SPEC® CFP2006 Result

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Hewlett-Packard Company

ProLiant DL385 G7
(2.3 GHz AMD Opteron 6176 SE)

$SPECfp^{®}\_rate2006 =$ 318

$SPECfp\_rate\_base2006 =$ 290

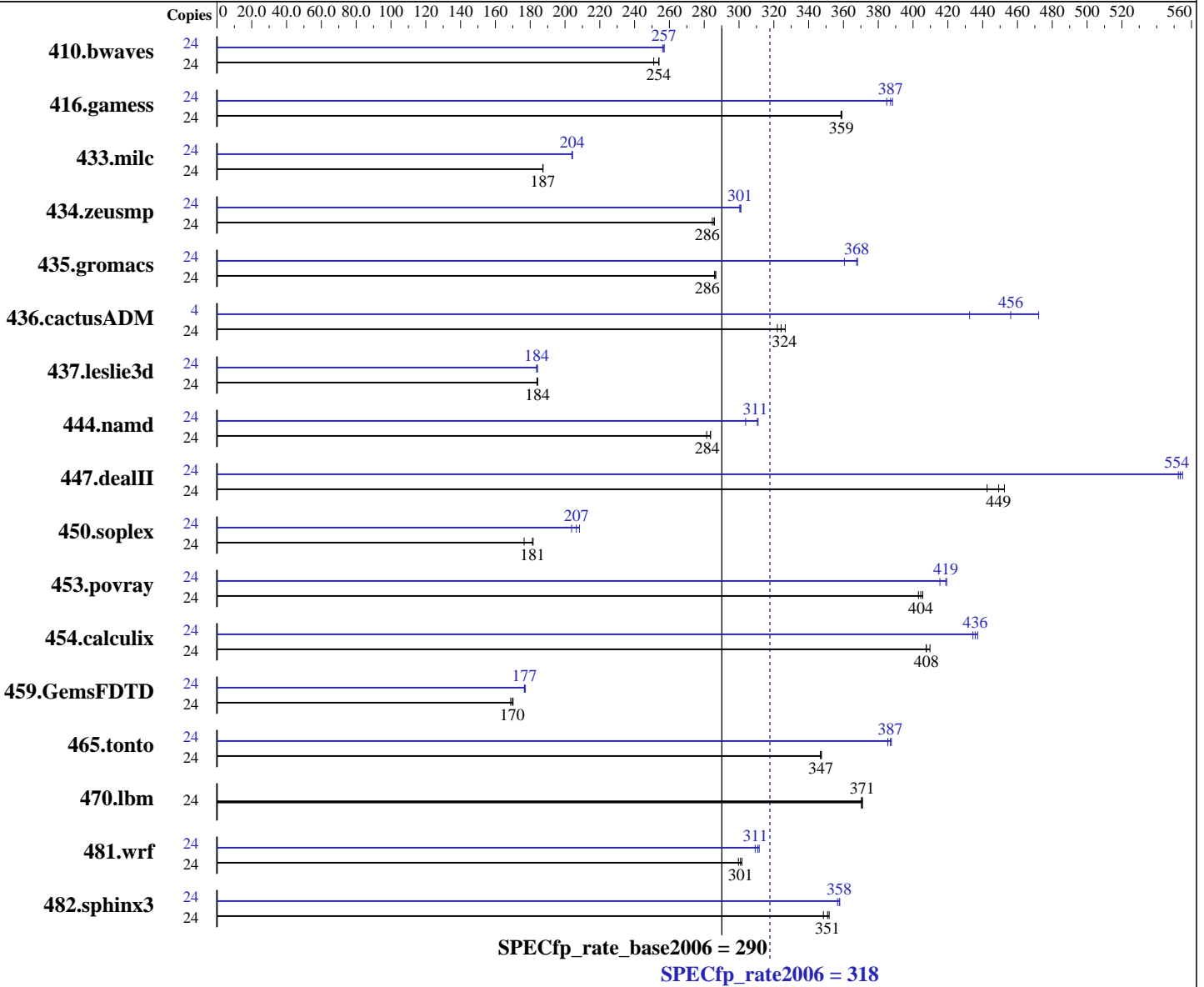|	
CPU2006 license: 3	**Test date:** Mar-2010
Test sponsor: Hewlett-Packard Company	**Hardware Availability:** Apr-2010
Tested by: Hewlett-Packard Company	**Software Availability:** Mar-2010

