SPEC® CFP2006 Result

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IBM Corporation

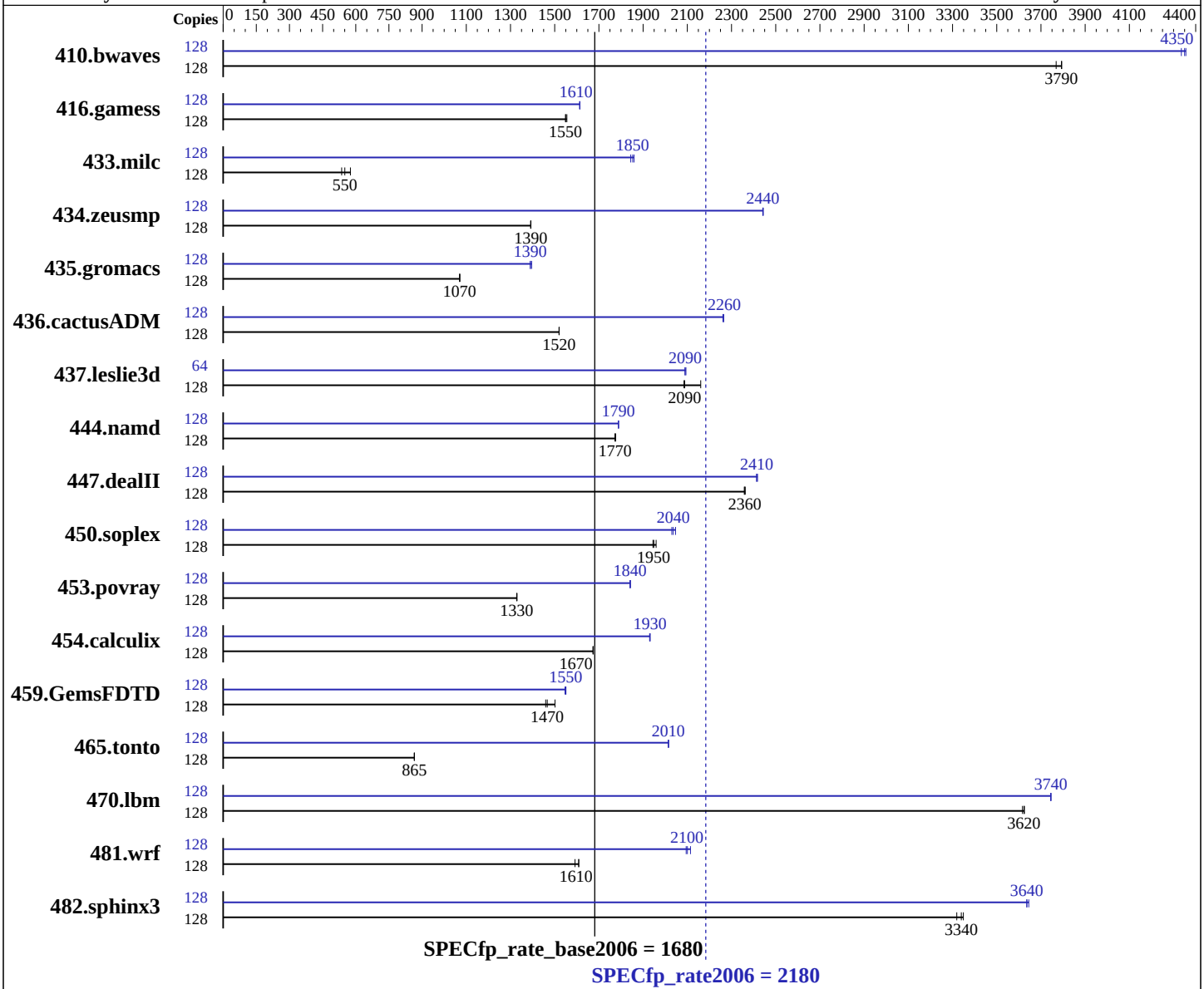
IBM Power 595 (5.0 GHz, 64 core, SLES)

SPECfp®_rate2006 = 2180

SPECfp_rate_base2006 = 1680

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

Test date: Mar-2009
Hardware Availability: Jun-2008
Software Availability: Mar-2009



Hardware

CPU Name:	POWER6
CPU Characteristics:	
CPU MHz:	5000
FPU:	Integrated
CPU(s) enabled:	64 cores, 32 chips, 2 cores/chip, 2 threads/core
CPU(s) orderable:	8,16,24,32,40,48,56,64 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, V12.1 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: 512 GB (256x2 GB) DDR2 667 MHz
Disk Subsystem: 4x146 GB SCSI 15K RPM
Other Hardware: None

Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: -IBM 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	128	462	3770	458	3790	**459**	**3790**	128	**400**	**4350**	399	4360	401	4340
416.gamess	128	1618	1550	1612	1560	**1617**	**1550**	128	1554	1610	**1553**	**1610**	1552	1610
433.milc	128	2191	536	**2135**	**550**	2041	576	128	**634**	**1850**	632	1860	637	1840
434.zeusmp	128	837	1390	**837**	**1390**	836	1390	128	**477**	**2440**	477	2440	477	2440
435.gromacs	128	**854**	**1070**	854	1070	854	1070	128	655	1400	**658**	**1390**	658	1390
436.cactusADM	128	**1006**	**1520**	1006	1520	1006	1520	128	675	2260	677	2260	**676**	**2260**
437.leslie3d	128	577	2080	557	2160	**576**	**2090**	64	**288**	**2090**	288	2090	287	2090
444.namd	128	**579**	**1770**	578	1780	579	1770	128	574	1790	574	1790	**574**	**1790**
447.dealII	128	621	2360	620	2360	**620**	**2360**	128	606	2420	**607**	**2410**	607	2410
450.soplex	128	**548**	**1950**	545	1960	549	1940	128	**524**	**2040**	522	2050	526	2030
453.povray	128	513	1330	**513**	**1330**	512	1330	128	**370**	**1840**	370	1840	370	1840
454.calculix	128	631	1670	**631**	**1670**	631	1670	128	547	1930	**547**	**1930**	547	1930
459.GemsFDTD	128	931	1460	**926**	**1470**	905	1500	128	876	1550	878	1550	**876**	**1550**
465.tonto	128	1457	865	1455	865	**1456**	**865**	128	625	2010	625	2020	**625**	**2010**
470.lbm	128	486	3620	**485**	**3620**	485	3630	128	470	3740	470	3750	**470**	**3740**
481.wrf	128	889	1610	898	1590	**889**	**1610**	128	**681**	**2100**	683	2090	676	2110
482.sphinx3	128	745	3350	752	3320	**747**	**3340**	128	686	3640	684	3640	**686**	**3640**

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 taskset 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 8960 > /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`

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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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