



# SPEC® CFP2006 Result

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## Supermicro

SPECfp®2006 = 21.7

Motherboard H8DA3-2, AMD Opteron 2439 SE

SPECfp\_base2006 = 17.6

CPU2006 license: 001176

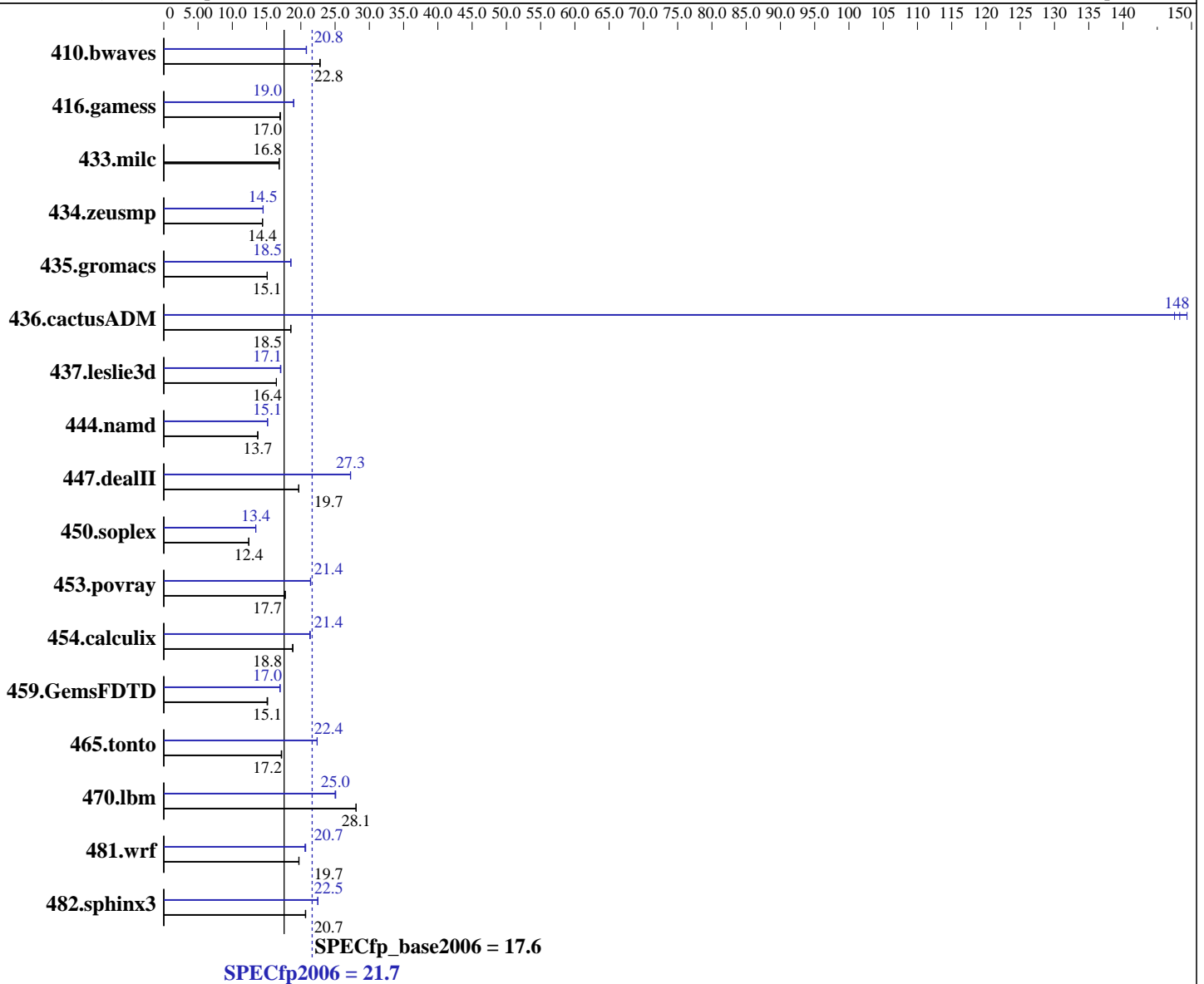
Test date: Aug-2009

Test sponsor: Supermicro

Hardware Availability: Jun-2009

Tested by: Supermicro

Software Availability: Apr-2009



### Hardware

CPU Name: AMD Opteron 2439 SE  
 CPU Characteristics:  
 CPU MHz: 2800  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 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

