SPEC® CFP2006 Result
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Dell Inc.

PowerEdge R805 (AMD Opteron 2425 HE, 2.10 GHz)

$SPECfp®_rate2006 = $ 128

$SPECfp_rate_base2006 = $ 116

CPU2006 license: 55	**Test date:** Jul-2009
Test sponsor: Dell Inc.	**Hardware Availability:** Aug-2009
Tested by: Dell Inc.	**Software Availability:** Apr-2009

Copies

Benchmark	Copies	Value
410.bwaves	12	109
	12	106
416.gamess	12	171
	12	159
433.milc	12	79.2
434.zeusmp	12	134
	12	134
435.gromacs	12	171
	12	139
436.cactusADM	2	173
	12	144
437.leslie3d	12	70.8
	12	66.7
444.namd	12	138
	12	125
447.dealII	12	241
	12	178
450.soplex	12	87.4
	12	80.6
453.povray	12	194
	12	161
454.calculix	12	199
	12	176
459.GemsFDTD	12	66.1
	12	64.6
465.tonto	12	173
	12	141
470.lbm	12	62.1
	12	61.9
481.wrf	12	123
	12	119
482.sphinx3	12	162
	12	151

SPECfp_rate_base2006 = 116

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Hardware

CPU Name:	AMD Opteron 2425 HE
CPU Characteristics:	
CPU MHz:	2100
FPU:	Integrated
CPU(s) enabled:	12 cores, 2 chips, 6 cores/chip
CPU(s) orderable:	1,2 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:	Red Hat Enterprise Linux Server release 5.3, Kernel 2.6.18-128.el5
Compiler:	PGI Server Complete Version 8.0 x86 Open64 4.2.2 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

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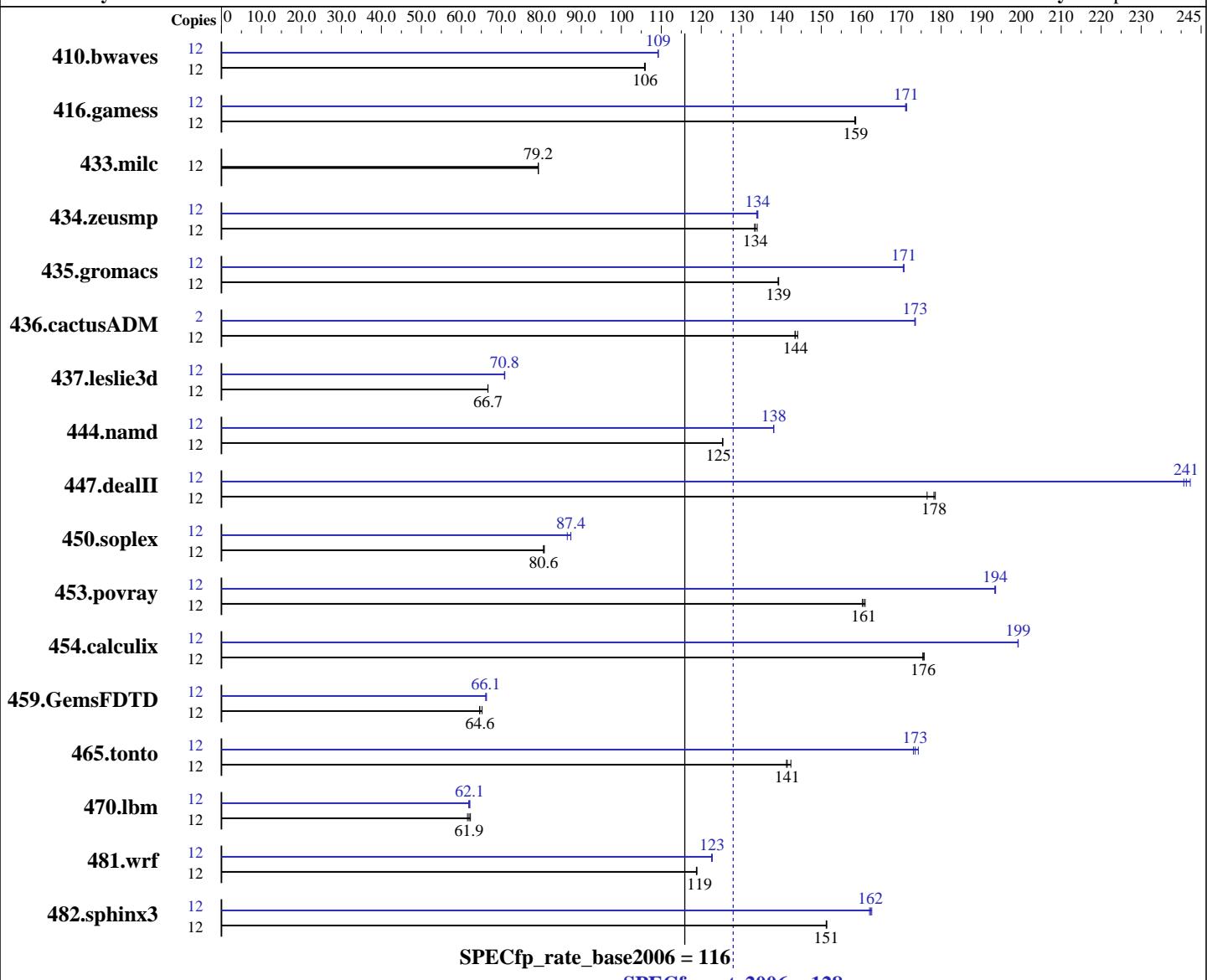
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L3 Cache:	6 MB I+D on chip per chip
Other Cache:	None
Memory:	32 GB (8 x 4 GB DDR2-800)
Disk Subsystem:	1 x 73 GB 15000 RPM SAS
Other Hardware:	None

