# SPEC® CFP2006 Result

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## Bull SAS

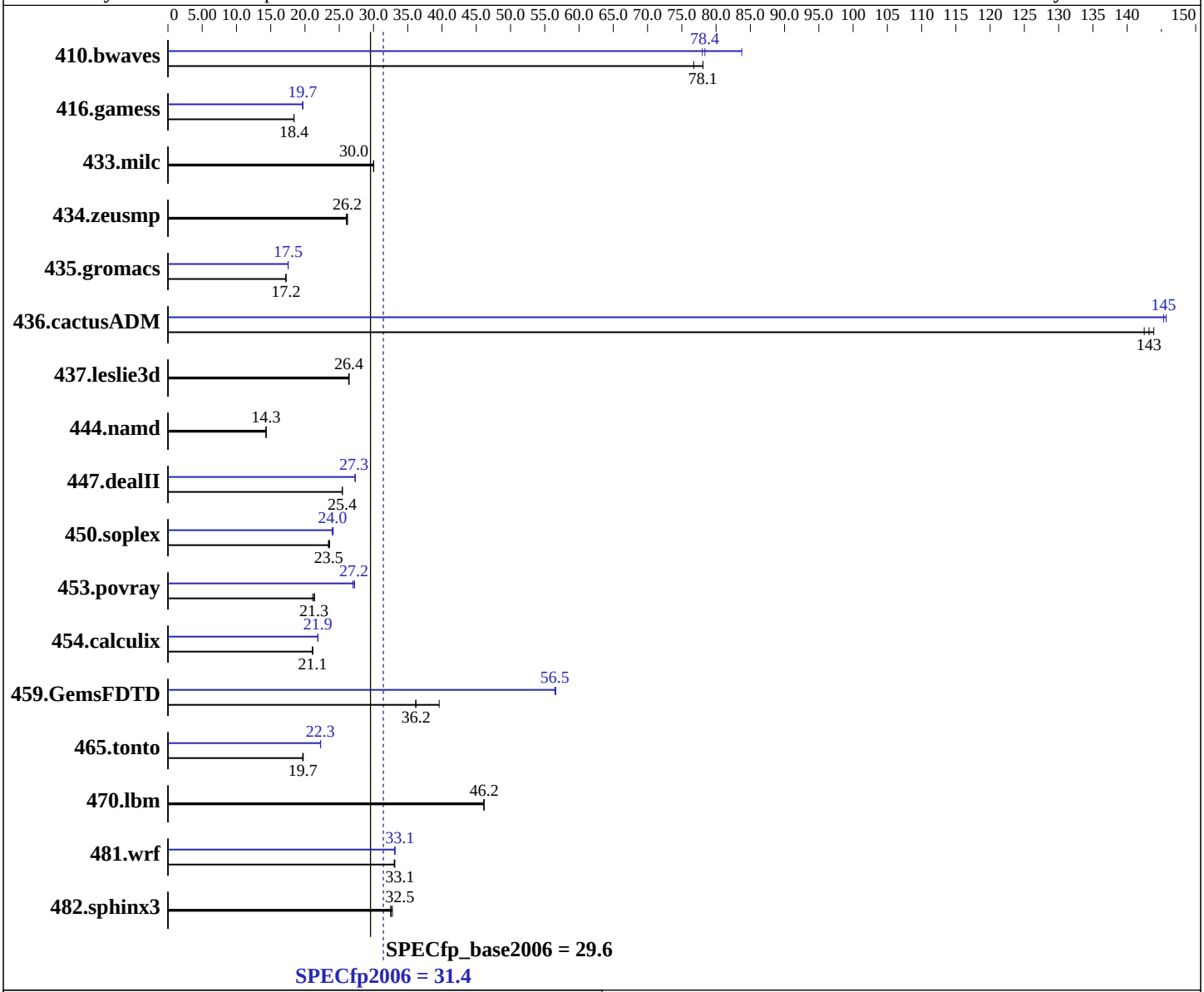
NovaScale R440 E2
(Intel Xeon L5520, 2.26 GHz)

SPECfp®2006 = 31.4

SPECfp_base2006 = 29.6

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

**Test date:** Sep-2009
**Hardware Availability:** Jul-2009
**Software Availability:** Feb-2009




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon L5520 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.53 GHz |
| CPU MHz: | 2267 |
| FPU: | Integrated |
| CPU(s) enabled: | 8 cores, 2 chips, 4 cores/chip, 2 threads/core |
| 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 10 (x86_64) SP2 with patch Linux kernel 20090119, Kernel 2.6.16.60-0.34-smp |
| Compiler: | Intel C++ and Fortran Compiler Professional 11.0 for Linux<br>Build 20090131 Package ID: l_cproc_p_11.0.081, l_cprof_p_11.0.081 |
| Auto Parallel: | Yes |
| File System: | ReiserFS |

