



# SPEC® CFP2006 Result

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## IBM Corporation

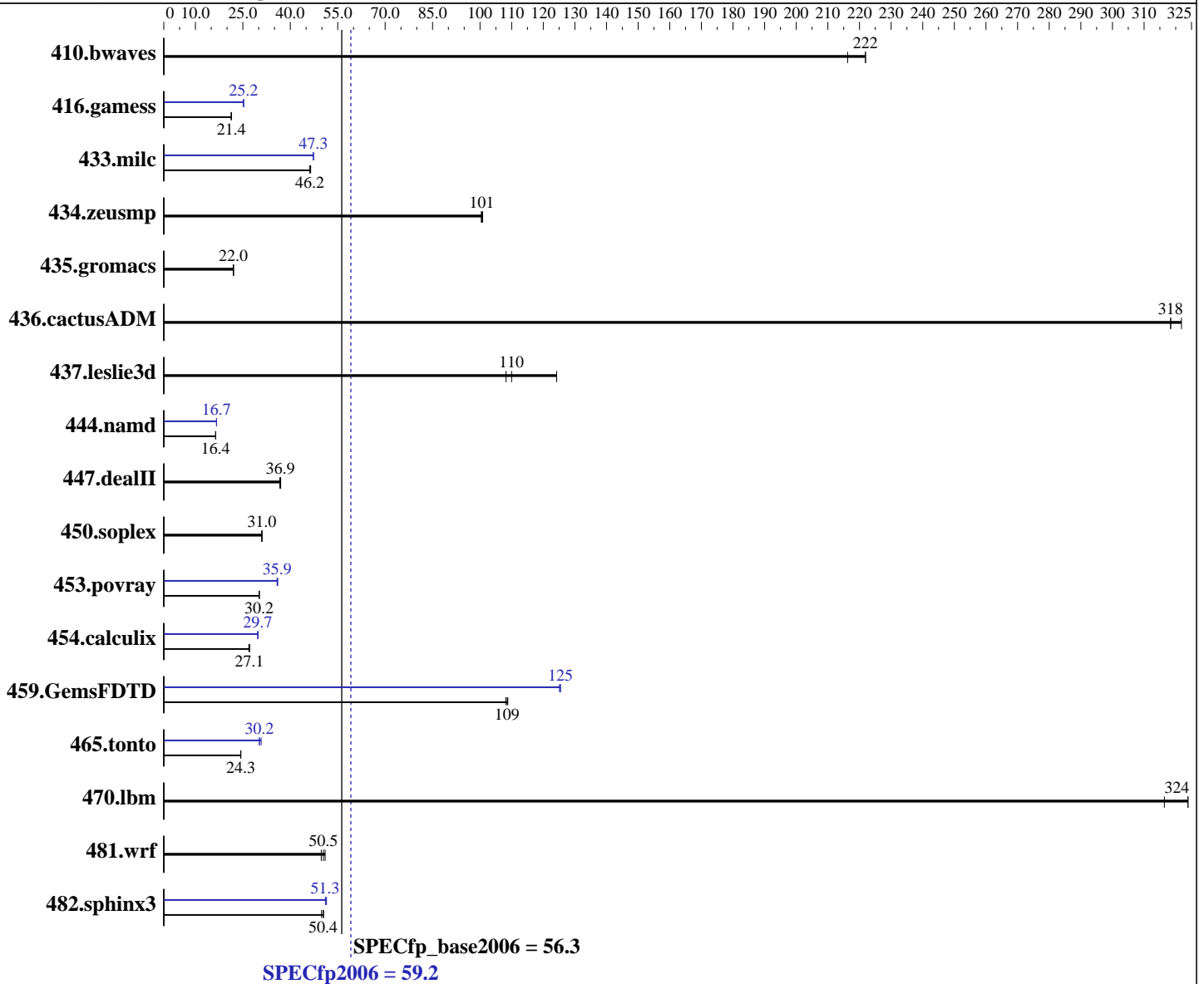
IBM Flex System x220  
(Intel Xeon E5-2420, 1.90 GHz)

SPECfp®2006 = **59.2**

SPECfp\_base2006 = **56.3**

CPU2006 license: 11  
Test sponsor: IBM Corporation  
Tested by: IBM Corporation

Test date: Jun-2012  
Hardware Availability: Jun-2012  
Software Availability: Dec-2011



