SPEC® CFP2006 Result

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IBM Corporation

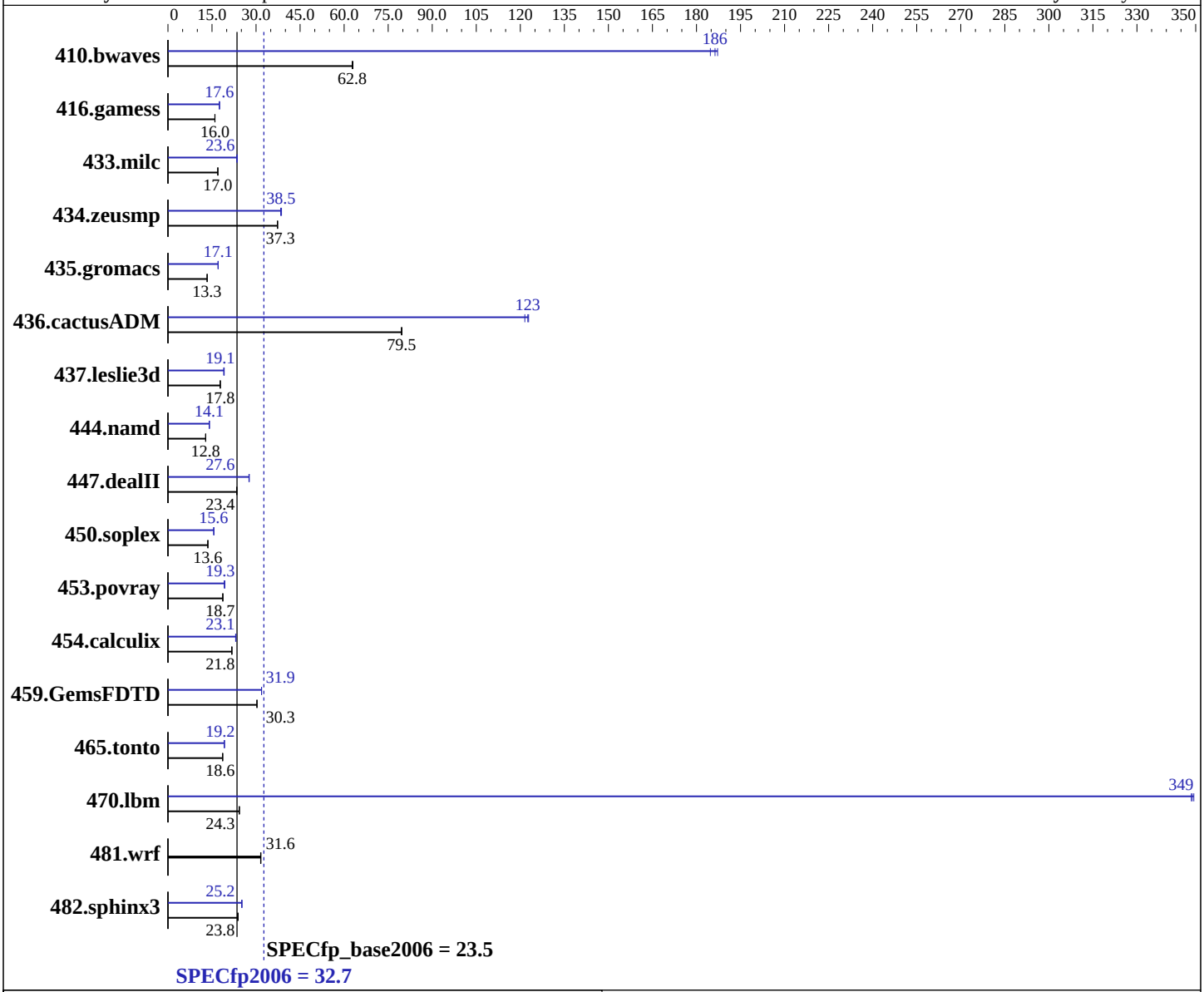
IBM System x3755 M3 (AMD Opteron 6180 SE)

SPECfp®2006 = 32.7

SPECfp_base2006 = 23.5

CPU2006 license: 11
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Apr-2011
Hardware Availability: May-2011
Software Availability: May-2010



Hardware

CPU Name:	AMD Opteron 6180 SE
CPU Characteristics:	
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	24 cores, 2 chips, 12 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 5.5, Kernel 2.6.18-194.el5
Compiler:	x86 Open64 4.2.3.2 Compiler Suite (from AMD)
Auto Parallel:	Yes
File System:	ext3
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit
Other Software:	None

