



# SPEC<sup>®</sup> CFP2006 Result

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## Supermicro

Supermicro A+ Server AS-4042G-6RF (H8QG6, Opteron 6370P)  
AMD Opteron 6370P

SPECfp<sup>®</sup>\_rate2006 = 749

SPECfp\_rate\_base2006 = 677

CPU2006 license: 001176

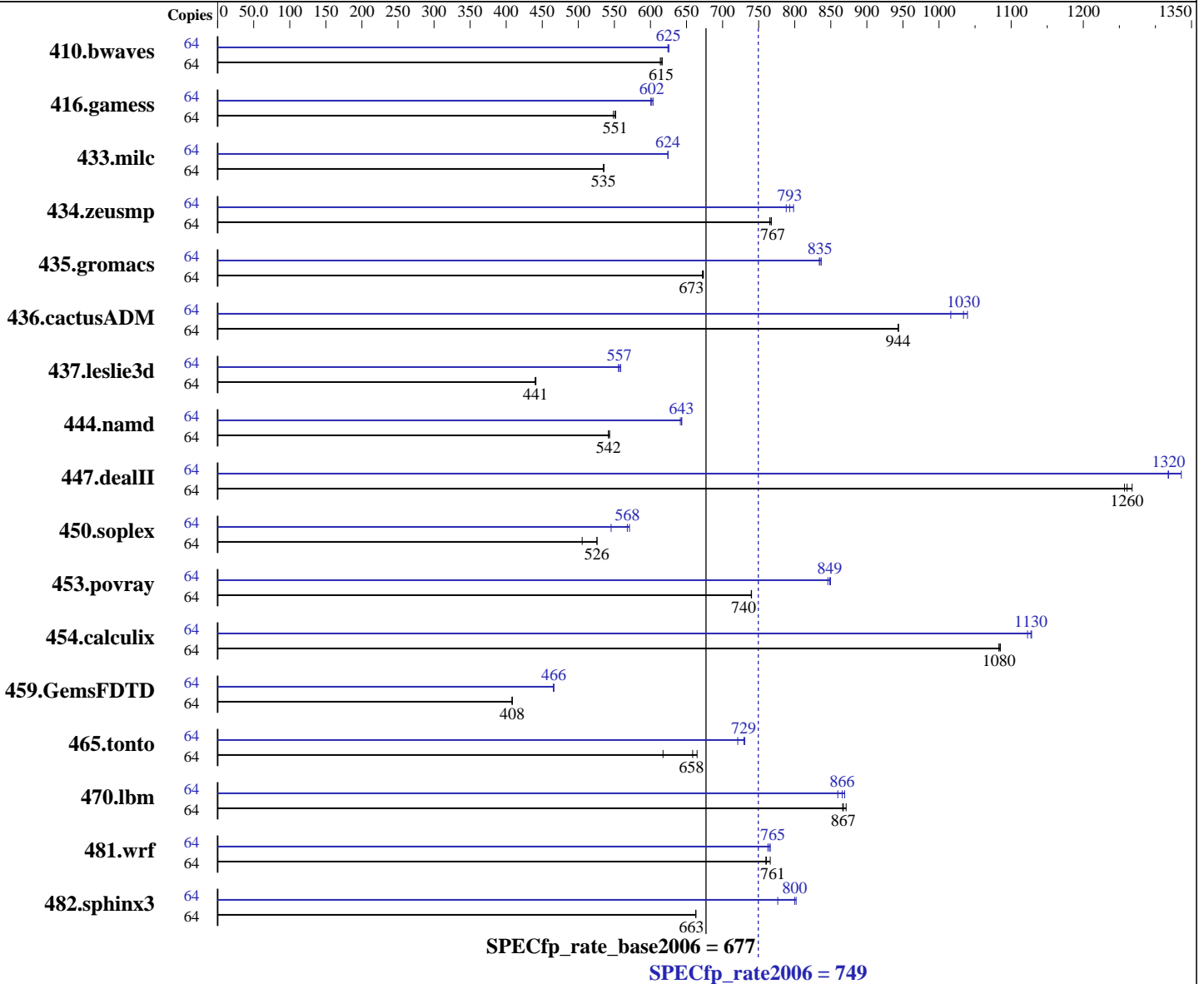
Test sponsor: Supermicro

Tested by: Supermicro

Test date: Nov-2013

Hardware Availability: Jan-2014

Software Availability: Aug-2012



### Hardware

CPU Name: AMD Opteron 6370P  
 CPU Characteristics: AMD Turbo CORE technology up to 2.50 GHz  
 CPU MHz: 2000  
 FPU: Integrated  
 CPU(s) enabled: 64 cores, 4 chips, 16 cores/chip  
 CPU(s) orderable: 2,4 chips

