SPEC® CFP2006 Result

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IBM Corporation

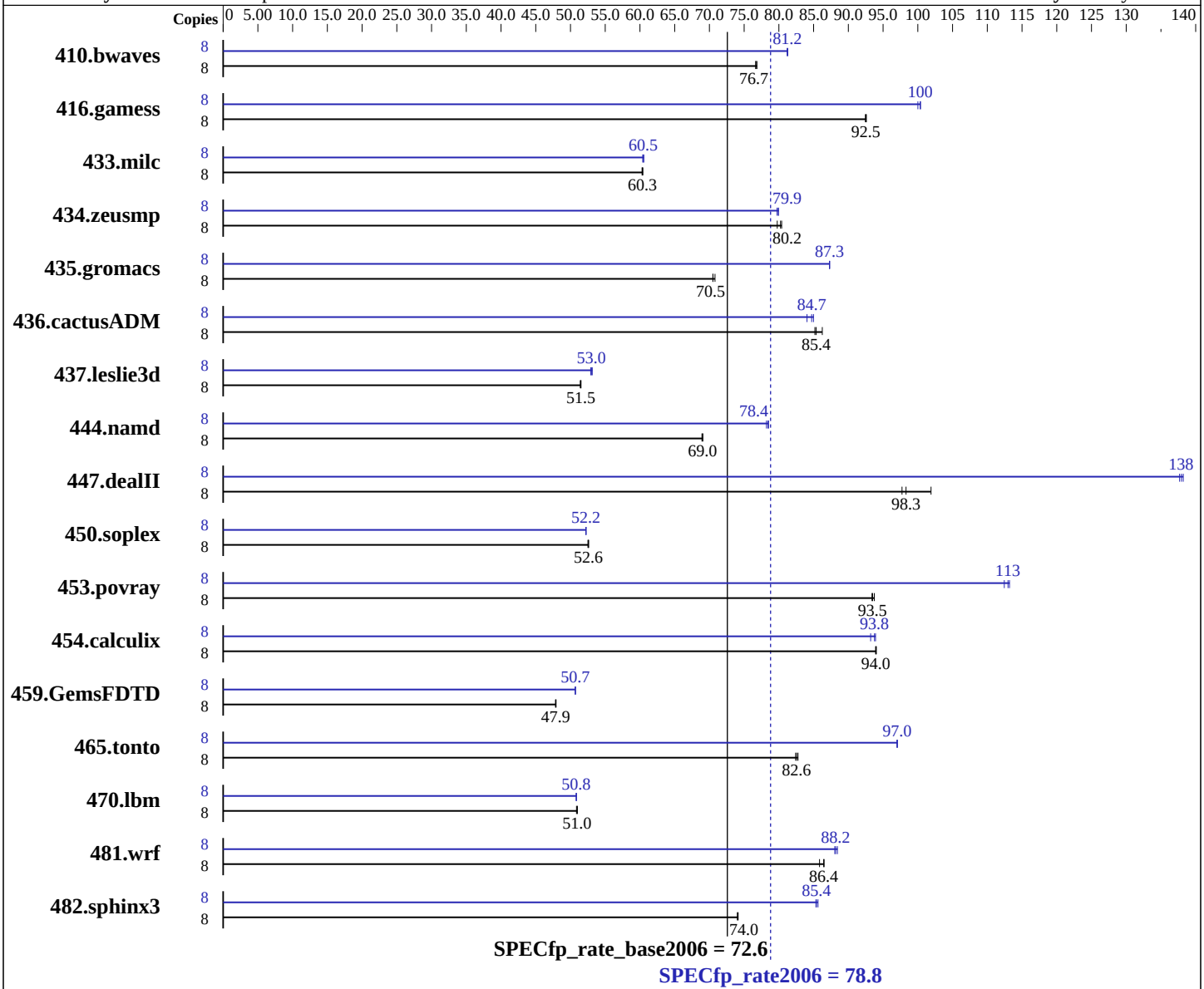
IBM BladeCenter LS22 (AMD Opteron 2347 HE)

SPECfp®_rate2006 = 78.8

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
```

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.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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