



# SPEC® CFP2006 Result

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## Tyan

(Test Sponsor: Advanced Micro Devices)

Tyan YR190B8228,  
AMD Opteron 4176 HE

**SPECfp®2006 = 30.5**

**SPECfp\_base2006 = 25.4**

**CPU2006 license:** 49

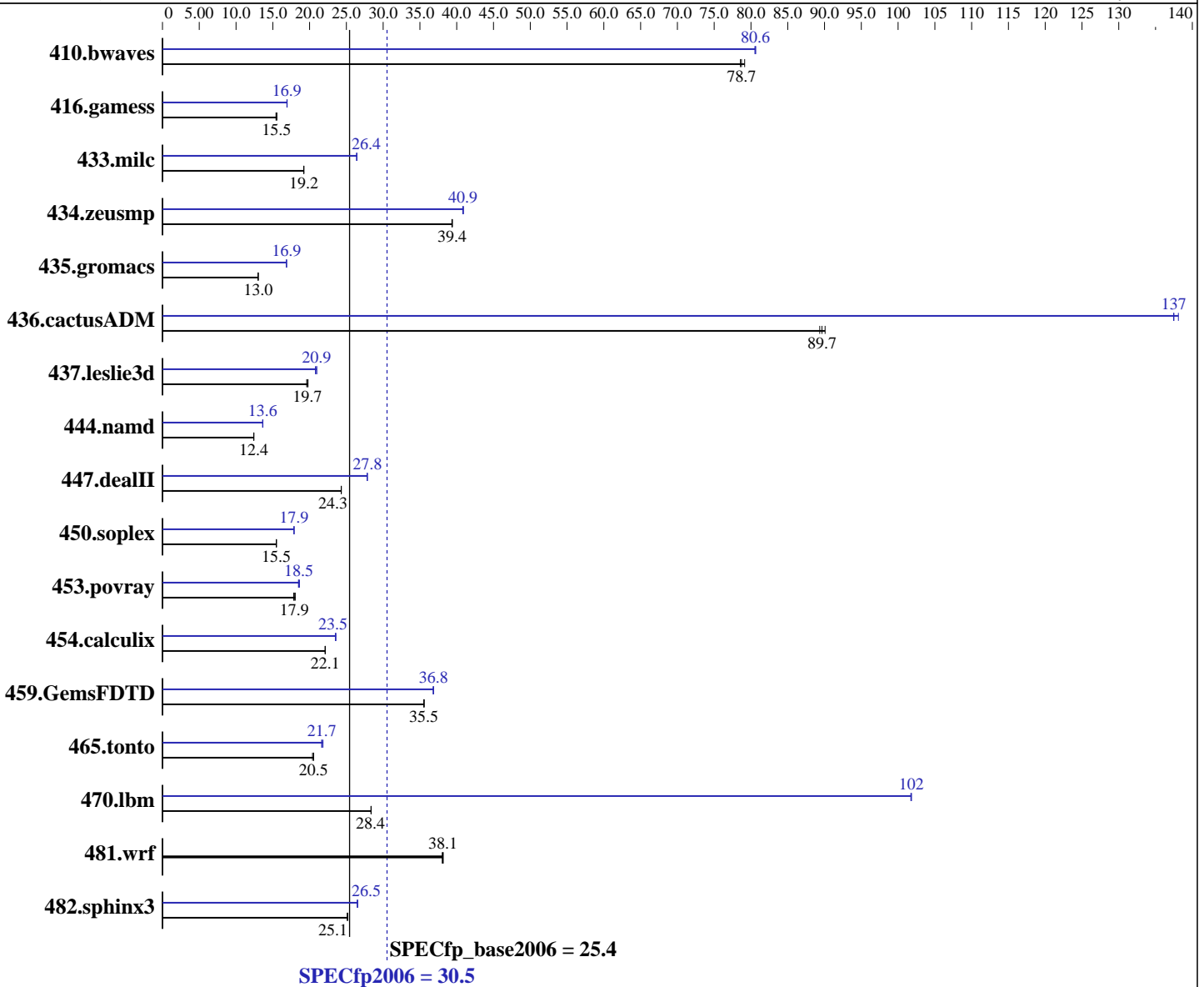
**Test sponsor:** Advanced Micro Devices

**Tested by:** Advanced Micro Devices

**Test date:** Nov-2010

**Hardware Availability:** Aug-2010

**Software Availability:** May-2010



### Hardware

CPU Name: AMD Opteron 4176 HE  
 CPU Characteristics:  
 CPU MHz: 2400  
 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

### 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	173	78.6	172	79.1	<b>173</b>	<b>78.7</b>	<b>169</b>	<b>80.6</b>	169	80.6	169	80.5
416.gamess	1260	15.5	1269	15.4	<b>1262</b>	<b>15.5</b>	1155	17.0	1157	16.9	<b>1157</b>	<b>16.9</b>
433.milc	478	19.2	<b>478</b>	<b>19.2</b>	478	19.2	<b>348</b>	<b>26.4</b>	348	26.4	347	26.4
434.zeusmp	231	39.4	231	39.3	<b>231</b>	<b>39.4</b>	<b>223</b>	<b>40.9</b>	222	40.9	223	40.8
435.gromacs	<b>549</b>	<b>13.0</b>	549	13.0	549	13.0	424	16.9	424	16.9	<b>424</b>	<b>16.9</b>
436.cactusADM	<b>133</b>	<b>89.7</b>	134	89.4	133	90.1	<b>86.9</b>	<b>137</b>	86.5	138	86.9	137
437.leslie3d	479	19.6	<b>477</b>	<b>19.7</b>	475	19.8	448	21.0	<b>449</b>	<b>20.9</b>	452	20.8
444.namd	<b>646</b>	<b>12.4</b>	646	12.4	646	12.4	587	13.7	<b>588</b>	<b>13.6</b>	589	13.6
447.dealII	471	24.3	470	24.3	<b>471</b>	<b>24.3</b>	411	27.8	<b>411</b>	<b>27.8</b>	411	27.8
450.soplex	538	15.5	539	15.5	<b>539</b>	<b>15.5</b>	467	17.9	466	17.9	<b>466</b>	<b>17.9</b>
453.povray	295	18.1	<b>297</b>	<b>17.9</b>	298	17.8	286	18.6	<b>287</b>	<b>18.5</b>	288	18.5
454.calculix	<b>373</b>	<b>22.1</b>	373	22.1	373	22.1	<b>351</b>	<b>23.5</b>	351	23.5	350	23.6
459.GemsFDTD	298	35.6	299	35.5	<b>299</b>	<b>35.5</b>	288	36.9	<b>288</b>	<b>36.8</b>	288	36.8
465.tonto	<b>479</b>	<b>20.5</b>	479	20.5	482	20.4	451	21.8	454	21.7	<b>454</b>	<b>21.7</b>
470.lbm	485	28.4	<b>484</b>	<b>28.4</b>	484	28.4	135	102	<b>135</b>	<b>102</b>	135	102
481.wrf	294	38.0	<b>293</b>	<b>38.1</b>	293	38.2	294	38.0	<b>293</b>	<b>38.1</b>	293	38.2
482.sphinx3	774	25.2	776	25.1	<b>776</b>	<b>25.1</b>	<b>735</b>	<b>26.5</b>	735	26.5	736	26.5

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:

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

Continued on next page



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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.deaIII: -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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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).

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