



# SPEC<sup>®</sup> CFP2006 Result

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Dell Inc.

SPECfp<sup>®</sup>2006 = 21.7

PowerEdge R610 (Intel Xeon E5502, 1.86 GHz)

SPECfp\_base2006 = 20.7

CPU2006 license: 55

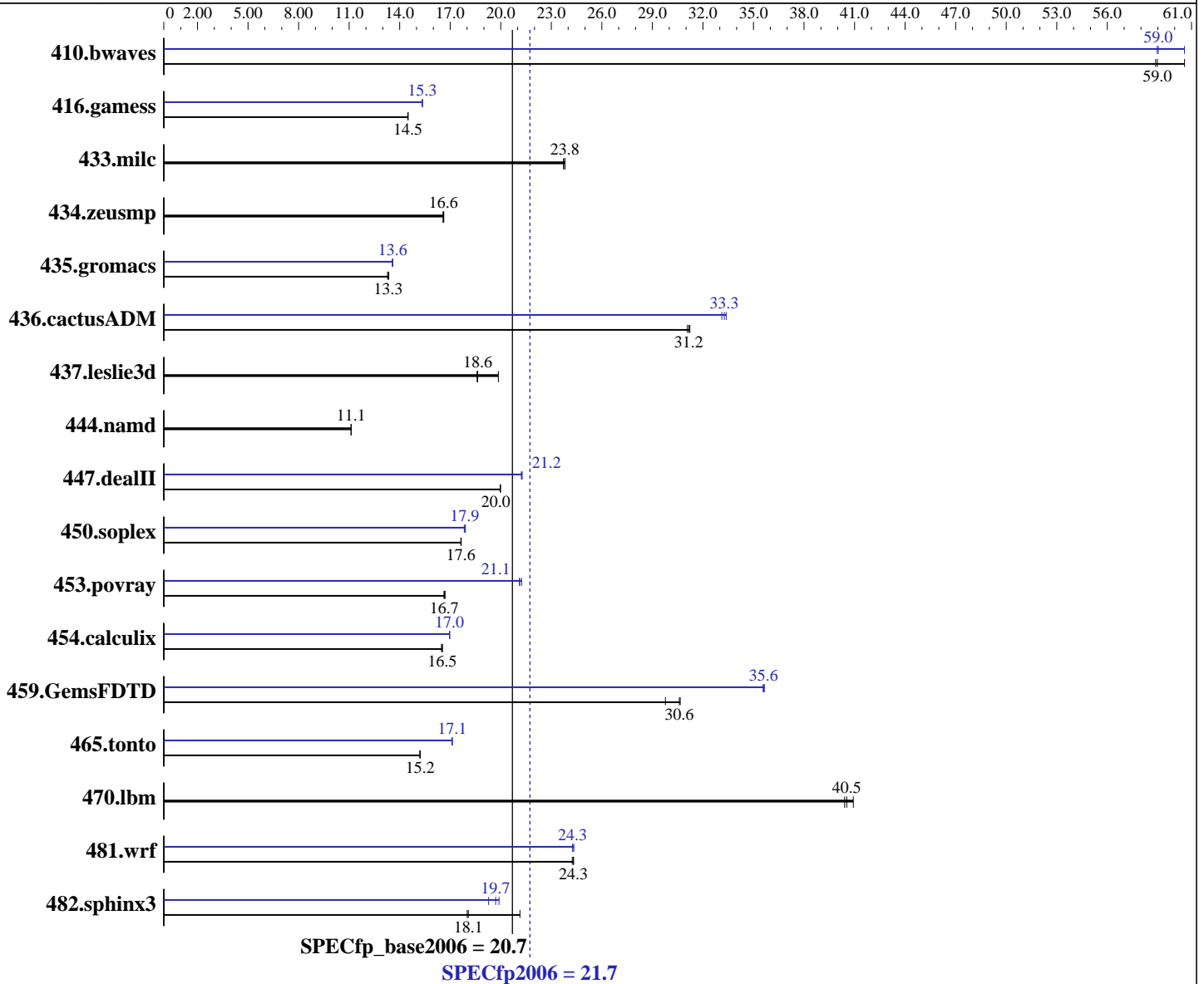
Test date: May-2009

Test sponsor: Dell Inc.

Hardware Availability: Mar-2009

Tested by: Dell Inc.

