



SPEC[®] CFP2006 Result

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Dell Inc.

SPECfp[®]_rate2006 = 177

PowerEdge R415 (AMD Opteron 4230 HE, 2.90 GHz)

SPECfp_rate_base2006 = 163

CPU2006 license: 55

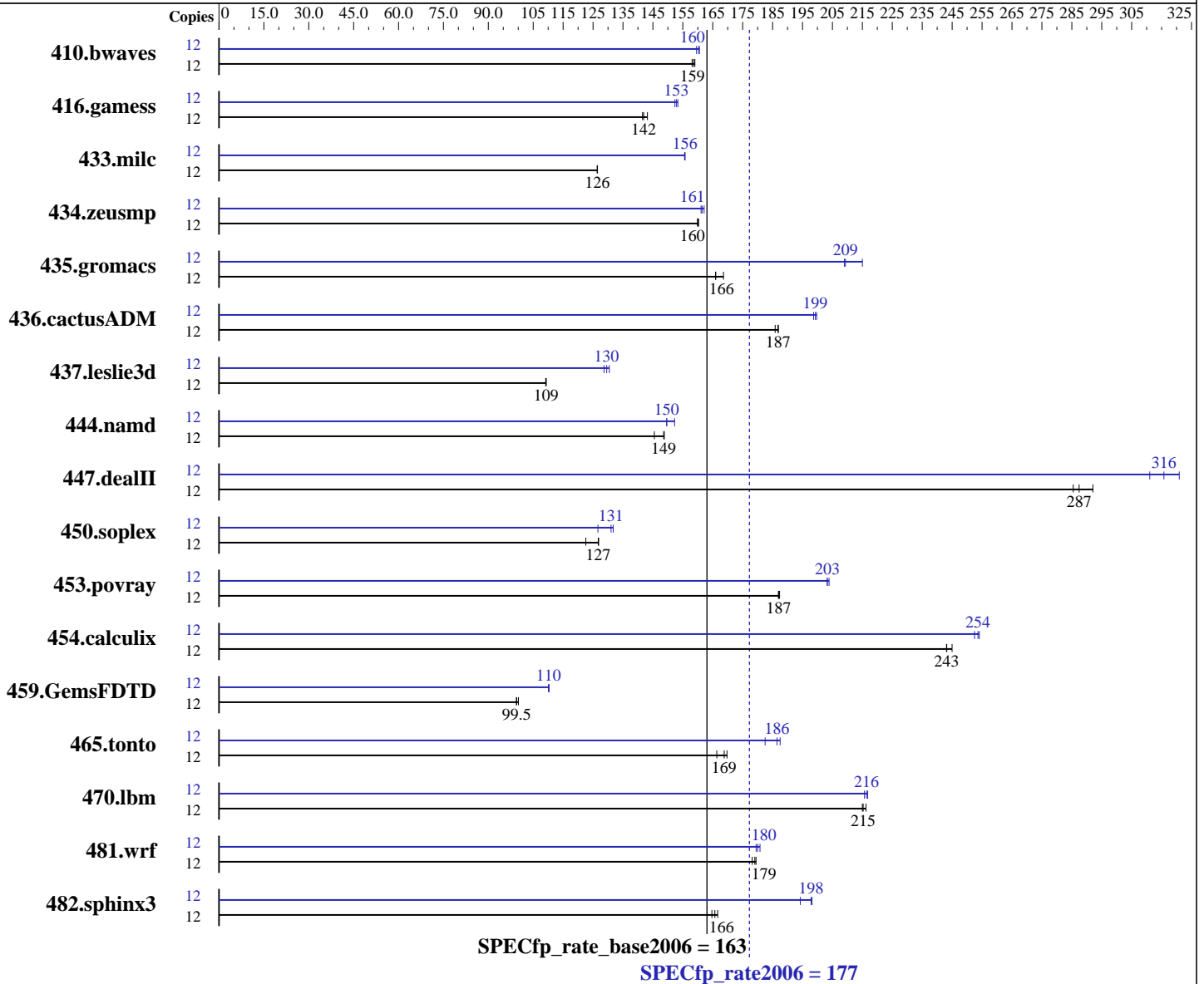
Test date: Jul-2012

Test sponsor: Dell Inc.

