



# SPEC<sup>®</sup> CFP2006 Result

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Dell Inc.

SPECfp<sup>®</sup>2006 = 30.4

PowerEdge R510 (Intel Xeon E5603, 1.6 GHz)

SPECfp\_base2006 = 29.5

CPU2006 license: 55

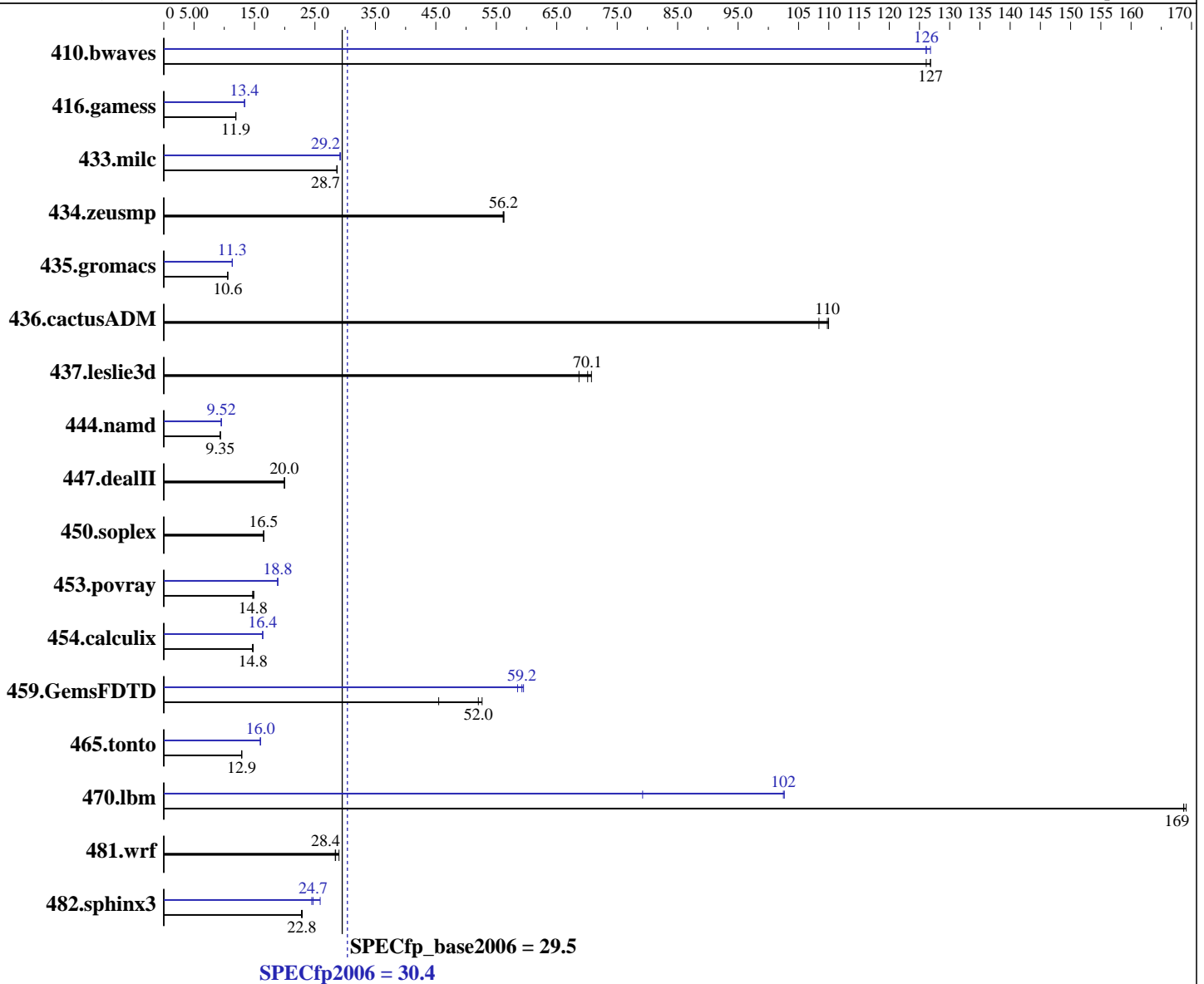
Test date: May-2011

Test sponsor: Dell Inc.

