



# SPEC® CFP2006 Result

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## IBM Corporation

**SPECfp®2006 = 89.1**

IBM System x3550 M4 (Intel Xeon E5-2680)

**SPECfp\_base2006 = 84.4**

CPU2006 license: 11

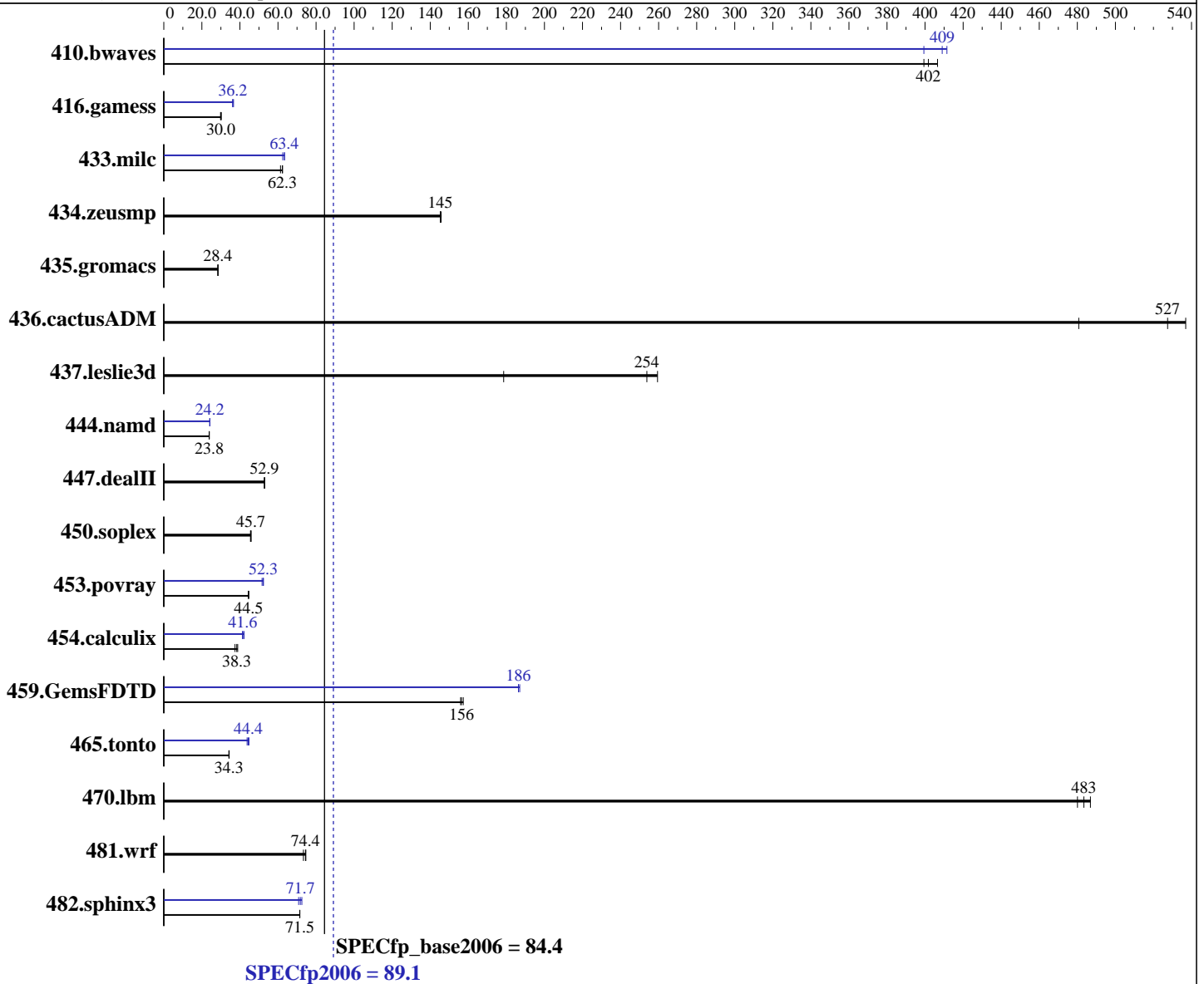
Test date: Mar-2012

Test sponsor: IBM Corporation

Hardware Availability: Mar-2012

Tested by: IBM Corporation

Software Availability: Oct-2011



### Hardware

CPU Name: Intel Xeon E5-2680  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.50 GHz  
 CPU MHz: 2700  
 FPU: Integrated  
 CPU(s) enabled: 16 cores, 2 chips, 8 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 6.1 (Santiago)  
 2.6.32-131.0.15.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: Yes  
 File System: ext4

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L3 Cache: 20 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: 1 x 1 TB SAS, 7200 RPM  
 Other Hardware: None

