# SPEC® CFP2006 Result

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## Supermicro

(Test Sponsor: Advanced Micro Devices)

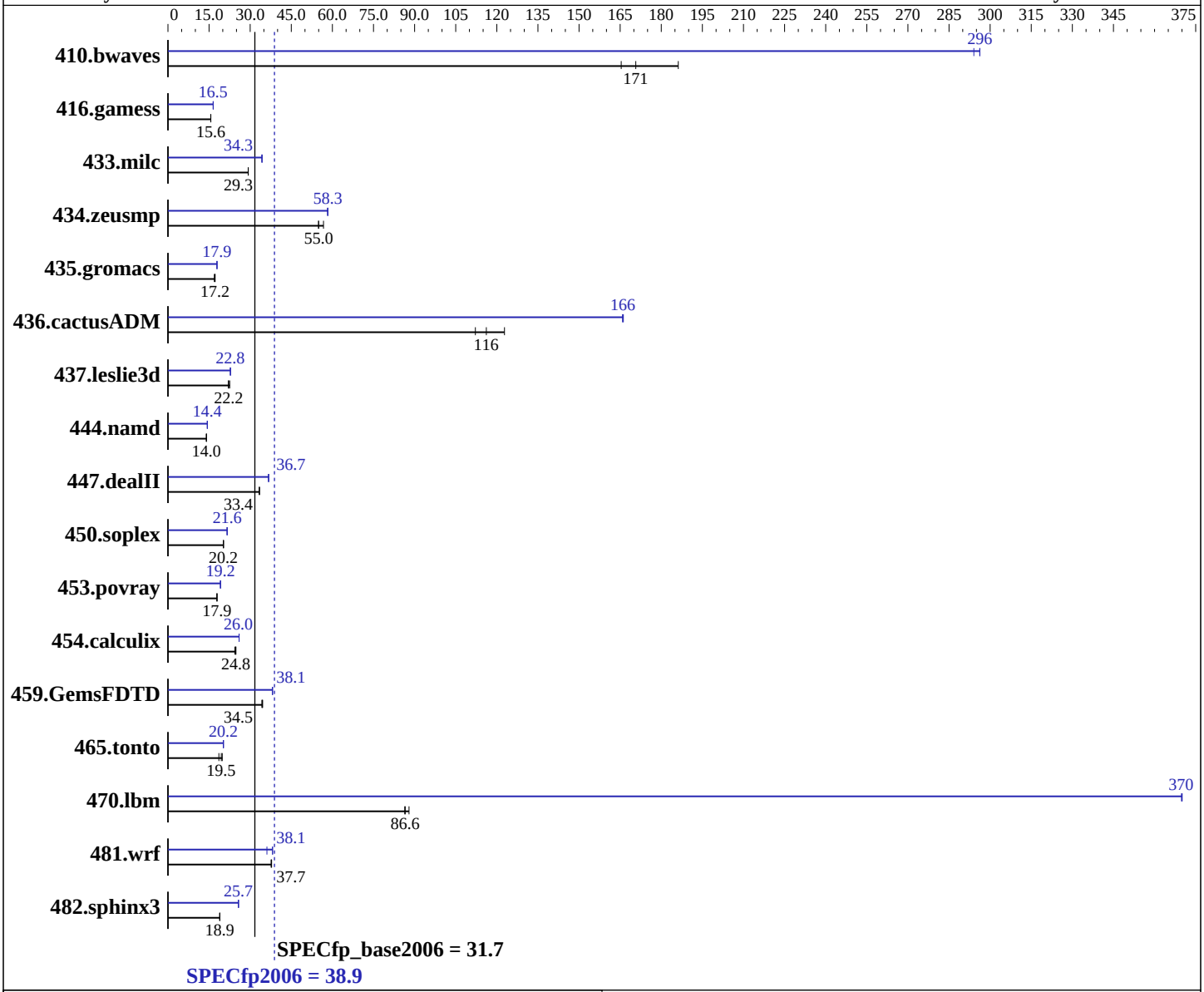
Supermicro A+ Server 1022G-NTF
AMD Opteron 6262 HE

SPECfp®2006 = 38.9

SPECfp_base2006 = 31.7

**CPU2006 license:** 49
**Test sponsor:** Advanced Micro Devices
**Tested by:** Advanced Micro Devices

**Test date:** Dec-2011
**Hardware Availability:** Nov-2011
**Software Availability:** Jul-2011




## Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 6262 HE |
| CPU Characteristics: | AMD Turbo CORE technology up to 2.90 GHz |
| CPU MHz: | 1600 |
| FPU: | Integrated |
| CPU(s) enabled: | 32 cores, 2 chips, 16 cores/chip |
| CPU(s) orderable: | 1,2 chips |

