# SPEC® CFP2006 Result
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## IBM Corporation

IBM BladeCenter HX5 (Intel Xeon E7-2870)

$SPECfp®\_rate2006 = 369$
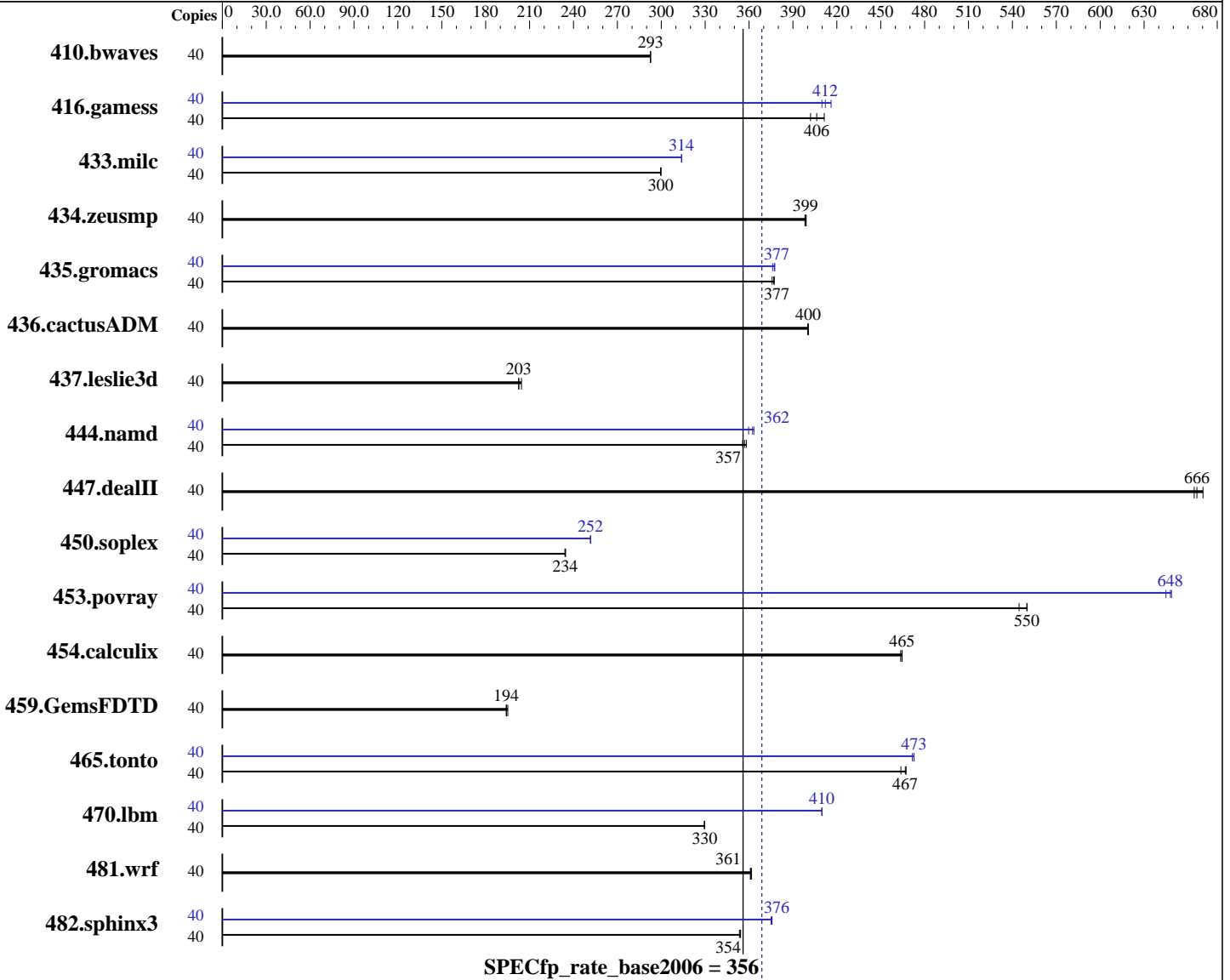
$SPECfp\_rate\_base2006 = 356$

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

**Test date:** Feb-2011
**Hardware Availability:** May-2011
**Software Availability:** Apr-2011



**Copies**

| Benchmark | Copies | Result |
|---|---|---|
| 410.bwaves | 40 | 293 |
| 416.gamess | 40 / 40 | 412 / 406 |
| 433.milc | 40 / 40 | 314 / 300 |
| 434.zeusmp | 40 | 399 |
| 435.gromacs | 40 / 40 | 377 / 377 |
| 436.cactusADM | 40 | 400 |
| 437.leslie3d | 40 | 203 |
| 444.namd | 40 / 40 | 362 / 357 |
| 447.dealII | 40 | 666 |
| 450.soplex | 40 / 40 | 252 / 234 |
| 453.povray | 40 / 40 | 648 / 550 |
| 454.calculix | 40 | 465 |
| 459.GemsFDTD | 40 | 194 |
| 465.tonto | 40 / 40 | 473 / 467 |
| 470.lbm | 40 / 40 | 410 / 330 |
| 481.wrf | 40 | 361 |
| 482.sphinx3 | 40 / 40 | 376 / 354 |

SPECfp_rate_base2006 = 356

SPECfp_rate2006 = 369

## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E7-2870 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.80 GHz |
| CPU MHz: | 2400 |
| FPU: | Integrated |
| CPU(s) enabled: | 20 cores, 2 chips, 10 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 |

