



# SPEC<sup>®</sup> CFP2006 Result

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## NEC Corporation

SPECfp<sup>®</sup>\_rate2006 = 370

Express5800/R120f-2M (Intel Xeon E5-2660 v3)

SPECfp\_rate\_base2006 = 360

CPU2006 license: 9006

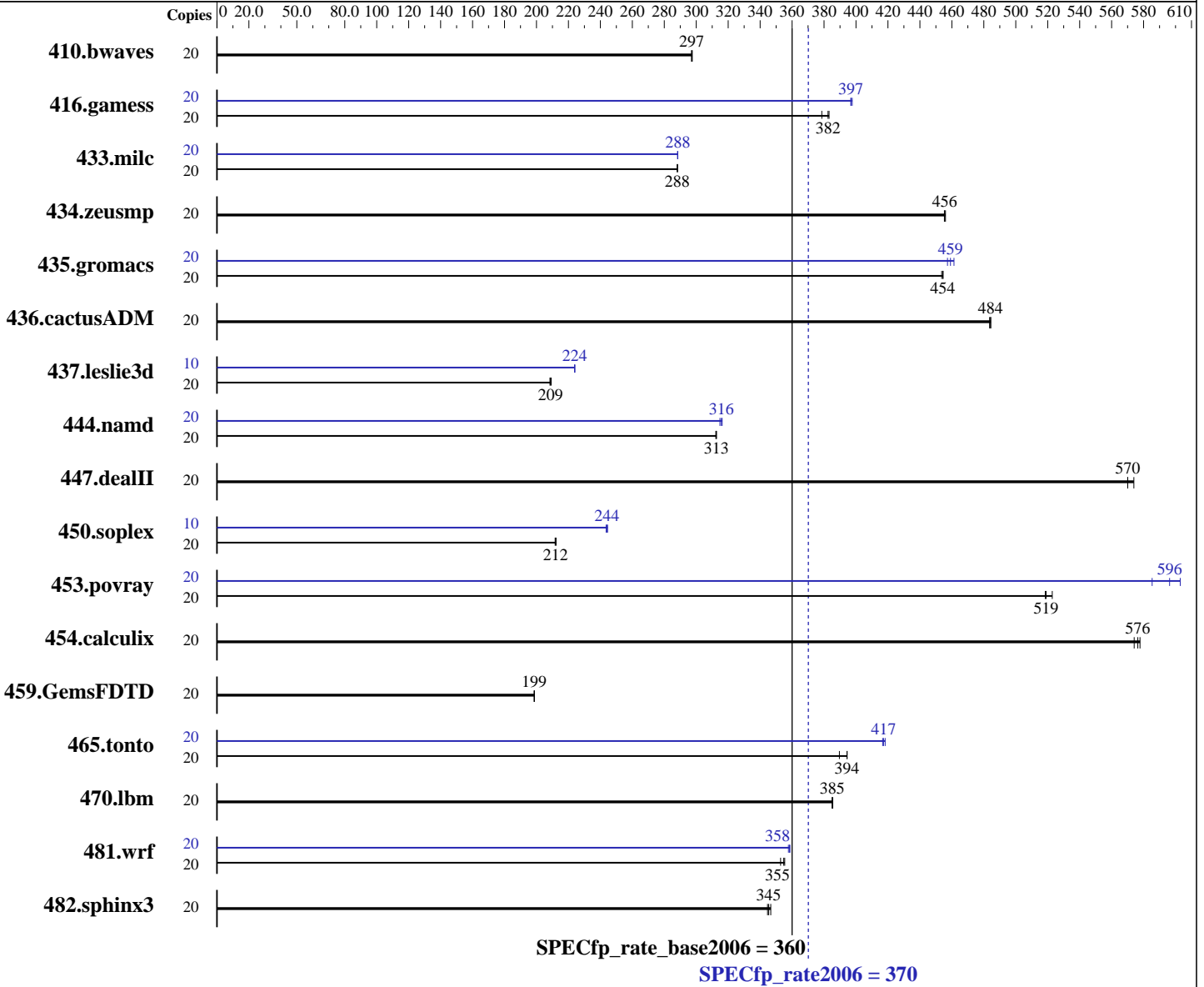
Test date: Oct-2014

Test sponsor: NEC Corporation

Hardware Availability: Feb-2015

Tested by: NEC Corporation

Software Availability: Jul-2014



### Hardware

CPU Name: Intel Xeon E5-2660 v3  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.30 GHz  
 CPU MHz: 2600  
 FPU: Integrated  
 CPU(s) enabled: 10 cores, 1 chip, 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)  
 Kernel 2.6.32-431.17.1.el6.x86\_64  
 Compiler: C/C++: Version 15.0.0.090 of Intel C++ Studio XE for Linux;  
 Fortran: Version 15.0.0.090 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 PC4-2133P-R)  
 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    | 20     | <u>915</u>  | <u>297</u> | 915         | 297        | 914        | 298        | 20     | <u>915</u>  | <u>297</u> | 915         | 297        | 914        | 298        |
| 416.gamess    | 20     | <u>1024</u> | <u>382</u> | 1022        | 383        | 1034       | 379        | 20     | 987         | 397        | <u>987</u>  | <u>397</u> | 985        | 398        |
| 433.milc      | 20     | 637         | 288        | 637         | 288        | <u>637</u> | <u>288</u> | 20     | 637         | 288        | <u>637</u>  | <u>288</u> | 637        | 288        |
| 434.zeusmp    | 20     | 400         | 455        | <u>400</u>  | <u>456</u> | 399        | 456        | 20     | 400         | 455        | <u>400</u>  | <u>456</u> | 399        | 456        |
| 435.gromacs   | 20     | 314         | 454        | 315         | 454        | <u>314</u> | <u>454</u> | 20     | 312         | 457        | <u>311</u>  | <u>459</u> | 310        | 461        |
| 436.cactusADM | 20     | 493         | 484        | <u>494</u>  | <u>484</u> | 494        | 484        | 20     | 493         | 484        | <u>494</u>  | <u>484</u> | 494        | 484        |
| 437.leslie3d  | 20     | 902         | 208        | 899         | 209        | <u>900</u> | <u>209</u> | 10     | <u>420</u>  | <u>224</u> | 420         | 224        | 420        | 224        |
| 444.namd      | 20     | <u>513</u>  | <u>313</u> | 513         | 313        | 514        | 312        | 20     | <u>508</u>  | <u>316</u> | 507         | 316        | 509        | 315        |
| 447.dealII    | 20     | 399         | 574        | <u>401</u>  | <u>570</u> | 401        | 570        | 20     | 399         | 574        | <u>401</u>  | <u>570</u> | 401        | 570        |
| 450.soplex    | 20     | 786         | 212        | 788         | 212        | <u>787</u> | <u>212</u> | 10     | 341         | 245        | <u>342</u>  | <u>244</u> | 342        | 244        |
| 453.povray    | 20     | <u>205</u>  | <u>519</u> | 204         | 523        | 205        | 518        | 20     | <u>178</u>  | <u>596</u> | 182         | 585        | 176        | 603        |
| 454.calculix  | 20     | <u>286</u>  | <u>576</u> | 287         | 574        | 286        | 578        | 20     | <u>286</u>  | <u>576</u> | 287         | 574        | 286        | 578        |
