



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

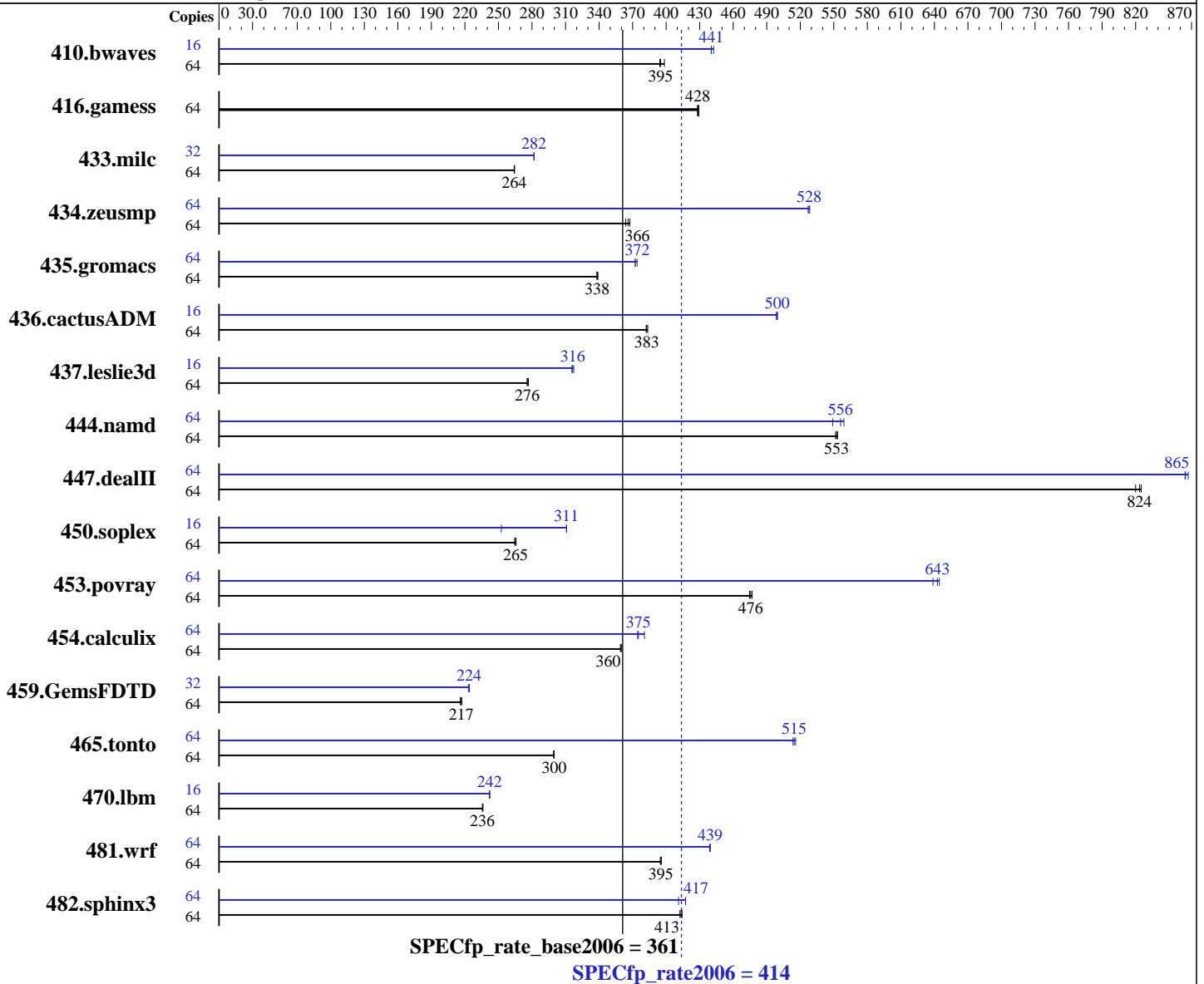
IBM BladeCenter PS702 Express (3.0 GHz, 16 core, SLES)

