



# SPEC<sup>®</sup> CFP2006 Result

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## IBM Corporation

IBM Flex System x240  
(Intel Xeon E5-2680 v2, 2.80 GHz)

**SPECfp<sup>®</sup>\_rate2006 = 634**

**SPECfp\_rate\_base2006 = 618**

CPU2006 license: 11

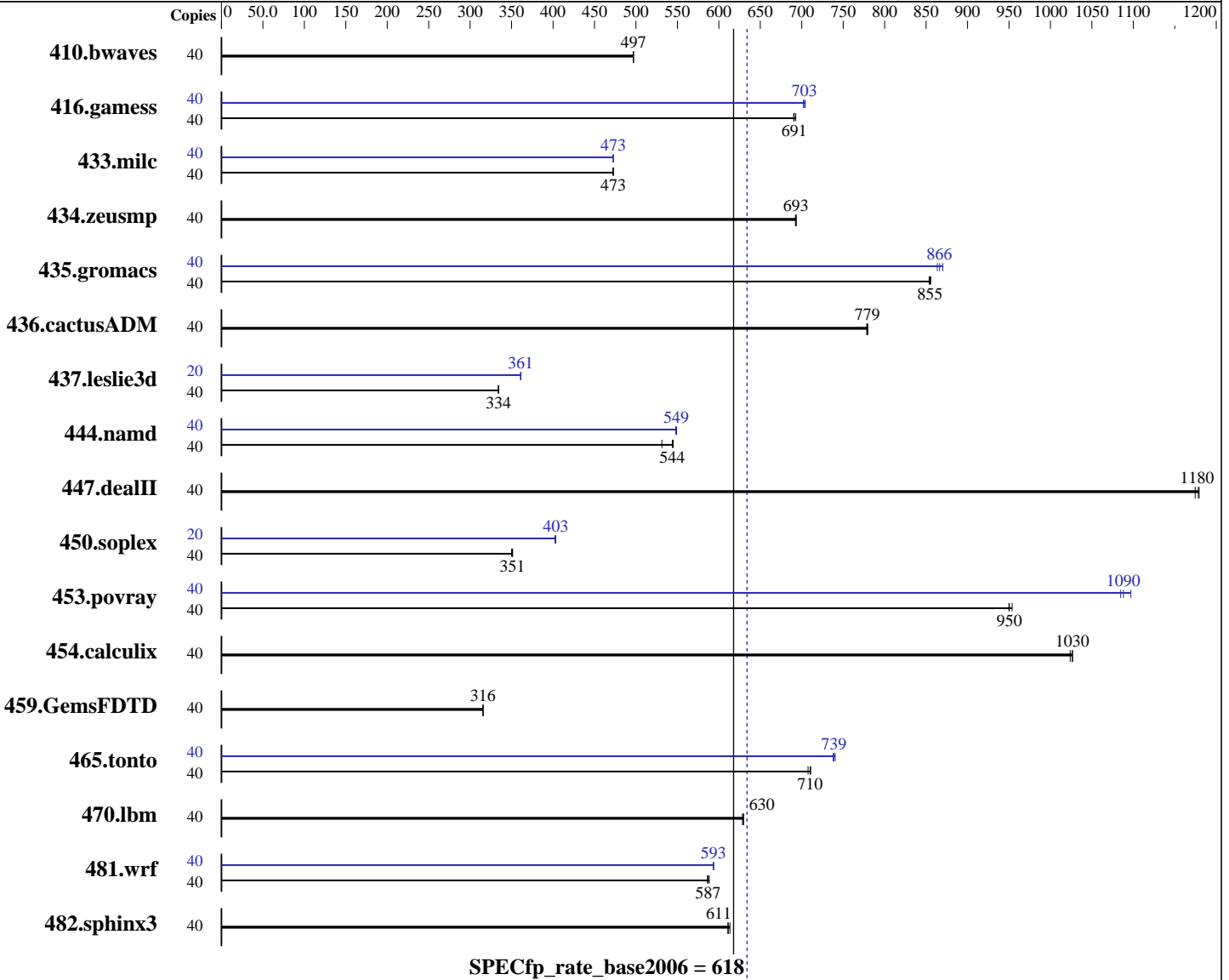
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Jun-2014

Hardware Availability: Dec-2013

Software Availability: Nov-2013



### Hardware

CPU Name: Intel Xeon E5-2680 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.60 GHz  
 CPU MHz: 2800  
 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

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### 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

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L3 Cache: 25 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx4 PC3-14900R-13, ECC)  
Disk Subsystem: 1 x 300 GB SAS, 10000 RPM  
Other Hardware: None

