



# SPEC® CFP2006 Result

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## IBM Corporation

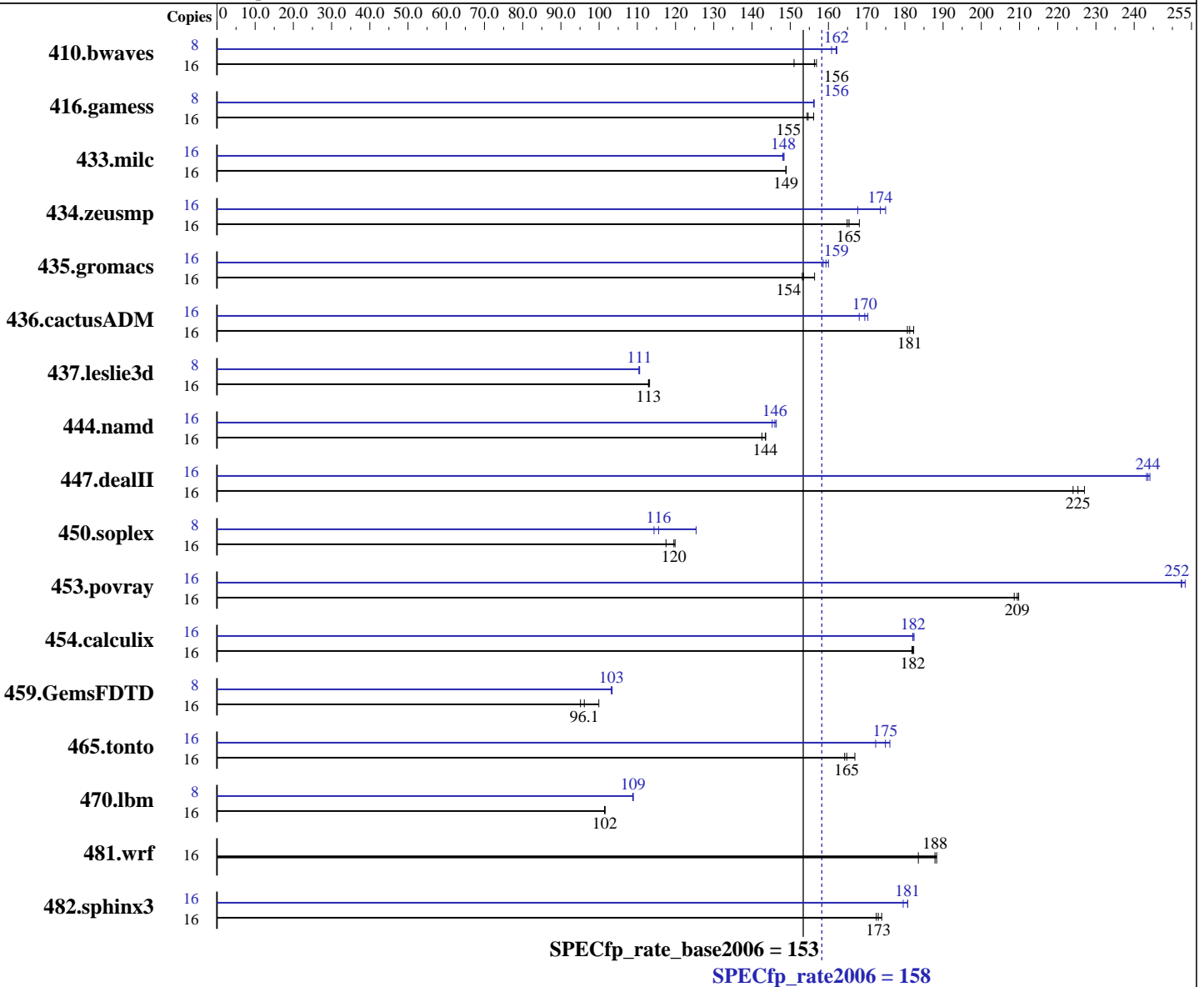
### SPECfp®\_rate2006 = 158

### IBM System x3500 M2 (Intel Xeon E5520)

### SPECfp\_rate\_base2006 = 153

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

Test date: Jun-2009  
 Hardware Availability: Apr-2009  
 Software Availability: Feb-2009



#### Hardware

CPU Name: Intel Xeon E5520  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.53 GHz  
 CPU MHz: 2267  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip, 2 threads/core  
 CPU(s) orderable: 1,2 chips  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core

Continued on next page

#### Software

Operating System: SuSE Linux Enterprise Server (x86\_64) SP2 with patch Linux kernel 20090119, Kernel 2.6.16.60-0.34-smpp  
 Compiler: Intel C++ and Fortran Compiler 11.0 for Linux Build 20090131 Package ID: l\_cproc\_p\_11.0.080, l\_cprof\_p\_11.0.080  
 Auto Parallel: Yes  
 File System: ReiserFS  
 System State: Run level 3 (multi-user)

Continued on next page



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L3 Cache: 8 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 24 GB (12 x 2 GB PC3-10600R, 2 Rank, running at 1066 MHz)  
 Disk Subsystem: 1 x 73 GB SAS, 10000 RPM  
 Other Hardware: None

Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other Software: Binutils 2.18.50.0.7.20080502

## Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	16	1440	151	<b><u>1391</u></b>	<b><u>156</u></b>	1386	157	8	676	161	670	162	<b><u>671</u></b>	<b><u>162</u></b>		
416.gamess	16	2006	156	2029	154	<b><u>2025</u></b>	<b><u>155</u></b>	8	1002	156	<b><u>1003</u></b>	<b><u>156</u></b>	1003	156		
433.milc	16	<b><u>986</u></b>	<b><u>149</u></b>	986	149	987	149	16	<b><u>991</u></b>	<b><u>148</u></b>	992	148	990	148		
434.zeusmp	16	866	168	<b><u>880</u></b>	<b><u>165</u></b>	883	165	16	<b><u>839</u></b>	<b><u>174</u></b>	832	175	868	168		
435.gromacs	16	731	156	746	153	<b><u>744</u></b>	<b><u>154</u></b>	16	<b><u>717</u></b>	<b><u>159</u></b>	714	160	720	159		
436.cactusADM	16	<b><u>1055</u></b>	<b><u>181</u></b>	1058	181	1049	182	16	<b><u>1128</u></b>	<b><u>170</u></b>	1123	170	1138	168		
437.leslie3d	16	1329	113	<b><u>1332</u></b>	<b><u>113</u></b>	1332	113	8	680	111	681	110	<b><u>680</u></b>	<b><u>111</u></b>		
444.namd	16	<b><u>894</u></b>	<b><u>144</u></b>	900	143	894	144	16	883	145	877	146	<b><u>879</u></b>	<b><u>146</u></b>		
447.dealII	16	<b><u>812</u></b>	<b><u>225</u></b>	817	224	806	227	16	753	243	<b><u>751</u></b>	<b><u>244</u></b>	750	244		
450.soplex	16	<b><u>1116</u></b>	<b><u>120</u></b>	1136	117	1113	120	8	<b><u>577</u></b>	<b><u>116</u></b>	583	114	532	125		
453.povray	16	<b><u>406</u></b>	<b><u>209</u></b>	408	209	406	210	16	336	253	337	252	<b><u>337</u></b>	<b><u>252</u></b>		
454.calculix	16	726	182	724	182	<b><u>725</u></b>	<b><u>182</u></b>	16	<b><u>725</u></b>	<b><u>182</u></b>	724	182	725	182		
459.GemsFDTD	16	<b><u>1766</u></b>	<b><u>96.1</u></b>	1785	95.1	1699	99.9	8	823	103	821	103	<b><u>822</u></b>	<b><u>103</u></b>		
465.tonto	16	959	164	<b><u>955</u></b>	<b><u>165</u></b>	943	167	16	894	176	913	172	<b><u>900</u></b>	<b><u>175</u></b>		
470.lbm	16	<b><u>2166</u></b>	<b><u>102</u></b>	2165	102	2168	101	8	<b><u>1010</u></b>	<b><u>109</u></b>	1009	109	1010	109		
481.wrf	16	<b><u>951</u></b>	<b><u>188</u></b>	949	188	974	184	16	<b><u>951</u></b>	<b><u>188</u></b>	949	188	974	184		
482.sphinx3	16	1793	174	1808	173	<b><u>1802</u></b>	<b><u>173</u></b>	16	1737	180	1725	181	<b><u>1726</u></b>	<b><u>181</u></b>		

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.  
numactl was used to bind copies to the cores

## General Notes

'ulimit -s unlimited' was used to set the stack size to unlimited prior to runspec.cpu2006.notes\_000: Hardware Prefetch Enabled, Adjacent Sector Prefetch Enabled  
OMP\_NUM\_THREADS set to number of processors



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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.lelie3d: -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:

-xSSE4.2 -ipo -O3 -no-prec-div -static

C++ benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static

Fortran benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static

Benchmarks using both Fortran and C:

-xSSE4.2 -ipo -O3 -no-prec-div -static



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## Peak Compiler Invocation

C benchmarks (except as noted below):

icc

482.sphinx3: icc -m32

C++ benchmarks (except as noted below):

icpc

450.soplex: icpc -m32

Fortran benchmarks (except as noted below):

ifort

437.leslie3d: ifort -m32

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.deallI: -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

## Peak Optimization Flags

C benchmarks:

433.milc: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
 -no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
 -fno-alias

470.lbm: -xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch  
 -auto-ilp32

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## Peak Optimization Flags (Continued)

482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -static -unroll2

### C++ benchmarks:

444.namd: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-fno-alias -auto-ilp32

447.dealII: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-unroll2 -ansi-alias -scalar-rep-

450.soplex: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-opt-malloc-options=3

453.povray: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-unroll4 -ansi-alias

### Fortran benchmarks:

410.bwaves: -xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch

416.gamess: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-unroll2 -Ob0 -ansi-alias -scalar-rep-

434.zeusmp: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)

437.leslie3d: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-opt-malloc-options=3 -opt-prefetch

459.GemsFDTD: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-unroll2 -Ob0 -opt-prefetch

465.tonto: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-unroll4 -auto

### Benchmarks using both Fortran and C:

435.gromacs: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-opt-prefetch -auto-ilp32

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## Peak Optimization Flags (Continued)

436.cactusADM: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -static(pass 2) -prof-use(pass 2)  
-unroll2 -opt-prefetch -auto-ilp32

454.calculix: -xSSE4.2 -ipo -O3 -no-prec-div -static -auto-ilp32

481.wrf: basepeak = yes

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

<http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revA.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revA.xml>

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

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