



# SPEC® CFP2006 Result

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## IBM Corporation

IBM NeXtScale nx360 M4  
(Intel Xeon E5-2670 v2, 2.50 GHz)

SPECfp®\_rate2006 = 602

SPECfp\_rate\_base2006 = 587

CPU2006 license: 11

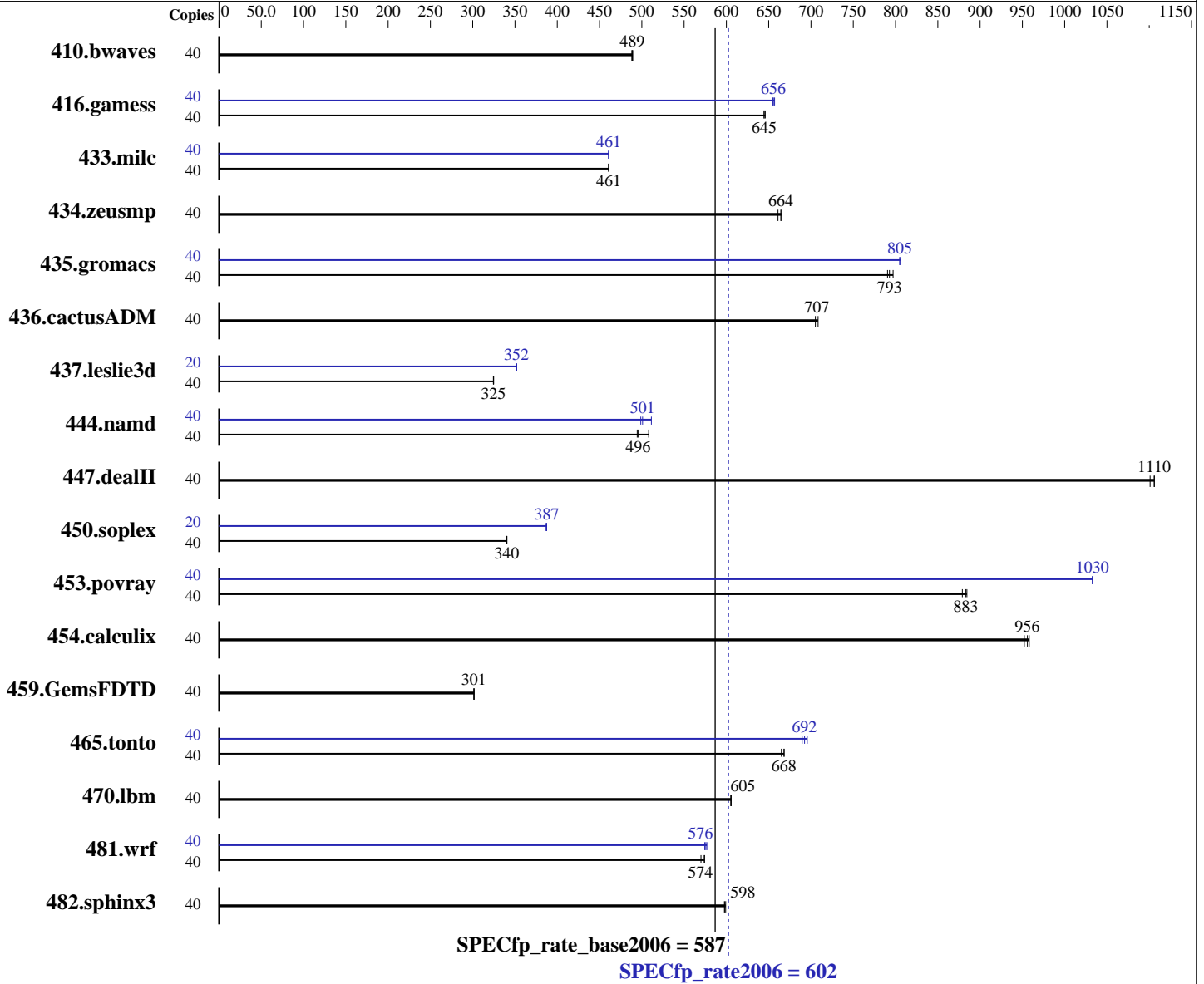
Test sponsor: IBM Corporation

Tested by: IBM Corporation

Test date: Aug-2014

Hardware Availability: Nov-2013

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2670 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2500  
 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: Red Hat Enterprise Linux Server release 6.4 (Santiago)  
 2.6.32-358.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: 128 GB (8 x 16 GB 2Rx4 PC3-14900R-13, ECC)  
Disk Subsystem: 2 x 250 GB SATA, 7200RPM, RAID 0  
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     | 1111       | 489         | 1114        | 488        | <u>1112</u> | <u>489</u> | 40     | 1111        | 489         | 1114        | 488        | <u>1112</u> | <u>489</u> |
| 416.gamess    | 40     | 1215       | 645         | <u>1215</u> | <u>645</u> | 1212        | 646        | 40     | <u>1195</u> | <u>656</u>  | 1196        | 655        | 1192        | 657        |
| 433.milc      | 40     | <u>797</u> | <u>461</u>  | 797         | 461        | 797         | 461        | 40     | 796         | 461         | 797         | 461        | <u>797</u>  | <u>461</u> |
| 434.zeusmp    | 40     | <u>548</u> | <u>664</u>  | 551         | 661        | 547         | 665        | 40     | <u>548</u>  | <u>664</u>  | 551         | 661        | 547         | 665        |
| 435.gromacs   | 40     | 358        | 797         | 361         | 791        | <u>360</u>  | <u>793</u> | 40     | 355         | 805         | 354         | 806        | <u>355</u>  | <u>805</u> |
| 436.cactusADM | 40     | 675        | 708         | <u>676</u>  | <u>707</u> | 678         | 705        | 40     | 675         | 708         | <u>676</u>  | <u>707</u> | 678         | 705        |
| 437.leslie3d  | 40     | 1159       | 324         | 1158        | 325        | <u>1159</u> | <u>325</u> | 20     | <u>534</u>  | <u>352</u>  | 534         | 352        | 535         | 351        |
| 444.namd      | 40     | 649        | 495         | 631         | 508        | <u>647</u>  | <u>496</u> | 40     | <u>640</u>  | <u>501</u>  | 627         | 511        | 643         | 499        |
| 447.dealII    | 40     | <u>414</u> | <u>1110</u> | 414         | 1110       | 416         | 1100       | 40     | <u>414</u>  | <u>1110</u> | 414         | 1110       | 416         | 1100       |
| 450.soplex    | 40     | <u>980</u> | <u>340</u>  | 980         | 340        | 981         | 340        | 20     | 431         | 387         | <u>431</u>  | <u>387</u> | 430         | 388        |
| 453.povray    | 40     | <u>241</u> | <u>883</u>  | 242         | 879        | 241         | 884        | 40     | <u>206</u>  | <u>1030</u> | 206         | 1030       | 206         | 1030       |
| 454.calculix  | 40     | 347        | 952         | <u>345</u>  | <u>956</u> | 344         | 958        | 40     | 347         | 952         | <u>345</u>  | <u>956</u> | 344         | 958        |
| 459.GemsFDTD  | 40     | 1407       | 302         | <u>1408</u> | <u>301</u> | 1408        | 301        | 40     | 1407        | 302         | <u>1408</u> | <u>301</u> | 1408        | 301        |
