



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

## SPECfp<sup>®</sup>\_rate2006 = 73.4

## IBM System x3650 (Intel Xeon E5440)

## SPECfp\_rate\_base2006 = 64.9

CPU2006 license: 11

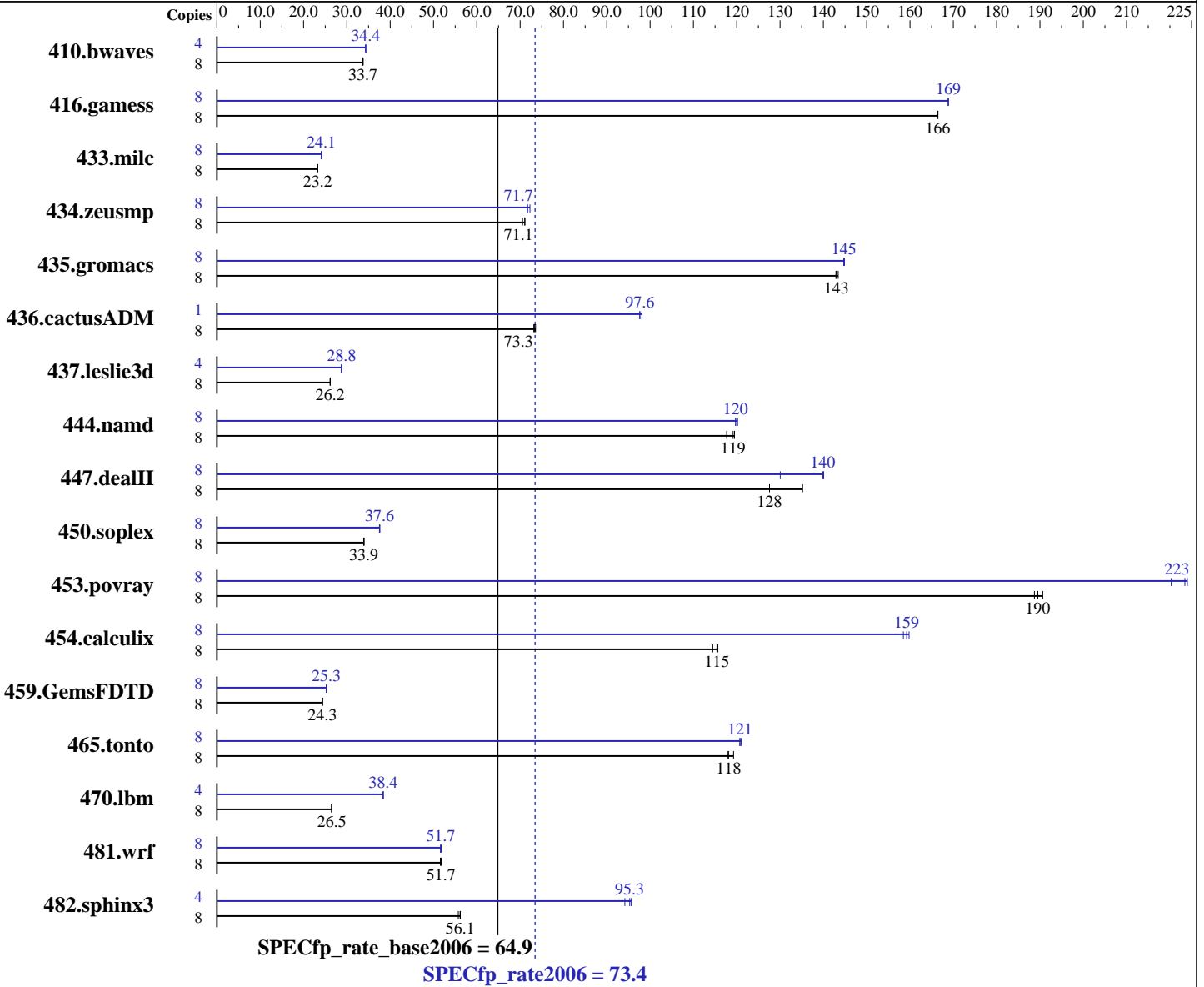
Test date: Jan-2008

Test sponsor: IBM Corporation

Hardware Availability: Jan-2008

Tested by: IBM Corporation

Software Availability: Nov-2007



### Hardware

CPU Name: Intel Xeon E5440  
 CPU Characteristics: 1333MHz system bus  
 CPU MHz: 2826  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 12 MB I+D on chip per chip, 6 MB shared / 2 cores

