SPEC® CFP2006 Result

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Supermicro

(Test Sponsor: Advanced Micro Devices)

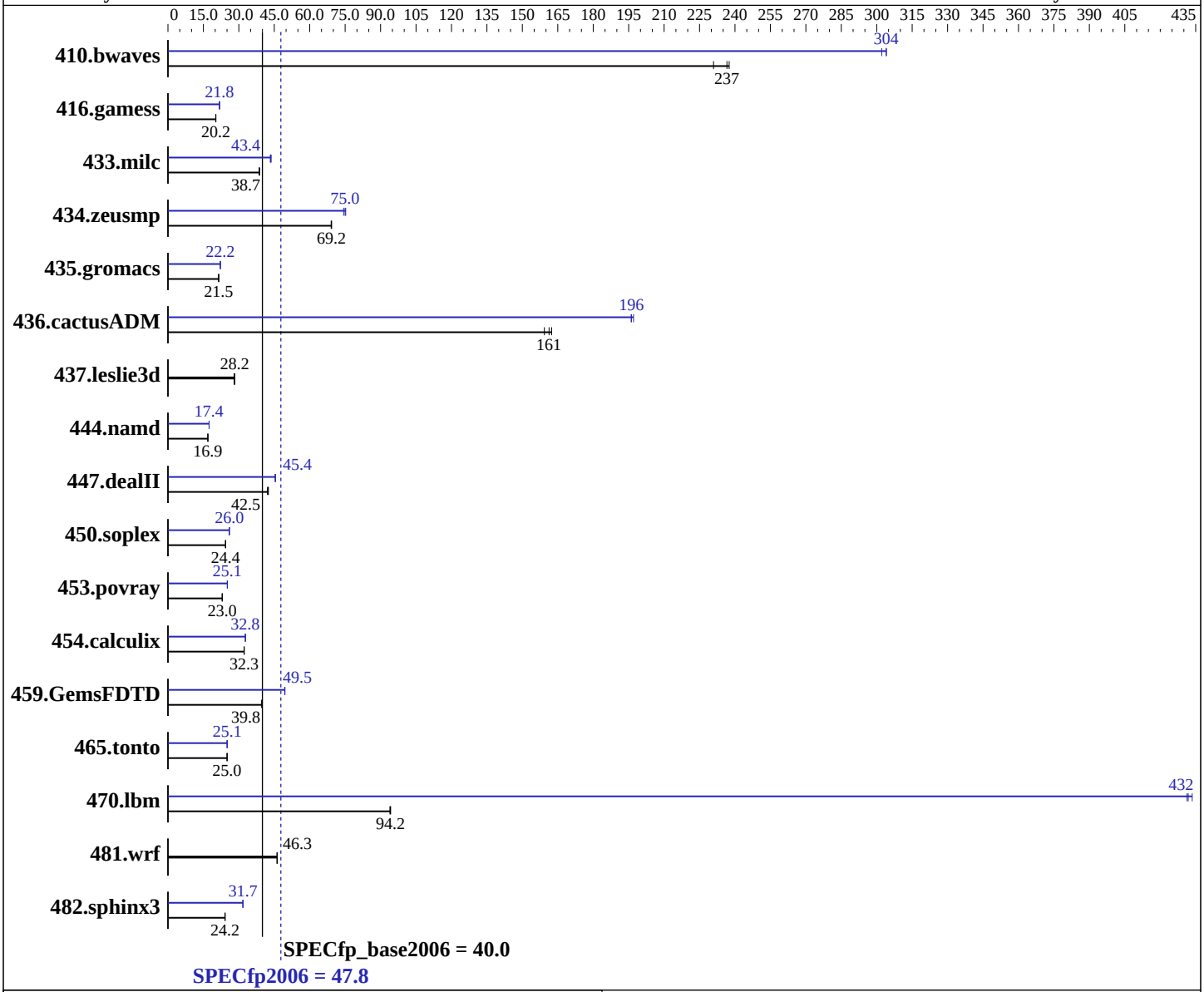
Supermicro A+ Server 1022G-NTF,
AMD Opteron 6344

SPECfp®2006 = 47.8

SPECfp_base2006 = 40.0

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 6344
CPU Characteristics:	AMD Turbo CORE technology up to 3.20 GHz
CPU MHz:	2600
FPU:	Integrated
CPU(s) enabled:	24 cores, 2 chips, 12 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:	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:	128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)
Disk Subsystem:	1 x 250 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	57.2	238	**57.4**	**237**	58.9	231	45.0	302	44.7	304	**44.7**	**304**
416.gamess	969	20.2	965	20.3	**967**	**20.2**	895	21.9	**898**	**21.8**	900	21.8
433.milc	238	38.6	**237**	**38.7**	237	38.8	210	43.7	**211**	**43.4**	212	43.4
434.zeusmp	132	69.1	**131**	**69.2**	131	69.2	**121**	**75.0**	121	75.2	122	74.4
435.gromacs	333	21.4	332	21.5	**333**	**21.5**	322	22.2	322	22.2	**322**	**22.2**
436.cactusADM	73.6	162	**74.1**	**161**	75.0	159	60.6	197	**60.9**	**196**	60.9	196
437.leslie3d	**333**	**28.2**	333	28.3	336	28.0	**333**	**28.2**	333	28.3	336	28.0
444.namd	475	16.9	474	16.9	**475**	**16.9**	460	17.4	461	17.4	**460**	**17.4**
447.dealII	**269**	**42.5**	272	42.1	269	42.5	252	45.5	252	45.4	**252**	**45.4**
450.soplex	342	24.4	**342**	**24.4**	342	24.4	321	26.0	**321**	**26.0**	322	25.9
453.povray	231	23.0	**232**	**23.0**	232	22.9	**212**	**25.1**	212	25.1	211	25.2
454.calculix	256	32.3	256	32.2	**256**	**32.3**	252	32.8	**252**	**32.8**	252	32.8
459.GemsFDTD	267	39.7	266	39.8	**267**	**39.8**	214	49.5	**214**	**49.5**	215	49.4
465.tonto	393	25.0	**393**	**25.0**	393	25.0	**393**	**25.1**	393	25.0	392	25.1
470.lbm	**146**	**94.2**	146	94.3	146	93.9	**31.8**	**432**	31.7	434	31.9	431
481.wrf	**242**	**46.3**	242	46.1	241	46.3	**242**	**46.3**	242	46.1	241	46.3
482.sphinx3	807	24.1	**806**	**24.2**	806	24.2	614	31.7	**614**	**31.7**	615	31.7

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

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