# SPEC® CINT2006 Result

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## Dell Inc.

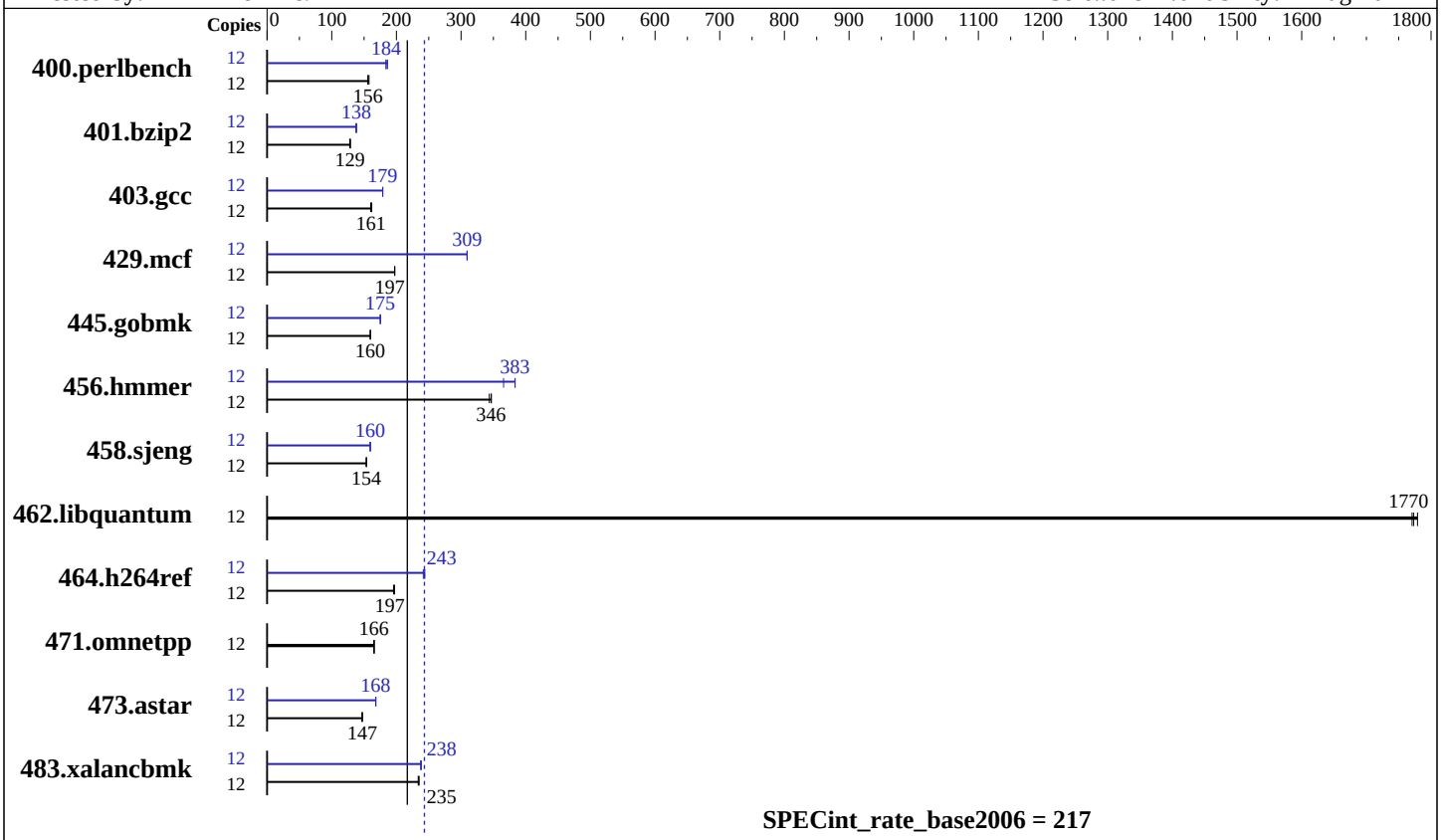
PowerEdge R415 (AMD Opteron 4332 HE, 3.00 GHz)

