# SPEC® CFP2006 Result

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## NEC Corporation

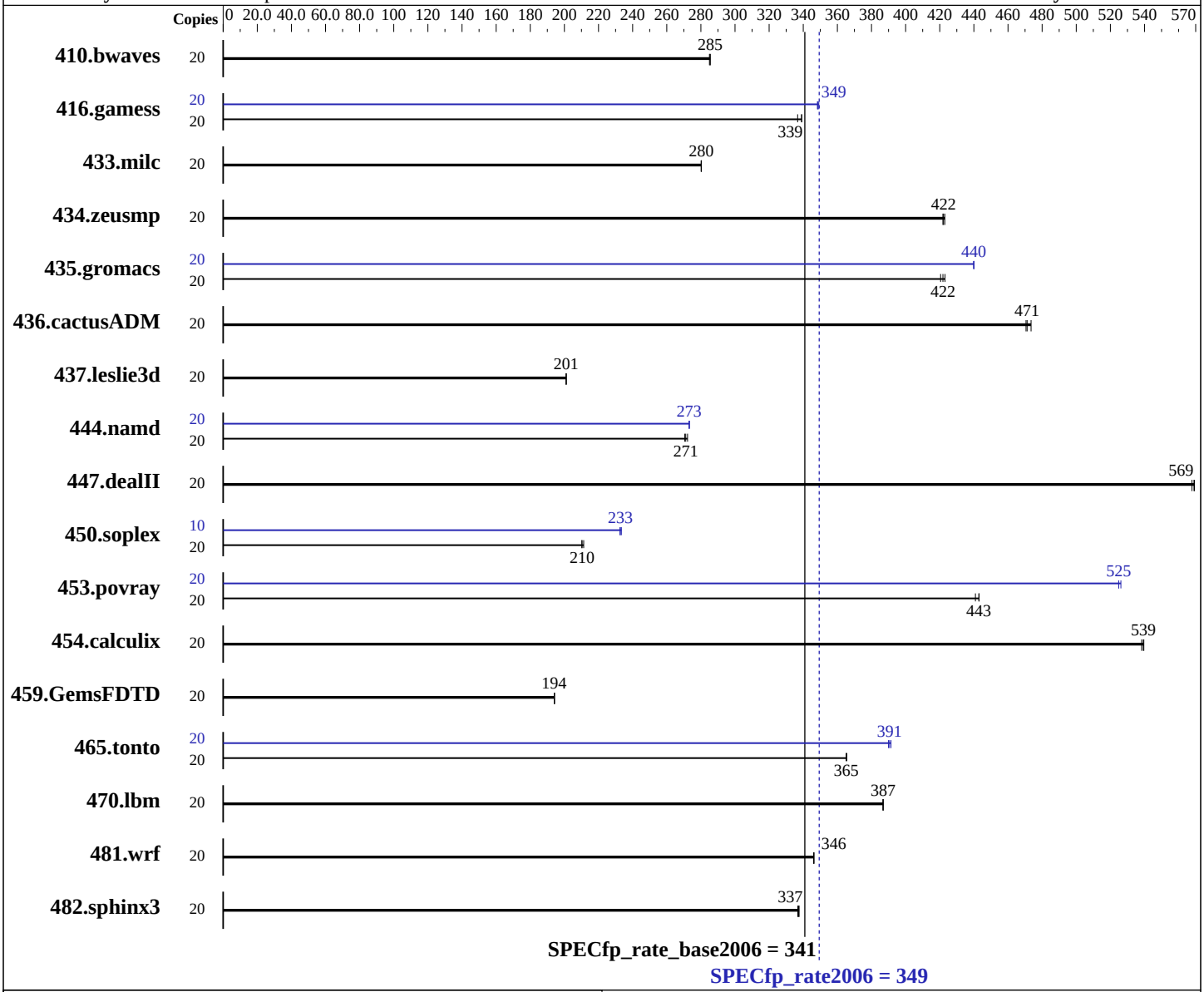
Express5800/R120g-2E (Intel Xeon E5-2630 v4)

