SPEC® CFP2006 Result
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Hewlett-Packard Company

ProLiant BL465c G5
(2.7 GHz AMD Opteron 2384)

$SPECfp^{®}2006 =$ 21.5

$SPECfp\_base2006 =$ 19.2

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

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

Benchmark	base	peak
410.bwaves		26.6
416.gamess	16.3	18.7
433.milc		20.7
434.zeusmp	16.8	18.6
435.gromacs	14.6	18.0
436.cactusADM		21.9
437.leslie3d	19.2	20.0
444.namd	12.6	14.6
447.dealII	21.5	28.6
450.soplex	15.6	17.8
453.povray	17.3	20.5
454.calculix	18.2	21.6
459.GemsFDTD	18.2	20.5
465.tonto	17.0	21.7
470.lbm		30.8
481.wrf	22.4	24.4
482.sphinx3	25.6	26.9

SPECfp_base2006 = 19.2

SPECfp2006 = 21.5

Hardware

CPU Name:	AMD Opteron 2384
CPU Characteristics:	
CPU MHz:	2700
FPU:	Integrated
CPU(s) enabled:	4 cores, 1 chip, 4 cores/chip
CPU(s) orderable:	1,2 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:	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:	No
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit

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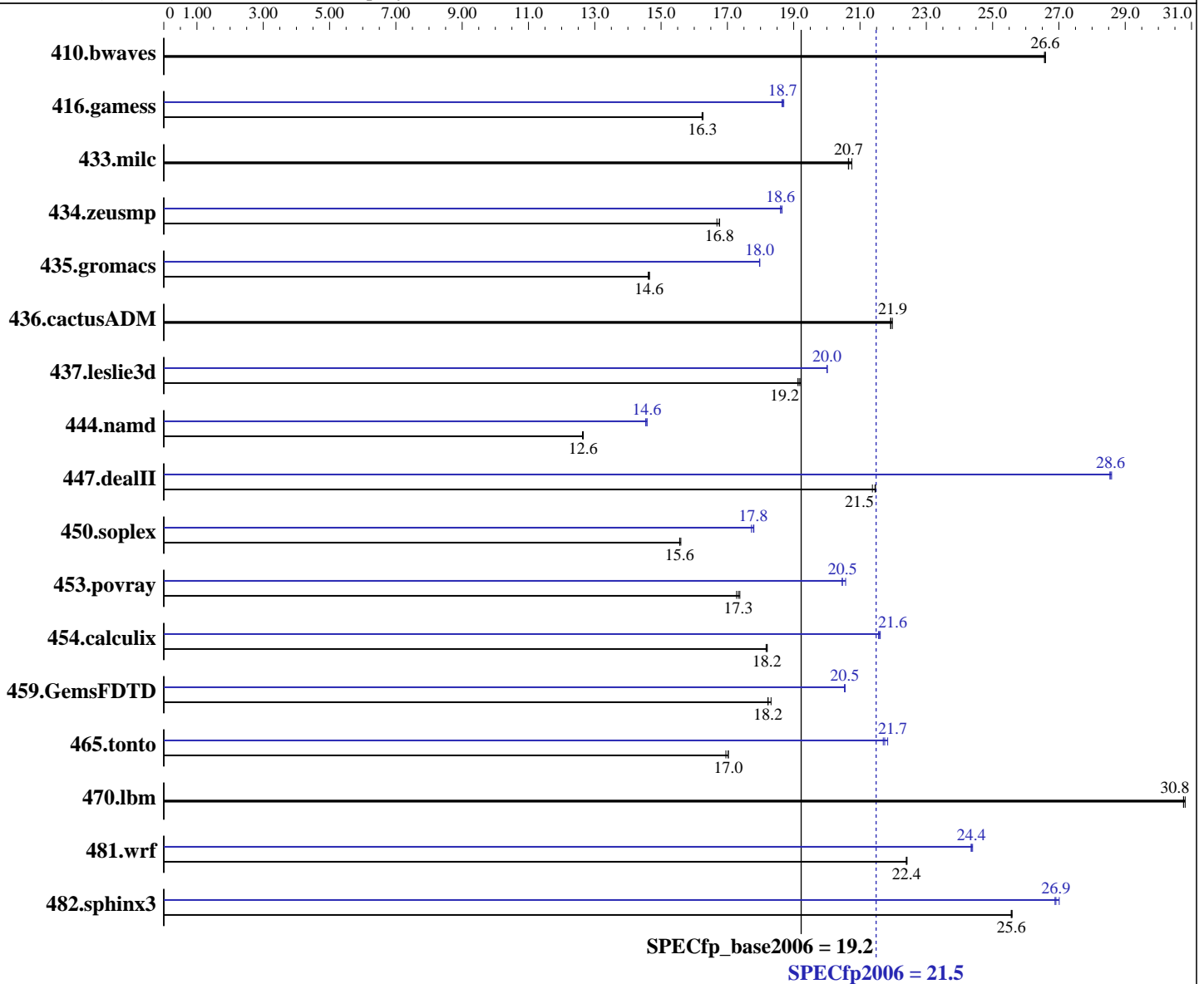|	
CPU2006 license: 3	**Test date:** Oct-2008
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L3 Cache:	6 MB I+D on chip per chip	Other Software:	binutils 2.17.50
Other Cache:	None		32-bit and 64-bit libhugetlbfs libraries
Memory:	16 GB (4x4 GB, PC2-6400P CL5)		
Disk Subsystem:	2x146 GB 10 K SAS		
Other Hardware:	None		

