# SPEC® CFP2006 Result

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## Hewlett-Packard Company

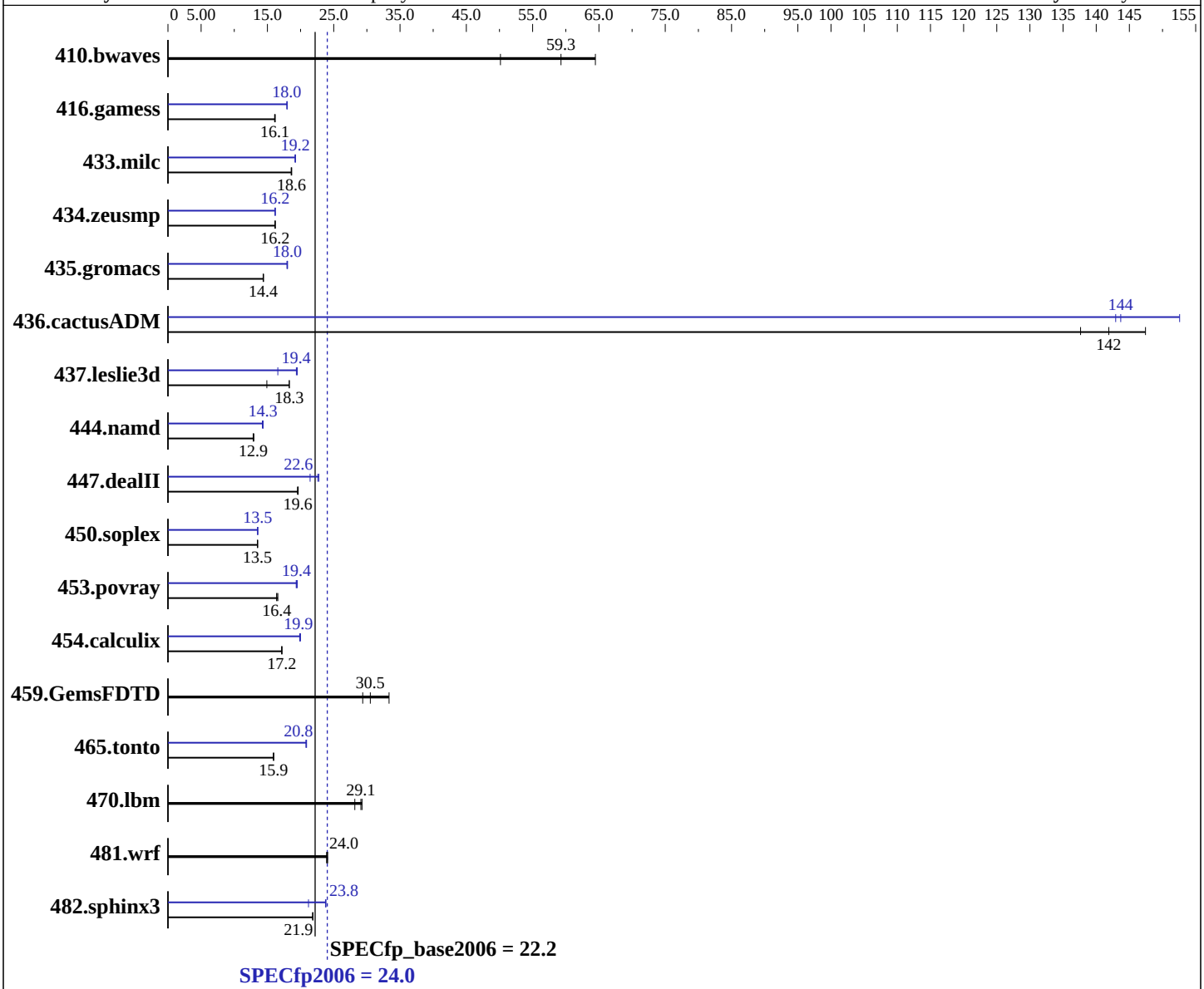
ProLiant DL585 G6
(2.6 GHz AMD Opteron 8435)

SPECfp®2006 = 24.0

SPECfp_base2006 = 22.2

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

**Test date:** May-2009
**Hardware Availability:** Jun-2009
**Software Availability:** May-2008




### Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 8435 |
| CPU Characteristics: | |
| CPU MHz: | 2600 |
| FPU: | Integrated |
| CPU(s) enabled: | 12 cores, 2 chips, 6 cores/chip |
| CPU(s) orderable: | 2,4 chips |
| Primary Cache: | 64 KB I + 64 KB D on chip per core |
| Secondary Cache: | 512 KB I+D on chip per core |

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### Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 5.3, Advanced Platform, Kernel 2.6.18-128.el5 |
| Compiler: | PGI Server Complete Version 8.0<br>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: 32 GB (8x4 GB, PC2-6400P CL5)
Disk Subsystem: 1x146 GB 10 K SAS
Other Hardware: None

