



# SPEC<sup>®</sup> CFP2006 Result

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Hewlett-Packard Company

(Test Sponsor: Advanced Micro Devices)

## Compaq 6005 Pro

SPECfp<sup>®</sup>\_rate2006 = 74.5

SPECfp\_rate\_base2006 = 68.4

CPU2006 license: 49

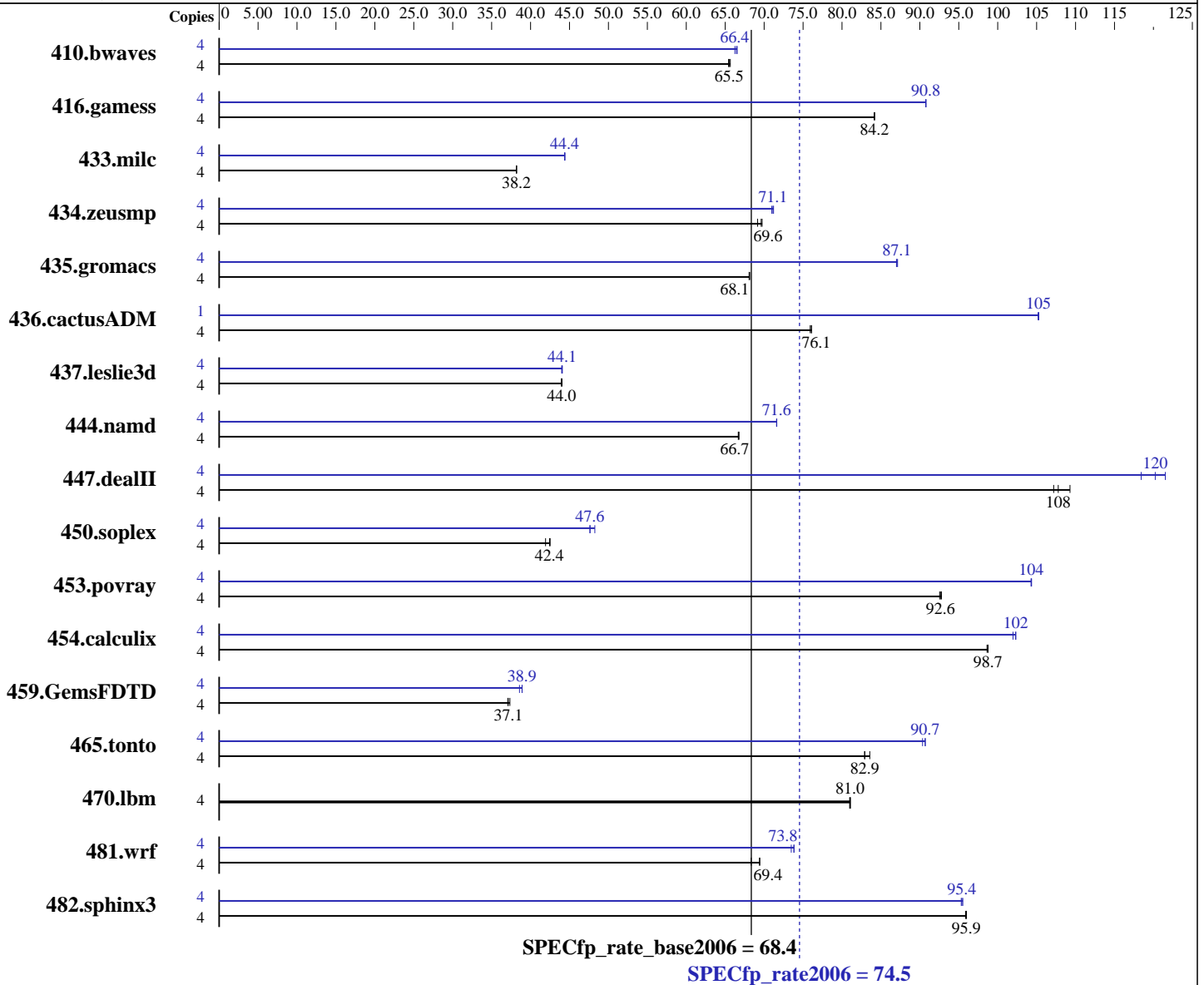
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Aug-2012

