# SPEC® CFP2006 Result

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## Hewlett-Packard Company

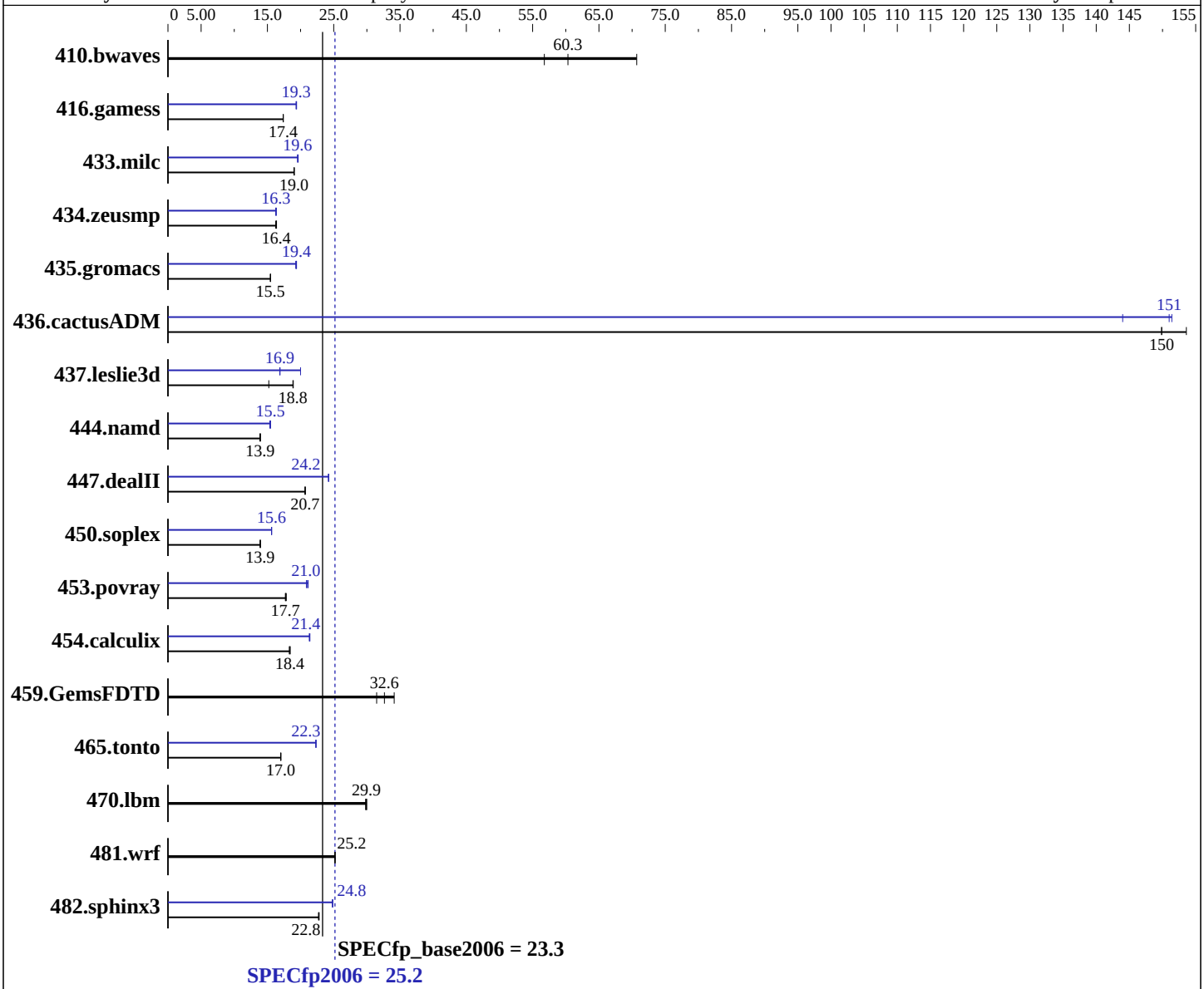
ProLiant DL585 G6
(2.8 GHz AMD Opteron 8439 SE)

