



# SPEC<sup>®</sup> CINT2006 Result

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## IBM Corporation

SPECint<sup>®</sup>\_rate2006 = 6130

### IBM Power 780 (3.7 GHz, 128 core, RHEL)

SPECint\_rate\_base2006 = 4460

CPU2006 license: 11

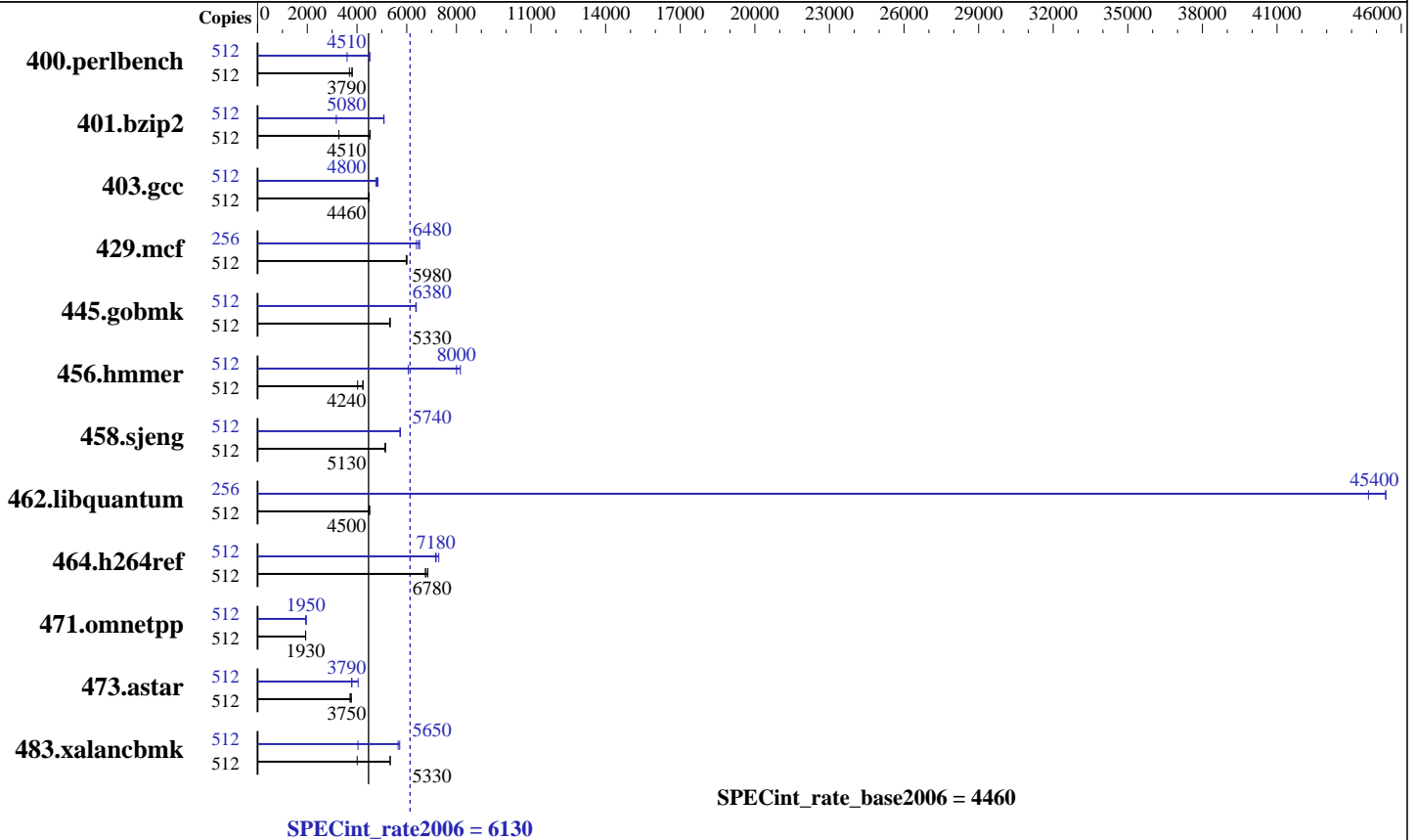
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Sep-2012

Hardware Availability: Oct-2012

Software Availability: Dec-2012



### Hardware

CPU Name: POWER7+  
 CPU Characteristics: Intelligent Energy Optimization enabled, up to 4.144 GHz  
 CPU MHz: 3724  
 FPU: Integrated  
 CPU(s) enabled: 128 cores, 16 chips, 8 cores/chip, 4 threads/core  
 CPU(s) orderable: 32,64,96,128 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: 10 MB I+D on chip per core  
 Other Cache: None  
 Memory: 1 TB (64 x 16 GB) DDR3 1066 MHz  
 Disk Subsystem: 12x146.8 GB SAS SFF 15K RPM  
 Other Hardware: None

