



# SPEC® CFP2006 Result

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## IBM Corporation

SPECfp®\_rate2006 = 1170

IBM Power 750 Express (4.0 GHz, 32 core, SLES)

SPECfp\_rate\_base2006 = 1050

CPU2006 license: 11

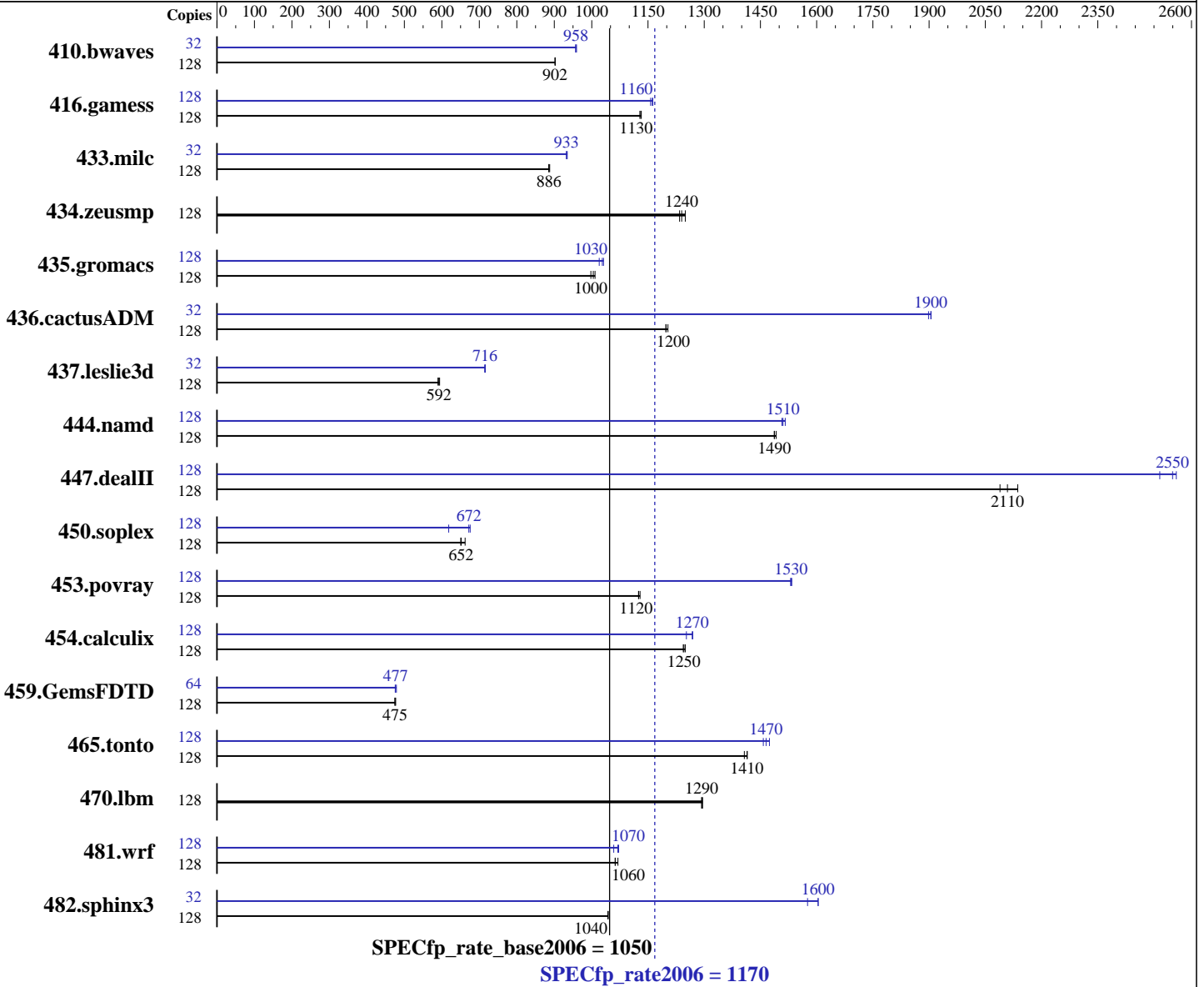
Test date: Jan-2013

Test sponsor: IBM Corporation

Hardware Availability: Mar-2013

Tested by: IBM Corporation

Software Availability: Dec-2012



### 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: 8, 16, 24, 32 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 SP2 (ppc64) kernel 3.0.42-0.7-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: ext3  
 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: 3 x 146.8 GB Raid0 SAS SFF 15K RPM  
 Other Hardware: None

