# SPEC® CFP2006 Result

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## GIGA-BYTE Technology Co. Ltd.

(Test Sponsor: Advanced Micro Devices)

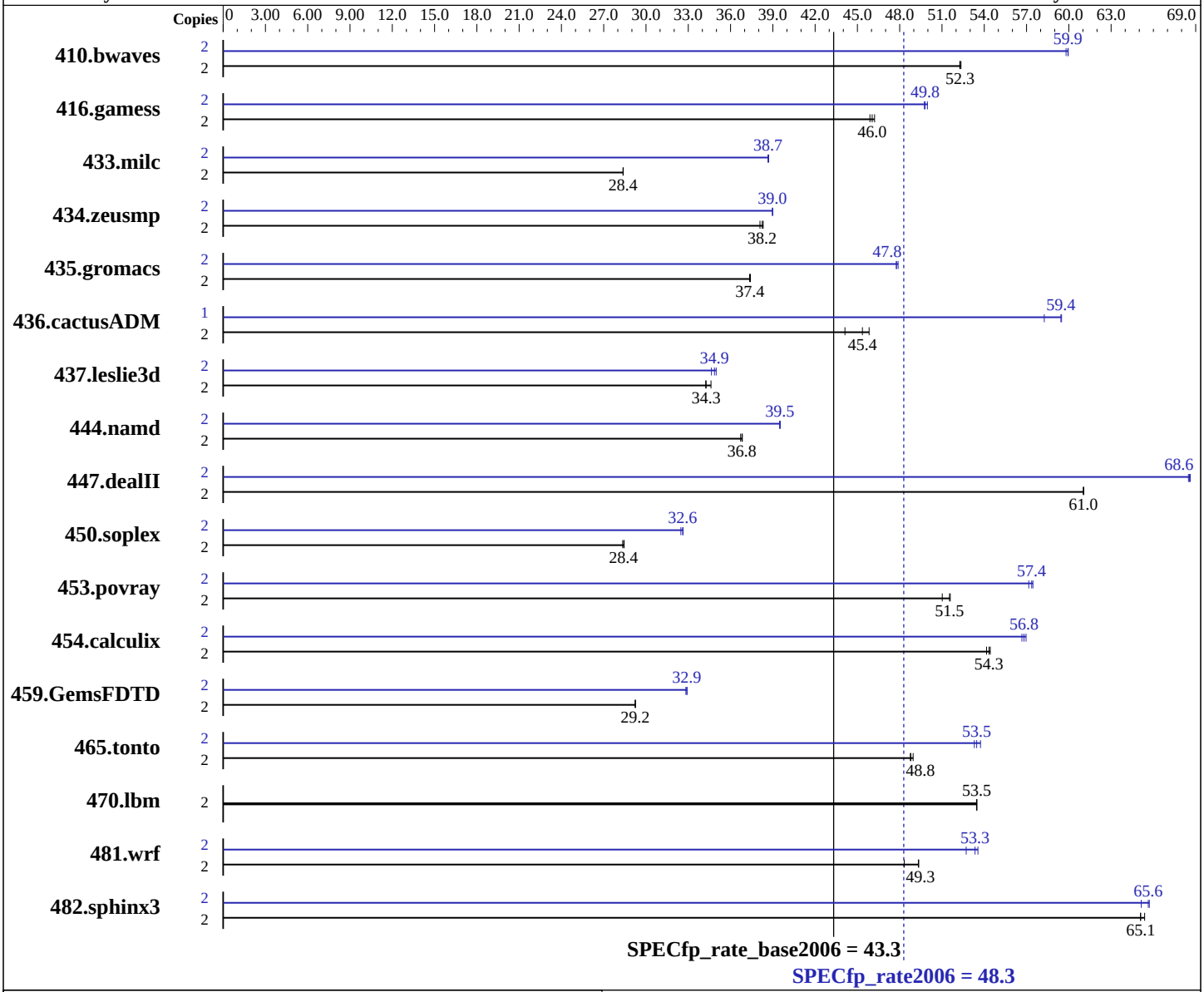
Gigabyte GA-880GMA-USB3,
AMD Phenom II X2 570