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	512	26.6	**511**	**26.6**	511	26.6	512	26.6	**511**	**26.6**	511	26.6
416.gamess	1204	16.3	**1205**	**16.3**	1206	16.2	**1049**	**18.7**	1050	18.6	1047	18.7
433.milc	445	20.6	442	20.8	**444**	**20.7**	445	20.6	442	20.8	**444**	**20.7**
434.zeusmp	543	16.8	545	16.7	**543**	**16.8**	488	18.6	**489**	**18.6**	489	18.6
435.gromacs	489	14.6	487	14.7	**488**	**14.6**	**397**	**18.0**	397	18.0	397	18.0
436.cactusADM	**545**	**21.9**	545	21.9	544	22.0	**545**	**21.9**	545	21.9	544	22.0
437.leslie3d	**490**	**19.2**	491	19.1	489	19.2	470	20.0	**470**	**20.0**	470	20.0
444.namd	634	12.7	635	12.6	**634**	**12.6**	550	14.6	552	14.5	**550**	**14.6**
447.dealII	533	21.5	535	21.4	**533**	**21.5**	401	28.5	400	28.6	**401**	**28.6**
450.soplex	535	15.6	536	15.6	**536**	**15.6**	469	17.8	**469**	**17.8**	471	17.7
453.povray	306	17.4	**307**	**17.3**	308	17.3	**260**	**20.5**	259	20.6	260	20.5
454.calculix	453	18.2	454	18.2	**453**	**18.2**	383	21.6	382	21.6	**382**	**21.6**
459.GemsFDTD	582	18.2	**582**	**18.2**	579	18.3	516	20.5	**516**	**20.5**	517	20.5
465.tonto	580	17.0	578	17.0	**578**	**17.0**	453	21.7	**453**	**21.7**	451	21.8
470.lbm	446	30.8	**447**	**30.8**	447	30.8	446	30.8	**447**	**30.8**	447	30.8
481.wrf	498	22.4	**499**	**22.4**	499	22.4	458	24.4	**459**	**24.4**	459	24.4
482.sphinx3	**762**	**25.6**	762	25.6	762	25.6	**724**	**26.9**	722	27.0	725	26.9

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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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"
```

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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CPU2006 license: 3	**Test date:** Oct-2008
Test sponsor: Hewlett-Packard Company	**Hardware Availability:** Nov-2008
Tested by: Hewlett-Packard Company	**Software Availability:** Jun-2008

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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CPU2006 license: 3		**Test date:**	Oct-2008
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Tested by:	Hewlett-Packard Company	**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: `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
```

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Peak Optimization Flags (Continued)

444.namd (continued):
```
-Mfprelaxed --zc_eh -tp barcelona-64 -Bstatic_pgi
```

447.dealII: `-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: 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`
`-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`

Benchmarks using both Fortran and C:

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Peak Optimization Flags (Continued)

```
 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: basepeak = yes

 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: -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

      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/pgi72_linux_flags.html

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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/pgi72_linux_flags.xml

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

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