SPEC® CFP2006 Result

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IBM Corporation

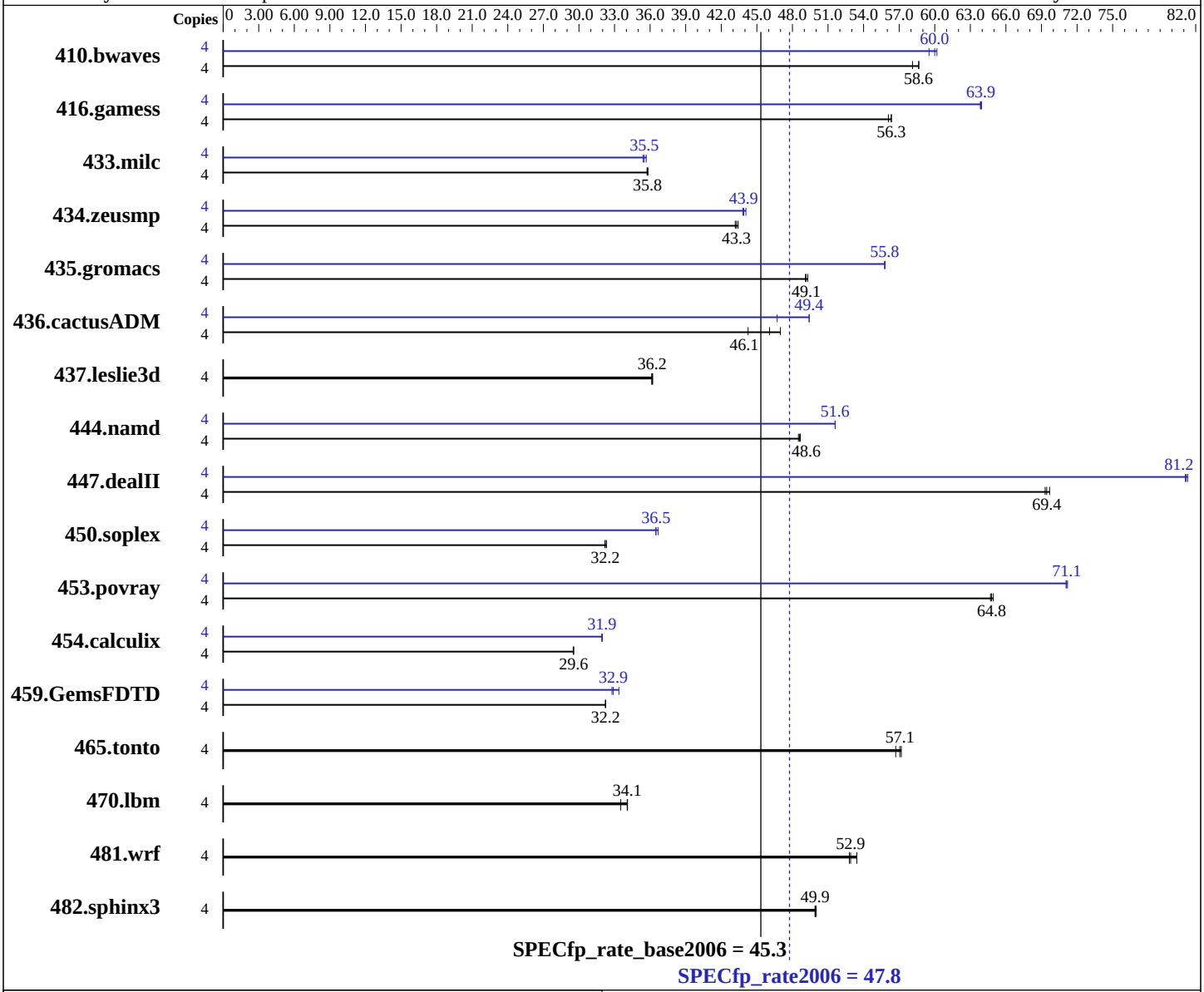
IBM System x3455 (AMD Opteron 2220)

SPECfp®_rate2006 = 47.8

SPECfp_rate_base2006 = 45.3

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Jul-2007
Hardware Availability: Apr-2007
Software Availability: Mar-2007



Hardware

CPU Name:	AMD Opteron 2220
CPU Characteristics:	
CPU MHz:	2800
FPU:	Integrated
CPU(s) enabled:	4 cores, 2 chips, 2 cores/chip
CPU(s) orderable:	1, 2 chips
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core

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Software

Operating System:	SLES 10 (x86_64), 2.6.16.21-0.8-smp
Compiler:	QLogic PathScale Compiler Suite, Release 3.0
Auto Parallel:	No
File System:	ext3
System State:	Multi-user, run level 3
Base Pointers:	64-bit
Peak Pointers:	32/64-bit

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L3 Cache: None
Other Cache: None
Memory: 16 GB (8 x 2GB DDR2-5300 ECC)
Disk Subsystem: 1 x 160 GB Serial ATA, 7200 RPM
Other Hardware: None

