SPEC® CFP2006 Result

Bull SAS
bullion S16 (E7-8890 v3)

$SPECfp^{®}\_rate2006 = \quad 7220$

SPECfp_rate_base2006 = 6990

CPU2006 license:	20		**Test date:**	Sep-2015
Test sponsor:	Bull SAS		**Hardware Availability:**	Jun-2015
Tested by:	Bull SAS		**Software Availability:**	Oct-2014

Benchmark results chart (Copies = 576 unless noted):

- **410.bwaves** — 576: 5300
- **416.gamess** — 576: 8680; 576: 8160
- **433.milc** — 576: 5030; 576: 5060
- **434.zeusmp** — 576: 8030
- **435.gromacs** — 576: 10400; 576: 10200
- **436.cactusADM** — 576: 8620
- **437.leslie3d** — 288: 4180; 576: 3740
- **444.namd** — 576: 7960; 576: 7800
- **447.dealII** — 576: 12900
- **450.soplex** — 288: 4350; 576: 3690
- **453.povray** — 576: 13300; 576: 11900
- **454.calculix** — 576: 12800
- **459.GemsFDTD** — 576: 3500
- **465.tonto** — 576: 7990; 576: 7550
- **470.lbm** — 576: 6800
- **481.wrf** — 576: 6200; 576: 6170
- **482.sphinx3** — 576: 6350; 576: 6320

SPECfp_rate_base2006 = 6990

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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

Continued on next page

Software

Operating System:	Red Hat Enterprise Linux Server release 7.1 (Maipo) 3.10.0-229.el7.x86_64
Compiler:	C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux; Fortran: Version 15.0.0.090 of Intel Fortran Studio XE for Linux
Auto Parallel:	No
File System:	tmpfs

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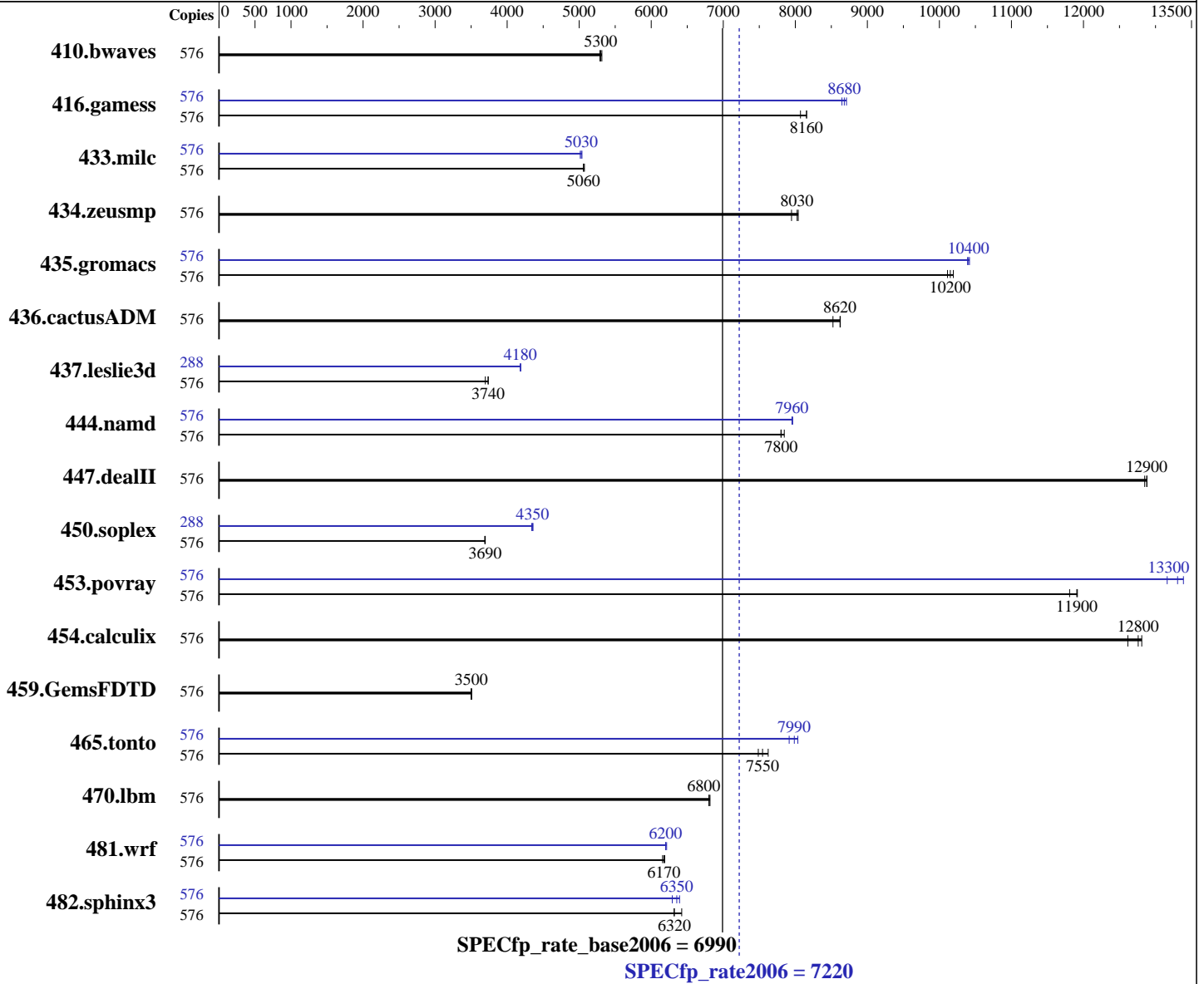$SPECfp\_rate\_base2006 =$ 6990

