



# SPEC® CFP2006 Result

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## Supermicro

(Test Sponsor: Advanced Micro Devices)

Supermicro A+ Server 2042G-6RF,  
AMD Opteron 6124 HE

SPECfp®2006 = 26.8

SPECfp\_base2006 = 18.4

CPU2006 license: 49

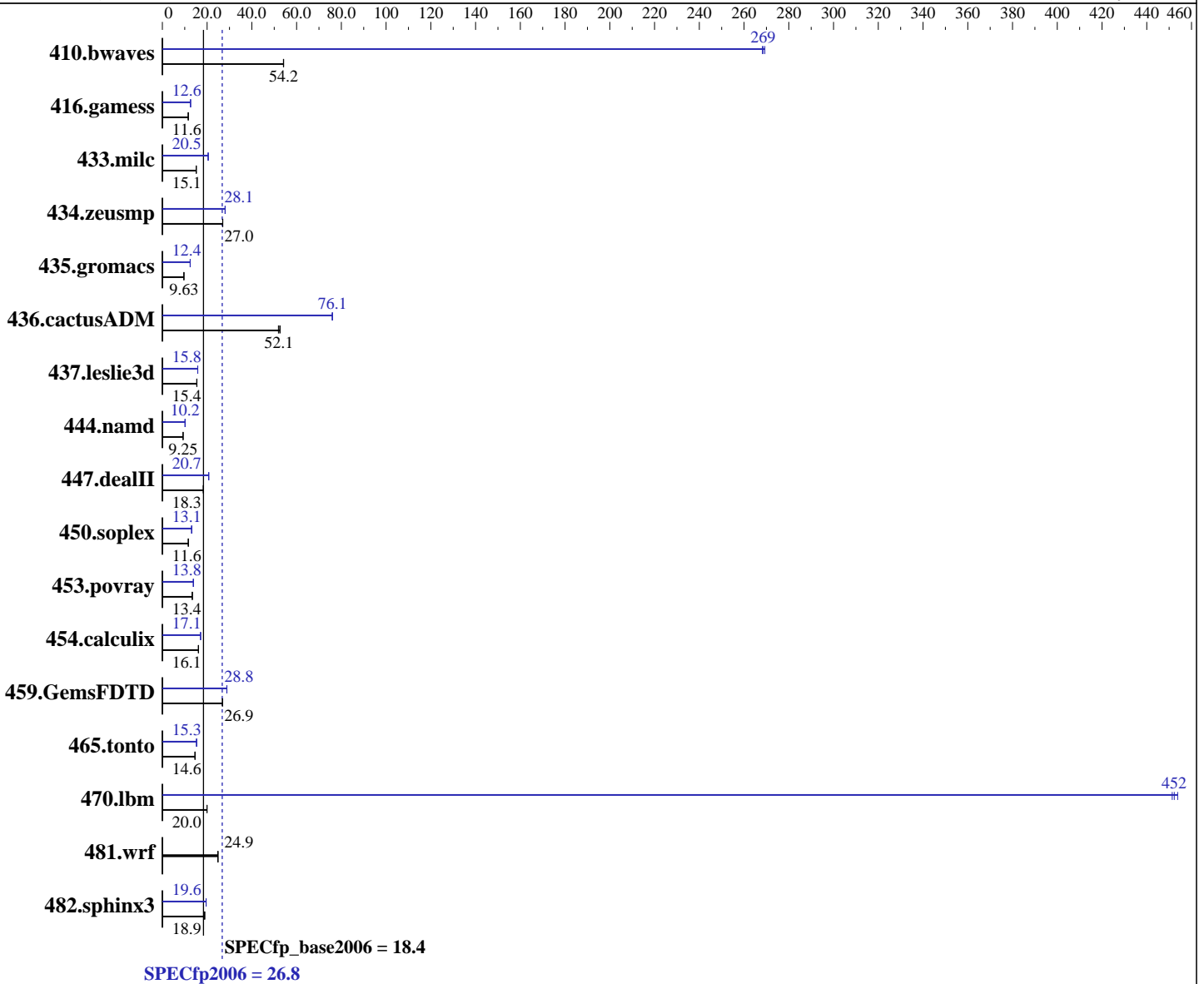
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Nov-2010

