SPEC® CFP2006 Result
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Dell Inc.

PowerEdge M905 (AMD Opteron 8360 SE, 2.50 GHz)

$SPECfp®\_rate2006 = 170$

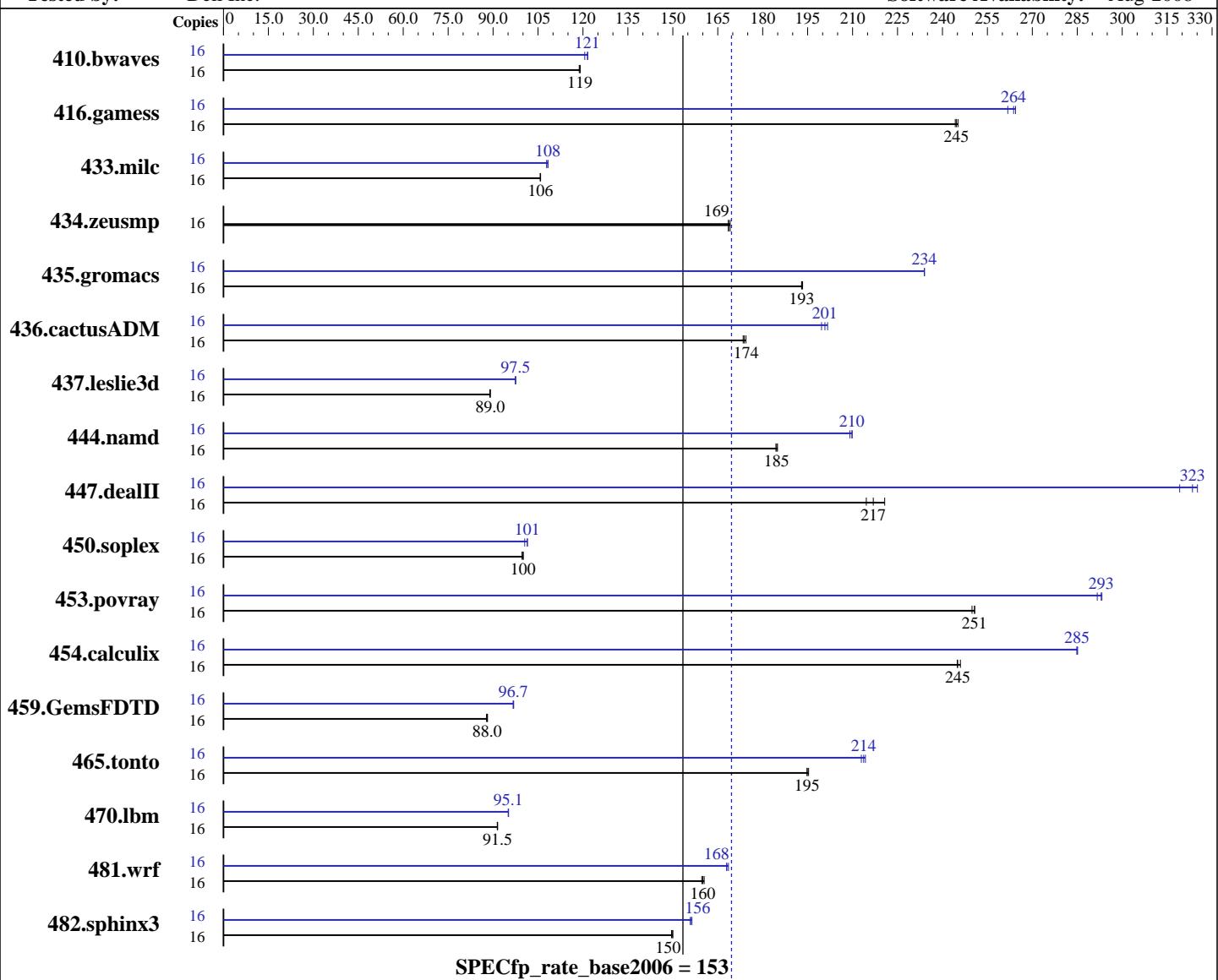$SPECfp\_rate\_base2006 = 153$

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

Test date: Sep-2008
Hardware Availability: Oct-2008
Software Availability: Aug-2008

SPECfp_rate_base2006 = 153

SPECfp_rate2006 = 170

Hardware

CPU Name: AMD Opteron 8360 SE
CPU Characteristics:
CPU MHz: 2500
FPU: Integrated
CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip
CPU(s) orderable: 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 10 (x86_64) SP2, Kernel 2.6.16-60.0.21-smp
Compiler: PGI Server Complete Version 7.2
PathScale Compiler Suite Version 3.2
Auto Parallel: No
File System: ReiserFS
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit

