



# SPEC<sup>®</sup> CFP2006 Result

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## Supermicro

SPECfp<sup>®</sup>\_rate2006 = 287

Motherboard H8QM8-2, AMD Opteron 8439 SE

SPECfp\_rate\_base2006 = 261

CPU2006 license: 001176

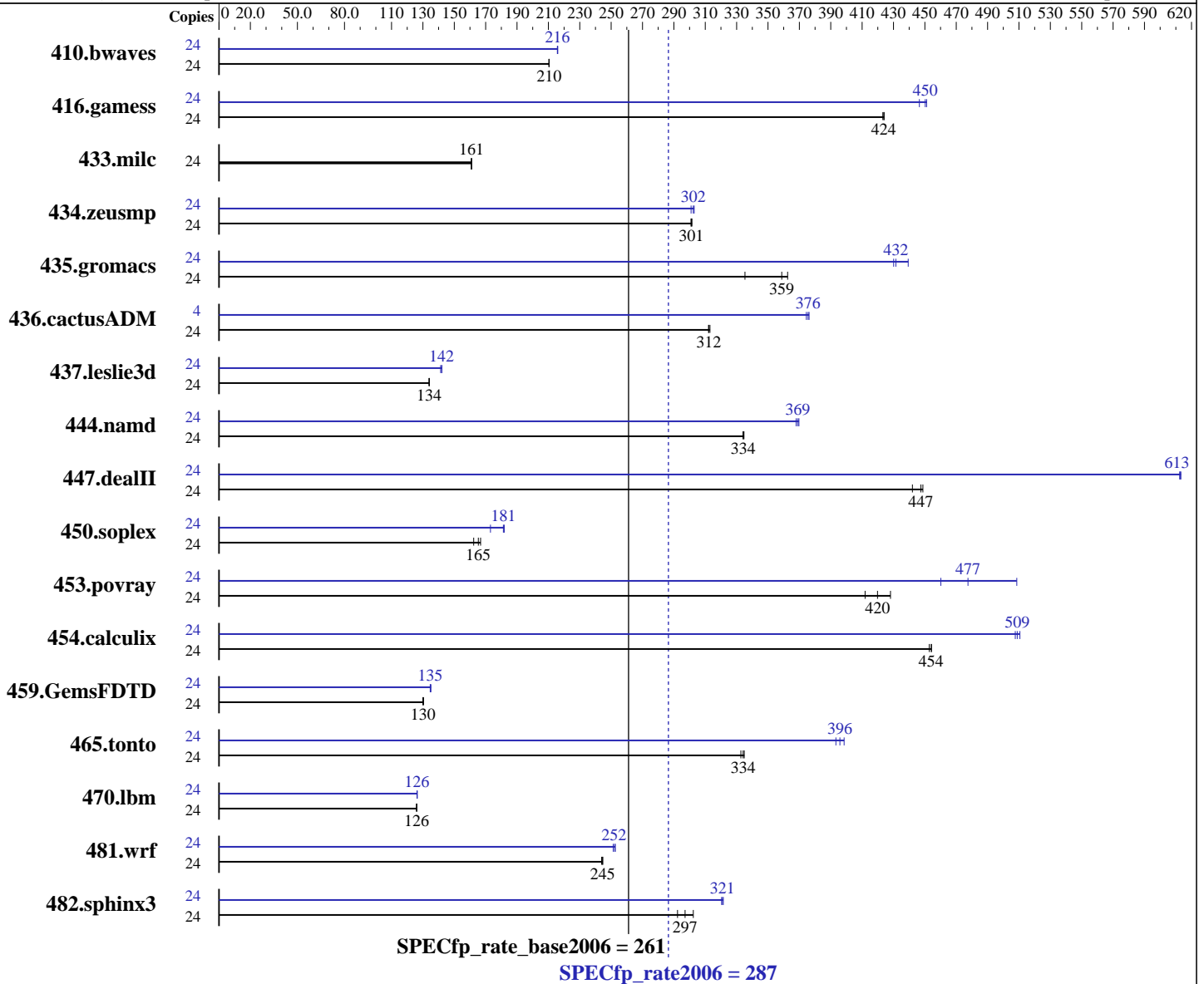
Test date: Jul-2009

Test sponsor: Supermicro

Hardware Availability: Jun-2009

Tested by: Supermicro

Software Availability: Apr-2009



### 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24	<b><u>1550</u></b>	<b><u>210</u></b>	1551	210	1550	210	24	1512	216	<b><u>1511</u></b>	<b><u>216</u></b>	1510	216
416.gamess	24	1108	424	<b><u>1109</u></b>	<b><u>424</u></b>	1110	423	24	1042	451	<b><u>1044</u></b>	<b><u>450</u></b>	1052	447
433.milc	24	<b><u>1369</u></b>	<b><u>161</u></b>	1368	161	1369	161	24	<b><u>1369</u></b>	<b><u>161</u></b>	1368	161	1369	161
434.zeusmp	24	724	302	726	301	<b><u>725</u></b>	<b><u>301</u></b>	24	726	301	721	303	<b><u>722</u></b>	<b><u>302</u></b>
435.gromacs	24	473	363	<b><u>478</u></b>	<b><u>359</u></b>	511	335	24	<b><u>397</u></b>	<b><u>432</u></b>	390	439	398	430
436.cactusADM	24	916	313	919	312	<b><u>919</u></b>	<b><u>312</u></b>	4	128	374	<b><u>127</u></b>	<b><u>376</u></b>	127	376
437.leslie3d	24	<b><u>1683</u></b>	<b><u>134</u></b>	1685	134	1683	134	24	1597	141	<b><u>1589</u></b>	<b><u>142</u></b>	1588	142
444.namd	24	576	334	575	335	<b><u>576</u></b>	<b><u>334</u></b>	24	523	368	<b><u>522</u></b>	<b><u>369</u></b>	521	370
