SPEC® CFP2006 Result

Dell Inc.

PowerEdge M805 (AMD Opteron 2356, 2.3 GHz)

$SPECfp^{®}2006 =$ 14.9

SPECfp_base2006 =   13.0

CPU2006 license: 55	**Test date:** Aug-2008
Test sponsor: Dell Inc.	**Hardware Availability:** Aug-2008
Tested by: Dell Inc.	**Software Availability:** May-2008

Benchmark	Base	Peak
410.bwaves	14.8	20.2
416.gamess	12.5	15.3
433.milc	15.3	15.8
434.zeusmp	13.0	13.0
435.gromacs	9.95	12.1
436.cactusADM	13.1	14.3
437.leslie3d	13.5	13.5
444.namd	9.18	10.3
447.dealII	15.6	20.6
450.soplex	10.4	10.1
453.povray	13.5	17.3
454.calculix	12.9	13.0
459.GemsFDTD	11.9	13.3
465.tonto	13.6	16.5
470.lbm	14.6	18.0
481.wrf	15.5	17.1
482.sphinx3	14.6	19.1

SPECfp_base2006 = 13.0

SPECfp2006 = 14.9
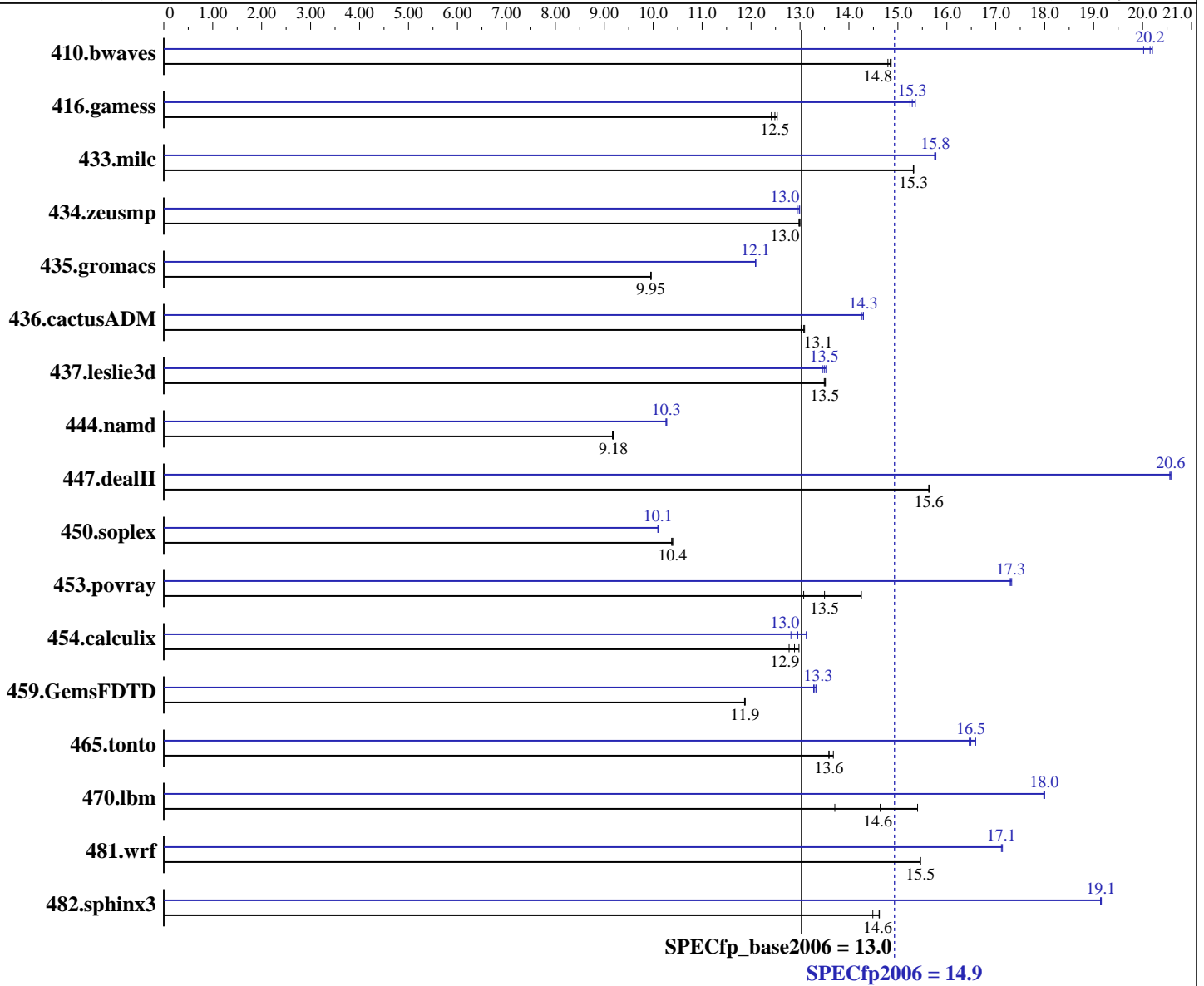
Hardware

CPU Name:	AMD Opteron 2356
CPU Characteristics:	
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
CPU(s) orderable:	2 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 3.1
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 Cache:	None
Memory:	16 GB (8 x 2 GB, DDR2-667, CL5, Reg, Dual Rank)
Disk Subsystem:	1 x 36 GB SAS 15000 RPM
Other Hardware:	None

