# SPEC® CFP2006 Result

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## IBM Corporation

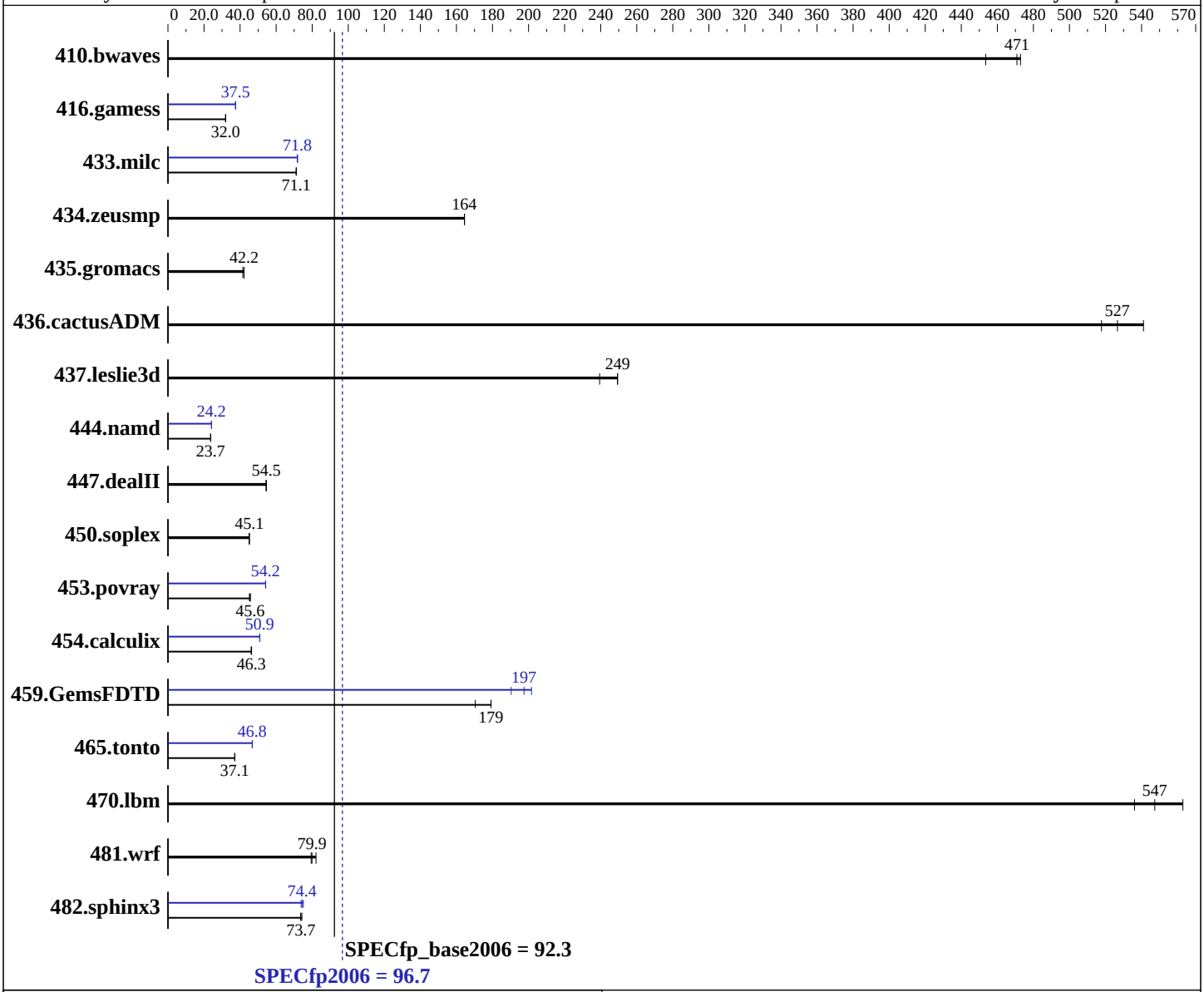
IBM System x3550 M4
(Intel Xeon E5-2650 v2, 2.60 GHz)

