SPEC® CFP2006 Result

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IBM Corporation

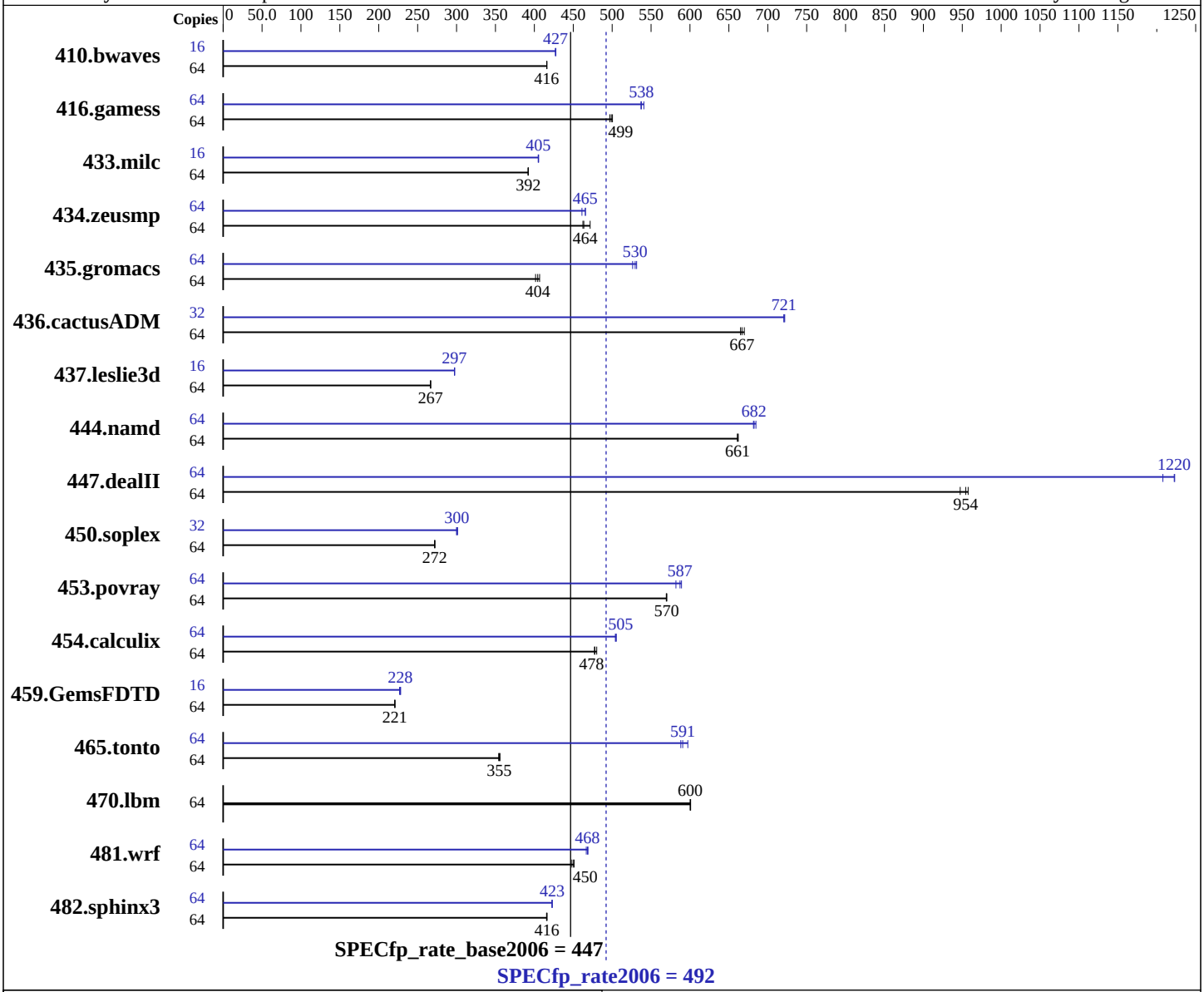
IBM Power 740 Express (3.55 GHz, 16 core, SLES)

SPECfp®_rate2006 = 492

SPECfp_rate_base2006 = 447

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

Test date: Jul-2010
Hardware Availability: Sep-2010
Software Availability: Aug-2010



