



SPEC® CINT2006 Result

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IBM Corporation

SPECint®_rate2006 = 3560

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

SPECint_rate_base2006 = 3140

CPU2006 license: 11

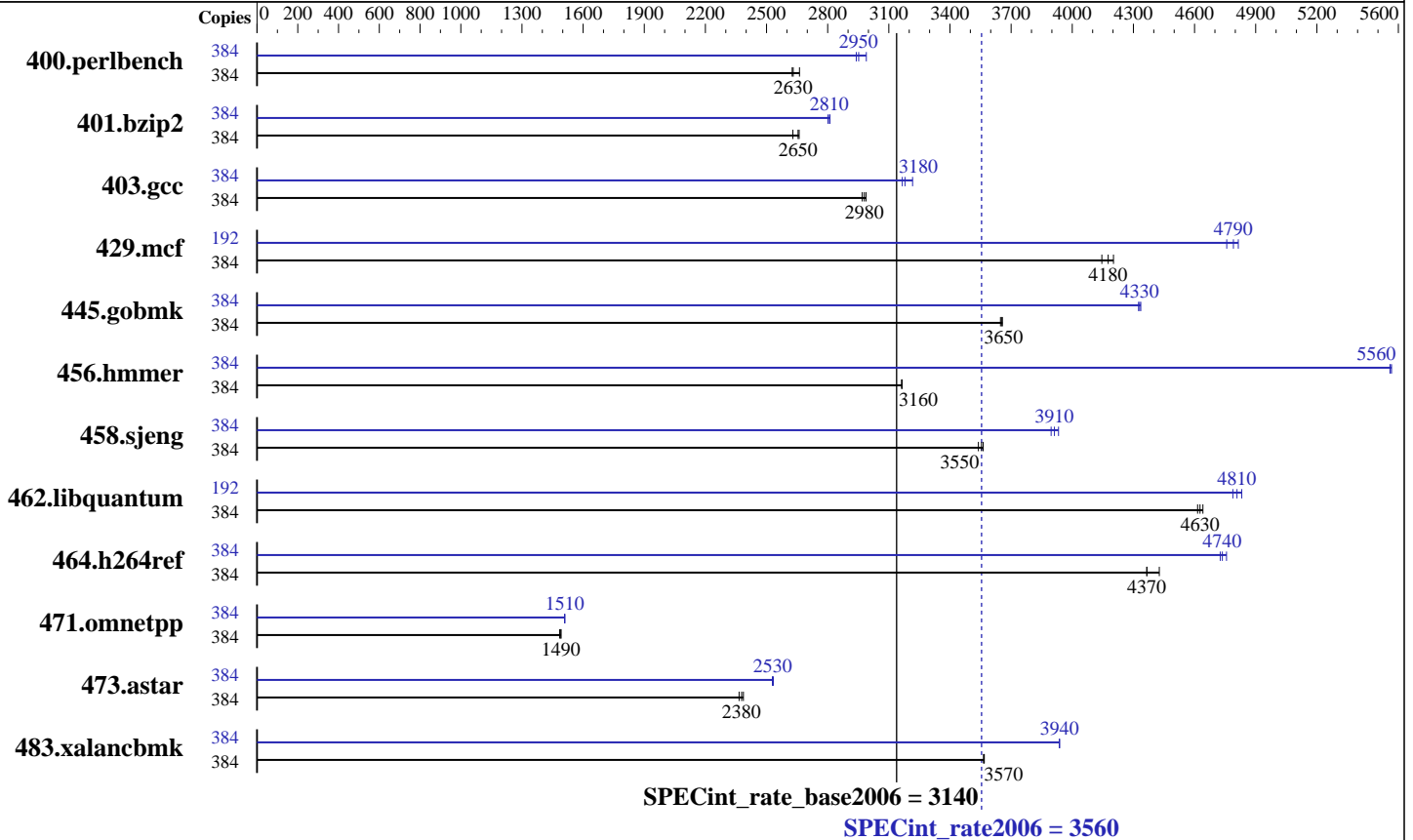
Test date: Aug-2011

Test sponsor: IBM Corporation

Hardware Availability: Oct-2011

Tested by: IBM Corporation

Software Availability: Jul-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: 10 x 146.8 GB Raid0 SAS SFF 15K RPM
 Other Hardware: None

Software

Operating System: SUSE Linux Enterprise Server 11 SP1 (ppc64), Kernel 2.6.32.12-0.7-ppc64
 Compiler: C/C++: Version 11.1 of IBM XL C/C++ for Linux
 Auto Parallel: No
 File System: ext2
 System State: Run level 3 (multi-user)
 Base Pointers: 32-bit
 Peak Pointers: 32/64-bit
 Other Software: -IBM Post-Link Optimization for Linux on POWER, version 5.6.0-4
 -MicroQuill SmartHeap 9



