SPEC® CFP2006 Result

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IBM Corporation

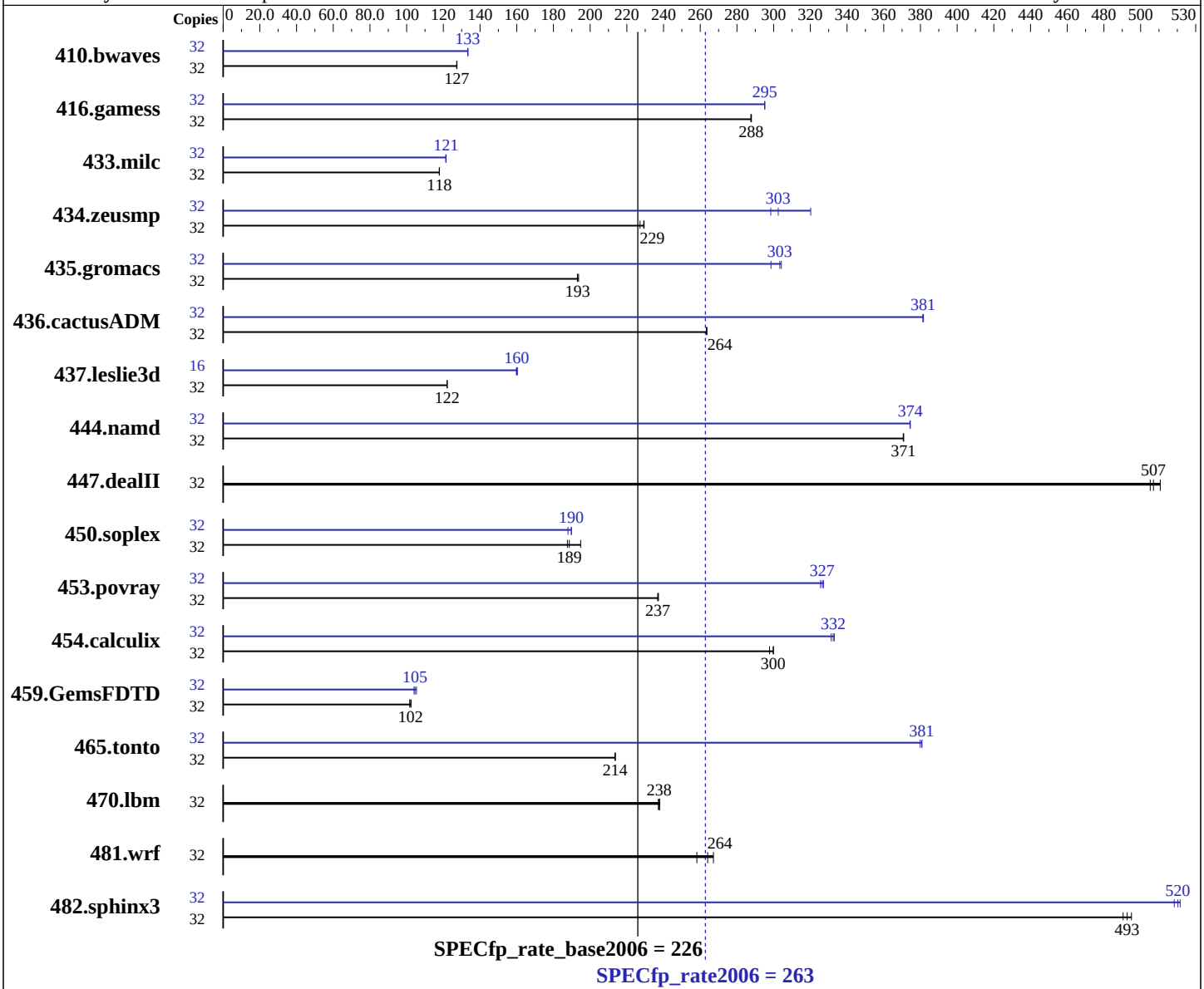
IBM Power 560 Express (3.6 GHz, 16 core)

SPECfp®_rate2006 = 263

SPECfp_rate_base2006 = 226

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

Test date: Sep-2008
Hardware Availability: Nov-2008
Software Availability: Nov-2008



