# SPEC® CFP2006 Result

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## GIGA-BYTE Technology Co. Ltd.

(Test Sponsor: Advanced Micro Devices)

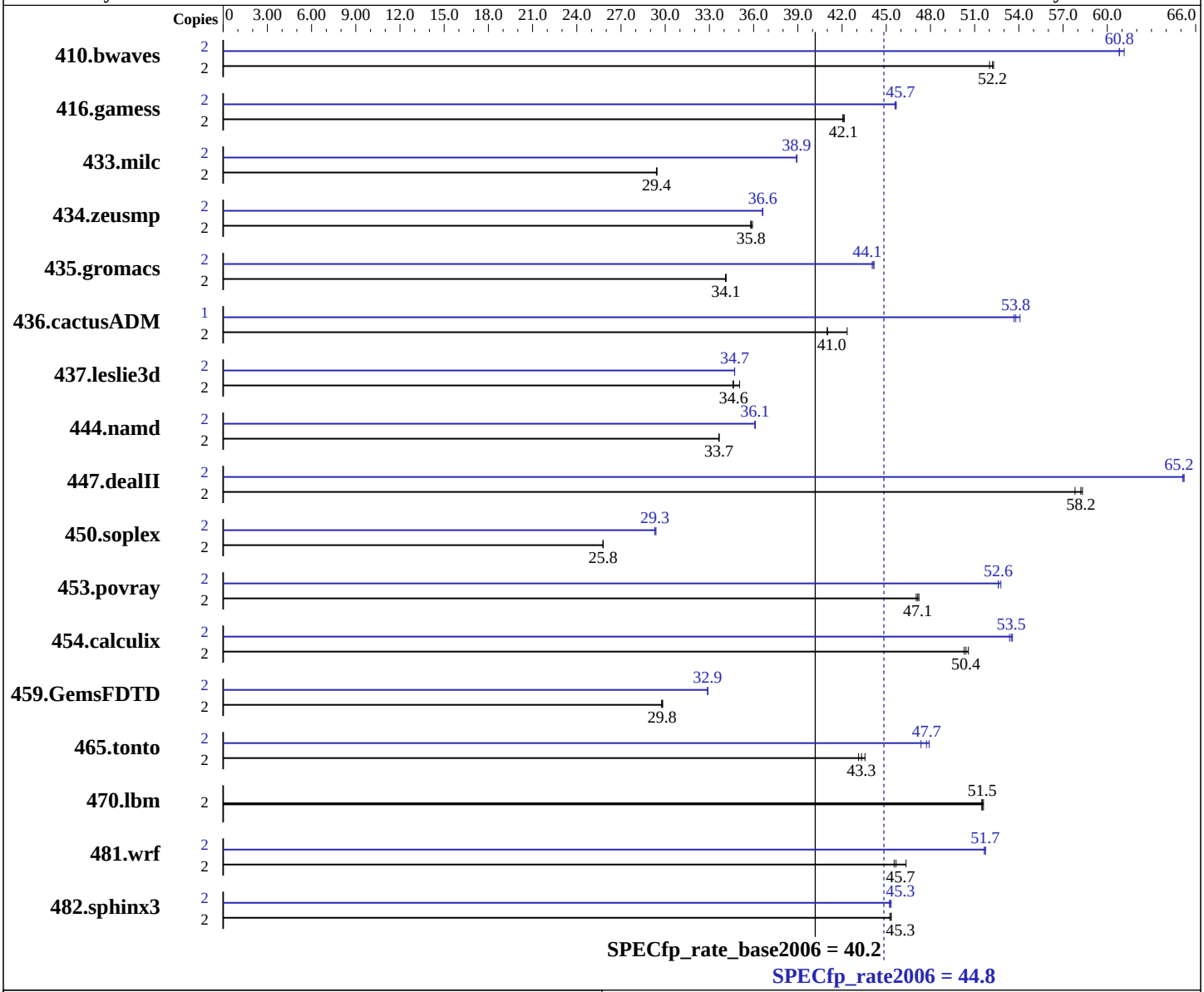
Gigabyte GA-880GMA-USB3,
AMD Athlon II X2 260