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: 32 GB (8x4 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	<b>597</b>	<b>22.8</b>	595	22.8	597	22.8	654	20.8	652	20.8	<b>653</b>	<b>20.8</b>
416.gamess	1150	17.0	1154	17.0	<b>1153</b>	<b>17.0</b>	1034	18.9	<b>1032</b>	<b>19.0</b>	1032	19.0
433.milc	545	16.9	546	16.8	<b>545</b>	<b>16.8</b>	545	16.9	546	16.8	<b>545</b>	<b>16.8</b>
434.zeusmp	631	14.4	632	14.4	<b>632</b>	<b>14.4</b>	629	14.5	627	14.5	<b>628</b>	<b>14.5</b>
435.gromacs	473	15.1	<b>473</b>	<b>15.1</b>	473	15.1	<b>385</b>	<b>18.5</b>	385	18.6	385	18.5
436.cactusADM	<b>644</b>	<b>18.5</b>	644	18.5	645	18.5	<b>80.6</b>	<b>148</b>	81.0	148	80.0	149
437.leslie3d	572	16.4	572	16.4	<b>572</b>	<b>16.4</b>	552	17.0	550	17.1	<b>551</b>	<b>17.1</b>
444.namd	584	13.7	585	13.7	<b>585</b>	<b>13.7</b>	529	15.1	<b>529</b>	<b>15.1</b>	530	15.1
447.dealII	580	19.7	<b>581</b>	<b>19.7</b>	581	19.7	420	27.3	<b>420</b>	<b>27.3</b>	420	27.2
450.soplex	<b>672</b>	<b>12.4</b>	673	12.4	672	12.4	621	13.4	621	13.4	<b>621</b>	<b>13.4</b>
453.povray	302	17.6	300	17.7	<b>300</b>	<b>17.7</b>	<b>248</b>	<b>21.4</b>	249	21.4	248	21.4
454.calculix	439	18.8	<b>438</b>	<b>18.8</b>	437	18.9	386	21.4	<b>386</b>	<b>21.4</b>	387	21.3
459.GemsFDTD	<b>701</b>	<b>15.1</b>	701	15.1	704	15.1	626	17.0	<b>625</b>	<b>17.0</b>	625	17.0
465.tonto	572	17.2	574	17.1	<b>572</b>	<b>17.2</b>	<b>440</b>	<b>22.4</b>	439	22.4	440	22.4
470.lbm	490	28.0	<b>490</b>	<b>28.1</b>	489	28.1	<b>549</b>	<b>25.0</b>	549	25.0	547	25.1
481.wrf	567	19.7	566	19.7	<b>566</b>	<b>19.7</b>	542	20.6	539	20.7	<b>540</b>	<b>20.7</b>
482.sphinx3	944	20.7	<b>942</b>	<b>20.7</b>	941	20.7	868	22.5	866	22.5	<b>867</b>	<b>22.5</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=5400 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 = "12"

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 550W (minimum) ATX power supply [ 4-pin (+12V), 8-pin (+12V) and 24-pin are required ]

Product description can be obtained at:

<http://www.supermicro.com/Aplus/motherboard/Opteron2000/MCP55/H8DA3-2.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: -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: -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.20090710.html>

[http://www.spec.org/cpu2006/flags/pgi80\\_linux\\_flags.20090914.html](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090914.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.20090914.xml](http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090914.xml)

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

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