### Hardware

CPU Name: Intel Xeon E5-2420  
CPU Characteristics: Intel Turbo Boost Technology up to 2.40 GHz  
CPU MHz: 1900  
FPU: Integrated  
CPU(s) enabled: 12 cores, 2 chips, 6 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: 15 MB I+D on chip per chip  
Other Cache: None  
Memory: 96 GB (12 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1333 MHz)  
Disk Subsystem: 1 x 500 GB SAS, 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	62.8	216	61.2	222	<b>61.2</b>	<b>222</b>	62.8	216	61.2	222	<b>61.2</b>	<b>222</b>
416.gamess	916	21.4	918	21.3	<b>917</b>	<b>21.4</b>	775	25.3	<b>777</b>	<b>25.2</b>	777	25.2
433.milc	199	46.2	<b>199</b>	<b>46.2</b>	198	46.5	<b>194</b>	<b>47.3</b>	194	47.3	194	47.3
434.zeusmp	<b>90.4</b>	<b>101</b>	90.6	100	90.2	101	<b>90.4</b>	<b>101</b>	90.6	100	90.2	101
435.gromacs	323	22.1	325	21.9	<b>324</b>	<b>22.0</b>	323	22.1	325	21.9	<b>324</b>	<b>22.0</b>
436.cactusADM	<b>37.5</b>	<b>318</b>	37.5	318	37.1	322	<b>37.5</b>	<b>318</b>	37.5	318	37.1	322
437.leslie3d	<b>85.5</b>	<b>110</b>	86.9	108	75.7	124	<b>85.5</b>	<b>110</b>	86.9	108	75.7	124
444.namd	<b>489</b>	<b>16.4</b>	489	16.4	489	16.4	481	16.7	481	16.7	<b>481</b>	<b>16.7</b>
447.dealII	312	36.7	309	37.0	<b>310</b>	<b>36.9</b>	312	36.7	309	37.0	<b>310</b>	<b>36.9</b>
450.soplex	269	31.0	<b>269</b>	<b>31.0</b>	269	31.1	269	31.0	<b>269</b>	<b>31.0</b>	269	31.1
453.povray	176	30.2	<b>176</b>	<b>30.2</b>	176	30.2	148	35.8	<b>148</b>	<b>35.9</b>	148	36.0
454.calculix	<b>305</b>	<b>27.1</b>	307	26.9	304	27.1	278	29.7	277	29.8	<b>277</b>	<b>29.7</b>
459.GemsFDTD	97.5	109	<b>97.7</b>	<b>109</b>	98.1	108	<b>84.6</b>	<b>125</b>	84.6	125	84.8	125
465.tonto	404	24.4	405	24.3	<b>404</b>	<b>24.3</b>	320	30.8	326	30.2	<b>325</b>	<b>30.2</b>
470.lbm	42.4	324	<b>42.4</b>	<b>324</b>	43.4	316	42.4	324	<b>42.4</b>	<b>324</b>	43.4	316
481.wrf	224	49.8	219	51.0	<b>221</b>	<b>50.5</b>	224	49.8	219	51.0	<b>221</b>	<b>50.5</b>
482.sphinx3	<b>387</b>	<b>50.4</b>	391	49.9	386	50.5	381	51.1	379	51.5	<b>380</b>	<b>51.3</b>

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"

## Platform Notes

Operating Mode set to Maximum Performance in BIOS  
Sysinfo program /cpu2006.1.2/config/sysinfo.rev6800  
\$Rev: 6800 \$ \$Date:: 2011-10-11 #\$ 6f2ebdff5032aaa42e583f96b07f99d3  
running on kestral-pete Mon Jun 4 21:49:31 2012

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>

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### Platform Notes (Continued)

```

From /proc/cpuinfo
  model name : Intel(R) Xeon(R) CPU E5-2420 0 @ 1.90GHz
    2 "physical id"s (chips)
    24 "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 : 6
    siblings  : 12
    physical 0: cores 0 1 2 3 4 5
    physical 1: cores 0 1 2 3 4 5
  cache size : 15360 KB

From /proc/meminfo
MemTotal:      99043528 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 kestral-pete 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 Jun 2 19:39

SPEC is set to: /cpu2006.1.2
  Filesystem      Type      Size  Used Avail Use% Mounted on
  /dev/mapper/vg_kestralpete-lv_root
    ext4          449G    6.1G  420G   2% /

Additional information from dmidecode:
Memory:
  12x Micron 36JSF1G72PZ-1G6M1 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 = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64"
OMP_NUM_THREADS = "12"

```

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB

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## General Notes (Continued)

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.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

## Base Optimization Flags

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

C++ benchmarks:  
-xAVX -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias

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## Base Optimization Flags (Continued)

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:

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`

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## Peak Optimization Flags (Continued)

447.deallI: 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- -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-linux64.20120425.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-linux64.20120425.xml>

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

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