



# SPEC<sup>®</sup> CFP2006 Result

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## Bull SAS

SPECfp<sup>®</sup>\_rate2006 = 721

NovaScale R480 F2 (Intel Xeon E7-4860, 2.27 GHz)

SPECfp\_rate\_base2006 = 693

CPU2006 license: 20

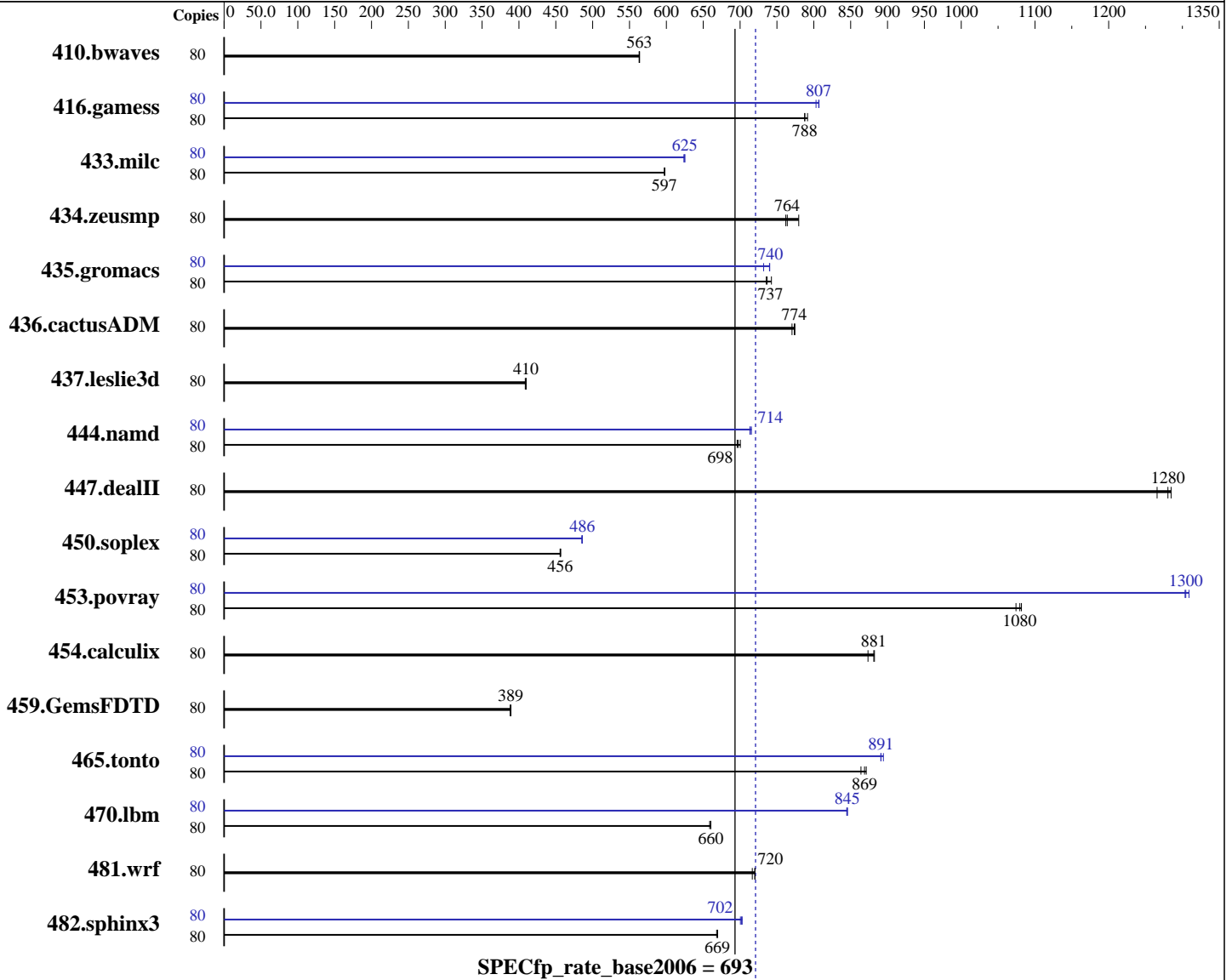
Test sponsor: Bull SAS

Tested by: Dell Inc.