Other Software: -Post-Link Optimization for Linux on POWER, version 5.6.1-7  
 -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	1929	902	<b><u>1928</u></b>	<b><u>902</u></b>	1927	903	32	454	957	<b><u>454</u></b>	<b><u>958</u></b>	453	959		
416.gamess	128	<b><u>2217</u></b>	<b><u>1130</u></b>	2214	1130	2221	1130	128	2155	1160	<b><u>2158</u></b>	<b><u>1160</u></b>	2166	1160		
433.milc	128	<b><u>1327</u></b>	<b><u>886</u></b>	1324	888	1327	885	32	<b><u>315</u></b>	<b><u>933</u></b>	314	935	315	932		
434.zeusmp	128	932	1250	<b><u>939</u></b>	<b><u>1240</u></b>	944	1230	128	932	1250	<b><u>939</u></b>	<b><u>1240</u></b>	944	1230		
435.gromacs	128	906	1010	<b><u>910</u></b>	<b><u>1000</u></b>	916	998	128	<b><u>889</u></b>	<b><u>1030</u></b>	896	1020	886	1030		
436.cactusADM	128	1271	1200	1277	1200	<b><u>1277</u></b>	<b><u>1200</u></b>	32	201	1900	201	1910	<b><u>201</u></b>	<b><u>1900</u></b>		
437.leslie3d	128	<b><u>2032</u></b>	<b><u>592</u></b>	2025	594	2041	590	32	<b><u>420</u></b>	<b><u>716</u></b>	420	716	421	714		
444.namd	128	688	1490	690	1490	<b><u>690</u></b>	<b><u>1490</u></b>	128	681	1510	677	1520	<b><u>680</u></b>	<b><u>1510</u></b>		
447.dealII	128	701	2090	<b><u>694</u></b>	<b><u>2110</u></b>	685	2140	128	<b><u>574</u></b>	<b><u>2550</u></b>	572	2560	582	2520		
450.soplex	128	1641	650	1612	662	<b><u>1638</u></b>	<b><u>652</u></b>	128	1726	618	<b><u>1589</u></b>	<b><u>672</u></b>	1580	676		
453.povray	128	605	1120	<b><u>605</u></b>	<b><u>1120</u></b>	603	1130	128	<b><u>445</u></b>	<b><u>1530</u></b>	445	1530	444	1530		
454.calculix	128	845	1250	849	1240	<b><u>848</u></b>	<b><u>1250</u></b>	128	832	1270	<b><u>833</u></b>	<b><u>1270</u></b>	843	1250		
459.GemsFDTD	128	2860	475	2848	477	<b><u>2859</u></b>	<b><u>475</u></b>	64	1428	476	<b><u>1425</u></b>	<b><u>477</u></b>	1418	479		
465.tonto	128	895	1410	<b><u>890</u></b>	<b><u>1410</u></b>	890	1410	128	864	1460	855	1470	<b><u>860</u></b>	<b><u>1470</u></b>		
470.lbm	128	1357	1300	1360	1290	<b><u>1360</u></b>	<b><u>1290</u></b>	128	1357	1300	1360	1290	<b><u>1360</u></b>	<b><u>1290</u></b>		
481.wrf	128	1346	1060	1336	1070	<b><u>1346</u></b>	<b><u>1060</u></b>	128	1351	1060	<b><u>1337</u></b>	<b><u>1070</u></b>	1334	1070		
482.sphinx3	128	2392	1040	2390	1040	<b><u>2391</u></b>	<b><u>1040</u></b>	32	396	1580	389	1600	<b><u>389</u></b>	<b><u>1600</u></b>		

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 December 2012 PTF  
 Version: 12.01.0000.0002  
 Fortran compiler updated to December 2012 PTF  
 Version: 14.01.0000.0002

## 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

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## 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

The following environment variables were set before the runspec command:  
export HUGETLB\_VERBOSE=0  
export HUGETLB\_MORECORE=yes  
export HUGETLB\_ELFMAP=RW  
export XLFRTEOPTS=intrinths=1

## Platform Notes

Hardware Page Table (HPT) ratio changed as follows by root user on Hardware Management Console (HMC):  
chsyscfg -m <CEC NAME> -r prof -i "name=<PROFILE NAME>,lpar\_name=<PARTITION NAME>,hpt\_ratio=1:512"

## Base Compiler Invocation

C benchmarks:  
xlc -qlanglvl=extc99

C++ benchmarks:  
xlC

Fortran benchmarks:  
xlf95

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## Base Compiler Invocation (Continued)

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

## Base Optimization Flags

C benchmarks:

-O5 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

C++ benchmarks:

-O5 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads -qrtti  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

Fortran benchmarks:

-O5 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads -qalias=nostd  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align

Benchmarks using both Fortran and C:

-O5 -qarch=pwr7 -qtune=pwr7 -q32 -qipa=threads  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-align -qalias=nostd

## Base Other Flags

C benchmarks:

C++ benchmarks:

Fortran benchmarks:

Benchmarks using both Fortran and C:



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## 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: -qfixed -qextname

436.cactusADM: -DSPEC\_CPU\_LP64 -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 -qipa=threads  
-lhugetlbfs

470.lbm: basepeak = yes

482.sphinx3: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qarch=pwr7  
-qtune=pwr7 -qipa=threads -lhugetlbfs

C++ benchmarks:

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

447.dealIII: -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qrtti  
-qcpp\_stdinc=/opt/stdcxx421/include/ansi:/opt/stdcxx421/include:/opt/ibmcomp/vacpp/12.1/i  
-lsmartheap -L/opt/stdcxx421/lib -R/opt/stdcxx421/lib  
-lstd8d

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## Peak Optimization Flags (Continued)

450.soplex: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=pwr7  
-qtune=pwr7 -q64 -lhugetlbfs

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

Fortran benchmarks:

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

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

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: -O4 -qarch=pwr7 -qtune=pwr7 -qipa=threads -qsimd  
-qnostrict -q64 -lhugetlbfs

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

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

## Peak Other Flags

C benchmarks:

C++ benchmarks:

Fortran benchmarks:

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## Peak Other Flags (Continued)

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.20130226.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.20130226.xml>

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20121024.xml>

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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