Other Software: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	918	14.8	**916**	**14.8**	914	14.9	679	20.0	673	20.2	**674**	**20.2**
416.gamess	1562	12.5	**1568**	**12.5**	1577	12.4	**1280**	**15.3**	1284	15.2	1275	15.4
433.milc	599	15.3	599	15.3	**599**	**15.3**	**582**	**15.8**	582	15.8	583	15.8
434.zeusmp	700	13.0	701	13.0	**701**	**13.0**	**701**	**13.0**	703	12.9	700	13.0
435.gromacs	718	9.95	**717**	**9.95**	717	9.96	591	12.1	**590**	**12.1**	590	12.1
436.cactusADM	918	13.0	**914**	**13.1**	913	13.1	836	14.3	838	14.3	**836**	**14.3**
437.leslie3d	697	13.5	**696**	**13.5**	695	13.5	**697**	**13.5**	698	13.5	695	13.5
444.namd	873	9.19	875	9.17	**873**	**9.18**	782	10.3	**781**	**10.3**	780	10.3
447.dealII	731	15.7	732	15.6	**732**	**15.6**	557	20.6	556	20.6	**556**	**20.6**
450.soplex	**802**	**10.4**	802	10.4	804	10.4	826	10.1	**826**	**10.1**	825	10.1
453.povray	**394**	**13.5**	407	13.1	373	14.3	307	17.3	**307**	**17.3**	308	17.3
454.calculix	**640**	**12.9**	636	13.0	646	12.8	628	13.1	**637**	**13.0**	644	12.8
459.GemsFDTD	**893**	**11.9**	893	11.9	894	11.9	**798**	**13.3**	796	13.3	799	13.3
465.tonto	719	13.7	724	13.6	**724**	**13.6**	**597**	**16.5**	593	16.6	598	16.5
470.lbm	**939**	**14.6**	892	15.4	1002	13.7	**764**	**18.0**	764	18.0	763	18.0
481.wrf	**723**	**15.5**	723	15.5	722	15.5	652	17.1	**653**	**17.1**	654	17.1
482.sphinx3	**1334**	**14.6**	1333	14.6	1345	14.5	1017	19.2	**1018**	**19.1**	1018	19.1

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

```
'numactl' was used to bind copies to the cores
Environment variable PGI_HUGE_PAGES set to 150
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2457600' was used to set environment locked pages in memory quantity
Set vm/nr_hugepages = 1200 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

Base Compiler Invocation

C benchmarks:
```
pgcc
```

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Base Compiler Invocation (Continued)

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

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

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

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

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Hardware Availability: Aug-2008

Software Availability: May-2008

Base Other Flags

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

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

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

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

Peak Compiler Invocation

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

     433.milc: `pgcc`

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

     444.namd: `pgcpp`

Fortran benchmarks (except as noted below):
```
pathf95
```

    410.bwaves: `pgf95`

    434.zeusmp: `pgf95`

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

  436.cactusADM: `pathcc pathf95`

     481.wrf: `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`

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Peak Portability Flags (Continued)

```
    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_LINUX -fno-second-underscore
      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 -m3dnow

      482.sphinx3: -march=barcelona -Ofast
```

C++ benchmarks:

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

       447.dealII: -march=barcelona -Ofast -static -INLINE:aggressive=on
                  -OPT:malloc_alg=1 -m32 -fno-exceptions

       450.soplex: -march=barcelona -fb_create fbdata(pass 1)
                  -fb_opt fbdata(pass 2) -m32 -O3 -TENV:frame_pointer=off
                  -LNO:prefetch=1

       453.povray: -march=barcelona -fb_create fbdata(pass 1)
                  -fb_opt fbdata(pass 2) -Ofast -CG:load_exe=0
```

Fortran benchmarks:

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

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Peak Optimization Flags (Continued)

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

   437.leslie3d: -march=barcelona -Ofast -m3dnow -OPT:unroll_size=256
                -CG:load_exe=0 -OPT:malloc_alg=1

  459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2
                -OPT:malloc_alg=1

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

Benchmarks using both Fortran and C:

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

  436.cactusADM: -march=barcelona -fb_create fbdata(pass 1)
                -fb_opt fbdata(pass 2) -Ofast -WOPT:aggstr=0

   454.calculix: -fastsse -Mfprelaxed -Msmartalloc=huge:150 -Mipa=fast
                -Mipa=inline -tp barcelona-64 -Bstatic_pgi

      481.wrf: -march=barcelona -Ofast -LNO:blocking=off
                -LNO:prefetch_ahead=10 -OPT:malloc_alg=1 -m3dnow
                -LANG:copyinout=off -IPA:callee_limit=5000
```

Peak Other Flags

C benchmarks:

```
     433.milc: -w -Mipa=jobs:4
```

C++ benchmarks:

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

Fortran benchmarks:

```
    410.bwaves: -w -Mipa=jobs:4(pass 2)

    434.zeusmp: -w -Mipa=jobs:4
```

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Peak Other Flags (Continued)

Benchmarks using both Fortran and C:

     435.gromacs: `-w -Mipa=jobs:4`

     454.calculix: `-w -Mipa=jobs:4`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/amd123GH-flags.20090713.01.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/amd123GH-flags.20090713.01.xml`

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

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