Hardware Availability: Sep-2010

Software Availability: Dec-2011



### Hardware

CPU Name: AMD Phenom II X4 B97  
 CPU Characteristics:  
 CPU MHz: 3200  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 1 chip, 4 cores/chip  
 CPU(s) orderable: 1 chip  
 Primary Cache: 64 KB I + 64 KB D on chip per core  
 Secondary Cache: 512 KB I+D on chip per core

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 4.2.4 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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L3 Cache: 6 MB I+D on chip per chip  
Other Cache: None  
Memory: 8 GB (4 x 2 GB 2Rx8 PC3-10600U-9)  
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	4	831	65.4	<b>830</b>	<b>65.5</b>	828	65.7	4	817	66.5	821	66.2	<b>818</b>	<b>66.4</b>
416.gamess	4	<b>930</b>	<b>84.2</b>	931	84.2	930	84.2	4	863	90.8	<b>863</b>	<b>90.8</b>	863	90.8
433.milc	4	<b>961</b>	<b>38.2</b>	961	38.2	962	38.2	4	828	44.4	827	44.4	<b>828</b>	<b>44.4</b>
434.zeusmp	4	522	69.7	526	69.2	<b>523</b>	<b>69.6</b>	4	<b>512</b>	<b>71.1</b>	511	71.2	513	71.0
435.gromacs	4	<b>419</b>	<b>68.1</b>	420	68.1	419	68.1	4	328	87.1	<b>328</b>	<b>87.1</b>	328	87.0
436.cactusADM	4	630	75.9	<b>628</b>	<b>76.1</b>	628	76.1	1	114	105	114	105	<b>114</b>	<b>105</b>
437.leslie3d	4	856	43.9	854	44.0	<b>855</b>	<b>44.0</b>	4	<b>853</b>	<b>44.1</b>	855	44.0	853	44.1
444.namd	4	481	66.7	<b>481</b>	<b>66.7</b>	480	66.8	4	448	71.6	<b>448</b>	<b>71.6</b>	448	71.6
447.dealII	4	427	107	419	109	<b>425</b>	<b>108</b>	4	386	118	377	122	<b>381</b>	<b>120</b>
450.soplex	4	796	41.9	<b>786</b>	<b>42.4</b>	785	42.5	4	700	47.6	<b>700</b>	<b>47.6</b>	691	48.3
453.povray	4	230	92.5	<b>230</b>	<b>92.6</b>	229	92.8	4	204	104	204	104	<b>204</b>	<b>104</b>
454.calculix	4	335	98.6	334	98.8	<b>334</b>	<b>98.7</b>	4	323	102	324	102	<b>323</b>	<b>102</b>
459.GemsFDTD	4	<b>1143</b>	<b>37.1</b>	1145	37.1	1136	37.3	4	<b>1091</b>	<b>38.9</b>	1090	38.9	1100	38.6
465.tonto	4	<b>475</b>	<b>82.9</b>	471	83.6	475	82.9	4	434	90.7	436	90.3	<b>434</b>	<b>90.7</b>
470.lbm	4	678	81.1	<b>678</b>	<b>81.0</b>	679	81.0	4	678	81.1	<b>678</b>	<b>81.0</b>	679	81.0
481.wrf	4	654	68.3	643	69.4	<b>644</b>	<b>69.4</b>	4	608	73.5	<b>605</b>	<b>73.8</b>	605	73.8
482.sphinx3	4	813	95.9	<b>813</b>	<b>95.9</b>	812	96.0	4	818	95.3	<b>817</b>	<b>95.4</b>	816	95.5

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

Huge pages were not configured for this run.  
Transparent huge pages were enabled for this run (OS default)

Binaries were compiled on a system with 2x AMD Opteron 2220SE chips + 32GB Memory using SLES10 SP2 (with binutils 2.18)



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## General Notes

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

HUGETLB\_LIMIT = "0"

LD\_LIBRARY\_PATH = "/root/work/cpu2006v1.1/amd1002-rate-libs-revC/64:/root/work/cpu2006v1.1/amd1002-rate-libs-revC/32"

OMP\_NUM\_THREADS = "4"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at <http://developer.amd.com/cpu/open64>

## 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.lelie3d: -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\_LP64 -DSPEC\_CPU\_LINUX -DSPEC\_CPU\_CASE\_FLAG  
 -fno-second-underscore  
 482.sphinx3: -DSPEC\_CPU\_LP64



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## Base Optimization Flags

C benchmarks:

-march=barcelona -mso -Ofast -OPT:malloc\_alg=1 -HP:bdt=2m

C++ benchmarks:

