



SPEC® CFP2006 Result

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IBM Corporation

SPECfp®2006 = 38.8

IBM System x iDataPlex dx360 M2 (Intel Xeon X5560)

SPECfp_base2006 = 36.5

CPU2006 license: 11

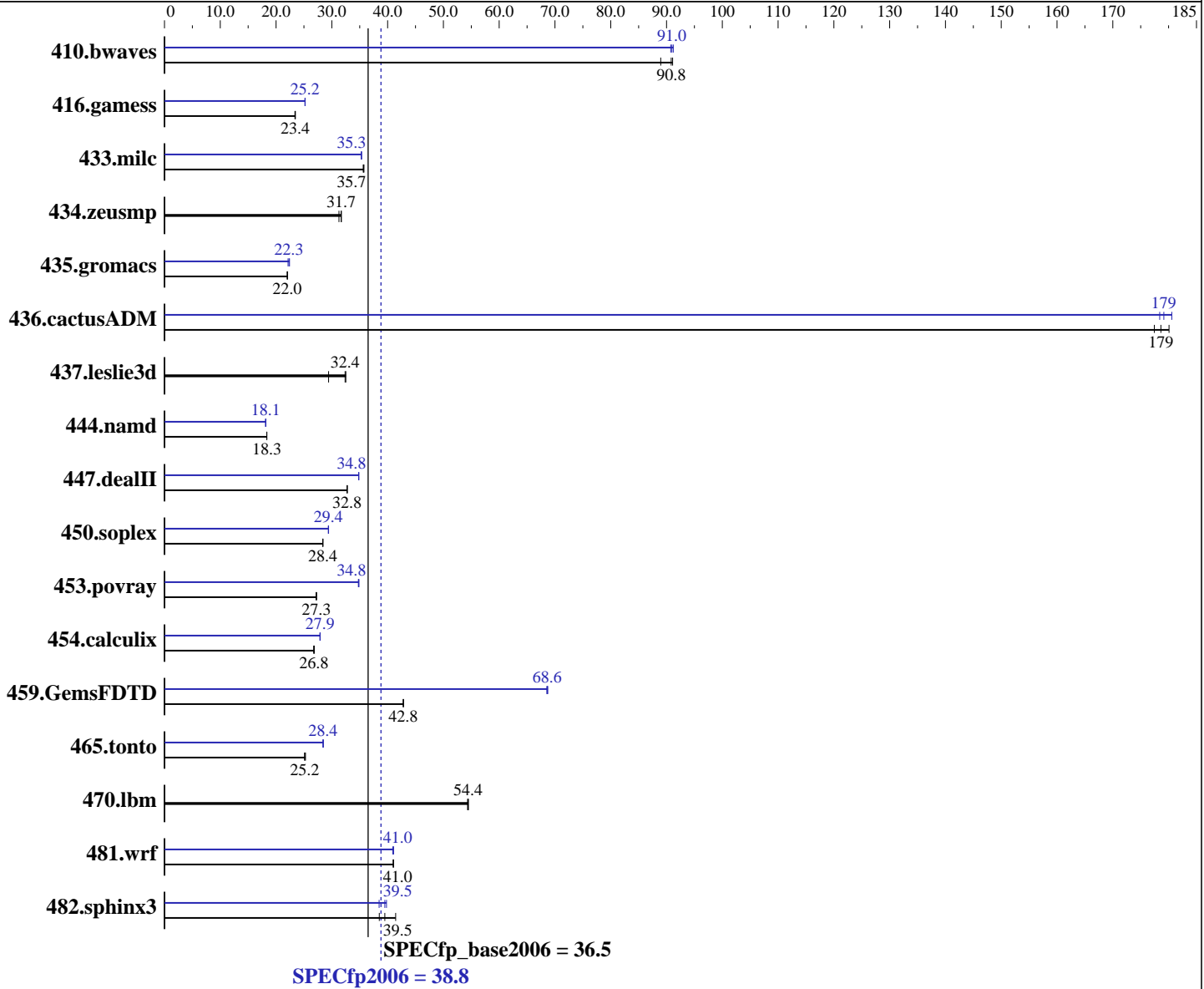
Test date: Mar-2009

Test sponsor: IBM Corporation

Hardware Availability: Apr-2009

Tested by: IBM Corporation

Software Availability: Feb-2009



Hardware

CPU Name: Intel Xeon X5560
 CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz
 CPU MHz: 2800
 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 (6 x 4 GB PC3-10600R)
 Disk Subsystem: 1 x 250 GB SATA, 7200 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 | 153 | 89.0 | <u>150</u> | <u>90.8</u> | 149 | 91.1 | <u>149</u> | <u>91.0</u> | 149 | 91.2 | 150 | 90.8 |
| 416.gamess | 837 | 23.4 | 835 | 23.5 | <u>835</u> | <u>23.4</u> | 777 | 25.2 | 777 | 25.2 | <u>777</u> | <u>25.2</u> |
| 433.milc | 258 | 35.6 | <u>257</u> | <u>35.7</u> | 257 | 35.7 | 260 | 35.3 | <u>260</u> | <u>35.3</u> | 260 | 35.3 |
| 434.zeusmp | 287 | 31.7 | 291 | 31.3 | <u>287</u> | <u>31.7</u> | 287 | 31.7 | 291 | 31.3 | <u>287</u> | <u>31.7</u> |
| 435.gromacs | <u>324</u> | <u>22.0</u> | 324 | 22.0 | 324 | 22.0 | 319 | 22.4 | 322 | 22.2 | <u>320</u> | <u>22.3</u> |
| 436.cactusADM | 67.3 | 177 | <u>66.9</u> | <u>179</u> | 66.4 | 180 | 66.2 | 181 | <u>66.7</u> | <u>179</u> | 67.0 | 178 |
| 437.leslie3d | 320 | 29.4 | <u>290</u> | <u>32.4</u> | 289 | 32.5 | 320 | 29.4 | <u>290</u> | <u>32.4</u> | 289 | 32.5 |
