



# SPEC<sup>®</sup> CFP2006 Result

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## Hewlett-Packard Company

SPECfp<sup>®</sup>\_rate2006 = 59.0

ProLiant BL465c G5  
(2.7 GHz AMD Opteron 2384)

SPECfp\_rate\_base2006 = 52.6

CPU2006 license: 3

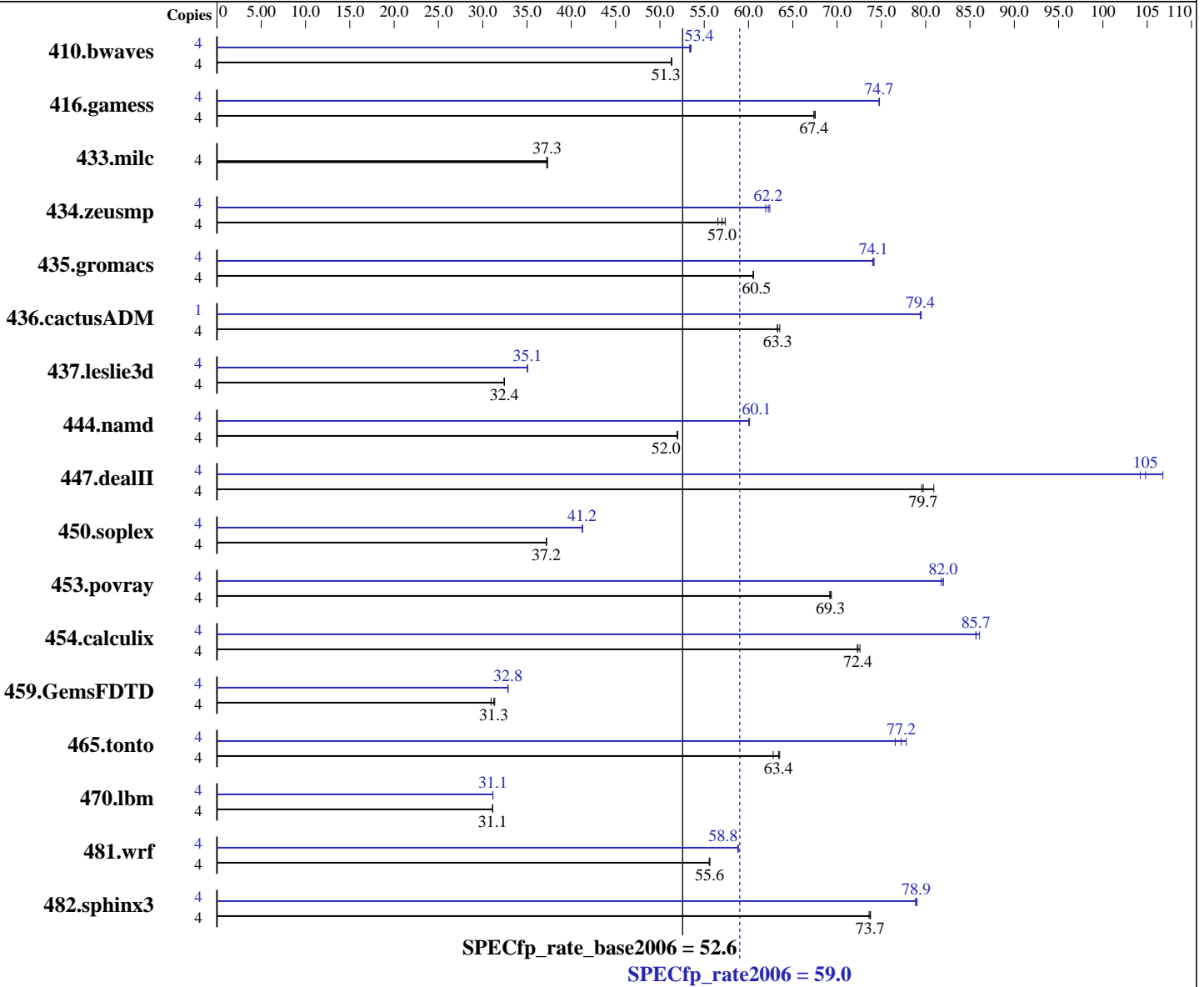
Test sponsor: Hewlett-Packard Company

Tested by: Hewlett-Packard Company

Test date: Nov-2008

Hardware Availability: Nov-2008

Software Availability: Jun-2008



### Hardware

CPU Name: AMD Opteron 2384  
 CPU Characteristics: 2700  
 CPU MHz: Integrated  
 FPU: 4 cores, 1 chip, 4 cores/chip  
 CPU(s) enabled: 1,2 chips  
 CPU(s) orderable: 64 KB I + 64 KB D on chip per core  
 Primary Cache: 512 KB I+D on chip per core  
 Secondary Cache:

