



# SPEC<sup>®</sup> CFP2006 Result

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## Bull SAS bullion S16 ( E7-8890 v3 )

SPECfp<sup>®</sup>\_rate2006 = 8100

SPECfp\_rate\_base2006 = 7950

CPU2006 license: 20

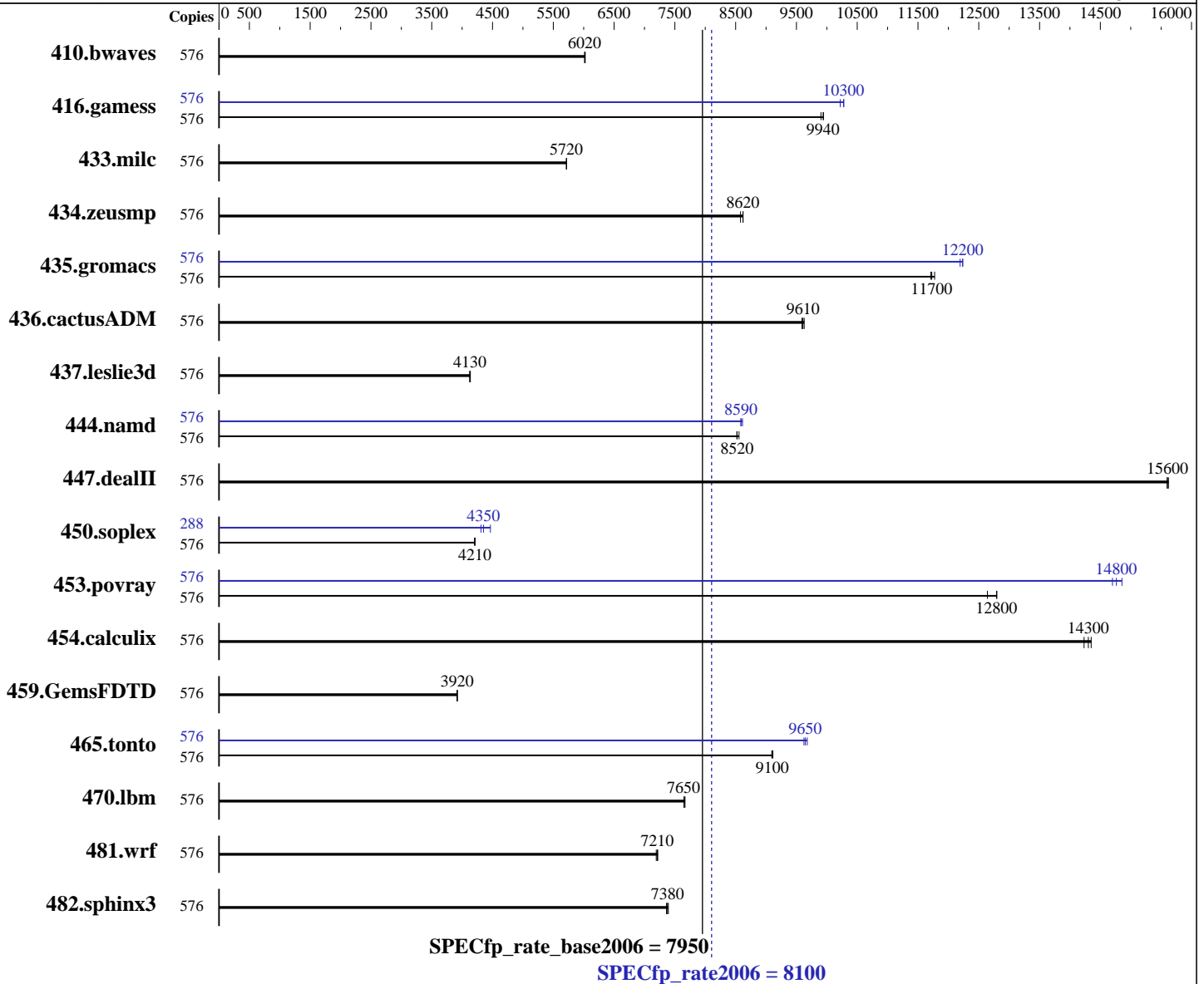
Test sponsor: Bull SAS

Tested by: Bull SAS

Test date: Dec-2015

Hardware Availability: Jun-2015

Software Availability: Aug-2015



### Hardware

CPU Name: Intel Xeon E7-8890 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2500  
 FPU: Integrated  
 CPU(s) enabled: 288 cores, 16 chips, 18 cores/chip, 2 threads/core  
 CPU(s) orderable: 2, 4, 8, 16 chip  
 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 (x86\_64) SP4 3.0.101-63-default  
 Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;  
 Fortran: Version 16.0.0.101 of Intel Fortran Studio XE for Linux  
 Auto Parallel: No  
 File System: tmpfs  
 System State: Run level 5 (Full multiuser with X11 graphics)

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L3 Cache: 45 MB I+D on chip per chip  
Other Cache: None  
Memory: 4 TB (256 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)  
Disk Subsystem: 1.2 TB LSI MR9381-4i4e (scsi)  
Other Hardware: None

Base Pointers: 32/64-bit  
Peak Pointers: 32/64-bit  
Other Software: None  
Updated gcc, glibc, and libstdc++

## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
410.bwaves	576	1299	6030	<b>1301</b>	<b>6020</b>	1301	6020	576	1299	6030	<b>1301</b>	<b>6020</b>	1301	6020
416.gamess	576	<b>1135</b>	<b>9940</b>	1139	9900	1134	9940	576	<b>1098</b>	<b>10300</b>	1097	10300	1104	10200
