# SPEC® CINT2006 Result

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## Dell Inc.

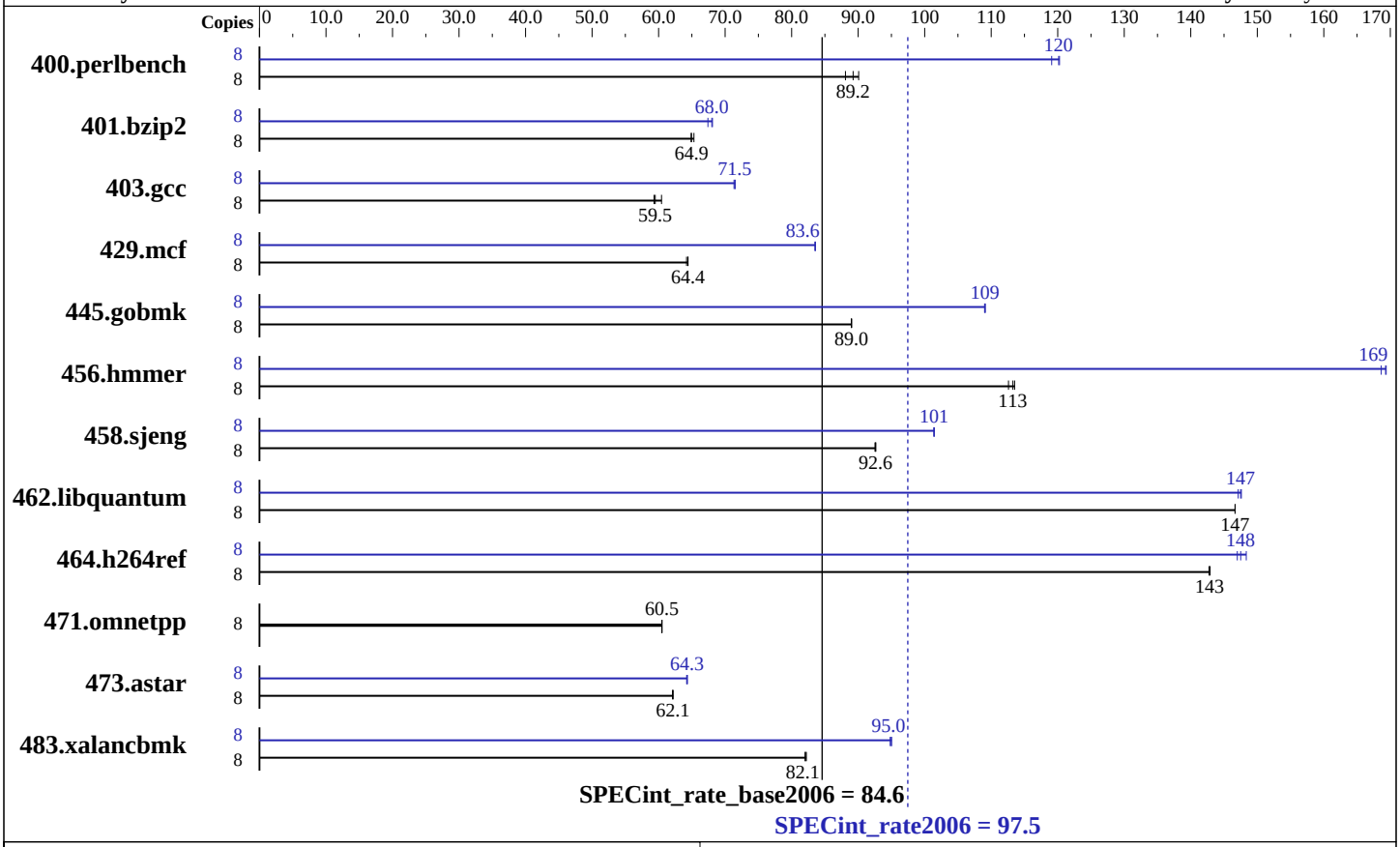
PowerEdge T605 (AMD Opteron 2354, 2.20 GHz)