Hardware Availability: Mar-2010

Software Availability: May-2010



### Hardware

CPU Name: AMD Opteron 6124 HE  
 CPU Characteristics:  
 CPU MHz: 1800  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 4 chips, 8 cores/chip  
 CPU(s) orderable: 2,4 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: Red Hat Enterprise Linux Server release 5.5, Advanced Platform, Kernel 2.6.18-194.el5  
 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: binutils 2.18

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L3 Cache: 12 MB I+D on chip per chip, 6 MB shared / 4 cores  
Other Cache: None  
Memory: 128 GB (32 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
Disk Subsystem: 1 x 250 GB SATA, 7200 RPM  
Other Hardware: None

## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	<u>251</u>	<u>54.2</u>	251	54.1	251	54.2	50.7	268	<u>50.6</u>	<u>269</u>	50.5	269
416.gamess	<u>1690</u>	<u>11.6</u>	1694	11.6	1690	11.6	1556	12.6	1553	12.6	<u>1554</u>	<u>12.6</u>
433.milc	604	15.2	608	15.1	<u>606</u>	<u>15.1</u>	448	20.5	449	20.4	<u>448</u>	<u>20.5</u>
434.zeusmp	338	26.9	337	27.0	<u>337</u>	<u>27.0</u>	324	28.1	<u>324</u>	<u>28.1</u>	325	28.0
435.gromacs	741	9.64	<u>741</u>	<u>9.63</u>	742	9.62	574	12.4	<u>574</u>	<u>12.4</u>	573	12.5
436.cactusADM	<u>229</u>	<u>52.1</u>	230	51.9	227	52.7	<u>157</u>	<u>76.1</u>	157	76.1	158	75.9
437.leslie3d	<u>610</u>	<u>15.4</u>	608	15.5	612	15.4	595	15.8	593	15.8	<u>594</u>	<u>15.8</u>
444.namd	<u>867</u>	<u>9.25</u>	868	9.24	865	9.27	<u>790</u>	<u>10.2</u>	790	10.2	789	10.2
447.dealII	624	18.3	<u>624</u>	<u>18.3</u>	623	18.4	552	20.7	<u>552</u>	<u>20.7</u>	552	20.7
450.soplex	716	11.6	721	11.6	<u>718</u>	<u>11.6</u>	640	13.0	<u>636</u>	<u>13.1</u>	633	13.2
453.povray	<u>397</u>	<u>13.4</u>	399	13.3	397	13.4	382	13.9	<u>384</u>	<u>13.8</u>	385	13.8
454.calculix	513	16.1	<u>511</u>	<u>16.1</u>	511	16.2	483	17.1	<u>483</u>	<u>17.1</u>	483	17.1
459.GemsFDTD	395	26.9	395	26.9	<u>395</u>	<u>26.9</u>	368	28.8	368	28.9	<u>368</u>	<u>28.8</u>
465.tonto	<u>674</u>	<u>14.6</u>	671	14.7	676	14.6	645	15.3	642	15.3	<u>644</u>	<u>15.3</u>
470.lbm	<u>688</u>	<u>20.0</u>	688	20.0	689	19.9	30.3	454	<u>30.4</u>	<u>452</u>	30.4	451
481.wrf	<u>449</u>	<u>24.9</u>	451	24.7	449	24.9	<u>449</u>	<u>24.9</u>	451	24.7	449	24.9
482.sphinx3	1034	18.8	1028	19.0	<u>1031</u>	<u>18.9</u>	<u>996</u>	<u>19.6</u>	997	19.5	996	19.6

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=8000 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages

cpuspeed stop was used to set the CPU frequency to its maximum.



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## General Notes

Environment variables set by runspec before the start of the run:

```
LD_LIBRARY_PATH = "/root/work/cpu2006/amd1002mc-speed-libs-revA/64:/root/work/cpu2006/amd1002mc-speed-libs-revA/32"
O64_OMP_AFFINITY_MAP = "0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31"
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
482.sphinx3: -DSPEC_CPU_LP64
```



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## 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  
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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## Peak Portability Flags (Continued)

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

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

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## Peak Optimization Flags (Continued)

410.bwaves (continued):

-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

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.20101207.html>



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You can also download the XML flags sources by saving the following links:

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<http://www.spec.org/cpu2006/flags/amd-platform-speed-revA.20101207.xml>

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

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