



# SPEC® CFP2006 Result

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Dell Inc.

SPECfp®2006 = 46.7

PowerEdge R910 (Intel Xeon E7-4850, 2.00 GHz)

SPECfp\_base2006 = 44.5

CPU2006 license: 55

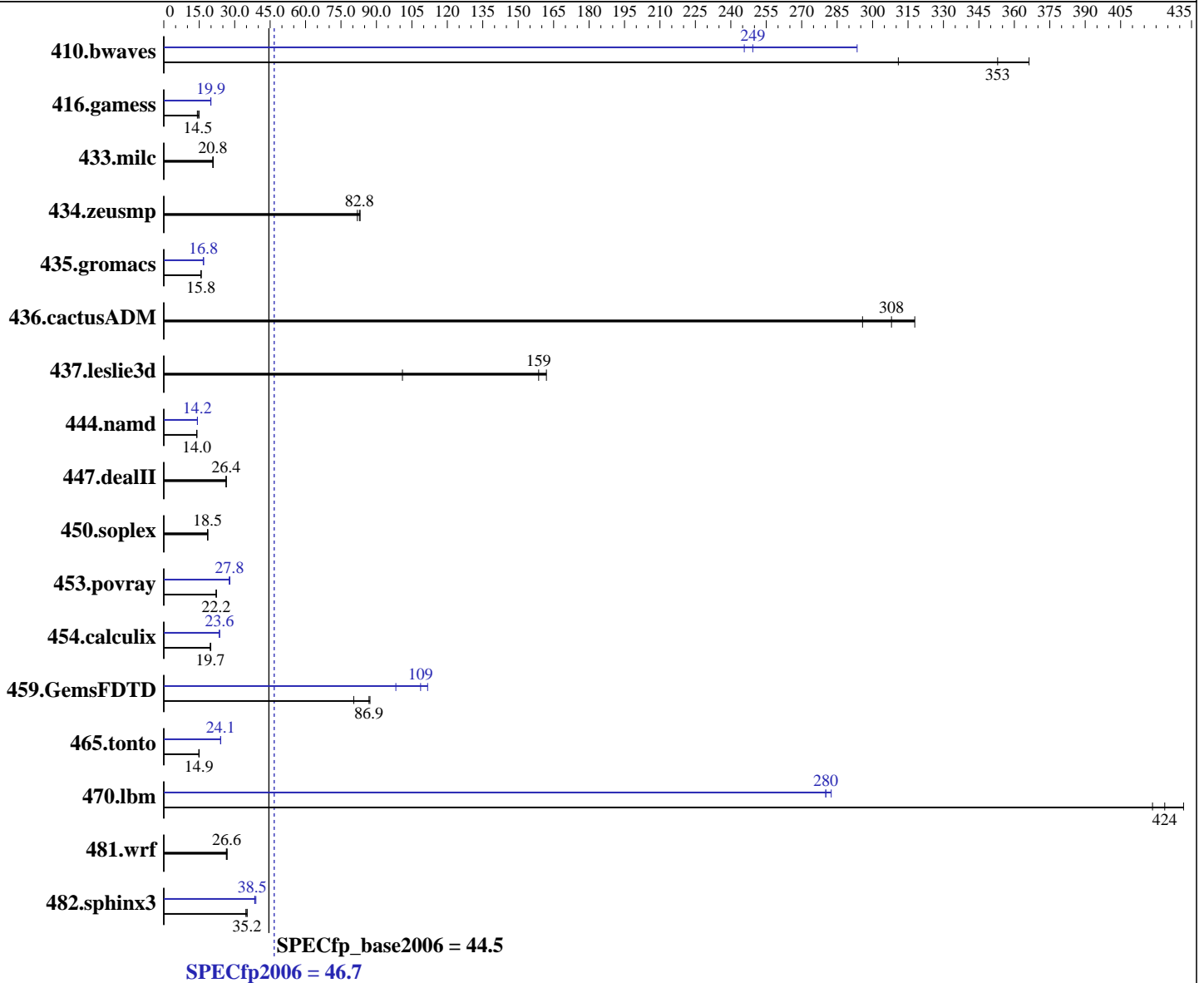
Test date: Mar-2011

Test sponsor: Dell Inc.

