SPEC® CFP2006 Result

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Dell Inc.

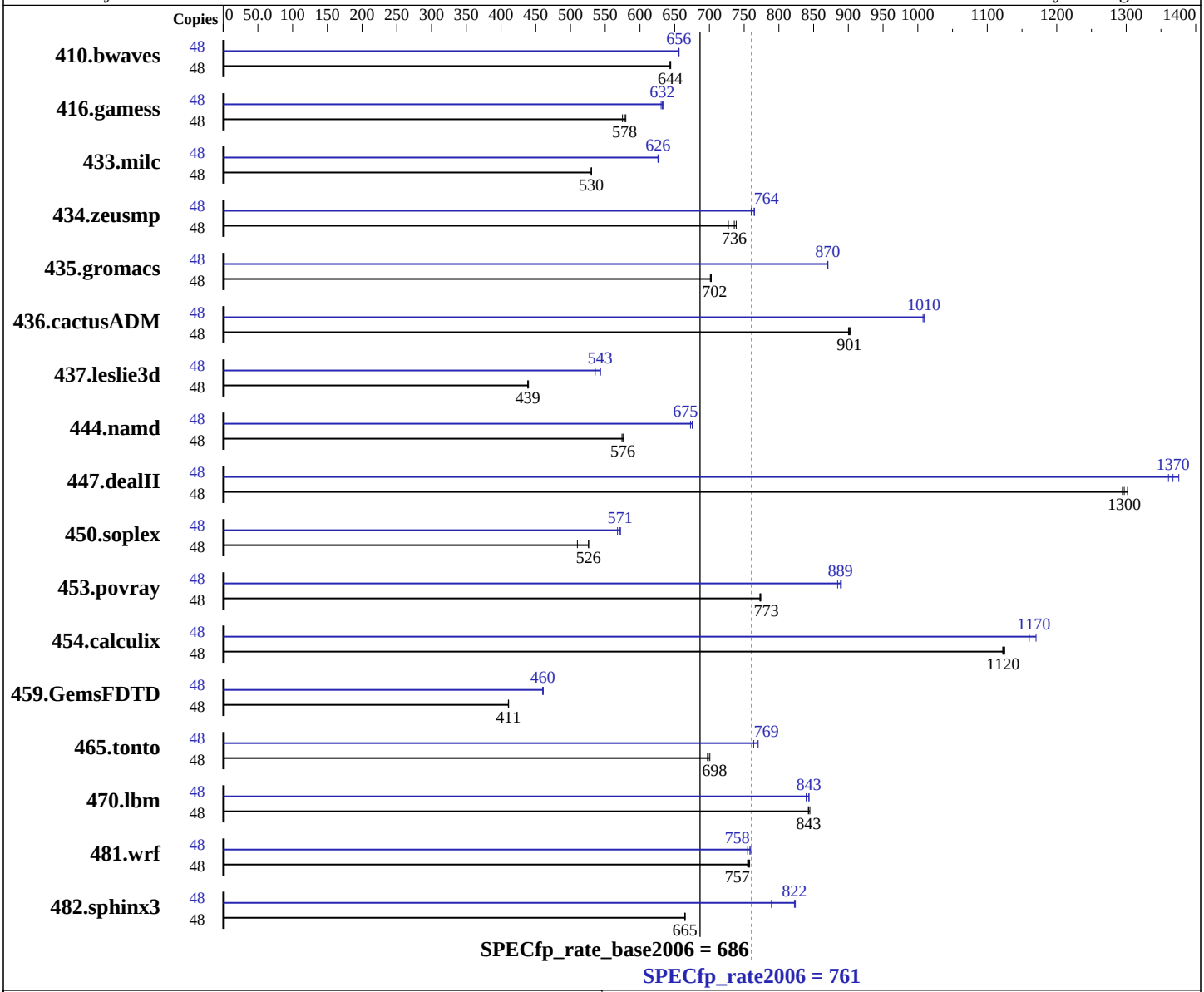
PowerEdge R815 (AMD Opteron 6348, 2.80 GHz)

SPECfp®_rate2006 = 761

SPECfp_rate_base2006 = 686

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Nov-2012
Hardware Availability: Dec-2012
Software Availability: Aug-2012



Hardware

CPU Name:	AMD Opteron 6348
CPU Characteristics:	AMD Turbo CORE technology up to 3.40 GHz
CPU MHz:	2800
FPU:	Integrated
CPU(s) enabled:	48 cores, 4 chips, 12 cores/chip
CPU(s) orderable:	2,4 chips

