SPEC® CFP2006 Result

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Supermicro

(Test Sponsor: Advanced Micro Devices)

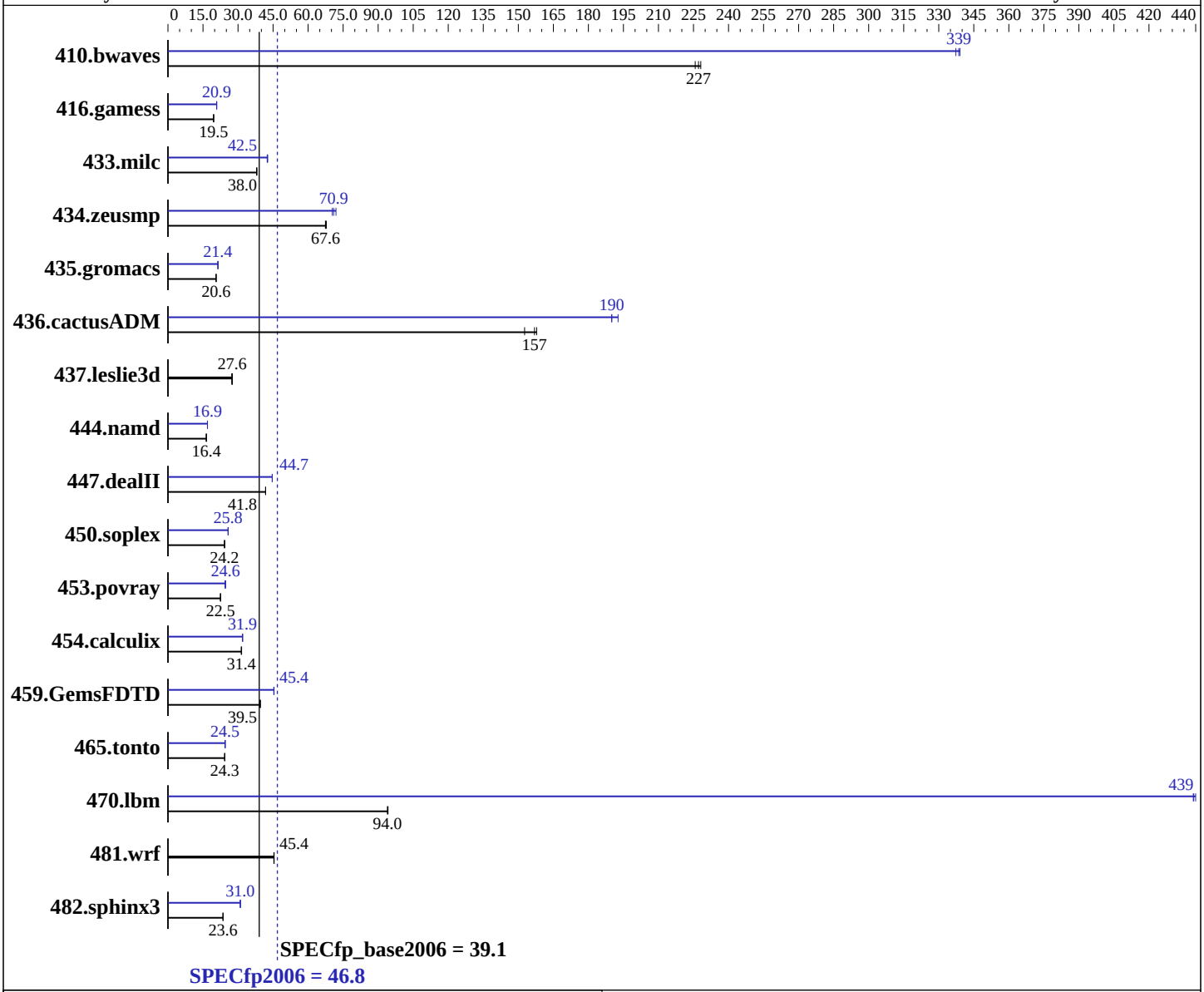
Supermicro A+ Server 1022G-NTF,
AMD Opteron 6378