| 465.tonto     | 40     | <u>589</u> | <u>668</u>  | 592         | 665        | 589         | 668        | 40     | <u>568</u>  | <u>692</u>  | 571         | 690        | 566         | 696        |
| 470.lbm       | 40     | 908        | 606         | <u>908</u>  | <u>605</u> | 908         | 605        | 40     | 908         | 606         | <u>908</u>  | <u>605</u> | 908         | 605        |
| 481.wrf       | 40     | <u>779</u> | <u>574</u>  | 784         | 570        | 778         | 574        | 40     | <u>776</u>  | <u>576</u>  | 775         | 577        | 778         | 574        |
| 482.sphinx3   | 40     | 1301       | 599         | <u>1304</u> | <u>598</u> | 1308        | 596        | 40     | 1301        | 599         | <u>1304</u> | <u>598</u> | 1308        | 596        |

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"  
Zone reclaim mode enabled with:  
echo 1 > /proc/sys/vm/zone\_reclaim\_mode  
Intel Idle Driver disabled with the following Linux kernel parameter in /etc/grub.conf:  
intel\_idle.max\_cstate=0



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**SPECfp\_rate\_base2006 = 587**

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**Test date:** Aug-2014  
**Hardware Availability:** Nov-2013  
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### Platform Notes

BIOS setting:  
Operating Mode set to Maximum Performance  
Sysinfo program /home/SPECcpu-20140116-ic14.0/config/sysinfo.rev6818  
\$Rev: 6818 \$ \$Date:: 2012-07-17 #\$ e86d102572650a6e4d596a3cee98f191  
running on nx360M4 Fri Aug 22 16:13:27 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 E5-2670 v2 @ 2.50GHz
 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:        132087124 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 nx360M4 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 Aug 22 16:12
```

```
SPEC is set to: /home/SPECcpu-20140116-ic14.0
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/mapper/vg_nx360m4-lv_home
ext4            403G    13G  370G   4% /home
```

```
Additional information from dmidecode:
BIOS IBM      -[FHE107NUS-1.20]- 06/03/2014
Memory:
8x Samsung M393B2G70QH0-CMA 16 GB 1867 MHz 2 rank
```

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## 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 = "/home/SPECcpu-20140116-ic14.0/libs/32:/home/SPECcpu-20140116-ic14.0/libs/64:/home/SPECcpu-20140116-ic14.0/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.lelie3d: -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

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## Base Portability Flags (Continued)

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 (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

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## Peak Portability Flags (Continued)

```

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
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.dealII: 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-

```

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## Peak Optimization Flags (Continued)

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

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-B.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-B.xml>

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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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