# SPEC® CINT2006 Result

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## IBM Corporation

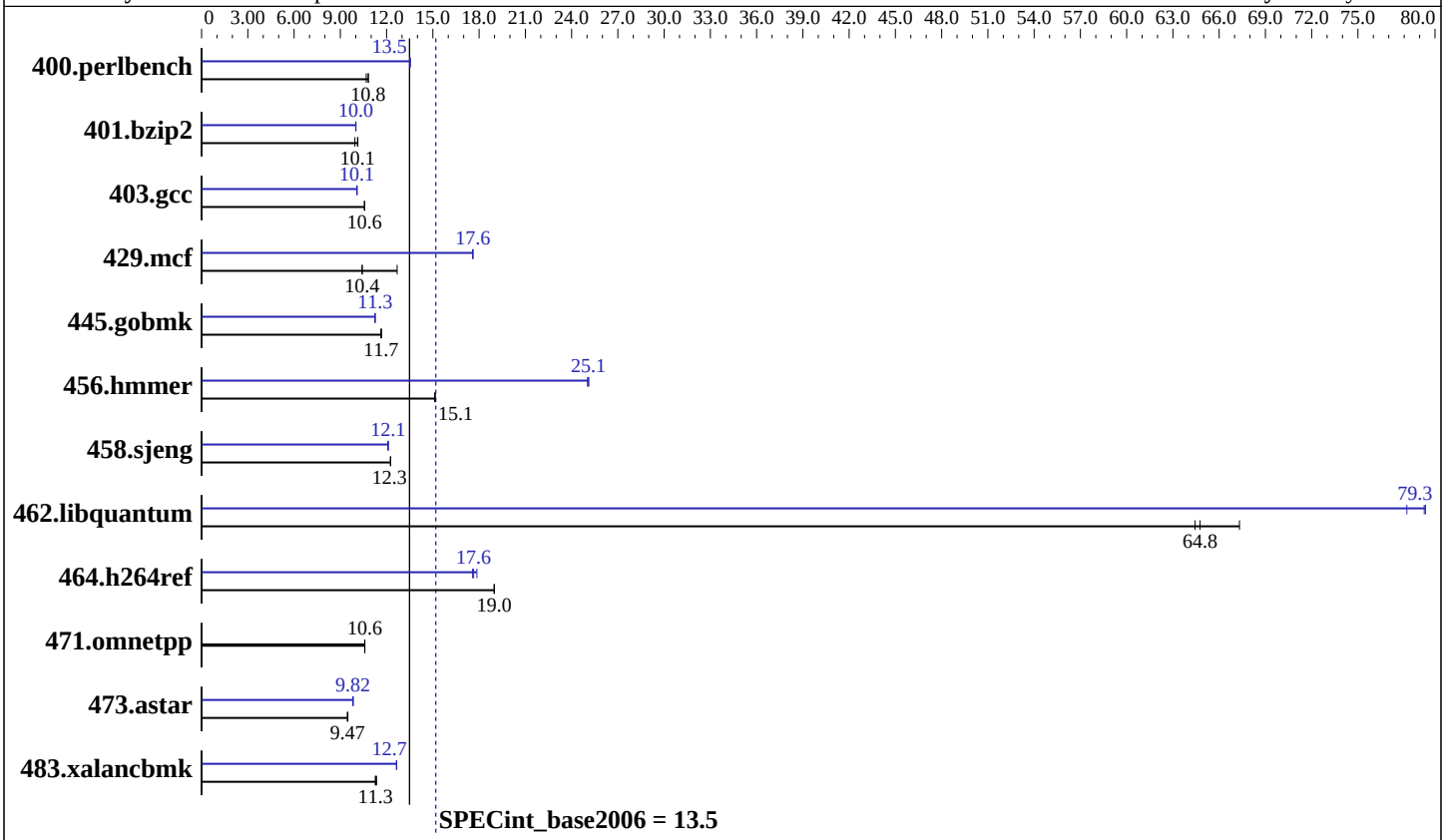
## IBM BladeCenter LS22 (AMD Opteron 2356)

SPECint®2006 = 15.2

SPECint_base2006 = 13.5

**CPU2006 license:** 11
**Test sponsor:** IBM Corporation
**Tested by:** IBM Corporation

**Test date:** Aug-2008
**Hardware Availability:** Sep-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: | 32 GB (8 x 4 GB DDR2-6400 ECC) |
| Disk Subsystem: | 1 x 36 GB 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 |
| Auto Parallel: | Yes |
| 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 8.1 32-bit Library for Linux binutils 2.18.50 |

