SPEC® CFP2006 Result

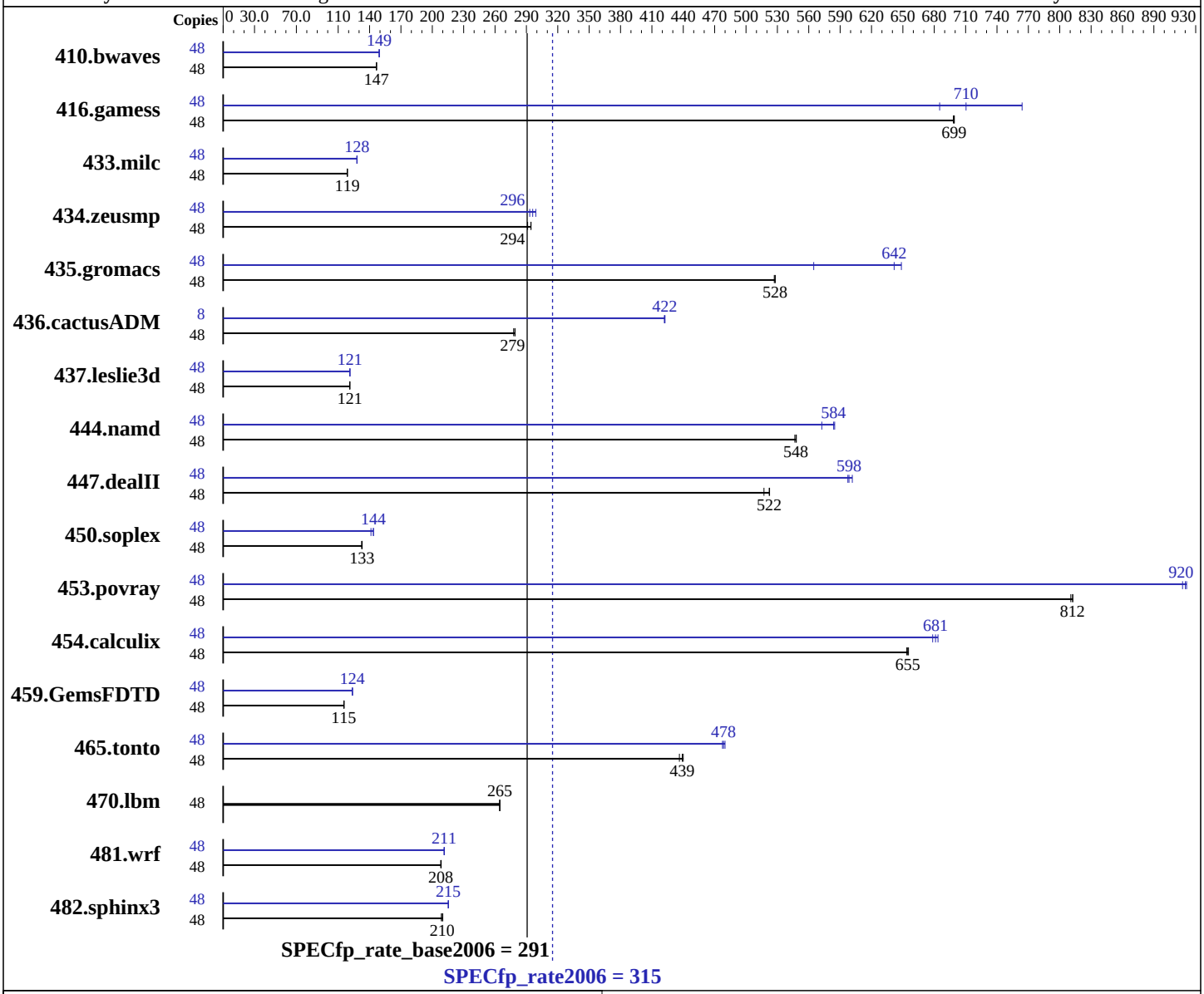
E4 Computer Engineering S.p.A.
E-Rack 8248, AMD Opteron 6174

