



# SPEC<sup>®</sup> CFP2006 Result

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## Bull SAS

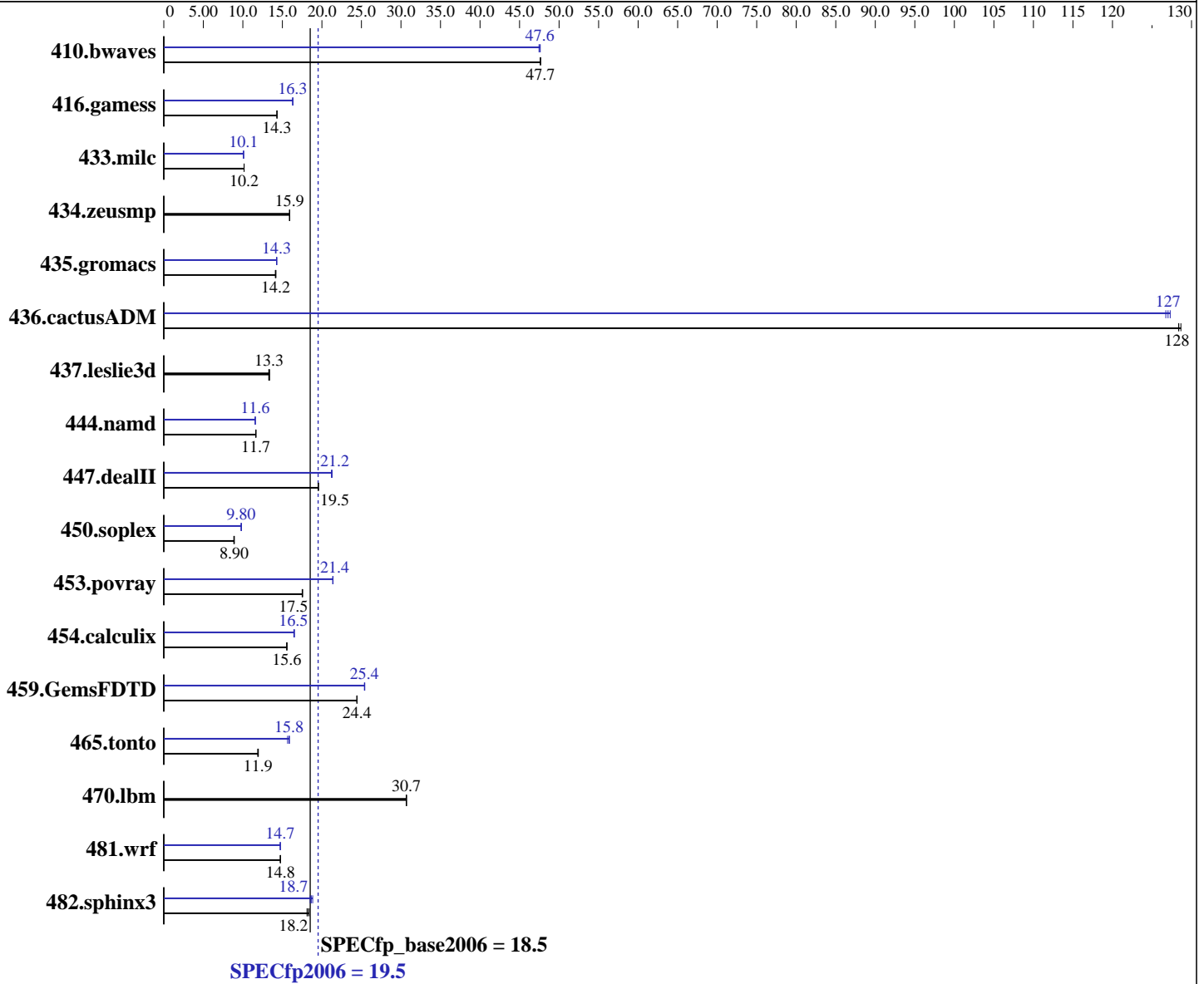
NovaScale R480 E1  
(Intel Xeon E7420, 2.13 GHz)

SPECfp<sup>®</sup>2006 = 19.5

SPECfp\_base2006 = 18.5

CPU2006 license: 20  
Test sponsor: Bull SAS  
Tested by: NEC Corporation

Test date: Nov-2008  
Hardware Availability: Nov-2008  
Software Availability: Nov-2008



### Hardware

CPU Name: Intel Xeon E7420  
CPU Characteristics: 1066 MHz system bus  
CPU MHz: 2133  
FPU: Integrated  
CPU(s) enabled: 16 cores, 4 chips, 4 cores/chip  
CPU(s) orderable: 1,2,3,4 chips  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 6 MB I+D on chip per chip, 3 MB shared / 2 cores

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### Software

Operating System: SUSE Linux Enterprise Server 10 (x86\_64) SP2, Kernel 2.6.16.60-0.21-smpp  
Compiler: Intel C++ and Fortran Compiler 11.0 for Linux Build 20080730 Package ID: l\_cproc\_b\_11.0.044, l\_fproc\_b\_11.0.044  
Auto Parallel: Yes  
File System: ext2  
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: 32 GB (16x2 GB PC2-5300F, 2 rank, CL5-5-5, ECC)  
Disk Subsystem: 1x73.2 GB SAS, 15000RPM  
Other Hardware: None

