



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

IBM System x3550 M4  
(Intel Xeon E5-2603 v2, 1.80 GHz)

SPECfp<sup>®</sup>2006 = **51.8**

SPECfp\_base2006 = **50.3**

CPU2006 license: 11

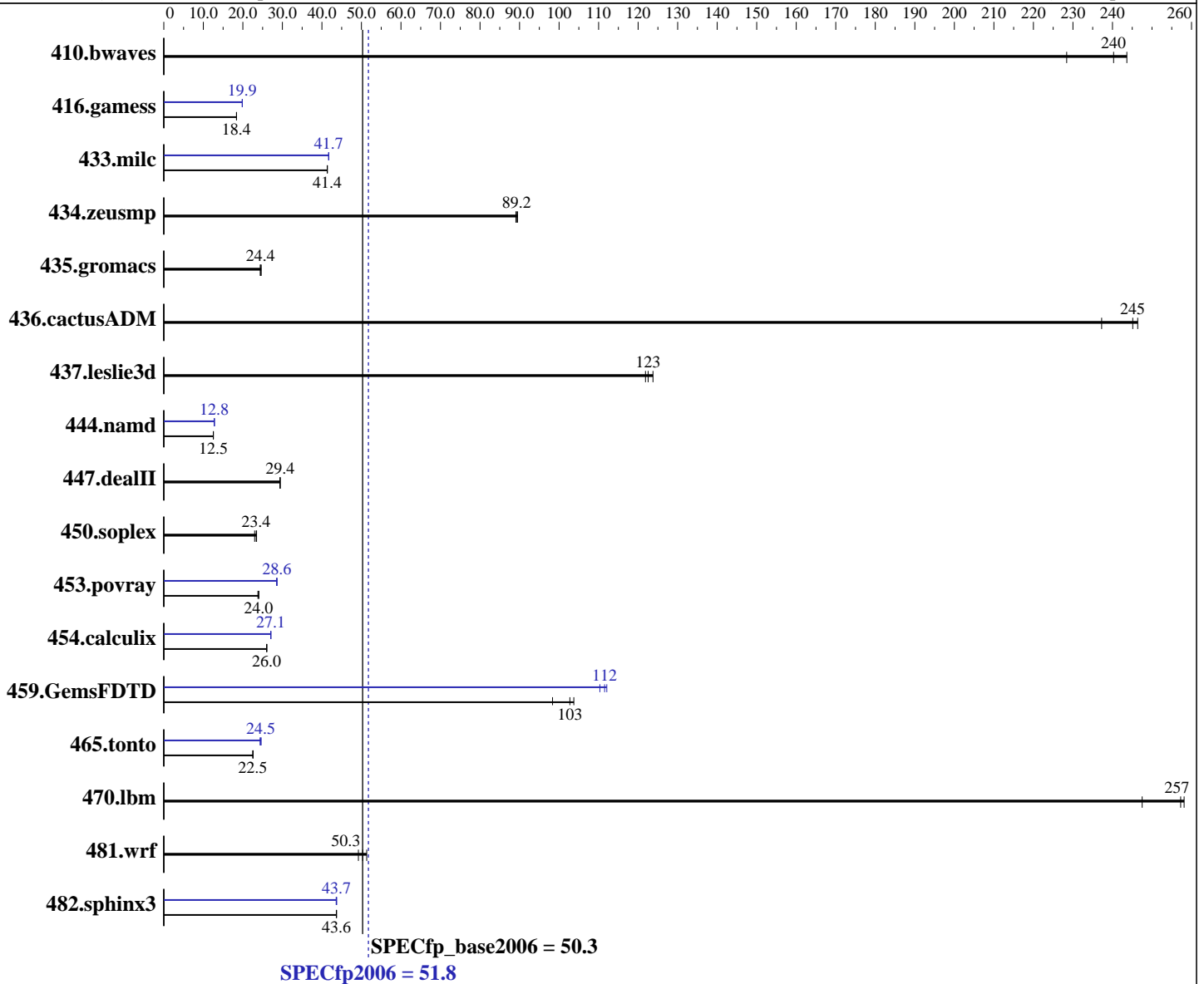
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Jan-2014