Other Software: binutils 2.18

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	12	1542	106	1539	106	**1539**	**106**	12	**1493**	**109**	1493	109	1494	109
416.gamess	12	1481	159	1484	158	**1481**	**159**	12	1373	171	**1372**	**171**	1371	171
433.milc	12	1390	79.2	**1390**	**79.2**	1390	79.2	12	1390	79.2	**1390**	**79.2**	1390	79.2
434.zeusmp	12	**818**	**134**	815	134	819	133	12	**815**	**134**	816	134	814	134
435.gromacs	12	**615**	**139**	615	139	616	139	12	**502**	**171**	502	171	503	171
436.cactusADM	12	**999**	**144**	995	144	1000	143	2	**138**	**173**	138	173	138	174
437.leslie3d	12	1693	66.6	1692	66.7	**1692**	**66.7**	12	**1593**	**70.8**	1594	70.8	1592	70.9
444.namd	12	768	125	767	125	**768**	**125**	12	697	138	**697**	**138**	697	138
447.dealII	12	**770**	**178**	769	179	778	176	12	**569**	**241**	567	242	570	241
450.soplex	12	1239	80.8	**1242**	**80.6**	1242	80.6	12	**1145**	**87.4**	1157	86.5	1145	87.4
453.povray	12	397	161	398	160	**397**	**161**	12	330	193	330	194	**330**	**194**
454.calculix	12	563	176	564	175	**564**	**176**	12	**497**	**199**	497	199	497	199
459.GemsFDTD	12	**1970**	**64.6**	1953	65.2	1972	64.6	12	1921	66.3	**1925**	**66.1**	1926	66.1
465.tonto	12	829	142	**834**	**141**	836	141	12	**681**	**173**	678	174	682	173
470.lbm	12	2680	61.5	2648	62.3	**2662**	**61.9**	12	**2657**	**62.1**	2654	62.1	2666	61.8
481.wrf	12	1129	119	1127	119	**1128**	**119**	12	1093	123	**1093**	**123**	1092	123
482.sphinx3	12	**1546**	**151**	1545	151	1547	151	12	**1441**	**162**	1438	163	1443	162

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=5400 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 = "450"
LD_LIBRARY_PATH = "/root/cpu2006-1.1/amd0905is-libs/64:/root/cpu2006-1.1/amd0905is-libs/32"
NCPUS = "6"
PGI_HUGE_PAGES = "450"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at
http://developer.amd.com/cpu/open64
```

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
```

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Base Optimization Flags

C benchmarks:
```
-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline
-tp shanghai-64 -Bstatic_pgi
```

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

Fortran benchmarks:
```
-fastsse -Msmartalloc=huge -Mfprelaxed -Mvect=short -Mipa=fast
-Mipa=inline -tp shanghai-64 -Bstatic_pgi
```

Benchmarks using both Fortran and C:
```
-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline
-tp shanghai-64 -Mvect=short -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:
```
pgcc
```

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

```
    444.namd: pgcpp
```

Fortran benchmarks (except as noted below):
```
openf95
```

```
    410.bwaves: pgf95
```

Continued on next page

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Peak Compiler Invocation (Continued)

434.zeusmp: `pgf95`

437.leslie3d: `pgf95`

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

435.gromacs: `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 -Mnomain`
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: `basepeak = yes`

470.lbm: `-fastsse -Msmartalloc=huge -Mprefetch=t0 -Mloop32`
`-Mfprelaxed -Mipa=fast -Mipa=inline -tp shanghai-64`
`-Bstatic_pgi`

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

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Peak Optimization Flags (Continued)

```
 447.dealII: -march=barcelona -Ofast -static -INLINE:aggressive=on
             -LNO:opt=0 -Wf,-fno-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 -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 -fb_create fbdata(pass 1)
             -fb_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on
             -HP:bdt=2m:heap=2m
```

Fortran benchmarks:

```
  410.bwaves: -fastsse -Msmartalloc -Mprefetch=nta -Mfprelaxed
             -Mipa=fast -Mipa=inline -tp shanghai-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 -HP:bdt=2m:heap=2m

  434.zeusmp: -fastsse -Mfprelaxed -Mprefetch=distance:8 -Mprefetch=t0
             -Msmartalloc=huge -Msmartalloc=hugebss -Mipa=fast
             -Mipa=inline -tp shanghai-64 -Bstatic_pgi

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

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

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

 436.cactusADM: -fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -Mipa=fast
             -Mipa=inline -tp shanghai-64 -Bstatic_pgi

 454.calculix: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
             -Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
             -Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre
```

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Peak Optimization Flags (Continued)

454.calculix (continued):
```
-Mfprelaxed -tp shanghai-64 -Bstatic_pgi
```

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

Peak Other Flags

C benchmarks:
`-Mipa=jobs:4(pass 2)`

C++ benchmarks:

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

Fortran benchmarks:

410.bwaves: `-Mipa=jobs:4`

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

437.leslie3d: `-Mipa=jobs:4(pass 2)`

Benchmarks using both Fortran and C:

436.cactusADM: `-Mipa=jobs:4`

454.calculix: `-Mipa=jobs:4(pass 2)`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.html
http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revB.html
http://www.spec.org/cpu2006/flags/amd-platform.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.xml
http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revB.xml
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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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