



# SPEC® CFP2006 Result

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## NEC Corporation

SPECfp®\_rate2006 = 662

Express5800/R120e-1M (Intel Xeon E5-2695 v2)

SPECfp\_rate\_base2006 = 644

CPU2006 license: 9006

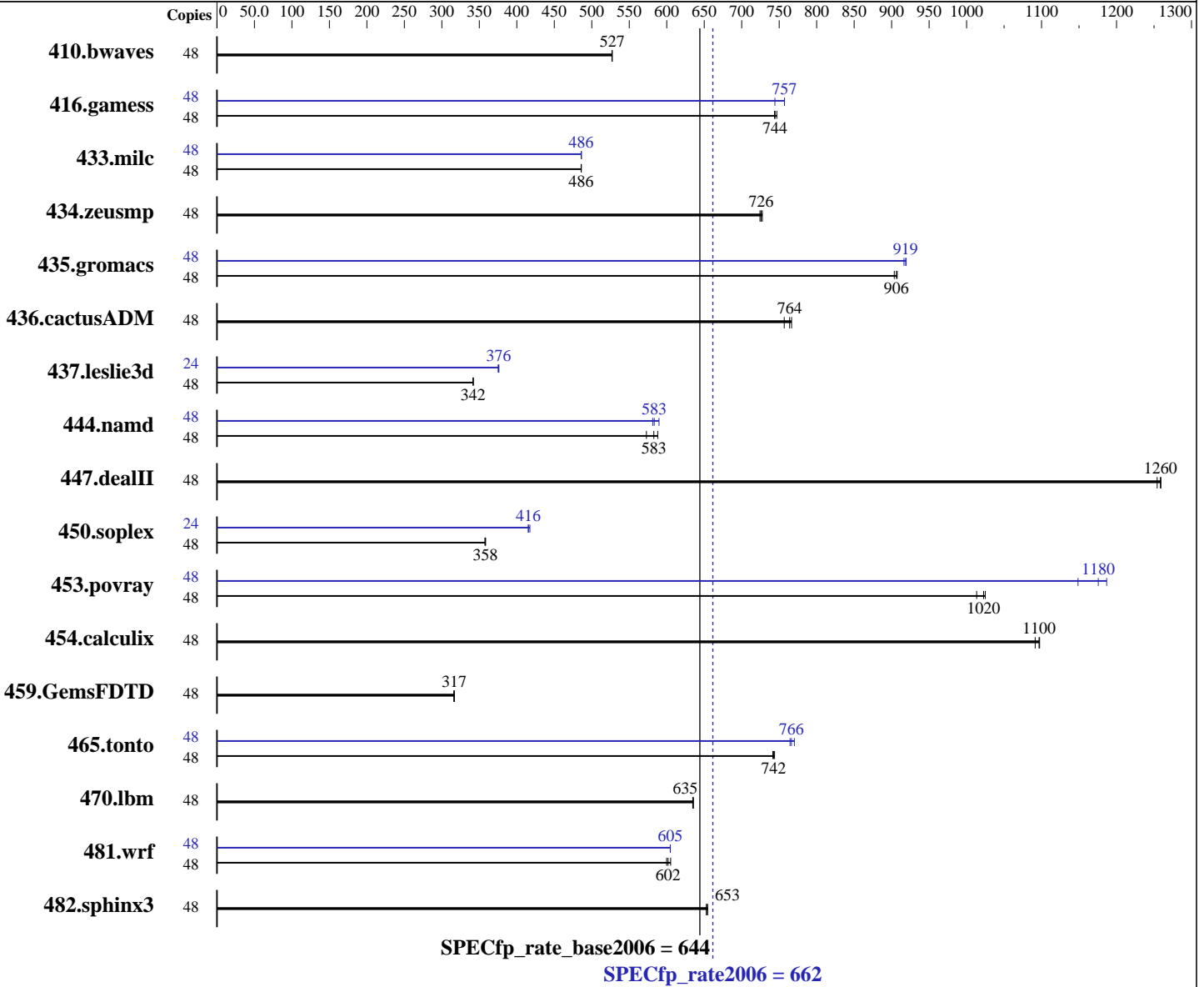
Test date: Oct-2013

Test sponsor: NEC Corporation

Hardware Availability: Sep-2013

Tested by: NEC Corporation

Software Availability: Sep-2013



### Hardware

CPU Name: Intel Xeon E5-2695 v2  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.20 GHz  
 CPU MHz: 2400  
 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     | 1238        | 527        | 1237        | 527         | <b>1237</b> | <b>527</b> | 48     | 1238        | 527         | 1237        | 527         | <b>1237</b> | <b>527</b> |
| 416.gamess    | 48     | <b>1262</b> | <b>744</b> | 1258        | 747         | 1264        | 744        | 48     | <b>1241</b> | <b>757</b>  | 1241        | 757         | 1263        | 744        |
| 433.milc      | 48     | 906         | 486        | 907         | 486         | <b>907</b>  | <b>486</b> | 48     | 906         | 486         | 907         | 486         | <b>907</b>  | <b>486</b> |
| 434.zeusmp    | 48     | 603         | 724        | <b>602</b>  | <b>726</b>  | 600         | 728        | 48     | 603         | 724         | <b>602</b>  | <b>726</b>  | 600         | 728        |
| 435.gromacs   | 48     | 379         | 904        | <b>378</b>  | <b>906</b>  | 378         | 907        | 48     | 374         | 916         | <b>373</b>  | <b>919</b>  | 373         | 919        |
| 436.cactusADM | 48     | 748         | 767        | <b>751</b>  | <b>764</b>  | 758         | 757        | 48     | 748         | 767         | <b>751</b>  | <b>764</b>  | 758         | 757        |
| 437.leslie3d  | 48     | 1319        | 342        | <b>1321</b> | <b>342</b>  | 1321        | 342        | 24     | <b>600</b>  | <b>376</b>  | 601         | 375         | 600         | 376        |
| 444.namd      | 48     | 655         | 588        | 672         | 573         | <b>661</b>  | <b>583</b> | 48     | 653         | 590         | <b>660</b>  | <b>583</b>  | 662         | 581        |
