SPEC® CFP2006 Result

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IBM Corporation

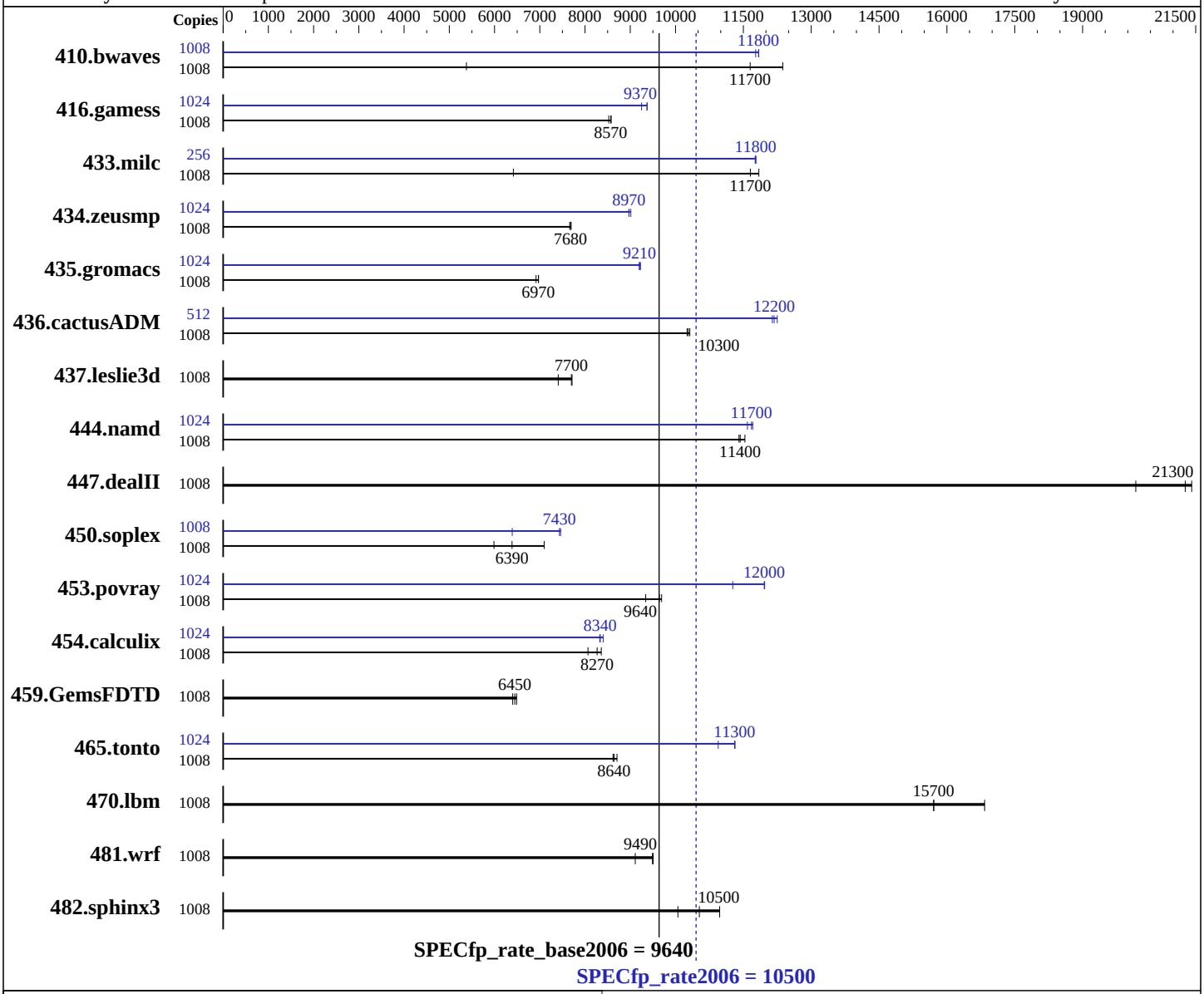
IBM Power 795 (4.0 GHz, 256 core, RedHat)

