SPEC® CFP2006 Result

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IBM Corporation

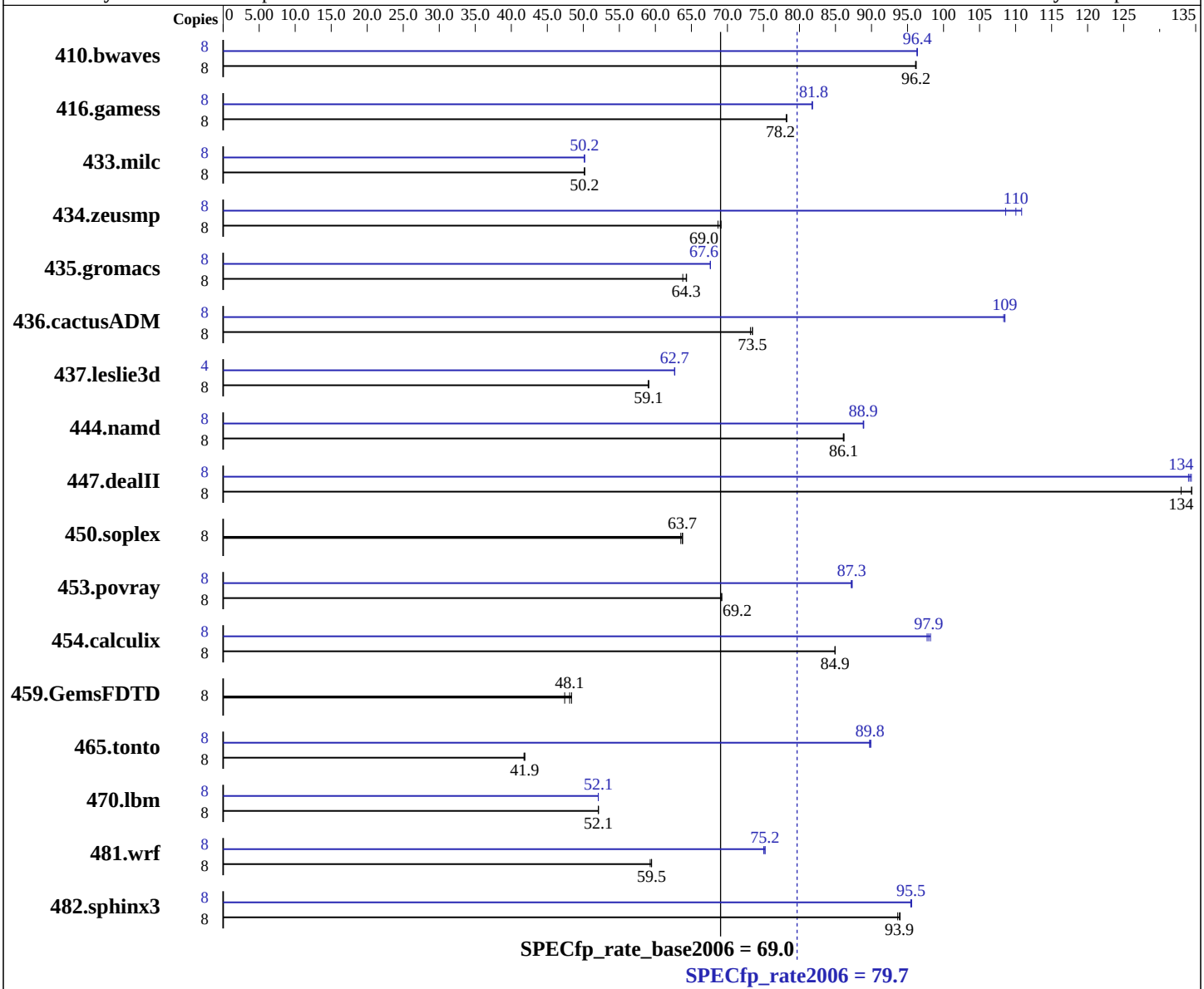
IBM System p 520 (4.2 GHz, 4 core, SLES)

SPECfp®_rate2006 = 79.7

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

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
```

Continued on next page

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

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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