SPEC® CINT2006 Result

IBM Corporation

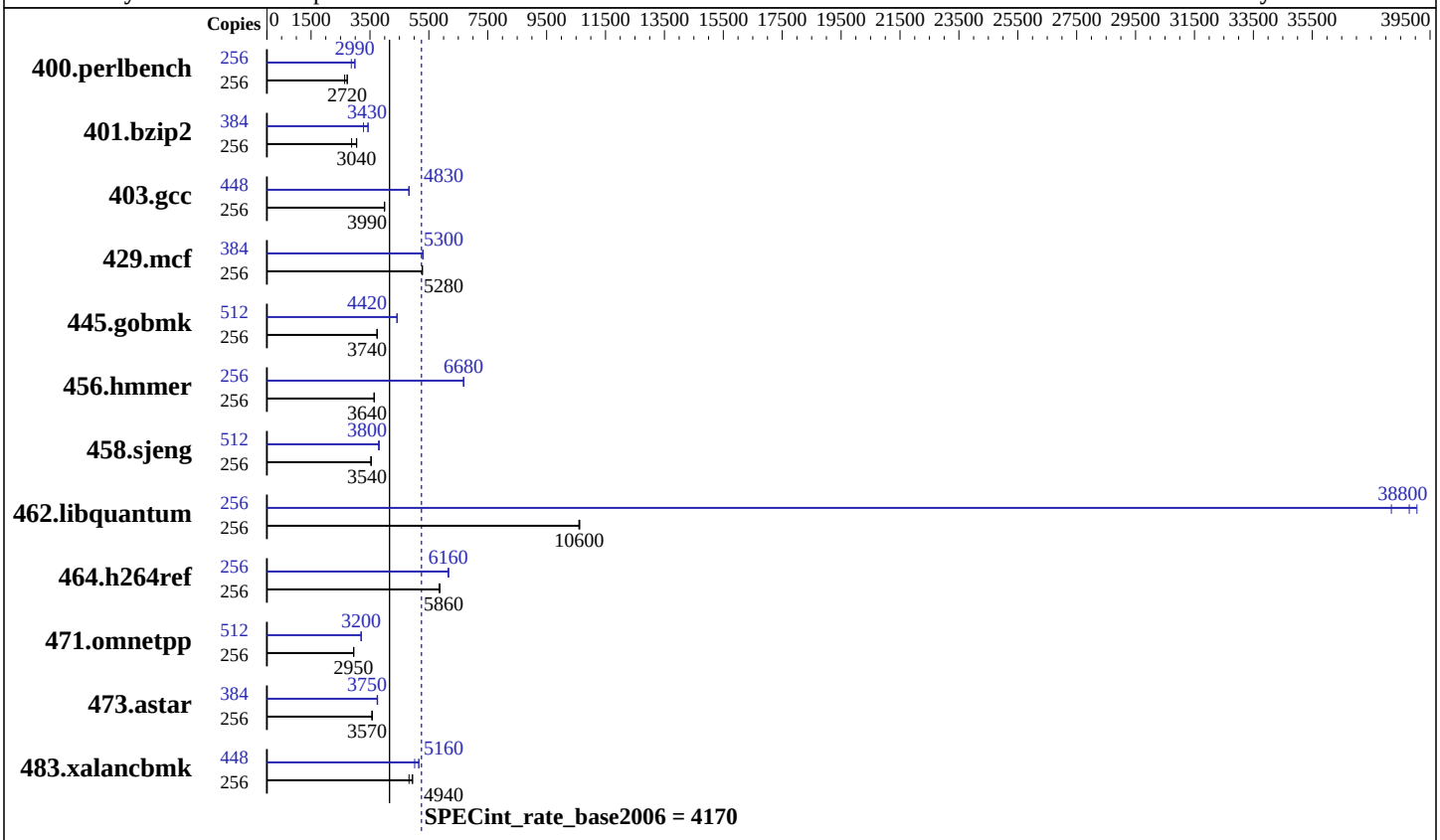
IBM Power E880 (4.35 GHz, 64 core, RHEL)

SPECint®_rate2006 = 5250

SPECint_rate_base2006 = 4170

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

Test date: Nov-2014
Hardware Availability: Nov-2014
Software Availability: Jun-2014



Hardware

CPU Name:	POWER8
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 4.53 GHz
CPU MHz:	4359
FPU:	Integrated
CPU(s) enabled:	64 cores, 8 chips, 8 cores/chip, 8 threads/core
CPU(s) orderable:	4,8 Modules
Primary Cache:	32 KB I + 64 KB D on chip per core
Secondary Cache:	512 KB I+D on chip per core
L3 Cache:	8 MB I+D on chip per core
Other Cache:	16 MB I+D off chip per CDIMM
Memory:	2 TB (64 x 32 GB CDIMMs) DDR3 1600 MHz
Disk Subsystem:	7 x 300 GB 15K RPM SAS SFF-2 Raid5
Other Hardware:	None

Software

Operating System:	Red Hat Enterprise Linux Server release 7.0 (ppc64) kernel 3.10.0-123.el7.ppc64
Compiler:	C/C++: Version 13.1 of IBM XL C/C++ for Linux
Auto Parallel:	No
File System:	xfs
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 5.7.0 IBM Advance Toolchain 7.0-3