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	285	47.7	<u>285</u>	<u>47.7</u>	285	47.6	286	47.5	<u>286</u>	<u>47.6</u>	285	47.6
416.gamess	<u>1368</u>	<u>14.3</u>	1367	14.3	1368	14.3	1201	16.3	<u>1201</u>	<u>16.3</u>	1199	16.3
433.milc	904	10.2	904	10.2	<u>904</u>	<u>10.2</u>	911	10.1	910	10.1	<u>910</u>	<u>10.1</u>
434.zeusmp	<u>572</u>	<u>15.9</u>	572	15.9	572	15.9	<u>572</u>	<u>15.9</u>	572	15.9	572	15.9
435.gromacs	506	14.1	<u>504</u>	<u>14.2</u>	504	14.2	<u>500</u>	<u>14.3</u>	501	14.3	499	14.3
436.cactusADM	93.1	128	<u>93.1</u>	<u>128</u>	92.9	129	93.9	127	<u>94.1</u>	<u>127</u>	94.3	127
437.leslie3d	702	13.4	<u>706</u>	<u>13.3</u>	708	13.3	702	13.4	<u>706</u>	<u>13.3</u>	708	13.3
444.namd	690	11.6	688	11.7	<u>688</u>	<u>11.7</u>	693	11.6	694	11.6	<u>693</u>	<u>11.6</u>
447.dealII	<u>585</u>	<u>19.5</u>	585	19.5	585	19.6	<u>538</u>	<u>21.2</u>	539	21.2	537	21.3
450.soplex	935	8.92	<u>937</u>	<u>8.90</u>	942	8.86	848	9.83	854	9.77	<u>851</u>	<u>9.80</u>
453.povray	<u>303</u>	<u>17.5</u>	303	17.6	304	17.5	<u>249</u>	<u>21.4</u>	248	21.4	249	21.4
454.calculix	529	15.6	531	15.5	<u>530</u>	<u>15.6</u>	500	16.5	502	16.4	<u>500</u>	<u>16.5</u>
459.GemsFDTD	<u>434</u>	<u>24.4</u>	434	24.5	435	24.4	417	25.4	<u>418</u>	<u>25.4</u>	418	25.4
465.tonto	823	12.0	<u>826</u>	<u>11.9</u>	828	11.9	619	15.9	<u>621</u>	<u>15.8</u>	629	15.7
470.lbm	448	30.7	<u>448</u>	<u>30.7</u>	447	30.7	448	30.7	<u>448</u>	<u>30.7</u>	447	30.7
481.wrf	756	14.8	<u>757</u>	<u>14.8</u>	759	14.7	<u>758</u>	<u>14.7</u>	758	14.7	758	14.7
482.sphinx3	1061	18.4	<u>1071</u>	<u>18.2</u>	1076	18.1	1035	18.8	1053	18.5	<u>1045</u>	<u>18.7</u>

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  
OMP\_NUM\_THREADS set to number of cores  
KMP\_AFFINITY set to "physical,0"  
KMP\_STACKSIZE set to 200M

## Platform Notes

Bios settings:  
Hardware Prefetcher: Enabled  
Adjacent Cache Line Prefetch: Enabled



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## General Notes

The NEC Express5800/R140a-4(Intel Xeon E7420) and the Bull NovaScale R480 E1(Intel Xeon E7420, 2.13 GHz) models are electronically equivalent. The results have been measured on a NEC Express5800/R140a-4(Intel Xeon E7420) model.

## Base Compiler Invocation

C benchmarks:  
icc  
  
C++ benchmarks:  
icpc  
  
Fortran benchmarks:  
ifort  
  
Benchmarks using both Fortran and C:  
icc ifort

## 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:  
-xSSE4.1 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch  
  
C++ benchmarks:  
-xSSE4.1 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

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## Base Optimization Flags (Continued)

Fortran benchmarks:

-xSSE4.1 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

Benchmarks using both Fortran and C:

-xSSE4.1 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

## Peak Compiler Invocation

C benchmarks (except as noted below):

icc

482.sphinx3: /opt/intel/Compiler/11.0/044/bin/ia32/icc  
-L/opt/intel/Compiler/11.0/044/ipp/ia32/lib  
-I/opt/intel/Compiler/11.0/044/ipp/ia32/include

C++ benchmarks (except as noted below):

icpc

450.soplex: /opt/intel/Compiler/11.0/044/bin/ia32/icpc  
-L/opt/intel/Compiler/11.0/044/ipp/ia32/lib  
-I/opt/intel/Compiler/11.0/044/ipp/ia32/include

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

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



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## Peak Optimization Flags

### C benchmarks:

433.milc: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -fno-alias

470.lbm: basepeak = yes

482.sphinx3: -xSSE4.1 -ipo -O3 -no-prec-div -static -unroll2

### C++ benchmarks:

444.namd: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -fno-alias -auto-ilp32

447.dealII: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll2 -ansi-alias -scalar-rep-  
-opt-prefetch

450.soplex: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -opt-malloc-options=3

453.povray: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll4 -ansi-alias

### Fortran benchmarks:

410.bwaves: -xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch  
-parallel

416.gamess: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll2 -Ob0 -ansi-alias  
-scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll2 -Ob0 -opt-prefetch  
-parallel

465.tonto: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll4 -auto

### Benchmarks using both Fortran and C:

435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -opt-prefetch -auto-ilp32

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## Peak Optimization Flags (Continued)

436.cactusADM: -prof-gen(pass 1) -prof-use(pass 2) -xSSE4.1 -ipo -O3  
-no-prec-div -static -unroll2 -opt-prefetch -parallel  
-auto-ilp32

454.calculix: -xSSE4.1 -ipo -O3 -no-prec-div -static -auto-ilp32

481.wrf: -xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch  
-parallel -auto-ilp32

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revD.html>

<http://www.spec.org/cpu2006/flags/NEC-Intel-Linux-Settings-flags-revB.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revD.xml>

<http://www.spec.org/cpu2006/flags/NEC-Intel-Linux-Settings-flags-revB.xml>

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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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