SPEC® CINT2006 Result

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IBM Corporation

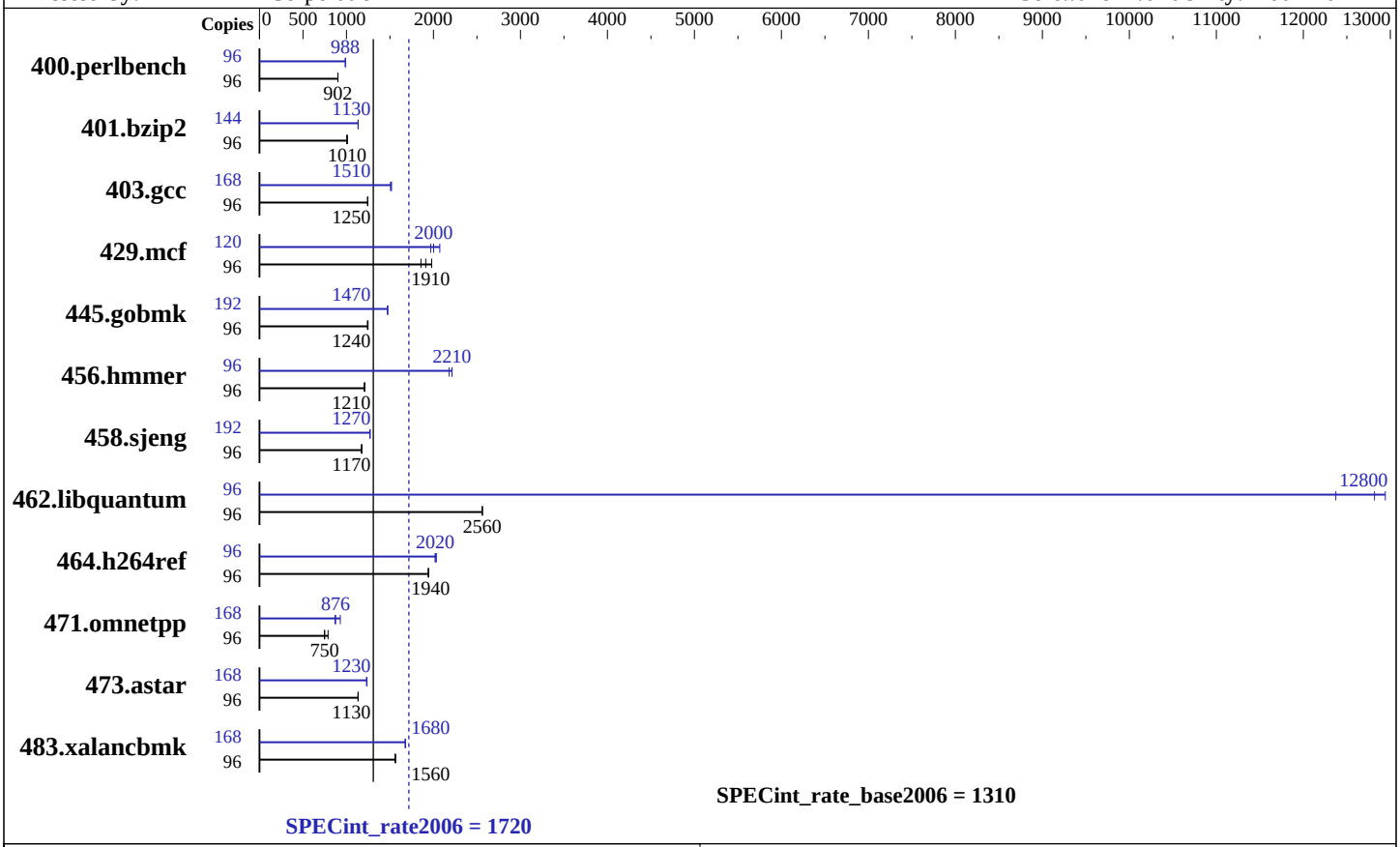
IBM Power S824 (3.5 GHz, 24 core, RHEL)

SPECint®_rate2006 = 1720

SPECint_rate_base2006 = 1310

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

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



Hardware

CPU Name:	POWER8
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 3.92 GHz
CPU MHz:	3525
FPU:	Integrated
CPU(s) enabled:	24 cores, 4 chips, 6 cores/chip, 8 threads/core
CPU(s) orderable:	2 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:	512 GB (16 x 32 GB CDIMMs) DDR3 1600 MHz
Disk Subsystem:	5 x 300 GB 15K RPM SAS SFF-2 Raid0
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	96	1041	901	**1040**	**902**	1039	902	96	950	987	949	989	**949**	**988**
401.bzip2	96	922	1000	918	1010	**919**	**1010**	144	1226	1130	1224	1140	**1226**	**1130**
403.gcc	96	**621**	**1250**	622	1240	621	1250	168	897	1510	**896**	**1510**	891	1520
429.mcf	96	**458**	**1910**	472	1860	442	1980	120	556	1970	**547**	**2000**	528	2070
445.gobmk	96	807	1250	811	1240	**810**	**1240**	192	1367	1470	**1367**	**1470**	1368	1470
456.hmmer	96	743	1210	**742**	**1210**	741	1210	96	**405**	**2210**	404	2210	411	2180
458.sjeng	96	**989**	**1170**	989	1170	990	1170	192	**1830**	**1270**	1826	1270	1830	1270
462.libquantum	96	**777**	**2560**	777	2560	776	2560	96	161	12400	154	12900	**155**	**12800**
464.h264ref	96	1093	1940	1095	1940	**1093**	**1940**	96	1045	2030	**1051**	**2020**	1052	2020
471.omnetpp	96	**800**	**750**	761	789	804	747	168	1130	929	1209	868	**1199**	**876**
473.astar	96	595	1130	594	1140	**594**	**1130**	168	954	1240	957	1230	**957**	**1230**
483.xalancbmk	96	**424**	**1560**	424	1560	425	1560	168	691	1680	692	1680	**691**	**1680**

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 1048576.

19200 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"
```

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
```

Continued on next page

Peak Compiler Invocation (Continued)

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 -qprefetch=dscr=84 -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=84 -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=84 -qfdpr -qrtti -lhugetlbfs -Wl,-q`
`-ltcmalloc`

473.astar: `-qinline=40 -qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2)
`-O5 -qlargepage -qprefetch=dscr=147 -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=147 -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.V13L.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.V13L.xml
http://www.spec.org/cpu2006/flags/IBM-Linux-V7.xml

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