# SPEC® CFP2006 Result

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## Supermicro

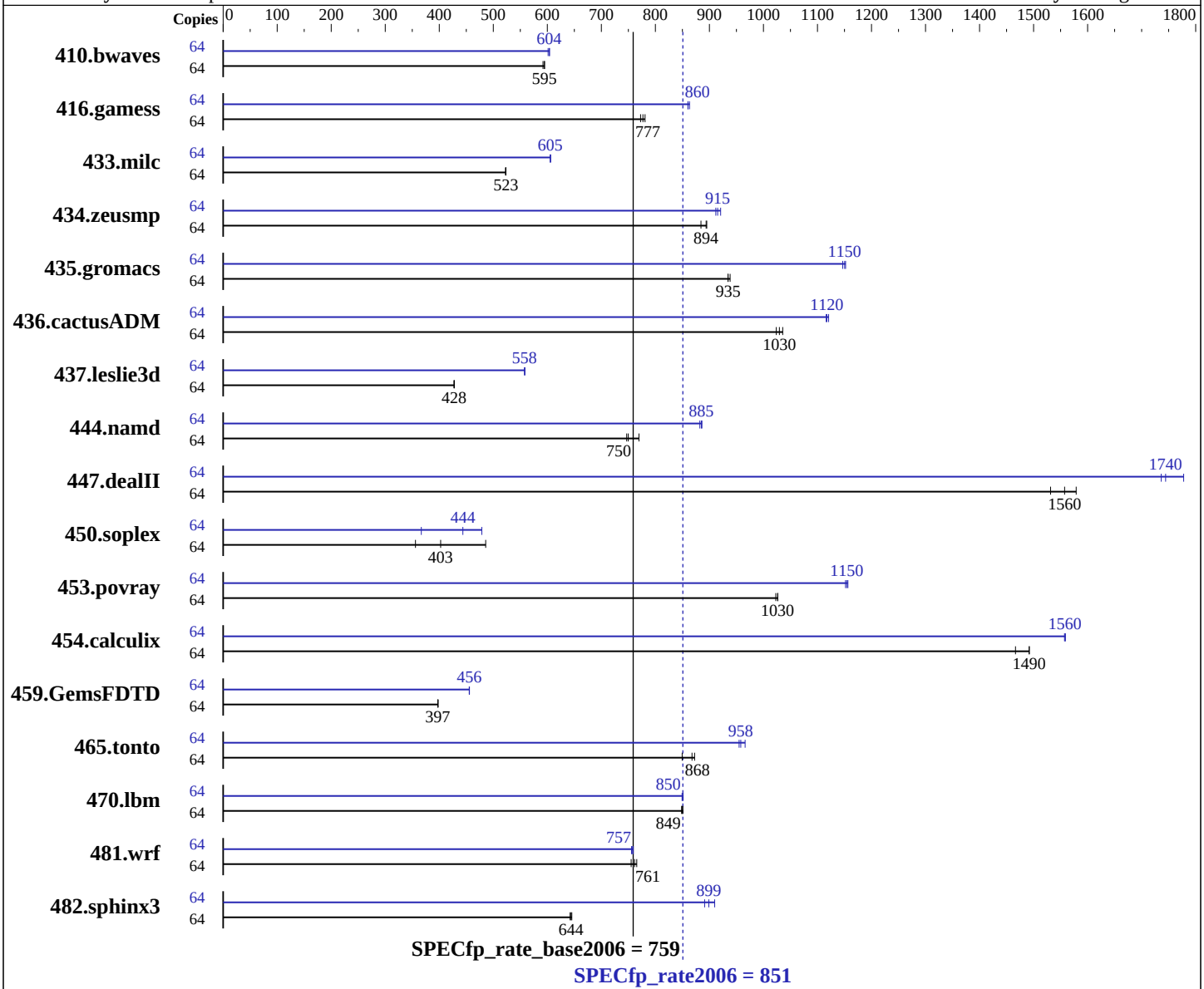
Supermicro A+ Server 1042G-LTF (H8QGL-iF+,
Opteron 6386 SE)
AMD Opteron 6386 SE

