



# SPEC<sup>®</sup> CFP2006 Result

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## Supermicro

SPECfp<sup>®</sup>2006 = 23.3

Motherboard H8QM3-2, AMD Opteron 8439 SE

SPECfp\_base2006 = 19.1

CPU2006 license: 001176

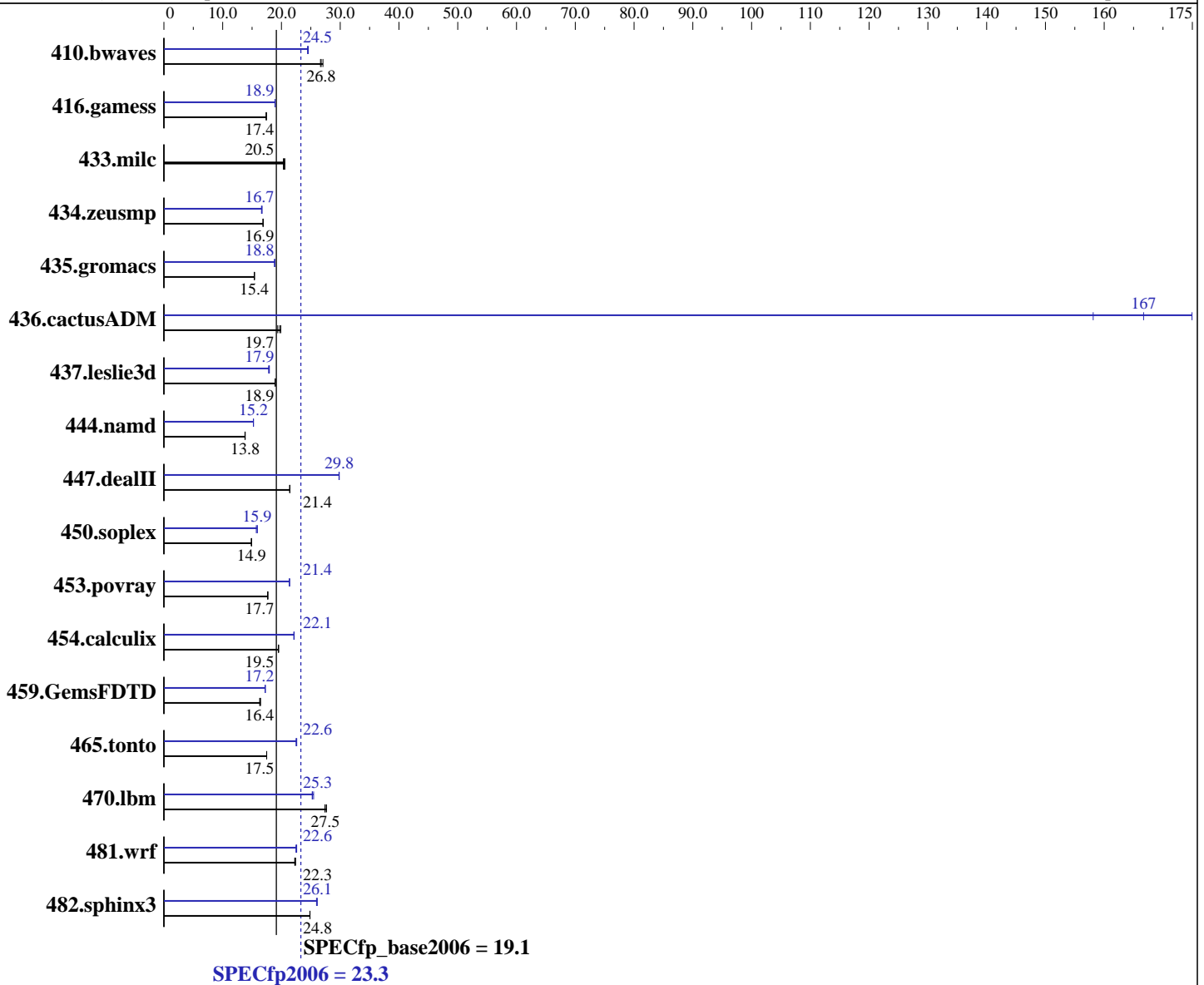
Test date: Jul-2009

Test sponsor: Supermicro

Hardware Availability: Jun-2009

Tested by: Supermicro

Software Availability: Apr-2009



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### Hardware

CPU Name: AMD Opteron 8439 SE  
 CPU Characteristics:  
 CPU MHz: 2800  
 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

