



# SPEC® CINT2006 Result

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Dell Inc.

SPECint®\_rate2006 = 84.5

PowerEdge 2970 (AMD Opteron 2346 HE, 1.8 GHz)

SPECint\_rate\_base2006 = 73.6

CPU2006 license: 55

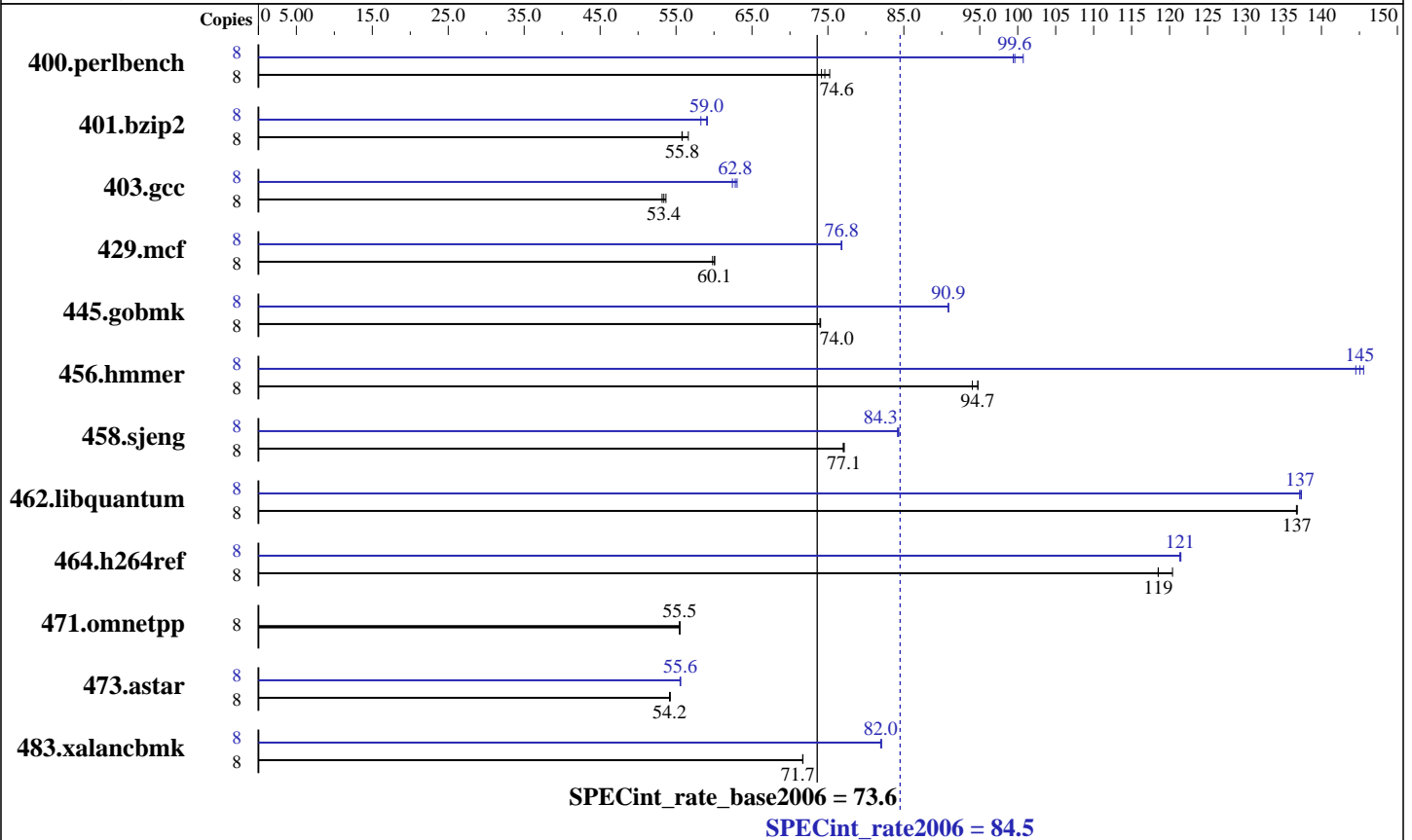
Test date: May-2008

Test sponsor: Dell Inc.

Hardware Availability: Apr-2008

Tested by: Dell Inc.

Software Availability: Jun-2008



## Hardware

CPU Name: AMD Opteron 2346 HE  
 CPU Characteristics: 1800  
 CPU MHz: 1800  
 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 4GB, DDR2-667, CL5)  
 Disk Subsystem: 1 x 73GB 2.5" 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 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	1039	75.2	<b>1048</b>	<b>74.6</b>	1054	74.2	8	786	99.4	<b>785</b>	<b>99.6</b>	776	101
401.bzip2	8	1364	56.6	<b>1383</b>	<b>55.8</b>	1384	55.8	8	1325	58.3	1306	59.1	<b>1308</b>	<b>59.0</b>
403.gcc	8	<b>1206</b>	<b>53.4</b>	1211	53.2	1200	53.7	8	<b>1025</b>	<b>62.8</b>	1032	62.4	1022	63.0
429.mcf	8	1220	59.8	1214	60.1	<b>1215</b>	<b>60.1</b>	8	951	76.8	<b>950</b>	<b>76.8</b>	950	76.8
445.gobmk	8	1133	74.0	<b>1134</b>	<b>74.0</b>	1135	74.0	8	<b>924</b>	<b>90.9</b>	924	90.9	923	90.9
456.hmmer	8	<b>788</b>	<b>94.7</b>	794	94.0	788	94.8	8	513	146	516	145	<b>515</b>	<b>145</b>
458.sjeng	8	<b>1255</b>	<b>77.1</b>	1257	77.0	1255	77.1	8	1150	84.2	<b>1149</b>	<b>84.3</b>	1148	84.3
462.libquantum	8	<b>1212</b>	<b>137</b>	1213	137	1212	137	8	1209	137	<b>1208</b>	<b>137</b>	1207	137
464.h264ref	8	1494	118	<b>1494</b>	<b>119</b>	1471	120	8	1457	121	<b>1459</b>	<b>121</b>	1459	121
471.omnetpp	8	902	55.4	<b>901</b>	<b>55.5</b>	901	55.5	8	902	55.4	<b>901</b>	<b>55.5</b>	901	55.5
473.astar	8	1037	54.1	1035	54.2	<b>1037</b>	<b>54.2</b>	8	1011	55.5	1010	55.6	<b>1010</b>	<b>55.6</b>
483.xalancbmk	8	770	71.7	770	71.7	<b>770</b>	<b>71.7</b>	8	<b>673</b>	<b>82.0</b>	674	81.9	673	82.1

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
mount -t hugetlbfs nodev /mnt/hugepages
'ulimit -l 2097152' was used to set environment locked pages in memory limit
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



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## 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.xalanbmk: -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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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