SPEC® CFP2006 Result

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Dell Inc.

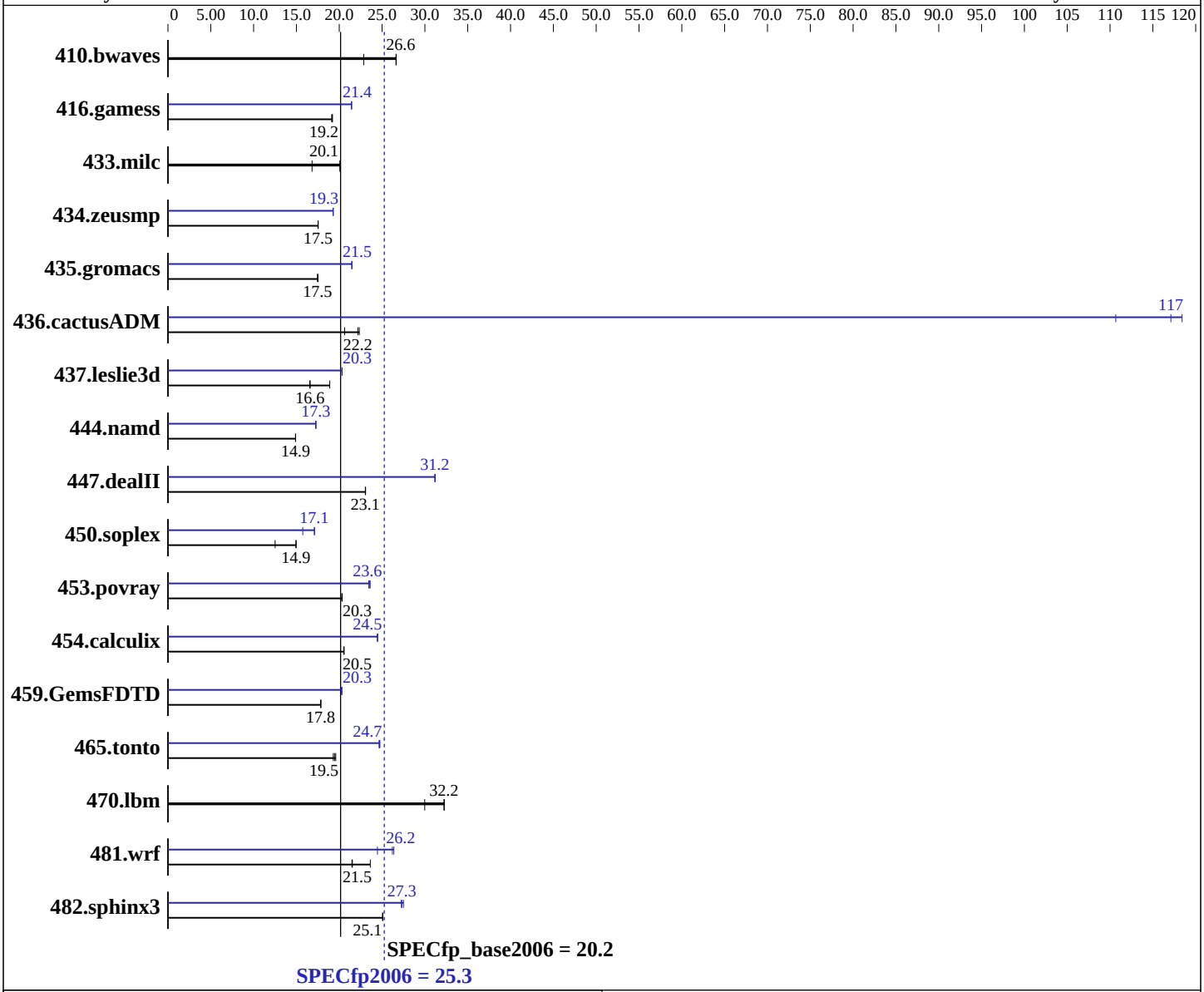
PowerEdge M905 (AMD Opteron 8393 SE, 3.10 GHz)

SPECfp®2006 = 25.3

SPECfp_base2006 = 20.2

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

Test date: Apr-2009
Hardware Availability: May-2008
Software Availability: Oct-2008



Hardware

CPU Name:	AMD Opteron 8393 SE
CPU Characteristics:	
CPU MHz:	3100
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

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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:	Yes
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: 6 MB I+D on chip per chip
Other Cache: None
Memory: 64 GB (16 x 4 GB DDR2-800)
Disk Subsystem: 1 x 73 GB 10000 RPM SAS
Other Hardware: None

