# SPEC® CFP2006 Result

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## IBM Corporation

IBM System x3850 X6
(Intel Xeon E7-4820 v2, 2.00 GHz)
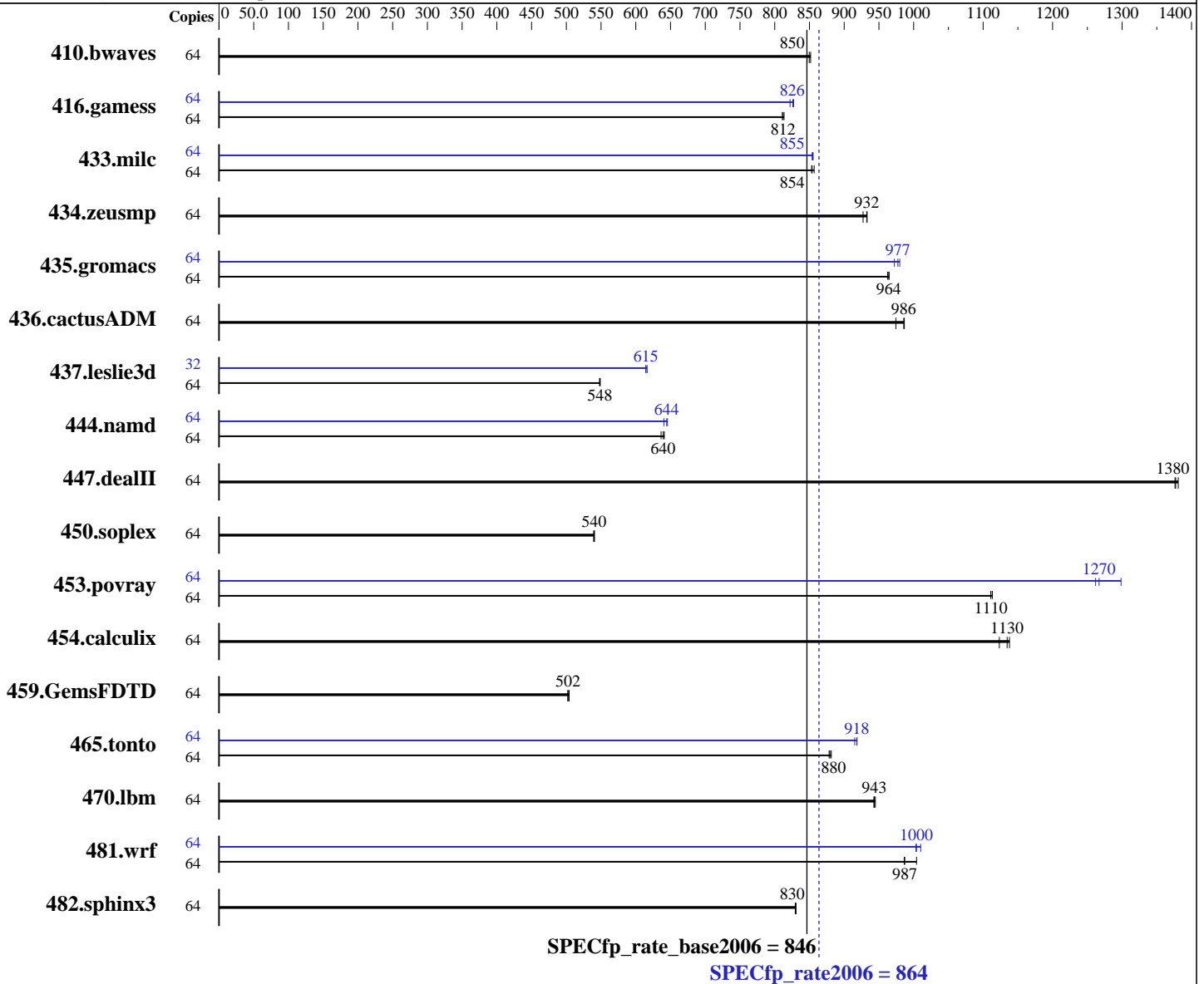
$SPECfp®\_rate2006 = 864$

$SPECfp\_rate\_base2006 = 846$

| | |
|---|---|
| **CPU2006 license:** 11 | **Test date:** Jul-2014 |
| **Test sponsor:** IBM Corporation | **Hardware Availability:** Mar-2014 |
| **Tested by:** IBM Corporation | **Software Availability:** Nov-2013 |