Hardware

CPU Name:	POWER6+
CPU Characteristics:	
CPU MHz:	3600
FPU:	Integrated
CPU(s) enabled:	16 cores, 8 chips, 2 cores/chip, 2 threads/core
CPU(s) orderable:	4,8,16 cores
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	4 MB I+D on chip per core

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Software

Operating System:	IBM AIX V6.1 with the 6100-02 Technology Level
Compiler:	IBM XL C/C++ V10.1 for AIX IBM XL Fortran V12.1 for AIX
Auto Parallel:	No
File System:	AIX/JFS2
System State:	Multi-user
Base Pointers:	32-bit

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L3 Cache: 32 MB I+D off chip per chip
Other Cache: None
Memory: 64 GB (32x2 GB) DDR2 667 MHz
Disk Subsystem: 4x146 GB SAS 15K RPM
Other Hardware: None

Peak Pointers: 32/64-bit
Other Software: None

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	32	3413	127	**3414**	**127**	3417	127	32	3259	133	**3262**	**133**	3262	133
416.gamess	32	2176	288	**2178**	**288**	2178	288	32	2123	295	**2123**	**295**	2123	295
433.milc	32	2492	118	**2494**	**118**	2494	118	32	**2418**	**121**	2422	121	2417	122
434.zeusmp	32	1269	229	**1271**	**229**	1282	227	32	**963**	**303**	909	320	976	298
435.gromacs	32	1180	194	**1183**	**193**	1184	193	32	**753**	**303**	751	304	765	299
436.cactusADM	32	1452	263	1451	264	**1451**	**264**	32	**1003**	**381**	1002	382	1003	381
437.leslie3d	32	**2465**	**122**	2465	122	2463	122	16	941	160	938	160	**940**	**160**
444.namd	32	**692**	**371**	692	371	692	371	32	**685**	**374**	686	374	685	374
447.dealII	32	717	511	725	505	**722**	**507**	32	717	511	725	505	**722**	**507**
450.soplex	32	1370	195	**1415**	**189**	1423	188	32	**1407**	**190**	1420	188	1406	190
453.povray	32	719	237	718	237	**719**	**237**	32	**521**	**327**	523	326	520	327
454.calculix	32	**881**	**300**	880	300	887	298	32	793	333	**794**	**332**	797	331
459.GemsFDTD	32	3316	102	**3321**	**102**	3341	102	32	3264	104	3222	105	**3247**	**105**
465.tonto	32	**1474**	**214**	1473	214	1474	214	32	827	381	829	380	**827**	**381**
470.lbm	32	**1850**	**238**	1848	238	1854	237	32	**1850**	**238**	1848	238	1854	237
481.wrf	32	1385	258	**1354**	**264**	1338	267	32	1385	258	**1354**	**264**	1338	267
482.sphinx3	32	1260	495	1272	490	**1266**	**493**	32	**1199**	**520**	1196	522	1203	518

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Peak Tuning Notes

```
fdpr binary optimization tool used for 410.bwaves
  with options -bf -bp -ece -lap -las -nop -nopr -pto -RC -RD -rmte -so -tlo -A 64
               -lu 6 -rt 0.10 -ihf 60 -sdpla 32 -sdpms 32 -shci 10 -si -siht 15 -lun 32
fdpr binary optimization tool used for 433.milc 435.gromacs 437.leslie3d 453.povray
                                       454.calculix 482.sphinx3
  with options -O4 -vrox -pbsi
fdpr binary optimization tool used for 434.zeusmp 450.soplex
  with options -O3 -vrox -sdp 9
fdpr binary optimization tool used for 459.GemsFDTD
  with options -bf -bp -ece -hr -lap -nop -pca -RC -rmte -si -tb -tlo -vro -A 32 -rt 0.80
               -hrf 0.05 -sdp 5 -sdpms 512 -shci 90 -lun 27 -rcctf 0.70 -rccrf 0.80 -rcaf 2
```

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

```
all ulimits set to unlimited.
3200 16M large pages defined with vmo command
```

Platform Notes

```
System set to "Enhanced" mode when defining partition on HMC.
```

General Notes

```
Environment variables set by runspec before the start of the run:
MALLOCOPTIONS = "pool"
MEMORY_AFFINITY = "MCM"
XLFRTEOPTS = "intrinthds=1"

 See the flags file for details on settings.
```

