SPEC® CFP2006 Result
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Supermicro
(Test Sponsor: Advanced Micro Devices)

Supermicro A+ Server 1022G-NTF,
AMD Opteron 6176

$SPECfp®\_rate2006 = 323$
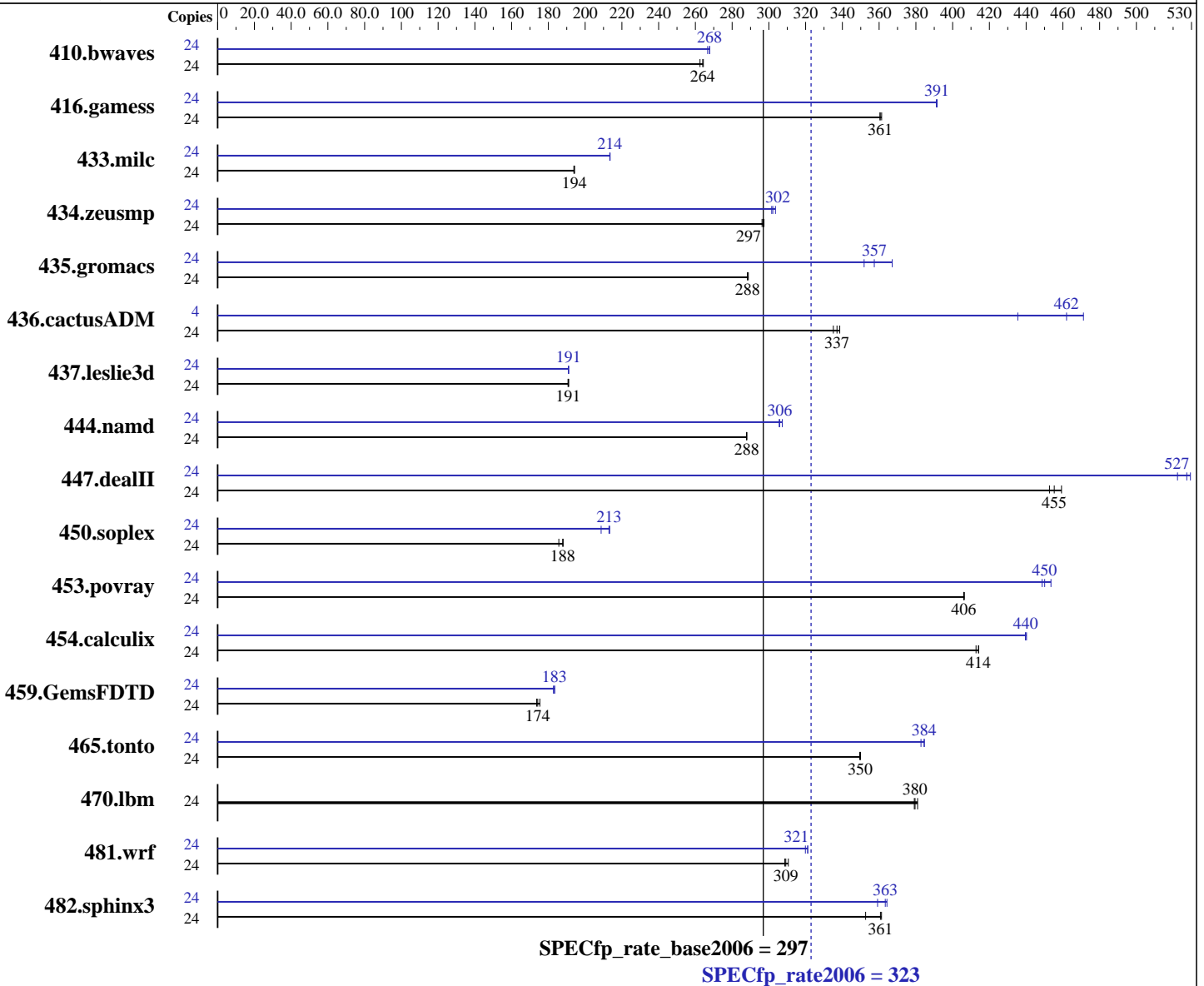
$SPECfp\_rate\_base2006 = 297$