**SPECfp<sup>®</sup>\_rate2006 = 414**

**SPECfp\_rate\_base2006 = 361**

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

Test date: Mar-2010  
Hardware Availability: Jun-2010  
Software Availability: Dec-2009



### Hardware

CPU Name: POWER7  
CPU Characteristics: Intelligent Energy Optimization enabled, up to 3.30 GHz  
CPU MHz: 3000  
FPU: Integrated  
CPU(s) enabled: 16 cores, 2 chips, 8 cores/chip, 4 threads/core  
CPU(s) orderable: 16 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 (ppc64), Kernel 2.6.27.19-5-ppc64  
Compiler: IBM XL C/C++ for Linux, V10.1 Updated with the Oct2009 PTF  
IBM XL Fortran for Linux, V12.1 Updated with the Oct2009 PTF  
Auto Parallel: No  
File System: ext3

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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: 128 GB (32x4 GB) DDR3 1066 MHz  
 Disk Subsystem: 1x300 GB SAS SFF 10K RPM  
 Other Hardware: None

System State: Run level 3 (multi-user)  
 Base Pointers: 32-bit  
 Peak Pointers: 32/64-bit  
 Other Software: -Post-Link Optimization for Linux on POWER, Version 5.5.0-1  
 -MicroQuill SmartHeap 9

## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	64	<b>2202</b>	<b>395</b>	2183	398	2206	394	16	491	443	<b>494</b>	<b>441</b>	494	440		
416.gamess	64	<b>2925</b>	<b>428</b>	2919	429	2927	428	64	<b>2925</b>	<b>428</b>	2919	429	2927	428		
433.milc	64	2225	264	2222	264	<b>2224</b>	<b>264</b>	32	<b>1042</b>	<b>282</b>	1043	282	1042	282		
434.zeusmp	64	1584	368	1600	364	<b>1591</b>	<b>366</b>	64	<b>1103</b>	<b>528</b>	1102	528	1105	527		
435.gromacs	64	<b>1351</b>	<b>338</b>	1352	338	1348	339	64	1222	374	<b>1227</b>	<b>372</b>	1227	372		
436.cactusADM	64	<b>1999</b>	<b>383</b>	2001	382	1994	384	16	383	500	<b>383</b>	<b>500</b>	384	499		
437.leslie3d	64	2182	276	2174	277	<b>2182</b>	<b>276</b>	16	<b>475</b>	<b>316</b>	476	316	474	317		
444.namd	64	931	552	<b>929</b>	<b>553</b>	928	553	64	918	559	935	549	<b>923</b>	<b>556</b>		
447.dealII	64	888	825	<b>889</b>	<b>824</b>	893	820	64	844	867	<b>847</b>	<b>865</b>	847	864		
450.soplex	64	2018	264	2009	266	<b>2012</b>	<b>265</b>	16	528	253	429	311	<b>429</b>	<b>311</b>		
453.povray	64	717	475	<b>716</b>	<b>476</b>	714	477	64	528	644	<b>530</b>	<b>643</b>	533	639		
454.calculix	64	1470	359	<b>1468</b>	<b>360</b>	1467	360	64	1387	381	<b>1407</b>	<b>375</b>	1410	374		
459.GemsFDTD	64	3147	216	3127	217	<b>3132</b>	<b>217</b>	32	<b>1518</b>	<b>224</b>	1522	223	1515	224		
465.tonto	64	<b>2101</b>	<b>300</b>	2104	299	2100	300	64	1227	513	1221	516	<b>1224</b>	<b>515</b>		
470.lbm	64	<b>3730</b>	<b>236</b>	3723	236	3730	236	16	908	242	909	242	<b>908</b>	<b>242</b>		
481.wrf	64	1811	395	<b>1808</b>	<b>395</b>	1807	396	64	1627	440	1629	439	<b>1627</b>	<b>439</b>		
482.sphinx3	64	3011	414	<b>3018</b>	<b>413</b>	3025	412	64	3034	411	<b>2989</b>	<b>417</b>	2988	418		

