# SPEC® CFP2006 Result

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## NEC Corporation

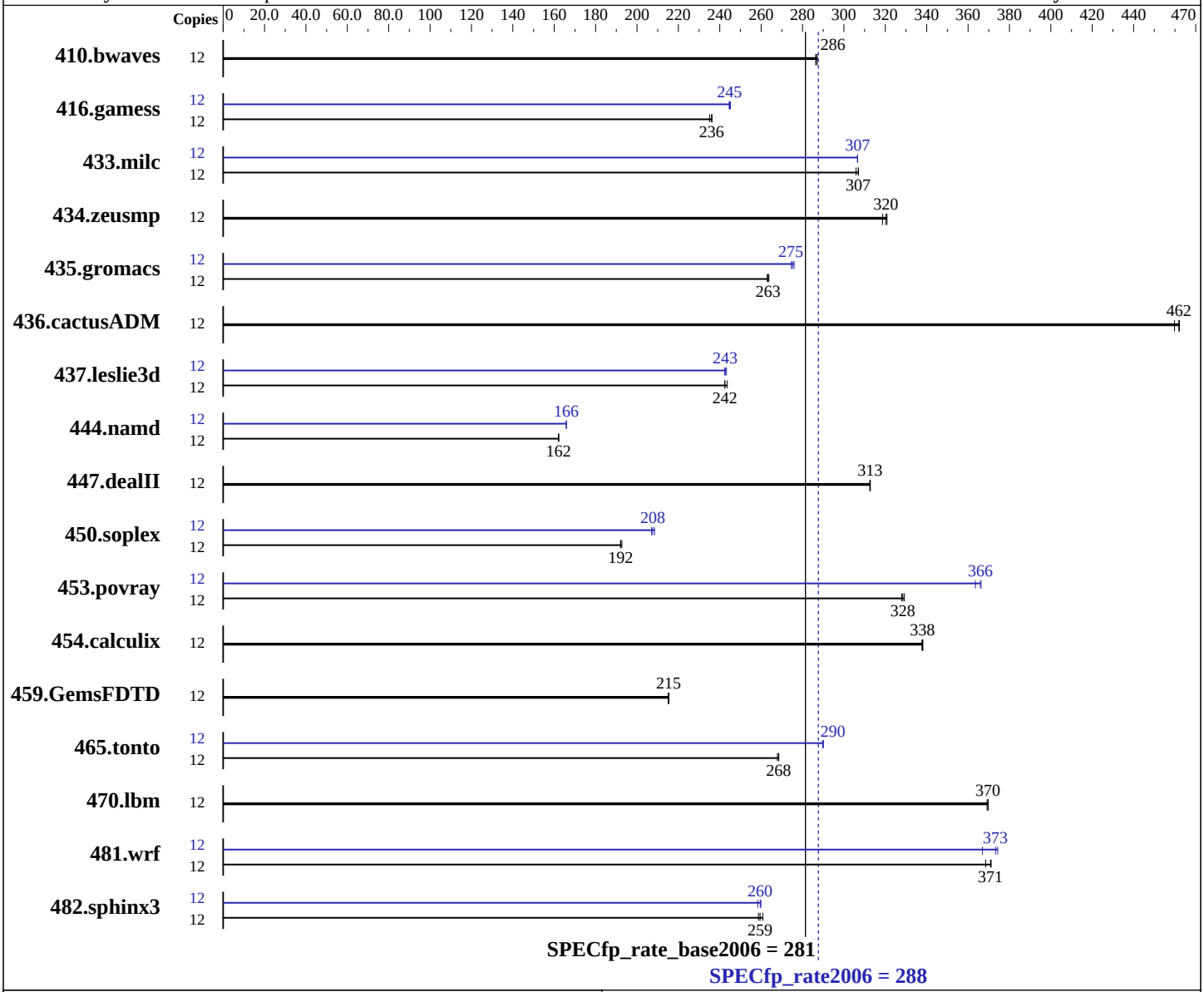
Express5800/R120f-2M (Intel Xeon E5-2603 v3)

