# SPEC® CFP2006 Result

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## Supermicro

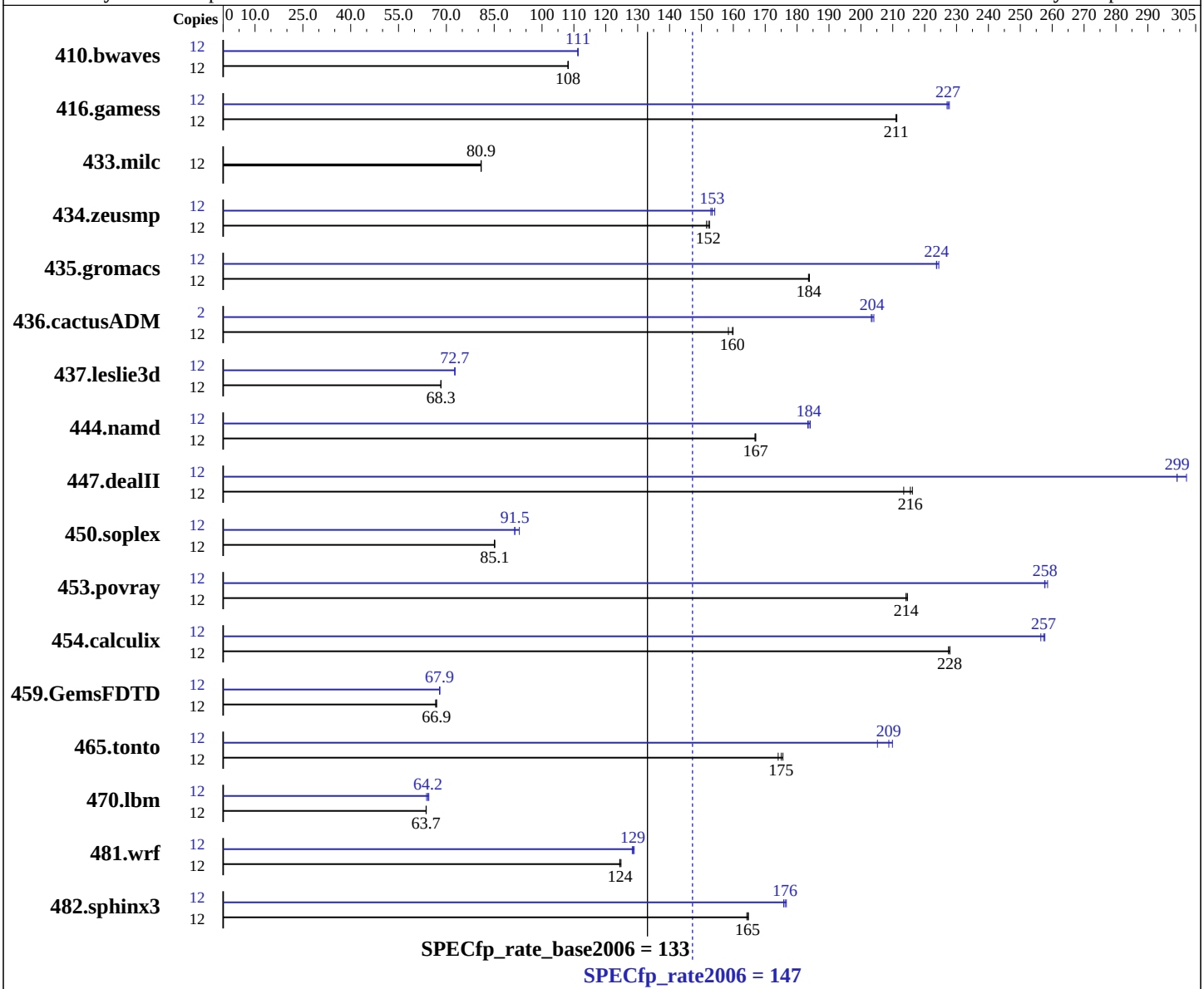
Motherboard H8DA3-2, AMD Opteron 2439 SE

SPECfp®_rate2006 = 147

SPECfp_rate_base2006 = 133

**CPU2006 license:** 001176
**Test sponsor:** Supermicro
**Tested by:** Supermicro

**Test date:** Aug-2009
**Hardware Availability:** Jun-2009
**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 |

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## 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 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 12 | 1506 | 108 | 1508 | 108 | **1507** | **108** | 12 | **1465** | **111** | 1465 | 111 | 1467 | 111 |
| 416.gamess | 12 | 1113 | 211 | **1113** | **211** | 1112 | 211 | 12 | 1035 | 227 | 1032 | 228 | **1034** | **227** |
| 433.milc | 12 | **1362** | **80.9** | 1362 | 80.9 | 1361 | 80.9 | 12 | **1362** | **80.9** | 1362 | 80.9 | 1361 | 80.9 |
| 434.zeusmp | 12 | 720 | 152 | 716 | 153 | **718** | **152** | 12 | 708 | 154 | 714 | 153 | **712** | **153** |
| 435.gromacs | 12 | 467 | 184 | 466 | 184 | **466** | **184** | 12 | 382 | 224 | 383 | 224 | **383** | **224** |
| 436.cactusADM | 12 | 905 | 158 | 897 | 160 | **898** | **160** | 2 | 118 | 203 | 117 | 204 | **117** | **204** |
| 437.leslie3d | 12 | **1651** | **68.3** | 1652 | 68.3 | 1651 | 68.3 | 12 | 1552 | 72.7 | 1552 | 72.7 | **1552** | **72.7** |
| 444.namd | 12 | 577 | 167 | **576** | **167** | 576 | 167 | 12 | 525 | 183 | **524** | **184** | 523 | 184 |
| 447.dealII | 12 | 635 | 216 | 643 | 213 | **637** | **216** | 12 | 459 | 299 | 454 | 302 | **459** | **299** |
| 450.soplex | 12 | 1175 | 85.2 | 1177 | 85.0 | **1176** | **85.1** | 12 | **1094** | **91.5** | 1095 | 91.4 | 1077 | 92.9 |
| 453.povray | 12 | 297 | 215 | **298** | **214** | 298 | 214 | 12 | 248 | 258 | **248** | **258** | 247 | 259 |
| 454.calculix | 12 | 434 | 228 | 435 | 227 | **435** | **228** | 12 | 384 | 258 | 386 | 256 | **385** | **257** |
| 459.GemsFDTD | 12 | **1903** | **66.9** | 1902 | 66.9 | 1911 | 66.6 | 12 | 1873 | 68.0 | 1877 | 67.8 | **1875** | **67.9** |
| 465.tonto | 12 | **675** | **175** | 678 | 174 | 673 | 176 | 12 | 563 | 210 | 575 | 205 | **566** | **209** |
| 470.lbm | 12 | **2590** | **63.7** | 2588 | 63.7 | 2591 | 63.6 | 12 | 2556 | 64.5 | 2585 | 63.8 | **2568** | **64.2** |
| 481.wrf | 12 | **1077** | **124** | 1078 | 124 | 1074 | 125 | 12 | 1045 | 128 | 1040 | 129 | **1042** | **129** |
| 482.sphinx3 | 12 | 1420 | 165 | **1421** | **165** | 1424 | 164 | 12 | **1327** | **176** | 1324 | 177 | 1330 | 176 |

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
```

## 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
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: -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.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: -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:

Continued on next page

# 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: `-Mpfi=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/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/x86-open64-4.2.2-flags-revE.xml

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