SPEC® CFP2006 Result

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IBM Corporation

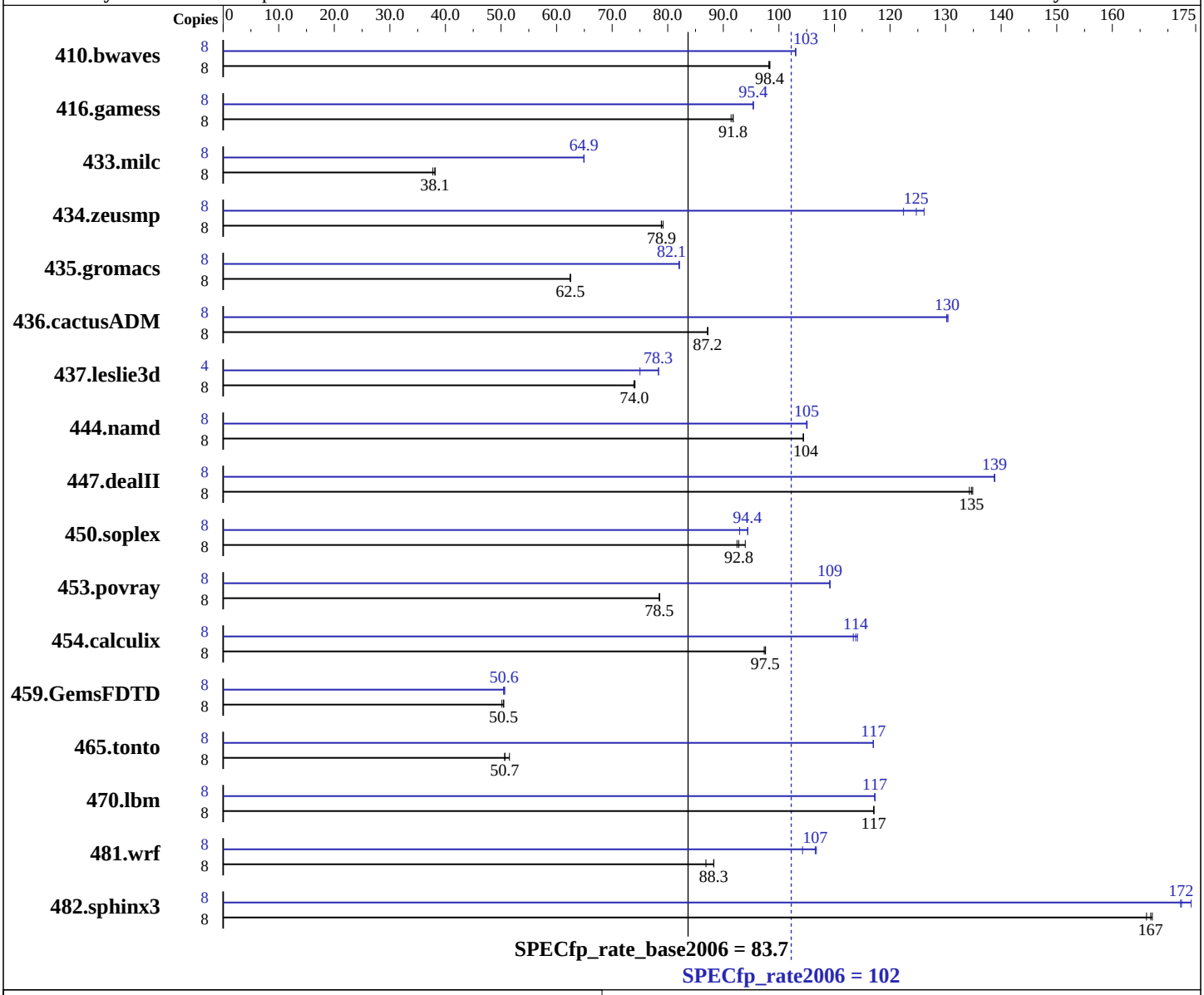
IBM Power 520 (4.7 GHz, 4 core, SLES)

SPECfp®_rate2006 = 102

SPECfp_rate_base2006 = 83.7

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

Test date: Mar-2009
Hardware Availability: May-2009
Software Availability: Mar-2009



