# SPEC® CINT2006 Result



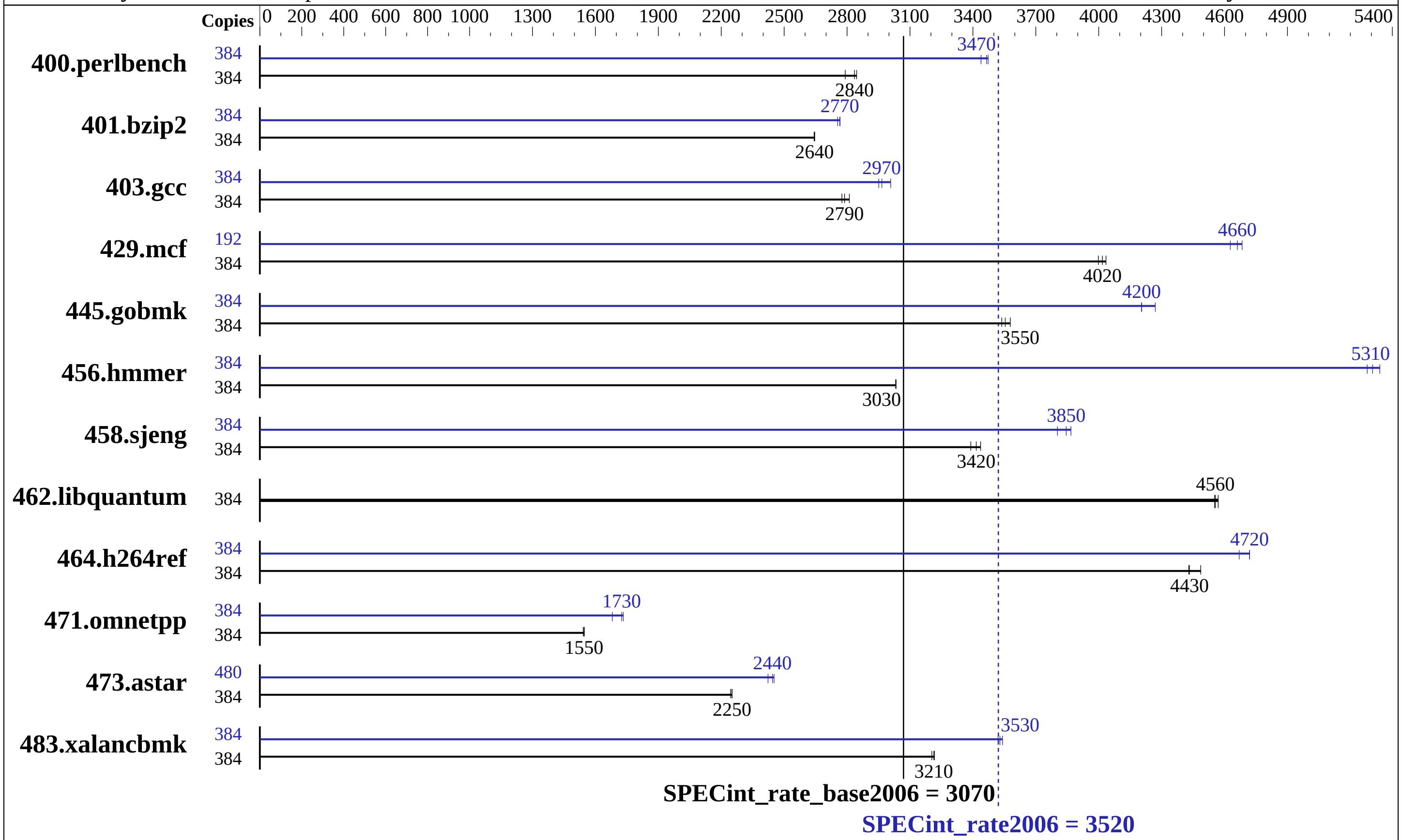
## IBM Corporation

## IBM Power 780 (3.44 GHz, 96 core)

SPECint®_rate2006 = 3520

SPECint_rate_base2006 = 3070

| | | | |
|---|---|---|---|
| **CPU2006 license:** | 11 | **Test date:** | Sep-2011 |
| **Test sponsor:** | IBM Corporation | **Hardware Availability:** | Oct-2011 |
| **Tested by:** | IBM Corporation | **Software Availability:** | Oct-2011 |




## Hardware

| | |
|---|---|
| CPU Name: | POWER7 |
| CPU Characteristics: | Intelligent Energy Optimization enabled, up to 3.780 GHz |
| CPU MHz: | 3444 |
| FPU: | Integrated |
| CPU(s) enabled: | 96 cores, 16 chips, 6 cores/chip, 4 threads/core |
| CPU(s) orderable: | 24,48,72,96 cores |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 256 KB I+D on chip per core |
| L3 Cache: | 4 MB I+D on chip per core |
| Other Cache: | None |
| Memory: | 1 TB (64 x 16 GB) DDR3 1066 MHz |
| Disk Subsystem: | 12 x 146.8 GB Raid0 SAS SFF 15K RPM |
| Other Hardware: | None |

