



# SPEC® CINT2006 Result

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## IBM Corporation

**SPECint®2006 = 13.8**

## IBM System x3755 (AMD Opteron 8356)

**SPECint\_base2006 = 11.6**

CPU2006 license: 11

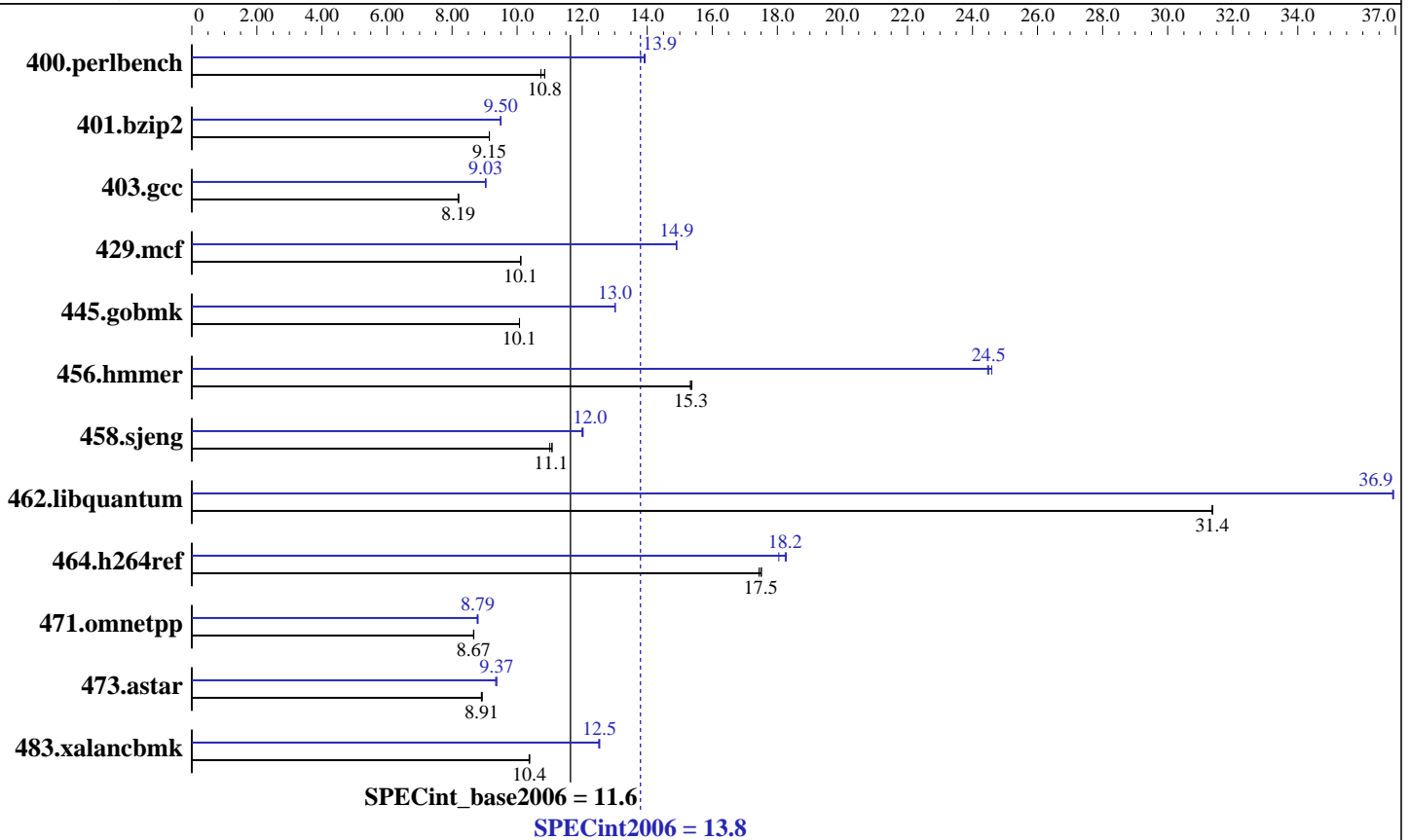
Test sponsor: IBM Corporation

Tested by: Advanced Micro Devices

Test date: Jun-2008

Hardware Availability: Jul-2008

Software Availability: Jun-2008



### Hardware

CPU Name: AMD Opteron 8356  
 CPU Characteristics:  
 CPU MHz: 2300  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip  
 CPU(s) orderable: 1,2,3,4 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: 32 GB (16 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 3.2  
 Auto Parallel: No  
 File System: ReiserFS  
 System State: Run level 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					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	<u>901</u>	<u>10.8</u>	901	10.8	910	10.7	708	13.8	701	13.9	<u>703</u>	<u>13.9</u>
401.bzip2	1055	9.15	<u>1055</u>	<u>9.15</u>	1055	9.15	1017	9.48	1015	9.51	<u>1016</u>	<u>9.50</u>
403.gcc	983	8.19	981	8.21	<u>982</u>	<u>8.19</u>	<u>891</u>	<u>9.03</u>	892	9.03	890	9.04
429.mcf	902	10.1	<u>902</u>	<u>10.1</u>	902	10.1	<u>612</u>	<u>14.9</u>	612	14.9	612	14.9
445.gobmk	<u>1041</u>	<u>10.1</u>	1041	10.1	1042	10.1	806	13.0	806	13.0	<u>806</u>	<u>13.0</u>
456.hammer	607	15.4	609	15.3	<u>608</u>	<u>15.3</u>	<u>381</u>	<u>24.5</u>	381	24.5	379	24.6
458.sjeng	<u>1093</u>	<u>11.1</u>	1092	11.1	1100	11.0	<u>1007</u>	<u>12.0</u>	1009	12.0	1006	12.0
462.libquantum	660	31.4	661	31.4	<u>660</u>	<u>31.4</u>	561	36.9	561	36.9	<u>561</u>	<u>36.9</u>
464.h264ref	1264	17.5	1269	17.4	<u>1265</u>	<u>17.5</u>	1226	18.0	<u>1213</u>	<u>18.2</u>	1211	18.3
471.omnetpp	<u>721</u>	<u>8.67</u>	722	8.66	721	8.67	710	8.80	713	8.77	<u>711</u>	<u>8.79</u>
473.astar	<u>788</u>	<u>8.91</u>	789	8.90	786	8.93	<u>750</u>	<u>9.37</u>	749	9.37	751	9.34
483.xalancbmk	664	10.4	<u>665</u>	<u>10.4</u>	665	10.4	550	12.5	552	12.5	<u>551</u>	<u>12.5</u>

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
'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit
Environment variable PGI_HUGE_PAGES set to 896
Set vm/nr_hugepages=3584 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
powersave -f was used to set the CPU frequency to its maximum.
```

## 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
```

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## Base Portability Flags (Continued)

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

## Base Optimization Flags

C benchmarks:

-fastsse -Msmartalloc=huge:150 -Mfprelaxed -Mipa=fast -Mipa=inline  
-tp barcelona-64 -Bstatic\_pgi

C++ benchmarks:

-fastsse -Msmartalloc=huge:150 -Mfprelaxed --zc\_eh -Mipa=fast  
-Mipa=inline -tp barcelona -Bstatic\_pgi

## Base Other Flags

C benchmarks:

-Mipa=jobs:4

C++ benchmarks:

-Mipa=jobs:4

## Peak Compiler Invocation

C benchmarks (except as noted below):

pgcc

400.perlbench: pathcc

403.gcc: pathcc

445.gobmk: pathcc

464.h264ref: pathcc

C++ benchmarks (except as noted below):

pathCC

473.astar: 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=indirect(pass 1) -Mpfo=indirect(pass 2) -fastsse -O4  
 -Msmartalloc=huge:150 -Mprefetch=t0 -Mnounroll  
 -tp barcelona-64 -Bstatic\_pgi

403.gcc: -march=barcelona -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -O3 -OPT:Ofast -m32

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

445.gobmk: -march=barcelona -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -O3 -OPT:alias=restrict  
 -LNO:prefetch=1 -LNO:ignore\_feedback=off -CG:p2align=on

456.hmmer: -fastsse -Mvect=partial -Munroll=n:8 -Msmartalloc=huge:150  
 -Msafeptr -Mprefetch=t0 -Mfprelaxed -Mipa=const -Mipa=ptr  
 -Mipa=arg -Mipa=inline -tp barcelona-64 -Bstatic\_pgi

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

462.libquantum: -fastsse -Munroll=m:8 -Msmartalloc=huge:150  
 -Mprefetch=distance:4 -Mfprelaxed -Mipa=fast -Mipa=inline  
 -Mipa=noarg -tp barcelona-64 -Bstatic\_pgi

464.h264ref: -march=barcelona -fb\_create fbdata(pass 1)  
 -fb\_opt fbdata(pass 2) -O3 -IPA:plimit=20000  
 -OPT:alias=disjoint -LNO:prefetch=0 -CG:ptr\_load\_use=0  
 -CG:push\_pop\_int\_saved\_regs=off

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## Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: -march=barcelona -Ofast -CG:gcm=off -INLINE:aggressive=on  
-OPT:alias=disjoint -WOPT:if\_conv=0 -m32 -lsmartheap

473.astar: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)  
-Mipa=inline:6(pass 2) -fastsse -O4 -Msmartalloc=huge:150  
-Msafeptr=global -Mfprelaxed --zc\_eh -tp barcelona  
-Bstatic\_pgi

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

## Peak Other Flags

C benchmarks:

429.mcf: -Mipa=jobs:4

456.hmmer: -Mipa=jobs:4

458.sjeng: -Mipa=jobs:4(pass 2)

462.libquantum: -Mipa=jobs:4

C++ benchmarks (except as noted below):

-L/root/work/cpu2006-amd421gh/amd421gh.libs/32

473.astar: -Mipa=jobs:4(pass 2)

The flags file that was used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/amd421GH-flags.html>

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

<http://www.spec.org/cpu2006/flags/amd421GH-flags.xml>



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Tested with SPEC CPU2006 v1.0.  
Report generated on Tue Jul 22 19:56:49 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 8 July 2008.