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L3 Cache:	2 MB I+D on chip per chip	Other Software:	None
Other Cache:	None		
Memory:	32 GB (16 x 2 GB 667 MHz CL5 DDR2 Dual Rank)		
Disk Subsystem:	1 x 36 GB SAS 15000 RPM (OS), 1 x 73 GB SAS 10000 RPM (CPU2006)		
Other Hardware:	None		

Results Table

Benchmark	Base Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Peak Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	16	1831	119	1826	119	**1828**	**119**	16	1788	122	**1790**	**121**	1803	121
416.gamess	16	1282	244	1278	245	**1280**	**245**	16	**1188**	**264**	1185	264	1197	262
433.milc	16	**1388**	**106**	1387	106	1389	106	16	1362	108	1356	108	**1357**	**108**
434.zeusmp	16	861	169	**864**	**169**	864	169	16	861	169	**864**	**169**	864	169
435.gromacs	16	**592**	**193**	591	193	592	193	16	488	234	488	234	**488**	**234**
436.cactusADM	16	1102	173	**1100**	**174**	1096	174	16	**952**	**201**	948	202	958	200
437.leslie3d	16	1692	88.9	1688	89.1	**1689**	**89.0**	16	1543	97.5	1542	97.5	**1543**	**97.5**
444.namd	16	**695**	**185**	694	185	696	184	16	**612**	**210**	614	209	611	210
447.dealII	16	**844**	**217**	829	221	853	215	16	573	319	563	325	**566**	**323**
450.soplex	16	1339	99.7	1334	100	**1334**	**100**	16	1327	101	1315	101	**1316**	**101**
453.povray	16	341	250	339	251	**340**	**251**	16	**291**	**293**	292	292	290	293
454.calculix	16	537	246	539	245	**539**	**245**	16	**463**	**285**	463	285	463	285
459.GemsFDTD	16	1926	88.1	1933	87.8	**1928**	**88.0**	16	**1755**	**96.7**	1755	96.7	1752	96.9
465.tonto	16	806	195	808	195	**808**	**195**	16	**737**	**214**	735	214	739	213
470.lbm	16	2405	91.4	2402	91.5	**2404**	**91.5**	16	2310	95.2	**2312**	**95.1**	2312	95.1
481.wrf	16	1119	160	1114	160	**1117**	**160**	16	1060	169	1064	168	**1064**	**168**
482.sphinx3	16	2085	150	**2079**	**150**	2079	150	16	1994	156	2002	156	**1996**	**156**

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
```

Operating System Notes

```
    'ulimit -s unlimited' was used to set environment stack size
    'ulimit -l 4915200' was used to set environment locked pages in memory limit
    Environment variable PGI_HUGE_PAGES set to 150
    Set vm/nr_hugepages=2400 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:
LD_LIBRARY_PATH = "/root/cpu2006-1.1/amd729gh-libs:/root/cpu2006-1.1/amd729gh-libs/32:\$LD_LIBRARY_PATH"

Base Compiler Invocation

C benchmarks:
     pgcc

C++ benchmarks:
     pgcpp

Fortran benchmarks:
     pgf95

Benchmarks using both Fortran and C:
     pgcc pgf95

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 -Mnomain
      436.cactusADM: -DSPEC_CPU_LP64 -Mnomain
        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 -Mnomain
       459.GemsFDTD: -DSPEC_CPU_LP64
          465.tonto: -DSPEC_CPU_LP64
           470.lbm: -DSPEC_CPU_LP64
            481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
        482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
     -fastsse -Msmartalloc=huge:150 -Mfprelaxed -Mipa=fast -Mipa=inline
     -tp barcelona-64 -Bstatic_pgi

C++ benchmarks:
     -fastsse -Msmartalloc=huge:150 -Mfprelaxed --zc_eh -Mipa=fast
     -Mipa=inline -tp barcelona-64 -Bstatic_pgi

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Base Optimization Flags (Continued)

Fortran benchmarks:
```
-fastsse -Mfprelaxed -Msmartalloc=huge:150 -Mipa=fast -Mipa=inline
-tp barcelona-64 -Bstatic_pgi
```

Benchmarks using both Fortran and C:
```
-fastsse -Msmartalloc=huge:150 -Mfprelaxed -Mipa=fast -Mipa=inline
-tp barcelona-64 -Bstatic_pgi
```

