SPEC® CFP2006 Result

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IBM Corporation

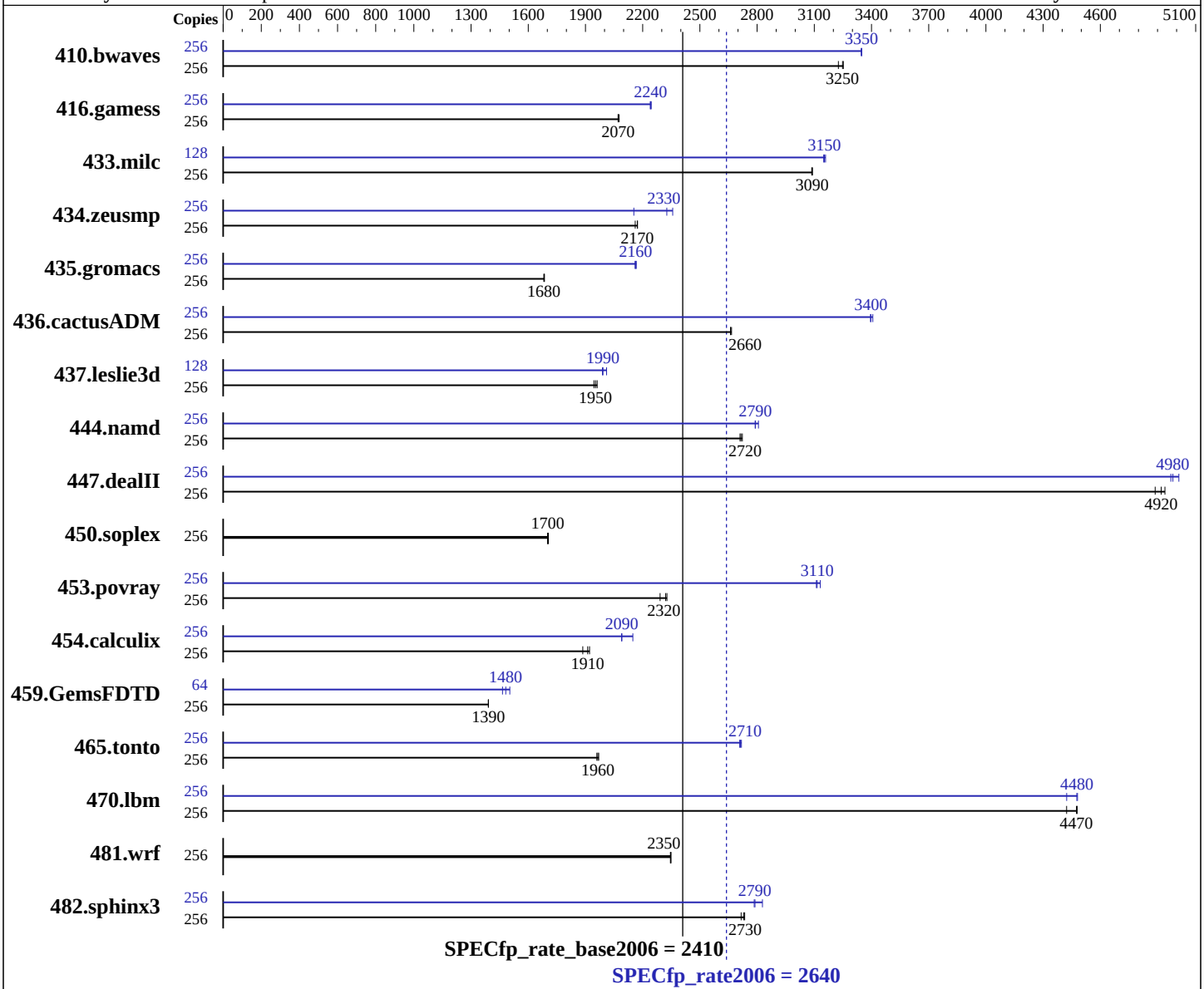
IBM Power 780 (3.92 GHz, 64 core)

SPECfp®_rate2006 = 2640

SPECfp_rate_base2006 = 2410

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

Test date: Sep-2011
Hardware Availability: Oct-2011
Software Availability: Oct-2011



