SPEC® CFP2006 Result

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IBM Corporation

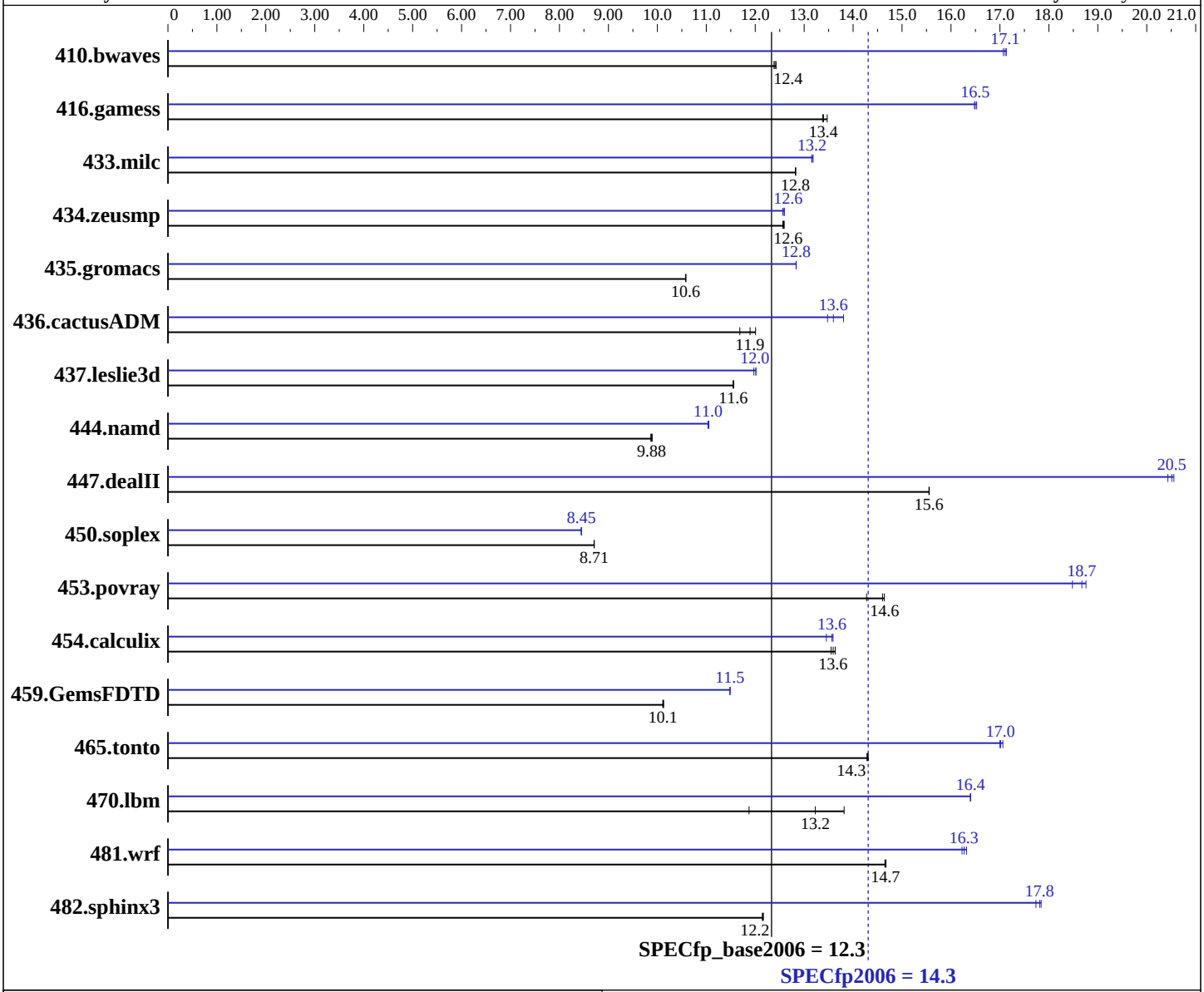
IBM System x3755 (AMD Opteron 8360 SE)