SPECfp®_rate2006 = 10500

SPECfp_rate_base2006 = 9640

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

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

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:	2 TB (256x8 GB) DDR3 1066 MHz
Disk Subsystem:	17x146.8 GB Raid0 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 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	1107	12400	2547	5380	**1176**	**11700**	1008	1164	11800	**1157**	**11800**	1157	11800
416.gamess	1008	2315	8530	**2303**	**8570**	2301	8580	1024	**2140**	**9370**	2167	9250	2139	9370
433.milc	1008	781	11800	1442	6420	**794**	**11700**	256	**200**	**11800**	200	11800	200	11800
434.zeusmp	1008	**1194**	**7680**	1192	7690	1197	7660	1024	**1038**	**8970**	1034	9010	1039	8970
435.gromacs	1008	1040	6920	**1033**	**6970**	1032	6970	1024	792	9230	**794**	**9210**	795	9200
436.cactusADM	1008	1167	10300	1174	10300	**1171**	**10300**	512	504	12100	**502**	**12200**	499	12200
437.leslie3d	1008	1228	7710	**1231**	**7700**	1279	7410	1008	1228	7710	**1231**	**7700**	1279	7410
444.namd	1008	**707**	**11400**	709	11400	701	11500	1024	709	11600	701	11700	**703**	**11700**
447.dealII	1008	539	21400	**542**	**21300**	572	20200	1008	539	21400	**542**	**21300**	572	20200
450.soplex	1008	1404	5990	**1316**	**6390**	1185	7100	1008	1315	6390	**1131**	**7430**	1127	7460
453.povray	1008	574	9340	**556**	**9640**	553	9690	1024	484	11300	**455**	**12000**	455	12000
454.calculix	1008	995	8360	1031	8070	**1006**	**8270**	1024	1006	8400	**1013**	**8340**	1015	8330
459.GemsFDTD	1008	1671	6400	**1659**	**6450**	1649	6490	1008	1671	6400	**1659**	**6450**	1649	6490
465.tonto	1008	1139	8710	1151	8620	**1148**	**8640**	1024	921	10900	890	11300	**891**	**11300**
470.lbm	1008	823	16800	882	15700	**882**	**15700**	1008	823	16800	882	15700	**882**	**15700**
481.wrf	1008	1184	9510	**1186**	**9490**	1236	9110	1008	1184	9510	**1186**	**9490**	1236	9110
482.sphinx3	1008	1790	11000	**1866**	**10500**	1954	10100	1008	1790	11000	**1866**	**10500**	1954	10100

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

Peak Tuning Notes

```
Post-Link 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
470.lbm
     with options -kr -O4 -sdp 9 -vrox -m power7
```

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 2097152.
 ulimit -n (open files) set to 20480.
 ulimit -u (user processes) set to unlimited
Large pages reserved as follows by root user:
      echo 68608 > /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=RW
      export XLFRTEOPTS=intrinthds=1
```

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`

Continued on next page

Base Portability Flags (Continued)

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

Base Optimization Flags

C benchmarks:
`-O5 -lhugetlbfs`

C++ benchmarks:
`-O4 -qrtti`
`-qcpp_stdinc=/root/stdcxx421/include/ansi:/root/stdcxx421/include:/opt/ibmcmp/vacpp/11.1/include`
`-lhugetlbfs -L/root/stdcxx421/lib -R/root/stdcxx421/lib -lstd8d`

Fortran benchmarks:
`-O5 -qalias=nostd -lhugetlbfs`

Benchmarks using both Fortran and C:
`-O5 -qalias=nostd -lhugetlbfs`

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`

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 -DSPEC_CPU_LP64
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 -lhugetlbfs

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

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

447.dealII: basepeak = yes

450.soplex: -Wl,-q -O3 -qarch=auto -qtune=auto -lhugetlbfs

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

Fortran benchmarks:

410.bwaves: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -q64 -lhugetlbfs

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

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Peak Optimization Flags (Continued)

434.zeusmp: `-O5 -qsmallstack=dynlenonheap -qalias=nostd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

437.leslie3d: `basepeak = yes`

459.GemsFDTD: `basepeak = yes`

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

Benchmarks using both Fortran and C:

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

436.cactusADM: `-Wl,-q -O4 -q64 -qsimd -qnostrict -qsmallstack=dynlenonheap -qalias=nostd -lhugetlbfs`

454.calculix: `-qpdf1`(pass 1) `-qpdf2`(pass 2) `-O5 -lhugetlbfs`

481.wrf: `basepeak = yes`

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.20101123.00.html`

You can also download the XML flags source by saving the following link:
`http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20101123.00.xml`

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