SPEC® CFP2006 Result

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IBM Corporation

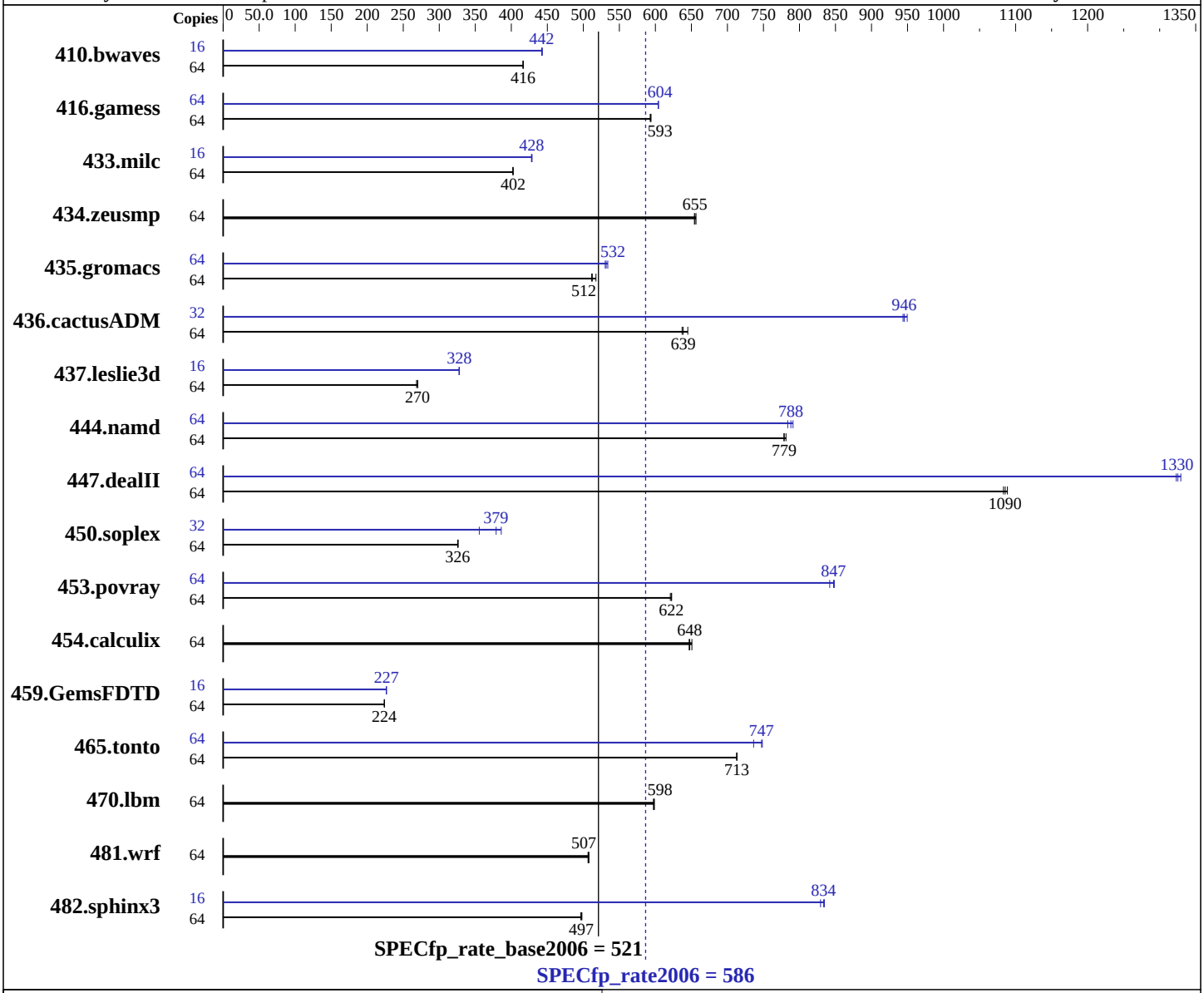
IBM Power 740 Express (4.2 GHz, 16 core, SLES)

SPECfp®_rate2006 = 586

SPECfp_rate_base2006 = 521

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

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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 (32 x 4 GB) DDR3 1066 MHz
Disk Subsystem: 5 x 146.8 GB Raid0 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	2090	416	2088	417	**2088**	**416**	16	491	443	492	442	**492**	**442**
416.gamess	64	**2113**	**593**	2110	594	2113	593	64	**2075**	**604**	2075	604	2073	604
433.milc	64	1461	402	1460	403	**1460**	**402**	16	343	428	**343**	**428**	343	429
434.zeusmp	64	890	654	**889**	**655**	887	656	64	890	654	**889**	**655**	887	656
435.gromacs	64	893	512	883	518	**892**	**512**	64	856	534	**859**	**532**	862	530
436.cactusADM	64	1201	637	1186	645	**1198**	**639**	32	**404**	**946**	405	944	403	950
437.leslie3d	64	2241	268	**2230**	**270**	2226	270	16	459	327	459	328	**459**	**328**
444.namd	64	**659**	**779**	657	781	659	778	64	649	791	**651**	**788**	655	784
447.dealII	64	676	1080	**674**	**1090**	673	1090	64	**552**	**1330**	553	1320	551	1330
450.soplex	64	**1639**	**326**	1636	326	1640	325	32	751	356	**704**	**379**	691	386
453.povray	64	549	621	547	623	**547**	**622**	64	401	848	404	842	**402**	**847**
454.calculix	64	**815**	**648**	811	651	816	647	64	**815**	**648**	811	651	816	647
459.GemsFDTD	64	3034	224	**3034**	**224**	3034	224	16	750	226	749	227	**749**	**227**
465.tonto	64	883	713	884	713	**883**	**713**	64	841	748	855	736	**843**	**747**
470.lbm	64	1469	599	1472	597	**1471**	**598**	64	1469	599	1472	597	**1471**	**598**
481.wrf	64	**1411**	**507**	1408	508	1411	507	64	**1411**	**507**	1408	508	1411	507
482.sphinx3	64	**2509**	**497**	2505	498	2512	497	16	376	829	**374**	**834**	374	835

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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