



# SPEC® CFP2006 Result

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## IBM Corporation

### SPECfp®\_rate2006 = 2880

## IBM Power 780 (4.4 GHz, 64 core)

### SPECfp\_rate\_base2006 = 2500

CPU2006 license: 11

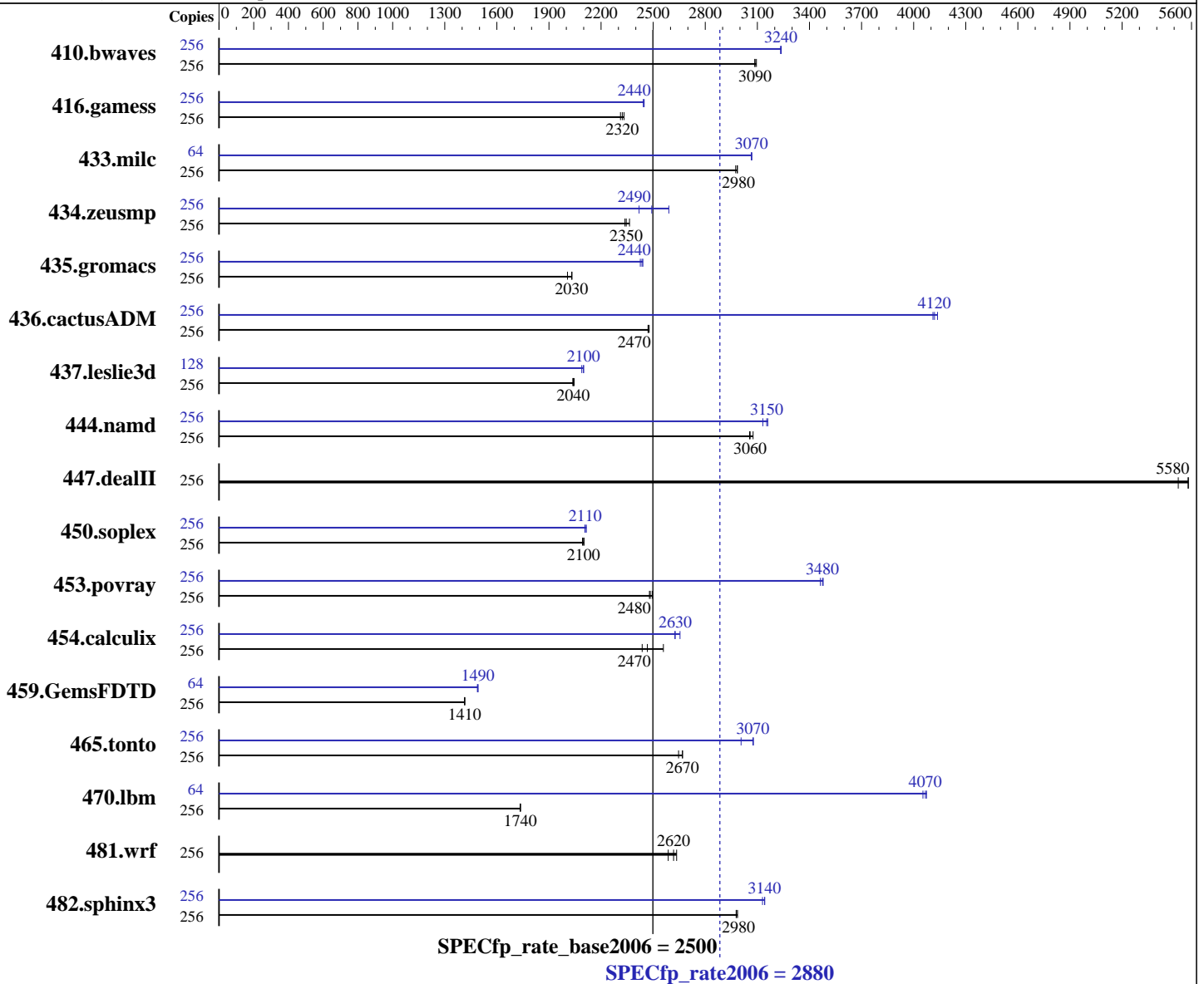
Test sponsor: IBM Corporation

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 4.480 GHz  
 CPU MHz: 4424  
 FPU: Integrated  
 CPU(s) enabled: 64 cores, 16 chips, 4 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

