SPEC® CFP2006 Result

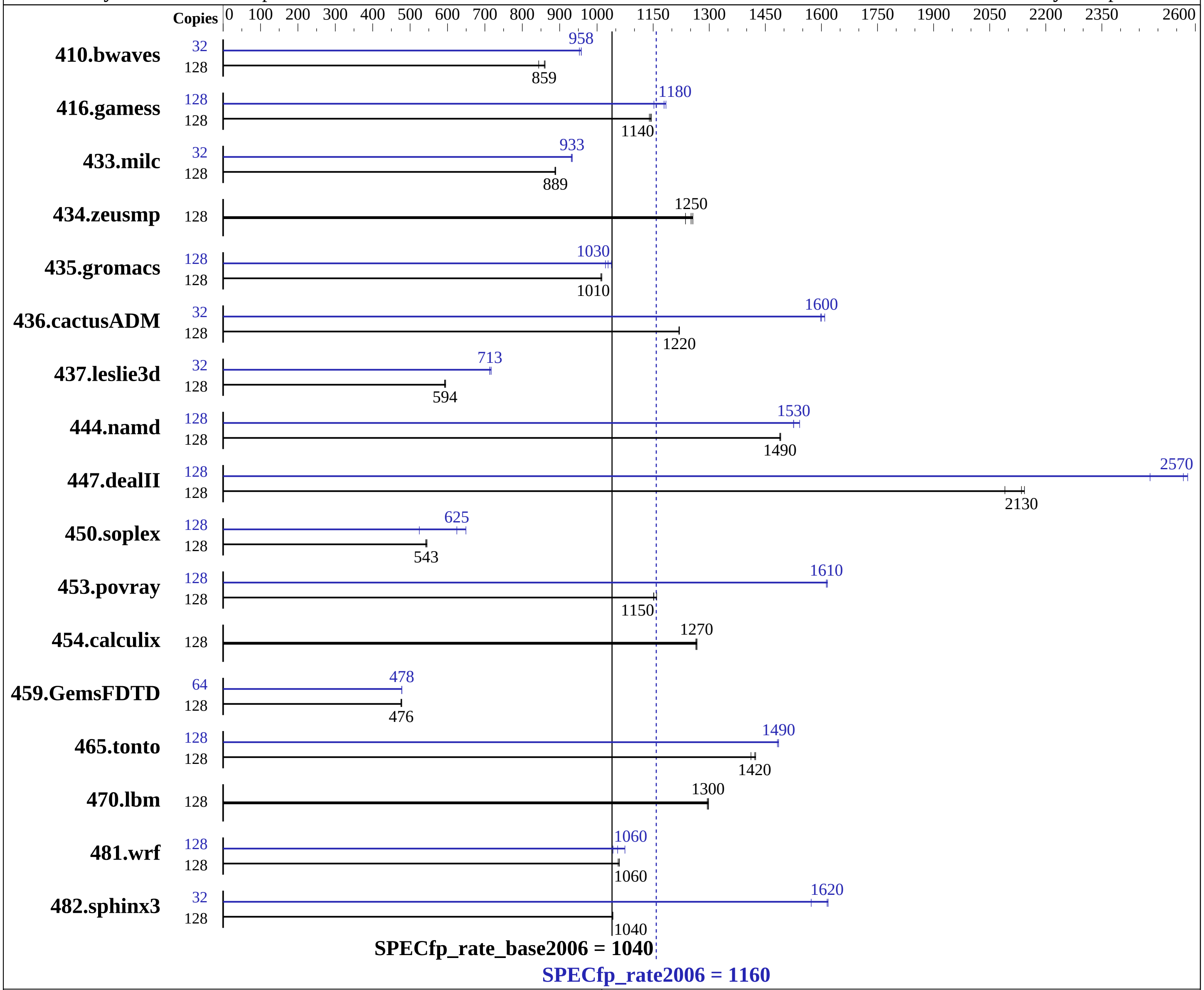
IBM Corporation

IBM PowerLinux 7R4 (4.0 GHz, 32 core, RHEL)

SPECfp®_rate2006 = 1160

SPECfp_rate_base2006 = 1040

CPU2006 license: 11		**Test date:**	May-2013
Test sponsor:	IBM Corporation	**Hardware Availability:**	Aug-2013
Tested by:	IBM Corporation	**Software Availability:**	Apr-2013



Hardware

CPU Name:	POWER7+
CPU Characteristics:	Intelligent Energy Optimization enabled, up to 4.431 GHz
CPU MHz:	4060
FPU:	Integrated
CPU(s) enabled:	32 cores, 8 chips, 4 cores/chip, 4 threads/core
CPU(s) orderable:	16, 32 cores
Primary Cache:	32 KB I + 32 KB D on chip per core

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Software

Operating System:	Red Hat Enterprise Linux Server release 6.4 (ppc64) kernel 2.6.32-358.6.1.el6.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:	ext4
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:	256 GB (64 x 4 GB) DDR3 1066 MHz
Disk Subsystem:	1 x 300 GB SAS SFF 15K RPM
Other Hardware:	None