Copies

Benchmark	Copies	Result (blue)	Copies	Result (black)
410.bwaves	24	257	24	254
416.gamess	24	387	24	359
433.milc	24	204	24	187
434.zeusmp	24	301	24	286
435.gromacs	24	368	24	286
436.cactusADM	4	456	24	324
437.leslie3d	24	184	24	184
444.namd	24	311	24	284
447.dealII	24	554	24	449
450.soplex	24	207	24	181
453.povray	24	419	24	404
454.calculix	24	436	24	408
459.GemsFDTD	24	177	24	170
465.tonto	24	387	24	347
470.lbm			24	371
481.wrf	24	311	24	301
482.sphinx3	24	358	24	351

SPECfp_rate_base2006 = 290

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Hardware

CPU Name:	AMD Opteron 6176 SE
CPU Characteristics:	
CPU MHz:	2300
FPU:	Integrated
CPU(s) enabled:	24 cores, 2 chips, 12 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:	Red Hat Enterprise Linux Server release 5.4, Advanced Platform with patch RHSA-2009:1670, Kernel 2.6.18-164.9.1.el5
Compiler:	x86 Open64 4.2.3 Compiler Suite
Auto Parallel:	Yes
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit

Continued on next page

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L3 Cache:	12 MB I+D on chip per chip, 6 MB shared / 6 cores	Other Software: binutils 2.18
Other Cache:	None	
Memory:	64 GB (16x4 GB PC3-10600R, CL9)	
Disk Subsystem:	1 x 146 GB 10 K SATA	
Other Hardware:	None	

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24	1299	251	**1285**	**254**	1284	254	24	1274	256	**1270**	**257**	1269	257
416.gamess	24	1309	359	1311	359	**1309**	**359**	24	1210	388	1221	385	**1214**	**387**
433.milc	24	1177	187	**1177**	**187**	1176	187	24	1079	204	**1079**	**204**	1080	204
434.zeusmp	24	**765**	**286**	764	286	767	285	24	725	301	**727**	**301**	727	300
435.gromacs	24	**599**	**286**	599	286	598	287	24	475	361	466	368	**466**	**368**
436.cactusADM	24	891	322	**885**	**324**	878	327	4	111	432	**105**	**456**	101	472
437.leslie3d	24	1224	184	**1225**	**184**	1227	184	24	**1227**	**184**	1225	184	1228	184
444.namd	24	679	284	684	281	**679**	**284**	24	634	304	**620**	**311**	619	311
447.dealII	24	**611**	**449**	620	443	607	453	24	**496**	**554**	495	555	497	552
450.soplex	24	1134	177	1102	182	**1104**	**181**	24	**969**	**207**	982	204	961	208
453.povray	24	**316**	**404**	317	403	315	406	24	307	415	304	419	**305**	**419**
454.calculix	24	483	410	**486**	**408**	486	408	24	**454**	**436**	456	434	453	437
459.GemsFDTD	24	1509	169	**1500**	**170**	1496	170	24	1437	177	**1441**	**177**	1442	177
465.tonto	24	681	347	680	347	**681**	**347**	24	609	388	613	385	**610**	**387**
470.lbm	24	**889**	**371**	891	370	889	371	24	**889**	**371**	891	370	889	371
481.wrf	24	895	300	**891**	**301**	889	302	24	867	309	860	312	**863**	**311**
482.sphinx3	24	1330	352	1342	348	**1333**	**351**	24	**1308**	**358**	1312	357	1307	358

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.
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=10800 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

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Platform Notes

```
BIOS configuration:
  HP Power Profile set to Maximum Performance
  Thermal Configuration set to Increased Cooling
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "450"
LD_LIBRARY_PATH = "/cpu2006/amd1002mc-rate-revA-libs/64:/cpu2006/amd1002mc-rate-revA-libs/32"
OMP_NUM_THREADS = "6"

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:
```
opencc
```

C++ benchmarks:
```
openCC
```

Fortran benchmarks:
```
openf95
```

Benchmarks using both Fortran and C:
```
opencc openf95
```

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
 436.cactusADM: -DSPEC_CPU_LP64 -fno-second-underscore
  437.leslie3d: -DSPEC_CPU_LP64
     444.namd: -DSPEC_CPU_LP64
    450.soplex: -DSPEC_CPU_LP64
    453.povray: -DSPEC_CPU_LP64
   454.calculix: -DSPEC_CPU_LP64
 459.GemsFDTD: -DSPEC_CPU_LP64
     465.tonto: -DSPEC_CPU_LP64
      470.lbm: -DSPEC_CPU_LP64
      481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -fno-second-underscore
   482.sphinx3: -DSPEC_CPU_LP64
```

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Software Availability: Mar-2010