**410.bwaves** — Copies 64 — 850

**416.gamess** — Copies 64 — 826; Copies 64 — 812

**433.milc** — Copies 64 — 855; Copies 64 — 854

**434.zeusmp** — Copies 64 — 932

**435.gromacs** — Copies 64 — 977; Copies 64 — 964

**436.cactusADM** — Copies 64 — 986

**437.leslie3d** — Copies 32 — 615; Copies 64 — 548

**444.namd** — Copies 64 — 644; Copies 64 — 640

**447.dealII** — Copies 64 — 1380

**450.soplex** — Copies 64 — 540

**453.povray** — Copies 64 — 1270; Copies 64 — 1110

**454.calculix** — Copies 64 — 1130

**459.GemsFDTD** — Copies 64 — 502

**465.tonto** — Copies 64 — 918; Copies 64 — 880

**470.lbm** — Copies 64 — 943

**481.wrf** — Copies 64 — 1000; Copies 64 — 987

**482.sphinx3** — Copies 64 — 830

SPECfp_rate_base2006 = 846

SPECfp_rate2006 = 864

## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E7-4820 v2 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.50 GHz |
| CPU MHz: | 2000 |
| FPU: | Integrated |
| CPU(s) enabled: | 32 cores, 4 chips, 8 cores/chip, 2 threads/core |
| CPU(s) orderable: | 2,4 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: | Red Hat Enterprise Linux Server release 6.5 (Santiago) 2.6.32-431.el6.x86_64 |
| Compiler: | C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux; Fortran: Version 14.0.0.080 of Intel Fortran Studio XE for Linux |
| Auto Parallel: | No |
| File System: | ext4 |

**Continued on next page**

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$SPECfp\_rate2006 =$ **864**

$SPECfp\_rate\_base2006 =$ **846**

| | |
|---|---|
| **CPU2006 license:** 11 | **Test date:** Jul-2014 |
| **Test sponsor:** IBM Corporation | **Hardware Availability:** Mar-2014 |
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| | | | |
|---|---|---|---|
| L3 Cache: | 16 MB I+D on chip per chip | System State: | Run level 3 (multi-user) |
| Other Cache: | None | Base Pointers: | 32/64-bit |
| Memory: | 1 TB (64 x 16 GB 2Rx4 PC3L-12800R-11, ECC, running at 1067 MHz) | Peak Pointers: | 32/64-bit |
| | | Other Software: | None |
| Disk Subsystem: | 1 x 400 GB SATA, SSD | | |
| Other Hardware: | None | | |

## Results Table

| Benchmark | Base | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 410.bwaves | 64 | 1021 | 852 | **1024** | **850** | 1027 | 847 | 64 | 1021 | 852 | **1024** | **850** | 1027 | 847 |
| 416.gamess | 64 | 1545 | 811 | 1540 | 813 | **1543** | **812** | 64 | 1515 | 827 | 1524 | 822 | **1517** | **826** |
| 433.milc | 64 | 689 | 853 | **688** | **854** | 686 | 857 | 64 | 687 | 855 | 688 | 854 | **687** | **855** |
| 434.zeusmp | 64 | 628 | 927 | **625** | **932** | 624 | 933 | 64 | 628 | 927 | **625** | **932** | 624 | 933 |
| 435.gromacs | 64 | 475 | 963 | **474** | **964** | 474 | 965 | 64 | **468** | **977** | 466 | 980 | 470 | 972 |
| 436.cactusADM | 64 | 785 | 974 | **776** | **986** | 775 | 987 | 64 | 785 | 974 | **776** | **986** | 775 | 987 |
| 437.leslie3d | 64 | 1098 | 548 | 1096 | 549 | **1097** | **548** | 32 | 490 | 615 | **489** | **615** | 488 | 616 |
| 444.namd | 64 | 801 | 641 | 807 | 636 | **803** | **640** | 64 | 801 | 641 | 795 | 646 | **796** | **644** |
| 447.dealII | 64 | 532 | 1380 | 530 | 1380 | **532** | **1380** | 64 | 532 | 1380 | 530 | 1380 | **532** | **1380** |
| 450.soplex | 64 | 990 | 539 | **988** | **540** | 988 | 540 | 64 | 990 | 539 | **988** | **540** | 988 | 540 |
| 453.povray | 64 | 306 | 1110 | 306 | 1110 | **306** | **1110** | 64 | **269** | **1270** | 270 | 1260 | 262 | 1300 |
| 454.calculix | 64 | 470 | 1120 | 464 | 1140 | **465** | **1130** | 64 | 470 | 1120 | 464 | 1140 | **465** | **1130** |
| 459.GemsFDTD | 64 | 1352 | 502 | 1347 | 504 | **1351** | **502** | 64 | 1352 | 502 | 1347 | 504 | **1351** | **502** |
| 465.tonto | 64 | 717 | 878 | 714 | 881 | **716** | **880** | 64 | **686** | **918** | 686 | 918 | 688 | 915 |
| 470.lbm | 64 | **932** | **943** | 931 | 945 | 933 | 943 | 64 | **932** | **943** | 931 | 945 | 933 | 943 |
| 481.wrf | 64 | 725 | 986 | **724** | **987** | 712 | 1000 | 64 | **712** | **1000** | 708 | 1010 | 713 | 1000 |
| 482.sphinx3 | 64 | 1504 | 830 | **1503** | **830** | 1502 | 831 | 64 | 1504 | 830 | **1503** | **830** | 1502 | 831 |

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

## Submit Notes

    The numactl mechanism was used to bind copies to processors. The config file option 'submit'
    was used to generate numactl commands to bind each copy to a specific processor.
    For details, please see the config file.