| 444.namd | <u>437</u> | <u>18.3</u> | 437 | 18.3 | 437 | 18.3 | <u>442</u> | <u>18.1</u> | 442 | 18.2 | 442 | 18.1 |
| 447.dealII | 350 | 32.7 | 349 | 32.8 | <u>349</u> | <u>32.8</u> | 329 | 34.8 | <u>329</u> | <u>34.8</u> | 328 | 34.8 |
| 450.soplex | 294 | 28.4 | 294 | 28.4 | <u>294</u> | <u>28.4</u> | 283 | 29.4 | <u>284</u> | <u>29.4</u> | 284 | 29.4 |
| 453.povray | 195 | 27.3 | <u>195</u> | <u>27.3</u> | 196 | 27.2 | <u>153</u> | <u>34.8</u> | 153 | 34.8 | 153 | 34.9 |
| 454.calculix | 307 | 26.8 | 308 | 26.8 | <u>308</u> | <u>26.8</u> | <u>296</u> | <u>27.9</u> | 296 | 27.9 | 296 | 27.9 |
| 459.GemsFDTD | 248 | 42.8 | 248 | 42.8 | <u>248</u> | <u>42.8</u> | <u>155</u> | <u>68.6</u> | 154 | 68.7 | 155 | 68.5 |
| 465.tonto | 389 | 25.3 | <u>391</u> | <u>25.2</u> | 392 | 25.1 | <u>346</u> | <u>28.4</u> | 346 | 28.4 | 345 | 28.5 |
| 470.lbm | <u>252</u> | <u>54.4</u> | 253 | 54.3 | 252 | 54.5 | <u>252</u> | <u>54.4</u> | 253 | 54.3 | 252 | 54.5 |
| 481.wrf | <u>272</u> | <u>41.0</u> | 272 | 41.0 | 272 | 41.0 | 273 | 40.9 | 272 | 41.1 | <u>272</u> | <u>41.0</u> |
| 482.sphinx3 | <u>493</u> | <u>39.5</u> | 470 | 41.4 | 506 | 38.5 | 507 | 38.5 | <u>493</u> | <u>39.5</u> | 490 | 39.8 |

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
Operation Mode set to "Performance Mode"
```

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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Tested with SPEC CPU2006 v1.1.
Report generated on Wed Jul 23 00:46:24 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 24 June 2009.