SPEC® CFP2006 Result

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IBM Corporation

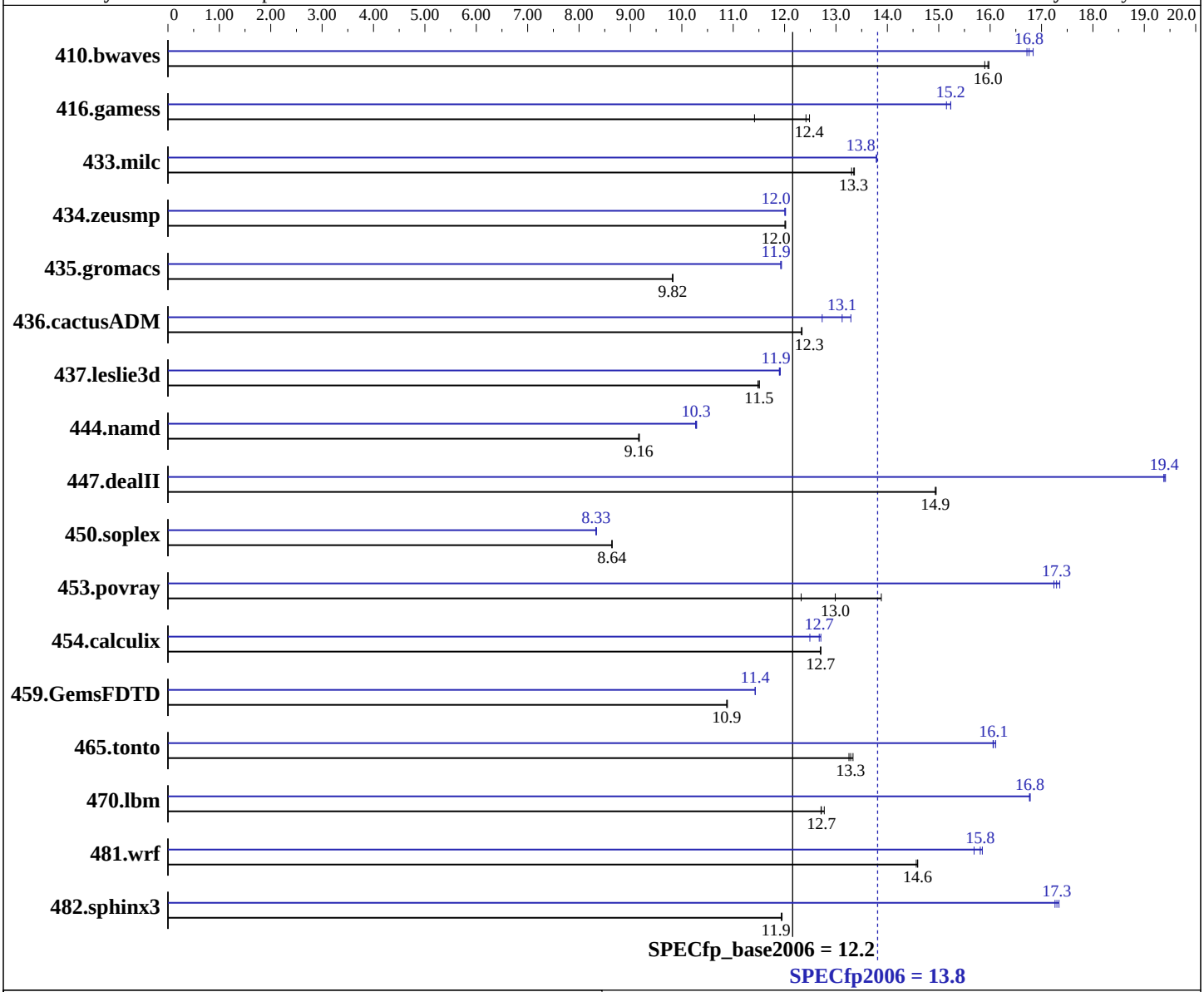
IBM BladeCenter LS42 (AMD Opteron 8356)

SPECfp®2006 = 13.8

SPECfp_base2006 = 12.2

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

Test date: Jun-2008
Hardware Availability: Sep-2008
Software Availability: May-2008



