# SPEC® CINT2006 Result

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## Dell Inc.

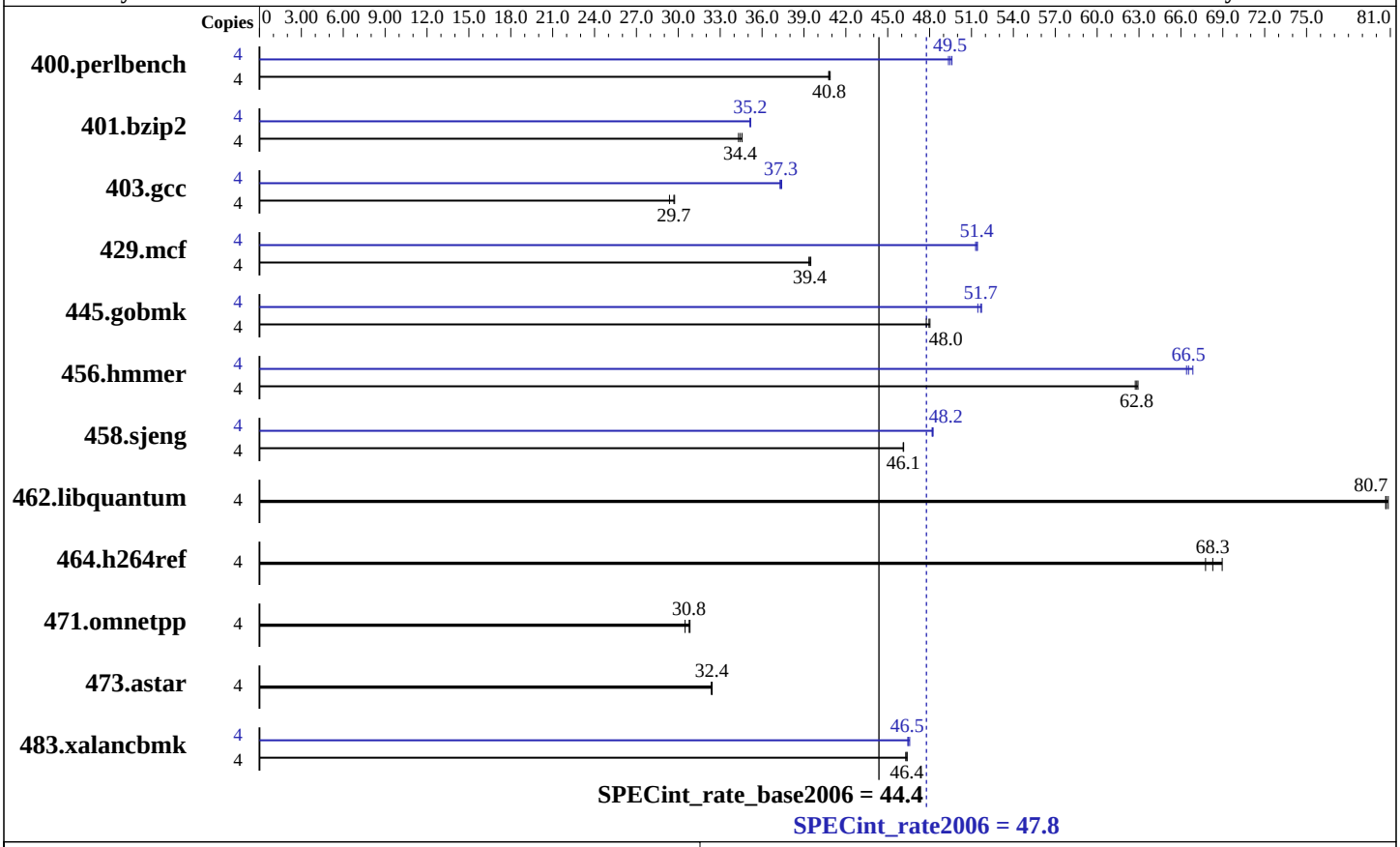
PowerEdge 2970 (AMD Opteron 2216, 2.40 GHz)

SPECint®_rate2006 = 47.8

SPECint_rate_base2006 = 44.4

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

**Test date:** Oct-2007
**Hardware Availability:** Apr-2007
**Software Availability:** Oct-2007




### Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 2216 |
| CPU Characteristics: | |
| CPU MHz: | 2400 |
| FPU: | Integrated |
| CPU(s) enabled: | 4 cores, 2 chips, 2 cores/chip |
| CPU(s) orderable: | 1,2 chips |
| Primary Cache: | 64 KB I + 64 KB D on chip per core |
| Secondary Cache: | 1 MB I+D on chip per core |
| L3 Cache: | None |
| Other Cache: | None |
| Memory: | 16 GB (8x2GB, DDR2-667 CL5 ECC Dual Rank) |
| Disk Subsystem: | 1 x 73 GB SAS 10k RPM |
| Other Hardware: | None |

