SPEC® CFP2006 Result

IBM Corporation

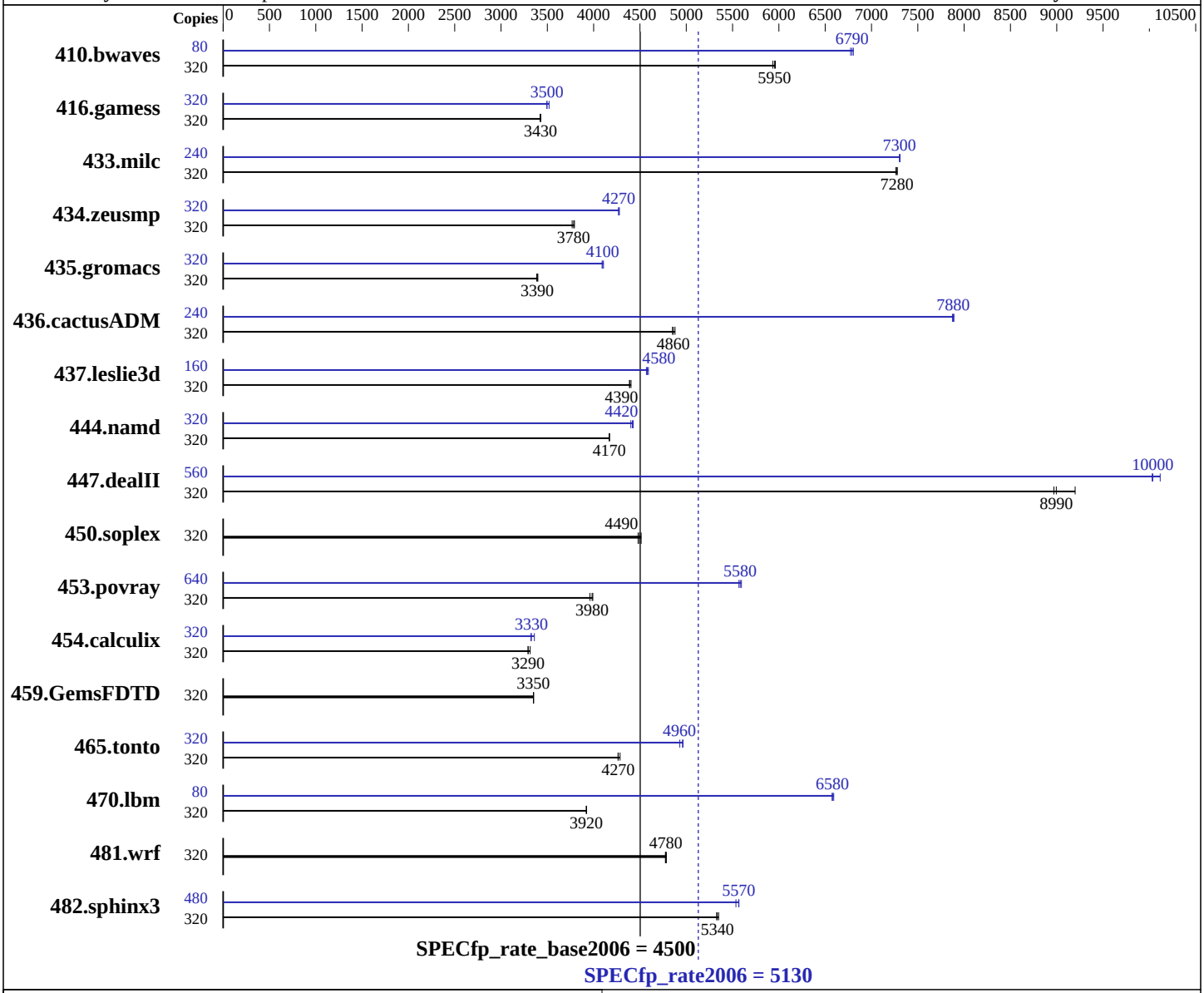
IBM Power E870 (4.19 GHz, 80 core)

SPECfp®_rate2006 = 5130

SPECfp_rate_base2006 = 4500

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 4.46 GHz
CPU MHz:	4192
FPU:	Integrated
CPU(s) enabled:	80 cores, 8 chips, 10 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: 4 TB (64 x 64 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	320	**730**	**5950**	729	5960	733	5940	80	160	6800	160	6770	**160**	**6790**
416.gamess	320	1828	3430	**1828**	**3430**	1831	3420	320	1780	3520	**1792**	**3500**	1793	3490
433.milc	320	404	7280	404	7260	**404**	**7280**	240	**302**	**7300**	302	7300	301	7310
434.zeusmp	320	768	3790	773	3770	**769**	**3780**	320	682	4270	**682**	**4270**	681	4280
435.gromacs	320	675	3390	672	3400	**674**	**3390**	320	556	4110	559	4090	**558**	**4100**
436.cactusADM	320	788	4850	784	4880	**787**	**4860**	240	364	7870	363	7890	**364**	**7880**
437.leslie3d	320	686	4390	**685**	**4390**	683	4400	160	328	4590	**328**	**4580**	329	4570
444.namd	320	615	4170	616	4170	**615**	**4170**	320	580	4430	**581**	**4420**	583	4400
447.dealII	320	408	8970	398	9200	**407**	**8990**	560	633	10100	639	10000	**638**	**10000**
450.soplex	320	596	4480	591	4510	**594**	**4490**	320	596	4480	591	4510	**594**	**4490**
453.povray	320	430	3960	**427**	**3980**	427	3990	640	**610**	**5580**	611	5570	608	5600
454.calculix	320	**802**	**3290**	802	3290	796	3320	320	786	3360	794	3320	**793**	**3330**
459.GemsFDTD	320	**1013**	**3350**	1013	3350	1014	3350	320	**1013**	**3350**	1013	3350	1014	3350
465.tonto	320	**738**	**4270**	735	4290	739	4260	320	**635**	**4960**	639	4930	634	4970
470.lbm	320	**1121**	**3920**	1121	3920	1121	3920	80	167	6590	**167**	**6580**	167	6570
481.wrf	320	**748**	**4780**	749	4770	747	4790	320	**748**	**4780**	749	4770	747	4790
482.sphinx3	320	1171	5330	**1169**	**5340**	1166	5350	480	1680	5570	1690	5540	**1681**	**5570**

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"

64000 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: -qinline=40 -qipa=threads -qpdf1(pass 1) -qpdf2(pass 2)
-qlargepage -O5 -qvecnvol -qprefetch=dscr=84 -D_ILS_MACROS
-qalign=natural -qfdpr -q64 -blpdata -btextpsize:64K

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

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

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Peak Optimization Flags (Continued)

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

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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