



# SPEC<sup>®</sup> CFP2006 Result

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## Supermicro

(Test Sponsor: Advanced Micro Devices)

Supermicro A+ Server 2042G-6RF,  
AMD Opteron 6276

SPECfp<sup>®</sup>\_rate2006 = 716

SPECfp\_rate\_base2006 = 666

CPU2006 license: 49

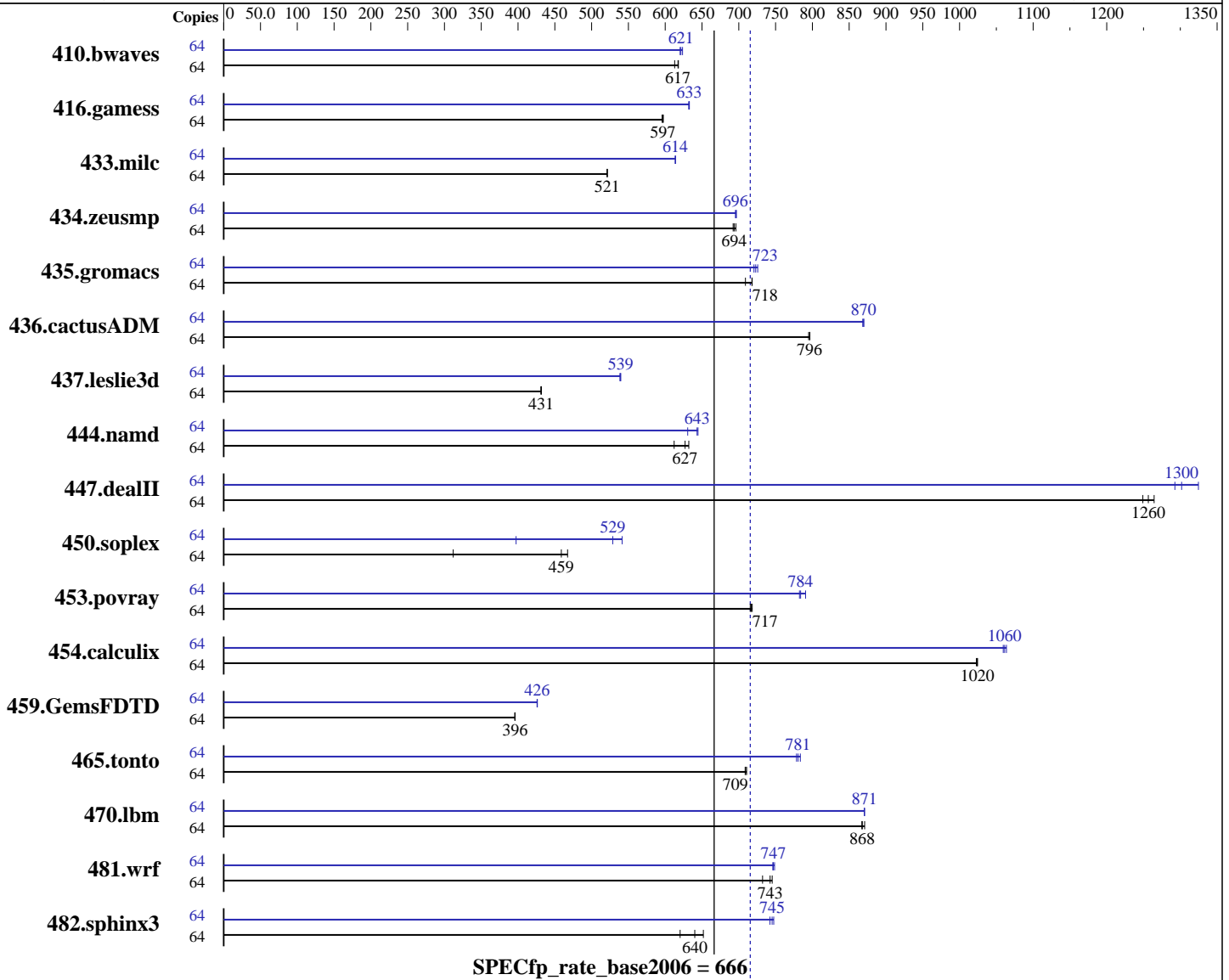
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Oct-2011