Base Optimization Flags

C benchmarks:
```
-march=barcelona -mso -Ofast -OPT:malloc_alg=1 -HP:bdt=2m
```

C++ benchmarks:
```
-march=barcelona -mso -Ofast -static -INLINE:aggressive=on
-OPT:malloc_alg=1 -HP:bdt=2m
```

Fortran benchmarks:
```
-march=barcelona -mso -Ofast -HP
```

Benchmarks using both Fortran and C:
```
-march=barcelona -mso -Ofast -OPT:malloc_alg=1 -HP:bdt=2m -HP
```

Peak Compiler Invocation

C benchmarks:
```
opencc
```

C++ benchmarks:
```
openCC
```

Fortran benchmarks:
```
openf95
```

Benchmarks using both Fortran and C:
```
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 -fno-second-underscore
 437.leslie3d: -DSPEC_CPU_LP64
    444.namd: -DSPEC_CPU_LP64
  453.povray: -DSPEC_CPU_LP64
 454.calculix: -DSPEC_CPU_LP64
459.GemsFDTD: -DSPEC_CPU_LP64
    465.tonto: -DSPEC_CPU_LP64
     470.lbm: -DSPEC_CPU_LP64
      481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -fno-second-underscore
  482.sphinx3: -DSPEC_CPU_LP64
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Peak Optimization Flags

C benchmarks:

```
433.milc: -march=barcelona -mso -Ofast -CG:movnti=1
          -CG:local_sched_alg=1 -CG:locs_shallow_depth=1
          -HP:bdt=2m:heap=2m -LNO:prefetch=3

470.lbm: basepeak = yes

482.sphinx3: -march=barcelona -mso -fb_create fbdata(pass 1)
             -fb_opt fbdata(pass 2) -Ofast -OPT:malloc_alg=2
             -CG:sse_cse_regs=0 -CG:locs_shallow_depth=1 -CG:cmp_peep=on
             -CG:local_sched_alg=1 -INLINE:aggressive=on
```

C++ benchmarks:

```
444.namd: -march=barcelona -mso -fb_create fbdata(pass 1)
          -fb_opt fbdata(pass 2) -Ofast -LNO:ignore_feedback=off
          -CG:local_sched_alg=2 -CG:load_exe=0 -CG:compute_to=on
          -OPT:unroll_size=256 -fno-exceptions -HP:bdt=2m:heap=2m

447.dealII: -march=barcelona -mso -Ofast -static -INLINE:aggressive=on
            -LNO:opt=0 -fno-emit-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 -mso -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 -mso -fb_create fbdata(pass 1)
            -fb_opt fbdata(pass 2) -Ofast -INLINE:aggressive=on
```

Fortran benchmarks:

```
410.bwaves: -march=barcelona -mso -O3 -OPT:Ofast -OPT:treeheight=on
            -LNO:blocking=off -LNO:prefetch_ahead=5
            -LNO:ignore_feedback=off -WOPT:aggstr=0 -HP:bdt=2m:heap=2m
            -CG:cmp_peep=on

416.gamess: -march=barcelona -mso -fb_create fbdata(pass 1)
            -fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
            -LNO:prefetch=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256
            -HP:bdt=2m:heap=2m

434.zeusmp: -march=barcelona -mso -Ofast -LNO:blocking=off
            -LNO:interchange=off -OPT:treeheight=on -OPT:unroll_size=256
            -CG:cmp_peep=on -GRA:prioritize_by_density=on -HP
```

Continued on next page

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Peak Optimization Flags (Continued)

437.leslie3d: `-march=barcelona -mso -Ofast -HP:bdt=2m:heap=2m`

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

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

436.cactusADM: `-march=barcelona -mso -fb_create fbdata(pass 1)`
`-fb_opt fbdata(pass 2) -Ofast -apo -LNO:prefetch_ahead=1`
`-HP:bdt=2m:heap=2m -LANG:heap_allocation_threshold=100`

454.calculix: `-march=barcelona -mso -Ofast -CG:load_exe=0`
`-CG:ptr_load_use=0 -CG:local_sched_alg=2 -CG:compute_to=on`
`-LNO:prefetch_ahead=30 -WOPT:unroll=2`
`-GRA:optimize_boundary=on -HP:bdt=2m:heap=2m`

481.wrf: `-march=barcelona -mso -Ofast -LNO:blocking=off`
`-LNO:prefetch_ahead=10 -LANG:copyinout=off`
`-IPA:callee_limit=5000 -GRA:prioritize_by_density=on -m3dnow`
`-HP`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.20100330.html
http://www.spec.org/cpu2006/flags/x86-open64-4.2.3-flags-revA.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/hp-amd-linux-flags.20100330.xml
http://www.spec.org/cpu2006/flags/x86-open64-4.2.3-flags-revA.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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