Hardware Availability: Dec-2013

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2603 v2  
 CPU Characteristics:  
 CPU MHz: 1800  
 FPU: Integrated  
 CPU(s) enabled: 8 cores, 2 chips, 4 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)  
 2.6.32-358.el6.x86\_64  
 Compiler: C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux;  
 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: 10 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1333 MHz)  
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    | 55.8       | 244         | 59.5        | 228         | <b>56.6</b> | <b>240</b>  | 55.8        | 244         | 59.5        | 228         | <b>56.6</b> | <b>240</b>  |
| 416.gamess    | 1064       | 18.4        | <b>1064</b> | <b>18.4</b> | 1065        | 18.4        | <b>986</b>  | <b>19.9</b> | 986         | 19.9        | 986         | 19.9        |
| 433.milc      | 222        | 41.4        | <b>222</b>  | <b>41.4</b> | 222         | 41.3        | <b>220</b>  | <b>41.7</b> | <b>220</b>  | <b>41.7</b> | 220         | 41.7        |
| 434.zeusmp    | <b>102</b> | <b>89.2</b> | 102         | 89.5        | 102         | 89.1        | <b>102</b>  | <b>89.2</b> | 102         | 89.5        | 102         | 89.1        |
| 435.gromacs   | 292        | 24.4        | <b>292</b>  | <b>24.4</b> | 290         | 24.6        | <b>292</b>  | <b>24.4</b> | <b>292</b>  | <b>24.4</b> | 290         | 24.6        |
| 436.cactusADM | 50.4       | 237         | 48.5        | 246         | <b>48.7</b> | <b>245</b>  | 50.4        | 237         | 48.5        | 246         | <b>48.7</b> | <b>245</b>  |
| 437.leslie3d  | 77.1       | 122         | 76.0        | 124         | <b>76.7</b> | <b>123</b>  | 77.1        | 122         | 76.0        | 124         | <b>76.7</b> | <b>123</b>  |
| 444.namd      | <b>640</b> | <b>12.5</b> | 640         | 12.5        | 640         | 12.5        | <b>627</b>  | <b>12.8</b> | 627         | 12.8        | 627         | 12.8        |
| 447.dealII    | 389        | 29.4        | 389         | 29.4        | <b>389</b>  | <b>29.4</b> | 389         | 29.4        | 389         | 29.4        | <b>389</b>  | <b>29.4</b> |
| 450.soplex    | 355        | 23.5        | 363         | 23.0        | <b>357</b>  | <b>23.4</b> | 355         | 23.5        | 363         | 23.0        | <b>357</b>  | <b>23.4</b> |
| 453.povray    | 221        | 24.0        | <b>222</b>  | <b>24.0</b> | 223         | 23.8        | 186         | 28.7        | 186         | 28.5        | <b>186</b>  | <b>28.6</b> |
| 454.calculix  | 317        | 26.0        | 317         | 26.0        | <b>317</b>  | <b>26.0</b> | 305         | 27.1        | <b>305</b>  | <b>27.1</b> | 305         | 27.1        |
| 459.GemsFDTD  | <b>103</b> | <b>103</b>  | 108         | 98.3        | 102         | 104         | <b>95.1</b> | <b>112</b>  | 96.2        | 110         | 94.7        | 112         |
| 465.tonto     | <b>437</b> | <b>22.5</b> | 435         | 22.6        | 437         | 22.5        | 400         | 24.6        | 404         | 24.3        | <b>401</b>  | <b>24.5</b> |
| 470.lbm       | 55.5       | 248         | <b>53.4</b> | <b>257</b>  | 53.2        | 258         | 55.5        | 248         | <b>53.4</b> | <b>257</b>  | 53.2        | 258         |
| 481.wrf       | 227        | 49.2        | <b>222</b>  | <b>50.3</b> | 218         | 51.3        | <b>227</b>  | <b>49.2</b> | <b>222</b>  | <b>50.3</b> | 218         | 51.3        |
| 482.sphinx3   | 446        | 43.7        | 447         | 43.6        | <b>447</b>  | <b>43.6</b> | <b>446</b>  | <b>43.7</b> | 446         | 43.7        | 447         | 43.6        |

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 Jan 7 15:52:29 2014
```

This section contains SUT (System Under Test) info as seen by

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**Software Availability:** Sep-2013

### Platform Notes (Continued)

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 E5-2603 v2 @ 1.80GHz
 2 "physical id"s (chips)
 8 "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 : 4
siblings : 4
physical 0: cores 0 1 2 3
physical 1: cores 0 1 2 3
cache size : 10240 KB
```

```
From /proc/meminfo
MemTotal:      264466576 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 Jan 6 14:50
```

```
SPEC is set to: /home/SPECcpu-new
Filesystem      Type      Size Used Avail Use% Mounted on
/dev/mapper/vg_x3550m4-lv_home
                ext4      312G  149G  148G  51% /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 1333 MHz 2 rank
```

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



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## 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 = "8"

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



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

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