SPEC® CFP2006 Result

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SGI

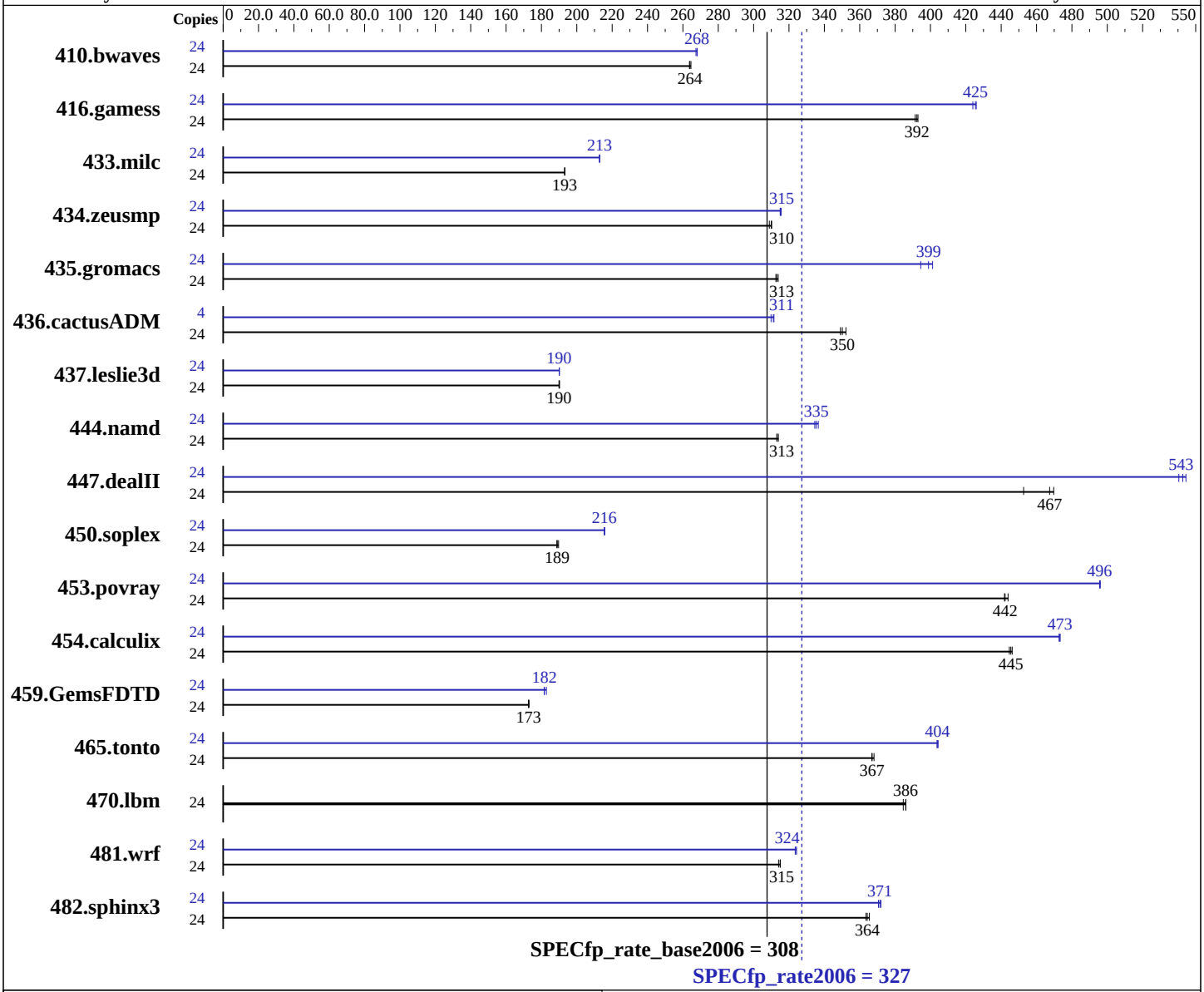
SGI Altix ICE 8400EX (AMD Opteron 6180 SE, 2.50 GHz)

SPECfp®_rate2006 = 327

SPECfp_rate_base2006 = 308

CPU2006 license: 4
Test sponsor: SGI
Tested by: SGI

Test date: Mar-2011
Hardware Availability: Feb-2011
Software Availability: Jul-2010



Hardware

CPU Name:	AMD Opteron 6180 SE
CPU Characteristics:	
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	24 cores, 2 chips, 12 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

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 11 (x86_64) SP1, Kernel 2.6.32.27-0.2-default
Compiler:	x86 Open64 4.2.4 Compiler Suite (from AMD)
Auto Parallel:	Yes
File System:	NFSv3 IPoIB
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	binutils 2.18

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L3 Cache: 12 MB I+D on chip per chip, 6 MB shared / 6 cores
Other Cache: None
Memory: 64 GB (16 x 4 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem: 16 TB RAID 5
32 x 500 GB SATA, 7200 RPM
Other Hardware: None

