# SPEC® CINT2006 Result

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## IBM Corporation

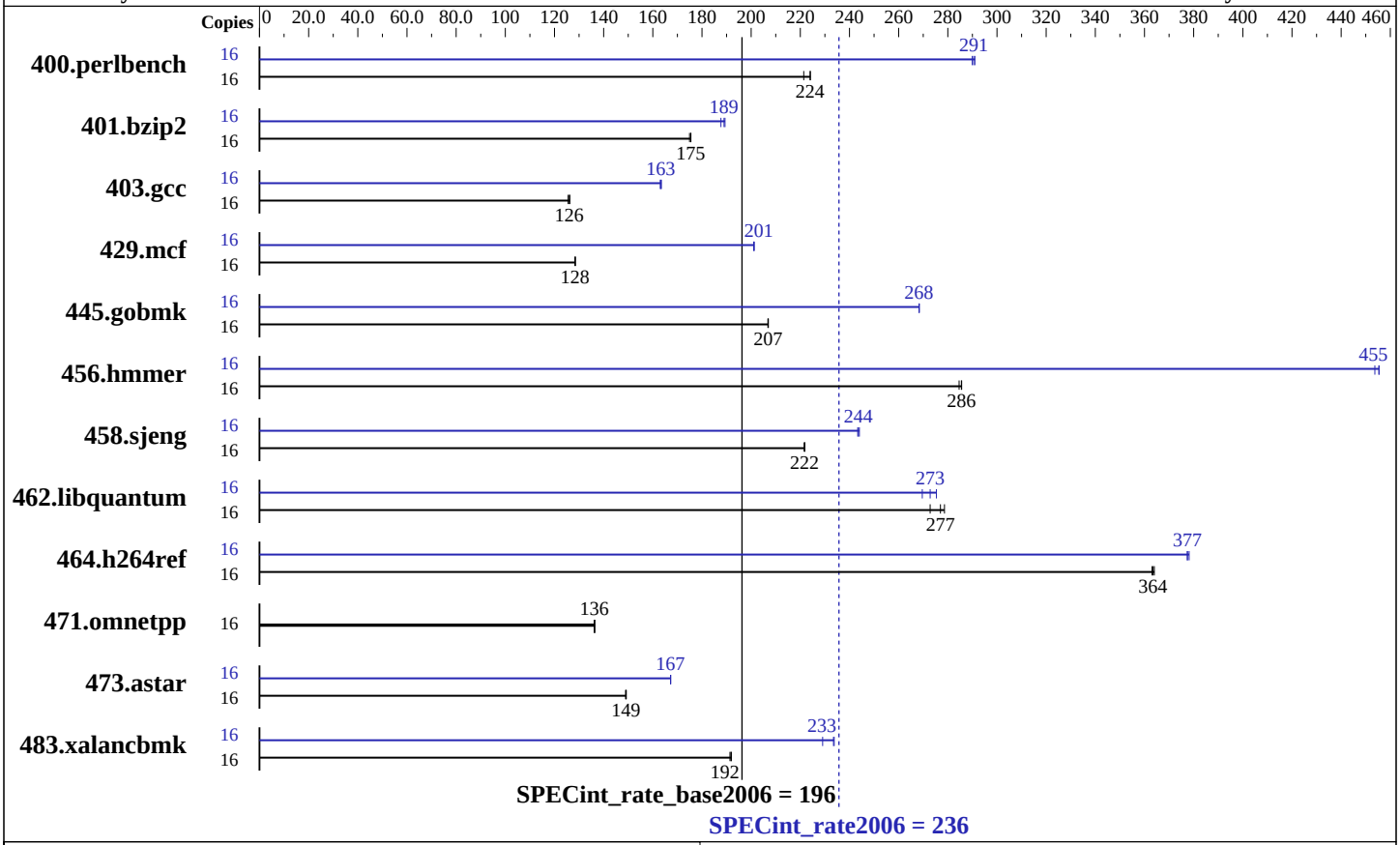
## IBM System x3755 (AMD Opteron 8382)

**SPECint®_rate2006 = 236**

**SPECint_rate_base2006 = 196**

**CPU2006 license:** 11
**Test sponsor:** IBM Corporation
**Tested by:** Advanced Micro Devices

**Test date:** Dec-2008
**Hardware Availability:** Mar-2009
**Software Availability:** Jun-2008




## Hardware

| | |
|---|---|
| CPU Name: | AMD Opteron 8382 |
| CPU Characteristics: | |
| CPU MHz: | 2600 |
| 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: | 6 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 64 GB (16 x 4 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<br>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: | binutils 2.18<br>32-bit and 64-bit libhugetlbfs libraries<br>SmartHeap 8.1 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 | 16 | 706 | 221 | 698 | 224 | **698** | **224** | 16 | **538** | **291** | 539 | 290 | 537 | 291 |
| 401.bzip2 | 16 | 880 | 175 | 883 | 175 | **880** | **175** | 16 | **817** | **189** | 823 | 188 | 815 | 189 |
| 403.gcc | 16 | 1020 | 126 | 1026 | 126 | **1022** | **126** | 16 | **789** | **163** | 790 | 163 | 788 | 163 |
| 429.mcf | 16 | **1136** | **128** | 1137 | 128 | 1136 | 128 | 16 | **725** | **201** | 725 | 201 | 726 | 201 |
| 445.gobmk | 16 | 811 | 207 | **811** | **207** | 811 | 207 | 16 | 626 | 268 | 625 | 268 | **626** | **268** |
| 456.hmmer | 16 | 523 | 286 | **523** | **286** | 525 | 285 | 16 | 329 | 454 | 328 | 455 | **328** | **455** |
| 458.sjeng | 16 | **873** | **222** | 874 | 222 | 873 | 222 | 16 | 796 | 243 | **795** | **244** | 793 | 244 |
| 462.libquantum | 16 | 1190 | 279 | 1215 | 273 | **1197** | **277** | 16 | **1215** | **273** | 1204 | 275 | 1230 | 270 |
| 464.h264ref | 16 | 975 | 363 | **974** | **364** | 973 | 364 | 16 | 936 | 378 | 938 | 377 | **938** | **377** |
| 471.omnetpp | 16 | 733 | 136 | 734 | 136 | **734** | **136** | 16 | 733 | 136 | 734 | 136 | **734** | **136** |
| 473.astar | 16 | **753** | **149** | 753 | 149 | 754 | 149 | 16 | 672 | 167 | **672** | **167** | 672 | 167 |
| 483.xalancbmk | 16 | **576** | **192** | 575 | 192 | 577 | 191 | 16 | **473** | **233** | 482 | 229 | 472 | 234 |