SPECint®_rate2006 = 243

SPECint_rate_base2006 = 217

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

**Test date:** Oct-2012
**Hardware Availability:** Nov-2012
**Software Availability:** Aug-2012




### Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 4332 HE |
| CPU Characteristics: | AMD Turbo CORE technology up to 3.70 GHz |
| CPU MHz: | 3000 |
| FPU: | Integrated |
| CPU(s) enabled: | 12 cores, 2 chips, 6 cores/chip |
| CPU(s) orderable: | 1,2 chips |
| 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 1 TB 7200 RPM SATA |
| Other Hardware: | None |

### Software

| | |
|---|---|
| Operating System: | Red Hat Enterprise Linux Server release 6.2, Kernel 2.6.32-220.el6.x86_64 |
| Compiler: | C/C++: Version 4.5.2 of x86 Open64 Compiler Suite (from AMD) |
| Auto Parallel: | No |
| File System: | ext3 |
| System State: | Run level 3 (Full multiuser with network) |
| Base Pointers: | 32/64-bit |
| Peak Pointers: | 32/64-bit |
| Other Software: | SmartHeap 10.0 32-bit Library for Linux |

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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 400.perlbench | 12 | **751** | **156** | 744 | 158 | 752 | 156 | 12 | 638 | 184 | **637** | **184** | 629 | 186 |
| 401.bzip2 | 12 | **901** | **129** | 906 | 128 | 899 | 129 | 12 | 843 | 137 | **838** | **138** | 837 | 138 |
| 403.gcc | 12 | 597 | 162 | **600** | **161** | 603 | 160 | 12 | 540 | 179 | 541 | 179 | **540** | **179** |
| 429.mcf | 12 | **554** | **197** | 554 | 197 | 555 | 197 | 12 | 354 | 309 | **354** | **309** | 354 | 309 |
| 445.gobmk | 12 | 789 | 160 | **788** | **160** | 787 | 160 | 12 | 719 | 175 | **718** | **175** | 718 | 175 |
| 456.hmmer | 12 | **323** | **346** | 326 | 344 | 323 | 347 | 12 | 306 | 366 | **292** | **383** | 292 | 384 |
| 458.sjeng | 12 | **945** | **154** | 947 | 153 | 944 | 154 | 12 | 909 | 160 | 911 | 159 | **910** | **160** |
| 462.libquantum | 12 | 140 | 1770 | 140 | 1780 | **140** | **1770** | 12 | 140 | 1770 | 140 | 1780 | **140** | **1770** |
| 464.h264ref | 12 | **1349** | **197** | 1348 | 197 | 1358 | 196 | 12 | **1093** | **243** | 1089 | 244 | 1099 | 242 |
| 471.omnetpp | 12 | 454 | 165 | **453** | **166** | 453 | 166 | 12 | 454 | 165 | **453** | **166** | 453 | 166 |
| 473.astar | 12 | **572** | **147** | 572 | 147 | 574 | 147 | 12 | **501** | **168** | 501 | 168 | 501 | 168 |
| 483.xalancbmk | 12 | 352 | 235 | 354 | 234 | **353** | **235** | 12 | 347 | 238 | **348** | **238** | 348 | 238 |

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

Transparent huge pages were enabled for this run (OS default)

Huge pages were not configured for this run.
```

## General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/root/cpu2006-1.2/amd1206-rate-libs-revA/32:/root/cpu2006-1.2/amd1206-rate-libs-revA/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 6386SE chips + 128GB Memory using RHEL 6.3
```

## Base Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

## Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX

## Base Optimization Flags

C benchmarks:
-Ofast -CG:local_sched_alg=1 -INLINE:aggressive=ON -IPA:plimit=8000
-IPA:small_pu=100 -HP:bd=2m:heap=2m -mso -LNO:prefetch=2
-march=bdver1

C++ benchmarks:
-Ofast -m32 -INLINE:aggressive=on -CG:cmp_peep=on -D__OPEN64_FAST_SET
-march=bdver1 -L/root/work/libraries/SmartHeap-10/lib -lsmartheap

## Peak Compiler Invocation

C benchmarks:
opencc

C++ benchmarks:
openCC

## Peak Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64

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## Peak Portability Flags (Continued)

