# SPEC® CFP2006 Result

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## NEC Corporation

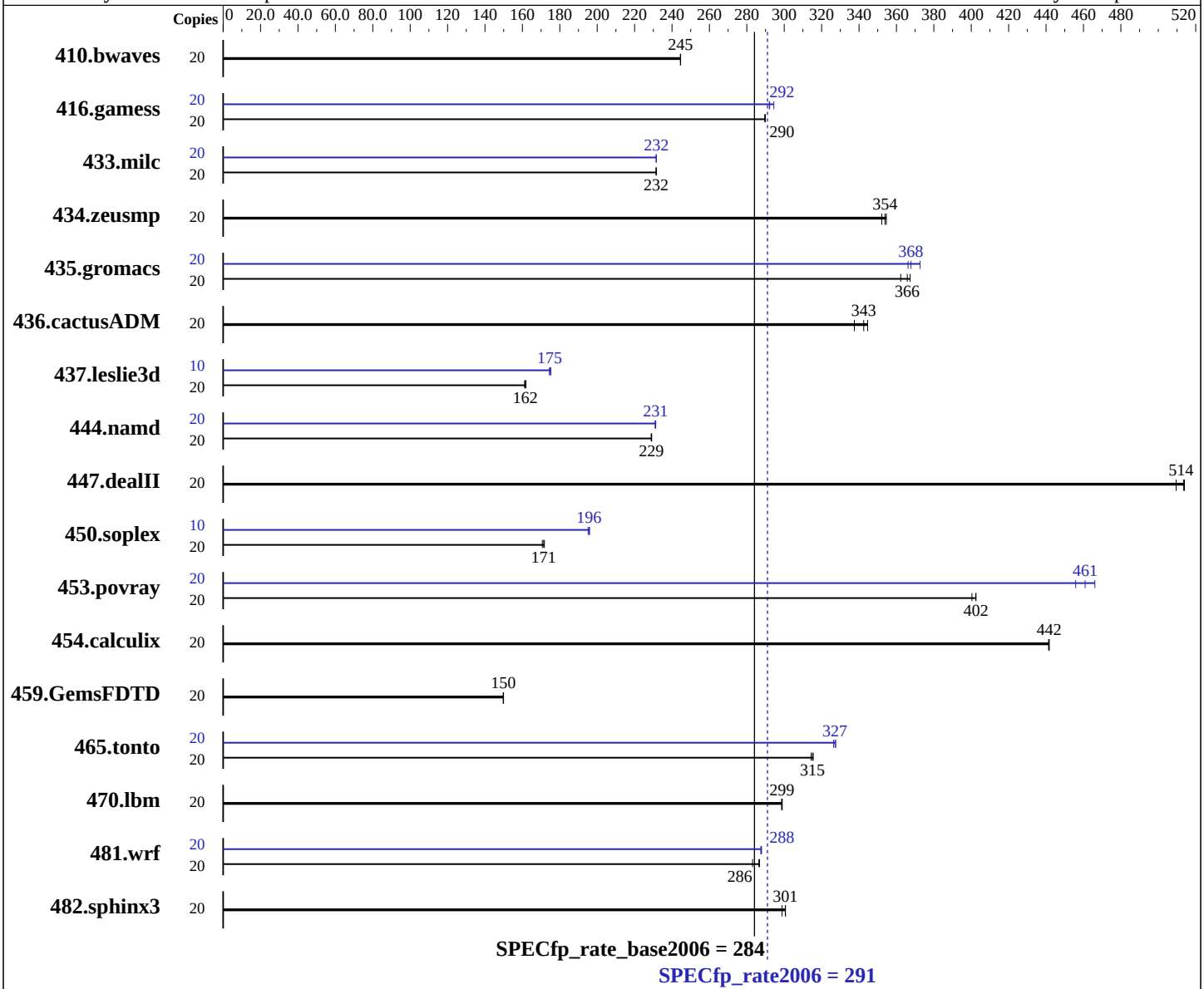
Express5800/R120e-2M (Intel Xeon E5-2660 v2)

SPECfp®_rate2006 = 291

SPECfp_rate_base2006 = 284

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

**Test date:** Nov-2013
**Hardware Availability:** Sep-2013
**Software Availability:** Sep-2013




## Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2660 v2 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.00 GHz |
| CPU MHz: | 2200 |
| 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 6.4 (Santiago)<br>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;<br>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: 64 GB (4 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 | 20 | 1111 | 245 | 1112 | 244 | **1111** | **245** | 20 | 1111 | 245 | 1112 | 244 | **1111** | **245** |
| 416.gamess | 20 | 1351 | 290 | 1352 | 290 | **1351** | **290** | 20 | **1340** | **292** | 1341 | 292 | 1330 | 294 |
| 433.milc | 20 | **793** | **232** | 793 | 232 | 793 | 232 | 20 | 793 | 232 | **793** | **232** | 793 | 231 |
| 434.zeusmp | 20 | **514** | **354** | 513 | 355 | 517 | 352 | 20 | **514** | **354** | 513 | 355 | 517 | 352 |
| 435.gromacs | 20 | **390** | **366** | 389 | 367 | 394 | 362 | 20 | 390 | 366 | **388** | **368** | 383 | 373 |
| 436.cactusADM | 20 | 694 | 345 | 708 | 338 | **698** | **343** | 20 | 694 | 345 | 708 | 338 | **698** | **343** |
| 437.leslie3d | 20 | **1164** | **162** | 1161 | 162 | 1167 | 161 | 10 | **538** | **175** | 539 | 174 | 536 | 175 |
| 444.namd | 20 | 701 | 229 | **701** | **229** | 700 | 229 | 20 | 695 | 231 | 693 | 231 | **694** | **231** |
| 447.dealII | 20 | 445 | 514 | **446** | **514** | 449 | 510 | 20 | 445 | 514 | **446** | **514** | 449 | 510 |
| 450.soplex | 20 | **973** | **171** | 977 | 171 | 971 | 172 | 10 | **426** | **196** | 426 | 196 | 427 | 195 |
| 453.povray | 20 | 266 | 400 | **264** | **402** | 264 | 402 | 20 | 228 | 466 | **231** | **461** | 233 | 456 |
| 454.calculix | 20 | 374 | 441 | 374 | 442 | **374** | **442** | 20 | 374 | 441 | 374 | 442 | **374** | **442** |
| 459.GemsFDTD | 20 | 1415 | 150 | **1416** | **150** | 1417 | 150 | 20 | 1415 | 150 | **1416** | **150** | 1417 | 150 |
| 465.tonto | 20 | **625** | **315** | 624 | 316 | 626 | 314 | 20 | **602** | **327** | 601 | 328 | 603 | 326 |
| 470.lbm | 20 | 920 | 299 | 919 | 299 | **920** | **299** | 20 | 920 | 299 | 919 | 299 | **920** | **299** |
| 481.wrf | 20 | **780** | **286** | 779 | 287 | 789 | 283 | 20 | **777** | **288** | 777 | 287 | 776 | 288 |
| 482.sphinx3 | 20 | 1304 | 299 | 1296 | 301 | **1297** | **301** | 20 | 1304 | 299 | 1296 | 301 | **1297** | **301** |

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
```

## 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-2M 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
```

## 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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## 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.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

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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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