



# SPEC<sup>®</sup> CFP2006 Result

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## NEC Corporation

SPECfp<sup>®</sup>\_rate2006 = 676

Express5800/R120e-2M (Intel Xeon E5-2697 v2)

SPECfp\_rate\_base2006 = 656

CPU2006 license: 9006

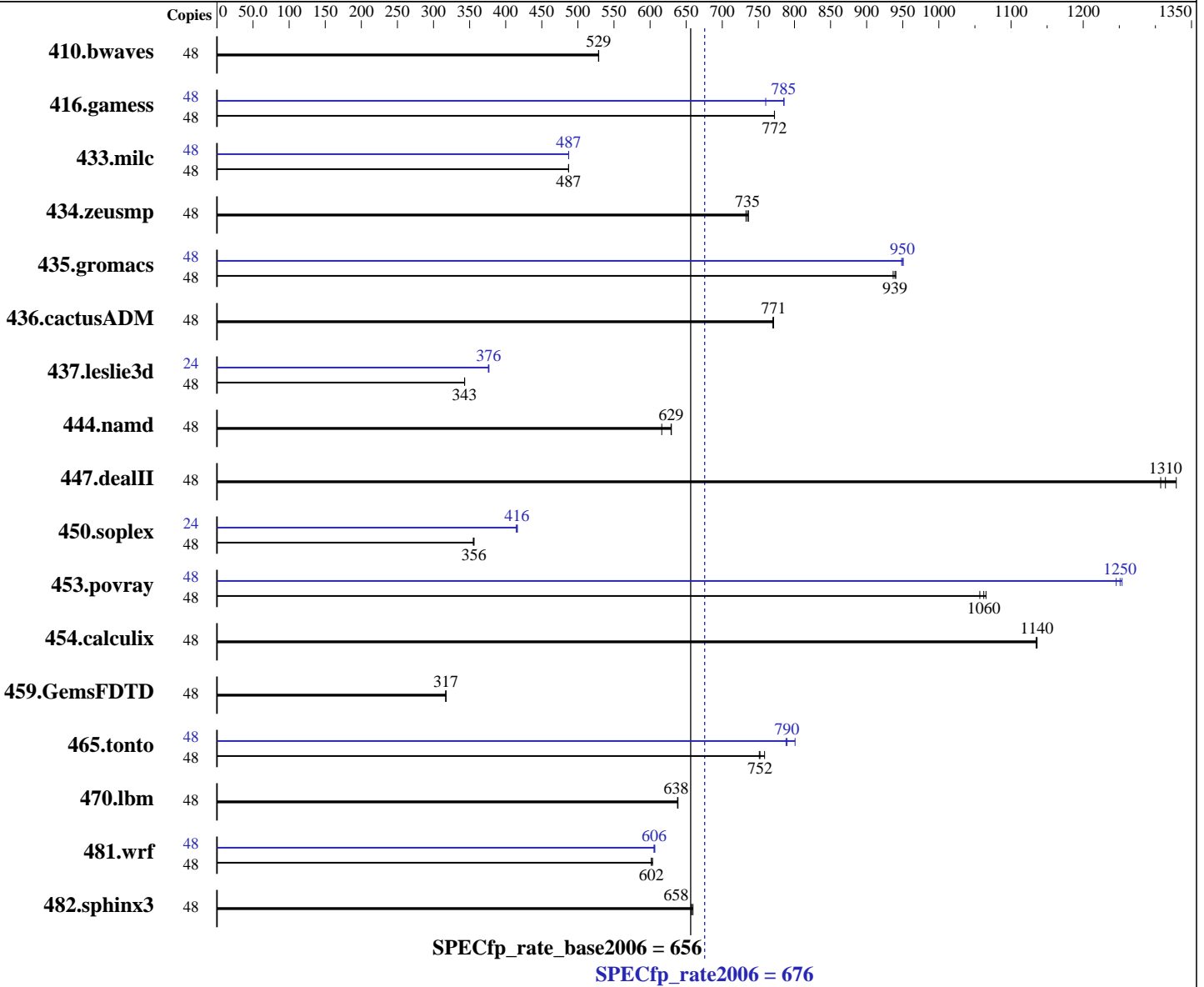
Test date: Oct-2013

Test sponsor: NEC Corporation

Hardware Availability: Sep-2013

Tested by: NEC Corporation

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2697 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.50 GHz  
 CPU MHz: 2700  
 FPU: Integrated  
 CPU(s) enabled: 24 cores, 2 chips, 12 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 6.4 (Santiago)  
 Kernel 2.6.32-358.18.1.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: 30 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 128 GB (8 x 16 GB 2Rx4 PC3-14900R-13, ECC)  
 Disk Subsystem: 1 x 250 GB SATA, 7200 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    | 48     | 1234        | 529        | <u>1234</u> | <u>529</u>  | 1233        | 529         | 48     | 1234        | 529        | <u>1234</u> | <u>529</u>  | 1233        | 529         |
| 416.gamess    | 48     | 1217        | 772        | 1217        | 772         | <u>1217</u> | <u>772</u>  | 48     | 1196        | 786        | <u>1197</u> | <u>785</u>  | 1236        | 760         |
| 433.milc      | 48     | <u>905</u>  | <u>487</u> | 904         | 487         | 905         | 487         | 48     | 905         | 487        | 904         | 487         | <u>904</u>  | <u>487</u>  |
| 434.zeusmp    | 48     | <u>594</u>  | <u>735</u> | 596         | 733         | 593         | 736         | 48     | <u>594</u>  | <u>735</u> | 596         | 733         | 593         | 736         |
| 435.gromacs   | 48     | 366         | 937        | <u>365</u>  | <u>939</u>  | 364         | 941         | 48     | 360         | 951        | <u>361</u>  | <u>950</u>  | 361         | 948         |
| 436.cactusADM | 48     | <u>744</u>  | <u>771</u> | 744         | 771         | 745         | 770         | 48     | <u>744</u>  | <u>771</u> | 744         | 771         | 745         | 770         |
| 437.leslie3d  | 48     | 1316        | 343        | <u>1315</u> | <u>343</u>  | 1315        | 343         | 24     | 599         | 377        | 600         | 376         | <u>600</u>  | <u>376</u>  |
| 444.namd      | 48     | 625         | 616        | 612         | 630         | <u>612</u>  | <u>629</u>  | 48     | 625         | 616        | 612         | 630         | <u>612</u>  | <u>629</u>  |
| 447.dealII    | 48     | 413         | 1330       | <u>418</u>  | <u>1310</u> | 420         | 1310        | 48     | 413         | 1330       | <u>418</u>  | <u>1310</u> | 420         | 1310        |
| 450.soplex    | 48     | 1124        | 356        | 1128        | 355         | <u>1125</u> | <u>356</u>  | 24     | 481         | 416        | <u>482</u>  | <u>416</u>  | 483         | 415         |