433.milc	576	925	5720	925	5720	<b>925</b>	<b>5720</b>	576	925	5720	925	5720	<b>925</b>	<b>5720</b>
434.zeusmp	576	<b>608</b>	<b>8620</b>	611	8580	608	8620	576	<b>608</b>	<b>8620</b>	611	8580	608	8620
435.gromacs	576	<b>351</b>	<b>11700</b>	351	11700	349	11800	576	336	12200	<b>336</b>	<b>12200</b>	337	12200
436.cactusADM	576	<b>716</b>	<b>9610</b>	715	9630	718	9590	576	<b>716</b>	<b>9610</b>	715	9630	718	9590
437.leslie3d	576	1313	4120	1309	4140	<b>1311</b>	<b>4130</b>	576	1313	4120	1309	4140	<b>1311</b>	<b>4130</b>
444.namd	576	540	8560	542	8520	<b>542</b>	<b>8520</b>	576	536	8610	<b>538</b>	<b>8590</b>	538	8590
447.dealII	576	422	15600	422	15600	<b>422</b>	<b>15600</b>	576	422	15600	422	15600	<b>422</b>	<b>15600</b>
450.soplex	576	1140	4210	<b>1141</b>	<b>4210</b>	1143	4200	288	538	4470	557	4310	<b>552</b>	<b>4350</b>
453.povray	576	242	12600	239	12800	<b>240</b>	<b>12800</b>	576	208	14700	206	14900	<b>208</b>	<b>14800</b>
454.calculix	576	334	14200	<b>332</b>	<b>14300</b>	331	14300	576	334	14200	<b>332</b>	<b>14300</b>	331	14300
459.GemsFDTD	576	<b>1559</b>	<b>3920</b>	1561	3920	1558	3920	576	<b>1559</b>	<b>3920</b>	1561	3920	1558	3920
465.tonto	576	<b>623</b>	<b>9100</b>	622	9110	623	9090	576	586	9680	<b>587</b>	<b>9650</b>	589	9620
470.lbm	576	<b>1034</b>	<b>7650</b>	1032	7670	1034	7650	576	<b>1034</b>	<b>7650</b>	1032	7670	1034	7650
481.wrf	576	894	7190	<b>892</b>	<b>7210</b>	891	7220	576	894	7190	<b>892</b>	<b>7210</b>	891	7220
482.sphinx3	576	1519	7390	<b>1522</b>	<b>7380</b>	1525	7360	576	1519	7390	<b>1522</b>	<b>7380</b>	1525	7360