Hardware Availability: Nov-2011

Tested by: Dell Inc.

Software Availability: Jul-2011



Hardware

CPU Name: AMD Opteron 4230 HE
 CPU Characteristics: AMD Turbo CORE technology up to 3.70 GHz
 CPU MHz: 2900
 FPU: Integrated
 CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip
 CPU(s) orderable: 1,2 chips

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Software

Operating System: SUSE Linux Enterprise Server 11 SP2 (x86_64) 3.0.13-0.27-default
 Compiler: C/C++/Fortran: Version 4.5.1 of x86 Open64 Compiler Suite (from AMD)
 Auto Parallel: No
 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: 192 KB I on chip per chip,
64 KB I shared / 2 cores;
16 KB D on chip per core

Secondary Cache: 6 MB I+D on chip per chip, 2 MB shared / 2 cores

L3 Cache: 8 MB I+D on chip per chip

Other Cache: None

Memory: 32 GB (4 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	12	1025	159	<u>1028</u>	<u>159</u>	1031	158	12	1022	160	1016	161	<u>1018</u>	<u>160</u>
416.gamess	12	1641	143	<u>1656</u>	<u>142</u>	1660	142	12	<u>1537</u>	<u>153</u>	1532	153	1542	152
433.milc	12	872	126	871	126	<u>871</u>	<u>126</u>	12	<u>708</u>	<u>156</u>	708	156	707	156
434.zeusmp	12	<u>682</u>	<u>160</u>	681	160	683	160	12	678	161	<u>676</u>	<u>161</u>	674	162
435.gromacs	12	508	169	<u>516</u>	<u>166</u>	516	166	12	398	215	<u>409</u>	<u>209</u>	410	209
436.cactusADM	12	767	187	<u>768</u>	<u>187</u>	772	186	12	718	200	722	199	<u>720</u>	<u>199</u>
437.leslie3d	12	1033	109	<u>1032</u>	<u>109</u>	1032	109	12	865	130	<u>871</u>	<u>130</u>	877	129
444.namd	12	<u>648</u>	<u>149</u>	647	149	662	145	12	632	152	643	150	<u>643</u>	<u>150</u>
447.dealII	12	<u>478</u>	<u>287</u>	481	285	470	292	12	<u>435</u>	<u>316</u>	441	311	428	321
450.soplex	12	816	123	789	127	<u>790</u>	<u>127</u>	12	790	127	<u>764</u>	<u>131</u>	760	132
453.povray	12	341	187	341	187	<u>341</u>	<u>187</u>	12	314	203	<u>314</u>	<u>203</u>	313	204
454.calculix	12	<u>407</u>	<u>243</u>	404	245	407	243	12	390	254	392	253	<u>390</u>	<u>254</u>
459.GemsFDTD	12	1272	100	1281	99.4	<u>1280</u>	<u>99.5</u>	12	1154	110	1156	110	<u>1156</u>	<u>110</u>
465.tonto	12	710	166	696	170	<u>699</u>	<u>169</u>	12	630	188	<u>633</u>	<u>186</u>	647	183
470.lbm	12	<u>766</u>	<u>215</u>	763	216	767	215	12	761	217	<u>762</u>	<u>216</u>	764	216
481.wrf	12	747	179	<u>749</u>	<u>179</u>	752	178	12	741	181	<u>745</u>	<u>180</u>	747	179
482.sphinx3	12	1420	165	<u>1411</u>	<u>166</u>	1403	167	12	1204	194	<u>1182</u>	<u>198</u>	1180	198

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)

```
Set vm/nr_hugepages=5760 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 = "480"

LD_LIBRARY_PATH = "/root/cpu2006/amd1104-rate-libs-revC/32:/root/cpu2006/amd1104-rate-libs-revC/64"

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 6274 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.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
```

