



# SPEC® CFP2006 Result

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## IBM Corporation

### SPECfp®\_rate2006 = 79.7

### IBM System p 520 (4.2 GHz, 4 core, SLES)

### SPECfp\_rate\_base2006 = 69.0

CPU2006 license: 11

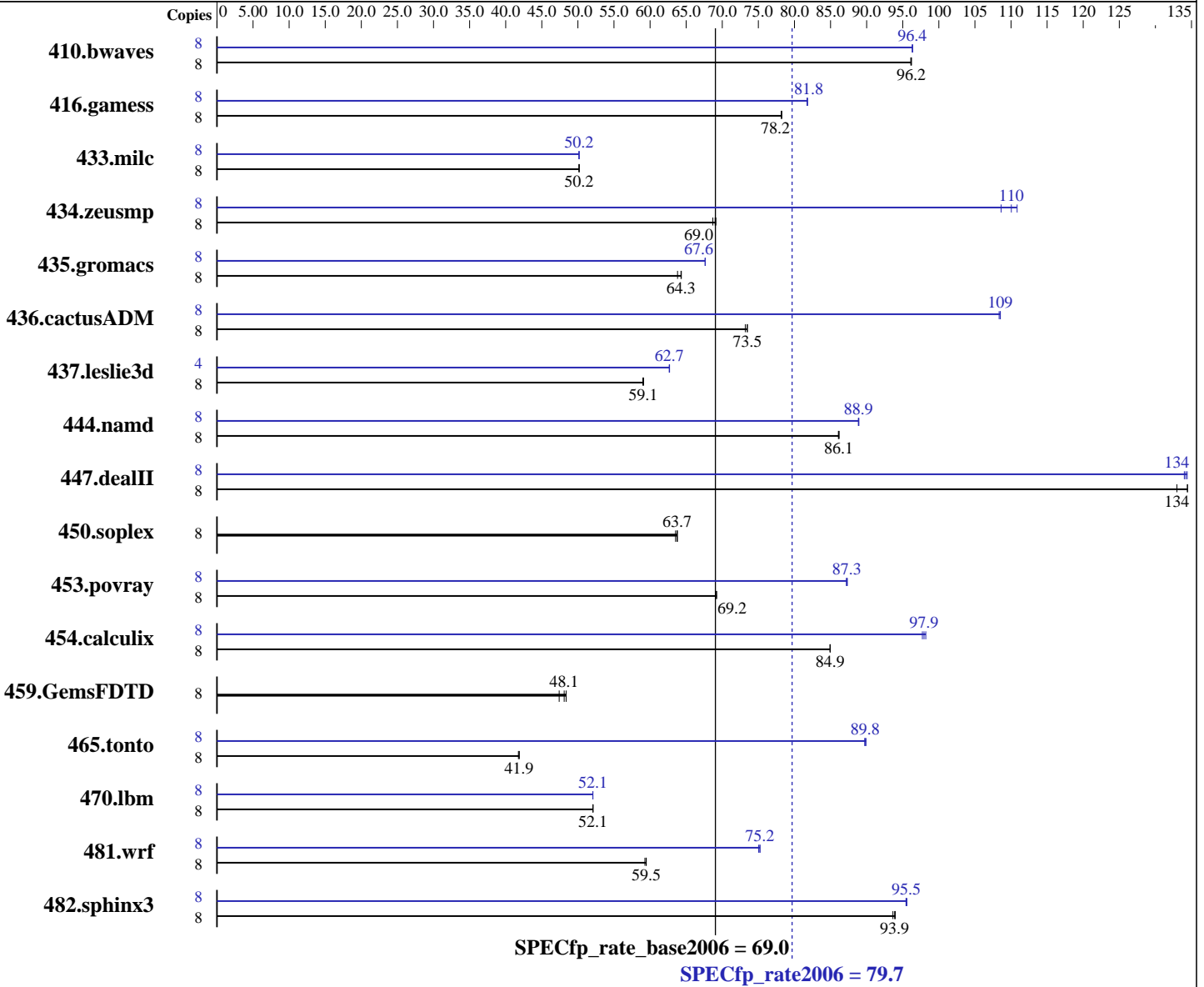
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Jan-2008

Hardware Availability: Feb-2008

Software Availability: Sep-2007



#### Hardware

CPU Name: POWER6  
 CPU Characteristics:  
 CPU MHz: 4200  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 2 chips, 2 cores/chip, 2 threads/core  
 CPU(s) orderable: 1,2,4 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 10 SP1  
 Compiler: IBM XL C/C++ Advanced Edition for Linux, V9.0  
 IBM XL Fortran Advanced Edition for Linux, V11.1  
 Auto Parallel: No  
 File System: ext3  
 System State: Multi-User  
 Base Pointers: 32-bit  
 Peak Pointers: 32/64-bit

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L3 Cache: None  
Other Cache: None  
Memory: 16 GB (8x2 GB) DDR2 667 MHz  
Disk Subsystem: 1x146 GB SAS 15K RPM  
Other Hardware: None

Other Software: -IBM Post-Link Optimization for Linux on POWER, Version 5.4.0-10  
-MicroQuill SmartHeap 7.3  
-IBM Engineering and Scientific Subroutine Library for Linux on POWER, Version 4.3