System State: Run level 3 (multi-user)  
Base Pointers: 32/64-bit  
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     | 1094        | 497        | <b>1094</b> | <b>497</b> | 1094       | 497         | 40     | 1094        | 497         | <b>1094</b> | <b>497</b> | 1094       | 497         |
| 416.gamess    | 40     | <b>1133</b> | <b>691</b> | 1135        | 690        | 1130       | 693         | 40     | <b>1114</b> | <b>703</b>  | 1116        | 702        | 1112       | 704         |
| 433.milc      | 40     | 777         | 473        | <b>777</b>  | <b>473</b> | 777        | 473         | 40     | <b>777</b>  | <b>473</b>  | 777         | 473        | 777        | 473         |
| 434.zeusmp    | 40     | 526         | 692        | 525         | 693        | <b>525</b> | <b>693</b>  | 40     | 526         | 692         | 525         | 693        | <b>525</b> | <b>693</b>  |
| 435.gromacs   | 40     | 334         | 856        | <b>334</b>  | <b>855</b> | 335        | 854         | 40     | 331         | 864         | <b>330</b>  | <b>866</b> | 328        | 870         |
| 436.cactusADM | 40     | 613         | 780        | <b>614</b>  | <b>779</b> | 614        | 778         | 40     | 613         | 780         | <b>614</b>  | <b>779</b> | 614        | 778         |
| 437.leslie3d  | 40     | <b>1125</b> | <b>334</b> | 1126        | 334        | 1125       | 334         | 20     | 521         | 361         | 520         | 361        | <b>521</b> | <b>361</b>  |
| 444.namd      | 40     | 589         | 545        | 604         | 531        | <b>590</b> | <b>544</b>  | 40     | <b>585</b>  | <b>549</b>  | 584         | 549        | 585        | 548         |
| 447.dealII    | 40     | 390         | 1170       | 388         | 1180       | <b>388</b> | <b>1180</b> | 40     | 390         | 1170        | 388         | 1180       | <b>388</b> | <b>1180</b> |
| 450.soplex    | 40     | <b>951</b>  | <b>351</b> | 953         | 350        | 950        | 351         | 20     | <b>414</b>  | <b>403</b>  | 414         | 403        | 415        | 402         |
| 453.povray    | 40     | 224         | 950        | <b>224</b>  | <b>950</b> | 223        | 954         | 40     | <b>196</b>  | <b>1090</b> | 194         | 1100       | 196        | 1080        |
| 454.calculix  | 40     | 322         | 1020       | 321         | 1030       | <b>322</b> | <b>1030</b> | 40     | 322         | 1020        | 321         | 1030       | <b>322</b> | <b>1030</b> |
| 459.GemsFDTD  | 40     | <b>1345</b> | <b>316</b> | 1345        | 315        | 1345       | 316         | 40     | <b>1345</b> | <b>316</b>  | 1345        | 315        | 1345       | 316         |
| 465.tonto     | 40     | <b>554</b>  | <b>710</b> | 556         | 708        | 554        | 711         | 40     | 532         | 740         | <b>533</b>  | <b>739</b> | 533        | 738         |
| 470.lbm       | 40     | 873         | 630        | <b>873</b>  | <b>630</b> | 874        | 629         | 40     | 873         | 630         | <b>873</b>  | <b>630</b> | 874        | 629         |
| 481.wrf       | 40     | 762         | 586        | <b>761</b>  | <b>587</b> | 759        | 589         | 40     | 753         | 593         | <b>753</b>  | <b>593</b> | 753        | 594         |
| 482.sphinx3   | 40     | 1276        | 611        | <b>1275</b> | <b>611</b> | 1271       | 613         | 40     | 1276        | 611         | <b>1275</b> | <b>611</b> | 1271       | 613         |

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"

## Platform Notes

Operating Mode set to Maximum Performance in BIOS  
Sysinfo program /cpu2006.1.2\_14.0\_updates/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191

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**Test date:** Jun-2014  
**Hardware Availability:** Dec-2013  
**Software Availability:** Nov-2013

## Platform Notes (Continued)

running on BT2-IVB Mon Jun 16 09:07:35 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 E5-2680 v2 @ 2.80GHz
 2 "physical id"s (chips)
 40 "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 : 10
  siblings  : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
cache size : 25600 KB
```

```
From /proc/meminfo
MemTotal:      264502276 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux Server release 6.4 (Santiago)
```

```
From /etc/*release* /etc/*version*
redhat-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release: Red Hat Enterprise Linux Server release 6.4 (Santiago)
system-release-cpe: cpe:/o:redhat:enterprise_linux:6server:ga:server
```

```
uname -a:
Linux BT2-IVB 2.6.32-358.el6.x86_64 #1 SMP Tue Jan 29 11:47:41 EST 2013
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Jun 15 21:48
```

```
SPEC is set to: /cpu2006.1.2_14.0_updates
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/mapper/vg_bt2ivb-lv_root
                ext4      265G   69G  183G  28% /
```

```
Additional information from dmidecode:
BIOS IBM -[B2E141AUS-1.50]- 05/08/2014
Memory:
16x Micron 36JSF2G72PZ-1G9E1 16 GB 1867 MHz 2 rank
8x Not Specified Not Specified
```

(End of data from sysinfo program)



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## General Notes

Environment variables set by runspec before the start of the run:

LD\_LIBRARY\_PATH = "/cpu2006.1.2\_14.0\_updates/libs/32:/cpu2006.1.2\_14.0\_updates/libs/64:/cpu2006.1.2\_14.0\_updates/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.deallI: -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



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## 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 (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

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## Peak 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

## 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.dealIII: basepeak = yes

450.soplex: -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-malloc-options=3

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

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## Peak Optimization Flags (Continued)

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

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>

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

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