



# 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

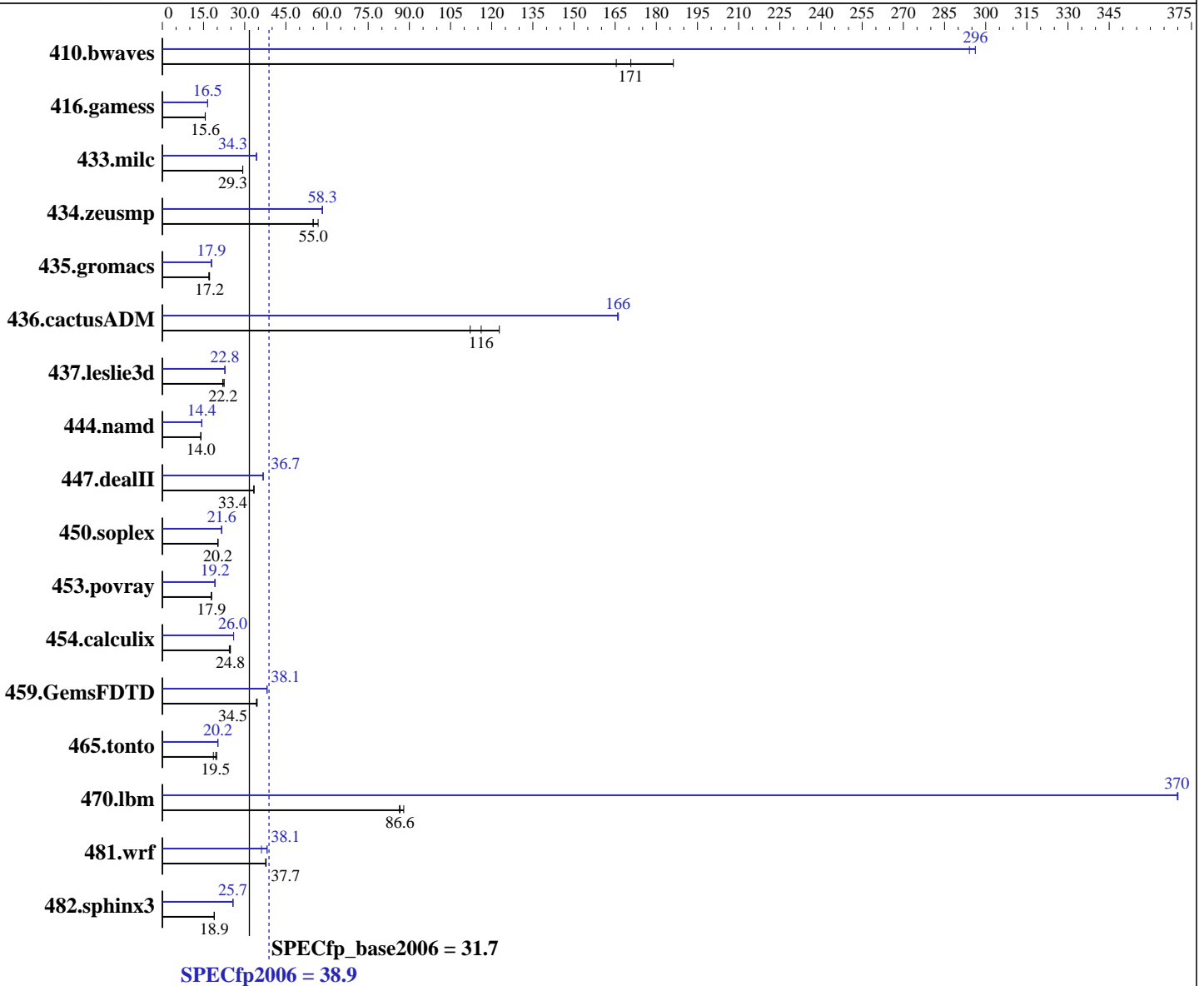
Test sponsor: Advanced Micro Devices

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	<b><u>79.6</u></b>	<b><u>171</u></b>	46.2	294	<b><u>45.9</u></b>	<b><u>296</u></b>	45.9	296
416.gamess	1255	15.6	1252	15.6	<b><u>1252</u></b>	<b><u>15.6</u></b>	1186	16.5	1186	16.5	<b><u>1186</u></b>	<b><u>16.5</u></b>
433.milc	<b><u>314</u></b>	<b><u>29.3</u></b>	313	29.3	314	29.3	267	34.3	<b><u>268</u></b>	<b><u>34.3</u></b>	268	34.3
434.zeusmp	160	56.8	166	54.9	<b><u>166</u></b>	<b><u>55.0</u></b>	156	58.2	<b><u>156</u></b>	<b><u>58.3</u></b>	156	58.4
435.gromacs	<b><u>416</u></b>	<b><u>17.2</u></b>	422	16.9	415	17.2	399	17.9	<b><u>399</u></b>	<b><u>17.9</u></b>	399	17.9
436.cactusADM	<b><u>103</u></b>	<b><u>116</u></b>	107	112	97.3	123	72.0	166	71.9	166	<b><u>72.0</u></b>	<b><u>166</u></b>
437.leslie3d	427	22.0	417	22.5	<b><u>424</u></b>	<b><u>22.2</u></b>	<b><u>412</u></b>	<b><u>22.8</u></b>	413	22.8	412	22.8
444.namd	571	14.0	<b><u>571</u></b>	<b><u>14.0</u></b>	571	14.0	<b><u>558</u></b>	<b><u>14.4</u></b>	558	14.4	558	14.4
447.dealII	<b><u>343</u></b>	<b><u>33.4</u></b>	343	33.4	343	33.4	312	36.7	<b><u>312</u></b>	<b><u>36.7</u></b>	311	36.7
450.soplex	412	20.2	<b><u>412</u></b>	<b><u>20.2</u></b>	412	20.3	387	21.6	<b><u>386</u></b>	<b><u>21.6</u></b>	386	21.6
453.povray	298	17.9	<b><u>297</u></b>	<b><u>17.9</u></b>	297	17.9	278	19.2	<b><u>278</u></b>	<b><u>19.2</u></b>	278	19.2
454.calculix	338	24.4	333	24.8	<b><u>333</u></b>	<b><u>24.8</u></b>	318	26.0	<b><u>318</u></b>	<b><u>26.0</u></b>	318	25.9
459.GemsFDTD	307	34.5	<b><u>308</u></b>	<b><u>34.5</u></b>	310	34.3	<b><u>278</u></b>	<b><u>38.1</u></b>	279	38.1	278	38.2
465.tonto	530	18.6	<b><u>506</u></b>	<b><u>19.5</u></b>	497	19.8	486	20.2	486	20.2	<b><u>486</u></b>	<b><u>20.2</u></b>
470.lbm	156	88.0	159	86.4	<b><u>159</u></b>	<b><u>86.6</u></b>	<b><u>37.1</u></b>	<b><u>370</u></b>	37.1	370	37.2	370
481.wrf	296	37.7	<b><u>296</u></b>	<b><u>37.7</u></b>	295	37.8	<b><u>293</u></b>	<b><u>38.1</u></b>	309	36.1	293	38.2
482.sphinx3	1032	18.9	<b><u>1030</u></b>	<b><u>18.9</u></b>	1030	18.9	758	25.7	758	25.7	<b><u>758</u></b>	<b><u>25.7</u></b>

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



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## 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.deallI: -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.deallI: -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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

Tested with SPEC CPU2006 v1.2.  
Report generated on Thu Jul 24 02:02:38 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 24 February 2012.