Hardware

CPU Name:	POWER6+
CPU Characteristics:	
CPU MHz:	4700
FPU:	Integrated
CPU(s) enabled:	4 cores, 2 chips, 2 cores/chip, 2 threads/core
CPU(s) orderable:	2,4 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:	SUSE Linux Enterprise Server 11
Compiler:	IBM XL C/C++ for Linux, V10.1 Updated with the Mar2009 PTF. IBM XL Fortran for Linux, V12 Updated with the Mar2009 PTF.
Auto Parallel:	No
File System:	ext3
System State:	Run Level 3 (Multi-User)

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L3 Cache: 32 MB I+D off chip per chip
Other Cache: None
Memory: 32 GB (8x4 GB) DDR2 667 MHz
Disk Subsystem: 2x146 GB SAS 15K RPM
Other Hardware: None

Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: -Post-Link Optimization for Linux on POWER, Version 5.4.0-21
-MicroQuill SmartHeap 8.1

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	8	1107	98.2	1105	98.4	**1105**	**98.4**	8	1055	103	1056	103	**1055**	**103**
416.gamess	8	**1707**	**91.8**	1707	91.8	1714	91.4	8	1642	95.4	**1642**	**95.4**	1642	95.4
433.milc	8	1925	38.2	1946	37.7	**1928**	**38.1**	8	1132	64.9	**1131**	**64.9**	1131	64.9
434.zeusmp	8	923	78.8	920	79.2	**923**	**78.9**	8	577	126	**584**	**125**	595	122
435.gromacs	8	914	62.5	**914**	**62.5**	914	62.5	8	**696**	**82.1**	696	82.1	696	82.0
436.cactusADM	8	**1097**	**87.2**	1096	87.2	1097	87.2	8	733	130	734	130	**734**	**130**
437.leslie3d	8	1017	73.9	**1016**	**74.0**	1015	74.1	4	501	75.0	**480**	**78.3**	480	78.4
444.namd	8	614	104	615	104	**614**	**104**	8	611	105	**611**	**105**	611	105
447.dealII	8	682	134	**680**	**135**	678	135	8	**659**	**139**	659	139	659	139
450.soplex	8	710	94.0	722	92.5	**719**	**92.8**	8	707	94.4	718	92.9	**707**	**94.4**
453.povray	8	542	78.5	542	78.5	**542**	**78.5**	8	390	109	**390**	**109**	390	109
454.calculix	8	678	97.4	**677**	**97.5**	676	97.6	8	**580**	**114**	578	114	582	113
459.GemsFDTD	8	1692	50.2	**1682**	**50.5**	1681	50.5	8	1675	50.7	1682	50.5	**1679**	**50.6**
465.tonto	8	**1553**	**50.7**	1554	50.7	1528	51.5	8	**673**	**117**	673	117	673	117
470.lbm	8	**939**	**117**	939	117	939	117	8	**937**	**117**	937	117	937	117
481.wrf	8	**1013**	**88.3**	1012	88.3	1029	86.9	8	**839**	**107**	837	107	857	104
482.sphinx3	8	933	167	938	166	**934**	**167**	8	**904**	**172**	905	172	895	174

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

Submit Notes

```
The config file option 'submit' was used.
 Benchmarks bound to a processor using numactl on the submit command.
```

General Notes

```
 kernel release 2.6.27.19-5-ppc64.
 See flags file for details on following settings.
 ulimit -s (stack) set to 1048576.
 System configured with libhugetlbfs library for application access to large pages
 Large pages reserved as follows by root user:
     echo 530 > /proc/sys/vm/nr_hugepages
 Environment variables set before executing benchmarks.
     export HUGETLB_VERBOSE=0
     export HUGETLB_MORECORE=yes
```

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General Notes (Continued)

```
    export XLFRTEOPTS=intrinthds=1
IBM Post-Link optimization tool was used for these benchmarks, with options:
   433.milc : "-imullX" (instrumentation phase), "-O4 -omullX" (optimization phase)
   435.gromacs : same as 433.milc
   436.cactusADM : same as 433.milc
   482.sphinx3 : same as 433.milc
  453.povray : "-imullX" (instrumentation phase), "-O4 -omullX -see 1 -ihf -1" (optimization phase)
   465.tonto : "-O4" (optimization phase)
```