Other Software:	-Post-Link Optimization for Linux on POWER, version 5.6.2-1 -MicroQuill SmartHeap 9 -Apache C++ Standard Library V4.2.1

Results Table

	Base							Peak						
Benchmark	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	128	2061	844	2020	861	**2025**	**859**	32	**454**	**958**	454	958	456	953
416.gamess	128	**2192**	**1140**	2189	1150	2199	1140	128	2116	1180	2175	1150	**2125**	**1180**
433.milc	128	**1322**	**889**	1321	889	1324	887	32	315	934	**315**	**933**	316	931
434.zeusmp	128	942	1240	**931**	**1250**	927	1260	128	942	1240	**931**	**1250**	927	1260
435.gromacs	128	904	1010	902	1010	**904**	**1010**	128	880	1040	894	1020	**888**	**1030**
436.cactusADM	128	**1254**	**1220**	1255	1220	1253	1220	32	**239**	**1600**	238	1610	239	1600
437.leslie3d	128	2022	595	**2027**	**594**	2032	592	32	420	717	422	713	**422**	**713**
444.namd	128	**689**	**1490**	690	1490	688	1490	128	**673**	**1530**	673	1530	666	1540
447.dealII	128	700	2090	683	2140	**686**	**2130**	128	568	2580	**570**	**2570**	591	2480
450.soplex	128	1969	542	1958	545	**1966**	**543**	128	2034	525	**1708**	**625**	1644	649
453.povray	128	591	1150	**591**	**1150**	587	1160	128	422	1610	**422**	**1610**	421	1620
454.calculix	128	**834**	**1270**	833	1270	835	1260	128	**834**	**1270**	833	1270	835	1260
459.GemsFDTD	128	**2852**	**476**	2856	475	2842	478	64	**1421**	**478**	1421	478	1422	478
465.tonto	128	**886**	**1420**	892	1410	884	1420	128	**848**	**1490**	850	1480	848	1490
470.lbm	128	1355	1300	**1356**	**1300**	1358	1290	128	1355	1300	**1356**	**1300**	1358	1290
481.wrf	128	1349	1060	1354	1060	**1350**	**1060**	128	**1355**	**1060**	1371	1040	1331	1070
482.sphinx3	128	2393	1040	**2396**	**1040**	2398	1040	32	397	1570	**386**	**1620**	385	1620

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 April 2013 PTF
Version: 12.01.0000.0003
Fortran compiler updated to April 2013 PTF
Version: 14.01.0000.0003
```

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 8448 > /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

crashkernel was set to 256 MB in /etc/yaboot.conf file.
```

General Notes

```
Environment variables set by runspec before the start of the run:
HUGETLB_ELFMAP = "RW"
HUGETLB_MORECORE = "yes"
HUGETLB_VERBOSE = "0"
XLFRTEOPTS = "intrinthds=1"
```

Base Compiler Invocation

C benchmarks:
    xlc -qlanglvl=extc99

C++ benchmarks:
    xlC

Continued on next page

Base Compiler Invocation (Continued)

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

Base Optimization Flags

C benchmarks:
`-O5 -qarch=auto -qtune=auto -qipa=threads -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

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

Fortran benchmarks:
`-O5 -qarch=auto -qtune=auto -qipa=threads -qalias=nostd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align`

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

Base Other Flags

C benchmarks:

C++ benchmarks:

Fortran benchmarks:

Continued on next page

Base Other Flags (Continued)

Benchmarks using both Fortran and C:

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: `-qextname -qfixed`
436.cactusADM: `-DSPEC_CPU_LP64 -qfixed -qextname`
437.leslie3d: `-qfixed`
453.povray: `-DSPEC_CPU_LP64`
454.calculix: `-qextname -qfixed`
481.wrf: `-DNOUNDERSCORE`
482.sphinx3: `-qchars=signed`

Peak Optimization Flags

C benchmarks:

433.milc: `-Wl,-q -O5 -qarch=auto -qtune=auto -qipa=threads -lhugetlbfs`

470.lbm: `basepeak = yes`

482.sphinx3: `-Wl,-q -qpdf1`(pass 1) `-qpdf2`(pass 2) `-O4 -qipa=threads -lhugetlbfs`

C++ benchmarks:

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Peak Optimization Flags (Continued)

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

447.dealII: -O4 -qipa=threads -qrtti -qcpp_stdinc=/opt/stdcxx421/include/ansi:/opt/stdcxx421/include:/opt/ibmcmp/vacpp/12.1/include -lsmartheap -L/opt/stdcxx421/lib -R/opt/stdcxx421/lib -lstd8d

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

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

Fortran benchmarks:

410.bwaves: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qipa=threads -qsmallstack=dynlenonheap -q64 -lhugetlbfs

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

434.zeusmp: basepeak = yes

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

459.GemsFDTD: -O4 -qipa=threads -qsimd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

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

Benchmarks using both Fortran and C:

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

436.cactusADM: -O4 -qipa=threads -qsimd -qnostrict -q64 -qsmallstack=dynlenonheap -qalias=nostd -lhugetlbfs

454.calculix: basepeak = yes

481.wrf: -O3 -qarch=auto -qtune=auto -q64 -lhugetlbfs

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

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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