SPEC® CINT2006 Result

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IBM Corporation

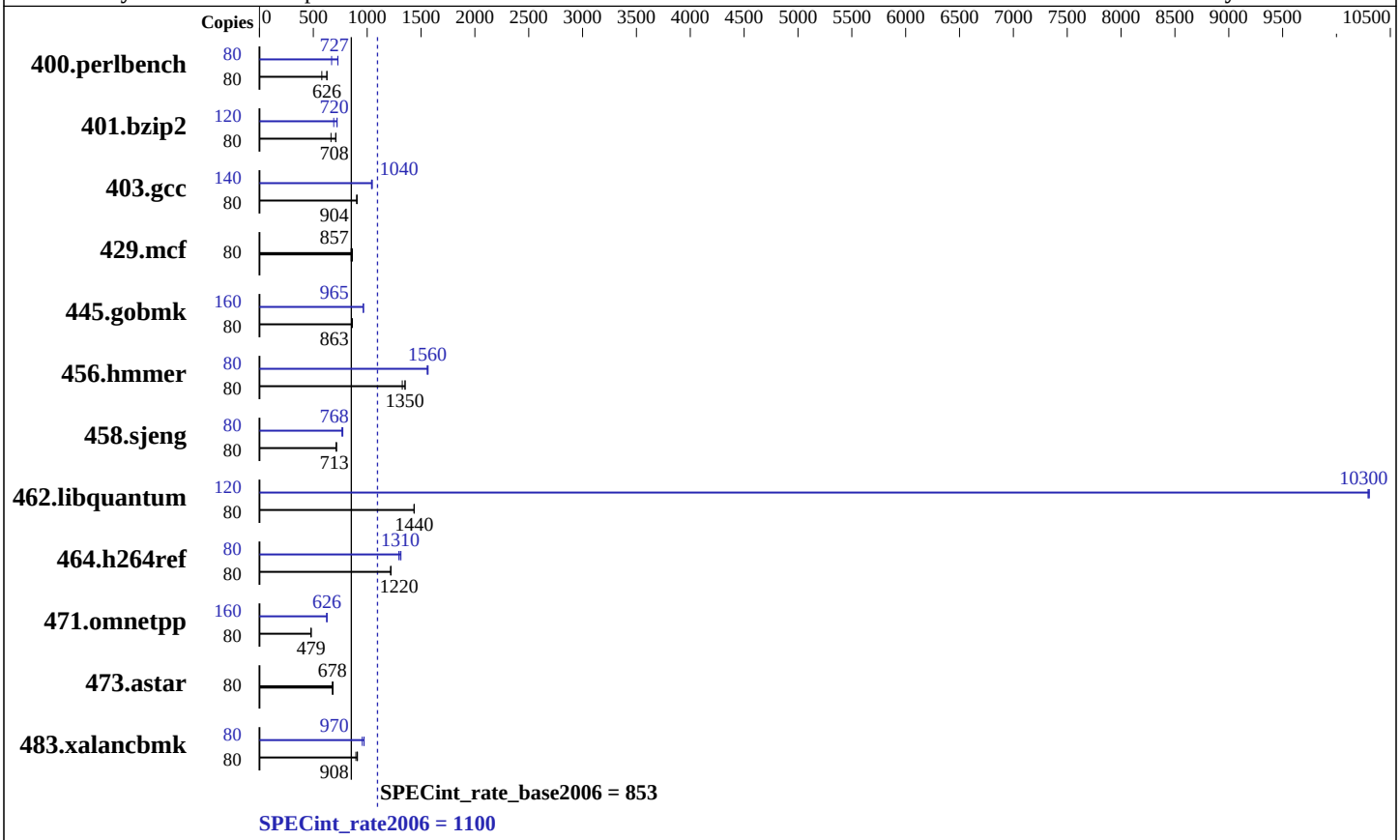
IBM Power S822LC (2.92 GHz, 20 core, Ubuntu)

SPECint®_rate2006 = 1100

SPECint_rate_base2006 = 853

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

Test date: Sep-2015
Hardware Availability: Oct-2015
Software Availability: Dec-2015



Hardware

CPU Name:	POWER8
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 3.49 GHz
CPU MHz:	2926
FPU:	Integrated
CPU(s) enabled:	20 cores, 2 chips, 10 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 4 DIMMs
Memory:	256 GB (32 x 8 GB DIMMs) DDR3 1333 MHz
Disk Subsystem:	2 x 500 GB 15K RPM SAS SFF-2 Raid5
Other Hardware:	None

