SPEC® CFP2006 Result

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IBM Corporation

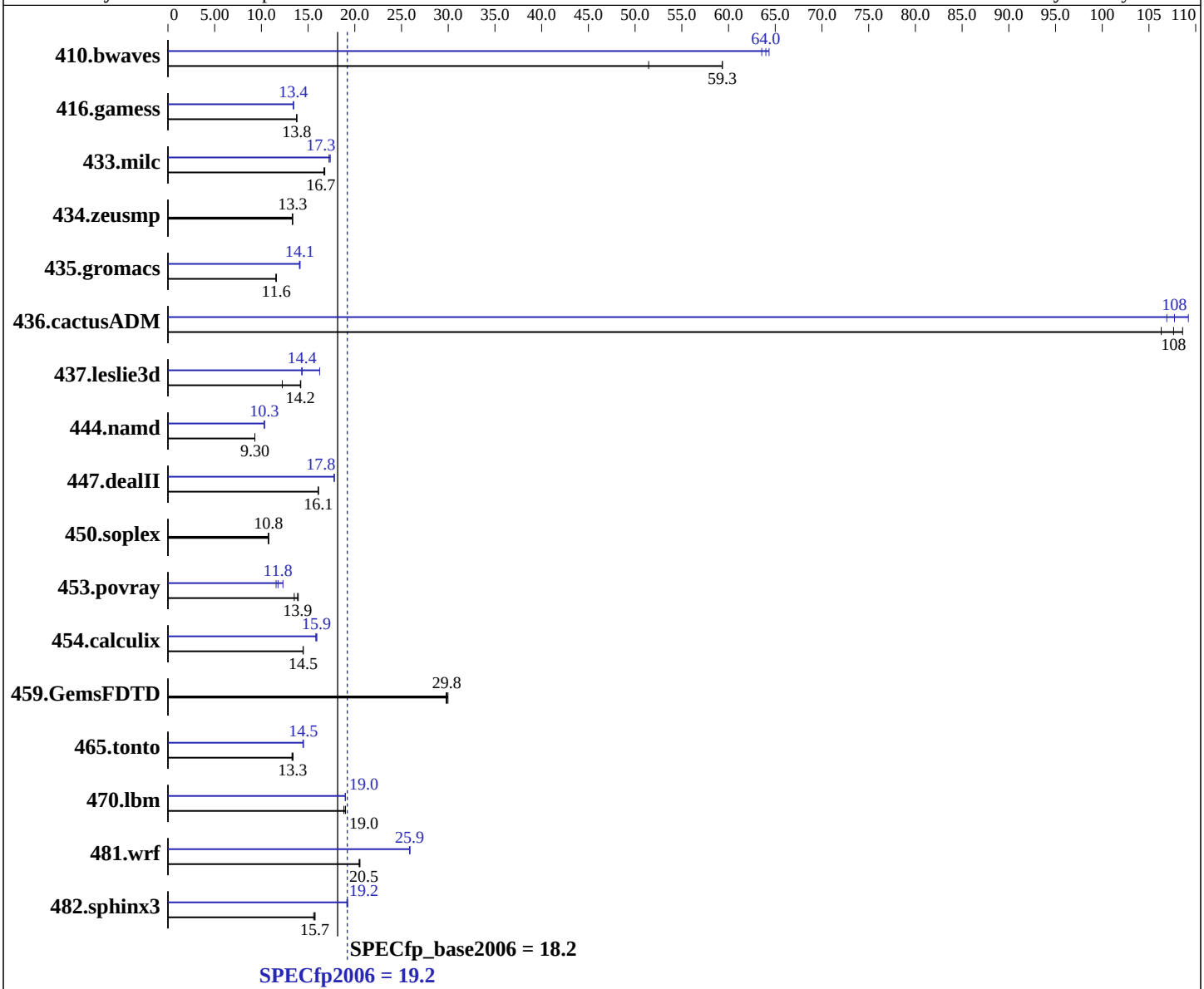
IBM BladeCenter LS22 (AMD Opteron 2356)

SPECfp®2006 = 19.2

SPECfp_base2006 = 18.2

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

Test date: Aug-2008
Hardware Availability: Sep-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 DDR2-6400 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	229	59.3	264	51.4	**229**	**59.3**	211	64.3	214	63.6	**212**	**64.0**
416.gamess	1420	13.8	1421	13.8	**1421**	**13.8**	1456	13.4	1459	13.4	**1458**	**13.4**
433.milc	547	16.8	550	16.7	**548**	**16.7**	532	17.3	**532**	**17.3**	528	17.4
434.zeusmp	**682**	**13.3**	684	13.3	682	13.3	**682**	**13.3**	684	13.3	682	13.3
435.gromacs	**616**	**11.6**	618	11.6	616	11.6	505	14.1	**506**	**14.1**	508	14.1
436.cactusADM	110	109	**111**	**108**	112	106	112	107	**111**	**108**	109	109
437.leslie3d	**663**	**14.2**	661	14.2	768	12.2	579	16.2	**654**	**14.4**	657	14.3
444.namd	**862**	**9.30**	862	9.30	862	9.30	778	10.3	776	10.3	**778**	**10.3**
447.dealII	711	16.1	711	16.1	**711**	**16.1**	643	17.8	643	17.8	**643**	**17.8**
450.soplex	**774**	**10.8**	776	10.7	774	10.8	**774**	**10.8**	776	10.7	774	10.8
453.povray	**384**	**13.9**	394	13.5	381	14.0	460	11.6	**451**	**11.8**	432	12.3
454.calculix	570	14.5	571	14.5	**570**	**14.5**	**519**	**15.9**	518	15.9	522	15.8
459.GemsFDTD	**355**	**29.8**	356	29.8	354	30.0	**355**	**29.8**	356	29.8	354	30.0
465.tonto	**738**	**13.3**	741	13.3	735	13.4	**679**	**14.5**	679	14.5	681	14.4
470.lbm	730	18.8	**724**	**19.0**	723	19.0	723	19.0	**723**	**19.0**	724	19.0
481.wrf	**544**	**20.5**	546	20.5	544	20.5	**432**	**25.9**	432	25.9	431	25.9
482.sphinx3	1250	15.6	1238	15.7	**1239**	**15.7**	**1015**	**19.2**	1018	19.1	1013	19.2

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 none /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:
-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

Continued on next page

Peak Optimization Flags (Continued)

416.gamess: `-Mpfi`(pass 1) `-Mpfo`(pass 2) `-Mipa=fast`(pass 2) `-Mipa=inline`(pass 2) `-fastsse -Mvect=noaltcode -Mprefetch=t0 -Mfprelaxed -tp barcelona-64 -Bstatic_pgi`

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

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`

Continued on next page

Peak Other Flags (Continued)

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

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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