**SPECfp®_rate2006 = 48.3**

**SPECfp_rate_base2006 = 43.3**

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

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




## Hardware

| | |
|---|---|
| CPU Name: | AMD Phenom II X2 570 |
| CPU Characteristics: | |
| CPU MHz: | 3500 |
| 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: | 512 KB 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: 6 MB I+D on chip per chip
Other Cache: None
Memory: 4 GB (2 x 2 GB 2Rx8 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 | **520** | **52.3** | 519 | 52.3 | 520 | 52.3 | 2 | 455 | 59.8 | 453 | 60.0 | **453** | **59.9** |
| 416.gamess | 2 | **850** | **46.0** | 853 | 45.9 | 847 | 46.2 | 2 | 784 | 50.0 | **786** | **49.8** | 787 | 49.8 |
| 433.milc | 2 | 647 | 28.4 | **647** | **28.4** | 647 | 28.4 | 2 | 474 | 38.7 | 475 | 38.7 | **475** | **38.7** |
| 434.zeusmp | 2 | **476** | **38.2** | 475 | 38.3 | 478 | 38.1 | 2 | 467 | 39.0 | 467 | 39.0 | **467** | **39.0** |
| 435.gromacs | 2 | 382 | 37.4 | 382 | 37.3 | **382** | **37.4** | 2 | 299 | 47.8 | **299** | **47.8** | 298 | 47.9 |
| 436.cactusADM | 2 | **527** | **45.4** | 542 | 44.1 | 521 | 45.8 | 1 | **201** | **59.4** | 201 | 59.5 | 205 | 58.3 |
| 437.leslie3d | 2 | 543 | 34.6 | 549 | 34.2 | **549** | **34.3** | 2 | 537 | 35.0 | **539** | **34.9** | 543 | 34.6 |
| 444.namd | 2 | 437 | 36.7 | **436** | **36.8** | 435 | 36.8 | 2 | 406 | 39.5 | **406** | **39.5** | 406 | 39.5 |
| 447.dealII | 2 | **375** | **61.0** | 375 | 61.1 | 375 | 61.0 | 2 | 334 | 68.5 | **334** | **68.6** | 333 | 68.6 |
| 450.soplex | 2 | 588 | 28.3 | **587** | **28.4** | 586 | 28.5 | 2 | **512** | **32.6** | 514 | 32.5 | 511 | 32.6 |
| 453.povray | 2 | **206** | **51.5** | 206 | 51.6 | 209 | 51.0 | 2 | 185 | 57.5 | 186 | 57.2 | **185** | **57.4** |
| 454.calculix | 2 | 303 | 54.4 | 305 | 54.2 | **304** | **54.3** | 2 | 291 | 56.7 | 290 | 57.0 | **290** | **56.8** |
| 459.GemsFDTD | 2 | **726** | **29.2** | 726 | 29.2 | 726 | 29.2 | 2 | **645** | **32.9** | 645 | 32.9 | 646 | 32.8 |
| 465.tonto | 2 | **403** | **48.8** | 402 | 49.0 | 404 | 48.8 | 2 | 366 | 53.7 | 369 | 53.3 | **368** | **53.5** |
| 470.lbm | 2 | 514 | 53.4 | **514** | **53.5** | 514 | 53.5 | 2 | 514 | 53.4 | **514** | **53.5** | 514 | 53.5 |
| 481.wrf | 2 | **453** | **49.3** | 462 | 48.3 | 453 | 49.4 | 2 | **419** | **53.3** | 424 | 52.7 | 417 | 53.6 |
| 482.sphinx3 | 2 | **599** | **65.1** | 596 | 65.4 | 599 | 65.1 | 2 | **594** | **65.6** | 593 | 65.7 | 598 | 65.1 |

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=0 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 = "0"
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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