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## Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 6.1, Kernel 2.6.32-131.0.15.el6.x86_64 |
| Compiler: | C/C++/Fortran: Version 4.2.5.2 of x86 Open64 Compiler Suite (from AMD) |
| Auto Parallel: | Yes |
| 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: 64 GB (8 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 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 73.0 | 186 | 82.2 | 165 | **79.6** | **171** | 46.2 | 294 | **45.9** | **296** | 45.9 | 296 |
| 416.gamess | 1255 | 15.6 | 1252 | 15.6 | **1252** | **15.6** | 1186 | 16.5 | 1186 | 16.5 | **1186** | **16.5** |
| 433.milc | **314** | **29.3** | 313 | 29.3 | 314 | 29.3 | 267 | 34.3 | **268** | **34.3** | 268 | 34.3 |
| 434.zeusmp | 160 | 56.8 | 166 | 54.9 | **166** | **55.0** | 156 | 58.2 | **156** | **58.3** | 156 | 58.4 |
| 435.gromacs | **416** | **17.2** | 422 | 16.9 | 415 | 17.2 | 399 | 17.9 | **399** | **17.9** | 399 | 17.9 |
| 436.cactusADM | **103** | **116** | 107 | 112 | 97.3 | 123 | 72.0 | 166 | 71.9 | 166 | **72.0** | **166** |
| 437.leslie3d | 427 | 22.0 | 417 | 22.5 | **424** | **22.2** | **412** | **22.8** | 413 | 22.8 | 412 | 22.8 |
| 444.namd | 571 | 14.0 | **571** | **14.0** | 571 | 14.0 | **558** | **14.4** | 558 | 14.4 | 558 | 14.4 |
| 447.dealII | **343** | **33.4** | 343 | 33.4 | 343 | 33.4 | 312 | 36.7 | **312** | **36.7** | 311 | 36.7 |
| 450.soplex | 412 | 20.2 | **412** | **20.2** | 412 | 20.3 | 387 | 21.6 | **386** | **21.6** | 386 | 21.6 |
| 453.povray | 298 | 17.9 | **297** | **17.9** | 297 | 17.9 | 278 | 19.2 | **278** | **19.2** | 278 | 19.2 |
| 454.calculix | 338 | 24.4 | 333 | 24.8 | **333** | **24.8** | 318 | 26.0 | **318** | **26.0** | 318 | 25.9 |
| 459.GemsFDTD | 307 | 34.5 | **308** | **34.5** | 310 | 34.3 | **278** | **38.1** | 279 | 38.1 | 278 | 38.2 |
| 465.tonto | 530 | 18.6 | **506** | **19.5** | 497 | 19.8 | 486 | 20.2 | 486 | 20.2 | **486** | **20.2** |
| 470.lbm | 156 | 88.0 | 159 | 86.4 | **159** | **86.6** | **37.1** | **370** | 37.1 | 370 | 37.2 | 370 |
| 481.wrf | 296 | 37.7 | **296** | **37.7** | 295 | 37.8 | **293** | **38.1** | 309 | 36.1 | 293 | 38.2 |
| 482.sphinx3 | 1032 | 18.9 | **1030** | **18.9** | 1030 | 18.9 | 758 | 25.7 | 758 | 25.7 | **758** | **25.7** |

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 kernel/randomize_va_space=0 in /etc/sysctl.conf
cpuspeed stop was used to set the CPU frequency to its maximum.

Set vm/nr_hugepages=4000 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

## General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/work/cpu2006v1.2/amd1104-speed-libs-revA/32:/root/work/cpu2006v1.2/amd1104-speed-libs-revA/64"
O64_OMP_AFFINITY_MAP = "0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31"
O64_OMP_SPIN_COUNT = "800000"
O64_OMP_SPIN_USER_LOCK = "true"

