



# SPEC® CFP2006 Result

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## IBM Corporation

IBM Flex System x240 (Intel Xeon E5-2650, 2.00 GHz)

SPECfp®2006 = 74.6

SPECfp\_base2006 = 70.3

CPU2006 license: 11

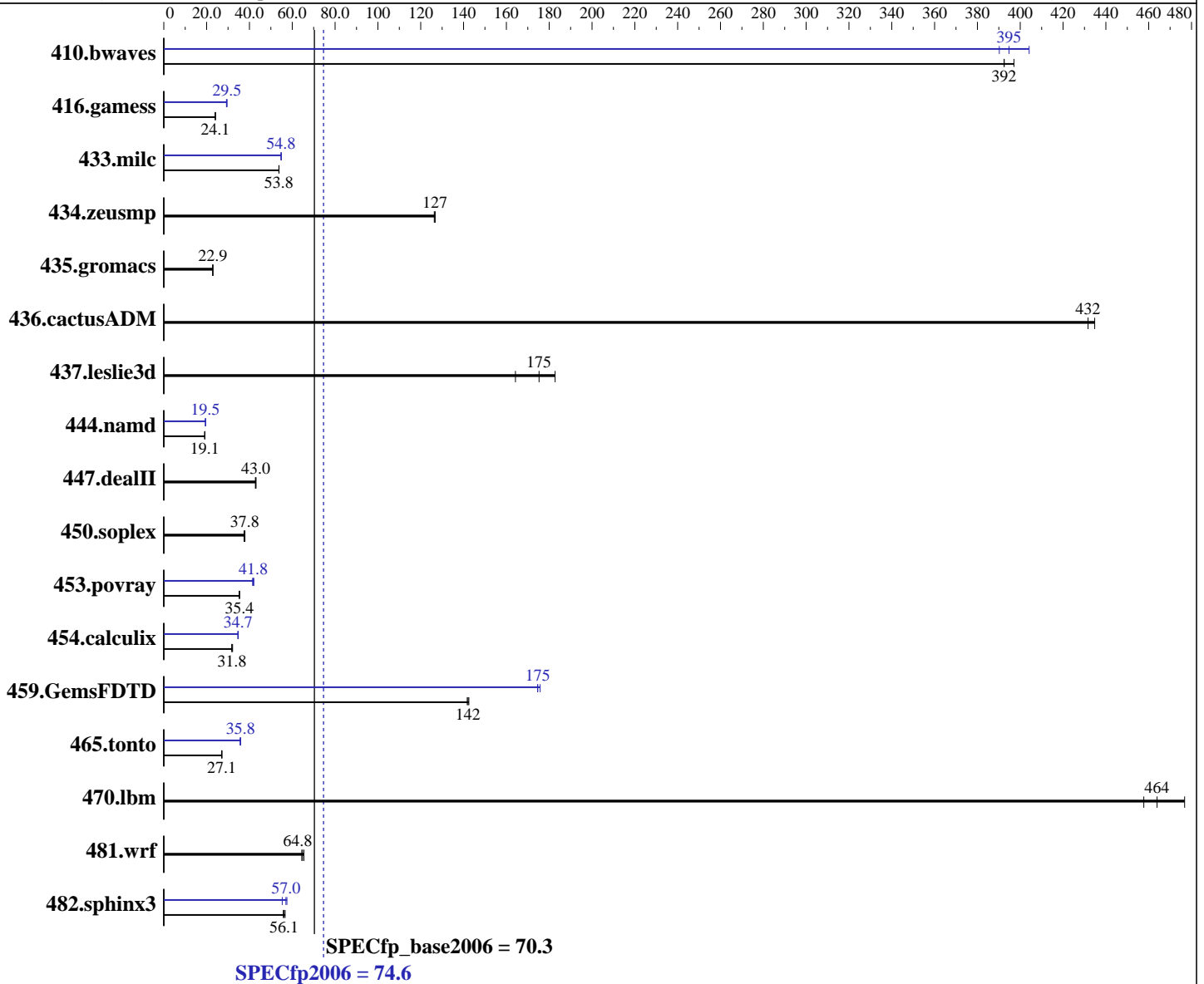
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Apr-2012