Test date: Mar-2011

Hardware Availability: Apr-2011

Software Availability: Apr-2011



### Hardware

CPU Name: Intel Xeon E7-4860  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.67 GHz  
 CPU MHz: 2267  
 FPU: Integrated  
 CPU(s) enabled: 40 cores, 4 chips, 10 cores/chip, 2 threads/core  
 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 12.0.1.116 Build 20101116  
 Auto Parallel: No  
 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   |             |            |             |            |             |             |
|---------------|--------|-------------|------------|-------------|------------|-------------|-------------|--------|-------------|------------|-------------|------------|-------------|-------------|
|               | Copies | Seconds     | Ratio      | Seconds     | Ratio      | Seconds     | Ratio       | Copies | Seconds     | Ratio      | Seconds     | Ratio      | Seconds     | Ratio       |
| 410.bwaves    | 80     | <b>1930</b> | <b>563</b> | 1929        | 564        | 1931        | 563         | 80     | <b>1930</b> | <b>563</b> | 1929        | 564        | 1931        | 563         |
| 416.gamess    | 80     | <b>1988</b> | <b>788</b> | 1989        | 788        | 1979        | 792         | 80     | 1941        | 807        | <b>1942</b> | <b>807</b> | 1951        | 803         |
| 433.milc      | 80     | <b>1229</b> | <b>597</b> | 1228        | 598        | 1230        | 597         | 80     | 1175        | 625        | <b>1175</b> | <b>625</b> | 1177        | 624         |
| 434.zeusmp    | 80     | 934         | 780        | 955         | 762        | <b>953</b>  | <b>764</b>  | 80     | 934         | 780        | 955         | 762        | <b>953</b>  | <b>764</b>  |
| 435.gromacs   | 80     | <b>775</b>  | <b>737</b> | 777         | 736        | 769         | 743         | 80     | 780         | 732        | 772         | 740        | <b>772</b>  | <b>740</b>  |
| 436.cactusADM | 80     | 1235        | 774        | 1241        | 770        | <b>1236</b> | <b>774</b>  | 80     | 1235        | 774        | 1241        | 770        | <b>1236</b> | <b>774</b>  |
| 437.leslie3d  | 80     | 1835        | 410        | <b>1836</b> | <b>410</b> | 1841        | 409         | 80     | 1835        | 410        | <b>1836</b> | <b>410</b> | 1841        | 409         |
| 444.namd      | 80     | <b>920</b>  | <b>698</b> | 916         | 700        | 922         | 696         | 80     | <b>899</b>  | <b>714</b> | 899         | 713        | 897         | 715         |
| 447.dealII    | 80     | 712         | 1280       | 723         | 1270       | <b>715</b>  | <b>1280</b> | 80     | 712         | 1280       | 723         | 1270       | <b>715</b>  | <b>1280</b> |
| 450.soplex    | 80     | 1461        | 457        | 1464        | 456        | <b>1463</b> | <b>456</b>  | 80     | 1373        | 486        | 1375        | 485        | <b>1373</b> | <b>486</b>  |
| 453.povray    | 80     | 396         | 1070       | 393         | 1080       | <b>394</b>  | <b>1080</b> | 80     | 326         | 1300       | 325         | 1310       | <b>326</b>  | <b>1300</b> |
| 454.calculix  | 80     | 748         | 882        | 756         | 874        | <b>749</b>  | <b>881</b>  | 80     | 748         | 882        | 756         | 874        | <b>749</b>  | <b>881</b>  |
| 459.GemsFDTD  | 80     | 2187        | 388        | 2181        | 389        | <b>2185</b> | <b>389</b>  | 80     | 2187        | 388        | 2181        | 389        | <b>2185</b> | <b>389</b>  |
| 465.tonto     | 80     | 904         | 871        | 911         | 864        | <b>906</b>  | <b>869</b>  | 80     | <b>883</b>  | <b>891</b> | 880         | 894        | 884         | 891         |
| 470.lbm       | 80     | 1665        | 660        | <b>1665</b> | <b>660</b> | 1669        | 659         | 80     | 1300        | 846        | <b>1300</b> | <b>845</b> | 1301        | 845         |
| 481.wrf       | 80     | <b>1241</b> | <b>720</b> | 1241        | 720        | 1247        | 717         | 80     | <b>1241</b> | <b>720</b> | 1241        | 720        | 1247        | 717         |
| 482.sphinx3   | 80     | 2329        | 669        | <b>2329</b> | <b>669</b> | 2333        | 668         | 80     | 2218        | 703        | 2226        | 700        | <b>2221</b> | <b>702</b>  |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The config file option 'submit' was used.

## 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 72000 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
```



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## Platform Notes

BIOS Settings:

Power Management = Maximum Performance (Default = Active Power Controller)

## 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. 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



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## Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

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

Fortran benchmarks:

`-xSSE4.2 -ipo -O3 -no-prec-div -static`

Benchmarks using both Fortran and C:

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

## Peak Compiler Invocation

C benchmarks (except as noted below):

`icc -m64`

482.sphinx3: `icc -m32`

C++ benchmarks (except as noted below):

`icpc -m64`

450.soplex: `icpc -m32`

Fortran benchmarks:

`ifort -m64`

Benchmarks using both Fortran and C:

`icc -m64 ifort -m64`

## Peak 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`  
 453.povray: `-DSPEC_CPU_LP64`  
 454.calculix: `-DSPEC_CPU_LP64 -nofor_main`  
 459.GemsFDTD: `-DSPEC_CPU_LP64`  
 465.tonto: `-DSPEC_CPU_LP64`

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## Peak Portability Flags (Continued)

470.lbm: -DSPEC\_CPU\_LP64

481.wrf: -DSPEC\_CPU\_LP64 -DSPEC\_CPU\_CASE\_FLAG -DSPEC\_CPU\_LINUX

## 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

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) -opt-malloc-options=3  
-ansi-alias -opt-prefetch -static -auto-ilp32

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

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.dealII: basepeak = yes

450.soplex: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3  
-B /usr/share/libhugetlbfs/ -Wl,-hugetlbfs-link=BDT

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: basepeak = yes

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: basepeak = yes

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

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## Peak Optimization Flags (Continued)

465.tonto (continued):

`-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) -opt-prefetch  
-static -auto-ilp32`

436.cactusADM: `basepeak = yes`

454.calculix: `basepeak = yes`

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.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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