### 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: 512 GB (64 x 8 GB) DDR3 1066 MHz  
Disk Subsystem: 8 x 177 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	256	1128	3090	<u>1127</u>	<u>3090</u>	1124	3090	256	1075	3240	1076	3230	<u>1075</u>	<u>3240</u>
416.gamess	256	<u>2158</u>	<u>2320</u>	2149	2330	2168	2310	256	2047	2450	<u>2051</u>	<u>2440</u>	2051	2440
433.milc	256	<u>787</u>	<u>2980</u>	790	2980	787	2980	64	<u>192</u>	<u>3070</u>	191	3070	192	3070
434.zeusmp	256	997	2340	986	2360	<u>993</u>	<u>2350</u>	256	963	2420	<u>935</u>	<u>2490</u>	899	2590
435.gromacs	256	911	2010	899	2030	<u>900</u>	<u>2030</u>	256	749	2440	753	2430	<u>750</u>	<u>2440</u>
436.cactusADM	256	<u>1237</u>	<u>2470</u>	1238	2470	1235	2480	256	739	4140	744	4110	<u>743</u>	<u>4120</u>
437.leslie3d	256	<u>1179</u>	<u>2040</u>	1181	2040	1177	2040	128	<u>573</u>	<u>2100</u>	576	2090	573	2100
444.namd	256	668	3080	672	3060	<u>671</u>	<u>3060</u>	256	650	3160	656	3130	<u>651</u>	<u>3150</u>
447.dealII	256	530	5520	<u>525</u>	<u>5580</u>	525	5580	256	530	5520	<u>525</u>	<u>5580</u>	525	5580
450.soplex	256	1020	2090	<u>1017</u>	<u>2100</u>	1016	2100	256	<u>1012</u>	<u>2110</u>	1009	2120	1013	2110
453.povray	256	546	2490	<u>548</u>	<u>2480</u>	549	2480	256	391	3480	393	3460	<u>392</u>	<u>3480</u>
454.calculix	256	825	2560	867	2440	<u>856</u>	<u>2470</u>	256	796	2650	805	2630	<u>804</u>	<u>2630</u>
459.GemsFDTD	256	1919	1420	<u>1921</u>	<u>1410</u>	1921	1410	64	<u>456</u>	<u>1490</u>	456	1490	455	1490
465.tonto	256	952	2650	<u>944</u>	<u>2670</u>	944	2670	256	819	3080	838	3010	<u>819</u>	<u>3070</u>
470.lbm	256	2026	1740	<u>2027</u>	<u>1740</u>	2028	1730	64	<u>216</u>	<u>4070</u>	216	4070	217	4050
481.wrf	256	1105	2590	<u>1092</u>	<u>2620</u>	1085	2640	256	1105	2590	<u>1092</u>	<u>2620</u>	1085	2640
482.sphinx3	256	1671	2990	1676	2980	<u>1674</u>	<u>2980</u>	256	<u>1588</u>	<u>3140</u>	1594	3130	1588	3140

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

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## 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.  
25600 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



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## 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 -qvecnv1
-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
```



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## 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.dealIII: basepeak = yes

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## Peak Optimization Flags (Continued)

450.soplex: -qipa=threads -bmaxdata:0x40000000 -O5 -qsimd -qvecnvml  
-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  
-qvecnvml -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 -qpdf1(pass 1) -qpdf2(pass 2) -O3  
-qarch=auto -qtune=auto -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 -qvecnvml -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 -qvecnvml  
-D\_ILS\_MACROS -qnostrict -blpdata -btextpsize:64K

454.calculix: -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qsimd  
-qvecnvml -qlargepage -D\_ILS\_MACROS -blpdata  
-btextpsize:64K

481.wrf: basepeak = yes



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## Peak Other Flags

C benchmarks:

-qipa=noobject -qsuppress=1500-036

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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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