



# SPEC<sup>®</sup> CFP2006 Result

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## Supermicro

Supermicro A+ Server 1012G-MTF  
(H8SGL-F, AMD Opteron 6274)

SPECfp<sup>®</sup>\_rate2006 = 188

SPECfp\_rate\_base2006 = 173

CPU2006 license: 001176

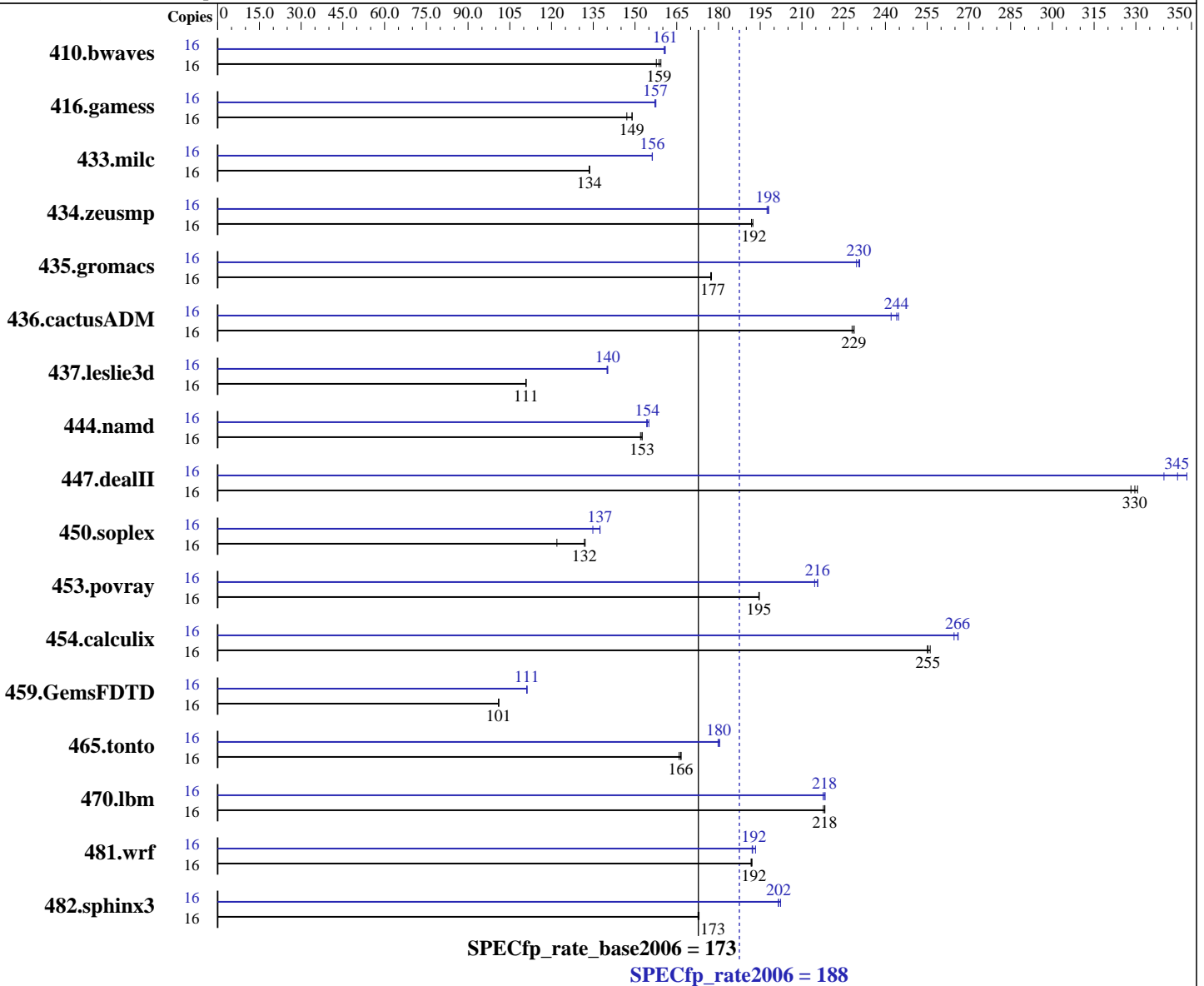
Test sponsor: Supermicro

Tested by: Supermicro

Test date: May-2012

Hardware Availability: Nov-2011

Software Availability: Dec-2011



### Hardware

CPU Name: AMD Opteron 6274  
 CPU Characteristics: AMD Turbo CORE technology up to 3.10 GHz  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 1 chip, 16 cores/chip  
 CPU(s) orderable: 1 chip