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=1200G  
Stack size set to unlimited using "ulimit -s unlimited"  
Turbo mode set with:  
cpupower -c all frequency-set -g performance



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**Test sponsor:** Bull SAS  
**Tested by:** Bull SAS

**Test date:** Dec-2015  
**Hardware Availability:** Jun-2015  
**Software Availability:** Aug-2015

## Platform Notes

BIOS configuration:  
BIOS engineering version number AR08.031.00.101 is identical to public version number BIOSX08.31.00.102  
Set Efficiency Policy to Performance  
Energy perf BIAS cfg mode = PERF  
Set Memory RAS to Performance  
Set Patrol Scrub to disable  
Baseboard Management Controller used to Force Full Fan Speed  
Sysinfo program /specRam/config/sysinfo.rev6914  
\$Rev: 6914 \$ \$Date:: 2014-06-25 #\$ e3fbb8667b5a285932ceab81e28219e1  
running on borsalino Wed Dec 16 06:38:00 2015

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 E7-8890 v3 @ 2.50GHz
 16 "physical id"s (chips)
 576 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 4: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 5: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 6: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 7: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 8: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 9: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 10: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 11: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 12: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 13: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 14: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 15: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 46080 KB
```

```
From /proc/meminfo
MemTotal: 4235810492 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsc_release -d
SUSE Linux Enterprise Server 11 (x86_64)
```

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

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## Platform Notes (Continued)

SuSE-release:  
SUSE Linux Enterprise Server 11 (x86\_64)  
VERSION = 11  
PATCHLEVEL = 4

os-release:  
NAME="SLES"  
VERSION="11.4"  
VERSION\_ID="11.4"  
PRETTY\_NAME="SUSE Linux Enterprise Server 11 SP4"  
ID="sles"  
ANSI\_COLOR="0;32"  
CPE\_NAME="cpe:/o:suse:sles:11:4"

uname -a:  
Linux borsalino 3.0.101-63-default #1 SMP Tue Jun 23 16:02:31 UTC 2015  
(4b89d0c) x86\_64 x86\_64 x86\_64 GNU/Linux

run-level 5 Dec 15 11:51 last=S

SPEC is set to: /specRam  
Filesystem Type Size Used Avail Use% Mounted on  
none tmpfs 1.2T 3.8G 1.2T 1% /specRam

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Bull AR08.031.00.101 11/19/2015

Memory:  
128x NO DIMM Unknown  
256x Samsung M393A2G40DB0-CPB 16 GB 2 rank , configured at 1600 MHz

(End of data from sysinfo program)

## General Notes

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

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1

Transparent Huge Pages enabled with:  
echo always > /sys/kernel/mm/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>



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## 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

## Base Optimization Flags

C benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:  
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

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## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
-ansi-alias -opt-mem-layout-trans=3

## Peak Compiler Invocation

C benchmarks:

icc -m64

C++ benchmarks (except as noted below):

icpc -m64

450.soplex: icpc -m32 -L/opt/intel/compilers\_and\_libraries\_2016/linux/compiler/lib/ia32\_lin

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  
450.soplex: -D\_FILE\_OFFSET\_BITS=64  
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:

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## Peak Optimization Flags (Continued)

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

### C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)  
-prof-use(pass 2) -fno-alias -auto-ilp32

447.dealIII: basepeak = yes

450.soplex: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)  
-prof-use(pass 2) -opt-malloc-options=3

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)  
-prof-use(pass 2) -unroll4 -ansi-alias

### Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2  
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4 -auto  
-inline-calloc -opt-malloc-options=3

### Benchmarks using both Fortran and C:

435.gromacs: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)  
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)  
-par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)  
-prof-use(pass 2) -opt-prefetch -auto-ilp32

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## Peak Optimization Flags (Continued)

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/Bull-BullionS-Flags-V2.1.html>  
<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html>

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

<http://www.spec.org/cpu2006/flags/Bull-BullionS-Flags-V2.1.xml>  
<http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml>

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

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