SPEC® CFP2006 Result

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IBM Corporation

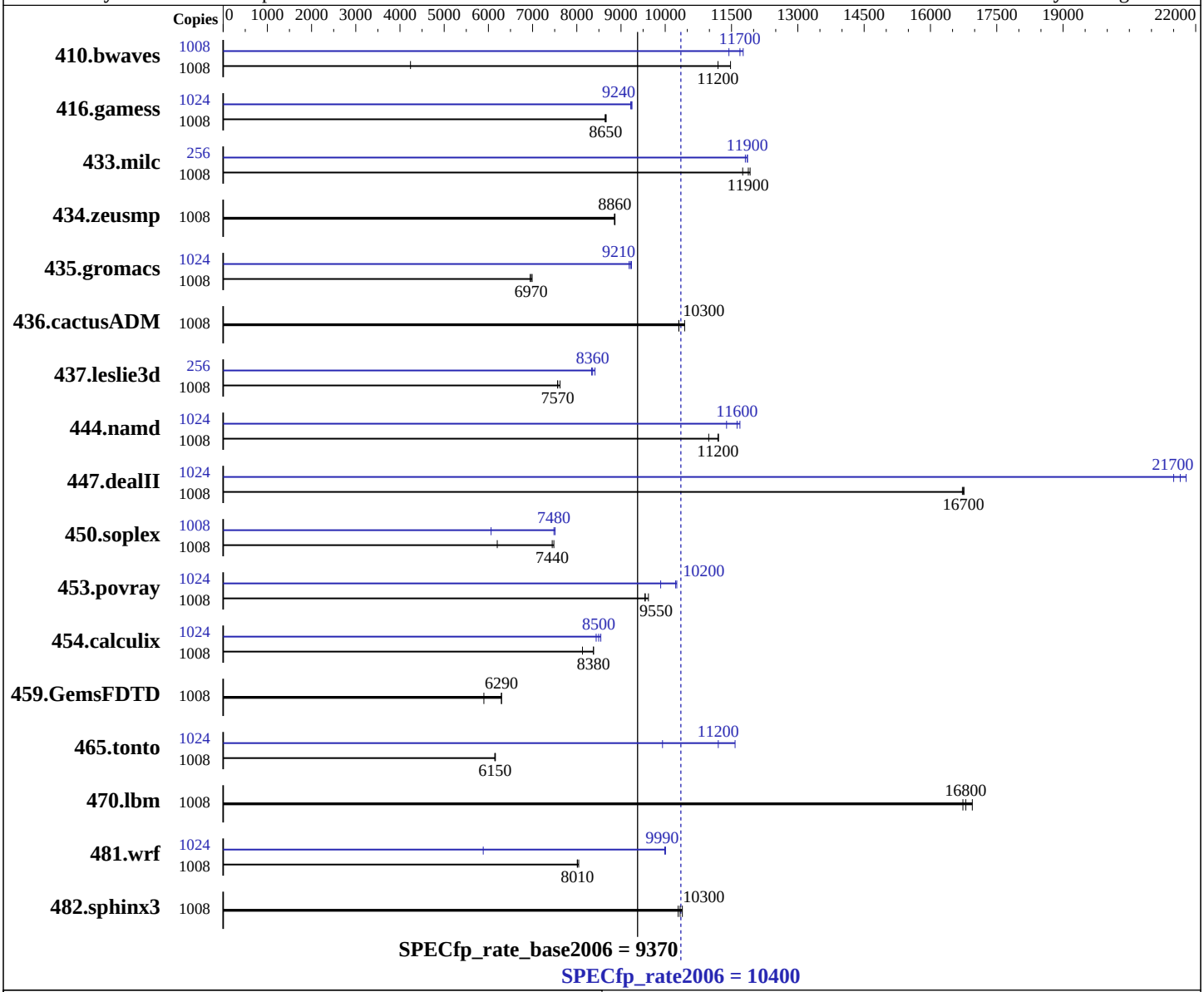
IBM Power 795 (4.0 GHz, 256 core, SLES)