Continued on next page

### Software

Operating System: Red Hat Enterprise Linux Server release 6.2,  
Kernel 2.6.32-220.el6.x86\_64  
 Compiler: C/C++/Fortran: Version 4.5.1 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 300 GB SATA, 10000 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	16	1379	158	<b><u>1370</u></b>	<b><u>159</u></b>	1365	159	16	1352	161	1355	160	<b><u>1352</u></b>	<b><u>161</u></b>
416.gamess	16	<b><u>2104</u></b>	<b><u>149</u></b>	2102	149	2130	147	16	1993	157	1989	158	<b><u>1991</u></b>	<b><u>157</u></b>
433.milc	16	<b><u>1099</u></b>	<b><u>134</u></b>	1099	134	1100	134	16	<b><u>940</u></b>	<b><u>156</u></b>	940	156	940	156
434.zeusmp	16	759	192	<b><u>759</u></b>	<b><u>192</u></b>	757	192	16	737	197	<b><u>736</u></b>	<b><u>198</u></b>	735	198
435.gromacs	16	<b><u>644</u></b>	<b><u>177</u></b>	645	177	644	177	16	<b><u>496</u></b>	<b><u>230</u></b>	498	230	495	231
436.cactusADM	16	836	229	839	228	<b><u>836</u></b>	<b><u>229</u></b>	16	781	245	<b><u>783</u></b>	<b><u>244</u></b>	790	242
437.leslie3d	16	1358	111	<b><u>1357</u></b>	<b><u>111</u></b>	1356	111	16	1075	140	<b><u>1073</u></b>	<b><u>140</u></b>	1073	140
444.namd	16	844	152	<b><u>841</u></b>	<b><u>153</u></b>	841	153	16	<b><u>831</u></b>	<b><u>154</u></b>	832	154	828	155
447.dealII	16	<b><u>555</u></b>	<b><u>330</u></b>	554	331	558	328	16	525	348	<b><u>531</u></b>	<b><u>345</u></b>	538	340
450.soplex	16	1094	122	1010	132	<b><u>1012</u></b>	<b><u>132</u></b>	16	990	135	971	137	<b><u>971</u></b>	<b><u>137</u></b>
453.povray	16	437	195	<b><u>437</u></b>	<b><u>195</u></b>	438	194	16	397	215	<b><u>395</u></b>	<b><u>216</u></b>	395	216
454.calculix	16	515	256	517	255	<b><u>517</u></b>	<b><u>255</u></b>	16	496	266	499	265	<b><u>496</u></b>	<b><u>266</u></b>
459.GemsFDTD	16	1680	101	<b><u>1681</u></b>	<b><u>101</u></b>	1682	101	16	1526	111	<b><u>1527</u></b>	<b><u>111</u></b>	1529	111
465.tonto	16	945	167	<b><u>946</u></b>	<b><u>166</u></b>	949	166	16	<b><u>874</u></b>	<b><u>180</u></b>	873	180	875	180
470.lbm	16	1007	218	1010	218	<b><u>1008</u></b>	<b><u>218</u></b>	16	<b><u>1008</u></b>	<b><u>218</u></b>	1007	218	1010	218
481.wrf	16	932	192	<b><u>932</u></b>	<b><u>192</u></b>	931	192	16	925	193	<b><u>929</u></b>	<b><u>192</u></b>	930	192
482.sphinx3	16	<b><u>1803</u></b>	<b><u>173</u></b>	1802	173	1806	173	16	1541	202	<b><u>1547</u></b>	<b><u>202</u></b>	1547	202

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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CPU2006 license: 001176

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Test date: May-2012

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## Operating System Notes (Continued)

```
Set vm/nr_hugepages=14336 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

## General Notes

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

```
HUGETLB_LIMIT = "896"
```

```
LD_LIBRARY_PATH = "/usr/cpu2006/amd1104-rate-libs-revC/32:/usr/cpu2006/amd1104-rate-libs-revC/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 6274 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
454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
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## Base Portability Flags (Continued)

481.wrf: -DSPEC\_CPU\_LINUX -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LP64  
-fno-second-underscore  
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

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## Peak Portability Flags (Continued)

```

435.gromacs: -DSPEC_CPU_LP64
436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
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 -IPA:plimit=1000
-OPT:malloc_alg=2 -CG:cmp_peep=on -CG:local_sched_alg=2
-CG:p2align=0 -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 -IPA:plimit=3000
-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.dealIII: -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

```

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## Peak Optimization Flags (Continued)

450.soplex: -march=bdver1 -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 -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  
-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

### 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:bdt=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:bdt=2m:heap=2m -WOPT:sib=on

434.zeusmp: -march=bdver1 -Ofast -LNO:blocking=off -LNO:interchange=off  
-IPA:plimit=1500 -HP:bdt=2m:heap=2m

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

459.GemsFDTD: -march=bdver1 -Ofast -IPA:plimit=1500 -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:bdt=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:bdt=2m:heap=2m -CG:local\_sched\_alg=2 -GRA:unspill=ON  
-CG:load\_exe=3 -LNO:simd=3

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  
-CG:dsched=on -WOPT:sib=on

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## Peak Optimization Flags (Continued)

454.calculix: -march=bdver1 -Ofast -OPT:unroll\_size=256  
-GRA:optimize\_boundary=on -CG:dsched=on -HP:bdt=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

The flags file that was used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/x86-open64-451-flags-rate-revC-I.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/cpu2006/flags/x86-open64-451-flags-rate-revC-I.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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