SPEC® CFP2006 Result

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Tyan
(Test Sponsor: Advanced Micro Devices)

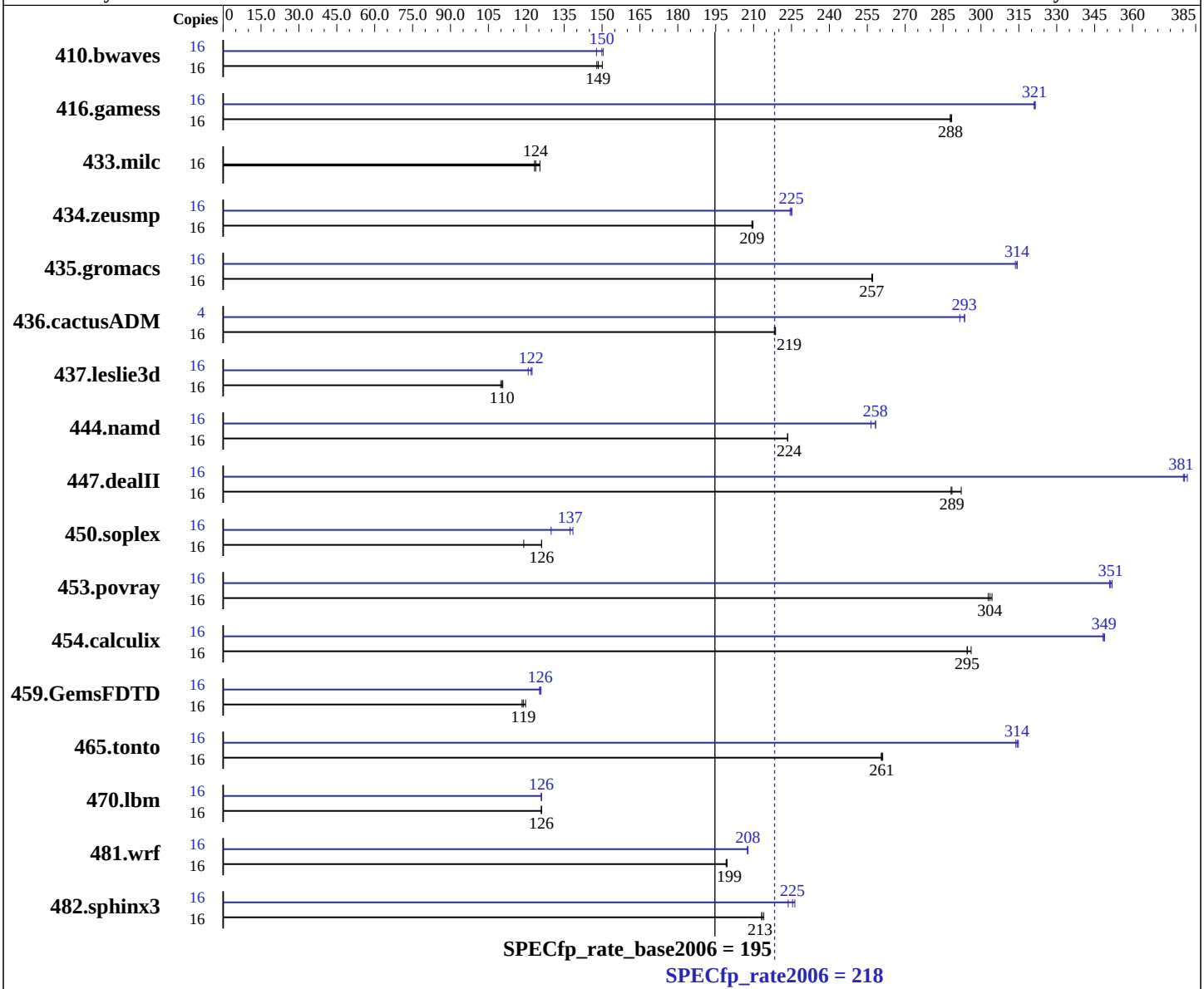
Transport TX46, AMD Opteron 8389

SPECfp®_rate2006 = 218

SPECfp_rate_base2006 = 195

CPU2006 license: 49
Test sponsor: Advanced Micro Devices
Tested by: Advanced Micro Devices

Test date: Feb-2009
Hardware Availability: Apr-2009
Software Availability: Jun-2008



Hardware

CPU Name:	AMD Opteron 8389
CPU Characteristics:	
CPU MHz:	2900
FPU:	Integrated
CPU(s) enabled:	16 cores, 4 chips, 4 cores/chip
CPU(s) orderable:	2,4 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 5.2, Advanced Platform, Kernel 2.6.18-92.el5
Compiler:	PGI Server Complete Version 7.2 PathScale Compiler Suite Version 3.2
Auto Parallel:	Yes
File System:	ext3
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 (16x4 GB, DDR2-800, CL5, Reg, Dual Rank)
Disk Subsystem: 1 x 250 GB SATA, 7200 RPM
Other Hardware: None

