SPEC® CFP2006 Result

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IBM Corporation

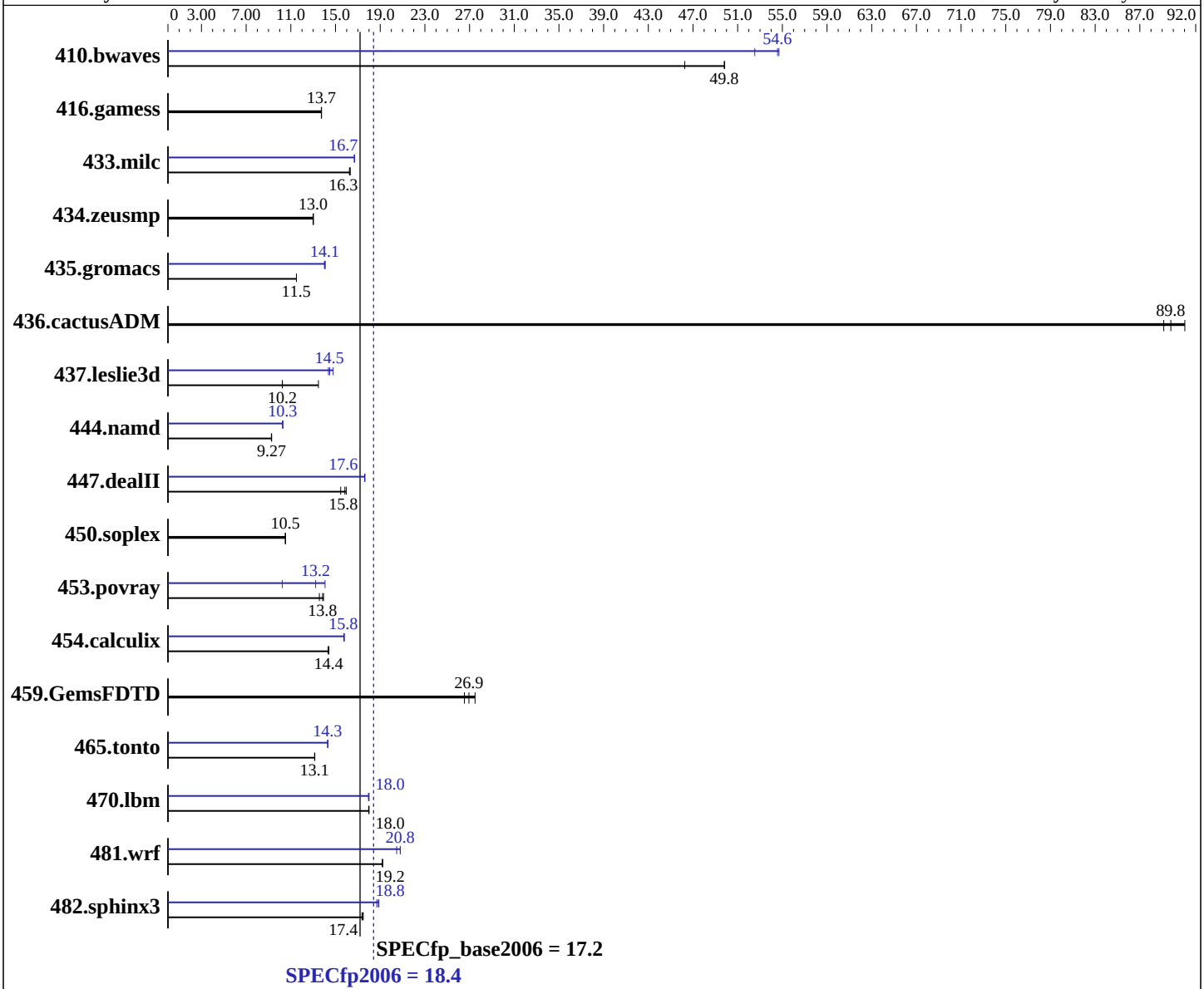
IBM System x3455 (AMD Opteron 2356)

