SPEC® CFP2006 Result

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Sun Microsystems

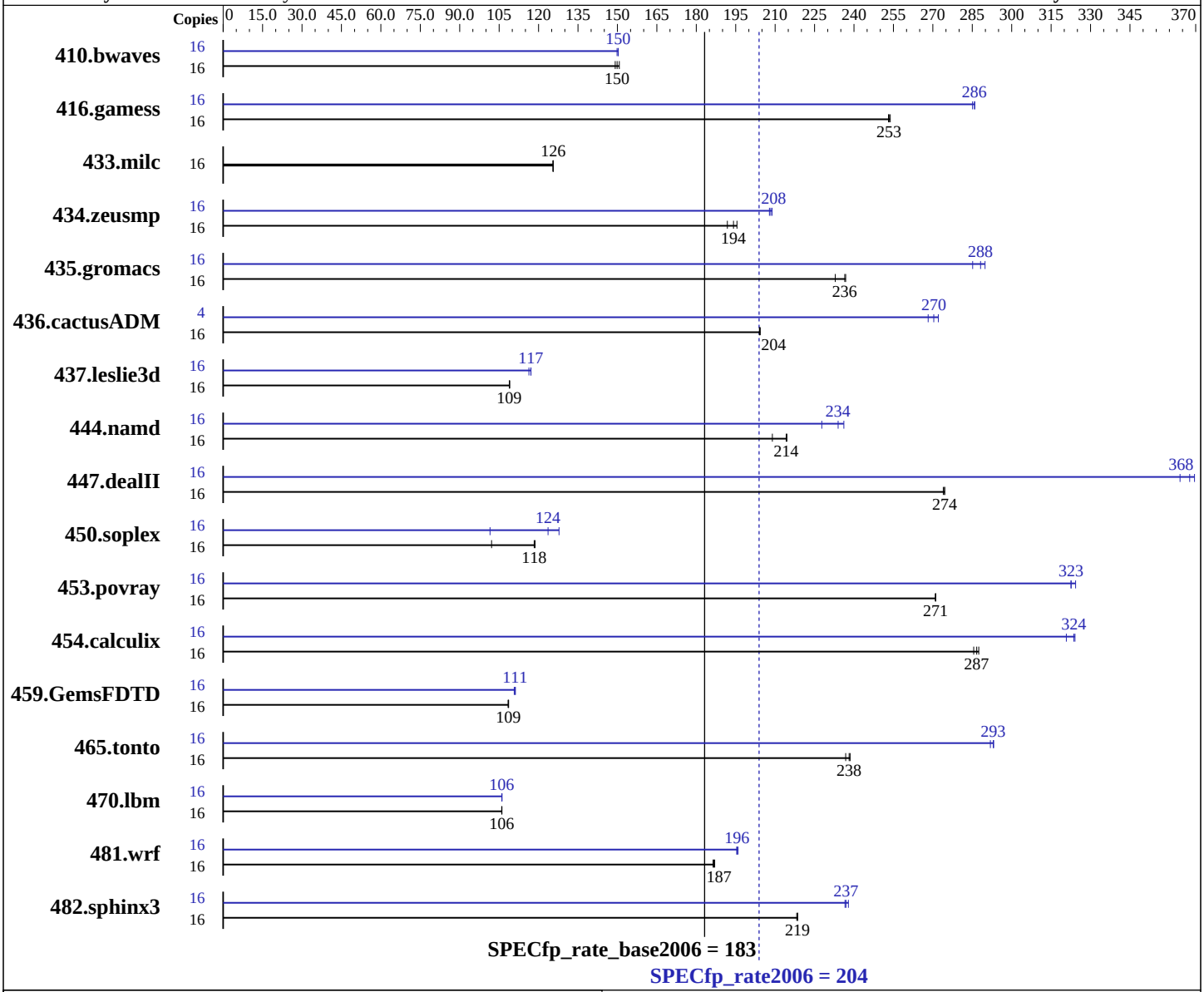
Sun Blade X6440 (AMD Opteron 8384 2.7GHz)

SPECfp®_rate2006 = 204

SPECfp_rate_base2006 = 183

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

Test date: Aug-2009
Hardware Availability: Jan-2009
Software Availability: Jun-2009



