# SPEC® CFP2006 Result

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## Supermicro

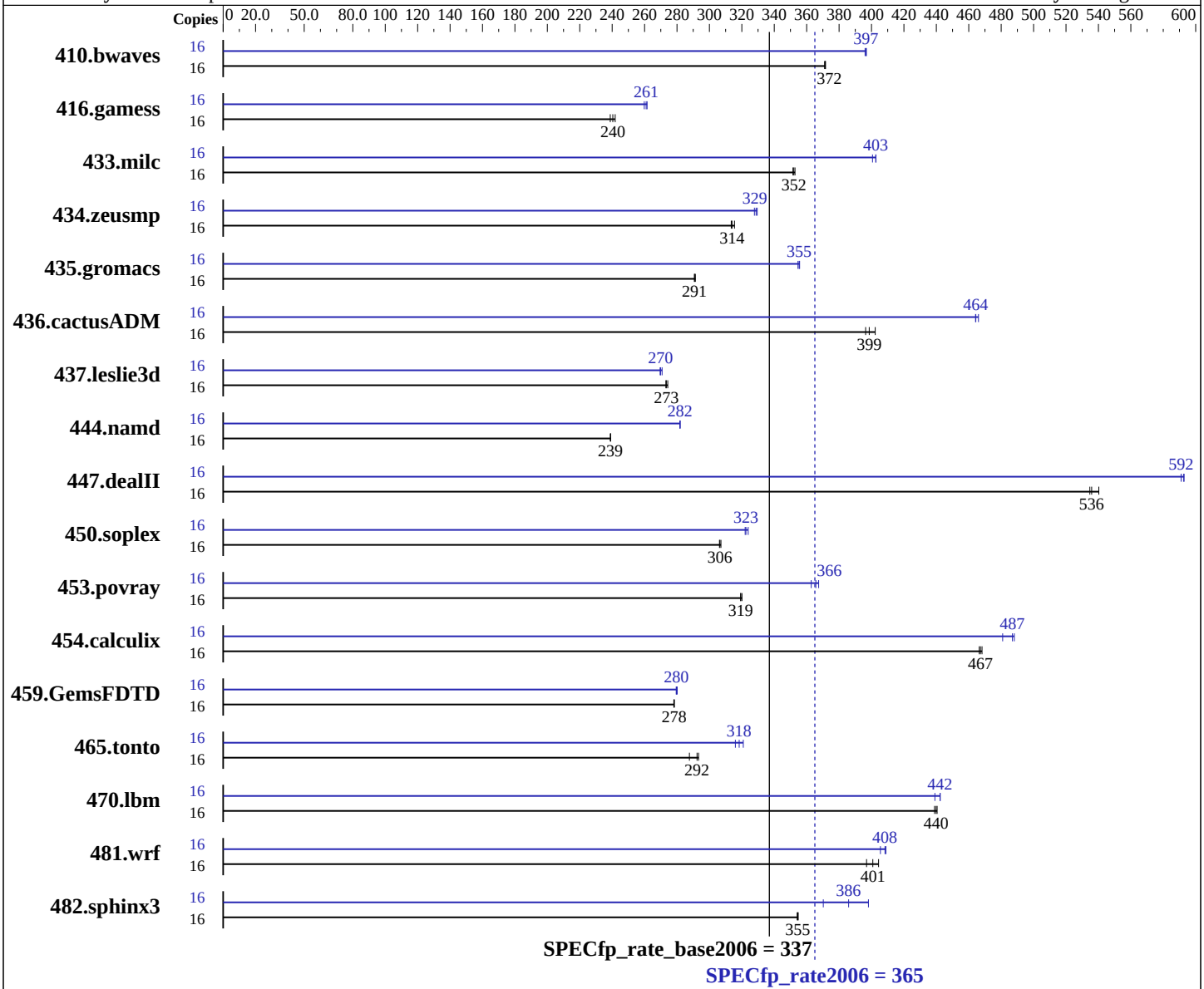
Supermicro Processor Blade SBA-7142G-T4 (BHQGE, Opteron 6308)
AMD Opteron 6308

**SPECfp®_rate2006 = 365**

**SPECfp_rate_base2006 = 337**

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

**Test date:** Oct-2012
**Hardware Availability:** Nov-2012
**Software Availability:** Aug-2012




## Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 6308 |
| CPU Characteristics: | |
| CPU MHz: | 3500 |
| FPU: | Integrated |
| CPU(s) enabled: | 16 cores, 4 chips, 4 cores/chip |
| CPU(s) orderable: | 2,4 chips |

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## Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 6.2, Kernel 2.6.32-220.el6.x86_64 |
| Compiler: | C/C++/Fortran: Version 4.5.2 of x86 Open64 Compiler Suite (from AMD) |
| Auto Parallel: | No |
| File System: | ext3 |
| System State: | Run level 3 (Full multiuser with network) |
| Base Pointers: | 64-bit |
| Peak Pointers: | 32/64-bit |

