# SPEC® CFP2006 Result
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## Dell Inc.

PowerEdge R510 (Intel Xeon E5502, 1.86 GHz)

$SPECfp®\_rate2006 = $ 70.8

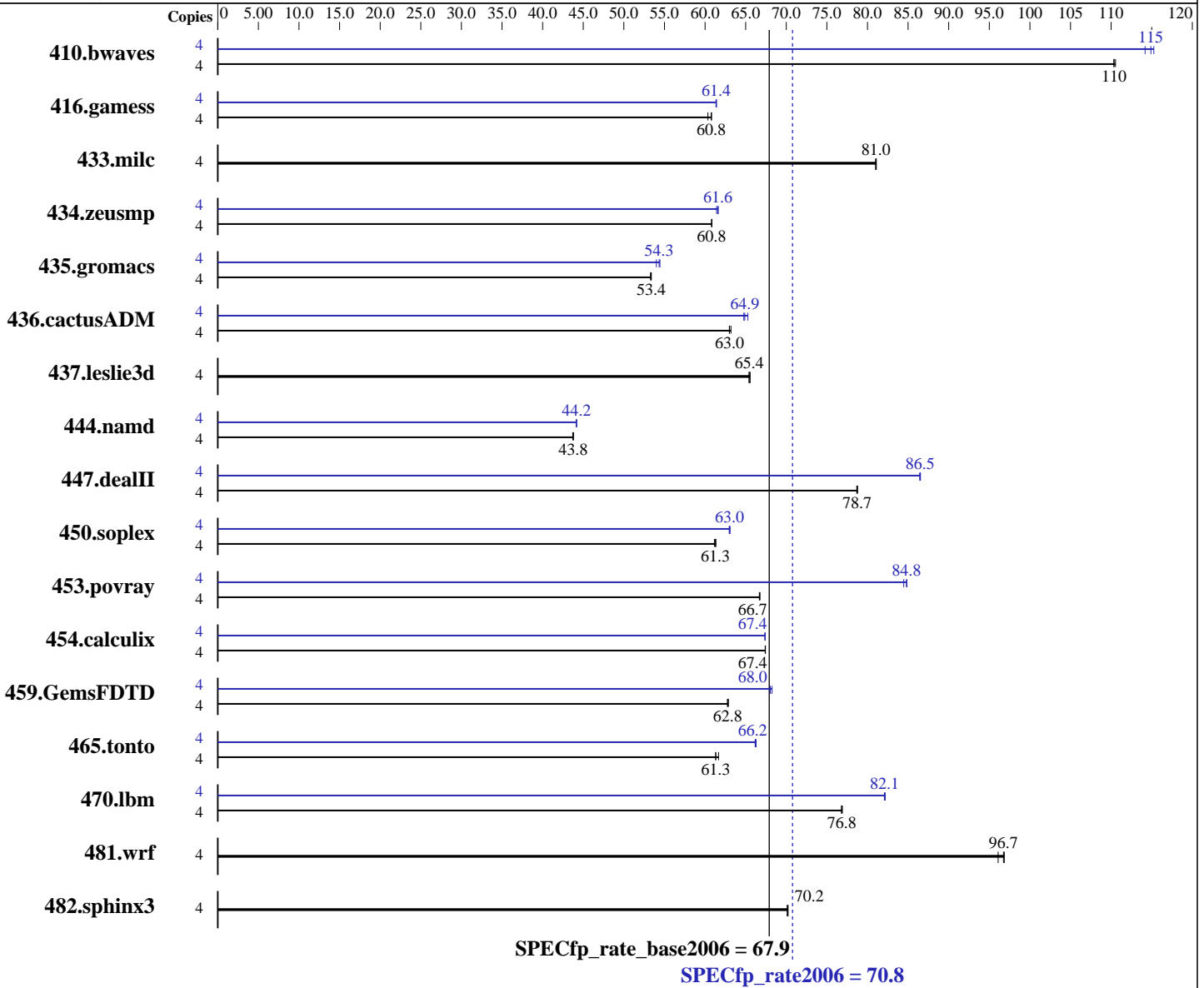$SPECfp\_rate\_base2006 = $ 67.9

**CPU2006 license:** 55
**Test sponsor:** Dell Inc.
**Tested by:** Dell Inc.

**Test date:** Sep-2009
**Hardware Availability:** Oct-2009
**Software Availability:** Feb-2009



| | Copies | |
|---|---|---|
| 410.bwaves | 4 | 115 |
| | 4 | 110 |
| 416.gamess | 4 | 61.4 |
| | 4 | 60.8 |
| 433.milc | 4 | 81.0 |
| 434.zeusmp | 4 | 61.6 |
| | 4 | 60.8 |
| 435.gromacs | 4 | 54.3 |
| | 4 | 53.4 |
| 436.cactusADM | 4 | 64.9 |
| | 4 | 63.0 |
| 437.leslie3d | 4 | 65.4 |
| 444.namd | 4 | 44.2 |
| | 4 | 43.8 |
| 447.dealII | 4 | 86.5 |
| | 4 | 78.7 |
| 450.soplex | 4 | 63.0 |
| | 4 | 61.3 |
| 453.povray | 4 | 84.8 |
| | 4 | 66.7 |
| 454.calculix | 4 | 67.4 |
| | 4 | 67.4 |
| 459.GemsFDTD | 4 | 68.0 |
| | 4 | 62.8 |
| 465.tonto | 4 | 66.2 |
| | 4 | 61.3 |
| 470.lbm | 4 | 82.1 |
| | 4 | 76.8 |
| 481.wrf | 4 | 96.7 |
| 482.sphinx3 | 4 | 70.2 |

