SPEC® CFP2006 Result

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IBM Corporation

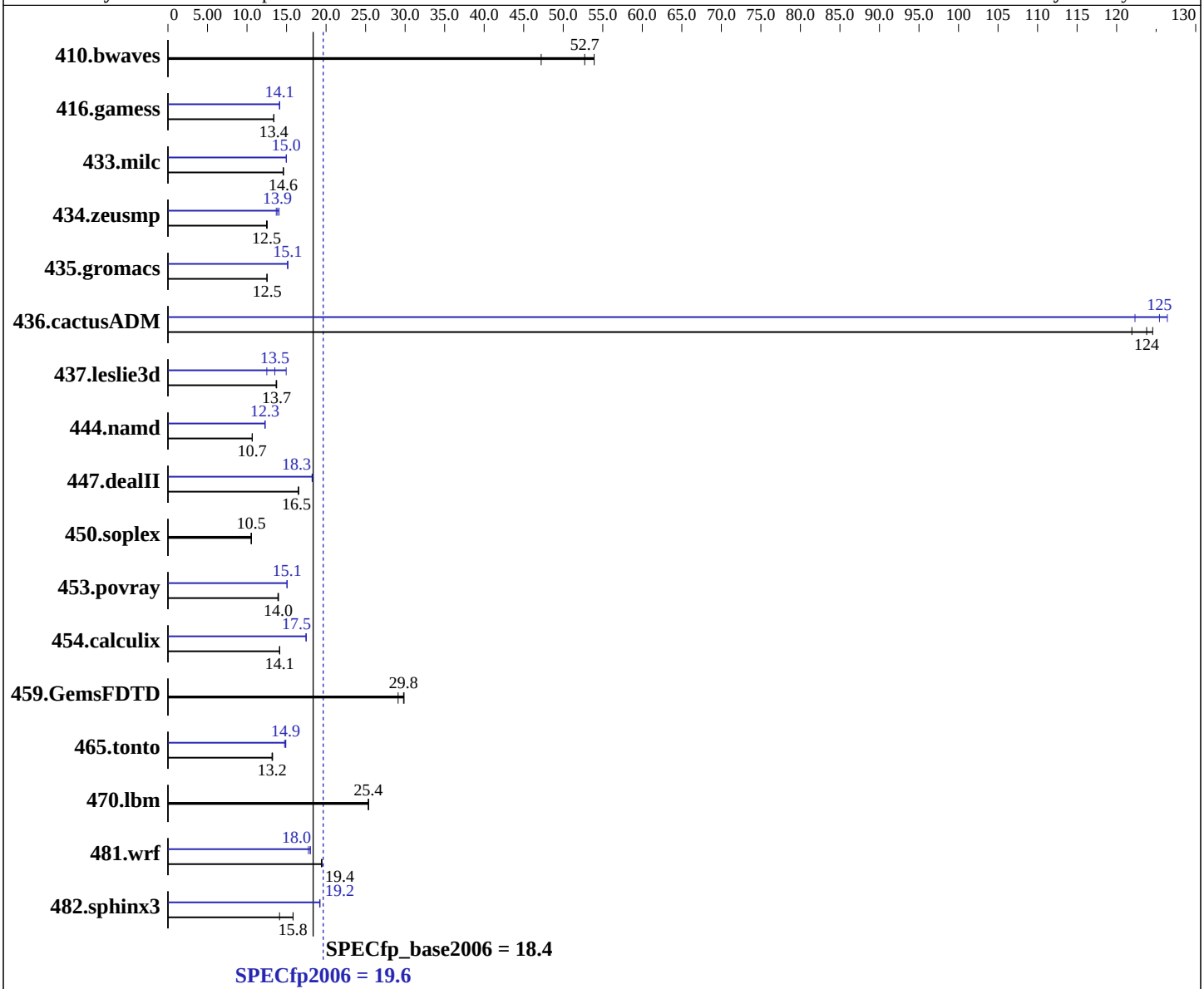
IBM BladeCenter LS42 (AMD Opteron 8374 HE)

SPECfp®2006 = 19.6

SPECfp_base2006 = 18.4

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 8374 HE
CPU Characteristics:	
CPU MHz:	2200
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) 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: 64 GB (16 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	**258**	**52.7**	288	47.2	252	53.9	**258**	**52.7**	288	47.2	252	53.9
416.gamess	**1462**	**13.4**	1464	13.4	1460	13.4	1386	14.1	**1387**	**14.1**	1387	14.1
433.milc	630	14.6	628	14.6	**629**	**14.6**	614	15.0	**613**	**15.0**	613	15.0
434.zeusmp	**729**	**12.5**	729	12.5	725	12.6	647	14.1	664	13.7	**657**	**13.9**
435.gromacs	**570**	**12.5**	570	12.5	570	12.5	472	15.1	471	15.1	**471**	**15.1**
436.cactusADM	95.9	125	98.0	122	**96.5**	**124**	94.5	126	97.7	122	**95.3**	**125**
437.leslie3d	687	13.7	684	13.7	**684**	**13.7**	**695**	**13.5**	629	15.0	752	12.5
444.namd	752	10.7	753	10.7	**752**	**10.7**	654	12.3	**653**	**12.3**	653	12.3
447.dealII	**693**	**16.5**	693	16.5	693	16.5	627	18.3	**627**	**18.3**	628	18.2
450.soplex	791	10.5	791	10.5	**791**	**10.5**	791	10.5	791	10.5	**791**	**10.5**
453.povray	381	14.0	**381**	**14.0**	383	13.9	**353**	**15.1**	354	15.0	353	15.1
454.calculix	585	14.1	583	14.1	**583**	**14.1**	**471**	**17.5**	473	17.4	471	17.5
459.GemsFDTD	364	29.1	**356**	**29.8**	355	29.9	364	29.1	**356**	**29.8**	355	29.9
465.tonto	743	13.2	747	13.2	**747**	**13.2**	667	14.8	660	14.9	**661**	**14.9**
470.lbm	541	25.4	542	25.3	**542**	**25.4**	541	25.4	542	25.3	**542**	**25.4**
481.wrf	574	19.5	576	19.4	**574**	**19.4**	**621**	**18.0**	620	18.0	629	17.8
482.sphinx3	1231	15.8	**1232**	**15.8**	1381	14.1	1013	19.2	1016	19.2	**1015**	**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.
'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=14336 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 = "14336"
SPEC_DIR = "/cpu2006"
NCPUS = "16"

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

Continued on next page

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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