



# SPEC<sup>®</sup> CFP2006 Result

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Dell Inc.

SPECfp<sup>®</sup>2006 = 31.2

PowerEdge R610 (Intel Xeon E5520, 2.26 GHz)

SPECfp\_base2006 = 29.4

CPU2006 license: 55

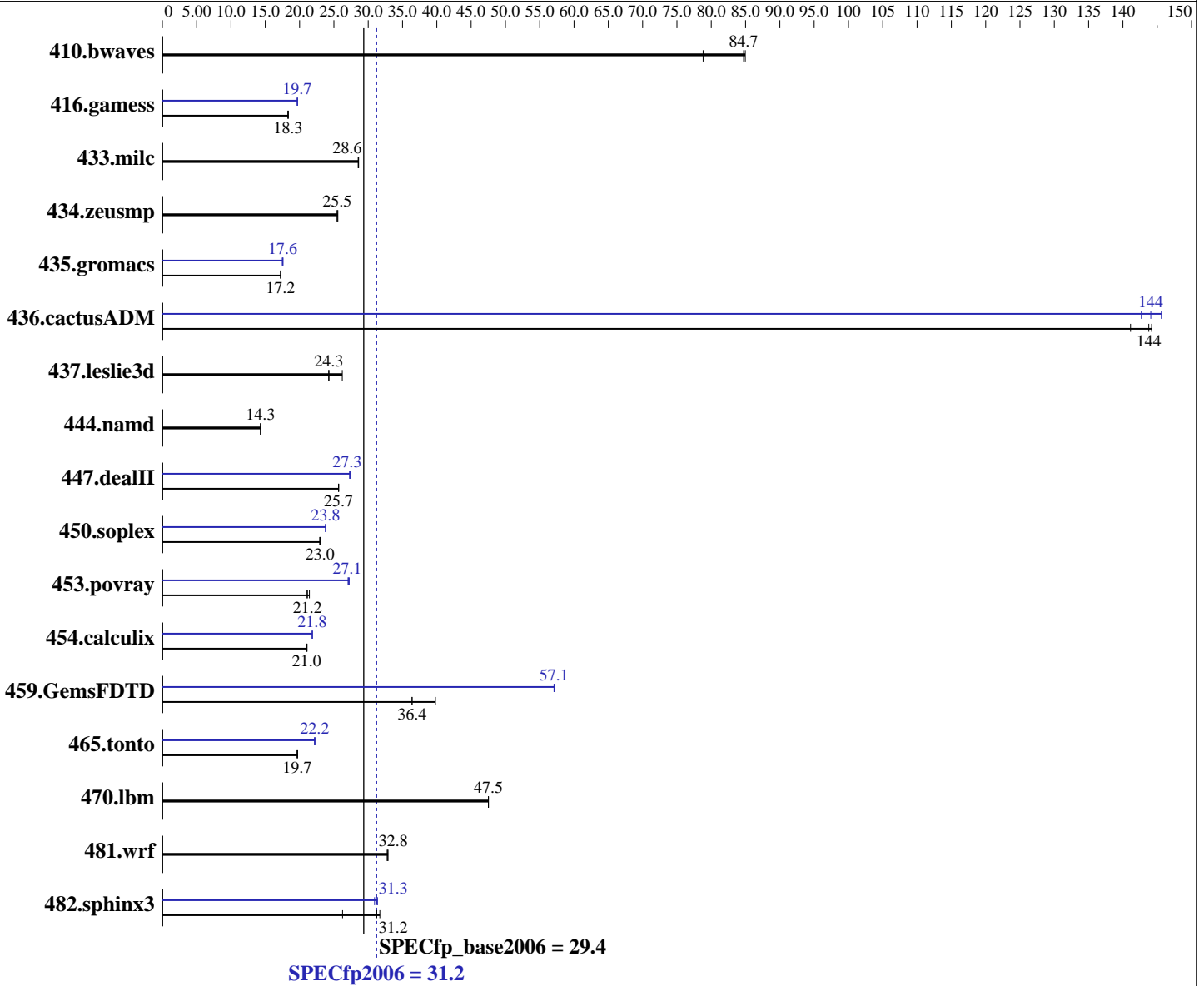
Test date: Apr-2009

Test sponsor: Dell Inc.

Hardware Availability: Mar-2009

Tested by: Dell Inc.

