SPEC® CFP2006 Result

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IBM Corporation

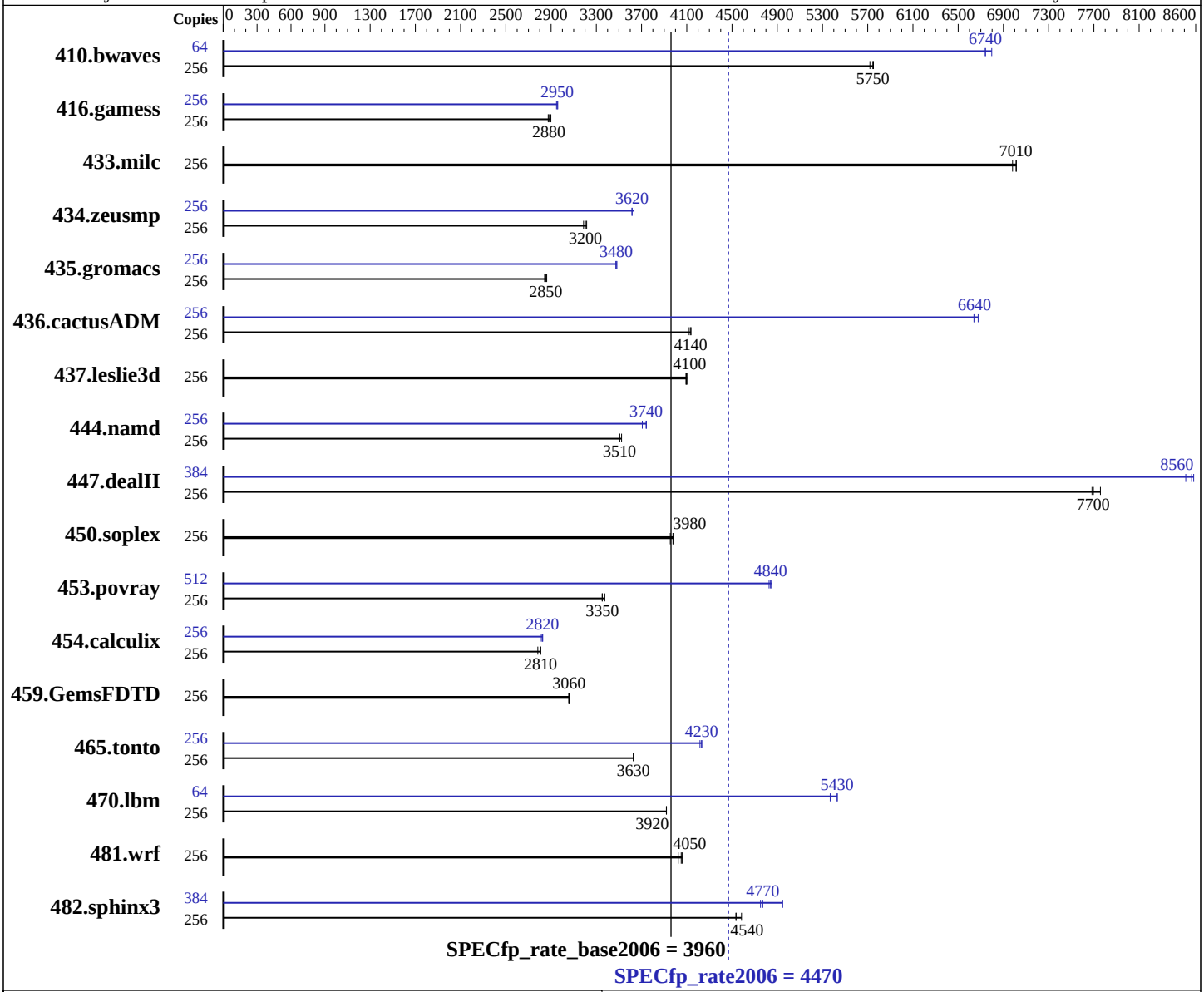
IBM Power E880 (4.35 GHz, 64 core)

