



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

IBM System x3650 M4  
(Intel Xeon E5-2650L v2, 1.70 GHz)

SPECfp<sup>®</sup>2006 = **70.2**

SPECfp\_base2006 = **67.5**

CPU2006 license: 11

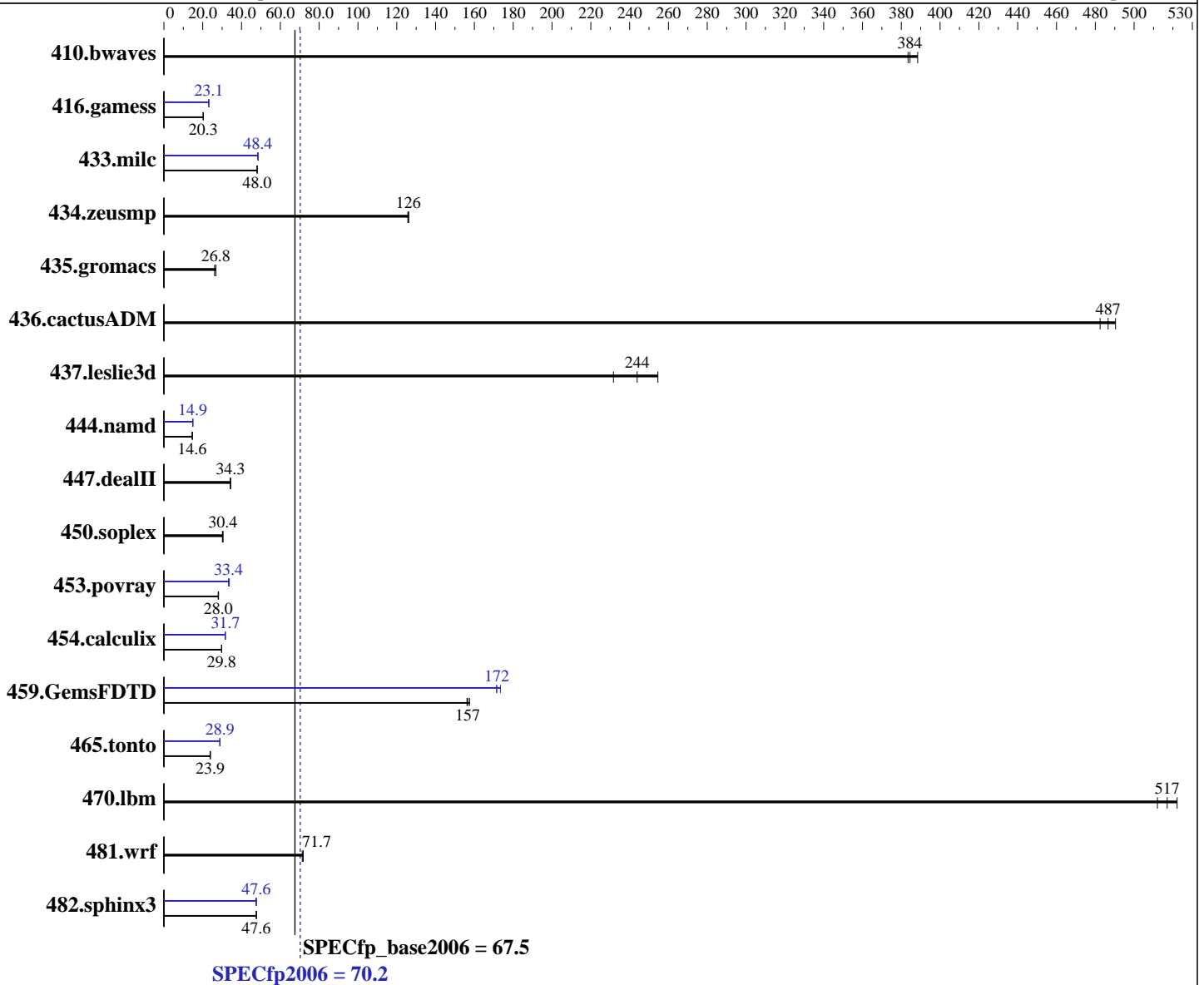
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Aug-2014