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

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### Software

Operating System: SUSE Linux Enterprise Server 10 (x86\_64) SP2, Kernel 2.6.16.60-0.21-smpp  
 Compiler: Intel C++ and Fortran Compiler Professional 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 DDR3-1066 DR RDIMM)  
Disk Subsystem: 1 x 146 GB 15000 RPM SAS  
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    | 160        | 85.0        | <b>160</b>  | <b>84.7</b> | 172         | 78.8        | 160         | 85.0        | <b>160</b> | <b>84.7</b> | 172        | 78.8        |
| 416.gamess    | 1066       | 18.4        | <b>1069</b> | <b>18.3</b> | 1070        | 18.3        | <b>995</b>  | <b>19.7</b> | 995        | 19.7        | 996        | 19.7        |
| 433.milc      | 321        | 28.6        | <b>321</b>  | <b>28.6</b> | 322         | 28.5        | 321         | 28.6        | <b>321</b> | <b>28.6</b> | 322        | 28.5        |
| 434.zeusmp    | 356        | 25.6        | 357         | 25.5        | <b>357</b>  | <b>25.5</b> | 356         | 25.6        | 357        | 25.5        | <b>357</b> | <b>25.5</b> |
| 435.gromacs   | 414        | 17.3        | <b>414</b>  | <b>17.2</b> | 415         | 17.2        | <b>407</b>  | <b>17.6</b> | 406        | 17.6        | 409        | 17.5        |
| 436.cactusADM | 84.7       | 141         | 82.9        | 144         | <b>83.1</b> | <b>144</b>  | <b>83.0</b> | <b>144</b>  | 83.8       | 143         | 82.1       | 146         |
| 437.leslie3d  | 358        | 26.2        | 388         | 24.2        | <b>387</b>  | <b>24.3</b> | 358         | 26.2        | 388        | 24.2        | <b>387</b> | <b>24.3</b> |
| 444.namd      | 560        | 14.3        | 560         | 14.3        | <b>560</b>  | <b>14.3</b> | 560         | 14.3        | 560        | 14.3        | <b>560</b> | <b>14.3</b> |
| 447.dealII    | 446        | 25.7        | 445         | 25.7        | <b>445</b>  | <b>25.7</b> | <b>419</b>  | <b>27.3</b> | 419        | 27.3        | 418        | 27.3        |
| 450.soplex    | 363        | 23.0        | <b>363</b>  | <b>23.0</b> | 363         | 23.0        | 350         | 23.8        | 351        | 23.8        | <b>350</b> | <b>23.8</b> |
| 453.povray    | 248        | 21.4        | <b>252</b>  | <b>21.2</b> | 253         | 21.0        | <b>196</b>  | <b>27.1</b> | 197        | 27.1        | 195        | 27.2        |
| 454.calculix  | 391        | 21.1        | <b>392</b>  | <b>21.0</b> | 392         | 21.0        | <b>378</b>  | <b>21.8</b> | 378        | 21.8        | 378        | 21.8        |
| 459.GemsFDTD  | 267        | 39.8        | <b>292</b>  | <b>36.4</b> | 292         | 36.4        | <b>186</b>  | <b>57.1</b> | 186        | 57.1        | 186        | 57.2        |
| 465.tonto     | 499        | 19.7        | 501         | 19.6        | <b>501</b>  | <b>19.7</b> | 443         | 22.2        | <b>443</b> | <b>22.2</b> | 444        | 22.2        |
| 470.lbm       | <b>289</b> | <b>47.5</b> | 289         | 47.5        | 289         | 47.5        | <b>289</b>  | <b>47.5</b> | 289        | 47.5        | 289        | 47.5        |
| 481.wrf       | 340        | 32.9        | <b>341</b>  | <b>32.8</b> | 341         | 32.8        | 340         | 32.9        | <b>341</b> | <b>32.8</b> | 341        | 32.8        |
| 482.sphinx3   | 615        | 31.7        | 742         | 26.3        | <b>624</b>  | <b>31.2</b> | 622         | 31.3        | 630        | 30.9        | <b>623</b> | <b>31.3</b> |

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

## General Notes

OMP\_NUM\_THREADS set to number of cores  
KMP\_AFFINITY set to granularity=fine,scatter  
KMP\_STACKSIZE set to 200M

## Base Compiler Invocation

C benchmarks:  
icc

C++ benchmarks:  
icpc

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## Base Compiler Invocation (Continued)

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

## Peak Compiler Invocation

C benchmarks (except as noted below):  
icc

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## Peak Compiler Invocation (Continued)

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: `basepeak = yes`

470.lbm: `basepeak = yes`

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

C++ benchmarks:

444.namd: `basepeak = yes`

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## Peak Optimization Flags (Continued)

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: basepeak = yes

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

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.20090710.04.html>



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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.20090710.04.xml>

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