



# SPEC<sup>®</sup> CFP2006 Result

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Dell Inc.

SPECfp<sup>®</sup>2006 = 57.0

PowerEdge M610 (Intel Xeon X5560, 2.80 GHz)

SPECfp\_base2006 = 53.3

CPU2006 license: 55

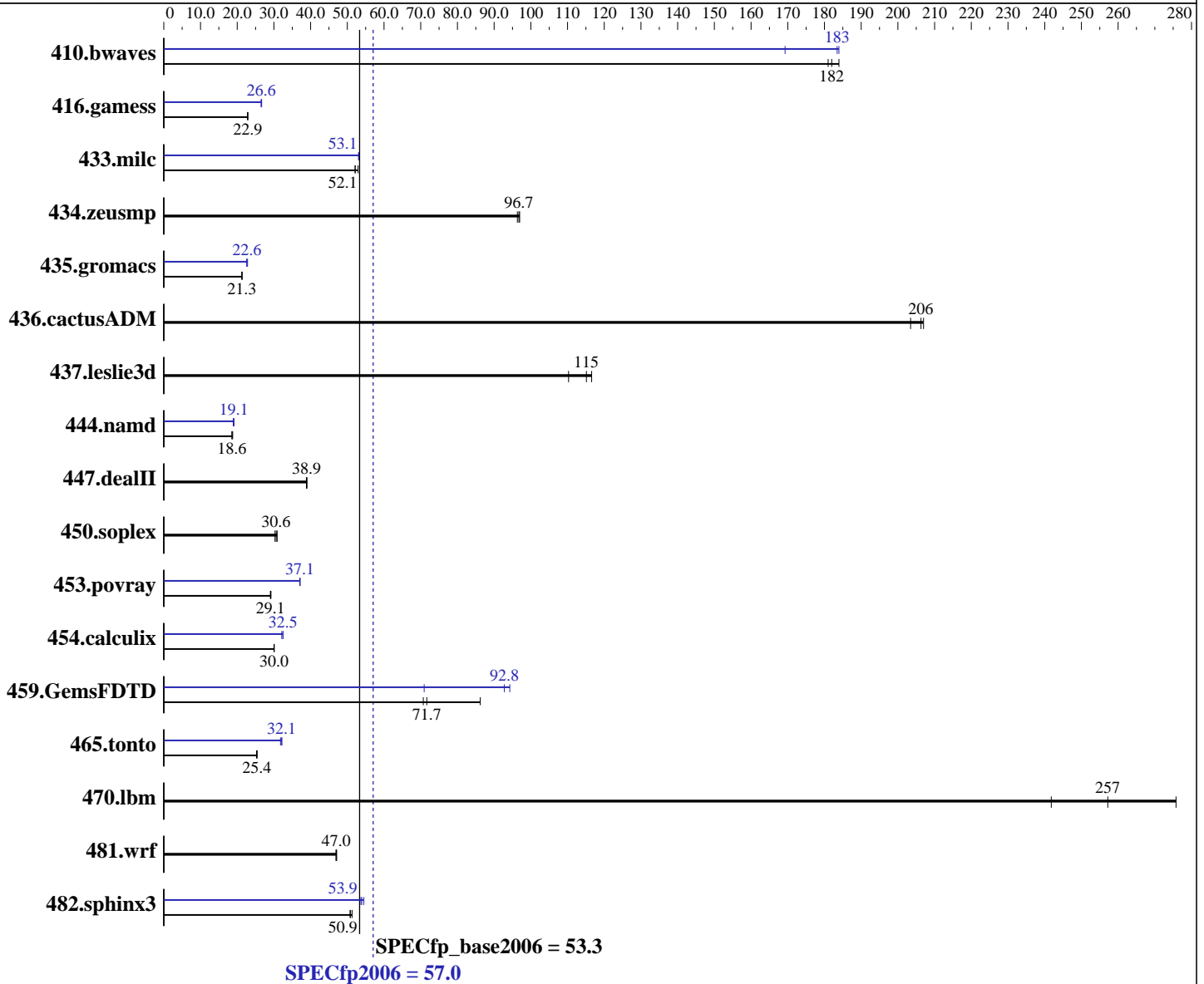
Test date: Jul-2011

Test sponsor: Dell Inc.

Hardware Availability: Mar-2009

Tested by: Dell Inc.