SPECfp®2006 = 46.8

SPECfp_base2006 = 39.1

CPU2006 license: 49
Test sponsor: Advanced Micro Devices
Tested by: Advanced Micro Devices

Test date: Oct-2012
Hardware Availability: Nov-2012
Software Availability: Jun-2012



Hardware

CPU Name:	AMD Opteron 6378
CPU Characteristics:	AMD Turbo CORE technology up to 3.30 GHz
CPU MHz:	2400
FPU:	Integrated
CPU(s) enabled:	32 cores, 2 chips, 16 cores/chip
CPU(s) orderable:	1,2 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 4.2.5.2 of x86 Open64 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

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Primary Cache:	512 KB I on chip per chip, 64 KB I shared / 2 cores; 16 KB D on chip per core
Secondary Cache:	16 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 / 8 cores
Other Cache:	None
Memory:	128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)
Disk Subsystem:	1 x 320 GB SATA, 7200 RPM
Other Hardware:	None

Other Software: None

Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	60.2	226	59.6	228	**59.8**	**227**	40.3	337	40.1	339	**40.1**	**339**
416.gamess	**1002**	**19.5**	1001	19.6	1002	19.5	940	20.8	**938**	**20.9**	938	20.9
433.milc	241	38.1	242	38.0	**242**	**38.0**	215	42.7	**216**	**42.5**	216	42.5
434.zeusmp	134	67.8	135	67.4	**135**	**67.6**	**128**	**70.9**	129	70.4	127	71.9
435.gromacs	346	20.6	347	20.6	**347**	**20.6**	334	21.4	334	21.4	**334**	**21.4**
436.cactusADM	**76.1**	**157**	75.7	158	78.3	153	**62.9**	**190**	62.9	190	62.0	193
437.leslie3d	**341**	**27.6**	344	27.3	341	27.6	**341**	**27.6**	344	27.3	341	27.6
444.namd	**488**	**16.4**	489	16.4	488	16.4	**474**	**16.9**	474	16.9	475	16.9
447.dealII	274	41.8	**274**	**41.8**	274	41.8	**256**	**44.7**	256	44.7	256	44.6
450.soplex	344	24.2	**344**	**24.2**	344	24.2	324	25.7	323	25.8	**324**	**25.8**
453.povray	236	22.5	**236**	**22.5**	237	22.5	216	24.6	218	24.5	**216**	**24.6**
454.calculix	263	31.4	**262**	**31.4**	262	31.5	258	31.9	**258**	**31.9**	258	31.9
459.GemsFDTD	**269**	**39.5**	269	39.5	269	39.5	234	45.4	**234**	**45.4**	234	45.3
465.tonto	405	24.3	**405**	**24.3**	405	24.3	402	24.5	402	24.5	**402**	**24.5**
470.lbm	146	94.0	**146**	**94.0**	146	94.2	**31.3**	**439**	31.3	439	31.2	440
481.wrf	**246**	**45.4**	246	45.5	246	45.3	**246**	**45.4**	246	45.5	246	45.3
482.sphinx3	**827**	**23.6**	826	23.6	827	23.6	**629**	**31.0**	629	31.0	629	31.0

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)