SPECfp®_rate2006 = 349

SPECfp_rate_base2006 = 341

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

**Test date:** Feb-2016
**Hardware Availability:** Apr-2016
**Software Availability:** Jan-2016




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon E5-2630 v4 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 3.10 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 7.2 (Maipo)<br>Kernel 3.10.0-327.4.5.el7.x86_64 |
| Compiler: | C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux;<br>Fortran: Version 16.0.0.101 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 PC4-2400T-R, running at 2133 MHz)
Disk Subsystem: 1 x 1 TB 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 | **952** | **285** | 952 | 285 | 954 | 285 | 20 | **952** | **285** | 952 | 285 | 954 | 285 |
| 416.gamess | 20 | 1155 | 339 | 1163 | 337 | **1155** | **339** | 20 | **1124** | **349** | 1124 | 348 | 1122 | 349 |
| 433.milc | 20 | 655 | 280 | **655** | **280** | 655 | 280 | 20 | 655 | 280 | **655** | **280** | 655 | 280 |
| 434.zeusmp | 20 | **431** | **422** | 430 | 423 | 431 | 422 | 20 | **431** | **422** | 430 | 423 | 431 | 422 |
| 435.gromacs | 20 | 340 | 421 | **338** | **422** | 338 | 423 | 20 | 325 | 440 | 324 | 440 | **325** | **440** |
| 436.cactusADM | 20 | 508 | 471 | 505 | 474 | **507** | **471** | 20 | 508 | 471 | 505 | 474 | **507** | **471** |
| 437.leslie3d | 20 | 935 | 201 | **935** | **201** | 935 | 201 | 20 | 935 | 201 | **935** | **201** | 935 | 201 |
| 444.namd | 20 | 589 | 272 | 593 | 271 | **592** | **271** | 20 | **587** | **273** | 587 | 273 | 587 | 273 |
| 447.dealII | 20 | 403 | 568 | **402** | **569** | 402 | 569 | 20 | 403 | 568 | **402** | **569** | 402 | 569 |
| 450.soplex | 20 | 789 | 211 | 793 | 210 | **793** | **210** | 10 | 357 | 233 | **358** | **233** | 359 | 233 |
| 453.povray | 20 | 241 | 441 | **240** | **443** | 240 | 443 | 20 | 203 | 525 | **203** | **525** | 202 | 526 |
| 454.calculix | 20 | 306 | 540 | 307 | 538 | **306** | **539** | 20 | 306 | 540 | 307 | 538 | **306** | **539** |
| 459.GemsFDTD | 20 | 1094 | 194 | 1092 | 194 | **1093** | **194** | 20 | 1094 | 194 | 1092 | 194 | **1093** | **194** |
| 465.tonto | 20 | **539** | **365** | 539 | 365 | 538 | 366 | 20 | **504** | **391** | 503 | 391 | 505 | 390 |
| 470.lbm | 20 | 711 | 387 | 710 | 387 | **710** | **387** | 20 | 711 | 387 | 710 | 387 | **710** | **387** |
| 481.wrf | 20 | 645 | 346 | **645** | **346** | 645 | 346 | 20 | 645 | 346 | **645** | **346** | 645 | 346 |
| 482.sphinx3 | 20 | **1156** | **337** | 1157 | 337 | 1155 | 338 | 20 | **1156** | **337** | 1157 | 337 | 1155 | 338 |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

```
The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset 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
```

Continued on next page

## 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"

 Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
 memory using RedHat EL 7.1
 Transparent Huge Pages enabled with:
 echo always > /sys/kernel/mm/transparent_hugepage/enabled
```

# 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:
```
-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 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin`

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`
450.soplex: `-D_FILE_OFFSET_BITS=64`
453.povray: `-DSPEC_CPU_LP64`
454.calculix: `-DSPEC_CPU_LP64 -nofor_main`

Continued on next page

## Peak 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

## Peak Optimization Flags

C benchmarks:

433.milc: basepeak = yes

470.lbm: basepeak = yes

482.sphinx3: basepeak = yes

C++ benchmarks:

444.namd: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -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:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -opt-malloc-options=3

453.povray: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -opt-mem-layout-trans=3(pass 2)
-prof-use(pass 2) -unroll4 -ansi-alias

Fortran benchmarks:

410.bwaves: basepeak = yes

416.gamess: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
-par-num-threads=1(pass 1) -prof-use(pass 2) -unroll2
-inline-level=0 -scalar-rep-

434.zeusmp: basepeak = yes

437.leslie3d: basepeak = yes

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## Peak Optimization Flags (Continued)

459.GemsFDTD: basepeak = yes

465.tonto: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -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:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -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: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-120g-RevB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/NEC-Platform-Settings-V1.2-120g-RevB.xml


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