



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

IBM System x3530 M4  
(Intel Xeon E5-2403 v2, 1.80 GHz)

SPECfp<sup>®</sup>2006 = 50.7

SPECfp\_base2006 = 49.4

CPU2006 license: 11

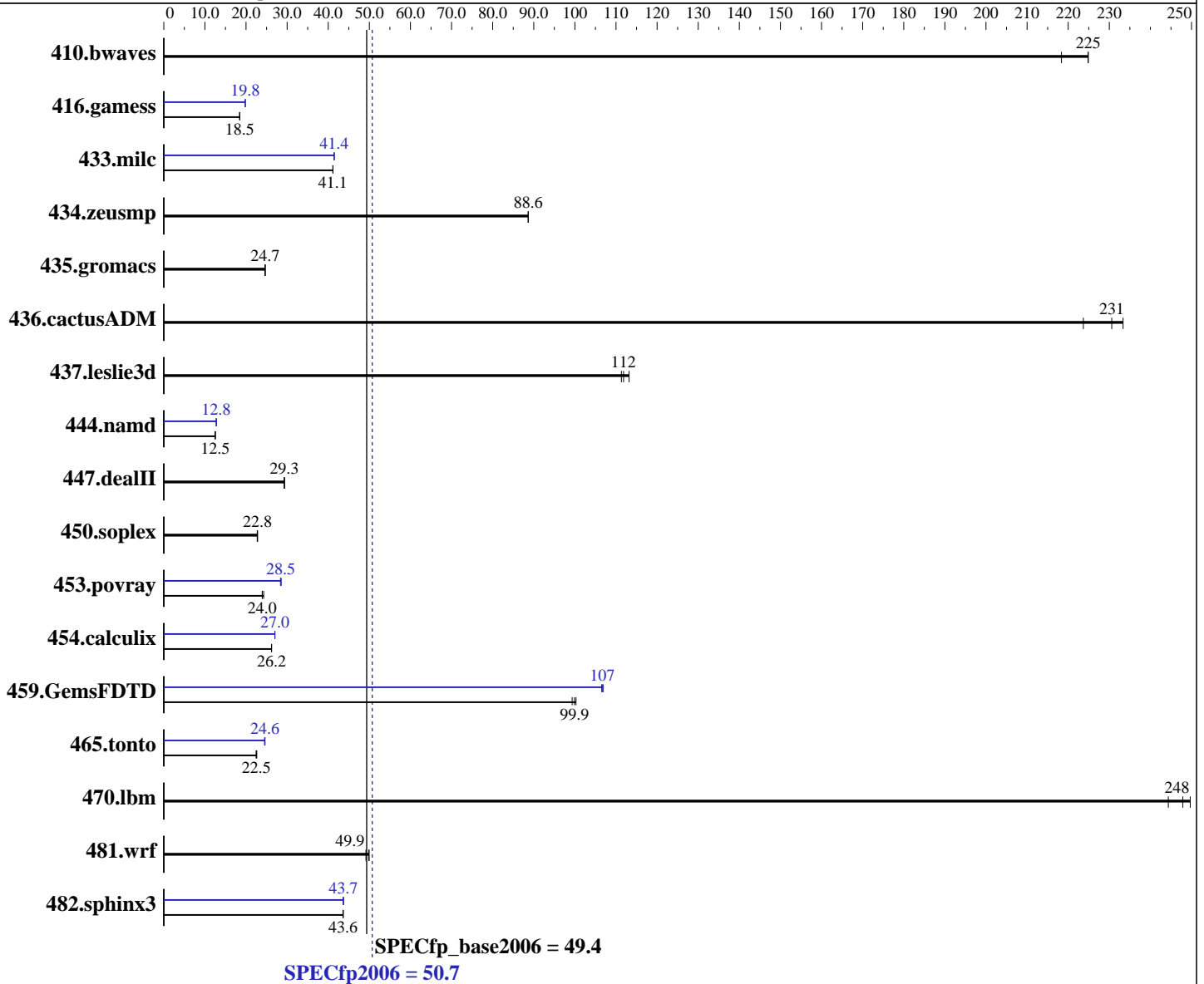
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: May-2014

