



# SPEC<sup>®</sup> CFP2006 Result

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## Tyan

(Test Sponsor: Advanced Micro Devices)

### SPECfp<sup>®</sup>\_rate2006 = 155

## Tyan YR190B8228, AMD Opteron 4170 HE

### SPECfp\_rate\_base2006 = 144

CPU2006 license: 49

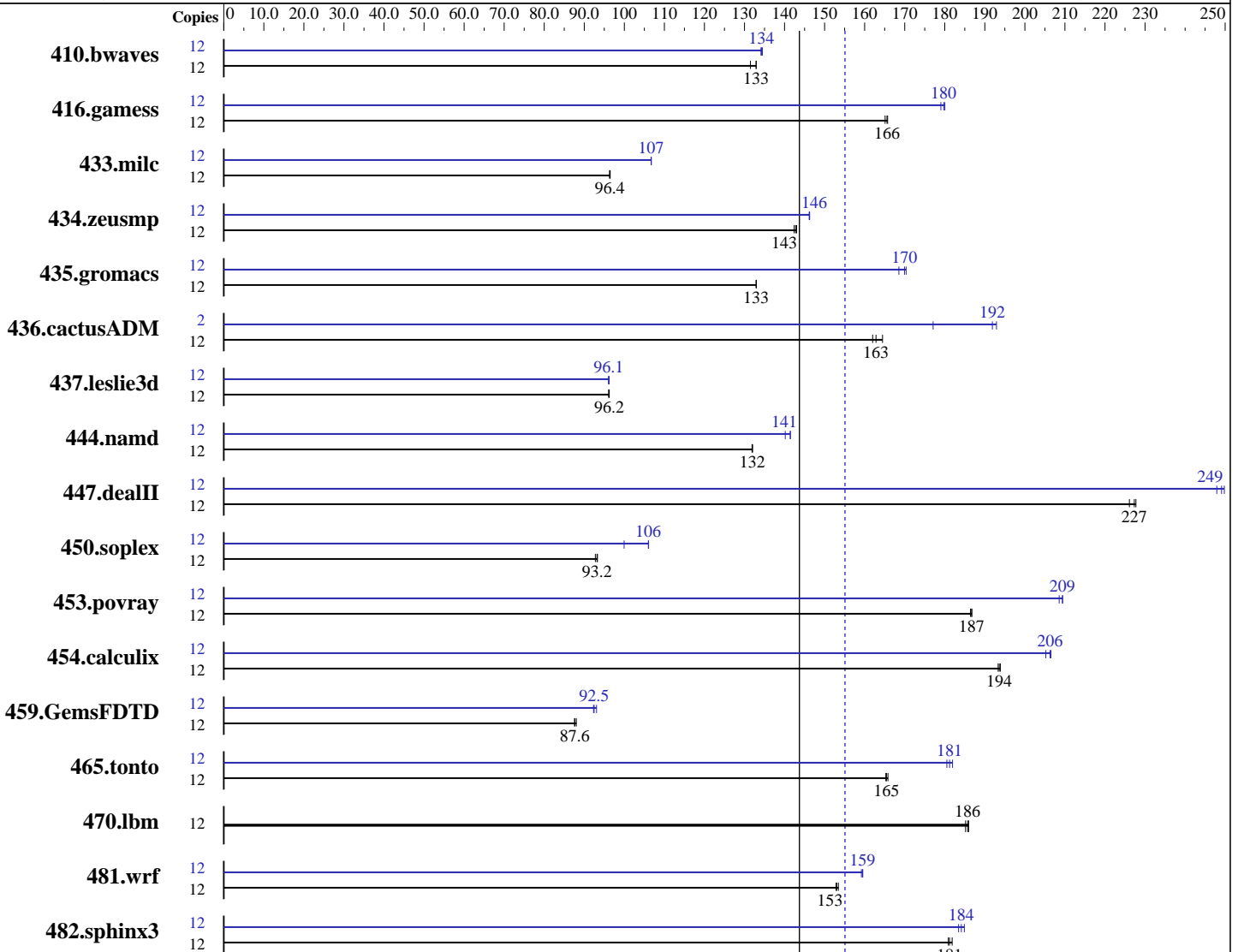
Test sponsor: Advanced Micro Devices

Tested by: Advanced Micro Devices

Test date: Aug-2010

Hardware Availability: Aug-2010

Software Availability: Jul-2010



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### Hardware

CPU Name: AMD Opteron 4170 HE  
 CPU Characteristics:  
 CPU MHz: 2100  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 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: SUSE Linux Enterprise Server 11 (x86\_64), Kernel 2.6.27.19-5-default  
 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  
 Other Software: None



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L3 Cache: 6 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 32 GB (4 x 8 GB, DDR3-1333, CL9, Reg, Dual Rank)  
 Disk Subsystem: 1 x 128 GB SATA SSD,  
 Western Digital SiliconEdge Blue SSC-D0128SC-2100  
 Other Hardware: None

## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	12	1240	131	1227	133	<u>1227</u>	<u>133</u>	12	1216	134	1213	134	<u>1215</u>	<u>134</u>		
416.gamess	12	1423	165	<u>1419</u>	<u>166</u>	1418	166	12	<u>1307</u>	<u>180</u>	1305	180	1312	179		
433.milc	12	1142	96.5	1144	96.3	<u>1143</u>	<u>96.4</u>	12	1033	107	1032	107	<u>1033</u>	<u>107</u>		
434.zeusmp	12	767	142	<u>765</u>	<u>143</u>	764	143	12	747	146	<u>747</u>	<u>146</u>	747	146		
435.gromacs	12	645	133	<u>645</u>	<u>133</u>	644	133	12	508	169	503	170	<u>504</u>	<u>170</u>		
436.cactusADM	12	<u>881</u>	<u>163</u>	885	162	872	164	2	135	177	124	193	<u>125</u>	<u>192</u>		
437.leslie3d	12	<u>1172</u>	<u>96.2</u>	1172	96.2	1174	96.1	12	1172	96.2	<u>1174</u>	<u>96.1</u>	1174	96.1		