SPECfp®_rate2006 = 315

SPECfp_rate_base2006 = 291

CPU2006 license: 3106
Test sponsor: E4 Computer Engineering S.p.A.
Tested by: Francesca Tartaglione

Test date: Sep-2011
Hardware Availability: Jun-2010
Software Availability: Jul-2011



Hardware

CPU Name:	AMD Opteron 6174
CPU Characteristics:	
CPU MHz:	2200
FPU:	Integrated
CPU(s) enabled:	48 cores, 4 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:	Scientific Linux release 6.1, Kernel 2.6.32-131.0.15.el6
Compiler:	C/C++/Fortran: Version 4.2.5.2 of x86 Open64 Compiler Suite (from AMD)
Auto Parallel:	Yes
File System:	ext4
System State:	Run level 3 (Full multiuser with network)
Base Pointers:	32/64-bit
Peak Pointers:	32/64-bit

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L3 Cache: 12 MB I+D on chip per chip, 6 MB shared / 6 cores
Other Cache: None
Memory: 256 GB (32 x 8 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem: 2 x 1 TB SATA, 7200 RPM
Other Hardware: None

Other Software: SmartHeap 8.1 32-bit Library for Linux

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	48	**4448**	**147**	4451	147	4448	147	48	**4370**	**149**	4372	149	4369	149
416.gamess	48	1346	698	**1345**	**699**	1344	699	48	**1323**	**710**	1230	764	1372	685
433.milc	48	3714	119	**3709**	**119**	3708	119	48	3439	128	3447	128	**3442**	**128**
434.zeusmp	48	**1484**	**294**	1483	294	1500	291	48	1490	293	**1476**	**296**	1461	299
435.gromacs	48	**649**	**528**	649	528	650	527	48	**534**	**642**	528	649	607	565
436.cactusADM	48	2055	279	**2056**	**279**	2065	278	8	**226**	**422**	226	422	227	422
437.leslie3d	48	3731	121	3723	121	**3723**	**121**	48	3723	121	3722	121	**3722**	**121**
444.namd	48	702	548	704	547	**703**	**548**	48	672	572	658	585	**659**	**584**
447.dealII	48	**1052**	**522**	1062	517	1051	523	48	919	597	**918**	**598**	913	602
450.soplex	48	**3013**	**133**	3011	133	3024	132	48	2832	141	2786	144	**2786**	**144**
453.povray	48	314	812	315	811	**314**	**812**	48	277	921	278	917	**278**	**920**
454.calculix	48	606	654	**605**	**655**	604	655	48	584	679	**581**	**681**	579	684
459.GemsFDTD	48	4402	116	4412	115	**4410**	**115**	48	4129	123	**4118**	**124**	4116	124
465.tonto	48	1073	440	1083	436	**1076**	**439**	48	984	480	989	477	**987**	**478**
470.lbm	48	2493	265	2494	264	**2493**	**265**	48	2493	265	2494	264	**2493**	**265**
481.wrf	48	2571	209	**2575**	**208**	2576	208	48	2534	212	**2537**	**211**	2538	211
482.sphinx3	48	**4464**	**210**	4484	209	4454	210	48	4342	215	4345	215	**4344**	**215**

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=21600 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/opt/amd/lib/gcc-lib/x86_64-open64-linux/4.2.5.2/64:/opt/amd/lib/gcc-lib/x86_64-open64-linux/4.2.5.2/32"
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
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
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 -mso -Ofast -OPT:malloc_alg=1 -HP:bdt=2m

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Base Optimization Flags (Continued)

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_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 -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

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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/x86-open64-423-flags-speed-revA.20101207.html
http://www.spec.org/cpu2006/flags/E4ComputerEngineering-amd-platform.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/E4ComputerEngineering-amd-platform.xml

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

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