SPEC® CFP2006 Result

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IBM Corporation

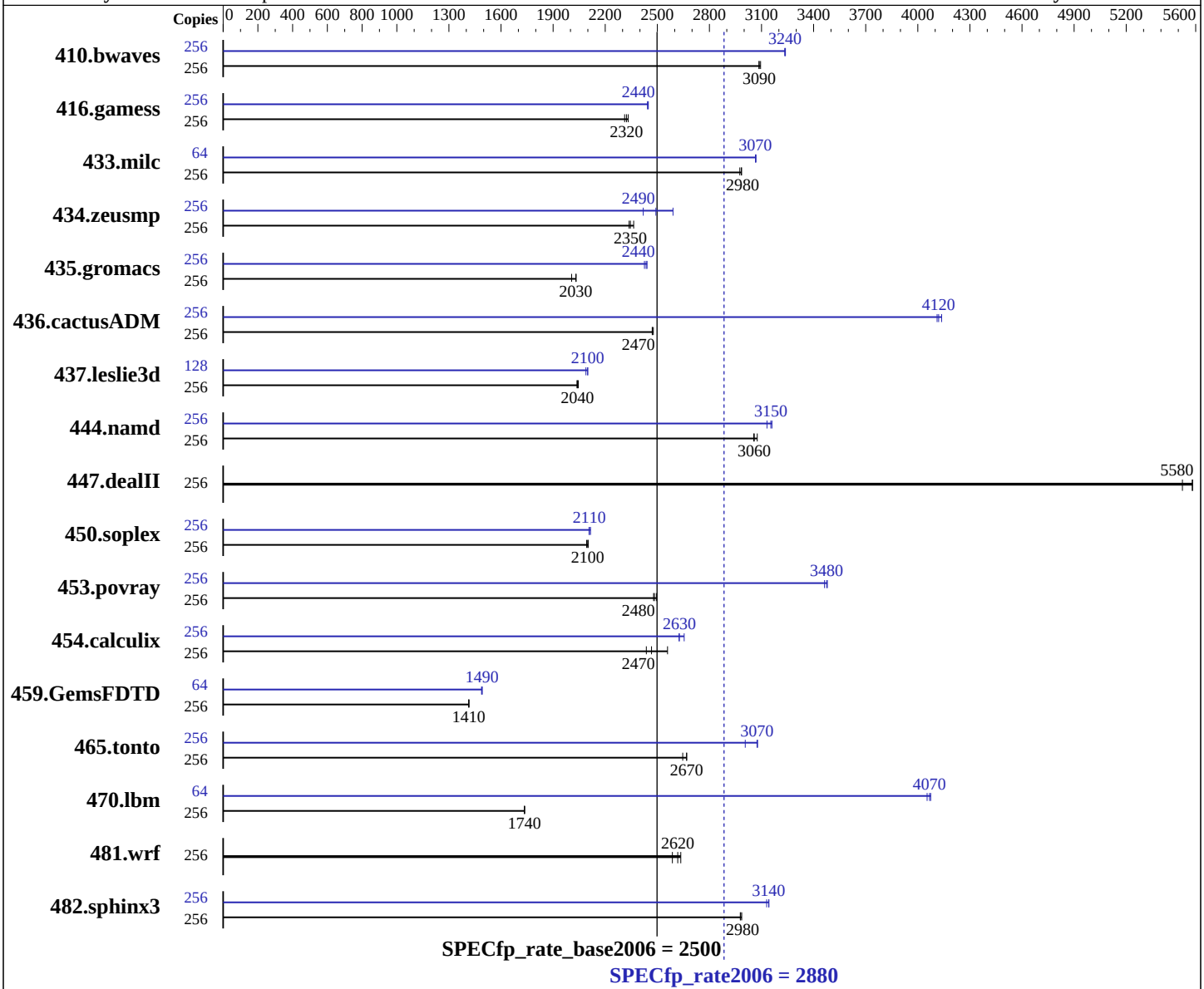
IBM Power 780 (4.4 GHz, 64 core)

SPECfp®_rate2006 = 2880

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

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

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.

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
```

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 -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 -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
```

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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