SPEC® CFP2006 Result

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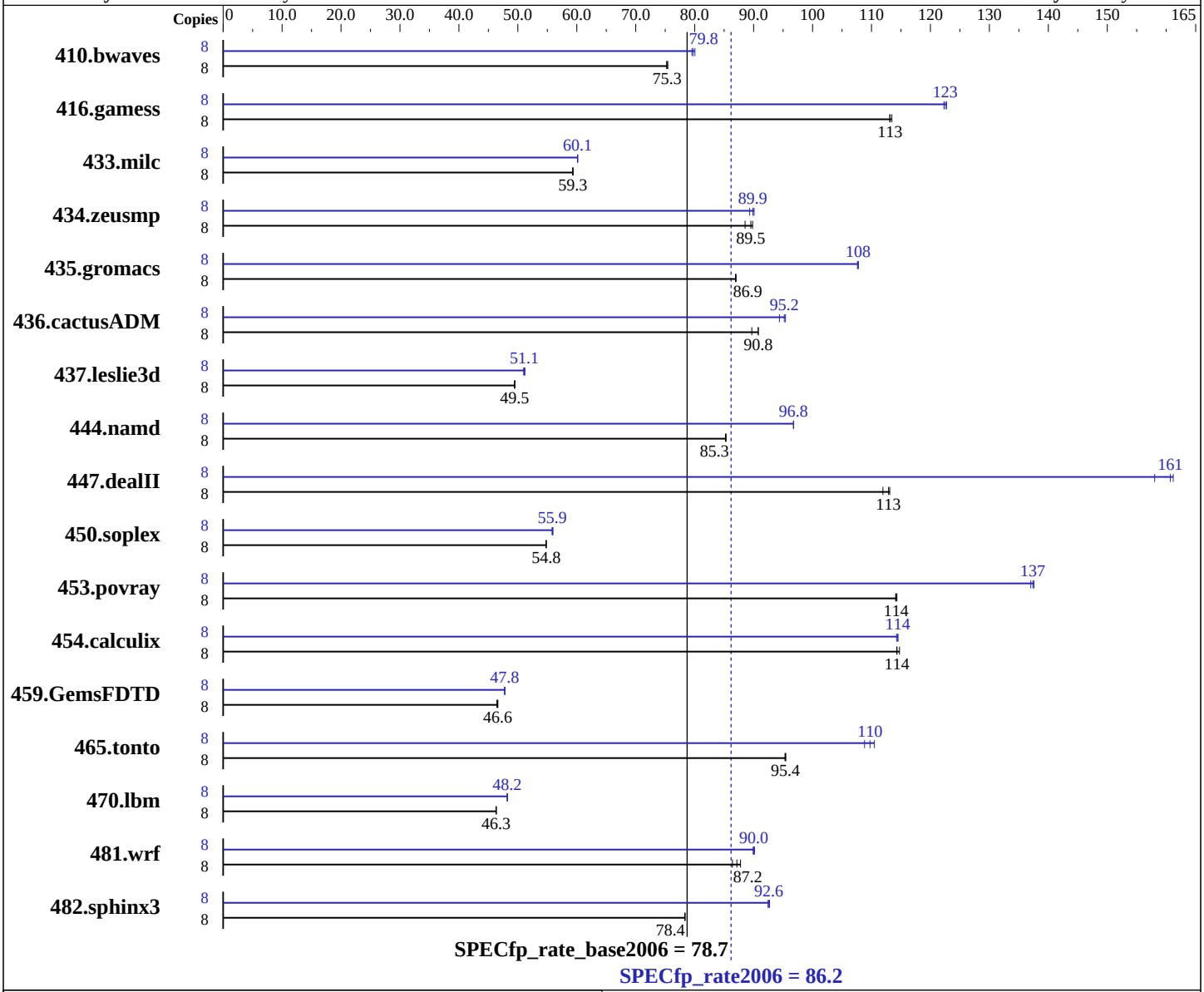
Sun Microsystems
Sun Fire X4140

