



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

SPECfp<sup>®</sup>\_rate2006 = **839**

IBM Power 750 Express (3.3 GHz, 32 core, SLES)

SPECfp\_rate\_base2006 = **736**

CPU2006 license: 11

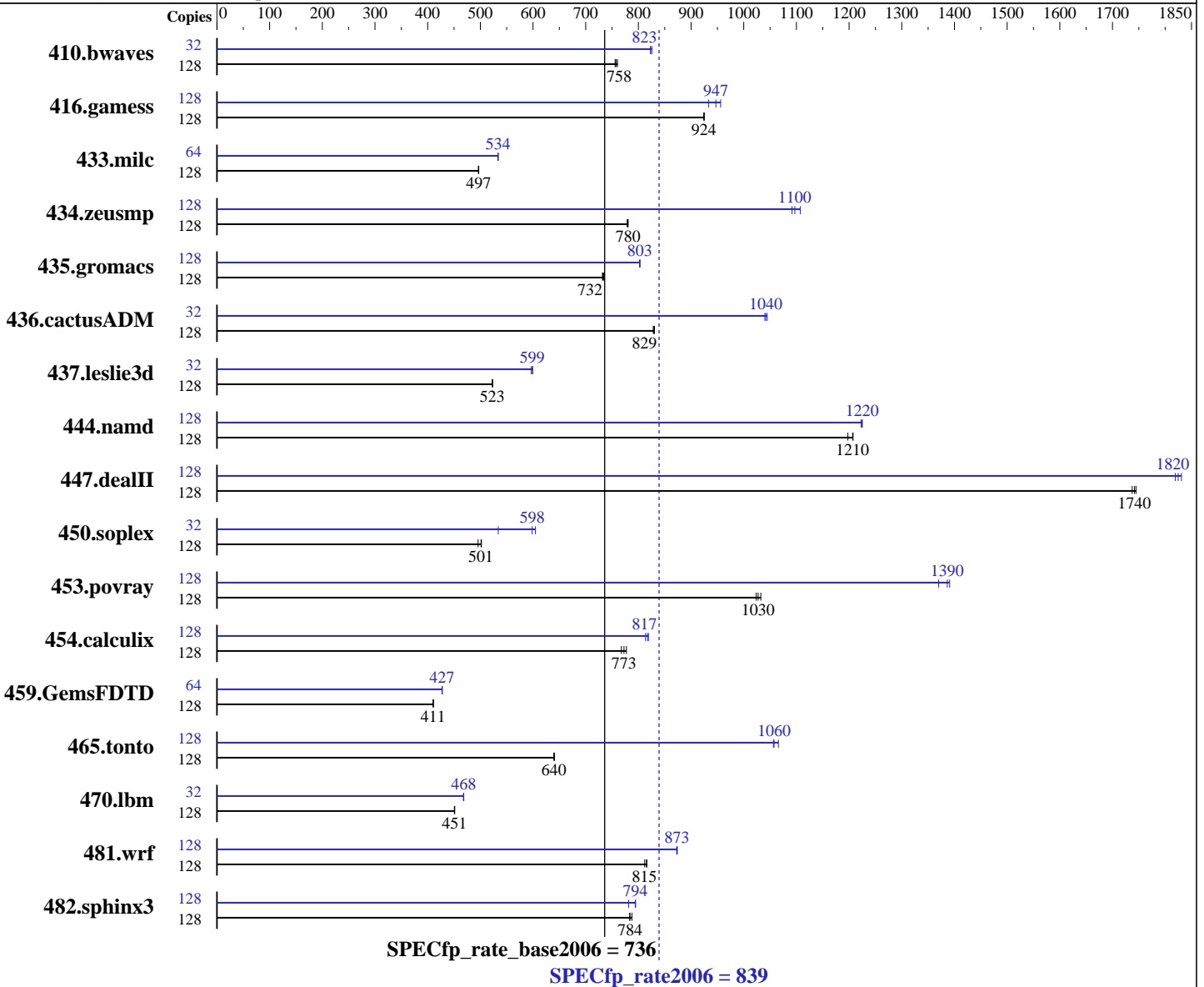
Test date: Jan-2010

Test sponsor: IBM Corporation

Hardware Availability: Feb-2010

Tested by: IBM Corporation

Software Availability: Dec-2009



### Hardware

CPU Name: POWER7  
 CPU Characteristics: Intelligent Energy Optimization enabled, up to 3.64 GHz  
 CPU MHz: 3300  
 FPU: Integrated  
 CPU(s) enabled: 32 cores, 4 chips, 8 cores/chip, 4 threads/core  
 CPU(s) orderable: 6,8,12,16,18,24,32 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 (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: 256 GB (32x8 GB) DDR3 1066 MHz  
 Disk Subsystem: 8x146.8 GB SAS SFF 15K 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	128	<b>2296</b>	<b>758</b>	2302	756	2288	760	32	<b>528</b>	<b>823</b>	527	826	529	823
416.gamess	128	2709	925	<b>2711</b>	<b>924</b>	2712	924	128	2621	956	2686	933	<b>2646</b>	<b>947</b>
433.milc	128	2364	497	<b>2366</b>	<b>497</b>	2367	496	64	1101	534	1101	534	<b>1101</b>	<b>534</b>
434.zeusmp	128	1496	779	<b>1493</b>	<b>780</b>	1493	780	128	1052	1110	1067	1090	<b>1062</b>	<b>1100</b>
435.gromacs	128	<b>1248</b>	<b>732</b>	1249	732	1245	734	128	1139	802	<b>1138</b>	<b>803</b>	1138	803
436.cactusADM	128	1842	831	<b>1844</b>	<b>829</b>	1847	828	32	368	1040	<b>367</b>	<b>1040</b>	366	1040
437.leslie3d	128	2301	523	<b>2301</b>	<b>523</b>	2298	524	32	504	597	<b>502</b>	<b>599</b>	502	600
444.namd	128	857	1200	<b>851</b>	<b>1210</b>	850	1210	128	838	1220	840	1220	<b>838</b>	<b>1220</b>
447.dealII	128	843	1740	<b>841</b>	<b>1740</b>	839	1740	128	800	1830	805	1820	<b>803</b>	<b>1820</b>
450.soplex	128	2153	496	<b>2129</b>	<b>501</b>	2126	502	32	500	534	<b>446</b>	<b>598</b>	441	604
453.povray	128	665	1020	<b>663</b>	<b>1030</b>	660	1030	128	497	1370	490	1390	<b>491</b>	<b>1390</b>
454.calculix	128	1375	768	<b>1367</b>	<b>773</b>	1358	777	128	1298	814	1289	819	<b>1292</b>	<b>817</b>