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Software

Operating System:	Red Hat Enterprise Linux Server release 6.3, Kernel 2.6.32-279.el6.x86_64
Compiler:	C/C++/Fortran: Version 4.5.2 of x86 Open64 Compiler Suite (from AMD)
Auto Parallel:	No
File System:	ext4
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	64-bit
Peak Pointers:	32/64-bit

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Primary Cache: 384 KB I on chip per chip, 64 KB I shared / 2 cores; 16 KB D on chip per core
Secondary Cache: 12 MB I+D on chip per chip, 2 MB shared / 2 cores
L3 Cache: 16 MB I+D on chip per chip, 8 MB shared / 6 cores
Other Cache: None
Memory: 256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)
Disk Subsystem: 6 x 73 GB 7200 RPM SATA
Other Hardware: None

Other Software: None

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	48	1012	644	**1013**	**644**	1014	643	48	994	656	**994**	**656**	994	656
416.gamess	48	1635	575	**1626**	**578**	1621	580	48	1484	633	**1487**	**632**	1491	630
433.milc	48	832	530	**831**	**530**	831	530	48	704	626	**704**	**626**	704	626
434.zeusmp	48	**594**	**736**	591	739	601	727	48	571	765	575	760	**571**	**764**
435.gromacs	48	488	703	**488**	**702**	489	701	48	**394**	**870**	394	870	394	871
436.cactusADM	48	635	903	**636**	**901**	637	900	48	568	1010	569	1010	**569**	**1010**
437.leslie3d	48	1026	440	1029	439	**1029**	**439**	48	842	536	**831**	**543**	831	543
444.namd	48	670	574	667	577	**669**	**576**	48	572	673	570	676	**570**	**675**
447.dealII	48	**423**	**1300**	422	1300	424	1290	48	399	1380	404	1360	**402**	**1370**
450.soplex	48	785	510	**761**	**526**	761	526	48	705	568	**701**	**571**	700	572
453.povray	48	**330**	**773**	330	774	330	773	48	**287**	**889**	289	885	287	890
454.calculix	48	352	1130	**353**	**1120**	353	1120	48	341	1160	338	1170	**339**	**1170**
459.GemsFDTD	48	1240	411	1241	411	**1240**	**411**	48	1105	461	**1107**	**460**	1107	460
465.tonto	48	674	701	677	697	**676**	**698**	48	**614**	**769**	618	764	613	770
470.lbm	48	**782**	**843**	781	845	784	841	48	**782**	**843**	782	843	786	839
481.wrf	48	**709**	**757**	710	755	707	758	48	**707**	**758**	710	755	706	759
482.sphinx3	48	1408	664	**1407**	**665**	1406	665	48	1136	824	1185	789	**1138**	**822**

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 transparent_hugepage=never as a boot parameter in /boot/grub/menu.lst
```

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Operating System Notes (Continued)

```
Set vm/nr_hugepages=43008 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "896"
LD_LIBRARY_PATH = "/root/cpu2006-1.2/amd1206-rate-libs-revA/32:/root/cpu2006-1.2/amd1206-rate-libs-revA/64"

