



SPEC® CFP2006 Result

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Hewlett-Packard Company

SPECfp®_rate2006 = 513

ProLiant DL785 G6
(2.8 GHz AMD Opteron 8439 SE)

SPECfp_rate_base2006 = 473

CPU2006 license: 3

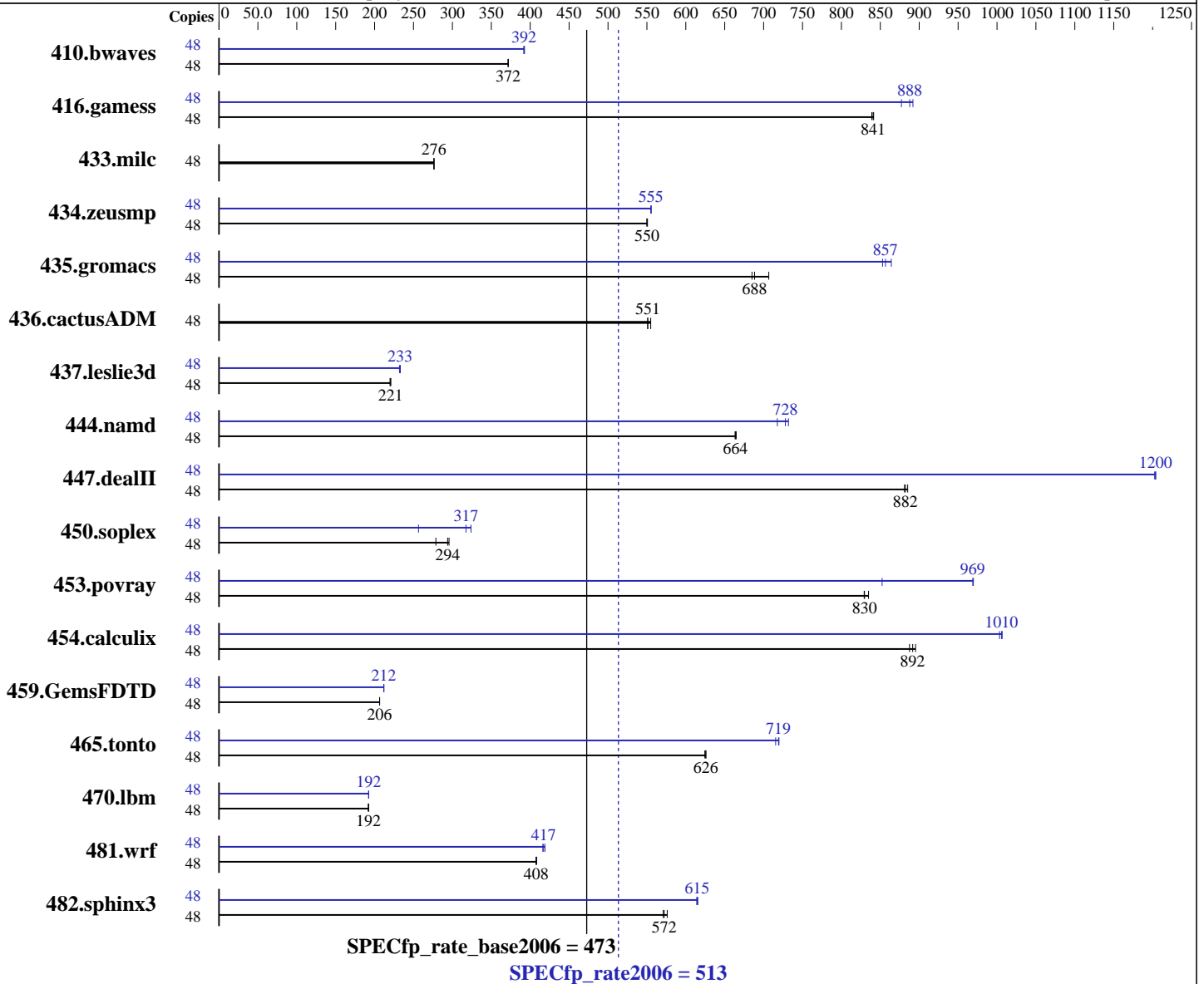
Test date: Aug-2009

Test sponsor: Hewlett-Packard Company

Hardware Availability: Oct-2009

Tested by: Hewlett-Packard Company

Software Availability: Apr-2009



Hardware

CPU Name: AMD Opteron 8439 SE
 CPU Characteristics:
 CPU MHz: 2800
 FPU: Integrated
 CPU(s) enabled: 48 cores, 8 chips, 6 cores/chip
 CPU(s) orderable: 4,8 chips
 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 5.3, Kernel 2.6.18-128.el5
 Compiler: PGI Server Complete Version 8.0 x86 Open64 4.2.2 Compiler Suite
 Auto Parallel: No
 File System: ext3
 System State: Run level 5 (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: 128 GB (32x4 GB, PC2-6400 CL5)
Disk Subsystem: 4x72 GB 10K SAS
Other Hardware: None

Other Software: binutils 2.18

Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---------------|--------|-------------|------------|-------------|------------|-------------|------------|--------|-------------|------------|-------------|-------------|-------------|-------------|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 48 | 1755 | 372 | 1754 | 372 | <u>1755</u> | <u>372</u> | 48 | <u>1664</u> | <u>392</u> | 1661 | 393 | 1665 | 392 |
| 416.gamess | 48 | 1117 | 841 | 1120 | 839 | <u>1118</u> | <u>841</u> | 48 | 1054 | 892 | <u>1059</u> | <u>888</u> | 1072 | 877 |
| 433.milc | 48 | 1595 | 276 | 1595 | 276 | <u>1595</u> | <u>276</u> | 48 | 1595 | 276 | 1595 | 276 | <u>1595</u> | <u>276</u> |
