



# SPEC<sup>®</sup> CFP2006 Result

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Dell Inc.

SPECfp<sup>®</sup>2006 = 32.0

PowerEdge R810 (Intel Xeon E7540, 2.00 GHz)

SPECfp\_base2006 = 29.9

CPU2006 license: 55

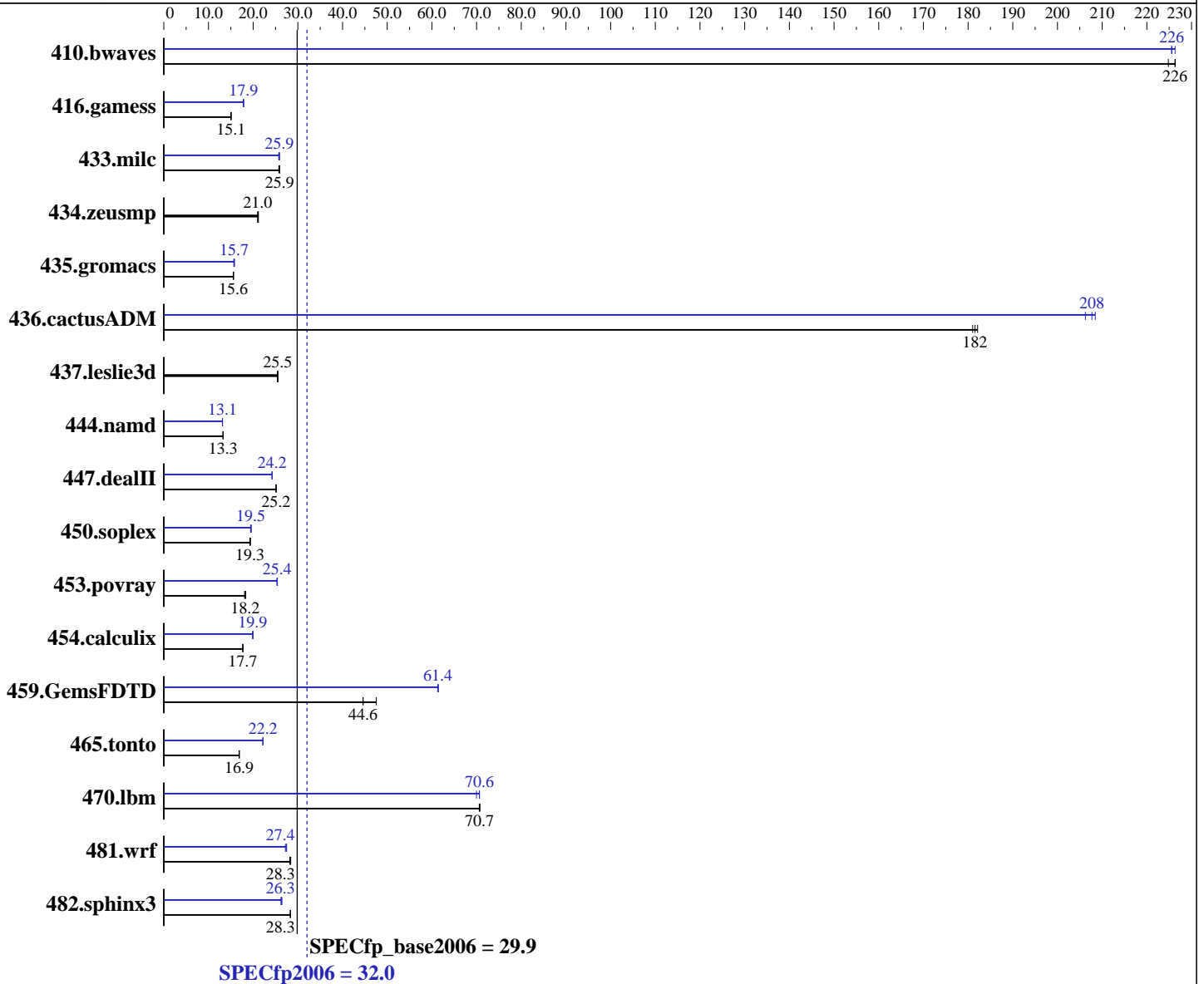
Test date: Mar-2010

Test sponsor: Dell Inc.

Hardware Availability: Mar-2010

Tested by: Dell Inc.

