# SPEC® CFP2006 Result

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Tyan
(Test Sponsor: Advanced Micro Devices)

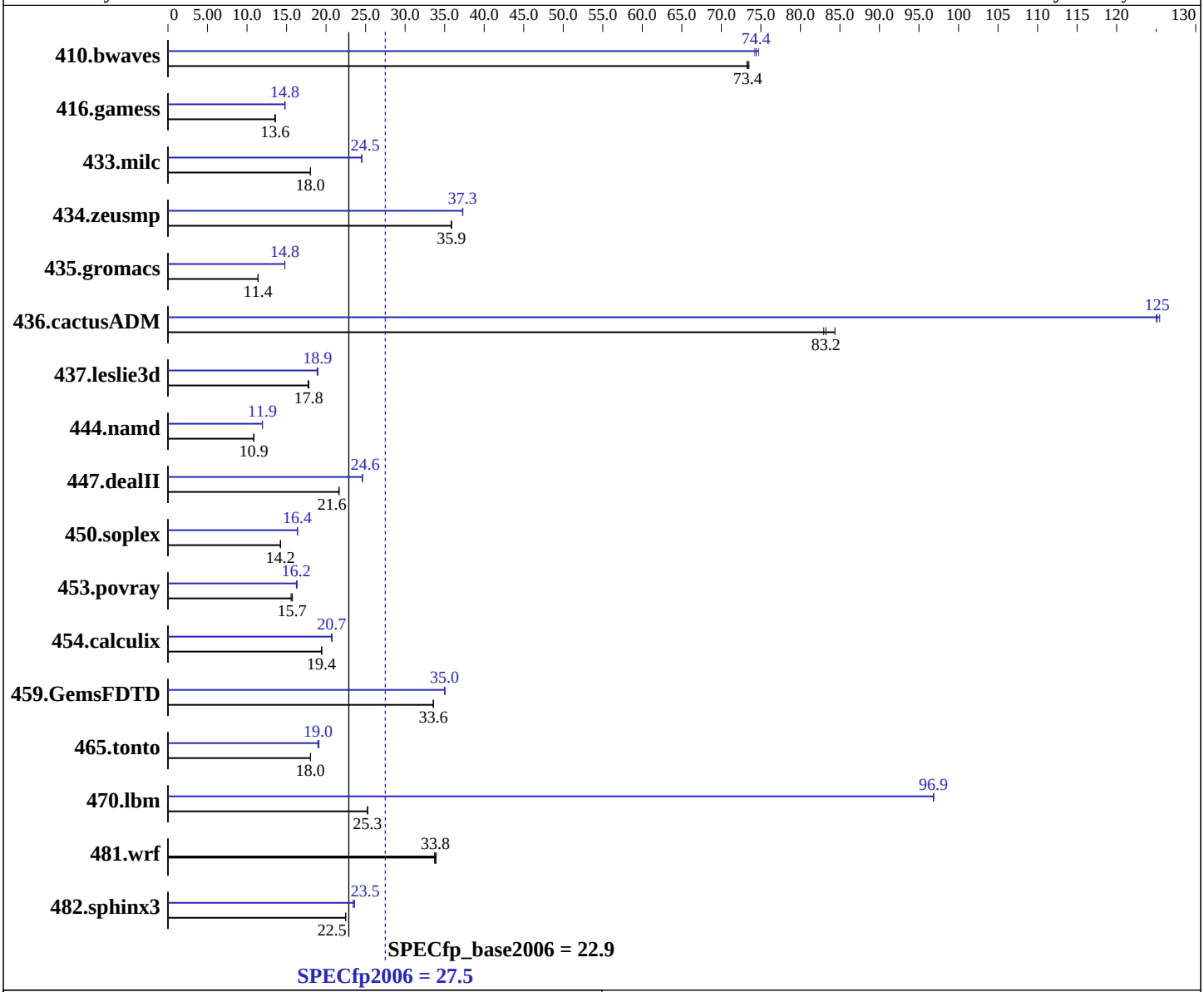
Tyan YR190B8228,
AMD Opteron 4170 HE

SPECfp®2006 = 27.5

SPECfp_base2006 = 22.9

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

**Test date:** Nov-2010
**Hardware Availability:** Aug-2010
**Software Availability:** May-2010




## Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 4170 HE |
| CPU Characteristics: | |
| CPU MHz: | 2100 |
| FPU: | Integrated |
| CPU(s) enabled: | 6 cores, 1 chip, 6 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 11 (x86_64), Kernel 2.6.27.19-5-default |
| Compiler: | x86 Open64 4.2.3.2 Compiler Suite (from AMD) |
| Auto Parallel: | Yes |
| File System: | ext3 |
| System State: | Run level 3 (Full multiuser with network) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 32/64-bit |
| Other Software: | None |

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L3 Cache: 6 MB I+D on chip per chip
Other Cache: None
Memory: 16 GB (2 x 8 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem: 1 x 128 GB SATA SSD
Crucial RealSSD C300 CTFDDAC128MAG-1G1
Other Hardware: None

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 186 | 73.2 | **185** | **73.4** | 185 | 73.5 | **183** | **74.4** | 183 | 74.2 | 182 | 74.7 |
| 416.gamess | 1449 | 13.5 | **1443** | **13.6** | 1441 | 13.6 | **1323** | **14.8** | 1325 | 14.8 | 1322 | 14.8 |
| 433.milc | 509 | 18.0 | 510 | 18.0 | **509** | **18.0** | 374 | 24.5 | **375** | **24.5** | 375 | 24.5 |