Hardware Availability: Mar-2014

Software Availability: Nov-2013



### Hardware

CPU Name: Intel Xeon E5-2403 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 6.5 (Santiago)  
 2.6.32-431.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: 192 GB (12 x 16 GB 2Rx4 PC3-12800R-11, ECC, running at 1333 MHz)  
Disk Subsystem: 1 x 500 GB SATA, 7200 RPM  
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	62.2	218	60.4	225	<b>60.4</b>	<b>225</b>	62.2	218	60.4	225	<b>60.4</b>	<b>225</b>
416.gamess	<b>1060</b>	<b>18.5</b>	1061	18.5	1060	18.5	989	19.8	<b>988</b>	<b>19.8</b>	987	19.8
433.milc	223	41.2	223	41.1	<b>223</b>	<b>41.1</b>	222	41.4	<b>221</b>	<b>41.4</b>	221	41.5
434.zeusmp	103	88.6	<b>103</b>	<b>88.6</b>	103	88.7	103	88.6	<b>103</b>	<b>88.6</b>	103	88.7
435.gromacs	<b>290</b>	<b>24.7</b>	290	24.6	290	24.7	<b>290</b>	<b>24.7</b>	290	24.6	290	24.7
436.cactusADM	51.2	233	<b>51.8</b>	<b>231</b>	53.4	224	51.2	233	<b>51.8</b>	<b>231</b>	53.4	224
437.leslie3d	84.5	111	<b>84.0</b>	<b>112</b>	83.0	113	84.5	111	<b>84.0</b>	<b>112</b>	83.0	113
444.namd	<b>641</b>	<b>12.5</b>	641	12.5	640	12.5	628	12.8	<b>628</b>	<b>12.8</b>	628	12.8
447.dealII	<b>390</b>	<b>29.3</b>	390	29.3	390	29.3	<b>390</b>	<b>29.3</b>	390	29.3	390	29.3
450.soplex	367	22.7	365	22.8	<b>366</b>	<b>22.8</b>	367	22.7	365	22.8	<b>366</b>	<b>22.8</b>
453.povray	219	24.3	<b>222</b>	<b>24.0</b>	222	23.9	186	28.6	187	28.4	<b>187</b>	<b>28.5</b>
454.calculix	315	26.2	315	26.2	<b>315</b>	<b>26.2</b>	<b>305</b>	<b>27.0</b>	305	27.0	305	27.0
459.GemsFDTD	107	99.3	<b>106</b>	<b>99.9</b>	106	100	<b>99.4</b>	<b>107</b>	99.6	106	99.2	107
465.tonto	<b>437</b>	<b>22.5</b>	438	22.5	435	22.6	400	24.6	<b>400</b>	<b>24.6</b>	402	24.5
470.lbm	56.2	244	55.0	250	<b>55.4</b>	<b>248</b>	56.2	244	55.0	250	<b>55.4</b>	<b>248</b>
481.wrf	<b>224</b>	<b>49.9</b>	224	50.0	227	49.2	<b>224</b>	<b>49.9</b>	224	50.0	227	49.2
482.sphinx3	<b>447</b>	<b>43.6</b>	446	43.7	447	43.6	<b>445</b>	<b>43.8</b>	<b>446</b>	<b>43.7</b>	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
Intel Idle Driver disabled with the following Linux kernel parameter in /etc/grub.conf:
intel_idle.max_cstate=0
```

## Platform Notes

```
BIOS setting:
Operating Mode set to Maximum Performance
Sysinfo program /home/SPECcpu-20140116-ic14.0/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on x3530M4 Sat May 31 18:20:11 2014
```

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## Platform Notes (Continued)

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 E5-2403 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:      198319836 kB
HugePages_Total: 0
Hugepagesize:  2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.5 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux x3530M4 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54 EST 2013
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 May 30 11:54
```

```
SPEC is set to: /home/SPECcpu-20140116-ic14.0
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/vg_x3530m4-lv_home ext4  404G  16G  368G   4% /home
```

```
Additional information from dmidecode:
BIOS IBM  -[BEE136CUS-1.60]- 01/23/2014
Memory:
 12x Samsung M393B2G70QH0-YK0 16 GB 1333 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:

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

LD\_LIBRARY\_PATH = "/home/SPECcpu-20140116-ic14.0/libs/32:/home/SPECcpu-20140116-ic14.0/libs/64:/home/SPECcpu-20140116-ic14.0/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.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 -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-B.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-B.xml>

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