SPECfp®2006 = 18.4

SPECfp_base2006 = 17.2

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: Advanced Micro Devices

Test date: Jul-2008
Hardware Availability: Jul-2008
Software Availability: May-2008



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:	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

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Software

Operating System:	SuSE Linux Enterprise Server 10 (x86_64) SP1, Kernel 2.6.16.46-0.12-smp
Compiler:	PGI Server Complete Version 7.2
Auto Parallel:	Yes
File System:	ReiserFS
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	binutils 2.18.50

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L3 Cache: 2 MB I+D on chip per chip
Other Cache: None
Memory: 32 GB (8 x 4 GB, DDR2-667 CL5 Reg Dual Rank)
Disk Subsystem: 1 x 160 GB SATA, 7200 RPM
Other Hardware: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	**273**	**49.8**	294	46.3	273	49.8	248	54.7	**249**	**54.6**	259	52.5
416.gamess	1426	13.7	1424	13.7	**1425**	**13.7**	1426	13.7	1424	13.7	**1425**	**13.7**
433.milc	565	16.2	**563**	**16.3**	563	16.3	550	16.7	**550**	**16.7**	549	16.7
434.zeusmp	**700**	**13.0**	701	13.0	699	13.0	**700**	**13.0**	701	13.0	699	13.0
435.gromacs	621	11.5	**621**	**11.5**	621	11.5	**508**	**14.1**	507	14.1	510	14.0
436.cactusADM	**133**	**89.8**	131	91.0	134	89.1	**133**	**89.8**	131	91.0	134	89.1
437.leslie3d	**918**	**10.2**	918	10.2	698	13.5	**649**	**14.5**	636	14.8	654	14.4
444.namd	867	9.26	**865**	**9.27**	864	9.29	780	10.3	**781**	**10.3**	781	10.3
447.dealII	740	15.5	**722**	**15.8**	717	16.0	649	17.6	650	17.6	**649**	**17.6**
450.soplex	**793**	**10.5**	794	10.5	793	10.5	**793**	**10.5**	794	10.5	793	10.5
453.povray	393	13.6	**384**	**13.8**	382	13.9	**402**	**13.2**	520	10.2	378	14.1
454.calculix	573	14.4	**573**	**14.4**	575	14.3	523	15.8	**523**	**15.8**	524	15.7
459.GemsFDTD	386	27.5	400	26.5	**394**	**26.9**	386	27.5	400	26.5	**394**	**26.9**
465.tonto	750	13.1	**749**	**13.1**	748	13.1	687	14.3	688	14.3	**688**	**14.3**
470.lbm	765	18.0	**764**	**18.0**	764	18.0	763	18.0	**764**	**18.0**	766	17.9
481.wrf	**582**	**19.2**	582	19.2	581	19.2	537	20.8	546	20.5	**537**	**20.8**
482.sphinx3	1115	17.5	1122	17.4	**1117**	**17.4**	**1035**	**18.8**	1032	18.9	1043	18.7

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.
```

Operating System Notes