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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:	Micron M510 128 GB SSD
Other Hardware:	None

System State:	Run level 3 (Full multiuser mode)
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	576	1480	5290	**1478**	**5300**	1473	5310	576	1480	5290	**1478**	**5300**	1473	5310
416.gamess	576	1383	8160	**1383**	**8160**	1397	8070	576	1304	8650	1295	8710	**1299**	**8680**
433.milc	576	1042	5070	1045	5060	**1045**	**5060**	576	1049	5040	**1052**	**5030**	1054	5010
434.zeusmp	576	652	8040	660	7950	**653**	**8030**	576	652	8040	660	7950	**653**	**8030**
435.gromacs	576	403	10200	407	10100	**405**	**10200**	576	396	10400	**395**	**10400**	395	10400
436.cactusADM	576	**798**	**8620**	798	8620	808	8520	576	**798**	**8620**	798	8620	808	8520
437.leslie3d	576	**1449**	**3740**	1449	3740	1465	3700	288	646	4190	**647**	**4180**	647	4180
444.namd	576	589	7850	592	7800	**592**	**7800**	576	581	7950	580	7960	**581**	**7960**
447.dealII	576	**512**	**12900**	513	12900	512	12900	576	**512**	**12900**	513	12900	512	12900
450.soplex	576	**1301**	**3690**	1300	3700	1302	3690	288	**552**	**4350**	553	4340	551	4360
453.povray	576	257	11900	**257**	**11900**	260	11800	576	233	13200	229	13400	**230**	**13300**
454.calculix	576	377	12600	371	12800	**372**	**12800**	576	377	12600	371	12800	**372**	**12800**
459.GemsFDTD	576	1746	3500	**1746**	**3500**	1742	3510	576	1746	3500	**1746**	**3500**	1742	3510
465.tonto	576	**751**	**7550**	743	7620	757	7490	576	716	7910	**710**	**7990**	705	8040
470.lbm	576	1161	6820	1164	6800	**1163**	**6800**	576	1161	6820	1164	6800	**1163**	**6800**
481.wrf	576	1045	6160	**1042**	**6170**	1040	6190	576	1035	6210	1038	6200	**1038**	**6200**
482.sphinx3	576	**1776**	**6320**	1748	6420	1777	6320	576	1784	6290	1756	6390	**1767**	**6350**

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=1024G
    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 date: Sep-2015
Hardware Availability: Jun-2015
Software Availability: Oct-2014

Platform Notes

```
    BIOS configuration:
    Set Efficiency Policy to Performance
    Set Memory RAS mode to Performance
    Baseboard Management Controller used to Force Full Fan Speed
    Sysinfo program /spec2006/config/sysinfo.rev6914
    $Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
    running on localhost.localdomain Sat Sep  5 06:18:15 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:       4227105880 kB
       HugePages_Total:        0
       Hugepagesize:        2048 kB

    From /etc/*release* /etc/*version*
       os-release:
          NAME="Red Hat Enterprise Linux Server"
          VERSION="7.1 (Maipo)"
          ID="rhel"
          ID_LIKE="fedora"
          VERSION_ID="7.1"
          PRETTY_NAME="Red Hat Enterprise Linux Server 7.1 (Maipo)"
```

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Platform Notes (Continued)

```
        ANSI_COLOR="0;31"
        CPE_NAME="cpe:/o:redhat:enterprise_linux:7.1:GA:server"
     redhat-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
     system-release: Red Hat Enterprise Linux Server release 7.1 (Maipo)
     system-release-cpe: cpe:/o:redhat:enterprise_linux:7.1:ga:server

  uname -a:
     Linux localhost.localdomain 3.10.0-229.el7.x86_64 #1 SMP Thu Jan 29 18:37:38
     EST 2015 x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Sep 3 17:37 last=5

  SPEC is set to: /spec2006
     Filesystem      Type   Size  Used Avail Use% Mounted on
     none           tmpfs  1.2T  8.6G  1.2T   1% /spec2006
  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 BIOSX08.029.00.102 08/27/2015
   Memory:
    256x Micron 36ASF2G72PZ-2G1A2 16 GB 2 rank  , configured at 1600 MHz
    128x NO DIMM Unknown

  (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:/spec2006/sh"

  Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB
  memory using RedHat EL 7.0
  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>
```

Base Compiler Invocation

C benchmarks:
```
     icc   -m64
```

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Base Compiler Invocation (Continued)

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
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-ansi-alias -opt-mem-layout-trans=3
```

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Peak Compiler Invocation

C benchmarks:
```
icc    -m64
```

C++ benchmarks (except as noted below):
```
icpc   -m64
```
```
450.soplex: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32
```

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
     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: -xCORE-AVX2(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)
               -auto-ilp32

      470.lbm: basepeak = yes

    482.sphinx3: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
               -unroll2
```

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Peak Optimization Flags (Continued)

C++ benchmarks:

447.dealII: basepeak = yes

450.soplex: -xCORE-AVX2(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: -xCORE-AVX2(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

416.gamess: -xCORE-AVX2(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-

434.zeusmp: basepeak = yes

437.leslie3d: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(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: -xCORE-AVX2(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 -auto-ilp32

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: -xCORE-AVX2 -ipo -O3 -no-prec-div -auto-ilp32

444.namd: -xCORE-AVX2(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

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

http://www.spec.org/cpu2006/flags/Bull-BullionS-Flags-V2.0.html
http://www.spec.org/cpu2006/flags/Intel-ic15.0-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-V2.0.xml
http://www.spec.org/cpu2006/flags/Intel-ic15.0-official-linux64.xml

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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