



# SPEC® CFP2006 Result

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## Tyan

(Test Sponsor: Advanced Micro Devices)

Tyan YR190B8228,  
AMD Opteron 4162 EE

SPECfp®2006 =

23.7

SPECfp\_base2006 =

18.3

CPU2006 license: 49

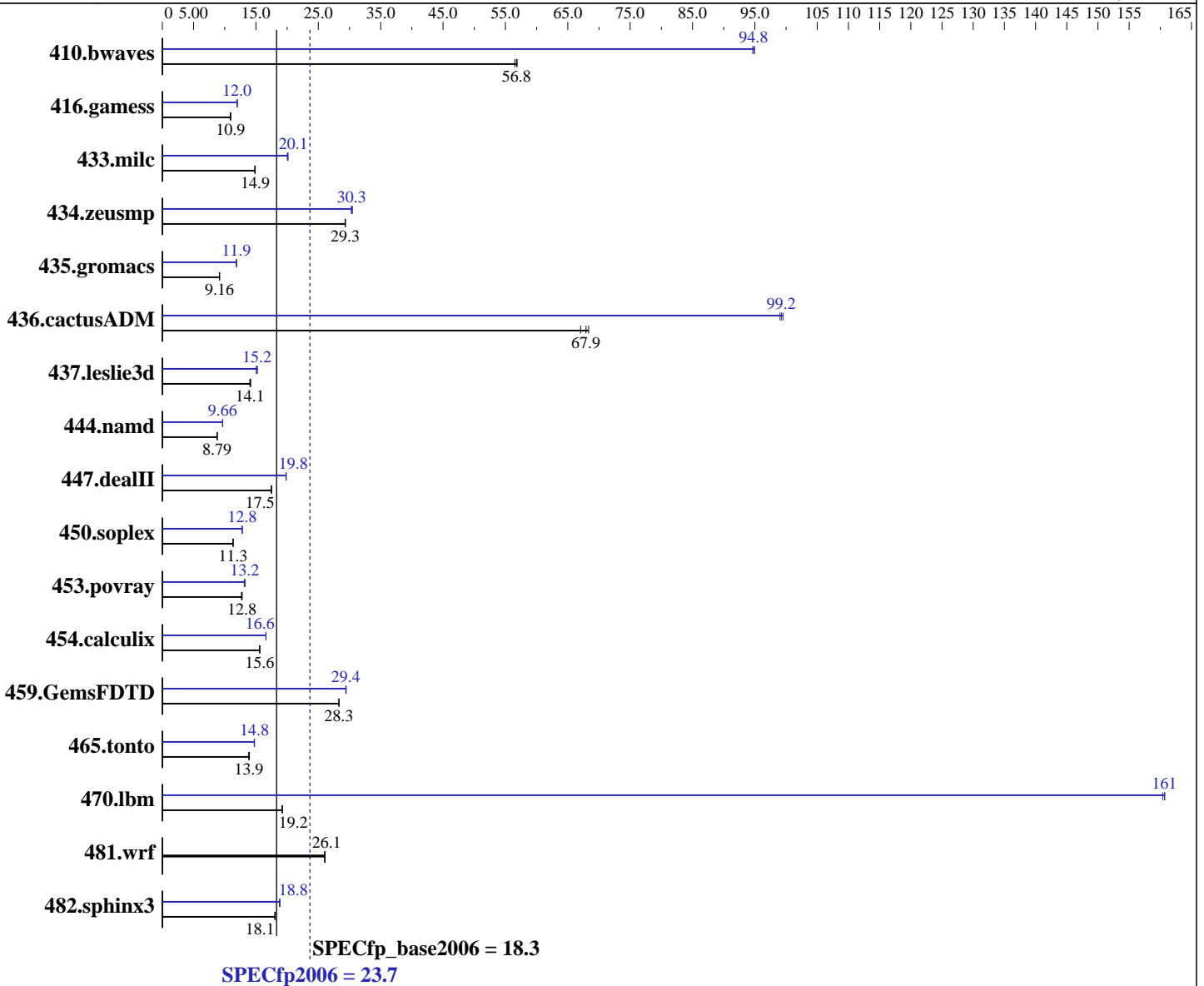
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Dec-2010

Hardware Availability: Aug-2010

Software Availability: May-2010



### Hardware

CPU Name: AMD Opteron 4162 EE  
 CPU Characteristics:  
 CPU MHz: 1700  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 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

### 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: 32 GB (4 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	241	56.5	239	56.9	<b>239</b>	<b>56.8</b>	143	95.0	<b>143</b>	<b>94.8</b>	144	94.7
416.gamess	1787	11.0	1797	10.9	<b>1789</b>	<b>10.9</b>	1629	12.0	<b>1633</b>	<b>12.0</b>	1635	12.0
433.milc	616	14.9	620	14.8	<b>617</b>	<b>14.9</b>	455	20.2	458	20.0	<b>457</b>	<b>20.1</b>
434.zeusmp	310	29.4	311	29.3	<b>310</b>	<b>29.3</b>	<b>300</b>	<b>30.3</b>	299	30.5	300	30.3
435.gromacs	777	9.19	780	9.15	<b>779</b>	<b>9.16</b>	602	11.9	601	11.9	<b>601</b>	<b>11.9</b>
436.cactusADM	178	67.1	<b>176</b>	<b>67.9</b>	175	68.3	120	99.5	<b>120</b>	<b>99.2</b>	121	99.0
437.leslie3d	664	14.2	<b>668</b>	<b>14.1</b>	670	14.0	624	15.1	617	15.2	<b>620</b>	<b>15.2</b>
444.namd	912	8.79	<b>913</b>	<b>8.79</b>	913	8.79	830	9.66	831	9.65	<b>830</b>	<b>9.66</b>
447.dealII	653	17.5	<b>654</b>	<b>17.5</b>	654	17.5	577	19.8	<b>576</b>	<b>19.8</b>	576	19.9
450.soplex	734	11.4	737	11.3	<b>735</b>	<b>11.3</b>	651	12.8	<b>651</b>	<b>12.8</b>	652	12.8
453.povray	416	12.8	<b>416</b>	<b>12.8</b>	419	12.7	405	13.1	<b>403</b>	<b>13.2</b>	401	13.3
454.calculix	528	15.6	<b>528</b>	<b>15.6</b>	529	15.6	<b>496</b>	<b>16.6</b>	496	16.6	497	16.6
459.GemsFDTD	<b>375</b>	<b>28.3</b>	375	28.3	375	28.3	<b>361</b>	<b>29.4</b>	361	29.4	360	29.5
465.tonto	710	13.9	705	13.9	<b>709</b>	<b>13.9</b>	668	14.7	<b>667</b>	<b>14.8</b>	666	14.8
470.lbm	716	19.2	<b>714</b>	<b>19.2</b>	714	19.2	85.5	161	85.7	160	<b>85.5</b>	<b>161</b>
481.wrf	428	26.1	430	26.0	<b>428</b>	<b>26.1</b>	428	26.1	430	26.0	<b>428</b>	<b>26.1</b>
482.sphinx3	<b>1080</b>	<b>18.1</b>	1081	18.0	1077	18.1	1038	18.8	<b>1036</b>	<b>18.8</b>	1034	18.9

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=2000 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 = "0,1,2,3,4,5,6,7,8,9,10,11"
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:

openc

C++ benchmarks:

openCC

Fortran benchmarks:

openf95

Benchmarks using both Fortran and C:

openc 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.dealIII: -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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

Tested with SPEC CPU2006 v1.1.  
Report generated on Wed Jul 23 15:21:04 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 3 February 2011.