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	8	<b>1131</b>	<b>96.2</b>	1130	96.2	1131	96.1	8	1128	96.4	1129	96.3	<b>1128</b>	<b>96.4</b>
416.gamess	8	2002	78.2	2003	78.2	<b>2003</b>	<b>78.2</b>	8	1916	81.7	1915	81.8	<b>1916</b>	<b>81.8</b>
433.milc	8	1464	50.2	1464	50.2	<b>1464</b>	<b>50.2</b>	8	<b>1464</b>	<b>50.2</b>	1464	50.2	1464	50.2
434.zeusmp	8	1060	68.7	<b>1055</b>	<b>69.0</b>	1053	69.1	8	<b>662</b>	<b>110</b>	670	109	657	111
435.gromacs	8	888	64.3	<b>889</b>	<b>64.3</b>	895	63.8	8	845	67.6	<b>845</b>	<b>67.6</b>	844	67.6
436.cactusADM	8	1306	73.2	1301	73.5	<b>1301</b>	<b>73.5</b>	8	882	108	881	109	<b>881</b>	<b>109</b>
437.leslie3d	8	1272	59.1	<b>1273</b>	<b>59.1</b>	1275	59.0	4	600	62.7	600	62.7	<b>600</b>	<b>62.7</b>
444.namd	8	744	86.2	745	86.1	<b>745</b>	<b>86.1</b>	8	721	88.9	<b>722</b>	<b>88.9</b>	722	88.9
447.dealII	8	688	133	<b>681</b>	<b>134</b>	681	134	8	681	134	683	134	<b>682</b>	<b>134</b>
450.soplex	8	1050	63.5	<b>1047</b>	<b>63.7</b>	1046	63.8	8	1050	63.5	<b>1047</b>	<b>63.7</b>	1046	63.8
453.povray	8	<b>615</b>	<b>69.2</b>	615	69.2	616	69.0	8	488	87.2	487	87.3	<b>488</b>	<b>87.3</b>
454.calculix	8	777	84.9	777	85.0	<b>777</b>	<b>84.9</b>	8	672	98.2	<b>674</b>	<b>97.9</b>	675	97.7
459.GemsFDTD	8	1790	47.4	<b>1765</b>	<b>48.1</b>	1755	48.4	8	1790	47.4	<b>1765</b>	<b>48.1</b>	1755	48.4
465.tonto	8	1880	41.9	1885	41.8	<b>1881</b>	<b>41.9</b>	8	877	89.7	876	89.9	<b>877</b>	<b>89.8</b>
470.lbm	8	<b>2110</b>	<b>52.1</b>	2110	52.1	2110	52.1	8	2111	52.1	<b>2111</b>	<b>52.1</b>	2111	52.1
481.wrf	8	<b>1503</b>	<b>59.5</b>	1507	59.3	1502	59.5	8	<b>1188</b>	<b>75.2</b>	1191	75.0	1188	75.2
482.sphinx3	8	1665	93.6	1659	94.0	<b>1661</b>	<b>93.9</b>	8	1634	95.4	1631	95.6	<b>1633</b>	<b>95.5</b>

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

## General Notes

kernel release 2.6.16.46-0.12-ppc64.

See flags file for details on following settings.

ulimit -s (stack) set to unlimited.

Large pages reserved as follows by root user:

```
echo 530 > /proc/sys/vm/nr_hugepages
```

System configured with libhugetlbfs library for application access to large pages  
Environment variables set before executing benchmarks.

```
export HUGETLB_VERBOSE=0
```

```
export HUGETLB_MORECORE=yes
```

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## General Notes (Continued)

```
export HUGETLB_MORECORE_HEAPBASE=0x50000000
export XLFRTEOPTS=intrinthds=1
```

IBM Post-Link Optimization tool used for  
435.gromacs 436.cactusADM 482.sphinx3

Benchmarks bound to a processor using numactl on the submit command.

## 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/ -t1 -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  
481.wrf: -DNOUNDERSCORE  
482.sphinx3: -qchars=signed



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## Peak Optimization Flags

### C benchmarks:

433.milc: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr6 -qtune=pwr6  
-qnoenablevmx -lhugetlbfs

470.lbm: -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) -O3 -qarch=pwr6 -qtune=pwr6

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

450.soplex: basepeak = yes

453.povray: -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: -O3 -qarch=pwr6 -qtune=pwr6 -B/usr/share/libhugetlbfs/ -tl  
-Wl,--hugetlbfs-link=BDT -q64

459.GemsFDTD: basepeak = yes

465.tonto: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr6 -qtune=pwr6  
-lessl -lhugetlbfs -lxlf90\_r

### Benchmarks using both Fortran and C:

435.gromacs: -Wl,-q -O2 -qarch=pwr6 -qtune=pwr6 -lhugetlbfs

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

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## Peak Optimization Flags (Continued)

454.calculix: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr6 -qtune=pwr6  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT

481.wrf: -O5 -qarch=pwr6 -qtune=pwr6 -qnoenablevmx  
-qsmallstack=dynlenonheap -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/lop-xl-flags.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/cpu2006/flags/lop-xl-flags.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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