System State: Run level 3 (add definition here)  
 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    | <b>33.8</b> | <b>402</b>  | 34.0        | 399         | 33.4        | 407         | 33.0        | 411         | 34.0        | 399         | <b>33.2</b> | <b>409</b>  |
| 416.gamess    | 649         | 30.2        | <b>652</b>  | <b>30.0</b> | 657         | 29.8        | 541         | 36.2        | <b>540</b>  | <b>36.2</b> | 534         | 36.6        |
| 433.milc      | <b>147</b>  | <b>62.3</b> | 147         | 62.4        | 150         | 61.3        | <b>145</b>  | <b>63.4</b> | 147         | 62.5        | 145         | 63.4        |
| 434.zeusmp    | 62.6        | 145         | 62.4        | 146         | <b>62.6</b> | <b>145</b>  | 62.6        | 145         | 62.4        | 146         | <b>62.6</b> | <b>145</b>  |
| 435.gromacs   | <b>251</b>  | <b>28.4</b> | 250         | 28.5        | 251         | 28.4        | <b>251</b>  | <b>28.4</b> | 250         | 28.5        | 251         | 28.4        |
| 436.cactusADM | <b>22.7</b> | <b>527</b>  | 22.3        | 537         | 24.9        | 481         | <b>22.7</b> | <b>527</b>  | 22.3        | 537         | 24.9        | 481         |
| 437.leslie3d  | 36.2        | 259         | <b>37.0</b> | <b>254</b>  | 52.6        | 179         | 36.2        | 259         | <b>37.0</b> | <b>254</b>  | 52.6        | 179         |
| 444.namd      | <b>336</b>  | <b>23.8</b> | 336         | 23.9        | 337         | 23.8        | 331         | 24.2        | 332         | 24.2        | <b>332</b>  | <b>24.2</b> |
| 447.dealII    | <b>216</b>  | <b>52.9</b> | 216         | 53.0        | 217         | 52.8        | <b>216</b>  | <b>52.9</b> | 216         | 53.0        | 217         | 52.8        |
| 450.soplex    | 182         | 45.9        | <b>182</b>  | <b>45.7</b> | 183         | 45.5        | 182         | 45.9        | <b>182</b>  | <b>45.7</b> | 183         | 45.5        |
| 453.povray    | 119         | 44.6        | 120         | 44.4        | <b>119</b>  | <b>44.5</b> | 102         | 52.3        | <b>102</b>  | <b>52.3</b> | 103         | 51.6        |
| 454.calculix  | <b>215</b>  | <b>38.3</b> | 212         | 38.8        | 220         | 37.4        | 195         | 42.2        | 200         | 41.3        | <b>199</b>  | <b>41.6</b> |
| 459.GemsFDTD  | <b>67.8</b> | <b>156</b>  | 68.0        | 156         | 67.4        | 157         | 56.9        | 186         | <b>56.9</b> | <b>186</b>  | 56.7        | 187         |
| 465.tonto     | 288         | 34.2        | 286         | 34.4        | <b>287</b>  | <b>34.3</b> | 225         | 43.8        | <b>222</b>  | <b>44.4</b> | 220         | 44.8        |
| 470.lbm       | <b>28.4</b> | <b>483</b>  | 28.6        | 480         | 28.2        | 487         | <b>28.4</b> | <b>483</b>  | 28.6        | 480         | 28.2        | 487         |
| 481.wrf       | 150         | 74.6        | <b>150</b>  | <b>74.4</b> | 152         | 73.4        | 150         | 74.6        | <b>150</b>  | <b>74.4</b> | 152         | 73.4        |
| 482.sphinx3   | 273         | 71.5        | <b>273</b>  | <b>71.5</b> | 273         | 71.4        | 275         | 70.8        | <b>272</b>  | <b>71.7</b> | 269         | 72.5        |

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 Settings:  
 Operating Mode set to Maximum Performance  
 Sysinfo program /root/SPECcpu-v1.2/config/sysinfo.rev6800  
 \$Rev: 6800 \$ \$Date:: 2011-10-11 #\$ 6f2ebdff5032aaa42e583f96b07f99d3  
 running on x3550M4 Wed Mar 21 09:47:51 2012

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 E5-2680 0 @ 2.70GHz
 2 "physical id"s (chips)
 32 "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  : 16
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: 132236124 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

/usr/bin/lsb\_release -d

```
Red Hat Enterprise Linux Server release 6.1 (Santiago)
```

From /etc/\*release\* /etc/\*version\*

```
redhat-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.1 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

uname -a:

```
Linux x3550M4 2.6.32-131.0.15.el6.x86_64 #1 SMP Tue May 10 15:42:40 EDT 2011
x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Mar 19 15:13

SPEC is set to: /root/SPECcpu-v1.2

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/vg_x3550m4-lv_root
ext4 790G 69G 681G 10% /
```

Additional information from dmidecode:

Memory:

```
16x Samsung M393B1K70DH0-CK0 8 GB 1600 MHz 2 rank
```

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:

KMP\_AFFINITY = "granularity=fine,compact,1,0"

LD\_LIBRARY\_PATH = "/root/SPECcpu-v1.2/libs/32:/root/SPECcpu-v1.2/libs/64"

OMP\_NUM\_THREADS = "16"

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## General Notes (Continued)

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

## 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

## Base Optimization Flags

C benchmarks:

-xAVX -ipo -O3 -no-prec-div -static -parallel -opt-prefetch  
-ansi-alias

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## Base Optimization Flags (Continued)

C++ benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

-xAVX -ipo -O3 -no-prec-div -static -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) -static -auto-ilp32  
-ansi-alias

470.lbm: basepeak = yes

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

C++ benchmarks:

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## Peak Optimization Flags (Continued)

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: -xAVX -ipo -O3 -no-prec-div -opt-prefetch -parallel  
-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: 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-ic12.1-official-linux64.20111122.html>

<http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-SNB-C.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-SNB-C.xml>



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