SPEC® CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

IBM Corporation

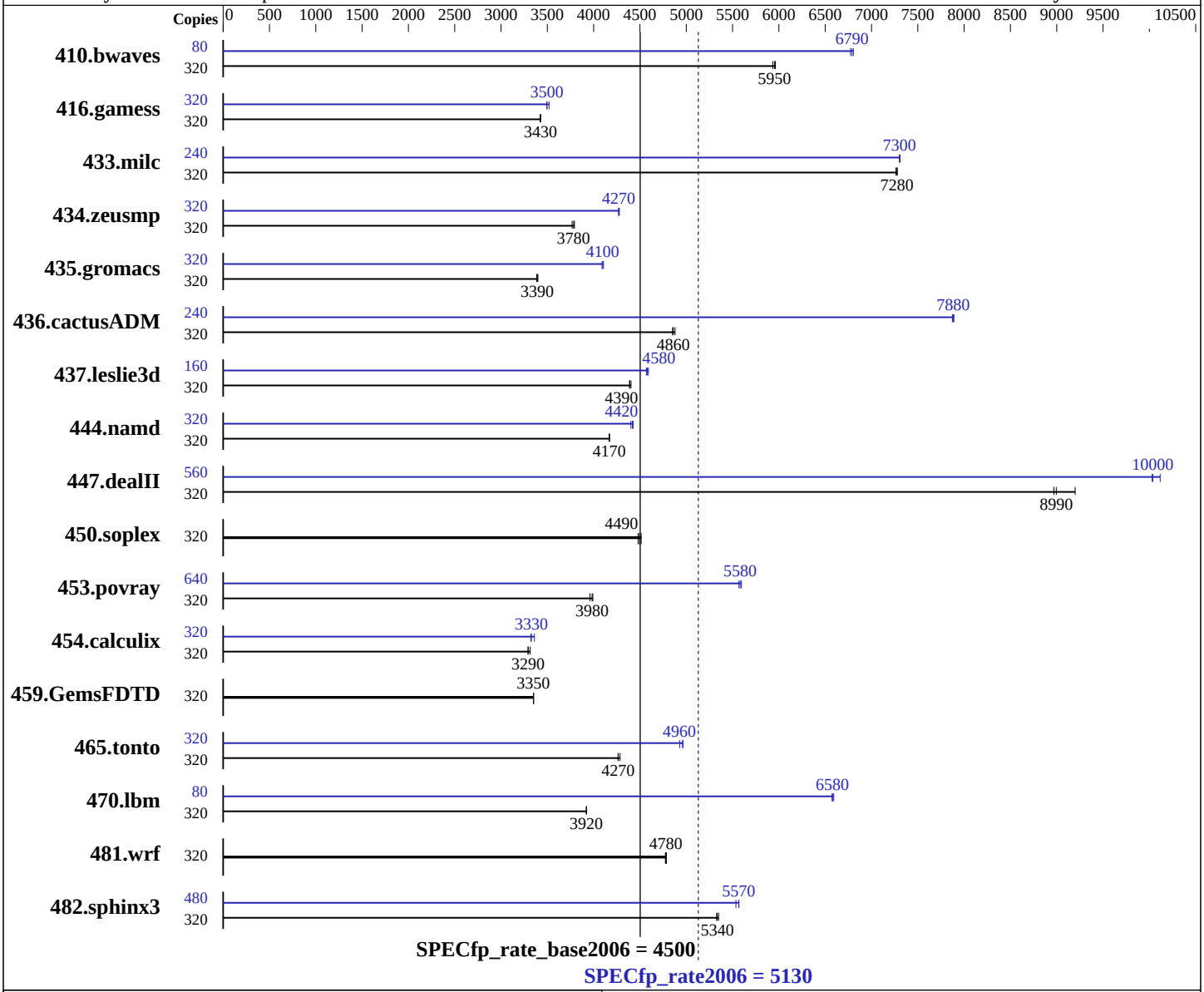
IBM Power E870 (4.19 GHz, 80 core)

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

Continued on next page

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

SPEC CFP2006 Result

Copyright 2006-2014 Standard Performance Evaluation Corporation

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

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
```

Continued on next page

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

Continued on next page

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

Continued on next page

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

SPEC and SPECfp are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.
Report generated on Tue Oct 21 15:48:17 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 21 October 2014.