SPECfp®_rate2006 = 86.2

SPECfp_rate_base2006 = 78.7

CPU2006 license: 6
Test sponsor: Sun Microsystems
Tested by: Sun Microsystems

Test date: May-2008
Hardware Availability: May-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 PathScale Compiler Suite Version 3.1
Auto Parallel:	No
File System:	ext3
System State:	Runlevel 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 (8x4GB, DDR2-667, CL5, Reg, Dual Rank)
Disk Subsystem: SAS, 72 GB,10 K 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	1441	75.4	**1444**	**75.3**	1445	75.2	8	1358	80.0	**1363**	**79.8**	1367	79.5
416.gamess	8	**1384**	**113**	1385	113	1381	113	8	**1278**	**123**	1276	123	1281	122
433.milc	8	**1238**	**59.3**	1238	59.3	1238	59.3	8	**1221**	**60.1**	1221	60.2	1222	60.1
434.zeusmp	8	**813**	**89.5**	810	89.8	822	88.6	8	815	89.3	**810**	**89.9**	808	90.1
435.gromacs	8	**657**	**86.9**	656	87.0	657	86.9	8	530	108	531	108	**530**	**108**
436.cactusADM	8	1066	89.7	**1053**	**90.8**	1053	90.8	8	1013	94.4	**1004**	**95.2**	1002	95.4
437.leslie3d	8	1520	49.5	1521	49.4	**1520**	**49.5**	8	1469	51.2	**1472**	**51.1**	1475	51.0
444.namd	8	**752**	**85.3**	753	85.2	752	85.3	8	663	96.8	663	96.7	**663**	**96.8**
447.dealII	8	809	113	**811**	**113**	818	112	8	**570**	**161**	568	161	579	158
450.soplex	8	1217	54.8	1218	54.8	**1217**	**54.8**	8	1192	56.0	**1194**	**55.9**	1196	55.8
453.povray	8	373	114	372	114	**373**	**114**	8	**310**	**137**	311	137	309	138
454.calculix	8	578	114	**577**	**114**	575	115	8	576	114	578	114	**577**	**114**
459.GemsFDTD	8	1821	46.6	**1822**	**46.6**	1828	46.4	8	1775	47.8	**1777**	**47.8**	1778	47.7
465.tonto	8	**825**	**95.4**	825	95.5	826	95.3	8	712	110	**717**	**110**	723	109
470.lbm	8	2371	46.4	**2374**	**46.3**	2375	46.3	8	2279	48.2	**2280**	**48.2**	2282	48.2
481.wrf	8	**1025**	**87.2**	1018	87.8	1034	86.4	8	**992**	**90.0**	994	89.9	991	90.2
482.sphinx3	8	1991	78.3	1990	78.4	**1990**	**78.4**	8	1682	92.7	1687	92.4	**1684**	**92.6**

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
Environment variable PGI_HUGE_PAGES set to 150
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2457600' was used to set environment locked pages in memory quantity
Set vm/nr_hugepages=1200 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

Platform Notes

```
Default BIOS settings were used.
```

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=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed
-Msmartalloc=huge:150 -tp barcelona-64 -Bstatic_pgi

C++ benchmarks:
-fast -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed
-Msmartalloc=huge:150 --zc_eh -tp barcelona-64 -Bstatic_pgi

Fortran benchmarks:
-fast -Mipa=jobs:4 -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=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150 -tp barcelona-64 -Bstatic_pgi`

Base Other Flags

C benchmarks:
`-w`

C++ benchmarks:
`-w`

Fortran benchmarks:
`-w`

Benchmarks using both Fortran and C:
`-w`

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=jobs:4 -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=jobs:4(pass 2) -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=jobs:4`(pass 2) `-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=jobs:4 -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=jobs:4 -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=jobs:4 -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`

C++ benchmarks:

444.namd: `-w`

Continued on next page

Peak Other Flags (Continued)

Fortran benchmarks:

410.bwaves: `-w`

434.zeusmp: `-w`

Benchmarks using both Fortran and C:

435.gromacs: `-w`

454.calculix: `-w`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/amd123GH-flags.20090713.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/amd123GH-flags.20090713.xml`

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