Other Software: binutils 2.18
32-bit and 64-bit libhugetlbfs libraries

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	16	1470	148	**1464**	**149**	1449	150	16	1445	150	**1450**	**150**	1471	148
416.gamess	16	**1088**	**288**	1088	288	1086	288	16	974	322	976	321	**975**	**321**
433.milc	16	1171	125	1192	123	**1187**	**124**	16	1171	125	1192	123	**1187**	**124**
434.zeusmp	16	696	209	694	210	**695**	**209**	16	**647**	**225**	649	224	647	225
435.gromacs	16	**445**	**257**	444	257	445	257	16	364	314	363	314	**364**	**314**
436.cactusADM	16	874	219	876	218	**875**	**219**	4	164	292	**163**	**293**	163	294
437.leslie3d	16	1368	110	**1362**	**110**	1358	111	16	1230	122	1245	121	**1234**	**122**
444.namd	16	574	223	**574**	**224**	574	224	16	500	256	**497**	**258**	497	258
447.dealII	16	635	288	**634**	**289**	626	292	16	480	382	481	380	**481**	**381**
450.soplex	16	1121	119	**1059**	**126**	1058	126	16	1028	130	**971**	**137**	964	138
453.povray	16	280	304	281	303	**280**	**304**	16	242	352	**242**	**351**	243	351
454.calculix	16	446	296	**448**	**295**	448	295	16	378	349	379	348	**378**	**349**
459.GemsFDTD	16	**1429**	**119**	1418	120	1435	118	16	1355	125	**1352**	**126**	1349	126
465.tonto	16	604	261	**604**	**261**	603	261	16	502	314	500	315	**501**	**314**
470.lbm	16	1745	126	**1745**	**126**	1744	126	16	1744	126	**1744**	**126**	1746	126
481.wrf	16	896	199	898	199	**896**	**199**	16	861	208	**860**	**208**	860	208
482.sphinx3	16	1457	214	**1462**	**213**	1463	213	16	1378	226	**1383**	**225**	1394	224

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
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_MORECORE = "yes"
LD_LIBRARY_PATH = "/root/work/cpu2006v1.1/amd909gh-libs/64:/root/work/cpu2006v1.1/amd909gh-libs/32"
NCPUS = "4"
```

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 -Mfprelaxed
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi

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Base Optimization Flags (Continued)

C++ benchmarks:
`-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed --zc_eh -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi`

Fortran benchmarks:
`-Mvect=cachesize:6291456 -fastsse -Mfprelaxed -Msmartalloc=huge -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi`

Benchmarks using both Fortran and C:
`-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64 -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):
`pathCC`

444.namd: `pgcpp`

Fortran benchmarks (except as noted below):
`pathf95`

410.bwaves: `pgf95`

434.zeusmp: `pgf95`

437.leslie3d: `pgf95`

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Peak Compiler Invocation (Continued)

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

435.gromacs: 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
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_LINUX -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: -Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge
-Mprefetch=t0 -Mloop32 -Mfprelaxed -Mipa=fast -Mipa=inline
-tp barcelona-64 -Bstatic_pgi

482.sphinx3: -Mpfi=indirect(pass 1) -Mpfo=indirect(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

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Peak Optimization Flags (Continued)

447.dealII: -march=barcelona -Ofast -static -INLINE:aggressive=on
-fno-exceptions -m32

450.soplex: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -L/usr/lib -lhugetlbfs(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

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

Fortran benchmarks:

410.bwaves: -Mvect=cachesize:6291456 -fastsse -Msmartalloc
-Mprefetch=nta -Mfprelaxed -Mipa=fast -Mipa=inline
-tp barcelona-64 -Bstatic_pgi

416.gamess: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -O2 -OPT:Ofast -OPT:ro=3
-OPT:unroll_size=256

434.zeusmp: -Mvect=cachesize:6291456 -fastsse -Mfprelaxed
-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)
-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: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2
-LNO:prefetch_ahead=1 -CG:load_exe=0 -CG:prefer_lru_reg=off
-OPT:malloc_alg=1
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT
-L/usr/lib64 -lhugetlbfs

465.tonto: -march=barcelona -Ofast -OPT:alias=no_f90_pointer_alias
-LNO:blocking=off -CG:load_exe=1 -IPA:plimit=525
-OPT:malloc_alg=1
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT
-L/usr/lib64 -lhugetlbfs

Benchmarks using both Fortran and C:

Continued on next page

Peak Optimization Flags (Continued)

435.gromacs: `-march=barcelona -Ofast -OPT:rsqrt=2 -OPT:malloc_alg=1 -Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT -L/usr/lib64 -lhugetlbfs`

436.cactusADM: `-Mvect=cachesize:6291456 -fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -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 -Mprefetch=t0 -Mpre -Mfprelaxed -tp barcelona-64 -Bstatic_pgi`

481.wrf: `-march=barcelona -Ofast -LNO:blocking=off -LNO:prefetch_ahead=10 -LANG:copyinout=off -IPA:callee_limit=5000 -GRA:prioritize_by_density=on -OPT:malloc_alg=1 -m3dnow -Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT -L/usr/lib64 -lhugetlbfs`

Peak Other Flags

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

C++ benchmarks:

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

Fortran benchmarks (except as noted below):
`-Mipa=jobs:4`(pass 2)

416.gamess: `No flags used`

459.GemsFDTD: `No flags used`

465.tonto: `No flags used`

Benchmarks using both Fortran and C (except as noted below):
`-Mipa=jobs:4`(pass 2)

435.gromacs: `No flags used`

481.wrf: `No flags used`

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2006/flags/pgi72_linux_flags.html
http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.html
http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2006/flags/pgi72_linux_flags.xml
http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.xml
http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.xml

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