



# SPEC® CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

Dell Inc.

SPECfp®\_rate2006 = 247

PowerEdge R715 (AMD Opteron 6132 HE, 2.20 GHz)

SPECfp\_rate\_base2006 = 222

CPU2006 license: 55

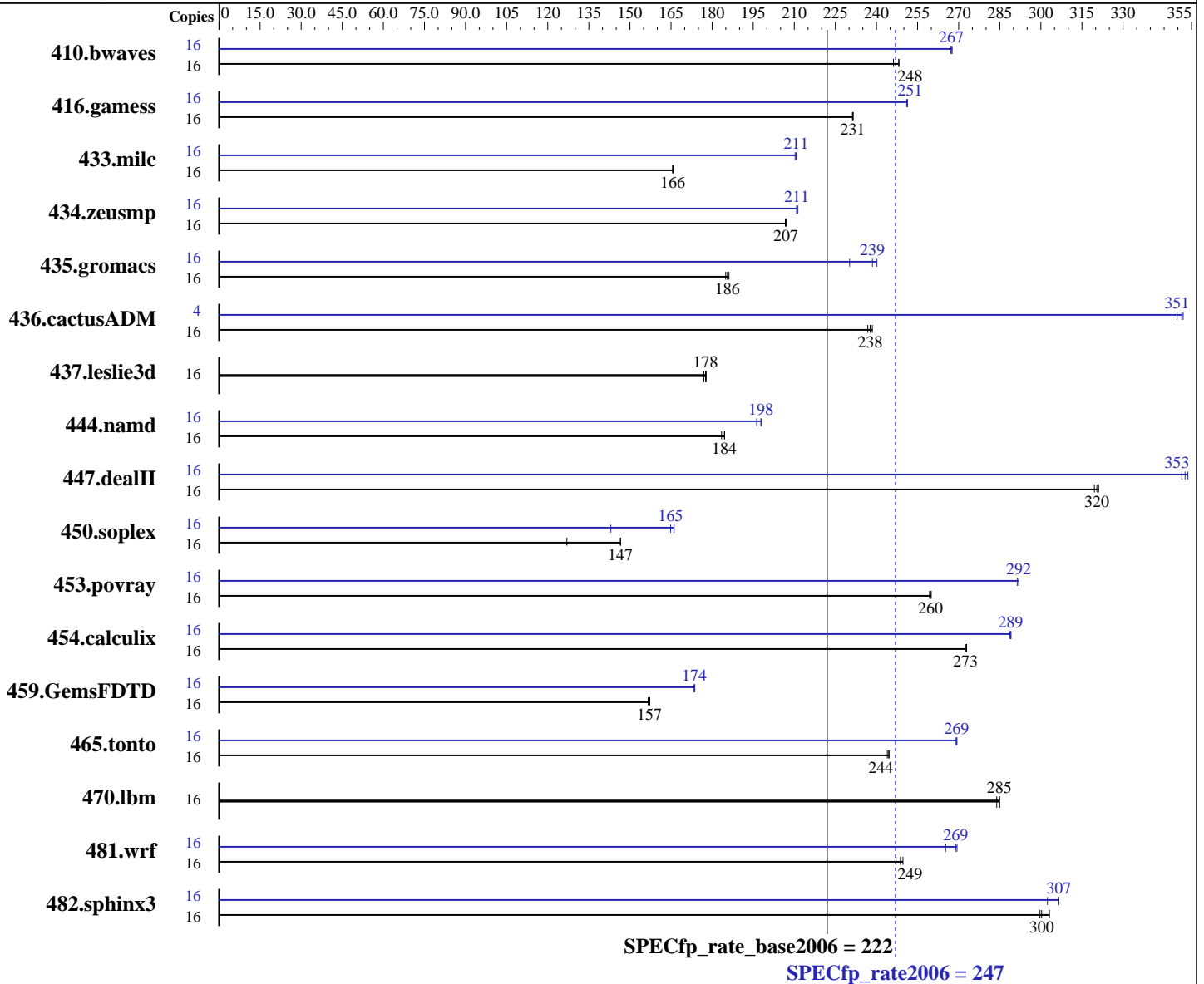
Test date: Oct-2010

Test sponsor: Dell Inc.

Hardware Availability: Feb-2011

Tested by: Dell Inc.