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**Software Availability:** Aug-2012

| | |
|---|---|
| Primary Cache: | 128 KB I on chip per chip, 64 KB I shared / 2 cores; 16 KB D on chip per core |
| Secondary Cache: | 4 MB I+D on chip per chip, 2 MB shared / 2 cores |
| L3 Cache: | 16 MB I+D on chip per chip, 8 MB shared / 2 cores |
| Other Cache: | None |
| Memory: | 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC) |
| Disk Subsystem: | 1 x 500 GB SATA, 7200 RPM |
| Other Hardware: | None |

Other Software: None

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 16 | **585** | **372** | 585 | 372 | 586 | 371 | 16 | 548 | 397 | 549 | 396 | **548** | **397** |
| 416.gamess | 16 | **1303** | **240** | 1295 | 242 | 1312 | 239 | 16 | 1198 | 262 | **1200** | **261** | 1206 | 260 |
| 433.milc | 16 | 416 | 353 | **417** | **352** | 418 | 352 | 16 | 365 | 403 | 367 | 401 | **365** | **403** |
| 434.zeusmp | 16 | 462 | 315 | **464** | **314** | 464 | 313 | 16 | 444 | 328 | 442 | 329 | **443** | **329** |
| 435.gromacs | 16 | **393** | **291** | 393 | 291 | 392 | 291 | 16 | 321 | 356 | **321** | **355** | 322 | 355 |
| 436.cactusADM | 16 | 475 | 402 | **480** | **399** | 482 | 396 | 16 | 412 | 464 | 410 | 466 | **412** | **464** |
| 437.leslie3d | 16 | 551 | 273 | **550** | **273** | 548 | 274 | 16 | 558 | 270 | 555 | 271 | **557** | **270** |
| 444.namd | 16 | **537** | **239** | 537 | 239 | 537 | 239 | 16 | **455** | **282** | 455 | 282 | 455 | 282 |
| 447.dealII | 16 | 339 | 540 | 342 | 535 | **342** | **536** | 16 | **309** | **592** | 310 | 591 | 309 | 593 |
| 450.soplex | 16 | 435 | 307 | 436 | 306 | **435** | **306** | 16 | 414 | 322 | 412 | 324 | **414** | **323** |
| 453.povray | 16 | **267** | **319** | 267 | 319 | 266 | 320 | 16 | **233** | **366** | 235 | 363 | 232 | 367 |
| 454.calculix | 16 | 282 | 468 | 283 | 466 | **283** | **467** | 16 | **271** | **487** | 270 | 488 | 274 | 481 |
| 459.GemsFDTD | 16 | 611 | 278 | 610 | 278 | **610** | **278** | 16 | 607 | 279 | 606 | 280 | **607** | **280** |
| 465.tonto | 16 | 547 | 288 | **539** | **292** | 537 | 293 | 16 | 498 | 316 | 491 | 321 | **495** | **318** |
| 470.lbm | 16 | **500** | **440** | 501 | 439 | 499 | 440 | 16 | 501 | 439 | 497 | 442 | **497** | **442** |
| 481.wrf | 16 | **446** | **401** | 450 | 397 | 442 | 404 | 16 | 441 | 405 | **438** | **408** | 437 | 409 |
| 482.sphinx3 | 16 | 879 | 355 | 881 | 354 | **880** | **355** | 16 | 783 | 398 | **808** | **386** | 842 | 370 |

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 transparent_hugepage=never as a boot parameter in /boot/grub/menu.lst
```

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## Operating System Notes (Continued)

```
Set vm/nr_hugepages=14336 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 = "896"
LD_LIBRARY_PATH = "/home/spec/amd1206-rate-libs-revA/32:/home/spec/amd1206-rate-libs-revA/64"