Continued on next page

### Software

Operating System: Red Hat Enterprise Linux Server release 5.3, Advanced Platform, Kernel 2.6.18-128.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	502	27.1	<b>508</b>	<b>26.8</b>	510	26.6	553	24.6	<b>555</b>	<b>24.5</b>	556	24.5
416.gamess	1123	17.4	1126	17.4	<b>1123</b>	<b>17.4</b>	1034	18.9	<b>1035</b>	<b>18.9</b>	1036	18.9
433.milc	446	20.6	452	20.3	<b>448</b>	<b>20.5</b>	446	20.6	452	20.3	<b>448</b>	<b>20.5</b>
434.zeusmp	<b>539</b>	<b>16.9</b>	540	16.9	539	16.9	545	16.7	548	16.6	<b>546</b>	<b>16.7</b>
435.gromacs	<b>464</b>	<b>15.4</b>	463	15.4	464	15.4	379	18.8	<b>379</b>	<b>18.8</b>	378	18.9
436.cactusADM	617	19.4	601	19.9	<b>607</b>	<b>19.7</b>	<b>71.7</b>	<b>167</b>	75.6	158	68.3	175
437.leslie3d	497	18.9	496	19.0	<b>497</b>	<b>18.9</b>	<b>524</b>	<b>17.9</b>	528	17.8	524	17.9
444.namd	<b>580</b>	<b>13.8</b>	580	13.8	582	13.8	527	15.2	526	15.2	<b>527</b>	<b>15.2</b>
447.dealII	<b>534</b>	<b>21.4</b>	534	21.4	535	21.4	384	29.8	<b>384</b>	<b>29.8</b>	384	29.8
450.soplex	561	14.9	559	14.9	<b>559</b>	<b>14.9</b>	531	15.7	525	15.9	<b>525</b>	<b>15.9</b>
453.povray	<b>301</b>	<b>17.7</b>	302	17.6	301	17.7	249	21.3	<b>249</b>	<b>21.4</b>	249	21.4
454.calculix	423	19.5	423	19.5	<b>423</b>	<b>19.5</b>	372	22.2	<b>373</b>	<b>22.1</b>	373	22.1
459.GemsFDTD	645	16.4	<b>647</b>	<b>16.4</b>	651	16.3	<b>616</b>	<b>17.2</b>	615	17.3	616	17.2
465.tonto	563	17.5	<b>563</b>	<b>17.5</b>	563	17.5	438	22.5	435	22.6	<b>436</b>	<b>22.6</b>
470.lbm	502	27.4	496	27.7	<b>500</b>	<b>27.5</b>	<b>544</b>	<b>25.3</b>	544	25.2	539	25.5
481.wrf	<b>501</b>	<b>22.3</b>	502	22.3	498	22.4	<b>495</b>	<b>22.6</b>	497	22.5	494	22.6
482.sphinx3	784	24.9	<b>784</b>	<b>24.8</b>	785	24.8	747	26.1	<b>748</b>	<b>26.1</b>	751	26.0

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 1200W (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/MCP55/H8QM3-2.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: -Mphi=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: -Mphi(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.dealII: -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: -Mphi=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.20090728.html>

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090710.html](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.html)

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

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

<http://www.spec.org/cpu2006/flags/amd-platform.20090728.xml>

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090710.xml](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090710.xml)

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

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