Base Other Flags

C benchmarks:
```
-Mipa=jobs:4
```

C++ benchmarks:
```
-Mipa=jobs:4
```

Fortran benchmarks:
```
-Mipa=jobs:4
```

Benchmarks using both Fortran and C:
```
-Mipa=jobs:4
```

Peak Compiler Invocation

C benchmarks (except as noted below):
```
pgcc
```

470.lbm: `pathcc`

C++ benchmarks (except as noted below):
```
pathCC
```

444.namd: `pgcpp`

Fortran benchmarks (except as noted below):
```
pgf95
```

416.gamess: `pathf95`

459.GemsFDTD: `pathf95`

465.tonto: `pathf95`

Benchmarks using both Fortran and C (except as noted below):
```
pgcc pgf95
```

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Peak Compiler Invocation (Continued)

436.cactusADM: `pathcc pathf95`

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 -Mnomain`
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 -Mnomain`
459.GemsFDTD: `-DSPEC_CPU_LP64`
465.tonto: `-DSPEC_CPU_LP64`
470.lbm: `-DSPEC_CPU_LP64`
481.wrf: `-DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX`
482.sphinx3: `-DSPEC_CPU_LP64`

Peak Optimization Flags

C benchmarks:

433.milc: `-fastsse -Msmartalloc=huge:150 -Msafeptr -Mfprelaxed`
`-Mipa=inline -Mipa=arg -Mipa=const -Mipa=ptr -Mipa=shape`
`-tp barcelona-64 -Bstatic_pgi`

470.lbm: `-march=barcelona -Ofast -CG:sse_cse_regs=0`
`-CG:locs_shallow_depth=1 -m3dnow`

482.sphinx3: `-Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)`
`-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse`
`-Mfprelaxed -Msmartalloc -tp barcelona-64 -Bstatic_pgi`

C++ benchmarks:

444.namd: `-Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)`
`-Mipa=inline(pass 2) -fastsse -Munroll=n:4 -Munroll=m:8`
`-Msmartalloc=huge:150 -Mnodepchk -Mfprelaxed --zc_eh`
`-tp barcelona-64 -Bstatic_pgi`

447.dealII: `-march=barcelona -Ofast -static -INLINE:aggressive=on`
`-fno-exceptions -m32`

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Peak Optimization Flags (Continued)

```
   450.soplex: -march=barcelona -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -O3 -TENV:frame_pointer=off
               -LNO:prefetch=1 -OPT:malloc_alg=1 -CG:load_exe=0 -m32

   453.povray: -march=barcelona -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -Ofast
```

Fortran benchmarks:

```
   410.bwaves: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
               -Mipa=inline(pass 2) -fastsse -Msmartalloc
               -Mprefetch=distance:12 -Mprefetch=nta -Mpre -Mfprelaxed
               -tp barcelona-64 -Bstatic_pgi

   416.gamess: -march=barcelona -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -O2 -OPT:Ofast -OPT:ro=3
               -OPT:unroll_size=256

   434.zeusmp: basepeak = yes

  437.leslie3d: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
               -Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
               -Mvect=fuse -Msmartalloc=huge:150 -Mprefetch=distance:8
               -Mprefetch=t0 -Mfprelaxed -tp barcelona-64 -Bstatic_pgi

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

    465.tonto: -march=barcelona -Ofast -OPT:alias=no_f90_pointer_alias
               -LNO:blocking=off -CG:load_exe=1 -IPA:plimit=525
```

Benchmarks using both Fortran and C:

```
   435.gromacs: -fastsse -Msmartalloc=huge:150 -Mfprelaxed -Mfpapprox=rsqrt
               -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi

  436.cactusADM: -march=barcelona -fb_create fbdata(pass 1)
               -fb_opt fbdata(pass 2) -Ofast -LNO:blocking=off

   454.calculix: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
               -Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
               -Msmartalloc=huge:150 -Mprefetch=t0 -Mpre -Mfprelaxed
               -tp barcelona-64 -Bstatic_pgi

      481.wrf: -fastsse -Mvect=noaltcode -Msmartalloc
               -Mprefetch=distance:8 -Mfprelaxed -tp barcelona-64
               -Bstatic_pgi
```

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Peak Other Flags

C benchmarks (except as noted below):
     `-Mipa=jobs:4(pass 2)`

        470.lbm: `No flags used`

C++ benchmarks:

        444.namd: `-Mipa=jobs:4(pass 2)`

Fortran benchmarks (except as noted below):
     `-Mipa=jobs:4(pass 2)`

     416.gamess: `No flags used`

   459.GemsFDTD: `No flags used`

        465.tonto: `No flags used`

Benchmarks using both Fortran and C (except as noted below):
     `-Mipa=jobs:4(pass 2)`

   436.cactusADM: `No flags used`

        481.wrf: `No flags used`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/amd729gh-flags.html`
`http://www.spec.org/cpu2006/flags/amd-platform.20090713.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/amd729gh-flags.xml`
`http://www.spec.org/cpu2006/flags/amd-platform.20090713.xml`

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

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