SPEC® CFP2006 Result

IBM Corporation

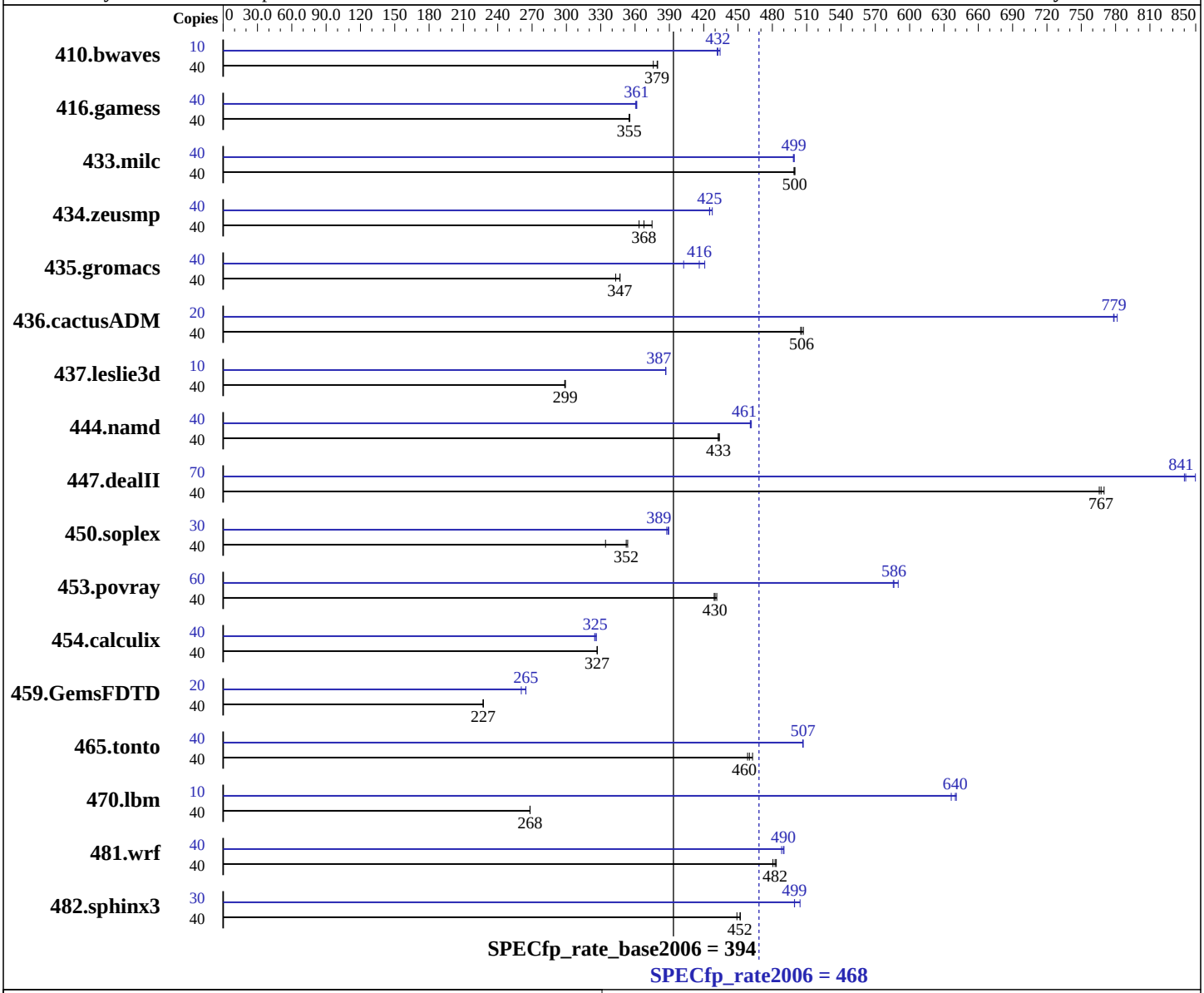
IBM Power S812LC (2.92 GHz, 10 core, Red Hat)

SPECfp®_rate2006 = 468

SPECfp_rate_base2006 = 394

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

Test date: Oct-2015
Hardware Availability: Oct-2015
Software Availability: Nov-2015



Hardware

CPU Name:	POWER8
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 3.49 GHz
CPU MHz:	2926
FPU:	Integrated
CPU(s) enabled:	10 cores, 1 chip, 10 cores/chip, 8 threads/core
CPU(s) orderable:	1 Modules
Primary Cache:	32 KB I + 64 KB D on chip per core

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Software

Operating System:	Red Hat Enterprise Linux Server release 7.1 (ppc64) kernel <3.10.0-229> PowerKVM 3.1 kernel <3.18.17-348>
Compiler:	C/C++: Version 13.1 of IBM XL C/C++ for Linux; Fortran: Version 15.1 of IBM XL Fortran for Linux
Auto Parallel:	No
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	32-bit

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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 (16 x 16 GB DIMMs) DDR3 1333 MHz
Disk Subsystem: 1 x 6TB 7200 RPM SATA LFF Disk
Other Hardware: None

Peak Pointers: 32/64-bit
Other Software: Post-Link Optimization for Linux on POWER, version 5.6.2.6
IBM Advance Toolchain 7.0-3