| 434.zeusmp | **254** | **35.9** | 254 | 35.9 | 254 | 35.8 | 244 | 37.3 | 244 | 37.3 | **244** | **37.3** |
| 435.gromacs | 627 | 11.4 | **626** | **11.4** | 626 | 11.4 | 483 | 14.8 | **483** | **14.8** | 483 | 14.8 |
| 436.cactusADM | 142 | 84.4 | 144 | 83.0 | **144** | **83.2** | 95.3 | 125 | **95.5** | **125** | 95.6 | 125 |
| 437.leslie3d | 530 | 17.7 | **528** | **17.8** | 527 | 17.8 | **496** | **18.9** | 498 | 18.9 | 496 | 19.0 |
| 444.namd | **739** | **10.9** | 738 | 10.9 | 739 | 10.9 | 672 | 11.9 | **671** | **11.9** | 671 | 12.0 |
| 447.dealII | 529 | 21.6 | **529** | **21.6** | 528 | 21.7 | **465** | **24.6** | 465 | 24.6 | 465 | 24.6 |
| 450.soplex | 586 | 14.2 | 586 | 14.2 | **586** | **14.2** | 509 | 16.4 | **509** | **16.4** | 509 | 16.4 |
| 453.povray | 338 | 15.7 | 342 | 15.6 | **339** | **15.7** | **327** | **16.2** | 328 | 16.2 | 325 | 16.3 |
| 454.calculix | **425** | **19.4** | 424 | 19.5 | 425 | 19.4 | 397 | 20.8 | **398** | **20.7** | 399 | 20.7 |
| 459.GemsFDTD | 316 | 33.6 | 316 | 33.6 | **316** | **33.6** | 303 | 35.0 | 303 | 35.0 | **303** | **35.0** |
| 465.tonto | **546** | **18.0** | 546 | 18.0 | 546 | 18.0 | 519 | 19.0 | 515 | 19.1 | **517** | **19.0** |
| 470.lbm | 544 | 25.3 | **544** | **25.3** | 544 | 25.2 | 142 | 96.9 | **142** | **96.9** | 142 | 96.8 |
| 481.wrf | **330** | **33.8** | 329 | 33.9 | 331 | 33.7 | **330** | **33.8** | 329 | 33.9 | 331 | 33.7 |
| 482.sphinx3 | 868 | 22.4 | 866 | 22.5 | **868** | **22.5** | **830** | **23.5** | 831 | 23.5 | 826 | 23.6 |

