



SPEC[®] CFP2006 Result

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Bull SAS

SPECfp[®]_rate2006 = 2590

bullion E7-4870 (160 cores - 4TB RAM)

SPECfp_rate_base2006 = 2540

CPU2006 license: 20

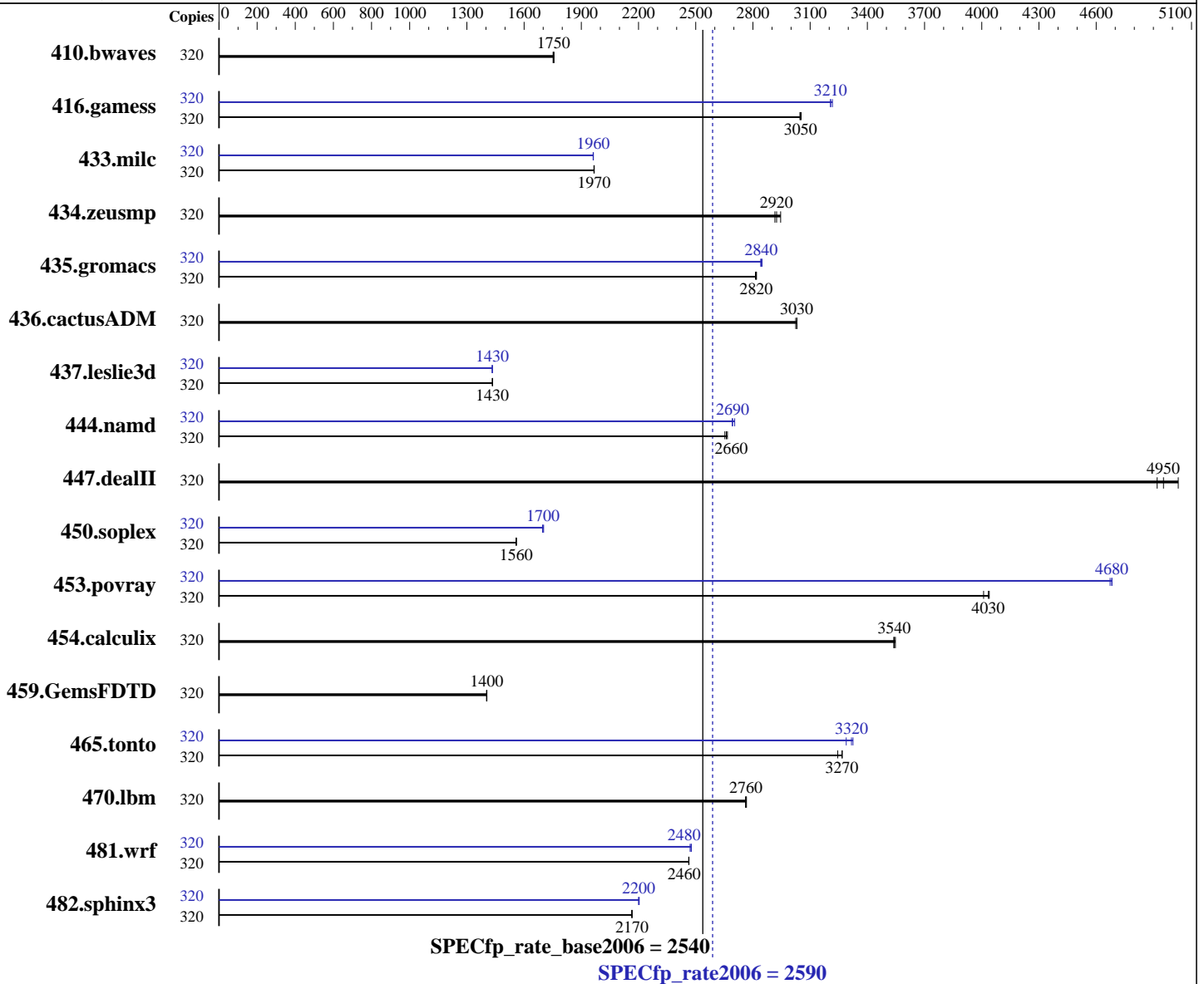
Test sponsor: Bull SAS

Tested by: Bull SAS

Test date: Jun-2012

Hardware Availability: Jan-2012

Software Availability: Oct-2011



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: 160 cores, 16 chips, 10 cores/chip, 2 threads/core
 CPU(s) orderable: 4,8,12,16 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 6.1 (Santiago)
 2.6.32-131.0.15.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: 4 TB (256 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	320	<u>2479</u>	<u>1750</u>	2482	1750	2476	1760	320	<u>2479</u>	<u>1750</u>	2482	1750	2476	1760
416.gamess	320	2053	3050	<u>2055</u>	<u>3050</u>	2056	3050	320	<u>1954</u>	<u>3210</u>	1954	3210	1948	3220
433.milc	320	1492	1970	<u>1494</u>	<u>1970</u>	1494	1970	320	1496	1960	<u>1497</u>	<u>1960</u>	1497	1960
434.zeusmp	320	989	2950	999	2920	<u>996</u>	<u>2920</u>	320	989	2950	999	2920	<u>996</u>	<u>2920</u>
435.gromacs	320	<u>811</u>	<u>2820</u>	811	2820	812	2810	320	802	2850	804	2840	<u>803</u>	<u>2840</u>
436.cactusADM	320	1262	3030	<u>1262</u>	<u>3030</u>	1264	3020	320	1262	3030	<u>1262</u>	<u>3030</u>	1264	3020
437.leslie3d	320	<u>2097</u>	<u>1430</u>	2096	1430	2098	1430	320	<u>2099</u>	<u>1430</u>	2097	1430	2100	1430
444.namd	320	<u>965</u>	<u>2660</u>	968	2650	963	2670	320	<u>953</u>	<u>2690</u>	949	2700	954	2690
447.dealII	320	744	4920	728	5030	<u>739</u>	<u>4950</u>	320	744	4920	728	5030	<u>739</u>	<u>4950</u>
450.soplex	320	<u>1711</u>	<u>1560</u>	1712	1560	1711	1560	320	1569	1700	1573	1700	<u>1571</u>	<u>1700</u>
453.povray	320	<u>422</u>	<u>4030</u>	425	4010	421	4040	320	364	4670	364	4680	<u>364</u>	<u>4680</u>
454.calculix	320	<u>745</u>	<u>3540</u>	746	3540	744	3550	320	<u>745</u>	<u>3540</u>	746	3540	744	3550
459.GemsFDTD	320	<u>2419</u>	<u>1400</u>	2419	1400	2420	1400	320	<u>2419</u>	<u>1400</u>	2419	1400	2420	1400
465.tonto	320	970	3240	<u>964</u>	<u>3270</u>	963	3270	320	947	3320	957	3290	<u>949</u>	<u>3320</u>
470.lbm	320	1592	2760	1590	2770	<u>1591</u>	<u>2760</u>	320	1592	2760	1590	2770	<u>1591</u>	<u>2760</u>
481.wrf	320	<u>1450</u>	<u>2460</u>	1450	2460	1451	2460	320	<u>1444</u>	<u>2480</u>	1443	2480	1446	2470
482.sphinx3	320	2881	2160	2879	2170	<u>2880</u>	<u>2170</u>	320	2830	2200	2834	2200	<u>2834</u>	<u>2200</u>

