



# SPEC<sup>®</sup> CFP2006 Result

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## Supermicro

SPECfp<sup>®</sup>2006 = 21.1

Motherboard H8QI6-F, AMD Opteron 8431

SPECfp\_base2006 = 17.3

CPU2006 license: 001176

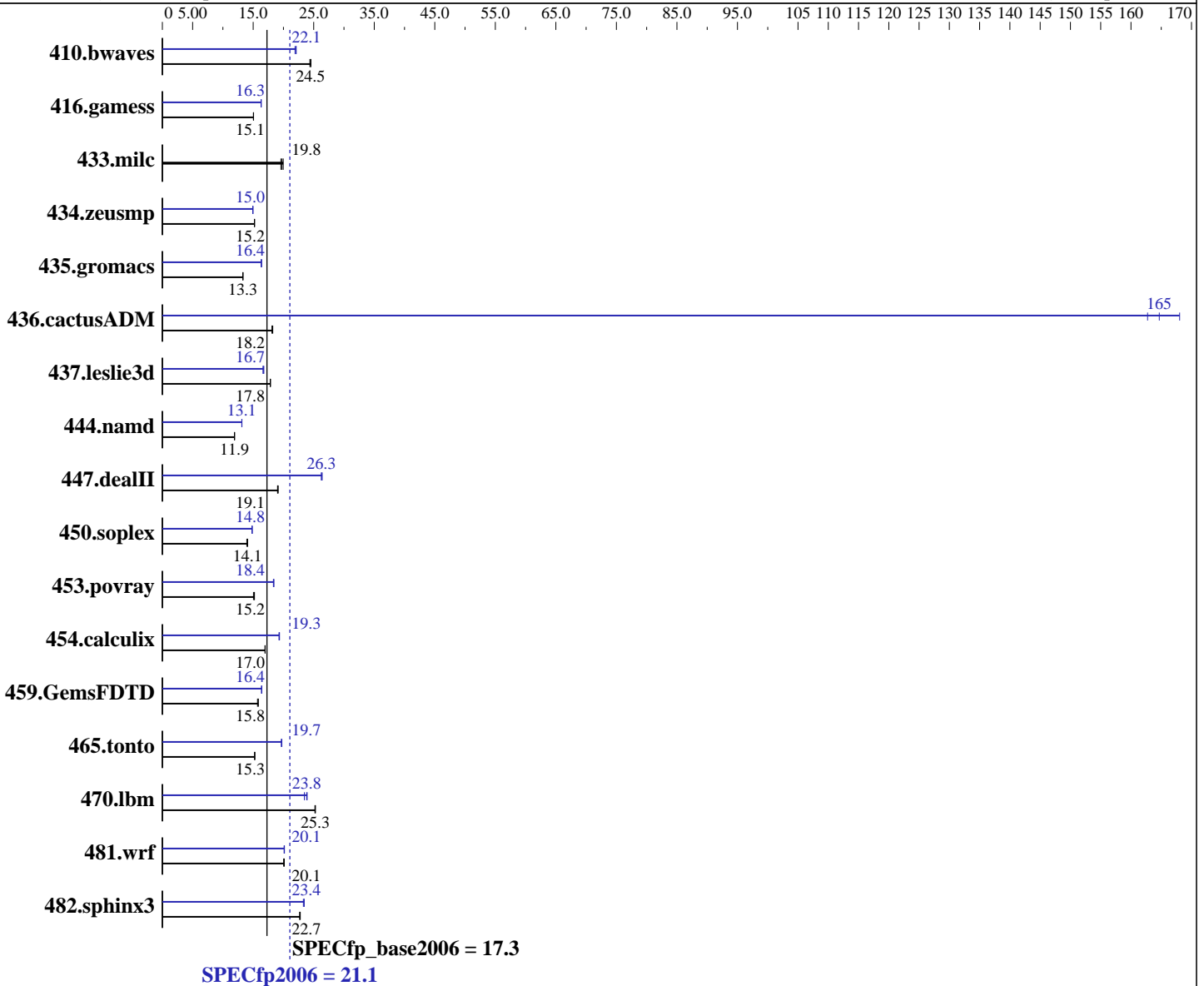
Test date: Nov-2009

Test sponsor: Supermicro

Hardware Availability: Jun-2009

Tested by: Supermicro

Software Availability: Apr-2009



### Hardware

CPU Name: AMD Opteron 8431  
 CPU Characteristics:  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 4 chips, 6 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

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### Software

Operating System: Red Hat Enterprise Linux Server release 5.4, Advanced Platform, Kernel 2.6.18-164.el5  
 Compiler: PGI Server Complete Version 8.0 x86 Open64 4.2.2 Compiler Suite (from AMD)  
 Auto Parallel: Yes  
 File System: ext3  
 System State: Run level 2 (Local multiuser without remote network)  
 Base Pointers: 64-bit

