



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

SPECfp<sup>®</sup>2006 = **76.5**

### IBM System x3630 M4 (Intel Xeon E5-2470)

SPECfp\_base2006 = **72.8**

CPU2006 license: 11

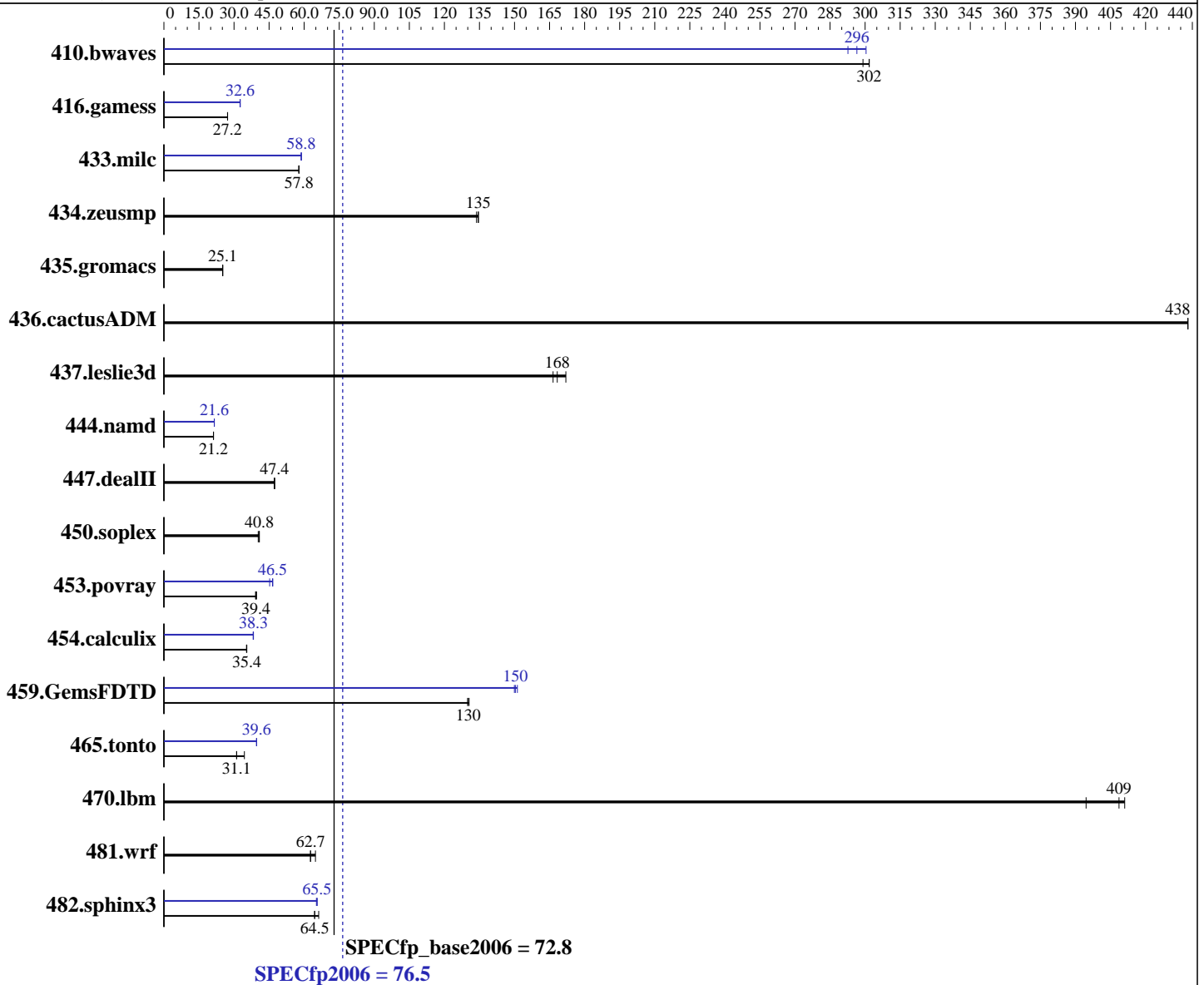
Test date: May-2012

Test sponsor: IBM Corporation

Hardware Availability: Jun-2012

Tested by: IBM Corporation

Software Availability: Dec-2011



### Hardware

CPU Name: Intel Xeon E5-2470  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.10 GHz  
 CPU MHz: 2300  
 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 6.2 (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: Yes  
 File System: ext4

