



# SPEC<sup>®</sup> CFP2006 Result

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## Bull SAS

SPECfp<sup>®</sup>2006 = 48.6

NovaScale R440 F2 (Intel Xeon E5620, 2.40 GHz)

SPECfp\_base2006 = 45.6

CPU2006 license: 20

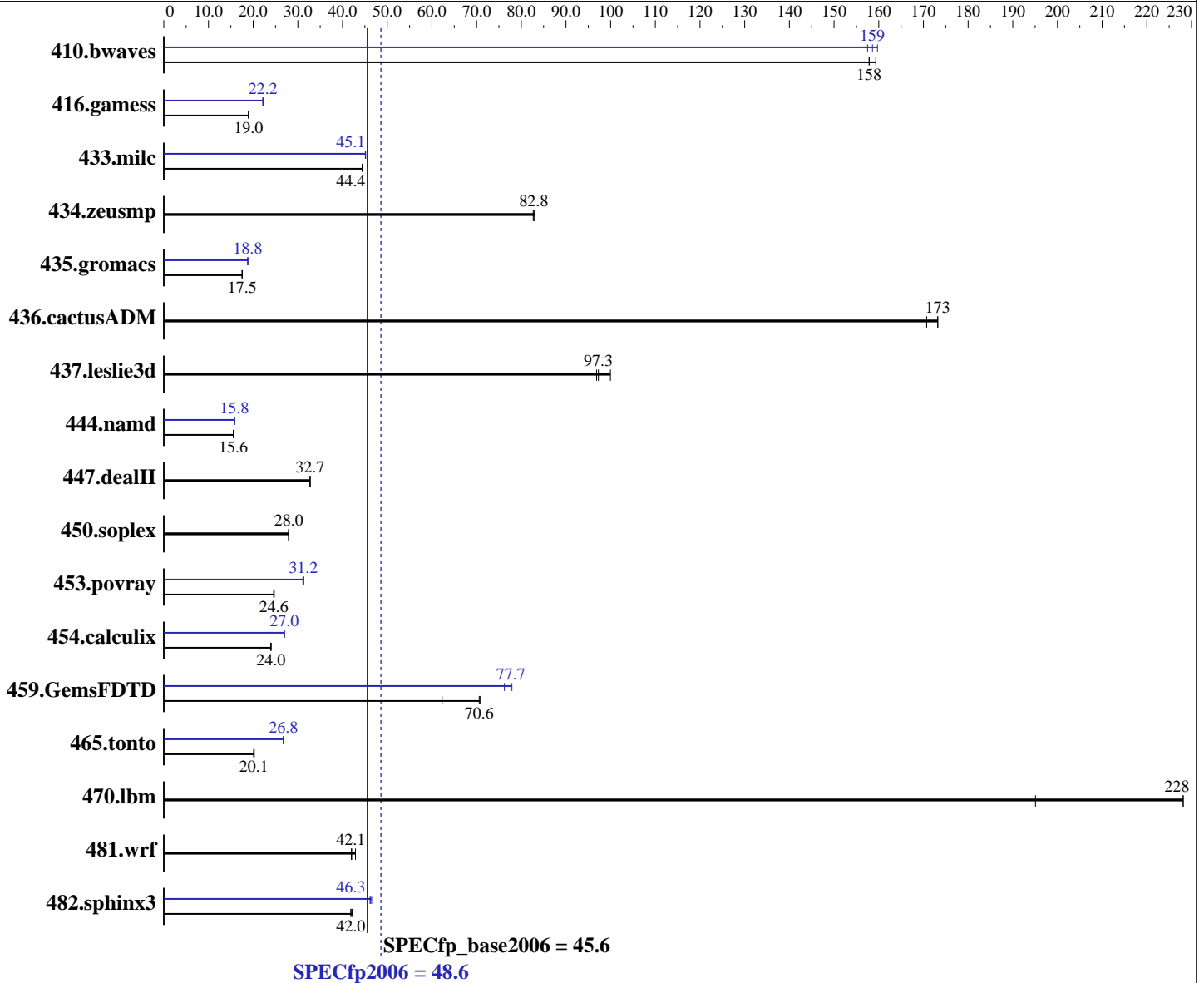
Test sponsor: Bull SAS

Tested by: Dell Inc.