Other Software: MicroQuill SmartHeap 8.1

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	4	935	58.1	**927**	**58.6**	927	58.7	4	913	59.5	903	60.2	**906**	**60.0**
416.gamess	4	**1390**	**56.3**	1396	56.1	1390	56.3	4	1227	63.8	1225	63.9	**1226**	**63.9**
433.milc	4	1025	35.8	1027	35.7	**1026**	**35.8**	4	1029	35.7	1037	35.4	**1034**	**35.5**
434.zeusmp	4	843	43.2	838	43.4	**841**	**43.3**	4	831	43.8	826	44.1	**829**	**43.9**
435.gromacs	4	**581**	**49.1**	582	49.1	579	49.3	4	512	55.8	512	55.8	**512**	**55.8**
436.cactusADM	4	1017	47.0	**1038**	**46.1**	1080	44.3	4	**968**	**49.4**	967	49.4	1023	46.7
437.leslie3d	4	1041	36.1	**1039**	**36.2**	1038	36.2	4	1041	36.1	**1039**	**36.2**	1038	36.2
444.namd	4	**660**	**48.6**	661	48.5	659	48.7	4	622	51.6	622	51.6	**622**	**51.6**
447.dealII	4	657	69.7	660	69.3	**659**	**69.4**	4	564	81.1	563	81.3	**563**	**81.2**
450.soplex	4	1032	32.3	**1036**	**32.2**	1036	32.2	4	**914**	**36.5**	909	36.7	915	36.5
453.povray	4	**328**	**64.8**	329	64.7	328	64.9	4	**299**	**71.1**	299	71.2	299	71.1
454.calculix	4	1117	29.6	**1117**	**29.6**	1118	29.5	4	1032	32.0	**1033**	**31.9**	1033	31.9
459.GemsFDTD	4	**1316**	**32.2**	1317	32.2	1316	32.3	4	1272	33.4	**1290**	**32.9**	1295	32.8
465.tonto	4	688	57.2	694	56.7	**690**	**57.1**	4	688	57.2	694	56.7	**690**	**57.1**
470.lbm	4	1639	33.5	**1613**	**34.1**	1612	34.1	4	1639	33.5	**1613**	**34.1**	1612	34.1
481.wrf	4	**845**	**52.9**	846	52.8	836	53.4	4	**845**	**52.9**	846	52.8	836	53.4
482.sphinx3	4	1559	50.0	1562	49.9	**1562**	**49.9**	4	1559	50.0	1562	49.9	**1562**	**49.9**

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

General Notes

```
 taskset utility used to bind CPU(s) to processes
DSPEC_CPU_TABLE_WORKAROUND was used for portability when compiling 447.dealII
due to compilation being performed on SLES 9 SP3
```

Base Compiler Invocation

C benchmarks:
`pathcc`

C++ benchmarks:
`pathCC`

Continued on next page

Base Compiler Invocation (Continued)

Fortran benchmarks:
pathf95

Benchmarks using both Fortran and C:
pathcc pathf95

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
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64 -DSPEC_CPU_TABLE_WORKAROUND
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
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

Base Optimization Flags

C benchmarks:
-Ofast

C++ benchmarks:
-Ofast

Fortran benchmarks:
-Ofast -OPT:malloc_alg=1

Benchmarks using both Fortran and C:
-Ofast -OPT:malloc_alg=1

Base Other Flags

C benchmarks:
-IPA:max_jobs=2

Continued on next page

Base Other Flags (Continued)

C++ benchmarks:
`-IPA:max_jobs=2`

Fortran benchmarks:
`-IPA:max_jobs=2`

Benchmarks using both Fortran and C:
`-IPA:max_jobs=2`

Peak Compiler Invocation

C benchmarks:
`pathcc`

C++ benchmarks:
`pathCC`

Fortran benchmarks:
`pathf95`

Benchmarks using both Fortran and C:
`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`
436.cactusADM: `-DSPEC_CPU_LP64 -fno-second-underscore`
437.leslie3d: `-DSPEC_CPU_LP64`
444.namd: `-DSPEC_CPU_LP64`
447.dealII: `-DSPEC_CPU_TABLE_WORKAROUND`
453.povray: `-DSPEC_CPU_LP64`
454.calculix: `-DSPEC_CPU_LP64`
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: `-Ofast -CG:cflow=off -LNO:prefetch=1 -OPT:malloc_alg=1`

470.lbm: `basepeak = yes`

482.sphinx3: `basepeak = yes`

C++ benchmarks:

444.namd: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-Ofast -fno-exceptions`

447.dealII: `-Ofast -INLINE:aggressive=on -LNO:opt=0 -OPT:alias=disjoint -m32 -fno-exceptions`

450.soplex: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-m32 -O3 -OPT:IEEE_arith=3 -CG:load_exe=0 -CG:movnti=1 -LNO:minvariant=off -LNO:prefetch=1 -fno-exceptions`

453.povray: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-Ofast -fno-fast-math`

Fortran benchmarks:

410.bwaves: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-O3 -OPT:Ofast -OPT:IEEE_arith=3 -LNO:blocking=off -LNO:ignore_feedback=off`

416.gamess: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-O2 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256`

434.zeusmp: `-Ofast -CG:local_fwd_sched=on -LNO:blocking=off -LNO:interchange=off -LNO:fu=10 -LNO:full_unroll_outer=on`

437.leslie3d: `basepeak = yes`

459.GemsFDTD: `-Ofast -LNO:fission=2 -LNO:prefetch=0`

465.tonto: `basepeak = yes`

Benchmarks using both Fortran and C:

435.gromacs: `-O3 -OPT:rsqrt=2 -OPT:ro=3`

436.cactusADM: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-O3 -LNO:prefetch=3 -LNO:prefetch_ahead=5 -LNO:ou_prod_max=10 -LNO:full_unroll=5 -ipa`

Continued on next page

Peak Optimization Flags (Continued)

454.calculix: `-Ofast -LNO:simd=0 -WOPT:mem_opnds=on`

481.wrf: `basepeak = yes`

Peak Other Flags

C benchmarks:
`-IPA:max_jobs=2`

C++ benchmarks:
`-IPA:max_jobs=2`

Fortran benchmarks:
`-IPA:max_jobs=2`

Benchmarks using both Fortran and C:
`-IPA:max_jobs=2`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/CPU2006_flags.20090714.13.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/CPU2006_flags.20090714.13.xml`

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