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L3 Cache: 8 MB I+D on chip per chip
Other Cache: None
Memory: 48 GB (12 X 4 GB PC3-8500R, 2 rank, CL7, ECC)
Disk Subsystem: 1x146.5 GB SAS, 15000 RPM
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 | 177 | 76.7 | 174 | 78.1 | **174** | **78.1** | 174 | 78.0 | **173** | **78.4** | 162 | 83.8 |
| 416.gamess | 1065 | 18.4 | **1064** | **18.4** | 1064 | 18.4 | 995 | 19.7 | **995** | **19.7** | 997 | 19.6 |
| 433.milc | 306 | 30.0 | 306 | 30.0 | **306** | **30.0** | 306 | 30.0 | 306 | 30.0 | **306** | **30.0** |
| 434.zeusmp | 349 | 26.0 | 347 | 26.2 | **347** | **26.2** | 349 | 26.0 | 347 | 26.2 | **347** | **26.2** |
| 435.gromacs | **415** | **17.2** | 415 | 17.2 | 415 | 17.2 | 407 | 17.6 | 407 | 17.5 | **407** | **17.5** |
| 436.cactusADM | **83.5** | **143** | 83.1 | 144 | 83.9 | 142 | 82.0 | 146 | **82.2** | **145** | 82.2 | 145 |
| 437.leslie3d | 356 | 26.4 | **356** | **26.4** | 356 | 26.4 | 356 | 26.4 | **356** | **26.4** | 356 | 26.4 |
| 444.namd | 560 | 14.3 | 560 | 14.3 | **560** | **14.3** | 560 | 14.3 | 560 | 14.3 | **560** | **14.3** |
| 447.dealII | 450 | 25.4 | 449 | 25.5 | **450** | **25.4** | **419** | **27.3** | 419 | 27.3 | 418 | 27.3 |
| 450.soplex | **355** | **23.5** | 356 | 23.4 | 353 | 23.6 | 346 | 24.1 | 348 | 24.0 | **347** | **24.0** |
| 453.povray | **249** | **21.3** | 252 | 21.1 | 249 | 21.4 | 195 | 27.2 | 197 | 27.0 | **196** | **27.2** |
| 454.calculix | 391 | 21.1 | 391 | 21.1 | **391** | **21.1** | 377 | 21.9 | 377 | 21.9 | **377** | **21.9** |
| 459.GemsFDTD | 293 | 36.2 | **293** | **36.2** | 268 | 39.6 | 187 | 56.6 | 188 | 56.5 | **188** | **56.5** |
| 465.tonto | 498 | 19.7 | 500 | 19.7 | **499** | **19.7** | 442 | 22.3 | 441 | 22.3 | **442** | **22.3** |
| 470.lbm | **298** | **46.2** | 298 | 46.1 | 298 | 46.2 | **298** | **46.2** | 298 | 46.1 | 298 | 46.2 |
| 481.wrf | **337** | **33.1** | 338 | 33.0 | 337 | 33.1 | **337** | **33.1** | 338 | 33.1 | 337 | 33.2 |
| 482.sphinx3 | 595 | 32.8 | 599 | 32.5 | **599** | **32.5** | 595 | 32.8 | 599 | 32.5 | **599** | **32.5** |

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 granularity=fine,scatter
KMP_STACKSIZE set to 200M
```

## Platform Notes

```
BIOS setting:
NUMA configuration : Enabled
```

## General Notes

```
The NEC Express5800/R120a-1(Intel Xeon L5520),
the NEC Express5800/R120a-2(Intel Xeon L5520),
the Bull NovaScale R440 E2 (Intel Xeon L5520, 2.26 GHz) and
the Bull NovaScale R460 E2 (Intel Xeon L5520, 2.26 GHz) models are electronically equivalent.
The results have been measured on a NEC Express5800/R120a-1(Intel Xeon L5520) 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:
-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch

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## Base Optimization Flags (Continued)

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`

## Peak Compiler Invocation

C benchmarks:
`icc`

C++ benchmarks (except as noted below):
`icpc`

450.soplex: `icpc -m32`

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`
482.sphinx3: `-DSPEC_CPU_LP64`

# Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: basepeak = yes

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- -opt-prefetch

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

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) -unroll4 -auto

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

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# Peak Optimization Flags (Continued)

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: `-xSSE4.2 -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-revH.html`
`http://www.spec.org/cpu2006/flags/NEC-Intel-Linux-Settings-flags-revE.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-revH.xml`
`http://www.spec.org/cpu2006/flags/NEC-Intel-Linux-Settings-flags-revE.xml`


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