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

Binaries were compiled on a system with 2x AMD Opteron 6386SE chips + 128GB Memory using RHEL 6.3
```

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_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64 -fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:
-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000 -IPA:small_pu=100 -mso -march=bdver1

C++ benchmarks:
-Ofast -static -CG:load_exe=0 -OPT:malloc_alg=1 -INLINE:aggressive=on -HP:bd=2m:heap=2m -D__OPEN64_FAST_SET -march=bdver1

Fortran benchmarks:
-Ofast -LNO:blocking=off -LNO:simd_peel_align=on -OPT:rsqrt=2 -OPT:unroll_size=256 -HP:bd=2m:heap=2m -mso -march=bdver1

Benchmarks using both Fortran and C:
-Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m -IPA:plimit=8000 -IPA:small_pu=100 -mso -march=bdver1 -LNO:blocking=off -LNO:simd_peel_align=on -OPT:rsqrt=2 -OPT:unroll_size=256

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

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Peak Portability Flags (Continued)

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 -DSPEC_CPU_LP64
-fno-second-underscore

Peak Optimization Flags

C benchmarks:

433.milc: -Ofast -CG:movnti=1 -CG:locs_best=on -HP:bdt=2m:heap=2m
-IPA:plimit=7000 -IPA:callee_limit=1200
-OPT:struct_array_copy=2 -OPT:alias=field_sensitive -mso
-march=bdver1

470.lbm: -Ofast -CG:cmp_peep=on -OPT:keep_ext=on -HP:bdt=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -march=bdver1 -mso

482.sphinx3: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-m32 -IPA:plimit=1000 -OPT:malloc_alg=2 -CG:cmp_peep=on
-CG:p2align=0 -CG:load_exe=1 -CG:dsched=on
-INLINE:aggressive=on -LNO:prefetch=2 -LNO:prefetch_ahead=4
-mso -march=bdver2

C++ benchmarks:

444.namd: -Ofast -IPA:plimit=3000 -LNO:ignore_feedback=off
-CG:local_sched_alg=0 -CG:load_exe=0 -OPT:unroll_size=256
-fno-exceptions -HP:bdt=2m:heap=2m -LNO:if_select_conv=1
-OPT:alias=disjoint -LNO:psimd_iso_unroll=ON -march=bdver1

447.dealII: -Ofast -D__OPEN64_FAST_SET -static -INLINE:aggressive=on
-LNO:opt=1 -LNO:simd=2 -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 -CG:movext_icmp=off -TENV:frame_pointer=off
-march=bdver1

450.soplex: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3
-LNO:ignore_feedback=off -INLINE:aggressive=on -OPT:RO=1
-OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off
-OPT:fold_unsigned_relops=on -fno-exceptions -CG:p2align=0
-m32 -mno-fma4 -HP:bdt=2m:heap=2m -WOPT:sib=on

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Peak Optimization Flags (Continued)

450.soplex (continued):
-march=bdver1

453.povray: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-CG:pre_local_sched=off -CG:p2align=0 -CG:p2align_split=on
-CG:dsched=on -INLINE:aggressive=on -HP:bd=2m:heap=2m
-OPT:transform=2 -OPT:alias=disjoint -WOPT:aggcm=0
-march=bdver2

Fortran benchmarks:

410.bwaves: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-OPT:Ofast -OPT:treeheight=on -LNO:blocking=off
-LNO:ignore_feedback=off -LNO:fu=4 -LNO:loop_model_simd=on
-LNO:simd_rm_unity_remainder=on -WOPT:aggstr=0
-HP:bdt=2m:heap=2m -CG:cmp_peep=on -march=bdver1

416.gamess: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:fu=6 -LNO:blocking=0 -LNO:simd=2 -OPT:ro=3
-OPT:recip=on -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m
-WOPT:sib=on -march=bdver1

434.zeusmp: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:blocking=off -LNO:interchange=off -IPA:plimit=1500
-HP:bdt=2m:heap=2m -march=bdver1

437.leslie3d: -Ofast -CG:pre_minreg_level=2 -LNO:simd=0 -LNO:fusion=2
-HP:bdt=2m:heap=2m -mso -march=bdver1

459.GemsFDTD: -Ofast -IPA:plimit=1500 -OPT:unroll_size=1024
-OPT:unroll_times_max=16 -LNO:fission=2
-CG:local_sched_alg=2 -HP -march=bdver1

465.tonto: -Ofast -OPT:alias=no_f90_pointer_alias -LNO:blocking=off
-CG:load_exe=1 -CG:local_sched_alg=3 -IPA:plimit=525
-HP:bdt=2m:heap=2m -march=bdver1

Benchmarks using both Fortran and C:

435.gromacs: -Ofast -OPT:rsqrt=2 -HP:bdt=2m:heap=2m
-CG:local_sched_alg=2 -CG:load_exe=3 -GRA:unspill=on
-march=bdver1 -LNO:simd=3

436.cactusADM: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:blocking=off -LNO:prefetch=2 -LNO:pf2=0
-LNO:prefetch_ahead=4 -HP -CG:locs_shallow_depth=1
-CG:load_exe=0 -CG:dsched=on -WOPT:sib=on -march=bdver1

454.calculix: -Ofast -OPT:unroll_size=256 -OPT:alias=disjoint
-GRA:optimize_boundary=on -CG:dsched=on -HP:bdt=2m:heap=2m
-march=bdver1

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Peak Optimization Flags (Continued)

481.wrf: `-Ofast -LNO:blocking=off -LANG:copyinout=off -IPA:callee_limit=5000 -GRA:prioritize_by_density=on -HP -WOPT:sib=on -march=bdver1`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-II.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-II.xml`

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

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