



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

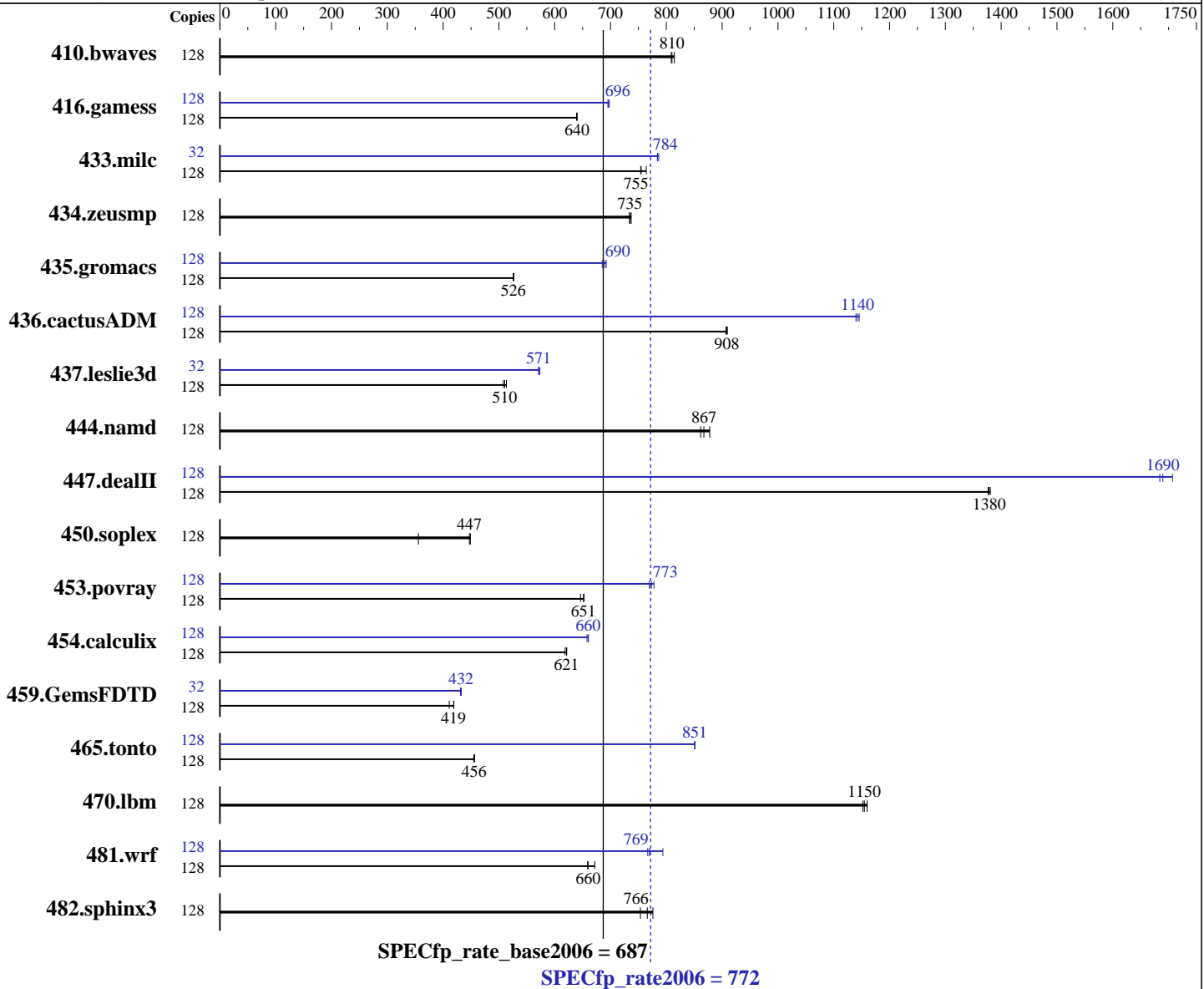
IBM BladeCenter PS704 Express (2.46 GHz, 32 core, RedHat)

SPECfp<sup>®</sup>\_rate2006 = 772

SPECfp\_rate\_base2006 = 687

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

Test date: Apr-2011  
Hardware Availability: May-2011  
Software Availability: Nov-2010



### Hardware

CPU Name: POWER7  
CPU Characteristics: Intelligent Energy Optimization not enabled  
CPU MHz: 2464  
FPU: Integrated  
CPU(s) enabled: 32 cores, 4 chips, 8 cores/chip, 4 threads/core  
CPU(s) orderable: 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  
Version: 11.01.0000.0001  
IBM XL Fortran for Linux, V13.1  
Version: 13.01.0000.0001  
Auto Parallel: No  
File System: ext3  
System State: Run Level 3 (multi-user)

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IBM BladeCenter PS704 Express (2.46 GHz, 32 core, RedHat)

SPECfp\_rate2006 = **772**

SPECfp\_rate\_base2006 = **687**

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Test date: Apr-2011  
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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 (32 x 8 GB) DDR3 1066 MHz  
Disk Subsystem: 1 x 600 GB SAS SFF 10K RPM  
Other Hardware: Installed in BladeCenter H

