SPEC® CFP2006 Result

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IBM Corporation

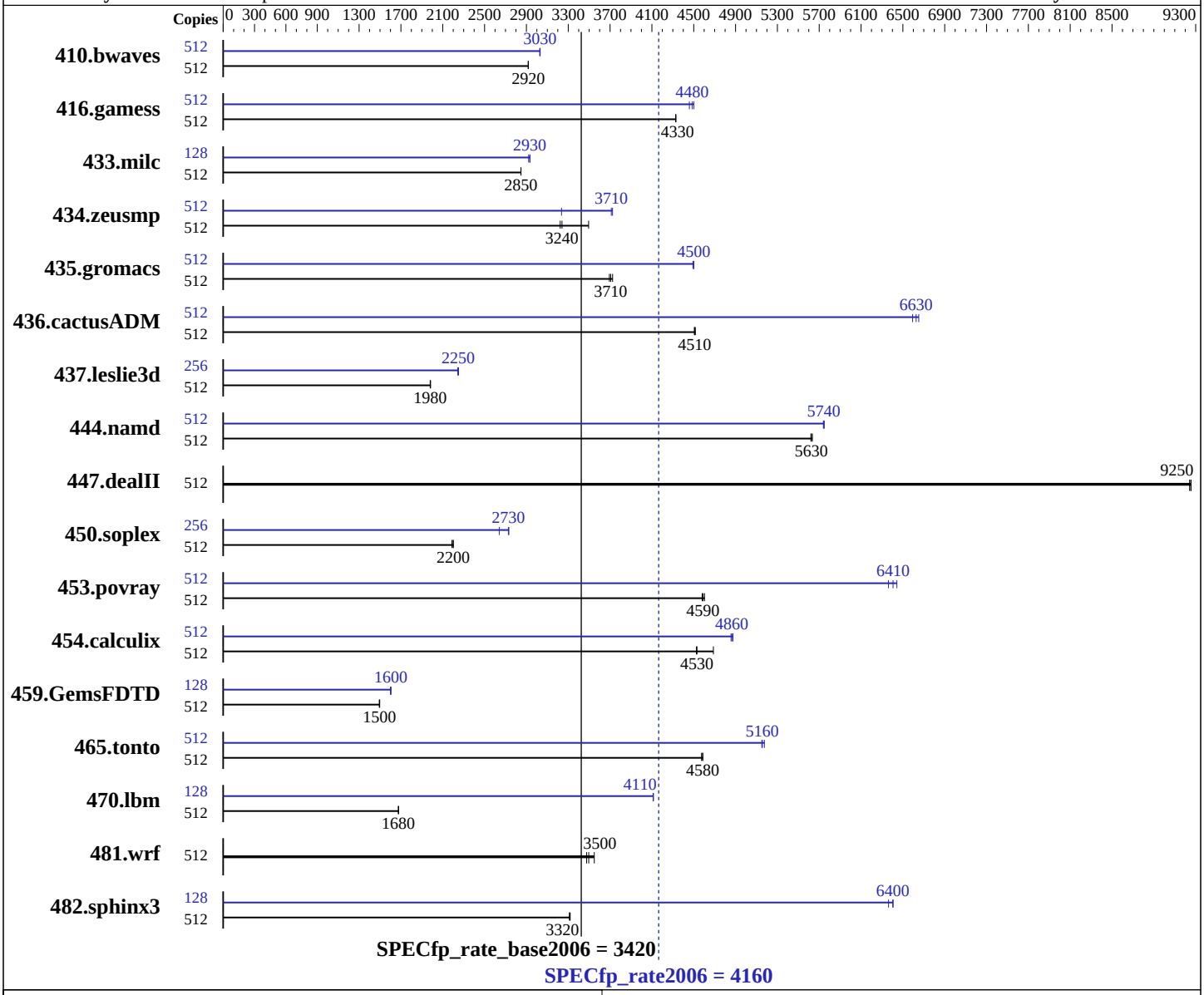
IBM Power 780 (3.7 GHz, 128 core)

SPECfp®_rate2006 = 4160

SPECfp_rate_base2006 = 3420

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

Test date: Sep-2012
Hardware Availability: Oct-2012
Software Availability: Nov-2012



Hardware

CPU Name:	POWER7+
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 4.144 GHz
CPU MHz:	3724
FPU:	Integrated
CPU(s) enabled:	128 cores, 16 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable:	32,64,96,128 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 12.1 of IBM XL C/C++ for AIX; Fortran: Version 14.1 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: 10 MB I+D on chip per core
Other Cache: None
Memory: 1 TB (64 x 16 GB) DDR3 1066 MHz
Disk Subsystem: 8 x 387 GB Raid0 SFF-1 SSD
Other Hardware: None