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

## 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
System configured with libhugetlbfs library for application access to large pages
Environment variables set before executing benchmarks.
export HUGETLB_VERBOSE=0
export HUGETLB_MORECORE=yes
export XLFRTLOPTS=intrinthds=1
```



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## General Notes

IBM Post-Link optimization tool with  
 options "-O4 -omullX -see 0 -m power6" used for  
 433.milc 435.gromacs 436.cactusADM 482.sphinx3  
 options "-O4 -omullX -see 1" used for  
 436.cactusADM  
 options "-O4 -omullX -see 1 -ihf -1" used for  
 453.povray  
 options "-O4" used for  
 465.tonto  
 Whenever option "-omullX" was used during the optimization phase,  
 option "-imullX" was also used during the instrumentation phase.

## 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

## Base Optimization Flags

C benchmarks:

-O5 -qnoenablevmx -lhugetlbf

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## Base Optimization Flags (Continued)

C++ benchmarks:

-O5 -qrtti -qnoenablevmx -qstaticlink  
-Wl,--whole-archive /usr/lib/libhugetlbfs.a -Wl,--no-whole-archive

Fortran benchmarks:

-O5 -qsmallstack=dynlenonheap -qalias=nostd -qnoenablevmx  
-B/usr/share/libhugetlbfs/ -t1 -Wl,--hugetlbfs-link=BDT

Benchmarks using both Fortran and C:

-O5 -qnoenablevmx -qsmallstack=dynlenonheap -qalias=nostd  
-B/usr/share/libhugetlbfs/ -t1 -Wl,--hugetlbfs-link=BDT

## 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

Benchmarks using both Fortran and C:

xlc -qlanglvl=extc99 xlf95

## Peak Portability Flags

410.bwaves: -qfixed

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## Peak Portability Flags (Continued)

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

## Peak Optimization Flags

### C benchmarks:

433.milc: -Wl,-q -O5 -qnoenablevmx -lhugetlbfs

470.lbm: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT  
-q64

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

### C++ benchmarks:

444.namd: -qpdf1(pass 1) -qpdf2(pass 2) -O5

447.dealIII: -O5 -qrtti -qnoenablevmx -qstaticlink -Wl,-z,muldefs  
-Wl,--whole-archive /usr/lib/libsmartheap.a  
-Wl,--no-whole-archive

450.soplex: -qpdf1(pass 1) -qpdf2(pass 2) -O4 -qstrict -lhugetlbfs

453.povray: -Wl,-q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -lsmartheap

### Fortran benchmarks:

410.bwaves: -O5 -qsmallstack=dynlenonheap -lhugetlbfs

416.gamess: basepeak = yes

434.zeusmp: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto  
-qxlf90=nosignedzero -B/usr/share/libhugetlbfs/ -tl  
-Wl,--hugetlbfs-link=BDT

437.leslie3d: -O5 -qsmallstack=dynlenonheap -qnoenablevmx  
-B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT

459.GemsFDTD: -O5 -B/usr/share/libhugetlbfs/ -tl -Wl,--hugetlbfs-link=BDT  
-q64

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## Peak Optimization Flags (Continued)

465.tonto: -Wl, -q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -q64  
-lsmartheap64

Benchmarks using both Fortran and C:

435.gromacs: -Wl, -q -qpdf1(pass 1) -qpdf2(pass 2) -O5 -lhugetlbfs

436.cactusADM: -Wl, -q -qpdf1(pass 1) -qpdf2(pass 2) -O2 -qarch=auto  
-qtune=auto -qnostrict -lhugetlbfs

454.calculix: -O4 -B/usr/share/libhugetlbfs/ -tl -Wl, --hugetlbfs-link=BDT

481.wrf: -O5 -qnoenablevmx -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.20100302.html>

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

<http://www.spec.org/cpu2006/flags/IBM-Linux-XL.20100302.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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