SPECfp®2006 = 14.3

SPECfp_base2006 = 12.3

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

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



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:	1,2,3,4 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) SP1, Kernel 2.6.16.46-0.12-smp
Compiler:	PGI Server Complete Version 7.2 PathScale Compiler Suite Version 3.1
Auto Parallel:	No
File System:	ReiserFS
System State:	Runlevel 3 (Full multiuser with network)
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: 32 GB (16 x 2 GB, DDR2-667, CL5, Reg, Dual Rank)
Disk Subsystem: 1 x 73.4 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	1097	12.4	**1096**	**12.4**	1094	12.4	796	17.1	793	17.1	**794**	**17.1**
416.gamess	1464	13.4	**1462**	**13.4**	1453	13.5	**1187**	**16.5**	1185	16.5	1188	16.5
433.milc	**716**	**12.8**	716	12.8	716	12.8	696	13.2	698	13.2	**697**	**13.2**
434.zeusmp	724	12.6	723	12.6	**723**	**12.6**	722	12.6	**723**	**12.6**	724	12.6
435.gromacs	675	10.6	**675**	**10.6**	675	10.6	556	12.8	556	12.8	**556**	**12.8**
436.cactusADM	**1005**	**11.9**	995	12.0	1023	11.7	887	13.5	866	13.8	**879**	**13.6**
437.leslie3d	813	11.6	814	11.5	**813**	**11.6**	782	12.0	785	12.0	**782**	**12.0**
444.namd	811	9.89	**812**	**9.88**	813	9.87	727	11.0	726	11.1	**726**	**11.0**
447.dealII	735	15.6	736	15.6	**736**	**15.6**	557	20.6	**558**	**20.5**	560	20.4
450.soplex	958	8.71	957	8.71	**958**	**8.71**	987	8.45	**987**	**8.45**	988	8.44
453.povray	**364**	**14.6**	363	14.6	373	14.3	**285**	**18.7**	288	18.5	284	18.8
454.calculix	609	13.6	**607**	**13.6**	605	13.6	613	13.5	607	13.6	**608**	**13.6**
459.GemsFDTD	**1049**	**10.1**	1049	10.1	1047	10.1	924	11.5	**924**	**11.5**	924	11.5
465.tonto	688	14.3	689	14.3	**688**	**14.3**	577	17.1	**578**	**17.0**	579	17.0
470.lbm	995	13.8	**1039**	**13.2**	1157	11.9	838	16.4	**838**	**16.4**	838	16.4
481.wrf	**762**	**14.7**	763	14.6	761	14.7	684	16.3	**687**	**16.3**	688	16.2
482.sphinx3	1602	12.2	1605	12.1	**1602**	**12.2**	**1094**	**17.8**	1099	17.7	1092	17.8

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 4915200' was used to set environment locked pages in memory quantity
Set vm/nr_hugepages=2400 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=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed
-Msmartalloc=huge:150 -tp barcelona-64 -Bstatic_pgi

C++ benchmarks:
-fast -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed
-Msmartalloc=huge:150 --zc_eh -tp barcelona-64 -Bstatic_pgi

Fortran benchmarks:
-fast -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed
-Msmartalloc=huge:150 -tp barcelona-64 -Bstatic_pgi

Benchmarks using both Fortran and C:
-fast -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed
-Msmartalloc=huge:150 -tp barcelona-64 -Bstatic_pgi

Base Other Flags

C benchmarks:
`-w`

C++ benchmarks:
`-w`

Fortran benchmarks:
`-w`

Benchmarks using both Fortran and C:
`-w`

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=jobs:4 -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=jobs:4(pass 2) -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=jobs:4(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -Mpfo(pass 2) -fastsse -Mfprelaxed
-Msmartalloc -Mprefetch=distance:12 -Mprefetch=nta
-tp barcelona-64 -Bstatic_pgi

Continued on next page

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=jobs:4`
`-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=jobs:4 -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=jobs:4`
`-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`

C++ benchmarks:

444.namd: `-w`

Fortran benchmarks:

410.bwaves: `-w`

Continued on next page

Peak Other Flags (Continued)

434.zeusmp: `-w`

Benchmarks using both Fortran and C:

435.gromacs: `-w`

454.calculix: `-w`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/amd123GH-flags.20090714.03.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/amd123GH-flags.20090714.03.xml`

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