Software Availability: Dec-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  
 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 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: 8 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 48 GB (12 x 4 GB 2Rx4 PC3-10600R-9, ECC)  
 Disk Subsystem: 1 x 146 GB 10000 RPM SAS  
 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    | 75.1               | 181                | <b><u>74.7</u></b> | <b><u>182</u></b>  | 73.9               | 184                | <b><u>74.1</u></b> | <b><u>183</u></b>  | 80.3              | 169                | 73.9               | 184                |
| 416.gamess    | 855                | 22.9               | 858                | 22.8               | <b><u>856</u></b>  | <b><u>22.9</u></b> | 738                | 26.5               | 734               | 26.7               | <b><u>737</u></b>  | <b><u>26.6</u></b> |
| 433.milc      | 173                | 52.9               | <b><u>176</u></b>  | <b><u>52.1</u></b> | 176                | 52.1               | <b><u>173</u></b>  | <b><u>53.1</u></b> | 173               | 53.1               | 173                | 53.1               |
| 434.zeusmp    | <b><u>94.1</u></b> | <b><u>96.7</u></b> | 93.9               | 97.0               | 94.5               | 96.3               | <b><u>94.1</u></b> | <b><u>96.7</u></b> | 93.9              | 97.0               | 94.5               | 96.3               |
| 435.gromacs   | 335                | 21.3               | <b><u>335</u></b>  | <b><u>21.3</u></b> | 336                | 21.3               | <b><u>316</u></b>  | <b><u>22.6</u></b> | 313               | 22.8               | 316                | 22.6               |
| 436.cactusADM | <b><u>57.9</u></b> | <b><u>206</u></b>  | 58.7               | 203                | 57.7               | 207                | <b><u>57.9</u></b> | <b><u>206</u></b>  | 58.7              | 203                | 57.7               | 207                |
| 437.leslie3d  | <b><u>81.6</u></b> | <b><u>115</u></b>  | 80.6               | 117                | 85.2               | 110                | <b><u>81.6</u></b> | <b><u>115</u></b>  | 80.6              | 117                | 85.2               | 110                |
| 444.namd      | 427                | 18.8               | 432                | 18.6               | <b><u>431</u></b>  | <b><u>18.6</u></b> | 419                | 19.1               | 424               | 18.9               | <b><u>419</u></b>  | <b><u>19.1</u></b> |
| 447.dealII    | <b><u>294</u></b>  | <b><u>38.9</u></b> | 293                | 39.0               | 294                | 38.8               | <b><u>294</u></b>  | <b><u>38.9</u></b> | 293               | 39.0               | 294                | 38.8               |
| 450.soplex    | 270                | 30.9               | 275                | 30.3               | <b><u>272</u></b>  | <b><u>30.6</u></b> | 270                | 30.9               | 275               | 30.3               | <b><u>272</u></b>  | <b><u>30.6</u></b> |
| 453.povray    | 183                | 29.1               | <b><u>183</u></b>  | <b><u>29.1</u></b> | 182                | 29.2               | <b><u>143</u></b>  | <b><u>37.1</u></b> | 143               | 37.1               | 144                | 37.0               |
| 454.calculix  | 274                | 30.1               | <b><u>275</u></b>  | <b><u>30.0</u></b> | 275                | 30.0               | 254                | 32.5               | 257               | 32.1               | <b><u>254</u></b>  | <b><u>32.5</u></b> |
| 459.GemsFDTD  | <b><u>148</u></b>  | <b><u>71.7</u></b> | 123                | 86.2               | 150                | 70.7               | 150                | 70.9               | <b><u>114</u></b> | <b><u>92.8</u></b> | 113                | 94.3               |
| 465.tonto     | 390                | 25.2               | 387                | 25.4               | <b><u>388</u></b>  | <b><u>25.4</u></b> | 306                | 32.2               | <b><u>306</u></b> | <b><u>32.1</u></b> | 309                | 31.8               |
| 470.lbm       | 56.8               | 242                | 49.8               | 276                | <b><u>53.4</u></b> | <b><u>257</u></b>  | 56.8               | 242                | 49.8              | 276                | <b><u>53.4</u></b> | <b><u>257</u></b>  |
| 481.wrf       | 238                | 46.9               | <b><u>238</u></b>  | <b><u>47.0</u></b> | 237                | 47.1               | 238                | 46.9               | <b><u>238</u></b> | <b><u>47.0</u></b> | 237                | 47.1               |
| 482.sphinx3   | 380                | 51.3               | <b><u>383</u></b>  | <b><u>50.9</u></b> | 384                | 50.7               | 363                | 53.7               | 358               | 54.5               | <b><u>361</u></b>  | <b><u>53.9</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)  
 Logical Processor = Disabled (Default = Enabled)



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## General Notes

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.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  
-ansi-alias

C++ benchmarks:

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

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## Base Optimization Flags (Continued)

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: -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

470.lbm: basepeak = yes

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

C++ benchmarks:

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

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## Peak Optimization Flags (Continued)

447.dealll: 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

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.20110524.00.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.20110524.00.xml>



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