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=1000 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

powersave -f was used to set the CPU frequency to its maximum.
```

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## Operating System Notes (Continued)

Binaries were compiled on SLES10 SP2 with binutils 2.18

## General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/work/cpu2006/amd1002-speed-libs-revA/64:/root/work/cpu2006/amd1002-speed-libs-revA/32"
O64_OMP_AFFINITY_MAP = "0,1,2,3,4,5"
O64_OMP_SPIN_USER_LOCK = "true"

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

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## Base Portability Flags (Continued)

482.sphinx3: -DSPEC_CPU_LP64

## Base Optimization Flags

C benchmarks:
-march=barcelona -Ofast -HP:bdt=2m:heap=2m

C++ benchmarks:
-march=barcelona -Ofast -static -INLINE:aggressive=on
-HP:bdt=2m:heap=2m

Fortran benchmarks:
-march=barcelona -Ofast -apo -LNO:parallel_overhead=10000
-LNO:fusion_peeling_limit=0 -HP:bdt=2m:heap=2m

Benchmarks using both Fortran and C:
-march=barcelona -Ofast -HP:bdt=2m:heap=2m -apo
-LNO:parallel_overhead=10000 -LNO:fusion_peeling_limit=0

## 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

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## Peak Portability Flags (Continued)

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 -Ofast -apo -CG:movnti=1
-CG:local_sched_alg=1 -CG:locs_shallow_depth=1
-CG:compute_to=on -HP:bdt=2m:heap=2m -LNO:prefetch=3

470.lbm: -march=barcelona -Ofast -mso -apo -CG:sse_cse_regs=0
-LNO:prefetch_ahead=4 -CG:locs_shallow_depth=1
-CG:cmp_peep=on -CG:compute_to=on -OPT:unroll_times_max=8
-OPT:unroll_size=256 -OPT:unroll_level=2 -OPT:keep_ext=on
-OPT:alias=restricted -m3dnow -IPA:inline=off

482.sphinx3: -march=barcelona -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 -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 -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 -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 -CG:load_exe=0 -fno-exceptions
-m32 -HP:bdt=2m:heap=2m

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## Peak Optimization Flags (Continued)

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: -march=barcelona -Ofast -apo -OPT:malloc_alg=2
-CG:use_prefetchnta=on -CG:cmp_peep=on -LNO:blocking=off
-LNO:prefetch=3 -LNO:prefetch_ahead=5
-LNO:ignore_feedback=off -LNO:apo_use_feedback=on
-WOPT:aggstr=0

416.gamess: -march=barcelona -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 -Ofast -apo -LNO:blocking=off
-LNO:interchange=off -LNO:fusion_peeling_limit=0
-OPT:treeheight=on -OPT:unroll_size=256 -CG:cmp_peep=on
-CG:compute_to=on -GRA:prioritize_by_density=on
-HP:bdt=2m:heap=2m

437.leslie3d: -march=barcelona -Ofast -apo -OPT:unroll_size=256
-LNO:prefetch_ahead=4 -LNO:parallel_overhead=32768
-GRA:prioritize_by_density=on -m3dnow -HP:bdt=2m:heap=2m

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

465.tonto: -march=barcelona -Ofast -apo
-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 -Ofast -apo -OPT:rsqrt=2
-HP:bdt=2m:heap=2m

436.cactusADM: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -apo
-LANG:heap_allocation_threshold=1000 -LNO:prefetch_ahead=1
-HP:bdt=2m:heap=2m

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

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## Peak Optimization Flags (Continued)

481.wrf: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/x86-open64-423-flags-speed-revA.20101207.html`
`http://www.spec.org/cpu2006/flags/amd-platform-speed-revA.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/x86-open64-423-flags-speed-revA.20101207.xml`
`http://www.spec.org/cpu2006/flags/amd-platform-speed-revA.xml`


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Tested with SPEC CPU2006 v1.1.
Report generated on Wed Jul 23 15:24:58 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 3 February 2011.