SPECfp®2006 = 25.2

SPECfp_base2006 = 23.3

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

**Test date:** Jun-2009
**Hardware Availability:** Jul-2009
**Software Availability:** Apr-2009




### Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 8439 SE |
| CPU Characteristics: | |
| CPU MHz: | 2800 |
| 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 | 239 | 56.8 | 192 | 70.7 | **225** | **60.3** | 239 | 56.8 | 192 | 70.7 | **225** | **60.3** |
| 416.gamess | **1126** | **17.4** | 1126 | 17.4 | 1127 | 17.4 | **1012** | **19.3** | 1013 | 19.3 | 1009 | 19.4 |
| 433.milc | 483 | 19.0 | 482 | 19.1 | **482** | **19.0** | 470 | 19.5 | **469** | **19.6** | 467 | 19.6 |
| 434.zeusmp | 556 | 16.4 | **557** | **16.4** | 560 | 16.2 | 557 | 16.3 | **558** | **16.3** | 560 | 16.3 |
| 435.gromacs | **462** | **15.5** | 463 | 15.4 | 461 | 15.5 | 371 | 19.3 | 368 | 19.4 | **368** | **19.4** |
| 436.cactusADM | 79.7 | 150 | **79.7** | **150** | 77.8 | 154 | 78.9 | 151 | 83.0 | 144 | **79.1** | **151** |
| 437.leslie3d | 618 | 15.2 | 497 | 18.9 | **499** | **18.8** | **556** | **16.9** | 558 | 16.9 | 470 | 20.0 |
| 444.namd | 578 | 13.9 | **575** | **13.9** | 575 | 13.9 | 522 | 15.4 | 519 | 15.5 | **519** | **15.5** |
| 447.dealII | 554 | 20.7 | **553** | **20.7** | 552 | 20.7 | 472 | 24.2 | **472** | **24.2** | 472 | 24.2 |
| 450.soplex | 600 | 13.9 | **599** | **13.9** | 598 | 14.0 | 533 | 15.6 | **534** | **15.6** | 534 | 15.6 |
| 453.povray | **300** | **17.7** | 298 | 17.8 | 300 | 17.7 | 252 | 21.2 | **253** | **21.0** | 255 | 20.9 |
| 454.calculix | **448** | **18.4** | 451 | 18.3 | 448 | 18.4 | 387 | 21.3 | 385 | 21.4 | **386** | **21.4** |
| 459.GemsFDTD | 337 | 31.5 | 311 | 34.1 | **325** | **32.6** | 337 | 31.5 | 311 | 34.1 | **325** | **32.6** |
| 465.tonto | 579 | 17.0 | 578 | 17.0 | **578** | **17.0** | 440 | 22.3 | **441** | **22.3** | 441 | 22.3 |
| 470.lbm | 461 | 29.8 | **459** | **29.9** | 458 | 30.0 | 461 | 29.8 | **459** | **29.9** | 458 | 30.0 |
| 481.wrf | 443 | 25.2 | 444 | 25.1 | **443** | **25.2** | 443 | 25.2 | 444 | 25.1 | **443** | **25.2** |
| 482.sphinx3 | **856** | **22.8** | 855 | 22.8 | 859 | 22.7 | 786 | 24.8 | 785 | 24.8 | **785** | **24.8** |

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

## Operating System Notes

```
Environment stack size set to 'unlimited'
Max locked memory set to 2457600
The libhugetlbfs libraries were installed using the
installation rpms that came with the distribution.
Set vm/nr_hugepages=5400 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
PGI_HUGE_PAGES set to 450.
```

## 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/hp-amd-linux-flags.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/hp-amd-linux-flags.xml`
`http://www.spec.org/cpu2006/flags/CPU2006_flags.xml`

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