Hardware

CPU Name:	AMD Opteron 8356
CPU Characteristics:	
CPU MHz:	2300
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:	ext2
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: 64 GB (16 x 4 GB DDR2-6400 ECC)
Disk Subsystem: 1 x 73 GB SAS, 10000 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	**852**	**16.0**	855	15.9	851	16.0	**811**	**16.8**	807	16.8	813	16.7
416.gamess	**1577**	**12.4**	1715	11.4	1568	12.5	**1285**	**15.2**	1285	15.2	1292	15.2
433.milc	690	13.3	**688**	**13.3**	687	13.4	666	13.8	666	13.8	**666**	**13.8**
434.zeusmp	758	12.0	**758**	**12.0**	757	12.0	**757**	**12.0**	758	12.0	757	12.0
435.gromacs	726	9.83	727	9.82	**727**	**9.82**	598	11.9	**599**	**11.9**	599	11.9
436.cactusADM	968	12.3	969	12.3	**968**	**12.3**	939	12.7	899	13.3	**911**	**13.1**
437.leslie3d	817	11.5	**817**	**11.5**	819	11.5	**790**	**11.9**	790	11.9	789	11.9
444.namd	876	9.16	874	9.17	**875**	**9.16**	**780**	**10.3**	779	10.3	781	10.3
447.dealII	766	14.9	**766**	**14.9**	765	14.9	**590**	**19.4**	589	19.4	590	19.4
450.soplex	**965**	**8.64**	965	8.64	965	8.64	1001	8.33	1000	8.34	**1001**	**8.33**
453.povray	432	12.3	383	13.9	**410**	**13.0**	307	17.4	309	17.2	**308**	**17.3**
454.calculix	650	12.7	649	12.7	**650**	**12.7**	**651**	**12.7**	649	12.7	660	12.5
459.GemsFDTD	**976**	**10.9**	976	10.9	974	10.9	929	11.4	**928**	**11.4**	928	11.4
465.tonto	**741**	**13.3**	742	13.3	738	13.3	611	16.1	613	16.1	**612**	**16.1**
470.lbm	1076	12.8	1081	12.7	**1081**	**12.7**	820	16.8	**819**	**16.8**	819	16.8
481.wrf	**766**	**14.6**	767	14.6	766	14.6	712	15.7	705	15.8	**707**	**15.8**
482.sphinx3	**1632**	**11.9**	1633	11.9	1631	12.0	1124	17.3	**1127**	**17.3**	1129	17.3

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
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 4915200'  was used to set environment locked pages in memory limit
Environment variable PGI_HUGE_PAGES set to 896
Set vm/nr_hugepages=14336 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
Processor Performance States Disabled in BIOS
Memory ChipKill Disabled in BIOS
```

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:
-fast -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150
-tp barcelona-64 -Bstatic_pgi

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

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

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Base Optimization Flags (Continued)

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

Base Other Flags

C benchmarks:
`-w -Mipa=jobs:4`

C++ benchmarks:
`-w -Mipa=jobs:4`

Fortran benchmarks:
`-w -Mipa=jobs:4`

Benchmarks using both Fortran and C:
`-w -Mipa=jobs:4`

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
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=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=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:

Continued on next page

Peak Optimization Flags (Continued)

410.bwaves: -Mpfi(pass 1) -Mipa=fast(pass 2) -Mipa=inline(pass 2) -Mpfo(pass 2) -fastsse -Mfprelaxed -Msmartalloc -Mprefetch=distance:12 -Mprefetch=nta -tp barcelona-64 -Bstatic_pgi

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=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=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=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 -Mipa=jobs:4

C++ benchmarks:

444.namd: -w -Mipa=jobs:4(pass 2)

Continued on next page

Peak Other Flags (Continued)

Fortran benchmarks:

410.bwaves: `-w -Mipa=jobs:4`(pass 2)

434.zeusmp: `-w -Mipa=jobs:4`

Benchmarks using both Fortran and C:

435.gromacs: `-w -Mipa=jobs:4`

454.calculix: `-w -Mipa=jobs:4`

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

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

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