Continued on next page

### Software

Operating System: Red Hat Enterprise Linux Server release 6.4, Kernel 2.6.32-358.el6.x86\_64  
 Compiler: C/C++/Fortran: Version 4.5.2 of x86 Open64 Compiler Suite (from AMD)  
 Auto Parallel: No  
 File System: ext4  
 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: 256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
Disk Subsystem: 1 x 500 GB SATA II, 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	1417	614	<b><u>1415</u></b>	<b><u>615</u></b>	1411	616	64	1393	624	<b><u>1391</u></b>	<b><u>625</u></b>	1390	626
416.gamess	64	2271	552	2284	549	<b><u>2274</u></b>	<b><u>551</u></b>	64	<b><u>2082</u></b>	<b><u>602</u></b>	2076	604	2087	600
433.milc	64	1098	535	1097	536	<b><u>1098</u></b>	<b><u>535</u></b>	64	941	624	<b><u>941</u></b>	<b><u>624</u></b>	941	624
434.zeusmp	64	761	765	<b><u>759</u></b>	<b><u>767</u></b>	759	768	64	739	788	729	798	<b><u>735</u></b>	<b><u>793</u></b>
435.gromacs	64	<b><u>679</u></b>	<b><u>673</u></b>	680	672	679	673	64	548	834	546	837	<b><u>547</u></b>	<b><u>835</u></b>
436.cactusADM	64	811	943	<b><u>811</u></b>	<b><u>944</u></b>	810	944	64	736	1040	753	1020	<b><u>740</u></b>	<b><u>1030</u></b>
437.leslie3d	64	<b><u>1365</u></b>	<b><u>441</u></b>	1367	440	1363	441	64	<b><u>1080</u></b>	<b><u>557</u></b>	1077	559	1083	556
444.namd	64	947	542	945	543	<b><u>947</u></b>	<b><u>542</u></b>	64	800	641	<b><u>798</u></b>	<b><u>643</u></b>	798	643
447.dealII	64	<b><u>581</u></b>	<b><u>1260</u></b>	582	1260	578	1270	64	<b><u>555</u></b>	<b><u>1320</u></b>	548	1340	556	1320
450.soplex	64	1056	505	1015	526	<b><u>1015</u></b>	<b><u>526</u></b>	64	979	545	<b><u>940</u></b>	<b><u>568</u></b>	935	571
453.povray	64	460	740	<b><u>460</u></b>	<b><u>740</u></b>	460	740	64	<b><u>401</u></b>	<b><u>849</u></b>	401	850	403	846
454.calculix	64	487	1080	<b><u>487</u></b>	<b><u>1080</u></b>	487	1090	64	468	1130	470	1120	<b><u>468</u></b>	<b><u>1130</u></b>
459.GemsFDTD	64	<b><u>1663</u></b>	<b><u>408</u></b>	1664	408	1663	408	64	<b><u>1457</u></b>	<b><u>466</u></b>	1457	466	1459	465
465.tonto	64	1020	617	<b><u>956</u></b>	<b><u>658</u></b>	948	665	64	873	721	862	731	<b><u>863</u></b>	<b><u>729</u></b>
470.lbm	64	1009	871	1015	866	<b><u>1014</u></b>	<b><u>867</u></b>	64	<b><u>1016</u></b>	<b><u>866</u></b>	1023	860	1012	869
481.wrf	64	933	766	<b><u>940</u></b>	<b><u>761</u></b>	941	760	64	933	766	<b><u>935</u></b>	<b><u>765</u></b>	937	763
482.sphinx3	64	1881	663	1882	663	<b><u>1882</u></b>	<b><u>663</u></b>	64	1607	776	1555	802	<b><u>1559</u></b>	<b><u>800</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 vm/nr_hugepages=57344 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

## Platform Notes

C State mode set to disabled under Processor & Clock Options in BIOS.  
HPC Mode set to enabled under Processor & Clock Options in BIOS.  
C1E Support set to disabled under Processor & Clock Options in BIOS.  
Power Down Enable set to disabled in Memory Configuration in BIOS.