SPECfp®2006 = 96.7

SPECfp_base2006 = 92.3

**CPU2006 license:** 11
**Test sponsor:** IBM Corporation
**Tested by:** IBM Corporation

**Test date:** Dec-2013
**Hardware Availability:** Dec-2013
**Software Availability:** Sep-2013




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2650 v2 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.40 GHz |
| CPU MHz: | 2600 |
| FPU: | Integrated |
| CPU(s) enabled: | 16 cores, 2 chips, 8 cores/chip |
| 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 6.4 (Santiago)<br>2.6.32-358.el6.x86_64 |
| Compiler: | C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;<br>Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | Yes |
| File System: | ext4 |

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L3 Cache: 20 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC)
Disk Subsystem: 1 x 400 GB SAS SSD, RAID 0
Other Hardware: None

System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other Software: None

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | **28.9** | **471** | 30.0 | 454 | 28.7 | 473 | **28.9** | **471** | 30.0 | 454 | 28.7 | 473 |
| 416.gamess | 611 | 32.0 | **612** | **32.0** | 613 | 31.9 | 522 | 37.5 | **522** | **37.5** | 522 | 37.5 |
| 433.milc | 129 | 71.1 | **129** | **71.1** | 129 | 71.2 | 128 | 71.9 | 128 | 71.7 | **128** | **71.8** |
| 434.zeusmp | 55.3 | 164 | **55.3** | **164** | 55.3 | 164 | 55.3 | 164 | **55.3** | **164** | 55.3 | 164 |
| 435.gromacs | 172 | 41.5 | **169** | **42.2** | 169 | 42.2 | 172 | 41.5 | **169** | **42.2** | 169 | 42.2 |
| 436.cactusADM | 22.1 | 541 | **22.7** | **527** | 23.1 | 518 | 22.1 | 541 | **22.7** | **527** | 23.1 | 518 |
| 437.leslie3d | 39.3 | 239 | **37.7** | **249** | 37.7 | 249 | 39.3 | 239 | **37.7** | **249** | 37.7 | 249 |
| 444.namd | 339 | 23.7 | 339 | 23.7 | **339** | **23.7** | 332 | 24.2 | 332 | 24.1 | **332** | **24.2** |
| 447.dealII | **210** | **54.5** | 210 | 54.5 | 210 | 54.5 | **210** | **54.5** | 210 | 54.5 | 210 | 54.5 |
| 450.soplex | **185** | **45.1** | 185 | 45.2 | 185 | 45.0 | **185** | **45.1** | 185 | 45.2 | 185 | 45.0 |
| 453.povray | **117** | **45.6** | 116 | 45.7 | 118 | 45.2 | 98.3 | 54.1 | **98.2** | **54.2** | 98.1 | 54.2 |
| 454.calculix | 178 | 46.4 | 179 | 46.1 | **178** | **46.3** | 162 | 50.9 | 162 | 51.0 | **162** | **50.9** |
| 459.GemsFDTD | 59.2 | 179 | 62.2 | 170 | **59.2** | **179** | **53.7** | **197** | 52.6 | 202 | 55.7 | 190 |
| 465.tonto | 266 | 37.0 | 265 | 37.1 | **265** | **37.1** | 211 | 46.7 | 210 | 46.8 | **210** | **46.8** |
| 470.lbm | 25.6 | 536 | 24.4 | 563 | **25.1** | **547** | 25.6 | 536 | 24.4 | 563 | **25.1** | **547** |
| 481.wrf | 141 | 79.4 | 136 | 82.1 | **140** | **79.9** | 141 | 79.4 | 136 | 82.1 | **140** | **79.9** |
| 482.sphinx3 | 265 | 73.5 | 262 | 74.3 | **264** | **73.7** | **262** | **74.4** | 264 | 73.9 | 260 | 75.1 |