Hardware Availability: Dec-2013

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2650L v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.10 GHz  
 CPU MHz: 1700  
 FPU: Integrated  
 CPU(s) enabled: 20 cores, 2 chips, 10 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: 25 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC, running at 1600 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	35.4	383	35.0	388	<b><u>35.3</u></b>	<b><u>384</u></b>	35.4	383	35.0	388	<b><u>35.3</u></b>	<b><u>384</u></b>
416.gamess	<b><u>966</u></b>	<b><u>20.3</u></b>	965	20.3	966	20.3	846	23.1	848	23.1	<b><u>847</u></b>	<b><u>23.1</u></b>
433.milc	191	48.1	<b><u>191</u></b>	<b><u>48.0</u></b>	191	48.0	189	48.5	190	48.4	<b><u>190</u></b>	<b><u>48.4</u></b>
434.zeusmp	72.4	126	<b><u>72.2</u></b>	<b><u>126</u></b>	72.1	126	72.4	126	<b><u>72.2</u></b>	<b><u>126</u></b>	72.1	126
435.gromacs	274	26.1	<b><u>267</u></b>	<b><u>26.8</u></b>	266	26.8	274	26.1	<b><u>267</u></b>	<b><u>26.8</u></b>	266	26.8
436.cactusADM	<b><u>24.6</u></b>	<b><u>487</u></b>	24.4	490	24.8	482	<b><u>24.6</u></b>	<b><u>487</u></b>	24.4	490	24.8	482
437.leslie3d	40.6	232	36.9	255	<b><u>38.5</u></b>	<b><u>244</u></b>	40.6	232	36.9	255	<b><u>38.5</u></b>	<b><u>244</u></b>
444.namd	<b><u>549</u></b>	<b><u>14.6</u></b>	549	14.6	549	14.6	538	14.9	<b><u>538</u></b>	<b><u>14.9</u></b>	538	14.9
447.dealII	<b><u>333</u></b>	<b><u>34.3</u></b>	333	34.3	334	34.3	<b><u>333</u></b>	<b><u>34.3</u></b>	333	34.3	334	34.3
450.soplex	277	30.2	274	30.4	<b><u>274</u></b>	<b><u>30.4</u></b>	277	30.2	274	30.4	<b><u>274</u></b>	<b><u>30.4</u></b>
453.povray	<b><u>190</u></b>	<b><u>28.0</u></b>	190	28.0	189	28.2	158	33.7	<b><u>159</u></b>	<b><u>33.4</u></b>	160	33.3
454.calculix	<b><u>277</u></b>	<b><u>29.8</u></b>	278	29.7	277	29.8	<b><u>261</u></b>	<b><u>31.7</u></b>	261	31.6	261	31.7
459.GemsFDTD	67.9	156	67.3	158	<b><u>67.7</u></b>	<b><u>157</u></b>	<b><u>61.9</u></b>	<b><u>172</u></b>	61.9	171	61.2	173
465.tonto	414	23.8	<b><u>411</u></b>	<b><u>23.9</u></b>	411	23.9	341	28.9	341	28.8	<b><u>341</u></b>	<b><u>28.9</u></b>
470.ibm	<b><u>26.6</u></b>	<b><u>517</u></b>	26.3	522	26.8	512	<b><u>26.6</u></b>	<b><u>517</u></b>	26.3	522	26.8	512
481.wrf	157	71.3	156	71.8	<b><u>156</u></b>	<b><u>71.7</u></b>	157	71.3	156	71.8	<b><u>156</u></b>	<b><u>71.7</u></b>
482.sphinx3	409	47.6	<b><u>409</u></b>	<b><u>47.6</u></b>	409	47.6	411	47.4	<b><u>410</u></b>	<b><u>47.6</u></b>	408	47.7

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
Hyper-Threading set to Disable
Sysinfo program /home/SPECcpu-20140116-ic14.0/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
```

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**SPECfp2006 = 70.2**

IBM System x3650 M4  
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**SPECfp\_base2006 = 67.5**

**CPU2006 license:** 11  
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## Platform Notes (Continued)

running on x3650M4 Fri Aug 8 06:09:57 2014

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 E5-2650L v2 @ 1.70GHz
 2 "physical id"s (chips)
 20 "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 : 10
  siblings  : 10
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size : 25600 KB
```

```
From /proc/meminfo
MemTotal:      264342100 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 x3650M4 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 Aug 7 21:22
```

```
SPEC is set to: /home/SPECcpu-20140116-ic14.0
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/mapper/vg_x3650m4-lv_home
                ext4      313G  116G  182G  39% /home
```

```
Additional information from dmidecode:
BIOS IBM -[VVE135VUS-1.60]- 12/05/2013
Memory:
8x Not Specified Not Specified
16x Samsung M393B2G70QH0-CMA 16 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:

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

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 = "20"

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>  
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Tested with SPEC CPU2006 v1.2.  
Report generated on Tue Aug 26 18:11:10 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 26 August 2014.