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=900G
 Stack size set to unlimited using "ulimit -s unlimited"
 Kernel booted with option clocksource=jiffies (allows to count time with interrupts at 1 jiffy period instead using HPET counters)
 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 rh61-mesca-wsm64 Thu Jun 14 22:01:34 2012

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
16 "physical id"s (chips)
320 "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
physical 8: cores 0 1 2 8 9 16 17 18 24 25
physical 9: cores 0 1 2 8 9 16 17 18 24 25
physical 10: cores 0 1 2 8 9 16 17 18 24 25
physical 11: cores 0 1 2 8 9 16 17 18 24 25
physical 12: cores 0 1 2 8 9 16 17 18 24 25
physical 13: cores 0 1 2 8 9 16 17 18 24 25
physical 14: cores 0 1 2 8 9 16 17 18 24 25
physical 15: cores 0 1 2 8 9 16 17 18 24 25
```

cache size : 30720 KB

From /proc/meminfo

```
MemTotal:      4233494120 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

/usr/bin/lsb_release -d

Red Hat Enterprise Linux Server release 6.1 (Santiago)

From /etc/*release* /etc/*version*

```
redhat-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

uname -a:

```
Linux rh61-mesca-wsm64 2.6.32-131.0.15.el6.x86_64 #1 SMP Tue May 10 15:42:40 EDT 2011 x86_64 x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

run-level 3 Jun 14 01:41 last=5

SPEC is set to: /spec2006

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
none	tmpfs	900G	273G	628G	31%	/spec2006

Additional information from dmidecode:

(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

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Base Portability Flags (Continued)

```
437.leslie3d: -DSPEC_CPU_LP64
444.namd: -DSPEC_CPU_LP64
447.deall: -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 -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
```



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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

```

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:

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Peak Optimization Flags (Continued)

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: -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-linux64.20111122.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-linux64.20111122.xml>

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

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