



SPEC® CFP2006 Result

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Dell Inc.

SPECfp®_rate2006 = 390

PowerEdge R715 (AMD Opteron 6278, 2.40 GHz)

SPECfp_rate_base2006 = 359

CPU2006 license: 55

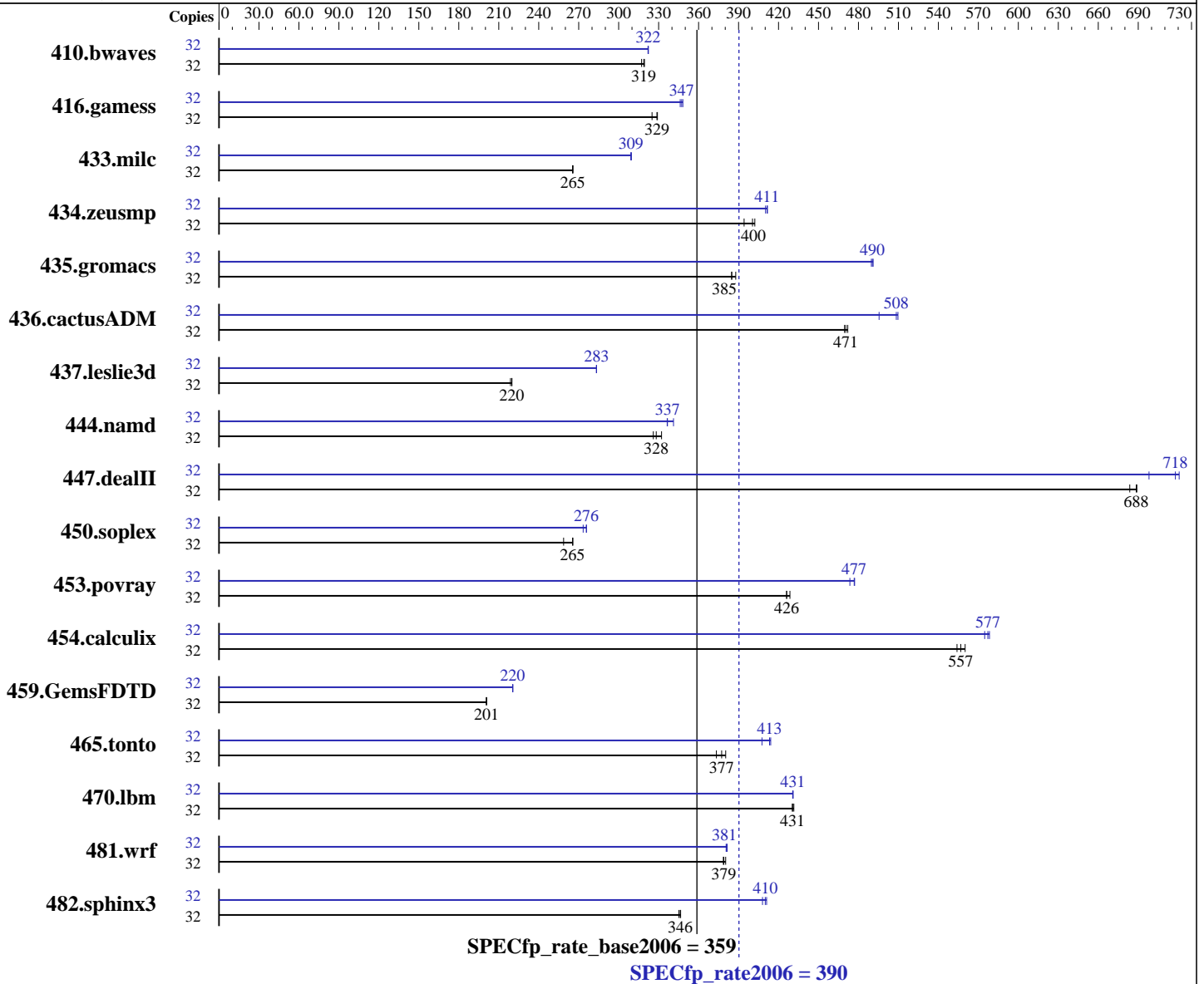
Test date: Jun-2012

Test sponsor: Dell Inc.

Hardware Availability: Jul-2012

Tested by: Dell Inc.

Software Availability: Jul-2011



Hardware

CPU Name: AMD Opteron 6278
 CPU Characteristics: AMD Turbo CORE technology up to 3.30 GHz
 CPU MHz: 2400
 FPU: Integrated
 CPU(s) enabled: 32 cores, 2 chips, 16 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: 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: 3 x 146 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	32	1371	317	<u>1364</u>	<u>319</u>	1362	319	32	<u>1350</u>	<u>322</u>	1350	322	1349	322
416.gamess	32	<u>1906</u>	<u>329</u>	1928	325	1904	329	32	1800	348	1810	346	<u>1804</u>	<u>347</u>
433.milc	32	1107	265	<u>1107</u>	<u>265</u>	1106	266	32	949	310	950	309	<u>950</u>	<u>309</u>
434.zeusmp	32	739	394	<u>727</u>	<u>400</u>	724	402	32	<u>708</u>	<u>411</u>	707	412	710	410
435.gromacs	32	589	388	<u>594</u>	<u>385</u>	594	385	32	467	490	465	491	<u>466</u>	<u>490</u>
436.cactusADM	32	814	469	810	472	<u>813</u>	<u>471</u>	32	772	495	750	510	<u>752</u>	<u>508</u>
437.leslie3d	32	1368	220	1375	219	<u>1368</u>	<u>220</u>	32	1062	283	1061	283	<u>1061</u>	<u>283</u>
444.namd	32	773	332	<u>782</u>	<u>328</u>	787	326	32	752	341	<u>762</u>	<u>337</u>	763	336
447.dealII	32	531	689	<u>532</u>	<u>688</u>	535	684	32	524	698	<u>510</u>	<u>718</u>	508	721
450.soplex	32	1032	259	<u>1006</u>	<u>265</u>	1005	266	32	976	273	<u>968</u>	<u>276</u>	968	276
453.povray	32	<u>400</u>	<u>426</u>	400	426	397	429	32	359	474	<u>357</u>	<u>477</u>	357	477
454.calculix	32	471	560	477	554	<u>474</u>	<u>557</u>	32	459	575	456	578	<u>457</u>	<u>577</u>
459.GemsFDTD	32	1691	201	1691	201	<u>1691</u>	<u>201</u>	32	1540	220	<u>1540</u>	<u>220</u>	1539	221
465.tonto	32	<u>835</u>	<u>377</u>	828	380	843	373	32	<u>762</u>	<u>413</u>	760	414	773	408
470.lbm	32	1019	432	1022	430	<u>1021</u>	<u>431</u>	32	<u>1021</u>	<u>431</u>	1020	431	1021	431
481.wrf	32	<u>943</u>	<u>379</u>	944	379	940	380	32	939	381	<u>938</u>	<u>381</u>	937	381
482.sphinx3	32	1807	345	<u>1801</u>	<u>346</u>	1800	347	32	1517	411	<u>1521</u>	<u>410</u>	1529	408

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=28672 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.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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Standard Performance Evaluation Corporation

info@spec.org

<http://www.spec.org/>

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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: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
 -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

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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 questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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