### Software

Operating System: Red Hat Enterprise Linux Server release 6.3 (ppc64) kernel 2.6.32-279.el6.ppc64  
 Compiler: C/C++: Version 12.1 of IBM XL C/C++ for Linux  
 Auto Parallel: No  
 File System: ext4  
 System State: Run level 3 (multi-user)  
 Base Pointers: 32-bit  
 Peak Pointers: 32/64-bit  
 Other Software: -Post-Link Optimization for Linux on POWER, version 5.6.1-7  
 -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	512	1354	3690	1313	3810	<b><u>1318</u></b>	<b><u>3790</u></b>	512	1389	3600	<b><u>1110</u></b>	<b><u>4510</u></b>	1108	4520
401.bzip2	512	<b><u>1095</u></b>	<b><u>4510</u></b>	1510	3270	1091	4530	512	1560	3170	<b><u>973</u></b>	<b><u>5080</u></b>	971	5090
403.gcc	512	<b><u>924</u></b>	<b><u>4460</u></b>	919	4490	925	4450	512	865	4760	<b><u>859</u></b>	<b><u>4800</u></b>	851	4840
429.mcf	512	777	6010	781	5980	<b><u>780</u></b>	<b><u>5980</u></b>	256	365	6390	<b><u>360</u></b>	<b><u>6480</u></b>	358	6520
445.gobmk	512	<b><u>1009</u></b>	<b><u>5330</u></b>	1008	5330	1009	5330	512	842	6380	844	6360	<b><u>842</u></b>	<b><u>6380</u></b>
456.hammer	512	1127	4240	1187	4020	<b><u>1128</u></b>	<b><u>4240</u></b>	512	789	6060	586	8160	<b><u>597</u></b>	<b><u>8000</u></b>
458.sjeng	512	1207	5130	1205	5140	<b><u>1207</u></b>	<b><u>5130</u></b>	512	1080	5740	1080	5740	<b><u>1080</u></b>	<b><u>5740</u></b>
462.libquantum	512	<b><u>2358</u></b>	<b><u>4500</u></b>	2358	4500	2356	4500	256	119	44700	<b><u>117</u></b>	<b><u>45400</u></b>	117	45400
464.h264ref	512	1679	6750	1654	6850	<b><u>1671</u></b>	<b><u>6780</u></b>	512	1554	7290	1581	7170	<b><u>1578</u></b>	<b><u>7180</u></b>
471.omnetpp	512	1658	1930	1654	1930	<b><u>1654</u></b>	<b><u>1930</u></b>	512	1640	1950	1643	1950	<b><u>1642</u></b>	<b><u>1950</u></b>
473.astar	512	<b><u>957</u></b>	<b><u>3750</u></b>	967	3720	953	3770	512	888	4050	<b><u>948</u></b>	<b><u>3790</u></b>	949	3790
483.xalancbmk	512	<b><u>663</u></b>	<b><u>5330</u></b>	882	4010	662	5340	512	875	4040	<b><u>625</u></b>	<b><u>5650</u></b>	618	5720

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 December 2012 PTF  
Version: 12.01.0000.0002

## Peak Tuning Notes

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.hammer  
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.
ulimit -n (open files) set to 500000.
Large pages reserved as follows by root user:
echo 30000 > /proc/sys/vm/nr_hugepages
echo 6000 > /proc/sys/vm/nr_overcommit_hugepages
```

## Platform Notes

Service processor memory mirroring property disabled.

## General Notes

The following environment variables were set before the runspec command:

```
export HUGETLB_VERBOSE=0
export HUGETLB_MORECORE=yes
export XLFRTEOPTS=intrinths=1
```

## 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 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads -qalias=noansi  
-qalloca -lhugetlbfs

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## Base Optimization Flags (Continued)

C++ benchmarks:

-O5 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads -qrtti -lsmartheap

## Base Other Flags

C benchmarks:

C++ benchmarks:

## 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 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -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 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -qalloca -lhugetlbfs  
429.mcf: -Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads  
-lhugetlbfs

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## Peak Optimization Flags (Continued)

445.gobmk: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -lhugetlbfs

456.hmmr: -Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsimd  
-qassert=refalign -qipa=inline=threshold=2888  
-qipa=inline=limit=11880 -lhugetlbfs

458.sjeng: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -lhugetlbfs

462.libquantum: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -q64 -lhugetlbfs

464.h264ref: Same as 458.sjeng

C++ benchmarks:

471.omnetpp: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -qrtti -lsmartheap

473.astar: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -lhugetlbfs -lsmartheap

483.xalancbmk: -Wl,-q -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads  
-qipa=partition=large -lsmartheap

## Peak Other Flags

C benchmarks:

C++ benchmarks:

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20121024.html>

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

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20121024.xml>

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



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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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