SPEC® CFP2006 Result

IBM Corporation

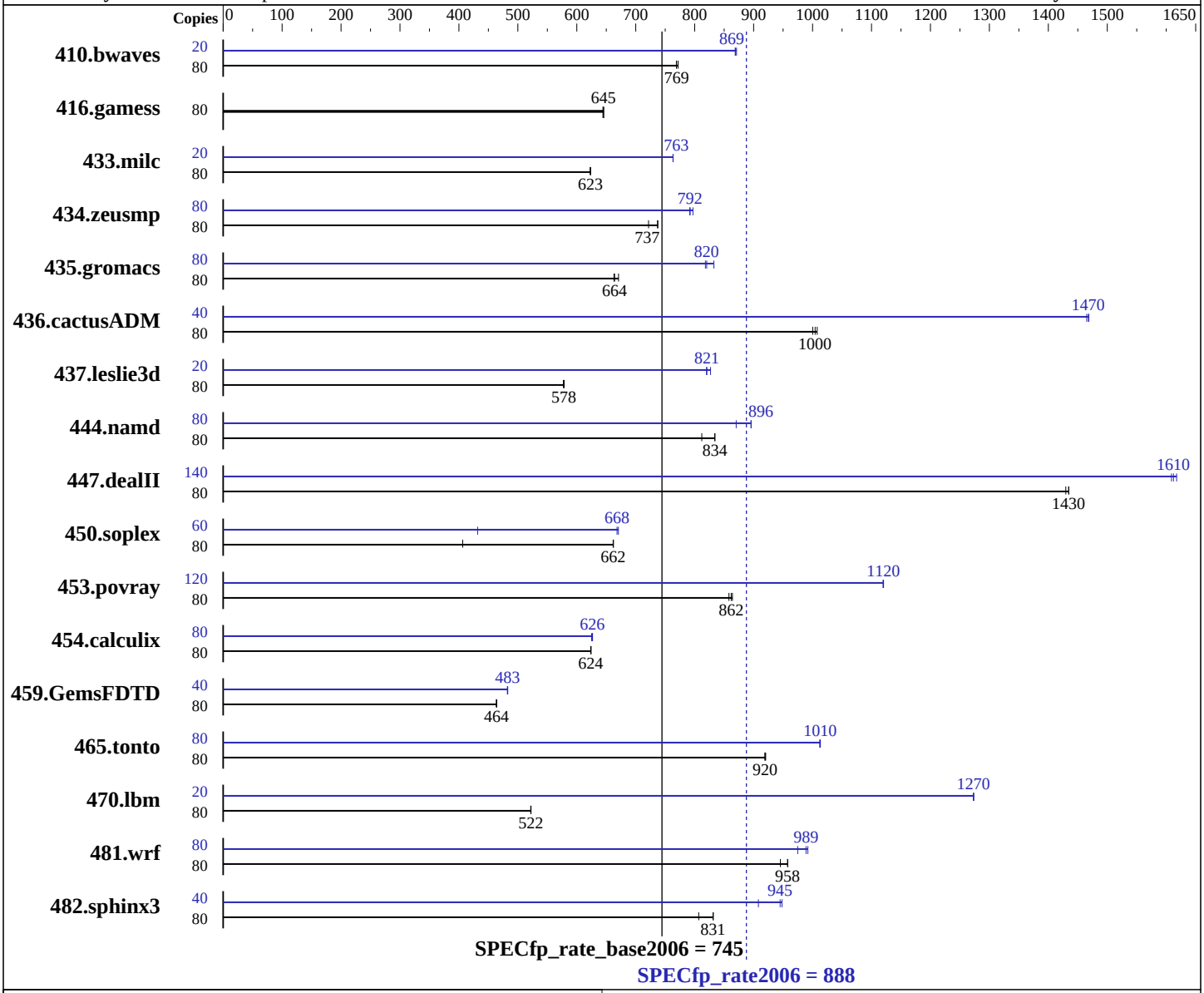
IBM Power S822LC (2.92 GHz, 20 core, Ubuntu)

SPECfp®_rate2006 = 888

SPECfp_rate_base2006 = 745

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

Continued on next page

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; Fortran: Version 15.1.3 of IBM XL Fortran for Linux
Auto Parallel:	No
File System:	ext4
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit

Continued on next page

SPEC CFP2006 Result

IBM Corporation

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

SPECfp_rate2006 = 888

SPECfp_rate_base2006 = 745

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

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

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

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
410.bwaves	80	1408	772	1414	769	**1413**	**769**	20	312	871	**313**	**869**	313	869
416.gamess	80	2426	646	**2427**	**645**	2431	644	80	2426	646	**2427**	**645**	2431	644
433.milc	80	1178	623	1179	623	**1179**	**623**	20	241	763	**241**	**763**	240	763
434.zeusmp	80	987	738	1009	722	**988**	**737**	80	**919**	**792**	913	797	920	792
435.gromacs	80	851	671	861	663	**860**	**664**	80	686	833	**696**	**820**	698	818
436.cactusADM	80	949	1010	956	1000	**952**	**1000**	40	**326**	**1470**	326	1470	325	1470
437.leslie3d	80	1300	579	1303	577	**1301**	**578**	20	227	827	**229**	**821**	229	820
444.namd	80	790	812	**769**	**834**	769	834	80	737	870	716	896	**716**	**896**
447.dealII	80	640	1430	638	1430	**638**	**1430**	140	995	1610	**993**	**1610**	990	1620
450.soplex	80	1642	406	1007	662	**1008**	**662**	60	1159	432	746	671	**749**	**668**
453.povray	80	493	864	496	858	**494**	**862**	120	**570**	**1120**	570	1120	570	1120
454.calculix	80	1057	624	1058	624	**1058**	**624**	80	1056	625	1053	627	**1054**	**626**
459.GemsFDTD	80	1831	463	1829	464	**1829**	**464**	40	879	483	**879**	**483**	880	482
465.tonto	80	**856**	**920**	855	920	857	919	80	**777**	**1010**	778	1010	777	1010
470.lbm	80	2106	522	2104	522	**2106**	**522**	20	216	1270	**216**	**1270**	216	1270
481.wrf	80	945	945	**933**	**958**	933	958	80	917	975	**904**	**989**	901	992
482.sphinx3	80	1932	807	**1876**	**831**	1875	832	40	858	908	**825**	**945**	822	948

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

Peak Tuning Notes

```
410.bwaves fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
416.gamess fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
434.zeusmp fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
435.gromacs fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
436.cactusADM fdpr options: -O4 -m power8 -A 2 -sls -dir -vrox
437.leslie3d fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
444.namd fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
447.dealII fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
454.calculix fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
459.GemsFDTD fdpr options: -O4 -m power8 -A 2 -sls -dir -vrox
465.tonto fdpr options: -O4 -m power8 -A 2 -sls -dir -vrox
470.lbm fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
481.wrf fdpr options: -O4 -m power8 -A 2 -rcl 2 -sls -dir -vrox
```

Continued on next page

Peak Tuning Notes (Continued)

482.sphinx3 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

Fortran benchmarks:
/opt/ibm/xlf/15.1.2/bin/xlf95_at

Benchmarks using both Fortran and C:
/opt/ibm/xlC/13.1.2/bin/xlc_at -qlanglvl=extc99
/opt/ibm/xlf/15.1.2/bin/xlf95_at

Base Portability Flags

410.bwaves: -qfixed
416.gamess: -qfixed
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -qfixed
435.gromacs: -DSPEC_CPU_LP64 -qfixed -qextname
436.cactusADM: -DSPEC_CPU_LP64 -qfixed -qextname
437.leslie3d: -qfixed
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -qfixed -qextname
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DNOUNDERSCORE -DSPEC_CPU_LINUX -DSPEC_CPU_WORDS_LITTLEENDIAN
482.sphinx3: -DSPEC_CPU_LP64 -qchars=signed

Base Optimization Flags

C benchmarks:
-qinline=40 -qipa=threads -O5 -qsimd=noauto -q64 -lhugetlbfs

C++ benchmarks:
-qinline=40 -qipa=threads -O5 -q64 -qrtti -qnoxlcompatmacros -D__extern_always_inline=inline -lhugetlbfs

Fortran benchmarks:
-qipa=threads -O5 -q64 -qalias=nostd -lhugetlbfs

Benchmarks using both Fortran and C:
-qinline=40 -qipa=threads -O5 -qsimd=noauto -q64 -qalias=nostd -lhugetlbfs

Base Other Flags

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

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

Fortran benchmarks:
-qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036

Continued on next page

Base Other Flags (Continued)

Benchmarks using both Fortran and C:
-qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg
-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

Fortran benchmarks:
/opt/ibm/xlf/15.1.2/bin/xlf95_at

Benchmarks using both Fortran and C:
/opt/ibm/xlC/13.1.2/bin/xlc_at -qlanglvl=extc99
/opt/ibm/xlf/15.1.2/bin/xlf95_at