Continued on next page

### Software

Operating System: SUSE Linux Enterprise Server 10 (x86\_64) SP1, Kernel 2.6.16.46-0.12-smp  
 Compiler: PGI Server Complete Version 7.2 PathScale Compiler Suite Version 3.2  
 Auto Parallel: Yes  
 File System: ext3  
 System State: Run level 3 (multi-user)  
 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: 16 GB (4x4 GB, PC2-6400P CL5)  
Disk Subsystem: 2x146 GB 10 K SAS  
Other Hardware: None

Other Software: binutils 2.17.50  
32-bit and 64-bit libhugetlbfs libraries

## Results Table

| Benchmark     | Base   |             |             |             |             |             |             | Peak   |             |             |             |             |             |             |
|---------------|--------|-------------|-------------|-------------|-------------|-------------|-------------|--------|-------------|-------------|-------------|-------------|-------------|-------------|
|               | Copies | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       | Copies | Seconds     | Ratio       | Seconds     | Ratio       | Seconds     | Ratio       |
| 410.bwaves    | 4      | 1060        | 51.3        | <b>1059</b> | <b>51.3</b> | 1059        | 51.3        | 4      | 1016        | 53.5        | 1019        | 53.4        | <b>1018</b> | <b>53.4</b> |
| 416.gamess    | 4      | <b>1162</b> | <b>67.4</b> | 1162        | 67.4        | 1160        | 67.5        | 4      | 1047        | 74.8        | <b>1048</b> | <b>74.7</b> | 1048        | 74.7        |
| 433.milc      | 4      | 984         | 37.3        | <b>985</b>  | <b>37.3</b> | 987         | 37.2        | 4      | 984         | 37.3        | <b>985</b>  | <b>37.3</b> | 987         | 37.2        |
| 434.zeusmp    | 4      | 635         | 57.4        | 644         | 56.5        | <b>638</b>  | <b>57.0</b> | 4      | 583         | 62.4        | <b>585</b>  | <b>62.2</b> | 588         | 61.9        |
| 435.gromacs   | 4      | 472         | 60.5        | 472         | 60.5        | <b>472</b>  | <b>60.5</b> | 4      | 385         | 74.2        | 386         | 74.0        | <b>385</b>  | <b>74.1</b> |
| 436.cactusADM | 4      | <b>755</b>  | <b>63.3</b> | 752         | 63.5        | 756         | 63.2        | 1      | 151         | 79.4        | 150         | 79.5        | <b>150</b>  | <b>79.4</b> |
| 437.leslie3d  | 4      | 1160        | 32.4        | 1159        | 32.4        | <b>1159</b> | <b>32.4</b> | 4      | 1073        | 35.0        | 1072        | 35.1        | <b>1072</b> | <b>35.1</b> |
| 444.namd      | 4      | 618         | 51.9        | <b>617</b>  | <b>52.0</b> | 617         | 52.0        | 4      | <b>534</b>  | <b>60.1</b> | 534         | 60.1        | 534         | 60.0        |
| 447.dealII    | 4      | <b>574</b>  | <b>79.7</b> | 565         | 80.9        | 575         | 79.5        | 4      | 429         | 107         | 439         | 104         | <b>437</b>  | <b>105</b>  |
| 450.soplex    | 4      | 897         | 37.2        | <b>897</b>  | <b>37.2</b> | 897         | 37.2        | 4      | <b>809</b>  | <b>41.2</b> | 809         | 41.2        | 808         | 41.3        |
| 453.povray    | 4      | 308         | 69.2        | <b>307</b>  | <b>69.3</b> | 307         | 69.4        | 4      | <b>260</b>  | <b>82.0</b> | 260         | 82.0        | 260         | 81.7        |
| 454.calculix  | 4      | 457         | 72.3        | <b>456</b>  | <b>72.4</b> | 455         | 72.6        | 4      | <b>385</b>  | <b>85.7</b> | 385         | 85.7        | 383         | 86.1        |
| 459.GemsFDTD  | 4      | 1353        | 31.4        | <b>1358</b> | <b>31.3</b> | 1372        | 30.9        | 4      | 1291        | 32.9        | <b>1292</b> | <b>32.8</b> | 1293        | 32.8        |
| 465.tonto     | 4      | <b>621</b>  | <b>63.4</b> | 620         | 63.5        | 627         | 62.8        | 4      | 514         | 76.6        | <b>510</b>  | <b>77.2</b> | 506         | 77.8        |
| 470.lbm       | 4      | <b>1766</b> | <b>31.1</b> | 1766        | 31.1        | 1766        | 31.1        | 4      | <b>1765</b> | <b>31.1</b> | 1765        | 31.1        | 1764        | 31.2        |
| 481.wrf       | 4      | 803         | 55.6        | <b>803</b>  | <b>55.6</b> | 804         | 55.6        | 4      | 759         | 58.9        | 760         | 58.8        | <b>760</b>  | <b>58.8</b> |
| 482.sphinx3   | 4      | 1059        | 73.6        | <b>1057</b> | <b>73.7</b> | 1057        | 73.8        | 4      | <b>988</b>  | <b>78.9</b> | 987         | 79.0        | 989         | 78.9        |