Software

Operating System:	Ubuntu 14.04 LTS Updated to 14.04.3 (ppc64le) kernel <3.16.0-46-generic>
Compiler:	C/C++: Version 13.1.3 of IBM XL C/C++ for Linux
Auto Parallel:	No
File System:	ext4
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other Software:	Post-Link Optimization for Linux on POWER, version 5.6.2-6f IBM Advance Toolchain 8.0-3

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
400.perlbench	80	1350	579	1248	626	**1249**	**626**	80	1167	670	1073	728	**1075**	**727**
401.bzip2	80	1163	664	**1090**	**708**	1089	709	120	1680	689	1607	720	**1608**	**720**
403.gcc	80	712	905	712	904	**712**	**904**	140	1076	1050	1084	1040	**1081**	**1040**
429.mcf	80	846	863	857	851	**851**	**857**	80	846	863	857	851	**851**	**857**
445.gobmk	80	973	863	**973**	**863**	974	862	160	1740	965	**1740**	**965**	1742	964
456.hmmer	80	**552**	**1350**	552	1350	563	1330	80	479	1560	477	1570	**478**	**1560**
458.sjeng	80	1355	714	1358	713	**1357**	**713**	80	1262	767	1251	774	**1261**	**768**
462.libquantum	80	**1153**	**1440**	1153	1440	1156	1430	120	242	10300	**241**	**10300**	241	10300
464.h264ref	80	**1452**	**1220**	1452	1220	1452	1220	80	1348	1310	1368	1290	**1354**	**1310**
471.omnetpp	80	1044	479	**1044**	**479**	1044	479	160	1599	626	1598	626	**1598**	**626**
473.astar	80	824	682	**828**	**678**	828	678	80	824	682	**828**	**678**	828	678
483.xalancbmk	80	617	895	**608**	**908**	607	910	80	579	954	568	972	**569**	**970**

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 -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
```

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

8000 16M large pages defined
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"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/opt/ibm/fdprpro/lib"
TCMALLOC_MEMFS_MALLOC_PATH = "/dev/hugepages/"
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/13.1.2/bin/xlc_at -qlanglvl=extc99
```

C++ benchmarks:
```
/opt/ibm/xlC/13.1.2/bin/xlC_at
```

Base Portability Flags

```
400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
  401.bzip2: -DSPEC_CPU_LP64
    403.gcc: -DSPEC_CPU_LP64
    429.mcf: -DSPEC_CPU_LP64
  445.gobmk: -DSPEC_CPU_LP64
  456.hmmer: -DSPEC_CPU_LP64
  458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
  464.h264ref: -DSPEC_CPU_LP64 -qchars=signed
  471.omnetpp: -DSPEC_CPU_LP64
    473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
```

Base Optimization Flags

C benchmarks:
```
-qinline=40 -qipa=threads -O5 -q64 -qalias=noansi -lhugetlbfs
```

C++ benchmarks:
```
-qinline=40 -qipa=threads -O5 -q64 -qrtti
-D__extern_always_inline=inline -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/13.1.2/bin/xlc_at -qlanglvl=extc99
```

C++ benchmarks:
```
/opt/ibm/xlC/13.1.2/bin/xlC_at
```

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

400.perlbench: -qinline=40 -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto -q64 -qfdpr -qalias=noansi -lhugetlbfs -Wl,-q

401.bzip2: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qsimd=noauto -q64 -qfdpr -lhugetlbfs -Wl,-q

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

429.mcf: basepeak = yes

445.gobmk: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O5 -q64 -lhugetlbfs

456.hmmer: -qinline=40 -qipa=threads -O5 -q64 -qassert=refalign -qfdpr -lhugetlbfs -Wl,-q

458.sjeng: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto -q64 -qprefetch=dscr=0x54 -qfdpr -lhugetlbfs -Wl,-q

Continued on next page

Peak Optimization Flags (Continued)

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

464.h264ref: `-qinline=40 -qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -q64 -qfdpr -lhugetlbfs -Wl,-q`

C++ benchmarks:

471.omnetpp: `-qinline=40 -qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qsimd=noauto -q64 -qarch=pwr8 -qtune=pwr8 -qprefetch=dscr=0x54 -qfdpr -qrtti -D__extern_always_inline=inline -lhugetlbfs -Wl,-q -ltcmalloc`

473.astar: `basepeak = yes`

483.xalancbmk: `-qinline=40 -qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O3 -qarch=auto -qtune=auto -qsimd -qprefetch=dscr=0x93 -qipa=partition=large -D__extern_always_inline=inline -lhugetlbfs -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`

429.mcf: `-qipa=noobject -qsuppress=1500-036`

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

462.libquantum: `-qsuppress=1586-476`(pass 2) `-qsuppress=1500-036`

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

473.astar: `-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.20151020.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.20151020.xml
http://www.spec.org/cpu2006/flags/IBM-Linux-V7.xml

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