# SPEC® CINT2006 Result

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## Dell Inc.

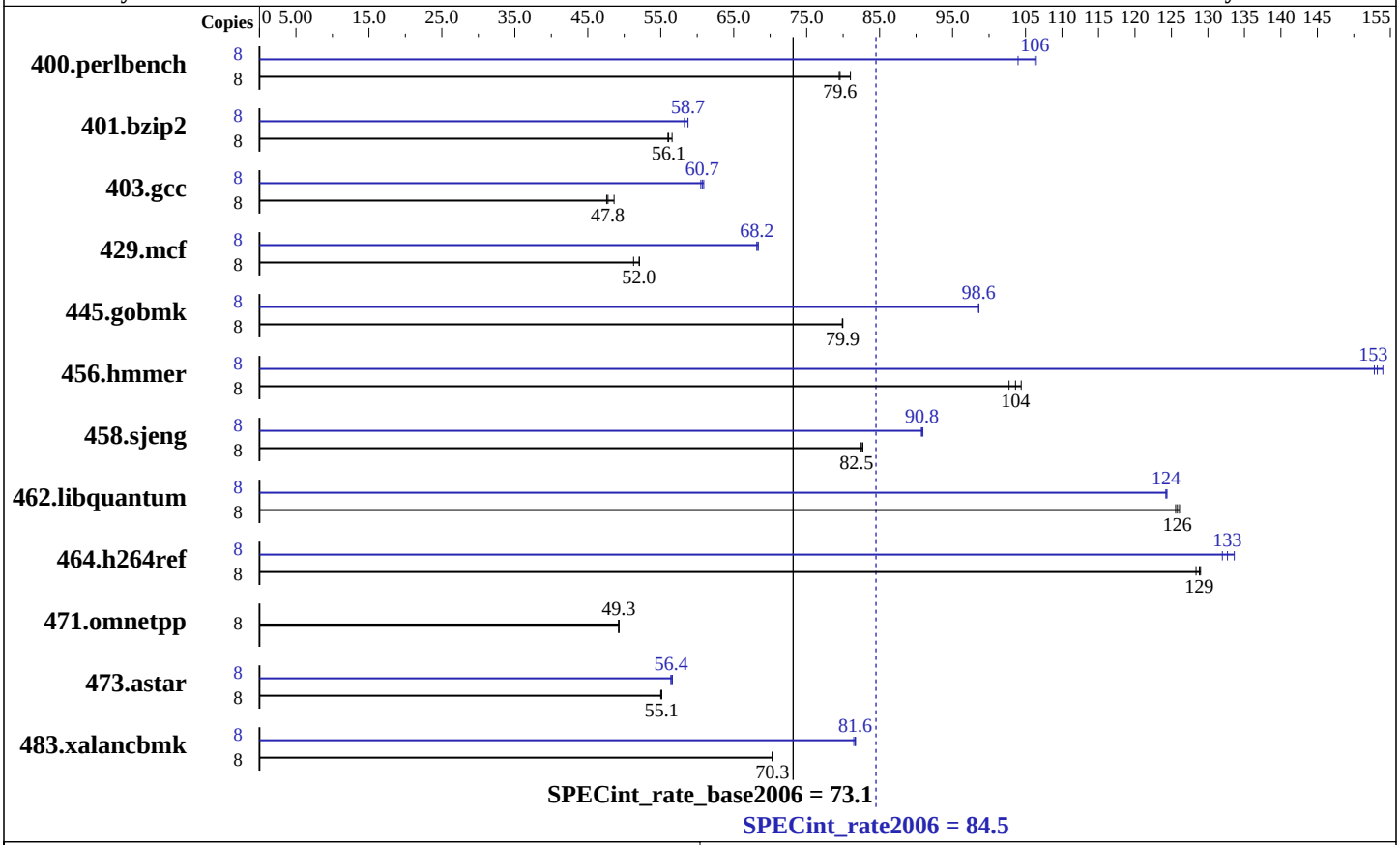
PowerEdge SC1435 (AMD Opteron 2350, 2.0 GHz)

SPECint®_rate2006 = 84.5

SPECint_rate_base2006 = 73.1

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

**Test date:** Jun-2008
**Hardware Availability:** Jun-2008
**Software Availability:** Jun-2008




### Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 2350 |
| CPU Characteristics: | |
| CPU MHz: | 2000 |
| FPU: | Integrated |
| CPU(s) enabled: | 8 cores, 2 chips, 4 cores/chip |
| CPU(s) orderable: | 1,2 chips |
| Primary Cache: | 64 KB I + 64 KB D on chip per core |
| Secondary Cache: | 512 KB I+D on chip per core |
| L3 Cache: | 2 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 16 GB (8 x 2GB, DDR2-667 CL5) |
| Disk Subsystem: | 1 x 73GB SAS, 10000 RPM |
| Other Hardware: | None |