**SPECfp®_rate2006 = 44.8**

**SPECfp_rate_base2006 = 40.2**

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

**Test date:** Apr-2011
**Hardware Availability:** May-2010
**Software Availability:** Jul-2010




## Hardware

| | |
|---|---|
| CPU Name: | AMD Athlon II X2 260 |
| CPU Characteristics: | |
| CPU MHz: | 3200 |
| FPU: | Integrated |
| CPU(s) enabled: | 2 cores, 1 chip, 2 cores/chip |
| CPU(s) orderable: | 1 chip |
| Primary Cache: | 64 KB I + 64 KB D on chip per core |
| Secondary Cache: | 1 MB I+D on chip per core |

**Continued on next page**

## Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 11 SP1 (x86_64), Kernel 2.6.32.12-0.7-default |
| Compiler: | x86 Open64 4.2.4 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: None
Other Cache: None
Memory: 8 GB (4 x 2 GB 1Rx4 PC3-10600U-9)
Disk Subsystem: 1 x 2 TB 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 | 2 | 523 | 52.0 | 520 | 52.3 | **521** | **52.2** | 2 | 447 | 60.8 | 444 | 61.2 | **447** | **60.8** |
| 416.gamess | 2 | 929 | 42.2 | 931 | 42.1 | **931** | **42.1** | 2 | 857 | 45.7 | **858** | **45.7** | 859 | 45.6 |
| 433.milc | 2 | 624 | 29.4 | **624** | **29.4** | 624 | 29.4 | 2 | 471 | 38.9 | **472** | **38.9** | 472 | 38.9 |
| 434.zeusmp | 2 | **508** | **35.8** | 507 | 35.9 | 508 | 35.8 | 2 | 497 | 36.6 | 497 | 36.6 | **497** | **36.6** |
| 435.gromacs | 2 | 418 | 34.1 | **419** | **34.1** | 419 | 34.1 | 2 | 324 | 44.0 | **324** | **44.1** | 323 | 44.2 |
| 436.cactusADM | 2 | 564 | 42.3 | **583** | **41.0** | 583 | 41.0 | 1 | 223 | 53.7 | **222** | **53.8** | 221 | 54.1 |
| 437.leslie3d | 2 | 543 | 34.6 | **543** | **34.6** | 536 | 35.0 | 2 | **542** | **34.7** | 542 | 34.7 | 542 | 34.7 |
| 444.namd | 2 | 477 | 33.6 | 477 | 33.7 | **477** | **33.7** | 2 | 444 | 36.1 | 444 | 36.1 | **444** | **36.1** |
| 447.dealII | 2 | **393** | **58.2** | 396 | 57.8 | 392 | 58.3 | 2 | **351** | **65.2** | 351 | 65.2 | 351 | 65.1 |
| 450.soplex | 2 | **647** | **25.8** | 647 | 25.8 | 647 | 25.8 | 2 | **569** | **29.3** | 569 | 29.3 | 568 | 29.4 |
| 453.povray | 2 | 226 | 47.0 | **226** | **47.1** | 225 | 47.2 | 2 | 202 | 52.8 | **202** | **52.6** | 202 | 52.6 |
| 454.calculix | 2 | 328 | 50.3 | **327** | **50.4** | 326 | 50.6 | 2 | 308 | 53.6 | 309 | 53.4 | **308** | **53.5** |
| 459.GemsFDTD | 2 | 711 | 29.8 | **712** | **29.8** | 713 | 29.8 | 2 | 645 | 32.9 | **645** | **32.9** | 645 | 32.9 |
| 465.tonto | 2 | 456 | 43.1 | **454** | **43.3** | 452 | 43.6 | 2 | 411 | 47.9 | 416 | 47.4 | **412** | **47.7** |
| 470.lbm | 2 | **533** | **51.5** | 534 | 51.5 | 533 | 51.6 | 2 | **533** | **51.5** | 534 | 51.5 | 533 | 51.6 |
| 481.wrf | 2 | **489** | **45.7** | 491 | 45.5 | 482 | 46.3 | 2 | 433 | 51.7 | **432** | **51.7** | 432 | 51.7 |
| 482.sphinx3 | 2 | 860 | 45.3 | **860** | **45.3** | 862 | 45.2 | 2 | **861** | **45.3** | 860 | 45.3 | 862 | 45.2 |

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=1792 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

Binaries were compiled on SLES10 SP2 with binutils 2.18
```

## General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "1792"
LD_LIBRARY_PATH = "/root/work/cpu2006v1.1/amd1002-rate-libs-revC/64:/root/work/cpu2006v1.1/amd1002-rate-libs-revC/32"
OMP_NUM_THREADS = "2"

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.20101109.html
http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.20110119.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.20101109.xml
http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.20110119.xml


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