444.namd	12	730	132	729	132	<u>729</u>	<u>132</u>	12	687	140	<u>680</u>	<u>141</u>	680	141		
447.dealII	12	607	226	<u>604</u>	<u>227</u>	603	228	12	<u>551</u>	<u>249</u>	550	250	554	248		
450.soplex	12	1079	92.8	1073	93.3	<u>1074</u>	<u>93.2</u>	12	1001	99.9	<u>944</u>	<u>106</u>	944	106		
453.povray	12	342	186	<u>342</u>	<u>187</u>	342	187	12	<u>305</u>	<u>209</u>	305	209	306	209		
454.calculix	12	<u>511</u>	<u>194</u>	511	194	512	193	12	482	205	479	207	<u>480</u>	<u>206</u>		
459.GemsFDTD	12	1454	87.6	<u>1453</u>	<u>87.6</u>	1447	88.0	12	<u>1377</u>	<u>92.5</u>	1368	93.1	1379	92.3		
465.tonto	12	712	166	<u>714</u>	<u>165</u>	714	165	12	654	181	649	182	<u>652</u>	<u>181</u>		
470.lbm	12	890	185	<u>888</u>	<u>186</u>	887	186	12	890	185	<u>888</u>	<u>186</u>	887	186		
481.wrf	12	<u>876</u>	<u>153</u>	874	153	877	153	12	840	160	<u>841</u>	<u>159</u>	842	159		
482.sphinx3	12	1286	182	<u>1291</u>	<u>181</u>	1293	181	12	1275	183	1265	185	<u>1270</u>	<u>184</u>		

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=5400 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/amd1002li-rate-libs-revC/64:/root/work/cpu2006/amd1002li-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:

openc

C++ benchmarks:

openCC

Fortran benchmarks:

openf95

Benchmarks using both Fortran and C:

openc 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.deallI: -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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## 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.deallI: -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.html>

<http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.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.xml>

<http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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