Base Pointers: 32-bit  
Peak Pointers: 32/64-bit  
Other Software: -Post-Link Optimization for Linux on POWER, Version 5.6.0-2  
-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	128	2136	814	<b>2147</b>	<b>810</b>	2150	809	128	2136	814	<b>2147</b>	<b>810</b>	2150	809
416.gamess	128	<b>3917</b>	<b>640</b>	3921	639	3916	640	128	3604	695	3592	698	<b>3603</b>	<b>696</b>
433.milc	128	1538	764	<b>1557</b>	<b>755</b>	1558	754	32	374	786	375	784	<b>375</b>	<b>784</b>
434.zeusmp	128	1587	734	<b>1585</b>	<b>735</b>	1580	737	128	1587	734	<b>1585</b>	<b>735</b>	1580	737
435.gromacs	128	<b>1738</b>	<b>526</b>	1735	527	1738	526	128	1334	685	<b>1325</b>	<b>690</b>	1320	692
436.cactusADM	128	1687	907	1682	909	<b>1684</b>	<b>908</b>	128	1342	1140	<b>1339</b>	<b>1140</b>	1335	1150
437.leslie3d	128	2344	513	2368	508	<b>2358</b>	<b>510</b>	32	525	573	<b>526</b>	<b>571</b>	527	571
444.namd	128	<b>1184</b>	<b>867</b>	1192	862	1169	878	128	<b>1184</b>	<b>867</b>	1192	862	1169	878
447.dealII	128	<b>1062</b>	<b>1380</b>	1061	1380	1064	1380	128	858	1710	869	1680	<b>867</b>	<b>1690</b>
450.soplex	128	<b>2388</b>	<b>447</b>	3001	356	2378	449	128	<b>2388</b>	<b>447</b>	3001	356	2378	449
453.povray	128	1054	646	1043	653	<b>1045</b>	<b>651</b>	128	<b>881</b>	<b>773</b>	885	769	875	778
454.calculix	128	1707	619	<b>1700</b>	<b>621</b>	1699	622	128	1599	660	<b>1600</b>	<b>660</b>	1605	658
459.GemsFDTD	128	3305	411	3239	419	<b>3243</b>	<b>419</b>	32	<b>786</b>	<b>432</b>	785	433	788	431
465.tonto	128	2766	455	2760	456	<b>2765</b>	<b>456</b>	128	1479	851	1480	851	<b>1480</b>	<b>851</b>
470.lbm	128	1516	1160	<b>1523</b>	<b>1150</b>	1526	1150	128	1516	1160	<b>1523</b>	<b>1150</b>	1526	1150
481.wrf	128	2170	659	<b>2167</b>	<b>660</b>	2129	672	128	1865	767	<b>1858</b>	<b>769</b>	1801	794
482.sphinx3	128	<b>3257</b>	<b>766</b>	3311	754	3215	776	128	<b>3257</b>	<b>766</b>	3311	754	3215	776

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 -nodp -m power7" used for 434.zeusmp  
options "-O3 -lu -l -nodp -sdp 9 -m power7" used for 436.cactusADM  
options "-O3 -lu -l -nodp -sdp 9" used for 437.leslie3d 444.namd  
options "-O4" used for 465.tonto



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## 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 variables were set before the runspec command:  
XLFRTEOPTS=intrinthds=1  
HUGETLB\_VERBOSE=0  
HUGETLB\_MORECORE=yes  
HUGETLB\_ELFMAP=RW

447.dealII (peak): "apache\_stdclx\_4\_2\_1" src.alt was used.  
447.dealII (base): "apache\_stdclx\_4\_2\_1" src.alt was used.

The Apache C++ Standard Library V4.2.1 was installed from  
<http://stdclx.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  
454.calculix: -qfixed -qextname  
481.wrf: -DNOUNDERSCORE  
482.sphinx3: -qchars=signed



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## Base Optimization Flags

C benchmarks:

-O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads -B/usr/share/libhugetlbfs/  
-tl -Wl,--hugetlbfs-align

C++ benchmarks:

-O4 -qsimd -qrtti -lhugetlbfs -lsmartheap

Fortran benchmarks:

-O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsmallstack=dynlenonheap  
-qalias=nostd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

Benchmarks using both Fortran and C:

-O5 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsmallstack=dynlenonheap  
-qalias=nostd -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

## Base Other Flags

C benchmarks:

C++ benchmarks:

Fortran benchmarks:

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

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## Peak Portability Flags (Continued)

434.zeusmp: -qfixed  
 435.gromacs: -qfixed -qextname  
 436.cactusADM: -DSPEC\_CPU\_LP64 -qfixed -qextname  
 437.leslie3d: -qfixed  
 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 -qipa=threads -lhugetlbfs

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

### C++ benchmarks:

444.namd: basepeak = yes

447.dealII: -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qrtti  
 -qcpp\_stdinc=/autobench/sources/stdcxx-4.2.1/dist/include/ansi:/autobench/sources/stdcxx-4.2.1/dist/include:/opt/ibmcomp/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: basepeak = yes

453.povray: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsimd -lsmartheap

### Fortran benchmarks:

410.bwaves: basepeak = yes

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

434.zeusmp: basepeak = yes

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

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

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## Peak Optimization Flags (Continued)

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

Benchmarks using both Fortran and C:

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

436.cactusADM: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -qnostrict -qsimd -q64  
-lhugetlbfs

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

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

## Peak Other Flags

C benchmarks:

C++ benchmarks:

Fortran benchmarks:

Benchmarks using both Fortran and C:

The flags file that was used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20110426.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20110426.xml>

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