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### Software

Operating System: SuSE Linux Enterprise Server 10 (x86\_64), kernel 2.6.16.21-0.8-smp  
 Compiler: Intel C++ and Fortran Compiler 10.1 for Linux Build 20070913 Package ID: l\_cc\_p\_10.1.008, l\_fc\_p\_10.1.008  
 Auto Parallel: Yes  
 File System: ReiserFS  
 System State: Multi-user, run level 3  
 Base Pointers: 64-bit

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L3 Cache: None  
Other Cache: None  
Memory: 16 GB (8 x 2 GB DDR2-5300F ECC)  
Disk Subsystem: 1 x 36 GB SAS, 15000 RPM  
Other Hardware: None

Peak Pointers: 32/64-bit  
Other Software: Binutils 2.17.50.0.15

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	8	3223	33.7	<b><u>3223</u></b>	<b><u>33.7</u></b>	3226	33.7	4	<b><u>1583</u></b>	<b><u>34.4</u></b>	1583	34.3	1582	34.4
416.gamess	8	941	166	942	166	<b><u>941</u></b>	<b><u>166</u></b>	8	<b><u>928</u></b>	<b><u>169</u></b>	928	169	928	169
433.milc	8	3170	23.2	3152	23.3	<b><u>3160</u></b>	<b><u>23.2</u></b>	8	3041	24.2	<b><u>3045</u></b>	<b><u>24.1</u></b>	3047	24.1
434.zeusmp	8	1024	71.1	1032	70.6	<b><u>1025</u></b>	<b><u>71.1</u></b>	8	1007	72.3	<b><u>1015</u></b>	<b><u>71.7</u></b>	1016	71.6
435.gromacs	8	400	143	<b><u>399</u></b>	<b><u>143</u></b>	398	143	8	395	145	394	145	<b><u>395</u></b>	<b><u>145</u></b>
436.cactusADM	8	1307	73.2	1300	73.6	<b><u>1304</u></b>	<b><u>73.3</u></b>	1	122	98.1	<b><u>122</u></b>	<b><u>97.6</u></b>	122	97.6
437.leslie3d	8	<b><u>2874</u></b>	<b><u>26.2</u></b>	2874	26.2	2877	26.1	4	1306	28.8	1309	28.7	<b><u>1307</u></b>	<b><u>28.8</u></b>
444.namd	8	<b><u>538</u></b>	<b><u>119</u></b>	545	118	537	119	8	536	120	534	120	<b><u>536</u></b>	<b><u>120</u></b>
447.dealII	8	<b><u>717</u></b>	<b><u>128</u></b>	721	127	677	135	8	<b><u>654</u></b>	<b><u>140</u></b>	653	140	704	130
450.soplex	8	1964	34.0	1969	33.9	<b><u>1966</u></b>	<b><u>33.9</u></b>	8	<b><u>1775</u></b>	<b><u>37.6</u></b>	1778	37.5	1774	37.6
453.povray	8	226	189	<b><u>225</u></b>	<b><u>190</u></b>	223	191	8	<b><u>190</u></b>	<b><u>223</u></b>	190	224	193	220
454.calculix	8	577	114	571	116	<b><u>572</u></b>	<b><u>115</u></b>	8	413	160	<b><u>415</u></b>	<b><u>159</u></b>	416	158
459.GemsFDTD	8	<b><u>3488</u></b>	<b><u>24.3</u></b>	3491	24.3	3479	24.4	8	<b><u>3360</u></b>	<b><u>25.3</u></b>	3360	25.3	3362	25.2
465.tonto	8	660	119	668	118	<b><u>666</u></b>	<b><u>118</u></b>	8	<b><u>652</u></b>	<b><u>121</u></b>	650	121	652	121
470.lbm	8	4156	26.4	<b><u>4146</u></b>	<b><u>26.5</u></b>	4145	26.5	4	<b><u>1432</u></b>	<b><u>38.4</u></b>	1432	38.4	1431	38.4
481.wrf	8	<b><u>1728</u></b>	<b><u>51.7</u></b>	1725	51.8	1732	51.6	8	1726	51.8	1731	51.6	<b><u>1729</u></b>	<b><u>51.7</u></b>
482.sphinx3	8	<b><u>2778</u></b>	<b><u>56.1</u></b>	2774	56.2	2798	55.7	4	828	94.2	<b><u>818</u></b>	<b><u>95.3</u></b>	815	95.6

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

## General Notes

All benchmarks compiled in 64-bit mode except 437.leslie3d, 450.soplex, 470.lbm and 482.sphinx3, at peak, are compiled in 32-bit mode  
Hardware Sector Prefetch Enabled and Adjacent Sector Prefetch Disabled  
OMP\_NUM\_THREADS set to number of cores  
KMP\_AFFINITY set to physical,0  
KMP\_STACKSIZE set to 64M  
Powersaved dameon was disabled in OS  
taskset utility used to bind CPU(s) to processes