## General Notes

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

```
HUGETLB_LIMIT = "896"
```

```
LD_LIBRARY_PATH = "/home/spec/amd1206-rate-libs-revA/32:/home/spec/amd1206-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 6386SE chips + 128GB Memory using RHEL 6.3

## 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
```

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## Base Portability Flags (Continued)

```

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
482.sphinx3: -DSPEC_CPU_LP64

```

## Base Optimization Flags

C benchmarks:

```

-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000
-IPA:small_pu=100 -mso -march=bdver1

```

C++ benchmarks:

```

-Ofast -static -CG:load_exe=0 -OPT:malloc_alg=1 -INLINE:aggressive=on
-HP:bd=2m:heap=2m -D__OPEN64_FAST_SET -march=bdver1

```

Fortran benchmarks:

```

-Ofast -LNO:blocking=off -LNO:simd_peel_align=on -OPT:rsqrt=2
-OPT:unroll_size=256 -HP:bd=2m:heap=2m -mso -march=bdver1

```

Benchmarks using both Fortran and C:

```

-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000
-IPA:small_pu=100 -mso -march=bdver1 -LNO:blocking=off
-LNO:simd_peel_align=on -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



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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
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

```

## Peak Optimization Flags

C benchmarks:

```

433.milc: -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
-march=bdver1

470.lbm: -Ofast -CG:cmp_peep=on -OPT:keep_ext=on -HP:bdt=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -march=bdver1 -mso

482.sphinx3: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-m32 -IPA:plimit=1000 -OPT:malloc_alg=2 -CG:cmp_peep=on
-CG:p2align=0 -CG:load_exe=1 -CG:dsched=on
-INLINE:aggressive=on -LNO:prefetch=2 -LNO:prefetch_ahead=4
-mso -march=bdver2

```

C++ benchmarks:

```

444.namd: -Ofast -IPA:plimit=3000 -LNO:ignore_feedback=off
-CG:local_sched_alg=0 -CG:load_exe=0 -OPT:unroll_size=256
-fno-exceptions -HP:bdt=2m:heap=2m -LNO:if_select_conv=1
-OPT:alias=disjoint -LNO:psimd_iso_unroll=ON -march=bdver1

447.dealII: -Ofast -D__OPEN64_FAST_SET -static -INLINE:aggressive=on
-LNO:opt=1 -LNO:simd=2 -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
-march=bdver1

```

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## Peak Optimization Flags (Continued)

450.soplex: -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 -mno-fma4 -HP:bdt=2m:heap=2m -WOPT:sib=on  
-march=bdver1

453.povray: -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  
-march=bdver2

### Fortran benchmarks:

410.bwaves: -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 -march=bdver1

416.gamess: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-LNO:fu=6 -LNO:blocking=0 -LNO:simd=2 -OPT:ro=3  
-OPT:recip=on -CG:local\_sched\_alg=1 -HP:bdt=2m:heap=2m  
-WOPT:sib=on -march=bdver1

434.zeusmp: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-LNO:blocking=off -LNO:interchange=off -IPA:plimit=1500  
-HP:bdt=2m:heap=2m -march=bdver1

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

459.GemsFDTD: -Ofast -IPA:plimit=1500 -OPT:unroll\_size=1024  
-OPT:unroll\_times\_max=16 -LNO:fission=2  
-CG:local\_sched\_alg=2 -HP -march=bdver1

465.tonto: -Ofast -OPT:alias=no\_f90\_pointer\_alias -LNO:blocking=off  
-CG:load\_exe=1 -CG:local\_sched\_alg=3 -IPA:plimit=525  
-HP:bdt=2m:heap=2m -march=bdver1

### Benchmarks using both Fortran and C:

435.gromacs: -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m  
-CG:local\_sched\_alg=2 -CG:load\_exe=3 -GRA:unspill=on  
-march=bdver1 -LNO:simd=3

436.cactusADM: -fb\_create fbdata(pass 1) -fb\_opt fbdata(pass 2) -Ofast  
-LNO:blocking=off -LNO:prefetch=2 -LNO:pf2=0  
-LNO:prefetch\_ahead=4 -HP -CG:locs\_shallow\_depth=1  
-CG:load\_exe=0 -CG:dsched=on -WOPT:sib=on -march=bdver1

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## Peak Optimization Flags (Continued)

454.calculix: -Ofast -OPT:unroll\_size=256 -OPT:alias=disjoint  
-GRA:optimize\_boundary=on -CG:dsched=on -HP:bdtd=2m:heap=2m  
-march=bdver1

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

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

<http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-III.html>

<http://www.spec.org/cpu2006/flags/amd-Supermicro-platform-rate-revC-I.html>

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

<http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-III.xml>

<http://www.spec.org/cpu2006/flags/amd-Supermicro-platform-rate-revC-I.xml>

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