SPECfp®_rate2006 = 288

SPECfp_rate_base2006 = 281

**CPU2006 license:** 9006
**Test sponsor:** NEC Corporation
**Tested by:** NEC Corporation

**Test date:** Feb-2015
**Hardware Availability:** Feb-2015
**Software Availability:** Jul-2014




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2603 v3 |
| CPU Characteristics: | |
| CPU MHz: | 1600 |
| FPU: | Integrated |
| CPU(s) enabled: | 12 cores, 2 chips, 6 cores/chip |
| 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)<br>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;<br>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: 15 MB I+D on chip per chip
Other Cache: None
Memory: 256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 MHz)
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 | 12 | 568 | 287 | **569** | **286** | 569 | 286 | 12 | 568 | 287 | **569** | **286** | 569 | 286 |
| 416.gamess | 12 | **996** | **236** | 999 | 235 | 995 | 236 | 12 | 958 | 245 | 961 | 245 | **960** | **245** |
| 433.milc | 12 | 359 | 307 | 360 | 306 | **359** | **307** | 12 | 359 | 307 | 359 | 307 | **359** | **307** |
| 434.zeusmp | 12 | 340 | 321 | **341** | **320** | 343 | 319 | 12 | 340 | 321 | **341** | **320** | 343 | 319 |
| 435.gromacs | 12 | 325 | 264 | **325** | **263** | 326 | 263 | 12 | **311** | **275** | 312 | 275 | 311 | 276 |
| 436.cactusADM | 12 | 310 | 462 | 312 | 460 | **310** | **462** | 12 | 310 | 462 | 312 | 460 | **310** | **462** |
| 437.leslie3d | 12 | 463 | 244 | 465 | 242 | **465** | **242** | 12 | 464 | 243 | **465** | **243** | 465 | 242 |
| 444.namd | 12 | 594 | 162 | 593 | 162 | **594** | **162** | 12 | 580 | 166 | **580** | **166** | 580 | 166 |
| 447.dealII | 12 | 439 | 312 | 439 | 313 | **439** | **313** | 12 | 439 | 312 | 439 | 313 | **439** | **313** |
| 450.soplex | 12 | **521** | **192** | 521 | 192 | 519 | 193 | 12 | 483 | 207 | **482** | **208** | 480 | 208 |
| 453.povray | 12 | 194 | 329 | **194** | **328** | 195 | 328 | 12 | **174** | **366** | 174 | 366 | 176 | 364 |
| 454.calculix | 12 | 293 | 338 | **293** | **338** | 293 | 338 | 12 | 293 | 338 | **293** | **338** | 293 | 338 |
| 459.GemsFDTD | 12 | 592 | 215 | **591** | **215** | 591 | 215 | 12 | 592 | 215 | **591** | **215** | 591 | 215 |
| 465.tonto | 12 | 441 | 268 | **440** | **268** | 440 | 269 | 12 | 408 | 290 | 407 | 290 | **407** | **290** |
| 470.lbm | 12 | 446 | 370 | 447 | 369 | **446** | **370** | 12 | 446 | 370 | 447 | 369 | **446** | **370** |
| 481.wrf | 12 | 364 | 369 | 361 | 371 | **361** | **371** | 12 | **359** | **373** | 358 | 374 | 365 | 367 |
| 482.sphinx3 | 12 | 897 | 261 | 904 | 259 | **901** | **259** | 12 | 900 | 260 | **901** | **260** | 905 | 258 |

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
```

## 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 E5-2603 v3) and
 the Express5800/R120f-2M (Intel Xeon E5-2603 v3) models are electronically equivalent.
 The results have been measured on the Express5800/R120f-2M (Intel Xeon E5-2603 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
    454.calculix: -DSPEC_CPU_LP64 -nofor_main
```

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## Base Portability Flags (Continued)

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 (except as noted below):
icc -m64

482.sphinx3: icc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

C++ benchmarks (except as noted below):
icpc -m64

450.soplex: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

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
465.tonto: -DSPEC_CPU_LP64
470.lbm: -DSPEC_CPU_LP64
481.wrf: -DSPEC_CPU_LP64 -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

## 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: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-mem-layout-trans=3
-unroll2

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-ic15.0-official-linux64.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-ic15.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-120f-RevB.xml

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Tested with SPEC CPU2006 v1.2.
Report generated on Tue Mar 10 16:02:24 2015 by SPEC CPU2006 PS/PDF formatter v6932.
Originally published on 10 March 2015.