| 453.povray    | 48     | 240         | 1070       | 242         | 1060        | <u>240</u>  | <u>1060</u> | 48     | 204         | 1250       | 205         | 1250        | <u>204</u>  | <u>1250</u> |
| 454.calculix  | 48     | 349         | 1130       | 349         | 1140        | <u>349</u>  | <u>1140</u> | 48     | 349         | 1130       | 349         | 1140        | <u>349</u>  | <u>1140</u> |
| 459.GemsFDTD  | 48     | 1604        | 317        | 1607        | 317         | <u>1606</u> | <u>317</u>  | 48     | 1604        | 317        | 1607        | 317         | <u>1606</u> | <u>317</u>  |
| 465.tonto     | 48     | 629         | 751        | <u>628</u>  | <u>752</u>  | 623         | 759         | 48     | <u>598</u>  | <u>790</u> | 590         | 801         | 599         | 788         |
| 470.lbm       | 48     | <u>1033</u> | <u>638</u> | 1034        | 638         | 1033        | 639         | 48     | <u>1033</u> | <u>638</u> | 1034        | 638         | 1033        | 639         |
| 481.wrf       | 48     | 888         | 604        | <u>891</u>  | <u>602</u>  | 891         | 602         | 48     | 884         | 607        | 885         | 606         | <u>885</u>  | <u>606</u>  |
| 482.sphinx3   | 48     | 1423        | 657        | 1419        | 659         | <u>1423</u> | <u>658</u>  | 48     | 1423        | 657        | 1419        | 659         | <u>1423</u> | <u>658</u>  |

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

BIOS Settings:  
Energy Performance: Performance



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CPU2006 license: 9006

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## General Notes

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

LD\_LIBRARY\_PATH = "/home/cpu2006/libs/32:/home/cpu2006/libs/64:/home/cpu2006/sh"

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>
```

The Express5800/R120e-1M and

the Express5800/R120e-2M models are electronically equivalent.

The results have been measured on the Express5800/R120e-1M model.

## 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
```



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**Software Availability:** Sep-2013

## 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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Hardware Availability: Sep-2013

Tested by: NEC Corporation

Software Availability: Sep-2013

## 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: basepeak = yes

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-

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

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## Peak Optimization Flags (Continued)

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/NEC-Platform-Settings-V1.2-R120d-RevA.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/NEC-Platform-Settings-V1.2-R120d-RevA.xml>

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

Tested with SPEC CPU2006 v1.2.  
Report generated on Thu Jul 24 19:10:06 2014 by SPEC CPU2006 PS/PDF formatter v6932.  
Originally published on 5 November 2013.