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

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

Benchmark	Copies	Result
410.bwaves	24	268
	24	264
416.gamess	24	391
	24	361
433.milc	24	214
	24	194
434.zeusmp	24	302
	24	297
435.gromacs	24	357
	24	288
436.cactusADM	4	462
	24	337
437.leslie3d	24	191
	24	191
444.namd	24	306
	24	288
447.dealII	24	527
	24	455
450.soplex	24	213
	24	188
453.povray	24	450
	24	406
454.calculix	24	440
	24	414
459.GemsFDTD	24	183
	24	174
465.tonto	24	384
	24	350
470.lbm	24	380
481.wrf	24	321
	24	309
482.sphinx3	24	363
	24	361

SPECfp_rate_base2006 = 297
SPECfp_rate2006 = 323

Hardware
CPU Name: AMD Opteron 6176
CPU Characteristics:
CPU MHz: 2300
FPU: Integrated
CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip
CPU(s) orderable: 1,2 chips
Primary Cache: 64 KB I + 64 KB D on chip per core
Secondary Cache: 512 KB I+D on chip per core
Continued on next page

Software
Operating System: Red Hat Enterprise Linux Server release 5.4, Advanced Platform with patch RHSA-2009:1670, Kernel 2.6.18-164.9.1.el5
Compiler: x86 Open64 4.2.4 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
Continued on next page

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L3 Cache:	12 MB I+D on chip per chip, 6 MB shared / 6 cores	Other Software: None
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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	24	1242	263	1234	264	**1236**	**264**	24	1223	267	1218	268	**1218**	**268**
416.gamess	24	1300	361	**1303**	**361**	1304	360	24	1200	392	1201	391	**1201**	**391**
433.milc	24	1136	194	**1135**	**194**	1134	194	24	1032	213	**1032**	**214**	1032	214
434.zeusmp	24	737	296	**736**	**297**	735	297	24	**723**	**302**	719	304	724	302
435.gromacs	24	593	289	**594**	**288**	594	288	24	487	352	467	367	**480**	**357**
436.cactusADM	24	847	339	856	335	**851**	**337**	4	101	471	110	435	**103**	**462**
437.leslie3d	24	**1182**	**191**	1181	191	1183	191	24	1182	191	**1181**	**191**	1181	191
444.namd	24	**668**	**288**	668	288	669	288	24	626	307	**629**	**306**	630	306
447.dealII	24	606	453	598	459	**603**	**455**	24	519	529	**521**	**527**	526	522
450.soplex	24	1078	186	1064	188	**1066**	**188**	24	**940**	**213**	959	209	938	213
453.povray	24	**314**	**406**	314	406	314	406	24	282	454	285	449	**284**	**450**
454.calculix	24	478	414	**478**	**414**	480	413	24	450	440	450	440	**450**	**440**
459.GemsFDTD	24	1467	174	**1462**	**174**	1452	175	24	1394	183	**1389**	**183**	1388	183
465.tonto	24	676	349	675	350	**675**	**350**	24	**614**	**384**	617	383	614	385
470.lbm	24	870	379	866	381	**869**	**380**	24	870	379	866	381	**869**	**380**
481.wrf	24	868	309	863	311	**867**	**309**	24	835	321	838	320	**835**	**321**
482.sphinx3	24	**1297**	**361**	1326	353	1295	361	24	1302	359	**1287**	**363**	1284	364

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=10800 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

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General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_LIMIT = "450"
LD_LIBRARY_PATH = "/root/work/cpu2006/amd1002mc-rate-libs-revC/64:/root/work/cpu2006/amd1002mc-rate-libs-revC/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

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

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Test sponsor:	Advanced Micro Devices	**Hardware Availability:**	Feb-2011
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Base Optimization Flags

C benchmarks:
```
-march=barcelona -mso -Ofast -OPT:malloc_alg=1 -HP:bdt=2m
```

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
```

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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-open64-424-flags-rate-revC.20101109.html
http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.20110119.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/x86-open64-424-flags-rate-revC.20101109.xml
http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.20110119.xml

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

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