SPEC® CFP2006 Result

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IBM Corporation

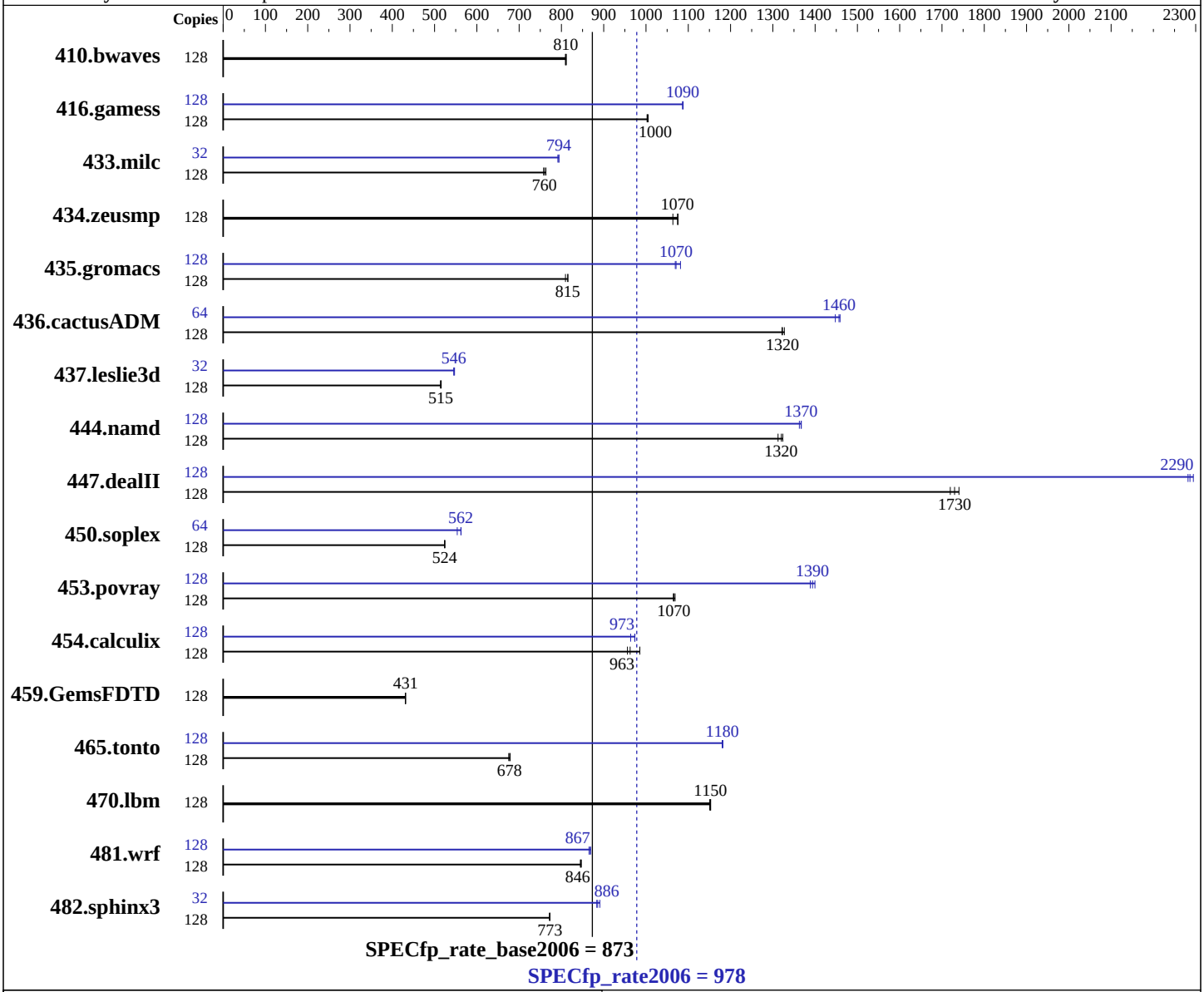
IBM Power 750 Express (3.55 GHz, 32 core, RedHat)

SPECfp®_rate2006 = 978

SPECfp_rate_base2006 = 873

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

Test date: Oct-2010
Hardware Availability: Feb-2010
Software Availability: Nov-2010



Hardware

CPU Name:	POWER7
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 3.86 GHz
CPU MHz:	3556
FPU:	Integrated
CPU(s) enabled:	32 cores, 4 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable:	8,16,24,32 cores
Primary Cache:	32 KB I + 32 KB D on chip per core

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 6.0 (ppc64), Kernel 2.6.32-71.el6.ppc64
Compiler:	IBM XL C/C++ for Linux, V11.1 Updated with the Nov2010 PTF IBM XL Fortran for Linux, V13.1 Updated with the Nov2010 PTF
Auto Parallel:	No
File System:	ext2
System State:	Run level 3 (multi-user)

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Secondary Cache: 256 KB I+D on chip per core
L3 Cache: 4 MB I+D on chip per core
Other Cache: None
Memory: 256 GB (32x8 GB) DDR3 1066 MHz
Disk Subsystem: 6x146.8 GB Software RAID-0 SAS SFF 15K RPM
Other Hardware: None

