SPEC® CFP2006 Result

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IBM Corporation

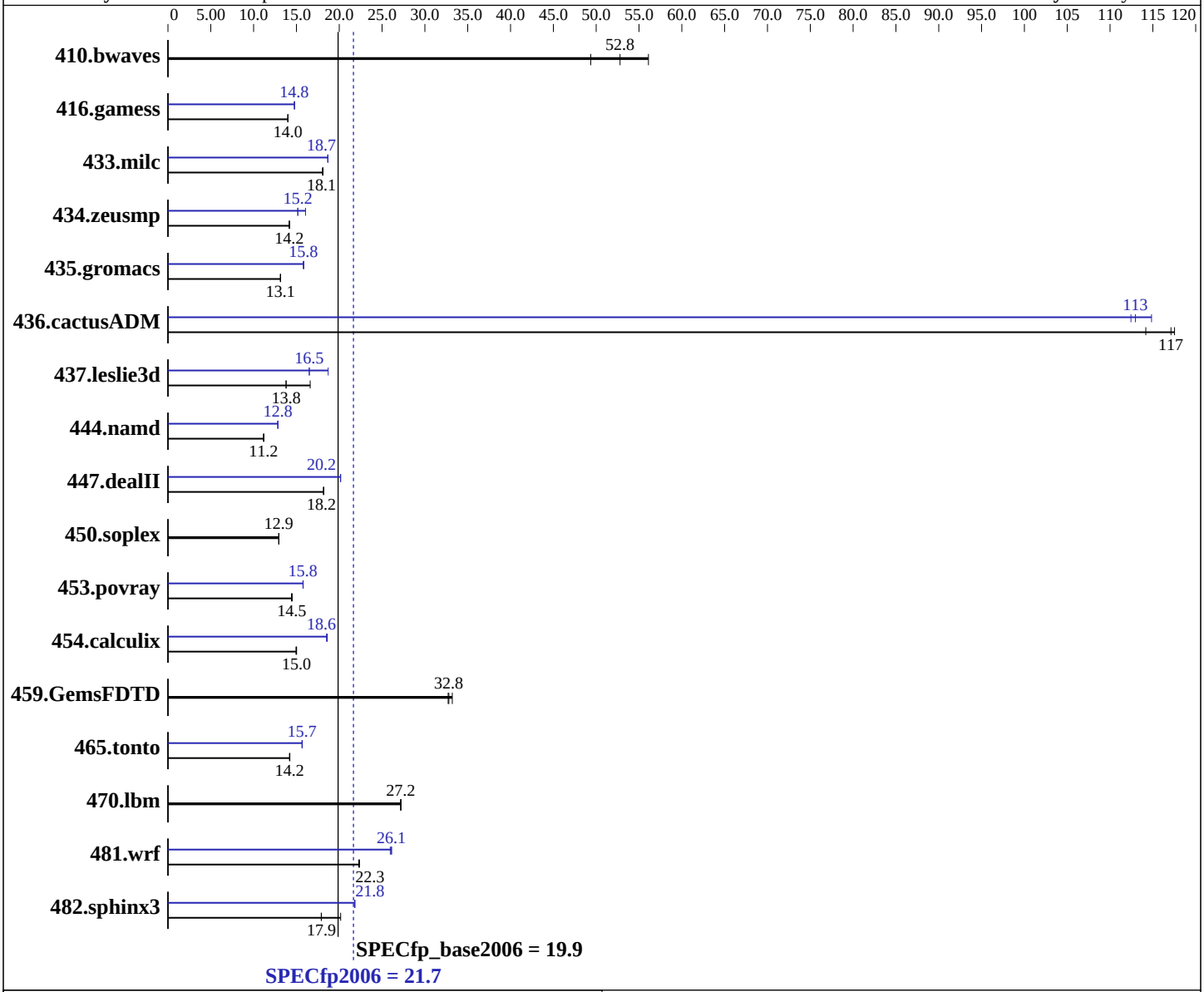
IBM BladeCenter LS42 (AMD Opteron 8376 HE)

SPECfp®2006 = 21.7

SPECfp_base2006 = 19.9

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

Test date: Feb-2009
Hardware Availability: Mar-2009
Software Availability: May-2008



Hardware

CPU Name:	AMD Opteron 8376 HE
CPU Characteristics:	
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 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) SP2, Kernel 2.6.16.60-0.21-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:	32/64-bit
Peak Pointers:	64-bit
Other Software:	binutils 2.18.50

