



# SPEC® CFP2006 Result

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## Bull SAS

SPECfp®\_rate2006 = 1310

### Bullion E7-4870 (80 cores - 2TB RAM)

SPECfp\_rate\_base2006 = 1280

CPU2006 license: 20

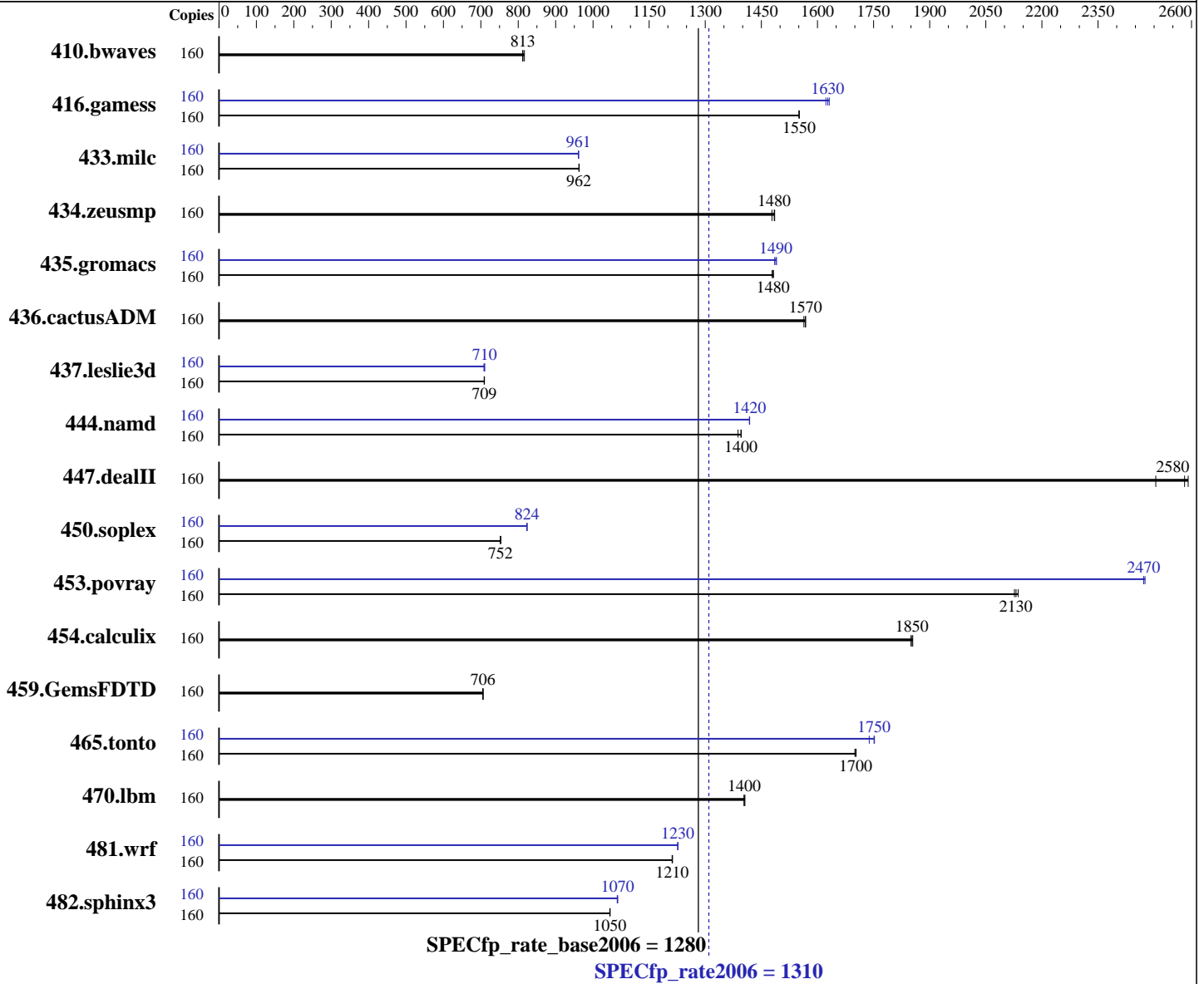
Test sponsor: Bull SAS

Tested by: Bull SAS

Test date: Jan-2013

Hardware Availability: Jan-2012

Software Availability: Jun-2012



#### Hardware

CPU Name: Intel Xeon E7-4870  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz  
 CPU MHz: 2400  
 FPU: Integrated  
 CPU(s) enabled: 80 cores, 8 chips, 10 cores/chip, 2 threads/core  
 CPU(s) orderable: 4,8 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: Red Hat Enterprise Linux Server release 6.3 (Santiago)  
 2.6.32-279.el6.x86\_64  
 Compiler: C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux;  
 Fortran: Version 12.1.0.225 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: tmpfs

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L3 Cache: 30 MB I+D on chip per chip  
Other Cache: None  
Memory: 2 TB (128 x 16 GB 2Rx4 PC3-8500R-7, ECC)  
Disk Subsystem: 1 x 500 GB SATA, 7200 RPM  
Other Hardware: None

