SPEC® CFP2006 Result

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Dell Inc.

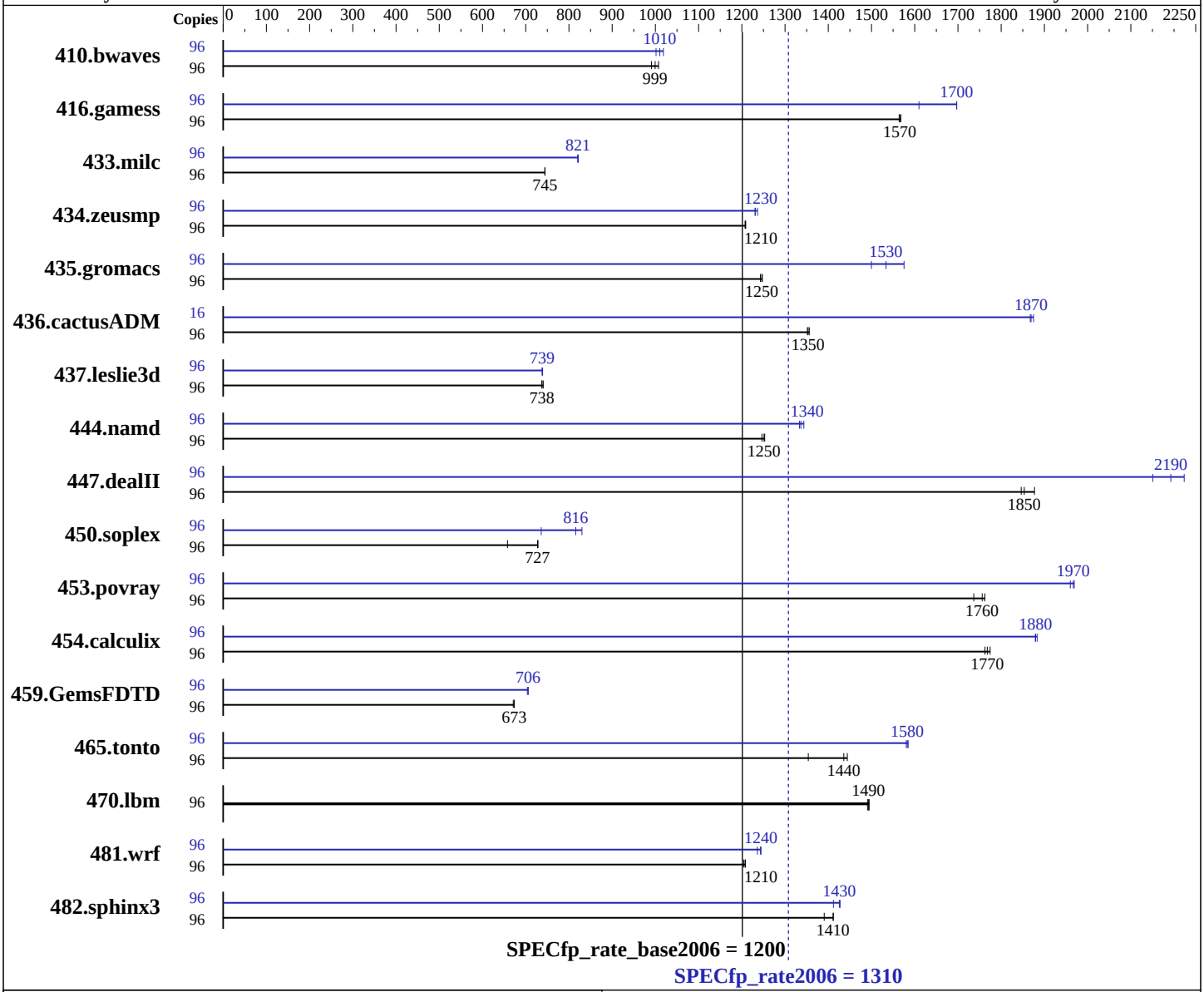
PowerEdge C6145 (AMD Opteron 6180 SE, 2.50 GHz)

SPECfp®_rate2006 = 1310

SPECfp_rate_base2006 = 1200

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Feb-2011
Hardware Availability: Feb-2011
Software Availability: Jul-2010



Hardware

CPU Name:	AMD Opteron 6180 SE
CPU Characteristics:	
CPU MHz:	2500
FPU:	Integrated
CPU(s) enabled:	96 cores, 8 chips, 12 cores/chip
CPU(s) orderable:	2,4 chips per node
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	512 KB I+D on chip per core