401.bzip2: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LINUX

## Peak Optimization Flags

C benchmarks:

400.perlbench: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:prefetch=2 -LNO:opt=0 -IPA:plimit=20000
-OPT:unroll_times_max=8 -OPT:unroll_size=256
-OPT:unroll_level=2 -OPT:keep_ext=on -WOPT:if_conv=0
-WOPT:sib=on -CG:local_sched_alg=1 -CG:unroll_fb_req=on
-CG:movext_icmp=off -HP:bd=2m:heap=2m -march=bdver1
-GRA:aggr_loop_splitting=off -GRA:loop_splitting=off

401.bzip2: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -O3
-LNO:prefetch=2 -LNO:pf2=0 -OPT:alias=disjoint
-OPT:goto=off -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m
-march=bdver2

403.gcc: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:trip_count=256 -CG:cmp_peep=on -CG:pre_minreg_level=2
-m32 -HP:bdt=2m:heap=2m -GRA:unspill=on -IPA:small_pu=200
-WOPT:sib=on -march=bdver2 -mno-fma4

429.mcf: -O3 -OPT:unroll_times_max=5 -ipa -INLINE:aggressive=on
-CG:gcm=off -CG:dsched=on -GRA:prioritize_by_density=on
-m32 -HP:bdt=2m:heap=2m -mso -march=bdver1

445.gobmk: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-OPT:unroll_size=256 -OPT:unroll_times_max=8
-OPT:keep_ext=on -IPA:plimit=750 -IPA:min_hotness=300
-IPA:pu_reorder=1 -LNO:ignore_feedback=off -WOPT:if_conv=2
-HP:bd=2m:heap=2m -march=bdver1

456.hmmer: -fb_create fbdata(pass 1) -fb_opt fbdata(pass 2) -Ofast
-LNO:prefetch=2 -OPT:alias=disjoint
-OPT:unroll_times_max=16 -OPT:unroll_size=512
-OPT:unroll_level=2 -OPT:keep_ext=on -CG:cflow=0
-CG:cmp_peep=on -CG:pre_local_sched=off -HP:bdt=2m:heap=2m
-CG:p2align=0 -CG:load_exe=3 -CG:dsched=on -march=bdver1

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## Peak Optimization Flags (Continued)

458.sjeng: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-Ofast -CG:ptr_load_use=0 -CG:divrem_opt=on -CG:movext_icmp=off -CG:locs_best=on -LNO:full_unroll=10 -IPA:pu_reorder=2 -HP:heap=2m:bd=2m -WOPT:sib=on -march=bdver1`

462.libquantum: `basepeak = yes`

464.h264ref: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-O3 -OPT:unroll_size=256 -OPT:unroll_times_max=2 -IPA:plimit=20000 -OPT:alias=disjoint -CG:ptr_load_use=0 -CG:local_sched_alg=1 -HP:bdt=2m:heap=2m -march=bdver1`

C++ benchmarks:

471.omnetpp: `basepeak = yes`

473.astar: `-fb_create fbdata`(pass 1) `-fb_opt fbdata`(pass 2) `-Ofast -WOPT:if_conv=0 -WOPT:sib=on -CG:divrem_opt=on -CG:p2align=1 -CG:dsched=on -GRA:optimize_boundary=on -OPT:alias=disjoint -INLINE:aggressive=on -IPA:small_pu=3000 -IPA:plimit=3000 -HP:bdt=2m:heap=2m -march=bdver1`

483.xalancbmk: `-Ofast -LNO:prefetch=2 -OPT:unroll_size=512 -OPT:unroll_times_max=8 -D__OPEN64_FAST_SET -INLINE:aggressive=on -m32 -CG:cmp_peep=on -CG:local_sched=off -CG:p2align=1 -GRA:unspill=on -TENV:frame_pointer=off -fno-emit-exceptions -march=bdver2 -mno-fma4 -L/root/work/libraries/SmartHeap-10/lib -lsmartheap`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-II.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/x86-open64-452-flags-rate-revA-II.xml`


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

Tested with SPEC CPU2006 v1.2.
Report generated on Thu Jul 24 14:38:22 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 2 January 2013.