459.GemsFDTD	128	3309	410	3305	411	<b>3308</b>	<b>411</b>	64	1588	428	1589	427	<b>1589</b>	<b>427</b>
465.tonto	128	<b>1968</b>	<b>640</b>	1969	640	1965	641	128	<b>1191</b>	<b>1060</b>	1192	1060	1182	1070
470.lbm	128	3896	451	<b>3900</b>	<b>451</b>	3902	451	32	940	468	<b>939</b>	<b>468</b>	938	469
481.wrf	128	1761	812	1752	816	<b>1754</b>	<b>815</b>	128	<b>1637</b>	<b>873</b>	1636	874	1638	873
482.sphinx3	128	3184	784	3167	788	<b>3182</b>	<b>784</b>	128	3192	782	<b>3142</b>	<b>794</b>	3139	795

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.

## Operating System Notes

ulimit -s (stack) set to 1048576.

Large pages reserved as follows by root user:

```
echo 8448 > /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=intrinths=1
```



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## General Notes

The "IBM Power 750 Express (3.3 GHz)" and "IBM Power 755 (3.3 GHz)" are electronically equivalent. The results have been measured on the "IBM Power 755 (3.3 GHz)"

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.

Benchmarks bound to a processor using numactl on the submit command.  
See flags file for details on settings.

## 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 -qnoenablevmx -lhugetlbfs

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



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## Peak 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

```

## 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.dealII: -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: -qpdf1(pass 1) -qpdf2(pass 2) -O5 -qalias=nostd
-qnoenablevmx

```

```

434.zeusmp: -qpdf1(pass 1) -qpdf2(pass 2) -O3 -qarch=auto -qtune=auto
-qxf90=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

```

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## Peak Optimization Flags (Continued)

459.GemsFDTD: -O5 -B/usr/share/libhugetlbfs/ -t1 -Wl,--hugetlbfs-link=BDT -q64

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/ -t1 -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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