### Software

| | |
|---|---|
| Operating System: | SUSE Linux Enterprise Server 10 (x86_64) SP1, Kernel 2.6.16.46-0.12-smp |
| Compiler: | PGI Server Complete Version 7.2<br>PathScale Compiler Suite Version 3.1 |
| Auto Parallel: | No |
| File System: | ReiserFS |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 32/64-bit |
| Peak Pointers: | 32/64-bit |
| Other Software: | SmartHeap 8.0 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 | 8 | 965 | 81.0 | 984 | 79.5 | **982** | **79.6** | 8 | 752 | 104 | 734 | 106 | **735** | **106** |
| 401.bzip2 | 8 | 1365 | 56.6 | 1379 | 56.0 | **1377** | **56.1** | 8 | 1325 | 58.2 | 1314 | 58.7 | **1315** | **58.7** |
| 403.gcc | 8 | 1325 | 48.6 | 1353 | 47.6 | **1348** | **47.8** | 8 | **1061** | **60.7** | 1058 | 60.9 | 1065 | 60.5 |
| 429.mcf | 8 | 1423 | 51.3 | 1401 | 52.1 | **1402** | **52.0** | 8 | **1070** | **68.2** | 1067 | 68.4 | 1070 | 68.2 |
| 445.gobmk | 8 | **1050** | **79.9** | 1050 | 79.9 | 1051 | 79.9 | 8 | 851 | 98.6 | **851** | **98.6** | 851 | 98.6 |
| 456.hmmer | 8 | **720** | **104** | 715 | 104 | 726 | 103 | 8 | 488 | 153 | **487** | **153** | 485 | 154 |
| 458.sjeng | 8 | **1173** | **82.5** | 1170 | 82.7 | 1174 | 82.5 | 8 | 1065 | 90.9 | **1066** | **90.8** | 1067 | 90.7 |
| 462.libquantum | 8 | 1314 | 126 | 1320 | 126 | **1317** | **126** | 8 | 1334 | 124 | 1333 | 124 | **1334** | **124** |
| 464.h264ref | 8 | **1374** | **129** | 1379 | 128 | 1373 | 129 | 8 | 1325 | 134 | **1334** | **133** | 1341 | 132 |
| 471.omnetpp | 8 | 1015 | 49.3 | **1015** | **49.3** | 1016 | 49.2 | 8 | 1015 | 49.3 | **1015** | **49.3** | 1016 | 49.2 |
| 473.astar | 8 | 1019 | 55.1 | 1021 | 55.0 | **1019** | **55.1** | 8 | **995** | **56.4** | 992 | 56.6 | 996 | 56.4 |
| 483.xalancbmk | 8 | 785 | 70.4 | 785 | 70.3 | **785** | **70.3** | 8 | 678 | 81.5 | 676 | 81.7 | **676** | **81.6** |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

```
'numactl' was used to bind copies to the cores
Environment variable PGI_HUGE_PAGES set to 150
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152'  was used to set environment locked pages in memory limit
mount -t hugetlbfs nodev /mnt/hugepages
Set vm/nr_hugepages=1200 in /etc/sysctl.conf
```

## Base Compiler Invocation

C benchmarks:
`pgcc`

C++ benchmarks:
`pgcpp`

## 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`

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## Base Portability Flags (Continued)

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:
`-fast -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150 -tp barcelona-64 -Bstatic_pgi`

C++ benchmarks:
`-fastsse -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150 --zc_eh -tp barcelona -Bstatic_pgi`

## Base Other Flags

C benchmarks:
`-w -Mipa=jobs:4`

C++ benchmarks:
`-w -Mipa=jobs:4`

## Peak Compiler Invocation

C benchmarks (except as noted below):
`pgcc`

400.perlbench: `pathcc`

403.gcc: `pathcc`

445.gobmk: `pathcc`

C++ benchmarks (except as noted below):
`pathCC`

471.omnetpp: `pgcpp`

## Peak Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
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
483.xalancbmk: -DSPEC_CPU_LINUX

## Peak Optimization Flags

C benchmarks:

400.perlbench: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -IPA:plimit=20000 -LNO:opt=0
-WOPT:if_conv=0 -CG:local_sched_alg=1

401.bzip2: -Mpfi(pass 1) -Mpfo(pass 2) -fast -O4
-Msmartalloc=huge:150 -Mnounroll -tp barcelona-64
-Bstatic_pgi

403.gcc: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -m32 -O3 -OPT:Ofast

429.mcf: -fastsse -Mipa=fast -Mipa=inline:1 -Msmartalloc=huge:150
-tp barcelona -Bstatic_pgi

445.gobmk: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -O3 -OPT:alias=restrict -LNO:opt=0
-CG:p2align=on

456.hmmer: -fastsse -Munroll=n:8 -Msmartalloc=huge:150 -Mfprelaxed
-Mvect=partial -Msafeptr -Mipa=const -Mipa=ptr -Mipa=arg
-Mipa=inline -tp barcelona-64 -Bstatic_pgi

458.sjeng: -Mpfi(pass 1) -Mipa=fast(pass 2) -Mipa=inline:1(pass 2)
-Mipa=noarg(pass 2) -Mpfo(pass 2) -fastsse
-Msmartalloc=huge:150 -Mfprelaxed -tp barcelona-64
-Bstatic_pgi

462.libquantum: -fastsse -Mfprelaxed -Msmartalloc=huge:150 -Munroll=m:8
-Mipa=fast -Mipa=inline -Mipa=noarg -tp barcelona-64
-Bstatic_pgi

464.h264ref: -Mpfi=indirect(pass 1) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -Mpfo=indirect(pass 2) -fastsse
-Msmartalloc=huge:150 -Mfprelaxed -tp barcelona-64
-Bstatic_pgi

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## Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -march=barcelona -Ofast -TENV:frame_pointer=off -WOPT:if_conv=0 -GRA:optimize_boundary=on -IPA:plimit=525 -m32 -lsmartheap

483.xalancbmk: -march=barcelona -Ofast -m32 -OPT:unroll_times_max=8 -CG:push_pop_int_saved_regs=off -CG:ptr_load_use=0 -lsmartheap

## Peak Other Flags

C benchmarks (except as noted below):
-w -Mipa=jobs:4(pass 2)

400.perlbench: No flags used

401.bzip2: -w

403.gcc: No flags used

445.gobmk: No flags used

C++ benchmarks (except as noted below):
-L/root/work/cpu2006/amd123GH.libs/32

471.omnetpp: -w -Mipa=jobs:4

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/amd421GH-flags.20090713.01.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/amd421GH-flags.20090713.01.xml


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