# SPEC® CFP2006 Result

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## IBM Corporation

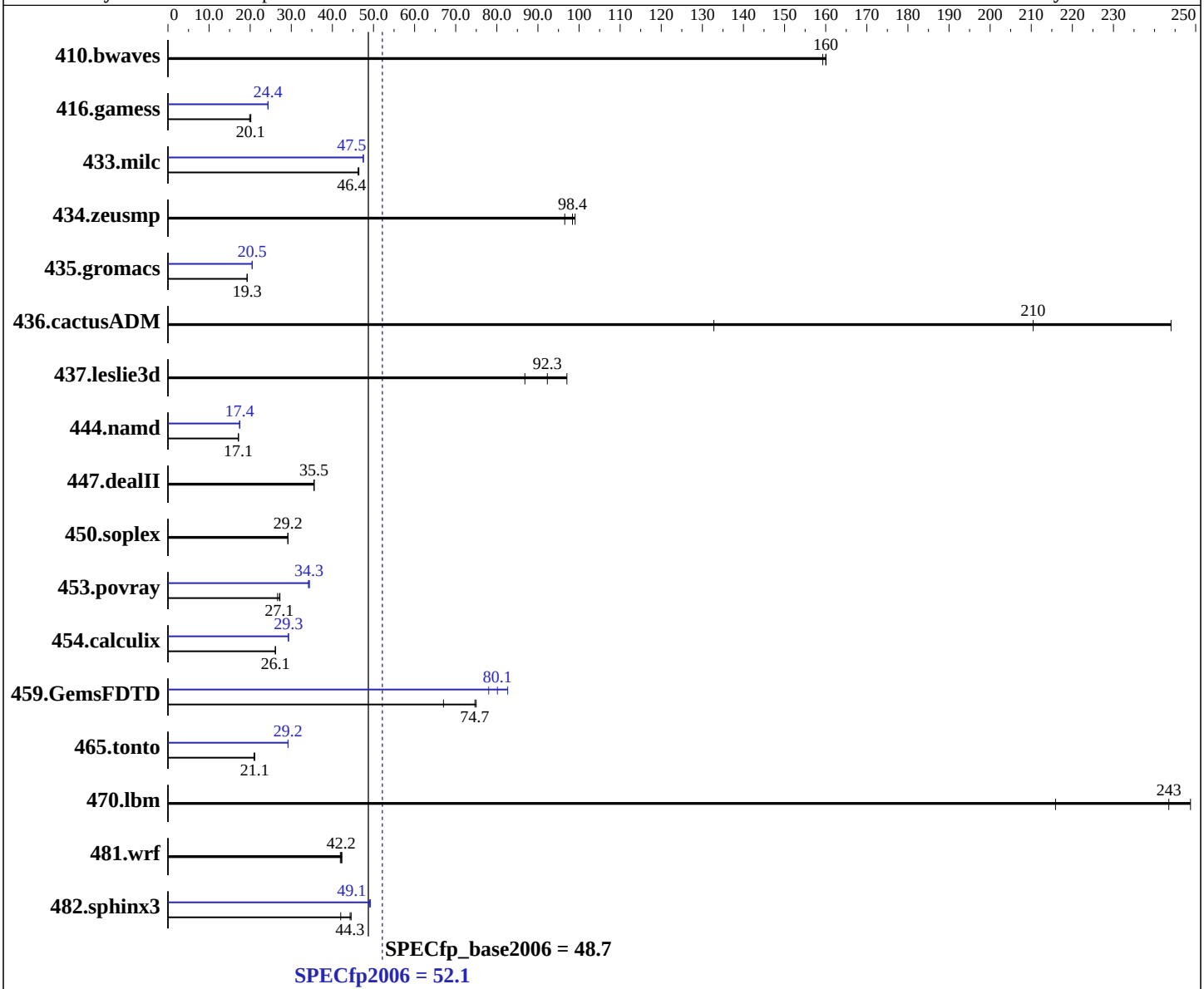
## IBM System x3400 M3 (Intel Xeon E5649)

SPECfp®2006 = 52.1

SPECfp_base2006 = 48.7

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

**Test date:** Mar-2011
**Hardware Availability:** Feb-2011
**Software Availability:** Jan-2011




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5649 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.93 GHz |
| CPU MHz: | 2533 |
| 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: | SUSE Linux Enterprise Server 11 SP1 (x86_64), Kernel 2.6.32.12-0.7-default |
| Compiler: | Intel C++ and Fortran Intel 64 Compiler XE for applications running on Intel 64 Version 12.0 Update 3 |
| Auto Parallel: | Yes |
| File System: | ext3 |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |

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L3 Cache: 12 MB I+D on chip per chip
Other Cache: None
Memory: 96 GB (12 x 8 GB 2Rx4 PC3-10600R-9, ECC)
Disk Subsystem: 1 x 146 GB SAS, 15000 RPM
Other Hardware: None