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L3 Cache: 20 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 96 GB (12 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 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	45.0	302	<b>45.0</b>	<b>302</b>	45.4	299	46.4	293	<b>45.8</b>	<b>296</b>	45.2	300
416.gamess	720	27.2	718	27.3	<b>719</b>	<b>27.2</b>	601	32.6	<b>600</b>	<b>32.6</b>	600	32.6
433.milc	159	57.7	<b>159</b>	<b>57.8</b>	159	57.8	<b>156</b>	<b>58.8</b>	156	58.8	156	58.7
434.zeusmp	67.6	135	<b>67.6</b>	<b>135</b>	68.0	134	67.6	135	<b>67.6</b>	<b>135</b>	68.0	134
435.gromacs	285	25.1	283	25.2	<b>284</b>	<b>25.1</b>	285	25.1	283	25.2	<b>284</b>	<b>25.1</b>
436.cactusADM	<b>27.3</b>	<b>438</b>	27.3	438	27.3	438	<b>27.3</b>	<b>438</b>	27.3	438	27.3	438
437.leslie3d	56.5	166	<b>55.9</b>	<b>168</b>	54.7	172	56.5	166	<b>55.9</b>	<b>168</b>	54.7	172
444.namd	<b>378</b>	<b>21.2</b>	378	21.2	378	21.2	372	21.6	<b>372</b>	<b>21.6</b>	372	21.5
447.dealII	241	47.4	242	47.2	<b>242</b>	<b>47.4</b>	241	47.4	242	47.2	<b>242</b>	<b>47.4</b>
450.soplex	204	40.8	207	40.3	<b>205</b>	<b>40.8</b>	204	40.8	207	40.3	<b>205</b>	<b>40.8</b>
453.povray	<b>135</b>	<b>39.4</b>	134	39.6	136	39.2	114	46.6	118	45.2	<b>115</b>	<b>46.5</b>
454.calculix	234	35.3	233	35.4	<b>233</b>	<b>35.4</b>	215	38.3	<b>215</b>	<b>38.3</b>	216	38.2
459.GemsFDTD	<b>81.5</b>	<b>130</b>	81.3	131	81.7	130	<b>70.6</b>	<b>150</b>	70.2	151	70.8	150
465.tonto	316	31.1	286	34.4	<b>316</b>	<b>31.1</b>	<b>248</b>	<b>39.6</b>	248	39.6	248	39.7
470.lbm	<b>33.6</b>	<b>409</b>	34.8	395	33.4	411	<b>33.6</b>	<b>409</b>	34.8	395	33.4	411
481.wrf	<b>178</b>	<b>62.7</b>	172	64.8	178	62.7	<b>178</b>	<b>62.7</b>	172	64.8	178	62.7
482.sphinx3	294	66.2	<b>302</b>	<b>64.5</b>	302	64.5	297	65.5	<b>298</b>	<b>65.5</b>	299	65.2

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 /home/SPECcpu-v1.2/config/sysinfo.rev6800  
 \$Rev: 6800 \$ \$Date:: 2011-10-11 #\$ 6f2ebdff5032aaa42e583f96b07f99d3  
 running on x3630m4-rhel62 Wed May 9 21:12:02 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 E5-2470 0 @ 2.30GHz
    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:      99042548 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 x3630m4-rhel62 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 May 9 08:17

```

SPEC is set to: /home/SPECcpu-v1.2
  Filesystem      Type      Size Used Avail Use% Mounted on
  /dev/mapper/vg_x3630m4rhel62-lv_home
    ext4          383G  7.8G  356G   3% /home

```

Additional information from dmidecode:

```

Memory:
  12x 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 = "/home/SPECcpu-v1.2/libs/32:/home/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.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: -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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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