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24	1237	264	1233	265	**1236**	**264**	24	1220	267	**1217**	**268**	1217	268
416.gamess	24	1201	391	**1198**	**392**	1196	393	24	1103	426	**1104**	**425**	1108	424
433.milc	24	1141	193	**1141**	**193**	1140	193	24	1035	213	**1035**	**213**	1035	213
434.zeusmp	24	704	310	707	309	**705**	**310**	24	692	316	**693**	**315**	693	315
435.gromacs	24	548	313	**547**	**313**	546	314	24	**430**	**399**	427	401	434	395
436.cactusADM	24	822	349	**819**	**350**	814	352	4	153	312	154	310	**154**	**311**
437.leslie3d	24	1186	190	**1187**	**190**	1188	190	24	**1187**	**190**	1187	190	1186	190
444.namd	24	615	313	**615**	**313**	613	314	24	575	335	572	337	**574**	**335**
447.dealII	24	**587**	**467**	607	453	585	470	24	**506**	**543**	504	544	508	540
450.soplex	24	1055	190	1061	189	**1059**	**189**	24	929	216	927	216	**928**	**216**
453.povray	24	289	442	**289**	**442**	288	444	24	258	496	257	496	**258**	**496**
454.calculix	24	444	446	445	445	**444**	**445**	24	418	473	419	473	**418**	**473**
459.GemsFDTD	24	1475	173	1472	173	**1474**	**173**	24	1403	182	**1401**	**182**	1393	183
465.tonto	24	644	367	**643**	**367**	642	368	24	584	404	585	404	**585**	**404**
470.lbm	24	**854**	**386**	854	386	857	385	24	**854**	**386**	854	386	857	385
481.wrf	24	851	315	853	314	**851**	**315**	24	**828**	**324**	827	324	829	324
482.sphinx3	24	1280	365	**1284**	**364**	1287	364	24	1262	371	**1260**	**371**	1257	372

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=10800 in /etc/sysctl.conf
mount -t hugetlbfs nodev /tmp/hugepages
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "450"
LD_LIBRARY_PATH = "/store/cma/cpu2006-1.1/amd1002mc-rate-libs-revC/64:/store/cma/cpu2006-1.1/amd1002mc-rate-libs-revC/32"
OMP_NUM_THREADS = "6"

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

Base Compiler Invocation

C benchmarks:
`opencc`

C++ benchmarks:
`openCC`

Fortran benchmarks:
`openf95`

Benchmarks using both Fortran and C:
`opencc openf95`

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`
436.cactusADM: `-DSPEC_CPU_LP64 -fno-second-underscore`
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`
459.GemsFDTD: `-DSPEC_CPU_LP64`
465.tonto: `-DSPEC_CPU_LP64`
470.lbm: `-DSPEC_CPU_LP64`
481.wrf: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -fno-second-underscore`
482.sphinx3: `-DSPEC_CPU_LP64`

Base Optimization Flags

C benchmarks:
```
-march=barcelona -mso -Ofast -OPT:malloc_alg=1 -HP:bdt=2m
```

C++ benchmarks:
```
-march=barcelona -mso -Ofast -static -INLINE:aggressive=on
-OPT:malloc_alg=1 -HP:bdt=2m
```

Fortran benchmarks:
```
-march=barcelona -mso -Ofast -HP
```

Benchmarks using both Fortran and C:
```
-march=barcelona -mso -Ofast -OPT:malloc_alg=1 -HP:bdt=2m -HP
```

Peak Compiler Invocation

C benchmarks:
```
opencc
```

C++ benchmarks:
```
openCC
```

Fortran benchmarks:
```
openf95
```

Benchmarks using both Fortran and C:
```
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 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:

433.milc: -march=barcelona -mso -Ofast -CG:movnti=1
-CG:local_sched_alg=1 -CG:locs_shallow_depth=1
-HP:bdt=2m:heap=2m -LNO:prefetch=3

470.lbm: basepeak = yes

482.sphinx3: -march=barcelona -mso -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -OPT:malloc_alg=2
-CG:sse_cse_regs=0 -CG:locs_shallow_depth=1 -CG:cmp_peep=on
-CG:local_sched_alg=1 -INLINE:aggressive=on

C++ benchmarks:

444.namd: -march=barcelona -mso -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -LNO:ignore_feedback=off
-CG:local_sched_alg=2 -CG:load_exe=0 -CG:compute_to=on
-OPT:unroll_size=256 -fno-exceptions -HP:bdt=2m:heap=2m

447.dealII: -march=barcelona -mso -Ofast -static -INLINE:aggressive=on
-LNO:opt=0 -fno-emit-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 -mso -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 -mso -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on

Fortran benchmarks:

410.bwaves: -march=barcelona -mso -O3 -OPT:Ofast -OPT:treeheight=on
-LNO:blocking=off -LNO:prefetch_ahead=5
-LNO:ignore_feedback=off -WOPT:aggstr=0 -HP:bdt=2m:heap=2m
-CG:cmp_peep=on

416.gamess: -march=barcelona -mso -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
-LNO:prefetch=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256
-HP:bdt=2m:heap=2m

434.zeusmp: -march=barcelona -mso -Ofast -LNO:blocking=off
-LNO:interchange=off -OPT:treeheight=on -OPT:unroll_size=256
-CG:cmp_peep=on -GRA:prioritize_by_density=on -HP

Continued on next page

Peak Optimization Flags (Continued)

437.leslie3d: `-march=barcelona -mso -Ofast -HP:bdt=2m:heap=2m`

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

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

Benchmarks using both Fortran and C:

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

436.cactusADM: `-march=barcelona -mso -fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-Ofast -apo -LNO:prefetch_ahead=1 -HP:bdt=2m:heap=2m -LANG:heap_allocation_threshold=100`

454.calculix: `-march=barcelona -mso -Ofast -CG:load_exe=0 -CG:ptr_load_use=0 -CG:local_sched_alg=2 -CG:compute_to=on -LNO:prefetch_ahead=30 -WOPT:unroll=2 -GRA:optimize_boundary=on -HP:bdt=2m:heap=2m`

481.wrf: `-march=barcelona -mso -Ofast -LNO:blocking=off -LNO:prefetch_ahead=10 -LANG:copyinout=off -IPA:callee_limit=5000 -GRA:prioritize_by_density=on -m3dnow -HP`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20100901.html`
`http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20100901.xml`
`http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.xml`

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