SPECfp®_rate2006 = 10400

SPECfp_rate_base2006 = 9370

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

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



Hardware

CPU Name:	POWER7
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 4.14 GHz
CPU MHz:	4004
FPU:	Integrated
CPU(s) enabled:	256 cores, 32 chips, 8 cores/chip, 4 threads/core
CPU(s) orderable:	32,64,96,128,160,192,224,256 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:	xfs
System State:	Run level 5 (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: 2 TB (256x8 GB) DDR3 1066 MHz
Disk Subsystem: 17x146.8 GB Raid0 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	1008	3232	4240	1194	11500	**1224**	**11200**	1008	**1172**	**11700**	1197	11400	1164	11800
416.gamess	1008	**2281**	**8650**	2278	8660	2284	8640	1024	2169	9250	**2169**	**9240**	2175	9220
433.milc	1008	787	11800	776	11900	**779**	**11900**	256	**198**	**11900**	199	11800	198	11900
434.zeusmp	1008	**1035**	**8860**	1036	8850	1035	8860	1008	**1035**	**8860**	1036	8850	1035	8860
435.gromacs	1008	1036	6950	1030	6990	**1033**	**6970**	1024	796	9180	792	9240	**793**	**9210**
436.cactusADM	1008	1169	10300	1154	10400	**1168**	**10300**	1008	1169	10300	1154	10400	**1168**	**10300**
437.leslie3d	1008	1252	7570	1243	7620	**1252**	**7570**	256	289	8340	**288**	**8360**	286	8410
444.namd	1008	736	11000	**722**	**11200**	721	11200	1024	721	11400	**706**	**11600**	703	11700
447.dealII	1008	**689**	**16700**	690	16700	688	16800	1024	545	21500	**541**	**21700**	538	21800
450.soplex	1008	1356	6200	**1129**	**7440**	1124	7480	1008	1387	6060	**1123**	**7480**	1119	7510
453.povray	1008	562	9540	557	9620	**562**	**9550**	1024	550	9900	531	10300	**532**	**10200**
454.calculix	1008	993	8380	**993**	**8380**	1023	8130	1024	989	8540	**994**	**8500**	1001	8440
459.GemsFDTD	1008	1813	5900	1698	6300	**1699**	**6290**	1008	1813	5900	1698	6300	**1699**	**6290**
465.tonto	1008	1610	6160	1614	6140	**1612**	**6150**	1024	1014	9940	870	11600	**900**	**11200**
470.lbm	1008	**824**	**16800**	817	16900	828	16700	1008	**824**	**16800**	817	16900	828	16700
481.wrf	1008	1400	8040	1406	8010	**1405**	**8010**	1024	1944	5880	1143	10000	**1145**	**9990**
482.sphinx3	1008	1909	10300	1891	10400	**1901**	**10300**	1008	1909	10300	1891	10400	**1901**	**10300**

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 436.cactusADM 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 67584 > /proc/sys/vm/nr_overcommit_hugepages
The following environment varibles were set before the runspec command:
      export HUGETLB_VERBOSE=0
      export HUGETLB_MORECORE=yes
      export HUGETLB_ELFMAP=W
      export XLFRTEOPTS=intrinthds=1
```

General Notes

```
 447.dealII (peak): "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
     437.leslie3d: -qfixed
```

Continued on next page

Base Portability Flags (Continued)

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

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

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`

Continued on next page

Peak Compiler Invocation (Continued)

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: `basepeak = yes`

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=/root/stdcxx421/include/ansi:/root/stdcxx421/include -lsmartheap -lhugetlbfs -L/root/stdcxx421/lib -R/root/stdcxx421/lib -lstd8d`

450.soplex: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O3 -qtune=auto -qarch=pwr5 -lhugetlbfs`

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

Fortran benchmarks:

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

Continued on next page

Peak Optimization Flags (Continued)

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

434.zeusmp: `basepeak = yes`

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: `basepeak = yes`

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=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.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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Tested with SPEC CPU2006 v1.1.
Report generated on Wed Jul 23 12:46:11 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 28 September 2010.