



SPEC[®] CFP2006 Result

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Dell Inc.

SPECfp[®]_rate2006 = 758

PowerEdge M915 (AMD Opteron 6276, 2.30 GHz)

SPECfp_rate_base2006 = 700

CPU2006 license: 55

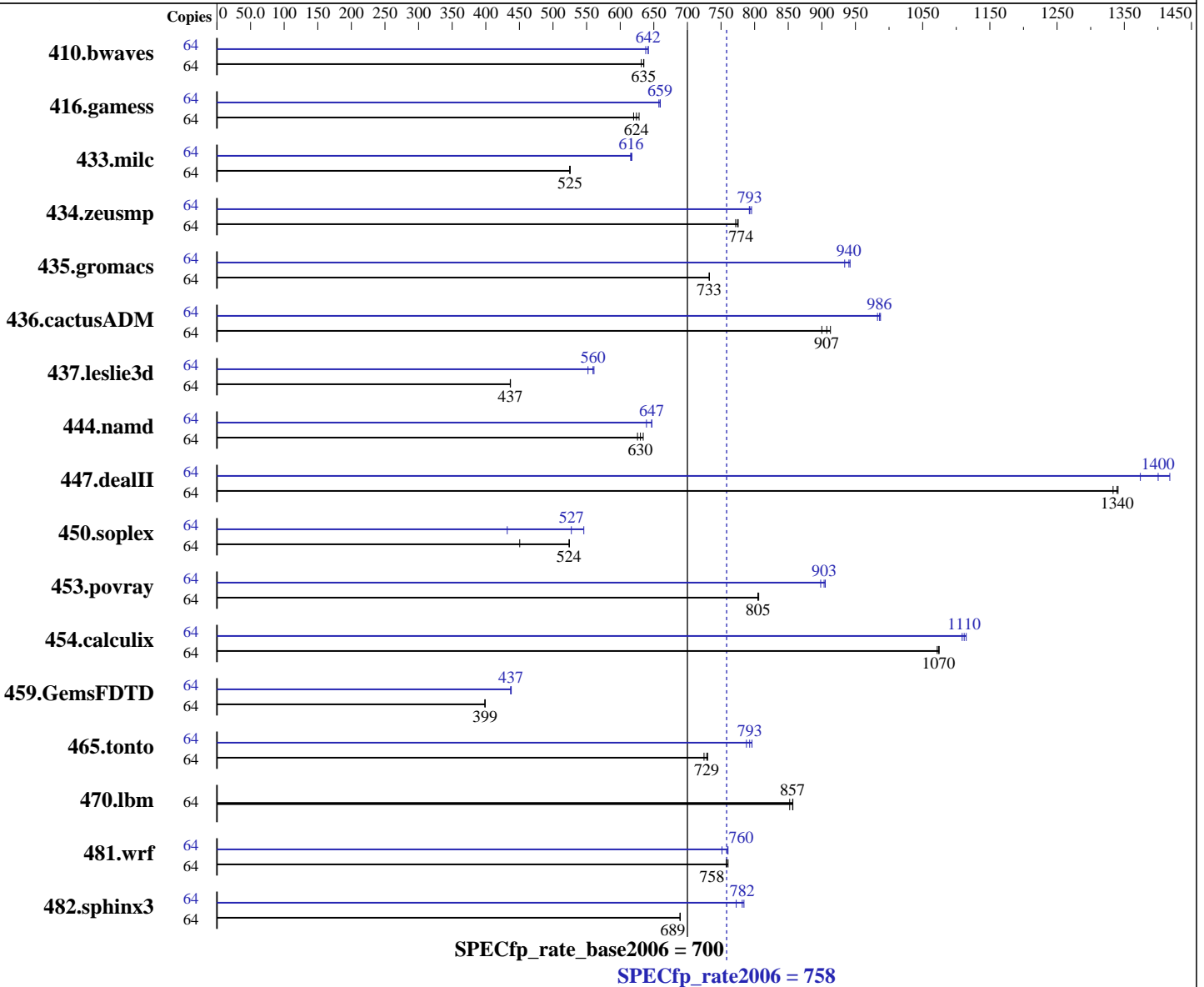
Test date: Jul-2012

Test sponsor: Dell Inc.

Hardware Availability: Nov-2011

Tested by: Dell Inc.