Hardware Availability: Nov-2011

Software Availability: Jul-2011



### Hardware

CPU Name: AMD Opteron 6276  
 CPU Characteristics: AMD Turbo CORE technology up to 3.20 GHz  
 CPU MHz: 2300  
 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 6.1,  
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: 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 1000 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	1407	618	<b>1409</b>	<b>617</b>	1419	613	64	1402	620	1395	624	<b>1400</b>	<b>621</b>		
416.gamess	64	2104	596	2098	597	<b>2099</b>	<b>597</b>	64	1980	633	1983	632	<b>1981</b>	<b>633</b>		
433.milc	64	<b>1127</b>	<b>521</b>	1127	521	1127	521	64	957	614	<b>957</b>	<b>614</b>	957	614		
434.zeusmp	64	837	696	<b>839</b>	<b>694</b>	841	692	64	<b>836</b>	<b>696</b>	836	697	838	695		
435.gromacs	64	644	709	<b>637</b>	<b>718</b>	636	718	64	634	721	<b>632</b>	<b>723</b>	630	726		
436.cactusADM	64	<b>961</b>	<b>796</b>	960	797	962	795	64	881	868	<b>879</b>	<b>870</b>	879	870		
437.leslie3d	64	<b>1395</b>	<b>431</b>	1393	432	1396	431	64	1115	540	<b>1115</b>	<b>539</b>	1117	538		
444.namd	64	838	612	<b>819</b>	<b>627</b>	812	632	64	814	631	796	645	<b>798</b>	<b>643</b>		
447.dealII	64	579	1260	<b>583</b>	<b>1260</b>	586	1250	64	<b>562</b>	<b>1300</b>	553	1320	566	1290		
450.soplex	64	1711	312	<b>1163</b>	<b>459</b>	1142	467	64	1343	397	<b>1009</b>	<b>529</b>	986	541		
453.povray	64	<b>475</b>	<b>717</b>	474	718	476	716	64	435	782	431	791	<b>434</b>	<b>784</b>		
454.calculix	64	516	1020	515	1020	<b>516</b>	<b>1020</b>	64	498	1060	496	1060	<b>498</b>	<b>1060</b>		
459.GemsFDTD	64	<b>1715</b>	<b>396</b>	1716	396	1715	396	64	<b>1594</b>	<b>426</b>	1595	426	1593	426		
465.tonto	64	889	709	<b>888</b>	<b>709</b>	886	711	64	<b>807</b>	<b>781</b>	809	778	804	784		
470.lbm	64	1010	871	1014	867	<b>1013</b>	<b>868</b>	64	1010	871	1010	871	<b>1010</b>	<b>871</b>		
481.wrf	64	976	732	<b>963</b>	<b>743</b>	959	745	64	955	749	<b>957</b>	<b>747</b>	958	746		
482.sphinx3	64	2011	620	<b>1948</b>	<b>640</b>	1914	652	64	1680	742	<b>1674</b>	<b>745</b>	1669	747		

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

Huge pages were not configured for this run.

## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/root/work/cpu2006v1.1/amd1104-rate-libs-revA/32:/root/work/cpu2006v1.1/amd1104-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 6276 chips + 128GB Memory using RHEL 6.1

## Base Compiler Invocation

C benchmarks:  
openc

C++ benchmarks:  
openCC

Fortran benchmarks:  
openf95

Benchmarks using both Fortran and C:  
openc 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:

-march=bdver1 -Ofast -OPT:malloc\_alg=1 -HP:bd=2m:heap=2m  
-IPA:plimit=8000 -IPA:small\_pu=100 -mso

### C++ benchmarks:

-march=bdver1 -Ofast -static -CG:load\_exe=0 -OPT:malloc\_alg=1  
-INLINE:aggressive=on -HP:bd=2m:heap=2m -D\_\_OPEN64\_FAST\_SET

### Fortran benchmarks:

-march=bdver1 -Ofast -LNO:blocking=off -OPT:rsqrt=2  
-OPT:unroll\_size=256 -HP:bd=2m:heap=2m -mso

### Benchmarks using both Fortran and C:

-march=bdver1 -Ofast -OPT:malloc\_alg=1 -HP:bd=2m:heap=2m  
-IPA:plimit=8000 -IPA:small\_pu=100 -mso -LNO:blocking=off  
-OPT:rsqrt=2 -OPT:unroll\_size=256

## Peak Compiler Invocation

### C benchmarks:

openc

### C++ benchmarks:

openCC

### Fortran benchmarks:

openf95

### Benchmarks using both Fortran and C:

openc 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  
 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 -mso

470.lbm: -march=bdver1 -Ofast -CG:cmp\_peep=on  
 -OPT:unroll\_times\_max=8 -OPT:unroll\_size=256  
 -OPT:unroll\_level=2 -OPT:keep\_ext=on -HP:bdt=2m:heap=2m  
 -IPA:plimit=8000 -IPA:small\_pu=100 -mso

482.sphinx3: -march=bdver1 -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -Ofast -OPT:malloc\_alg=2  
 -CG:cmp\_peep=on -CG:local\_sched\_alg=2 -INLINE:aggressive=on  
 -LNO:prefetch=2 -LNO:prefetch\_ahead=4 -mso

### 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 -D\_\_OPEN64\_FAST\_SET -static  
 -INLINE:aggressive=on -LNO:opt=0 -LNO:simd=0  
 -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

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 -m32  
 -HP:bdt=2m:heap=2m -WOPT:sib=on

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## Peak Optimization Flags (Continued)

453.povray: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -CG:pre\_local\_sched=off  
-INLINE:aggressive=on -HP:bd=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 -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:bd=2m:heap=2m -CG:cmp\_peep=on

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:bd=2m:heap=2m -WOPT:sib=on

434.zeusmp: -march=bdver1 -Ofast -LNO:blocking=off -LNO:interchange=off  
-HP:bd=2m:heap=2m

437.leslie3d: -march=bdver1 -Ofast -CG:pre\_minreg\_level=2 -LNO:simd=0  
-LNO:fusion=2 -HP:bd=2m:heap=2m -mso

459.GemsFDTD: -march=bdver1 -Ofast -OPT:unroll\_size=0 -LNO:fission=2  
-CG:load\_exe=0 -CG:local\_sched\_alg=2 -HP

465.tonto: -march=bdver1 -Ofast -OPT:alias=no\_f90\_pointer\_alias  
-LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525  
-HP:bd=2m:heap=2m

### 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:bd=2m:heap=2m

436.cactusADM: -march=bdver1 -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:blocking=off  
-LNO:prefetch=2 -HP -CG:locs\_shallow\_depth=1 -CG:load\_exe=0  
-WOPT:sib=on

454.calculix: -march=bdver1 -Ofast -OPT:unroll\_size=256  
-GRA:optimize\_boundary=on -HP:bd=2m:heap=2m

481.wrf: -march=bdver1 -Ofast -LNO:blocking=off -LANG:copyinout=off  
-IPA:callee\_limit=5000 -GRA:prioritize\_by\_density=on  
-CG:load\_exe=1 -HP -WOPT:sib=on



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The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.html>

<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.xml>

<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.xml>

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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