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Test sponsor: IBM Corporation

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## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

## Base Portability Flags

410.bwaves: -DSPEC\_CPU\_LP64  
416.gamess: -DSPEC\_CPU\_LP64  
433.milc: -DSPEC\_CPU\_LP64  
434.zeusmp: -DSPEC\_CPU\_LP64  
435.gromacs: -DSPEC\_CPU\_LP64 -nofor\_main  
436.cactusADM: -DSPEC\_CPU\_LP64 -nofor\_main  
437.leslie3d: -DSPEC\_CPU\_LP64  
444.namd: -DSPEC\_CPU\_LP64  
447.dealII: -DSPEC\_CPU\_LP64  
450.soplex: -DSPEC\_CPU\_LP64  
453.povray: -DSPEC\_CPU\_LP64  
454.calculix: -DSPEC\_CPU\_LP64 -nofor\_main  
459.GemsFDTD: -DSPEC\_CPU\_LP64  
465.tonto: -DSPEC\_CPU\_LP64  
470.lbm: -DSPEC\_CPU\_LP64  
481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX  
482.sphinx3: -DSPEC\_CPU\_LP64

## Base Optimization Flags

C benchmarks:

-fast

C++ benchmarks:

-fast

Fortran benchmarks:

-fast

Benchmarks using both Fortran and C:

-fast



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## Peak Compiler Invocation

C benchmarks (except as noted below):

```
/opt/intel/cc/10.1.008/bin/icc -L/opt/intel/cc/10.1.008/lib
-I/opt/intel/cc/10.1.008/include
```

433.milc: icc

C++ benchmarks (except as noted below):

icpc

```
450.soplex: /opt/intel/cc/10.1.008/bin/icpc -L/opt/intel/cc/10.1.008/lib
-I/opt/intel/cc/10.1.008/include
```

Fortran benchmarks (except as noted below):

ifort

```
437.leslie3d: /opt/intel/fc/10.1.008/bin/ifort -L/opt/intel/fc/10.1.008/lib
-I/opt/intel/fc/10.1.008/include
```

Benchmarks using both Fortran and C:

icc ifort

## Peak Portability Flags

```
410.bwaves: -DSPEC_CPU_LP64
416.gamess: -DSPEC_CPU_LP64
433.milc: -DSPEC_CPU_LP64
434.zeusmp: -DSPEC_CPU_LP64
435.gromacs: -DSPEC_CPU_LP64 -nofor_main
436.cactusADM: -DSPEC_CPU_LP64 -nofor_main
444.namd: -DSPEC_CPU_LP64
447.deall: -DSPEC_CPU_LP64
453.povray: -DSPEC_CPU_LP64
454.calculix: -DSPEC_CPU_LP64 -nofor_main
459.GemsFDTD: -DSPEC_CPU_LP64
465.tonto: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX
```

## Peak Optimization Flags

C benchmarks:

```
433.milc: -prof-gen(pass 1) -prof-use(pass 2) -fast -fno-alias
-auto-ilp32
```

```
470.lbm: -prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2
-scalar-rep- -prefetch -opt-malloc-options=3
```

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## Peak Optimization Flags (Continued)

482.sphinx3: -fast -unroll2

### C++ benchmarks:

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -fast -fno-alias  
-auto-ilp32

447.dealIII: -prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2  
-ansi-alias -scalar-rep-

450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -fast  
-opt-malloc-options=3

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -fast -unroll4  
-ansi-alias

### Fortran benchmarks:

410.bwaves: -fast -prefetch

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2 -Ob0  
-ansi-alias -scalar-rep-

434.zeusmp: -prof-gen(pass 1) -prof-use(pass 2) -fast

437.leslie3d: -prof-gen(pass 1) -prof-use(pass 2) -fast -prefetch  
-opt-malloc-options=3

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2 -Ob0  
-prefetch

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -fast -unroll4 -auto

### Benchmarks using both Fortran and C:

435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -fast -prefetch  
-auto-ilp32

436.cactusADM: -prof-gen(pass 1) -prof-use(pass 2) -fast -unroll2  
-prefetch -parallel -auto-ilp32

454.calculix: -fast -unroll-aggressive -auto-ilp32

481.wrf: -fast -auto-ilp32

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

<http://www.spec.org/cpu2006/flags/Intel-ic10.1-FP-intel64-linux-flags.20090714.14.html>



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<http://www.spec.org/cpu2006/flags/Intel-ic10.1-FP-intel64-linux-flags.20090714.14.xml>

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Tested with SPEC CPU2006 v1.0.  
Report generated on Tue Jul 22 15:52:52 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 20 February 2008.