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Software

Operating System:	SUSE Linux Enterprise Server 11 SP1 (x86_64) Kernel 2.6.32.12-0.7-default
Compiler:	x86 Open64 4.2.4 Compiler Suite (from AMD)
Auto Parallel:	Yes
File System:	NFSv3
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 / 6 cores
Other Cache: None
Memory: 128 GB (16 x 8 GB 2Rx4 PC3L-10600R-9, ECC, per node)
Disk Subsystem: 1 x 500 GB 7200 RPM SATA local; PowerEdge C2100 via NFS (See additional details below)
Other Hardware: None

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	96	1317	991	**1305**	**999**	1295	1010	96	1281	1020	1303	1000	**1291**	**1010**
416.gamess	96	1202	1560	**1201**	**1570**	1199	1570	96	1107	1700	1168	1610	**1108**	**1700**
433.milc	96	1184	744	1183	745	**1183**	**745**	96	**1074**	**821**	1073	821	1074	821
434.zeusmp	96	**723**	**1210**	723	1210	723	1210	96	**710**	**1230**	707	1240	710	1230
435.gromacs	96	549	1250	551	1240	**550**	**1250**	96	435	1580	457	1500	**447**	**1530**
436.cactusADM	96	849	1350	846	1360	**848**	**1350**	16	102	1870	**102**	**1870**	102	1870
437.leslie3d	96	1219	741	1224	737	**1223**	**738**	96	**1222**	**739**	1221	739	1223	738
444.namd	96	618	1250	**615**	**1250**	614	1250	96	577	1330	**576**	**1340**	573	1340
447.dealII	96	585	1880	**593**	**1850**	595	1850	96	**501**	**2190**	511	2150	494	2220
450.soplex	96	1217	658	**1101**	**727**	1099	728	96	1088	736	**981**	**816**	964	830
453.povray	96	294	1740	290	1760	**291**	**1760**	96	261	1960	**260**	**1970**	259	1970
454.calculix	96	446	1770	**448**	**1770**	449	1760	96	422	1880	421	1880	**421**	**1880**
459.GemsFDTD	96	1512	673	1518	671	**1513**	**673**	96	1444	706	**1444**	**706**	1447	704
465.tonto	96	**658**	**1440**	698	1350	654	1440	96	596	1580	**597**	**1580**	598	1580
470.lbm	96	883	1490	**883**	**1490**	885	1490	96	883	1490	**883**	**1490**	885	1490
481.wrf	96	888	1210	890	1200	**888**	**1210**	96	868	1240	862	1240	**863**	**1240**
482.sphinx3	96	1346	1390	1325	1410	**1326**	**1410**	96	1325	1410	1311	1430	**1313**	**1430**

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, along with submit.pl to distribute jobs to the two nodes of the PowerEdge C6145.
See the configuration file and flags file for details.
```

Operating System Notes

```
The following environment settings were set in the test user's .bashrc on each system
   ulimit -s unlimited
   ulimit -l 2097152
   LD_LIBRARY_PATH=/cpu2006/amd1002-rate-libs-revC/64:/cpu2006/amd1002-rate-libs-revC/32
   HUGETLB_LIMIT=450
   OMP_NUM_THREADS=6
```

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Operating System Notes (Continued)

```
SLES 11 SP1 was installed on the local drive of each of the two nodes of the PowerEdge C6145
Set vm/nr_hugepages=21600 in /etc/sysctl.conf on each system node
mount -t hugetlbfs nodev /mnt/hugepages on each system node
MaxSessions = 1000 set in /etc/ssh/sshd_config on each system node
ClientAliveCountMax = 100 set in /etc/ssh/sshd_config on each system node
MaxStartups = 1000 set in /etc/ssh/sshd_config on each system node
```

Platform Notes

```
Storage Configuration for Disk Subsystem:
 PowerEdge C2100 has 24 x 600 GB
 10000 RPM SAS 6Gb disks under RAID-1 configuration
 mounted over 1GbE network interface with these options
 "rw,noacl,hard,intr,rsize=65536,wsize=65536" in the /etc/fstab.
```

General Notes

```
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`

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Base Portability Flags (Continued)

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
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:
opencc

C++ benchmarks:
openCC

Fortran benchmarks:
openf95

Benchmarks using both Fortran and C:
opencc 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
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.dealII: -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

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Peak Optimization Flags (Continued)

450.soplex (continued):
-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:

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: -march=barcelona -mso -Ofast -HP:bdt=2m:heap=2m

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.20101109.html
http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.20110119.html
http://www.spec.org/cpu2006/flags/amd-6100-rate-cluster-revA.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.20101109.xml
http://www.spec.org/cpu2006/flags/amd-platform-rate-revC.20110119.xml
http://www.spec.org/cpu2006/flags/amd-6100-rate-cluster-revA.xml

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