### Software

| | |
|---|---|
| Operating System: | 64-Bit SUSE LINUX Enterprise Server 10 SP1 |
| Compiler: | The Portland Group (PGI)<br>PGI pgcc 7.1-0 C Compiler<br>PGI pgCC 7.1-0 C++ Compiler |
| Auto Parallel: | No |
| File System: | ReiserFS |
| System State: | Multi-user, run level 3 |
| 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 | 4 | **958** | **40.8** | 956 | 40.9 | 959 | 40.8 | 4 | **790** | **49.5** | 792 | 49.4 | 788 | 49.6 |
| 401.bzip2 | 4 | 1117 | 34.6 | **1121** | **34.4** | 1125 | 34.3 | 4 | 1097 | 35.2 | 1099 | 35.1 | **1098** | **35.2** |
| 403.gcc | 4 | **1085** | **29.7** | 1083 | 29.7 | 1096 | 29.4 | 4 | 864 | 37.3 | **862** | **37.3** | 861 | 37.4 |
| 429.mcf | 4 | 924 | 39.5 | **925** | **39.4** | 927 | 39.4 | 4 | **710** | **51.4** | 709 | 51.4 | 711 | 51.3 |
| 445.gobmk | 4 | **875** | **48.0** | 874 | 48.0 | 879 | 47.8 | 4 | 811 | 51.7 | **812** | **51.7** | 815 | 51.5 |
| 456.hmmer | 4 | 593 | 62.9 | 595 | 62.7 | **594** | **62.8** | 4 | 562 | 66.4 | **561** | **66.5** | 558 | 66.9 |
| 458.sjeng | 4 | **1049** | **46.1** | 1049 | 46.1 | 1050 | 46.1 | 4 | 1005 | 48.2 | **1004** | **48.2** | 1003 | 48.3 |
| 462.libquantum | 4 | **1027** | **80.7** | 1027 | 80.7 | 1025 | 80.9 | 4 | **1027** | **80.7** | 1027 | 80.7 | 1025 | 80.9 |
| 464.h264ref | 4 | 1284 | 69.0 | 1306 | 67.8 | **1296** | **68.3** | 4 | 1284 | 69.0 | 1306 | 67.8 | **1296** | **68.3** |
| 471.omnetpp | 4 | 811 | 30.8 | **812** | **30.8** | 820 | 30.5 | 4 | 811 | 30.8 | **812** | **30.8** | 820 | 30.5 |
| 473.astar | 4 | 868 | 32.4 | 866 | 32.4 | **867** | **32.4** | 4 | 868 | 32.4 | 866 | 32.4 | **867** | **32.4** |
| 483.xalancbmk | 4 | 595 | 46.4 | 596 | 46.3 | **595** | **46.4** | 4 | 593 | 46.6 | **594** | **46.5** | 594 | 46.4 |

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

## General Notes

```
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2457600' was used to set environment locked pages in memory quantity
'numactl' was used to bind one copy per core, and memory to a local NUMA node
Set vm/nr_hugepages=1200 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
Environment variable PGI_HUGE_PAGES set to 150
```

## 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

Continued on next page

## 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 -Mipa=noarg -Mfprelaxed
-Msmartalloc=huge:64 -tp k8-64 -Bstatic_pgi

C++ benchmarks:
-fastsse -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc --zc_eh
-tp k8-32 -Bstatic_pgi -lsmartheap

## Base Other Flags

C benchmarks:
-w

C++ benchmarks:
-w -L/proj/qa/smartheap/SmartHeap_8/lib

## Peak Compiler Invocation

C benchmarks:
pgcc

C++ benchmarks:
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: `-Mpfi`(pass 1) `-Mpfo`(pass 2) `-Mipa=inline`(pass 2) `-fast -O4 -Mfprelaxed -Msmartalloc=huge:8 -Mnounroll -tp k8-64 -Bstatic_pgi`

401.bzip2: `-Mpfi`(pass 1) `-Mpfo`(pass 2) `-fast -O4 -Msmartalloc=huge:64 -tp k8-64 -Bstatic_pgi`

403.gcc: `-fastsse -Mfprelaxed -Msmartalloc=huge:32 -Mipa=fast -Mipa=inline -tp k8-32 -Bstatic_pgi`

429.mcf: `-fastsse -Mipa=fast -Mipa=inline -Msmartalloc=huge:16 -tp k8-32 -Bstatic_pgi`

445.gobmk: `-Mpfi`(pass 1) `-Mpfo`(pass 2) `-Mipa=fast`(pass 2) `-fast -O4 -Msmartalloc=huge:32 -Mfprelaxed -Mnovect -tp k8-64 -Bstatic_pgi`

456.hmmer: `-fast -Msmartalloc=huge:32 -Mfprelaxed -Msafeptr -Mipa=const -Mipa=ptr -Mipa=arg -tp k8-64 -Bstatic_pgi`

458.sjeng: `-Mpfi`(pass 1) `-Mipa=fast`(pass 2) `-Mipa=inline`(pass 2) `-Mipa=noarg`(pass 2) `-Mpfo`(pass 2) `-fast -Msmartalloc=huge:32 -Mfprelaxed -tp k8-64 -Bstatic_pgi`

462.libquantum: `basepeak = yes`

464.h264ref: `basepeak = yes`

C++ benchmarks:

471.omnetpp: `basepeak = yes`

473.astar: `basepeak = yes`

483.xalancbmk: `-fastsse -O4 -Mipa=fast -Mipa=inline -Mfprelaxed -Msmartalloc --zc_eh -tp k8-32 -Bstatic_pgi -lsmartheap`

## Peak Other Flags

C benchmarks:
`-w`

C++ benchmarks:
`-w -L/proj/qa/smartheap/SmartHeap_8/lib`

The flags file that was used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/pgi710_flags.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/pgi710_flags.xml


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