| 434.zeusmp | 48 | 794 | 550 | 793 | 551 | <u>794</u> | <u>550</u> | 48 | <u>787</u> | <u>555</u> | 786 | 555 | 787 | 555 |
| 435.gromacs | 48 | <u>498</u> | <u>688</u> | 500 | 685 | 485 | 707 | 48 | 397 | 864 | 402 | 853 | <u>400</u> | <u>857</u> |
| 436.cactusADM | 48 | 1034 | 555 | 1041 | 551 | <u>1041</u> | <u>551</u> | 48 | 1034 | 555 | 1041 | 551 | <u>1041</u> | <u>551</u> |
| 437.leslie3d | 48 | <u>2045</u> | <u>221</u> | 2053 | 220 | 2044 | 221 | 48 | 1945 | 232 | 1936 | 233 | <u>1939</u> | <u>233</u> |
| 444.namd | 48 | 580 | 663 | 579 | 665 | <u>580</u> | <u>664</u> | 48 | 536 | 718 | <u>529</u> | <u>728</u> | 526 | 732 |
| 447.dealII | 48 | <u>622</u> | <u>882</u> | 623 | 881 | 620 | 885 | 48 | 457 | 1200 | 456 | 1200 | <u>456</u> | <u>1200</u> |
| 450.soplex | 48 | 1436 | 279 | <u>1362</u> | <u>294</u> | 1354 | 296 | 48 | 1561 | 256 | <u>1261</u> | <u>317</u> | 1236 | 324 |
| 453.povray | 48 | 306 | 835 | <u>308</u> | <u>830</u> | 308 | 829 | 48 | 263 | 970 | <u>264</u> | <u>969</u> | 300 | 852 |
| 454.calculix | 48 | 442 | 895 | 446 | 888 | <u>444</u> | <u>892</u> | 48 | 393 | 1010 | <u>394</u> | <u>1010</u> | 395 | 1000 |
| 459.GemsFDTD | 48 | 2466 | 207 | 2468 | 206 | <u>2467</u> | <u>206</u> | 48 | <u>2405</u> | <u>212</u> | 2405 | 212 | 2402 | 212 |
| 465.tonto | 48 | 756 | 624 | 755 | 626 | <u>755</u> | <u>626</u> | 48 | 656 | 720 | <u>657</u> | <u>719</u> | 660 | 715 |
| 470.lbm | 48 | <u>3433</u> | <u>192</u> | 3434 | 192 | 3432 | 192 | 48 | <u>3428</u> | <u>192</u> | 3428 | 192 | 3428 | 192 |
| 481.wrf | 48 | 1314 | 408 | <u>1315</u> | <u>408</u> | 1315 | 408 | 48 | 1288 | 416 | <u>1285</u> | <u>417</u> | 1280 | 419 |
| 482.sphinx3 | 48 | 1638 | 571 | <u>1635</u> | <u>572</u> | 1624 | 576 | 48 | 1524 | 614 | 1520 | 615 | <u>1522</u> | <u>615</u> |