Hardware

CPU Name:	AMD Opteron 8384
CPU Characteristics:	
CPU MHz:	2700
FPU:	Integrated
CPU(s) enabled:	16 cores, 4 chips, 4 cores/chip
CPU(s) orderable:	2 or 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:	Red Hat Enterprise Linux Server release 5.3, Kernel 2.6.18-128.el5 for x86_64
Compiler:	PGI Server Complete Version 8.0 x86 Open64 4.2.2 Compiler Suite (from AMD)
Auto Parallel:	Yes
File System:	NFSv3
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit

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L3 Cache: 6 MB I+D on chip per chip
Other Cache: None
Memory: 64 GB (16x4GB, DDR2-667, CL5, Reg, Dual Rank)
Disk Subsystem: 1 x 80 GB 10 K RPM SATA via NFS
Other Hardware: See additional details below

Other Software: binutils 2.18

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	16	1458	149	**1451**	**150**	1443	151	16	1451	150	1446	150	**1447**	**150**
416.gamess	16	1238	253	**1237**	**253**	1234	254	16	**1096**	**286**	1099	285	1096	286
433.milc	16	1169	126	**1170**	**126**	1171	125	16	1169	126	**1170**	**126**	1171	125
434.zeusmp	16	759	192	745	195	**750**	**194**	16	701	208	**699**	**208**	697	209
435.gromacs	16	491	233	482	237	**483**	**236**	16	401	285	**396**	**288**	394	290
436.cactusADM	16	937	204	936	204	**937**	**204**	4	**177**	**270**	176	272	178	268
437.leslie3d	16	1379	109	1381	109	**1381**	**109**	16	**1285**	**117**	1284	117	1293	116
444.namd	16	614	209	**599**	**214**	598	214	16	563	228	**548**	**234**	543	236
447.dealII	16	**667**	**274**	668	274	667	274	16	495	370	503	364	**498**	**368**
450.soplex	16	1307	102	**1128**	**118**	1124	119	16	1314	102	**1080**	**124**	1044	128
453.povray	16	314	271	314	271	**314**	**271**	16	262	324	264	323	**264**	**323**
454.calculix	16	462	286	459	287	**460**	**287**	16	**408**	**324**	407	324	411	321
459.GemsFDTD	16	1563	109	**1564**	**109**	1566	108	16	1533	111	1527	111	**1529**	**111**
465.tonto	16	665	237	**661**	**238**	660	239	16	**537**	**293**	537	293	539	292
470.lbm	16	2074	106	**2074**	**106**	2072	106	16	2073	106	2073	106	**2073**	**106**
481.wrf	16	**957**	**187**	959	186	956	187	16	**914**	**196**	915	195	912	196
482.sphinx3	16	1429	218	1427	219	**1427**	**219**	16	**1316**	**237**	1311	238	1318	237

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.
See the configuration file for details.
```

Operating System Notes

```
'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
```

Platform Notes

```
Default BIOS (BIOS Revision : 2.0.3.18) settings used except:
DCT Unganged Mode set to "Enable"
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "896"
LD_LIBRARY_PATH = "/data1/SPECcpu2006v1.1-pegasus215/amd0905is-libs/64:/data1/SPECcpu2006v1.1-pegasus215/amd0905is-libs/32"
NCPUS = "4"
PGI_HUGE_PAGES = "896"
The NFS server used was a Sun Fire X2100 M2 containing 1 x 80 GB 10 K RPM SATA disks.
Connections to the clients were via gigabit ethernet.