*Continued on next page*

## 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 12.0.1.116 Build 20101116 |
| Auto Parallel: | No |
| File System: | ext3 |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |

*Continued on next page*

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| | |
|---|---|
| L3 Cache: | 30 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 128 GB (16 x 8 GB 4Rx8 PC3-8500R-7, ECC) |
| Disk Subsystem: | 2 x 50 GB SSD, RAID 0 |
| Other Hardware: | None |

| | |
|---|---|
| Peak Pointers: | 32/64-bit |
| Other Software: | None |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 40 | 1858 | 293 | 1857 | 293 | **1857** | **293** | 40 | 1858 | 293 | 1857 | 293 | **1857** | **293** |
| 416.gamess | 40 | 1948 | 402 | 1904 | 411 | **1928** | **406** | 40 | 1882 | 416 | 1911 | 410 | **1900** | **412** |
| 433.milc | 40 | 1226 | 300 | 1225 | 300 | **1226** | **300** | 40 | 1169 | 314 | 1170 | 314 | **1170** | **314** |
| 434.zeusmp | 40 | 914 | 398 | 912 | 399 | **913** | **399** | 40 | 914 | 398 | 912 | 399 | **913** | **399** |
| 435.gromacs | 40 | 757 | 377 | 760 | 376 | **758** | **377** | 40 | 759 | 376 | **757** | **377** | 756 | 378 |
| 436.cactusADM | 40 | 1194 | 400 | **1194** | **400** | 1195 | 400 | 40 | 1194 | 400 | **1194** | **400** | 1195 | 400 |
| 437.leslie3d | 40 | **1855** | **203** | 1856 | 203 | 1839 | 204 | 40 | **1855** | **203** | 1856 | 203 | 1839 | 204 |
| 444.namd | 40 | 902 | 356 | 896 | 358 | **899** | **357** | 40 | 892 | 360 | **885** | **362** | 883 | 363 |
| 447.dealII | 40 | 689 | 664 | **687** | **666** | 683 | 670 | 40 | 689 | 664 | **687** | **666** | 683 | 670 |
| 450.soplex | 40 | 1422 | 235 | **1423** | **234** | 1425 | 234 | 40 | 1325 | 252 | 1326 | 252 | **1325** | **252** |
| 453.povray | 40 | **387** | **550** | 391 | 545 | 387 | 550 | 40 | 330 | 645 | **328** | **648** | 328 | 649 |
| 454.calculix | 40 | 710 | 465 | **710** | **465** | 712 | 464 | 40 | 710 | 465 | **710** | **465** | 712 | 464 |
| 459.GemsFDTD | 40 | 2186 | 194 | **2186** | **194** | 2175 | 195 | 40 | 2186 | 194 | **2186** | **194** | 2175 | 195 |
| 465.tonto | 40 | 849 | 464 | **843** | **467** | 842 | 467 | 40 | **833** | **473** | 832 | 473 | 835 | 472 |
| 470.lbm | 40 | 1668 | 329 | **1667** | **330** | 1667 | 330 | 40 | 1341 | 410 | 1341 | 410 | **1341** | **410** |
| 481.wrf | 40 | 1238 | 361 | **1238** | **361** | 1235 | 362 | 40 | 1238 | 361 | **1238** | **361** | 1235 | 362 |
| 482.sphinx3 | 40 | 2201 | 354 | **2202** | **354** | 2206 | 353 | 40 | 2075 | 376 | 2079 | 375 | **2075** | **376** |

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

## Submit Notes

```
The config file option 'submit' was used.
 numactl was used to bind copies to the cores
```

## Operating System Notes

```
'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
echo 1 > /proc/sys/vm/zone_reclaim_mode
'mount -t hugetlbfs nodev /mnt/hugepages' was used to enable large pages
echo 18000 > /proc/sys/vm/nr_hugepages
export HUGETLB_MORECORE=yes
export LD_PRELOAD=/usr/lib64/libhugetlbfs.so
```

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**Test date:** Feb-2011
**Hardware Availability:** May-2011
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## Platform Notes

```
   BIOS Settings:
   Turbo Boost Power Optimization set to Traditional
```

## General Notes

```
   Binaries were 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 -ansi-alias

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## Base Optimization Flags (Continued)

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

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

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

## Peak Compiler Invocation

C benchmarks (except as noted below):
```
icc    -m64
```

482.sphinx3: `icc -m32`

C++ benchmarks (except as noted below):
```
icpc   -m64
```

450.soplex: `icpc -m32`

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
icc    -m64 ifort -m64
```

## Peak 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
       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
```

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# 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

> 470.lbm: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3
> -ansi-alias -opt-prefetch -static -auto-ilp32

> 482.sphinx3: -xSSE4.2 -ipo -O3 -no-prec-div -unroll2

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

> 447.dealII: basepeak = yes

> 450.soplex: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)
> -no-prec-div(pass 2) -prof-use(pass 2) -opt-malloc-options=3
> -B /usr/share/libhugetlbfs/ -Wl,-hugetlbfs-link=BDT

> 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: basepeak = yes

> 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) -unroll4 -auto
> -inline-calloc -opt-malloc-options=3
> -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) -opt-prefetch
> -static -auto-ilp32

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# Peak Optimization Flags (Continued)

436.cactusADM: basepeak = yes

454.calculix: basepeak = yes

481.wrf: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/IBM-platform-linux64-revA.html
http://www.spec.org/cpu2006/flags/Intel-ic12.0-linux64-revB.html

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

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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