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

## Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
Zone reclaim mode enabled with:
echo 1 > /proc/sys/vm/zone_reclaim_mode
```

## Platform Notes

```
BIOS setting:
Operating Mode set to Maximum Performance
Sysinfo program /home/SPECcpu-new/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on x3550M4 Tue Dec 24 10:26:31 2013

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
```

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## Platform Notes (Continued)

```
      http://www.spec.org/cpu2006/Docs/config.html#sysinfo

    From /proc/cpuinfo
       model name : Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
          2 "physical id"s (chips)
          16 "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 : 8
          siblings  : 8
          physical 0: cores 0 1 2 3 4 5 6 7
          physical 1: cores 0 1 2 3 4 5 6 7
       cache size : 20480 KB

    From /proc/meminfo
       MemTotal:       264465576 kB
       HugePages_Total:       0
       Hugepagesize:       2048 kB

    /usr/bin/lsb_release -d
       Red Hat Enterprise Linux Server release 6.4 (Santiago)

    From /etc/*release* /etc/*version*
       redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
       system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
       system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

    uname -a:
       Linux x3550M4 2.6.32-358.18.1.el6.x86_64 #1 SMP Fri Aug 2 17:04:38 EDT 2013
       x86_64 x86_64 x86_64 GNU/Linux

    run-level 3 Dec 23 11:39

    SPEC is set to: /home/SPECcpu-new
       Filesystem     Type    Size  Used Avail Use% Mounted on
       /dev/mapper/vg_x3550m4-lv_home
                      ext4    312G  136G  161G  46% /home

    Additional information from dmidecode:
      BIOS IBM -[D7E133GUS-1.50]- 08/09/2013
      Memory:
       8x Not Specified Not Specified
       16x Samsung M393B2G70QH0-CMA 16 GB 1867 MHz 2 rank

    (End of data from sysinfo program)
  "Not Specified" memory information from dmidecode indicates unused DIMM slots.
```

## General Notes

```
Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/home/SPECcpu-new/libs/32:/home/SPECcpu-new/libs/64:/home/SPECcpu-new/sh"
OMP_NUM_THREADS = "16"

 Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
 memory using RedHat EL 6.4
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
 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
      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:
`-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias`

C++ benchmarks:
`-xAVX -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias`

Fortran benchmarks:
`-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch`

Benchmarks using both Fortran and C:
`-xAVX -ipo -O3 -no-prec-div -parallel -opt-prefetch -ansi-alias`

## Peak Compiler Invocation

C benchmarks:
`icc -m64`

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

Benchmarks using both Fortran and C:
`icc -m64 ifort -m64`

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

433.milc: `-xAVX`(pass 2) `-prof-gen`(pass 1) `-ipo`(pass 2) `-O3`(pass 2) `-no-prec-div`(pass 2) `-prof-use`(pass 2) `-auto-ilp32` `-ansi-alias`

470.lbm: `basepeak = yes`

482.sphinx3: `-xAVX -ipo -O3 -no-prec-div -unroll2 -ansi-alias -parallel`

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# Peak Optimization Flags (Continued)

C++ benchmarks:

444.namd: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -fno-alias -auto-ilp32

447.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xAVX(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: basepeak = yes

459.GemsFDTD: -xAVX(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 -opt-prefetch -parallel

465.tonto: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -inline-calloc -opt-malloc-options=3 -auto -unroll4

Benchmarks using both Fortran and C:

435.gromacs: basepeak = yes

436.cactusADM: basepeak = yes

454.calculix: -xAVX -ipo -O3 -no-prec-div -auto-ilp32 -ansi-alias

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-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.xml

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Tested with SPEC CPU2006 v1.2.
Report generated on Thu Jul 24 20:17:04 2014 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 14 January 2014.