SPEC® CFP2006 Result

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IBM Corporation

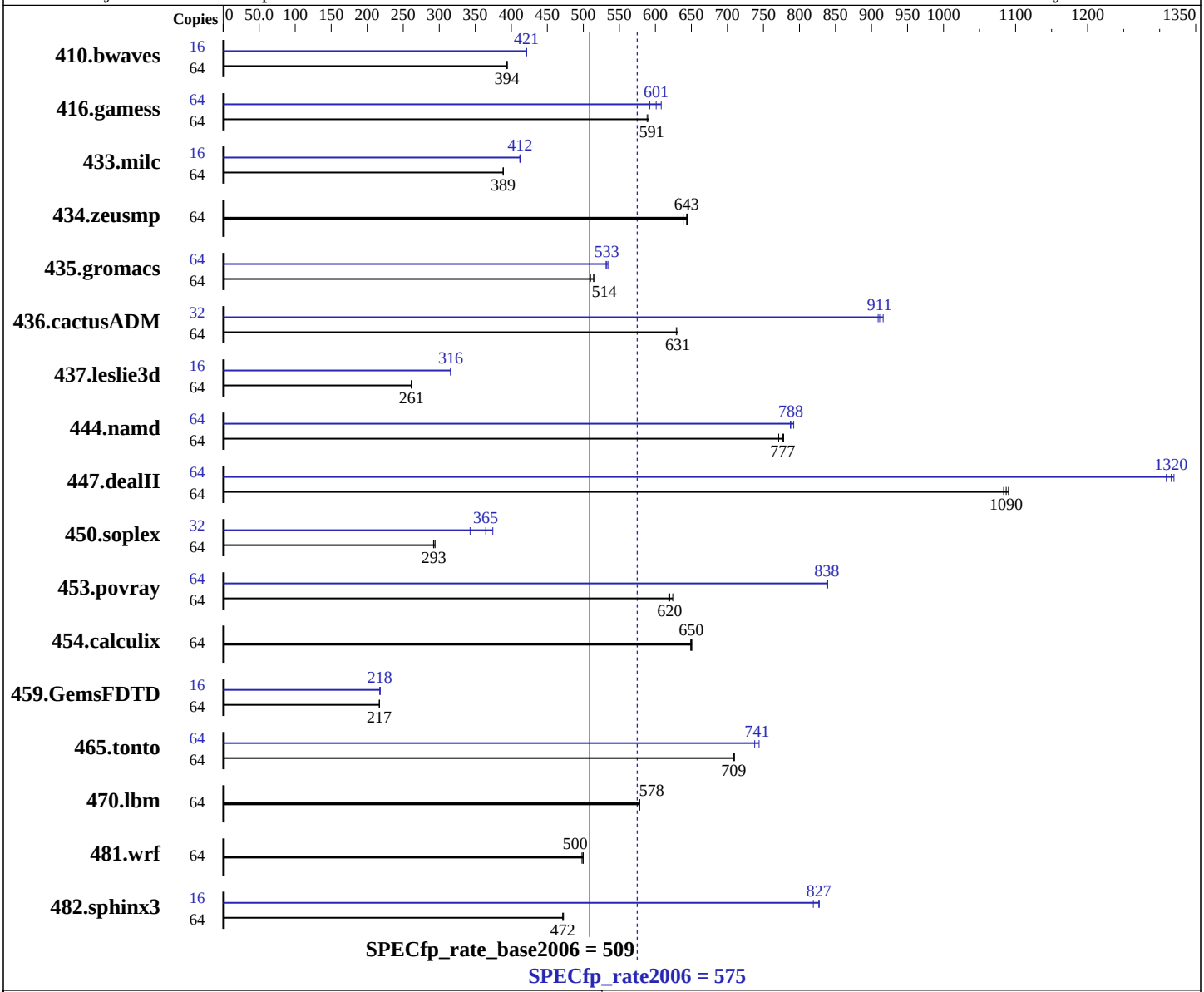
IBM Power 730 Express (4.2 GHz, 16 core, SLES)

SPECfp®_rate2006 = 575

SPECfp_rate_base2006 = 509

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

Test date: Jan-2013
Hardware Availability: Feb-2013
Software Availability: Dec-2012



Hardware

CPU Name:	POWER7+
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 4.540 GHz
CPU MHz:	4228
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable:	8, 16 cores
Primary Cache:	32 KB I + 32 KB D on chip per core

Continued on next page

Software

Operating System:	SUSE Linux Enterprise Server 11 SP2 (ppc64) kernel 3.0.42-0.7-ppc64
Compiler:	C/C++: Version 12.1 of IBM XL C/C++ for Linux; Fortran: Version 14.1 of IBM XL Fortran for Linux
Auto Parallel:	No
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	32-bit
Peak Pointers:	32/64-bit

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Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 10 MB I+D on chip per core
Other Cache: None
Memory: 128 GB (16 x 8 GB) DDR3 1066 MHz
Disk Subsystem: 1 x 146.8 GB SAS SFF 15K RPM
Other Hardware: None

Other Software: -Post-Link Optimization for Linux on POWER, version 5.6.1-7
-MicroQuill SmartHeap 9
-Apache C++ Standard Library V4.2.1