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## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 400.perlbench | 903 | 10.8 | **904** | **10.8** | 915 | 10.7 | 723 | 13.5 | 722 | 13.5 | **722** | **13.5** |
| 401.bzip2 | **954** | **10.1** | 970 | 9.94 | 952 | 10.1 | 965 | 10.0 | **964** | **10.0** | 964 | 10.0 |
| 403.gcc | 761 | 10.6 | 762 | 10.6 | **762** | **10.6** | 799 | 10.1 | **799** | **10.1** | 798 | 10.1 |
| 429.mcf | **875** | **10.4** | 719 | 12.7 | 876 | 10.4 | 518 | 17.6 | **518** | **17.6** | 519 | 17.6 |
| 445.gobmk | 901 | 11.6 | 900 | 11.7 | **900** | **11.7** | 932 | 11.2 | 932 | 11.3 | **932** | **11.3** |
| 456.hmmer | **616** | **15.1** | 616 | 15.1 | 617 | 15.1 | **372** | **25.1** | 372 | 25.1 | 373 | 25.0 |
| 458.sjeng | **987** | **12.3** | 987 | 12.3 | 987 | 12.3 | 1002 | 12.1 | **1000** | **12.1** | 999 | 12.1 |
| 462.libquantum | 322 | 64.4 | **320** | **64.8** | 308 | 67.3 | **261** | **79.3** | 265 | 78.2 | 261 | 79.4 |
| 464.h264ref | 1166 | 19.0 | **1166** | **19.0** | 1165 | 19.0 | 1239 | 17.9 | 1259 | 17.6 | **1254** | **17.6** |
| 471.omnetpp | 590 | 10.6 | **591** | **10.6** | 591 | 10.6 | 590 | 10.6 | **591** | **10.6** | 591 | 10.6 |
| 473.astar | 742 | 9.46 | 740 | 9.49 | **742** | **9.47** | 714 | 9.84 | **715** | **9.82** | 715 | 9.81 |
| 483.xalancbmk | 608 | 11.4 | 612 | 11.3 | **611** | **11.3** | **545** | **12.7** | 546 | 12.6 | 545 | 12.7 |

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.
```

## Operating System Notes

```
'numactl' was used to bind copies to the cores.
Environment stack size set to 'unlimited'.
'ulimit -l 2097152' was used to set environment locked pages in memory quantity.
NCPUS set to number of cores.
PGI_HUGE_PAGES set to 896.
Set vm/nr_hugepages=7168 in /etc/sysctl.conf
mount -t hugetlbfs none /mnt/hugepages
Processor Performance States Disabled in BIOS
Memory ChipKill Disabled in BIOS
```

## 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:
-fastsse -Msmartalloc=huge:896 -Mloop32 -Mconcur=innermost
-Mfprelaxed -Mipa=fast -Mipa=inline -tp barcelona-64 -Bstatic_pgi

C++ benchmarks:
-fastsse -Msmartalloc=huge:896 -Mloop32 -Mfprelaxed --zc_eh
-Mipa=fast -Mipa=inline -tp barcelona-32 -Bstatic_pgi

## Base Other Flags

C benchmarks:
-Mipa=jobs:8

C++ benchmarks:
-Mipa=jobs:8

## 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

Continued on next page

## Peak Portability Flags (Continued)

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) -fastsse
-O4 -Msmartalloc=huge:896 -Mnovect -Mnounroll -Mfprelaxed
-tp barcelona-64 -Bstatic_pgi

401.bzip2: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2) -fastsse -O4
-Msmartalloc=huge:896 -Mprefetch=t0 -Mnounroll
-tp barcelona-64 -Bstatic_pgi

403.gcc: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2)
-Mipa=inline(pass 2) -fastsse -Msmartalloc=huge:896
-Mprefetch=t0 -Mnodalign -Mloop32 -Mfprelaxed
-tp barcelona-32 -Bstatic_pgi

429.mcf: -fastsse -Msmartalloc=huge:896 -Mipa=fast -Mipa=inline:1
-tp barcelona-32 -Bstatic_pgi

445.gobmk: -Mpfi(pass 1) -Mpfo(pass 2) -Mipa=fast(pass 2) -fastsse
-O4 -Msmartalloc=huge:896 -Mnovect -Mfprelaxed
-tp barcelona-64 -Bstatic_pgi

456.hmmer: -fastsse -Mvect=partial -Munroll=n:8 -Msmartalloc=huge:896
-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:896 -Mfprelaxed -tp barcelona-64
-Bstatic_pgi

462.libquantum: -fastsse -Munroll=m:8 -Msmartalloc=huge:896
-Mprefetch=distance:8 -Mconcur=innermost -Mconcur=noaltcode
-Mfprelaxed -Mipa=fast -Mipa=noarg -tp barcelona-64
-Bstatic_pgi

464.h264ref: -Mpfi=indirect(pass 1) -Mpfo=indirect(pass 2)
-Mipa=fast(pass 2) -Mipa=inline(pass 2) -fastsse
-Msmartalloc=huge:896 -Mfprelaxed -tp barcelona-64
-Bstatic_pgi

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## Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: `basepeak = yes`

473.astar: `-Mpfi`(pass 1) `-Mpfo`(pass 2) `-Mipa=fast`(pass 2) `-Mipa=inline:6`(pass 2) `-fastsse -O4 -Msmartalloc=huge:896 -Msafeptr=global -Mloop32 -Mfprelaxed --zc_eh -tp barcelona-32 -Bstatic_pgi`

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

## Peak Other Flags

C benchmarks (except as noted below):
`-Mipa=jobs:8`(pass 2)

401.bzip2: `No flags used`

C++ benchmarks (except as noted below):
`-Mipa=jobs:8`(pass 2)

483.xalancbmk: `-Mipa=jobs:8 -L/proj/qa/smartheap/SmartHeap_8.1/lib`

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/pgi72_flags.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/pgi72_flags.xml`


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For other inquiries, please contact webmaster@spec.org.

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