## Operating System Notes

    Stack size set to unlimited using "ulimit -s unlimited"

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IBM System x3850 X6
(Intel Xeon E7-4820 v2, 2.00 GHz)

$SPECfp\_rate2006 =$ 864

$SPECfp\_rate\_base2006 =$ 846

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

**Test date:** Jul-2014
**Hardware Availability:** Mar-2014
**Software Availability:** Nov-2013

## Platform Notes

```
Operating Mode set to Maximum Perfomance in BIOS
Sysinfo program /cpu2006.1.2_14.0_aug2013/config/sysinfo.rev6818
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191
running on Larry-Andromeda Sat Jul 12 05:04:43 2014

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
   model name : Intel(R) Xeon(R) CPU E7-4820 v2 @ 2.00GHz
      4 "physical id"s (chips)
      64 "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
      physical 2: cores 0 1 2 3 4 5 6 7
      physical 3: cores 0 1 2 3 4 5 6 7
   cache size : 16384 KB

From /proc/meminfo
   MemTotal:       1058474560 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

/usr/bin/lsb_release -d
   Red Hat Enterprise Linux Server release 6.5 (Santiago)

From /etc/*release* /etc/*version*
   redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
   system-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server

uname -a:
   Linux Larry-Andromeda 2.6.32-431.el6.x86_64 #1 SMP Sun Nov 10 22:19:54 EST
   2013 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 11 13:29

SPEC is set to: /cpu2006.1.2_14.0_aug2013
   Filesystem                         Type  Size  Used Avail Use% Mounted on
   /dev/mapper/vg_larryandromed-lv_root ext4  357G  233G  106G  69% /

Additional information from dmidecode:
  BIOS IBM -[A8E107JUS-1.00]- 05/02/2014
  Memory:
  32x NO DIMM Unknown
  64x Samsung M393B2G70QH0-YK0 16 GB 1067 MHz 2 rank
```

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$SPECfp\_rate2006 =$    864

$SPECfp\_rate\_base2006 =$   846

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

**Test date:** Jul-2014
**Hardware Availability:** Mar-2014
**Software Availability:** Nov-2013

## Platform Notes (Continued)

(End of data from sysinfo program)

## General Notes

Environment variables set by runspec before the start of the run:
LD_LIBRARY_PATH = "/cpu2006.1.2_14.0_aug2013/libs/32:/cpu2006.1.2_14.0_aug2013/libs/64:/cpu2006.1.2_14.0_aug2013/sh"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB
memory using RedHat EL 6.4
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/redhat_transparent_hugepage/enabled
Filesystem page cache cleared with:
echo 1>        /proc/sys/vm/drop_caches
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>

## 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

Continued on next page

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$\text{SPECfp\_rate2006} =$ 864

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| | |
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## Base Portability Flags (Continued)

```
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 -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

C++ benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch
```

Benchmarks using both Fortran and C:
```
-xAVX -ipo -O3 -no-prec-div -opt-prefetch -auto-p32 -ansi-alias
-opt-mem-layout-trans=3
```

## 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
```

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**Hardware Availability:** Mar-2014
**Software Availability:**  Nov-2013

# 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) -opt-mem-layout-trans=3(pass 2)`
> `-prof-use(pass 2) -auto-ilp32`

> 470.lbm: `basepeak = yes`

> 482.sphinx3: `basepeak = yes`

C++ benchmarks:

> 444.namd: `-xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)`
> `-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)`
> `-prof-use(pass 2) -fno-alias -auto-ilp32`

> 447.dealII: `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) -opt-mem-layout-trans=3(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-`

> 434.zeusmp: `basepeak = yes`

> 437.leslie3d: `-xAVX -ipo -O3 -no-prec-div -opt-prefetch`

> 459.GemsFDTD: `basepeak = yes`

> 465.tonto: `-xAVX(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`

Benchmarks using both Fortran and C:

> 435.gromacs: `-xAVX(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2)`
> `-no-prec-div(pass 2) -opt-mem-layout-trans=3(pass 2)`
> `-prof-use(pass 2) -opt-prefetch -auto-ilp32`

> 436.cactusADM: `basepeak = yes`

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# Peak Optimization Flags (Continued)

454.calculix: basepeak = yes

481.wrf: -xAVX -ipo -O3 -no-prec-div -auto-ilp32

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/IBM-Platform-Flags-V1.2-IVB-A.xml

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

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