Hardware

CPU Name:	POWER7
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 3.86 GHz
CPU MHz:	3556
FPU:	Integrated
CPU(s) enabled:	16 cores, 2 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable:	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 SP1 (ppc64), Kernel 2.6.32.12-0.7-ppc64
Compiler:	IBM XL C/C++ for Linux, V11.1 IBM XL Fortran for Linux, V13.1
Auto Parallel:	No
File System:	ext3
System State:	Run level 3 (multi-user)
Base Pointers:	32-bit

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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:	2x146.8 GB SAS SFF 15K RPM
Other Hardware:	None

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 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	2091	416	**2091**	**416**	16	509	427	**509**	**427**	508	428
416.gamess	64	2522	497	2504	500	**2512**	**499**	64	2334	537	**2331**	**538**	2317	541
433.milc	64	**1498**	**392**	1500	392	1497	392	16	363	405	**363**	**405**	362	406
434.zeusmp	64	1235	472	1259	462	**1256**	**464**	64	**1251**	**465**	1263	461	1251	466
435.gromacs	64	**1130**	**404**	1138	402	1123	407	64	**863**	**530**	860	531	868	526
436.cactusADM	64	1150	665	1142	670	**1147**	**667**	32	531	721	**530**	**721**	530	722
437.leslie3d	64	**2257**	**267**	2256	267	2257	267	16	**506**	**297**	505	298	506	297
444.namd	64	**776**	**661**	776	661	775	662	64	750	685	753	682	**752**	**682**
447.dealII	64	765	958	**767**	**954**	773	947	64	599	1220	**599**	**1220**	606	1210
450.soplex	64	1962	272	1964	272	**1962**	**272**	32	**889**	**300**	886	301	890	300
453.povray	64	597	570	598	570	**597**	**570**	64	585	582	**580**	**587**	578	589
454.calculix	64	1106	477	**1105**	**478**	1100	480	64	1045	505	1047	504	**1046**	**505**
459.GemsFDTD	64	**3076**	**221**	3076	221	3079	221	16	749	227	**745**	**228**	744	228
465.tonto	64	1778	354	**1774**	**355**	1770	356	64	**1066**	**591**	1071	588	1054	597
470.lbm	64	1465	600	1463	601	**1464**	**600**	64	1465	600	1463	601	**1464**	**600**
481.wrf	64	1598	447	**1590**	**450**	1585	451	64	1524	469	**1527**	**468**	1532	467
482.sphinx3	64	3001	416	2997	416	**2998**	**416**	64	2949	423	**2950**	**423**	2951	423

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

Peak Tuning Notes

```
fdpr binary 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 444.namd
     with options -O3 -lu -1 -nodp -sdp 9
  465.tonto
     with options -O4
```

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 4224 > /proc/sys/vm/nr_hugepages
The following environment varibles were set before the runspec command:
  export XLFRTEOPTS=intrinthds=1
  export HUGETLB_VERBOSE=0
  export HUGETLB_MORECORE=yes
  export HUGETLB_ELFMAP=RW
```

General Notes

```
447.dealII (peak): "apache_stdcxx_4_2_1" src.alt was used.
447.dealII (base): "apache_stdcxx_4_2_1" src.alt was used.

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

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`

Continued on next page

Base Portability Flags (Continued)

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

Base Optimization Flags

C benchmarks:
`-O5 -qarch=pwr7 -qtune=pwr7 -lhugetlbfs`

C++ benchmarks:
`-O5 -qarch=pwr7 -qtune=pwr7 -qrtti -lhugetlbfs`

Fortran benchmarks:
`-O5 -qarch=pwr7 -qtune=pwr7 -qsmallstack=dynlenonheap -qalias=nostd -lhugetlbfs`

Benchmarks using both Fortran and C:
`-O5 -qarch=pwr7 -qtune=pwr7 -qsmallstack=dynlenonheap -qalias=nostd -lhugetlbfs`

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`

Continued on next page

Peak Compiler Invocation (Continued)

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
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) -O5 -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/ir
-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 -lhugetlbfs

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

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Peak Optimization Flags (Continued)

Fortran benchmarks:

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

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

434.zeusmp: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qarch=pwr7 -qtune=pwr7 -qalias=nostd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

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

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

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: -O5 -qarch=pwr7 -qtune=pwr7 -qnostrict -qsmallstack=dynlenonheap -qalias=nostd -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:
-qipa=threads

Fortran benchmarks:
-qipa=threads

Benchmarks using both Fortran and C:
-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.20100901.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20100901.xml

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