Peak Portability Flags

410.bwaves: -qfixed
416.gamess: -qfixed
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -qfixed
435.gromacs: -DSPEC_CPU_LP64 -qfixed -qextname
436.cactusADM: -DSPEC_CPU_LP64 -qfixed -qextname
437.leslie3d: -qfixed
444.namd: -DSPEC_CPU_LP64
447.dealII: -DSPEC_CPU_LP64
450.soplex: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -qfixed -qextname
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DNOUNDERSCORE -DSPEC_CPU_LINUX
-DSPEC_CPU_WORDS_LITTLEENDIAN
482.sphinx3: -DSPEC_CPU_LP64 -qchars=signed

Peak Optimization Flags

C benchmarks:

433.milc: -qinline=40 -qipa=threads -O5 -q64 -qprefetch=dscr=0x93
-lhugetlbfs

Continued on next page

Peak Optimization Flags (Continued)

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

482.sphinx3: -qinline=40 -O5 -qsimd=noauto -q64 -qfdpr -lhugetlbfs -Wl,-q

C++ benchmarks:

444.namd: -qinline=40 -qipa=threads -O4 -q64 -qfdpr -D__extern_always_inline=inline -lhugetlbfs -Wl,-q

447.dealII: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O4 -q64 -qfdpr -qrtti -qnoxlcompatmacros -D__extern_always_inline=inline -lhugetlbfs -Wl,-q

450.soplex: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto -qsimd -q64 -qnoprefetch -D__extern_always_inline=inline -lhugetlbfs

453.povray: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto -qprefetch=dscr=0x93 -D__extern_always_inline=inline -lhugetlbfs -Wl,-q

Fortran benchmarks:

410.bwaves: -qipa=threads -O5 -qsimd=noauto -q64 -qfdpr -qsmallstack=dynlenonheap -lhugetlbfs -Wl,-q

416.gamess: basepeak = yes

434.zeusmp: -qipa=threads -O4 -qsimd=noauto -q64 -qfdpr -qxlf90=nosignedzero -lhugetlbfs -Wl,-q

437.leslie3d: -qipa=threads -O5 -q64 -qassert=contig -qprefetch=dscr=0x1D7 -qhot=novector -qfdpr -lhugetlbfs -Wl,-q -B/opt/at8.0/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

459.GemsFDTD: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O5 -q64 -qipa=partition=large -qfdpr -lhugetlbfs -Wl,-q

465.tonto: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O5 -q64 -qipa=partition=large -qalias=nostd -qfdpr -lhugetlbfs -Wl,-q

Benchmarks using both Fortran and C:

435.gromacs: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O4 -q64 -qipa=partition=large -qfdpr -lhugetlbfs -Wl,-q

Continued on next page

Peak Optimization Flags (Continued)

436.cactusADM: `-qinline=40 -qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2)
`-O4 -qipa=partition=large -q64 -qfdpr -lhugetlbfs -Wl,-q`

454.calculix: `-qinline=40 -qipa=threads -O3 -qarch=auto -qtune=auto`
`-q64 -qhot -qfdpr -lhugetlbfs -Wl,-q`

481.wrf: `-qinline=40 -O4 -q64 -qfdpr -lhugetlbfs -Wl,-q`

Peak Other Flags

C benchmarks:

433.milc: `-qipa=noobject -qsuppress=1500-036`

470.lbm: `-qsuppress=1586-476`(pass 2) `-qipa=noobject`
`-qsuppress=1500-036`

482.sphinx3: `-qsuppress=1500-036`

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

444.namd: `-qipa=noobject -qsuppress=1500-036`

Fortran benchmarks (except as noted below):
`-qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg`
`-qsuppress=1500-036`

459.GemsFDTD: `-qsuppress=1586-476`(pass 2) `-qipa=noobject`
`-qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036`

465.tonto: `-qsuppress=1586-476`(pass 2) `-qipa=noobject`
`-qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036`

Benchmarks using both Fortran and C (except as noted below):
`-qsuppress=1586-476`(pass 2) `-qipa=noobject -qsuppress=1500-010`
`-qsuppress=cmpmsg -qsuppress=1500-036`

454.calculix: `-qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036`

481.wrf: `-qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg`
`-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

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

Tested with SPEC CPU2006 v1.2.
Report generated on Wed Dec 20 18:25:42 2017 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 20 October 2015.