



SPEC[®] CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge R715
(AMD Opteron 6234, 2.40 GHz)

SPECfp[®]_rate2006 = 325

SPECfp_rate_base2006 = 304

CPU2006 license: 55

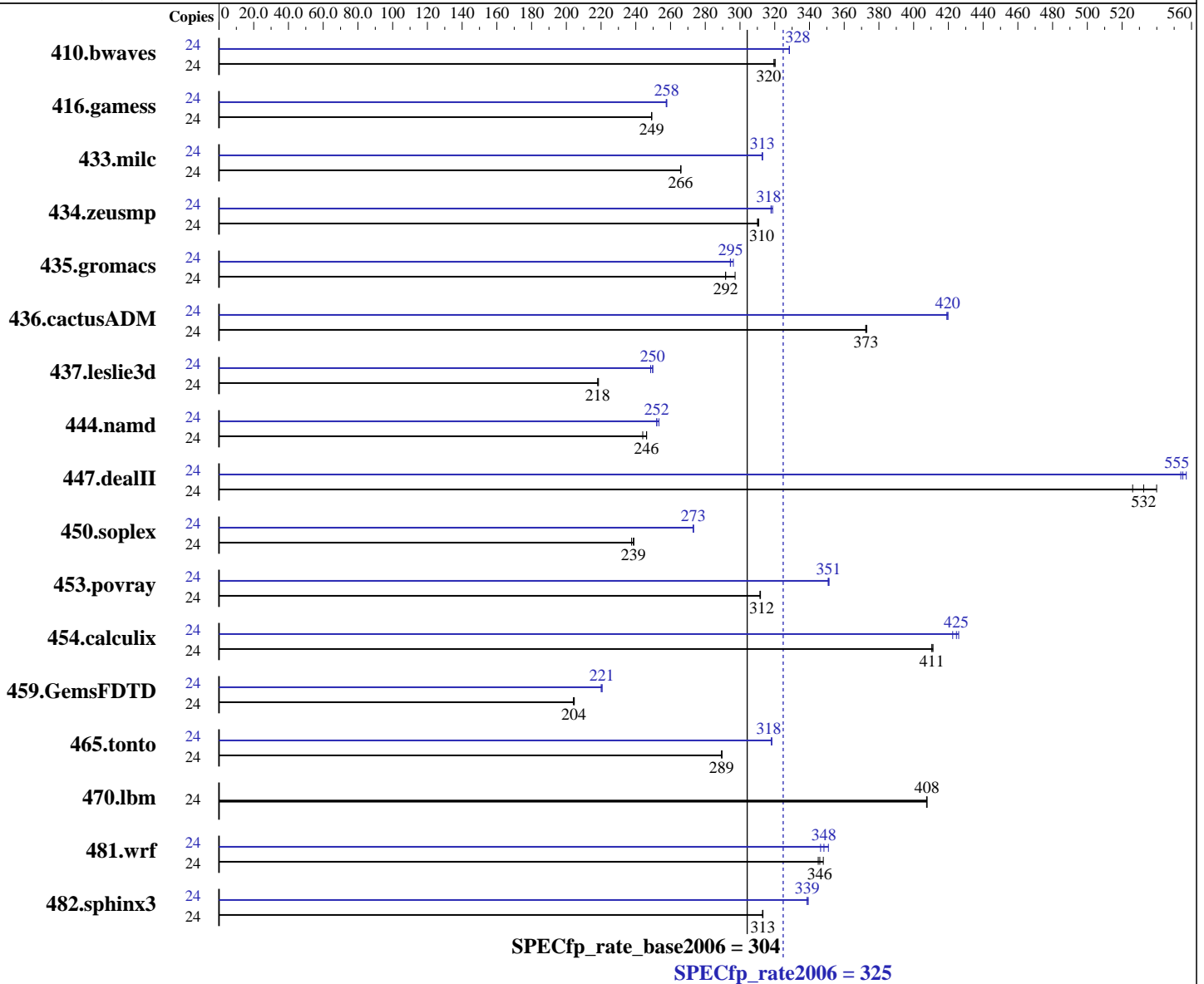
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Nov-2011

Hardware Availability: Nov-2011

Software Availability: Jul-2011



Hardware

CPU Name: AMD Opteron 6234
 CPU Characteristics: AMD Turbo CORE technology up to 3.00 GHz
 CPU MHz: 2400
 FPU: Integrated
 CPU(s) enabled: 24 cores, 2 chips, 12 cores/chip
 CPU(s) orderable: 2 chips

Continued on next page

Software

Operating System: Red Hat Enterprise Linux Server release 6.1, Kernel 2.6.32-131.0.15.el6.x86_64
 Compiler: C/C++/Fortran: Version 4.2.5.2 of x86 Open64 Compiler Suite (from AMD)
 Auto Parallel: No
 File System: ext4
 System State: Run level 3 (Full multiuser with network)
 Base Pointers: 64-bit

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Primary Cache: 384 KB I on chip per chip,
64 KB I shared / 2 cores;
16 KB D on chip per core