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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	256	947	2640	915	2730	**918**	**2720**	256	873	2870	836	2990	**837**	**2990**
401.bzip2	256	858	2880	810	3050	**812**	**3040**	384	1129	3280	**1080**	**3430**	1077	3440
403.gcc	256	**516**	**3990**	515	4000	517	3990	448	**746**	**4830**	749	4820	746	4840
429.mcf	256	**442**	**5280**	443	5270	442	5280	384	**661**	**5300**	661	5300	659	5310
445.gobmk	256	**718**	**3740**	717	3740	718	3740	512	**1215**	**4420**	1213	4430	1216	4420
456.hmmer	256	655	3650	656	3640	**656**	**3640**	256	**357**	**6680**	358	6680	357	6680
458.sjeng	256	873	3550	**875**	**3540**	877	3530	512	1634	3790	**1629**	**3800**	1623	3820
462.libquantum	256	501	10600	**500**	**10600**	499	10600	256	139	38200	136	39100	**137**	**38800**
464.h264ref	256	964	5880	968	5850	**966**	**5860**	256	920	6160	**919**	**6160**	918	6170
471.omnetpp	256	**543**	**2950**	542	2950	543	2950	512	1001	3200	**999**	**3200**	998	3210
473.astar	256	**503**	**3570**	504	3570	502	3580	384	720	3740	717	3760	**718**	**3750**
483.xalancbmk	256	366	4830	**357**	**4940**	357	4950	448	616	5020	599	5160	**599**	**5160**

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

Peak Tuning Notes

```
400.perlbench fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
401.bzip2 fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
403.gcc fdpr options: -O4 -m power8 -A 2 -sls -dir -vrox
429.mcf fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
456.hmmer fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
458.sjeng fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
462.libquantum fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
464.h264ref fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
471.omnetpp fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
473.astar fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
483.xalancbmk fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
```

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 unlimited

51200 16M large pages defined with sysctl command
Transparent huge page disabled with
echo never > /sys/kernel/mm/transparent_hugepage/enabled
sysctl vm.nr_hugepages=N and reboot to set large page pool
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_MORECORE = "yes"
HUGETLB_VERBOSE = "0"
XLFRTEOPTS = "intrinthds=1"

This result uses the post_setup and/or bench_post_setup to drop caches. SPEC has
determined that although the effect may have been negligible for this run, future
submissions will not be considered rule compliant if the post_setup actions drop
caches (e.g. : "echo 3 > /proc/sys/vm/drop_caches").
```

Base Compiler Invocation

C benchmarks:
```
/opt/ibm/xlC/13.1.0/bin/xlc_at -qlanglvl=extc99
```

C++ benchmarks:
```
/opt/ibm/xlC/13.1.0/bin/xlC_at
```

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:
```
-qinline=40 -qipa=threads -qlargepage -O5 -qalias=noansi -qalloca
-lhugetlbfs
```

C++ benchmarks:
```
-qinline=40 -qipa=threads -qlargepage -O5 -qrtti -ltcmalloc
```

Base Other Flags

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

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

Peak Compiler Invocation

C benchmarks:
/opt/ibm/xlC/13.1.0/bin/xlc_at -qlanglvl=extc99

C++ benchmarks:
/opt/ibm/xlC/13.1.0/bin/xlC_at

Peak Portability Flags

400.perlbench: -DSPEC_CPU_LINUX_PPC
403.gcc: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LINUX
464.h264ref: -qchars=signed
483.xalancbmk: -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:

400.perlbench: -qinline=40 -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto
-qtune=auto -qfdpr -qalias=noansi -lhugetlbfs -Wl,-q

401.bzip2: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-O4 -qsimd=noauto -qlargepage -qfdpr -lhugetlbfs -Wl,-q

403.gcc: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-O4 -q64 -qlargepage -qfdpr -qalloca -lhugetlbfs -Wl,-q

429.mcf: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-O5 -qlargepage -qnoprefetch -qfdpr -lhugetlbfs -Wl,-q

445.gobmk: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-O5 -qlargepage -lhugetlbfs

456.hmmer: -qinline=40 -qipa=threads -O5 -qlargepage
-qassert=refalign -qfdpr -lhugetlbfs -Wl,-q

458.sjeng: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-O3 -qarch=auto -qtune=auto -qprefetch=dscr=0x54 -qfdpr
-lhugetlbfs -Wl,-q

462.libquantum: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-O5 -qsimd=noauto -qinline=400 -q64 -qlargepage -qfdpr
-lhugetlbfs -Wl,-q

464.h264ref: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-O5 -qfdpr -lhugetlbfs -Wl,-q

Continued on next page

Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: `-qinline=40 -qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2)
`-O5 -qsimd=noauto -qarch=pwr7 -qtune=pwr7`
`-qprefetch=dscr=0x54 -qfdpr -qrtti -lhugetlbfs -Wl,-q`
`-ltcmalloc`

473.astar: `-qinline=40 -qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2)
`-O5 -qlargepage -qprefetch=dscr=0x93 -qfdpr -lhugetlbfs`
`-Wl,-q -ltcmalloc`

483.xalancbmk: `-qinline=40 -qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2)
`-O3 -qarch=auto -qtune=auto -qsimd -qlargepage`
`-qprefetch=dscr=0x93 -qipa=partition=large -qfdpr`
`-lhugetlbfs -Wl,-q -ltcmalloc`

Peak Other Flags

C benchmarks (except as noted below):
`-qsuppress=1586-476`(pass 2) `-qipa=noobject -qsuppress=1500-036`

400.perlbench: `-qsuppress=1586-476`(pass 2) `-qsuppress=1500-036`

456.hmmer: `-qipa=noobject -qsuppress=1500-036`

C++ benchmarks:
`-qsuppress=1586-476`(pass 2) `-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.V13La.html
http://www.spec.org/cpu2006/flags/IBM-Linux-V7.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/IBM-XL.V13La.xml
http://www.spec.org/cpu2006/flags/IBM-Linux-V7.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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