Software Availability: Dec-2009



## Hardware

CPU Name: Intel Xeon E7540  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.27 GHz  
 CPU MHz: 2000  
 FPU: Integrated  
 CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip, 2 threads/core  
 CPU(s) orderable: 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: Red Hat Enterprise Linux 5 (x86\_64) Update 4 errata kernel (RHEL 5.4.z) kernel-2.6.18-164.9.1.el5.x86\_64  
 Compiler: Intel C++ and Fortran Professional Compiler for IA32 and Intel 64, Version 11.1 Build 20091130 Package ID: l\_cproc\_p\_11.1.064, l\_cprof\_p\_11.1.064  
 Auto Parallel: Yes  
 File System: ext3

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L3 Cache: 18 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 128 GB (32 x 4 GB DDR3-1066 QR RDIMM)  
 Disk Subsystem: 6 x 73 GB 15000 RPM SAS  
 Other Hardware: None

System State: Run level 3 (multi-user)  
 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    | 60.0       | 226         | <b>60.0</b> | <b>226</b>  | 60.4        | 225         | 60.2       | 226         | <b>60.2</b> | <b>226</b>  | 60.0        | 226         |
| 416.gamess    | 1298       | 15.1        | 1307        | 15.0        | <b>1299</b> | <b>15.1</b> | 1098       | 17.8        | 1096        | 17.9        | <b>1096</b> | <b>17.9</b> |
| 433.milc      | 357        | 25.7        | <b>354</b>  | <b>25.9</b> | 354         | 25.9        | 354        | 25.9        | <b>355</b>  | <b>25.9</b> | 357         | 25.7        |
| 434.zeusmp    | 433        | 21.0        | 430         | 21.2        | <b>432</b>  | <b>21.0</b> | 433        | 21.0        | 430         | 21.2        | <b>432</b>  | <b>21.0</b> |
| 435.gromacs   | 458        | 15.6        | <b>458</b>  | <b>15.6</b> | 458         | 15.6        | 456        | 15.7        | 451         | 15.8        | <b>453</b>  | <b>15.7</b> |
| 436.cactusADM | 66.0       | 181         | 65.6        | 182         | <b>65.8</b> | <b>182</b>  | 57.3       | 208         | <b>57.5</b> | <b>208</b>  | 57.9        | 206         |
| 437.leslie3d  | 368        | 25.5        | 370         | 25.4        | <b>369</b>  | <b>25.5</b> | 368        | 25.5        | 370         | 25.4        | <b>369</b>  | <b>25.5</b> |
| 444.namd      | 606        | 13.2        | <b>604</b>  | <b>13.3</b> | 604         | 13.3        | <b>611</b> | <b>13.1</b> | 611         | 13.1        | 610         | 13.1        |
| 447.dealII    | 455        | 25.2        | <b>455</b>  | <b>25.2</b> | 456         | 25.1        | 472        | 24.3        | <b>472</b>  | <b>24.2</b> | 472         | 24.2        |
| 450.soplex    | <b>432</b> | <b>19.3</b> | 430         | 19.4        | 433         | 19.3        | <b>428</b> | <b>19.5</b> | 429         | 19.4        | 426         | 19.6        |
| 453.povray    | 290        | 18.3        | 294         | 18.1        | <b>292</b>  | <b>18.2</b> | 209        | 25.4        | 210         | 25.3        | <b>210</b>  | <b>25.4</b> |
| 454.calculix  | <b>466</b> | <b>17.7</b> | 465         | 17.7        | 467         | 17.6        | <b>414</b> | <b>19.9</b> | 415         | 19.9        | 414         | 19.9        |
| 459.GemsFDTD  | <b>238</b> | <b>44.6</b> | 238         | 44.6        | 223         | 47.6        | 173        | 61.3        | 173         | 61.4        | <b>173</b>  | <b>61.4</b> |
| 465.tonto     | 585        | 16.8        | 581         | 16.9        | <b>584</b>  | <b>16.9</b> | 445        | 22.1        | 443         | 22.2        | <b>443</b>  | <b>22.2</b> |
| 470.lbm       | <b>194</b> | <b>70.7</b> | 194         | 70.7        | 195         | 70.6        | 195        | 70.6        | 196         | 70.0        | <b>195</b>  | <b>70.6</b> |
| 481.wrf       | <b>395</b> | <b>28.3</b> | 393         | 28.4        | 396         | 28.2        | 410        | 27.2        | <b>408</b>  | <b>27.4</b> | 406         | 27.5        |
| 482.sphinx3   | <b>688</b> | <b>28.3</b> | 688         | 28.3        | 688         | 28.3        | <b>741</b> | <b>26.3</b> | 743         | 26.2        | 737         | 26.4        |

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

## Platform Notes

vm.zone\_reclaim\_mode = 1 in /etc/sysctl.conf file  
 BIOS Settings:  
 Power Management = Maximum Performance (Default = Active Power Controller)

## 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 -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

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:

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) -static(pass 2) -prof-use(pass 2)  
-ansi-alias

470.lbm: -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)  
-parallel -ansi-alias -auto-ilp32

482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -static -auto-ilp32  
-unroll2

C++ benchmarks:

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- -auto-ilp32

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 -auto-ilp32

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## Peak Optimization Flags (Continued)

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)  
-inline-calloc -opt-malloc-options=3 -auto -unroll4

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: Same as 454.calculix

The flags file that was used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic11.1-linux64-revE.20100330.html>

You can also download the XML flags source by saving the following link:

<http://www.spec.org/cpu2006/flags/Intel-ic11.1-linux64-revE.20100330.xml>



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