Other Software: binutils 2.18
32-bit and 64-bit libhugetlbfs libraries

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 271 | 50.1 | 211 | 64.5 | **229** | **59.3** | 271 | 50.1 | 211 | 64.5 | **229** | **59.3** |
| 416.gamess | **1213** | **16.1** | 1217 | 16.1 | 1211 | 16.2 | **1091** | **18.0** | 1088 | 18.0 | 1092 | 17.9 |
| 433.milc | **493** | **18.6** | 494 | 18.6 | 492 | 18.7 | 477 | 19.2 | **478** | **19.2** | 479 | 19.2 |
| 434.zeusmp | 563 | 16.2 | **563** | **16.2** | 563 | 16.2 | 562 | 16.2 | 563 | 16.2 | **563** | **16.2** |
| 435.gromacs | 496 | 14.4 | **496** | **14.4** | 497 | 14.4 | 398 | 17.9 | **396** | **18.0** | 396 | 18.0 |
| 436.cactusADM | 81.1 | 147 | 86.8 | 138 | **84.2** | **142** | 83.6 | 143 | 78.3 | 153 | **83.2** | **144** |
| 437.leslie3d | 630 | 14.9 | **514** | **18.3** | 513 | 18.3 | **485** | **19.4** | 567 | 16.6 | 482 | 19.5 |
| 444.namd | 619 | 13.0 | **623** | **12.9** | 624 | 12.8 | 563 | 14.2 | **559** | **14.3** | 559 | 14.3 |
| 447.dealII | **583** | **19.6** | 582 | 19.6 | 586 | 19.5 | 534 | 21.4 | **506** | **22.6** | 503 | 22.8 |
| 450.soplex | **617** | **13.5** | 617 | 13.5 | 617 | 13.5 | **616** | **13.5** | 616 | 13.5 | 617 | 13.5 |
| 453.povray | 324 | 16.4 | **324** | **16.4** | 321 | 16.6 | 273 | 19.5 | 275 | 19.3 | **274** | **19.4** |
| 454.calculix | 480 | 17.2 | **480** | **17.2** | 481 | 17.2 | 415 | 19.9 | **414** | **19.9** | 413 | 20.0 |
| 459.GemsFDTD | 318 | 33.3 | **348** | **30.5** | 361 | 29.4 | 318 | 33.3 | **348** | **30.5** | 361 | 29.4 |
| 465.tonto | 617 | 16.0 | **618** | **15.9** | 618 | 15.9 | 472 | 20.8 | **472** | **20.8** | 471 | 20.9 |
| 470.lbm | **472** | **29.1** | 488 | 28.2 | 469 | 29.3 | **472** | **29.1** | 488 | 28.2 | 469 | 29.3 |
| 481.wrf | **465** | **24.0** | 464 | 24.1 | 467 | 23.9 | **465** | **24.0** | 464 | 24.1 | 467 | 23.9 |
| 482.sphinx3 | 894 | 21.8 | **892** | **21.9** | 891 | 21.9 | 920 | 21.2 | 818 | 23.8 | **820** | **23.8** |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

```
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2457600'  was used to set environment locked pages in memory limit
The libhugetlbfs libraries were installed using the
installation rpms that came with the distribution.
PGI_HUGE_PAGES set to 450.
Total number of huge pages available is 5400.
NCPUS set to number of cores
```

## 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 = "12"
```

## 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

## Base Optimization Flags

C benchmarks:
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mconcur
-Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi

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## Base Optimization Flags (Continued)

C++ benchmarks:
```
-Mvect=cachesize:6291456 -fastsse -Mconcur -Msmartalloc=huge
-Mfprelaxed --zc_eh -Mipa=fast -Mipa=inline -tp barcelona-64
-Bstatic_pgi
```

Fortran benchmarks:
```
-Mvect=cachesize:6291456 -fastsse -Mconcur -Mfprelaxed
-Msmartalloc=huge -Mipa=fast -Mipa=inline -tp barcelona-64
-Bstatic_pgi
```

Benchmarks using both Fortran and C:
```
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mconcur
-Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi
```

## Base Other Flags

C benchmarks:
```
-Mipa=jobs:11
```

C++ benchmarks:
```
-Mipa=jobs:11
```

Fortran benchmarks:
```
-Mipa=jobs:11
```

Benchmarks using both Fortran and C:
```
-Mipa=jobs:11
```

## Peak Compiler Invocation

C benchmarks:
```
pgcc
```

C++ benchmarks (except as noted below):
```
pathCC
```

444.namd: `pgcpp`

Fortran benchmarks (except as noted below):
```
pgf95
```

416.gamess: `pathf95`

465.tonto: `pathf95`

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## Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C (except as noted below):
pgcc pgf95

435.gromacs: 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_CASE_FLAG -DSPEC_CPU_LINUX
482.sphinx3: -DSPEC_CPU_LP64

## Peak Optimization Flags

C benchmarks:

433.milc: -fastsse -Msmartalloc=huge -Msafeptr -Mconcur -Mfprelaxed
-Mipa=inline -Mipa=arg -Mipa=const -Mipa=ptr -Mipa=shape
-tp barcelona-64

470.lbm: basepeak = yes

482.sphinx3: -Mpfi=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:

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

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# Peak Optimization Flags (Continued)

447.dealII: `-march=barcelona -Ofast -INLINE:aggressive=on -LNO:opt=0 -OPT:alias=disjoint -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: `basepeak = yes`

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 -Mconcur -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) `-Mconcur=noaltcode`(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: `basepeak = yes`

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`

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`

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## Peak Optimization Flags (Continued)

454.calculix: `-Mpfi=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: `basepeak = yes`

## Peak Other Flags

C benchmarks:
`-Mipa=jobs:11`(pass 2)

C++ benchmarks:

444.namd: `-Mipa=jobs:11`(pass 2)

Fortran benchmarks (except as noted below):
`-Mipa=jobs:11`

416.gamess: `No flags used`

465.tonto: `No flags used`

Benchmarks using both Fortran and C (except as noted below):
`-Mipa=jobs:11`

435.gromacs: `No flags used`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/pgi80_linux_flags.html`
`http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.20090710.00.html`
`http://www.spec.org/cpu2006/flags/CPU2006_flags.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/pgi80_linux_flags.xml`
`http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.20090710.00.xml`
`http://www.spec.org/cpu2006/flags/CPU2006_flags.xml`

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