| 459.GemsFDTD  | 20     | 1068        | 199        | <u>1068</u> | <u>199</u> | 1068       | 199        | 20     | 1068        | 199        | <u>1068</u> | <u>199</u> | 1068       | 199        |
| 465.tonto     | 20     | <u>499</u>  | <u>394</u> | 505         | 390        | 499        | 394        | 20     | <u>472</u>  | <u>417</u> | 471         | 418        | 472        | 417        |
| 470.lbm       | 20     | <u>714</u>  | <u>385</u> | 714         | 385        | 713        | 385        | 20     | <u>714</u>  | <u>385</u> | 714         | 385        | 713        | 385        |
| 481.wrf       | 20     | <u>630</u>  | <u>355</u> | 629         | 355        | 633        | 353        | 20     | 625         | 358        | 623         | 359        | <u>623</u> | <u>358</u> |
| 482.sphinx3   | 20     | <u>1129</u> | <u>345</u> | 1124        | 347        | 1131       | 345        | 20     | <u>1129</u> | <u>345</u> | 1124        | 347        | 1131       | 345        |

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:  
Power Management Policy: Custom  
Energy Performance: Performance

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## Platform Notes (Continued)

Patrol Scrub: Disabled  
Demand Scrub: Disabled

## 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"

The Express5800/R120f-1M (Intel Xeon E5-2660 v3) and the Express5800/R120f-2M (Intel Xeon E5-2660 v3) models are electronically equivalent. The results have been measured on the Express5800/R120f-2M (Intel Xeon E5-2660 v3) model.

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
```

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## Base Portability Flags (Continued)

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

## Base Optimization Flags

C benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
 -ansi-alias -opt-mem-layout-trans=3

C++ benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32  
 -ansi-alias -opt-mem-layout-trans=3

Fortran benchmarks:

-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

Benchmarks using both Fortran and C:

-xCORE-AVX2 -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

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Software Availability: Jul-2014

## Peak Portability Flags (Continued)

```

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
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: -xCORE-AVX2(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: -xCORE-AVX2(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: -xCORE-AVX2(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: -xCORE-AVX2(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

```

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## Peak Optimization Flags (Continued)

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(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: -xCORE-AVX2(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: -xCORE-AVX2 -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-V1.2-120f-RevB.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-V1.2-120f-RevB.xml>



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

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