Hardware Availability: Feb-2011

Tested by: Dell Inc.

Software Availability: Apr-2011



## Hardware

CPU Name: Intel Xeon E5603  
 CPU Characteristics:  
 CPU MHz: 1600  
 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

Continued on next page

## 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: 4 MB I+D on chip per chip  
Other Cache: None  
Memory: 48 GB (6 x 8 GB 2Rx4 PC3-10600R-9, ECC, running at 1066 MHz)  
Disk Subsystem: 2 x 146 GB 15000 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	107	127	108	126	<b>107</b>	<b>127</b>	107	127	108	126	<b>108</b>	<b>126</b>
416.gamess	<b>1643</b>	<b>11.9</b>	1642	11.9	1645	11.9	<b>1465</b>	<b>13.4</b>	1465	13.4	1466	13.4
433.milc	320	28.7	<b>320</b>	<b>28.7</b>	321	28.6	314	29.2	315	29.1	<b>315</b>	<b>29.2</b>
434.zeusmp	<b>162</b>	<b>56.2</b>	162	56.1	162	56.3	<b>162</b>	<b>56.2</b>	162	56.1	162	56.3
435.gromacs	676	10.6	<b>675</b>	<b>10.6</b>	675	10.6	632	11.3	629	11.3	<b>630</b>	<b>11.3</b>
436.cactusADM	<b>109</b>	<b>110</b>	109	110	110	108	<b>109</b>	<b>110</b>	109	110	110	108
437.leslie3d	<b>134</b>	<b>70.1</b>	133	70.7	137	68.7	<b>134</b>	<b>70.1</b>	133	70.7	137	68.7
444.namd	857	9.36	<b>857</b>	<b>9.35</b>	857	9.35	<b>842</b>	<b>9.52</b>	843	9.51	842	9.52
447.dealII	<b>573</b>	<b>20.0</b>	573	20.0	573	20.0	<b>573</b>	<b>20.0</b>	573	20.0	573	20.0
450.soplex	505	16.5	504	16.5	<b>505</b>	<b>16.5</b>	505	16.5	504	16.5	<b>505</b>	<b>16.5</b>
453.povray	357	14.9	<b>361</b>	<b>14.8</b>	362	14.7	283	18.8	282	18.9	<b>282</b>	<b>18.8</b>
454.calculix	558	14.8	563	14.7	<b>558</b>	<b>14.8</b>	505	16.3	504	16.4	<b>504</b>	<b>16.4</b>
459.GemsFDTD	233	45.5	<b>204</b>	<b>52.0</b>	202	52.6	178	59.5	<b>179</b>	<b>59.2</b>	181	58.5
465.tonto	<b>763</b>	<b>12.9</b>	764	12.9	763	12.9	616	16.0	<b>616</b>	<b>16.0</b>	615	16.0
470.lbm	81.2	169	<b>81.4</b>	<b>169</b>	81.4	169	173	79.2	134	103	<b>134</b>	<b>102</b>
481.wrf	394	28.4	385	29.0	<b>393</b>	<b>28.4</b>	394	28.4	385	29.0	<b>393</b>	<b>28.4</b>
482.sphinx3	851	22.9	<b>853</b>	<b>22.8</b>	856	22.8	797	24.5	<b>789</b>	<b>24.7</b>	753	25.9

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

```
'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)  
Data Reuse = Disabled (Default = Enabled)



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## General Notes

OMP\_NUM\_THREADS set to number of cores  
Binaries were compiled on RHEL5.5  
The Dell PowerEdge R510 and  
the Bull NovaScale R450 F2 models are electronically equivalent.  
The results have been measured on a Dell PowerEdge R510 model.

## 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: -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: -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

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## Peak Optimization Flags (Continued)

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

447.dealIII: 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.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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