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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 | 384 | 1429 | 2630 | 1410 | 2660 | 1426 | 2630 | 384 | 1255 | 2990 | 1276 | 2940 | 1271 | 2950 |
| 401.bzip2 | 384 | 1396 | 2650 | 1409 | 2630 | 1393 | 2660 | 384 | 1323 | 2800 | 1319 | 2810 | 1318 | 2810 |
| 403.gcc | 384 | 1041 | 2970 | 1035 | 2990 | 1037 | 2980 | 384 | 976 | 3170 | 961 | 3220 | 972 | 3180 |
| 429.mcf | 384 | 839 | 4180 | 845 | 4150 | 833 | 4200 | 192 | 364 | 4810 | 368 | 4760 | 366 | 4790 |
| 445.gobmk | 384 | 1104 | 3650 | 1101 | 3660 | 1103 | 3650 | 384 | 929 | 4340 | 931 | 4330 | 930 | 4330 |
| 456.hmmer | 384 | 1133 | 3160 | 1132 | 3160 | 1132 | 3160 | 384 | 644 | 5570 | 644 | 5560 | 645 | 5560 |
| 458.sjeng | 384 | 1304 | 3560 | 1313 | 3540 | 1307 | 3550 | 384 | 1193 | 3900 | 1188 | 3910 | 1182 | 3930 |
| 462.libquantum | 384 | 1724 | 4620 | 1720 | 4630 | 1714 | 4640 | 192 | 823 | 4830 | 831 | 4790 | 827 | 4810 |
| 464.h264ref | 384 | 1947 | 4370 | 1920 | 4430 | 1946 | 4370 | 384 | 1794 | 4740 | 1798 | 4730 | 1786 | 4760 |
| 471.omnetpp | 384 | 1617 | 1480 | 1610 | 1490 | 1610 | 1490 | 384 | 1590 | 1510 | 1590 | 1510 | 1589 | 1510 |
| 473.astar | 384 | 1130 | 2390 | 1134 | 2380 | 1140 | 2370 | 384 | 1066 | 2530 | 1066 | 2530 | 1064 | 2530 |
| 483.xalancbmk | 384 | 743 | 3570 | 743 | 3570 | 743 | 3560 | 384 | 673 | 3940 | 673 | 3940 | 673 | 3940 |

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

Compiler Invocation Notes

C/C++ compiler updated to July2011 PTF
Version 11.01.0000.0003

Peak Tuning Notes

IBM Post-Link optimization tool used for:

400.perlbench
with options -O4 -omullX for optimization phase,
and -imullX for instrumentation phase

401.bzip2
with options -O4 -vrox

403.gcc
with options -O4 -nodp -rtb

429.mcf 445.gobmk 458.sjeng 473.astar
with options -O3

456.hmmer
with options -O4 -nodp -m power7

462.libquantum
with options -O4 -vrox -nodp

464.h264ref
with options -O4 -vrox -nodp -rtb

471.omnetpp
with options -O3 -lu -l -nodp -sdp 9

483.xalancbmk
with options -O3 -m power7



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Submit Notes

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

Operating System Notes

ulimit -s (stack) set to 1048576.

Large pages reserved as follows by root user:

```
echo 21120 > /proc/sys/vm/nr_hugepages
```

The following environment variables were set before the runspec command:

```
export XLFRTIOPTS=intrinthds=1
```

```
export HUGETLB_VERBOSE=0
```

```
export HUGETLB_MORECORE=yes
```

General Notes

IBM Post-Link optimization tool can be downloaded from

<http://www-304.ibm.com/webapp/set2/sas/f/lopdiags/sdkdownload.html>

Base Compiler Invocation

C benchmarks:

```
xlc -qlanglvl=extc99
```

C++ benchmarks:

```
xlC
```

Base Portability Flags

```
400.perlbench: -DSPEC_CPU_LINUX_PPC
```

```
462.libquantum: -DSPEC_CPU_LINUX
```

```
464.h264ref: -qchars=signed
```

```
483.xalancbmk: -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:

```
-O5 -qalias=noansi -qalloca -lhugetlbf
```

C++ benchmarks:

```
-O5 -qrtti -lsmartheap -lhugetlbf
```



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Base Other Flags

C benchmarks:

-qipa=noobject -qipa=threads

C++ benchmarks:

-qipa=noobject -qipa=threads

Peak Compiler Invocation

C benchmarks:

xlc -qlanglvl=extc99

C++ benchmarks:

x1C

Peak Portability Flags

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

Peak Optimization Flags

C benchmarks:

400.perlbench: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qalias=noansi
-qipa=level=2 -lsmartheap

401.bzip2: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=pwr7
-qtune=pwr7 -lhugetlbfs

403.gcc: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qalloca
-lhugetlbfs

429.mcf: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -lhugetlbfs

445.gobmk: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -lhugetlbfs

456.hmmer: -Wl,-q -O5 -qsimd -qassert=refalign
-qipa=inline=threshold=2888 -qipa=inline=limit=11880
-lhugetlbfs

458.sjeng: Same as 429.mcf

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Peak Optimization Flags (Continued)

462.libquantum: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -q64
-lhugetlbfs

464.h264ref: Same as 429.mcf

C++ benchmarks:

471.omnetpp: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -grtti
-lhugetlbfs -lsmartheap

473.astar: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4
-qipa=inline=threshold=2468 -qipa=inline=limit=11060
-qipa=partition=large -lhugetlbfs -lsmartheap

483.xalancbmk: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr5
-qtune=pwr5 -qipa=inline=threshold=2468
-qipa=inline=limit=11060 -qipa=partition=large -lhugetlbfs
-lsmartheap

Peak Other Flags

C benchmarks:

-qipa=noobject -qipa=threads

C++ benchmarks:

-qipa=noobject -qipa=threads

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

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20101123.html>

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

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20101123.xml>

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

Tested with SPEC CPU2006 v1.1.
Report generated on Thu Jul 24 00:53:57 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 7 November 2011.