Other Software: binutils 2.18
32-bit and 64-bit libhugetlbfs libraries

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	594	22.9	510	26.7	**510**	**26.6**	594	22.9	510	26.7	**510**	**26.6**
416.gamess	1019	19.2	**1022**	**19.2**	1024	19.1	**914**	**21.4**	913	21.4	914	21.4
433.milc	546	16.8	456	20.1	**457**	**20.1**	546	16.8	456	20.1	**457**	**20.1**
434.zeusmp	519	17.5	519	17.5	**519**	**17.5**	472	19.3	**472**	**19.3**	472	19.3
435.gromacs	408	17.5	408	17.5	**408**	**17.5**	333	21.5	332	21.5	**332**	**21.5**
436.cactusADM	535	22.3	**539**	**22.2**	579	20.6	101	118	108	111	**102**	**117**
437.leslie3d	498	18.9	568	16.6	**566**	**16.6**	462	20.3	463	20.3	**462**	**20.3**
444.namd	539	14.9	538	14.9	**538**	**14.9**	465	17.2	464	17.3	**464**	**17.3**
447.dealII	**496**	**23.1**	496	23.1	496	23.1	366	31.2	**367**	**31.2**	367	31.2
450.soplex	557	15.0	**558**	**14.9**	667	12.5	**488**	**17.1**	487	17.1	530	15.7
453.povray	**261**	**20.3**	261	20.3	262	20.3	227	23.4	**226**	**23.6**	225	23.6
454.calculix	**402**	**20.5**	401	20.6	402	20.5	337	24.5	337	24.5	**337**	**24.5**
459.GemsFDTD	595	17.8	**595**	**17.8**	594	17.9	524	20.3	**523**	**20.3**	522	20.3
465.tonto	510	19.3	**506**	**19.5**	502	19.6	398	24.7	**398**	**24.7**	399	24.6
470.lbm	458	30.0	**426**	**32.2**	426	32.3	458	30.0	**426**	**32.2**	426	32.3
481.wrf	473	23.6	520	21.5	**519**	**21.5**	**426**	**26.2**	457	24.5	423	26.4
482.sphinx3	**777**	**25.1**	778	25.1	777	25.1	715	27.3	709	27.5	**714**	**27.3**

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

```
The libhugetlbfs libraries were installed using the
installation RPMs that came with the distribution.

'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=14336 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_MORECORE = "yes"
LD_LIBRARY_PATH = "/root/cpu2006-1.1/amd909gh-libs/64:/root/cpu2006-1.1/amd909gh-libs/32"
NCPUS = "8"
```

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:
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi

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Base Optimization Flags (Continued)

C++ benchmarks:
```
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed
--zc_eh -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi
```

Fortran benchmarks:
```
-Mvect=cachesize:6291456 -fastsse -Mfprelaxed -Msmartalloc=huge
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi
```

Benchmarks using both Fortran and C:
```
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -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:
```
pgcc
```

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`

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Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C (except as noted below):
pathcc pathf95

436.cactusADM: pgcc pgf95

454.calculix: pgcc pgf95

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_LINUX -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2)
-Mvect=cachesize:6291456 -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) -Mvect=cachesize:6291456 -fastsse
-Munroll=n:4 -Munroll=m:8 -Msmartalloc=huge -Mnodepchk
-Mfprelaxed --zc_eh -tp barcelona-64 -Bstatic_pgi

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Peak Optimization Flags (Continued)

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

450.soplex: `-march=barcelona -fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-L/usr/lib -lhugetlbfs`(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`

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

Fortran benchmarks:

410.bwaves: `basepeak = yes`

416.gamess: `-march=barcelona -fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT`(pass 2) `-L/usr/lib64 -lhugetlbfs`(pass 2) `-O2 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256`

434.zeusmp: `-Mvect=cachesize:6291456 -fastsse -Mfprelaxed -Mprefetch=distance:8 -Mprefetch=t0 -Msmartalloc=huge -Msmartalloc=hugebss -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi`

437.leslie3d: `-Mpfi=indirect`(pass 1) `-Mpfo=indirect`(pass 2) `-Mipa=fast`(pass 2) `-Mipa=inline`(pass 2) `-Mvect=cachesize:6291456 -fastsse -Mvect=fuse -Msmartalloc=huge -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 -CG:prefer_lru_reg=off -OPT:malloc_alg=1 -Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT -L/usr/lib64 -lhugetlbfs`

465.tonto: `-march=barcelona -Ofast -OPT:alias=no_f90_pointer_alias -LNO:blocking=off -CG:load_exe=1 -IPA:plimit=525 -OPT:malloc_alg=1 -Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT -L/usr/lib64 -lhugetlbfs`

Benchmarks using both Fortran and C:

435.gromacs: `-march=barcelona -Ofast -OPT:rsqrt=2 -OPT:malloc_alg=1 -Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT -L/usr/lib64 -lhugetlbfs`

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Peak Optimization Flags (Continued)

436.cactusADM: `-Mvect=cachesize:6291456 -fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi`

454.calculix: `-Mpfi=indirect`(pass 1) `-Mpfo=indirect`(pass 2) `-Mipa=fast`(pass 2) `-Mipa=inline`(pass 2) `-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mpre -Mfprelaxed -tp barcelona-64 -Bstatic_pgi`

481.wrf: `-march=barcelona -Ofast -LNO:blocking=off -LNO:prefetch_ahead=10 -LANG:copyinout=off -IPA:callee_limit=5000 -GRA:prioritize_by_density=on -OPT:malloc_alg=1 -m3dnow -Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT -L/usr/lib64 -lhugetlbfs`

Peak Other Flags

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

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)

435.gromacs: `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/pgi72_linux_flags.20090710.html`
`http://www.spec.org/cpu2006/flags/pathscale32-flags.html`
`http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.html`

You can also download the XML flags sources by saving the following links:

```
http://www.spec.org/cpu2006/flags/pgi72_linux_flags.20090710.xml
http://www.spec.org/cpu2006/flags/pathscale32-flags.xml
http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.xml
```


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