Base Pointers: 32-bit
Peak Pointers: 32/64-bit
Other Software: -Post-Link Optimization for Linux on POWER, Version 5.5.0-3
-MicroQuill SmartHeap 9
-Apache C++ Standard Library 4.2.1

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	128	2143	812	2149	810	**2147**	**810**	128	2143	812	2149	810	**2147**	**810**
416.gamess	128	2500	1000	2493	1010	**2498**	**1000**	128	2304	1090	**2306**	**1090**	2307	1090
433.milc	128	1539	763	1550	758	**1546**	**760**	32	**370**	**794**	370	794	371	792
434.zeusmp	128	1083	1080	1095	1060	**1084**	**1070**	128	1083	1080	1095	1060	**1084**	**1070**
435.gromacs	128	1129	810	**1122**	**815**	1121	815	128	**853**	**1070**	845	1080	855	1070
436.cactusADM	128	**1156**	**1320**	1157	1320	1152	1330	64	**525**	**1460**	524	1460	528	1450
437.leslie3d	128	2333	516	2340	514	**2338**	**515**	32	**551**	**546**	550	547	551	546
444.namd	128	**778**	**1320**	782	1310	776	1320	128	751	1370	**751**	**1370**	753	1360
447.dealII	128	841	1740	852	1720	**847**	**1730**	128	**640**	**2290**	638	2290	642	2280
450.soplex	128	2037	524	2039	524	**2037**	**524**	64	964	554	**950**	**562**	948	563
453.povray	128	640	1060	**639**	**1070**	637	1070	128	487	1400	490	1390	**489**	**1390**
454.calculix	128	1072	985	1104	956	**1097**	**963**	128	1096	964	**1085**	**973**	1084	974
459.GemsFDTD	128	3153	431	**3148**	**431**	3147	431	128	3153	431	**3148**	**431**	3147	431
465.tonto	128	**1859**	**678**	1865	675	1856	679	128	1067	1180	**1067**	**1180**	1066	1180
470.lbm	128	1526	1150	1529	1150	**1526**	**1150**	128	1526	1150	1529	1150	**1526**	**1150**
481.wrf	128	1688	847	1692	845	**1690**	**846**	128	1652	865	**1650**	**867**	1645	869
482.sphinx3	128	**3228**	**773**	3233	772	3228	773	32	706	884	700	891	**704**	**886**

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

Peak Tuning Notes

```
IBM Post-Link Optimization tool with
options "-O4 -nodp" used for
  433.milc 435.gromacs 450.soplex 482.sphinx3
options "-O4 -vrox -nodp" used for
  434.zeusmp
options "-O3 -lu -1 -nodp -sdp 9"  used for
  437.leslie3d 444.namd
options "-O4"  used for
  465.tonto
```

Submit Notes

```
The config file option 'submit' was used.
 Benchmarks bound to a processor using numactl on the submit command.
```

Operating System Notes

```
ulimit -s (stack) set to 1048576.
Large pages reserved as follows by root user:
  echo 9000 > /proc/sys/vm/nr_hugepages
The following environment varibles were set before the runspec command:
  XLFRTEOPTS=intrinthds=1
  HUGETLB_VERBOSE=0
  HUGETLB_MORECORE=yes
  HUGETLB_ELFMAP=RW
447.dealII (peak): "apache_stdcxx_4_2_1" src.alt was used.
447.dealII (base): "apache_stdcxx_4_2_1" src.alt was used.
```

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 -B/usr/share/libhugetlbfs/ -tl
-Wl,--hugetlbfs-align
```

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

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

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

Base Other Flags

C benchmarks:
```
-qipa=threads
```

C++ benchmarks:
```
-qipa=threads
```

Fortran benchmarks:
```
-qipa=threads
```

Benchmarks using both Fortran and C:
```
-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: -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 -lhugetlbfs

470.lbm: basepeak = yes

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

C++ benchmarks:

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

447.dealII: -O4 -qarch=pwr7 -qtune=pwr7 -qrtti
-qcpp_stdinc=/autobench/sources/stdcxx-4.2.1/dist/include/ansi:/autobench/sources/stdcxx-4.2.1/dist/include:/opt/ibmcmp/vacpp/11.1/incl
-lsmartheap -L/autobench/sources/stdcxx-4.2.1/dist/lib
-R/autobench/sources/stdcxx-4.2.1/dist/lib -lstd8d

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

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

Fortran benchmarks:

410.bwaves: basepeak = yes

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

434.zeusmp: basepeak = yes

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Peak Optimization Flags (Continued)

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

459.GemsFDTD: `basepeak = yes`

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

Benchmarks using both Fortran and C:

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

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

454.calculix: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -qarch=pwr7 -qtune=pwr7 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

481.wrf: `-O3 -qarch=pwr7 -qtune=pwr7 -q64 -lhugetlbfs`

Peak Other Flags

C benchmarks:
`-qipa=threads`

C++ benchmarks (except as noted below):
`-qipa=threads`

Fortran benchmarks:
`-qipa=threads`

Benchmarks using both Fortran and C (except as noted below):
`-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.20101123.01.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20101123.01.xml`

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