



# SPEC® CFP2006 Result

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## IBM Corporation

IBM System x3100 M4  
(Intel Core i3-3220, 3.30 GHz)

SPECfp®\_rate2006 = 85.3

SPECfp\_rate\_base2006 = 82.8

CPU2006 license: 11

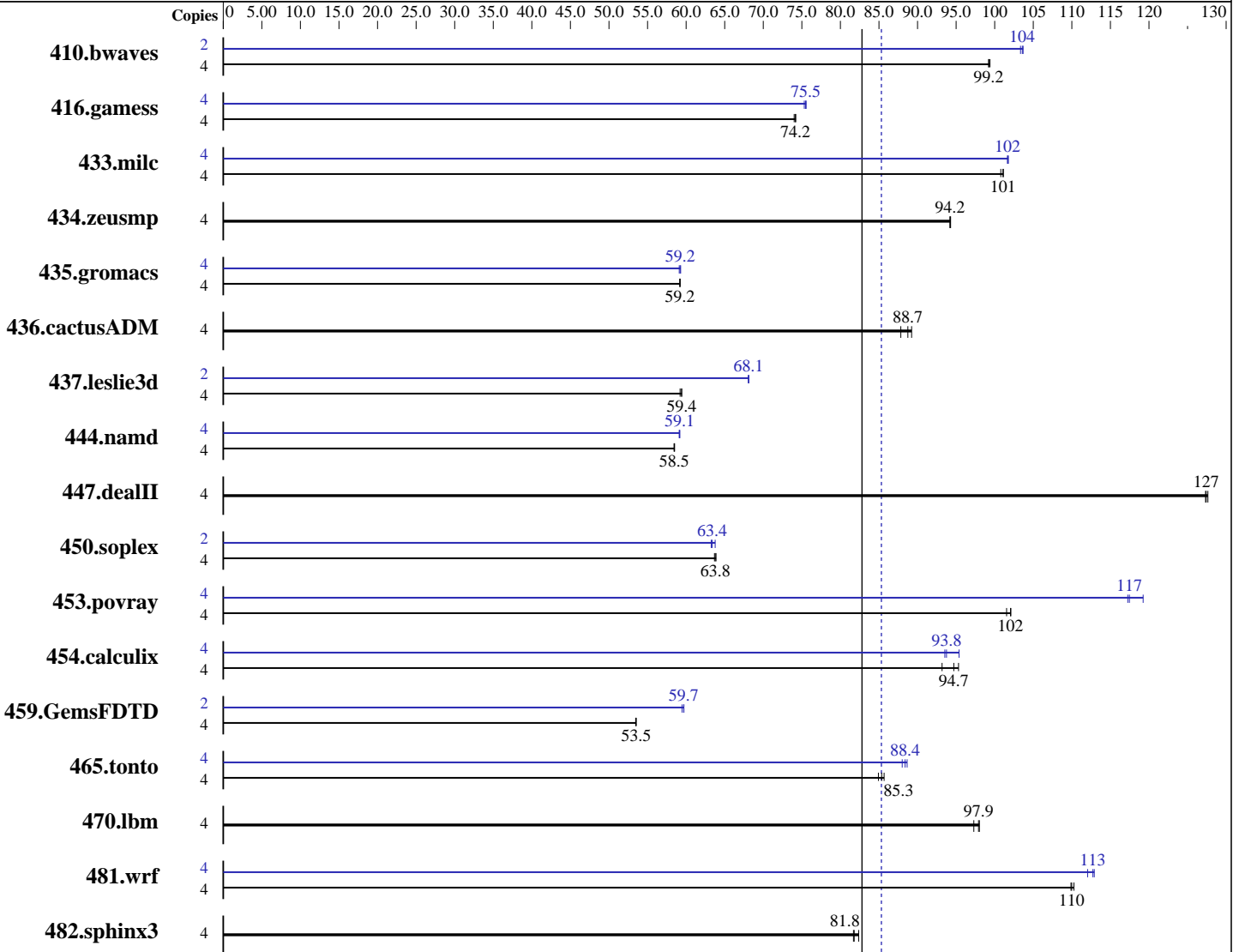
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Oct-2012

Hardware Availability: Sep-2012

Software Availability: Dec-2011



SPECfp\_rate\_base2006 = 82.8

SPECfp\_rate2006 = 85.3

### Hardware

CPU Name: Intel Core i3-3220  
 CPU Characteristics:  
 CPU MHz: 3300  
 FPU: Integrated  
 CPU(s) enabled: 2 cores, 1 chip, 2 cores/chip, 2 threads/core  
 CPU(s) orderable: 1 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: Red Hat Enterprise Linux Server release 6.2 (Santiago)  
 2.6.32-220.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: ext4

