



# SPEC<sup>®</sup> CFP2006 Result

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## Supermicro

(Test Sponsor: Advanced Micro Devices)

Supermicro A+ Server 1022G-NTF,  
AMD Opteron 6282 SE

SPECfp<sup>®</sup>\_rate2006 = 382

SPECfp\_rate\_base2006 = 355

CPU2006 license: 49

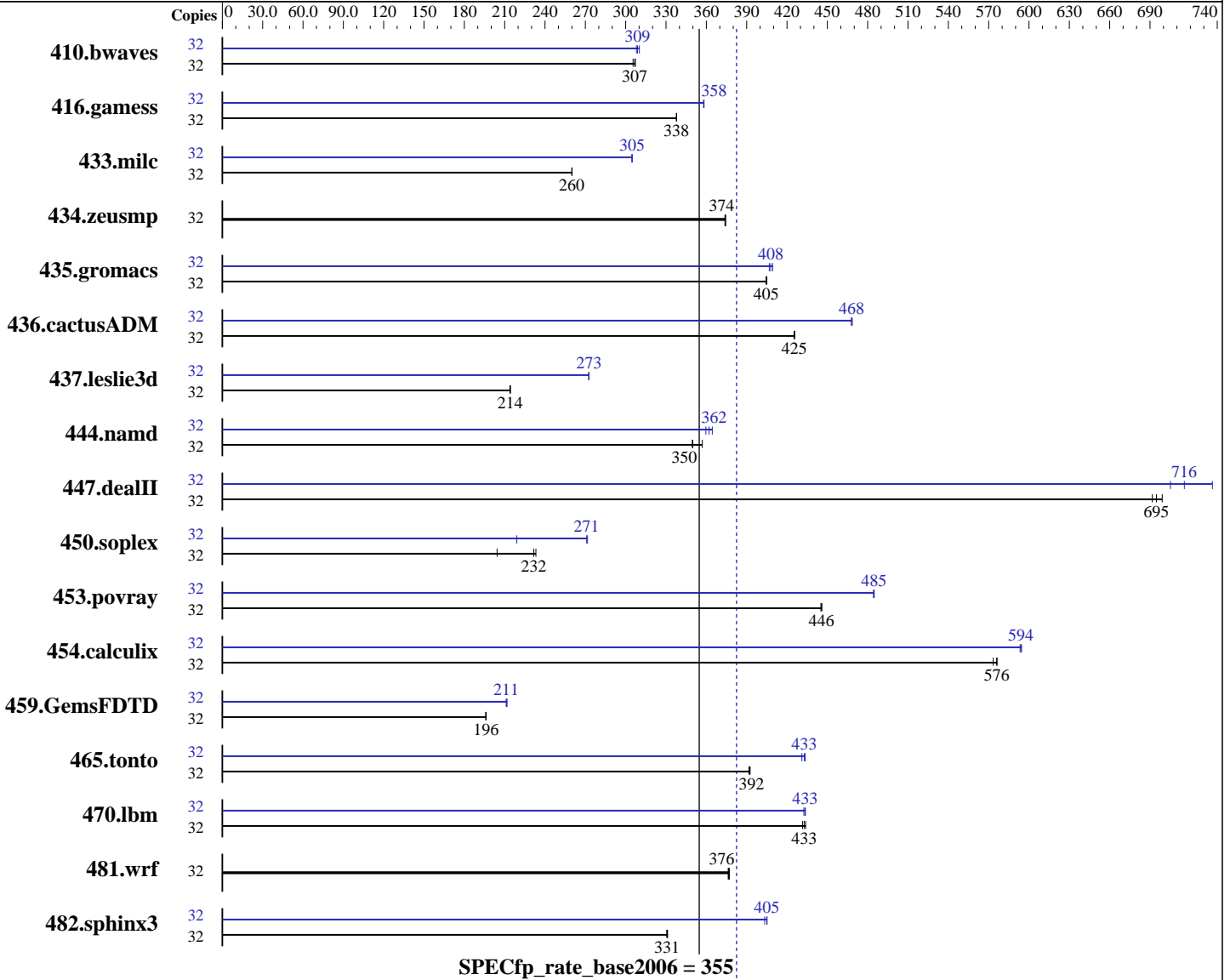
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Sep-2011