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L3 Cache: 12 MB I+D on chip per chip, 6 MB shared / 6 cores
Other Cache: None
Memory: 64 GB (16 x 4 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem: 1 x 250 GB SATA, 7200 RPM
Other Hardware: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	216	63.0	217	62.8	**216**	**62.8**	72.6	187	**72.9**	**186**	73.6	185
416.gamess	1227	16.0	**1223**	**16.0**	1222	16.0	1119	17.5	**1116**	**17.6**	1116	17.6
433.milc	540	17.0	**540**	**17.0**	541	17.0	**390**	**23.6**	390	23.6	391	23.5
434.zeusmp	244	37.4	**244**	**37.3**	244	37.3	237	38.4	**236**	**38.5**	235	38.7
435.gromacs	533	13.4	**536**	**13.3**	536	13.3	418	17.1	417	17.1	**418**	**17.1**
436.cactusADM	150	79.5	**150**	**79.5**	150	79.7	97.3	123	98.3	122	**97.5**	**123**
437.leslie3d	**528**	**17.8**	529	17.8	526	17.9	491	19.1	496	19.0	**491**	**19.1**
444.namd	624	12.9	**624**	**12.8**	625	12.8	570	14.1	568	14.1	**569**	**14.1**
447.dealII	**488**	**23.4**	487	23.5	490	23.4	415	27.6	**414**	**27.6**	413	27.7
450.soplex	**614**	**13.6**	613	13.6	614	13.6	534	15.6	**534**	**15.6**	534	15.6
453.povray	**285**	**18.7**	284	18.7	285	18.6	**276**	**19.3**	275	19.4	277	19.2
454.calculix	380	21.7	**379**	**21.8**	379	21.8	358	23.0	**357**	**23.1**	356	23.1
459.GemsFDTD	**350**	**30.3**	350	30.3	350	30.3	333	31.9	333	31.9	**333**	**31.9**
465.tonto	527	18.7	**528**	**18.6**	529	18.6	**512**	**19.2**	512	19.2	513	19.2
470.lbm	567	24.2	**566**	**24.3**	564	24.4	39.3	349	**39.4**	**349**	39.4	349
481.wrf	**353**	**31.6**	353	31.7	354	31.6	**353**	**31.6**	353	31.7	354	31.6
482.sphinx3	**818**	**23.8**	815	23.9	823	23.7	**774**	**25.2**	775	25.1	774	25.2

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=4000 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages

cpuspeed stop was used to set the CPU frequency to its maximum.
```

Platform Notes

```
BIOS Settings:
 Operating Mode set to Performance Mode
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/speccpu_2011-03-22/speccpu_speed_revA-6/amd1002mc-speed-libs-revA/64:/root/speccpu_2011-03-22/speccpu_speed_revA-6/amd1002mc-speed-libs-revA/32"
O64_OMP_AFFINITY_MAP = "0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23"
O64_OMP_SPIN_USER_LOCK = "true"

The x86 Open64 Compiler Suite is only available from (and supported by) AMD at
http://developer.amd.com/cpu/open64

Binaries were complied on SLES10 SP2 with binutils 2.18
```

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
447.dealII: -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

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Base Portability Flags (Continued)

481.wrf: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -fno-second-underscore`
482.sphinx3: `-DSPEC_CPU_LP64`

Base Optimization Flags

C benchmarks:
`-march=barcelona -Ofast -HP:bdt=2m:heap=2m`

C++ benchmarks:
`-march=barcelona -Ofast -static -INLINE:aggressive=on -HP:bdt=2m:heap=2m`

Fortran benchmarks:
`-march=barcelona -Ofast -apo -LNO:parallel_overhead=10000 -LNO:fusion_peeling_limit=0 -HP:bdt=2m:heap=2m`

Benchmarks using both Fortran and C:
`-march=barcelona -Ofast -HP:bdt=2m:heap=2m -apo -LNO:parallel_overhead=10000 -LNO:fusion_peeling_limit=0`

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`

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Peak Portability Flags (Continued)

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_LP64 -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

Peak Optimization Flags

C benchmarks:

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

470.lbm: -march=barcelona -Ofast -mso -apo -CG:sse_cse_regs=0 -LNO:prefetch_ahead=4 -CG:locs_shallow_depth=1 -CG:cmp_peep=on -CG:compute_to=on -OPT:unroll_times_max=8 -OPT:unroll_size=256 -OPT:unroll_level=2 -OPT:keep_ext=on -OPT:alias=restricted -m3dnow -IPA:inline=off

482.sphinx3: -march=barcelona -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 -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 -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 -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 -CG:load_exe=0 -fno-exceptions -m32 -HP:bdt=2m:heap=2m

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Peak Optimization Flags (Continued)

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: -march=barcelona -Ofast -apo -OPT:malloc_alg=2
-CG:use_prefetchnta=on -CG:cmp_peep=on -LNO:blocking=off
-LNO:prefetch=3 -LNO:prefetch_ahead=5
-LNO:ignore_feedback=off -LNO:apo_use_feedback=on
-WOPT:aggstr=0

416.gamess: -march=barcelona -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 -Ofast -apo -LNO:blocking=off
-LNO:interchange=off -LNO:fusion_peeling_limit=0
-OPT:treeheight=on -OPT:unroll_size=256 -CG:cmp_peep=on
-CG:compute_to=on -GRA:prioritize_by_density=on
-HP:bdt=2m:heap=2m

437.leslie3d: -march=barcelona -Ofast -apo -OPT:unroll_size=256
-LNO:prefetch_ahead=4 -LNO:parallel_overhead=32768
-GRA:prioritize_by_density=on -m3dnow -HP:bdt=2m:heap=2m

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

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

436.cactusADM: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -apo
-LANG:heap_allocation_threshold=1000 -LNO:prefetch_ahead=1
-HP:bdt=2m:heap=2m

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

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Peak Optimization Flags (Continued)

481.wrf: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/x86-open64-423-flags-speed-revA.20101207.html`
`http://www.spec.org/cpu2006/flags/amd-platform-speed-revA.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/x86-open64-423-flags-speed-revA.20101207.xml`
`http://www.spec.org/cpu2006/flags/amd-platform-speed-revA.xml`

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For other inquiries, please contact webmaster@spec.org.

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