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 6220 chips + 64GB Memory using RHEL 6.1
```

## 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

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## Base Portability Flags (Continued)

454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

## Base Optimization Flags

C benchmarks:
-march=bdver1 -Ofast -HP:bdt=2m:heap=2m -apo -mso -OPT:alias=restricted -OPT:malloc_alg=2 -LNO:parallel_overhead=10000

C++ benchmarks:
-march=bdver1 -Ofast -static -CG:load_exe=0 -CG:p2align=0 -INLINE:aggressive=on -HP:bdt=2m:heap=2m -D__OPEN64_FAST_SET

Fortran benchmarks:
-march=bdver1 -Ofast -LNO:blocking=off -LNO:fusion_peeling_limit=0 -LNO:parallel_overhead=10000 -OPT:rsqrt=2 -OPT:unroll_size=256 -HP:bdt=2m:heap=2m -apo

Benchmarks using both Fortran and C:
-march=bdver1 -Ofast -HP:bdt=2m:heap=2m -apo -mso -OPT:alias=restricted -OPT:malloc_alg=2 -LNO:parallel_overhead=10000 -LNO:blocking=off -LNO:fusion_peeling_limit=0 -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
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.dealII: -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_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG
-fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

## Peak Optimization Flags

C benchmarks:

433.milc: -march=bdver1 -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

470.lbm: -march=bdver1 -Ofast -mso -apo -CG:sse_cse_regs=0
-LNO:prefetch_ahead=4 -CG:locs_shallow_depth=1
-CG:cmp_peep=on -CG:compute_to=on -OPT:unroll_times_max=8
-OPT:unroll_size=256 -OPT:unroll_level=2 -OPT:keep_ext=on
-OPT:alias=restricted -m3dnow -IPA:inline=off

482.sphinx3: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -LNO:loop_model_simd=on
-LNO:simd_rm_unity_remainder=on -OPT:malloc_alg=2
-CG:cmp_peep=on -CG:local_sched_alg=2 -CG:use_incdec=off
-INLINE:aggressive=on -WOPT:sib=on -HP

C++ benchmarks:

444.namd: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -LNO:ignore_feedback=off
-CG:local_sched_alg=2 -CG:load_exe=0 -OPT:unroll_size=256
-fno-exceptions -HP:bdt=2m:heap=2m

447.dealII: -march=bdver1 -Ofast -LNO:simd=0 -D__OPEN64_FAST_SET
-static -INLINE:aggressive=on -OPT:alias=disjoint
-OPT:unroll_times_max=8 -OPT:unroll_size=256
-OPT:unroll_level=2 -HP:bdt=2m:heap=2m

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## Peak Optimization Flags (Continued)

450.soplex: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -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 -HP:bdt=2m:heap=2m -WOPT:sib=on

453.povray: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -CG:pre_local_sched=off
-INLINE:aggressive=on -HP:bdt=2m:heap=2m -OPT:transform=2
-OPT:alias=disjoint -WOPT:aggcm=0

Fortran benchmarks:

410.bwaves: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -apo -OPT:Ofast
-OPT:treeheight=on -LNO:blocking=off -LNO:prefetch=2
-LNO:pf2=0 -LNO:prefetch_ahead=3 -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 -CG:p2align=0

416.gamess: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
-LNO:simd=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256
-OPT:unroll_times_max=2 -CG:local_sched_alg=1
-HP:bdt=2m:heap=2m -WOPT:sib=on

434.zeusmp: -march=bdver1 -Ofast -apo -LNO:blocking=off
-LNO:interchange=off -LNO:fusion_peeling_limit=0
-OPT:treeheight=on -OPT:unroll_size=256 -CG:cmp_peep=on
-CG:compute_to=on -GRA:prioritize_by_density=on
-HP:bdt=2m:heap=2m

437.leslie3d: -march=bdver1 -Ofast -LNO:prefetch=2 -LNO:blocking=off
-CG:interior_ptrs=on -OPT:unroll_size=256
-GRA:prioritize_by_density=on -HP:bdt=2m:heap=2m

459.GemsFDTD: -march=bdver1 -Ofast -OPT:unroll_size=0 -LNO:fission=2
-CG:load_exe=0 -CG:local_sched_alg=2 -HP -apo

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

Benchmarks using both Fortran and C:

435.gromacs: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -OPT:rsqrt=2
-HP:bdt=2m:heap=2m

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## Peak Optimization Flags (Continued)

436.cactusADM: `-march=bdver1 -fb_create fbdata`(pass 1)
`-fb_opt fbdata`(pass 2) `-Ofast -LNO:blocking=off`
`-LNO:prefetch=2 -HP:bdt=2m:heap=2m -CG:locs_shallow_depth=1`
`-CG:load_exe=0 -WOPT:sib=on -apo`

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

481.wrf: `-march=bdver1 -Ofast -OPT:unroll_size=256 -LNO:blocking=off`
`-LANG:copyinout=off -IPA:callee_limit=5000`
`-GRA:prioritize_by_density=on -CG:load_exe=1 -HP`
`-WOPT:sib=on -apo`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/x86-open64-425-flags-speed-revA.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/x86-open64-425-flags-speed-revA.xml`


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