Hardware Availability: Nov-2011

Software Availability: Jul-2011



### Hardware

CPU Name: AMD Opteron 6282 SE  
 CPU Characteristics: AMD Turbo CORE technology up to 3.30 GHz  
 CPU MHz: 2600  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 2 chips, 16 cores/chip  
 CPU(s) orderable: 1,2 chips

Continued on next page

### 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: 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   |             |            |             |            |             |            |
|---------------|--------|-------------|------------|-------------|------------|-------------|------------|--------|-------------|------------|-------------|------------|-------------|------------|
|               | Copies | Seconds     | Ratio      | Seconds     | Ratio      | Seconds     | Ratio      | Copies | Seconds     | Ratio      | Seconds     | Ratio      | Seconds     | Ratio      |
| 410.bwaves    | 32     | 1416        | 307        | <u>1418</u> | <u>307</u> | 1423        | 306        | 32     | 1412        | 308        | 1402        | 310        | <u>1408</u> | <u>309</u> |
| 416.gamess    | 32     | <u>1855</u> | <u>338</u> | 1854        | 338        | 1855        | 338        | 32     | <u>1750</u> | <u>358</u> | 1750        | 358        | 1749        | 358        |
| 433.milc      | 32     | 1130        | 260        | <u>1130</u> | <u>260</u> | 1129        | 260        | 32     | 964         | 305        | <u>964</u>  | <u>305</u> | 964         | 305        |
| 434.zeusmp    | 32     | 779         | 374        | <u>778</u>  | <u>374</u> | 778         | 374        | 32     | 779         | 374        | <u>778</u>  | <u>374</u> | 778         | 374        |
| 435.gromacs   | 32     | 564         | 405        | 565         | 404        | <u>565</u>  | <u>405</u> | 32     | 558         | 409        | <u>560</u>  | <u>408</u> | 562         | 407        |
| 436.cactusADM | 32     | <u>899</u>  | <u>425</u> | 898         | 426        | 899         | 425        | 32     | 817         | 468        | 816         | 469        | <u>817</u>  | <u>468</u> |
| 437.leslie3d  | 32     | 1404        | 214        | <u>1405</u> | <u>214</u> | 1406        | 214        | 32     | <u>1103</u> | <u>273</u> | 1103        | 273        | 1104        | 272        |
| 444.namd      | 32     | <u>733</u>  | <u>350</u> | 734         | 350        | 719         | 357        | 32     | <u>709</u>  | <u>362</u> | 704         | 364        | 714         | 360        |
| 447.dealII    | 32     | <u>527</u>  | <u>695</u> | 524         | 699        | 529         | 692        | 32     | 497         | 736        | <u>512</u>  | <u>716</u> | 519         | 705        |
| 450.soplex    | 32     | 1306        | 204        | <u>1152</u> | <u>232</u> | 1144        | 233        | 32     | 1218        | 219        | <u>985</u>  | <u>271</u> | 982         | 272        |
| 453.povray    | 32     | 382         | 446        | 382         | 445        | <u>382</u>  | <u>446</u> | 32     | 351         | 485        | 352         | 484        | <u>351</u>  | <u>485</u> |
| 454.calculix  | 32     | 458         | 576        | <u>458</u>  | <u>576</u> | 460         | 573        | 32     | <u>444</u>  | <u>594</u> | 444         | 594        | 445         | 593        |
| 459.GemsFDTD  | 32     | 1734        | 196        | 1730        | 196        | <u>1731</u> | <u>196</u> | 32     | 1603        | 212        | 1608        | 211        | <u>1607</u> | <u>211</u> |
| 465.tonto     | 32     | <u>802</u>  | <u>392</u> | 804         | 392        | 802         | 393        | 32     | 726         | 433        | <u>727</u>  | <u>433</u> | 730         | 431        |
| 470.lbm       | 32     | 1013        | 434        | <u>1016</u> | <u>433</u> | 1019        | 432        | 32     | <u>1014</u> | <u>433</u> | 1014        | 434        | 1017        | 433        |
| 481.wrf       | 32     | <u>949</u>  | <u>376</u> | 948         | 377        | 950         | 376        | 32     | <u>949</u>  | <u>376</u> | 948         | 377        | 950         | 376        |
| 482.sphinx3   | 32     | 1887        | 331        | <u>1885</u> | <u>331</u> | 1883        | 331        | 32     | 1546        | 403        | <u>1540</u> | <u>405</u> | 1539        | 405        |

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:

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  
 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: basepeak = yes

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: basepeak = yes



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

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