Software Availability: Jan-2011



### Hardware

CPU Name: AMD Opteron 6132 HE  
 CPU Characteristics:  
 CPU MHz: 2200  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 2 chips, 8 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

### 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: 12 MB I+D on chip per chip, 6 MB shared / 4 cores  
 Other Cache: None  
 Memory: 64 GB (16 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 146 GB SAS 10000 RPM SAS  
 Other Hardware: None

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	16	883	246	<b><u>876</u></b>	<b><u>248</u></b>	876	248	16	<b><u>813</u></b>	<b><u>267</u></b>	814	267	812	268
416.gamess	16	1353	232	1355	231	<b><u>1355</u></b>	<b><u>231</u></b>	16	1247	251	1248	251	<b><u>1247</u></b>	<b><u>251</u></b>
433.milc	16	886	166	887	166	<b><u>886</u></b>	<b><u>166</u></b>	16	<b><u>697</u></b>	<b><u>211</u></b>	697	211	698	210
434.zeusmp	16	704	207	<b><u>704</u></b>	<b><u>207</u></b>	703	207	16	<b><u>690</u></b>	<b><u>211</u></b>	689	211	690	211
435.gromacs	16	<b><u>616</u></b>	<b><u>186</u></b>	618	185	614	186	16	<b><u>479</u></b>	<b><u>239</u></b>	496	230	476	240
436.cactusADM	16	802	238	<b><u>804</u></b>	<b><u>238</u></b>	807	237	4	<b><u>136</u></b>	<b><u>351</u></b>	136	352	137	350
437.leslie3d	16	850	177	846	178	<b><u>847</u></b>	<b><u>178</u></b>	16	850	177	846	178	<b><u>847</u></b>	<b><u>178</u></b>
444.namd	16	699	183	<b><u>696</u></b>	<b><u>184</u></b>	695	185	16	654	196	649	198	<b><u>649</u></b>	<b><u>198</u></b>
447.dealII	16	573	320	<b><u>571</u></b>	<b><u>320</u></b>	570	321	16	518	354	<b><u>519</u></b>	<b><u>353</u></b>	521	351
450.soplex	16	1051	127	910	147	<b><u>911</u></b>	<b><u>147</u></b>	16	933	143	<b><u>810</u></b>	<b><u>165</u></b>	803	166
453.povray	16	<b><u>328</u></b>	<b><u>260</u></b>	327	260	328	259	16	292	291	292	292	<b><u>292</u></b>	<b><u>292</u></b>
454.calculix	16	484	273	485	272	<b><u>484</u></b>	<b><u>273</u></b>	16	457	289	457	289	<b><u>457</u></b>	<b><u>289</u></b>
459.GemsFDTD	16	<b><u>1080</u></b>	<b><u>157</u></b>	1084	157	1079	157	16	979	173	<b><u>978</u></b>	<b><u>174</u></b>	977	174
465.tonto	16	645	244	<b><u>644</u></b>	<b><u>244</u></b>	644	245	16	<b><u>585</u></b>	<b><u>269</u></b>	584	269	585	269
470.lbm	16	<b><u>772</u></b>	<b><u>285</u></b>	771	285	774	284	16	<b><u>772</u></b>	<b><u>285</u></b>	771	285	774	284
481.wrf	16	723	247	<b><u>719</u></b>	<b><u>249</u></b>	716	250	16	674	265	<b><u>665</u></b>	<b><u>269</u></b>	663	269
482.sphinx3	16	<b><u>1038</u></b>	<b><u>300</u></b>	1041	300	1029	303	16	1031	302	1017	307	<b><u>1017</u></b>	<b><u>307</u></b>

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=14336 in /etc/sysctl.conf  
 mount -t hugetlbfs nodev /mnt/hugepages



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## Platform Notes

BIOS Settings:

Power Management = Maximum Performance (Default = Active Power Controller)

## General Notes

Environment variables set by runspec before the start of the run:

HUGETLB\_LIMIT = "896"

LD\_LIBRARY\_PATH = "/cpu2006/amd1002-rate-libs-revC/64:/cpu2006/amd1002-rate-libs-revC/32"

OMP\_NUM\_THREADS = "4"

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

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## Base Portability Flags (Continued)

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

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:

openc

C++ benchmarks:

openCC

Fortran benchmarks:

openf95

Benchmarks using both Fortran and C:

openc 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

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## Peak Portability Flags (Continued)

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.dealIII: -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:

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## Peak Optimization Flags (Continued)

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

437.leslie3d: basepeak = yes

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.20100901.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.20100901.xml>  
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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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