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 and local memory
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 vm/nr_hugepages=21600 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages



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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_LIMIT = "450"

LD_LIBRARY_PATH = "/SPECcpu2006_Open64/amd0905is-libs/64:/SPECcpu2006_Open64/amd0905is-libs/32"

PGI_HUGE_PAGES = "450"

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:

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:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline
-tp shanghai-64 -Bstatic_pgi

C++ benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed --zc_eh -Mipa=fast
-Mipa=inline -tp shanghai-64 -Bstatic_pgi

Fortran benchmarks:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mvect=short -Mipa=fast
-Mipa=inline -tp shanghai-64 -Bstatic_pgi

Benchmarks using both Fortran and C:

-fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=fast -Mipa=inline
-tp shanghai-64 -Mvect=short -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):

openCC

444.namd: pgcpp

Fortran benchmarks (except as noted below):

openf95

410.bwaves: pgf95

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Peak Compiler Invocation (Continued)

434.zeusmp: pgf95

437.leslie3d: pgf95

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

pgcc pgf95

435.gromacs: 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 -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: basepeak = yes

470.lbm: -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mloop32
-Mfprelaxed -Mipa=fast -Mipa=inline -tp shanghai-64
-Bstatic_pgi

482.sphinx3: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Mfprelaxed -Msmartalloc -tp shanghai-64 -Bstatic_pgi

C++ benchmarks:

444.namd: -Mphi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -fastsse -Munroll=n:4 -Munroll=m:8
-Msmartalloc=huge -Mnodepchk -Mfprelaxed --zc_eh
-tp shanghai-64 -Bstatic_pgi

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Peak Optimization Flags (Continued)

447.deallI: -march=barcelona -Ofast -static -INLINE:aggressive=on
-LNO:opt=0 -Wf,-fno-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 -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 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on
-HP:bdt=2m:heap=2m

Fortran benchmarks:

410.bwaves: -fastsse -Msmartalloc -Mprefetch=nta -Mfprelaxed
-Mipa=fast -Mipa=inline -tp shanghai-64 -Bstatic_pgi

416.gamess: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O2 -OPT:Ofast -OPT:ro=3
-OPT:unroll_size=256 -HP:bdt=2m:heap=2m

434.zeusmp: -fastsse -Mfprelaxed -Mprefetch=distance:8 -Mprefetch=t0
-Msmartalloc=huge -Msmartalloc=hugebss -Mipa=fast
-Mipa=inline -tp shanghai-64 -Bstatic_pgi

437.leslie3d: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Mvect=fuse -Msmartalloc=huge -Mprefetch=distance:8
-Mprefetch=t0 -Mfprelaxed -tp shanghai-64 -Bstatic_pgi

459.GemsFDTD: -march=barcelona -Ofast -LNO:fission=2 -LNO:simd=2
-LNO:prefetch_ahead=1 -CG:load_exe=0 -HP

465.tonto: -march=barcelona -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 -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m

436.cactusADM: basepeak = yes

454.calculix: -Mphi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Mvect=short -Msmartalloc=huge -Mprefetch=t0 -Mpre
-Mfprelaxed -tp shanghai-64 -Bstatic_pgi

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Peak Optimization Flags (Continued)

```
481.wrf: -fastsse -Mvect=noaltcode -Msmartalloc=huge
-Mprefetch=distance:8 -Mfprelaxed -tp shanghai-64
-Bstatic_pgi
```

Peak Other Flags

C benchmarks:

```
-Mipa=jobs:4(pass 2)
```

C++ benchmarks:

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

Fortran benchmarks:

```
410.bwaves: -Mipa=jobs:4
```

```
434.zeusmp: -Mipa=jobs:4
```

```
437.leslie3d: -Mipa=jobs:4(pass 2)
```

Benchmarks using both Fortran and C:

```
436.cactusADM: -Mipa=jobs:4
```

```
454.calculix: -Mipa=jobs:4(pass 2)
```

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

http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090901.html

<http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.html>

<http://www.spec.org/cpu2006/flags/x86-open64-4.2.2-flags-revE.html>

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

http://www.spec.org/cpu2006/flags/pgi80_linux_flags.20090901.xml

<http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.xml>

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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