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L3 Cache: 3 MB I+D on chip per chip  
Other Cache: None  
Memory: 16 GB (2 x 8 GB 2Rx8 PC3-12800E-11, ECC)  
Disk Subsystem: 1 x 250 GB SATA, 7200 RPM  
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    | 4      | 547        | 99.4        | 548        | 99.2        | <b>548</b>  | <b>99.2</b> | 2      | 263         | 103         | 262        | 104         | <b>262</b> | <b>104</b>  |
| 416.gamess    | 4      | 1055       | 74.2        | 1058       | 74.0        | <b>1056</b> | <b>74.2</b> | 4      | <b>1037</b> | <b>75.5</b> | 1040       | 75.3        | 1037       | 75.6        |
| 433.milc      | 4      | 363        | 101         | <b>363</b> | <b>101</b>  | 364         | 101         | 4      | 361         | 102         | 361        | 102         | <b>361</b> | <b>102</b>  |
| 434.zeusmp    | 4      | <b>386</b> | <b>94.2</b> | 386        | 94.3        | 386         | 94.2        | 4      | <b>386</b>  | <b>94.2</b> | 386        | 94.3        | 386        | 94.2        |
| 435.gromacs   | 4      | <b>482</b> | <b>59.2</b> | 483        | 59.2        | 482         | 59.2        | 4      | 483         | 59.1        | 482        | 59.3        | <b>482</b> | <b>59.2</b> |
| 436.cactusADM | 4      | 536        | 89.2        | 544        | 87.8        | <b>539</b>  | <b>88.7</b> | 4      | 536         | 89.2        | 544        | 87.8        | <b>539</b> | <b>88.7</b> |
| 437.leslie3d  | 4      | 635        | 59.2        | 633        | 59.4        | <b>633</b>  | <b>59.4</b> | 2      | <b>276</b>  | <b>68.1</b> | 276        | 68.1        | 276        | 68.1        |
| 444.namd      | 4      | 548        | 58.5        | <b>549</b> | <b>58.5</b> | 549         | 58.4        | 4      | <b>542</b>  | <b>59.1</b> | 542        | 59.2        | 543        | 59.1        |
| 447.dealII    | 4      | <b>359</b> | <b>127</b>  | 359        | 127         | 359         | 128         | 4      | <b>359</b>  | <b>127</b>  | 359        | 127         | 359        | 128         |
| 450.soplex    | 4      | <b>523</b> | <b>63.8</b> | 522        | 63.9        | 524         | 63.7        | 2      | 264         | 63.3        | 262        | 63.8        | <b>263</b> | <b>63.4</b> |
| 453.povray    | 4      | <b>209</b> | <b>102</b>  | 210        | 102         | 208         | 102         | 4      | 178         | 119         | <b>181</b> | <b>117</b>  | 181        | 117         |
| 454.calculix  | 4      | <b>348</b> | <b>94.7</b> | 354        | 93.2        | 346         | 95.3        | 4      | <b>352</b>  | <b>93.8</b> | 346        | 95.4        | 353        | 93.5        |
| 459.GemsFDTD  | 4      | 793        | 53.5        | 794        | 53.5        | <b>793</b>  | <b>53.5</b> | 2      | <b>355</b>  | <b>59.7</b> | 357        | 59.5        | 355        | 59.7        |
| 465.tonto     | 4      | 463        | 84.9        | 459        | 85.7        | <b>461</b>  | <b>85.3</b> | 4      | <b>445</b>  | <b>88.4</b> | 447        | 88.0        | 444        | 88.6        |
| 470.lbm       | 4      | <b>561</b> | <b>97.9</b> | 561        | 98.0        | 565         | 97.3        | 4      | <b>561</b>  | <b>97.9</b> | 561        | 98.0        | 565        | 97.3        |
| 481.wrf       | 4      | 407        | 110         | <b>406</b> | <b>110</b>  | 405         | 110         | 4      | <b>396</b>  | <b>113</b>  | 399        | 112         | 396        | 113         |
| 482.sphinx3   | 4      | 954        | 81.7        | <b>953</b> | <b>81.8</b> | 946         | 82.4        | 4      | 954         | 81.7        | <b>953</b> | <b>81.8</b> | 946        | 82.4        |

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:  
Turbo Mode enabled in BIOS  
C-State enabled in BIOS

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### Platform Notes (Continued)

```
Sysinfo program /root/SPECcpul.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
running on localhost.localdomain Tue Oct 16 16:52:24 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) Core(TM) i3-3220 CPU @ 3.30GHz
1 "physical id"s (chips)
4 "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 : 2
siblings : 4
physical 0: cores 0 1
cache size : 3072 KB
```

```
From /proc/meminfo
MemTotal: 16322724 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.2 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.2 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux localhost.localdomain 2.6.32-220.el6.x86_64 #1 SMP Wed Nov 9 08:03:13
EST 2011 x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Oct 16 16:48
```

```
SPEC is set to: /root/SPECcpul.2
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/VolGroup-lv_root
ext4 50G 26G 22G 55% /
```

```
Additional information from dmidecode:
Memory:
2x Micron 18JSF1G72AZ-1G6D1 8 GB 1600 MHz 2 rank
```

(End of data from sysinfo program)



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## General Notes

Environment variables set by runspec before the start of the run:  
LD\_LIBRARY\_PATH = "/root/SPECcpul.2/libs/32:/root/SPECcpul.2/libs/64"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5  
Transparent Huge Pages enabled with:  
echo always > /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  
437.leslie3d: -DSPEC\_CPU\_LP64  
444.namd: -DSPEC\_CPU\_LP64  
447.deallI: -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



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## Base Optimization Flags

C benchmarks:

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

C++ benchmarks:

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

Fortran benchmarks:

-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch

Benchmarks using both Fortran and C:

-xAVX -ipo -O3 -no-prec-div -static -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

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  
465.tonto: -DSPEC\_CPU\_LP64

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## Peak Portability Flags (Continued)

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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -static -auto-ilp32  
-opt-mem-layout-trans=3

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

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.dealIII: basepeak = yes

450.soplex: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

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: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -static

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- -static

434.zeusmp: basepeak = yes

437.leslie3d: -xAVX -ipo -O3 -no-prec-div -static -opt-prefetch

459.GemsFDTD: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3

465.tonto: -xAVX(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

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## Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

435.gromacs: -xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)  
-no-prec-div(pass 2) -prof-use(pass 2) -opt-prefetch  
-static -auto-ilp32 -opt-mem-layout-trans=3

436.cactusADM: basepeak = yes

454.calculix: -xAVX -ipo -O3 -no-prec-div -static -auto-ilp32  
-opt-mem-layout-trans=3

481.wrf: Same as 454.calculix

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/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-ic12.1-official-linux64.20111122.xml>  
<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.xml>

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

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