



SPEC® CFP2006 Result

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IBM Corporation

SPECfp®_rate2006 = 78.8

IBM BladeCenter LS22 (AMD Opteron 2347 HE)

SPECfp_rate_base2006 = 72.6

CPU2006 license: 11

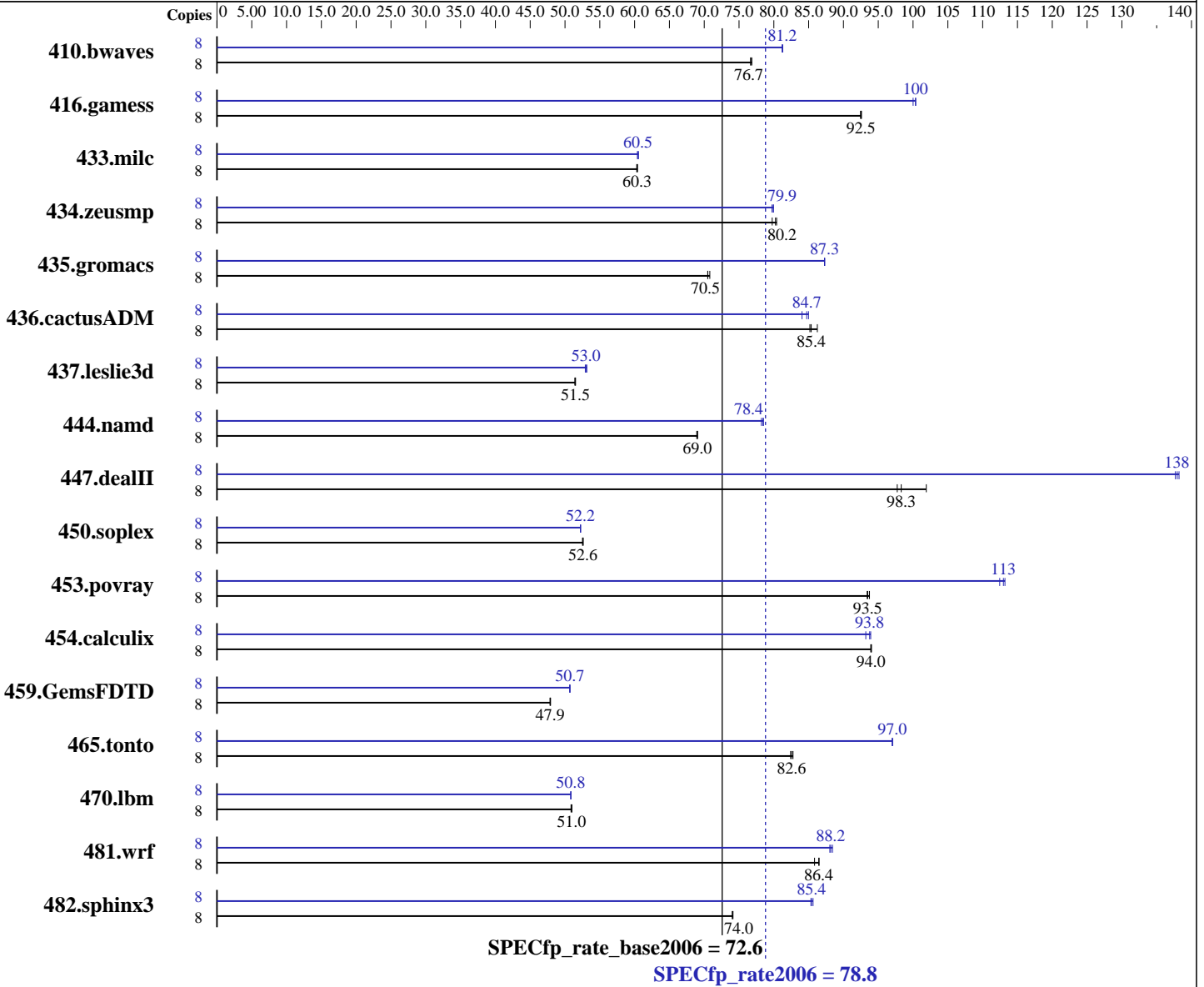
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Jul-2008

Hardware Availability: Sep-2008

Software Availability: May-2008



Hardware

CPU Name: AMD Opteron 2347 HE
 CPU Characteristics:
 CPU MHz: 1900
 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 PathScale Compiler Suite Version 3.1
 Auto Parallel: No
 File System: ext2
 System State: Run level 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: 32 GB (8 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	8	1418	76.7	1418	76.7	1415	76.8	8	1338	81.3	1339	81.2	1339	81.2
416.gamess	8	1693	92.5	1692	92.6	1694	92.4	8	1566	100	1561	100	1560	100
433.milc	8	1218	60.3	1215	60.4	1217	60.3	8	1214	60.5	1216	60.4	1213	60.6
434.zeusmp	8	905	80.4	913	79.8	907	80.2	8	913	79.7	911	79.9	911	79.9
435.gromacs	8	807	70.8	810	70.5	810	70.5	8	654	87.3	654	87.3	654	87.3
436.cactusADM	8	1108	86.2	1122	85.2	1120	85.4	8	1128	84.7	1125	85.0	1137	84.0
437.leslie3d	8	1460	51.5	1460	51.5	1463	51.4	8	1415	53.1	1418	53.0	1421	52.9
444.namd	8	931	68.9	929	69.0	930	69.0	8	818	78.4	817	78.5	820	78.2
447.dealII	8	931	98.3	936	97.7	898	102	8	663	138	662	138	665	138
450.soplex	8	1269	52.6	1268	52.6	1271	52.5	8	1277	52.2	1278	52.2	1277	52.2
453.povray	8	455	93.5	456	93.4	454	93.7	8	377	113	378	112	376	113
454.calculix	8	702	94.0	702	94.0	703	93.9	8	704	93.8	708	93.2	703	93.9
459.GemsFDTD	8	1774	47.8	1773	47.9	1771	47.9	8	1674	50.7	1674	50.7	1675	50.7
465.tonto	8	955	82.4	951	82.8	954	82.6	8	811	97.1	812	97.0	811	97.0
470.lbm	8	2157	51.0	2161	50.9	2156	51.0	8	2162	50.8	2162	50.8	2162	50.8
481.wrf	8	1034	86.4	1041	85.9	1033	86.5	8	1011	88.4	1013	88.2	1015	88.0
482.sphinx3	8	2106	74.0	2103	74.1	2106	74.0	8	1827	85.3	1825	85.4	1821	85.6

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 2457600' was used to set environment locked pages in memory limit
Environment variable PGI_HUGE_PAGES set to 896
Set vm/nr_hugepages=7168 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
Processor Performance States Disabled in BIOS
Memory ChipKill Disabled in BIOS



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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
```



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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.dealIII: -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:

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Peak Optimization Flags (Continued)

410.bwaves: -Mphi(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)

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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.20090714.01.html>

You can also download the XML flags source by saving the following link:
<http://www.spec.org/cpu2006/flags/amd123GH-flags.20090714.01.xml>

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