# SPEC® CFP2006 Result

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## ACTION S.A.

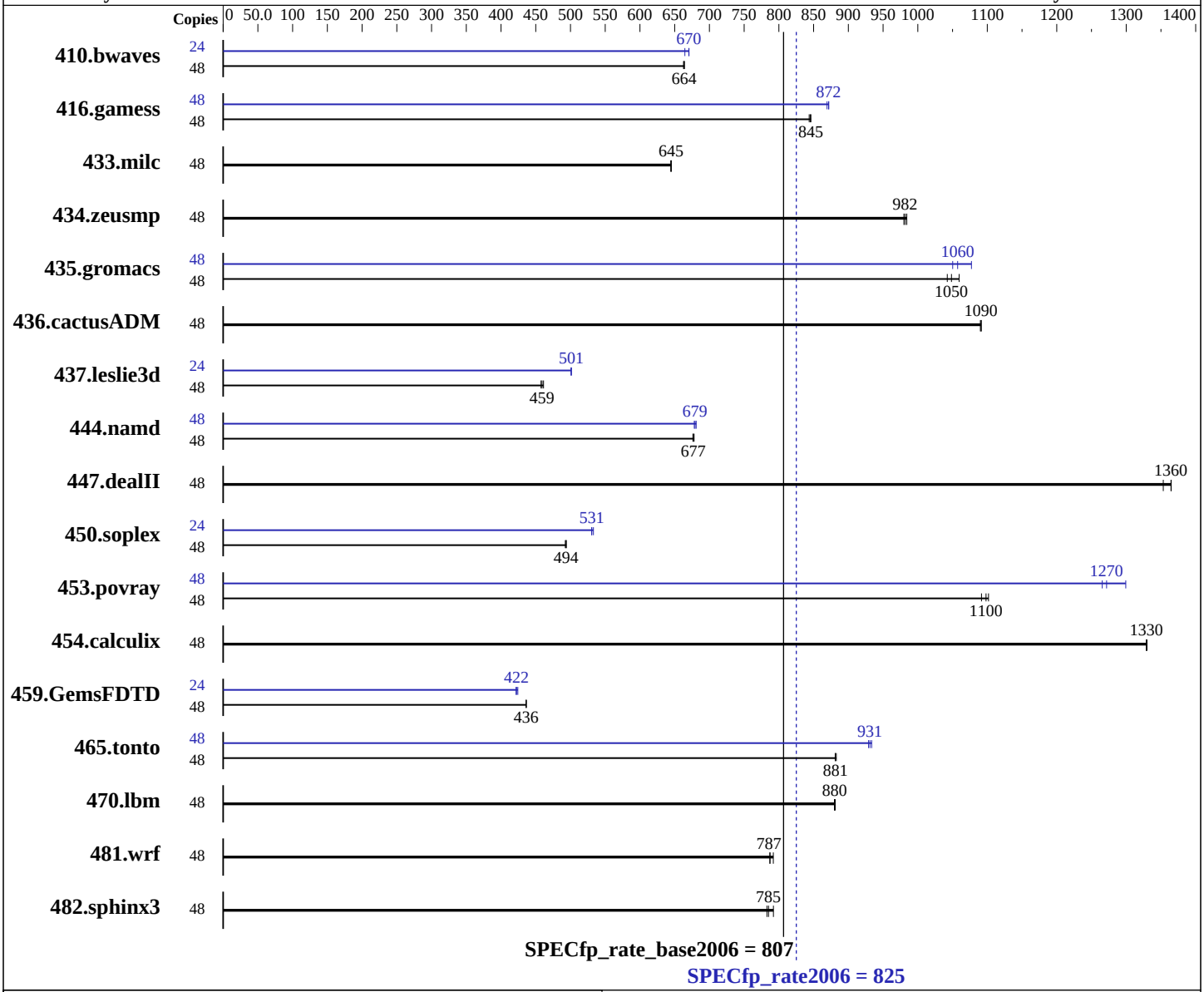
ACTINA SOLAR 220 X6 (Intel Xeon E5-2650 v4, 2.20 GHz)

SPECfp®_rate2006 = 825

SPECfp_rate_base2006 = 807

**CPU2006 license:** 9008
**Test sponsor:** ACTION S.A.
**Tested by:** ACTION S.A.

**Test date:** Nov-2016
**Hardware Availability:** Mar-2016
**Software Availability:** Mar-2016




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2650 v4 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.90 GHz |
| CPU MHz: | 2200 |
| FPU: | Integrated |
| CPU(s) enabled: | 24 cores, 2 chips, 12 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: | Red Hat Enterprise Linux Server release 7.2 (Maipo)<br>3.10.0-327.18.2.el7.x86_64 |
| Compiler: | C/C++: Version 17.0.0.098 of Intel C/C++ Compiler for Linux;<br>Fortran: Version 17.0.0.098 of Intel Fortran Compiler for Linux |
| Auto Parallel: | No |
| File System: | ext4 |

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L3 Cache: 30 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R)
Disk Subsystem: 1 x 240 GB SATA II SSD
Other Hardware: None