-march=barcelona -mso -Ofast -static -INLINE:aggressive=on  
-OPT:malloc\_alg=1 -HP:bdt=2m

Fortran benchmarks:

-march=barcelona -mso -Ofast -HP

Benchmarks using both Fortran and C:

-march=barcelona -mso -Ofast -OPT:malloc\_alg=1 -HP:bdt=2m -HP

## 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  
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\_LP64 -DSPEC\_CPU\_LINUX -DSPEC\_CPU\_CASE\_FLAG  
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## Peak Optimization Flags

### C benchmarks:

433.milc: -march=barcelona -mso -Ofast -CG:movnti=1  
-CG:local\_sched\_alg=1 -CG:locs\_shallow\_depth=1  
-HP:bdt=2m:heap=2m -LNO:prefetch=3

470.lbm: basepeak = yes

482.sphinx3: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -OPT:malloc\_alg=2  
-CG:sse\_cse\_regs=0 -CG:locs\_shallow\_depth=1 -CG:cmp\_peep=on  
-CG:local\_sched\_alg=1 -INLINE:aggressive=on

### C++ benchmarks:

444.namd: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -LNO:ignore\_feedback=off  
-CG:local\_sched\_alg=2 -CG:load\_exe=0 -CG:compute\_to=on  
-OPT:unroll\_size=256 -fno-exceptions -HP:bdt=2m:heap=2m

447.deallI: -march=barcelona -mso -Ofast -static -INLINE:aggressive=on  
-LNO:opt=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 -TENV:frame\_pointer=off

450.soplex: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -INLINE:aggressive=on  
-OPT:IEEE\_arith=3 -OPT:IEEE\_NaN\_Inf=off  
-OPT:fold\_unsigned\_relops=on -OPT:malloc\_alg=1  
-CG:load\_exe=0 -fno-exceptions -m32 -HP:bdt=2m

453.povray: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on

### Fortran benchmarks:

410.bwaves: -march=barcelona -mso -O3 -OPT:Ofast -OPT:treeheight=on  
-LNO:blocking=off -LNO:prefetch\_ahead=5  
-LNO:ignore\_feedback=off -WOPT:aggstr=0 -HP:bdt=2m:heap=2m  
-CG:cmp\_peep=on

416.gamess: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0  
-LNO:prefetch=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll\_size=256  
-HP:bdt=2m:heap=2m

434.zeusmp: -march=barcelona -mso -Ofast -LNO:blocking=off  
-LNO:interchange=off -OPT:treeheight=on -OPT:unroll\_size=256  
-CG:cmp\_peep=on -GRA:prioritize\_by\_density=on -HP

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## Peak Optimization Flags (Continued)

437.leslie3d: -march=barcelona -mso -Ofast -HP:bdt=2m:heap=2m

459.GemsFDTD: -march=barcelona -mso -Ofast -LNO:fission=2  
-LNO:prefetch\_ahead=1 -CG:load\_exe=0 -CG:local\_sched\_alg=1  
-HP

465.tonto: -march=barcelona -mso -Ofast  
-OPT:alias=no\_f90\_pointer\_alias -LNO:blocking=off  
-CG:load\_exe=1 -IPA:plimit=525 -HP

Benchmarks using both Fortran and C:

435.gromacs: -march=barcelona -mso -Ofast -OPT:rsqrt=2  
-HP:bdt=2m:heap=2m

436.cactusADM: -march=barcelona -mso -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -Ofast -apo -LNO:prefetch\_ahead=1  
-HP:bdt=2m:heap=2m -LANG:heap\_allocation\_threshold=100

454.calculix: -march=barcelona -mso -Ofast -CG:load\_exe=0  
-CG:ptr\_load\_use=0 -CG:local\_sched\_alg=2 -CG:compute\_to=on  
-LNO:prefetch\_ahead=30 -WOPT:unroll=2  
-GRA:optimize\_boundary=on -HP:bdt=2m:heap=2m

481.wrf: -march=barcelona -mso -Ofast -LNO:blocking=off  
-LNO:prefetch\_ahead=10 -LANG:copyinout=off  
-IPA:callee\_limit=5000 -GRA:prioritize\_by\_density=on -m3dnow  
-HP

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

<http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC-I.html>

<http://www.spec.org/cpu2006/flags/amd-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-open64-424-flags-rate-revC-I.xml>

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

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

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