



# SPEC® CINT2006 Result

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## IBM Corporation

### SPECint®\_rate2006 = 97.6

## IBM System x3655 (AMD Opteron 2356)

### SPECint\_rate\_base2006 = 84.9

CPU2006 license: 11

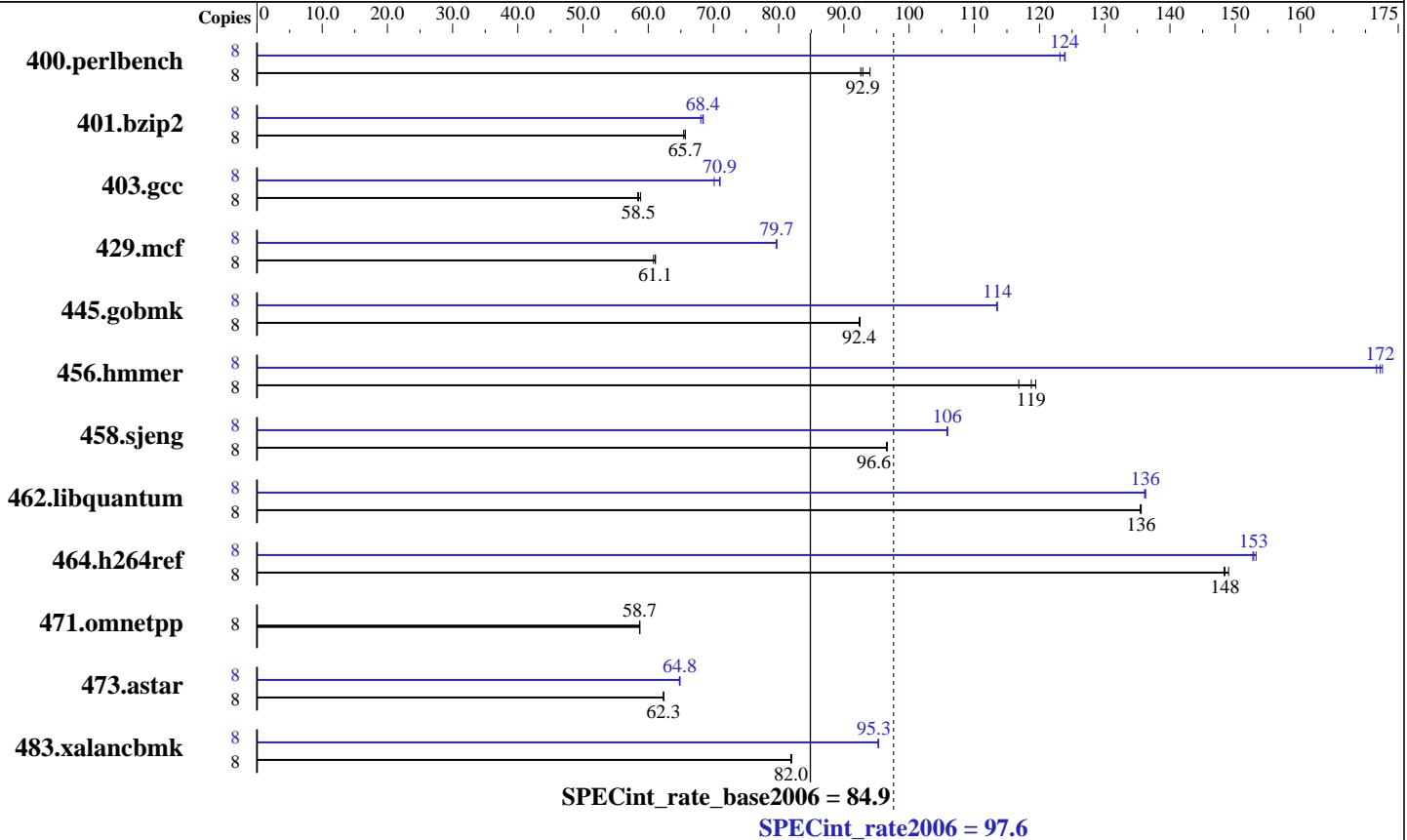
Test sponsor: IBM Corporation

Tested by: Advanced Micro Devices

Test date: Apr-2008

Hardware Availability: Jul-2008

Software Availability: May-2008



### Hardware

CPU Name: AMD Opteron 2356  
 CPU Characteristics:  
 CPU MHz: 2300  
 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 2 GB, DDR2-667, CL5, Reg, Dual Rank)  
 Disk Subsystem: 1 x 73.4 GB SAS, 15000 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: ext3  
 System State: Runlevel 3 (Full multiuser with network)  
 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	831	94.0	844	92.6	<b>841</b>	<b>92.9</b>	8	635	123	<b>631</b>	<b>124</b>	631	124
401.bzip2	8	1176	65.7	<b>1176</b>	<b>65.7</b>	1180	65.4	8	1134	68.1	<b>1129</b>	<b>68.4</b>	1128	68.4
403.gcc	8	1095	58.8	<b>1101</b>	<b>58.5</b>	1103	58.4	8	<b>908</b>	<b>70.9</b>	907	71.0	919	70.1
429.mcf	8	1200	60.8	1194	61.1	<b>1195</b>	<b>61.1</b>	8	915	79.7	917	79.6	<b>916</b>	<b>79.7</b>
445.gobmk	8	<b>908</b>	<b>92.4</b>	909	92.3	907	92.5	8	739	114	740	113	<b>739</b>	<b>114</b>
456.hmmer	8	<b>629</b>	<b>119</b>	625	119	639	117	8	<b>433</b>	<b>172</b>	435	172	432	173
458.sjeng	8	<b>1002</b>	<b>96.6</b>	1003	96.5	1002	96.6	8	914	106	<b>914</b>	<b>106</b>	915	106
462.libquantum	8	1222	136	1224	135	<b>1223</b>	<b>136</b>	8	1218	136	<b>1217</b>	<b>136</b>	1216	136
464.h264ref	8	<b>1193</b>	<b>148</b>	1188	149	1194	148	8	1156	153	<b>1158</b>	<b>153</b>	1159	153
471.omnetpp	8	852	58.7	<b>852</b>	<b>58.7</b>	852	58.7	8	852	58.7	<b>852</b>	<b>58.7</b>	852	58.7
473.astar	8	901	62.3	900	62.4	<b>901</b>	<b>62.3</b>	8	867	64.8	<b>866</b>	<b>64.8</b>	866	64.9
483.xalancbmk	8	674	81.8	<b>674</b>	<b>82.0</b>	673	82.0	8	580	95.2	579	95.3	<b>579</b>	<b>95.3</b>

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 vm/nr_hugepages=1200 in /etc/sysctl.conf
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



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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=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 -lsmarheap

483.xalancbmk: -march=barcelona -Ofast -m32 -OPT:unroll\_times\_max=8  
-CG:push\_pop\_int\_saved\_regs=off -CG:ptr\_load\_use=0  
-lsmarheap

## 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.20090714.03.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/cpu2006/flags/amd123GH-flags.20090714.03.xml>

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

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