Software Availability: Feb-2009



### Hardware

CPU Name: Intel Xeon E5502  
 CPU Characteristics:  
 CPU MHz: 1867  
 FPU: Integrated  
 CPU(s) enabled: 4 cores, 2 chips, 2 cores/chip  
 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-smp  
 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: 4 MB I+D on chip per chip  
Other Cache: None  
Memory: 24 GB (6 x 4 GB DDR3-1333 DR RDIMM downclocked to 800 MHz)  
Disk Subsystem: 1 x 146 GB 10000 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    | 231               | 58.9               | <b><u>230</u></b> | <b><u>59.0</u></b> | 224                | 60.6               | 224               | 60.6               | <b><u>230</u></b> | <b><u>59.0</u></b> | 230                | 59.0               |
| 416.gamess    | 1352              | 14.5               | 1350              | 14.5               | <b><u>1351</u></b> | <b><u>14.5</u></b> | 1276              | 15.3               | 1276              | 15.3               | <b><u>1276</u></b> | <b><u>15.3</u></b> |
| 433.milc      | <b><u>386</u></b> | <b><u>23.8</u></b> | 385               | 23.8               | 387                | 23.7               | <b><u>386</u></b> | <b><u>23.8</u></b> | 385               | 23.8               | 387                | 23.7               |
| 434.zeusmp    | 548               | 16.6               | 549               | 16.6               | <b><u>548</u></b>  | <b><u>16.6</u></b> | 548               | 16.6               | 549               | 16.6               | <b><u>548</u></b>  | <b><u>16.6</u></b> |
| 435.gromacs   | 538               | 13.3               | 535               | 13.4               | <b><u>536</u></b>  | <b><u>13.3</u></b> | 525               | 13.6               | 526               | 13.6               | <b><u>526</u></b>  | <b><u>13.6</u></b> |
| 436.cactusADM | <b><u>383</u></b> | <b><u>31.2</u></b> | 383               | 31.2               | 385                | 31.1               | <b><u>359</u></b> | <b><u>33.3</u></b> | 358               | 33.4               | 361                | 33.1               |
| 437.leslie3d  | 506               | 18.6               | <b><u>505</u></b> | <b><u>18.6</u></b> | 473                | 19.9               | 506               | 18.6               | <b><u>505</u></b> | <b><u>18.6</u></b> | 473                | 19.9               |
| 444.namd      | 721               | 11.1               | 721               | 11.1               | <b><u>721</u></b>  | <b><u>11.1</u></b> | 721               | 11.1               | 721               | 11.1               | <b><u>721</u></b>  | <b><u>11.1</u></b> |
| 447.dealII    | 573               | 20.0               | <b><u>573</u></b> | <b><u>20.0</u></b> | 573                | 20.0               | 538               | 21.3               | 539               | 21.2               | <b><u>539</u></b>  | <b><u>21.2</u></b> |
| 450.soplex    | <b><u>473</u></b> | <b><u>17.6</u></b> | 473               | 17.6               | 472                | 17.7               | 468               | 17.8               | 466               | 17.9               | <b><u>467</u></b>  | <b><u>17.9</u></b> |
| 453.povray    | 320               | 16.6               | 319               | 16.7               | <b><u>319</u></b>  | <b><u>16.7</u></b> | <b><u>252</u></b> | <b><u>21.1</u></b> | 252               | 21.1               | 250                | 21.2               |
| 454.calculix  | 499               | 16.5               | <b><u>499</u></b> | <b><u>16.5</u></b> | 501                | 16.5               | 486               | 17.0               | <b><u>486</u></b> | <b><u>17.0</u></b> | 487                | 17.0               |
| 459.GemsFDTD  | 356               | 29.8               | 346               | 30.7               | <b><u>347</u></b>  | <b><u>30.6</u></b> | 298               | 35.6               | 298               | 35.6               | <b><u>298</u></b>  | <b><u>35.6</u></b> |
| 465.tonto     | <b><u>647</u></b> | <b><u>15.2</u></b> | 647               | 15.2               | 647                | 15.2               | 575               | 17.1               | <b><u>575</u></b> | <b><u>17.1</u></b> | 575                | 17.1               |
| 470.lbm       | 336               | 40.9               | 340               | 40.4               | <b><u>339</u></b>  | <b><u>40.5</u></b> | 336               | 40.9               | 340               | 40.4               | <b><u>339</u></b>  | <b><u>40.5</u></b> |
| 481.wrf       | 459               | 24.3               | <b><u>459</u></b> | <b><u>24.3</u></b> | 461                | 24.2               | 459               | 24.3               | <b><u>460</u></b> | <b><u>24.3</u></b> | 460                | 24.3               |
| 482.sphinx3   | 922               | 21.1               | 1082              | 18.0               | <b><u>1078</u></b> | <b><u>18.1</u></b> | 1011              | 19.3               | <b><u>990</u></b> | <b><u>19.7</u></b> | 979                | 19.9               |

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

## Operating System Notes

'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run

## General Notes

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



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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:

-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: basepeak = yes

470.lbm: basepeak = yes

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

C++ benchmarks:

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## Peak Optimization Flags (Continued)

444.namd: basepeak = yes

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- -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

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



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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.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.20090710.xml>

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

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