



# SPEC® CFP2006 Result

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## Supermicro

Supermicro A+ Server 2022TG-HIBQRF,  
AMD Opteron 6174

SPECfp®2006 = 31.0

SPECfp\_base2006 = 22.4

CPU2006 license: 001176

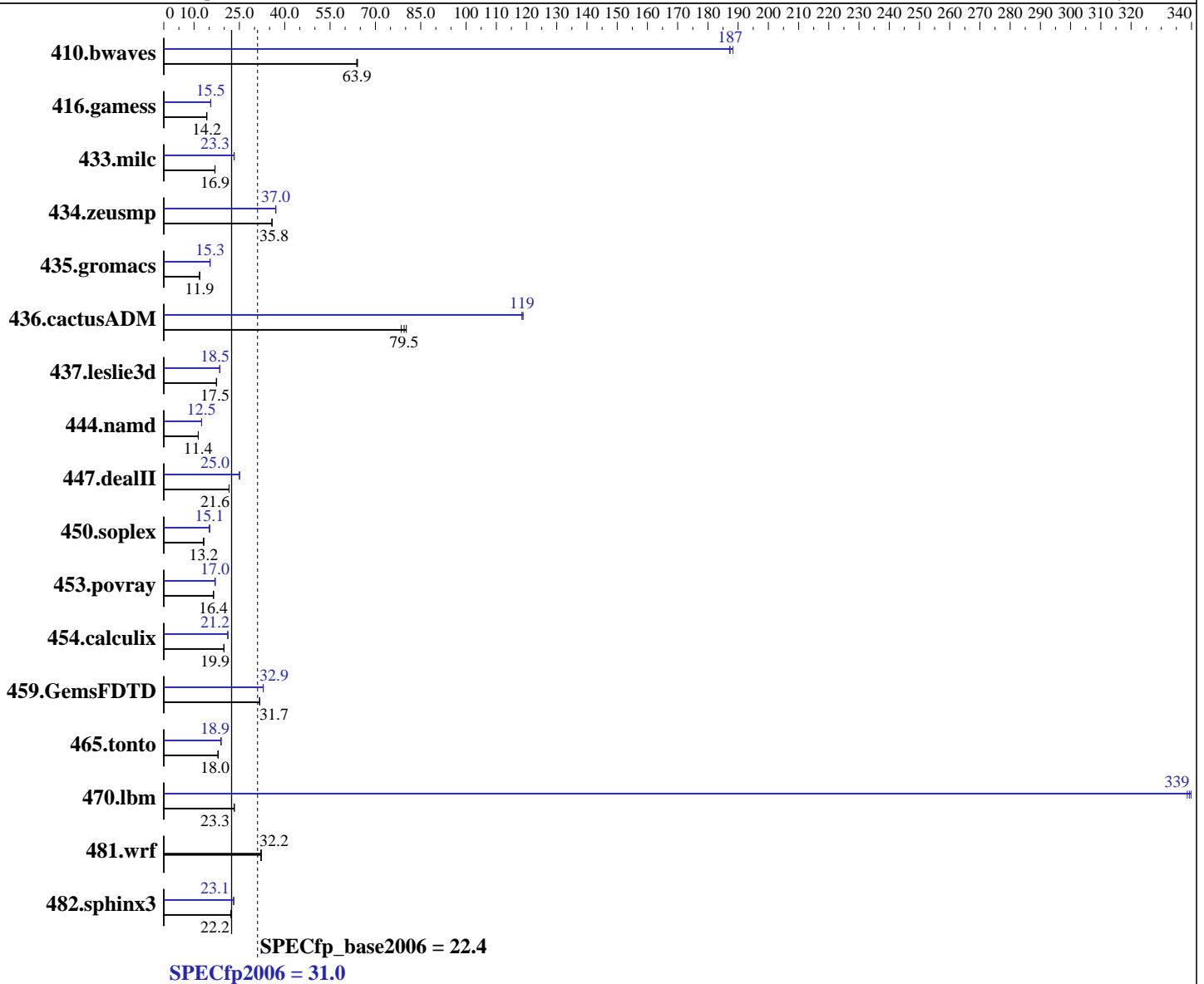
Test sponsor: Supermicro

Tested by: Supermicro

Test date: Nov-2010

Hardware Availability: Mar-2010

Software Availability: May-2010



### Hardware

CPU Name: AMD Opteron 6174  
 CPU Characteristics:  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 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