Hardware

CPU Name:	POWER7
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 3.948 GHz
CPU MHz:	3920
FPU:	Integrated
CPU(s) enabled:	64 cores, 8 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable:	16,32,48,64 cores
Primary Cache:	32 KB I + 32 KB D on chip per core

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Software

Operating System:	IBM AIX V7.1
Compiler:	C/C++: Version 11.1 of IBM XL C/C++ for AIX; Fortran: Version 13.1 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: 256 KB I+D on chip per core
L3 Cache: 4 MB I+D on chip per core
Other Cache: None
Memory: 512 GB (64 x 8 GB) DDR3 1066 MHz
Disk Subsystem: 12 x 146.8 GB Raid0 SAS SFF 15K RPM
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	1078	3230	**1071**	**3250**	1070	3250	256	**1039**	**3350**	1039	3350	1040	3350
416.gamess	256	2414	2080	2420	2070	**2419**	**2070**	256	2238	2240	**2236**	**2240**	2233	2240
433.milc	256	761	3090	761	3090	**761**	**3090**	128	**373**	**3150**	373	3150	372	3160
434.zeusmp	256	1078	2160	1072	2170	**1073**	**2170**	256	988	2360	**1001**	**2330**	1082	2150
435.gromacs	256	1085	1680	1087	1680	**1086**	**1680**	256	844	2170	**845**	**2160**	846	2160
436.cactusADM	256	**1150**	**2660**	1150	2660	1147	2670	256	**901**	**3400**	898	3410	901	3390
437.leslie3d	256	1227	1960	1238	1940	**1232**	**1950**	128	**604**	**1990**	598	2010	605	1990
444.namd	256	**756**	**2720**	754	2720	757	2710	256	731	2810	736	2790	**735**	**2790**
447.dealII	256	**595**	**4920**	593	4940	599	4890	256	589	4970	**588**	**4980**	584	5010
450.soplex	256	**1254**	**1700**	1255	1700	1252	1710	256	**1254**	**1700**	1255	1700	1252	1710
453.povray	256	**587**	**2320**	585	2330	594	2290	256	438	3110	**437**	**3110**	435	3130
454.calculix	256	1120	1890	**1105**	**1910**	1099	1920	256	**1010**	**2090**	983	2150	1011	2090
459.GemsFDTD	256	1952	1390	**1952**	**1390**	1954	1390	64	452	1500	464	1460	**458**	**1480**
465.tonto	256	1286	1960	**1282**	**1960**	1279	1970	256	**929**	**2710**	927	2720	930	2710
470.lbm	256	785	4480	795	4420	**786**	**4470**	256	**786**	**4480**	785	4480	795	4420
481.wrf	256	1219	2350	1218	2350	**1218**	**2350**	256	1219	2350	1218	2350	**1218**	**2350**
482.sphinx3	256	**1828**	**2730**	1824	2730	1837	2720	256	1764	2830	**1789**	**2790**	1792	2780

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

Compiler Invocation Notes

```
C/C++ compiler update to August 2011 PTF
      Version: 11.01.0000.0007
Fortran compiler updated to August 2011 PTF
       Version: 13.01.0000.0007
```

Peak Tuning Notes

```
fdpr binary optimization tool used for 416.gamess
 with options -O4 -cbpth -1 -sdp -1 -m power7
fdpr binary optimization tool used for 433.milc
 with options -O4 -nodp -m power7
fdpr binary optimization tool used for 434.zeusmp
 with options -O4 -vrox -nodp -m power7
```

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Peak Tuning Notes (Continued)

```
fdpr binary optimization tool used for 436.cactusADM
 with options -O3 -lu -1 -nodp -sdp 9 -m power7
fdpr binary optimization tool used for 437.leslie3d
 with options -O4 -vrox -m power7
fdpr binary optimization tool used for 450.soplex
 with options -O3 -lu -1 -nodp -sdp 9 -m power7
fdpr binary optimization tool used for 453.povray
 with options -O3 -cbpth -1 -m power7
fdpr binary optimization tool used for 459.GemsFDTD
 with options -O3 -cbpth -1 -m power7
fdpr binary optimization tool used for 465.tonto
 with options -O4 -m power7
fdpr binary optimization tool used for 482.sphinx3
 with options -O4 -rcctf 0 -sdp 9 -vrox -m power7
```

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 TL 1 SP 1 (7.1.1.1)

All ulimits set to unlimited.

