SPEC® CFP2006 Result
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IBM Corporation

IBM BladeCenter LS21 (AMD Opteron 2220)

$SPECfp®2006 =$ 13.9

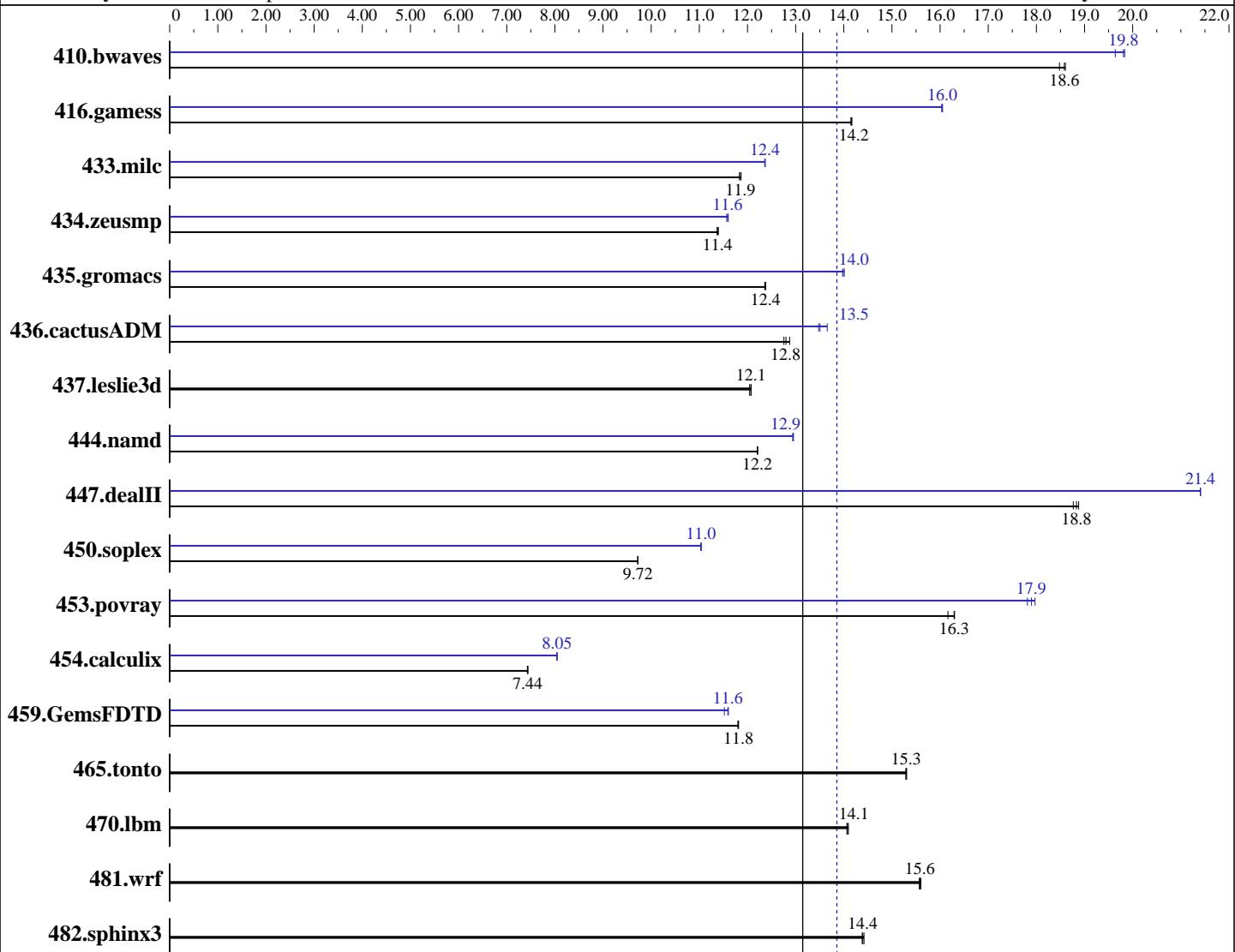$SPECfp\_base2006 =$ 13.1

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

Test date: Mar-2007
Hardware Availability: Feb-2007
Software Availability: Mar-2007

Benchmark	Peak	Base
410.bwaves	19.8	18.6
416.gamess	16.0	14.2
433.milc	12.4	11.9
434.zeusmp	11.6	11.4
435.gromacs	14.0	12.4
436.cactusADM	13.5	12.8
437.leslie3d		12.1
444.namd	12.9	12.2
447.dealII	21.4	18.8
450.soplex	11.0	9.72
453.povray	17.9	16.3
454.calculix	8.05	7.44
459.GemsFDTD	11.6	11.8
465.tonto		15.3
470.lbm		14.1
481.wrf		15.6
482.sphinx3		14.4

SPECfp_base2006 = 13.1
SPECfp2006 = 13.9

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
Continued on next page

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
Continued on next page

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L3 Cache:	None	Other Software: None
Other Cache:	None	
Memory:	16 GB (8 x 2GB DDR2-5300 ECC)	
Disk Subsystem:	1 x 36 GB SAS, 10000 RPM	
Other Hardware:	None	

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	735	18.5	**731**	**18.6**	731	18.6	692	19.6	685	19.8	**686**	**19.8**
416.gamess	**1383**	**14.2**	1384	14.1	1382	14.2	1221	16.0	**1220**	**16.0**	1220	16.1
433.milc	774	11.9	**774**	**11.9**	776	11.8	**743**	**12.4**	743	12.4	742	12.4
434.zeusmp	800	11.4	799	11.4	**800**	**11.4**	787	11.6	**785**	**11.6**	784	11.6
435.gromacs	577	12.4	**577**	**12.4**	578	12.4	510	14.0	511	14.0	**510**	**14.0**
436.cactusADM	937	12.8	928	12.9	**934**	**12.8**	887	13.5	**885**	**13.5**	875	13.7
437.leslie3d	781	12.0	**779**	**12.1**	779	12.1	781	12.0	**779**	**12.1**	779	12.1
444.namd	657	12.2	657	12.2	**657**	**12.2**	620	12.9	619	13.0	**620**	**12.9**
447.dealII	610	18.8	606	18.9	**607**	**18.8**	534	21.4	**534**	**21.4**	535	21.4
450.soplex	**858**	**9.72**	857	9.73	858	9.72	**756**	**11.0**	755	11.0	756	11.0
453.povray	329	16.2	326	16.3	**327**	**16.3**	296	18.0	**297**	**17.9**	299	17.8
454.calculix	1111	7.43	1109	7.44	**1110**	**7.44**	**1025**	**8.05**	1026	8.04	1025	8.05
459.GemsFDTD	899	11.8	898	11.8	**898**	**11.8**	914	11.6	921	11.5	**915**	**11.6**
465.tonto	643	15.3	**643**	**15.3**	644	15.3	643	15.3	**643**	**15.3**	644	15.3
470.lbm	977	14.1	975	14.1	**976**	**14.1**	977	14.1	975	14.1	**976**	**14.1**
481.wrf	716	15.6	**717**	**15.6**	718	15.6	716	15.6	**717**	**15.6**	718	15.6
482.sphinx3	**1354**	**14.4**	1352	14.4	1355	14.4	**1354**	**14.4**	1352	14.4	1355	14.4

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
```

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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

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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
```

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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

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SPECfp_base2006 =	13.1

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`

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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