System State: Run level 3 (multi-user)
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 | 48 | **983** | **664** | 982 | 664 | 984 | 663 | 24 | **487** | **670** | 486 | 671 | 491 | 665 |
| 416.gamess | 48 | 1114 | 844 | 1111 | 846 | **1112** | **845** | 48 | 1078 | 872 | **1078** | **872** | 1081 | 869 |
| 433.milc | 48 | 683 | 645 | 684 | 644 | **683** | **645** | 48 | 683 | 645 | 684 | 644 | **683** | **645** |
| 434.zeusmp | 48 | 444 | 984 | **445** | **982** | 446 | 980 | 48 | 444 | 984 | **445** | **982** | 446 | 980 |
| 435.gromacs | 48 | 323 | 1060 | **327** | **1050** | 329 | 1040 | 48 | 318 | 1080 | 326 | 1050 | **324** | **1060** |
| 436.cactusADM | 48 | 526 | 1090 | **526** | **1090** | 526 | 1090 | 48 | 526 | 1090 | **526** | **1090** | 526 | 1090 |
| 437.leslie3d | 48 | 986 | 458 | **983** | **459** | 978 | 461 | 24 | 450 | 501 | 450 | 501 | **450** | **501** |
| 444.namd | 48 | 568 | 678 | 569 | 676 | **569** | **677** | 48 | **567** | **679** | 565 | 681 | 568 | 678 |
| 447.dealII | 48 | 406 | 1350 | 402 | 1360 | **402** | **1360** | 48 | 406 | 1350 | 402 | 1360 | **402** | **1360** |
| 450.soplex | 48 | 813 | 493 | **811** | **494** | 810 | 494 | 24 | 377 | 531 | **377** | **531** | 376 | 533 |
| 453.povray | 48 | **233** | **1100** | 234 | 1090 | 232 | 1100 | 48 | 202 | 1270 | **201** | **1270** | 197 | 1300 |
| 454.calculix | 48 | 298 | 1330 | 298 | 1330 | **298** | **1330** | 48 | 298 | 1330 | 298 | 1330 | **298** | **1330** |
| 459.GemsFDTD | 48 | 1168 | 436 | **1167** | **436** | 1167 | 436 | 24 | **603** | **422** | 600 | 424 | 604 | 422 |
| 465.tonto | 48 | 535 | 883 | 536 | 881 | **536** | **881** | 48 | 508 | 929 | 506 | 934 | **507** | **931** |
| 470.lbm | 48 | **749** | **880** | 749 | 881 | 749 | 880 | 48 | **749** | **880** | 749 | 881 | 749 | 880 |
| 481.wrf | 48 | **681** | **787** | 681 | 787 | 677 | 792 | 48 | **681** | **787** | 681 | 787 | 677 | 792 |
| 482.sphinx3 | 48 | 1181 | 792 | 1195 | 783 | **1192** | **785** | 48 | 1181 | 792 | 1195 | 783 | **1192** | **785** |

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

```
Stack size set to unlimited using "ulimit -s unlimited"
```

## Platform Notes

```
Bios Settings:
Intel(R) Hyper-Threading Tech = Enabled
```

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## Platform Notes (Continued)

```
Power & Performance = Performance
Enforce POR = Disabled
Memory Operating Speed Selection = 2400
Cluster-on-Die = Enabled
Set FAN Profile = Performance
Fan PWM Offset = 0

Sysinfo program /cpu2006.1.2/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on SUT Wed Nov 16 05:52:59 2016

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 E5-2650 v4 @ 2.20GHz
      2 "physical id"s (chips)
      48 "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 : 12
      siblings  : 24
      physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
      physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
   cache size : 15360 KB

From /proc/meminfo
   MemTotal:       263860272 kB
   HugePages_Total:       1
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.2 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.2"
      PRETTY_NAME="Red Hat Enterprise Linux"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.2:GA:server"
   os-release.rpmsave:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.0 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="7.0"
      PRETTY_NAME="Red Hat Enterprise Linux"
      ANSI_COLOR="0;31"
      CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
```

Continued on next page

## Platform Notes (Continued)

```
      redhat-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
      system-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)
      system-release-cpe: cpe:/o:redhat:enterprise_linux:7.2:ga:server

   uname -a:
      Linux SUT 3.10.0-327.18.2.el7.x86_64 #2 SMP Wed Jun 1 17:37:13 CEST 2016
      x86_64 x86_64 x86_64 GNU/Linux

   run-level 3 Nov 15 18:22

   SPEC is set to: /cpu2006.1.2
      Filesystem     Type  Size  Used Avail Use% Mounted on
      /dev/sda1      ext4  212G   88G  114G  44% /
   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 Intel Corporation SE5C610.86B.01.01.0019.101220160604 10/12/2016
     Memory:
      16x Hynix HMA42GR7AFR4N-UH 16 GB 2 rank 2400 MHz
      8x NO DIMM NO DIMM

   (End of data from sysinfo program)
   dmidecode does not properly detect memory modules
   16 modules of 16 GB were used to run the test (256 GB total)
```

## General Notes

```
 Environment variables set by runspec before the start of the run:
 LD_LIBRARY_PATH = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64:/cpu2006.1.2/sh10.2"

  Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
  memory using Redhat Enterprise Linux 7.2
  Transparent Huge Pages enabled by default
  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
```

Continued on next page

## Base Compiler Invocation (Continued)

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 -qopt-prefetch -auto-p32
-qopt-mem-layout-trans=3

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

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

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-qopt-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_2017/linux/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
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:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

Continued on next page

# Peak Optimization Flags (Continued)

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

447.dealII: basepeak = yes

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

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

Fortran benchmarks:

410.bwaves: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch

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

434.zeusmp: basepeak = yes

437.leslie3d: Same as 410.bwaves

459.GemsFDTD: Same as 410.bwaves

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

Benchmarks using both Fortran and C:

435.gromacs: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2) -par-num-threads=1(pass 1) -qopt-prefetch -auto-ilp32 -qopt-mem-layout-trans=3

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/Intel-ic17.0-official-linux64.html
http://www.spec.org/cpu2006/flags/ACTION.SA-Platform-Flags-RevB-aug-2015-For-Intel-Platform.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/ACTION.SA-Platform-Flags-RevB-aug-2015-For-Intel-Platform.xml


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