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 | 84.9 | 160 | **84.9** | **160** | 85.3 | 159 | 84.9 | 160 | **84.9** | **160** | 85.3 | 159 |
| 416.gamess | 985 | 19.9 | 971 | 20.2 | **975** | **20.1** | 803 | 24.4 | **804** | **24.4** | 805 | 24.3 |
| 433.milc | 198 | 46.2 | 198 | 46.4 | **198** | **46.4** | 193 | 47.5 | 193 | 47.5 | **193** | **47.5** |
| 434.zeusmp | 94.3 | 96.5 | **92.5** | **98.4** | 91.9 | 99.0 | 94.3 | 96.5 | **92.5** | **98.4** | 91.9 | 99.0 |
| 435.gromacs | 370 | 19.3 | 371 | 19.3 | **370** | **19.3** | **348** | **20.5** | 349 | 20.5 | 348 | 20.5 |
| 436.cactusADM | **56.8** | **210** | 90.0 | 133 | 49.0 | 244 | **56.8** | **210** | 90.0 | 133 | 49.0 | 244 |
| 437.leslie3d | 108 | 86.8 | 96.9 | 97.0 | **102** | **92.3** | 108 | 86.8 | 96.9 | 97.0 | **102** | **92.3** |
| 444.namd | **468** | **17.1** | 468 | 17.1 | 468 | 17.1 | 460 | 17.4 | 459 | 17.5 | **460** | **17.4** |
| 447.dealII | 322 | 35.6 | 322 | 35.5 | **322** | **35.5** | 322 | 35.6 | 322 | 35.5 | **322** | **35.5** |
| 450.soplex | 286 | 29.2 | 286 | 29.2 | **286** | **29.2** | 286 | 29.2 | 286 | 29.2 | **286** | **29.2** |
| 453.povray | 195 | 27.2 | 200 | 26.6 | **196** | **27.1** | 156 | 34.2 | **155** | **34.3** | 155 | 34.4 |
| 454.calculix | **316** | **26.1** | 315 | 26.2 | 316 | 26.1 | **282** | **29.3** | 281 | 29.3 | 282 | 29.3 |
| 459.GemsFDTD | **142** | **74.7** | 158 | 67.0 | 141 | 75.0 | 136 | 78.0 | 128 | 82.6 | **132** | **80.1** |
| 465.tonto | **467** | **21.1** | 466 | 21.1 | 470 | 20.9 | 337 | 29.2 | 337 | 29.2 | **337** | **29.2** |
| 470.lbm | 63.6 | 216 | 55.2 | 249 | **56.4** | **243** | 63.6 | 216 | 55.2 | 249 | **56.4** | **243** |
| 481.wrf | 264 | 42.3 | 266 | 41.9 | **265** | **42.2** | 264 | 42.3 | 266 | 41.9 | **265** | **42.2** |
| 482.sphinx3 | 437 | 44.6 | **440** | **44.3** | 464 | 42.0 | **397** | **49.1** | 398 | 48.9 | 396 | 49.3 |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Operating System Notes

```
'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
'mount -t hugetlbfs nodev /mnt/hugepages' was used to enable large pages
echo 900 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
```

## Platform Notes

```
Turbo Mode enabled in BIOS
Turbo Boost set to Traditional in BIOS
Power C-State enabled in BIOS
Data Reuse disabled in BIOS
Demand Scrub disabled in BIOS
```

## General Notes

```
OMP_NUM_THREADS set to number of cores
Binaries compiled on RHEL5.5
```

## 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:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch
-ansi-alias
```

C++ benchmarks:
```
-xSSE4.2 -ipo -O3 -no-prec-div -static -opt-prefetch -ansi-alias
```

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## Base Optimization Flags (Continued)

Fortran benchmarks:
`-xSSE4.2 -ipo -O3 -no-prec-div -static -parallel -opt-prefetch`

Benchmarks using both Fortran and C:
`-xSSE4.2 -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: `-xSSE4.2`(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: `-xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -ansi-alias -parallel`

C++ benchmarks:

444.namd: `-xSSE4.2`(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.dealII: basepeak = yes

450.soplex: basepeak = yes

453.povray: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -ansi-alias
-B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xSSE4.2(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: -xSSE4.2(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
-B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT

465.tonto: -xSSE4.2(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
-B /usr/share/libhugetlbfs/ -Wl,-melf_x86_64 -Wl,-hugetlbfs-link=BDT

Benchmarks using both Fortran and C:

435.gromacs: -xSSE4.2(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

436.cactusADM: basepeak = yes

454.calculix: -xSSE4.2 -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-ic12.0-linux64-revB.html
http://www.spec.org/cpu2006/flags/IBM-platform-linux64-revA.20110420.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.xml
http://www.spec.org/cpu2006/flags/IBM-platform-linux64-revA.20110420.xml

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