SPECfp®_rate2006 = 851

SPECfp_rate_base2006 = 759

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

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




## Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 6386 SE |
| CPU Characteristics: | AMD Turbo CORE technology up to 3.50 GHz |
| CPU MHz: | 2800 |
| FPU: | Integrated |
| CPU(s) enabled: | 64 cores, 4 chips, 16 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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Primary Cache: 512 KB I on chip per chip, 64 KB I shared / 2 cores; 16 KB D on chip per core
Secondary Cache: 16 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 / 8 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 | 64 | **1463** | **595** | 1469 | 592 | 1462 | 595 | 64 | 1446 | 601 | **1441** | **604** | 1440 | 604 |
| 416.gamess | 64 | **1613** | **777** | 1622 | 773 | 1605 | 781 | 64 | 1452 | 863 | 1457 | 860 | **1456** | **860** |
| 433.milc | 64 | 1122 | 523 | 1124 | 523 | **1123** | **523** | 64 | **970** | **605** | 969 | 606 | 971 | 605 |
| 434.zeusmp | 64 | 651 | 895 | 659 | 884 | **652** | **894** | 64 | 639 | 912 | 633 | 921 | **636** | **915** |
| 435.gromacs | 64 | **489** | **935** | 487 | 938 | 489 | 934 | 64 | 398 | 1150 | **397** | **1150** | 397 | 1150 |
| 436.cactusADM | 64 | 738 | 1040 | **743** | **1030** | 747 | 1020 | 64 | 685 | 1120 | 682 | 1120 | **684** | **1120** |
| 437.leslie3d | 64 | 1406 | 428 | **1407** | **428** | 1408 | 427 | 64 | 1079 | 558 | 1077 | 558 | **1078** | **558** |
| 444.namd | 64 | 687 | 747 | 667 | 770 | **685** | **750** | 64 | **580** | **885** | 579 | 886 | 582 | 882 |
| 447.dealII | 64 | 464 | 1580 | 478 | 1530 | **470** | **1560** | 64 | 422 | 1740 | 412 | 1780 | **420** | **1740** |
| 450.soplex | 64 | 1500 | 356 | 1098 | 486 | **1326** | **403** | 64 | 1455 | 367 | **1203** | **444** | 1115 | 479 |
| 453.povray | 64 | 333 | 1020 | 332 | 1030 | **332** | **1030** | 64 | **295** | **1150** | 296 | 1150 | 294 | 1160 |
| 454.calculix | 64 | 354 | 1490 | 360 | 1470 | **354** | **1490** | 64 | 339 | 1560 | **339** | **1560** | 339 | 1560 |
| 459.GemsFDTD | 64 | **1709** | **397** | 1706 | 398 | 1710 | 397 | 64 | 1491 | 456 | 1490 | 456 | **1490** | **456** |
| 465.tonto | 64 | 741 | 850 | 722 | 873 | **726** | **868** | 64 | **657** | **958** | 652 | 966 | 659 | 955 |
| 470.lbm | 64 | **1035** | **849** | 1036 | 849 | 1033 | 851 | 64 | 1035 | 849 | 1033 | 851 | **1034** | **850** |
| 481.wrf | 64 | 947 | 755 | 934 | 766 | **939** | **761** | 64 | 946 | 756 | **944** | **757** | 942 | 759 |
| 482.sphinx3 | 64 | 1933 | 645 | 1943 | 642 | **1937** | **644** | 64 | 1400 | 891 | **1388** | **899** | 1371 | 910 |

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

Transparent huge pages were enabled for this run (OS default)
```

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## Operating System Notes (Continued)

```
Huge pages were not configured for this run.
```

## General Notes

```
Environment variables set by runspec before the start of the run:
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`
481.wrf: `-DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64 -fno-second-underscore`

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## Base Portability Flags (Continued)

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
435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore

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## Peak Portability Flags (Continued)

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 -march=bdver1

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# Peak Optimization Flags (Continued)

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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