Secondary Cache: 12 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 / 6 cores

Other Cache: None

Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)

Disk Subsystem: 2 x 160 GB SAS, 15000 RPM

Other Hardware: None

Peak Pointers: 32/64-bit
Other Software: SmartHeap 10.0 32-bit Library for Linux

Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	24	1021	320	<u>1019</u>	<u>320</u>	1019	320	24	993	328	<u>993</u>	<u>328</u>	993	328		
416.gamess	24	<u>1886</u>	<u>249</u>	1887	249	1886	249	24	1825	257	<u>1823</u>	<u>258</u>	1823	258		
433.milc	24	829	266	828	266	<u>829</u>	<u>266</u>	24	705	313	704	313	<u>704</u>	<u>313</u>		
434.zeusmp	24	704	310	<u>704</u>	<u>310</u>	703	311	24	685	319	<u>687</u>	<u>318</u>	687	318		
435.gromacs	24	577	297	588	292	<u>587</u>	<u>292</u>	24	<u>582</u>	<u>295</u>	579	296	582	294		
436.cactusADM	24	769	373	<u>770</u>	<u>373</u>	770	372	24	684	419	683	420	<u>683</u>	<u>420</u>		
437.leslie3d	24	<u>1034</u>	<u>218</u>	1034	218	1032	219	24	<u>903</u>	<u>250</u>	908	249	903	250		
444.namd	24	789	244	<u>782</u>	<u>246</u>	782	246	24	764	252	760	253	<u>763</u>	<u>252</u>		
447.dealII	24	522	526	509	540	<u>516</u>	<u>532</u>	24	496	554	<u>495</u>	<u>555</u>	493	557		
450.soplex	24	838	239	843	238	<u>839</u>	<u>239</u>	24	<u>733</u>	<u>273</u>	733	273	732	273		
453.povray	24	<u>410</u>	<u>312</u>	410	311	409	312	24	<u>364</u>	<u>351</u>	364	351	363	351		
454.calculix	24	<u>482</u>	<u>411</u>	482	411	482	410	24	<u>466</u>	<u>425</u>	465	426	469	422		
459.GemsFDTD	24	1245	205	<u>1246</u>	<u>204</u>	1248	204	24	1157	220	<u>1155</u>	<u>221</u>	1155	221		
465.tonto	24	<u>816</u>	<u>289</u>	815	290	816	289	24	742	318	<u>742</u>	<u>318</u>	742	318		
470.lbm	24	809	407	809	408	<u>809</u>	<u>408</u>	24	809	407	809	408	<u>809</u>	<u>408</u>		
481.wrf	24	770	348	<u>775</u>	<u>346</u>	777	345	24	774	346	764	351	<u>770</u>	<u>348</u>		
482.sphinx3	24	1495	313	<u>1494</u>	<u>313</u>	1493	313	24	1379	339	1381	339	<u>1381</u>	<u>339</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

Binaries were compiled on a system with 2x AMD Opteron 6276 chips + 128GB Memory using RHEL 6.1
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Operating System Notes (Continued)

Huge pages, transparent Huge pages, and space randomization is controlled with the following settings:

```
echo 57344 > /proc/sys/vm/nr_hugepages
mount -t hugetlbfs nodev /mnt/hugepages
echo never > /sys/kernel/mm/redhat_transparent_hugepage/enabled
echo 0 > /proc/sys/kernel/randomize_va_space=0
```

Platform Notes

'Power Management' set to 'Maximum Performance' in BIOS

General Notes

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

```
HUGETLB_LIMIT = "896"
LD_LIBRARY_PATH = "/root/cpu2006-1.1/amd1104-rate-libs-revA/32:/root/cpu2006-1.1/amd1104-rate-libs-revA/64"
The x86 Open64 Compiler Suite is only available from (and supported by) AMD at
http://developer.amd.com/cpu/open64
```

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
```

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Base Portability Flags (Continued)

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

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:
opencc

C++ benchmarks:
openCC

Fortran benchmarks:
openf95

Benchmarks using both Fortran and C:
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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_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 -OPT:malloc_alg=2
-CG:cmp_peep=on -CG:local_sched_alg=2 -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 -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.dealII: -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 -INLINE:aggressive=on -OPT:RO=1
-OPT:IEEE_arith=3 -OPT:IEEE_NaN_Inf=off

```

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Peak Optimization Flags (Continued)

450.soplex (continued):

-OPT:fold_unsigned_relops=on -fno-exceptions -m32
-HP:bd=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
-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
-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 -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

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
-WOPT:sib=on

454.calculix:

-march=bdver1 -Ofast -OPT:unroll_size=256
-GRA:optimize_boundary=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/amd1104-platform-rate-revA.20111122.html>
<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.html>

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

<http://www.spec.org/cpu2006/flags/amd1104-platform-rate-revA.20111122.xml>
<http://www.spec.org/cpu2006/flags/x86-open64-425-flags-rate-revA.xml>

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

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