System State: Run level 3 (multiuser)  
Base Pointers: 32/64-bit  
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	160	2663	816	<u>2675</u>	<u>813</u>	2678	812	160	2663	816	<u>2675</u>	<u>813</u>	2678	812
416.gamess	160	2020	1550	2020	1550	<u>2020</u>	<u>1550</u>	160	<u>1925</u>	<u>1630</u>	1931	1620	1920	1630
433.milc	160	1526	962	1525	963	<u>1526</u>	<u>962</u>	160	1528	961	<u>1528</u>	<u>961</u>	1528	961
434.zeusmp	160	<u>981</u>	<u>1480</u>	985	1480	980	1490	160	<u>981</u>	<u>1480</u>	985	1480	980	1490
435.gromacs	160	771	1480	773	1480	<u>771</u>	<u>1480</u>	160	769	1490	766	1490	<u>767</u>	<u>1490</u>
436.cactusADM	160	1219	1570	<u>1219</u>	<u>1570</u>	1223	1560	160	1219	1570	<u>1219</u>	<u>1570</u>	1223	1560
437.leslie3d	160	2121	709	<u>2120</u>	<u>709</u>	2119	710	160	2117	710	<u>2119</u>	<u>710</u>	2124	708
444.namd	160	919	1400	<u>920</u>	<u>1400</u>	925	1390	160	905	1420	904	1420	<u>905</u>	<u>1420</u>
447.dealII	160	706	2590	731	2500	<u>709</u>	<u>2580</u>	160	706	2590	731	2500	<u>709</u>	<u>2580</u>
450.soplex	160	1774	752	1771	754	<u>1773</u>	<u>752</u>	160	1622	823	1620	824	<u>1620</u>	<u>824</u>
453.povray	160	400	2130	398	2140	<u>399</u>	<u>2130</u>	160	<u>344</u>	<u>2470</u>	344	2480	344	2470
454.calculix	160	714	1850	<u>712</u>	<u>1850</u>	712	1850	160	714	1850	<u>712</u>	<u>1850</u>	712	1850
459.GemsFDTD	160	2404	706	2407	705	<u>2406</u>	<u>706</u>	160	2404	706	2407	705	<u>2406</u>	<u>706</u>
465.tonto	160	<u>925</u>	<u>1700</u>	924	1700	926	1700	160	<u>899</u>	<u>1750</u>	898	1750	906	1740
470.lbm	160	1563	1410	1566	1400	<u>1566</u>	<u>1400</u>	160	1563	1410	1566	1400	<u>1566</u>	<u>1400</u>
481.wrf	160	1474	1210	1475	1210	<u>1475</u>	<u>1210</u>	160	1458	1230	<u>1457</u>	<u>1230</u>	1457	1230
482.sphinx3	160	2982	1050	<u>2983</u>	<u>1050</u>	2985	1040	160	2926	1070	<u>2927</u>	<u>1070</u>	2929	1060

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

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## Operating System Notes

SPEC files placed in /spec2006, with /spec2006 mounted as tmpfs with mpol=interleave, size=480G  
Stack size set to unlimited using "ulimit -s unlimited"  
Kernel booted with option clocksource=jiffies  
Bios set with Max\_Numa\_Nodes\_per\_module to 4  
Bios set with Memory hemisphere mode



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### Platform Notes

Sysinfo program /spec2006/config/sysinfo.rev6800  
\$Rev: 6800 \$ \$Date:: 2011-10-11 # \$ 6f2ebdff5032aaa42e583f96b07f99d3  
running on turin12 Sat Jan 19 09:17:00 2013

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:  
<http://www.spec.org/cpu2006/Docs/config.html#sysinfo>

```
From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E7- 4870 @ 2.40GHz
 8 "physical id"s (chips)
160 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
caution.)
cpu cores : 10
siblings : 20
physical 0: cores 0 1 2 8 9 16 17 18 24 25
physical 1: cores 0 1 2 8 9 16 17 18 24 25
physical 2: cores 0 1 2 8 9 16 17 18 24 25
physical 3: cores 0 1 2 8 9 16 17 18 24 25
physical 4: cores 0 1 2 8 9 16 17 18 24 25
physical 5: cores 0 1 2 8 9 16 17 18 24 25
physical 6: cores 0 1 2 8 9 16 17 18 24 25
physical 7: cores 0 1 2 8 9 16 17 18 24 25
cache size : 30720 KB
```

```
From /proc/meminfo
MemTotal: 2115654452 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.3 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.3 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.3 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux turin12 2.6.32-279.el6.x86_64 #1 SMP Wed Jun 13 18:24:36 EDT 2012
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Jan 18 14:00 last=5
```

```
SPEC is set to: /spec2006
Filesystem Type Size Used Avail Use% Mounted on
none tmpfs 480G 138G 343G 29% /spec2006
```

Additional information from dmidecode:

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**Bull SAS**

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## Platform Notes (Continued)

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/spec2006/libs/32:/spec2006/libs/64"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5  
Transparent Huge Pages disabled with:  
echo never > /sys/kernel/mm/redhat\_transparent\_hugepage/enabled  
Filesystem page cache cleared with:  
echo 1> /proc/sys/vm/drop\_caches  
runspec command invoked through numactl i.e.:  
numactl --interleave=all runspec <etc>

## 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

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## Base Portability Flags (Continued)

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 -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch

Benchmarks using both Fortran and C:

-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

## 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

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### Peak Portability Flags (Continued)

```
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
```

### 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) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -static -auto-ilp32

470.lbm: basepeak = yes

482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
-unroll2
```

C++ benchmarks:

```
444.namd: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -opt-mem-layout-trans=3(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) -opt-mem-layout-trans=3(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) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -unroll4 -ansi-alias
```

Fortran benchmarks:

```
410.bwaves: basepeak = yes
```

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## Peak Optimization Flags (Continued)

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: -xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch

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

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) -opt-mem-layout-trans=3(pass 2)  
-prof-use(pass 2) -opt-prefetch -static -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xSSE4.2 -ipo -O3 -no-prec-div -static -auto-ilp32

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

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20130214.html>

<http://www.spec.org/cpu2006/flags/Bull-Platform-Settings-V1.2-revB.html>

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

<http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20130214.xml>

<http://www.spec.org/cpu2006/flags/Bull-Platform-Settings-V1.2-revB.xml>

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

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