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Base Portability Flags (Continued)

481.wrf: -DSPEC_CPU_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
-fno-second-underscore
482.sphinx3: -DSPEC_CPU_LP64

Base Optimization Flags

C benchmarks:

-march=bdver1 -Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -mso

C++ benchmarks:

-march=bdver1 -Ofast -static -CG:load_exe=0 -OPT:malloc_alg=1
-INLINE:aggressive=on -HP:bd=2m:heap=2m -D__OPEN64_FAST_SET

Fortran benchmarks:

-march=bdver1 -Ofast -LNO:blocking=off -OPT:rsqrt=2
-OPT:unroll_size=256 -HP:bd=2m:heap=2m -mso

Benchmarks using both Fortran and C:

-march=bdver1 -Ofast -OPT:malloc_alg=1 -HP:bd=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -mso -LNO:blocking=off
-OPT:rsqrt=2 -OPT:unroll_size=256

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

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Peak Portability Flags (Continued)

```

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_LINUX -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LP64
-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 -mso

470.lbm: -march=bdver1 -Ofast -CG:cmp_peep=on
-OPT:unroll_times_max=8 -OPT:unroll_size=256
-OPT:unroll_level=2 -OPT:keep_ext=on -HP:bdt=2m:heap=2m
-IPA:plimit=8000 -IPA:small_pu=100 -mso

482.sphinx3: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -IPA:plimit=1000
-OPT:malloc_alg=2 -CG:cmp_peep=on -CG:local_sched_alg=2
-CG:p2align=0 -INLINE:aggressive=on -LNO:prefetch=2
-LNO:prefetch_ahead=4 -mso

```

C++ benchmarks:

```

444.namd: -march=bdver1 -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -IPA:plimit=3000
-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.dealIII: -march=bdver1 -Ofast -D__OPEN64_FAST_SET -static
-INLINE:aggressive=on -LNO:opt=0 -LNO:simd=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 -CG:movext_icmp=off
-TENV:frame_pointer=off

```

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Peak Optimization Flags (Continued)

450.soplex: -march=bdver1 -fb_create fbdata(pass 1)
 -fb_opt fbdata(pass 2) -O3 -LNO:ignore_feedback=off
 -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
 -CG:p2align=0 -CG:p2align_split=on -CG:dsched=on
 -INLINE:aggressive=on -HP:bd=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 -OPT:Ofast -OPT:treeheight=on
 -LNO:blocking=off -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

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 -LNO:blocking=off -LNO:interchange=off
 -IPA:plimit=1500 -HP:bdt=2m:heap=2m

437.leslie3d: -march=bdver1 -Ofast -CG:pre_minreg_level=2 -LNO:simd=0
 -LNO:fusion=2 -HP:bdt=2m:heap=2m -mso

459.GemsFDTD: -march=bdver1 -Ofast -IPA:plimit=1500 -OPT:unroll_size=0
 -LNO:fission=2 -CG:load_exe=0 -CG:local_sched_alg=2 -HP

465.tonto: -march=bdver1 -Ofast -OPT:alias=no_f90_pointer_alias
 -LNO:blocking=off -CG:load_exe=1 -IPA:plimit=525
 -HP:bdt=2m:heap=2m

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 -CG:local_sched_alg=2 -GRA:unspill=ON
 -CG:load_exe=3 -LNO:simd=3

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

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Peak Optimization Flags (Continued)

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

481.wrf: -march=bdver1 -Ofast -LNO:blocking=off -LANG:copyinout=off
-IPA:callee_limit=5000 -GRA:prioritize_by_density=on
-CG:load_exe=1 -HP -WOPT:sib=on

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/amd-platform-speed-revA-I.html>
<http://www.spec.org/cpu2006/flags/x86-open64-451-flags-rate-revC.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/amd-platform-speed-revA-I.xml>
<http://www.spec.org/cpu2006/flags/x86-open64-451-flags-rate-revC.xml>

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

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