPEC® CFP2006 Result
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Dell Inc.

PowerEdge R815 (AMD Opteron 6124 HE, 1.80 GHz)

$SPECfp^®\_rate2006 = 430$

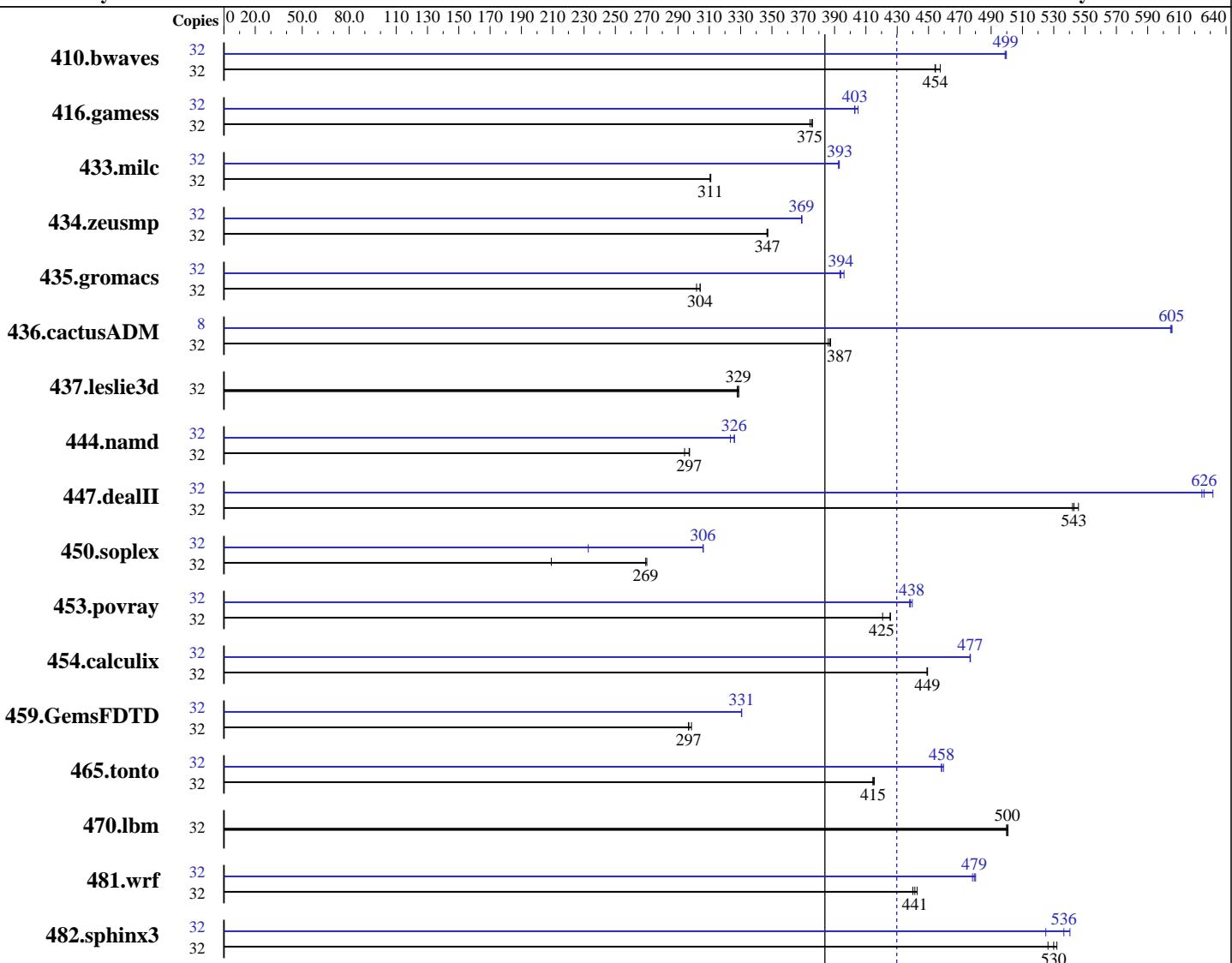$SPECfp\_rate\_base2006 = 384$

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

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

Results chart (Copies = 32 unless noted):

Benchmark	Copies	Base	Peak
410.bwaves	32	454	499
416.gamess	32	375	403
433.milc	32	311	393
434.zeusmp	32	347	369
435.gromacs	32	304	394
436.cactusADM	8 / 32	387	605
437.leslie3d	32	329	
444.namd	32	297	326
447.dealII	32	543	626
450.soplex	32	269	306
453.povray	32	425	438
454.calculix	32	449	477
459.GemsFDTD	32	297	331
465.tonto	32	415	458
470.lbm	32	500	
481.wrf	32	441	479
482.sphinx3	32	530	536

SPECfp_rate_base2006 = 384
SPECfp_rate2006 = 430

Hardware

CPU Name: AMD Opteron 6124 HE
CPU Characteristics:
CPU MHz: 1800
FPU: Integrated
CPU(s) enabled: 32 cores, 4 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

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

Continued on next page

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L3 Cache: 12 MB I+D on chip per chip, 6 MB shared / 4 cores
Other Cache: None
Memory: 128 GB (32 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 Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	32	951	457	958	454	**957**	**454**	32	**871**	**499**	872	499	870	500
416.gamess	32	**1669**	**375**	1674	374	1667	376	32	**1555**	**403**	1547	405	1555	403
433.milc	32	946	311	**946**	**311**	945	311	32	**748**	**393**	748	393	747	393
434.zeusmp	32	**839**	**347**	838	347	840	347	32	789	369	789	369	**789**	**369**
435.gromacs	32	757	302	**751**	**304**	751	304	32	**580**	**394**	577	396	581	393
436.cactusADM	32	987	387	991	386	**988**	**387**	8	**158**	**605**	158	606	158	605
437.leslie3d	32	918	328	**915**	**329**	915	329	32	918	328	**915**	**329**	915	329
444.namd	32	872	294	863	297	**864**	**297**	32	793	323	787	326	**788**	**326**
447.dealII	32	675	542	**674**	**543**	671	546	32	580	632	**585**	**626**	586	625
450.soplex	32	1276	209	988	270	**991**	**269**	32	1147	233	872	306	**872**	**306**
453.povray	32	405	421	400	426	**400**	**425**	32	389	438	387	440	**388**	**438**
454.calculix	32	**588**	**449**	588	449	587	449	32	**554**	**477**	554	477	554	477
459.GemsFDTD	32	**1144**	**297**	1144	297	1137	299	32	**1027**	**331**	1027	331	1027	331
465.tonto	32	760	414	758	415	**759**	**415**	32	687	458	**687**	**458**	685	460
470.lbm	32	**879**	**500**	878	501	880	500	32	**879**	**500**	878	501	880	500
481.wrf	32	812	440	**810**	**441**	807	443	32	748	478	745	480	**746**	**479**
482.sphinx3	32	1185	526	1172	532	**1177**	**530**	32	1188	525	**1163**	**536**	1154	540

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=28672 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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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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CPU2006 license: 55		**Test date:**	May-2010
Test sponsor:	Dell Inc.	**Hardware Availability:**	May-2010
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Peak Optimization Flags (Continued)

437.leslie3d: basepeak = yes

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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