447.dealII	24	612	449	<b><u>614</u></b>	<b><u>447</u></b>	621	442	24	<b><u>448</u></b>	<b><u>613</u></b>	448	612	448	613
450.soplex	24	1233	162	<b><u>1211</u></b>	<b><u>165</u></b>	1200	167	24	1157	173	<b><u>1104</u></b>	<b><u>181</u></b>	1101	182
453.povray	24	298	428	<b><u>304</u></b>	<b><u>420</u></b>	310	412	24	277	460	<b><u>267</u></b>	<b><u>477</u></b>	251	509
454.calculix	24	<b><u>436</u></b>	<b><u>454</u></b>	436	454	437	453	24	388	511	390	508	<b><u>389</u></b>	<b><u>509</u></b>
459.GemsFDTD	24	<b><u>1956</u></b>	<b><u>130</u></b>	1959	130	1953	130	24	<b><u>1890</u></b>	<b><u>135</u></b>	1891	135	1884	135
465.tonto	24	<b><u>707</u></b>	<b><u>334</u></b>	710	333	705	335	24	600	393	<b><u>597</u></b>	<b><u>396</u></b>	593	399
470.lbm	24	2616	126	2618	126	<b><u>2617</u></b>	<b><u>126</u></b>	24	2612	126	<b><u>2611</u></b>	<b><u>126</u></b>	2610	126
481.wrf	24	<b><u>1096</u></b>	<b><u>245</u></b>	1096	245	1099	244	24	1067	251	1061	253	<b><u>1063</u></b>	<b><u>252</u></b>
482.sphinx3	24	<b><u>1574</u></b>	<b><u>297</u></b>	1600	292	1547	302	24	1455	322	<b><u>1457</u></b>	<b><u>321</u></b>	1460	320

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 = "6"  
PGI\_HUGE\_PAGES = "450"

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

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/MCP55/H8QM8-2.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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Software Availability: Apr-2009

## 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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