Software Availability: Dec-2011



Hardware

CPU Name: AMD Opteron 6276
 CPU Characteristics: AMD Turbo CORE technology up to 3.20 GHz
 CPU MHz: 2300
 FPU: Integrated
 CPU(s) enabled: 64 cores, 4 chips, 16 cores/chip
 CPU(s) orderable: 2,4 chips

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Software

Operating System: Red Hat Enterprise Linux Server release 6.2
 Kernel 2.6.32-220.el6.x86_64
 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: 512 KB I on chip per chip,
64 KB I shared / 2 cores;
16 KB D on chip per core

Secondary Cache: 16 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 / 8 cores

Other Cache: None

Memory: 256 GB (32 x 8 GB 2Rx4 PC3-12800R-11, ECC)

Disk Subsystem: 1 x 300 GB SAS 15000 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	64	1378	631	<u>1370</u>	<u>635</u>	1369	635	64	1355	642	1363	638	<u>1355</u>	<u>642</u>
416.gamess	64	<u>2008</u>	<u>624</u>	1995	628	2021	620	64	1906	658	<u>1901</u>	<u>659</u>	1900	660
433.milc	64	1120	525	<u>1119</u>	<u>525</u>	1118	526	64	952	617	954	616	<u>953</u>	<u>616</u>
434.zeusmp	64	751	776	755	772	<u>752</u>	<u>774</u>	64	735	792	732	795	<u>735</u>	<u>793</u>
435.gromacs	64	624	732	<u>624</u>	<u>733</u>	624	733	64	489	934	485	942	<u>486</u>	<u>940</u>
436.cactusADM	64	850	900	<u>843</u>	<u>907</u>	838	913	64	<u>776</u>	<u>986</u>	775	987	778	983
437.leslie3d	64	1379	436	1378	437	<u>1378</u>	<u>437</u>	64	1090	552	1072	561	<u>1075</u>	<u>560</u>
444.namd	64	820	626	809	634	<u>815</u>	<u>630</u>	64	<u>794</u>	<u>647</u>	793	647	803	639
447.dealII	64	546	1340	<u>547</u>	<u>1340</u>	549	1330	64	<u>523</u>	<u>1400</u>	516	1420	533	1370
450.soplex	64	1185	450	<u>1019</u>	<u>524</u>	1018	525	64	1236	432	<u>1012</u>	<u>527</u>	978	546
453.povray	64	423	805	<u>423</u>	<u>805</u>	422	806	64	<u>377</u>	<u>903</u>	376	905	379	898
454.calculix	64	493	1070	<u>492</u>	<u>1070</u>	491	1070	64	476	1110	474	1110	<u>475</u>	<u>1110</u>
459.GemsFDTD	64	<u>1702</u>	<u>399</u>	1703	399	1702	399	64	1554	437	1551	438	<u>1552</u>	<u>437</u>
465.tonto	64	869	725	<u>864</u>	<u>729</u>	862	730	64	799	788	791	796	<u>795</u>	<u>793</u>
470.lbm	64	1032	852	<u>1027</u>	<u>857</u>	1026	857	64	1032	852	<u>1027</u>	<u>857</u>	1026	857
481.wrf	64	<u>943</u>	<u>758</u>	940	760	943	758	64	951	751	940	760	<u>941</u>	<u>760</u>
482.sphinx3	64	1811	689	<u>1810</u>	<u>689</u>	1809	689	64	1615	773	<u>1596</u>	<u>782</u>	1591	784

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=57344 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 = "896"

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.lelie3d: -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: basepeak = yes

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

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

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Peak Optimization Flags (Continued)

450.soplex (continued):

-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:bd=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:bd=2m:heap=2m -WOPT:sib=on

434.zeusmp: -march=bdver1 -Ofast -LNO:blocking=off -LNO:interchange=off

-IPA:plimit=1500 -HP:bd=2m:heap=2m

437.leslie3d: -march=bdver1 -Ofast -CG:pre_minreg_level=2 -LNO:simd=0

-LNO:fusion=2 -HP:bd=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:bd=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:bd=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

454.calculix: -march=bdver1 -Ofast -OPT:unroll_size=256

-GRA:optimize_boundary=on -CG:dsched=on -HP:bd=2m:heap=2m

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Peak Optimization Flags (Continued)

```
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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