



# SPEC® CFP2006 Result

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## IBM Corporation

**SPECfp®2006 = 33.9**

### IBM System x3550 M2 (Intel Xeon E5540)

**SPECfp\_base2006 = 32.1**

CPU2006 license: 11

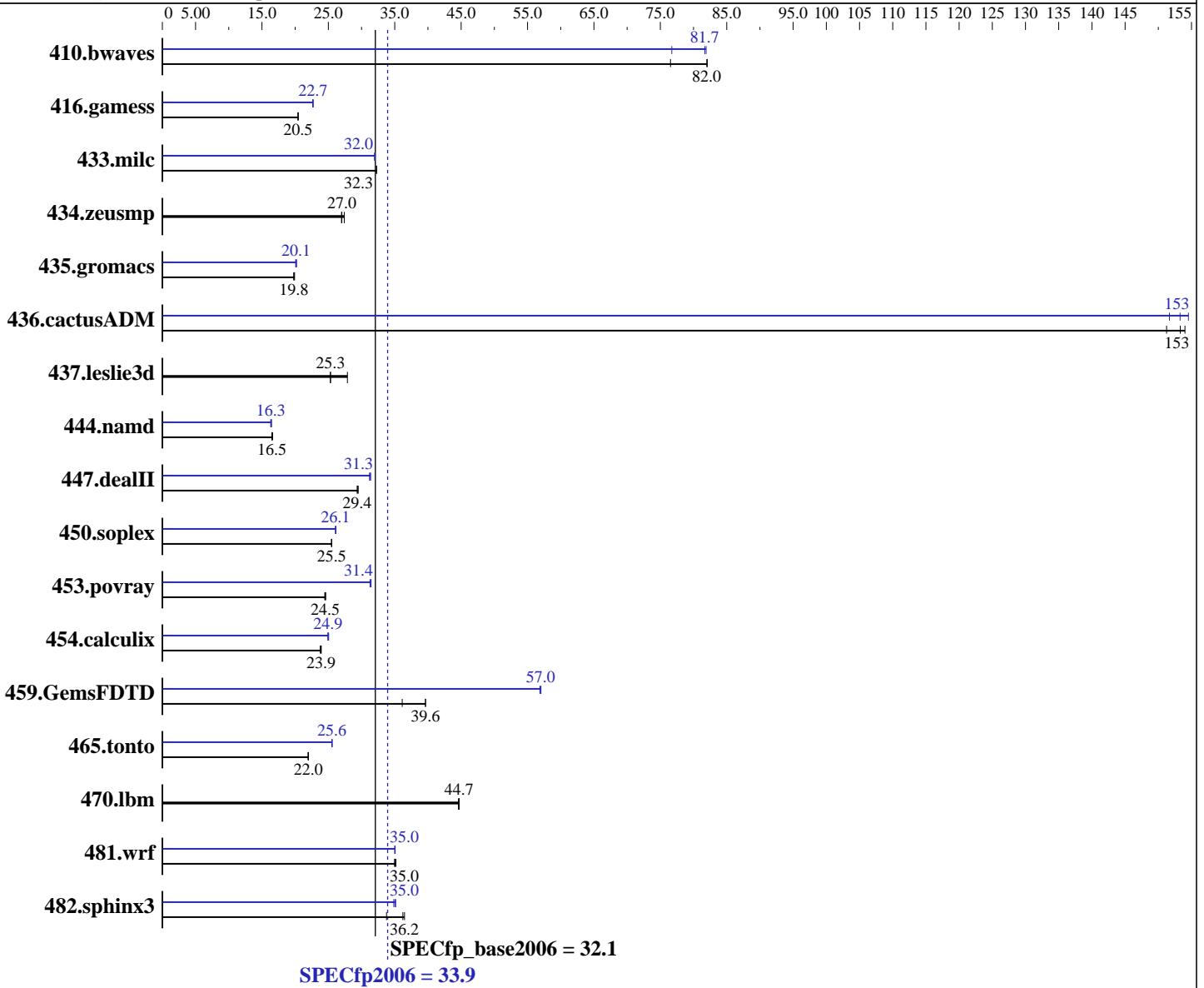
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Jun-2009

Hardware Availability: Apr-2009

Software Availability: Feb-2009



### Hardware

CPU Name: Intel Xeon E5540  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz  
 CPU MHz: 2533  
 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