## Software

| | |
|---|---|
| Operating System: | IBM AIX V7.1 |
| Compiler: | C/C++: Version 11.1 of IBM XL C/C++ for AIX |
| Auto Parallel: | No |
| File System: | AIX/JFS2 |
| System State: | Multi-user |
| Base Pointers: | 32-bit |
| Peak Pointers: | 32/64-bit |
| Other Software: | None |

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## Results Table

| | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Benchmark** | **Copies** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Copies** | **Seconds** | **Ratio** | **Seconds** | **Ratio** | **Seconds** | **Ratio** |
| 400.perlbench | 384 | 1344 | 2790 | 1318 | 2850 | **1323** | **2840** | 384 | 1080 | 3470 | **1083** | **3470** | 1091 | 3440 |
| 401.bzip2 | 384 | 1402 | 2640 | 1401 | 2650 | **1401** | **2640** | 384 | **1340** | **2770** | 1339 | 2770 | 1345 | 2760 |
| 403.gcc | 384 | 1100 | 2810 | 1114 | 2780 | **1109** | **2790** | 384 | 1047 | 2950 | **1042** | **2970** | 1028 | 3010 |
| 429.mcf | 384 | 876 | 4000 | **872** | **4020** | 868 | 4030 | 192 | **376** | **4660** | 378 | 4630 | 374 | 4680 |
| 445.gobmk | 384 | 1126 | 3580 | 1139 | 3540 | **1133** | **3550** | 384 | 943 | 4270 | 958 | 4200 | **958** | **4200** |
| 456.hmmer | 384 | **1182** | **3030** | 1181 | 3030 | 1182 | 3030 | 384 | 679 | 5280 | 671 | 5340 | **675** | **5310** |
| 458.sjeng | 384 | 1352 | 3440 | 1371 | 3390 | **1360** | **3420** | 384 | **1208** | **3850** | 1201 | 3870 | 1222 | 3800 |
| 462.libquantum | 384 | 1748 | 4550 | **1746** | **4560** | 1741 | 4570 | 384 | 1748 | 4550 | **1746** | **4560** | 1741 | 4570 |
| 464.h264ref | 384 | **1917** | **4430** | 1894 | 4490 | 1919 | 4430 | 384 | 1800 | 4720 | **1801** | **4720** | 1820 | 4670 |
| 471.omnetpp | 384 | 1556 | 1540 | **1552** | **1550** | 1551 | 1550 | 384 | 1428 | 1680 | **1391** | **1730** | 1385 | 1730 |
| 473.astar | 384 | 1197 | 2250 | 1201 | 2240 | **1197** | **2250** | 480 | 1391 | 2420 | **1379** | **2440** | 1374 | 2450 |
| 483.xalancbmk | 384 | **824** | **3210** | 824 | 3220 | 827 | 3200 | 384 | 753 | 3520 | **751** | **3530** | 748 | 3540 |

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

## Compiler Invocation Notes

```
C/C++ compiler update to August 2011 PTF
      Version: 11.01.0000.0007
```

## Peak Tuning Notes

```
fdpr binary optimization tool used for 400.perlbench
 with options -O4 -cbpth -1 -sdp -1 -m power7
fdpr binary optimization tool used for 401.bzip2
 with options -O4 -vrox -m power7
fdpr binary optimization tool used for 403.gcc
 with options -O4 -cbpth -1 -sdp -1 -m power7
fdpr binary optimization tool used for 429.mcf
 with options -O4 -nobp -m power7
fdpr binary optimization tool used for 445.gobmk
 with options -O3 -m power7
fdpr binary optimization tool used for 456.hmmer
 with options -O3 -lu -1 -nodp -sdp 9 -m power7
fdpr binary optimization tool used for 458.sjeng
 with options -O3 -m power7
fdpr binary optimization tool used for 462.libquantum
 with options -O4 -cbpth -1 -sdp -1 -m power7
fdpr binary optimization tool used for 464.h264ref
 with options -O4 -rcctf 0 -vrox -RD -m power7
fdpr binary optimization tool used for 471.omnetpp
 with options -O3 -cbpth -1 -m power7
fdpr binary optimization tool used for 473.astar
 with options -O3 -cbpth -1 -m power7
```


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## Peak Tuning Notes (Continued)

```
fdpr binary optimization tool used for 483.xalancbmk
 with options -O4 -rcctf 0 -nobp -m power7
```

## Submit Notes

```
The config file option 'submit' was used
to assign benchmark copy to specific kernel thread using
the "bindprocessor" command (see flags file for details).
```