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

Binaries were compiled on a system with 2x AMD Opteron 6386SE chips + 128GB Memory using RHEL 6.3
```

## Base Compiler Invocation

C benchmarks:
`opencc`

C++ benchmarks:
`openCC`

Fortran benchmarks:
`openf95`

Benchmarks using both Fortran and C:
`opencc openf95`

## 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`
436.cactusADM: `-DSPEC_CPU_LP64 -fno-second-underscore`
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`
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_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64 -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

## Base Optimization Flags

C benchmarks:
-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000 -IPA:small_pu=100 -mso -march=bdver1

C++ benchmarks:
-Ofast -static -CG:load_exe=0 -OPT:malloc_alg=1 -INLINE:aggressive=on -HP:bd=2m:heap=2m -D__OPEN64_FAST_SET -march=bdver1

Fortran benchmarks:
-Ofast -LNO:blocking=off -LNO:simd_peel_align=on -OPT:rsqrt=2 -OPT:unroll_size=256 -HP:bd=2m:heap=2m -mso -march=bdver1

Benchmarks using both Fortran and C:
-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000 -IPA:small_pu=100 -mso -march=bdver1 -LNO:blocking=off -LNO:simd_peel_align=on -OPT:rsqrt=2 -OPT:unroll_size=256

## Peak Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

Fortran benchmarks:
openf95

Benchmarks using both Fortran and C:
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

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## Peak Portability Flags (Continued)

435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64 -fno-second-underscore

## Peak Optimization Flags

C benchmarks:

433.milc: -Ofast -CG:movnti=1 -CG:locs_best=on -HP:bdt=2m:heap=2m -IPA:plimit=7000 -IPA:callee_limit=1200 -OPT:struct_array_copy=2 -OPT:alias=field_sensitive -mso -march=bdver1

470.lbm: -Ofast -CG:cmp_peep=on -OPT:keep_ext=on -HP:bdt=2m:heap=2m -IPA:plimit=8000 -IPA:small_pu=100 -march=bdver1 -mso

482.sphinx3: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast -m32 -IPA:plimit=1000 -OPT:malloc_alg=2 -CG:cmp_peep=on -CG:p2align=0 -CG:load_exe=1 -CG:dsched=on -INLINE:aggressive=on -LNO:prefetch=2 -LNO:prefetch_ahead=4 -mso -march=bdver2

C++ benchmarks:

444.namd: -Ofast -IPA:plimit=3000 -LNO:ignore_feedback=off -CG:local_sched_alg=0 -CG:load_exe=0 -OPT:unroll_size=256 -fno-exceptions -HP:bdt=2m:heap=2m -LNO:if_select_conv=1 -OPT:alias=disjoint -LNO:psimd_iso_unroll=ON -march=bdver1

447.dealII: -Ofast -D__OPEN64_FAST_SET -static -INLINE:aggressive=on -LNO:opt=1 -LNO:simd=2 -fno-emit-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 -CG:movext_icmp=off -TENV:frame_pointer=off -march=bdver1

450.soplex: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3 -LNO:ignore_feedback=off -INLINE:aggressive=on -OPT:RO=1 -OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off -OPT:fold_unsigned_relops=on -fno-exceptions -CG:p2align=0 -m32 -mno-fma4 -HP:bdt=2m:heap=2m -WOPT:sib=on

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# Peak Optimization Flags (Continued)

450.soplex (continued):
-march=bdver1

453.povray: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-CG:pre_local_sched=off -CG:p2align=0 -CG:p2align_split=on
-CG:dsched=on -INLINE:aggressive=on -HP:bd=2m:heap=2m
-OPT:transform=2 -OPT:alias=disjoint -WOPT:aggcm=0
-march=bdver2

Fortran benchmarks:

410.bwaves: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-OPT:Ofast -OPT:treeheight=on -LNO:blocking=off
-LNO:ignore_feedback=off -LNO:fu=4 -LNO:loop_model_simd=on
-LNO:simd_rm_unity_remainder=on -WOPT:aggstr=0
-HP:bdt=2m:heap=2m -CG:cmp_peep=on -march=bdver1

416.gamess: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:fu=6 -LNO:blocking=0 -LNO:simd=2 -OPT:ro=3
-OPT:recip=on -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m
-WOPT:sib=on -march=bdver1

434.zeusmp: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:blocking=off -LNO:interchange=off -IPA:plimit=1500
-HP:bdt=2m:heap=2m -march=bdver1

437.leslie3d: -Ofast -CG:pre_minreg_level=2 -LNO:simd=0 -LNO:fusion=2
-HP:bdt=2m:heap=2m -mso -march=bdver1

459.GemsFDTD: -Ofast -IPA:plimit=1500 -OPT:unroll_size=1024
-OPT:unroll_times_max=16 -LNO:fission=2
-CG:local_sched_alg=2 -HP -march=bdver1

465.tonto: -Ofast -OPT:alias=no_f90_pointer_alias -LNO:blocking=off
-CG:load_exe=1 -CG:local_sched_alg=3 -IPA:plimit=525
-HP:bdt=2m:heap=2m -march=bdver1

Benchmarks using both Fortran and C:

435.gromacs: -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m
-CG:local_sched_alg=2 -CG:load_exe=3 -GRA:unspill=on
-march=bdver1 -LNO:simd=3

436.cactusADM: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:blocking=off -LNO:prefetch=2 -LNO:pf2=0
-LNO:prefetch_ahead=4 -HP -CG:locs_shallow_depth=1
-CG:load_exe=0 -CG:dsched=on -WOPT:sib=on -march=bdver1

454.calculix: -Ofast -OPT:unroll_size=256 -OPT:alias=disjoint
-GRA:optimize_boundary=on -CG:dsched=on -HP:bdt=2m:heap=2m
-march=bdver1

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# Peak Optimization Flags (Continued)

481.wrf: `-Ofast -LNO:blocking=off -LANG:copyinout=off -IPA:callee_limit=5000 -GRA:prioritize_by_density=on -HP -WOPT:sib=on -march=bdver1`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-I.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-I.xml`


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