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`

Continued on next page

Base Portability Flags (Continued)

481.wrf: `-DSPEC_CPU_AIX -DNOUNDERSCORE`
482.sphinx3: `-qchars=signed`

Base Optimization Flags

C benchmarks:
`-bmaxdata:0x40000000 -O5 -qlargepage -D_ILS_MACROS -blpdata`

C++ benchmarks:
`-bmaxdata:0x50000000 -O5 -qlargepage -D_ILS_MACROS -qrtti=all -D__IBM_FAST_VECTOR -D__IBM_FAST_SET_MAP_ITERATOR -blpdata`

Fortran benchmarks:
`-bmaxdata:0x60000000 -O5 -qlargepage -qsmallstack=dynlenonheap -qalias=nostd -blpdata`

Benchmarks using both Fortran and C:
`-bmaxdata:0x60000000 -O5 -qlargepage -D_ILS_MACROS -qsmallstack=dynlenonheap -qalias=nostd -blpdata`

Base Other Flags

C benchmarks:
`-qipa=threads -qipa=noobject -qsuppress=1500-036`

C++ benchmarks:
`-qipa=threads -qipa=noobject -qsuppress=1500-036`

Fortran benchmarks:
`-qipa=threads -qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036`

Benchmarks using both Fortran and C:
`-qipa=threads -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`

Continued on next page

Peak Compiler Invocation (Continued)

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: -bmaxdata:0x40000000 -O5 -qlargepage -D_ILS_MACROS
-qalign=natural -qfdpr -blpdata

470.lbm: basepeak = yes

482.sphinx3: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qlargepage
-D_ILS_MACROS -qfdpr -blpdata

C++ benchmarks:

444.namd: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qlargepage
-D_ILS_MACROS -blpdata

447.dealII: basepeak = yes

450.soplex: -O3 -qarch=auto -qtune=auto -qlargepage -q64
-D_ILS_MACROS -qfdpr -blpdata

453.povray: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -D_ILS_MACROS
-qalign=natural -qfdpr

Fortran benchmarks:

Continued on next page

Peak Optimization Flags (Continued)

410.bwaves: -bmaxdata:0x50000000 -O5 -qlargepage -qenablevmx -qvecnvol -qfdpr -qsmallstack=dynlenonheap -blpdata

416.gamess: -bmaxdata:0x40000000 -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qlargepage -qalias=nostd -blpdata

434.zeusmp: -bmaxdata:0x40000000 -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto -qlargepage -qenablevmx -qvecnvol -qxlf90=nosignedzero -qfdpr -blpdata

437.leslie3d: -O5 -qlargepage -qenablevmx -qvecnvol -qfdpr -blpdata

459.GemsFDTD: -O4 -qlargepage -q64 -qfdpr -blpdata

465.tonto: -bmaxdata:0x50000000 -qpdf1(pass 1) -qpdf2(pass 2) -O5 -bdatapsize:64K -bstackpsize:64K -btextpsize:64K

Benchmarks using both Fortran and C:

435.gromacs: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -D_ILS_MACROS -qfdpr

436.cactusADM: -bmaxdata:0x60000000 -qpdf1(pass 1) -qpdf2(pass 2) -O2 -qarch=auto -qtune=auto -qlargepage -qenablevmx -qvecnvol -D_ILS_MACROS -qfdpr -qnostrict -blpdata

454.calculix: -O4 -qlargepage -q64 -D_ILS_MACROS -qfdpr -blpdata

481.wrf: basepeak = yes

Peak Other Flags

C benchmarks:
-qipa=threads -qipa=noobject -qsuppress=1500-036

C++ benchmarks:
-qipa=threads -qipa=noobject -qsuppress=1500-036

Fortran benchmarks:
-qipa=threads -qipa=noobject -qsuppress=1500-010 -qsuppress=cmpmsg -qsuppress=1500-036

Benchmarks using both Fortran and C:
-qipa=threads -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-AIX.html
http://www.spec.org/cpu2006/flags/IBM-XL.20090713.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/IBM-AIX.xml
http://www.spec.org/cpu2006/flags/IBM-XL.20090713.xml

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