## Operating System Notes

```
AIX updated to V7.1 TL 1 SP 1 (7.1.1.1)

All ulimits set to unlimited.

38400 16M large pages defined with vmo command
```

## General Notes

```
Environment variables set by runspec before the start of the run:
MALLOCOPTIONS = "pool"
MEMORY_AFFINITY = "MCM"
XLFRTEOPTS = "intrinthds=1"
```

# Base Compiler Invocation

C benchmarks:
`/usr/vac/bin/xlc -qlanglvl=extc99`

C++ benchmarks:
`/usr/vacpp/bin/xlC`

# Base Portability Flags

400.perlbench: `-DSPEC_CPU_AIX`
462.libquantum: `-DSPEC_CPU_AIX`
464.h264ref: `-DSPEC_CPU_AIX -qchars=signed`
483.xalancbmk: `-DSPEC_CPU_AIX`

# Base Optimization Flags

C benchmarks:
```
-qipa=threads -bmaxdata:0x50000000 -qlargepage -O5 -D_ILS_MACROS
-qalias=noansi -qalloca -blpdata
```

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## Base Optimization Flags (Continued)

C++ benchmarks:
-qipa=threads -bmaxdata:0x20000000 -qlargepage -O4 -qsimd -qvecnvol -D_ILS_MACROS -qrtti=all -D__IBM_FAST_SET_MAP_ITERATOR -blpdata

## Base Other Flags

C benchmarks:
-qipa=noobject -qsuppress=1500-036

C++ benchmarks:
-qipa=noobject -qsuppress=1500-036

## Peak Compiler Invocation

C benchmarks:
/usr/vac/bin/xlc -qlanglvl=extc99

C++ benchmarks:
/usr/vacpp/bin/xlC

## Peak Portability Flags

400.perlbench: -DSPEC_CPU_AIX
462.libquantum: -DSPEC_CPU_AIX
464.h264ref: -DSPEC_CPU_AIX -qchars=signed
483.xalancbmk: -DSPEC_CPU_AIX

## Peak Optimization Flags

C benchmarks:

400.perlbench: -bmaxdata:0x50000000 -qpdf1(pass 1) -qpdf2(pass 2) -O2 -qarch=auto -qtune=auto -D_ILS_MACROS -qalias=noansi -blpdata -btextpsize:64K

401.bzip2: -qipa=threads -bmaxdata:0x50000000 -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qlargepage -D_ILS_MACROS -blpdata -btextpsize:64K

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## Peak Optimization Flags (Continued)

403.gcc: -qipa=threads -bmaxdata:0x50000000 -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto -qlargepage -D_ILS_MACROS -qalloca -blpdata -btextpsize:64K

429.mcf: -qipa=threads -bmaxdata:0x50000000 -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qsimd -qvecnvol -qlargepage -D_ILS_MACROS -blpdata -btextpsize:64K

445.gobmk: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qlargepage -D_ILS_MACROS -blpdata -btextpsize:64K

456.hmmer: -qipa=threads -O5 -qsimd -qvecnvol -qassert=refalign -D_ILS_MACROS -blpdata -btextpsize:64K

458.sjeng: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O5 -D_ILS_MACROS -blpdata -btextpsize:64K

462.libquantum: basepeak = yes

464.h264ref: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O5 -D_ILS_MACROS -bdatapsize:64K -bstackpsize:64K -btextpsize:64K

C++ benchmarks:

471.omnetpp: -qipa=threads -bmaxdata:0x20000000 -qpdf1(pass 1) -qpdf2(pass 2) -O4 -D_ILS_MACROS -qalign=natural -qrtti=all -qinlglue -D__IBM_FAST_SET_MAP_ITERATOR -blpdata -btextpsize:64K

473.astar: -qipa=threads -bmaxdata:0x20000000 -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qsimd -qvecnvol -qlargepage -D_ILS_MACROS -qinlglue -qalign=natural -blpdata -btextpsize:64K

483.xalancbmk: -qipa=threads -bmaxdata:0x20000000 -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qsimd -qvecnvol -qarch=pwr5 -qtune=pwr5 -qlargepage -D_ILS_MACROS -qinlglue -D__IBM_FAST_VECTOR -blpdata -btextpsize:64K

## Peak Other Flags

C benchmarks (except as noted below):
-qipa=noobject -qsuppress=1500-036

400.perlbench: -qsuppress=1500-036

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## Peak Other Flags (Continued)

C++ benchmarks:
`-qipa=noobject -qsuppress=1500-036`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/IBM-XL.20110613.html
http://www.spec.org/cpu2006/flags/IBM-AIX.20110613.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/IBM-XL.20110613.xml
http://www.spec.org/cpu2006/flags/IBM-AIX.20110613.xml



Tested with SPEC CPU2006 v1.2.
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