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

## Submit Notes

```
The config file option 'submit' was used.
 'numactl' was used to bind copies to the cores
```

## Operating System Notes

```
The libhugetlbfs libraries were installed using the
installation rpms that came with the distribution.

'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152'  was used to set environment locked pages in memory limit

Set vm/nr_hugepages=14336 in /etc/sysctl.conf
mount -t hugetlbfs nodev /mnt/hugepages
```

## General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_MORECORE = "yes"
LD_LIBRARY_PATH = "/root/work/cpu2006v1.1/amd909gh-libs/64:/root/work/cpu2006v1.1/amd909gh-libs/32"
```

## 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
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:
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed
-Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi

C++ benchmarks:
-Mvect=cachesize:6291456 -fastsse -Msmartalloc=huge -Mfprelaxed
--zc_eh -Mipa=fast -Mipa=inline:10 -tp barcelona-32 -Bstatic_pgi

## Base Other Flags

C benchmarks:
-Mipa=jobs:4

C++ benchmarks:
-Mipa=jobs:4

## Peak Compiler Invocation

C benchmarks (except as noted below):
pathcc

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## Peak Compiler Invocation (Continued)

456.hmmer: pgcc

462.libquantum: pgcc

C++ benchmarks (except as noted below):
pgcpp

483.xalancbmk: pathCC

## 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)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -Ofast -IPA:plimit=20000
-IPA:field_reorder=on -LNO:opt=0 -WOPT:if_conv=0
-CG:local_sched_alg=1

401.bzip2: -march=barcelona -O3 -OPT:alias=disjoint -OPT:Ofast
-OPT:goto=off -INLINE:aggressive=on -CG:local_sched_alg=1
-m3dnow
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT
-L/usr/lib64 -lhugetlbfs

403.gcc: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2) -Ofast -OPT:malloc_alg=1
-LNO:trip_count=256 -LNO:prefetch_ahead=10
-CG:prefer_lru_reg=off -m32

429.mcf: -march=barcelona -O3 -ipa -INLINE:aggressive=on
-CG:gcm=off -GRA:prioritize_by_density=on -m32
-L/usr/lib -lhugetlbfs

Continued on next page

## Peak Optimization Flags (Continued)

445.gobmk: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -O3 -OPT:alias=restrict
-LNO:prefetch=1 -LNO:ignore_feedback=off -CG:p2align=on

456.hmmer: -Mvect=cachesize:6291456 -fastsse -Mvect=partial
-Munroll=n:8 -Msmartalloc=huge -Msafeptr -Mprefetch=t0
-Mfprelaxed -Mipa=const -Mipa=ptr -Mipa=arg -Mipa=inline
-tp barcelona-64 -Bstatic_pgi

458.sjeng: -march=barcelona -fb_create fbdata(pass 1)
-fb_opt fbdata(pass 2)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -O3 -ipa
-LNO:ignore_feedback=off -LNO:full_unroll=10 -LNO:fusion=0
-LNO:fission=2 -IPA:pu_reorder=2 -CG:ptr_load_use=0
-OPT:unroll_times_max=8 -INLINE:aggressive=on

462.libquantum: -Mvect=cachesize:6291456 -fastsse -Munroll=m:8
-Msmartalloc=huge -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)
-Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT(pass 2)
-L/usr/lib64 -lhugetlbfs(pass 2) -O3 -IPA:plimit=20000
-OPT:alias=disjoint -LNO:prefetch=0 -CG:ptr_load_use=0
-CG:push_pop_int_saved_regs=off -CG:prefer_lru_reg=off

C++ benchmarks:

471.omnetpp: basepeak = yes

473.astar: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mipa=inline:6(pass 2) -Mvect=cachesize:6291456 -fastsse
-O4 -Msmartalloc=huge -Msafeptr=global -Mfprelaxed
--zc_eh -tp barcelona-32 -Bstatic_pgi

483.xalancbmk: -march=barcelona -Ofast -INLINE:aggressive=on -m32
-L/root/work/libraries/SmartHeap_8.1/lib -lsmartheap

## Peak Other Flags

C benchmarks:

Continued on next page

## Peak Other Flags (Continued)

456.hmmer: `-Mipa=jobs:4`

462.libquantum: `-Mipa=jobs:4`

C++ benchmarks (except as noted below):
`-Mipa=jobs:4`(pass 2)

483.xalancbmk: `No flags used`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/pgi72_linux_flags.html`
`http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.html`
`http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2006/flags/pgi72_linux_flags.xml`
`http://www.spec.org/cpu2006/flags/CPU2006_flags.20090710.xml`
`http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.xml`


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