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L3 Cache: 6 MB I+D on chip per chip  
Other Cache: None  
Memory: 64 GB (16x4 GB, DDR2-800, CL5, Reg, Dual Rank)  
Disk Subsystem: 1 x 500 GB SATA, 7200 RPM  
Other Hardware: None

Peak Pointers: 32/64-bit  
Other Software: binutils 2.18

## Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	554	24.5	558	24.4	<b>555</b>	<b>24.5</b>	615	22.1	<b>616</b>	<b>22.1</b>	620	21.9
416.gamess	1302	15.0	1300	15.1	<b>1301</b>	<b>15.1</b>	1200	16.3	1199	16.3	<b>1200</b>	<b>16.3</b>
433.milc	<b>465</b>	<b>19.8</b>	460	20.0	469	19.6	<b>465</b>	<b>19.8</b>	460	20.0	469	19.6
434.zeusmp	598	15.2	598	15.2	<b>598</b>	<b>15.2</b>	<b>608</b>	<b>15.0</b>	608	15.0	609	14.9
435.gromacs	<b>537</b>	<b>13.3</b>	537	13.3	536	13.3	437	16.3	<b>437</b>	<b>16.4</b>	436	16.4
436.cactusADM	660	18.1	<b>658</b>	<b>18.2</b>	655	18.2	71.1	168	<b>72.6</b>	<b>165</b>	73.4	163
437.leslie3d	526	17.9	528	17.8	<b>528</b>	<b>17.8</b>	<b>563</b>	<b>16.7</b>	561	16.8	565	16.6
444.namd	674	11.9	<b>673</b>	<b>11.9</b>	672	11.9	610	13.1	611	13.1	<b>611</b>	<b>13.1</b>
447.dealII	601	19.0	598	19.1	<b>600</b>	<b>19.1</b>	433	26.4	<b>435</b>	<b>26.3</b>	435	26.3
450.soplex	592	14.1	<b>593</b>	<b>14.1</b>	598	13.9	563	14.8	<b>563</b>	<b>14.8</b>	562	14.8
453.povray	354	15.0	350	15.2	<b>351</b>	<b>15.2</b>	289	18.4	290	18.3	<b>289</b>	<b>18.4</b>
454.calculix	<b>486</b>	<b>17.0</b>	486	17.0	486	17.0	428	19.3	<b>427</b>	<b>19.3</b>	426	19.4
459.GemsFDTD	675	15.7	670	15.8	<b>670</b>	<b>15.8</b>	<b>647</b>	<b>16.4</b>	648	16.4	646	16.4
465.tonto	644	15.3	646	15.2	<b>645</b>	<b>15.3</b>	501	19.7	498	19.7	<b>499</b>	<b>19.7</b>
470.lbm	543	25.3	<b>544</b>	<b>25.3</b>	545	25.2	586	23.5	<b>577</b>	<b>23.8</b>	574	23.9
481.wrf	<b>557</b>	<b>20.1</b>	557	20.1	554	20.2	555	20.1	554	20.2	<b>555</b>	<b>20.1</b>
482.sphinx3	855	22.8	859	22.7	<b>859</b>	<b>22.7</b>	837	23.3	832	23.4	<b>833</b>	<b>23.4</b>

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=10800 in /etc/sysctl.conf  
mount -t hugetlbfs nodev /mnt/hugepages



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## General Notes

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

HUGETLB\_LIMIT = "450"

LD\_LIBRARY\_PATH = "/spec/amd0905is-libs/64:/spec/amd0905is-libs/32"

NCPUS = "24"

PGI\_HUGE\_PAGES = "450"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at <http://developer.amd.com/cpu/open64>

System was tested in an open environment.

To ensure system stability, a 1000W (minimum) ATX power supply [ 8-pin & 8-pin (+12V) and 24-pin are required ]

Product description can be obtained at:

<http://www.supermicro.com/Aplus/motherboard/Opteron8000/SR56x0/H8QI6-F.cfm>

## Base Compiler Invocation

C benchmarks:

pgcc

C++ benchmarks:

pgcpp

Fortran benchmarks:

pgf95

Benchmarks using both Fortran and C:

pgcc pgf95

## 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 -Mnomain  
 436.cactusADM: -DSPEC\_CPU\_LP64 -Mnomain  
 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 -Mnomain  
 459.GemsFDTD: -DSPEC\_CPU\_LP64  
 465.tonto: -DSPEC\_CPU\_LP64  
 470.lbm: -DSPEC\_CPU\_LP64

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## Base Portability Flags (Continued)

481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
482.sphinx3: -DSPEC\_CPU\_LP64

## Base Optimization Flags

C benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp shanghai-64 -Bstatic\_pgi

C++ benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed --zc\_eh -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