```
'numactl' was used to bind copies to the cores.
Environment stack size set to 'unlimited'.
'ulimit -l 2097152' was used to set environment locked pages in memory quantity.
NCPUS set to number of cores.
PGI_HUGE_PAGES set to 896.
Set vm/nr_hugepages=7168 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
powersave -f was used to set the CPU frequency to its maximum.
```

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:896 -Mconcur -Mfprelaxed -Mipa=fast
-Mipa=inline -tp barcelona-64 -Bstatic_pgi

C++ benchmarks:
-fastsse -Msmartalloc=huge:896 -Mfprelaxed -Mconcur --zc_eh
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi

Fortran benchmarks:
-fastsse -Mfprelaxed -Msmartalloc=huge:896 -Mconcur -Mipa=fast
-Mipa=inline -tp barcelona-64 -Bstatic_pgi

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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
`-fastsse -Msmartalloc=huge:896 -Mconcur -Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi`

Base Other Flags

C benchmarks:
`-Mipa=jobs:8`

C++ benchmarks:
`-Mipa=jobs:8`

Fortran benchmarks:
`-Mipa=jobs:8`

Benchmarks using both Fortran and C:
`-Mipa=jobs:8`

Peak Compiler Invocation

C benchmarks:
`pgcc`

C++ benchmarks:
`pgcpp`

Fortran benchmarks:
`pgf95`

Benchmarks using both Fortran and C:
`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 -Mnomain`
436.cactusADM: `-DSPEC_CPU_LP64 -Mnomain`
437.leslie3d: `-DSPEC_CPU_LP64`
444.namd: `-DSPEC_CPU_LP64`
450.soplex: `-DSPEC_CPU_LP64`

Continued on next page

Peak Portability Flags (Continued)

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:896 -Msafeptr -Mconcur
-Mfprelaxed -Mipa=inline -Mipa=arg -Mipa=const -Mipa=ptr
-Mipa=shape -tp barcelona-64 -Bstatic_pgi

470.lbm: -fastsse -Msmartalloc=huge:896 -Mprefetch=t0 -Mloop32
-Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64
-Bstatic_pgi

482.sphinx3: -Mpfi(pass 1) -Mpfo(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:896 -Mnodepchk -Mfprelaxed --zc_eh
-tp barcelona-64 -Bstatic_pgi

447.dealII: -fastsse -alias=ansi -Msmartalloc=huge:896 -Mprefetch=t0
-Mnovect -Mfprelaxed --zc_eh -Mipa=fast -Mipa=inline
-tp barcelona-32 -Bstatic_pgi

450.soplex: basepeak = yes

453.povray: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inlinenopfo:3(pass 2)
-Mipa=staticfunc(pass 2) -fastsse -Msmartalloc=huge:896
-Mprefetch=t0 -Mfprelaxed -tp barcelona-64 -Bstatic_pgi

Fortran benchmarks:

410.bwaves: -fastsse -Msmartalloc -Mprefetch=distance:12 -Mprefetch=nta
-Mconcur -Mloop32 -Mpre -Mfprelaxed -Mipa=fast
-Mipa=inline -tp barcelona-64 -Bstatic_pgi

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Peak Optimization Flags (Continued)

416.gamess: basepeak = yes

434.zeusmp: basepeak = yes

437.leslie3d: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mconcur=noaltcode(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -fastsse -Mvect=fuse
-Msmartalloc=huge:896 -Mprefetch=distance:8 -Mprefetch=t0
-Mfprelaxed -tp barcelona-64 -Bstatic_pgi

459.GemsFDTD: basepeak = yes

465.tonto: -fastsse -O4 -Mvect=noaltcode -Msmartalloc=huge:896
-Mprefetch=distance:8 -Mprefetch=t0 -Mfprelaxed -Mipa=fast
-Mipa=inline -tp barcelona-64 -Bstatic_pgi

Benchmarks using both Fortran and C:

435.gromacs: -fastsse -Msmartalloc=huge:896 -Mfprelaxed -Mconcur
-Mfpapprox=rsqrt -Mipa=fast -Mipa=inline -tp barcelona-64
-Bstatic_pgi

436.cactusADM: basepeak = yes

454.calculix: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Msmartalloc=huge:896 -Mloop32 -Mprefetch=t0 -Mpre
-Mfprelaxed -tp barcelona-64 -Bstatic_pgi

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

Peak Other Flags

C benchmarks:
-Mipa=jobs:8(pass 2)

C++ benchmarks:
-Mipa=jobs:8(pass 2)

Fortran benchmarks:
-Mipa=jobs:8

Benchmarks using both Fortran and C (except as noted below):
-Mipa=jobs:8(pass 2)

Continued on next page

Peak Other Flags (Continued)

481.wrf: `No flags used`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/pgi72_flags.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/pgi72_flags.xml`

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