Test date: May-2011

Hardware Availability: Mar-2010

Software Availability: Apr-2011



### Hardware

CPU Name: Intel Xeon E5620  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.66 GHz  
 CPU MHz: 2400  
 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: 12 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 48 GB (12 x 4 GB 2Rx4 PC3-10600R-9, ECC, running at 1066 MHz)  
 Disk Subsystem: 1 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    | 85.3        | 159         | 86.1        | 158         | <b>86.1</b> | <b>158</b>  | <b>85.7</b> | <b>159</b>  | 86.3        | 157         | 85.1        | 160         |
| 416.gamess    | <b>1031</b> | <b>19.0</b> | 1033        | 19.0        | 1031        | 19.0        | 882         | 22.2        | <b>882</b>  | <b>22.2</b> | 884         | 22.2        |
| 433.milc      | 206         | 44.5        | 207         | 44.4        | <b>207</b>  | <b>44.4</b> | 204         | 45.1        | 203         | 45.2        | <b>203</b>  | <b>45.1</b> |
| 434.zeusmp    | 110         | 83.0        | <b>110</b>  | <b>82.8</b> | 110         | 82.7        | 110         | 83.0        | <b>110</b>  | <b>82.8</b> | 110         | 82.7        |
| 435.gromacs   | <b>407</b>  | <b>17.5</b> | 406         | 17.6        | 408         | 17.5        | <b>380</b>  | <b>18.8</b> | 380         | 18.8        | 380         | 18.8        |
| 436.cactusADM | 69.0        | 173         | 70.0        | 171         | <b>69.0</b> | <b>173</b>  | 69.0        | 173         | 70.0        | 171         | <b>69.0</b> | <b>173</b>  |
| 437.leslie3d  | 97.0        | 96.9        | <b>96.6</b> | <b>97.3</b> | 94.0        | 100         | 97.0        | 96.9        | <b>96.6</b> | <b>97.3</b> | 94.0        | 100         |
| 444.namd      | 516         | 15.6        | 515         | 15.6        | <b>515</b>  | <b>15.6</b> | <b>507</b>  | <b>15.8</b> | 507         | 15.8        | 507         | 15.8        |
| 447.dealII    | 349         | 32.8        | <b>349</b>  | <b>32.7</b> | 350         | 32.7        | 349         | 32.8        | <b>349</b>  | <b>32.7</b> | 350         | 32.7        |
| 450.soplex    | 298         | 28.0        | <b>298</b>  | <b>28.0</b> | 299         | 27.9        | 298         | 28.0        | <b>298</b>  | <b>28.0</b> | 299         | 27.9        |
| 453.povray    | 215         | 24.7        | <b>216</b>  | <b>24.6</b> | 216         | 24.6        | <b>170</b>  | <b>31.2</b> | 170         | 31.3        | 171         | 31.1        |
| 454.calculix  | 343         | 24.0        | <b>344</b>  | <b>24.0</b> | 345         | 23.9        | 306         | 27.0        | 306         | 27.0        | <b>306</b>  | <b>27.0</b> |
| 459.GemsFDTD  | 150         | 70.8        | <b>150</b>  | <b>70.6</b> | 170         | 62.3        | <b>137</b>  | <b>77.7</b> | 139         | 76.2        | 136         | 77.9        |
| 465.tonto     | 486         | 20.2        | <b>488</b>  | <b>20.1</b> | 489         | 20.1        | 368         | 26.8        | 367         | 26.8        | <b>368</b>  | <b>26.8</b> |
| 470.lbm       | <b>60.2</b> | <b>228</b>  | 70.4        | 195         | 60.2        | 228         | <b>60.2</b> | <b>228</b>  | 70.4        | 195         | 60.2        | 228         |
| 481.wrf       | <b>266</b>  | <b>42.1</b> | 260         | 42.9        | 266         | 42.0        | <b>266</b>  | <b>42.1</b> | 260         | 42.9        | 266         | 42.0        |
| 482.sphinx3   | 462         | 42.2        | <b>464</b>  | <b>42.0</b> | 466         | 41.8        | 419         | 46.5        | 422         | 46.1        | <b>421</b>  | <b>46.3</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)  
 Data Reuse = Disabled (Default = Enabled)  
 Logical Processor = Disabled (Default = Enabled)



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## General Notes

OMP\_NUM\_THREADS set to number of cores  
The Dell PowerEdge R610 and the Bull NovaScale R440 F2 models are electronically equivalent. The results have been measured on a Dell PowerEdge R610 model  
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

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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: basepeak = yes

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.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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Tested with SPEC CPU2006 v1.1.  
Report generated on Wed Jul 23 23:10:57 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 16 August 2011.