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at
<a href="http://developer.amd.com/cpu/open64">http://developer.amd.com/cpu/open64</a>.
```

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

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Base Portability Flags (Continued)

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:
-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline
-tp shanghai-64 -Bstatic_pgi

C++ benchmarks:
-fastsse -Msmartalloc=huge -Mfprelaxed --zc_eh -Mipa=fast
-Mipa=inline -tp shanghai-64 -Bstatic_pgi

Fortran benchmarks:
-fastsse -Msmartalloc=huge -Mfprelaxed -Mvect=short -Mipa=fast
-Mipa=inline -tp shanghai-64 -Bstatic_pgi

Benchmarks using both Fortran and C:
-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline
-tp shanghai-64 -Mvect=short -Bstatic_pgi

Base Other Flags

C benchmarks:
-Mipa=jobs:4

C++ benchmarks:
-Mipa=jobs:4

Fortran benchmarks:
-Mipa=jobs:4

Benchmarks using both Fortran and C:
-Mipa=jobs:4

Peak Compiler Invocation

C benchmarks:
pgcc

C++ benchmarks (except as noted below):
openCC

Continued on next page

Peak Compiler Invocation (Continued)

444.namd: pgcpp

Fortran benchmarks (except as noted below):
openf95

410.bwaves: pgf95

434.zeusmp: pgf95

437.leslie3d: pgf95

Benchmarks using both Fortran and C (except as noted below):
pgcc pgf95

435.gromacs: opencc openf95

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
436.cactusADM: -DSPEC_CPU_LP64 -Mnomain
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_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mloop32
-Mfprelaxed -Mipa=fast -Mipa=inline -tp shanghai-64
-Bstatic_pgi

482.sphinx3: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Mfprelaxed -Msmartalloc -tp shanghai-64 -Bstatic_pgi

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Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse -Munroll=n:4 -Munroll=m:8 -Msmartalloc=huge -Mnodepchk -Mfprelaxed --zc_eh -tp shanghai-64 -Bstatic_pgi

447.dealII: -march=barcelona -Ofast -static -INLINE:aggressive=on -LNO:opt=0 -Wf,-fno-exceptions -m32 -OPT:unroll_times_max=8 -OPT:unroll_size=256 -OPT:unroll_level=2 -HP:bdt=2m:heap=2m -GRA:unspill=on -CG:cmp_peep=on -TENV:frame_pointer=off

450.soplex: -march=barcelona -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3 -INLINE:aggressive=on -OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off -OPT:fold_unsigned_relops=on -OPT:malloc_alg=1 -CG:load_exe=0 -fno-exceptions -m32 -HP:bdt=2m

453.povray: -march=barcelona -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on -HP:bdt=2m:heap=2m

Fortran benchmarks:

410.bwaves: -fastsse -Msmartalloc -Mprefetch=nta -Mfprelaxed -Mipa=fast -Mipa=inline -tp shanghai-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 -HP:bdt=2m:heap=2m

434.zeusmp: -fastsse -Mfprelaxed -Mprefetch=distance:8 -Mprefetch=t0 -Msmartalloc=huge -Msmartalloc=hugebss -Mipa=fast -Mipa=inline -tp shanghai-64 -Bstatic_pgi

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

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2 -LNO:prefetch_ahead=1 -CG:load_exe=0 -HP

465.tonto: -march=barcelona -Ofast -OPT:alias=no_f90_pointer_alias -LNO:blocking=off -CG:load_exe=1 -IPA:plimit=525 -HP

Benchmarks using both Fortran and C:

Continued on next page

Peak Optimization Flags (Continued)

435.gromacs: `-march=barcelona -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m`

436.cactusADM: `-fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline -tp shanghai-64 -Bstatic_pgi`

454.calculix: `-Mpfi=indirect`(pass 1) `-Mpfo=indirect`(pass 2) `-Mipa=fast`(pass 2) `-Mipa=inline`(pass 2) `-fastsse -Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre -Mfprelaxed -tp shanghai-64 -Bstatic_pgi`

481.wrf: `-fastsse -Mvect=noaltcode -Msmartalloc=huge -Mprefetch=distance:8 -Mfprelaxed -tp shanghai-64 -Bstatic_pgi`

Peak Other Flags

C benchmarks:
`-Mipa=jobs:4`(pass 2)

C++ benchmarks:

444.namd: `-Mipa=jobs:4`(pass 2)

Fortran benchmarks:

410.bwaves: `-Mipa=jobs:4`

434.zeusmp: `-Mipa=jobs:4`

437.leslie3d: `-Mipa=jobs:4`(pass 2)

Benchmarks using both Fortran and C:

436.cactusADM: `-Mipa=jobs:4`

454.calculix: `-Mipa=jobs:4`(pass 2)

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/amd-platform.20090710.html
http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.20090915.html
http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090915.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/amd-platform.20090710.xml
http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.20090915.xml
http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090915.xml

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