SPECint®_rate2006 = 97.5

SPECint_rate_base2006 = 84.6

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

**Test date:** Mar-2008
**Hardware Availability:** Apr-2008
**Software Availability:** May-2008




### Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 2354 |
| CPU Characteristics: | |
| CPU MHz: | 2200 |
| 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 (4 x 4 GB, DDR2-667, CL5, Reg, Dual Rank) |
| Disk Subsystem: | 2 x 250 GB 7200 RPM SATA (RAID 0) |
| 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 | **876** | **89.2** | 868 | 90.1 | 887 | 88.1 | 8 | 656 | 119 | 650 | 120 | **651** | **120** |
| 401.bzip2 | 8 | 1182 | 65.3 | 1190 | 64.9 | **1189** | **64.9** | 8 | 1145 | 67.4 | **1135** | **68.0** | 1134 | 68.1 |
| 403.gcc | 8 | 1066 | 60.4 | 1086 | 59.3 | **1082** | **59.5** | 8 | 901 | 71.5 | **901** | **71.5** | 903 | 71.3 |
| 429.mcf | 8 | 1136 | 64.2 | 1133 | 64.4 | **1133** | **64.4** | 8 | 874 | 83.5 | 873 | 83.6 | **873** | **83.6** |
| 445.gobmk | 8 | 943 | 89.0 | **943** | **89.0** | 943 | 89.0 | 8 | **769** | **109** | 769 | 109 | 770 | 109 |
| 456.hmmer | 8 | 658 | 114 | 663 | 113 | **659** | **113** | 8 | 443 | 169 | **441** | **169** | 441 | 169 |
| 458.sjeng | 8 | **1045** | **92.6** | 1045 | 92.6 | 1046 | 92.5 | 8 | 954 | 101 | **954** | **101** | 955 | 101 |
| 462.libquantum | 8 | 1130 | 147 | **1130** | **147** | 1130 | 147 | 8 | 1127 | 147 | 1123 | 148 | **1124** | **147** |
| 464.h264ref | 8 | **1239** | **143** | 1240 | 143 | 1239 | 143 | 8 | 1193 | 148 | 1204 | 147 | **1200** | **148** |
| 471.omnetpp | 8 | 826 | 60.5 | 827 | 60.5 | **826** | **60.5** | 8 | 826 | 60.5 | 827 | 60.5 | **826** | **60.5** |
| 473.astar | 8 | **904** | **62.1** | 904 | 62.1 | 903 | 62.2 | 8 | 875 | 64.2 | 873 | 64.3 | **873** | **64.3** |
| 483.xalancbmk | 8 | **672** | **82.1** | 671 | 82.2 | 673 | 82.0 | 8 | 581 | 95.0 | **581** | **95.0** | 582 | 94.8 |

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 2457600' was used to set environment locked pages in memory quantity
Set /proc/sys/vm/nr_hugepages=1200
mount -t hugetlbfs nodev /mnt/hugepages
```

## 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=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150 -tp barcelona-64 -Bstatic_pgi`

C++ benchmarks:
`-fastsse -Mipa=jobs:4 -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc=huge:150 --zc_eh -tp barcelona -Bstatic_pgi`

## Base Other Flags

C benchmarks:
`-w`

C++ benchmarks:
`-w`

## 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=jobs:4 -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=jobs:4 -Mipa=const
-Mipa=ptr -Mipa=arg -Mipa=inline -tp barcelona-64
-Bstatic_pgi

458.sjeng: -Mpfi(pass 1) -Mipa=jobs:4(pass 2) -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=jobs:4 -Mipa=fast -Mipa=inline -Mipa=noarg
-tp barcelona-64 -Bstatic_pgi

464.h264ref: -Mpfi=indirect(pass 1) -Mipa=jobs:4(pass 2)
-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`

400.perlbench: `No flags used`

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`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/amd123GH-flags.20090714.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/amd123GH-flags.20090714.xml`


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