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	40	**1433**	**379**	1446	376	1431	380	10	**314**	**432**	313	434	315	432
416.gamess	40	2204	355	**2207**	**355**	2207	355	40	2173	360	2166	362	**2168**	**361**
433.milc	40	736	499	735	500	**735**	**500**	40	736	499	**736**	**499**	737	498
434.zeusmp	40	1001	364	971	375	**990**	**368**	40	851	428	**856**	**425**	856	425
435.gromacs	40	823	347	832	343	**824**	**347**	40	678	421	**686**	**416**	710	402
436.cactusADM	40	**945**	**506**	947	505	943	507	20	307	778	306	781	**307**	**779**
437.leslie3d	40	**1258**	**299**	1257	299	1260	299	10	243	387	**243**	**387**	243	387
444.namd	40	**741**	**433**	741	433	740	434	40	696	461	**696**	**461**	695	462
447.dealII	40	598	766	**596**	**767**	594	770	70	953	840	**952**	**841**	942	850
450.soplex	40	998	334	943	354	**947**	**352**	30	645	388	642	389	**643**	**389**
453.povray	40	496	429	**495**	**430**	493	431	60	541	590	545	586	**544**	**586**
454.calculix	40	**1009**	**327**	1010	327	1009	327	40	**1015**	**325**	1016	325	1012	326
459.GemsFDTD	40	1866	227	**1867**	**227**	1868	227	20	**802**	**265**	814	261	802	265
465.tonto	40	851	463	859	458	**856**	**460**	40	**777**	**507**	776	507	777	507
470.lbm	40	2049	268	**2049**	**268**	2050	268	10	214	641	216	636	**215**	**640**
481.wrf	40	930	481	**926**	**482**	924	483	40	915	488	**912**	**490**	911	490
482.sphinx3	40	1736	449	1725	452	**1726**	**452**	30	1160	504	**1171**	**499**	1171	499

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
433.milc 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
453.povray 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
```

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Peak Tuning Notes (Continued)

```
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
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

```
Red Hat 7.1 guest running on PowerKVM 3.1 host

ulimit -s (stack) set to unlimited

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"
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/13.1.0/bin/xlc_at -qlanglvl=extc99
```

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

Fortran benchmarks:
```
/opt/ibm/xlf/15.1.0/bin/xlf95_at
```

Benchmarks using both Fortran and C:
```
/opt/ibm/xlC/13.1.0/bin/xlc_at -qlanglvl=extc99
/opt/ibm/xlf/15.1.0/bin/xlf95_at
```

Base Portability Flags

410.bwaves: -qfixed
416.gamess: -qfixed
434.zeusmp: -qfixed
435.gromacs: -qfixed -qextname
436.cactusADM: -qfixed -qextname
437.leslie3d: -qfixed
454.calculix: -qfixed -qextname
481.wrf: -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Base Optimization Flags

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

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

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

Benchmarks using both Fortran and C:
-qinline=40 -qipa=threads -qlargepage -O5 -qsimd=noauto
-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

Benchmarks using both Fortran and C:
-qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg
-qsuppress=1500-036

Peak Compiler Invocation

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

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

Fortran benchmarks:
/opt/ibm/xlf/15.1.0/bin/xlf95_at

Benchmarks using both Fortran and C:
/opt/ibm/xlC/13.1.0/bin/xlc_at -qlanglvl=extc99
/opt/ibm/xlf/15.1.0/bin/xlf95_at

Peak Portability Flags

410.bwaves: -qfixed
416.gamess: -qfixed
434.zeusmp: -qfixed
435.gromacs: -qfixed -qextname
436.cactusADM: -DSPEC_CPU_LP64 -qfixed -qextname
437.leslie3d: -qfixed
454.calculix: -qfixed -qextname
481.wrf: -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Peak Optimization Flags

C benchmarks:

433.milc: -qinline=40 -qipa=threads -qlargepage -O5 -qsimd=noauto
-qfdpr -lhugetlbfs -Wl,-q

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

482.sphinx3: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-qlargepage -O5 -qsimd=noauto -qfdpr -lhugetlbfs -Wl,-q

C++ benchmarks:

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

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

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Peak Optimization Flags (Continued)

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

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

Fortran benchmarks:

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

416.gamess: -qipa=threads -qlargepage -O5 -qsimd=noauto -qprefetch=dscr=0x54 -qipa=partition=large -qfdpr -qalias=nostd -lhugetlbfs -Wl,-q

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

437.leslie3d: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -qlargepage -O5 -q64 -qfdpr -lhugetlbfs -Wl,-q -B/opt/at7.0/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

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

465.tonto: Same as 459.GemsFDTD

Benchmarks using both Fortran and C:

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

436.cactusADM: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -qlargepage -O4 -qarch=pwr7 -qtune=pwr7 -qipa=partition=large -q64 -qfdpr -lhugetlbfs -Wl,-q

454.calculix: -qinline=40 -qipa=threads -O5 -qsimd=noauto -qfdpr -lhugetlbfs -Wl,-q

481.wrf: -qinline=40 -qipa=threads -qlargepage -O5 -qipa=partition=large -qfdpr -lhugetlbfs -Wl,-q

Peak Other Flags

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

433.milc: `-qipa=noobject -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`

437.leslie3d: `-qsuppress=1586-476`(pass 2) `-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.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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