SPECfp®_rate2006 = 4470

SPECfp_rate_base2006 = 3960

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

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

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Software

Operating System:	IBM AIX V7.1
Compiler:	C/C++: Version 13.1 of IBM XL C/C++ for AIX Fortran: Version 15.1 of IBM XL Fortran for AIX
Auto Parallel:	No
File System:	AIX/JFS2
System State:	Multi-user
Base Pointers:	32-bit
Peak Pointers:	32/64-bit
Other Software:	None

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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 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

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	256	605	5750	608	5720	**606**	**5750**	64	129	6740	128	6800	**129**	**6740**
416.gamess	256	1730	2900	1744	2870	**1740**	**2880**	256	1694	2960	1700	2950	**1696**	**2950**
433.milc	256	335	7010	**335**	**7010**	337	6980	256	335	7010	**335**	**7010**	337	6980
434.zeusmp	256	725	3210	**727**	**3200**	731	3190	256	641	3630	**644**	**3620**	644	3610
435.gromacs	256	639	2860	643	2840	**641**	**2850**	256	525	3480	526	3470	**526**	**3480**
436.cactusADM	256	**740**	**4140**	740	4140	742	4120	256	458	6680	**460**	**6640**	461	6640
437.leslie3d	256	587	4100	588	4090	**587**	**4100**	256	587	4100	588	4090	**587**	**4100**
444.namd	256	586	3510	**586**	**3510**	583	3520	256	**549**	**3740**	549	3740	554	3710
447.dealII	256	**381**	**7700**	381	7680	378	7760	384	512	8580	**513**	**8560**	516	8510
450.soplex	256	540	3950	536	3980	**537**	**3980**	256	540	3950	536	3980	**537**	**3980**
453.povray	256	**406**	**3350**	404	3370	406	3350	512	**563**	**4840**	564	4830	562	4850
454.calculix	256	759	2780	752	2810	**752**	**2810**	256	747	2830	751	2810	**748**	**2820**
459.GemsFDTD	256	889	3060	**888**	**3060**	887	3060	256	889	3060	**888**	**3060**	887	3060
465.tonto	256	694	3630	**694**	**3630**	694	3630	256	597	4220	595	4230	**595**	**4230**
470.lbm	256	897	3920	897	3920	**897**	**3920**	64	162	5430	164	5370	**162**	**5430**
481.wrf	256	**706**	**4050**	705	4060	711	4020	256	**706**	**4050**	705	4060	711	4020
482.sphinx3	256	1088	4580	1100	4540	**1100**	**4540**	384	1575	4750	1513	4950	**1568**	**4770**

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

Compiler Invocation Notes

```
C/C++ compiler updated to September 2014 PTF
      Version 13.01.0000.0001
Fortran compiler updated to September 2014 PTF
      Version 15.01.0000.0001
```

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 -rcl 2 -sls -dir -vrox
```

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Peak Tuning Notes (Continued)

```
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 -rcl 2 -sls -dir -vrox
465.tonto fdpr options: -O4 -m power8 -A 2 -rcl 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
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 "bindprocessor" command (see flags file for details).
```

Operating System Notes

```
AIX updated to V7.1 TL3 SP4

All ulimits set to unlimited.
Set 8 threads per core via "smtctl -t 8 -w boot"