Hardware Availability: Apr-2011

Tested by: Dell Inc.

Software Availability: Apr-2011



### Hardware

CPU Name: Intel Xeon E7-4850  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.40 GHz  
 CPU MHz: 2000  
 FPU: Integrated  
 CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip  
 CPU(s) orderable: 2,4 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 11 SP1 (x86\_64), Kernel 2.6.32.12-0.7-default  
 Compiler: Intel C++ and Fortran Intel 64 Compiler XE for applications running on Intel 64 Version 12.0 Update 3  
 Auto Parallel: Yes  
 File System: ext3  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit

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L3 Cache: 24 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 512 GB (64 x 8 GB 4Rx8 PC3-8500R-7, ECC)  
 Disk Subsystem: 1 x 500 GB 7200 RPM SAS 6Gb  
 Other Hardware: None

Peak Pointers: 32/64-bit  
 Other Software: None

## Results Table

| Benchmark     | Base               |                    |                    |                    |                    |                    | Peak               |                    |                    |                    |                    |                    |
|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|               | Seconds            | Ratio              | Seconds            | Ratio              | Seconds            | Ratio              | Seconds            | Ratio              | Seconds            | Ratio              | Seconds            | Ratio              |
| 410.bwaves    | <b><u>38.5</u></b> | <b><u>353</u></b>  | 37.1               | 366                | 43.7               | 311                | 55.3               | 246                | 46.3               | 293                | <b><u>54.5</u></b> | <b><u>249</u></b>  |
| 416.gamess    | 1311               | 14.9               | <b><u>1353</u></b> | <b><u>14.5</u></b> | 1379               | 14.2               | 986                | 19.8               | <b><u>983</u></b>  | <b><u>19.9</u></b> | 982                | 19.9               |
| 433.milc      | <b><u>441</u></b>  | <b><u>20.8</u></b> | 442                | 20.8               | 438                | 20.9               | <b><u>441</u></b>  | <b><u>20.8</u></b> | 442                | 20.8               | 438                | 20.9               |
| 434.zeusmp    | 111                | 81.9               | 109                | 83.1               | <b><u>110</u></b>  | <b><u>82.8</u></b> | 111                | 81.9               | 109                | 83.1               | <b><u>110</u></b>  | <b><u>82.8</u></b> |
| 435.gromacs   | 451                | 15.8               | 454                | 15.7               | <b><u>453</u></b>  | <b><u>15.8</u></b> | 424                | 16.8               | <b><u>424</u></b>  | <b><u>16.8</u></b> | 428                | 16.7               |
| 436.cactusADM | 37.6               | 318                | <b><u>38.8</u></b> | <b><u>308</u></b>  | 40.4               | 296                | 37.6               | 318                | <b><u>38.8</u></b> | <b><u>308</u></b>  | 40.4               | 296                |
| 437.leslie3d  | 58.0               | 162                | 93.1               | 101                | <b><u>59.2</u></b> | <b><u>159</u></b>  | 58.0               | 162                | 93.1               | 101                | <b><u>59.2</u></b> | <b><u>159</u></b>  |
| 444.namd      | <b><u>574</u></b>  | <b><u>14.0</u></b> | 574                | 14.0               | 574                | 14.0               | <b><u>563</u></b>  | <b><u>14.2</u></b> | 563                | 14.2               | 564                | 14.2               |
| 447.dealII    | <b><u>433</u></b>  | <b><u>26.4</u></b> | 434                | 26.4               | 433                | 26.4               | <b><u>433</u></b>  | <b><u>26.4</u></b> | 434                | 26.4               | 433                | 26.4               |
| 450.soplex    | 447                | 18.7               | <b><u>451</u></b>  | <b><u>18.5</u></b> | 451                | 18.5               | 447                | 18.7               | <b><u>451</u></b>  | <b><u>18.5</u></b> | 451                | 18.5               |
| 453.povray    | 239                | 22.2               | <b><u>239</u></b>  | <b><u>22.2</u></b> | 240                | 22.2               | 190                | 28.0               | <b><u>191</u></b>  | <b><u>27.8</u></b> | 192                | 27.7               |
| 454.calculix  | 415                | 19.9               | 419                | 19.7               | <b><u>418</u></b>  | <b><u>19.7</u></b> | 350                | 23.5               | 350                | 23.6               | <b><u>350</u></b>  | <b><u>23.6</u></b> |
| 459.GemsFDTD  | 132                | 80.4               | 122                | 87.3               | <b><u>122</u></b>  | <b><u>86.9</u></b> | <b><u>97.6</u></b> | <b><u>109</u></b>  | 108                | 98.2               | 95.0               | 112                |
| 465.tonto     | 656                | 15.0               | <b><u>659</u></b>  | <b><u>14.9</u></b> | 664                | 14.8               | 409                | 24.1               | 409                | 24.1               | <b><u>409</u></b>  | <b><u>24.1</u></b> |
| 470.lbm       | 31.8               | 432                | 32.8               | 418                | <b><u>32.4</u></b> | <b><u>424</u></b>  | <b><u>49.0</u></b> | <b><u>280</u></b>  | 48.6               | 283                | 49.0               | 280                |
| 481.wrf       | 417                | 26.8               | <b><u>419</u></b>  | <b><u>26.6</u></b> | 422                | 26.5               | 417                | 26.8               | <b><u>419</u></b>  | <b><u>26.6</u></b> | 422                | 26.5               |
| 482.sphinx3   | 561                | 34.7               | <b><u>553</u></b>  | <b><u>35.2</u></b> | 553                | 35.2               | 500                | 39.0               | 506                | 38.5               | <b><u>506</u></b>  | <b><u>38.5</u></b> |