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	64	2208	394	2206	394	**2206**	**394**	16	516	421	**516**	**421**	516	421
416.gamess	64	2129	589	2121	591	**2122**	**591**	64	2061	608	2116	592	**2085**	**601**
433.milc	64	1511	389	**1511**	**389**	1511	389	16	**356**	**412**	356	412	357	412
434.zeusmp	64	904	644	**905**	**643**	912	639	64	904	644	**905**	**643**	912	639
435.gromacs	64	888	514	896	510	**889**	**514**	64	855	534	860	531	**858**	**533**
436.cactusADM	64	**1212**	**631**	1211	631	1216	629	32	**420**	**911**	417	916	421	909
437.leslie3d	64	2303	261	2301	261	**2302**	**261**	16	476	316	476	316	**476**	**316**
444.namd	64	**661**	**777**	660	778	666	771	64	652	787	**651**	**788**	648	792
447.dealII	64	676	1080	**674**	**1090**	672	1090	64	559	1310	555	1320	**556**	**1320**
450.soplex	64	1828	292	**1825**	**293**	1814	294	32	779	343	**732**	**365**	713	374
453.povray	64	**549**	**620**	546	624	550	619	64	**406**	**838**	406	838	406	839
454.calculix	64	**812**	**650**	814	649	811	651	64	**812**	**650**	814	649	811	651
459.GemsFDTD	64	3131	217	3130	217	**3131**	**217**	16	781	217	**780**	**218**	779	218
465.tonto	64	887	710	**888**	**709**	890	708	64	**850**	**741**	854	738	847	744
470.lbm	64	1521	578	1522	578	**1522**	**578**	64	1521	578	1522	578	**1522**	**578**
481.wrf	64	1431	500	**1431**	**500**	1435	498	64	1431	500	**1431**	**500**	1435	498
482.sphinx3	64	2646	471	2640	472	**2645**	**472**	16	381	819	**377**	**827**	377	828

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

Compiler Invocation Notes

```
C/C++ compiler updated to December 2012 PTF
Version: 12.01.0000.0002
Fortran compiler updated to December 2012 PTF
Version: 14.01.0000.0002
```

Peak Tuning Notes

```
Post-Link optimization tool used for:
433.milc 435.gromacs 450.soplex 482.sphinx3
     with options -O4 -nodp
434.zeusmp
     with options -O4 -vrox -nodp
 437.leslie3d
```

Continued on next page

Peak Tuning Notes (Continued)

```
     with options -O3 -lu -1 -nodp -sdp 9
444.namd
     with options -O3 -lu -1 -nodp -sdp 9
450.soplex
    with options -O4 -nodp
465.tonto
   with options -O4
482.sphinx3
    with options -O4 -nodp
```

Submit Notes

```
The config file option 'submit' was used
to assign benchmark copy to specific kernel thread using
the "numactl" command (see flags file for details).
```

Operating System Notes

```
ulimit -s (stack) set to 1048576.

Large pages reserved as follows by root user:
echo 4224 > /proc/sys/vm/nr_hugepages

The Apache C++ Standard Library V4.2.1 was installed from
http://stdcxx.apache.org/download.html using:
gmake BUILDTYPE=8d CONFIG=gcc.config

The following environment varibles were set before the runspec command:
  export HUGETLB_VERBOSE=0
  export HUGETLB_MORECORE=yes
  export HUGETLB_ELFMAP=RW
  export XLFRTEOPTS=intrinthds=1
```

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=pwr7 -qtune=pwr7 -q32 -qipa=threads -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

C++ benchmarks:
`-O5 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads -qrtti -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

Fortran benchmarks:
`-O5 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads -qalias=nostd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

Benchmarks using both Fortran and C:
`-O5 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align -qalias=nostd`

Base Other Flags

C benchmarks:

C++ benchmarks:

Fortran benchmarks:

Benchmarks using both Fortran and C:

Peak Compiler Invocation

C benchmarks:
`xlc -qlanglvl=extc99`

Continued on next page

Peak Compiler Invocation (Continued)

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: -DSPEC_CPU_LP64 -qfixed -qextname
437.leslie3d: -qfixed
453.povray: -DSPEC_CPU_LP64
454.calculix: -qfixed -qextname
481.wrf: -DNOUNDERSCORE
482.sphinx3: -qchars=signed

Peak Optimization Flags

C benchmarks:

433.milc: -Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads
-lhugetlbfs

470.lbm: basepeak = yes

482.sphinx3: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7
-qtune=pwr7 -qipa=threads -lhugetlbfs

C++ benchmarks:

444.namd: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7
-qtune=pwr7 -qipa=threads -lhugetlbfs

447.dealII: -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qrtti
-qcpp_stdinc=/opt/stdcxx421/include/ansi:/opt/stdcxx421/include:/opt/ibmcmp/vacpp/12.1/i
-lsmartheap -L/opt/stdcxx421/lib -R/opt/stdcxx421/lib
-lstd8d

450.soplex: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=pwr7
-qtune=pwr7 -q64 -lhugetlbfs

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Peak Optimization Flags (Continued)

453.povray: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsimd -q64 -lsmartheap64

Fortran benchmarks:

410.bwaves: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsmallstack=dynlenonheap -q64 -lhugetlbfs

416.gamess: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qalias=nostd -lhugetlbfs

434.zeusmp: basepeak = yes

437.leslie3d: -Wl,-q -O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads -q64 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

459.GemsFDTD: -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsimd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

465.tonto: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsimd -lhugetlbfs

Benchmarks using both Fortran and C:

435.gromacs: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsimd -lhugetlbfs

436.cactusADM: -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsimd -qnostrict -q64 -lhugetlbfs

454.calculix: basepeak = yes

481.wrf: basepeak = yes

Peak Other Flags

C benchmarks:

C++ benchmarks:

Fortran benchmarks:

Benchmarks using both Fortran and C:

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/IBM-Power.html
http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20121024.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2006/flags/IBM-Power.xml
http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20121024.xml

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