51200 16M large pages defined with vmo command
```

General Notes

```
Environment variables set by runspec before the start of the run:
MALLOCOPTIONS = "pool"
MEMORY_AFFINITY = "MCM"
XLFRTEOPTS = "intrinthds=1"
```

Base Compiler Invocation

C benchmarks:
```
/opt/IBM/xlc/13.1.0/bin/xlc -qlanglvl=extc99
```

C++ benchmarks:
```
/opt/IBM/xlC/13.1.0/bin/xlC
```

Fortran benchmarks:
```
/opt/IBM/xlf/15.1.0/bin/xlf95
```

Benchmarks using both Fortran and C:
```
/opt/IBM/xlc/13.1.0/bin/xlc -qlanglvl=extc99
/opt/IBM/xlf/15.1.0/bin/xlf95
```

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: -DSPEC_CPU_AIX -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Base Optimization Flags

C benchmarks:
-qinline=40 -qipa=threads -bmaxdata:0x40000000 -qlargepage -O5
-qsimd=noauto -D_ILS_MACROS -blpdata

C++ benchmarks:
-qinline=40 -qipa=threads -bmaxdata:0x50000000 -qlargepage -O5
-qvecnvol -D_ILS_MACROS -qrtti=all -D__IBM_FAST_VECTOR
-D__IBM_FAST_SET_MAP_ITERATOR -blpdata

Fortran benchmarks:
-qipa=threads -bmaxdata:0x60000000 -qlargepage -O5 -qvecnvol
-qsmallstack=dynlenonheap -qalias=nostd -blpdata

Benchmarks using both Fortran and C:
-qinline=40 -qipa=threads -bmaxdata:0x60000000 -qlargepage -O5
-qsimd=noauto -D_ILS_MACROS -qvecnvol -qsmallstack=dynlenonheap
-qalias=nostd -blpdata

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 -qlanglvl=extc99

C++ benchmarks:
/opt/IBM/xlC/13.1.0/bin/xlC

Fortran benchmarks:
/opt/IBM/xlf/15.1.0/bin/xlf95

Benchmarks using both Fortran and C:
/opt/IBM/xlc/13.1.0/bin/xlc -qlanglvl=extc99
/opt/IBM/xlf/15.1.0/bin/xlf95

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: -DSPEC_CPU_AIX -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-qlargepage -O5 -qsimd=noauto -qprefetch=dscr=84
-D_ILS_MACROS -qfdpr -q64 -blpdata -btextpsize:64K

482.sphinx3: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-qlargepage -O5 -qsimd=noauto -qprefetch=dscr=147
-D_ILS_MACROS -qfdpr -blpdata -btextpsize:64K

C++ benchmarks:

444.namd: -qinline=40 -qipa=threads -qlargepage -O4 -qvecnvol
-qfdpr -D_ILS_MACROS -D__IBM_FAST_VECTOR
-D__IBM_FAST_SET_MAP_ITERATOR -blpdata -btextpsize:64K

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Peak Optimization Flags (Continued)

447.dealII: -qinline=40 -qipa=threads -bmaxdata:0x50000000 -qpdf1(pass 1) -qpdf2(pass 2) -qlargepage -O4 -qvecnvol -qfdpr -D_ILS_MACROS -qrtti=all -D__IBM_FAST_VECTOR -D__IBM_FAST_SET_MAP_ITERATOR -blpdata -btextpsize:64K

450.soplex: basepeak = yes

453.povray: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -qlargepage -O3 -qarch=auto -qtune=auto -qprefetch=dscr=147 -D_ILS_MACROS -qalign=natural -qfdpr -blpdata -btextpsize:64K

Fortran benchmarks:

410.bwaves: -qipa=threads -bmaxdata:0x50000000 -qlargepage -O5 -qsimd=noauto -qprefetch=dscr=84 -qfdpr -qsmallstack=dynlenonheap -blpdata -btextpsize:64K

416.gamess: -qipa=threads -bmaxdata:0x40000000 -qlargepage -O5 -qsimd=noauto -qalias=nostd -qfdpr -blpdata -btextpsize:64K

434.zeusmp: -qipa=threads -qlargepage -O4 -qsimd=noauto -qxlf90=nosignedzero -qfdpr -q64 -blpdata -btextpsize:64K

437.leslie3d: basepeak = yes

459.GemsFDTD: basepeak = yes

465.tonto: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -qlargepage -O5 -qvecnvol -qprefetch=dscr=147 -qfdpr -q64 -blpdata -btextpsize:64K

Benchmarks using both Fortran and C:

435.gromacs: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -qlargepage -O4 -qvecnvol -D_ILS_MACROS -qfdpr -blpdata -btextpsize:64K

436.cactusADM: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -qlargepage -O4 -qvecnvol -qarch=pwr7 -qtune=pwr7 -q64 -D_ILS_MACROS -qfdpr -blpdata -btextpsize:64K

454.calculix: -qinline=40 -qipa=threads -O5 -qsimd=noauto -qprefetch=dscr=147 -D_ILS_MACROS -qfdpr -blpdata -btextpsize:64K

481.wrf: basepeak = yes

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

454.calculix: `-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.V13.html
http://www.spec.org/cpu2006/flags/IBM-AIX.V7.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/IBM-XL.V13.xml
http://www.spec.org/cpu2006/flags/IBM-AIX.V7.xml

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