Base Compiler Invocation

C benchmarks:
```
xlc -qlanglvl=extc99
```

C++ benchmarks:
```
xlC
```

Fortran benchmarks:
```
xlf95
```

Benchmarks using both Fortran and C:
```
xlc -qlanglvl=extc99 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: -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Base Optimization Flags

C benchmarks:
```
-O5 -qarch=pwr6 -qtune=pwr6 -qnoenablevmx -lhugetlbfs
```

C++ benchmarks:
```
-O5 -qarch=pwr6 -qtune=pwr6 -qrtti -qnoenablevmx -qstaticlink
-Wl,--whole-archive /usr/lib/libhugetlbfs.a -Wl,--no-whole-archive
```

Fortran benchmarks:
```
-O5 -qarch=pwr6 -qtune=pwr6 -qsmallstack=dynlenonheap -qalias=nostd
-qnoenablevmx -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT
```

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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
`-O5 -qarch=pwr6 -qtune=pwr6 -qnoenablevmx -qsmallstack=dynlenonheap -qalias=nostd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT`

Base Other Flags

C benchmarks:
`-qipa=noobject -qipa=threads`

C++ benchmarks:
`-qipa=noobject -qipa=threads`

Fortran benchmarks:
`-qipa=noobject -qipa=threads`

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

Peak Compiler Invocation

C benchmarks:
`xlc -qlanglvl=extc99`

C++ benchmarks:
`xlC`

Fortran benchmarks:
`xlf95`

Benchmarks using both Fortran and C:
`xlc -qlanglvl=extc99 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`

Continued on next page

Peak Portability Flags (Continued)

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

Peak Optimization Flags

C benchmarks:

433.milc: -Wl,-q -O5 -qarch=pwr6 -qtune=pwr6 -qnoenablevmx -lhugetlbfs

470.lbm: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=pwr6 -qtune=pwr6 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT -q64

482.sphinx3: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr6 -qtune=pwr6 -lhugetlbfs

C++ benchmarks:

444.namd: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr6 -qtune=pwr6

447.dealII: -O5 -qarch=pwr6 -qtune=pwr6 -qrtti -qnoenablevmx -qstaticlink -Wl,--whole-archive /usr/lib/libsmartheap.a -Wl,--no-whole-archive

450.soplex: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr6 -qtune=pwr6 -qstrict -lhugetlbfs

453.povray: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr6 -qtune=pwr6 -lsmartheap

Fortran benchmarks:

410.bwaves: -O5 -qarch=pwr6 -qtune=pwr6 -qsmallstack=dynlenonheap -lhugetlbfs

416.gamess: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr6 -qtune=pwr6 -qalias=nostd -qnoenablevmx

434.zeusmp: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=pwr6 -qtune=pwr6 -qxlf90=nosignedzero -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT

437.leslie3d: -O5 -qarch=pwr6 -qtune=pwr6 -qsmallstack=dynlenonheap -qnoenablevmx -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT

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Peak Optimization Flags (Continued)

459.GemsFDTD: `-O5 -qarch=pwr6 -qtune=pwr6 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT -q64`

465.tonto: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6 -q64 -lsmartheap64 -lxlf90_r`

Benchmarks using both Fortran and C:

435.gromacs: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr6 -qtune=pwr6 -lhugetlbfs`

436.cactusADM: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O2 -qarch=pwr6 -qtune=pwr6 -qnostrict -lhugetlbfs`

454.calculix: `-O4 -qarch=pwr6 -qtune=pwr6 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT`

481.wrf: `-O5 -qarch=pwr6 -qtune=pwr6 -qnoenablevmx -q64 -lhugetlbfs`

Peak Other Flags

C benchmarks:
`-qipa=noobject -qipa=threads`

C++ benchmarks:
`-qipa=noobject -qipa=threads`

Fortran benchmarks:
`-qipa=noobject -qipa=threads`

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

The flags file that was used to format this result can be browsed at
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.xml`

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Tested with SPEC CPU2006 v1.1.
Report generated on Tue Jul 22 23:55:41 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 12 May 2009.