Hardware Availability: May-2012

Software Availability: Dec-2011



### Hardware

CPU Name: Intel Xeon E5-2650  
 CPU Characteristics: Intel Turbo Boost Technology up to 2.80 GHz  
 CPU MHz: 2000  
 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: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
Disk Subsystem: 1 x 300 GB SAS, 10000 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    | <b>34.6</b> | <b>392</b>  | 34.2        | 397         | 34.6        | 392         | 33.6       | 404         | 34.8        | 390         | <b>34.4</b> | <b>395</b>  |
| 416.gamess    | 815         | 24.0        | <b>814</b>  | <b>24.1</b> | 812         | 24.1        | 669        | 29.3        | 664         | 29.5        | <b>664</b>  | <b>29.5</b> |
| 433.milc      | 171         | 53.8        | 171         | 53.8        | <b>171</b>  | <b>53.8</b> | 168        | 54.7        | <b>168</b>  | <b>54.8</b> | 167         | 54.9        |
| 434.zeusmp    | 71.8        | 127         | <b>71.8</b> | <b>127</b>  | 72.0        | 126         | 71.8       | 127         | <b>71.8</b> | <b>127</b>  | 72.0        | 126         |
| 435.gromacs   | 311         | 22.9        | 312         | 22.9        | <b>312</b>  | <b>22.9</b> | 311        | 22.9        | 312         | 22.9        | <b>312</b>  | <b>22.9</b> |
| 436.cactusADM | 27.7        | 432         | 27.5        | 435         | <b>27.7</b> | <b>432</b>  | 27.7       | 432         | 27.5        | 435         | <b>27.7</b> | <b>432</b>  |
| 437.leslie3d  | 57.2        | 164         | 51.4        | 183         | <b>53.6</b> | <b>175</b>  | 57.2       | 164         | 51.4        | 183         | <b>53.6</b> | <b>175</b>  |
| 444.namd      | <b>419</b>  | <b>19.1</b> | 419         | 19.1        | 419         | 19.1        | 412        | 19.5        | <b>412</b>  | <b>19.5</b> | 412         | 19.5        |
| 447.dealII    | 266         | 43.0        | <b>266</b>  | <b>43.0</b> | 267         | 42.8        | 266        | 43.0        | <b>266</b>  | <b>43.0</b> | 267         | 42.8        |
| 450.soplex    | <b>221</b>  | <b>37.8</b> | 222         | 37.5        | 220         | 37.9        | <b>221</b> | <b>37.8</b> | 222         | 37.5        | 220         | 37.9        |
| 453.povray    | <b>150</b>  | <b>35.4</b> | 150         | 35.4        | 151         | 35.2        | <b>127</b> | <b>41.8</b> | 128         | 41.5        | 126         | 42.1        |
| 454.calculix  | 260         | 31.8        | 257         | 32.1        | <b>259</b>  | <b>31.8</b> | 239        | 34.6        | 237         | 34.8        | <b>238</b>  | <b>34.7</b> |
| 459.GemsFDTD  | 74.9        | 142         | <b>74.7</b> | <b>142</b>  | 74.5        | 142         | 60.8       | 175         | <b>60.8</b> | <b>175</b>  | 60.4        | 176         |
| 465.tonto     | 363         | 27.1        | <b>363</b>  | <b>27.1</b> | 363         | 27.1        | 274        | 35.9        | 276         | 35.6        | <b>275</b>  | <b>35.8</b> |
| 470.lbm       | 30.0        | 458         | 28.8        | 477         | <b>29.6</b> | <b>464</b>  | 30.0       | 458         | 28.8        | 477         | <b>29.6</b> | <b>464</b>  |
| 481.wrf       | <b>172</b>  | <b>64.8</b> | 173         | 64.5        | 171         | 65.4        | <b>172</b> | <b>64.8</b> | 173         | 64.5        | 171         | 65.4        |
| 482.sphinx3   | 349         | 55.8        | <b>347</b>  | <b>56.1</b> | 344         | 56.7        | <b>342</b> | <b>57.0</b> | 352         | 55.3        | 339         | 57.5        |

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 blacktip-pete Sun Apr 8 10:32:46 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>

From /proc/cpuinfo

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### Platform Notes (Continued)

```
model name : Genuine Intel(R) CPU @ 2.00GHz
  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:      132136204 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 blacktip-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 Apr 6 12:39
```

```
SPEC is set to: /cpu2006.1.2
Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/mapper/vg_blacktippete-lv_root
                ext4      265G     96G  157G  38% /
```

```
Additional information from dmidecode:
Memory:
  4x Hynix HMT31GR7CFR4C-PB 8 GB 1600 MHz 2 rank
  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 = "/cpu2006.1.2/libs/32:/cpu2006.1.2/libs/64"  
OMP\_NUM\_THREADS = "16"

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: -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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