| 447.dealII    | 48     | 436         | 1260       | <b>436</b>  | <b>1260</b> | 438         | 1250       | 48     | 436         | 1260        | <b>436</b>  | <b>1260</b> | 438         | 1250       |
| 450.soplex    | 48     | 1120        | 357        | <b>1118</b> | <b>358</b>  | 1117        | 358        | 24     | 479         | 418         | 482         | 415         | <b>482</b>  | <b>416</b> |
| 453.povray    | 48     | 252         | 1010       | <b>250</b>  | <b>1020</b> | 249         | 1020       | 48     | <b>217</b>  | <b>1180</b> | 222         | 1150        | 215         | 1190       |
| 454.calculix  | 48     | 363         | 1090       | <b>361</b>  | <b>1100</b> | 361         | 1100       | 48     | 363         | 1090        | <b>361</b>  | <b>1100</b> | 361         | 1100       |
| 459.GemsFDTD  | 48     | 1612        | 316        | 1609        | 317         | <b>1609</b> | <b>317</b> | 48     | 1612        | 316         | 1609        | 317         | <b>1609</b> | <b>317</b> |
| 465.tonto     | 48     | 635         | 744        | 637         | 742         | <b>636</b>  | <b>742</b> | 48     | 618         | 764         | <b>616</b>  | <b>766</b>  | 613         | 770        |
| 470.lbm       | 48     | 1038        | 636        | 1039        | 635         | <b>1038</b> | <b>635</b> | 48     | 1038        | 636         | 1039        | 635         | <b>1038</b> | <b>635</b> |
| 481.wrf       | 48     | 886         | 605        | <b>891</b>  | <b>602</b>  | 894         | 600        | 48     | <b>887</b>  | <b>605</b>  | 887         | 605         | 887         | 605        |
| 482.sphinx3   | 48     | 1429        | 655        | <b>1432</b> | <b>653</b>  | 1433        | 653        | 48     | 1429        | 655         | <b>1432</b> | <b>653</b>  | 1433        | 653        |

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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**SPECfp\_rate\_base2006 = 644**

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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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## 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: -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/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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