Fortran benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mvect=short -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

Benchmarks using both Fortran and C:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp shanghai-64 -Mvect=short -Bstatic\_pgi

## Base Other Flags

C benchmarks:

-Mipa=jobs:4

C++ benchmarks:

-Mipa=jobs:4

Fortran benchmarks:

-Mipa=jobs:4

Benchmarks using both Fortran and C:

-Mipa=jobs:4

## Peak Compiler Invocation

C benchmarks:

pgcc

C++ benchmarks (except as noted below):

openCC

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## Peak Compiler Invocation (Continued)

444.namd: pgcpp

Fortran benchmarks (except as noted below):

openf95

410.bwaves: pgf95

434.zeusmp: pgf95

437.leslie3d: pgf95

Benchmarks using both Fortran and C (except as noted below):

pgcc pgf95

435.gromacs: 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 -Mnomain  
 437.leslie3d: -DSPEC\_CPU\_LP64  
 444.namd: -DSPEC\_CPU\_LP64  
 453.povray: -DSPEC\_CPU\_LP64  
 454.calculix: -DSPEC\_CPU\_LP64 -Mnomain  
 459.GemsFDTD: -DSPEC\_CPU\_LP64  
 465.tonto: -DSPEC\_CPU\_LP64  
 470.lbm: -DSPEC\_CPU\_LP64  
 481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
 482.sphinx3: -DSPEC\_CPU\_LP64

## Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mloop32  
-Mfprelaxed -Mipa=fast -Mipa=inline -tp shanghai-64  
-Bstatic\_pgi

482.sphinx3: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse  
-Mfprelaxed -Msmartalloc -tp shanghai-64 -Bstatic\_pgi

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## Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)  
 -Mipa=inline(pass 2) -fastsse -Munroll=n:4 -Munroll=m:8  
 -Msmartalloc=huge -Mnodepchk -Mfprelaxed --zc\_eh  
 -tp shanghai-64 -Bstatic\_pgi

447.dealIII: -march=barcelona -Ofast -static -INLINE:aggressive=on  
 -LNO:opt=0 -Wf,-fno-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 -OPT:malloc\_alg=1  
 -CG:load\_exe=0 -fno-exceptions -m32 -HP:bdt=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: -fastsse -Msmartalloc -Mprefetch=nta -Mfprelaxed  
 -Mipa=fast -Mipa=inline -tp shanghai-64 -Bstatic\_pgi

416.gamess: -march=barcelona -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -O2 -OPT:Ofast -OPT:ro=3  
 -OPT:unroll\_size=256 -HP:bdt=2m:heap=2m

434.zeusmp: -fastsse -Mfprelaxed -Mprefetch=distance:8 -Mprefetch=t0  
 -Msmartalloc=huge -Msmartalloc=hugebss -Mipa=fast  
 -Mipa=inline -tp shanghai-64 -Bstatic\_pgi

437.leslie3d: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)  
 -Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse  
 -Mvect=fuse -Msmartalloc=huge -Mprefetch=distance:8  
 -Mprefetch=t0 -Mfprelaxed -tp shanghai-64 -Bstatic\_pgi

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2  
 -LNO:prefetch\_ahead=1 -CG:load\_exe=0 -HP

465.tonto: -march=barcelona -Ofast -OPT:alias=no\_f90\_pointer\_alias  
 -LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525 -HP

Benchmarks using both Fortran and C:

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## Peak Optimization Flags (Continued)

435.gromacs: -march=barcelona -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m

436.cactusADM: -fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -Mipa=fast  
-Mipa=inline -tp shanghai-64 -Bstatic\_pgi

454.calculix: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse  
-Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre  
-Mfprelaxed -tp shanghai-64 -Bstatic\_pgi

481.wrf: -fastsse -Mvect=noaltcode -Msmartalloc=huge  
-Mprefetch=distance:8 -Mfprelaxed -tp shanghai-64  
-Bstatic\_pgi

## Peak Other Flags

C benchmarks:

-Mipa=jobs:4(pass 2)

C++ benchmarks:

444.namd: -Mipa=jobs:4(pass 2)

Fortran benchmarks:

410.bwaves: -Mipa=jobs:4

434.zeusmp: -Mipa=jobs:4

437.leslie3d: -Mipa=jobs:4(pass 2)

Benchmarks using both Fortran and C:

436.cactusADM: -Mipa=jobs:4

454.calculix: -Mipa=jobs:4(pass 2)

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/amd-platform.20090710.html>

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags-revA.html](http://www.spec.org/cpu2006/flags/pgi80_linux_flags-revA.html)

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.html>

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

<http://www.spec.org/cpu2006/flags/amd-platform.20090710.xml>

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags-revA.xml](http://www.spec.org/cpu2006/flags/pgi80_linux_flags-revA.xml)

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

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