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
'mount -t hugetlbfs nodev /mnt/hugepages' was used to enable large pages
echo 900 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
```

## Platform Notes

BIOS Settings:  
 Power Management = Maximum Performance (Default = Active Power Controller)  
 Memory Interleaving = Enabled (Default = Disabled)



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## General Notes

The Dell PowerEdge R910 and the Bull NovaScale R480 F2 models are electronically equivalent. The results have been measured on a Dell PowerEdge R910 model. OMP\_NUM\_THREADS set to number of cores  
Binaries were compiled on RHEL5.5

## Base Compiler Invocation

C benchmarks:

icc -m64

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## 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.deallI: -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  
-ansi-alias

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## Base Optimization Flags (Continued)

C++ benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias

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  
-ansi-alias

## Peak Compiler Invocation

C benchmarks:

icc -m64

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

Benchmarks using both Fortran and C:

icc -m64 ifort -m64

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -parallel  
-ansi-alias -static -auto-ilp32

482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias  
-parallel

C++ benchmarks:

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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) -prof-use(pass 2) -fno-alias  
-auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

### Fortran benchmarks:

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

416.gamess: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -unroll2  
-inline-level=0 -scalar-rep- -static

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) -prof-use(pass 2) -unroll2  
-inline-level=0 -opt-prefetch -parallel  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

465.tonto: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -inline-calloc  
-opt-malloc-options=3 -auto -unroll4  
-B /usr/share/libhugetlbfs/ -Wl,-melf\_x86\_64 -Wl,-hugetlbfs-link=BDT

### 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) -prof-use(pass 2) -static -auto-ilp32  
-ansi-alias

436.cactusADM: basepeak = yes

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

481.wrf: basepeak = yes



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The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.html>

<http://www.spec.org/cpu2006/flags/Intel-Linux64-Platform.20110308.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.xml>

<http://www.spec.org/cpu2006/flags/Intel-Linux64-Platform.20110308.xml>

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

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