**SPECfp_rate_base2006 = 67.9**

SPECfp_rate2006 = 70.8

## 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 |

**Continued on next page**

## 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: | No |
| File System: | ReiserFS |
| System State: | Run level 3 (multi-user) |

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| | | | |
|---|---|---|---|
| L3 Cache: | 4 MB I+D on chip per chip | Base Pointers: | 64-bit |
| Other Cache: | None | Peak Pointers: | 32/64-bit |
| Memory: | 24 GB (6 x 4 GB DDR3-1333 DR RDIMM downclocked to 800 MHz) | Other Software: | Binutils 2.18.50.0.7.20080502 |
| Disk Subsystem: | 1 x 500 GB 7200 RPM SATA | | |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 4 | 493 | 110 | **493** | **110** | 492 | 111 | 4 | 476 | 114 | 472 | 115 | **473** | **115** |
| 416.gamess | 4 | 1288 | 60.8 | **1289** | **60.8** | 1298 | 60.4 | 4 | **1276** | **61.4** | 1276 | 61.4 | 1277 | 61.3 |
| 433.milc | 4 | 453 | 81.1 | **453** | **81.0** | 453 | 81.0 | 4 | 453 | 81.1 | **453** | **81.0** | 453 | 81.0 |
| 434.zeusmp | 4 | **599** | **60.8** | 599 | 60.8 | 598 | 60.8 | 4 | 591 | 61.6 | **591** | **61.6** | 593 | 61.4 |
| 435.gromacs | 4 | 535 | 53.4 | **535** | **53.4** | 536 | 53.3 | 4 | **526** | **54.3** | 525 | 54.4 | 529 | 54.0 |
| 436.cactusADM | 4 | **759** | **63.0** | 756 | 63.2 | 759 | 63.0 | 4 | 738 | 64.8 | **737** | **64.9** | 732 | 65.3 |
| 437.leslie3d | 4 | **575** | **65.4** | 574 | 65.6 | 575 | 65.4 | 4 | **575** | **65.4** | 574 | 65.6 | 575 | 65.4 |
| 444.namd | 4 | 734 | 43.7 | 733 | 43.8 | **733** | **43.8** | 4 | 727 | 44.1 | 726 | 44.2 | **726** | **44.2** |
| 447.dealII | 4 | 581 | 78.8 | 582 | 78.7 | **581** | **78.7** | 4 | 529 | 86.5 | **529** | **86.5** | 529 | 86.4 |
| 450.soplex | 4 | **544** | **61.3** | 546 | 61.2 | 544 | 61.3 | 4 | **529** | **63.0** | 530 | 63.0 | 529 | 63.1 |
| 453.povray | 4 | 319 | 66.7 | **319** | **66.7** | 319 | 66.7 | 4 | **251** | **84.8** | 251 | 84.9 | 252 | 84.5 |
| 454.calculix | 4 | 489 | 67.4 | 490 | 67.4 | **490** | **67.4** | 4 | 490 | 67.4 | **490** | **67.4** | 490 | 67.4 |
| 459.GemsFDTD | 4 | **676** | **62.8** | 676 | 62.8 | 675 | 62.9 | 4 | 622 | 68.3 | **624** | **68.0** | 624 | 68.0 |
| 465.tonto | 4 | 638 | 61.7 | **642** | **61.3** | 642 | 61.3 | 4 | 594 | 66.3 | **595** | **66.2** | 595 | 66.2 |
| 470.lbm | 4 | 716 | 76.8 | 715 | 76.9 | **715** | **76.8** | 4 | 669 | 82.2 | 670 | 82.1 | **669** | **82.1** |
| 481.wrf | 4 | **462** | **96.7** | 461 | 96.8 | 465 | 96.1 | 4 | **462** | **96.7** | 461 | 96.8 | 465 | 96.1 |
| 482.sphinx3 | 4 | 1112 | 70.1 | 1110 | 70.2 | **1111** | **70.2** | 4 | 1112 | 70.1 | 1110 | 70.2 | **1111** | **70.2** |

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

## Operating System Notes

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

## 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

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:
        icc

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`
        482.sphinx3: `-DSPEC_CPU_LP64`

## Peak Optimization Flags

C benchmarks:

        433.milc: `basepeak = yes`

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

    482.sphinx3: `basepeak = yes`

C++ benchmarks:

Continued on next page

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# Peak Optimization Flags (Continued)

```
   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: 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

   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 -auto-ilp32

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

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# Peak Optimization Flags (Continued)

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.20090805.01.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.20090805.01.xml`

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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