25600 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:
```
/usr/vac/bin/xlc -qlanglvl=extc99
```

C++ benchmarks:
```
/usr/vacpp/bin/xlC
```

Fortran benchmarks:
```
/usr/bin/xlf95
```

Continued on next page

Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
/usr/vac/bin/xlc -qlanglvl=extc99 /usr/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:
-qipa=threads -bmaxdata:0x40000000 -qlargepage -O5 -D_ILS_MACROS
-blpdata

C++ benchmarks:
-qipa=threads -bmaxdata:0x50000000 -qlargepage -O5 -qsimd -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
-qsmallstack=dynlenonheap -qalias=nostd -blpdata

Benchmarks using both Fortran and C:
-qipa=threads -bmaxdata:0x60000000 -qlargepage -O5 -D_ILS_MACROS
-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

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:
/usr/vac/bin/xlc -qlanglvl=extc99

C++ benchmarks:
/usr/vacpp/bin/xlC

Fortran benchmarks:
/usr/bin/xlf95

Benchmarks using both Fortran and C:
/usr/vac/bin/xlc -qlanglvl=extc99 /usr/bin/xlf95

Peak 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

Peak Optimization Flags

C benchmarks:

433.milc: -qipa=threads -bmaxdata:0x40000000 -O5 -qlargepage
-D_ILS_MACROS -qrestrict -qprefetch=aggressive
-qalign=natural -blpdata -btextpsize:64K

470.lbm: -qipa=threads -bmaxdata:0x30000000 -O5 -D_ILS_MACROS
-blpdata -btextpsize:64K

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Peak Optimization Flags (Continued)

482.sphinx3: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto
-qlargepage -D_ILS_MACROS -blpdata -btextpsize:64K

C++ benchmarks:

444.namd: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O5 -q64
-qsimd -qvecnvol -qlargepage -D_ILS_MACROS -blpdata
-btextpsize:64K

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

450.soplex: basepeak = yes

453.povray: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qsimd
-qvecnvol -qlargepage -D_ILS_MACROS -qalign=natural
-blpdata -btextpsize:64K

Fortran benchmarks:

410.bwaves: -qipa=threads -bmaxdata:0x50000000 -O5 -qlargepage
-qsmallstack=dynlenonheap -blpdata -btextpsize:64K

416.gamess: -qipa=threads -bmaxdata:0x40000000 -qpdf1(pass 1)
-qpdf2(pass 2) -O5 -qarch=pwr5 -qlargepage -qalias=nostd
-blpdata -btextpsize:64K

434.zeusmp: -bmaxdata:0x40000000 -O3 -qarch=auto -qtune=auto
-qlargepage -qxlf90=nosignedzero -blpdata -btextpsize:64K

437.leslie3d: -qipa=threads -O5 -q64 -blpdata -btextpsize:64K

459.GemsFDTD: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -q64 -qlargepage
-blpdata -btextpsize:64K

465.tonto: -qipa=threads -bmaxdata:0x50000000 -qpdf1(pass 1)
-qpdf2(pass 2) -O5 -qsimd -qvecnvol -blpdata
-btextpsize:64K

Benchmarks using both Fortran and C:

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

436.cactusADM: -qipa=threads -bmaxdata:0x60000000 -O4 -qsimd -qvecnvol
-D_ILS_MACROS -qnostrict -blpdata -btextpsize:64K

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Peak Optimization Flags (Continued)

454.calculix: `-qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qsimd -qvecnvol -qlargepage -D_ILS_MACROS -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 (except as noted below):
`-qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036`

434.zeusmp: `-qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036`

Benchmarks using both Fortran and C:
`-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.20110613.html
http://www.spec.org/cpu2006/flags/IBM-AIX.20110613.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/IBM-XL.20110613.xml
http://www.spec.org/cpu2006/flags/IBM-AIX.20110613.xml

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