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

## Operating System Notes

Environment stack size set to 'unlimited'  
Max locked memory set to 2097152  
The libhugetlbfs libraries were installed using the installation rpms that came with the distribution.  
PGI\_HUGE\_PAGES set to 896.  
Total number of huge pages available is 3584.  
NCPUS set to number of cores



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**SPECfp\_rate2006 = 59.0**

ProLiant BL465c G5  
(2.7 GHz AMD Opteron 2384)

**SPECfp\_rate\_base2006 = 52.6**

**CPU2006 license:** 3  
**Test sponsor:** Hewlett-Packard Company  
**Tested by:** Hewlett-Packard Company

**Test date:** Nov-2008  
**Hardware Availability:** Nov-2008  
**Software Availability:** Jun-2008

## Platform Notes

BIOS configuration:  
Power Regulator set to Static High Performance Mode

## General Notes

Environment variables set by runspec before the start of the run:  
HUGETLB\_MORECORE = "yes"  
NCPUS = "4"

## Base Compiler Invocation

C benchmarks:  
pgcc

C++ benchmarks:  
pgcpp

Fortran benchmarks:  
pgf95

Benchmarks using both Fortran and C:  
pgcc pgf95

## 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 -Mnomain  
436.cactusADM: -DSPEC\_CPU\_LP64 -Mnomain  
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 -Mnomain  
459.GemsFDTD: -DSPEC\_CPU\_LP64  
465.tonto: -DSPEC\_CPU\_LP64  
470.lbm: -DSPEC\_CPU\_LP64  
481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
482.sphinx3: -DSPEC\_CPU\_LP64



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## Base Optimization Flags

C benchmarks:

-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

C++ benchmarks:

-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed  
--zc\_eh -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

Fortran benchmarks:

-Mvect=cachesize:6291456 -fastsse -Mfprelaxed -Msmartalloc=huge  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

Benchmarks using both Fortran and C:

-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed  
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

## Base Other Flags

C benchmarks:

-Mipa=jobs:4

C++ benchmarks:

-Mipa=jobs:4

Fortran benchmarks:

-Mipa=jobs:4

Benchmarks using both Fortran and C:

-Mipa=jobs:4

## Peak Compiler Invocation

C benchmarks:

pgcc

C++ benchmarks (except as noted below):

pathCC

444.namd: pgcpp

Fortran benchmarks (except as noted below):

pathf95

410.bwaves: pgf95

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**Software Availability:** Jun-2008

## Peak Compiler Invocation (Continued)

434.zeusmp: pgf95

437.leslie3d: pgf95

Benchmarks using both Fortran and C (except as noted below):

pgcc pgf95

435.gromacs: pathcc pathf95

481.wrf: pathcc pathf95

## 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 -Mnomain

437.leslie3d: -DSPEC\_CPU\_LP64

444.namd: -DSPEC\_CPU\_LP64

453.povray: -DSPEC\_CPU\_LP64

454.calculix: -DSPEC\_CPU\_LP64 -Mnomain

459.GemsFDTD: -DSPEC\_CPU\_LP64

465.tonto: -DSPEC\_CPU\_LP64

470.lbm: -DSPEC\_CPU\_LP64

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

482.sphinx3: -DSPEC\_CPU\_LP64

## Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: -Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge

-Mprefetch=t0 -Mloop32 -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

482.sphinx3: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)

-Mipa=fast(pass 2) -Mipa=inline(pass 2)

-Mvect=cachesize:6291456 -fastsse -Mfprelaxed -Msmartalloc

-tp barcelona-64 -Bstatic\_pgi

C++ benchmarks:

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## Peak Optimization Flags (Continued)

444.namd: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)  
-Mipa=inline(pass 2) -Mvect=cachesize:6291456 -fastsse  
-Munroll=n:4 -Munroll=m:8 -Msmartalloc=huge -Mnodepchk  
-Mfprelaxed --zc\_eh -tp barcelona-64 -Bstatic\_pgi

447.deallI: -march=barcelona -Ofast -static -INLINE:aggressive=on  
-fno-exceptions -m32

450.soplex: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2) -L/usr/lib -lhugetlbfs(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

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

### Fortran benchmarks:

410.bwaves: -Mvect=cachesize:6291456 -fastsse -Msmartalloc  
-Mprefetch=nta -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

416.gamess: -march=barcelona -fb\_create fbdata(pass 1)  
-fb\_opt fbdata(pass 2)  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT(pass 2)  
-L/usr/lib64 -lhugetlbfs(pass 2) -O2 -OPT:Ofast -OPT:ro=3  
-OPT:unroll\_size=256

434.zeusmp: -Mvect=cachesize:6291456 -fastsse -Mfprelaxed  
-Mprefetch=distance:8 -Mprefetch=t0 -Msmartalloc=huge  
-Msmartalloc=hugebss -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

437.leslie3d: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2)  
-Mvect=cachesize:6291456 -fastsse -Mvect=fuse  
-Msmartalloc=huge -Mprefetch=distance:8 -Mprefetch=t0  
-Mfprelaxed -tp barcelona-64 -Bstatic\_pgi

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2  
-LNO:prefetch\_ahead=1 -CG:load\_exe=0 -CG:prefer\_lru\_reg=off  
-OPT:malloc\_alg=1  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

465.tonto: -march=barcelona -Ofast -OPT:alias=no\_f90\_pointer\_alias  
-LNO:blocking=off -CG:load\_exe=1 -IPA:plimit=525  
-OPT:malloc\_alg=1  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

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## Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: -march=barcelona -Ofast -OPT:rsqrt=2 -OPT:malloc\_alg=1  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

436.cactusADM: -Mvect=cachesize:6291456 -fastsse -Mconcur  
-Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

454.calculix: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)  
-Mipa=fast(pass 2) -Mipa=inline(pass 2)  
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge  
-Mprefetch=t0 -Mpre -Mfprelaxed -tp barcelona-64  
-Bstatic\_pgi

481.wrf: -march=barcelona -Ofast -LNO:blocking=off  
-LNO:prefetch\_ahead=10 -LANG:copyinout=off  
-IPA:callee\_limit=5000 -GRA:prioritize\_by\_density=on  
-OPT:malloc\_alg=1 -m3dnow  
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf\_x86\_64.xBDT  
-L/usr/lib64 -lhugetlbfs

## Peak Other Flags

C benchmarks:

-Mipa=jobs:4(pass 2)

C++ benchmarks:

444.namd: -Mipa=jobs:4(pass 2)

Fortran benchmarks (except as noted below):

-Mipa=jobs:4(pass 2)

416.gamess: No flags used

459.GemsFDTD: No flags used

465.tonto: No flags used

Benchmarks using both Fortran and C (except as noted below):

-Mipa=jobs:4(pass 2)

435.gromacs: No flags used

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## Peak Other Flags (Continued)

481.wrf: No flags used

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

<http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.20090710.html>

[http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090710.html](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.html)

[http://www.spec.org/cpu2006/flags/pgi72\\_linux\\_flags.html](http://www.spec.org/cpu2006/flags/pgi72_linux_flags.html)

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

<http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.20090710.xml>

[http://www.spec.org/cpu2006/flags/CPU2006\\_flags.20090710.xml](http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.xml)

[http://www.spec.org/cpu2006/flags/pgi72\\_linux\\_flags.xml](http://www.spec.org/cpu2006/flags/pgi72_linux_flags.xml)

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

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