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

Set vm/nr_hugepages=4000 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 = "4000"
LD_LIBRARY_PATH = "/root/work/cpu2006v1.2/amd1104-speed-libs-revA/32:/root/work/cpu2006v1.2/amd1104-speed-libs-revA/64"
O64_OMP_AFFINITY_MAP = "0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31"
O64_OMP_SPIN_COUNT = "800000"
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 compiled on a system with 2x AMD Opteron 6220 chips + 64GB Memory using RHEL 6.1
```

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

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Base Portability Flags (Continued)

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=bdver1 -Ofast -HP:bdt=2m:heap=2m -apo -mso
-OPT:alias=restricted -OPT:malloc_alg=2 -LNO:parallel_overhead=10000

C++ benchmarks:
-march=bdver1 -Ofast -static -CG:load_exe=0 -CG:p2align=0
-INLINE:aggressive=on -HP:bdt=2m:heap=2m -D__OPEN64_FAST_SET

Fortran benchmarks:
-march=bdver1 -Ofast -LNO:blocking=off -LNO:fusion_peeling_limit=0
-LNO:parallel_overhead=10000 -OPT:rsqrt=2 -OPT:unroll_size=256
-HP:bdt=2m:heap=2m -apo

Benchmarks using both Fortran and C:
-march=bdver1 -Ofast -HP:bdt=2m:heap=2m -apo -mso
-OPT:alias=restricted -OPT:malloc_alg=2 -LNO:parallel_overhead=10000
-LNO:blocking=off -LNO:fusion_peeling_limit=0 -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
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
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=bdver1 -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

470.lbm: -march=bdver1 -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=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -LNO:loop_model_simd=on
-LNO:simd_rm_unity_remainder=on -OPT:malloc_alg=2
-CG:cmp_peep=on -CG:local_sched_alg=2 -CG:use_incdec=off
-INLINE:aggressive=on -WOPT:sib=on -HP

C++ benchmarks:

444.namd: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -LNO:ignore_feedback=off
-CG:local_sched_alg=2 -CG:load_exe=0 -OPT:unroll_size=256
-fno-exceptions -HP:bdt=2m:heap=2m

447.dealII: -march=bdver1 -Ofast -LNO:simd=0 -D__OPEN64_FAST_SET
-static -INLINE:aggressive=on -OPT:alias=disjoint
-OPT:unroll_times_max=8 -OPT:unroll_size=256
-OPT:unroll_level=2 -HP:bdt=2m:heap=2m

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Peak Optimization Flags (Continued)

450.soplex: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -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 -HP:bdt=2m:heap=2m -WOPT:sib=on

453.povray: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -CG:pre_local_sched=off
-INLINE:aggressive=on -HP:bdt=2m:heap=2m -OPT:transform=2
-OPT:alias=disjoint -WOPT:aggcm=0

Fortran benchmarks:

410.bwaves: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -apo -OPT:Ofast
-OPT:treeheight=on -LNO:blocking=off -LNO:prefetch=2
-LNO:pf2=0 -LNO:prefetch_ahead=3 -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 -CG:p2align=0

416.gamess: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -LNO:fu=6 -LNO:blocking=0
-LNO:simd=0 -OPT:Ofast -OPT:ro=3 -OPT:unroll_size=256
-OPT:unroll_times_max=2 -CG:local_sched_alg=1
-HP:bdt=2m:heap=2m -WOPT:sib=on

434.zeusmp: -march=bdver1 -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: basepeak = yes

459.GemsFDTD: -march=bdver1 -Ofast -OPT:unroll_size=0 -LNO:fission=2
-CG:load_exe=0 -CG:local_sched_alg=2 -HP -apo

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

Benchmarks using both Fortran and C:

435.gromacs: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -OPT:rsqrt=2
-HP:bdt=2m:heap=2m

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Peak Optimization Flags (Continued)

436.cactusADM: `-march=bdver1 -fb_create fbdata`(pass 1)
`-fb_opt fbdata`(pass 2) `-Ofast -LNO:blocking=off`
`-LNO:prefetch=2 -HP:bdt=2m:heap=2m -CG:locs_shallow_depth=1`
`-CG:load_exe=0 -WOPT:sib=on -apo`

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

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-open64-425-flags-speed-revA-I.html`
`http://www.spec.org/cpu2006/flags/amd-platform-speed-revA-I.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/x86-open64-425-flags-speed-revA-I.xml`
`http://www.spec.org/cpu2006/flags/amd-platform-speed-revA-I.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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