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### Software

Operating System: SUSE Linux Enterprise Server 11 SP1,  
Kernel 2.6.32.12-0.7-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

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L3 Cache: 12 MB I+D on chip per chip, 6 MB shared / 6 cores  
Other Cache: None  
Memory: 64 GB (16 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
Disk Subsystem: 1 x 500 GB SATA, 7200 RPM  
Other Hardware: None

Other Software: binutils 2.18

## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	<b><u>213</u></b>	<b><u>63.9</u></b>	212	64.1	213	63.8	72.2	188	72.6	187	<b><u>72.5</u></b>	<b><u>187</u></b>
416.gamess	1376	14.2	<b><u>1377</u></b>	<b><u>14.2</u></b>	1380	14.2	<b><u>1262</u></b>	<b><u>15.5</u></b>	1258	15.6	1263	15.5
433.milc	544	16.9	<b><u>542</u></b>	<b><u>16.9</u></b>	541	17.0	394	23.3	<b><u>394</u></b>	<b><u>23.3</u></b>	395	23.2
434.zeusmp	254	35.8	<b><u>254</u></b>	<b><u>35.8</u></b>	254	35.8	<b><u>246</u></b>	<b><u>37.0</u></b>	246	37.0	246	37.0
435.gromacs	<b><u>602</u></b>	<b><u>11.9</u></b>	602	11.9	603	11.8	467	15.3	466	15.3	<b><u>466</u></b>	<b><u>15.3</u></b>
436.cactusADM	152	78.6	149	80.3	<b><u>150</u></b>	<b><u>79.5</u></b>	101	119	101	119	<b><u>101</u></b>	<b><u>119</u></b>
437.leslie3d	541	17.4	538	17.5	<b><u>538</u></b>	<b><u>17.5</u></b>	509	18.5	506	18.6	<b><u>508</u></b>	<b><u>18.5</u></b>
444.namd	704	11.4	<b><u>703</u></b>	<b><u>11.4</u></b>	703	11.4	<b><u>642</u></b>	<b><u>12.5</u></b>	641	12.5	642	12.5
447.dealII	529	21.6	<b><u>530</u></b>	<b><u>21.6</u></b>	530	21.6	<b><u>457</u></b>	<b><u>25.0</u></b>	457	25.0	456	25.1
450.soplex	634	13.2	<b><u>634</u></b>	<b><u>13.2</u></b>	630	13.2	549	15.2	554	15.1	<b><u>551</u></b>	<b><u>15.1</u></b>
453.povray	<b><u>324</u></b>	<b><u>16.4</u></b>	323	16.5	324	16.4	<b><u>313</u></b>	<b><u>17.0</u></b>	313	17.0	313	17.0
454.calculix	416	19.8	<b><u>414</u></b>	<b><u>19.9</u></b>	413	20.0	389	21.2	<b><u>389</u></b>	<b><u>21.2</u></b>	390	21.1
459.GemsFDTD	<b><u>334</u></b>	<b><u>31.7</u></b>	334	31.7	335	31.7	323	32.9	<b><u>323</u></b>	<b><u>32.9</u></b>	322	32.9
465.tonto	545	18.1	551	17.9	<b><u>546</u></b>	<b><u>18.0</u></b>	521	18.9	<b><u>520</u></b>	<b><u>18.9</u></b>	518	19.0
470.lbm	589	23.3	590	23.3	<b><u>590</u></b>	<b><u>23.3</u></b>	<b><u>40.5</u></b>	<b><u>339</u></b>	40.4	340	40.6	339
481.wrf	348	32.1	346	32.2	<b><u>347</u></b>	<b><u>32.2</u></b>	348	32.1	346	32.2	<b><u>347</u></b>	<b><u>32.2</u></b>
482.sphinx3	879	22.2	878	22.2	<b><u>879</u></b>	<b><u>22.2</u></b>	<b><u>843</u></b>	<b><u>23.1</u></b>	844	23.1	842	23.1

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=4000 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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## General Notes

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

```
LD_LIBRARY_PATH = "/usr/cpu2006/amd1002-speed-libs-revA/64:/usr/cpu2006/amd1002-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"
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.lelie3d: -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.html>



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<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 14:31:12 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 22 December 2010.