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L3 Cache: 6 MB I+D on chip per chip
Other Cache: None
Memory: 32 GB (8 x 4 GB DDR2-6400 ECC)
Disk Subsystem: 1 x 73 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	242	56.1	**257**	**52.8**	275	49.4	242	56.1	**257**	**52.8**	275	49.4
416.gamess	**1398**	**14.0**	1397	14.0	1399	14.0	**1326**	**14.8**	1327	14.8	1324	14.8
433.milc	**507**	**18.1**	509	18.0	507	18.1	491	18.7	492	18.7	**492**	**18.7**
434.zeusmp	643	14.2	**642**	**14.2**	641	14.2	**600**	**15.2**	566	16.1	600	15.2
435.gromacs	**543**	**13.1**	543	13.1	544	13.1	**451**	**15.8**	450	15.9	451	15.8
436.cactusADM	105	114	102	118	**102**	**117**	104	115	**106**	**113**	106	112
437.leslie3d	682	13.8	566	16.6	**681**	**13.8**	502	18.7	570	16.5	**569**	**16.5**
444.namd	718	11.2	**717**	**11.2**	717	11.2	625	12.8	625	12.8	**625**	**12.8**
447.dealII	630	18.2	629	18.2	**629**	**18.2**	**567**	**20.2**	568	20.1	567	20.2
450.soplex	**644**	**12.9**	644	12.9	644	12.9	**644**	**12.9**	644	12.9	644	12.9
453.povray	367	14.5	369	14.4	**368**	**14.5**	337	15.8	337	15.8	**337**	**15.8**
454.calculix	552	14.9	549	15.0	**550**	**15.0**	443	18.6	**444**	**18.6**	446	18.5
459.GemsFDTD	320	33.2	**324**	**32.8**	324	32.7	320	33.2	**324**	**32.8**	324	32.7
465.tonto	694	14.2	691	14.2	**692**	**14.2**	**628**	**15.7**	629	15.6	627	15.7
470.lbm	**505**	**27.2**	505	27.2	506	27.2	**505**	**27.2**	505	27.2	506	27.2
481.wrf	500	22.4	501	22.3	**500**	**22.3**	430	26.0	428	26.1	**428**	**26.1**
482.sphinx3	1089	17.9	966	20.2	**1088**	**17.9**	892	21.8	895	21.8	**894**	**21.8**

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.
'numactl' was used to bind copies to the cores
```

Operating System Notes

```
The libhugetlbfs libraries were installed using the
installation rpms that came with the distribution.

'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152'  was used to set environment locked pages in memory limit

Set vm/nr_hugepages=7168 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

Continued on next page

Operating System Notes (Continued)

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH to "/cpu2006/pgi72/linux_lib32:/cpu2006/pgi72/linux_lib64"
PGI_HUGE_PAGES = "7168"
SPEC_DIR = "/cpu2006"
NCPUS = "8"

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:
```
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mconcur
-Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi
```

C++ benchmarks:
```
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed
-Mconcur --zc_eh -Mipa=fast -Mipa=inline -tp barcelona-64
-Bstatic_pgi
```

Fortran benchmarks:
```
-Mvect=cachesize:6291456 -fastsse -Mfprelaxed -Msmartalloc=huge
-Mconcur -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi
```

Benchmarks using both Fortran and C:
```
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -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
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: -Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge
-Msafeptr -Mconcur -Mfprelaxed -Mipa=inline -Mipa=arg
-Mipa=const -Mipa=ptr -Mipa=shape -tp barcelona-64
-Bstatic_pgi

470.lbm: basepeak = yes

482.sphinx3: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -Mvect=cachesize:6291456 -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) -Mvect=cachesize:6291456 -fastsse
-Munroll=n:4 -Munroll=m:8 -Msmartalloc=huge -Mnodepchk
-Mfprelaxed --zc_eh -tp barcelona-64 -Bstatic_pgi

447.dealII: -Mvect=cachesize:6291456 -fastsse -alias=ansi
-Msmartalloc=huge -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) -Mvect=cachesize:6291456 -fastsse

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Peak Optimization Flags (Continued)

453.povray (continued):
-Msmartalloc=huge -Mprefetch=t0 -Mfprelaxed
-tp barcelona-64 -Bstatic_pgi

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -Mvect=cachesize:6291456 -fastsse
-Msmartalloc=huge -Mvect=noaltcode -Mprefetch=t0
-Mfprelaxed -tp barcelona-64 -Bstatic_pgi

434.zeusmp: -Mvect=cachesize:6291456 -fastsse -Mfprelaxed -Mconcur
-Mprefetch=distance:8 -Mprefetch=t0 -Msmartalloc=huge
-Msmartalloc=hugebss -Mipa=fast -Mipa=inline
-tp barcelona-64 -Bstatic_pgi

437.leslie3d: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mconcur=noaltcode(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -Mvect=cachesize:6291456 -fastsse
-Mvect=fuse -Msmartalloc=huge -Mprefetch=distance:8
-Mprefetch=t0 -Mfprelaxed -tp barcelona-64 -Bstatic_pgi

459.GemsFDTD: basepeak = yes

465.tonto: -Mvect=cachesize:6291456 -fastsse -O4 -Mvect=noaltcode
-Msmartalloc=huge -Mprefetch=distance:8 -Mprefetch=t0
-Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64
-Bstatic_pgi

Benchmarks using both Fortran and C:

435.gromacs: -Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge
-Mfprelaxed -Mconcur -Mfpapprox=rsqrt -Mipa=fast
-Mipa=inline -tp barcelona-64 -Bstatic_pgi

436.cactusADM: -Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge
-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)
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge
-Mloop32 -Mprefetch=t0 -Mpre -Mfprelaxed -tp barcelona-64
-Bstatic_pgi

481.wrf: -Mvect=cachesize:6291456 -fastsse -Mvect=noaltcode
-Msmartalloc=huge -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`

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_linux_flags.20090713.00.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/pgi72_linux_flags.20090713.00.xml`

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