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	512	2385	2920	**2384**	**2920**	2384	2920	512	2295	3030	2299	3030	**2296**	**3030**
416.gamess	512	2315	4330	2317	4330	**2316**	**4330**	512	**2235**	**4480**	2227	4500	2249	4460
433.milc	512	**1650**	**2850**	1650	2850	1651	2850	128	402	2920	**401**	**2930**	401	2930
434.zeusmp	512	1446	3220	**1438**	**3240**	1333	3490	512	1440	3240	1251	3720	**1255**	**3710**
435.gromacs	512	982	3720	**986**	**3710**	990	3690	512	812	4500	814	4490	**812**	**4500**
436.cactusADM	512	1355	4520	1358	4510	**1357**	**4510**	512	920	6650	**923**	**6630**	928	6590
437.leslie3d	512	2427	1980	2431	1980	**2428**	**1980**	256	1070	2250	1073	2240	**1070**	**2250**
444.namd	512	729	5630	731	5620	**730**	**5630**	512	**715**	**5740**	715	5740	714	5750
447.dealII	512	633	9250	634	9240	**633**	**9250**	512	633	9250	634	9240	**633**	**9250**
450.soplex	512	1940	2200	**1941**	**2200**	1952	2190	256	809	2640	781	2730	**783**	**2730**
453.povray	512	**594**	**4590**	592	4600	595	4580	512	423	6440	428	6360	**425**	**6410**
454.calculix	512	**932**	**4530**	933	4530	901	4690	512	866	4880	**868**	**4860**	870	4860
459.GemsFDTD	512	3638	1490	**3634**	**1500**	3628	1500	128	**847**	**1600**	846	1600	849	1600
465.tonto	512	1098	4590	1101	4570	**1099**	**4580**	512	978	5150	**977**	**5160**	973	5180
470.lbm	512	4195	1680	4199	1680	**4195**	**1680**	128	428	4110	428	4110	**428**	**4110**
481.wrf	512	**1636**	**3500**	1645	3480	1611	3550	512	**1636**	**3500**	1645	3480	1611	3550
482.sphinx3	512	3014	3310	3007	3320	**3010**	**3320**	128	389	6410	**390**	**6400**	392	6360

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 November 2012 PTF
      Version: 12.01.0000.0002
Fortran compiler updated to November 2012 PTF
      Version: 14.01.0000.0002
```

Peak Tuning Notes

```
416.gamess fdpr options: -O4 -cbpth -1 -sdp -1
433.milc fdpr options: -O3 -lu -1
435.gromacs fdpr options: -O
436.cactusADM fdpr options: -O3 -lu -1 -nodp -sdp 9
437.leslie3d fdpr options: -O3
453.povray fdpr options: -O3 -cbpth -1
```

Continued on next page

Peak Tuning Notes (Continued)

```
459.GemsFDTD fdpr options: -O3 -cbpth -1
465.tonto fdpr options: -O4
482.sphinx3 fdpr options: -O4 -rcctf 0 -sdp 9 -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 TL 2

All ulimits set to unlimited.

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

Platform Notes

```
Service Processor Memory Mirroring Property Disabled
```

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
```

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`

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 -qprefetch=aggressive -qalign=natural -blpdata -btextpsize:64K`

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

482.sphinx3: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qlargepage -D_ILS_MACROS -blpdata -btextpsize:64K`

C++ benchmarks:

444.namd: `-qipa=threads -O4 -q64 -qlargepage -D_ILS_MACROS -D__IBM_FAST_VECTOR -D__IBM_FAST_SET_MAP_ITERATOR -blpdata -btextpsize:64K`

447.dealII: `basepeak = yes`

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Peak Optimization Flags (Continued)

450.soplex: `-qipa=threads -bmaxdata:0x40000000 -O5 -qsimd -qvecnvol -D_ILS_MACROS -D__IBM_FAST_VECTOR -D__IBM_FAST_SET_MAP_ITERATOR -blpdata -btextpsize:64K`

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 -O5 -qlargepage -qxlf90=nosignedzero -blpdata -btextpsize:64K`

437.leslie3d: `-qipa=threads -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -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) `-O5 -D_ILS_MACROS -blpdata -btextpsize:64K`

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

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`

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Peak Other Flags (Continued)

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

450.soplex: `-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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Tested with SPEC CPU2006 v1.2.
Report generated on Thu Jul 24 13:52:30 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 23 October 2012.