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### Software

Operating System: SuSE Linux Enterprise Server 10 (x86\_64) SP2 with patch Linux kernel 20090119, Kernel 2.6.16.60-0.34-smp  
 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)

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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, 15000 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					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	178	76.5	166	82.1	<b>166</b>	<b>82.0</b>	177	76.7	<b>166</b>	<b>81.7</b>	166	81.9
416.gamess	<b>957</b>	<b>20.5</b>	958	20.4	957	20.5	<b>863</b>	<b>22.7</b>	862	22.7	864	22.7
433.milc	284	32.3	285	32.3	<b>284</b>	<b>32.3</b>	287	32.0	287	32.0	<b>287</b>	<b>32.0</b>
434.zeusmp	<b>337</b>	<b>27.0</b>	337	27.0	332	27.4	<b>337</b>	<b>27.0</b>	337	27.0	332	27.4
435.gromacs	359	19.9	361	19.8	<b>360</b>	<b>19.8</b>	<b>355</b>	<b>20.1</b>	353	20.2	356	20.1
436.cactusADM	79.0	151	<b>77.9</b>	<b>153</b>	77.6	154	78.8	152	77.3	155	<b>78.0</b>	<b>153</b>
437.leslie3d	371	25.3	337	27.9	<b>371</b>	<b>25.3</b>	371	25.3	337	27.9	<b>371</b>	<b>25.3</b>
444.namd	<b>486</b>	<b>16.5</b>	486	16.5	483	16.6	488	16.4	<b>491</b>	<b>16.3</b>	491	16.3
447.dealII	388	29.5	390	29.4	<b>390</b>	<b>29.4</b>	<b>365</b>	<b>31.3</b>	367	31.2	365	31.3
450.soplex	<b>327</b>	<b>25.5</b>	327	25.5	327	25.5	320	26.1	319	26.1	<b>320</b>	<b>26.1</b>
453.povray	217	24.5	216	24.6	<b>217</b>	<b>24.5</b>	<b>170</b>	<b>31.4</b>	170	31.3	169	31.4
454.calculix	347	23.8	<b>345</b>	<b>23.9</b>	345	23.9	331	24.9	<b>331</b>	<b>24.9</b>	329	25.0
459.GemsFDTD	268	39.6	294	36.1	<b>268</b>	<b>39.6</b>	186	57.0	187	56.9	<b>186</b>	<b>57.0</b>
465.tonto	<b>448</b>	<b>22.0</b>	447	22.0	448	21.9	385	25.6	<b>385</b>	<b>25.6</b>	386	25.5
470.lbm	<b>307</b>	<b>44.7</b>	307	44.7	308	44.6	<b>307</b>	<b>44.7</b>	307	44.7	308	44.6
481.wrf	319	35.0	<b>319</b>	<b>35.0</b>	318	35.2	<b>319</b>	<b>35.0</b>	319	35.1	319	35.0
482.sphinx3	577	33.8	534	36.5	<b>538</b>	<b>36.2</b>	555	35.1	<b>556</b>	<b>35.0</b>	559	34.9

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

## General Notes

'ulimit -s unlimited' was used to set the stack size to unlimited prior to run  
OMP\_NUM\_THREADS set to number of cores  
KMP\_AFFINITY set to granularity=fine,scatter  
KMP\_STACKSIZE set to 200M  
Processor CPU C-States Enabled

## Base Compiler Invocation

C benchmarks:  
icc

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## Base Compiler Invocation (Continued)

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

C++ benchmarks:  
-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

Fortran benchmarks:  
-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

Benchmarks using both Fortran and C:  
-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch



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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:

ifort

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  
 437.leslie3d: -DSPEC\_CPU\_LP64  
 444.namd: -DSPEC\_CPU\_LP64  
 447.dealII: -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: basepeak = yes

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

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## Peak Optimization Flags (Continued)

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.dealIII: -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- -opt-prefetch

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  
-parallel

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: basepeak = yes

437.leslie3d: basepeak = yes

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 -parallel

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

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 -parallel -auto-ilp32

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## Peak Optimization Flags (Continued)

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

481.wrf: -xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch  
-parallel -auto-ilp32

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

Tested with SPEC CPU2006 v1.1.  
Report generated on Wed Jul 23 02:37:38 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 21 July 2009.